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BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

IN THE MATTER OF THE COMPLAINT AGAINST DYOCORE, INC. BROUGHT BY ENERGY COMMISSION STAFF	DOCKET NO.: 11-CAI-03 DATED: OCTOBER 4, 2011

ENERGY COMMISSION STAFF'S PREHEARING CONFERENCE STATEMENT

The Renewables Committee ("Committee") assigned to hear this matter issued a Notice of Prehearing Conference on September 21, 2011. In it, the Committee ordered the parties to submit a Prehearing Conference Statement by noon on October 4, 2011. Energy Commission Staff's ("Staff") responses to the questions posed by the Committee follow.

Response to Question 5(a)*: *Whether or not data submitted by DyoCore was false.

I. The Data Submitted to KEMA, Inc. by DyoCore, Inc. is False

A. The One-Year of Operational Data is False

The one-year of operational data submitted by DyoCore for the purpose of having the DyoCore SolAir wind turbine ("DyoCore turbine") listed as eligible for use in the Emerging Renewables Program ("ERP") is false for at least three reasons.

First, as explained in the complaint filed by staff against DyoCore, Inc. ("DyoCore") on July 26, 2011 ("Complaint"), and shown by the report prepared by KEMA, Inc. ("KEMA") that evaluates DyoCore's performance claims, and that is attached to the Complaint as Exhibit D ("KEMA Report"), (the Complaint is Exhibit 1 of Complainant's exhibits) the one-year of operational data that DyoCore identified as having been obtained from an installation in Hampshire, Illinois is inconsistent with the power curve data submitted by DyoCore. The one-year of operational data from the Hampshire, Illinois location shows an annual average wind speed of 15.3 miles-per-hour ("mph") and annual energy production of 2,554 kilowatt hours ("kWh"). Using the power curve data submitted and the same annual average wind speed of 15.3 mph, the KEMA Report calculated that the annual energy production would be 9,513 kWh. Thus, it is impossible to reconcile the one-year of operational data from the Hampshire, Illinois location and the power curve data submitted by DyoCore, and therefore, at least one of these data sets must be incorrect or false.

Second, and also as explained in the Complaint and the KEMA Report, the claimed annual energy production of 2,554 kWh, and the annual energy production as calculated by KEMA using the submitted power curve of 9,513 kWh, grossly exceed the performance of an optimal, state-of-the-art, utility scale turbine rotor with the same diameter as the rotor on the DyoCore turbine. As submitted by DyoCore for listing as eligible for use in the ERP, the rotor diameter of the DyoCore turbine is 1.2 meters, or approximately 47 inches. *See* April 9, 2010 email from David Raine, attached as Exhibit 24. The KEMA Report calculated that an optimal state-of-the-art, utility scale turbine rotor with the same diameter results in annual energy production of 1,643 kWh. Therefore, the KEMA Report concluded that DyoCore's claimed performance "is not possible" because the annual energy production calculated using the submitted power curve of 9,513 kWh exceeds the performance of an optimal, state-of-the-art, utility scale turbine rotor by 9.0 times.

Third, DyoCore submitted the same monthly kWh production data to KEMA, the exact same numbers, for two installed small wind systems that use the DyoCore turbine and which are located in areas with significantly varied wind resources. On February 15, 2010, DyoCore submitted one-year of operational data in tabular form for an installation in San Marcos, California ("San Marcos Table"). *See* February 15, 2011 email from Rick Berry, attached as Exhibit 8.[1] The first column of the San Marcos Table identifies kWh production from the wind turbine for 17 consecutive months, from September of 2008 through January of 2010.[2] The average wind speed identified in the San Marcos Table during the testing period was 6.6 mph.[3] However, the Emerging Renewables Program Final Guidebook ("ERP Guidebook") requires that manufacturers who elect to submit one-year of operational data for the purpose of having their small wind turbine listed as eligible for use under the ERP must provide data from a site with average annual wind speeds of at least 12 mph.[4] Thus, KEMA rejected the data from

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[1] Email from Rick Berry, DyoCore to Pete Baumstark, PE, Energy Engineer, KEMA, February 15, 2010, 11:50 a.m.. Notably, the February 15, 2010 email from Mr. Berry does not identify the data as having been measured at the San Marcos location. However, *see* email from Rick Berry, DyoCore to Daria Mashnik, Energy Engineer, KEMA, May 26, 2010 (the same data set appears and is identified as having been measured at the San Marcos location in an attached document entitled "SolAir – IEC standard 61400-12-1," March 1, 2010, Table 1, at page 4 (unnumbered), (referred to below as the "DyoCore Testing Report")). As of October 4, 2011, a modified version of the DyoCore Testing Report appeared on DyoCore's website, *available at* http://www.dyocore.com/material/IEC_Standard_61400-SolAir.pdf (although also dated March 1, 2010, the updated version of the DyoCore Testing Report on DyoCore's website is two pages longer than the version submitted to KEMA and includes two additional sections, "SolAir – Ginlong Grid Tie Electrical Diagram," and "Sound Testing") (referred to as "DyoCore Testing Report – Later Version" below).

[2] As two small solar panels are affixed to the DyoCore turbine, the one-year of operational data submitted by DyoCore also includes a column for kWh production from solar.

[3] Email from Pete Baumstark, PE, Energy Engineer, KEMA to David Raine, CTO, DyoCore, February 16, 2010, 8:46 a.m.

[4] Emerging Renewables Program Final Guidebook, Tenth Edition, California Energy Commission, April 2010, p.49, available at http://www.energy.ca.gov/2010publications/CEC-300-2010-003/CEC-300-2010-003-F.PDF (referred to below as "ERP Guidebook") ("Manufacturers of small wind systems must provide monthly data of average energy produced (kWh) and average wind speed for one consecutive year for each model of system they wish to be considered eligible for this program to demonstrate reliable operation of that model of equipment at a site with average annual wind speeds of at least 12 mph.").

the San Marcos, California installation on this basis.[5]

DyoCore then submitted data for an installation in Hampshire, Illinois to KEMA ("Hampshire Table"), stating "[a] little less sun but a lot more wind!" *See* February 16, 2010 from David Raine, attached as Exhibit 12.[6] The numbers provided in the Hampshire Table for kWh production attributable to solar and the identified maximum and average wind speeds are different than the numbers provided in these categories in the San Marcos Table.[7] As indicated by DyoCore, less kWh production attributable to solar is reported in the Hampshire Table and the maximum and average wind speeds are higher.[8] Similar to the format of the San Marcos Table, the first column of the Hampshire Table identifies kWh production from the wind turbine for 14 consecutive months, from January of 2009 through February of 2010.[9] However, the numbers identified in the first column of the Hampshire Table are the exact same numbers for kWh production identified in the San Marcos Table for the initial 14 months that are listed.[10] For example, the San Marcos Table identifies kWh production for January of 2009 as "94.00400394," and the Hampshire Table identifies kWh production for May of 2009 as "94.00400394."

Using a valid testing methodology, it would be impossible to measure the exact same kWh production at two different installations that are located in areas with significantly varied wind resources. The substantial variance in wind speed at the two sites would necessarily yield different kWh production. The maximum and average wind speeds indentified in the San Marcos Table for January of 2009 are 18.4 mph and 5.8 mph, respectively. By contrast, the maximum and average wind speeds identified in the Hampshire Table for May of 2009 are 56.1 mph and 16.7 mph, respectively. Thus, the San Marcos Table identifies significantly lower wind speeds for January of 2009, as compared to the wind speeds identified in the Hampshire Table for May of 2009. Accordingly, the kWh production identified in the San Marcos Table for January of 2009 should be significantly lower than the kWh production identified in the Hampshire Table for May of 2009. However, as noted, the kWh production identified in the San Marcos Table for January of 2009 is identical to the kWh production identified in the Hampshire Table for May of 2009. These measurements could not have been obtained using a valid testing methodology at two different locations with significantly varied wind speeds, and therefore, it appears, the numbers provided were simply duplicated.

Moreover, the wind speeds identified in the Hampshire Table for February, March and April of 2009 may have been falsified. The Hampshire Table, as submitted via

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[5] Email from Pete Baumstark, PE, Energy Engineer, KEMA to David Raine, CTO, DyoCore, February 16, 2010, 8:46 a.m.
[6] Email from David Raine, CTO, DyoCore to Pete Baumstark, PE, Energy Engineer, KEMA, February 16, 2010, 3:04 p.m.
[7] *Id*.
[8] *Id*.
[9] *Id*.
[10] *See* DyoCore Testing Report, *supra* note 2, at pages 4-5 (unnumbered) (presenting the San Marcos Table and Hampshire Table and including the duplication of purported measurements for kWh production, all as identified above).

email to KEMA on February 16, 2010, neither provides maximum nor average wind speeds for these three months.[11] Instead, the Hampshire Table, as submitted on February 16, 2010, states "N" in the columns for maximum and average wind speeds for these months, presumably indicating "Not Available."[12] It appears that an anemometer had not been installed at the Hampshire location during this period.[13] Yet, on May 26, 2010 DyoCore submitted the DyoCore Testing Report to KEMA which, as noted, includes the one-year of operational data from the Hampshire installation.[14] However, the Hampshire Table that appears in the DyoCore Testing Report identifies maximum and average wind speeds for the months of February, March, and April of 2009.[15] Given that wind speed information for the Hampshire installation for these months was not available on February 16, 2010, and presumably, did not exist because it had not been measured, it appears that this information may have been falsified in the DyoCore Testing Report.

B. The Power Curve Data is False

Similarly, the power curve data submitted by DyoCore for the purpose of having the DyoCore turbine listed as eligible for use in the ERP is false for at least two reasons.

First, the power curve data submitted by DyoCore for the purpose of having the DyoCore turbine listed as eligible for use in the ERP is theoretically impossible. As explained in the Complaint, the KEMA Report analyzes the power curve data submitted by DyoCore on June 1, 2010 in support of a rated output of 1.6 kW at 18 mph winds[16] by applying the Betz Limit theory. The Betz Limit theory posits that a wind turbine can capture no more than 59.3 percent of the kinetic energy in wind, which is calculated in relation to the diameter of its rotor. The KEMA Report concludes that if the DyoCore turbine, which has a rotor that is 1.2 meters, or approximately 47 inches in diameter, had an actual rated output of 1.6 kW at 18 mph winds, it would represent a machine that could extract 7.5 times more energy from wind than is thought possible under the Betz Limit theory.

Further, the 1.6 kW rating at 18 mph represents an output of "more than four times the energy in the wind at the speed."[17] *See* DyoCore and Why the Rating of Small Turbines Remains a Black Art, attached as Exhibit 79. As stated by renewable energy industry analyst Paul Gipe, "[f]orget the Betz Limit, there is simply not the energy

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[11] Email from David Raine, CTO, DyoCore to Pete Baumstark, PE, Energy Engineer, KEMA, February 16, 2010, 3:04 p.m.
[12] *Id*.
[13] Email from Pete Baumstark, PE, Energy Engineer, KEMA to Daria Mashnik, Energy Engineer, KEMA, February 17, 2010 (describing the omitted wind speed information as follows: "They've given me 12 months of output data, but only had their anemometer installed for 10 of those months.").
[14] Email from Rick Berry, DyoCore to Daria Mashnik, Energy Engineer, KEMA, May 26, 2010.
[15] *Id*.
[16] Email from David Raine, CTO, DyoCore to Daria Mashnik, Energy Engineer, KEMA, June 1, 2010, 8:21 a.m.
[17] DyoCore and Why the Rating of Small Turbines Remains a Black Art, Paul Gipe, September 23, 2011, available at http://www.wind-works.org/SmallTurbines/DyoCoreandWhytheRatingofSmallTurbinesRemainsaBlackArt.html.

in the wind to do what DyoCore says its turbine will do."[18]

Second, and also as explained in the Complaint and the KEMA Report, the submitted power curve data exceeds the maximum power output of an optimal, state-of-the art, utility scale turbine by 9.0 times. As explained in the KEMA Report, a state-of-the-art, utility scale turbine may be able to achieve power coefficient values, or Cp values, of .49, meaning that such a turbine may be able to capture 49 percent of the kinetic energy available in wind at a certain wind speed. DyoCore's claimed output of 1.6 kW at 18 mph winds equates to a Cp value of 4.43, which is approximately 9 times greater than the .49 Cp value that may be attainable by a state-of-the-art, utility scale turbine.

C. DyoCore's Admits that the Data Submitted to KEMA was False

i. Although DyoCore Actively Sought to have the DyoCore Turbine Listed with a Rated Output of 1.6 kW at 18 mph winds, DyoCore has Subsequently Conceded that the Turbine Cannot Produce 1.6 kW at that Wind Speed

1. DyoCore Actively Sought a Rated Output of 1.6 kW at 18 mph winds

As explained in more detail below in Section II(C)(ii), between April and June of 2010 DyoCore actively sought to modify the listing for the DyoCore turbine that appears on the List of Eligible Small Wind Turbines on the ERP website by claiming in email correspondence with KEMA that the rated output for the DyoCore turbine was actually 1.6 kW at 18 mph winds, not .8 kW at 12 mph winds as the turbine had originally been listed.[19] The final email from David Raine in this chain of correspondence included DyoCore's submission of power curve data in tabular form that showed 1.589 kW output at 18 mph winds. *See* June 1, 2010 Email from David Raine, attached as Exhibit 41. The subject of the email is "RE: power curve output data for SolAir – 1.6 kW." In the body of the email, Mr. Raine describes the submitted data as follows:

> Here's is [sic] actual data tested at specific wind speeds.[20]

This is the power curve data that KEMA relied upon in accepting the claimed higher rated output of 1.6 kW at 18 mph winds for the DyoCore turbine. Significantly, DyoCore acknowledges that the ERP listing of the DyoCore turbine is entirely based upon the data it submitted.

> The listing at 1.6 kW at 18 mph came off the Power Curve

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[18] *Id*.

[19] Email from David Raine, CTO, DyoCore to Daria Mashnik, Energy Engineer, KEMA, April 9, 2010 ("AT 18 mph [] our output is 1.6 kW. This should be the posted data or applied output.").

[20] Email from David Raine, CTO, DyoCore to Daria Mashnik, Energy Engineer, KEMA, June 1, 2010, 8:21 a.m.

> calculations that KEMA reviewed from the wind and power data that DyoCore submitted.[21]

As stated in the Complaint, KEMA accepted this power curve data and consequently aggregated the turbines to be added to the List of Eligible Small Wind Turbines on the ERP website for the month of June, including the DyoCore turbine at a rated output of 1.6 kW at 18 mph winds, and forwarded the information to Commission staff who promptly updated the list on June 2, 2010.[22]

2. DyoCore Subsequently Conceded that the DyoCore Turbine Cannot Produce 1.6 kW at 18 mph winds

Through a series of admissions, DyoCore has conceded that the DyoCore turbine cannot produce 1.6 kW at 18 mph winds, and thus, DyoCore admits that its representations to KEMA regarding the performance of the turbine, and the data submitted in support of the manufacturer's performance claims, are false.

As stated in the Complaint, on April 11, 2011, DyoCore posted a revised power curve for the DyoCore turbine on its website. *See* Revised Power Curve, attached as Exhibit E to the Complaint, which is Exhibit 1 of Complainant's exhibits. Mr. Raine posted the revised power curve on the manufacturer's blog, stating:

> This is the most accurate reference to estimated power production based on wind conditions. Though this does not account for gusts or rapid changes it can provide a basis for your production expectations at specific constant wind speeds:

Significantly, DyoCore's revised power curve reflects a rated output of less than .25 kW at 18 mph winds.

Further, in DyoCore's Response to the Complaint, dated August 8, 2011 ("DyoCore's Response"), the manufacturer expressly concedes that the claimed rated output for the DyoCore turbine of 1.6 kW at 18 mph winds is incorrect, stating:

> In real-time winds of 18 mph the production is approximately 212 watts [.212 kW] . . . .[23]

Moreover, in DyoCore's Response to the Amendment of the Complaint, dated September 13, 2011, DyoCore asserts:

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[21] DyoCore Response to Complaint of California Energy Commission, page 2 (unnumbered) (emphasis added), August 8, 2011, *available at* http://www.energy.ca.gov/renewables/emerging_renewables/11-cai-03/documents/2011-08-09_DyoCore_Response_to_Compliant_and_Request_for-Informal_Hearing_TN-62001.pdf, (referred to below as "DyoCore Response")

[22] List of Eligible Small Wind Turbines on the ERP website, California Energy Commission, *available at* http://www.consumerenergycenter.org/cgi-bin/eligible_smallwind.cgi.

[23] DyoCore Response, *supra* note 21, at page 5.

> DyoCore's SolAir will produce 1.6 kW in real wind speeds at approximately 38 mph.[24]

The power curve data that was submitted to KEMA by Mr. Raine on June 1, 2010 was identified by him as "actual data tested at specific wind speeds" and shows 1.589 kW output at 18 mph winds. As stated by DyoCore, this data was relied upon by KEMA in accepting a higher rated output of 1.6 kW at 18 mph winds for the DyoCore turbine. Between June 1, 2010 and the filing of the Complaint on July 26, 2011, DyoCore never submitted any revised power curve data to the Energy Commission or KEMA to correct the rated output of the DyoCore turbine, as it appears on the List of Eligible Small Wind Turbines on the ERP website, *i.e.*, 1.6 kW at 18 mph winds. Thus, whether the data submitted by DyoCore on June 1, 2010 is false, and thus, invalid is the pivotal question in this complaint proceeding. By admitting that the DyoCore turbine will only produce "approximately 212 watts [.212 kW]" at 18 mph winds and that it can only generate 1.6 kW at 38 mph winds, DyoCore concedes that the claimed performance of 1.6 kW at 18 mph, and the data submitted in support of that rated output, are incorrect, or false. The DyoCore turbine should be immediately delisted from use in the ERP on this basis alone.

ii. Although DyoCore Claims it Neither Understood How to Create Nor How to Apply a Power Curve When it Submitted Data to KEMA, Statements Made by the Manufacturer Suggest Otherwise

1. DyoCore Claims it Neither Understood How to Create Nor How to Apply a Power Curve When it Submitted Data to KEMA

In DyoCore's Response, Mr. Raine, the manufacturer's Chief Technology Officer, states that when DyoCore submitted data to KEMA for the purpose of having the DyoCore turbine listed as eligible for use in the ERP, neither DyoCore nor "its representatives" understood: (1) how a power curve is used to establish the rated output of a turbine; and, (2) how to test a small wind turbine to obtain a valid power curve:

> We have a general idea of what a power curve is but are still not certain as to how it was intended to apply to the listing, something we were ignorant of when we initiated the process with the CEC and KEMA.[25]
> [At the time of submission of data to KEMA] DyoCore had never submitted its product to a power curve and had no formal knowledge base or education that would qualify

[24] DyoCore, Inc. Response to Amendment of Complaint against DyoCore, Inc., page 2 (unnumbered), September 13, 2011, *available at* http://www.energy.ca.gov/renewables/emerging_renewables/11-cai-03/documents/2011-09-13_DyoCore_Inc_Response_to_Amendment_of_Complaint_TN-62211.pdf (referred to below as "DyoCore Response to Amendment of Complaint").
[25] DyoCore Response, *supra* note 20, at page 2 (unnumbered).

> DyoCore or its representatives to formulate a power curve.[26]

Assuming that these statements are true, DyoCore has demonstrated reckless disregard for the accuracy of the performance claims it made regarding the DyoCore turbine and the data submitted to KEMA in support of the claimed rated output of 1.6 kW at 18 mph winds. If no one at DyoCore understood basic concepts regarding the creation and application of power curves for small wind turbines, the manufacturer should have retained a consultant with relevant expertise. In fact, DyoCore states in its response that the manufacturer eventually sought out such technical assistance. Unfortunately, however, for all affected parties, DyoCore apparently engaged in these consultations *after* their submission of power curve data to KEMA. Specifically, DyoCore stated:

> Over the past year DyoCore has corresponded with several professionals within the industry that have aided DyoCore in reassessing of its raw data. Consequently DyoCore has created a wind to production power curve for direct real time indicated winds. DyoCore has maintained an updated record of this power curve work on its website.[27]

Again, assuming that these statements are true, it appears that if DyoCore had worked with qualified consultants *before* it submitted power curve data to KEMA, and not made false representations regarding the rated output of the DyoCore turbine, neither the Energy Commission, DyoCore, its distributors, or its customers would be in this difficult situation.

2. Statements by DyoCore Suggest Experience With Power Curve Testing Prior to Submission of Data to KEMA

DyoCore's statements in this complaint proceeding regarding the manufacturer's purported lack of experience with power curve testing during the relevant time period, between March and June of 2010, are directly contradicted by email correspondence between the manufacturer and KEMA, and the manufacturer and its distributors. In May of 2010, a consultant from KEMA contacted DyoCore in response to the manufacturer's request to modify the ERP listing for the DyoCore turbine.[28] In the email, the KEMA consultant posits, "[a]s your product is advertised as SolAir 800 W Hybrid Wind Solar Generator on your website, your watts output of 800 Watts makes sense."[29] Mr. Raine responds as follows:

> The name [800] for our product came from an initial prototype test about 3 years ago. It had no reference to power performance, power curve or rating. *At the time we*

[26] *Id*. at page 6 (unnumbered).
[27] *Id*. at page 2 (unnumbered).
[28] Email from Daria Mashnik, Energy Engineer, KEMA to David Raine, CTO, DyoCore, May 26, 2010.
[29] *Id.*

> *[did not] even know what a power curve was unfortunately*. . . . ¶ *However, since that point we have had a lot of formal testing done* including a few years collecting operational data. Below are our *formal* power curve and annual production data:[30]

(Emphasis added). By contrast, as noted, in this complaint proceeding DyoCore has stated that at the time of submission of data to KEMA, "DyoCore had never submitted its product to a power curve."[31] Suffice it to say, both of these statements cannot be true.

Further, it appears that DyoCore was not only actively working with outside consultants to obtain a more accurate power curve for the DyoCore turbine in July of 2010, one month *after* the DyoCore turbine had been listed on the ERP website with a rated output of 1.6 kW at 18 mph winds, but that the request to modify the ERP listing may have been the result of such consultations. *See* email from David Raine to distributor list, July 10, 2010, attached as Exhibit 77 (emphasis added).

> Good news is *we are more confident now than before that our turbines produce significant power* but unfortunately through the conversion of modern inverters the efficiency in transferring that power is very low, very similar to Solar panels at the moment. . . .
>
> We have a solid lower level power curve but it's very basic and can still be improved upon. We have tested it and it works great up to about 100v from the turbine. *Anything greater is right now a guessing game.* We're getting our product to two of these companies we're working with that both indicate with confidence they have a solution and both are able to get the higher curve testing done at their facilities within the next week or so.
>
> *About our power curve work*:
>
> We identified when meeting with one of the engineering companies that we were not effectively doing our Amp/power testing. *We made some corrections and immediately doubled our previous power output results* – this still was not the best setup and left room for improvement. We will be doing some field tests this coming week that should give us some *better accuracy for actual power curve testing* and wind speed vs RPM. . . .

[30] Email from David Raine, CTO, DyoCore to Daria Mashnik, Energy Engineer, KEMA, May 26, 2010.
[31] DyoCore Response, *supra* note 20, at page 2 (unnumbered).

> This has been a very dynamic learning curve for us and the engineers we've been working with. . . .

(Emphasis added). Significantly, this email states that DyoCore was working with "engineering companies" when the manufacturer recognized that "we were not effectively doing our Amp/power testing. . . . [and consequently] made some corrections and immediately doubled our previous power output results." The referenced doubling of power output appears to correlate to DyoCore's request to modify the ERP listing for the DyoCore turbine by increasing the rated output from .8 kW at 12 mph to 1.6kW at 18 mph.

DyoCore's contradictory statements suggest that although it had experience with power curve testing during the relevant time period, between March and June of 2010, it nevertheless submitted theoretically impossible data regarding the output of the DyoCore turbine to KEMA.

iii. DyoCore Admits it Made a Mistake by Submitting False Data to KEMA

In DyoCore's Response, the manufacturer assumes responsibility for submitting false data to KEMA, stating,

> DyoCore, *upon realizing it had made a mistake in the information that it presented to KEMA* attempted to remedy and mitigate any harm it caused by publishing *more accurate data* on its public web site. . . . Admittedly, in hindsight DyoCore could have done some things better, but *an attempt at correcting a mistake* is not evidence of fraud, it is evidence of good faith and transparency and should not be used to condemn DyoCore.[32]

Despite DyoCore's "attempt at correcting a mistake" by posting a revised power curve for the DyoCore turbine on the company's website on April 11, 2011, DyoCore never informed the Energy Commission at any time prior to the filing of the Complaint on July 26, 2011 that DyoCore had, in fact, submitted data to KEMA that grossly overstated the turbine's generating capacity. Consequently, between April 11, 2011 and July 26, 2011 the Energy Commission paid 15 rebates for such systems based upon the rated output as listed on the ERP website of 1.6 kW at 18 mph winds, totaling $294,045.33. Similarly, during this period distributors continued to install small wind systems that used the DyoCore turbine, which presumably entailed purchasing equipment from DyoCore.

It is important to emphasize that the difference between the claimed rated output of 1.6 kW at 18 mph winds and the power curve posted by DyoCore on April 11, 2011, that showed output of .25 kW at 18 mph winds, is not a negligible discrepancy. Under

[32] *Id*. (emphasis added).

the ERP Guidebook in effect prior to the suspension of the program, rebates for small wind turbines were based on the generating capacity of the turbine and paid at $3.00/watt for systems up to 10 kW. Thus, based upon the claimed rated output of 1.6 kW at 18 mph winds, rebate payments of $4,800 were paid for each installed DyoCore turbine. Given this rebate amount, small wind systems using the DyoCore turbine were essentially free to end-use consumers. By comparison, had the rebate amounts been calculated by reference to the output shown in DyoCore's revised power curve of .25 kW at 18 mph winds, the rebate payments would have been $750 per turbine. Inevitably such a down grading of the rated output of the DyoCore turbine, and corresponding reduction in rebate amount, would have significantly impacted the turbine's marketability.

As explained above, the evidence shows that DyoCore submitted false data to KEMA regarding the claimed output of the DyoCore turbine. DyoCore's further actions, as described in this section, show that DyoCore knew that the data submitted to KEMA was false, at least as of April 11, 2011, yet never informed the Energy Commission. If DyoCore had genuinely sought to "remedy and mitigate any harm it caused" through its submission of false data to KEMA, it would have directly informed the Energy Commission and its distributors and customers that it had made a "mistake" when it learned that the DyoCore turbine could not generate 1.6 kW at 18 mph winds. Instead, DyoCore continued to reap the benefits of the higher rebate amount based on the data it had submitted to KEMA that it knew was incorrect, or false.

Response to Question 5(b)*: *KEMA's role with respect to review of data submitted by DyoCore prior to suspension of the ERP.

II. KEMA's Review of Data Submitted by DyoCore Prior to the ERP Suspension

A. Applicable Contract and Program Requirements

i. The KEMA Contract and Work Authorization Nos. 10 and 13

Under the prime contract between the Energy Commission and KEMA, Commission Agreement No. 400-07-030 ("KEMA Contract"), KEMA is charged with providing technical assistance to the Energy Commission in support of its Renewable Energy Program ("REP") and specific responsibilities related to the California Renewables Portfolio Standard ("RPS"). Task 5 of the KEMA Contract pertains to the Energy Commission's Renewable Rebate Programs, and specifically includes the ERP. Under the KEMA Contract, KEMA is assigned to provide technical assistance for the ERP through the work authorization process.

Work Authorization No. 10, effective dates September 21, 2009 through March 31, 2010, identifies the technical assistance to be provided by KEMA for the ERP. Under Work Authorization No. 10, KEMA is responsible for providing technical assistance in the following areas: "(1) review and provide feedback on draft guidebook

language, (2) respond to requests for additions to the eligible equipment lists per certification requirements in the program guidebooks, (3) evaluating new technology requests for determining eligibility under the ERP requirements, and (4) providing updates to the eligible equipment lists to be posted on the Energy Commission's REP websites."

Significantly, Work Authorization No. 10 includes Task 1, titled "Equipment Certification and Power Output Ratings," that tasks KEMA with responding to requests for additions to the equipment eligibility lists of three rebate programs: the ERP, the New Solar Home Partnership ("NSHP"), and the California Solar Initiative ("CSI"). Specifically, Sub Task 1.1, titled "ERP," provides:

> [KEMA] will provide ongoing support by responding to requests for additions to the ERP's current equipment eligibility lists including: obtaining information from industry representatives; developing/updating a comprehensive list of inverters, *wind turbines*, fuel cells and meters, that meet the certification requirements of the current ERP guidebook, Appendix 3. For each inverter, the list will include efficiency rating, continuous rated AC power, and other physical and electrical parameters as determined by the standardized test protocol adopted by the Energy Commission. New information will be obtained from the manufacturers as available. [KEMA] will modify the list based on the updated information received and will submit it electronically to the Energy Commission Project Manager not less than monthly. Staff will have these updated lists posted to the state's Go Solar California website for use by manufacturers, retailers and customers.

(Emphasis added).

Work Authorization No. 10 also includes Task 2, titled "Review of New Technology Requests." By its express terms, Task 2 only applies to products "that are *not* standard non-concentrating photovoltaic modules, meters/metering providers, inverters, fuel cells or *wind turbines*." (Emphasis added). Assuming that such a product satisfies the requirements for eligibility under the applicable guidebook, and upon approval by the Energy Commission project manager, under Task 2 KEMA may be directed to "evaluate the technical merits of the proposal."

The responsibilities assigned to KEMA under Work Authorization No. 10 were subsequently assigned to KEMA under Work Authorization No. 13. Thus, Work Authorization No. 13 incorporates the scope of work from Work Authorization No. 10, including Sub Task 1.1 and Task 2. Work Authorization No. 13 was initially effective from May 17, 2010 through August 31, 2010. However, the covered period was extended to April 30, 2012 through a series of three amendments. Notably, none of

these amendments altered the scope of work.

Work Authorization No. 13 was amended yet again on May 25, 2011 to include, among other things, Sub Task 1.3, titled "Technical Evaluation of Equipment Performance," that provides:

> At the direction of the Energy Commission Project Manager, [KEMA] will conduct a technical evaluation of the data and/or information provided to KEMA and/or the Energy Commission for the purposes of adding specific equipment to the Energy Commission's list of eligible equipment under the ERP . . . . The Energy Commission Project Manager will identify specific data and/or information for [KEMA] to evaluate. The evaluations should seek to determine whether the data and/or information submitted to KEMA and/or the Energy Commission for specific equipment by equipment manufacturers and/or retailers support the claims of performance, power output, capacity, and/or operational characteristics made by the manufacturers and/or retailers for the specific equipment.

Thus, the express purpose of the May 25, 2011 amendment is to assign KEMA the responsibility to conduct technical evaluations, as directed by Energy Commission staff, of the data or information provided to KEMA or the Energy Commission for the purpose of adding specific equipment to the Energy Commission's list of eligible equipment under the ERP. The chronology in the instant case demonstrates that Energy Commission staff and KEMA viewed the May 25, 2011 amendment as necessary in order to assign KEMA the responsibility to conduct a technical evaluation of the data and information submitted by DyoCore for the DyoCore turbine to determine whether DyoCore's claimed rated output of 1.6kW at 18 mph winds is physically possible for a turbine with a rotor diameter of 1.2 meters, or approximately 47 inches, under the Betz limit theory ("Betz limit theory check"). Energy Commission staff tasked KEMA with conducting a technical evaluation of the data and information submitted by DyoCore, that included the Betz limit theory check, after the May 25, 2011 amendment. If the Energy Commission and KEMA had understood that KEMA could be directed to conduct such a technical evaluation by Energy Commission staff prior to the May 25, 2011 amendment, then there would have been no reason to execute the amendment.

Therefore, it is clear that from September 21, 2009 through May 24, 2011, KEMA was responsible for responding to requests for additions to the ERP's list of current eligible equipment under Sub Task 1.1 of Work Authorization Nos. 10 and 13. As noted, Sub Task 1.1 directs KEMA to obtain, or aggregate, product information from manufacturers for the purpose of adding specific equipment to the ERP's list of eligible equipment. Further, it is equally clear that Task 2 excludes "wind turbines" from the operable definition of new technology, and therefore, is not applicable here. Finally, Sub Task 1.3, added via amendment on May 25, 2011, assigns KEMA the responsibility

to "conduct a technical evaluation of the data and/or information provided" by manufacturers, as directed by Energy Commission staff, for the purpose of adding specific equipment to the ERP's list of eligible equipment. The addition of Sub Task 1.3 shows that KEMA was NOT tasked with conducting technical evaluations of data or information submitted for the purpose of adding equipment to the ERP's list of eligible equipment prior to the May 25, 2011 amendment, and thus, KEMA was not responsible for conducting such technical evaluations during the relevant time period in the instant case, *i.e.*, between February and June of 2010.

ii. Requirements and Process for Listing Small Wind Systems as Eligible for Use in the ERP

As stated in the Complaint, the rules adopted by the Energy Commission to govern the administration of the ERP are contained in the ERP Guidebook, and the Renewable Energy Program Overall Program Guidebook ("Overall Program Guidebook").[33] Further, additional procedures for listing specific equipment, *e.g.*, wind turbines, as eligible for use in the ERP are found on the ERP website.[34]

Pursuant to Appendix 3, Section (A)(2) of the ERP Guidebook, the Commission provides manufacturers with two options for having their small wind systems listed as eligible for use in the ERP:

1. Small wind turbines must be certified as meeting the requirements of a small wind turbine-specific safety and/or performance standard adopted by a national or international standards setting body, including, but not limited to International Electrical Code (IEC) 61400-2. The Energy Commission will monitor, review, and may participate in the Interstate Renewable Energy Council's efforts to create a national certification program.

OR

2. Manufacturers of small wind systems must provide monthly data of average energy produced (kWh) and average wind speed for one consecutive year for each model of system they wish to be considered eligible for this program to demonstrate reliable operation of that model of equipment at a site with average annual wind speeds of at least 12 mph.

[33] ERP Guidebook, *supra* note 4, at 1. Pursuant to Public Resources Code Section 25747, subdivision (a) the Commission is required to adopt guidelines governing the funding programs under its Renewable Energy Program, including the ERP, and such guidelines are exempt from the requirements of the Administrative Procedures Act ("APA"), as codified at Government Code Section 11340, *et seq*.
[34] Consumer Energy Center, California Energy Commission, *see* heading "Adding Equipment," *available at* http://www.consumerenergycenter.org/erprebate/equipment.html.

Specific procedural requirements for having wind turbines listed as eligible for use in the ERP are contained in a form on the ERP website titled, "Wind Turbine Eligibility Listing Procedure," attached as Exhibit A to the Complaint, which is Exhibit 1 of Complainant's exhibits. The form provides that if a manufacturer elects option two, as identified above, then it must submit the following information to KEMA:

- **A year of operational data for the turbine** (including wind speeds and power output);[35]
- **The power curve for the turbine** (indicates the turbine's generating capacity, or how much power (in watts or kilowatts) the turbine will produce at any given wind speed, referred to herein as the *rated output,* when used to describe the generating capacity of a single turbine, or the *system rated output,* when used to describe the generating capacity of multiple turbines that comprise a small wind system);
- **The power curve data**, or data upon which the power curve is based; and,
- **A short product description for the ERP website** that includes the rated output at which the manufacturer seeks to list the turbine.

B. KEMA's Review of Data Submitted Prior to the ERP Suspension

As noted, prior to the ERP suspension, KEMA was charged with responding to requests for additions to the ERP's current equipment eligibility lists under Work Authorization Nos. 10 and 13. This primarily entailed obtaining, or aggregating, product information from manufacturers and ensuring that the information submitted satisfied the ERP requirements, *e.g.*, to the extent that a manufacturer submitted one year of operational data, KEMA was tasked with confirming that 12 continuous months of data were presented and that such data had been measured at a site with average annual wind speeds of at least 12 mph. Thus, as stated in the Complaint, prior to the ERP suspension, KEMA was responsible for performing a completeness and consistency check to confirm that manufacturers had submitted the requisite information in compliance with all applicable program requirements to have equipment listed as eligible for use in the ERP. Significantly, and also as explained, KEMA was NOT tasked with conducting technical evaluations of the data or information submitted by manufacturers until after execution of the amendment to Work Authorization No. 13 on May 25, 2011.

C. KEMA's Review of DyoCore's Submitted Data

i. Rated Output of .8 kW at 12 mph winds

DyoCore originally sought to have the DyoCore turbine listed as eligible for use in the ERP with a rated output of .8 kW at 12 mph winds. *See* February 16, 2010, 3:27

[35] Pursuant to option two referenced above, the Energy Commission requires manufacturers to provide one-year of operational data in order to demonstrate the reliable and safe performance of their turbine.

p.m. email from David Raine, attached as Exhibit 13. Pursuant to Appendix 3, Section (A)(2) of the ERP Guidebook, DyoCore elected to submit one year of operational data and power curve data in order to have the DyoCore turbine listed as eligible for use in the ERP. DyoCore first submitted energy production data from its installation located in San Marcos, California. *See* February 15, 2010 email from Rick Berry, attached as Exhibit 8.[36] However, as the average wind speed reported on the submitted table is lower than 6.6 mph, and thus, below the required minimum of 12 mph, the KEMA consultant rejected the data from the San Marcos location. *See* February 16, 2010 email from Pete Baumstark, attached as Exhibit 11.

DyoCore subsequently submitted data from its installation in Hampshire, Illinois. *See* February 16, 2010, 3:04 p.m. email from David Raine, attached as Exhibit 12. DyoCore also submitted a power curve in tabular form and a short description for the ERP website that stated the DyoCore turbine produces 800 watts at 12 mph winds. *See* February 16, 2010, 3:27 p.m. email from David Raine, attached as Exhibit 13. The submitted power curve data shows that at 12 mph winds the turbine will produce 811.25 watts.[37] As the KEMA consultant had received all the required information, on the following day he sent an internal email stating that the DyoCore turbine could be added to the list of eligible equipment for use in the ERP. *See* February 17, 2011 email from Pete Baumstark, attached as Exhibit 17.[38] The DyoCore turbine was subsequently added to the list in March of 2010.

Thus, the KEMA consultant followed the required protocol, as specified in Work Authorization No. 13 and in adherence to the program requirements set forth in the ERP Guidebook and on the ERP website. The KEMA consultant rejected the one-year of operational data for the San Marcos installation after determining that the average wind speed stated on the San Marcos Table was 6.6 mph, and thus, below the minimum 12 mph required by Appendix 3, Section (A)(2) of the ERP Guidebook. Ultimately, the KEMA consultant accepted the one-year of operational data for the Hampshire installation and the submitted power curve data that showed a rated output of 811.25 watts at 12 mph winds.

Although the KEMA consultant did not detect the duplication of energy production measurements in the San Marcos Table and Hampshire Table, he had no reason to suspect that DyoCore would be responsible for such an egregious falsification.

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[36] As noted, the February 15, 2010 email from Mr. Berry does not identify the data as having been measured at the San Marcos location. However, *see* email from Rick Berry, DyoCore to Daria Mashnik, Energy Engineer, KEMA, May 26, 2010 (attaching DyoCore Testing Report) (the same data set appears and is identified as having been measured at the San Marcos location in the DyoCore Testing Report, *supra* note 2, at page 4 (unnumbered)).

[37] *Id*.

[38] Email from Pete Baumstark, PE, Energy Engineer, KEMA to Daria Mashnik, Energy Engineer, KEMA, February 17, 2011 ("We can add this product to the wind turbine listing. They've given me 12 months of output data, but only had their anemometer installed for 10 of those months. But in looking at the power output for the two months missing the wind speed data, it looks like the wind speed was good enough to not significantly reduce the average wind speed for the year.").

Accordingly, the KEMA consultant had no reason to do a side-by-side comparison of the two submitted tables.

ii. Rated Output of 1.6 kW at 18 mph winds

1. DyoCore Seeks the Higher Rated Output

As noted, between April 9, 2010 and June 1, 2010, DyoCore actively sought to modify the listing for the DyoCore turbine that appears on the List of Eligible Small Wind Turbines on the ERP website by claiming in email correspondence with KEMA that the rated output for the DyoCore turbine was actually 1.6 kW at 18 mph winds, not .8 kW at 12 mph winds as the turbine had originally been listed. On April 9, 2010, in an email to the KEMA consultant, Mr. Raine requested that the DyoCore turbine be listed with the higher output, asserting,

> AT 18 mph [] our output is 1.6 kW. This should be the posted data or applied output.[39]

Significantly, Rick Berry from DyoCore explained to the KEMA consultant that it was his fault that the DyoCore turbine had been listed as eligible for use in the ERP with a rated output of .8 kW at 12 mph winds.

> Hello Daria, our CEO David Raine sent you the info to upgrade our state listing . . . *from 800 watts which was my mistake to the actual watts per the curve of 1600 watts*. This is causing some problems with people purchasing the units.[40]

David Raine also acknowledged that the initial listing at 800 watt at 12 mph winds was the result of Rick Berry's mistake.

> I apologize *when we originally submitted our data to you Rick did not understand the listing terms*. Thank you for your consideration in correcting our listing.[41]

2. DyoCore Sends KEMA a Barrage of Confusing Emails and Attachments in Support of the Higher Rated Output

The KEMA consultant was unable to respond to requests to add equipment to the List of Eligible Small Wind Turbines under the ERP between April 1, 2010 and May 16, 2010 because Work Authorization No. 10 expired on March 31, 2010 and Work

[39] Email from David Raine, CTO, DyoCore to Daria Mashnik, Energy Engineer, KEMA, April 9, 2010.
[40] Email from Rick Berry, DyoCore to Daria Mashnik, Energy Engineer, KEMA, April 22, 2010.
[41] Email from David Raine, CTO, DyoCore to Daria Mashnik, Energy Engineer, KEMA, May 26, 2010.

Authorization No. 13 was not executed and effective until May 17, 2010.[42] After Work Authorization No. 13 was executed on May 17, 2010, the KEMA consultant requested that DyoCore submit proof of certification to the IEC 61400 standard or one-year of operational data and a power curve. Email from Daria Mashnik, May 26, 2010, 5:12 a.m., attached as Exhibit 30. Mr. Berry responded by emailing the KEMA consultant four documents, two tables, a logo, and the DyoCore Testing Report. Email from Rick Berry, May 26, 7:18 a.m., attached as Exhibit 31. Notably, and as explained in more detail below, the DyoCore Testing Report is entitled "SolAir – IEC Standard 61400-12-1" and appears to represent testing results that comply with that standard. DyoCore Testing Report, attached as Exhibit 89.

Five minutes later, Mr. Raine emailed the KEMA consultant, having embedded two tables and a graph in his email. Email from David Raine, May 26, 2010, 7:23 a.m., attached as Exhibit 32. One of the embedded tables, entitled "Sea-Level Air Density Normalized Power Curve SolAir San Marcos CA," contains power curve data, and significantly, shows a rated output of 1.6 kW at 18.4 mph winds. The other embedded table purports to show energy production. The graph appears to correspond to the energy production table, but the y-axis is mislabeled kilowatts instead of kilowatt hours. Notably, power curve data is represented as kilowatt generation in relation to wind speed, as reflected on the graph.

The KEMA consultant responded two hours later. Email from Daria Mashnik, May 26, 2010, 9:25 a.m., attached as Exhibit 33. As required under the ERP, the KEMA consultant requested to see a certificate to confirm that an authorized certifying body had tested the DyoCore turbine to IEC Standard 61400-12-1. Alternatively, she requested that DyoCore provide one-year of operational data. The KEMA consultant also questioned DyoCore's claimed rated output of 1.6 kW at 18 mph winds, given that the mislabeled graph provided by Mr. Raine identifies 1.6 kW at about 4 meters per second (m/s), or approximately 9 mph.

Instead of simply clearing up the confusion by identifying the mislabeled graph and directing the KEMA consultant to the power curve data, between 10:08 a.m. and 5:01 p.m. on that same day, Mr. Raine and Mr. Berry emailed the KEMA consultant 4 more times, attaching 14 data files for her review.[43]

The KEMA consultant replied two days later, stating,

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[42] See email from Daria Mashnik, Energy Engineer, KEMA to David Raine, CTO, DyoCore, April 22, 2010 ("We are currently experiencing delays in processing applications because our work contract with California Energy Commission has been expired and is currently being renewed.").

[43] Email from David Raine, CTO, DyoCore to Daria Mashnik, Energy Engineer, KEMA, May 26, 2010, 10:08 a.m. ("Our qualifying data was from our Hampshire IL testing facility. . . . I've attached the data."); email from David Raine, CTO, DyoCore to Daria Mashnik, Energy Engineer, KEMA, May 26, 2010, 10:19 a.m. ("The attached is the actual 1 hour production data from the GinLong inverter as attached to the system in Hampshire IL. The previous email was the BIN data. I think the Raw data is what you are looking for."); email from David Raine, CTO, DyoCore to Daria Mashnik, Energy Engineer, KEMA, May 26, 2010, 11:19 a.m. ("Extrapolated from the raw data – Actual Ginlong kWh production numbers."); email from Rick Berry, DyoCore to Daria Mashnik, Energy Engineer, KEMA, May 26, 2010, 5:01 p.m. (attaching 6 more files) ("Daria, I just wanted to reach out and make sure you got all the info you needed today.").

> I graphed the data that you sent me below to get the following Performance Curve for your product (same as the one you sent me below). You would like your product to be rated at 1,600 Watts, however based on the curve the output only goes up to 700 Watts which happens at [] 26 mph.

See email from Daria Mashnik, Energy Engineer, KEMA to David Raine, CTO, DyoCore, May 28, 2010, 11:59 a.m., attached as Exhibit 39. Notably, the KEMA consultant states that she "graphed the data" provided by DyoCore. The KEMA consultant graphed the data in order to determine whether it was consistent with the increased rated output requested by DyoCore. Simply put, pressing a button in Excel to change the way that data is presented, *i.e.*, to convert the data from tabular form into a graph, does not represent technical evaluation or substantive analysis.

A few days afterwards, as referenced above, Mr. Raine sent an email with yet another embedded table. *See* June 1, 2010 Email from David Raine, attached as Exhibit 41. Mr. Raine described the table as "actual data tested at specific wind speeds." The table shows power generation in watts in relation to wind speed, and thus, is accepted by the KEMA consultant as DyoCore's power curve data. Significantly, the table states an output of 1,589 watts (1.589 kW) at 18 mph winds.

After receiving the power curve data, the KEMA consultant sends one last email to Mr. Raine. June 1, 2010 Email from Daria Mashnik, attached as Exhibit 42. In this final email communication, the KEMA consultant asks Mr. Raine to give her a call at the office. This is where the email correspondence ends. Thus, the KEMA consultant accepts the power curve data submitted on June 1, 2010. The next day, on June 2, 2010, the listing for the DyoCore turbine on the ERP website is updated by Energy Commission staff to reflect the higher rated output of 1.6 kW at 18 mph winds.

Notably, the final data set submitted by Mr. Raine on June 1, 2010 appears to be an extension of the data set he submitted to KEMA on February 16, 2010 to qualify the DyoCore turbine for the initial listing of .8 kW at 12 mph winds.[44] For example, the power curve data submitted on February 16, 2010 shows a generating capacity of 811.25 watts (.81125 kW) at 12 mph winds as the last data point on the curve. Similarly, the data set submitted on June 1, 2010 also shows a generating capacity of 811.25 watts (.81125 kW) at 12 mph winds. However, the date set submitted on June 1, 2010 extends beyond 12 mph winds to 36 mph winds. Nevertheless, all of the entries for generating capacity for wind speeds at or below 12 mph are the same in both the data set submitted on February 16, 2010 and the data set submitted on June 1, 2010.

Accordingly, the KEMA consultant followed the required protocol, as specified in Work Authorization No. 13 and in adherence to the program requirements set forth in the ERP Guidebook and on the ERP website. Upon submission of the DyoCore Testing

[44] Compare email from David Raine, CTO, DyoCore to Pete Baumstark, PE, Energy Engineer, KEMA, February 16, 2010, 3:27 p.m., attached as Exhibit 13 to email from David Raine, CTO, DyoCore to Daria Mashnik, Energy Engineer, KEMA, June 1, 2010.

Report, the KEMA consultant sought to confirm whether an authorized certifying body had certified the DyoCore turbine as having satisfied IEC Standard 61400-12-1. As no certification was proffered, in accordance with Appendix 3, Section (A)(2) of the ERP Guidebook, the KEMA consultant accepted the one-year of operational data for the Hampshire, Illinois installation. Further, when the KEMA consultant reviewed power curve data, or, in the case of the mislabeled graph embedded in Mr. Raine's email,[45] data that appeared to be power curve data, which was inconsistent with the claimed higher rated output of the DyoCore turbine she questioned it. In the end, the KEMA consultant accepted the power curve data submitted on June 1, 2010, which stated an output of 1.6 kW at 18 mph winds and was consistent, on its face, with the data set submitted by Mr. Raine on February 16, 2010 in support of the initial listing of .8 kW at 12 mph winds.

D. DyoCore has Misrepresented the KEMA emails

DyoCore has repeatedly misrepresented its communications with KEMA regarding the listing of the DyoCore turbine on the Energy Commission's "List of Eligible Small Wind Turbines" in the complaint proceeding. Here is a sampling.

DyoCore stated:

> KEMA provided DyoCore a power curve represented on a table and a chart. KEMA also recommended a power curve listing to DyoCore.[46]

As shown above, KEMA never recommended that the DyoCore turbine should be listed at a particular rated output, but instead, simply responded to DyoCore's request to list the turbine at 1.6 kW at 18 mph winds.

DyoCore stated:

> When the listing rating was given to DyoCore KEMA contacted us and asked if we wanted to modify our rating from 12 mph to a higher rated amount because we had the lowest rating wind speed on the approved list.[47]

As shown by the email correspondence from Mr. Raine and Mr. Berry to the KEMA consultant, DyoCore actively sought to modify the listing for the DyoCore turbine that appears on the List of Eligible Small Wind Turbines on the ERP website by claiming that the rated output for the DyoCore turbine was actually 1.6 kW at 18 mph winds, not .8 kW at 12 mph winds as the turbine had originally been listed.

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[45] Email from David Raine, CTO, DyoCore to Daria Mashnik, Energy Engineer, KEMA, May 26, 2010, 7:23 a.m.
[46] DyoCore's Response, *supra* note at 21, at page 2 (unnumbered).
[47] *Id*. at 6 (unnumbered).

DyoCore stated:

> KEMA at the time of evaluating SolAir was under considerable pressure from workflow . . . which might have contributed to an error in the evaluation of DyoCore's submitted application.[48]

As shown above, KEMA correctly evaluated DyoCore's submitted application in accordance with the required protocol, as specified in Work Authorization No. 13 and in adherence to the program requirements set forth in the ERP Guidebook and on the ERP website. DyoCore asserted that the DyoCore turbine should be listed at a higher rated output of 1.6 kW at 18 mph winds and provided corresponding power curve data. DyoCore, by its own admission, has acknowledged that it "made a mistake in the information it presented to KEMA."[49]

DyoCore stated:

> When the listing was granted DyoCore understood that the rating was based on Annual Average Wind and not based on a *specific wind speed*.[50]

This statement contradicts Mr. Raine's description of the power curve data that he submitted on June 1, 2010, and which was relied upon by KEMA to modify the listing on the ERP site to reflect the higher rated output of 1.6 kW at 18 mph winds. Mr. Raine described the power curve data relied upon as follows: "Here's is actual data tested at *specific* wind speeds." *See* June 1, 2010 email from David Raine, attached as Exhibit 41. (Emphasis added).

DyoCore stated:

> During DyoCore's application for CEC ERP inclusion when presented with a power curve by KEMA DyoCore representatives requested that KEMA evaluate if it would be more appropriate for SolAir to be listed at higher wind speed since all other turbines on the CEC site were listed at substantially higher wind speeds. KEMA agreed and reposted the listing from 12 mph to 18 mph.[51]

As shown by the emails referenced above, DyoCore explained to KEMA that the lower listing of 800 watts (.8 kW) at 12 mph winds was the result of a "mistake" by Rick Berry given that he "did not understand the listing terms" at the time of submission of the

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[48] *Id*. (unnumbered).
[49] *Id*. at 3 (unnumbered).
[50] *Id*. at 5 (unnumbered).
[51] *Id*. at 7 (unnumbered).

original data.[52] Further, DyoCore represented that "AT 18 mph [] our output is 1.6 kW. This should be the posted data or applied output."[53] Thus, presumably DyoCore had taken measurements and had obtained valid data that supported their request. Notably, the email correspondence between DyoCore and KEMA does not contain any mention of the rationale for modification of the listing that is proffered by DyoCore in its response, *i.e.*, that other wind turbines on the ERP List of Eligible Small Wind Turbines are listed at higher wind speeds.

DyoCore stated:

> In real-time winds of 18 mph the production is approximately 212 watts [.212 kW], this is about 66% of he BETZ maximum 59%. This information was provided and available to KEMA upon application.[54]

There were two sets of power curve data submitted to KEMA by DyoCore, one is entitled "Sea-Level Air Density Normalized Power Curve SolAir San Marcos CA," and provides a rated output of 1.6 kW at 18.4 mph winds, and the other was embedded in Mr. Raine's email of June 1, 2010, and provides a rated output of 1589 watts (1.589 kW) at 18 mph winds. DyoCore did not submit any power curve data to KEMA that showed a rated output of 212 watts (.212 kW) at 18 mph winds.

DyoCore stated:

> DyoCore submitted data that was taken into consideration by KEMA who then mistakenly published annual performance data opposed to *actual wind data*. . . . Since all other qualifications, other than a mistake made by KEMA, meet the ERP guidelines there is no cause for removal.[55]

As explained above, the final email from Mr. Raine to the KEMA consultant on June 1, 2010 included DyoCore's submission of power curve data in tabular form that showed 1.589 kW output at 18 mph winds. In the body of the email Mr. Raine describes the data as "*actual data* tested at specific wind speeds." (Emphasis added).

Notably, DyoCore also misrepresented its communications with KEMA regarding the listing of the DyoCore turbine on the Energy Commission's "List of Eligible Small Wind Turbines" to its distributors and customers.

DyoCore stated:

> There have been significant issues raised by the California

[52] Email from David Raine, CTO, DyoCore to Daria Mashnik, Energy Engineer, KEMA, May 26, 2010.
[53] Email from David Raine, CTO, DyoCore to Daria Mashnik, Energy Engineer, KEMA, April 9, 2010.
[54] DyoCore's Response, *supra* note at 21, at page 5 (unnumbered).
[55] DyoCore Response to Amendment of Complaint, *supra* note 24, at page 1 (unnumbered) (emphasis added).

> Energy Commission through the Emerging Renewables Program which impact your deposit, rebate status, and installations.
>
> The primary issue is a complaint filed by the CEC against DyoCore Inc. alleging fraud in the company's representation of its power curve at the time of Turbine Certification for listing on the state's list of eligible equipment. ¶ DyoCore has denied these claims based upon the program qualification procedure calling for DyoCore *to submit data to a third party certifier (KEMA Labs) who thereafter configure the data into a usable power curve and then assign a rating. In this case DyoCore was assigned 1.6 k[W] at 18 mph. KEMA arrived at these figures in April of 2009*. In June of 2011 the state of California requested that KEMA review the previously submitted data and either confirm *their original configuration* being correct or wrong. KEMA responded to the state saying the listing was wrong based upon the data submitted. In essence, the data confirmed as right in 2009 according to KEMA is now in error. . . .
>
> DyoCore Inc's financial status has been severely hampered due to these accusations causing inability to complete installations, devote effort to company growth, and added expense of legal defense of the firm. Therein, the company will be unable to refund deposits, refunds, nor complete any installations until such time as these allegations have been resolved.

Letter from David Raine, identified as CEO of DyoCore, Inc. to "DyoCore Clients, Distributors, affected persons and entities," August 8, 2011, attached as Exhibit 78. As noted, on April 9, 2010 Mr. Raine asserted in an email to the KEMA consultant that "AT 18 mph [] our output is 1.6 kW. This should be the posted data or applied output."[56] The KEMA consultant did not "arrive[] at these figures." As shown, following Mr. Raine's April 9th email, DyoCore repeatedly sought the higher rated output of 1.6 kW at 18 mph winds and provided data in support of its performance claims. Thus, DyoCore clearly misrepresents the facts of this case by stating that the claimed output of 1.6 kW at 18 mph winds was the result of KEMA's "original configuration."

[56] Email from David Raine, CTO, DyoCore to Daria Mashnik, Energy Engineer, KEMA, April 9, 2010.

Response to Question 5(c)*: *How a power curve is generated.

III. Generation of a Power Curve and Estimated Annual Energy Production as Specified by IEC 61400-12-1

The IEC 61400-12-1 standard sets forth a testing methodology for obtaining power performance measurements of electricity producing wind turbines. The IEC 61400-12-1 standard provides,

> [T]he wind turbine power performance characteristics are determined by the measured power curve and the estimated annual energy production (AEP). The measured power curve is determined by collecting simultaneous measurements of wind speed and power output at the test site for a period that is long enough to establish a statistically significant database over a range of wind speeds and under varying wind and atmospheric conditions. The AEP is calculated by applying the measured power curve to reference wind speed frequency distributions, assuming 100% availability.[57]

Staff will present expert witness testimony on the subject of power performance testing for small wind turbines during the evidentiary hearing in this proceeding, and, in particular, will show that there is a valid method for obtaining these measurements that is accepted within the small wind industry.

Response to Question 5(d)*: *How the correct point on a power curve is selected for purposes of determining rated output.

IV. Even if DyoCore had Sought a Rated Output at a Wind Speed Higher than 18 mph Winds, *e.g*. 36 or 38 mph, the Result Would Have been the Same Because All of the Power Curve Data Submitted by DyoCore is Theoretically Impossible

It is true that DyoCore could have chosen a rated output for the DyoCore turbine that correlated to a wind speed higher than 18 mph, *e.g.*, 36 or 38 mph, for the purpose of listing the DyoCore turbine on the ERP website, provided the manufacturer's data supported such performance claims. However, as noted, DyoCore actively sought to have the DyoCore turbine rated at 1.6 kW at 18 mph winds on the ERP website, and significantly, did not seek to have the DyoCore turbine listed at a rated output that corresponded to a higher wind speed, *e.g*., 36 or 38 mph. More importantly, the power curve data submitted by DyoCore neither supports a rated output of 1.6 kW at 18 mph winds nor any other rated output at any other identified wind speed. DyoCore submitted

[57] International Standard IEC 61400-12-1, First edition 2005-12: Wind turbines – Part 12-1: Power performance measurements of electricity producing wind turbines, at 8.

two sets of power curve data to KEMA: one is entitled "Sea-Level Air Density Normalized Power Curve SolAir San Marcos CA;" the other is embedded in Mr. Raine's email of June 1, 2010. As shown by the Declaration of Rich Pollich, Senior Program Manager, KEMA, Exhibit 90, the energy output measurements contained in these data sets that supposedly correlate to each identified wind speed are all theoretically impossible for a wind turbine with a rotor diameter of 1.2 meters, or approximately 47 inches.

Staff recognizes that the ERP Guidebook should have identified a standard wind speed for the purpose of determining the rated output of small wind turbines. Accordingly, Staff is proposing changes in the upcoming Eleventh edition of the ERP Guidebook that will address this issue by requiring third-party certification to available performance, safety, and reliability standards. More specifically, the Eleventh Edition of the ERP Guidebook will require that the certified rated output of a small wind system be measured at a wind speed of 11 meters per second, or 24.6 mph, the wind speed used in applicable performance standards for small wind turbines.

Question 5(e)*: *What the correct amount of the rebate for DyoCore turbines would have been under the pre-suspension ERP if the turbine's listed output was at the level that Staff contends is accurate.

V. The Accurate Rated Output of the DyoCore Turbine Has Not been Established

The complaint filed by staff does not posit an appropriate or accurate power curve or rated output for the DyoCore turbine. Rather, the analysis in the KEMA Report simply identifies the maximum, theoretical generating capacity of the DyoCore turbine in light of the Betz limit theory. In order to determine an accurate rated output for the DyoCore turbine it would be necessary to submit the equipment for valid power performance testing. Neither staff nor KEMA are able to perform such testing.

That said, had the rebate amounts been calculated by reference to output of 212 watts (.212 kW) at 18 mph winds, as stated in DyoCore's response,[58] and assuming the system was sized under 9.6 kW to qualify for the higher $3.00/watt rebate amount, the rebate would be $636 per turbine. Similarly, if the rebate amounts had been calculated by reference to the output of approximately 250 watts (.25 kW) at 18 mph winds, as shown in DyoCore's April 11, 2011 revised power curve, the rebate would be $750 per turbine. By comparison rebates calculated by reference to the claimed rated output of 1.6 kW at 18 mph winds would be $4,800 per turbine.

[58] DyoCore's Response, *supra* note at 21, at page 5 (unnumbered).

Question 5(f)*: *Whether the ERP regulations in existence at the time DyoCore submitted its application permitted rebates up to 100 percent of the installed system cost to the consumer.

VI. Although the Tenth Edition of the ERP Guidebook Did Not Prohibit100 Percent Rebates, the ERP is not Intended to Cover the Total Purchase and Installation Costs of Small Wind Systems of Fuel Cells for End-Use Consumers

DyoCore and its retailers submitted rebate applications under the Tenth Edition of the *ERP Guidebook* which did not expressly limit the rebate amount except that the rebate was not to exceed the total cost of the system. Although it was permissible to obtain a rebate that covered the entire cost of the system, this scenario had never occurred in the context of the ERP prior to the DyoCore turbine. Historically, rebates paid for small wind systems (using turbines other than the DyoCore turbine) under the ERP have averaged approximately 45% of the system's installed cost. In any event, as stated in the complaint, as a policy matter, the ERP is not intended to cover the total purchase and installation costs of small wind systems or fuel cells for end-use consumers, as such a complete subsidy is unsustainable and sends improper signals to the market by motivating increased sales of these renewable energy systems without concern for cost-effective siting and/or operation. This issue will be addressed in the revised version of the ERP Guidebook.

Question 5(g)*: *Details of the pricing methodology used by distributors of the DyoCore turbine including the costs of the turbines and associated equipment, sales commissions, salaries, labor costs, overhead and profit margins.

VII. While Staff Does Not Have Information that is Directly Responsive to this Question, We Are Aware of Factors that Suggest Inadequate Siting and Sizing of Small Wind Systems Using the DyoCore Turbine

Staff does not have direct information about the pricing methodology used by DyoCore and its retailers. However, a significant portion of the applications that were received present an identical system configuration – six DyoCore turbines with two inverters. This configuration results in a system with a capacity of 9.6 kW. The ERP Guidebook requires that systems funded through the ERP be sized to offset the on-site electricity load of the location where the system is being installed. However, applications for this configuration were submitted to the Energy Commission by various retailers throughout the state, regardless of the end-use customers' electrical consumption or wind resource availability.

It is expected that different households will have different energy consumption patterns, and that varied locations will have different wind resource availability. Given this variation, it is expected that different households would require varying amounts of generating capacity to offset their on-site load. However, for a large number of applications received by the Energy Commission, retailers submitted cookie-cutter

system specifications for a wide variety of customers in different locations.

Question 5(h)*: *The results of any tests that have been conducted to determine the output of the DyoCore turbine.

VIII. Staff has not contracted with any parties to conduct testing to determine the output of the DyoCore turbine.

Staff has no responsive information on this point.

Question 5(i)*: *Whether or not any such testing is currently underway or contemplated, the expected date of completion, and the cost for such testing.

IX. DyoCore is Currently Listed as "Under contract" with the SWCC.

DyoCore is currently listed as "under contract" on the Small Wind Certification Council's website, as of September 12, 2011.[59] The Small Wind Certification Council completes testing to the AWEA 9.1-2009 standard for small wind turbines. Staff does not have information related to the expected date of completion or the cost of the testing.

Question 5(k)*: *The identities of any qualified testing entities.

X. SWCC.

DyoCore is seeking certification to the AWEA 9.1-2009 standard through the Small Wind Certification Council (SWCC). The contact information for the SWCC is as follows:

Small Wind Certification Council
56 Clifton Country Road
Suite 202
Clifton Park, NY 12065
info@smallwindcertification.org
Telephone: (518) 213-9440
Fax: (518) 899-1092

[59] The SWCC provides a list of applicant turbine statuses on its website: http://www.smallwindcertification.org/applicant-turbines/

Question 5(j)*: *Proposals for handling of the applications for rebates that have not yet been paid.

XI. Energy Commission Staff Proposal for Resolution of Outstanding Applications and Payment Requests that Identify Small Wind Systems which Use the DyoCore Turbine

A. R1 Forms

i. All Incomplete Applications should be Rejected

As stated in the Complaint, applicants seeking rebates for small wind systems under the ERP must submit a completed Reservation Request Form, CEC-1038 R1 ("R1 Form") and supporting documentation to reserve a fixed amount of program funds.[60] The ERP Guidebook provides that "[f]unding reservations are made only for complete applications on a first-come, first-served basis. Applications that are missing application forms or have omissions or discrepancies will not be approved or processed."[61] Further, the notice suspending the ERP that was issued on March 4, 2011, states, "Complete applications for rebate reservations . . . will be processed." Thus, staff recommends that incomplete applications, or R1 Forms, for small wind systems that use DyoCore turbines and which lack information necessary for processing, or reviewing, should be rejected.

There are currently 1,086 pending applications for small wind systems that use DyoCore turbines. Staff has determined that 631 of these applications are incomplete, meaning that it would be necessary for staff to obtain additional information from applicants in order to complete the review of their applications. The other 455 applications have been deemed complete. Staff recommends that the 631 incomplete applications should be rejected.

ii. All Complete Applications That Identify Small Wind Systems with DyoCore Turbines Should be Rejected But Retain Their Current Place In the Queue For Consideration Under the Eleventh Edition of the ERP Guidebook

As explained in the Complaint, applicants must identify the "System Rated Output" on the R1 Form.[62] The system rated output, as provided by the applicant, is an essential part of the request for a reservation given that rebates offered through the ERP "are based on the generating capacity of the system."[63]

Pursuant to Section 2, subdivision (K) of the ERP Guidebook, titled "Audits and

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[60] ERP Guidebook, *supra* note 2, at 2
[61] *Id*. at 13.
[62] *Id*. at 33.
[63] *Id*. at 11; see *id* at iv ("Incentives for small wind turbines . . . are calculated by multiplying the rated output by the incentive level [currently $3.00/watt for the first 10 kW]").

Inspections," the Commission "will conduct audits of the applications it receives to verify that the information provided in the applications is true and correct." Subdivision (K) states that if information contained in an application or payment request "appears to be false or misrepresented" then the Commission will take one or more of eight identified measures, *e.g.*, rejection of the application.

Accordingly, given that every application submitted prior to the suspension of the ERP for a small wind system using DyoCore turbines was premised on a rated output of 1.6 kW at 18 mph winds and contained statements to that effect, staff recommend that all of these applications should be rejected on this basis alone.

However, staff recommends that the 455 applications determined to be complete which identify small wind systems that use DyoCore turbines should be given preferential treatment when the ERP restarts under the Eleventh Edition of the ERP Guidebook insofar as these applicants should retain their current place in the queue. Thus, staff recommends that the 455 applications be allowed to switch to another turbine, provided that they comply with the requirements of the Eleventh Edition of the ERP Guidebook.

B. R2 Forms

i. Purpose and Application in the Instant Case

Once the R1 Form is reviewed and approved, the Commission sends the applicant a Payment Claim Form, CEC-1038 R2 ("R2 Form") that identifies the amount of funds reserved and the date upon which the reservation expires.[64] The system rated output is also included on the R2 Form.[65] Once an R2 Form is issued by the Energy Commission, applicants typically move forward and complete their installations. The Energy Commission issued approximately 249 R2 Forms for small wind systems that use the DyoCore turbine.

The ERP was established to help develop self-sustaining markets for renewable energy systems by providing rebates and production incentives to end-use consumers who purchase and install such systems for on-site generation in California. Payments under the ERP are currently intended to stimulate increased sales of small wind systems that have a generating capacity of up to 50 kilowatts ("kW") and fuel cells that have a generating capacity of up to 30 kW, and thereby, encourage manufacturers, sellers, and installers to expand their operations, improve distribution, and reduce system costs associated with these renewable technologies.[66]

From the outset of the DyoCore Complaint Proceeding, staff has worked to develop a fair, equitable and expedient resolution of this matter for distributors/retailers of DyoCore turbines who have incurred equipment, installation, labor, and other costs

[64] *Id*. at 2.
[65] *Id*. at 39.
[66] *Id*. at iii, 1.

as a direct result of their involvement in the ERP. Thus, staff recommends the following proposal to resolve outstanding claims associated with R2 Forms issued for small wind systems that use DyoCore turbines.

ii. Proposal for Resolution of Pending R2 Forms that Identify Small Wind Systems that use the DyoCore turbine and Important Process Considerations

I. Proposal for Resolution of Pending R2 Forms

In recognition of the express purpose of the ERP – to encourage the continued development of private sector infrastructure associated with specific renewable technologies, *i.e*. small wind and fuel cells, such as the expansion of manufacturing operations – and in the interest of fairness given the magnitude of the problems that have arisen as a result of DyoCore's submission of false data to KEMA, staff recommends that the Energy Commission adopt the following formula, which will provide reimbursement for costs incurred as a result of issued R2 Forms.

Thus, staff recommends a formula for resolution of pending R2 Forms whereby the following categories of actual and provable costs would be reimbursed by the ERP:

1. Equipment/turbine component costs

2. Installation and other related costs, *e.g*., engineering, permitting financing, electrical component assembly, general administrative costs, sales tax and shipping.

3. Staff compensation, *e.g*., management sales staff, legal, accounting, and administrative personnel.
    a. Management costs and salaries capped at 50% of all other costs.

4. 15 % overhead based on the expected rebate level of the R2s Forms (as if rebates for R2 Forms were paid in full).

5. 5 % profit based on the expected rebate level of the R2s Forms.

6. With a cap on the total payment so that it cannot exceed what the Energy Commission would have paid at expected rebate level of 1.6 kW at 18 mph winds.

As an example of how this approach would work, assume the rebate payment for existing R2 Forms for a particular distributor/retailer is $100,000 if all are installed and the actual expenses to date are $40,000. The applicant would receive $48,000 [calculated by $40,000 + $6,000 ($40,000 x .15 for overhead) + $2,000 ($40,000 x .05 for profit)].

2. Payment Subject to Approval by State Controller

The Energy Commission does not issue its own checks under the ERP or its other programs. Instead, after the Energy Commission approves payments, it submits a request to the State Controller's Office ("SCO"). If SCO approves the payment, it then issues the check. Because of this arrangement, payments under the proposal would be subject to approval by SCO.

3. Urgency in Establishing Payment Arrangement Regarding R2 Forms

Many of the applicants to the ERP are small businesses that do not have the financial ability to cover the expenses they have incurred for a long period of time. Further delay of payments could do irreparable damage. In addition, some expenses continue to increase even if applicants have stopped work on the installations (*e.g.*, interest payments on loans or other financial charges). It is in the best interest of these companies, the Energy Commission, and this proceeding to reach conclusion on the payment arrangement and make the payments as soon as possible.

4. Suggested Requirements for Applicants before Receiving Payment for R2 Forms

Staff recommends that the Energy Commission require that applicants satisfy the following conditions before receiving payments under the proposed formula:

- Applicants must execute a release agreement that releases all claims against the Energy Commission and KEMA arising from the applicant's involvement in the ERP.

- A declaration in which the applicant attests under penalty of perjury that includes information the Energy Commission deems necessary to ensure that DyoCore, its employees, managers, owners, and investors do not directly benefit from the Energy Commission's efforts to pay for applicants' costs directly attributable to its approved applications, or R2 Forms.

- Backup documentation for all claimed expenses associate with the applicant's R2 Forms:

    - For materials and equipment, receipts or other proof of purchase.

    - For staff and consultants, copies of time sheets showing hours associated with the R2s or sales contracts showing the amount of the commission.

    - For management compensation, flexibility in the types of documents allowed compared to staff and consultants.

- Other documentation as appropriate.

- Proof that applicants have not or cannot receive additional payments from other sources that would result in double recovery (*e.g.*, an insurance claim that would pay for what the Energy Commission has paid for through this process). This requirement would not preclude applicants from recovering additionally from DyoCore for amounts not covered by the payment that results from application of the proposed formula.

5. Agreement Reached with Solar Point Resources Regarding this Formula

Solar Point Resources has the largest number of approved applications, or R2 Forms, of any applicant (Solar Point Resources has 110 R2 Forms out of a total universe of approximately 249 R2 Forms). Solar Point Resources also has submitted approximately 215 rebate reservation applications or R1 Forms. Energy Commission staff have discussed this formula for resolution all pending applications and payment requests with Solar Point Resources and they agree that it is a fair and equitable proposal.

XII. Scheduling

Staff believes this matter should be heard as expeditiously as possible because there are potential economic consequences to many individuals if resolution is delayed. Therefore, Staff urges the Committee to schedule a hearing soon.

Having said that, Staff has an important witness that is not available on the following dates: November 1-4, November 14-18, and November 22.

Staff believes that Staff's case in chief and cross examination will take two hours, if all of the testimony is pre-filed in writing, as set forth below. Staff anticipates that DyoCore's case in chief and cross examination might also take two hours. With respect to the discussion about appropriate resolution of the applications for rebates, Staff believes that discussion will take approximately two hours as well. Therefore, Staff believes this matter can be concluded in one full day.

In order to make sure the hearing time is used efficiently, Staff proposes that all parties pre-file written testimony one week in advance of the hearing. In that way, direct testimony may be limited to merely foundational questions and a short summary of the testimony, followed by cross examination, if any.

XIII. Use of Informal Procedures

Staff agrees to the use of informal hearing procedures with one stipulation. Staff would to like to present its case in chief uninterrupted by questions from other parties (we understand the Committee may ask questions during the presentation) because Staff has several detailed points it must make in order to complete a prima facie case.

Staff believes it would be more efficient if all parties were allowed to present their cases uninterrupted, and then use the informal procedures to respond to questions or elicit more information from the parties.

XIV. Service of Staff Prehearing Conference Statement and Exhibits

Staff's filing consists of approximately 300 double-sided pages. Because of the volume, Staff has asked the parties on the Proof of Service list whether they want a CD or hard copy. Based on those responses, Staff is serving our document appropriately to each person.

With respect to the 1400 affected parties, Staff is sending each person a letter directing them to the Energy Commission website to locate Staff's documents. We are also informing them that if they would like a hard copy or a CD, they may contact the Office of Chief Counsel to request a copy. A copy of the letter is attached hereto.

Respecfully submitted,

/s/ Jonathan Knapp
Jonathan Knapp
Staff Counsel

Docket Number: 11-CAI-03 Date: October 4, 2011
Project Name: In the Matter of the Complaint Against DyoCore Nevada, Inc Brought By Energy Commission Staff

TENTATIVE EXHIBIT LIST

Exhibit	Docket Transaction Number	Brief Description	Offered	Admitted	Refused
		COMPLAINANT'S EXHIBITS			
1		Complaint against Dyocore, Inc. with exhibits, dated 7/26/11, docketed 7/26/2011			
2		Amendment of Complaint against Dyocore, Inc. dated 9/9/2011			
3		Dyocore's Initial Response to Complaint, dated 7/26/11 docketed 7/26/11			
4		Dyocore's Response to Complaint of California Energy Commission Request for Informal Hearing, dated 8/8/2011, docketed 8/8/2011			
5		Dyocore's Response to Amendment of Complaint against Dyocore, Inc. dated 9/13/2011, docketed 9/13/2011			
6		Email from Rick Berry to Daria Mashnik, dated 12/8/2009			
7		Email from Rick Berry to Daria Mashnik, dated 12/16/2009			
8		Email from Rick Berry to Pete Baumstark, dated 02/15/2010			
9		Email from Pete Baumstark to Rick Berry, dated 2/15/2010			
10		Email from David Raine to Pete Baumstark, dated 2/15/2010			
11		Email from Pete Baumstark to David Raine, dated 2/16/2010			
12		Email from David Raine to Pete Baumstark , dated 2/16/2010, 3:04 pm			
13		Email from David Raine to Pete Baumstark, dated 2/16/2010, 3:27 pm			
14		Email from Rick Berry to Pete Baumstark, dated 2/17/2010			
15		Email from Pete Baumstark to Rick Berry, dated 2/17/2010			
16		Email from Pete Baumstark to Daria Mashnik, dated 2/17/2010, 10:38 am Part I			
17		Email from Pete Baumstark to Daria Mashnik, dated 2/17/2010, 10:38 am Part II			
18		Email from Rick Berry to Pete Baumstark, dated 2/20/2010			
19		Email from Pete Baumstark to Patrick Saxton, dated 2/21/2010			

Exhibit	Docket Transaction Number	Brief Description	Offered	Admitted	Refused
		COMPLAINANT'S EXHIBITS			
20		Email from Daria Mashnik to Dave Raine, dated 3/01/2010			
21		Email from David Raine to to Daria Mashnik, dated 3/1/2010			
22		Email from Rick Berry to Daria Mashnik, dated 4/09/2010			
23		Email from Daria Mashnik to Rick Berry, dated 4/09/2010			
24		Email from David Raine to Daria Mashnik, dated 4/09/2010			
25		Email from Rick Berry to Daria Mashnik, dated 4/22/2010			
26		Email from Daria Mashnik to Rick Berry, dated 4/22/2010			
27		Email from Daria Mashnik to David Raine, dated 4/22/2010			
28		Email from Rick Berry to Daria Mashnik, dated 5/5/2010			
29		Email from Daria Mashnik to Rick Berry, dated 5/7/2010			
30		Email from Daria Mashnik to David Raine, dated 5/26/2010			
31		Email from Rick Berry to Daria Mashnik, dated 5/26/2010			
32		Email from David Raine to Daria Mashnik, dated 5/26/2010			
33		Email from Daria Mashnik to David Raine, dated 5/26/2010			
34		Email from David Raine to Daria Mashnik, dated 5/26/2010, 10:08 am			
35		Email from David Raine to Daria Mashnik, dated 5/26/2010, 10:19 am			
36		Email from David Raine to Daria Mashnik, dated 5/26/2010, 11:19 am			
37		Email from Rick Berry to Daria Mashnik, dated 5/26/2010, 5:01 pm			
38		Email from Rick Berry to Daria Mashnik, dated 5/27/2010, 5:01 pm			
39		Email from Daria Mashnik to David Raine, dated 5/28/2010			
40		Email from Rick Berry to Daria Mashnik, dated 5/28/2010			
41		Email from David Raine to Daria Mashnik, dated 6/1/2010			
42		Email from Daria Mashnik to David Raine, dated 6/1/2010			
43		Email attachment from Michael Klemen's email regarding 2011-09-09 Version of Dyocore Website			
44		Email attachment from Michael Klemen's email regarding Klemen's comments onf Dyocore Website			
45		Email from David Raine to daryl-solar@yahoo.com, 2/6/11, 11:43 pm			
46		Email from David Raine to freedomev@yahoo.com, small-wind-home @yahoogroups.com, 2/7/2011, 11:11 am			

Exhibit	Docket Transaction Number	Brief Description	Offered	Admitted	Refused
COMPLAINANT'S EXHIBITS					
47		Email from Michael Klemen to small-wind-home @yahoogroups.com, 2/7/2011, 12:58 pm			
48		Email from Cory Arnold to small-wind-home@yahoogroups.com, 2/9/11, 10:59 am			
49		Email from David Raine from roger.dixon@att.net,coryarnold@mcwindenergy.com,small-wind-home@yahoo groups.com, 2/10/11, 10:35 am			
50		Email from Michael Klemen to small-wind-home@yahoogroups.com,dave@dyocore.com, 2/10/11, 8:43 pm			
51		Email from David Raine to wind4energy@yahoo.com, 2/10/11, 9:57 pm			
52		Email from Michael Klemen to dave@dyocore.com, 2/10/11, 11:07 pm			
53		Email from David Raine to wind4energy@yahoo.com, 2/10/11, 11:51 pm			
54		Email from David Raine to wind4energy@yahoo.com, 2/10/11, 11:52 pm			
55		Email from Michael Klemen to dave@dyocore.com, 2/11/11, 6:27 am			
56		Email from Michael Klemen to dave@dyocore.com, 2/12/11, 7:58 am			
57		Email from David Raine to wind4energy@yahoo.com, 2/14/11, 4:01 pm			
58		Email from Michael Klemen to dave@dyocore.com, 2/14/11, 5:04 pm			
59		Email from David Raine to wind4energy@yahoo.com, 2/15/11, 8:53 pm			
60		Email from Mike Bergey to small-wind-home@yahoogroups.com, 3/21/1, 6:16 am			
61		Email from David Raine to mbergey@bergey.com, small-wind-home@yahoogroups.com, 3/21/11 7:45 am			
62		Email from Michael Klemen to small-wind-home@yahoogroups.com, 3/21/11, 12:18 pm			
63		Email from Dave Merrill to wind4energy@yahoo.com, 3/21/2011, 2:26 pm			
64		Email from David Raine to wind4energy@yahoo.com,small-wind-home@yahoogroups.com			
65		Email from Doug Selsam to small-wind-home@yahoogroups.com			
66		Email from Nando to dave@dyocore.com,small-wind-home@yahoogroups.com, 3/22/11, 10:51 am			

Exhibit	Docket Transaction Number	Brief Description	Offered	Admitted	Refused
COMPLAINANT'S EXHIBITS					
67		Email from Michael Klemen to small-wind-home@yahoogroups.com, 3/23/11, 12:51 pm			
68		Email from hgengineer to small-wind-home@yahoogroups.com, 3/23/11, 1:26 pm			
		Email from Michael Klemen to small-wind-home@yahoogroups.com,dave@dyocore.com, 3/27/11, 9:18 am			
70		Email from David Raine to wind@energy@yahoo.com, 3/27/11, 11:49 am			
71		Email from Michael Klemen to dave@dyocore.com , 3/27/11, 11:53 am			
72		Email from David Raine to wind4energy@yahoo.com, dave@dyocore.com, 3/27/11, 12:59 pm			
73		Email from Michael Klemen to dave@dyocore.com, 3/27/11, 2:09 pm			
74		Email Michael Klemen to small-wind-home@yahoogroups.com, 4/6/11, 5:42 pm			
75		Email from David Raine to wind4energy@yahoo.com, 7/25/11, 5:06 pm			
76		Email from Michael Klemen to dave@dyocore.com, 7/27/11, 11:26 pm			
77		Email from David Raine to dave@dyocore.com, 7/9/11,			
78		Letter from David Raine to Dyocore Clients, Distributors, affected persons and entitities,dated 8/8/2011			
79		"Dyocore and Why the Rating of Small Turbines Remains a Black Art " written by Paul Gipe, www.wind-works.org			
80		Expecting Declaration of Tim Glenn, Nassef Francis, Thomas Crankes, regarding Dyocore system never generated any electricity			
81		Expecting Declaration of Art Kuehn, Mike Sheffer regarding Dyocore System never generated any electricity			
82		Curriculum Vitae of C.P. van Dam, Warren and Leta Giedt Professor and Department Chair			
83		Notes of C.P. van Dam regarding Determining a Power Curve of a Wind Turbine			
84		Rick Cooper, Director of Safety Laboratory Operations at MET Laboratories, Dyocore not authorized to use MET Listing Mark			
85		Douglas K. Ellar, Principal/CEO of Ellar Associates, Inc., Dyocore presented false sound date			

Exhibit	Docket Transaction Number	Brief Description	Offered	Admitted	Refused
COMPLAINANT'S EXHIBITS					
86		Renewable Energy Program Overall Program Guide book, CEC-300-2010-008-CMF, page 17			
87		Energy Renewables Program Final Guidebook			
88		Resume of Michael A. Klemen			
89		CEC Commission Agreement , No 400-07-030, KEMA Work Authorization No. 10, KEMA Work Authorization No, 13, KEMA Work Authorization No. 13, Amendment No. 1 - No. 4			
90		Email from Rick Berry from Daria Mahnik, 5/26/2010, 7:18 am			
91		Additional KEMA Analysis on Dyocore Power Curve			

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512
www.energy.ca.gov

July 26, 2011

DOCKET
11-CA1-03
DATE JUL 26 2011
RECD. JUL 27 2011

Mr. Michael J. Levy
Office of Chief Counsel
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Re: Complaint against DyoCore, Inc.

Dear Mr. Levy:

Enclosed is a complaint against DyoCore, Inc. ("DyoCore") filed pursuant to title 20, Section 1231 of the California Code of Regulations, which provides that "[a]ny person, including . . . commission staff . . . may file a complaint alleging a violation of a statute, regulation, order, *program*, or decision adopted, administered, or enforced by the commission."[1] As the Executive Director of the California Energy Commission ("Energy Commission" or "Commission"), I am filing this complaint to allege that DyoCore violated the intent of the Emerging Renewables Program ("ERP"), and, in particular, Appendix 3, Section (A)(2) of the Emerging Renewables Program Final Guidebook ("ERP Guidebook"),[2] by submitting grossly overstated information regarding the performance characteristics of the DyoCore SolAir wind turbine ("DyoCore turbine")[3] in order to have the DyoCore turbine listed by the Commission as eligible for use under the ERP.

For the reasons set forth in more detail below, I request that the DyoCore turbine be immediately removed from the Energy Commission's "List of Eligible Small Wind Turbines" on the ERP website, and that the Energy Commission provide guidance

[1] 20 CCR § 1231 (emphasis added). References to section numbers are to those in title 20 of the California Code of Regulations unless otherwise noted.

[2] Emerging Renewables Program Final Guidebook, Tenth Edition, California Energy Commission, April 2010, p. 49, *available at* http://www.energy.ca.gov/2010publications/CEC-300-2010-003/CEC-300-2010-003-F.PDF (referred to below as "ERP Guidebook").

[3] List of Eligible Small Wind Turbines on the ERP website, California Energy Commission, *available at* http://www.consumerenergycenter.org/cgi-bin/eligible_smallwind.cgi (the List of Eligible Small Wind Turbines on the ERP website identifies the DyoCore turbine as the "SolAir 1600W hybrid wind/solar generator," and provides the following model number, "S80015dc"). However, the DyoCore turbine is also referred to on DyoCore's website as the "DyoCore SolAir I 800 Hybrid Wind Solar Generator," and the "SolAir I 800." *See* DyoCore's website, *available at* http://www.dyocore.com/ (referring to the DyoCore turbine as the "DyoCore SolAir I 800 Hybrid Wind Solar Generator"); *id.*, *available at* http://www.dyocore.com/solair.html (referring to the "SolAir I 800"). In addition, applications for rebate reservations under the ERP have also referred to the DyoCore turbine as the "DyoCore SolAir I 800W." Nonetheless, Commission staff understand that DyoCore only manufacturers one turbine which is referred to in this complaint as the "DyoCore turbine."

Exhibit 1

regarding the resolution of applications for rebate reservations and payment requests under the ERP for small wind systems that use DyoCore turbines, and take such action as may be necessary to recover ERP funds that were paid as rebates for such systems. In addition, I request that the Energy Commission refer this matter to the Attorney General for investigation and prosecution, as appropriate.

I. Identification of Complainant (§ 1231(b)(1))

Robert P. Oglesby
Executive Director
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814
(916) 654-4996

II. Identification of Respondent (§ 1231(b)(2))

Ralph Bettencourt, CEO
DyoCore, Inc.
3125 Tiger Run Court, #104
Carlsbad, CA 92010
(866) 404-2428

David Raine, CTO
DyoCore, Inc.
3125 Tiger Run Court, #104
Carlsbad, CA 92010
(760) 580-4271

III. Statement of Program and Regulation Upon Which the Complaint is Based (§ 1231(b)(4))

A. The Purpose of the ERP

The ERP was established in 1998 to help develop self-sustaining markets for renewable energy systems, *i.e.*, solar and small wind, by providing rebates and production incentives to end-use consumers who purchase and install such systems for on-site generation in California. However, after the Energy Commission established the New Solar Homes Partnership ("NSHP") in 2006, the ERP no longer provided funding for solar energy systems and expanded the program to include fuel cells. Thus, payments under the ERP are currently intended to stimulate increased sales of small wind systems that have a generating capacity up to 50 kilowatts ("kW") and fuel cells that have a generating capacity up to 30 kW, and thereby, encourage manufacturers, sellers, and installers to expand their operations, improve distribution, and reduce system costs associated with these renewable technologies.[4] Significantly, the ERP is not intended to cover the total purchase and installation costs of small wind systems or fuel cells for end-use consumers,[5] as such a complete subsidy is unsustainable and sends improper signals to the market by motivating increased sales of these renewable

[4] *Id.* at iii, 1.
[5] See *id.* at 11 (emphasis added) (explaining that rebates offered under the ERP "must be used to *reduce* the purchase or lease cost of the eligible system, or the cost of electricity produced by the eligible system

energy systems without concern for cost-effective siting and/or operation. Since 1998, the ERP has issued $8.7 million in rebates for 577 small wind systems, with a cumulative installed capacity of 3.6 megawatts.

B. Requirements and Process for Listing Small Wind Systems as Eligible for Use in the ERP

The rules adopted by the Energy Commission to govern the administration of the ERP are contained in the ERP Guidebook, and the Renewable Energy Program Overall Program Guidebook ("Overall Program Guidebook").[6] Further, additional procedures for listing specific equipment, *e.g.*, wind turbines, as eligible for use in the ERP are found on the ERP website.[7]

Pursuant to Appendix 3, Section (A)(2) of the ERP Guidebook, the Commission provides manufacturers with two options for having their small wind systems listed as eligible for use in the ERP:

1. Small wind turbines must be certified as meeting the requirements of a small wind turbine-specific safety and/or performance standard adopted by a national or international standards setting body, including, but not limited to International Electrical Code (IEC) 61400-2. The Energy Commission will monitor, review, and may participate in the Interstate Renewable Energy Council's efforts to create a national certification program.

OR

2. Manufacturers of small wind systems must provide monthly data of average energy produced (kWh) and average wind speed for one consecutive year for each model of system they wish to be considered eligible for this program to demonstrate reliable operation of that model of equipment at a site with average annual wind speeds of at least 12 mph.

Specific procedural requirements for having wind turbines listed as eligible for use in the ERP are contained in a form on the ERP website titled, "Wind Turbine Eligibility Listing

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for the on-site customer. . . . [u]nder no circumstances will the incentive from the ERP exceed the net purchase price of the system to the final customer (before ERP incentives).").

[6] *Id.* at 1. Pursuant to Public Resources Code Section 25747, subdivision (a) the Commission is required to adopt guidelines governing the funding programs under its Renewable Energy Program, including the ERP, and such guidelines are exempt from the requirements of the Administrative Procedures Act ("APA"), as codified at Government Code Section 11340, *et seq.*.

[7] Consumer Energy Center, California Energy Commission, *see* heading "Adding Equipment," *available at* http://www.consumerenergycenter.org/erprebate/equipment.html.

Procedure," attached as Exhibit A. The form provides that if a manufacturer elects option two, as identified above, then it must submit the following information to the Commission's consultant, KEMA, Inc. ("KEMA"):

- **A year of operational data for the turbine** (including wind speeds and power output) – used to demonstrate the reliable and safe performance of the turbine;[8]
- **The power curve** for the turbine indicates the turbine's generating capacity, or how much power (in watts or kilowatts) the turbine will produce at any given wind speed, referred to in this complaint as the *rated output,* when used to describe the generating capacity of a single turbine, or the *system rated output,* when used to describe the generating capacity of multiple turbines the comprise a solar energy system;
- **The power curve data**, or data upon which the power curve is based; and,
- **A short product description for the ERP website** that includes the rated output at which the manufacturer seeks to list the turbine.

During the period in which DyoCore requested that the DyoCore turbine be included on the "List of Eligible Small Wind Turbines" on the ERP website, *i.e.*, prior to the suspension of the program, KEMA was tasked with performing a completeness and consistency check to confirm that manufacturers had submitted the requisite information to have equipment listed as eligible for use in the ERP but was not charged with substantively analyzing the data received.

C. Requirements for Securing a Reservation under the ERP

Applicants seeking rebates for small wind systems under the ERP must submit a completed Reservation Request Form, CEC-1038 R1 ("R1 Form") and supporting documentation to reserve a fixed amount of program funds.[9] Applicants must identify the "System Rated Output" on the R1 Form.[10] The system rated output, as provided by the applicant, is an essential part of the request for a reservation given that rebates offered through the ERP "are based on the generating capacity of the system."[11] Once the R1 Form is reviewed and approved, the Commission sends the applicant a Payment Claim Form, CEC-1038 R2 ("R2 Form") that identifies the amount of funds reserved and the date upon which the reservation expires.[12] The system rated output is also included on the R2 Form.[13] The R1 and R2 Forms require the end-use consumer and the

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[8] Pursuant to option two referenced above, the Energy Commission requires manufacturers to provide one-year of operational data in order to demonstrate the reliable and safe performance of their turbine.
[9] ERP Guidebook, *supra* note 2, at 2
[10] *Id.* at 33.
[11] *Id.* at 11; see *id* at iv ("Incentives for small wind turbines . . . are calculated by multiplying the rated output by the incentive level [currently $3.00/watt for the first 10 kW]").
[12] *Id.* at 2.
[13] *Id.* at 39.

equipment seller to attest under penalty of perjury that the information provided in each form is "true and correct to the best of their knowledge."[14]

IV. Authority Under Which the Commission May Take Action (§ 1231(b)(6))

Pursuant to Section 2, subdivision (K) of the ERP Guidebook, titled "Audits and Inspections," the Commission "will conduct audits of the applications it receives to verify that the information provided in the applications is true and correct."[15] Subdivision (K) states that if information contained in an application or payment request "appears to be false or misrepresented" then the Commission will take one or more of eight identified measures, *e.g.*, rejection of the application or payment request, or notification of the proper authorities so appropriate enforcement action may be initiated.[16]

Further, Section 7, subdivision (B) of the Overall Program Guidebook, titled "Fraud and Misrepresentation," provides the Commission's Renewables Committee ("Committee") broad authority to investigate "any awardee who the Committee has reason to believe may have misstated, falsified, or misrepresented information in applying for . . . funding" under the Renewable Energy Program.[17] Subdivision (B) states that based upon the results of an investigation, "the Committee may take any action that it deems appropriate, including, but not limited to . . . cancellation of the funding award . . . recovery of any overpayment, and, with concurrence of the Energy Commission, recommending the Attorney General initiate an investigation and prosecution pursuant to Government Code Section 12650, *et seq.*, or other provisions of law."

V. Statement of Facts Upon Which the Complaint is Based (§ 1231(b)(3))

A. DyoCore and the DyoCore Turbine

DyoCore manufactures a small wind turbine that may be roof-top mounted or pole-mounted, *i.e.*, the DyoCore turbine, which it markets as potentially eligible for a one-hundred percent rebate under the ERP. *See* screenshot of DyoCore, Inc. website ("DyoCore website"), attached as Exhibit B. According to the DyoCore website, the DyoCore turbine appears to have a rated output of 1.6 kW at 18 mph and to cost approximately $2,000 to purchase. At the current rebate level of $3.00 per watt for systems with a total rated output of up to 10 kW,[18] purchasers of the DyoCore turbine

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[14] *Id.* at 33, 39.

[15] *Id.* at 9 (Notably, subdivision (K) further provides, "[t]he Energy Commission may also conduct field inspections to verify systems are operating properly and installed as specified in the reservation request and payment claim applications.").

[16] *Id.*

[17] Renewable Energy Program, Overall Program Guidebook, Third Edition, January 2011, p. 17, *available at* http://www.energy.ca.gov/2010publications/CEC-300-2010-008/CEC-300-2010-008-CMF.PDF (referred to below as "Overall Program Guidebook").

[18] ERP Guidebook, *supra* note 2, at 11 (stating that the current rebate level for the first 10 kW of a small wind system is $3.00 per watt). Prior to the suspension of the ERP, the incentive level was scheduled to decrease to $2.50 per watt on April 7, 2011. *Id.* However, the Notice of Temporary Suspension of the

are eligible for a $4,800 rebate for a single installed turbine under the ERP. The typical application, however, is comprised of six DyoCore turbines, representing 9.6 kW, and a corresponding rebate amount of $28,800.

DyoCore has directly applied to the ERP for rebates for small wind systems using DyoCore turbines as an equipment seller, but, more often, works with a network of certified distributors.[19]

B. The Listing of the DyoCore Turbine

DyoCore requested that the DyoCore turbine be listed as eligible for use in the ERP in February of 2010. DyoCore originally asserted that the rated output of the DyoCore turbine should be listed as .8 kW, or 800 watts, at 12 miles per hour ("mph") winds and provided the requisite operational data, power curve, and power curve data in support of that claim.[20] Based upon the information submitted by DyoCore regarding the performance characteristics of the DyoCore turbine, on March 2, 2010, KEMA included it on the "List of Eligible Small Wind Turbines" on the ERP website with a rated output of .8 kW at 12 mph winds.

However, DyoCore subsequently claimed that the rated output for the DyoCore turbine was actually 1.6 kW at 18 mph winds.[21] In light of the disparity, a KEMA representative questioned DyoCore's claim.[22] DyoCore, however, provided an explanation for the difference and furnished a revised power curve and new power

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Emerging Renewables Program, attached as Exhibit C, provided that "[t]o avoid affecting any pending negotiations or potential sales that are contingent on the higher rebate level of $3.00 per watt the Energy Commission intends to extend the $3.00 per watt rebate level for approximately 30 days after the suspension is lifted."

[19] Letter from Ralph Bettencourt, CEO, DyoCore to Energy Commission, April 20, 2011, Docket No. 02-REN-1038 ("Dyocore has a network of 12 California distributors who undergo training and adhere to diligent standards as they relate to locations of installations of the products. Those 12 certified distributors have submitted approximately 800 R-1 applications (65 per distributor) [under the ERP]."). Notably, DyoCore lists 13 certified distributors on its website, all of whom are identified as potentially affected parties in Section 8, subdivision (A) of this complaint.

[20] Email from David Raine, CTO, DyoCore to Pete Baumstark, PE, Energy Engineer, KEMA, February 16, 2010.

[21] Email from David Raine, CTO, DyoCore to Daria S. Mashnick, Energy Engineer, KEMA, April 9, 2010 (stating "[at] 18mph . . . our output is 1.6 kW. This should be the posted data or applied output."); email from Rick Berry, DyoCore, Inc. to Daria S. Mashnik, Energy Engineer, KEMA, April 22, 2010 ("our CEO Dave Raine sent you the info to upgrade our state listing on 4/14/2010 from [.8 kW] which was my mistake to the actual watts per the curve of [1.6 kW]. This is causing some problems with people purchasing the units. . . ."). Mr. Berry refers to an email that was supposedly sent by Mr. Raine to Ms. Mashnik on April 14, 2011 in which Mr. Raine allegedly asserts that the rated output for the DyoCore turbine is 1.6 kW. However, KEMA has no record of any such email. In fact, it appears that Mr. Berry intended to reference the email sent by Mr. Raine to Ms. Mashnik on April 9, 2011, which is cited above.

[22] Email from Daria S. Mashnik, Energy Engineer, KEMA, to David Raine, CTO, May 28, 2010 ("My question (and what needs to be verified by you) is as follows: I graphed the data that you sent me below to get the following Performance Curve for your product (same as the one you sent me below). You would like your product to be rated at [1.6 kW], however based on the curve the output only goes up to [.7 kW] which happens at ~ 26 mph. Please clarify.").

curve data in support of their assertion that the rated output for the DyoCore turbine should be 1.6 kW at 18 mph winds.[23] Notably, DyoCore did not provide new operational data in support of their assertion regarding the increased generating capacity of the DyoCore turbine. KEMA ultimately accepted DyoCore's explanation and the manufacturer's submission of the revised power curve and new power curve data as sufficient. Consequently, KEMA aggregated the turbines to be added to the List of Eligible Small Wind Turbines on the ERP website for the month of June, including the DyoCore turbine at a rated output of 1.6 kW at 18 mph winds, and forwarded the information to Commission staff who promptly updated the list on June 2, 2010.[24]

C. Temporary Suspension of the ERP

During the initial months of 2011, Energy Commission staff became aware of three issues with DyoCore turbines that necessitated the temporary suspension of the ERP. *See* Notice of Temporary Suspension of Emerging Renewables Program, attached as Exhibit C. First, Energy Commission staff learned that the ERP was essentially providing free DyoCore turbines to end-use consumers which, as noted, is problematic for two reasons: such a complete subsidy is unsustainable and sends improper signals to the market by motivating increased sales of renewable energy systems without concern for cost-effective operation. Second, staff received reservation applications for rebates for DyoCore turbines that were to be installed in locations with poor wind resources, increasing the concern that the incentives were driving increased sales at the expense of cost-effective siting and operation of small wind systems. Third, during this same period the number of reservation applications for rebates for DyoCore systems received by the Commission increased dramatically.

As of the filing of this complaint on July 26, 2011, approximately:

- 33 systems using DyoCore turbines have been installed and ERP rebates had been paid, totaling $515,385
- 249 reservation applications for rebates for systems using DyoCore turbines have been approved, totaling $6,393,544.
- 1069 applications have been received and are pending review, totaling $31,220,976.

As such, there are a grand total of 1351 applications or payment requests for small wind systems using DyoCore turbines under the ERP that have been paid, approved, or which are currently pending, totaling $38,129,905.

[23] Email from David Raine, CTO, DyoCore, to Daria S. Mashnick, Energy Engineer, KEMA, June 1, 2010.
[24] List of Eligible Small Wind Turbines on the ERP website, California Energy Commission, *available at* http://www.consumerenergycenter.org/cgi-bin/eligible_smallwind.cgi.

D. The KEMA Report

Following the suspension of the ERP, the Energy Commission obtained information which alleged that the rated output for the DyoCore turbine may have been misstated, and further, might be physically impossible.[25] In response to questions raised about the validity of DyoCore's performance claims, and in reliance upon the Audit and Inspection provisions in the ERP Guidebook and the Fraud and Misrepresentation provisions in the Overall Program Guidebook, the Energy Commission engaged KEMA to analyze the operational data, power curve, and power curve data submitted by DyoCore. *See* KEMA's report of July 25, 2011 ("KEMA Report"), attached as Exhibit D.

The KEMA Report analyzed the power curve data submitted by DyoCore and concluded:

> DyoCore's claim of 1600 watts power output at 18 miles per hour (8.1 m/s) is 7.5 times greater than the theoretical maximum power output at that wind speed and 9.0 times greater than an optimal state-of-the-art turbine rotor with the same diameter.[26]

KEMA's analysis of the power curve is based on the Betz Limit theory, which posits that a wind turbine can capture no more than 59.3 percent of the kinetic energy in wind, which is calculated in relation to the diameter of its rotor. The KEMA Report concludes that if the DyoCore turbine, which has a rotor that is 1.2 meters in diameter, had an actual rated output of 1.6 kW at 18 mph winds, it would represent a machine that could extract 7.5 times more energy from wind than is thought possible under the Betz Limit theory.

The KEMA Report reached a similar conclusion when analyzing the one year of operational data submitted by DyoCore. The one year of operational data submitted by DyoCore showed an annual average wind speed of 15.3 miles per hour and an annual energy production of 2,554 kWh.[27] The KEMA Report shows that this is inconsistent with the power curve data submitted by DyoCore. Using the power curve submitted by

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[25] *See e.g.*, Trabish, Have Small Wind Manufacturers Exploited Loopholes in California Rebates?, Greentech Media, March 15, 2001, *available at* http://www.greentechmedia.com/articles/read/have-small-wind-manufacturers-exploited-loopholes-in-california-rebates/ (The article quotes several prominent figures in the small wind industry, including DyoCore's competitors, who suggest that the system rated output listed on the ERP website for the DyoCore turbine of 1.6 kW at 18 mph is physically impossible based upon the diameter of the turbine's rotor.
Further, the article states that David Raine, CTO of DyoCore, asserts that the company's performance claims are backed up by laboratory and field performance tests, referencing the work of Chuck Skinner, a field evaluation engineer with TUV America. However, the article questions the accuracy of this assertion, stating, "[f]or his part, Skinner said that TUV America had done no testing that would confirm anything but the electrical safety of the DyoCore turbine.").

[26] KEMA Report, at 5, attached as Exhibit D.

[27] *Id.* at 7.

DyoCore and the same annual average wind speed of 15.3 miles per hour, the annual energy production was calculated to be 9,513 kWh, which far exceeds the annual production data submitted by DyoCore.[28] In addition, the KEMA Report concluded that DyoCore's claimed annual energy production of 2,554 kWh with annual average wind speed of 15.3 miles per hour "is not possible because the claimed power curve exceeds the performance of a state-of-the-art wind turbine rotor by 9.0 times."[29]

The analysis in the KEMA Report demonstrates that DyoCore's submissions to KEMA for the purpose of listing the DyoCore turbine as eligible for use under the ERP fail to support the asserted rated output of 1.6 kW at 18 mph winds. More specifically, the power curve data grossly overstates the amount of energy that a turbine with a 1.2 diameter rotor can extract from the wind, and the one year of operational data does not support a rating of 1.6 kW at 18 mph winds.

After KEMA had been engaged to analyze DyoCore's operational data, power curve, and power curve data, the Commission learned that DyoCore had posted yet another power curve for the DyoCore turbine on its website. *See* Revised Power Curve, attached as Exhibit E. David Raine, DyoCore's CTO, posted the revised power curve on the company's blog on April 11, 2011, stating:

> This is the most accurate reference to estimated power production based on wind conditions. Though this does not account for gusts or rapid changes it can provide a basis for your production expectations at specific constant wind speeds:

Significantly, the revised power curve more closely corresponds to KEMA's analysis, and in particular, reflects a rated output of approximately .25 kW at 18 mph winds.

As of the filing of this complaint on July 26, 2011, DyoCore had not disclosed any new information regarding the rated output of the DyoCore turbine to KEMA or the Commission, and further, continues to state on its website that the DyoCore turbine is "CEC Listed: 1.6kW at 18mph." *See* DyoCore website, attached as Exhibit B.

VI. Argument

A. DyoCore's Actions Contravene the Purpose of the ERP

As explained above, the current purpose of the ERP is to incentivize increased sales of small wind systems and fuels cells for on-site generation in California and thereby encourage manufacturers, sellers, and installers to expand their operations, improve distribution, and reduce system costs for the end-use consumer.[30] The underlying rationale of any such incentive program is to encourage legitimate

[28] *Id.*
[29] *Id.*
[30] ERP Guidebook, *supra* note 2, at iii, 1.

competition with the ultimate goal of inspiring and rewarding innovation. DyoCore claims that the DyoCore turbine reflects "New Innovative Technology," and further, that the manufacturer "has demonstrated significant success in accomplishing ERP objectives," by offering "lower cost margin products" which, in turn, "opens the door for greater deployment." *See* Letter from David Raine, CTO, DyoCore to Energy Commission, April 18, 2011, Docket No. 02-REN-1038, p. 1, 3-4, attached as Exhibit F, ("Raine Letter").

However, any such purported "success" is premised upon the DyoCore turbine performing as advertised, *i.e.*, approximately generating 1.6 kW at 18 mph winds. The Commission relied upon the accuracy of the information that DyoCore submitted for the purpose of having the DyoCore turbine listed as eligible for use under the ERP, *i.e.*, one-year of operational data, power curve, and corresponding power curve data. Yet the KEMA report demonstrates that the information submitted by DyoCore to the Commission grossly overstates the performance characteristics of the DyoCore turbine. KEMA Report, p. 5-6. Moreover, the manufacturer's statements regarding the rated output of the DyoCore turbine on its own website are inconsistent and irreconcilable, *e.g.*, DyoCore's website states that the DyoCore turbine is "CEC Listed: 1.6kW at 18mph" yet also provides a newly revised power curve that indicates a rated output of less than .3 kW at 18 mph winds. *See* DyoCore website, attached as Exhibit B. Similarly, DyoCore inconsistently represented the rated output of the DyoCore turbine to the Commission itself, via the Commission's agent, KEMA, by initially advocating for a rating of .8 kW watts at 12 mph winds and then asserting that the rating should be 1.6 kW at 18 mph winds.

DyoCore's actions have negatively impacted legitimate competition under the ERP insofar as other providers of small wind systems are unable to compete with DyoCore's "low cost margin products," which are, in turn, based on a false premise, *i.e.*, the manufacturer's grossly overstated performance claims of the DyoCore turbine. Further, DyoCore appears to have directly harmed end-use consumers who presumably relied, at least in part, upon the manufacturer's advertising regarding the performance characteristics of the DyoCore turbine in making their purchasing decision. These end-use consumers may ultimately be subject to revocation or withholding of rebate payments under the ERP based upon false or misrepresented statements regarding the rated output of their systems in their submitted R1 and R2 Forms. Moreover, DyoCore's actions necessitated the temporary suspension of the ERP and the corresponding diversion of program resources, *i.e.*, Commission staff time.

B. DyoCore Violated Appendix 3, Section (A)(2) of the ERP Guidebook by Submitting Operational Data That Does Not Support the Asserted Performance Claims of the DyoCore Turbine

DyoCore's submission of inaccurate and invalid operational data should serve as an independent basis for immediately removing the DyoCore turbine from the "List of Eligible Small Wind Turbines" on the ERP website. As noted, the KEMA Report concluded that the one-year of operational data originally submitted by DyoCore in

order to have the DyoCore turbine listed on the ERP website, initially with a rated output of .8 kW at 12 mph winds, and then, 1.6 kW at 18 mph, was inconsistent with the submitted power curve, and failed to substantiate the manufacturer's claim of increased generating capacity as it is "not possible because the claimed power curve exceeds the performance of a state-of-the-art wind turbine rotor by 9.0 times."[31] Under the ERP Guidebook, the identification of the DyoCore turbine on the ERP website was premised upon the submission of the operational data; the Commission relied upon the accuracy and validity of this data when it added the DyoCore turbine to the list and identified the rated output as 1.6 kW at 18 mph winds. However, the operational data submitted by DyoCore and relied upon by the Commission grossly overstates the performance characteristics of the DyoCore turbine, and thus, is inaccurate and invalid. Accordingly, the DyoCore turbine should be de-listed from the ERP website on this basis alone.

VII. Requested Action (§ 1231(b)(5))

I respectfully request that the DyoCore turbine be immediately removed from the Energy Commission's list of eligible equipment for use in the ERP. As shown by the KEMA report, and reflected by DyoCore's admissions on its own website, the DyoCore turbine was listed as eligible for use in the ERP on the basis of grossly overstated, inaccurate, and invalid information. I further request that the Energy Commission provide guidance regarding the resolution of applications for rebate reservations and payment requests under the ERP for small wind systems that use DyoCore turbines, and take such action as may be necessary to recover ERP funds that were paid as rebates for such systems.

In addition, I request that the Energy Commission refer this matter to the Attorney General for investigation and prosecution, as appropriate.

Finally, I also request that the Energy Commission send the following or similar notice to all retailers and end-use consumers who applied for rebates under the ERP for small wind systems using DyoCore turbines along with the Energy Commission's order serving this complaint:

> Under the Emerging Renewables Program ("ERP") there are three categories of consumers who may be affected by the attached complaint proceeding: (1) consumers who received a rebate payment under the ERP for the purchase and installation of a small wind system that uses DyoCore SolAir wind turbines ("DyoCore turbines"); (2) consumers who were issued an R2 Form reserving ERP funding for systems that use DyoCore turbines, but have not received, or submitted a request for a rebate payment; and, (3) consumers who have pending applications for rebate reservations under the ERP for systems that use DyoCore turbines. All parties to these

[31] KEMA Report, p.7,

rebate payments, payment requests and applications are on notice that payments may be revoked or withheld, and pending applications may be rejected, pursuant to the Audits and Inspections provisions contained in Section 2, subdivision (K) of the ERP Guidebook, and the Fraud and Misrepresentation provisions contained in Section 7, subdivision (b) of the Renewable Energy Program Overall Program Guidebook ("Overall Program Guidebook"). Further, any misstatements, falsifications, or misrepresentations contained in these payment requests or applications may be referred to the Attorney General for possible investigation and prosecution pursuant to Section 7, subdivision (b) of the Overall Program Guidebook.

VIII. Identification of All Parties Who Would be Affected by Relief Sought (§ 1231(b)(7))

A. The following retailers will be affected by the relief sought in the complaint. Each of these retailers has submitted applications for rebate reservations and/or payment request claims under the ERP for small wind systems that use DyoCore turbines.

Bay Area Energy Solutions
1326 Marsten Road
Burlingame, CA 94010
(650) 375-5955

California Solar Systems
1411 Rusch Court
Santa Rosa, CA 95401
(707) 637-0762

Synergy Corp.
863 N Bush Avenue
Clovis, CA 93611
(559) 352-6987

Crizer Wind Energy, Inc.
1191 4th St
Los Osos, CA 93402
(805) 528-4812

My Wind Power
4037 Phelan Road, A267
Phelan, CA 92371
(760) 314-9375

Solar Point Resources
P.O. Box 4761
San Jose, CA 95150
(408) 313-2814

Energy Pros
2235 Solitude Court
Rocklin, CA 95765
(800) 709-4168

Canaday Electric
402 Avalon Street
Morro Bay, CA 93442
(805) 975-7739

CA Green Team
337 Ridgecrest Blvd
Ridgecrest, CA 93555
(760) 684-4458

Prevailing Wind Power
324 N Gertruda
Redondo Beach, CA 90277
(310) 529-5217

Green Solar Solutions, Inc.
22267 Vacation Dr.
Canyon Lakes, CA 92587
(951) 258-8580

San Diego Small Wind
3125 Tiger Run Ct. #103
San Marcos, CA 92009
(866) 404-2428

Desert Power, Inc.
77380 Michigan Dr.
Palm Desert, CA 92211
(760) 360-9060

Apple Acres, Inc. DBA GRIDNOT
P.O. Box 645
Lucerne Valley, CA 92356
(760) 978-6840

B. All end-use consumers who have submitted applications for rebate reservations and/or payment request claims under the ERP for small wind systems using the DyoCore turbine.

VIIII. Declaration of Penalty under Perjury (§ 1231(b)(8))

I, the undersigned, declare to the best of my knowledge and under penalty of perjury, to the truth and accuracy of all factual allegations contained in this complaint.

Sincerely,

Robert P. Oglesby
Executive Director
California Energy Commission

EXHIBIT A

The Emerging Renewables Program (ERP) is for all small wind and fuel cell market segments for distributed generation offsetting on-site load. For wind turbine eligibility, a manufacturer must either have the turbine certified to IEC 61400-2, or a similar certification from a national or international standards setting body, or gather one year of operational data.[1]

The process for adding wind turbines for ERP is as follows:

1. The manufacturer either gets their product certified as meeting the requirements of a small wind turbine-specific safety and/or performance standard adopted by a national or international standards setting body, including, but not limited to International Electric Code (IEC) 61400-2 **or** gathers one year of operational data.

   This is a non-exhaustive list of companies that perform IEC 61400-2 testing:
   - SGS Taipei (Taiwan)
   - Germanischer Lloyd (Germany)
   - Dynatech Engineering, Inc. (California, USA)

2. The manufacturer generates a power curve for the turbine. This is often already known and readily available.

3. Submit documentation to KEMA, Inc. **All documentation must be in English – KEMA will reject any test reports that are not in English.** Required documentation is either:
   a. The turbine's power curve data, a copy of the IEC 61400-2 Certification or similar certification, and a short product description (under 10 words) for the website.
   b. The turbine's power curve data, a year of operational data (including wind speeds and power output), and a short product description (under 10 words) for the website.

The small wind turbine eligibility list is updated monthly on the first of the month. The cut-off date for the monthly update is the 15th day of the preceding month; all documentation must be submitted before this date.

[1] http://www.energy.ca.gov/2010publications/CEC-300-2010-003/CEC-300-2010-003-F.PDF. *Emerging Renewables Program Guidebook, Tenth Edition;* Appendix 3 describes the requirements for listing small wind turbines.

EXHIBIT B

DyoCore SolAir - Mozilla Firefox

File Edit View History Bookmarks Tools Help

DyoCore SolAir

http://dyocore.com/solair.html

Go Solar California - I... EnergyNet, the Intran... California Cash For Ap... DSIRE: DSIRE Home California's Emerging ... Go Solar California Energy News Latitude Longitude loc... California State Board...

DyoCore

SolAir I 800

SolAir is a dynamic hybrid vertical mill that combines wind/solar integrated into a single balanced frame/fin design. SolAir is designed so versatile it can be mounted on any flat horizontal, vertical or pitched surface and can be either bolted or ballasted down. SolAir's unique design allows it to work effectively in low turbulent winds from any direction.

For the majority of property owners living in urban areas, installing wind turbines on or close to buildings with overall wind speeds of less than 14 mph has not been a realistic proposition. Equipment is expensive, hard to install, electricity generation will be disappointing and pay-back periods are likely to recede into the distant future if at all.

DyoCore products present a dramatic change to this way of thinking. DyoCore turbines have been specifically tooled and specifically created for turbulent wind in both low wind and obstructed areas. Perfect for the average home roof!

Technical Specs

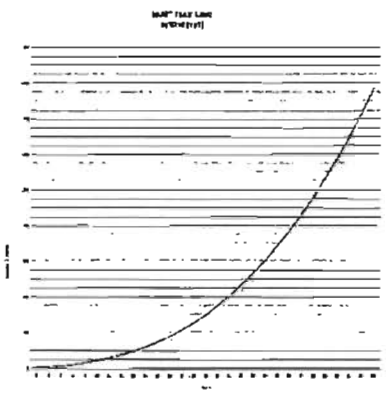
- Weight 60lbs. fully assembled.
- Can be setup and installed within minutes out of box
- Height of SolAir from its mount bracket surface to the blade at it's highest point is only 67".
- Blade diameter is 60".
- Number of Blades - 3 (Aluminum)
- CEC Listed: 1.5kW at 18mph
- Maximum output is approximately 2.2kW (26 to 30mph winds)
- Average power is approximately 400watts (12 to 14mph winds)
- Quieter than a whisper with no vibration
- Optimal install height is along the roof line or approximately 20'.
- SolAir units can be stacked when more energy generation/storage power is needed.
- Federal 30% tax credit
- CA CEC - up to 100% direct rebate!
- On-grid or Off-Grid - combined DC solar/wind output for simple plug and play.
- Shipping Details:
  - Frame & Mounting Hardware - 1 Box, 50" x 11" x 20", 50 lbs
  - SolAir Motor - 1 Box, 13" x 13" x 10", 28 lbs

Easy Math! Simple tool to calculate your SolAir Equipment Costs

DyoCore Installation/Setup of a SolAir System

http://www.youtube.com/watch?v=dAQfjEgtVXI

- SolAir Performance
- Small Wind Barriers
- Inverters
- Environmental Conditions at Install Site
- Additional Equipment - Stoppers / Capacitors
- Technology Development
- Successful Deployment Model



Annual Wind/Power production is based on the estimated annual energy you can potential experience from a collective average annual wind speed.

Friday, July 22, 2011

start Novell GroupWise - M... DyoCore SolAir - Mozi... 12:13 PM

17

winds from any direction.

For the majority of property owners living in urban areas, installing wind turbines on or close to b realistic proposition. Equipment is expensive, hard to install, electricity generation will be disappo future if at all.

DyoCore products present a dramatic change to this way of thinking. DyoCore turbines have been both low wind and obstructed areas. Perfect for the average home roof!

Technical Specs

- Weight 60lbs. fully assembled.
- Can be setup and installed within minutes out of box
- Height of SolAir from it's mount bracket surface to the blade at it's highest point is only 67".
- Blade diameter is 60".
- Number of Blades - 3 (Aluminum)
- CEC Listed: 1.6kW at 18mph
- Maximum output is approximately 2.2kW (26 to 30mph winds)
- Average power is approximately 400watts (12 to 14mph winds)
- Quieter than a whisper with no vibration
- Optimal install height is along the roof line or approximately 20'.
- SolAir units can be stacked when more energy generation/storage power is needed.
- Federal 30% tax credit
- CA CEC - up to 100% direct rebate!
- On-grid or Off-Grid - combined DC solar/wind output for simple plug and play.
- Shipping Details:
  - Frame & Mounting Hardware - 1 Box, 50" x 11" x 20", 50 lbs
  - SolAir Motor - 1 Box, 13" x 13" x 10", 28 lbs

EXHIBIT C

CALIFORNIA ENERGY COMMISSION
1516 Ninth Street
Sacramento, California 95814

Main website: www.energy.ca.gov

Temporary Suspension of the Emerging Renewables Program

The Energy Commission is temporarily suspending the Emerging Renewables Program (ERP) effective March 4, 2011, at 5 pm PST. New applications for ERP rebate reservations will not be accepted after this date. The Energy Commission will, however, continue to process payment claims for rebate reservations approved before this date.

Complete applications for rebate reservations postmarked through March 4, 2011, or received via fax or email before the suspension takes effect will be processed. Applications submitted by fax must be sent to (916) 653-2543. Applications submitted by email must include a scanned copy of the application as an attachment, and be sent to [ang@energy.state.ca.us]. Please include "ERP Rebate Application" in the subject line.

The Energy Commission is suspending the ERP so it may address deficiencies with the program requirements. The goal of the ERP is to increase the installation of small wind systems and fuel cells using renewable fuels, by reducing the net cost of on-site renewable energy systems. The program, however, is not intended to fully eliminate a consumer's economic interest by covering the entire cost of the system. Over the last several weeks, the Energy Commission has seen a significant increase in applications for small wind energy systems, where the applicant is requesting rebate amounts close to or equal to the total installed cost of the system. As a result, the consumer and retailer/installation contractor may have no interest in verifying that the installation site has adequate wind resources to accommodate the wind energy system and generate enough electricity to offset the consumer's electrical load. Wind energy systems installed in locations with a poor wind resource are likely to underperform and result in a poor investment and use of ERP funding.

During this suspension the Energy Commission will review its current ERP Guidelines and adopt necessary changes to guidelines to address deficiencies with the program requirements. The suspension will remain in effect until further notice. The Energy Commission anticipates that it will take 60 to 120 days to review the ERP Guidelines and adopt necessary changes. New applications for rebate reservations received after the suspension becomes effective, will **NOT** be reviewed or approved by the Energy Commission and will be returned to the applicant.

The Energy Commission recognizes that the current rebate level for wind energy systems is scheduled to drop from $3.00 per watt to $2.50 per watt on April 7, 2011, and that the suspension of the ERP will extend beyond this date, thereby precluding prospective applicants from taking advantage of the higher rebate level. To avoid affecting any pending negotiations or potential sales that are contingent on the higher rebate level of $3.00 per watt, the Energy Commission intends to extend the $3.00 per watt rebate level for approximately 30 days after the suspension is lifted. Applications for rebate reservations submitted to the Energy Commission after the suspension is lifted and the ERP is re-started **will** be subject to *ERP Guideline* changes that are adopted while the suspension is in place.

Please direct all news media inquiries to the Media and Public Communications Office at (916) 654-4989, or by e-mail at [mediaoffice@energy.state.ca.us]. For technical questions on the subject matter, please contact James Lee, at (916) 653-1195 or by e-mail at [jslee@energy.state.ca.us].

JAMES D. BOYD
Vice Chair and Presiding Member
Renewables Committee

Electronic Mail Lists: Renewables
Date: March 4, 2011

EXHIBIT D

KEMA

memo

To:	CEC ERP Staff	Date:	July 25, 2011
From:	KEMA Team		
Copy:			
Subject:	Small Wind Data Review		

Objective

Review certification data for DyoCore SolAir wind turbine and evaluate claimed performance.

Methods

Two types of data must be submitted to the CEC to become eligible to qualify for rebates from the Emerging Renewables Program: power curve and either one year of operational data or IEC 61400-2 Certification. Dyocore opted to submit power curve and one year of operational data. Using this data, KEMA were able to perform the following analyses to evaluate their claimed performance.

Power Curve Analysis

A power curve shows the power output of a wind turbine system over the operational range of wind speeds. An example power curve is shown in Figure 1. The power output in watts or kilowatts is shown on the vertical axis and the wind speed in meters per second or miles per hour is shown on the horizontal axis. Due to the variable nature of wind, the standard method for measuring a power curve requires taking many measurements over the entire operational range of the wind turbine and averaging power output over a range of wind speeds.

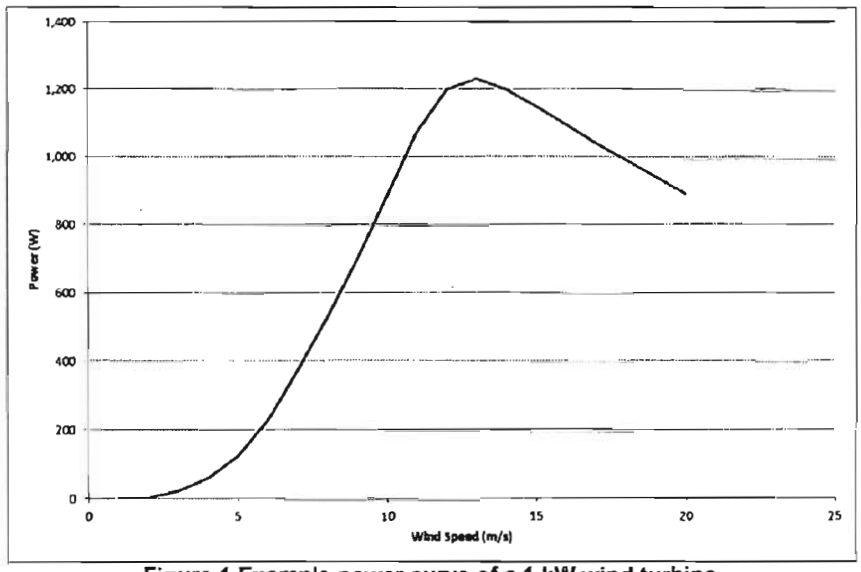


Figure 1 Example power curve of a 1 kW wind turbine.

The power curve can be evaluated by comparing the claimed turbine performance to the theoretical maximum performance as well as the current state-of-the-art performance. These comparisons can be made using the power coefficient (Cp) -- a percentage of how much power a wind turbine rotor is able to extract from the total wind available. For this analysis, Cp is determined by dividing the turbine power output at a certain wind speed by the total power in wind at that speed (Equation 1).

$$Cp = \frac{P_{turbine}}{P_{wind}}$$

Equation 1

The equation for the total power in the wind is shown in Equation 2

$$P_{wind} = \frac{1}{2}\rho V^3 A$$

Equation 2

Where:

- P_{wind} is the power of the wind in watts
- ρ is the air density in kg/m^3 (1.225 kg/m^3 unless otherwise noted)
- V is the wind speed in m/s
- A is the swept area of the rotor in m^2

This approach neglects mechanical and electrical losses in the turbine system and results in a conservative value for Cp, but is still sufficient to determine if the claimed power curve is in within a reasonable range.

The theoretical maximum for Cp is 0.593, which is known as the Betz limit and was derived in the early 1900's by Albert Betz and others [1]. With substantial development, current utility scale turbines can attain peak rotor Cp values of 0.49 [2]. The Cp of the claimed power curve was compared to the theoretical maximum performance as well current state-of-the-art performance of utility scale turbines.

Annual Energy Production Analysis

The Annual Energy Production (AEP) for a turbine can be estimated for a given wind resource using the power curve and a standard wind speed distribution. To calculate the AEP, first an annual wind speed distribution (number of hours per year spent at each wind speed) is determined using a Rayleigh probability distribution with the average annual wind speed from the test site. Equation 3 gives the Rayleigh distribution of the number of hours per year at a wind speed (V_i) given the site average wind speed (V_{ave}) and the wind speed bin size of 1.

$$Number\ of\ hours\ per\ year\ at\ V_i = \frac{\pi}{2} * \frac{V_i}{V_{ave}^2} * e^{-\frac{\pi}{4}\left(\frac{V_i}{V_{ave}}\right)^2} * 8760 * 1$$

Equation 3

Where:

- V_i = Wind speed of interest
- V_{ave} = Average wind speed
- *8760* = total number of hours per year
- *1* = size of the wind bin (spacing between each V_i)

Figure 2 shows an example Rayleigh wind speed distribution with an annual average wind speed of 7 m/s.

wind speed (m/s) i	Hours per year
0	0
0.5	140
1.5	406
2.5	635
3.5	807
4.5	913
5.5	951
6.5	927
7.5	855
8.5	750
9.5	628
10.5	504
11.5	388
12.5	287
13.5	204
14.5	140
15.5	93
16.5	59
17.5	36
18.5	22
19.5	12
20.5	7
21.5	4
22.5	2
23.5	1
24.5	0

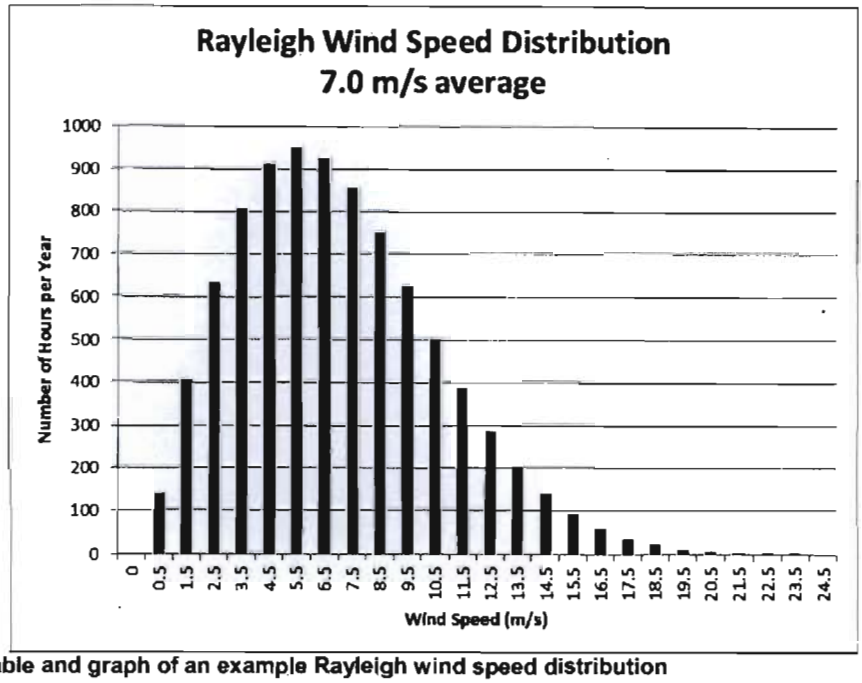


Figure 2 Table and graph of an example Rayleigh wind speed distribution

The energy production at each wind speed is the product of the turbine power output at that wind speed and the number of hours each year that the wind speed occurs. The AEP is then the sum of energy production at all of the different wind speeds. The estimated AEP was then compared to the claimed AEP taken from the operational data submitted by the manufacturer.

$$AEP = \sum_{i=.5}^{V_{max}} P_t(i) \times Hours\ per\ year\ at\ V_i$$

Equation 4

Where:

- $P_t(i)$ = turbine power output at wind speed i

Results

Using Power Curve Analysis and Annual Energy Production Analysis, KEMA evaluated the following equipment.

Manufacturer Name:	DyoCore
Model Number:	S80015dc
Description:	SolAir 1600W
Rotor Diameter:	1.2 meter
Claimed Power Output:	1,600 Watts
Claimed Annual Energy Production:	2,554 kWh
Notes:	Produces rated power at 18 mph

Table 1 shows a list of data files submitted by DyoCore for the SolAir turbine for eligibility for the CEC Emerging Renewables Program. Additional information and sources used in the analysis are also listed.

Table 1 DyoCore data summary.

File/Document Title	Description
Submitted Data	
DATA.xls	Correct Performance Curve, Performance Curve, Operational Year Data
DATA;001.xls	Performance Curve, Operational Year Data
DATA;002.xls	Correct Performance Curve, Performance Curve, Operational Year Data
DATA;003.xls	Correct Performance Curve, Performance Curve, Operational Year Data
Dyocore_Hamshire_IL_compiled_raw_ginlong_1_hr.xlsx	Operational Year Data
image003.png	Voltage/RPM Graph
image005.png	Power/RPM Graph
image007.png	Annual Energy/Wind speed Graph
Power Curve.bmp	Graph
rawdata09_hampshireIL.xlsx	Operational Data
rawdata09_hampshireIL;001.xlsx	Operational Data (Same as above)
Additional Information	
www.dyocore.com/solair.html	DyoCore web site turbine information page
IEC_Standard_61400-SolAir.pdf	Turbine and Testing overview document
www.dyocore.com//images/power_curve.JPG	Power curve picture on web site dated April 11, 2011
www.dyocore.com/sphpblog_0511/index.php?entry=entry110130-214346	DyoCore blog entry dated January 30, 2011 that includes power curve data
www.dyocore.com/sphpblog_0511/index.php?entry=entry110608-120151	DyoCore blog entry dated June 8, 2011 that includes power curve data

Power Curve Analysis

Several power curves were found in the submitted data and on the SolAir web site. The submitted file named Power Curve.bmp contained mis-labeled and unlabeled data and was not used in this analysis. Data for the Claimed Power Curve 1 shown in Figure 3 was taken from the submitted file "DATA.xls" on the tab titled "Correct Performance Curve". Data for the Claimed Power Curve 2 was taken from Figure 3 in the file "IEC_Standard_61400-SolAir.pdf" found on the DyoCore website. The third curve shown is the theoretical maximum power (Betz Limit) that a 1.2 meter diameter rotor could extract from the wind. The fourth curve on Figure 3 is the power curve of an optimal state-of-the-art turbine rotor with the same diameter as the DyoCore rotor.

DyoCore's claim of 1600 watts power output at 18 miles per hour (8.1 m/s) is 7.5 times greater than the theoretical maximum power output at that wind speed and 9.0 times greater than an optimal state-of-the-art turbine rotor with the same diameter.

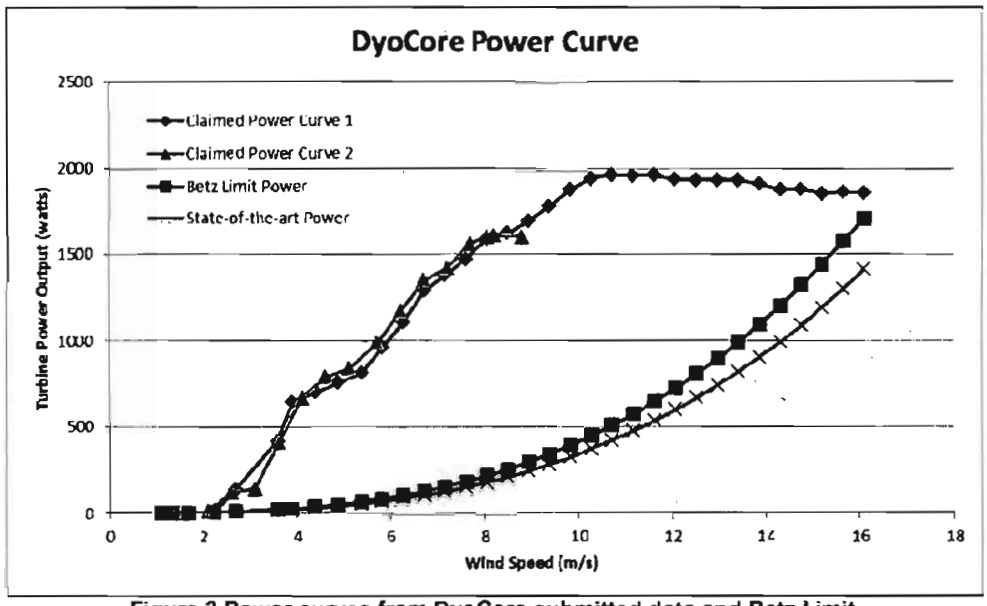


Figure 3 Power curves from DyoCore submitted data and Betz Limit.

Several other power curves were found on the manufacturer's web site that are substantially different than the claimed power curve submitted to the CEC. The data was found in two blog posts, dated January 30, 2011 and June 8, 2011 and a picture of a power curve graph that was added to the DyoCore web site on April 11, 2011. Website address for these data can be found in Table 1. The power curve picture can be found in Appendix A. These three power curves were very similar to each other, so only the data from the January 30 blog post was included on Figure 4. Figure 4 also shows the power curve from the submitted file "DATA.xls" and the Betz Limit and State-of-the-art power curves for reference. The power curve from the blog post is much lower that the submitted power curve, but still above the theoretical maximum of the Betz Limit power curve.

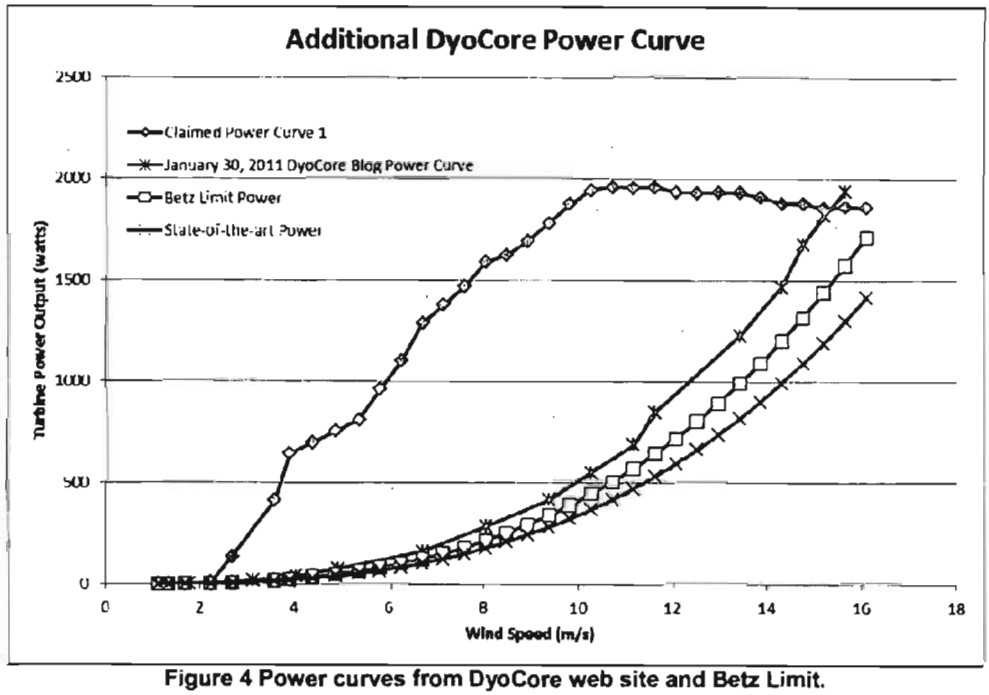


Figure 4 Power curves from DyoCore web site and Betz Limit.

Annual Energy Production Analysis

Data for the AEP analysis was taken from the file "DATA.xls". This same data was repeated in several of the other submitted data files (DATA;001.xls, DATA;002.xls, DATA;003.xls, and Dyocore_Hamshire_IL_compiled_raw_ginlong_1_hr.xlsx). Units for winds speed and energy production were not stated, and assumed to be miles per hour and kilowatt-hours respectively. These assumptions lead to results with the correct order of magnitude and are shown in Table 2 as the Claimed AEP. The annual average wind speed for the site was calculated from the submitted data to be 6.8 m/s (15.3 mph). Using Equation 3 and Equation 4 above and the Claimed Power Curve 1 shown in Figure 3, the annual energy production was calculated to be 9,513 kWh. The same analysis method using the state-of-the-art rotor power curve results in an annual energy production of 1,643 kWh.

Table 2 Annual energy production analysis results.

Claimed AEP	2,554 kWh
AEP using Claimed Power Curve	9,513 kWh
AEP using state-of-the-art rotor	1,643 kWh

Conclusions

From the above analysis, the manufacture's claimed performance is not possible because the claimed power curve exceeds the performance of a state-of-the-art wind turbine rotor by 9.0 times.

References

1. de Vries, O., Fluid Dynamic Aspects of Wind Energy Conversion, National Aerospace Laboratory NLR, The Netherlands, 1979.

2. Based on industry experience and conversations with experts in wind turbine aerodynamics.

Appendix A

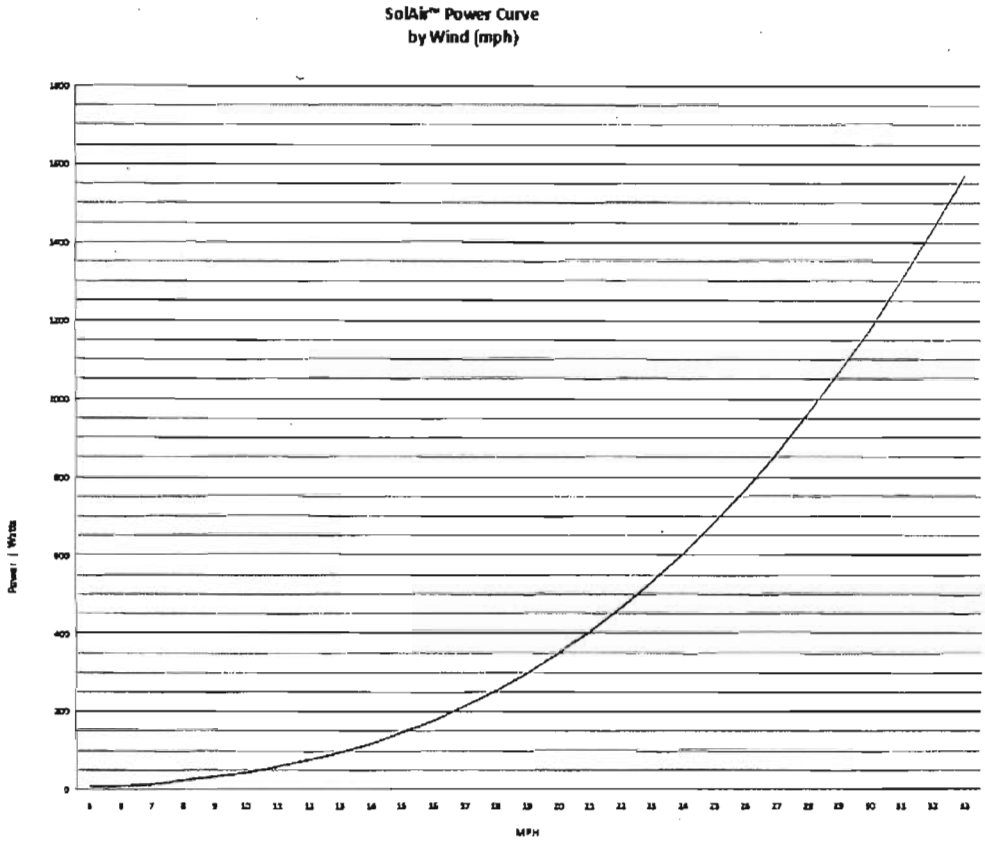
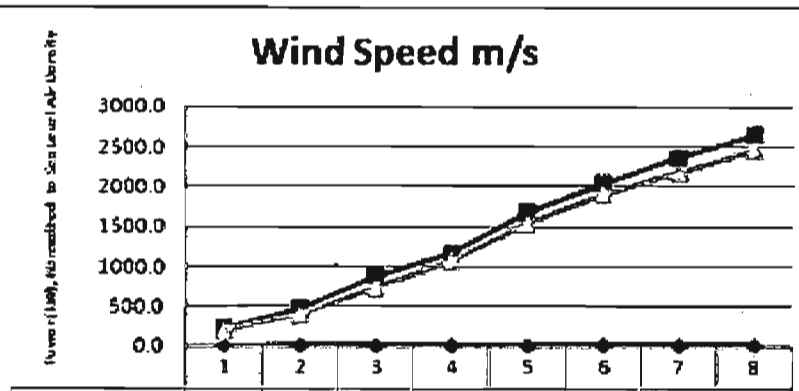


Figure 5 Power curve picture found on DyoCore web site (www.dyocore.com//images/power_curve.JPG).



	1	2	3	4	5	6	7	8
m/s	2.2	2.7	3.1	3.6	4.0	4.5	4.9	5.4
hamshire	221.8	462.2	870.2	1148.0	1671.8	2034.4	2353.2	2641.0
San Marcos	189.0	386.2	730.2	1074.3	1533.4	1901.5	2170.9	2461.0

Figure 6 Picture titled "Power Curve.bmp" submitted by DyoCore.

EXHIBIT E

DyoCore - Comments - Mozilla Firefox

http://www.dyocore.com/sphpblog_0511/comments.php?y=11&m=02&entry=entry110207-094058

DyoCore SolAir Wind Pit

Monday, February 7, 2011, 09:40 AM **Technology**

February 2011 DyoCore completes the setup of its testing facility in Carlsbad CA Now called the SolAir Wind Pit, DyoCore will expand testing and further development of its unique low turbulent wind solution called SolAir.

The wind pit can create simulated winds up to 30mph and DyoCore techs indicate with a little modification wind simulation tests can reach upwards of 60 or 70mph!

DyoCore's new facility is one of only a small handful of wind simulation testing facilities nationwide and demonstrates our commitment to making SolAir the best solution for the homeowner, said David Raine, founder of DyoCore. within this new facility we can simulate, within reason, actual conditions in a controlled environment on demand to further test and develop our product to optimal performance. We will additionally make this facility available to our industry to assist in the continued momentum to make small wind power obtainable, efficient and affordable for the average home owner.

Testing begins this week and guests are welcomed. Over the next few months DyoCore expects to log hundreds of simulation hours and continue to add on new testing tools to its facility. For more information about the SolAir Wind Pit email **testing@dyocore.com**.

Administrator (David Raine)

Monday, April 11, 2011, 08:30 AM

This is the most accurate reference to estimated power production based on wind conditions. Though this does not account for gusts or rapid changes it can provide a basis for your production expectations at specific constant wind speeds:

http://www.dyocore.com//images/power_curve.JPG

Start | Novell GroupWise - M... | Document1 - Microsof... | DyoCore - Wind turbi... | DyoCore - Comments... | Tuesday, July 26, 2011 | 2:12 PM

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power_curve.JPG (JPEG Image, 839x674 pixels) - Mozilla Firefox

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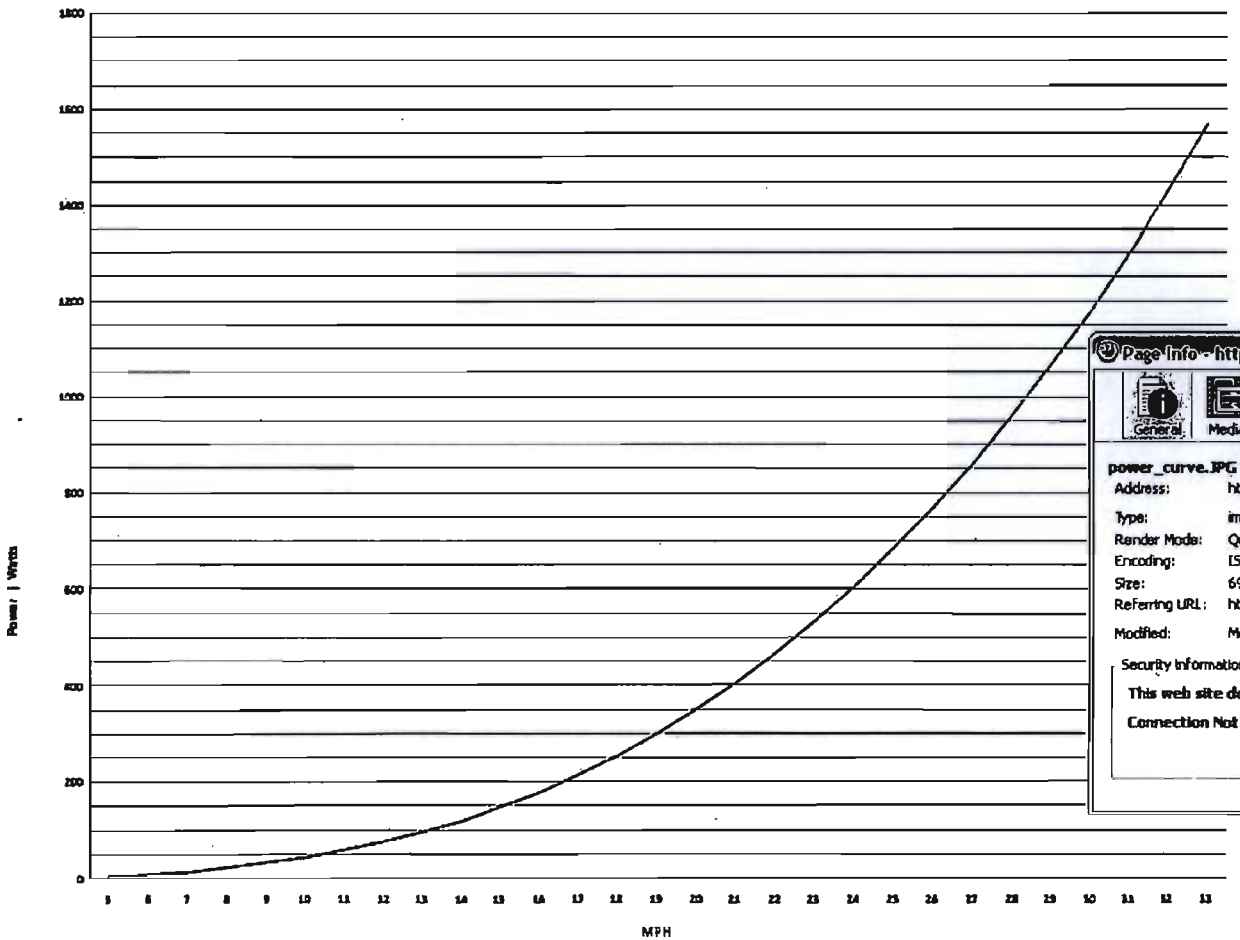
http://www.dyocore.com/images/power_curve.JPG

Go Solar California - I... | EnergyNet, the Intran... | California Cash For Ap... | DSIRE: DSIRE Home | California's Emerging ... | Go Solar California | Energy News | Latitude Longitude loc... | California State Board...



Page Info - http://www.dyocore.com//imag...

General | Media | Permissions | Security

power_curve.JPG (JPEG Image, 839x674 pixels):

Address:	http://www.dyocore.com//images/power_curve.JPG
Type:	image/jpeg
Render Mode:	Quirks mode
Encoding:	ISO-8859-1
Size:	69.49 KB (71,157 bytes)
Referring URL:	http://www.dyocore.com/solair.html
Modified:	Monday, April 11, 2011 7:15:45 AM

Security Information for this page

This web site does not supply ownership information.

Connection Not Encrypted

Details

Tuesday, July 26, 2011

start | Novell GroupWise - M... | Document1 - Microsof... | power_curve.JPG (JP... | Page Info - http://... | 2:17 PM

35

EXHIBIT F

DyoCore, Inc.
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Carlsbad, CA 92010

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www.dyocore.com

California Energy Commission
1516 Ninth Street
Sacramento, California 95814

DOCKET
02-REN-1038
DATE APR 18 2011
RECD. APR 18 2011

April 18, 2011

California Energy Commission,

Thank you for this opportunity to present and thank you to the committee for your diligent efforts in reinstatement of the ERP.

California created the Renewable Portfolio Standard (RPS). Under the RPS, the Renewable Energy Program's focus is twofold as published;

- To increase, in the near term, the quantity of California's electricity generated by renewable energy resources, while protecting system reliability, fostering resource diversity, and obtaining the greatest environmental benefits for California residents.

- To identify and support emerging renewable energy technologies with the greatest near-term commercial promise that merit targeted assistance.

In 1996 ERP was established as an initiative to promote "wind" but later was re-invested in to promote energy conservation. Then after very few qualified recipients the program evolved into an incentive to promote new technology. This is the current modern direction of the plan. With the recent economy downfall and more direct financial crisis in CA, I think that, now today, the program is also in place to promote jobs and economy within CA.

- Companies like DyoCore are the intended target of the program.

- DyoCore's SolAir is New innovative Technology

- SolAir applies to the largest majority of CA residents who directly funded the program

- DyoCore both as a CA company and through its organization of professional distributors represents 100's of jobs and millions into our economy.

- DyoCore is the forefront company for the momentum created within local communities towards the acceptance and installation of Wind power technology throughout CA and the US.

- SolAir combines wind and solar, this is again the most innovative development of technology towards the ERP's intended objectives.

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Summary concerns with the current ERP:

On March 4th the CEC sent notice that it suspended the renewables rebate program so it may address deficiencies with the program requirements.

The goal of the ERP is to increase the installation of small wind systems and fuel cells

Though the suspension notice indicated "deficiencies with the program requirements", this does not fit well into the intention of the program as outlined.

The most current intention of the program, the state and our country is to promote the development of new technologies.

The concern is the recent large activity of ERP reservations from a single company whereas only a few months ago only a very few manufacturer products applied to a very few qualified recipients. Additionally these products are priced at significantly higher price points.

Now that products are available to a larger quantity of participating recipients Attention is now being placed on the production of energy at installation sites and the method of rating products qualified for the program.

Solution overview:

Separation of wind into specific qualification categories. Currently a power/wind rating incentive applies equally to a vague range of installation sites regardless of the wind conditions. A turbine qualified at 2kW @ 25mph and a turbine qualified at 2kW at 35mph apply to the exact same incentive regardless if either are installed in wind conditions substantially less than the rated wind speed.

By defining wind categories and ratings based on qualified installed locations will strengthen the intended benefits of the program. A turbine should be qualified based on its location and based on the projected power production as applied to that location.

Unfortunately wind experienced at a location can change dramatically from day to day less year to year. A qualified site today might not be qualified next week, however, relevance at the time of qualification and good history data should present a foundation for future expectations. we recommend the consideration of wind, product categories (wind zone categories)

Wind zones specific to turbines in size and intended use can be created that build a foundation for qualifying the program as applied to specific expected conditions. Data is readily available for easy separation of these categories.

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- Micro wind – turbines under 500w or under a specific blade size, usually less than 48" (more appropriate) can only produce so much power and intended use is typically at ground level.

- Low or small wind – Turbines again with a blade diameter under 70' and whereas the intended installation is under 50' fall well into this category.

- Medium wind – installation sites well above 50', typically large pole mount, and with blade diameters exceeding 70" typically apply to this category.

- High wind – greater than 5kW and installed on poles exceeding 100'.

Special circumstances can apply to any category whereas local wind conditions at the intended site could be greater or lower than normally anticipated for the original category. A smaller turbine can be applied to a pole mount application and increase it's expected normal applied performance. The solution is a simple application exception request that can be accompanied with supporting data, installation details and wind analysis.

Summary Conclusion:

The ERP program was designed and is in effect today to:

- make green energy available financially

- create green jobs

- promote green technology

- make CA a green community

- make green products accessible to everyone

Until small wind products like DyoCore the program did not fully accomplish any of these objectives. Manufacturers like DyoCore are the core of the ERP intended results and DyoCore has demonstrated significant success in accomplishing the ERP objectives.

Unfortunately without site qualifications any turbine can be installed in a location that does not meet the intentions of the ERP. If you create site specific guidelines and more specific product categories for incentive qualification you can distinguish between productive and non-productive installations.

An incentive that varies based on the installed location and turbine size creates a powerful tool that maintains the direction of the program as designated.

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DyoCore notes from ERP workshop

Presentation moderator – Anthony NG

April 14, 2011

1. Primary stated barrier and cause to suspension of the ERP; Rebate amounts applied for in reservations covered most and in some all costs of the systems resulting in systems being installed that could possibly have little owner vested interest in the success of the application.

   Response:

   This is a direct correlation with over inflated Industry pricing / overpriced products. ERP was projected to bring down costs. New tech is less expensive and opens doors for greater deployment. New technology and resources for manufacturers present lower price point advantages and in turn will drive down pricing – this in turn is a benefit to the program and its success.

   The program as it is priced today should remain the same and be a tool to reward companies that maintain lower cost margin products and an incentive for larger turbine manufacturers to reduce highly over inflated price points.

   Manufacturers already have tremendous pressure to assure the success their products as installed and spend considerable resources to assure installations meet expectations.

2. It was presented that a $ per kWh produced annually could be applied.

   Response:

   If backed by an upfront incentive as applied to an annual objective it could be a good solution. However, we caution that any program with a spread out rebate structure will provide barriers to financing for product sales. If banks are unable to provide financing for installation of proposed/qualified systems due to lengthy repayment of their funds the sales agents will not have the resources needed to maintain growth within the market.

   A potential solution is the state initiates a direct funding incentive and provides the rebate based on pre-qualified conditions which then apply to a term loan or other method of payback over time that is funded through the existing program.

DyoCore, Inc.
3125 Tiger Run Court, #104
Carlsbad, CA 92010

P/F 866.404.2428

www.dyocore.com

3. Bergey presented that they, Bergey, are the only qualified product. Bergey presented that the list should be scrubbed. Mike Bergey is on the SWCC board and has already demonstrated extreme bias towards the industry – specifically towards "small wind".

   Response:

   All turbines installed in California by simple permitting standards have to present extensive 3rd party engineering, testing and performance proof prior to being issued a permit for installation. Even if a product acquires CEC listing, it will not be able to pull a permit until it can demonstrate it meets all the current applicable standards.

   Proper equality in listing should be given to all companies. Manufacturers should not hold positions that allow discrimination against other companies. Any 3rd party certification body should be completely independent. To force companies to meet a standard that is enforced and managed by distributors directly is in conflict with the intentions of a fair program.

   The ERP does and should encourage tech and its continued development. We cannot simply dismiss new development of tech and remove these tools from the eligibility, this is completely opposite of the ERP program. Without encouragement and resources of new tech there will be no new tech.

4. Listings at fixed wind speeds. It was discussed that turbines have arbitrary wind speed listings.

   Response:

   This is a valid point. Wind ratings are arbitrary and only effective if a turbine is installed in the rated conditions. This is highly unlikely. Most turbines will never experience the amount of wind they are rated for. 99% of the contributors to the program do not experience winds that most of the qualified products are listed at.

   Ratings should be based on realistic expectations as related to the specific install site. A turbine size and intended use is a great indication of its performance.

   Breaking up turbines into respective categories that label them for specific expectations and incentive consideration is a key method in the success of the program.

5. Site wind analysis reporting

   Response:

   Education is a primary solution, a wind turbine needs wind, an unqualified location damages the success of the program, distributors and manufacturers.

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High variable wind conditions make it difficult to do site evaluate in dense areas most applicable to the majority

Simple tools are fairly readily available for local area conditions through accumulated wind data but not always specific to a site. Possibly within several blocks and if specific to turbines than only applicable to 60' poles. Tools like Wind Cad are very expensive and only applicable to larger pole mounted turbines. They have no relevance on low wind and the majority of intended applications in California.

Large costs of formal assessments could be greater than the cost of the power benefit and possibly the cost of the system

Qualified professional installers should be held accountable for bad decisions. Training and certification by the ERP or CEC will provide the resources for distributors to make smart installation decisions.

Great source for residential and small commercial low wind analysis:
http://www.wunderground.com/wundermap/

6. Certification qualification for ERP inclusion

Response:

Limited and expensive resources towards 3rd party testing, standards have not yet been formally accepted towards certification, no current standard exists or is agreed upon within the wind field directly. But readily available professional and recognized 3rd parties exist and are already required prior to a permit or installation being done in California.

Standards for safety already exist, are excepted by state codes and provide a solid foundation for qualification. Safety and quality should be the primary factor IEC standards present a very good guideline and 3rd party NRTL companies have done qualified testing for safety and engineering for years.

The current CEC qualification does not need to be changed.. Any CA city or community already has a very stringent installation/permitting process to assure safety and quality standards are met. All of which already highly exceed any state minimums.

7. Combining solutions into the ERP (wind, solar, fuel cells)

Response:

DyoCore, Inc.
3125 Tiger Run Court, #104
Carlsbad, CA 92010

P/F 866.404.2428

www.dyocore.com

Simple process for applying Additional Benefits to tie together wind, solar as a combined application.

Separation of fuel cells that could substantially improve wind, solar performance. A direct incentive would encourage important tech development in this direction. Similar to solar now.

8. Add a cost cap based incentive

   Response:

   Avoid cost cap, this encourages overpricing. Lower cost turbines move the market in the right direction holding manufactures to fair market prices.

We appreciate your consideration in reviewing our comments towards your objectives in reinstatement of the ERP.

Sincerely,

David Raine
CTO, DyoCore Inc.
760-580-4271
dave@dyocore.com

cc
Assemblyman Martin Garrick
1910 Palomar Point Way, #106
Carlsbad, CA 92008

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512
www.energy.ca.gov

September 9, 2011

Raoul A. Renaud
Hearing Adviser II
California Energy Commission
1516 9th Street
Sacramento, CA 95814

RE: Amendment of Complaint against DyoCore, Inc.
Docket # 11-CAI-03

Dear Mr. Renaud:

Energy Commission staff request leave to amend the complaint filed against DyoCore, Inc. on July 26, 2011 ("Complaint") to clarify that staff are not seeking to recover rebate payments from consumers for small wind systems that use the DyoCore SolAir wind turbine.

The referenced clarifications are identified in Attachment 1 to this letter. The language that is proposed to be deleted from the Complaint appears in strike-through in Attachment 1 and the language that is proposed to be added is underlined.

Notably, the changes in the proposed amendment do not affect the allegations against DyoCore, Inc. Thus, if the Renewables Committee grants staff leave to amend the Complaint, it does not appear that it would be necessary for DyoCore, Inc. to respond.

Sincerely,

Robert P. Oglesby
Executive Director

Enclosure

Exhibit 2

Attachment 1
Changes to Complaint Filed Against DyoCore, Inc. (Docket # 11-CAI-03)

VII. Requested Action (§ 1231(b)(5))

I respectfully request that the DyoCore turbine be immediately removed from the Energy Commission's list of eligible equipment for use in the ERP. As shown by the KEMA report, and reflected by DyoCore's admissions on its own website, the DyoCore turbine was listed as eligible for use in the ERP on the basis of grossly overstated, inaccurate, and invalid information. I further request that the Energy Commission provide guidance regarding the resolution of applications for rebate reservations and payment requests under the ERP for small wind systems that use DyoCore turbines, and take such action as may be necessary to recover ERP funds that were paid as rebates for such systems.

In addition, I request that the Energy Commission refer this matter to the Attorney General for investigation and prosecution, as appropriate.

Finally, I also request that the Energy Commission send the following or similar notice to all retailers and end-use consumers who applied for rebates under the ERP for small wind systems using DyoCore turbines along with the Energy Commission's order serving this complaint:

> Under the Emerging Renewables Program ("ERP") there are two~~three~~ categories of consumers who may be affected by the attached complaint proceeding: (1) ~~consumers who received a rebate payment under the ERP for the purchase and installation of a small wind system that uses DyoCore SolAir wind turbines ("DyoCore turbines"); (2)~~ consumers who were issued an R2 Form reserving ERP funding for systems that use DyoCore SolAir wind turbines ("DyoCore turbines"), but have not received, or submitted a request for a rebate payment~~;~~ and, (2~~3~~) consumers who have pending applications for rebate reservations under the ERP for systems that use DyoCore turbines. All parties to these ~~rebate payments,~~ payment requests and applications are on notice that payments may be ~~revoked or~~ withheld~~,~~ and pending applications may be rejected~~,~~ pursuant to the Audits and Inspections provisions contained in Section 2, subdivision (K) of the ERP Guidebook~~, and the Fraud and Misrepresentation provisions contained in Section 7, subdivision (b) of the Renewable Energy Program Overall Program Guidebook ("Overall Program Guidebook")~~.

Energy Commission staff are NOT seeking to recover rebate payments from consumers for small wind systems that use DyoCore turbines.

~~Further, any misstatements, falsifications, or misrepresentations contained in these payment requests or applications~~ This matter may be referred to the Attorney General for possible investigation and prosecution pursuant to the Fraud and Misrepresentation provisions contained in Section 7, subdivision (b) of the Overall Program Guidebook.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

IN THE MATTER OF THE COMPLAINT AGAINST DYOCORE, INC. BROUGHT BY ENERGY COMMISSION STAFF

Docket No. 11-CAI-03
(Revised 9/6/2011)

COMPLAINANT

California Energy Commission
Robert P. Oglesby
Executive Director
1516 Ninth Street
Sacramento, CA 95814
e-mail service preferred
roglesby@energy.state.ca.us

California Energy Commission
Payam Narvand
Program Manager
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COUNSEL FOR COMPLAINANT

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Gabe Herrera
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California Energy Commission
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1516 Ninth Street
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jknapp@energy.state.ca.us

RESPONDENT

DyoCore, Inc.
Ralph Bettencourt, CEO
David Raine, CTO
3125 Tiger run Court, #104
Carlsbad, CA 92010
ralph@dyocore.com
dave@dyocore.com

INTERVENORS

Solar Point Resources Inc.
Jane E. Luckhardt
Stephen J. Meyer
Downey Brand, LLP
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Sacramento, CA 95814
jluckhardt@downeybrand.com
smeyer@downeybrand.com

INTERESTED ENTITIES/AGENCIES

Bay Area Energy Solutions
1326 Marsten Road
Burlingame, CA 94010
www.bayenergy.com

California Solar Systems
1411 Rusch Court
Santa Rosa, CA 95401
barryw@855casolar.com

Synergy Corp.
863 N Bush Avenue
Clovis, CA 93611
marlin.magic@sbcglobal.net

Crizer Wind Energy, Inc.
1191 4th Street
Los Osos, CA 93402
crizerwindenergy@sbcglobal.net

My Wind Power
4037 Phelan Road, A267
Phelan, CA 92371
www.info@mywindpower.biz

Solar Point Resources
P.O. Box 4761
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Energy Pros
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brian@energyprosllc.com

***Wind Solar Solutions**
420 Avalon Street
Morro Bay, CA 93442
corky@windandsolarsolutions.com

***CA Green Team**
720 North China Lake Boulevard
Ridgecrest, CA 93555
tammy@cagreenteam.com
rayw@cagreenteam.com

Prevailing Wind Power
324 N Gertruda
Redondo Beach, CA 90277
bob@prevailingwindpower.com

*indicates change

INTERESTED ENTITIES/AGENCIES (cont.)

Green Solar Solutions, Inc.
22267 Vacation Dr.
Canyon Lakes, CA 92587
greensolarsolutions@yahoo.com

Desert Power, Inc.
77380 Michigan Dr.
Palm Desert, CA 92211

San Diego Small Wind
3125 Tiger Run Ct. #103
San Marcos, CA 92009

Apple Acres, Inc. DBA Gridnot
P.O. Box 645
Lucerne Valley, CA 92356
info@gridnot.com

ENERGY COMMISSION – DECISIONMAKERS

Carla Peterman
Commissioner and Presiding Member
CP eterma@energy.state.ca.us

James D. Boyd
Vice Chair and Associate Member
jboyd@energy.state.ca.us

Raoul Renaud
Hearing Officer
rrenaud@energy.state.ca.us

ENERGY COMMISSION - CHIEF COUNSEL

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ENERGY COMMISSION - PUBLIC ADVISER

Jennifer Jennings
Public Adviser
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publicadviser@energy.state.ca.us

*indicates change

DECLARATION OF SERVICE

I, **Rhea Moyer**, declare that on **September 9, 2011**, I served and filed copies of the attached **Amendment of Complaint against DyoCore, Inc. Docket #11-CAI-03**, dated **September 9, 2011**. The original document, filed with the Docket Unit or the Chief Counsel, as required by the applicable regulation, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[http://www.energy.ca.gov/renewables/emerging_renewables/11-cai-03/]**.

The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit or Chief Counsel, as appropriate, in the following manner:

(Check all that Apply)

For service to all other parties:

_x_ Served electronically to all e-mail addresses on the Proof of Service list;

_x_ Served by delivering on this date, either personally, or for mailing with the U.S. Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "e-mail service preferred."

AND

For filing with the Docket Unit at the Energy Commission:

_x_ by sending an original paper copy and one electronic copy, mailed with the U.S. Postal Service with first class postage thereon fully prepaid and e-mailed respectively, to the address below (preferred method); ***OR***

____ by depositing an original and 12 paper copies in the mail with the U.S. Postal Service with first class postage thereon fully prepaid, as follows:

CALIFORNIA ENERGY COMMISSION – DOCKET UNIT
Attn: Docket No. 11-CAI-03
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

OR, if filing a Petition for Reconsideration of Decision or Order pursuant to Title 20, § 1720:

____ Served by delivering on this date one electronic copy by e-mail, and an original paper copy to the Chief Counsel at the following address, either personally, or for mailing with the U.S. Postal Service with first class postage thereon fully prepaid:

California Energy Commission
Michael J. Levy, Chief Counsel
1516 Ninth Street MS-14
Sacramento, CA 95814
mlevy@energy.state.ca.us

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

/s/ Rhea Moyer
Rhea Moyer

*indicates change

DOCKET
11-CAI-03
DATE JUL 26 2011
RECD. JUL 27 2011

From: David Raine <dave@dyocore.com>
To: <mlevy@energy.state.ca.us>
Date: 7/26/2011 10:23 PM
Subject: Response to Complaint Re DyoCore, Inc., Solar Wind Turbine
Attachments: DyoCore_response to CEC Notice.pdf

-----Original Message-----
From: David Raine [mailto:dave@dyocore.com]
Sent: Tuesday, July 26, 2011 10:20 PM
To: 'Robert Oglesby'; 'ralph@dyocore.com'
Subject: Response to Complaint Re DyoCore, Inc., Solar Wind Turbine

Thank you for this notice and the opportunity to respond.

We have attached our preliminary response. We hope it will be taken into consideration during your meeting.

We feel very strongly that the complaint is misleading and inaccurate of the facts.

Thank you for your consideration,

David Raine
DyoCore

www.dyocore.com
p&f. 866-404-2428
c. 760-580-4271
dave@dyocore.com

-----Original Message-----
From: Robert Oglesby [mailto:ROglesby@energy.state.ca.us]
Sent: Tuesday, July 26, 2011 5:26 PM
To: ralph@dyocore.com
Cc: dave@dyocore.com
Subject: Complaint Re DyoCore, Inc., Solar Wind Turbine

Please see attachments below. Thank you.

DyoCore, Inc.
3125 Tiger Run Court, #104
Carlsbad, CA 92010

P/F 866.404.2428

www.dyocore.com

Mr. Michael J. Levy
Office of Chief Counsel
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

RE: DyoCore Response to Complaint

Dear Mr. Levy,

Following is our response to the complaint presented to us on July 26, 2011 submitted by Robert P. Oglesby. The allegations in the complaint are misleading and false. We request a formal hearing and to be allowed to present facts that would clarify that DyoCore both met the requirements of the intended program and represented the program with the highest of intentions, integrity and honorably.

In response to point III A:

DyoCore's SolAir is exactly why the ERP was created. DyoCore did not develop the ERP and had no part in its designation, rebate structure, amount of rebate or in its management. DyoCore's SolAir was in development and being sold within the market before DyoCore's application to be included into the ERP at the same price point upon inclusion. DyoCore's SolAir is the first product of its kind. It is amongst the lowest cost turbines on the market, it applies to the broadest range of potential users and meets all required certifications for use in most CA urban communities. In fact it is in most communities the very first and only allowed residential roof mounted turbine.

DyoCore has worked diligently in development of SolAir, education within the market and the drive behind the acceptance of new policies and regulations that will benefit the entire industry for years to come. DyoCore did this at its own expense, with no grants and no government funding. Because of these accomplishments the ERP now has a venue that applies to the majority of homeowners opposed to the 1% it previously applied to. This is not a burden on the ERP it lends to the pinnacle success of the ERP. Removing DyoCore from the listing based on false allegations substantially cripples the program and halts its intended purpose while also discouraging the development of new technology and lower cost energy alternatives.

DyoCore's product price point was established before application to the program and before knowledge of the rebate allotted to its product. The end result was that the rebate allotted upwards of 100% towards the full purchase and install of the SolAir system. This was known by the CEC and encouraged by the CEC program management staff. It was never indicated that this was a concern or that DyoCore's price point was a violation of the programs intention. The ERP states directly that it was designated to encourage lower cost products. DyoCore meets that expectation.

In Response to part III B:

DyoCore did not create the rules for application, DyoCore simply submitted an application and the materials requested. DyoCore collected almost two years of data from two reporting sites, one in Hampshire IL, the other in San Marcos CA. It was determined by NEMA that the raw data from the site in Hampshire IL would be acceptable due to higher average annual wind conditions. The review and listing of DyoCore's SolAir

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was done by NEMA, a third party with no affiliation to DyoCore. When the listing was granted it was DyoCore's understanding that the rating was based on Annual Average Wind and not based on a specific wind speed. These two are completely different sets of data. At an annual average wind speed of 18mph, which could and did represent times in which winds were substantially greater at both locations, the expected production was 1.8kW. In real-time winds of 18mph the production is approximately 212 watts, this is about 66% of the BETZ maximum 59%. This information was provided and available to NEMA upon application. It was our understanding that the rating was Annual Wind Speed Production and presented, evaluated and determined by NEMA not DyoCore.

A comparison of the two side by side is attached herein. (Attachment A)

When the listing rating was given to DyoCore NEMA contacted us and asked if we wanted to modify our rating from 12mph to a higher rated amount because we had the lowest rating wind speed on the approved list. Most other products were rated at winds well above 25mph. We had felt we were being conservative at only 18mph as we felt most Urban areas where our product primarily applied would never experience conditions greater than this. This is a direct indication of our integrity and intention upon acceptance of a listing.

Recently the CEC accepted the listing of another company's product that utilizes the DyoCore PMG. This product received a rating of 1.6 at approximately 32mph. Regardless of the "wind speed" rating, it has the same effect and outcome of rebate. The only variance is the wind speed at which the rating was applied. However, both our product and these companies receive the same rebate amount. This is not miss-intention on either party's part, it is simply a lack of formal standards for the purpose of qualification and rating.

At the time of listing DyoCore on the CEC the process was both new to us, to NEMA and to the CEC as only a handful of other products were ever listed with little or no standard in place. This is evident by the recent upset in the program and need for revision. However, even in its revision there still is no specific standard of rating or formal US process of certification other than suggested guidelines by AWEA. DyoCore has worked directly with TUV to meet UL standards and continues daily to collect and evaluate site data to better represent performance expectations based on specific install circumstances. DyoCore's website provides quite a bit of continued development material that is made public for the purpose of evaluation of its product and the intended use. http://www.dyocore.com/sphpblog_0511/index.php. Almost 50,000 unique visitors have watched and some participated in our continued development towards smart low cost urban alternative energy solutions.

DyoCore provides the highest level of product warranty – a 100% no questions asked policy on the removal or replacement of a non working system in addition to being the only company with highly trained professional distributors and installers that in contract support the product 100% after installation through the entire warranty term.

In response to part III C:

DyoCore completes all R1 applications to the rules and to the best of its ability to estimate wind conditions based on site evaluations. DyoCore cannot answer directly for its distributors but works diligently and in good faith to educate all its distributors and clients about proper site evaluations and placement of SolAir units in qualified locations. However, the wind is a difficult aspect to estimate with recent changes in the environment and further completed by the Urban landscape where most SolAir units are installed. This is a new market and in most areas the first application of its kind. There are hundreds of Urban area installations throughout CA, some in great locations and some in poor locations. All of which are fairly recent and/or just being completed. DyoCore will continue to collect data and use that knowledge to make better decisions on installation sites but also estimates on production. There unfortunately no history to base these assumptions on.

DyoCore, Inc.
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There were companies that mislead potential clients indicating that they were an authorized Distributor, however they were not and sent formal notices to cease all representation of the DyoCore product and notice was given to the CEC that they were not an authorized distributor. We recommended to the CEC that they deny any applications that this company falsely sent in as an authorized representative of our product. This is the only instance known to us of potentially false applications and this was not done on the part or by a representative of DyoCore.

Our request for consideration and resolution:

DyoCore's SolAir has grown to be a significant Hybrid Wind/Solar energy tool within the emerging market with now hundreds units installed throughout CA and over a thousand worldwide. Short term installations are estimated at a little over 4000 units within the next year. SolAir is a significant change in who small wind applies to. Removal of SolAir damages dozens of business who with high integrity and honorable actions submitted qualified ERP reservations representing thousands of CA residents. Based on the numbers submitted in the complaint it would indicate that SolAir is the most successful small wind solution ever developed both in public demand but also in the push for the continued development of new wind technologies that apply to everyone and not just the few in remote areas and with significant financial resources.

If the contention is the listing rating, DyoCore requests to be considered for re-rating to the new ERP playbook guidelines as outlined in the July 2011 DRAFT and apply that rating to all currently outstanding held R1 reservations. DyoCore does not feel it would be in good faith to make any changes retroactive for currently held/issued R2s as all parties have acted honorably and both dozens of business and hundreds of CA residents have applied under qualified terms and the intention of the program.

DyoCore in June of 2011 submitted application to the SWCC and expects testing towards formal rating certification to begin shortly that both meets the new playbook standards and provides the CEC with a direct resolution to the complaint.

In the event of consideration of removal of the DyoCore product listing with the CEC DyoCore requests a formal hearing and that the Energy Commission will allow DyoCore reasonable time to prepare and present facts that demonstrate the statements as indicated herein, address all statements falsely represented in the Complaint and present its belief that not only does DyoCore meet the requirements of the CEC listing and ERP it is the pinnacle intended purpose of the program.

David Raine,
CTO DyoCore, Inc.
3125 Tiger Run Court, #104
Carlsbad, CA 92010
(760) 580-4271

CC:
Robert Oglesby
CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512

Office of Assemblyman
Martin Garrick

Office of Senator Wyland

DyoCore, Inc.
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Carlsbad, CA 92010

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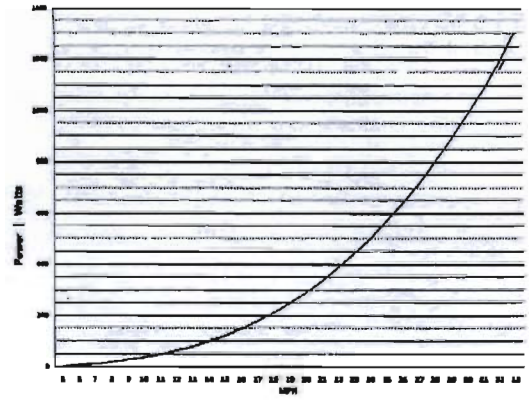
Attachment A

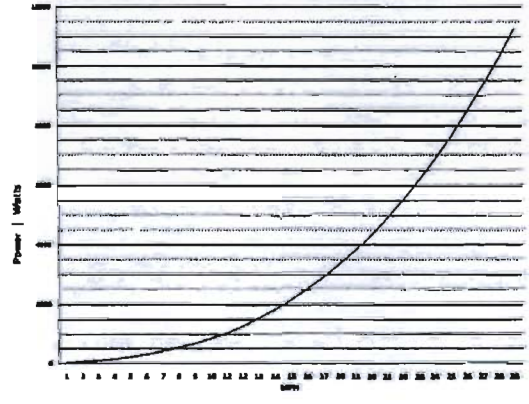
Table showing SolAir expected power vs BETZ limit at constant wind speeds. SolAir is approximately 66% of the BETZ limit at a Cp of 45%.

mph	Watts	m/s	Betz Max @ .592
1	0	0.4	0
2	0	0.9	0
3	1	1.3	1
4	2	1.8	1
5	5	2.2	7
6	8	2.7	11
7	12	3.1	19
8	18	3.6	28
9	26	4.0	40
10	36	4.5	54
11	48	4.9	72
12	63	5.4	94
13	80	5.8	119
[redacted]			
15	122	6.7	183
16	143	7.2	214
17	178	7.6	266
[redacted]			
19	249	8.5	372
20	290	9.0	434
21	336	9.4	502
22	387	9.8	578
23	442	10.3	660
24	502	10.7	750
25	567	11.2	847
[redacted]			
27	715	12.1	1068
28	797	12.5	1191
29	885	13.0	1323
30	980	13.4	1464
31	1081	13.9	1616
32	1190	14.3	1777
33	1305	14.8	1949
34	1427	15.2	2132
35	1556	15.6	2325
[redacted]			
37	1839	16.5	2747
38	1992	17.0	2976
39	2153	17.4	3217

SolAir™ Power Curve
by Wind (mph)



SolAir™ Power Curve
Estimated Annual Power Production by Wind (mph)



DYOCORE INC.
3125 Tiger Run Court #104
Carlsbad, CA 92010
Phone and Fax: 866-404-2428

Carla Peterman
CEC Commissioner

California Energy Commission
Office of Chief Counsel
1516 Ninth Street, MS-14
Sacramento, CA 95814

DOCKET
11-CAI-03
DATE AUG 08 2011
RECD. AUG 25 2011

RE: DyoCore Response to Complaint of California Energy Commission
Request for Informal Hearing

Dear Ms. Peterman,

DyoCore generally denies the allegations stated in the complaint of the California Energy Commission dated July 26, 2011 submitted by Robert P. Oglesby. Pursuant to California Code of Regulations, Title 20. Section 1217, DyoCore respectfully requests consideration for an informal hearing to present its facts and declarations in support of its denial.

The allegations in the complaint are misleading under the totality of the circumstances surrounding DyoCore's application and require clarification. DyoCore respectfully submits its response, Exhibits and Declarations in support of the proposition that DyoCore met the requirements of the Emerging Renewables Program (ERP).

1. Summary of Response

It appears that DyoCore made some errors in obtaining its certification, however those errors were committed out of inexperience and naiveté in understanding the roles of the various parties involved in the certification process. It should be taken into consideration that DyoCore up until January 2011 was basically a business operated out of the garage of its founder Mr. Raine. Its SolAir product is the first and only experience DyoCore has had with wind generation of electricity and its only attempt at manufacturing any product and placing it into commerce and its first experience with working with the California Energy Commission.

In early 2009 DyoCore learned of the CEC's ERP program and applied for inclusion. The CEC instructed DyoCore to submit its application to the state's third party listing agent KEMA. Working with and in close communication with KEMA, DyoCore provided KEMA with data obtained from two independent testing sites, one in San Marcos California and a

second in Hampshire Illinois. DyoCore's product, SolAir, had been installed at these two locations for several months where electrical power output and wind condition data had been monitored and logged. Based on the data logs obtained from these two sites KEMA determined that the San Marcos California site did not meet the state listing criteria for minimum winds, however, KEMA concluded that the second site in Hampshire IL qualified.

DyoCore summarized annual performance data from the Hampshire IL site from approximately January 2009 through February 2010 and provided this information to KEMA. At KEMA's request the annual electrical generation performance data was summarized in monthly production schedules alongside coordinated wind data for the corresponding months and provided to KEMA for evaluation. From evaluation of this data KEMA provided DyoCore a power curve represented on a table and chart. KEMA also recommended a power curve listing to DyoCore. DyoCore responded to the suggested listing by asking for a listing at a different point in the curve to better represent the wind conditions where DyoCore believed the turbine would actually be installed. The listing at 1.6 kW at 18mph came off of the Power Curve calculations that KEMA reviewed from the wind and power data that DyoCore submitted. This was the first unintentional mistake made by DyoCore because as DyoCore has come to learn since it first submitted its data to KEMA, the data it submitted was not in the proper form from which to prepare a power curve.

Over the past year DyoCore has corresponded with several professionals within the industry that have aided DyoCore in reassessing of its raw data. Consequently DyoCore has created a wind to production power curve for direct real time indicated winds. DyoCore has maintained an updated record of this power curve work on its website. We have a general idea of what a power curve is but are still not certain as to how it was intended to apply to the listing, something we were ignorant of when we initiated the process with the CEC and KEMA. Furthermore DyoCore has taken steps to correct its mistake by including ongoing development information on its public website.

DyoCore's efforts to continue its education and better compliance with CEC regulations have been hampered from a current lack of understanding as to how the power curve is intended to apply as either Annual Average Wind Production or Real Time Wind Production, however DyoCore understands that its current data allows it to describe the performance of its SolAir product with sufficient accuracy as to not be materially misleading as to performance characteristics. In defense of DyoCore, as we were identifying our power curve, a third party whose product utilizes our motor was listed with the CEC (Exhibit 1 - TLG CEC Listing) at a similar rating to that of DyoCore but using higher wind speed. This shows that applying our real wind to power curve was accurate.

The new power curve data does show a lower power output at the same wind speeds, however, this change would not change the rebate applied to our product. It appears that although a mistake was made in our interpretation of the raw data and how it should be presented, that mistake did not amount to one that resulted in a material misrepresentation or result in a significant change to the qualification for rebate under the program.

The rebate program is currently in suspension and awaiting new guidelines. It has been indicated the new guidelines will require formal third party testing. DyoCore retained SWCC in June 2011 to assist DyoCore in meeting the expected new guidelines. As noted above, DyoCore is learning the processes necessary and diligently acting to ensure no further mistakes are made.

The California Energy Commission's complaint of July 26, 2011 alleges fraud against DyoCore. Fraud requires the intent to mislead others with false information. Being inexperienced and naïve in the application process should not rise to the level of intentional misrepresentation with the purpose of causing harm. DyoCore, upon realizing it had made a mistake in the information it presented to KEMA attempted to remedy and mitigate any harm it caused by publishing more accurate data on its public web site. The complaint of the CEC seeks to use this attempt at transparency, as further evidence of fraud and deceit. Admittedly, in hindsight DyoCore could have done some things better, but an attempt at correcting a mistake is not evidence of fraud, it is evidence of good faith and transparency and should not be used to condemn DyoCore. DyoCore mistakenly believed that KEMA was hired by CEC to confirm the accuracy and completeness of the data submitted by the applicants. DyoCore does not believe that a review of anything in the record would lead a reasonable person to believe that KEMA was hired only to ensure that the requested information was submitted but not to analyze or confirm that information. Working closely with KEMA as DyoCore did in establishing the initial power curve certainly did not remove this understanding from DyoCore. DyoCore, in its inexperience, relied upon KEMA and its representatives to review and assess the data DyoCore provided and make the appropriate listing.

Regardless of such listing by simply applying the correct real wind or annual wind would have resulted in the same rebate to be applied towards our product.

Our request for consideration and resolution:

DyoCore's SolAir has grown to be a significant Hybrid Wind/Solar energy tool within the emerging market. There are now hundreds of SolAir's installed throughout CA and over a thousand worldwide. New installations are estimated at a little over 4000 units within the next year. SolAir represents a significant change in who can afford and take advantage of small wind power generation. Removal of SolAir from the qualified list of products damages dozens of business who with high integrity and honorable actions submitted qualified ERP reservations representing thousands of CA residents. Based on the numbers presented in the complaint, SolAir appears to be the most successful and affordable small wind solution ever developed which advances the stated purpose of the program to the push for the continued development of new wind technologies that apply to everyone, not just the few in remote areas or those with significant financial resources.

DyoCore requests to be considered for re-rating under the new ERP guidelines as outlined in the July 2011 DRAFT and apply that rating to all currently outstanding held R1

reservations. DyoCore proposes it would be unwise and unfair make any changes retroactive for currently held/issued R2s as all parties involved acted honorably and in good faith based on valid data. Changing or withholding those R2 already approved would only damage dozens of business and hundreds of CA residents have applied and qualified under the existing terms and the intention of the program. In this respect any deficiency applicable to the SolAir 800 could and is corrected by a change from Annual Average Wind to Real Wind but the end result in applying this change is the same listing incentive placement simply at a higher wind speed similar to 99% of other turbines listed as approved equipment that are rated at 30mph or higher.

DyoCore in June of 2011 submitted application to the SWCC and expects testing to commence soon resulting in a formal rating certification that meets the new ERP standards and provides the CEC with a direct resolution to the complaint. This will also make DyoCore the first turbine manufacturer to qualify under the new CEC program guidelines to meet these objectives.

It is my strong belief that DyoCore meets the requirements of the CEC listing and the intended purpose ERP to encourage the development of affordable alternative renewable sources for everyone. Thank you for your consideration of our request for an informal hearing and resolution.

Sincerely,

David Raine,
CTO DyoCore, Inc.
3125 Tiger Run Court, #104
Carlsbad, CA 92010

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dave@dyocore.com
Phone and Fax: 866-404-2428
Direct: (760) 580-4271

[redacted]

Topic Areas of Discussion in Response to the Proposed Complaint:

In response to Complaint point III A (Purpose of the ERP):

The complaint states that the purpose of the ERP is to stimulate increased sales of small wind systems that have a generating capacity of up to 50 Kilowats ...thereby, encourage manufactures, sellers and installers to expand their operations, improve distribution, and reduce system costs associated with these renewable technologies.

DyoCore's SolAir is exactly why the ERP was created. DyoCore did not develop the ERP and had no part in its designation, rebate structure, amount of rebate or in its management. DyoCore's SolAir developed and being sold at its price point within the market before DyoCore submitted its application to be included into the ERP at the same price point upon inclusion. DyoCore's SolAir is the first product of its kind. It is among the lowest cost turbines on the market; it applies to the broadest range of potential users; and meets all required certifications for use in most CA urban communities. In fact it is in most communities the very first and only residential roof mounted turbine allowed.

DyoCore has worked diligently in development of SolAir, education within the market and the drive behind the acceptance of new policies and regulations that will benefit the entire industry for years to come. DyoCore did this at its own expense, with no grants and no government funding. Because of these accomplishments the ERP now has a venue that applies to the majority of homeowners opposed to the 1% it previously applied to. This is not a burden on the ERP it contributes to the success of the ERP. Removing DyoCore from the listing based on allegations arising from the misunderstood circumstances surrounding DyoCore's application substantially damages the program and interferes with its intended purpose while discouraging the development of new technology and lower cost energy alternatives.

DyoCore's product price point was established before application to the program and before knowledge of the rebate allotted to its product. The end result was that the rebate allotted upwards of 100% towards the full purchase and install of the SolAir system. This was known by the CEC and encouraged by the CEC program management staff. It was never indicated that this was a concern or that DyoCore's price point was a violation of the programs intention. The ERP states directly that it was designated to encourage lower cost products. DyoCore meets that expectation.

In response to Complaint point III B (Requirements and Process for Listing Small Wind Systems as Eligible for Use in the ERP)

Pursuant to Appendix 3, Section (A)(2) of the ERP Guidebook DyoCore provided KEMA with summary monthly data of collected Average Wind conditions with Energy produced for one consecutive year. (Exhibit 2 - Hampshire IL summary data)

In early 2010 DyoCore submitted an application and the materials requested to KEMA. DyoCore collected data from two reporting sites, one in Hampshire IL, the other in San Marcos CA. It was determined by KEMA that the raw data from the site in Hampshire IL would be acceptable due to higher average annual wind conditions. The review and listing of DyoCore's SolAir was done by KEMA, a third party with no affiliation to DyoCore. When the listing was granted DyoCore understood that the rating was based on Annual Average Wind and not based on a specific wind speed. These two are completely different sets of data. At an annual average wind speed of 18mph, which could and did represent times in which winds were substantially greater at both locations, the expected production was 1.8kW. In real-time winds of 18mph the production is approximately 212 watts, this is about 66% of the BETZ maximum 59%. This information was provided and available to KEMA upon application. It was our understanding that the rating was Annual Wind Speed Production and presented, evaluated and determined by KEMA.

A comparison of the two side by side is attached herein. (Exhibit 3 - Annual Wind vs Real Wind with Betz comparison)

When the listing rating was given to DyoCore KEMA contacted us and asked if we wanted to modify our rating from 12mph to a higher rated amount because we had the lowest rating wind speed on the approved list. Most other products were rated at winds well above 30mph. We had felt we were being conservative at only 18mph *(Exhibit 4 - Correspondence with KEMA pertaining rating)* as we felt most Urban areas where our product primarily applied would never experience conditions greater than this. This is a direct indication of our integrity and intention upon acceptance of a listing.

Recently the CEC accepted the listing of another company's product that utilizes the DyoCore PMG. (Exhibit 1 - TLG CEC listing) This product received a rating of 1.6 at approximately 32mph. Regardless of the "wind speed" rating, it has the same effect and outcome of rebate. The only variance is the wind speed at which the rating was applied. However, both our product and this company's product receive the same rebate amount. This is not miss-intention on either party's part, it is simply a lack of formal standards for the purpose of qualification and rating combined with our lack of knowledge within the industry.

The rated wind speed has no correlation towards the rebate amount. Both turbines in the following example use the exact same PMG (Motor) :

DyoCore rated at 18mph at 1.6kW – Rebate amount $3 per Watt or $4800
TLG rated at 30mph at 1.8kW – Rebate amount $3 per Watt or $5400

At the time of listing DyoCore's product SolAir within the ERP program the process was both new to us, to KEMA and to the CEC as only a handful of other products were ever listed with little or no standard in place. Products listed on the approved ERP list demonstrate a wide assortment of wind speeds and corresponding rated performance. There was and still is no fixed standard in place. With approximately 180 products listed (www.consumerenergycenter.org / cgi-bin / ELIGIBLE SMALLWIND) at wind speeds from 42mph[1] to 16mph[2] and power outputs range from 100watts[3] to 1000,000watts[4] it is very confusing as to how power curves apply and how they correlate to a unified rating system.

1	Home Energy International B.V.	Energy Ball V200	2,500W Wind Turbine	2,500	42
2	Hummer Wind Power, LLC/EES Greentech	H2.7-500W	500W Wind Turbine	500	16
3	Jetpro Technology Inc.	JPT-100	100W HAWT Turbine	100	26.9
4	Shanghai Ghrepower	FD20-100/12	100kW Wind Turbine	100,000	26

Table 1: http://www.consumerenergycenter.org/cgi-bin/eligible_smallwind.cgi

DyoCore submitted its application under the expectations that KEMA was the rating authority and tasked by the CEC to qualify all applications to the program. KEMA at the time of evaluating SolAir was under considerable pressure from workflow (Exhibit 10 - KEMA email pertaining workload) which might have contributed to an error in the evaluation of DyoCore's submitted application. DyoCore had never submitted its product to a power curve and had no formal knowledge base or education that would qualify DyoCore or its representatives to formulate a power curve.

It is our intention to continue to move towards meeting requirements for certification as determined by outcome of the new ERP guidelines for qualification. DyoCore has worked with MET and TUV to meet safety and quality standards and continues daily to collect and evaluate site data to better represent performance expectations based on specific install circumstances. DyoCore's website provides quite a bit of continued development material that is made public for the purpose of evaluation of its product and the intended use. http://www.dyocore.com/sphpblog_0511/index.php. Almost 50,000 unique visitors have viewed and participated in our continued development towards smart low cost urban alternative energy solutions.

DyoCore provides the highest level of product warranty – a 100% no questions asked policy on the removal or replacement of a non working system in addition to being the only company with highly trained

professional distributors and installers that in contract support the product 100% after installation through the entire warranty term.

In response to Complaint point III C (Requirements for Securing a Reservation under the ERP)

DyoCore completes all R1 applications to the rules and to the best of its ability to estimate wind conditions based on site evaluations. DyoCore cannot answer directly for its distributors but works diligently and in good faith to educate all its distributors and clients about proper site evaluations and placement of SolAir units in qualified locations. However, the wind is a difficult aspect to estimate with recent changes in the environment and further completed by the Urban landscape where most SolAir units are installed. This is a new market and in most areas the first application of its kind. There are hundreds of Urban area installations throughout CA, some in great locations and some in poor locations. All of which are fairly recent and/or just being completed. DyoCore will continue to collect data and use that knowledge to make better decisions on installation sites but also estimates on production. There unfortunately no history to base these assumptions on.

There were companies that mislead potential clients indicating that they were an authorized Distributor, however they were not and sent formal notices (Exhibit 5 - Notice to Gridnot) to cease all representation of the DyoCore product and notice was given to the CEC (Exhibit 6 - Correspondence from Rick Berry to CEC) that they were not an authorized distributor. We recommended to the CEC that they deny any applications that this company falsely sent in as an authorized representative of our product. This is the only instance known to us of potentially false applications and this was not done on the part or by a representative of DyoCore.

In response to Complaint point V A (Statement of Facts Upon Which the Complaint is Based (1231(b)(3)))

DyoCore supplied information on its website to potential clients throughout California that might apply to the use of its product SolAir and is the same information as referenced and available from the CEC directly on the approved ERP listing posted on the Consumer Energy Center website: http://www.consumerenergycenter.org/cgi-bin/eligible_smallwind.cgi. All information is factual as it applies to the rebate and SolAir, in some applications the purchase of a complete SolAir system as it applies to the guidelines of the ERP could result in 100% of the total cost of the system covered by an approved rebate. Though this is contention of the current purpose towards redraft of the ERP, it was not a contention when DyoCore applied to the program and was further supported by representatives of the CEC (Exhibit 7 - Email from CEC pertaining changing equipment to max out the rebate allotted)

DyoCore does not sell SolAir direct outside of San Diego CA and provided on its website, www.dyocore.com, a link to qualified DyoCore distributors.

In response to Complaint point V B (The listing of the DyoCore Turbine)

During DyoCore's application for CEC ERP inclusion when presented with a power curve by KEMA DyoCore representatives requested that KEMA evaluate if it would be more appropriate for SolAir to be listed at a higher wind speed since all other turbines on the CEC site were listed at substantially higher wind speeds. KEMA agreed and reposted the listing from 12mph to 18mph. During a phone call with KEMA I personally asked KEMA advice on how to list our product and tried to apply it to a listing that was agreed by KEMA to be better suited for wind conditions that might be found at the roof line of a home.

In response to Complaint point V C (Temporary Suspension of the ERP)

DyoCore is not in contention with the redraft of the ERP guidebook and supports the CEC in its objectives of applying a fair incentive program that represents the majority of products opposed to a single product. (Exhibit 8 - DyoCore's Response to the CEC ERP suspension). DyoCore and its distributors acted

honorable and within the program guidelines as outlined and management by the CEC. It is understandable that as new technologies emerge, new manufacturing processes reduce costs and as the industry matures there will be a constant need to modify the program to fit the needs of all participants. We are all hopeful towards the reinstatement and continuance of the ERP in accordance with the CEC's objectives.

DyoCore feels statements towards actual reservations are miss-stated:

1. 33 systems using DyoCore turbines have been installed – We only have warranty data for about 12 completed systems. DyoCore directly from these paid reservations has received approximately $40,000 towards the purchase of SolAir product.
2. 249 approved applications pending – Some of these applications could have been submitted by non-approved and invalid representatives of DyoCore's SolAir. DyoCore has communicated with the CEC on the possible denial of these applications.
3. 1069 applications – it is believed a large portion of these applications were submitted by one company who is not an authorized DyoCore distributor and whereas most if not all of their applications are unqualified and should be denied.

We hope you will take into consideration that DyoCore has not benefited from the ERP program to date. Product is sold near or slightly below costs in some circumstances whereas direct field support is needed. DyoCore distributors can verify that DyoCore has provided exceptional field support for its product beyond the standard industry expectations as the sole cost of DyoCore.

In response to Complaint point V D (The KEMA Report)

DyoCore has never been notified or contacted by any member of KEMA as to a concern about the power curve data.

Data being evaluated in the statements made by Greentech Media on March 15, 2001, as outlined in the Complaint, were unqualified and referenced Annual Average Wind data opposed to data that qualified under the Betz law that was readily available and clearly posted on the DyoCore website. (Exhibit 9 - Power curve data from DyoCore website).

DyoCore never made statements pertaining TUV power curve testing and has formally asked Greentech to correct its statements. TUV has done field safety and quality evaluations on several SolAir turbines to meet the high standards of local community permitting agencies.

DyoCore in good faith summited data to KEMA as the CEC assigned authority and professional independent agent in determining the qualification of the applicant towards a rating with the CEC and the ERP. No one at DyoCore was qualified or indicated qualification to make such assertions towards an applicable rating as it was applied to the program nor did anyone at DyoCore know the methodology in how that rating would be qualified.

In response to Complaint point VI A (DyoCore's Actions Contravene the Purpose of the ERP)

> "The current purpose of the ERP is to incentivize increased sales of small wind systems and fuels cells for on-side generation in California"

DyoCore has become as an applicant of the ERP program the highest demand turbine on the market.

> "and thereby encourage manufacturers,"

DyoCore has opened a new factory in IL and grown by 400% since application into the ERP program and at one point DyoCore employed approximately 30 prior to the suspension of the program.

"sellers, and installers to expand their operations,"

DyoCore's SolAir was represented by over 20 new CA distribution companies, representing upwards of approximately 200 jobs in CA all based on the distribution of the SolAir product.

"improve distribution,"

DyoCore's professional Distributors represented the industry with the highest integrity, thorough product knowledge and training, and highest level of customer education and service.

"and reduce system costs for the end-use consumer."

DyoCore's SolAir was amongst the lowest cost turbines available with the highest level of customer service and support making it applicable to the largest user base in CA.

Based on these facts as outlined in the ERP and broken down above DyoCore is the most successful application ever applied to the ERP program.

In response to Complaint point VI B (DyoCore Violated Appendix 3, Section (A)(2) of the ERP Guidebook by Submitting Operational Data That Does Not Support the Asserted Performance Claims of the DyoCore Turbine)

DyoCore in good faith submitted summary performance data as evaluated from its Hampshire IL installation. How this data was evaluated and applied by KEMA to the ERP is unknown to DyoCore. DyoCore and its representatives made no assertions that they were qualified in the evaluation of the data or how it applied to a listing with the CEC ERP.

In response to Complaint point VII (Requested Action (1231(b)(5))

DyoCore, its representatives and myself personally request that the facts included herein are taken into consideration towards a fair resolution that applies to all participants that each acted in good faith and to the best intent of the intended program.

The allegation of Fraud on the part of DyoCore has already caused significant and potentially un-survivable damage to the future of DyoCore. DyoCore is a small family owned US company and acted within the highest integrity of the system, constantly striving to grow through education and continued development towards solutions that apply to everyone that has a roof top to place a turbine on at a low cost and the highest obtainable efficiency. I personally request that if a formal complaint is filled and any formal notifications to participants in the ERP are contacted consideration be taken that the alleged intention of fraud be strongly reviewed prior to use of this very damaging allegation whereas no merit to its claim is valid or has been factually presented in the Complaint.

Declaration of Penalty under Perjury. I the undersigned, declare to the best of my knowledge and under penalty of perjury, to the truth and accuracy of all factual allegations contained in this complaint.

David Raine
CTO and Founder DyoCore Inc.

8/8/2011

Exhibits and Declarations

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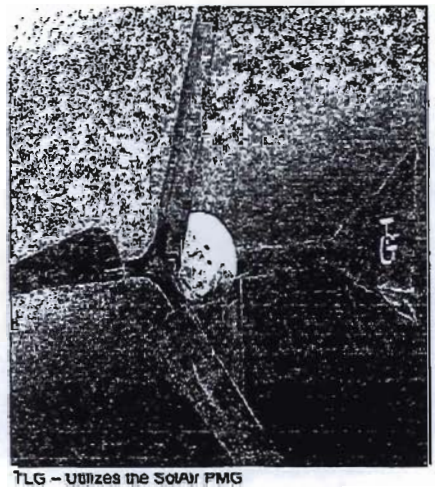
Exhibit 1: TLG CEC Listing

← C www.consumerenergycenter.org/cgi-bin/eligible_small.cgi

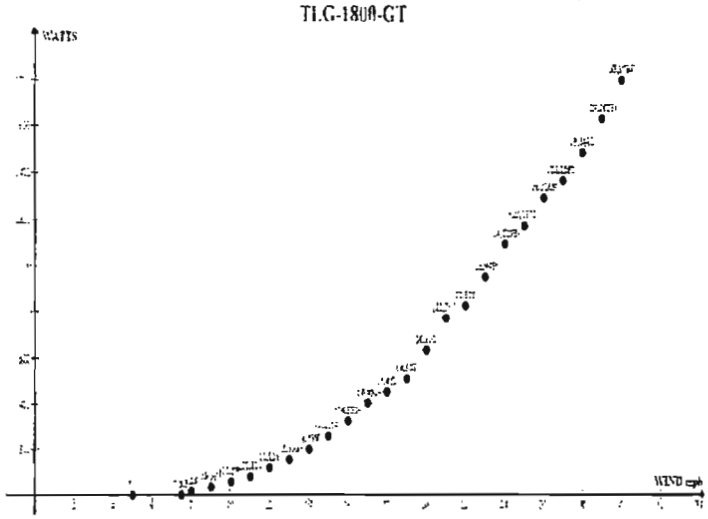
		Turbine		
SWEA USA 6V	WN20000	20,000W HAWT Wind Turbine	20,000	Produces rated power at 22 mph.
SWEA USA 8V	WN1000	1,000W HAWT Wind Turbine	1,000	Produces rated power at 20 mph.
Synergy Power Corporation	S-5000 / S-8	Survivor 830W Wind Turbine	830	Produces rated power at 29 mph.
Synergy Power Corporation	SLG/S300	Survivor 30,000W Wind Turbine	30,000	N/A
TechnoSpin	ComSpin C2000	2,000W HWAT Wind Turbine for Telecom	2,000	Produces rated power at 25 mph.
TechnoSpin	PowerSpin TSW2000	2,000W HWAT Wind Turbine	2,000	Produces rated power at 25 mph.
TECWIND, LLC	TECWIND 6.0	7,500 Watt; HAWT Active Upwind	7,500	Produces rated power at 30 mph
TECWIND, LLC	TECWIND 9.0	30,000 Watt; HAWT Active Upwind	30,000	Produces rated power at 33 mph
TECWIND, LLC	TECWIND 8.0	15,000 Watt; HAWT Active Upwind	15,000	Produces rated power at 30 mph
TECWIND, LLC	TECWIND 4.6	4,500 Watt; HAWT Active Upwind	4,500	Produces rated power at 40 mph
TLG WindPower	TLG-1800-GT	1,800 watt vidn turbine, production starts @ 7.5 mph	1,800	Produces rated power at 30 mph
Unitron Energy Pvt. Ltd.	UE 42	4200W Wind Turbine	4,200	Produces rated power at 27 mph.
Unitron Energy Pvt. Ltd.	UE 15	1500W Wind Turbine	1,500	Produces rated power at 23 mph.

TLG – Approved Turbine



TLG – Utilizes the SolAir PMG

← C www.tlgwindpower.com/images/new/TLG_1800_GT_tx8.jpg



TLG power curve utilizing the DyoCore PMG – Same motor that is utilized on the SolAir.

← C www.tlgwindpower.com/images/new/TLG_1800_GT_tx8.jpg

Wind in MPH	Hourly Production in Watts	Daily Kwh Production 24 hours	Monthly Production in Kwh 30 days	Yearly Production in Kwh 365 days
7.5	1	.024	.72	8.76
8.0	16	.384	11.5	140
9.0	36	.861	25.9	315
10.0	58	1.392	41.7	508
11.0	81	1.944	58.3	709
12.0	121	2.904	87.1	1059
13.0	155	3.72	111.6	1357
14.0	199	4.776	143.2	1743
15.0	254	6.096	182.9	2223
16.0	320	7.68	230.4	2803
17.0	401	9.624	288.7	3512
18.0	452	10.848	325.4	3959
19.0	505	12.102	365.7	4450
20.0	632	15.168	455.0	5536
21.0	767	18.408	552.2	6718
22.0	823	19.752	592.5	7209
23.0	948	22.752	682.5	8304
24.0	1093	25.2	756.0	9193
25.0	1172	28.128	843.8	10,266
26.0	1288	30.912	927.3	11,282
27.0	1361	32.664	979.92	11,922
28.0	1482	35.568	1067.0	12,982
29.0	1628	39.072	1172.16	14,261
30.0	1798	43.152	1294.56	15,750
32.0	2136	51.264	1537.92	18,711

TLG – Power Performance Data

Exhibit 2: Hampshire IL Summary Data

Table 2. Preliminary Duration Results for the Hampshire IL SolAir Install

Month	Wind kWh production	Solar kWh production	Hours of production at 0's above 0	6	8	10	12	>12	Wind / Gust Average - limits Max Wind	Average Wind	Max Gusts	Average Gusts	T_1 Hours	T_2	T_3	T_4	O %
Jan-09	82.80788208	4.894652	N	N	N	N	N	N	N	N	N	N	350	0	32	2	99%
Feb-09	195.3345042	12.722152	0	9	0	18	79	638	48	16.8	N	N	744	0	0	1	100%
Mar-09	128.782932	12.786694	1	35	0	40	89	555	53.8	16.7	N	N	720	0	0	0	100%
Apr-09	192.5889154	13.336386	7	10	0	27	80	620	59.5	19.1	N	N	744	0	0	6	99%
May-09	94.00400394	12.508624	0	27	0	25	97	595	56.1	16.7	N	N	744	0	0	3	100%
Jun-09	218.5929992	12.999974	0	28	0	39	90	515	60.7	14.8	N	N	672	0	0	0	100%
Jul-09	251.2555455	13.623136	1	53	0	66	184	440	48	13.7	N	N	744	0	0	0	100%
Aug-09	340.6171748	13.84832	0	59	0	69	185	407	41.1	13.1	N	N	720	0	0	0	100%
Sep-09	226.7815714	13.284678	0	103	0	87	199	355	36.5	11.9	N	N	744	0	0	16	98%
Oct-09	296.5248076	13.225654	0	84	0	65	174	397	50.3	13.3	N	N	720	0	0	0	100%
Nov-09	230.5729028	16.680728	0	23	0	29	126	566	48	15.4	24	20	744	0	24	0	100%
Dec-09	218.7764195	15.512214	0	34	0	19	127	564	44.6	15.7	24	20	744	0	0	0	100%
Jan-10	182.7617497	15.84875	10	30	0	37	102	541	40	18.1	24	20	720	0	0	0	100%
Feb-10	212.153999	10.798912	0	46	0	46	104	438	44.6	15.6	27	21	634	0	0	0	100%
Totals:	2659.4	171.3	19.0	495.0	0.0	521.0	1532.0	6193.0	47.0	14.8	24.8	20.3	9744.0	0.0	2.4	1.9	99%

Hours of Power Production for Hampshire IL:
Table 2. shows the duration results for the SolAir installed in Hamshire IL. This unit has accumulated 9,744 hours of total run time with an operational time fraction of 99%.

The low operational time fraction that occurred in September 2009 was a result of changing out the turbine's bearing from bronze to sealed casted bearings. The majority of the remaining time classified as TN during the test is attributed to the wire being twisted up at the base of the unit requiring manual untwisting. This has been solved for current production models with a free swivel joint connection that allows the wires to turn freely 360^0. Wind metering equipment that extended data being recorded from simply wind speeds to include gusts was added in November 2009, this was accompanied by an inspection of the voltage metering equipment and resulted in downtime due to adverse weather conditions that prevented reconnection of the unit until the following day.

Another factor of reliable operation is that the turbine should experience no significant power degradation. Each month the average power is plotted for each wind-speed bin and analyzed for any obvious trends in power production. Examination of power degradation plots indicated no apparent power degradation for either installed location. The dynamic behavior of the turbine is assessed by observing the turbine in a range of operating conditions. The turbine is observed at wind-speed intervals from cut-in wind speed to a maximum experienced wind speed of 53 mph at the Hampshire install site. Tower vibrations, noise, yaw behavior, and tail movement all were periodically documented for evaluations and consideration in reporting the above data.

For the San Marcos install site the following dynamic observations were made. During high winds, the frame will yaw out of the wind between approximately 5 degrees and 30 degrees which was identified as a result of wind blade wash hitting the integrated frame fin assembly. This constant yaw at higher wind speeds allowed the unit to both maintain a lower overall consistent RPM but also prevented the motor from excessive heating. Additionally, it appears that no excessive vibrations are occurring during these conditions. In winds of between 3mph and 15mph both turbines tracked the wind well with no adverse dynamic behavior observations made. No audible noise was detected from either turbine during any of the testing observations.

Power Performance Testing

Power performance testing is conducted per IEC standard 61400-12-1, Power Performance Measurements of Electricity Producing Wind Turbines, referencing Annex H for small wind turbines when appropriate. Products of the test include a measured power curve, a power coefficient (CP) curve, and an estimation of annual energy production (AEP). For small turbines, statistical data is collected in 1-minute sets and sorted into 0.5-m/s-wide wind speed bins. Data collection is complete when the wind speed bins between 1 m/s and 14 m/s contain 10 minutes of data each, and the total database consists of at least 60 relevant hours. Wind speed bins are plotted against the corresponding bin power to produce a power curve. Power curves are normalized to sea-level air density; the site-specific air density at the either observed location is relatively low, 1.0 kg/m3. The power coefficient is the ratio of power generated by the turbine to the power available in the wind. The power curve for the both turbines show power measurements that are greater than rated power. Preliminary power and CP curves for the San Marcos Install as displayed in Figure 3; Both turbines performed as expected.

The original testing voltage equipment on the San Marcos Install was optimized for power performance and was found un-reliable after several months of operation. After the failure, a production model testing solution, Hobo Equipment, was installed and operated until testing was completed with a backup data recorder on the inverter. The preliminary power and CP curves for both configurations are shown in Figure 4.

Sea-Level Air Density Normalized Power Curve
SolAir San Marcos CA

m/s	Mph	Bin Wind Speed m/s	Bin Power kW	Number Data Points	C_p
1.6	3.5	1.554	0	0	0.77
2.1	4.6	2.0424	0.01	1340	0.58
2.6	5.8	2.5752	0.12	1134	0.44
3.1	6.9	3.0636	0.14	903	0.37
3.6	8.1	3.5964	0.41	747	0.30
4.1	9.2	4.0848	0.67	476	0.25
4.6	10.4	4.6176	0.79	276	0.22
5.1	11.5	5.106	0.84	161	0.20
5.7	12.7	5.6388	0.99	65	0.18
6.2	13.8	6.1272	1.17	47	0.16
6.7	15	6.66	1.35	29	0.15
7.2	16.1	7.1484	1.42	15	0.14
7.7	17.3	7.6812	1.56	13	0.13
8.2	18.4	8.1696	1.61	12	0.12
8.8	19.6	8.7024	1.6	8	0.12

Figure 3. Preliminary power and CP data for San Marcos CA Install

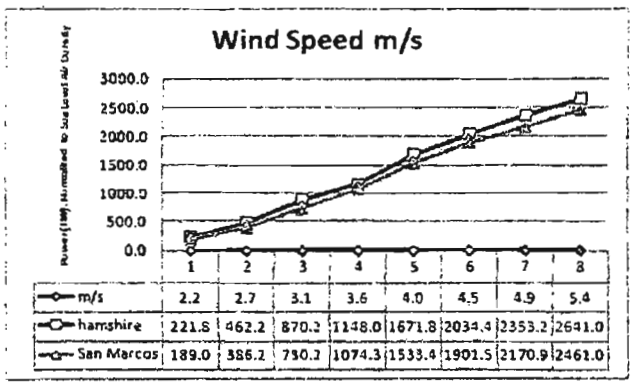


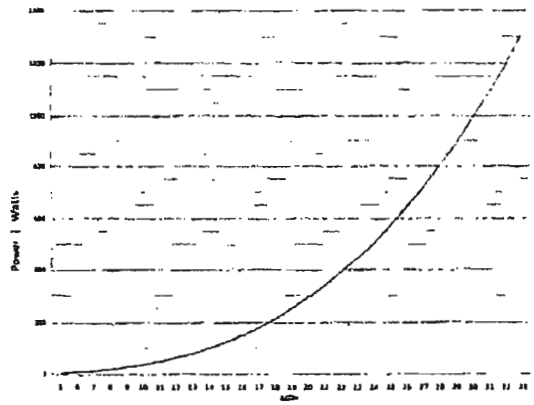
Figure 4. Annual Energy Production (AEP) at sea-level density; 1.225 kg/m^3 for normal power production

Exhibit 3: Annual Wind vs Real Wind with Betz comparison

Table showing SolAir expected power vs BETZ limit at constant wind speeds. SolAir is approximately 66% of the BETZ limit at a Cp of 45%.

mph	Watts	m/s	Betz Max @ .593
1	0	0.4	0
2	0	0.9	0
3	1	1.3	1
4	2	1.8	3
5	5	2.2	7
6	8	2.7	12
7	12	3.1	19
8	19	3.6	28
9	26	4.0	40
10	36	4.5	54
11	48	4.9	72
12	63	5.4	94
13	80	5.8	119
14	100	6.3	149
15	123	6.7	183
16	149	7.2	222
17	178	7.6	266
18	212	8.0	316
19	249	8.5	372
20	290	8.9	434
21	336	9.4	502
22	387	9.8	578
23	442	10.3	660
24	502	10.7	750
25	567	11.2	847
26	638	11.6	953
27	715	12.1	1068
28	797	12.5	1191
29	885	13.0	1323
30	980	13.4	1464
31	1081	13.9	1616
32	1190	14.3	1777
33	1305	14.8	1949
34	1427	15.2	2132
35	1556	15.6	2325
36	1694	16.1	2531
37	1839	16.5	2747
38	1992	17.0	2976
39	2153	17.4	3217

SolAir™ Power Curve
by Wind (mph)



SolAir™ Power Curve
Estimated Annual Power Production by Wind (mph)

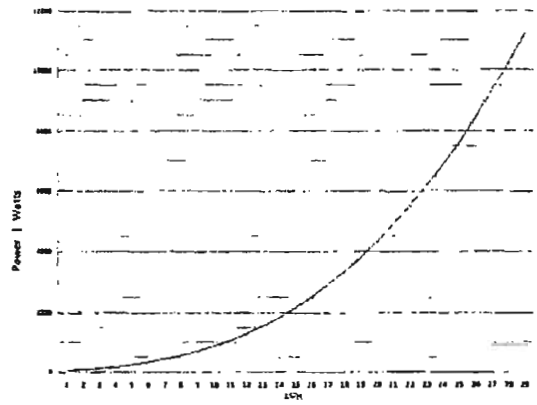


Exhibit 4: Correspondence with KEMA pertaining rating

DyoCore Response to Compliant & Request for Informal Hearing
August 8,2011

From: Baumstark, Pete [mailto:Pete.Baumstark@us.kema.com]
Sent: Tuesday, February 16, 2010 3:45 PM
To: David Raine
Subject: RE: iec data

Looks fine thanks

Pete Baumstark, PE
Energy Engineer

+1 (510) 891-0446 (office)
+1 (510) 691-8440 (cell)
pete.baumstark@kema.com

KEMA
155 Grand Avenue, Suite 500
Oakland, CA 94612

Please visit our website www.kema.com

This message may contain confidential or privileged information. If you are not the addressee, please return the message to its sender and delete it from your files.

Please consider the environment before printing this email.

From: David Raine [mailto:dave@dyocore.com]
Sent: Tuesday, February 16, 2010 3:27 PM
To: Baumstark, Pete
Subject: RE: iec data

Please let me know if this is acceptable:

Manufacturer Name	Model Number	Description	Power Output (Watts)	Notes
DyoCore	S80015dc	SolAir 800W hybrid wind/solar generator	800	Produces rated power at 12 mph.

The 800 W output is based on a 75% load – average load when charging batteries or running a motor or other object in real time plugged directly into an inverter. The output without load at 12mph is approximately 1.5 kW. Most companies rate their products at substantially higher wind speeds. We would like to present a much more realistic rating for the average user of our units. If you have experience in this area it would be helpful in a direction towards correctly labeling our product.

Here are the primary two output tests:

DyoCore Response to Compliant & Request for Informal Hearing
August 8,2011

BelAir - open v.					Watts		Wind Speed	
RPM	Voltage	RPM	V	A	Open	75% Load	mph	cfs
179	9.9						2.5	1.1
213	11.8						3	1.32
300	17.2						3.5	1.672
400	23.9	450	20.5	0.5	10.25	10.25	5	2.2
519	30.5	600	28.5	5.1	145.35	135.15	6	2.64
612	35.9	600	36.3	16.1	616.63	414.96	8	3.52
700	40.6	700	41.2	22.6	931.12	644.1	9.7	3.828
800	47.6	800	46.4	25.6	1183.2	701.25	9.8	4.312
900	51.6	900	50.1	27.5	1387.73	756.21	10.9	4.796
1000	57	1000	53.1	29.5	1568.45	991.25	12	5.28

Best wishes, David Raine

dave@dyocore.com

mobile: 760-807-2135

Desk: 866-404-2428

DyoCore
smart solutions

663 So. Rancho Santa Fe Rd. #610

San Marcos, CA 92078

From: Baumstark, Pete [mailto:Pete.Baumstark@us.kema.com]
Sent: Tuesday, February 16, 2010 8:46 AM
To: David Raine
Cc: rick@dyocore.com
Subject: RE: lec data

So your average wind speed during the tested period is only 6.8 mph?

Pete Baumstark, PE
Energy Engineer

• T (510) 691-0440 (office)
• T (510) 691-0440 (fax)
pete.baumstark@kema.com

KEMA
155 Grand Avenue, Suite 500
Oakland, CA 94612

Please visit our website www.kema.com

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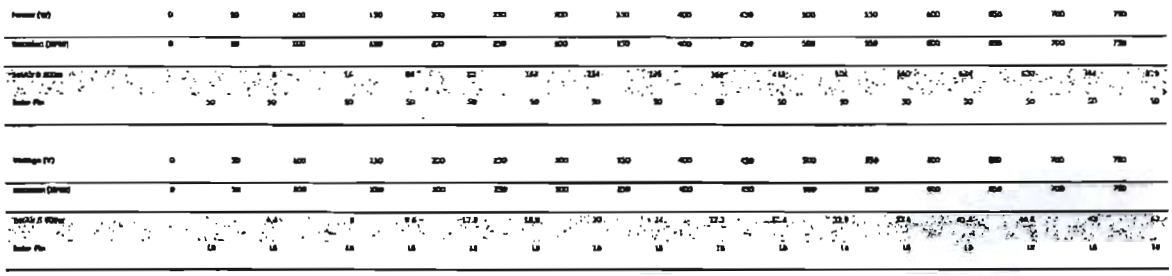
Please consider the environment before printing this email.

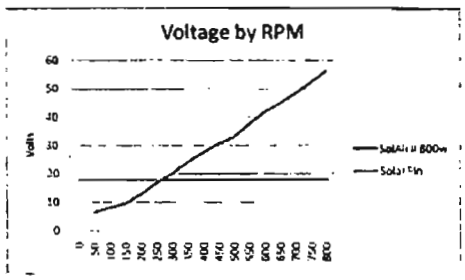
From: David Raine [mailto:dave@dyocore.com]
Sent: Monday, February 15, 2010 9:38 PM
To: Baumstark, Pete
Cc: rick@dyocore.com
Subject: RE: lec data

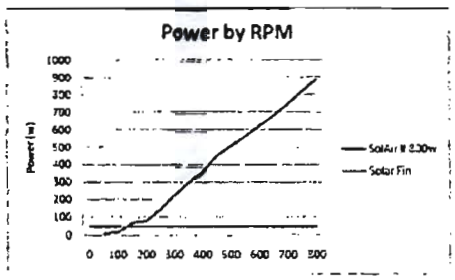
Thank you for your assistance. The units for wind our MPH. I can convert to m/s if preferred.

Here is the performance charts. We are a bit conservative but we wanted to apply to very realistic residential conditions:

DyoCore Response to Compliant & Request for Informal Hearing
August 8,2011







Let me know if you have questions. Thank you!

Annual Energy Production

Best wishes, David Raine

dave@dyocore.com

mobile: 760-807-2135

Desk: 856-404-2428

DyoCore smart solutions

663 So. Rancho Santa Fe Rd. #610

San Marcos, CA 92078

DyoCore Response to Compliant & Request for Informal Hearing
August 8,2011

From: Baumstark, Pete [mailto:Pete.Baumstark@us.kema.com]
Sent: Monday, February 15, 2010 12:05 PM
To: rick@dyocore.com
Cc: dave@dyocore.com; Mashnik, Daria
Subject: RE: lec data

Thanks. Please also send a performance curve and also tell me what the units for wind speed are (m/s or mph).

Pete Baumstark, PE
Energy Engineer

+1 (510) 891-0488 (office)
+1 (510) 891-0449 (fax)
pete.baumstark@kema.com

KEMA
155 Grand Avenue, Suite 500
Oakland, CA 94612

Please visit our website www.kema.com

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Please consider the environment before printing this email.

From: rick@dyocore.com [mailto:rick@dyocore.com]
Sent: Monday, February 15, 2010 11:50 AM
To: Baumstark, Pete
Cc: dave@dyocore.com
Subject: Fwd: lec data

Pete Here are the data figures from our tests. The company is Dyocore, the product is a SolAir 800 turbine, David Raine is the CEO of Dyocore and he can answer any questions you may have at 760-807-2135. When I spoke with you regarding the review you told me you could return the results the same day. I could really appreciate your notifying the state immediately if the data is sufficient so we can get listed by March 1, 2010. Our trade show sales in California are extremely successful and we'd like to install into around 45 homes in March. Pete, thanks for any and all assistance. I remain Rick Berry 858-598-5254

—Original Message—
From: David Raine [mailto:dave@dyocore.com]
Sent: Monday, February 15, 2010 12:20 AM
To: rick@dyocore.com
Subject: lec data

SolAir 800 - Summary Production
Results

		[illegible]	[illegible]	[illegible]						[illegible]				[illegible]				
Month	Notes	kWh production	kWh production	0	6	8	10	12	>12	Max Wind	Average Wind	Max Gusts	Average Gusts	Hours				%
Sep-08	1,2,3	82.80788208	6.431632	171	103	29	35	12	0	18.4	6.3	N	N	350	72	20	24	91%
Oct-08	4	195.3345041	14.791154	342	262	50	66	21	3	20.7	5.8	N	N	744	0	10	8	99%
Nov-08	5	128.782932	14.15863	341	273	46	36	16	8	25.3	5.5	N	N	720	0	0	16	98%

DyoCore Response to Compliant & Request for Informal Hearing
August 8,2011

Dec-08	6	192.5883154	12.697476	274	326	56	48	18	22	36.8	5.3	N	N	744	0	0	0	100%
Jan-09	7,8	94.00400394	13.343624	344	317	42	32	7	2	18.4	5.8	N	N	744	110	5	48	92%
Feb-09	9	218.5929992	13.552332	259	251	52	60	28	22	38	7.3	N	N	672	0	0	0	100%
Mar-09	10	251.2555455	14.882604	270	276	54	90	43	11	24.2	7.4	N	N	744	6	0	48	93%
Apr-09	11	340.6171748	14.950184	165	273	73	112	45	32	29.8	7.2	N	N	720	0	0	24	97%
May-09	12	226.7815714	14.604224	246	291	67	113	27	0	19.6	7	N	N	744	0	2	24	97%
Jun-09	13	296.5248076	15.705282	184	300	67	99	61	9	23	7.2	N	N	720	0	1	0	100%
Jul-09	14	230.5729028	17.39069	287	234	79	120	24	0	18.4	7.1	N	N	744	0	0	24	97%
Aug-09	15	218.7764195	19.266376	300	245	63	106	30	0	17.3	5.8	N	N	744	0	0	0	100%
Sep-09	16,17,18	182.7617497	17.642534	319	240	46	92	23	0	21.9	6.3	24	20	720	56	48	86	86%
Oct-09	19	212.153999	18.10679	283	289	59	71	26	16	26.5	6	27	21	744	0	0	0	100%
Nov-09	20	124.3978237	16.808882	343	279	43	42	13	6	26.5	5.8	25	23	720	1	0	0	100%
Dec-09	21,22	200.9828557	15.042874	299	312	39	54	28	22	42.6	6.7	39	26	744	0	3	0	100%
* Jan-10	23,24,25	233.7411242	13.852288	329	274	38	47	15	41	41.4	7.8	43	26	744	4	36	96	86%
Annual-09		2597.4	191.3	3209.0	3201.0	684.0	991.0	355.0	120.0	25.5	6.6	29.0	22.5	730.0	14.4	4.9	21.2	97%

Just need to now do the data notes and summary content. I should have it done by Wednesday but this might be enough to file with the State right away.

Best wishes, David Raine

dave@dyocore.com

mobile: 760-807-2135

Desk: 866-404-2428

DyoCore smart solutions

663 So. Rancho Santa Fe Rd. #610

San Marcos, CA 92078

Exhibit 5: Notice to Gridnot

Formal notice was given by email and verbally to Gridnot the cease all representation of DyoCore and it's SolAir product line and remove all reference of such from its website in early 2011. The same notice was communicated to the CEC by Rick Berry.

Gridnot is not an authorized DyoCore Distributor and product obtained and installed by Gridnot will not be eligible for DyoCore warranty.

All applications filed by Gridnot that represent SolAir installations are invalid and do not meet the ERP guidelines for acceptance due to invalid warranty.

Exhibit 6: Correspondence from Rick Berry to CEC

TO: David Raine
CEO Dyocore Inc.

FROM: Richard Berry
Compliance Department
Dyocore Inc.

David: In April 2011 I sent an email to James Lee at the State of California Renewable Energy Department regarding a number of R-2's Dyocore had received over the previous six months and would not be using.

Dyocore applied for these with R-1's signed by clients wishing to purchase a small wind system but for one reason or another were unable or unwilling to wait the time it took Dyocore to open the permitting processes in San Diego County to small wind turbines. This effort took one and a half years and cost Dyocore upwards of $100,000.00.

Regardless of the reason for refund, Dyocore honored each and every clients request for rebate and refunded their entire deposit while suffering financial loss on each for handling, permit activities (plot plans, one line drawings, meetings with Local Area Planning Groups, etc.).

Mr. Lee received five of these R-2's and cancelled four of them. One R-2 client subsequently asked to have her system installed and paid the full price for the 5 unit roof mounted small wind turbine system.

I am including this signed memo as I feel it further shows our efforts to be a good corporate neighbor and abide by the rules of the Rebate Program.

SIGNED: **DATED:** 8/3/10

TO: David Raine
CEO Dyocore Inc.

FROM: Richard Berry
Compliance Department
Dyocore Inc.

David: On February 4, 2011 I received an email from Sarah Taheri, State of California Renewable Energy Department (see attached) asking me (in effect) why we were not taking advantage of the full power of our turbine by using larger inverters.

I responded by saying we had been testing a new line of inverters (Aurora, Power One; 3.0, 4.2, and 6.0) as an alternative to the Ginlong Inverter line. Sarah's email was taken to heart and we have upgraded four or five of our planned installs by replacing the old inverter's with the new Power One equivalent.

This email is important because I believe it shows that Dyocore has attempted to stay within the official guidelines of program and has maintained credible practices that are well with the bounds of the spirit of the program.

SIGNED: **DATED:**

8/2/11

From: rick@dyocore.com <rick@dyocore.com>

To: dave@dyocore.com, rick@dyocore.com
Cc:

Date: Wednesday, July 27, 2011 02:40 pm
Subject: Fwd: More info needed

Dave, the attached email from the state should show that we were not bilking the rebate system, in fact under-requesting rebate amounts. This gal is under James Lee. Rick

-----Original Message-----
From: Sarah Taheri [mailto:STaheri@energy.state.ca.us]
Sent: Friday, February 4, 2011 05:50 PM
To: rick@dyocore.com
Subject: More info needed

Hi Rick, Realized there were a few applications that I didn't catch earlier. A few notes and requests: McChesney - utility bill is for address 825 Cape Breton; we need bill for 3030 Overhill. This will receive a rebate of $4808 (equivalent to total system cost), as rated output is limited to 2000 watts due to inverter (rather than 3200 watt capacity of turbines). Almodovar - need more recent utility bill. This will receive a rebate of $4904 (equivalent to total system cost), as rated output is limited to 2000 watts due to inverter (rather than 3200 watt capacity of turbines). The total output of these systems could be increased by installing a larger inverter; granted, this would also increase the total cost and potentially increase the rebate. This may be something you could discuss with the clients if you like. If you choose to change the installations, let me know, as we'll need new paperwork. Thanks, Sarah _____ Sarah Taheri California Energy Commission Efficiency & Renewables Division Renewable Energy Office Tel: (916) 654-3929 Email: staheri@energy.state.ca.us

Attachments:

TO: David Raine
CEO Dyocore Inc.

FROM: Richard Berry
Compliance Dept.
Dyocore Inc.

David: On February 12, 2011 I spoke by telephone with Mr. James Lee at the State of California Energy Commission to inform him that Dyocore was concerned about one of their "distributors". This company is called Gridnot, they had signed a distributorship agreement with Dyocore but had purchased no units for installation although they were writing contracts for huge numbers of systems.

The manager for the distributor network at Dyocore sent a cancellation letter to Gridnot on February 11, 2011 informing them of our concern with their method of selling units and failure to live up to their agreement to purchase units from Dyocore as specified in the agreement.

Mr. Lee informed me he had a large stack of Gridnot R-1's on his desk that were not properly filled out and he also had a concern. I informed him that we had information that Gridnot was holding meetings (akin to Tupper Ware Parties) with 10 to 15 people at a time and guaranteeing them complete wind turbine systems if they would put one Dollar ($1.00) down and sign the sales contract and R-1, at no cost to them.

There was no regard or question of wind speeds or even if wind existed in or around the client location. I further informed James that we had cancelled their distributorship agreement and would not renew the agreement.

I am writing this memo and signing it based upon the State's allegation that Gridnot was one of our distributors and has listed it on their complaint to the energy commission. Mr. James Lee can confirm these statements.

In fact Dyocore has filed just 35 R-1's for rebate reservations with the State of California Renewable Energy Program to date and only three of it's clients have received rebate checks.

SIGNED: DATED: 7/30/11

Exhibit 7: Email from CEC pertaining changing equipment to max out the rebate allotted

-----Original Message-----
From: Sarah Taheri [mailto:STaheri@energy.state.ca.us]
Sent: Friday, February 4, 2011 05:50 PM
To: rick@dyocore.com
Subject: More info needed

Hi Rick, Realized there were a few applications that I didn't catch earlier. A few notes and requests: McChesney - utility bill is for address 825 Cape Breton; we need bill for 3030 Overhill. This will receive a rebate of $4808 (equivalent to total system cost), as rated output is limited to 2000 watts due to inverter (rather than 3200 watt capacity of turbines). Almodovar - need more recent utility bill. This will receive a rebate of $4904 (equivalent to total system cost), as rated output is limited to 2000 watts due to inverter (rather than 3200 watt capacity of turbines). The total output of these systems could be increased by installing a larger inverter; granted, this would also increase the total cost and potentially increase the rebate. This may be something you could discuss with the clients if you like. If you choose to change the installations, let me know, as we'll need new paperwork. Thanks, Sarah _____ Sarah Taheri California Energy Commission Efficiency & Renewables Division Renewable Energy Office Tel: (916) 654-3929 Email: staheri@energy.state.ca.us

Exhibit 8: DyoCore's Response to the CEC ERP suspension

DyoCore, Inc.
3125 Tiger Run Court, #104
Carlsbad, CA 92010

P/F 866.404.2428

www.dyocore.com

California Energy Commission
1516 Ninth Street
Sacramento, California 95814

April 18, 2011

California Energy Commission,

Thank you for this opportunity to present and thank you to the committee for your diligent efforts in reinstatement of the ERP.

California created the Renewable Portfolio Standard (RPS). Under the RPS, the Renewable Energy Program's focus is twofold as published;

- To increase, in the near term, the quantity of California's electricity generated by renewable energy resources, while protecting system reliability, fostering resource diversity, and obtaining the greatest environmental benefits for California residents.

- To identify and support emerging renewable energy technologies with the greatest near-term commercial promise that merit targeted assistance.

In 1996 ERP was established as an initiative to promote "wind" but later was re-invested in to promote energy conservation. Then after very few qualified recipients the program evolved into an incentive to promote new technology. This is the current modern direction of the plan. With the recent economy downfall and more direct financial crisis in CA, I think that, now today, the program is also in place to promote jobs and economy within CA.

- Companies like DyoCore are the intended target of the program.

- DyoCore's SolAir is New innovative Technology

- SolAir applies to the largest majority of CA residents who directly funded the program

- DyoCore both as a CA company and through its organization of professional distributors represents 100's of jobs and millions into our economy.

- DyoCore is the forefront company for the momentum created within local communities towards the acceptance and installation of Wind power technology throughout CA and the US.

- SolAir combines wind and solar, this is again the most innovative development of technology towards the ERP's intended objectives.

DyoCore, Inc.
3125 Tiger Run Court, #104
Carlsbad, CA 92010

P/F 866.404.2428

www.dyocore.com

Summary concerns with the current ERP:

On March 4th the CEC sent notice that it suspended the renewables rebate program so it may address deficiencies with the program requirements.

The goal of the ERP is to increase the installation of small wind systems and fuel cells

Though the suspension notice indicated "deficiencies with the program requirements", this does not fit well into the intention of the program as outlined.

The most current intention of the program, the state and our country is to promote the development of new technologies.

The concern is the recent large activity of ERP reservations from a single company whereas only a few months ago only a very few manufacturer products applied to a very few qualified recipients. Additionally these products are priced at significantly higher price points.

Now that products are available to a larger quantity of participating recipients Attention is now being placed on the production of energy at installation sites and the method of rating products qualified for the program.

Solution overview:

Separation of wind into specific qualification categories. Currently a power/wind rating incentive applies equally to a vague range of installation sites regardless of the wind conditions. A turbine qualified at 2kW @ 25mph and a turbine qualified at 2kW at 35mph apply to the exact same incentive regardless if either are installed in wind conditions substantially less than the rated wind speed.

By defining wind categories and ratings based on qualified installed locations will strengthen the intended benefits of the program. A turbine should be qualified based on its location and based on the projected power production as applied to that location.

Unfortunately wind experienced at a location can change dramatically from day to day less year to year. A qualified site today might not be qualified next week, however, relevance at the time of qualification and good history data should present a foundation for future expectations. we recommend the consideration of wind, product categories (wind zone categories)

Wind zones specific to turbines in size and intended use can be created that build a foundation for qualifying the program as applied to specific expected conditions. Data is readily available for easy separation of these categories.

DyoCore, Inc.
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- Micro wind – turbines under 500w or under a specific blade size, usually less than 48" (more appropriate) can only produce so much power and intended use is typically at ground level.

- Low or small wind – Turbines again with a blade diameter under 70' and whereas the intended installation is under 50' fall well into this category.

- Medium wind – installation sites well above 50', typically large pole mount, and with blade diameters exceeding 70" typically apply to this category.

- High wind – greater than 5kW and installed on poles exceeding 100'.

Special circumstances can apply to any category whereas local wind conditions at the intended site could be greater or lower than normally anticipated for the original category. A smaller turbine can be applied to a pole mount application and increase it's expected normal applied performance. The solution is a simple application exception request that can be accompanied with supporting data, installation details and wind analysis.

Summary Conclusion:

The ERP program was designed and is in effect today to:

- make green energy available financially

- create green jobs

- promote green technology

- make CA a green community

- make green products accessible to everyone

Until small wind products like DyoCore the program did not fully accomplish any of these objectives. Manufacturers like DyoCore are the core of the ERP intended results and DyoCore has demonstrated significant success in accomplishing the ERP objectives.

Unfortunately without site qualifications any turbine can be installed in a location that does not meet the intentions of the ERP. If you create site specific guidelines and more specific product categories for incentive qualification you can distinguish between productive and non-productive installations.

An incentive that varies based on the installed location and turbine size creates a powerful tool that maintains the direction of the program as designated.

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DyoCore notes from ERP workshop

Presentation moderator – Anthony NG

April 14, 2011

1. Primary stated barrier and cause to suspension of the ERP; Rebate amounts applied for in reservations covered most and in some all costs of the systems resulting in systems being installed that could possibly have little owner vested interest in the success of the application.

   Response:

   This is a direct correlation with over inflated Industry pricing / overpriced products. ERP was projected to bring down costs. New tech is less expensive and opens doors for greater deployment. New technology and resources for manufacturers present lower price point advantages and in turn will drive down pricing – this in turn is a benefit to the program and its success.

   The program as it is priced today should remain the same and be a tool to reward companies that maintain lower cost margin products and an incentive for larger turbine manufacturers to reduce highly over inflated price points.

   Manufacturers already have tremendous pressure to assure the success their products as installed and spend considerable resources to assure installations meet expectations.

2. It was presented that a $ per kWh produced annually could be applied.

   Response:

   If backed by an upfront incentive as applied to an annual objective it could be a good solution. However, we caution that any program with a spread out rebate structure will provide barriers to financing for product sales. If banks are unable to provide financing for installation of proposed/qualified systems due to lengthy repayment of their funds the sales agents will not have the resources needed to maintain growth within the market.

   A potential solution is the state initiates a direct funding incentive and provides the rebate based on pre-qualified conditions which then apply to a term loan or other method of payback over time that is funded through the existing program.

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3. Bergey presented that they, Bergey, are the only qualified product. Bergey presented that the list should be scrubbed. Mike Bergey is on the SWCC board and has already demonstrated extreme bias towards the industry – specifically towards "small wind".

   Response:

   All turbines installed in California by simple permitting standards have to present extensive 3rd party engineering, testing and performance proof prior to being issued a permit for installation. Even if a product acquires CEC listing, it will not be able to pull a permit until it can demonstrate it meets all the current applicable standards.

   Proper equality in listing should be given to all companies. Manufacturers should not hold positions that allow discrimination against other companies. Any 3rd party certification body should be completely independent. To force companies to meet a standard that is enforced and managed by distributors directly is in conflict with the intentions of a fair program.

   The ERP does and should encourage tech and its continued development. We cannot simply dismiss new development of tech and remove these tools from the eligibility, this is completely opposite of the ERP program. Without encouragement and resources of new tech there will be no new tech.

4. Listings at fixed wind speeds. It was discussed that turbines have arbitrary wind speed listings.

   Response:

   This is a valid point. Wind ratings are arbitrary and only effective if a turbine is installed in the rated conditions. This is highly unlikely. Most turbines will never experience the amount of wind they are rated for. 99% of the contributors to the program do not experience winds that most of the qualified products are listed at.

   Ratings should be based on realistic expectations as related to the specific install site. A turbine size and intended use is a great indication of its performance.

   Breaking up turbines into respective categories that label them for specific expectations and incentive consideration is a key method in the success of the program.

5. Site wind analysis reporting

   Response:

   Education is a primary solution, a wind turbine needs wind, an unqualified location damages the success of the program, distributors and manufacturers.

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High variable wind conditions make it difficult to do site evaluate in dense areas most applicable to the majority

Simple tools are fairly readily available for local area conditions through accumulated wind data but not always specific to a site. Possibly within several blocks and if specific to turbines than only applicable to 60' poles. Tools like Wind Cad are very expensive and only applicable to larger pole mounted turbines. They have no relevance on low wind and the majority of intended applications in California.

Large costs of formal assessments could be greater than the cost of the power benefit and possibly the cost of the system

Qualified professional installers should be held accountable for bad decisions. Training and certification by the ERP or CEC will provide the resources for distributors to make smart installation decisions.

Great source for residential and small commercial low wind analysis:
http://www.wunderground.com/wundermap/

6. Certification qualification for ERP inclusion

Response:

Limited and expensive resources towards 3rd party testing, standards have not yet been formally accepted towards certification, no current standard exists or is agreed upon within the wind field directly. But readily available professional and recognized 3rd parties exist and are already required prior to a permit or installation being done in California.

Standards for safety already exist, are excepted by state codes and provide a solid foundation for qualification. Safety and quality should be the primary factor IEC standards present a very good guideline and 3rd party NRTL companies have done qualified testing for safety and engineering for years.

The current CEC qualification does not need to be changed. Any CA city or community already has a very stringent installation/permitting process to assure safety and quality standards are met. All of which already highly exceed any state minimums.

7. Combining solutions into the ERP (wind, solar, fuel cells)

Response:

DyoCore, Inc.
3125 Tiger Run Court, #104
Carlsbad, CA 92010

P/F 866.404.2428

www.dyocore.com

Simple process for applying Additional Benefits to tie together wind, solar as a combined application.

Separation of fuel cells that could substantially improve wind, solar performance. A direct incentive would encourage important tech development in this direction. Similar to solar now.

8. Add a cost cap based incentive

   Response:

   Avoid cost cap, this encourages overpricing. Lower cost turbines move the market in the right direction holding manufactures to fair market prices.

We appreciate your consideration in reviewing our comments towards your objectives in reinstatement of the ERP.

Sincerely,

David Raine
CTO, DyoCore Inc.
760-580-4271
dave@dyocore.com

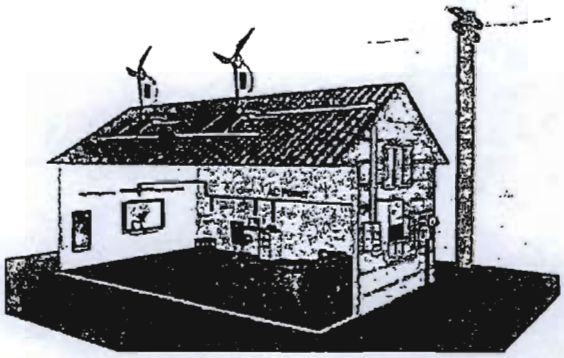
cc
Assemblyman Martin Garrick
1910 Palomar Point Way, #106
Carlsbad, CA 92008

Exhibit 9: Power curve data from DyoCore website

www.dyocore.com/sphpblog_0511/index.php?entry=entry110608-120151

Updated power curve / Solar add on overview

[illegible] Technology



The Aurora has an efficiency curve for conversion. The attached is a fairly close extrapolation of the conversion efficiency percentage – see the last column:

	Number of SolAir Units								
[illegible]	Wattz 1 Units	Single Unit Amps	Wattz 2 Units	Wattz 3 Units	Wattz 4 Units	Approx RPM	Approx. LSPM	[illegible]	Conversion Efficiency Curve
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	7	[illegible]	6	12	18	152	5	[illegible]	[illegible]
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SolAir and Aurora http://www.dyocore.com/sphpblog_0511/index.php?entry=entry110130-214346

Sunday January 30 2011, 09:43 PM **Technology**

	Power Curve Watts Setting by Number of SolAir Units - Parallel						
volts	1 Unit	2 Units	3 Units	4 Units	Approx RPM	Approx. MPH	Conversion Efficiency
30	5	6	8	11	150	4	5%
40	10	11	17	22	192	6	7%
50	20	22	33	44	228	7	12%
60	40	44	66	88	269	9	18%
70	75	83	124	165	336	11	23%
80	160	176	264	352	378	15	35%
90	287	316	474	632	419	18	40%
100	418	459	689	919	467	21	45%
110	552	828	1242	1656	508	23	50%
120	690	1035	1553	2070	555	25	55%
130	847	1271	1906	2541	603	26	60%
150	1228	1842	2763	3684	722	30	70%
160	1468	2203	3304	4405	764	32	75%
170	1676	2514	3771	5029	810	33	80%
180	1820	2730	4095	5460	858	34	85%
190	1940	2909	4364	5819	905	35	90%

DyoCore's SolAir in conjunction with Power One's Aurora Wind line of Inverters provides an out of the box solution for the residential small wind customer. Optimization still needs a bit of work but with current technology it's a very close match.

SolAir produces upwards of 300v DC, the Aurora peak input is 600v (580v max recommended by Aurora) with optimal input for peak conversation at approximately 250v. though a single SolAir still presents barriers due to the wide and quick variance of power created during turbulent wind conditions which are the most common found in low wind residential applications, 3 or more units is optimal and provide for the best connection start up and conversion results.

Having enough wind, approximately 8mph annual conditions or greater, and optimizing the Aurora power curve for the specific install wind conditions is key to the success of efficient energy conversion.

Pulling power from a turbine is like applying the brakes to a car. It will both slow the momentum of the blades and create a delay in momentum to get back to peak rotation. This combined with rapid changing wind conditions is a difficult to manage combination. The aurora will moderately apply the brakes. when pulling power, this causes the turbine to slightly slow, reduce voltage output and allow the aurora to drop to a lower power curve setting then in turn taking off the brakes and allowing the turbine to catch up in momentum. When a power curve is too aggressive or passive it could substantially accentuate the applied brakes or momentum required from brake recovery to catch back up to an optimized power conversion. This is most commonly experienced in the lower voltage/power curve settings.

SolAir begins power conversion, in combination with the Aurora, at about 160rpms or approximately a consistent 11mph wind. applying the brakes too hard in this power range will prevent the SolAir from gaining higher rpm momentum. if the known wind conditions are lower, under 10mph annually, setting the first few power curve settings conservatively will allow the turbine available momentum to build up and maintain higher rpm and higher conversion efficiency.

From our current in house testing we know the following:

1. A single SolAir will start up the Aurora at a constant wind of approximately 11mph or greater. Approximate RPM startup is 160rpm. Approximate voltage startup is 50v

2. Three SolAir Solar Panels wired in Series are sufficient to keep the Aurora on for several hours in daylight. They are not enough to start up the Aurora on their own.

3. Approximately 5 to 6 SolAir Solar panels wired in series are required to provide sufficient power to start up the Aurora.

4. An unlimited amount of SolAir units can be tied to the Aurora in Parallel configuration.

5. Any configuration that has the potential to create more than 700v will damage the inverter. This would indicate that a maximum of two SolAir units can be fed into the inverter in Series configuration.

Exhibit 10 - Kema email pertaining workload

Rick,

Please feel free to call me on my cell with your questions.

Unfortunately we've been kind of snowed under with processing module requests since around June. When I did this job from 2005-2007, we'd maybe get 20 to 30 module requests a month. Now we're getting around 200 per month (mostly from China). So Daria has trouble getting back to everyone individually.

I'll be mostly around through the holidays and if you're working, please feel free to call me any time. I tried calling the number listed below, but got no answer.

Thank you,

Pete Baumstark –
KEMA, Inc.
cell: (408) 826-1435

From: Mashnik, Daria
Sent: Thu 12/24/2009 10:35 AM
To: Baumstark, Pete
Subject: Please get back to this individual. I didn't have a chance yet.

Pete -

Can you follow up with this person from Dyocore? I haven't had a chance yet. He e-mailed me twice. Thanks!

Best regards,
Daria S. Mashnik

Energy Engineer
KEMA Services, Inc

DyoCore Response to Complaint Against DyoCore, Inc. by the California Energy Commission, Executive Director, Robert P. Oglesby

Docket no. 11-CAI-03

PROOF OF SERVICE (original sent via Email to all recipients: 8/8/11)

Respondent

David Raine, CEO
DyoCore Inc.
3125 Tiger Run Court, #104
Carlsbad, CA 92010

Response sent to:

Applicant

Robert P. Oglesby
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roglesby@energy.state.ca.us

Payam Narvand
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Energy Commission Decisionmakers

Robert Weisenmiller
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eallen@energy.state.ca.us

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Sacramento, CA 95814
mlevy@energy.state.ca.us

Jennifer Martin-Gallardo
Staff Counsel
jmarting@energy.state.ca.us

DECLARATION OF SERVICE

I, Ryan Foster, declare that on, 8/22/11, I served and filed copies of the attached DyoCore Response dated 8/8/11. The original document, filed with the Docket Unit or the Chief Counsel, as required by the applicable regulation, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [http://www.energy.ca.gov/renewables/emerging_renewables/11-cai-03/index.html]. The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit or Chief Counsel, as appropriate, in the following manner:

(*Check all that Apply*)

For service to all other parties:

X Served electronically to all email addresses on the Proof of Service list;

X Served by delivering on this date, either personally, or for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

AND

For filing with the Docket Unit at the Energy Commission:

X by sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (preferred method);

OR

____ by depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION – DOCKET UNIT
Attn: Docket No. 11-CAI-03
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

OR, if filing a Petition for Reconsideration of Decision or Order pursuant to Title 20, § 1720:

____ Served by delivering on this date one electronic copy by email, and an original paper copy to the Chief Counsel at the following address, either personally, or by depositing in the mail.

California Energy Commission
Michael J. Levy, Chief Counsel
1516 Ninth Street MS-14
Sacramento, CA 95814
mlevy@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

Ryan Foster

DyoCore Response to Amendment of Complaint against DyoCore, Inc.
Sept 13, 2011

DOCKET	
11-CAI-03	
DATE	SEP 13 2011
RECD.	SEP 13 2011

Raoul A. Renaud
Hearing Adviser II
California Energy Commission
1516 9th Street
Sacramento, CA 95814

RE: DyoCore Inc. Response to Amendment of Complaint against DyoCore, Inc.

Docket # 11-CAI-03

Dear Mr. Renaud,

We request to include the following towards response in respect to the filed Amended Complaint against DyoCore Inc.

Points requested to be considered by the Commission

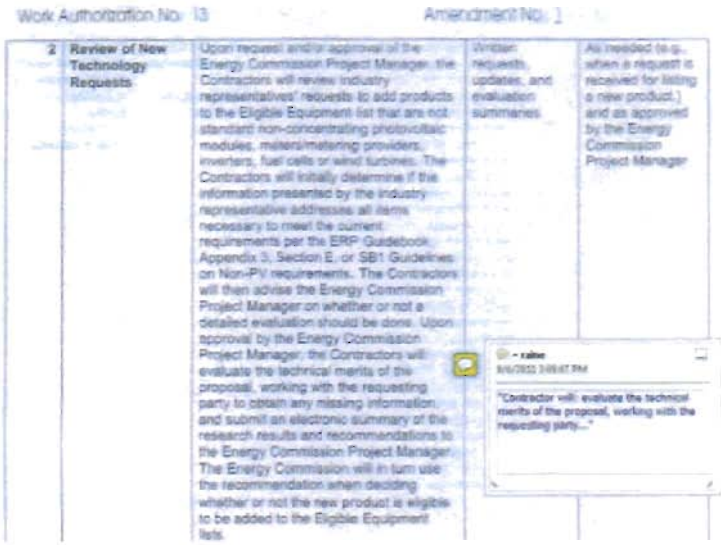
1. Requested Action (§ 1231 (b)(S))

   I request this action be removed in its entirety. There is no justifiable cause to remove DyoCore as a qualified ERP participant.

   DyoCore submitted data that was taken into consideration by KEMA who then mistakenly published annual performance data opposed to actual wind data. The simple solution would be to post the correct data that is applicable for the intended rating performance listing as it should have been done in the first place. Since all other qualifications, other than a mistake made by KEMA, meet the ERP guidelines there is no cause for removal.

   As outlined in the KEMA CEC agreement Work Authorization No. 13, Amendment No. 1 Renewable Energy Program Technical Assistance Contract No. 400-07-030, KEMA was the sole authority on determining the merits of a company/product for inclusion.

   DyoCore acted in good faith in working with KEMA for such qualification and inclusion in the ERP. Following inclusion DyoCore and its independent representatives spent considerable financial resources and efforts towards building out SolAir product distribution capabilities to meet the demand of the California applicants as applied to the program. DyoCore, its distributors and California qualified residents and ERP participants depended on the intentions of the CEC and KEMA.



Work Authorization No. 13 Amendment No. 1

2	**Review of New Technology Requests**	Upon request and/or approval of the Energy Commission Project Manager, the Contractors will review industry representatives' requests to add products to the Eligible Equipment list that are not standard non-concentrating photovoltaic modules, meters/metering providers, inverters, fuel cells or wind turbines. The Contractors will initially determine if the information presented by the industry representative addresses all items necessary to meet the current requirements per the ERP Guidebook, Appendix 3, Section E, or SB1 Guidelines on Non-PV requirements. The Contractors will then advise the Energy Commission Project Manager on whether or not a detailed evaluation should be done. Upon approval by the Energy Commission Project Manager, the Contractors will evaluate the technical merits of the proposal, working with the requesting party to obtain any missing information, and submit an electronic summary of the research results and recommendations to the Energy Commission Project Manager. The Energy Commission will in turn use the recommendation when deciding whether or not the new product is eligible to be added to the Eligible Equipment lists.	Written requests, updates, and evaluation summaries	As needed (e.g., when a request is received for listing a new product.) and as approved by the Energy Commission Project Manager

- xalne
8/6/2011 3:49:47 PM
"Contractor will: evaluate the technical merits of the proposal, working with the requesting party..."

Exhibit 5

2. Time is of the Essence

Substantial financial damage is being caused by continued delays to both the reinstatement of the CEC ERP and in the complaint against DyoCore. It is our request that a timely and immediate resolution be sought in moving forward. Further delay is causing significant financial damage to California businesses, some of which have already began closing their doors and have already reduced staff, and already financially crushed families who have placed deposits down towards renewable energy systems that are being considerably held up by this continued delayed process of reinstating the ERP and release of held funds.

If there is cause against DyoCore it should be identified and DyoCore should be given its opportunity to defend itself formally, if no cause exists other than simply the wrong power curve being posted by KEMA then post the correct power curve so we can all move forward.

3. The Facts

DyoCore at the time of application and inclusion in the ERP could have arbitrarily chosen any point within the correct power curve. The fact is that there was NO standard in place that required a product to qualify at any specific wind speed.

DyoCore's SolAir will produce 1.6 kW in real wind speeds at approximately 38mph. This at the time of listing and still today is an applicable qualification. Other products on the ERP are listing at similar wind speeds that are installed in similar conditions.

As published by Paul Gipe, Testing the Power Curves of Small Wind Turbines – Published in 2000, Summer 2000 (Vol. 13, No. 3) issue. WindStats.

> "There are no rules, standards, or norms about what wind speed manufacturers may pick to "rate" their small wind turbines. Often in the United States it's 28 mph (12.5 m/s). But manufacturers may pick any speed they choose. If it's less than 28 mph, the turbine will have a lower "power rating" than a wind turbine with a similar sized rotor but with a higher rated speed. In the 1970s it was easy for unscrupulous manufacturers to manipulate this system to make it appear that their turbines were a better buy than competing products. By pushing "rated power" higher they were able to show lower relative costs in $/kW of rated power (turbine cost/rated power) or they were able to jack up their price--and profits--proportionally."
>
> "Measuring power curves is not an exact science. There's a lot of room for error and misinterpretation. Most notable is the sheer difficulty of accurately measuring wind speed. It's not as simple as most think."

Paul Gipe concluded by stating: "it's unlikely that a consumer can expect to see the performance promised", then listed companies that are ERP participants.

4. If any notice is to be sent to participants it should be a notice of when to expect their rebates as promised by the program that they and all participating parties invested in.

If the objective of the committee is to delay a hearing to allow further investigation of a resolution to release held funds it is understood that this is a difficult decision, however, the facts have to have a part on that timely decision. The facts do not change in time and they are clearly agreeable. The facts are that approximately 180 turbines are listed on the ERP of which over three quarters if not greater have published power curves that will never be experienced by the consumer and NO set standard was in place for their consideration during publication.

DyoCore, its distributors and its clients are inappropriately being made a target by an already broken system. Had any other company prior to DyoCore had demonstrated the demand that DyoCore has for its products the system would have come to a halt as well. DyoCore should not be victimized because of its success and the success of the ERP as it was intended to apply. If the system is broken then fix it but not at the financial burden and good hard working California companies who all acted in good intentions to the intended purpose of the program. If companies and consumers

participated in good faith and within the terms of the program then the program should honor those participants as promised and stated.

DyoCore has a qualified physicist reviewing its raw data. DyoCore should have a verified power curve from its 2009-10 Hampshire IL test site within the next week and will immediately forward this qualified data to KEMA for its review and modification of the SolAir published power curve. Since no current requirement is in place for a required wind speed, DyoCore will be seeking a qualification at 1.6 kW at the respective correlating wind speed if applicable.

DyoCore has also been accepted for testing by SWCC and expects to begin testing within the month to meet the anticipated new playbook standards and a new published rating that applies to the applicable standard in place at that time as it would apply to all other qualified ERP products/companies.

Sincerely,

David Raine,
CEO DyoCore, Inc.
3125 Tiger Run Court, #104
Carlsbad, CA 92010

www.dyocore.com
dave@dyocore.com
Phone and Fax: 866-404-2428
Direct: (760) 580-4271

DECLARATION OF SERVICE

I, David Raine, declare that on, 9/13, 2011, I served and filed copies of the attached Amendment Response, dated 9/13, 2011. The original document, filed with the Docket Unit or the Chief Counsel, as required by the applicable regulation, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[http://www.energy.ca.gov/renewables/emerging_renewables/11-cai-03/]**.

The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit or Chief Counsel, as appropriate, in the following manner:

(Check all that Apply)

For service to all other parties:

✓ Served electronically to all e-mail addresses on the Proof of Service list;

___ Served by delivering on this date, either personally, or for mailing with the U.S. Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "e-mail service preferred."

AND

For filing with the Docket Unit at the Energy Commission:

✓ by sending an original paper copy and one electronic copy, mailed with the U.S. Postal Service with first class postage thereon fully prepaid and e-mailed respectively, to the address below (preferred method); ***OR***

___ by depositing an original and 12 paper copies in the mail with the U.S. Postal Service with first class postage thereon fully prepaid, as follows:

CALIFORNIA ENERGY COMMISSION – DOCKET UNIT
Attn: Docket No. 11-CAI-03
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

OR, if filing a Petition for Reconsideration of Decision or Order pursuant to Title 20, § 1720:

___ Served by delivering on this date one electronic copy by e-mail, and an original paper copy to the Chief Counsel at the following address, either personally, or for mailing with the U.S. Postal Service with first class postage thereon fully prepaid:

California Energy Commission
Michael J. Levy, Chief Counsel
1516 Ninth Street MS-14
Sacramento, CA 95814
mlevy@energy.state.ca.us

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

*indicates change

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

IN THE MATTER OF THE COMPLAINT AGAINST DYOCORE, INC. BROUGHT BY ENERGY COMMISSION STAFF

Docket No. 11-CAI-03
(Revised 9/6/2011)

COMPLAINANT

California Energy Commission
Robert P. Oglesby
Executive Director
1516 Ninth Street
Sacramento, CA 95814
e-mail service preferred
roglesby@energy.state.ca.us

California Energy Commission
Payam Narvand
Program Manager
1516 Ninth Street
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COUNSEL FOR COMPLAINANT

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gherrera@energy.state.ca.us

California Energy Commission
Jonathan Knapp
Staff Counsel
1516 Ninth Street
Sacramento, CA 95814
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jknapp@energy.state.ca.us

RESPONDENT

DyoCore, Inc.
Ralph Bettencourt, CEO
David Raine, CTO
3125 Tiger run Court, #104
Carlsbad, CA 92010
ralph@dyocore.com
dave@dyocore.com

INTERVENORS

Solar Point Resources Inc.
Jane E. Luckhardt
Stephen J. Meyer
Downey Brand, LLP
621 Capitol Mall, 18th Floor
Sacramento, CA 95814
jluckhardt@downeybrand.com
smeyer@downeybrand.com

INTERESTED ENTITIES/AGENCIES

Bay Area Energy Solutions
1326 Marsten Road
Burlingame, CA 94010
www.bayenergy.com

California Solar Systems
1411 Rusch Court
Santa Rosa, CA 95401
barryw@855casolar.com

Synergy Corp.
863 N Bush Avenue
Clovis, CA 93611
marlin.magie@sbcglobal.net

Crizer Wind Energy, Inc.
1191 4th Street
Los Osos, CA 93402
crizerwindenergy@sbcglobal.net

My Wind Power
4037 Phelan Road, A267
Phelan, CA 92371
www.info@mywindpower.biz

Solar Point Resources
P.O. Box 4761
San Jose, CA 95150

Energy Pros
2235 Solitude Court
Rocklin, CA 95765
brian@energyproslic.com

***Wind Solar Solutions**
420 Avalon Street
Morro Bay, CA 93442
corky@windandsolarsolutions.com

***CA Green Team**
720 North China Lake Boulevard
Ridgecrest, CA 93555
tammy@cagreenteam.com
rayw@cagreenteam.com

Prevailing Wind Power
324 N Gertruda
Redondo Beach, CA 90277
bob@prevailingwindpower.com

*indicates change

5

INTERESTED ENTITIES/AGENCIES (cont.)

Green Solar Solutions, Inc.
22267 Vacation Dr.
Canyon Lakes, CA 92587
greensolarsolutions@yahoo.com

Desert Power, Inc.
77380 Michigan Dr.
Palm Desert, CA 92211

San Diego Small Wind
3125 Tiger Run Ct. #103
San Marcos, CA 92009

Apple Acres, Inc. DBA Gridnot
P.O. Box 645
Lucerne Valley, CA 92356
info@gridnot.com

ENERGY COMMISSION – DECISIONMAKERS

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Commissioner and Presiding Member
cpeterman@energy.state.ca.us

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jboyd@energy.state.ca.us

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Hearing Officer
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jmarting@energy.state.ca.us

ENERGY COMMISSION - PUBLIC ADVISER

Jennifer Jennings
Public Adviser
e-mail service preferred
publicadviser@energy.state.ca.us

*indicates change

From: <rick@dyocore.com>
To: KSI-CA Equipment <Equipmentus.kema.com@kema.com>
Date: 12/8/2009 10:20 AM

Ms. Daria Mashnik; My name is Rick Berry I work for Dyocore Inc. in San Diego, Ca. we wish to have a wind turbine product of ours certified in the state of Ca., please advise. My home phone is 858-598-5254 best Rick

Exhibit 6

From: <rick@dyocore.com>
To: KSI-CA Equipment <Equipmentus.kema.com@kema.com>
Date: 12/16/2009 8:49 AM
Subject: 2nd REQUEST FOR ASSISTANCE

To: Daria Mashnik, this is my second email request for assistance to you. We are a California based company attempting to have our product certified with the state, I have spoken w/Mr. Lee at the state and he tells me that you should help me and if not I should get back to him and he w/get with you. I prefer doing my own work, Kindly contact me; Rick Berry 858-598-5254

Exhibit 7

From: rick@dyocore.com [mailto:rick@dyocore.com]
Sent: Monday, February 15, 2010 11:50 AM
To: Baumstark, Pete
Cc: dave@dyocore.com
Subject: Fwd: iec data

Pete Here are the data figures from our tests. The company is Dyocore, the product is a SolAir 800 turbine, David Raine is the CEO of Dyocore and he can answer any questions you may have at 760-807-2135. When I spoke with you regarding the review you told me you could return the results the same day. I could really appreciate your notifying the state immediately if the data is sufficient so we can get listed by March 1, 2010. Our trade show sales in California are extremely successful and we'd like to install into around 45 homes in March. Pete, thanks for any and all assistance. I remain Rick Berry 858-598-5254

-----Original Message-----
From: David Raine [mailto:dave@dyocore.com]
Sent: Monday, February 15, 2010 12:20 AM
To: rick@dyocore.com
Subject: iec data

SolAir 800 - Summary Production Results

		Wind	Solar	Hours of production at ws above						Wind / Gust Average - limits				T_T	T_U	T_E	T_N	O
Month	Notes	kWh production	kWh production	0	6	8	10	12	>12	Max Wind	Average Wind	Max Gusts	Average Gusts	Hours				%
Sep-08	1,2,3	82.80788208	6.431632	171	103	29	35	12	0	18.4	6.3	N	N	350	72	20	24	91%
Oct-08	4	195.3345042	14.791154	342	262	50	66	21	3	20.7	5.8	N	N	744	0	10	8	99%
Nov-08	5	128.782932	14.15863	341	273	46	36	16	8	25.3	5.5	N	N	720	0	0	16	98%
Dec-08	6	192.5889154	12.697476	274	326	56	48	18	22	36.8	5.3	N	N	744	0	0	0	100%
Jan-09	7,8	94.00400394	13.345624	344	317	42	32	7	2	18.4	5.8	N	N	744	110	5	48	92%
Feb-09	9	218.5929992	13.552332	259	251	52	60	28	22	38	7.3	N	N	672	0	0	0	100%
Mar-09	10	251.2555455	14.882604	270	276	54	90	43	11	24.2	7.4	N	N	744	6	0	48	93%
Apr-09	11	340.6171748	14.950184	185	273	73	112	45	32	29.9	7.2	N	N	720	0	0	24	97%
May-09	12	226.7815714	14.604224	246	291	67	113	27	0	19.6	7	N	N	744	0	2	24	97%
Jun-09	13	296.5248076	15.705282	184	300	67	99	61	9	23	7.2	N	N	720	0	1	0	100%
Jul-09	14	230.5729028	17.39069	287	234	79	120	24	0	18.4	7.1	N	N	744	0	0	24	97%
Aug-09	15	218.7764195	19.266376	300	245	63	106	30	0	17.3	5.8	N	N	744	0	0	0	100%
Sep-09	16,17,18	182.7617497	17.642534	319	240	46	92	23	0	21.9	6.3	24	20	720	S6	48	86	86%
Oct-09	19	212.153999	18.10679	283	289	59	71	26	16	26.5	6	27	21	744	0	0	0	100%
Nov-09	20	124.3978237	16.808882	343	273	43	42	13	6	26.5	5.8	26	23	720	1	0	0	100%
Dec-09	21,22	200.9828667	15.042874	289	312	39	54	28	22	42.6	6.7	39	26	744	0	3	0	100%
Jan-10	23,24,25	233.7411242	13.852288	329	274	38	47	15	41	41.4	7.8	43	26	744	4	36	96	86%
Annual - 09		2597.4	191.3	3309.0	3301.0	684.0	991.0	355.0	120.0	25.5	6.6	29.0	22.5	730.0	14.4	4.9	21.2	97%

Just need to now do the data notes and summary content. I should have it done by Wednesday but this might be enough to file with the State right away.

Best wishes, David Raine
dave@dyocore.com
mobile: 760-807-2135
Desk: 866-404-2428

DyoCore smart solutions

663 So. Rancho Santa Fe Rd. #610
San Marcos, CA 92078

Exhibit 8

From: "Baumstark, Pete" <IMCEAEX-_O=KEMA+20CONSULTING_OU=KCG_CN=KEMA+20CONSULTING+20GROUP_CN=OAKLAND_CN=ACCOUNTS_CN=PBAUMSTARK@kema.com>
To: <rick@dyocore.com>
Date: 2/15/2010 12:04 PM
Subject: RE: iec data
CC: <dave@dyocore.com>, "Mashnik, Daria" <Daria.Mashnik@us.kema.com>
Attachments: image001.jpg

Thanks. Please also send a performance curve and also tell me what the units for wind speed are (m/s or mph).

Pete Baumstark, PE
Energy Engineer

+1 (510) 891-0446 (office)
+1 (510) 891-0440 (fax)
pete.baumstark@kema.com

KEMA
155 Grand Avenue, Suite 500
Oakland, CA 94612

Please visit our website www.kema.com

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Exhibit 9

Exhibit 10

From: David Raine [mailto:dave@dyocore.com]
Sent: Monday, February 15, 2010 9:38 PM
To: Baumstark, Pete
Cc: rick@dyocore.com
Subject: RE: iec data

Thank you for your assistance. The units for wind our MPH. I can convert to m/s if preferred.

Here is the performance charts. We are a bit conservative but we wanted to apply to very realistic residential conditions:

Power (W)	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750
Rotation (RPM)	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750
SolAir II 800w		8	16	64	80	144	224	296	360	448	504	560	624	680	744	816
Solar Fin	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50

Voltage (V)	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750
Rotation (RPM)	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750
SolAir II 800w		6.4	8	9.6	12.8	16.8	20	24	27.2	30.4	32.8	37.6	41.6	44.8	48	52
Solar Fin	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18

*Solar Fin represents Solar Output during normal indirect sunlight conditions.

Let me know if you
have questions.
Thank you!

Annual Energy Production

Average Wind Sp	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
SolAir I 800w		200	400	900	1500	2100	2600	3200	3800	4000	4200	4250	4300	4350	4400	4450

From: Baumstark, Pete [mailto:Pete.Baumstark@us.kema.com]
Sent: Tuesday, February 16, 2010 8:46 AM
To: David Raine
Cc: rick@dyocore.com
Subject: RE: lec data

So your average wind speed during the tested period is only 6.6 mph?

Pete Baumstark, PE
Energy Engineer

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pete.baumstark@kema.com

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Please visit our website www.kema.com

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Exhibit 11

Sent: Tuesday, February 16, 2010 3:04 PM
To: Baumstark, Pete
Cc: rick@dyocore.com
Subject: RE: iec data

Thank you Pete for your consideration and assistance. Here is the data summary for our single unit installed in Hampshire IL. A little less sun but a lot more wind!

SolAir 800 - Summary Production Results
Hampshire, Il 60140

Month	Notes	Wind kWh production	Solar kWh production	Wind / Gust Average - limits Max Wind	Average Wind
Jan-09	1,2	82.80788208	4.894652	N	N
Feb-09	2	195.3345042	12.722152	N	N
Mar-09	3	128.782932	12.786694	N	N
Apr-09	4	192.5889154	13.336386	N	N
May-09	5	94.00400394	12.508624	56.1	16.7
Jun-09	6	218.5929992	12.999974	60.7	14.8
Jul-09	7	251.2555455	13.623136	48	13.7
Aug-09	8	340.6171748	13.84832	41.1	13.1
Sep-09	9	226.7815714	13.284678	36.5	11.9
Oct-09	10	296.5248076	13.225654	50.3	13.3
Nov-09	11	230.5729028	16.680728	48	15.4
Dec-09	12	218.7764195	15.512214	44.6	15.7
Jan-10	13	182.7617497	15.84875	40	18.1
Feb-10	14	212.153999	10.798912	44.6	15.6
Annual - 09		2659.4	171.3	47.0	14.8

Best wishes, David Raine
dave@dyocore.com
mobile: 760-807-2135
Desk: 866-404-2428

Exhibit 12

From: David Raine [mailto:dave@dyocore.com]
Sent: Tuesday, February 16, 2010 3:27 PM
To: Baumstark, Pete
Subject: RE: iec data

Please let me know if this is acceptable:

Manufacturer Name	Model Number	Description	Power Output (Watts)	Notes
DyoCore	S80015dc	SolAir 800W hybrid wind/solar generator	800	Produces rated power at 12 mph.

The 800 W output is based on a 75% load – average load when charging batteries or running a motor or other object in real time plugged directly into an inverter. The output without load at 12mph is approximately 1.5 kW. Most companies rate their products at substantially higher wind speeds. We would like to present a much more realistic rating for the average user of our units. If you have experience in this area it would be helpful in a direction towards correctly labeling our product.

Here are the primary two output tests:

SolAir - open v.					Watts		Wind Speed	
RPM	Voltage	RPM	V	A	Open	75% Load	mph	m/s
173	9.9						2.5	1.1
213	11.8						3	1.32
300	17.2						3.8	1.672
400	23.9	450	20.5	0.5	10.25	10.25	5	2.2
519	30.5	500	28.5	5.1	145.35	135.15	6	2.64
612	35.9	600	38.3	16.1	616.63	414.96	8	3.52
700	40.6	700	41.2	22.6	931.12	644.1	8.7	3.828
800	47.6	800	46.4	25.5	1183.2	701.25	9.8	4.312
900	51.6	900	50.1	27.3	1367.73	756.21	10.9	4.796
1000	57	1000	53.1	29.5	1566.45	811.25	12	5.28

Best wishes, David Raine
dave@dyocore.com
mobile. 760-807-2135
Desk: 866-404-2428

DyoCore
Smart Solutions

663 So. Rancho Santa Fe Rd. #610
San Marcos, CA 92078

Exhibit 13

From: <rick@dyocore.com>
To: "Baumstark, Pete" <Pete.Baumstark@us.kema.com>
CC: <dave@dyocore.com>
Date: 2/17/2010 9:53 AM
Subject: Dyocore Inverter
Attachments: EMC_GCI-2k[2].pdf; GCI_UL_1741[2].pdf; LVD_GCI-2k[2].pdf; V09111237[1] test .pdf

Hello Pete, thank you for your rapid response on the turbine cert. I am enclosing information on the Ginlong GCI-2k Inverter we want to use with the turbine. It has undergone extensive tests as the attached Declarations of Conformity (s) will verify. Kindly respond with any additional information you may need. This inverter is used widely in Asia and Europe and is just now breaking into the US market.
Best Rick Berry

Exhibit 14

From: "Baumstark, Pete" <IMCEAEX-_O=KEMA+20CONSULTING_OU=KCG_CN=KEMA+20CONSULTING+20GROUP_CN=OAKLAND_CN=ACCOUNTS_CN=PBAUMSTARK@kema.com>
To: <rick@dyocore.com>
CC: <dave@dyocore.com>, "Mashnik, Daria" <Daria.Mashnik@us.kema.com>, BillBr...
Date: 2/17/2010 10:31 AM
Subject: RE: Dyocore Inverter
Attachments: Dyocore Inverter

Rick,

Here's the inverter eligibility procedure:

http://www.gosolarcalifornia.ca.gov/equipment/documents/INVERTER_ELIGIBILITY_PROCEDURE.PDF

It looks like everything is in order to add this product except the performance testing as defined in this document. I don't know if Ginlong has had Intertek perform this testing or not. I didn't see them on our approved inverter listing and I'm not the one who performs the inverter reviews (Bill Brooks performs that review, copied on this e-mail).

Thank you,

Pete Baumstark, PE

Energy Engineer

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+1 (510) 891-0440 (fax)
pete.baumstark@kema.com

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Oakland, CA 94612

Please visit our website <http://www.kema.com/> www.kema.com

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Exhibit 15

From: "Baumstark, Pete" <IMCEAEX-_O=KEMA+20CONSULTING_OU=KCG_CN=KEMA+20CONSULTING+20GROUP_CN=OAKLAND_CN=ACCOUNTS_CN=PBAUMSTARK@kema.
To: "Mashnik, Daria" <Daria.Mashnik@us.kema.com>
Date: 2/17/2010 10:38 AM
Subject: FW: iec data
Attachments: image002.png; image009.png; image012.png; image003.jpg; image004.gif; image005.gif; image006.gif; image008.png; image010.png; image013.png; image014.jpg

Daria,

We can add this product to the wind turbine listing.

They've given me 12 months of output data, but only had their anemometer installed for 10 of those months. But in looking at the power output for the two months missing the wind speed data, it looks like the wind speed was good enough to not significantly reduce the average wind speed for the year.

Pete Baumstark, PE
Energy Engineer

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Exhibit 16

Exhibit 17

From: "Baumstark, Pete" <IMCEAEX-_O=KEMA+20CONSULTING_OU=KCG_CN=KEMA+20CONSULTING+20GROUP_CN=OAKLAND_CN=ACCOUNTS_CN=PBAUMSTARK@kema.
To: "Mashnik, Daria" <Daria.Mashnik@us.kema.com>
Date: 2/17/2010 10:38 AM
Subject: FW: iec data
Attachments: image002.png; image004.png; image006.png; image008.gif; image009.gif; image010.gif; image001.jpg; image003.png; image005.png; image007.png

Here's the description they want to add to the ERP listing.

Pete Baumstark, PE
Energy Engineer

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pete.baumstark@kema.com

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Please visit our website www.kema.com

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Exhibit 18

From: rick@dyocore.com [mailto:rick@dyocore.com]
Sent: Saturday, February 20, 2010 11:35 AM
To: Baumstark, Pete
Cc: dave@dyocore.com
Subject: Inverter

Hello Pete, I finally spoke w/Bill Brooks, he called me late Friday afternoon after two phone calls and two emails. Once he got on the phone he informed me that he was leaving the country for 12 days beginning Sunday. I tried to explain the importance of getting the inverter approved and on the state list by 3/1 but he cut me short and said "oh, everybody is in a rush". Waiting seven days for contact and another twelve days for him to get back isn't acceptable, do you have an alternative. Your operation at Kema is right on the money, timely, and professional, got a twin to handle the inverter? Rick Berry

From: "Baumstark, Pete" <IMCEAEX-_O=KEMA+20CONSULTING_OU=KCG_CN=KEMA+20CONSULTING+20GROUP_CN=OAKLAND_CN=ACCOUNTS_CN=PBAUMSTARK@kema.com>
To: Patrick Saxton <psaxton@energy.state.ca.us>, "Tong, Nellie" <Nellie.Tong...
CC: "Mashnik, Daria" <Daria.Mashnik@us.kema.com>
Date: 2/21/2010 10:05 AM
Subject: FW: Inverter

FYI. As far as I know, they haven't done the performance testing yet.
I'll get with Rick on that.

Pete Baumstark, PE

Energy Engineer

+1 (510) 891-0446 (office)
+1 (510) 891-0440 (fax)
pete.baumstark@kema.com

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155 Grand Avenue, Suite 500
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Please visit our website <http://www.kema.com/> www.kema.com

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P Please consider the environment before printing this email.

Exhibit 19

From: Mashnik, Daria [mailto:Daria.Mashnik@US.KEMA.com]
Sent: Monday, March 01, 2010 11:43 AM
To: dave@dyocore.com
Subject: CEC listing

Dave -

I wanted to let you know that I have added your hybrid solar/wind generator product to our wind turbine update and will be submitting it to CEC shortly. I would guess that your product should appear on the website sometime tomorrow or Wednesday.

Have a good day,

Daria S. Mashnik
Energy Engineer

KEMA Services, Inc.
150 Grand Avenue, Suite 500
Oakland, CA 94612
Tel: 510-891-0446

Exhibit 20

From: David Raine <dave@dyocore.com>
To: "Mashnik, Daria" <Daria.Mashnik@US.KEMA.com>
Date: 3/1/2010 11:45 AM
Subject: RE: CEC listing
Attachments: image001.png

Thank you! Do you have any information as to how the listing will appear?

Best wishes, David Raine

dave@dyocore.com

mobile: 760-807-2135

Desk: 866-404-2428

<http://www.agentsestaff.com/mymedia/uploads/3576/images/David_Raine.msg> v-card link

<http://www.dyocore.com/>

663 So. Rancho Santa Fe Rd. #610

San Marcos, CA 92078

Exhibit 21

1

From: rick@dyocore.com [mailto:rick@dyocore.com]
Sent: Friday, April 09, 2010 2:32 PM
To: Mashnik, Daria
Cc: dave@dyocore.com
Subject:

Daria, per our conversation today, here is my contact email 858-598-5254 is the phone Dyocore the company SolAir 800 the product and 1000 watts the actual output of the unit per our office. Thanks for your help Rick

Exhibit 22

From: Mashnik, Daria [mailto:Daria.Mashnik@US.KEMA.com]
Sent: Friday, April 09, 2010 2:33 PM
To: rick@dyocore.com
Cc: dave@dyocore.com
Subject: RE:

Thanks, Rick.

I'll get to this once our contract has been renewed. I hope this will happen shortly.

I'll be in touch if I have any further questions.

Best regards,
Daria S. Mashnik

Energy Engineer
KEMA Services, Inc.

Exhibit 23

From: David Raine [mailto:dave@dyocore.com]
Sent: Friday, April 09, 2010 2:51 PM
To: Mashnik, Daria; rick@dyocore.com
Subject: power curve output data for SolAir - 1.6 kW

I?m sorry about the confusion. Here?s the formal material for our rated output:

Model	SolAir
Orientation	Downwind
Rated Output	1.6 kW
Output Voltage (V)	130v @ 800 rpm
Applications	Stand Alone (combines wind/solar DC output), Grid Connection, Direct Heating, and Pumping
Controller Type	Girlong
Overspeed Protection	Osculates mechanically in high winds for auto speed control
Blade Material	Aluminum
# of Blades	3
Rotor Diameter (m)	1.2
Swept Area (m²)	1.13
Windspeed (m/s)	
Rated	8
Cut-in	2
Cut-out	16.5
Survival	54 - known
Head Weight (kg)	20
Tower Type	Surface mount
Tower Height (m)	1.4m - 58"
Product Life (years)	15
Warranty (years)	10
Units sold	450
Years on the market	0.5
Price (USD)	MSRP: $1700 SolAir 800 hybrid wind/solar turbine. Includes turbine, rectifier, and surface mounting hardware.
Additional Info	SolAir is a dynamic hybrid vertical mill that combines wind/solar integrated into a single balanced frame/fin design. SolAir is designed so versatile it can be mounted on any flat horizontal, vertical or pitched surface and can be either bolted or ballasted down

AT 18mph ? our output is 1.6 kW. This should be the posted data or applied output.

Sea-Level Air Density Normalized Power Curve
SolAir San Marcos CA

m/s	Mph	Bin Wind Speed m/s	Bin Power kW	Number Data Points	C_p
1.6	3.5	1.554	0	0	0.77
2.1	4.6	2.0424	0.01	1340	0.58
2.6	5.8	2.5752	0.12	1134	0.44
3.1	6.9	3.0636	0.14	903	0.37
3.6	8.1	3.5864	0.41	747	0.30
4.1	9.2	4.0848	0.67	478	0.25
4.6	10.4	4.6176	0.79	278	0.22
5.1	11.5	5.106	0.84	161	0.20
5.7	12.7	5.6388	0.99	65	0.18
6.2	13.8	6.1272	1.17	47	0.16
6.7	15	6.66	1.35	29	0.15
7.2	16.1	7.1484	1.42	15	0.14
7.7	17.3	7.6812	1.56	13	0.13
8.2	18.4	8.1696	1.61	12	0.12
8.8	19.6	8.7024	1.8	8	0.12

Best wishes, David Raine
dave@dyocore.com
mobile: 760-807-2135
Desk: 866-404-2428
v-card link

DyoCore smart solutions

663 So. Rancho Santa Fe Rd. #610
San Marcos, CA 92078

Exhibit 24

From: <rick@dyocore.com>
To: "Mashnik, Daria" <daria.mashnik@kema.com>
CC: <dave@dyocore.com>
Date: 4/22/2010 9:57 AM
Subject: Editing the Dyocore Watt Listing

Hello Daria, our CEO Dave Raine sent you the info to upgrade our state listing on 4/14/2010 from 800 watts which was my mistake to the actual watts per the curve of 1600 watts. This is causing some problems with people purchasing the units. I just wanted to remind you of this as I know you have alot going on. I believe you update the first of the month. If you need anything else let me know, and have a great day. Rick Berry

Exhibit 25

From: "Mashnik, Daria" <IMCEAEX-_O=KEMA+20CONSULTING_OU=KCG_CN=RECIPIENTS_CN=DMASHNIK@kema.com>
To: <rick@dyocore.com>
Date: 4/22/2010 10:28 AM
Subject: RE: Editing the Dyocore Watt Listing

Thanks, Ricky.

I will include this change with our next update.

Best regards,
Daria S. Mashnik

Energy Engineer
KEMA Services, Inc.

Exhibit 26

From: "Mashnik, Daria" <IMCEAEX-_O=KEMA+20CONSULTING_OU=KCG_CN=RECIPIENTS_CN=DMASHNIK@kema.com>
To: David Raine <dave@dyocore.com>
Date: 4/22/2010 11:29 AM
Subject: RE: power curve output data for SolAir - 1.6 kW
Attachments: image006.jpg; image007.jpg; image005.png

Thanks David -

We are currently experiencing delays in processing applications because our work contract with California Energy Commission has been expired and is currently being renewed.

I will go ahead and have a closer look once the contract gets renewed for our next update.

Best regards,
Daria S. Mashnik

Energy Engineer
KEMA Services, Inc.

Exhibit 27

From: <rick@dyocore.com>
To: "Mashnik, Daria" <Daria.Mashnik@US.KEMA.com>
Date: 5/5/2010 1:26 PM
Subject: Re: Editing the Dyocore Watt Listing

Hi, I hope you remembered to update our product on the list. I know you're busy, thanks Rick

Exhibit 28

From: "Mashnik, Daria" <IMCEAEX-_O=KEMA+20CONSULTING_OU=KCG_CN=RECIPIENTS_CN=DMASHNIK@kema.com>
To: <rick@dyocore.com>
Date: 5/7/2010 1:07 PM
Subject: RE: Editing the Dyocore Watt Listing

Hi Rick -

As you can see from the red note on the CEC website (http://www.gosolarcalifornia.ca.gov/equipment/) currently we are experiencing a delay in processing of all applications because our funding contract with CEC is currently undergoing renewal. The contract expired right before 1st of April and we cannot do any work without it being back in place. CEC promised to have it in place by next Tuesday but I cannot promise anything.

Once the contract is renewed, I'll submit an update to CEC and it will include your products.

Best regards,
Daria S. Mashnik

Energy Engineer
KEMA Services, Inc.

Exhibit 29

From: "Mashnik, Daria" <IMCEAEX-_O=KEMA+20CONSULTING_OU=KCG_CN=RECIPIENTS_CN=DMASHNIK@kema.com>
To: David Raine <dave@dyocore.com>, <rick@dyocore.com>
Date: 5/26/2010 5:12 AM
Subject: RE: power curve output data for SolAir - 1.6 kW
CC: "Steele, Elizabeth" <Elizabeth.Steele@kema.com>
Attachments: image006.jpg; image007.jpg; image005.png

David -

As you know our contract with California Energy Commission was expired for about a month and a half and it finally got finalized this past week. We are working through the back log of applications and I am currently working on your inquiry to change the output of your SolAir 800 product.

A couple of things:

1. Firstly, I only see different types of power curves in our files under your name. Did you ever submit your IEC 61400 certification or one year of operating data for your turbine? Those are requirements as per CEC guidelines. If yes, can you please send that documentation my way one more time.

2. Secondly, do you have a power curve available of Watt Output vs. Wind Speed for this product?

As your product is advertised as SolAir 800W Hybrid Wind Solar Generator on your website, your watts output of 800 Watts makes sense.

I look forward to your clarifications. I need some sort of documentation linking your turbine model number (S80015dc) with wattage output. I also need a Watt vs. Wind Speed performance curve for your product. If I am missing something, please let me know -

Best regards,
Daria S. Mashnik

Energy Engineer
KEMA Services, Inc.

Exhibit 30

From: <rick@dyocore.com>
To: "Mashnik, Daria" <Daria.Mashnik@US.KEMA.com>
CC: <dave@dyocore.com>
Date: 5/26/2010 7:18 AM
Subject: Re: power curve output data for SolAir - 1.6 kW
Attachments: image006.jpg; image007.jpg; image005.png; IEC_Standard_61400[1].doc

Daria, kindly find requested data attached, Rick

Exhibit 31

From: David Raine [mailto:dave@dyocore.com]
Sent: Wednesday, May 26, 2010 7:23 AM
To: Mashnik, Daria; rick@dyocore.com
Cc: Steele, Elizabeth
Subject: RE: power curve output data for SolAir - 1.6 kW

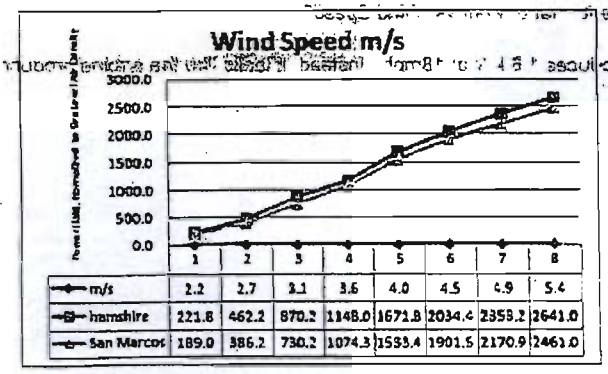
Hi Darah,

Thank you for your assistance. The name ?800? for our product came from an initial prototype test about 3 years ago. It had no reference to power performance, power curve or rating. At the time we didn?t even know what a power curve was unfortunately. It just happened the day we tested we have 8mph winds and on our bench test produced about 800 watts at about 800 rpm ? though the numbers weren?t perfect they were close enough to call the product ?800?.

However, since that point we have had a lot of formal testing done including a few years collecting operational data. Below are out formal power curve and annual production data:

Sea-Level Air Density Normalized Power Curve
SolAir San Marcos CA

m/s	Mph	Bin Wind Speed m/s	Bin Power kW	Number Data Points	C_p
1.6	2.5	1.554	0	0	0.77
2.1	4.6	2.0424	0.01	1369	0.58
2.6	5.8	2.5752	0.12	1134	0.44
3.1	6.9	3.0636	0.14	903	0.37
3.6	8.1	3.5964	0.41	737	0.30
4.1	9.2	4.0848	0.67	478	0.25
4.6	10.4	4.6176	0.79	276	0.22
5.1	11.5	5.106	0.84	161	0.20
5.7	12.7	5.6388	0.99	65	0.18
6.2	13.8	6.1272	1.17	47	0.16
6.7	15	6.66	1.35	29	0.15
7.2	16.1	7.1484	1.42	15	0.14
7.7	17.3	7.6812	1.56	13	0.13
8.2	18.4	8.1696	1.61	12	0.12
8.8	19.6	8.7024	1.6	8	0.12



Hub Height Annual Average Wind Speed (Rayleigh)		San Marcos			Hampshire IL		
mph	m/s	AEP Measured	Standard Uncertainty		AEP Measured	Standard Uncertainty	
		kWh	kWh	%	kWh	kWh	%
5	2.2	189.0	117.2	62%	221.8	157.5	71%
6	2.7	386.2	104.3	27%	462.2	152.5	33%
7	3.1	730.2	131.4	18%	870.2	208.9	24%
8	3.6	1074.3	182.6	17%	1148.0	206.6	18%
9	4.0	1533.4	214.7	14%	1671.8	284.2	17%
10	4.5	1901.5	209.2	11%	2034.4	305.2	15%
11	4.9	2170.9	238.8	11%	2353.2	329.4	14%
12	5.4	2461.0	246.1	10%	2641.0	369.7	14%

I apologize when we originally submitted our data to you Rick did not understand the listing terms. Thank you for your consideration in correcting our listing.

David Raine
DyoCore
www.dyocore.com
p&f. 866-404-2428
c. 760-580-4271
dave@dyocore.com

Exhibit 32

From: Mashnik, Daria [mailto:Daria.Mashnik@US.KEMA.com]
Sent: Wednesday, May 26, 2010 9:25 AM
To: David Raine; rick@dyocore.com
Cc: Steele, Elizabeth
Subject: RE: power curve output data for SolAir - 1.6 kW

Hi Dave -

Thanks for the explanation.

So yes, the requirements for a wind turbine to appear on the CEC Eligibility List is:

1. IEC 61400 Certification or continual 1 year operational data (monthly average power output Watts vs. monthly average wind speed).

I see from Rick's e-mail that your turbine was certified to IEC 61400. Can you send me a copy of your certificate? It has to be a document issued by the certifying body.

If you don't have that, do you have annual operating data by month in the format of Watt vs. Wind Speed?

2. From the power curve that you sent, I cannot see how your turbine produces 1.6 kW at 18mph. Instead, it looks like the turbine produce 1.6 kW at about 4 m/s which is a wind speed below the CEC requirement.

Please verify -

Best regards,
Daria S. Mashnik

Energy Engineer
KEMA Services, Inc.

Exhibit 33

From: David Raine <dave@dyocore.com>
To: "Mashnik, Daria" <Daria.Mashnik@US.KEMA.com>, <rick@dyocore.com>
CC: "Steele, Elizabeth" <Elizabeth.Steele@kema.com>
Date: 5/26/2010 10:08 AM
Subject: RE: power curve output data for SolAir - 1.6 kW
Attachments: image001.jpg; image002.jpg; image003.jpg; image004.jpg; image005.jpg; image 006.png; rawdata09_hampshireIL.xlsx

Hi,

Our qualifying data was from our Hampshire IL testing facility. Were the average wind speeds exceeded the standard. I've attached the data.

David Raine

DyoCore
www.dyocore.com

p&f. 866-404-2428

c. 760-580-4271

dave@dyocore.com

Exhibit 34

From: David Raine <dave@dyocore.com>
To: "Mashnik, Daria" <Daria.Mashnik@US.KEMA.com>, <rick@dyocore.com>
CC: "Steele, Elizabeth" <Elizabeth.Steele@kema.com>
Date: 5/26/2010 10:19 AM
Subject: RE: power curve output data for SolAir - 1.6 kW
Attachments: image001.jpg; image002.jpg; image003.jpg; image004.jpg; image005.jpg; image 006.png; Dyocore_Hamshire_IL_compiled_raw_ginlong_1_hr.xlsx

The attached is the actual 1 hour production data from the GinLong inverter as attached to the system in Hampshire IL. The previous email was the BIN data. I think the Raw data is what you are looking for.

David Raine

DyoCore
www.dyocore.com

p&f. 866-404-2428

c. 760-580-4271

dave@dyocore.com

Exhibit 35

From: David Raine <dave@dyocore.com>
To: "Mashnik, Daria" <Daria.Mashnik@US.KEMA.com>
Date: 5/26/2010 11:19 AM
Subject: RE: power curve output data for SolAir - 1.6 kW
Attachments: image001.png; image003.png; image011.png; image012.png; image005.jpg; image 006.jpg; image007.jpg; image008.jpg; image009.jpg; image010.png

Extrapolated from the raw data – Actual Ginlong kWh production numbers:

Average wind:	15.12713	
Max wind:	60.7	
Average kWh	0.293259	
Total Hours:	9744	
hours per year:	8765.813	
Total Annual Average:	2570.656	kWh
Total kWh - data:	2857.518	kWh

wind	kWh	Annual
5.4	0.007448	65.28593
8.9	0.100219	878.4975
10	0.148838	1304.69
11.2	0.166564	1460.069
12.3	0.193887	1699.58
13.5	0.244124	2139.941
14.6	0.297101	2604.331
15.8	0.33248	2914.46
16.9	0.3719	3260.005
18.1	0.424166	3718.161
19.2	0.411789	3609.662
20.4	0.453231	3972.94
21.5	0.476322	4175.352
22.7	0.524	4593.284
23.8	0.536366	4701.688
25	0.552031	4839.003
26.1	0.562683	4932.378
27.3	0.582527	5106.324
28.4	0.605514	5307.819
29.6	0.61424	5384.31
30.7	0.624132	5471.025
31.9	0.641911	5626.873
33	0.620148	5436.098
34.2	0.641176	5620.431
35.3	0.643837	5643.755
37.6	0.6972	6111.524

Exhibit 36

From: <rick@dyocore.com>
To: "Mashnik, Daria" <Daria.Mashnik@US.KEMA.com>
Date: 5/26/2010 5:01 PM
Subject: Re: power curve output data for SolAir - 1.6 kW
Attachments: image010.jpg; image011.jpg; image012.jpg; image001.jpg; image002.jpg; image 003.png

Daria, I just wanted to reach out and make sure you got all the info you needed today, I am sorry I wasn't available, but I have been fighting the permitting battles with cities all week and it's a slugfest. Hope all is well, If you need any other items, kindly let me know, Best Rick

Exhibit 37

From: <rick@dyocore.com>
To: "Mashnik, Daria" <Daria.Mashnik@US.KEMA.com>
Date: 5/27/2010 2:50 PM
Subject: Re: power curve output data for SolAir - 1.6 kW
Attachments: image010.jpg; image011.jpg; image012.jpg; image001.jpg; image002.jpg; image 003.png

Hi Daria, we're real interested in knowing if you got everything you needed, Best Rick

Exhibit 38

From: Mashnik, Daria [mailto:Daria.Mashnik@US.KEMA.com]
Sent: Friday, May 28, 2010 11:59 AM
To: David Raine
Cc: rick@dyocore.com
Subject: RE: power curve output data for SolAir - 1.6 kW

Hello David!

Thank you for getting that information to me. I just left you a quick message on your answering machine and had a quick talk with Rick over the phone.

My question (and what needs to be verified by you) is as follows:

I graphed the data that you sent me below to get the following Performance Curve for your product (same as the one you sent me below). You would like your product to be rated at 1,600 Watts, however based on the curve the output only goes up to 700 Watts which happens at ~ 26 mph. Please clarify.

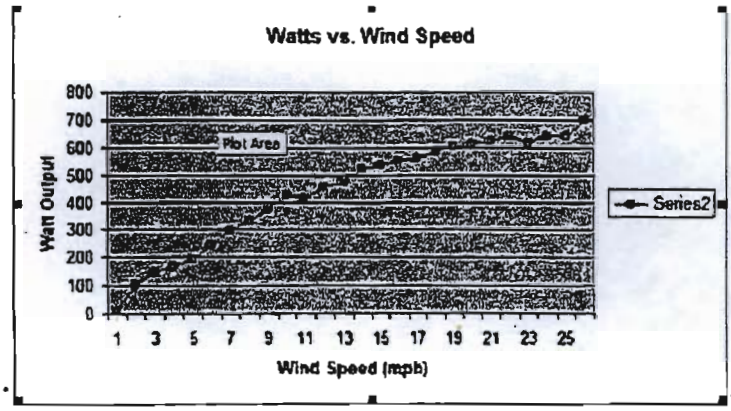


Exhibit 39

From: <rick@dyocore.com>
To: "Mashnik, Daria" <Daria.Mashnik@US.KEMA.com>
Date: 5/28/2010 12:49 PM
Subject: Re: power curve output data for SolAir - 1.6 kW
Attachments: image011.png; image012.png; image005.jpg; image006.jpg; image007.jpg; image 008.jpg; image009.jpg; image010.png; atte2ef4.jpg

Daria, I believe Dave is headed towards Catalina Islands for the long weekend (I hate him), I have left a message, but probably Tuesday due to the Holiday. Thank you for all your efforts, you have a nice weekend also, Best Rick

Exhibit 40

From: David Raine <dave@dyocore.com>
To: "Mashnik, Daria" <Daria.Mashnik@US.KEMA.com>
CC: <rick@dyocore.com>
Date: 6/1/2010 8:21 AM
Subject: RE: power curve output data for SolAir - 1.6 kW
Attachments: image001.jpg; image002.jpg; image003.jpg; image004.jpg; image005.jpg; image 006.jpg; image007.png

Hi Daria,

That data is directly related to the "bin" wind speeds. It has no direct relevance to turbines production in "Average" winds. It was only pulled from one location and wind speeds indicated at top speeds recorded at that hours interval. The average could have been a bit less. Unfortunately our wind equipment only recorded top winds and top gusts hourly.

Here's is actual data tested at specific wind speeds.

Watts		Wind Speed
Open	75% Load	mph
		2.5
		3
		3.8
10.25	10.25	5
145.35	135.15	6
616.63	414.96	8
931.12	644.1	8.7
1183.2	701.25	9.8
1367.73	756.21	10.9
1566.45	811.25	12
1659.409	962	13
1901.496	1104	14
2148.467	1290	15
2213.29	1378	16
2313.536	1471	17
2495.703	1589	18
2465.487	1623	19
2254.078	1692	20
2261.958	1781	21
2336.245	1877	22
2420.014	1945	23
2371.244	1962	24
2314.733	1958	25
2315.756	1961	26
2268.327	1937	27
2238.208	1933	28
2238.258	1935	29
2179.412	1934	30

Exhibit 41

2152.959	1911	31
2089.219	1879	32
2043.612	1878	33
1991.838	1854	34
1989.34	1862	35
1945.406	1859	36

David Raine
DyoCore
www.dyocore.com
p&f. 866-404-2428
c. 760-580-4271
dave@dyocore.com

From: "Mashnik, Daria" <IMCEAEX-_O=KEMA+20CONSULTING_OU=KCG_CN=RECIPIENTS_CN=DMASHNIK@kema.com>
To: David Raine <dave@dyocore.com>
Date: 6/1/2010 10:08 AM
Subject: RE: power curve output data for SolAir - 1.6 kW
Attachments: image001.jpg; image002.jpg; image003.jpg; image004.jpg; image005.jpg; image 006.jpg; image007.png

David -

Thanks for that note. Can you give me a quick call in the office when you have a chance?

510.891.0446.

Thanks -

Best regards,
Daria S. Mashnik

Energy Engineer
KEMA Services, Inc.

Exhibit 42

SolAir - IEC standard 61400-12-1
DyoCore
March 1st, 2010

Abstract

In 2006 DyoCore, a California manufacturing company, began development of its small wind/solar hybrid turbine – SolAir™. Over the past few years DyoCore has collected information that relates to power performance, power quality, noise, safety and function, and endurance tests that meet or exceed the standards established by the DOE's National Renewable Energy Laboratory (NREL) established in 2008 and now part of the International Electrotechnical Commission (IEC) standards. These results are being provided to state and federal agencies for their consideration in allowing SolAir as an eligible alternative energy product for state incentives.

The following reports the results of SolAir actual on location installed testing to date, and puts the test results in perspective for the average consumer. Other topics addressed include independent testing results, and a discussion of SolAir's support resources.

Introduction

The basis for DyoCore's presented data was established at the National Renewable Energy Laboratory to help reduce the barriers of wind energy expansion and qualify SolAir under the IEC Standard 61400. Among these barriers is a lack of independent testing resources for small turbines and guidelines for their manufacturers. Testing results established by the NREL provide turbine manufacturers with a portion of the requirements for turbine certification and use. Turbines that meet these guidelines give consumers confidence in small turbine technology and will separate reliable turbines from those that do not perform as advertised.

Figure 1 shows the SolAir installed in San Marcos, CA. and Hampshire IL, Power performance, duration, noise, and safety and function tests were performed on both turbines presented herein. Power quality testing was performed only on single-phase applications. The available preliminary results of those tests to date are presented below and are subject to change.

	Install Date	Data Hours	cut in wind sp m/s	cut out wind sp m/s	hub height	site AEP	Avg annual wind sp m/s
San Marcos, CA	16-Sep-08	12062	2.1	16.7	27'	1674.7	2.9
Hampshire, IL	13-Jan-09	9744	2	17.1	22'	2293.3	6.3

Exhibit 43

E112995
UL 6140

DyoCore™ (USA)

663 So. Rancho Santa Fe.
#610 San Marcos,
Ca US 92078

www.dyocore.com

Tel: +1 866-404-2428
Fax: +1 866-404-2428
E-mail: sales@dyocore.com
Contact: David Raine

Domestic and international distribution
Turbines also available direct from factory

Model	SolAir
Orientation	Downwind
Rated Output	1.6 kW
Output Voltage (V)	130v @ 800 rpm
Applications	Stand Alone (combined wind/solar DC output), Grid Connection, Direct Heating, and Pumping
Controller Type	Ginlong
Overspeed Protection	Osculates mechanically in high winds for auto speed control
Blade Material	Aluminum
# of Blades	3
Rotor Diameter (m)	1.2
Swept Area (m^2)	1.13
Windspeed (m/s)	
Rated	8
Cut-in	2
Cut-out	16.5
Survival	54 - known
Head Weight (kg)	20
Tower Type	Surface mount
Tower Height (m)	1.4m - 58"
Product Life (years)	15
Warranty (years)	10
Units sold	450
Years on the market	0.5
Price (USD)	MSRP: $1700 SolAir 800 hybrid wind/solar turbine. Inludes turbine, rectifier, and surface mounting hardware.
Additional Info	SolAir is a dynamic hybrid vertical mill that combines wind/solar integrated into a single balanced frame/fin design. SolAir is designed so versatile it can be mounted on any flat horizontal, vertical or pitched surface and can be either bolted or ballasted down.

The SolAir wind/solar Hybrid Generator

DyoCore's SolAir in San Marcos CA was installed on September 16th, 2008. It combines is a 120 VAC, single-phase, grid-connected, permanent-magnet generator wind turbine rated at 1.6 kW and a 36 VDC Solar panel rated at 30 W. SolAir is a horizontal-axis turbine mounted on a flat roof surface, and has a rotor height of 59" above the mounted surface and a rotor area of 54". The Second SolAir unit was installed on September 28th, 2008 in Hampshire IL. At the time of this publication IEC Standard 61400 data collection for duration, safety and function, power performance testing and power quality and acoustic noise testing was complete.

SolAir, Hampshire IL

SolAir San Marcos CA

Duration Testing

The duration test is conducted according to section 9.4 of the IEC Standard 61400-2: Design Requirements for Small Wind Turbines. Duration testing provides information about the turbine's structural integrity, quality of environmental protection, and dynamic behavior. The test requires a minimum of 6 months of operation, 2,500 hours of power production in winds of any velocity, 250 hours of power production in winds of 1.2 Vave and greater, and 25 hours of power production in wind of 1.8 Vave and greater. Section 6.2 of IEC Standard 61400-2 defines Vave , which depends on the small wind turbine class as identified by the manufacturer and based on the wind speeds in which the turbine was designed to operate. The turbine must not experience any major failures during the test period and must achieve an operational time fraction of 90% or greater. The operational time fraction is defined by the following.

$$\theta = \frac{T_T - T_N - T_U - T_E}{T_T - T_N - T_E} \times 100\%$$

Where TT is the total test time, TN is the time attributed to turbine faults and manufacturer-mandated inspections and maintenance, TU is the time during which the turbine status is unknown due to lost data or data-acquisition failure and maintenance, and TE is the time that is excluded from analysis due to grid faults and laboratory-mandated inspections or stops.

Part of the reliable-operation requirement for the duration test includes no significant wear, corrosion, or damage to turbine components. The structural integrity and material degradation are investigated through inspections of the turbine before, during, and after the testing period. Blades, welds, and other turbine components were visually inspected and photographed before the test and any apparent abnormalities

documented. After the required test data is collected, the turbine is lowered and disassembled for inspection of all individual components. Routine inspections of both units during the tests have not revealed any abnormalities. Post-test inspections for the units presented have not occurred.

Duration testing on both units are still in progress. The turbines have experienced minimal and normal operational problems and none of which resulted in complete failure or termination of the testing. Both SolAir units tested were in original condition without modification at the term of the presented testing results. Problems and/or noted downtime that occurred included wrapping of the wires at the base of the unit at the IL location which required manual untwisting, test equipment failure and replacement at the CA location, and movement of unit in CA to a new location for the placement of the online live Camera.

Table 1. Preliminary Duration Results for the San Marcos CA SolAir Install

	Wind	Solar	Hours of production at ws above						Wind / Gust Average - limits								
Month	kWh production	kWh production	0	6	8	10	12	>12	Max Wind	Average Wind	Max Gusts	Average Gusts	Hours				%
Sep-08	82.80788208	6.431632	171	103	29	35	12	0	18.4	6.3	N	N	350	72	20	24	91%
Oct-08	195.3345042	14.791154	342	262	50	66	21	3	20.7	5.8	N	N	744	0	10	8	99%
Nov-08	128.782932	14.15863	341	273	46	36	16	8	25.3	5.5	N	N	720	0	0	16	98%
Dec-08	192.5889154	12.697476	274	326	56	48	18	22	36.8	5.3	N	N	744	0	0	0	100%
Jan-09	94.00400394	13.345624	344	317	42	32	7	2	18.4	5.8	N	N	744	110	5	48	92%
Feb-09	218.5929992	13.552332	259	251	52	60	28	22	38	7.3	N	N	672	0	0	0	100%
Mar-09	251.2555455	14.882604	270	276	54	90	43	11	24.2	7.4	N	N	744	6	0	48	93%
Apr-09	340.6171748	14.950184	185	273	73	112	45	32	29.9	7.2	N	N	720	0	0	24	97%
May-09	226.7815714	14.604224	246	291	67	113	27	0	19.6	7	N	N	744	0	2	24	97%
Jun-09	296.5248076	15.705282	184	300	67	99	61	9	23	7.2	N	N	720	0	1	0	100%
Jul-09	230.5729028	17.39069	287	234	79	120	24	0	18.4	7.1	N	N	744	0	0	24	97%
Aug-09	218.7764195	19.266376	300	245	63	106	30	0	17.3	5.8	N	N	744	0	0	0	100%
Sep-09	182.7617497	17.642534	319	240	46	92	23	0	21.9	6.3	24	20	720	56	48	86	86%
Oct-09	212.153999	18.10679	283	289	59	71	26	16	26.5	6	27	21	744	0	0	0	100%
Nov-09	124.3978237	16.808882	343	273	43	42	13	6	26.5	5.8	26	23	720	1	0	0	100%
Dec-09	200.9828667	15.042874	289	312	39	54	28	22	42.6	6.7	39	26	744	0	3	0	100%
* Jan-10	233.7411242	13.852288	329	274	38	47	15	41	41.4	7.8	43	26	744	4	36	96	86%
Annual - 09	2597.4	191.3	3309.0	3301.0	684.0	991.0	355.0	120.0	25.5	6.6	29.0	22.5	730.0	14.4	4.9	21.2	97%

Hours of Power Production for San Marcos CA:
Table 1 shows the preliminary duration results for the San Marcos SolAir installation. The turbine accumulated 12,062 hours of total run time with an operational time fraction of 97%.

The low operational time fraction for January of 2009 was caused by the failure of testing equipment, Data Logger failed and had to be replaced. Investigations suggest that high output amps caused the logger to fail. The Aemc L261 Data Logger was used to log voltage utilizing two 10 k Voltage dividers combined with an inspeed anemometer and WindWare software.

Since the replacement of the Aemc L261 Data Logger with the Hobo U-30 Data Logger, the turbine has run with a high operational time fraction. The majority of the other time classified as TN during the test is attributed to recording equipment time faults, and general maintenance whereas often the generator during excessively high winds/gusts would create amps that would burn out the 10k resistors. In September 2009 both units were removed to replace the bronze bearings with sealed casted bearings. Both turbines have run without vibration, mechanical errors or operational modifications since September 2009 through the end of the testing data period.

Table 2. Preliminary Duration Results for the Hampshire IL SolAir Install

	Wind	Solar	Hours of production at ws above						Wind / Gust Average - limits				T_v	T_c	T_f	T_N	O
Month	kWh production	kWh production	0	6	8	10	12	>12	Max Wind	Average Wind	Max Gusts	Average Gusts	Hours				%
Jan-09	82.80788208	4.894652	N	N	N	N	N	N	N	N	N	N	350	0	32	2	99%
Feb-09	195.3345042	12.722152	0	9	0	18	79	638	48	16.8	N	N	744	0	0	1	100%
Mar-09	128.782932	12.786694	1	35	0	40	89	555	53.8	16.7	N	N	720	0	0	0	100%
Apr-09	192.5889154	13.336386	7	10	0	27	80	620	59.5	19.1	N	N	744	0	0	6	99%
May-09	94.00400394	12.508624	0	27	0	25	97	595	56.1	16.7	N	N	744	0	0	3	100%
Jun-09	218.5929992	12.999974	0	28	0	39	90	515	60.7	14.8	N	N	672	0	0	0	100%
Jul-09	251.2555455	13.623136	1	53	0	66	184	440	48	13.7	N	N	744	0	0	0	100%
Aug-09	340.6171748	13.84832	0	59	0	69	185	407	41.1	13.1	N	N	720	0	0	0	100%
Sep-09	226.7815714	13.284678	0	103	0	87	199	355	36.5	11.9	N	N	744	0	0	16	98%
Oct-09	296.5248076	13.225654	0	84	0	65	174	397	50.3	13.3	N	N	720	0	0	0	100%
Nov-09	230.5729028	16.680728	0	23	0	29	126	566	48	15.4	24	20	744	0	24	0	100%
Dec-09	218.7764195	15.512214	0	34	0	19	127	564	44.6	15.7	24	20	744	0	0	0	100%
Jan-10	182.7617497	15.84875	10	30	0	37	102	541	40	18.1	24	20	720	0	0	0	100%
Feb-10	212.153999	10.798912	0	46	0	46	104	438	44.6	15.6	27	21	634	0	0	0	100%
Totals:	2659.4	171.3	19.0	495.0	0.0	521.0	1532.0	6193.0	47.0	14.8	24.8	20.3	9744.0	0.0	2.4	1.9	99%

Hours of Power Production for Hampshire IL:
Table 2. shows the duration results for the SolAir installed in Hamshire IL. This unit has accumulated 9,744 hours of total run time with an operational time fraction of 99%.

The low operational time fraction that occurred in September 2009 was a result of changing out the turbine's bearing from bronze to sealed casted bearings. The majority of the remaining time classified as TN during the test is attributed to the wire being twisted up at the base of the unit requiring manual untwisting. This has been solved for current production models with a free swivel joint connection that allows the wires to turn freely 360^0. Wind metering equipment that extended data being recorded from simply wind speeds to include gusts was added in November 2009, this was accompanied by an inspection of the voltage metering equipment and resulted in downtime due to adverse weather conditions that prevented reconnection of the unit until the following day.

Another factor of reliable operation is that the turbine should experience no significant power degradation. Each month the average power is plotted for each wind-speed bin and analyzed for any obvious trends in power production. Examination of power degradation plots indicated no apparent power degradation for either installed location. The dynamic behavior of the turbine is assessed by observing the turbine in a range of operating conditions. The turbine is observed at wind-speed intervals from cut-in wind speed to a maximum experienced wind speed of 53 mph at the Hampshire install site. Tower vibrations, noise, yaw behavior, and tail movement all were periodically documented for evaluations and consideration in reporting the above data.

For the San Marcos install site the following dynamic observations were made. During high winds, the frame will yaw out of the wind between approximately 5 degrees and 30 degrees which was identified as a result of wind blade wash hitting the integrated frame fin assembly. This constant yaw at higher wind speeds allowed the unit to both maintain a lower overall consistent RPM but also prevented the motor from excessive heating. Additionally, it appears that no excessive vibrations are occurring during these conditions. In winds of between 3mph and 15mph both turbines tracked the wind well with no adverse dynamic behavior observations made. No audible noise was detected from either turbine during any of the testing observations.

Power Performance Testing

Power performance testing is conducted per IEC standard 61400-12-1, Power Performance Measurements of Electricity Producing Wind Turbines, referencing Annex H for small wind turbines when appropriate. Products of the test include a measured power curve, a power coefficient (CP) curve, and an estimation of annual energy production (AEP). For small turbines, statistical data is collected in 1-minute sets and sorted into 0.5-m/s-wide wind speed bins. Data collection is complete when the wind speed bins between 1 m/s and 14 m/s contain 10 minutes of data each, and the total database consists of at least 60 relevant hours. Wind speed bins are plotted against the corresponding bin power to produce a power curve. Power curves are normalized to sea-level air density; the site-specific air density at the either observed location is relatively low, 1.0 kg/m3. The power coefficient is the ratio of power generated by the turbine to the power available in the wind. The power curve for the both turbines show power measurements that are greater than rated power. Preliminary power and CP curves for the San Marcos Install as displayed in Figure 3; Both turbines performed as expected.

The original testing voltage equipment on the San Marcos Install was optimized for power performance and was found un-reliable after several months of operation. After the failure, a production model testing solution, Hobo Equipment, was installed and operated until testing was completed with a backup data recorder on the inverter. The preliminary power and CP curves for both configurations are shown in Figure 4.

Sea-Level Air Density Normalized Power Curve
SolAir San Marcos CA

m/s	Mph	Bin Wind Speed m/s	Bin Power kW	Number Data Points	C_p
1.6	3.5	1.554	0	0	0.77
2.1	4.6	2.0424	0.01	1340	0.58
2.6	5.8	2.5752	0.12	1134	0.44
3.1	6.9	3.0636	0.14	903	0.37
3.6	8.1	3.5964	0.41	747	0.30
4.1	9.2	4.0848	0.67	476	0.25
4.6	10.4	4.6176	0.79	276	0.22
5.1	11.5	5.106	0.84	161	0.20
5.7	12.7	5.6388	0.99	65	0.18
6.2	13.8	6.1272	1.17	47	0.16
6.7	15	6.66	1.35	29	0.15
7.2	16.1	7.1484	1.42	15	0.14
7.7	17.3	7.6812	1.56	13	0.13
8.2	18.4	8.1696	1.61	12	0.12
8.8	19.6	8.7024	1.6	8	0.12

Figure 3. Preliminary power and CP data for San Marcos CA Install

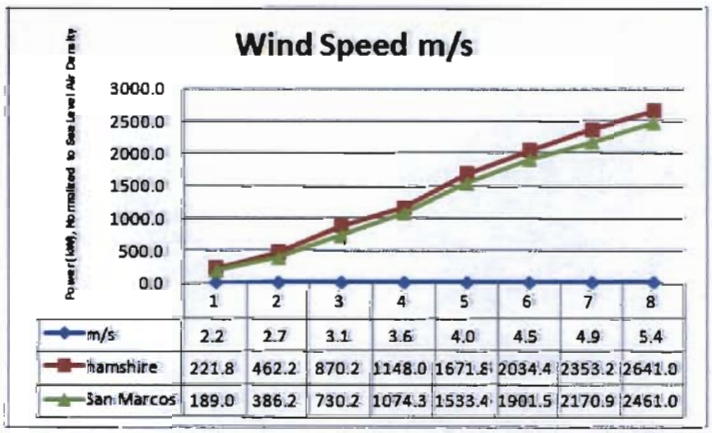


Figure 4. Annual Energy Production (AEP) at sea-level density; 1.225 kg/m^3 for normal power production

Figure 4. San Marcos CA Install preliminary power and Cp curves for the power production GinLong inverter (Inverter 1) and the Hampshire IL location shows preliminary testing inverter install (Inverter 2)

Annual energy production is estimated by applying the power curve generated from power performance testing to a Rayleigh distribution. The AEP is given for annual average wind speeds at hub height for 6.6mph to 19mph. The measurements reported below assume no energy production beyond the highest filled bin in the power performance test.

Hub Height Annual Average Wind Speed (Rayleigh) mph - m/s		San Marcos			Hampshire IL		
		AEP Measured	Standard Uncertainty		AEP Measured	Standard Uncertainty	
mph	m/s	kWh	kWh	%	kWh	kWh	%
5	2.2	189.0	117.2	62%	221.8	157.5	71%
6	2.7	386.2	104.3	27%	462.2	152.5	33%
7	3.1	730.2	131.4	18%	870.2	208.9	24%
8	3.6	1074.3	182.6	17%	1148.0	206.6	18%
9	4.0	1533.4	214.7	14%	1671.8	284.2	17%
10	4.5	1901.5	209.2	11%	2034.4	305.2	15%
11	4.9	2170.9	238.8	11%	2353.2	329.4	14%
12	5.4	2461.0	246.1	10%	2641.0	369.7	14%

Table 3. Preliminary Measured AEP for both units

Table 3 shows the preliminary AEP as measured based on power performance data for both locations.

SolAir – Ginlong Grid Tie Electrical Diagram

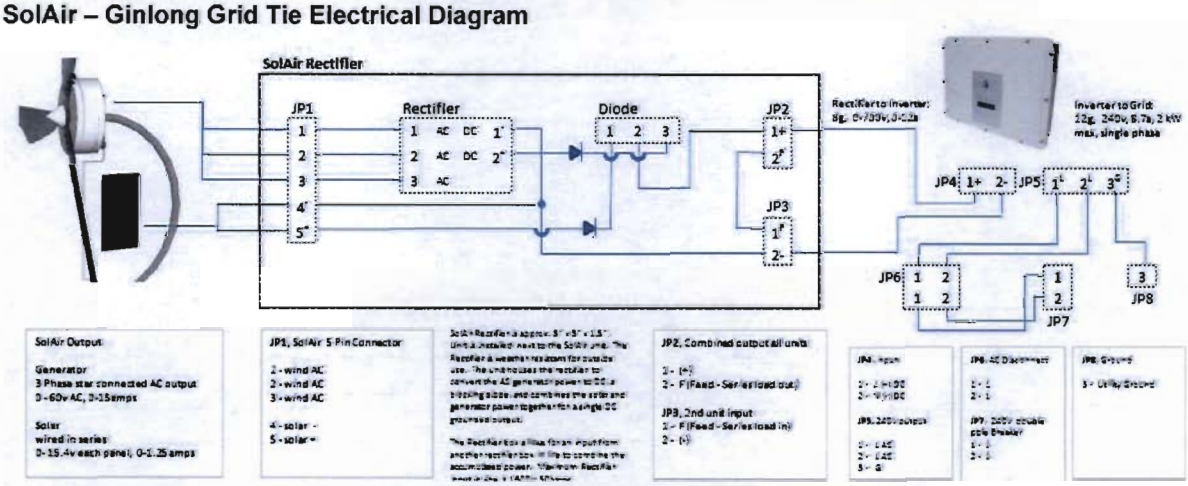


Figure 5. SolAir Electrical Overview as connected to the GinLong inverter and Grid Tied.

Sound Testing

Dyocore SolAir Unit Noise Level Measurements

5110 Leicester, San Diego 30-Mar-10

	Ambient only	Ambient only	Unit+other	Unit+other	Unit+other	Unit+other	Unit+other		
DataFile	22	24	18	19	20	21	23		
Start Time	14:53:50	14:56:49	14:47:38	14:48:07	14:49:22	14:52:50	14:54:49	Immission spectra	
Run Time:	00:04.0	00:16.2	00:16.5	00:25.0	00:32.7	00:19.7	00:11.0	imbalance (C - A < 20	
Leq:	47.7 dBA	47.6 dBA	47.2 dBA	54.4 dBA	53.7 dBA	48.2 dBA	48.9 dBA		
Freq Hz	Leq 1/3 Oct	Leq 1/3 Oct	Leq 1/3 Oct	Leq 1/3 Oct	Leq 1/3 Oct	Leq 1/3 Oct	Leq 1/3 Oct		
50	55.9	50.9	59.3	69.1	66.9	62.7	64.3	TRUE	16.06
63	53.6	45.6	56.1	66.8	65	59.4	61.3	TRUE	17.12
80	48.8	45.9	52.4	64.4	62.3	56.2	57.8	TRUE	16.27
100	46	44.5	48.8	60.5	58.9	52.3	53.8	TRUE	14.61
125	43.6	43	46	57.6	56	49.1	49.7	TRUE	13.38
160	42.5	41.5	43.4	54.3	53.3	46.7	46.8	TRUE	11.9
200	42.5	40.3	43.3	51	50.3	44.6	45.3	TRUE	10.5
250	41	39.7	42.4	48	47.8	43.2	43.4	TRUE	9.61
315	40.1	39.4	39.6	45.6	45.4	46.6	43.3	TRUE	9.35
400	39.6	38.5	42	45.9	47.9	43.4	43.4	TRUE	10.47
500	37.6	39.1	37.6	44.8	45.1	39.2	38.7	TRUE	7.73
630	40.6	40	37.6	52	48.3	38.5	39	TRUE	7.78
800	40	41.2	38.9	43.5	43.5	37.6	39.2	TRUE	4.94
1000	40	39.6	38.4	43.7	43.5	36.4	38.9	TRUE	5.38
1250	37.2	37.9	36.2	42.9	44.2	35	38.5	TRUE	6.81
1600	35.8	34.2	34	39	39.8	33.2	33.9	TRUE	5.98
2000	32.4	31.1	30.8	35.3	35.9	29.7	30.8	TRUE	5.75
2500	29.6	29.8	29.5	33.8	34.8	27.6	27.8	TRUE	6
3150	29.3	32.3	31.1	34	33.9	26.7	26.8	TRUE	4.7
4000	27.6	32	25.2	32.9	32.1	25.6	27.9	TRUE	3.94
5000	25.3	24.6	23.3	30.7	31	23.5	24.1	TRUE	6.57
6300	24.2	19.7	22.1	28.8	29.1	22.5	22.2	TRUE	7.99
8000	23.5	19.4	21.5	26.3	27.9	21.9	21.6	TRUE	7.39
10000	23.6	23.6	21.2	24.8	26.3	21.7	21.4	TRUE	4.48

Eilar Associates, Inc.
Job B00301N2

Notes:

Immission spectrum testing was applied per the IEC 61400-11 standard in the last two columns. 1st column was to indicate Pass (true) or failure (false), second column is the data applied. Data was pooled by average results given during each testing stage. Both in average and as stand alone our turbine falls within allowable limits as outlined in the 2008 G.W. Kamperman and R.R. James sound testing standards overview.

Calculation used: LCeq (immission) minus (LA90 (background) +5 dB) ≥ 20 dB

The above outline also states that testing should be done at the propertly line. Our testing data was obtained at the location of install or base of equipment. Any testing greater than 10 feet of the SolAir resulted in no usable noise changes to the ambient noise level.

Testing at this location experienced wind gusts of approximatly 15 mph.

Safety and Function Testing
Safety and function testing is conducted per IEC Standard 61400-2, section 9.6, and seeks to test the essential functions of the turbine system. However, NREL does not limit testing to the scope of the standard; other features that are not required by the standard also are inspected and tested. For each turbine, NREL collects data to characterize the turbine's power control, rotor-speed control, behavior upon loss of load, normal start-up, normal shutdown, and emergency shutdown. Additionally, NREL 8 performs turbine specific tests to verify the turbine controller's function and predicted behavior. Although safety and function testing examines the essential functions of the turbine, it does not certify whether a turbine is safe to operate.

Table 4 shows the preliminary safety and function data summary for San Marcos SolAir Install. The turbine performed as designed with one exception. When the inverter was shut down manually using the disconnect switch and then was restarted, an over-load error was present on the Inverter. The error had to be reset before the turbine could be started again.

Table 4. Preliminary Safety and Function Test Summary for the San Marcos SolAir Install

Test Method	Comment	Complies with Design
Power control	Turbine controls power output per design	Yes
Rotor speed control	Turbine controls rpm to 2100, per design	Yes
Normal start-up	Turbine starts at indicated cut-in wind speed and above, and below cut-out; over-speed error control operates as indicated	Yes
Normal shutdown	Turbine shuts down normally in winds less than cut-in and greater than cut-out	Yes
Emergency stop	Turbine when positioned out of the wind stops within 2 to 3 seconds.	Yes
Loss of grid	Inverter shuts off immediately upon grid loss	Yes
Undervoltage / overvoltage	In an overvoltage simulation the Inverter cuts off immediately	Yes
High wind speed shutdown	Turbine through mechanical rotation corrects in winds greater than 8 m/s to maintain lower rpm.	Yes
Rotor overspeed	Turbine by mechanical design self brakes preventing overspeed.	Yes
Generator overcharge	Inverter shuts down immediately in simulated generator overcharge	Yes
Excessive vibration	No vibration was detected	Yes
Cable twist	Swivel base wiring connection prevents twisting.	Yes

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DyoCore SolAir Wind Pit

Monday, February 7, 2011, 09:40 AM **Technology**

February 2011 DyoCore completes the setup of its testing facility in Carlsbad CA. Now called the SolAir Wind Pit, DyoCore will expand testing and further development of its unique low turbulent wind solution called SolAir.

The wind pit can create simulated winds up to 30mph and DyoCore techs indicate with a little modification wind simulation tests can reach upwards of 60 or 70mph!

DyoCore's new facility is one of only a small handful of wind simulation testing facilities nationwide and demonstrates our commitment to making SolAir the best solution for the homeowner, said David Raine, founder of DyoCore. within this new facility we can simulate, within reason, actual conditions in a controlled environment on demand to further test and develop our product to optimal performance. We will additionally make this facility available to our industry to assist in the continued momentum to make small wind power obtainable, efficient and affordable for the average home owner.

Testing begins this week and guests are welcomed. Over the next few months DyoCore expects to log hundreds of simulation hours and continue to add on new testing tools to its facility. For more information about the SolAir Wind Pit email **testing@dyocore.com**.

Administrator (David Raine)

Monday, April 11, 2011, 08:30 AM

This is the most accurate reference to estimated power production based on wind conditions. Though this does not account for gusts or rapid changes it can provide a basis for your production expectations at specific constant wind speeds:

http://www.dyocore.com//images/power_curve.JPG

Exhibit 44

Administrator (David Raine)

Monday, April 11, 2011, 07:21 AM

we will have to simply agree to disagree. I feel our IEC data was specific to our application and the intended use of our turbine. That is the most accurate and applicable data available about our turbines performance.

However, our distributors are doing many pole mount applications and recently a company posted it's data and CEC listing acceptance utilizing our exact same motor on a pole mounted turbine.

I appreciate your experience and consideration in providing us some guidance. I will do my best in applying your information to our future testing and continued improvement of information for our potential consumers. But most, if not all and then some, of this information we already provide everyone. We are very specific about the low power created from our turbine in the wrong conditions. All of which can be found right on this site. Our IEC data is a very small part of that and very rarely referenced, if ever, to a consumer.

I'm not sure how we can be more diligent than we already are but I'm open to suggestions to make our product better and our consumers more aware of the low power creation and conversion barriers associated with roof mount turbines.

Administrator (David Raine)

Monday, February 14, 2011, 11:05 AM

Wind Tunnel vs Betz law

I recently had an inquiry with questions about our Wind Tunnel and our objectives. These were great comments and posted on another site. It's a bit long but I think if you are an engineer it might be a good read and give you a better understanding our our direction in building the wind tunnel. here are the comments;

Posted by Mike Klemen to me. If you would like to contact Mike: **wind4energy@yahoo.com**

David,

Regarding the WindPit, DyoCore has a lot to learn about what would produce a reasonable result in a wind tunnel. The wind tunnel blockage is too high. Power performance as measured in this wind tunnel with the turbine pictured will be higher than anybody will experience when the turbine is place is free and clear wind. Energy production will be overstated if power data is used from this setup.

If any data is published from the WindPit, it will be in error, negligent, and incorrect.

Regarding the Power Curve that is on the DyoCore web site, it is clear that whoever created it does not understand the standards and how to acquire data. The data has absolutely nothing to do with Betz.

Sincerely,
Mike

Hi Michael,

Yes the "Wind Pit" is a great learning experience for us and for the industry. Not many companies get to actually test their products in a controlled environment.

I can understand your assumptions and initially would have thought the same myself, however, it turns out quite the opposite.

1. Exact volume – Betz's law (60" wind tunnel – 60" blade diameter) will create lower results than could be experienced in the real world. **http://www.symscape.com/blog/virtual-wi** ... s-betz-law
2. Betz's law is the basis for most turbine power curves
3. Our tunnel does not produce exact volume, though I appreciate your assumption we are not engineers and did not create a "perfect" volume tunnel.
4. We have found at a lower wind speeds that that we do get better results in the tunnel due to "constant" wind, has nothing to do with volume.
5. At higher wind speeds in the tunnel we get lower results than in the real world, has everything to do with volume.
6. Creating a power curve from any one piece of data is negligent and we are not utilizing the tunnel to create power curves, the purpose of our tunnel is to develop the best solution with the resources we have today.

In the real world a 10mph average wind is a very misleading number. The accelerated increase in energy production and conversion efficiency as the wind speed increases is so great that the difference between 10mph and 11mph could be almost doubled. Understanding this then applying it to trying to get a range of wind vs power in "average" conditions almost becomes impossible. An average wind speed of 10mph really means varying wind between maybe 5mph and 15mph. this would indicate that 50% of your energy production was greater than 10mph and at the accelerated power production your gross production is going to be greater than a wind tunnel test at 10mph. This is unfortunately how we applied our original power curve data and learned later that the "real world" can NOT be duplicated in a wind tunnel.

Unfortunately where we disagree is in I feel Betz, though a good starting point, does not represent a real word power curve. But we are striving to find a nice medium.

You appear to be very angry about our direction and development of a solution. I hope we have not offended you in our objectives to solve for what we feel is a very important solution. Are you a manufacturer of a product? Are you an engineer developing a solution for the average homeowner? Maybe if I understood your position within the industry I could better answer your comments.

I welcome your comments and appreciate your time to take such an interest in what we are doing.

Thanks for your input!

David Raine
DyoCore Inc.

www.dyocore.com
p&f. 866-404-2428
c. 760-580-4271
dave@dyocore.com

Comments

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Post Comment

Subject:	Re: [s-w-h] Solar verses wind efficiency
From:	David Raine (dave@dyocore.com)
To:	daryl_solar@yahoo.com;
Cc:	wb4apr@amsat.org; small-wind-home@yahoogroups.com;
Date:	Sunday, February 6, 2011 11:43 PM

I will try to address your responses directly below,

David Raine
760-580-4271

On Feb 6, 2011, at 7:16 PM, Darryl Thayer <daryl_solar@yahoo.com> wrote:

> Very well said, thanks Bob, you said it much better than I ever could. I love
> wind, but what you said.
>
> Darryl
>
> _____
> From: Bob Bruninga <wb4apr@amsat.org>
> To: small-wind-home@yahoogroups.com
> Sent: Sun, February 6, 2011 7:08:06 PM
> Subject: Re: [s-w-h] Solar verses wind efficiency
>
>
> > Solar is a multibillion dollar industry with
> > tremendous resource funding, comparing this
> > to small wind and a handful of true "small
> > wind" products with less than maybe 20 million
> > in development capital amongst all of them
> > is quite a stretch.
>
> I don't think that has anything to do with it. The comparison is simply based on
> the old Real estate trueism: LOCATION, LOCATION, LOCATION.
>
> Good wind sites are fantastic for wind power. Bad wind sites (the vast majority
> of all other sites) are useless.

Exhibit 45

>
Wind can be leveraged in almost any condition, but buying the wrong product for the wrong application will never work. Applying turbines to simply "location" is as simple to applying solar to sun. Neither are relative when compared together in generic test environment.

"vast majority" is meaningless when applied to a generic test that doesn't account for all possible available products.

>
> So comparing the two is meaningless. The point is that the average homeowner is
> much more likely to live where there is good sun, than where there is good wind.
> But same goes for solar. If you are surrounded by shade trees, forget it.
>
> > You cannot at this point simply compare the
> > two without the bias towards the better
> > funded and equipped product.
>
> Again, has nothing to do with it. If there is no wind on a property, then no
> amount of $$$ will change that.
>

How do you know there was "no wind", I feel maybe the product choice was poorly made for the conditions present. Additionally, buying the right product at the right price would absolutely affect the outcome. $$. Makes ALL the difference.

>
> > Wind is on those coat tails and moving fast
> > towards the same objective.
>
> Not really possible. Only 1% of the property in Maryland has any potential for
> even the minimum average wind speed. Yet probably 50% of all property owners
> have sun.
>
So based on your assumption if the same test was done in Seattle then hands down wind is better, does this mean that wind is better everywhere?

Over 56% of the US experience wind conditions greater than 6mph annually, these are in my opinion great wind areas making the US much more practical for wind resource and development.

>
> > I would like to hope to see more direction in
> > creating resources for alternative energy
> > needs and the improvement of the existing
> > technology towards making Small Wind for
> > the average home practical.
>
> Again, I think that is impossible. The *average* home has no wind! I think what
> you meant was "for the average home in a high-wind area, practical".
>
> Leaving off that kind of disclamer is what causes wind to be oversold to the
> average consumer (who slept through high school science)...
>

The average home less than 10 years ago wasn't practical for solar. Solar is still expensive and substantially inefficient today. It is complete ignorance to dismiss wind as a potential solution. Solar is still in the innovator stages. In less than a few years wind will pass solar 3 to 1 and move to demand market. This has nothing to do with high school science, it's more towards college economics.

>
> Bob, WB4APR
>
> [Non-text portions of this message have been removed]
>
>

[Non-text portions of this message have been removed]

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(and read it on the Web), go to
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Subject: RE: [s-w-h] b Solar verses wind efficiency

From: David Raine (dave@dyocore.com)

To: freedomev@yahoo.com; small-wind-home@yahoogroups.com;

Date: Monday, February 7, 2011 11:11 AM

SolAir SMRP $1,800,

CEC rated at 1.6 kW at 18mph. Nominal production in average installed locations is about 1 kW.

We have designed SolAir specifically for Small Wind conditions. Unfortunately "Small Wind" is quite a broad category that encompasses everything from rooftop to industrial 160' pole mount devices.

Roof top is a very difficult sector to pull usable wind energy from if not in the right conditions. We are working hard to create solutions that make "Small Wind" affordable and efficient for the average homeowner.

DyoCore wind tunnel

February 1st, 2011 DyoCore completes the setup of its testing facility in Carlsbad CA. Now called the SolAir Wind Pit, DyoCore will expand testing and further development of its unique low turbulent wind solution called SolAir.

Exhibit 46

The wind pit can create simulated winds up to 30mph and DyoCore techs indicate with a little modification wind simulation tests can reach upwards of 60 or 70mph!

DyoCore's new facility is one of only a small handful of wind simulation testing facilities nationwide and demonstrates our commitment to making SolAir the best solution for the homeowner, said David Raine, founder of DyoCore. within this new facility we can simulate, within reason, actual conditions in a controlled environment on demand to further test and develop our product to optimal performance. we will additionally make this facility available to our industry to assist in the continued momentum to make small wind power obtainable, efficient and affordable for the average home owner.

Testing begins this week and guests are welcomed. Over the next few months DyoCore expects to log hundreds of simulation hours and continue to add on new testing tools to its facility. For more information about the SolAir Wind Pit email testing@dyocore.com.

David Raine

DyoCore
www.dyocore.com

p&f. 866-404-2428

c. 760-580-4271

dave@dyocore.com

From: small-wind-home@yahoogroups.com
[mailto:small-wind-home@yahoogroups.com] On Behalf Of jerry freedomev

Sent: Monday, February 07, 2011 8:39 AM
To: small-wind-home@yahoogroups.com
Subject: Re: [s-w-h] b Solar verses wind efficiency

Hi David and All,

Nice looking WT but I have problems with your website facts. Little power is available under 7mph and yours is just interesting looking old tech. Not that anything is wrong with older tech, 1930's, since in most cases it's better than 'new' tech. So stop dissing the old tech and make your specs at lower wind speeds more honest. And higher is better than lower to catch more wind, power.

But there is no reason WT's can't be built at a more reasonable price that can't pay for itself in under 3 yrs in most places. Nor do you need exceptional wind resources, just design for lower speeds if that's what you have. Sadly for most that means building your own as most WT's companies way overcharge for their units. Just what is the price for your unit?

In the Wind vs solar wind in most cases will put out 3x's or more power/$ if well shopped. Though PV panels can now be had for under $2/wt. But WT's shouldn't cost anymore than that and they work over 24hrs vs

8-10 for PV.

----- Original Message ----
From: David Raine <dave@dyocore.com <mailto:dave%40dyocore.com> >

To: small-wind-home@yahoogroups.com
<mailto:small-wind-home%40yahoogroups.com>
Sent: Sun, February 6, 2011 1:07:32 PM
Subject: [s-w-h] Solar verses wind efficiency

Solar is a multibillion dollar industry with tremendous resource funding, comparing this to small wind and a handful of true "small wind" products with less than maybe 20 million in development capital amongst all of them is quite a stretch. You cannot at this point simply compare the two without the bias towards the better funded and equipped product. Solar is a great product today and getting better but just less than 10 years ago it was a very poor and expensive solution. Solar has come a long way. Wind is on those coat tails and moving fast towards the same objective.

In the next few years we might come a bit closer to a side by side comparison but my thought is both and possibly other solutions will serve as a complete system in combination. Finding ways to leverage solutions based on the resources, site review, available will be the only way to indicate if any solution is a good one.

At DyoCore We have already solved the financial barrier. We have not quite concurred small wind power conversions but we're working hard towards it and see light at the end of the tunnel with the help of several industry leaders.

I would like to hope to see more direction in creating resources for alternative energy needs and the improvement of the existing technology towards making Small Wind for the average home practical. At what point does that occur? Beating Solar or simply making energy at a reasonable cost with little or no maintenance?

I think this thread is a little pre-mature and bias towards a industry with an open check book.

David Raine

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Subject:	RE: [s-w-h] b Solar verses wind efficiency
From:	Michael Klemen (wind4energy@yahoo.com)
To:	small-wind-home@yahoogroups.com;
Date:	Monday, February 7, 2011 12:58 PM

Dave,

I find your take fascinating.

Can you provide details of DyoCore's wind tunnel arrangements?

Also, on DyoCore's web site, there is a link to IEC testing data. In this document:

http://www.dyocore.com/material/IEC_Standard_61400-SolAir.pdf

DyoCore states: "Over the past few years DyoCore has collected information that relates to power performance, power quality, noise, safety and function, and endurance tests that meet or exceed the standards established by the DOE's National Renewable Energy Laboratory (NREL) established in 2008 and now part of the International Electrotechnical Commission (IEC) standards."

The turbine installations at both sides are on a rooftop. That does not comply with the requirements of the IEC standards (or AWEA standards) for small turbine testing. The basis for everything else presented in the document that relates to IEC testing is flawed on this basis alone. It seems devious at best to even mention the standards, since nothing was done to comply with them!

Can DyoCore explain how the Hampshire, IL site, with a 6.3 m/s average wind speed didn't seriously outdo the performance of the San Marcos site? More than doubling the wind speed ought to have more than doubled energy output. Instead, there's just a 36% improvement in output for a 117% increase in wind speed. That doesn't account for the fact that the

Exhibit 47

energy in the wind is proportional to velocity cubed.

Looking at my page for a "Perfect Turbine":

http://www.ndsu.edu/ndsu/klemen/Perfect_Turbine.htm

You can see that for an ideal real life wind turbine ("good turbine") the increase in energy production should be on the order of 5.75 times (575%) the output on the 6.3 m/s site compared to the 2.9 m/s site.

Can you also explain, in that same document how some of these numbers pan out? DyoCore states that the turbine has a 1.13 m^2 turbine. That document states that rated power is at 8 m/s and is 1.6 kW (I also note that you stated previously that nominal output on a site is just 1kW, not the 1.6kW in this document).

That is rather odd, given the swept area of this turbine, there are only about 350 Watts of attainable energy in the wind at that wind speed! So basically, the output and power performance of this turbine as presented cannot be used for any useful purpose.

I would love to be shown otherwise, but this is misleading at best, if not outright ..... .

Sincerely,
Mike Klemen

--- On Mon, 2/7/11, David Raine <dave@dyocore.com> wrote:

> From: David Raine <dave@dyocore.com>
> Subject: RE: [s-w-h] b Solar verses wind efficiency
> To: "'jerry freedomev'" <freedomev@yahoo.com>, small-wind-home@yahoogroups.com
> Date: Monday, February 7, 2011, 11:11 AM

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> Nor
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>
>
> In the Wind vs solar wind
> in most cases will put
> out
> 3x's or more power/$ if well shopped. Though PV panels can
> now be had for
> under
> $2/wt. But WT's shouldn't cost anymore than that and they
> work over 24hrs vs
>
> 8-10 for PV.
>
>
>
>
> ----- Original Message ----
> From: David Raine <dave@dyocore.com
> <mailto:dave%40dyocore.com> >
> To: small-wind-home@yahoogroups.com
> <mailto:small-wind-home%40yahoogroups.com>
> Sent: Sun, February 6, 2011 1:07:32 PM
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> [Non-text portions of this message have been removed]
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<*> To change settings online go to:
  http://groups.yahoo.com/group/small-wind-home/join
  (Yahoo! ID required)

<*> To change settings via email:
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  http://docs.yahoo.com/info/terms/

Subject: Re: [s-w-h] Solar verses wind efficiency

From: Cory Arnold (coryarnold@mcwindenergy.com)

To: small-wind-home@yahoogroups.com;

Date: Wednesday, February 9, 2011 10:59 AM

To all,

This conversation could have ended in the one sentence that Mike Bergey stated. There is a place for solar and a place for small wind. Sadly David you are going against the grain of this industry. The only people who have really stood the test of time are the ones who stop trying to bend the rules and followed them. Giving realistic numbers for a given wind resource, and get that Pig in the AIR! If you are installing on roof tops or smaller towers, then the customer has the right to know the effects it will have on production. Not to mention the additional wear and tear the turbine will have so close to the ground.

I would say that my life in this industry has been a lot like 70% of small wind dealers. I started selling small turbine on small towers. They had a good price tag, they worked(most of the time) and I made money. That was the goal right? To make money and provide for my family. Except I saw lots of unhappy customers. We had turbine issues, but mostly they just didn't produce close to the numbers they were supposed to. Then there was a shift, I got educated. I started being a advocate for the industry. Doing local seminars and educating people. Business slowed way down. I got away from selling toys, and stopped selling anything under a 5 kW. Then something happened, Instead of doing sites surveys with a sales pitch, I did site surveys with wind education. Sales ramped up and we started rocking. Wind is one of the most awesome forces on this earth. It is highly unpredictable and the fact that turbines can handle consistent 60+ winds is amazing to me. Education is the key to small wind. Customers will buy what they can understand. Thats why companies like Proven, Bergey, and Jacobs are seeing huge growth right now. Their products are simple and they function. Customers can see how they work and understand their concepts. Ducted, high tech(people cramming megawatt unit technology into small wind turbines), or giving claims of production that dont map out on paper. Will do

Exhibit 48

nothing but push customers away. I am in the field with dealers on almost a daily basis. Educated customers are happy customers, so if it is hard to educate the customer on a certain product it is a hard sale.

I do agree there are many ways to improve the small wind industry. However, every time someone tries to approach this industry , with what I see as obnoxious claims for untested products, everyone gets hurt. Re-inventing the wheel, instead of just trying to improve it is causing investors and potential customers to shy away from good products. Because of the bad ones. The positive side of this, is that I believe there has been enough of this happening that new companies are learning from others past mistakes. With the inception of the SWCC and DWEA's code of conduct etc... New companies now have people to talk to about bringing new product to the table, and the order of things. We are all excited to see both organizations evolve and bring control to the industry.

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Cory Arnold
Director of Business Development
MC Energy LLC
C: 208.360.3788
F: 509.892.0609
CoryArnold@MCWindEnergy.com

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>
> David Raine
>
> DyoCore
> www.dyocore.com
>
> p&f. 866-404-2428
>

> c. 760-580-4271
>
> dave@dyocore.com <mailto:dave%40dyocore.com>
>
> From: small-wind-home@yahoogroups.com
> <mailto:small-wind-home%40yahoogroups.com>
> [mailto:small-wind-home@yahoogroups.com
> <mailto:small-wind-home%40yahoogroups.com>] On Behalf Of Ian Woofenden
> Sent: Monday, February 07, 2011 1:11 PM
> To: small-wind-home@yahoogroups.com
> <mailto:small-wind-home%40yahoogroups.com>
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> Regards,
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> Ian
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> [Non-text portions of this message have been removed]
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subscribe to a daily digest of the list,
or stop receiving the list by e-mail
(and read it on the Web), go to
http://www.yahoogroups.com/list/small-wind-home .
. An FAQ on small wind systems is located at
http://www.ndsu.nodak.edu/ndsu/klemen .

Yahoo! Groups Links

<*> To visit your group on the web, go to:
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<*> Your email settings:
Individual Email | Traditional

<*> To change settings online go to:
http://groups.yahoo.com/group/small-wind-home/join
(Yahoo! ID required)

<*> To change settings via email:
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small-wind-home-fullfeatured@yahoogroups.com

<*> To unsubscribe from this group, send an email to:
small-wind-home-unsubscribe@yahoogroups.com

<*> Your use of Yahoo! Groups is subject to:
http://docs.yahoo.com/info/terms/

Subject:	RE: [s-w-h] Solar verses wind efficiency
From:	David Raine (dave@dyocore.com)
To:	roger.dixon@att.net; coryarnold@mcwindenergy.com; small-wind-home@yahoogroups.com;
Date:	Thursday, February 10, 2011 10:35 AM

Thank you for your comments Cory, I appreciate your passion and experience.

I regret the industry in which I am very passionate about is so negative towards the advancement of such important alternative energy solutions. I hear a lot of argument on "it will not work" from a lot of people who claim to be professionals but none of which have spend a even a moment in our testing facility, who have actually tested our product or who have spoken to our clients and more importantly who have vested energy towards create efficiencies. I have purchased, tested an tried to return other products, specifically one of the members of the group, I ended up selling it on ebay for $10. I think this might have pissed Mr. B off a bit because the header was "junk for sale".

I believe strongly low wind conversion can be accomplished. Maybe not today but very soon. I invite this group to think a bit more about that flying pig. We are not geniuses, there aren't many out there but in their own minds, we are innovators driven to create useful energy for the average homeowner. I find to our benefit we are not engineers because it appears from this group they are first to give up.

We are very open and forward about the development and barriers of our product, additionally our turbine is amongst the lowest cost turbine on the market, just about 1/3 that of similar products and 1/10 that of Bergy. We stand behind our product 100%! We accept returns NO QUESTIONS ASKED full refund if our customers feel SolAir will not fit their needs, we have had

Exhibit 49

only 3 turbines returned in the past year. Our distributors are very well educated on low wind barriers and they spend considerable time and efforts making sure a SolAir end user is aware of low wind conversion barriers.

DyoCore is not getting rich off SolAir. We pour every dollar back into the further development and advancement of the efficiency in lower wind conversion. We are most likely the only turbine manufacture with an in-house wind tunnel for testing. We can easily stop development over inflate our prices similar to that of Bergy but we have a completely different market direction in mind, one that is built on integrity and our passion.

Our partners are Aurora, Xantrex, Zahn Electronics, Ginlong, TUV, DC Power and several more in efforts to create solutions. We are humbled to be in the spotlight within our industry and hope that maybe our product and our ideas help drive others to continue to bend the rules and maybe look for a few flying pigs.

David Raine

DyoCore
www.dyocore.com

p&f. 866-404-2428

c. 760-580-4271

dave@dyocore.com

From: small-wind-home@yahoogroups.com
[mailto:small-wind-home@yahoogroups.com] On Behalf Of roger dixon

Sent: Thursday, February 10, 2011 4:55 AM
To: 'Cory Arnold'; 'SWH'
Subject: RE: [s-w-h] Solar verses wind efficiency

Well said Cory. Thanks.

Roger Dixon

Skylands Renewable Energy, LLC

Certified Wind Site Assessor

ASME/IACET Certified Rigging Instructor

NJ CEP (Clean Energy Program) Approved Wind Turbine Installer

NYSERDA Approved Wind Turbine Installer

Distributor & Installer of Solar & Wind Energy Systems

908.337.2057 cell

908.730.6474 fax

roger.dixon@skylandsre.com <mailto:roger.dixon%40skylandsre.com>

www.skylandsre.com

SkylandsRenewD66bR03dP01ZL

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[mailto:small-wind-home@yahoogroups.com
<mailto:small-wind-home%40yahoogroups.com>] On Behalf Of Cory Arnold
Sent: Wednesday, February 09, 2011 11:59 AM
To: SWH
Subject: Re: [s-w-h] Solar verses wind efficiency

To all,

This conversation could have ended in the one sentence that Mike Bergey stated. There is a place for solar and a place for small wind. Sadly David you are going against the grain of this industry. The only people who have really stood the test of time are the ones who stop trying to bend the rules and followed them. Giving realistic numbers for a given wind resource, and get that Pig in the AIR! If you are installing on roof tops or smaller towers, then the customer has the right to know the effects it will have on production. Not to mention the additional wear and tear the turbine will have so close to the ground.

I would say that my life in this industry has been a lot like 70% of small wind dealers. I started selling small turbine on small towers. They had a good price tag, they worked(most of the time) and I made money. That was the goal right? To make money and provide for my family. Except I saw lots of unhappy customers. We had turbine issues, but mostly they just didn't produce close to the numbers they were supposed to. Then there was a shift, I got educated. I started being a advocate for the industry. Doing local seminars and educating people. Business slowed way down. I got away from selling toys, and stopped selling anything under a 5 kW. Then something happened, Instead of doing sites surveys with a sales pitch, I did site surveys with wind education. Sales ramped up and we started rocking. Wind is one of the most awesome forces on this earth. It is highly unpredictable and the fact that

turbines can handle consistent 60+ winds is amazing to me. Education is the key to small wind. Customers will buy what they can understand. Thats why companies like Proven, Bergey, and Jacobs are seeing huge growth right now. Their products are simple and they function. Customers can see how they work and understand their concepts. Ducted, high tech(people cramming megawatt unit technology into small wind turbines), or giving claims of production that dont map out on paper. Will do nothing but push customers away. I am in the field with dealers on almost a daily basis. Educated customers are happy customers, so if it is hard to educate the customer on a certain product it is a hard sale.

I do agree there are many ways to improve the small wind industry. However, every time someone tries to approach this industry , with what I see as obnoxious claims for untested products, everyone gets hurt. Re-inventing the wheel, instead of just trying to improve it is causing investors and potential customers to shy away from good products. Because of the bad ones. The positive side of this, is that I believe there has been enough of this happening that new companies are learning from others past mistakes. With the inception of the SWCC and DWEA's code of conduct etc... New companies now have people to talk to about bringing new product to the table, and the order of things. We are all excited to see both organizations evolve and bring control to the industry.

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> [Non-text portions of this message have been removed]
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>

[Non-text portions of this message have been removed]

No virus found in this message.
Checked by AVG - www.avg.com
Version: 10.0.1204 / Virus Database: 1435/3431 - Release Date: 02/08/11

[Non-text portions of this message have been removed]

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  subscribe to a daily digest of the list,
  or stop receiving the list by e-mail
  (and read it on the Web), go to
  http://www.yahoogroups.com/list/small-wind-home .
. An FAQ on small wind systems is located at
  http://www.ndsu.nodak.edu/ndsu/klemen .

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<*> Your email settings:
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<*> To change settings online go to:
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Subject: RE: [s-w-h] Solar verses wind efficiency

From: Michael Klemen (wind4energy@yahoo.com)

To: small-wind-home@yahoogroups.com; dave@dyocore.com;

Date: Thursday, February 10, 2011 8:43 PM

David,

I appreciate passion for something that is good and responsible!

It is hard to ignore some of the obvious things you mentioned.

"Professionals" don't have to do as you suggest. People with experience such as Mike Bergey do not need to spend a moment in your testing facility or test your turbine to know that what information that is publicly available tells us that the claims are totally impossible. It is physically impossible to capture energy that doesn't exist.

I do note that you haven't talked about what Mike Bergey or myself said about the product. We weren't talking about a sales pitch or feelings.

Testing a wind turbine in a wind tunnel can be useful for a manufacturer, but cannot be used for any type of energy or performance information for public consumption.

Low speed wind conversion can be accomplished, but at what cost? If you refer to my Perfect Turbine page (which I sent in my prior post), you'll see that at a 35% conversion efficiency, you will only get 4.74 kWh per month per square meter of capture area. That assumes a Rayleigh distribution.

Do the math. The DyoCore turbine is just over 1 square meter. The installed cost of a turbine to generate 75 cents of electricity per month (15 c/kwh) has got to be cheaper than dirt! I recall that you previously claimed that 6 mph was a decent wind site for installing a wind turbine. A single nominal 100 watt solar

Exhibit 50

panel for 4 sun hours/day would yield .4 kWh/day or 12 kWh/month.
At $2/watt, that would be a $200 investment plus an inverter.
That would generate 3 times the energy at 1/8 the cost!

I'm just trying to keep your statements in perspective.

There just isn't enough energy in the wind at that average wind speed to make it worthwhile. At 10 mph, the energy available for harvest is 5 times higher than 6 mph. Now generating 25 kWh per month per m^2, this gets to be more credible. Compared to the PV, that's now twice the energy than the PV at 8 times the cost.

> I believe strongly low wind conversion can be
> accomplished. Maybe not today but very soon. I invite
> this group to think a bit more about that flying
> pig.

So, given the physics, what kind of a flying pig is it?
You can't capture energy that doesn't exist. That's just reality.

> We stand behind our product 100%! We accept returns NO
> QUESTIONS ASKED full refund if our customers feel SolAir
> will not fit their needs

But do you also refund installation costs when the turbine doesn't perform as expected? You cannot refund the faith that people had in a product when it disappoints. You cannot refund the faith and hope people had in wind energy when it doesn't deliver. That's why we're asking these questions.

> We are most likely the only turbine manufacture with an
> in-house wind tunnel for testing.

Nope. Southwest Wind Power has a wind tunnel for research.
I bet there are more.

Sincerely,
Mike Klemen

3

Subject: Re: [s-w-h] Solar verses wind efficiency

From: David Raine (dave@dyocore.com)

To: wind4energy@yahoo.com;

Date: Thursday, February 10, 2011 9:57 PM

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David Raine
760-580-4271

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> I appreciate passion for something that is good and responsible!
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> It is hard to ignore some of the obvious things you mentioned.
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Exhibit 51

that you previously claimed that 6 mph was a decent wind site for installing a wind turbine. A single nominal 100 watt solar panel for 4 sun hours/day would yield .4 kWh/day or 12 kWh/month. At $2/watt, that would be a $200 investment plus an inverter. That would generate 3 times the energy at 1/8 the cost!

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To: dave@dyocore.com;

Date: Thursday, February 10, 2011 11:07 PM

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Exhibit 52

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Subject: Re: [s-w-h] Solar verses wind efficiency

From: David Raine (dave@dyocore.com)

To: wind4energy@yahoo.com;

Date: Thursday, February 10, 2011 11:51 PM

You are welcome to visit our facility or test our SolAir at any time.

David Raine
760-580-4271

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Subject: Re: [s-w-h] Solar verses wind efficiency

From: David Raine (dave@dyocore.com)

To: wind4energy@yahoo.com;

Date: Thursday, February 10, 2011 11:52 PM

I am responding from my iPad, I simply hit reply.

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Exhibit 54

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Date: Friday, February 11, 2011 6:27 AM

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On this list, hit Reply All. Remove any recipients you do not want to send to.

While I appreciate the offer to visit your facility, I can save a lot of money simply looking at the data. The data simply does not add up, so a visit would not help with any of these issues.

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__,_._,___

Subject: RE: [s-w-h] Solar verses wind efficiency

From: Michael Klemen (wind4energy@yahoo.com)

To: dave@dyocore.com;

Date: Saturday, February 12, 2011 7:58 AM

David,

Regarding the WindPit, DyoCore has a lot to learn about what would produce a reasonable result in a wind tunnel. The wind tunnel blockage is too high. Power performance as measured in this wind tunnel with the turbine pictured will be higher than anybody will experience when the turbine is place is free and clear wind. Energy production will be overstated if power data is used from this setup.

If any data is published from the WindPit, it will be in error, negligent, and incorrect.

Regarding the Power Curve that is on the DyoCore web site, it is clear that whoever created it does not understand the standards and how to acquire data. The data has absolutely nothing to do with Betz.

On this page:

http://www.dyocore.com/windpower.html

It states: "The difficulty in answering this question is compounded by the difficulty in obtaining accurate data to make energy production assumptions. Below is our attempt to simplify the answer. Though we can almost identify maximum capabilities it is difficult to accurately estimate wind speeds, consistency and conversion capabilities of the equipment being used"

The answer is not difficult. It is not difficult to obtain the necessary data according to the IEC or SWCC standards.

Exhibit 56

The process is outlined pretty clearly. There is no need to accurately estimate anything. All you have to do is just measure it.

Further, it states:

"The following table provides a power curve as applied to the Betz law;"

Well, it is clear that whoever wrote this page and whoever took the data doesn't understand the difference between power performance measurement and the guideline provided by Betz. Power Curves are never applied to the Betz law. The resultant power curve can be compared to the Betz law for reasonability.

Furthermore, on that same page, point #3 says: "Equipment efficiency is the final factor." Equipment efficiency is not a factor at all. The measured result of the power curve includes the equipment efficiency. It is built in to the measurement. There is no need to factor it in.

Lastly, this same web page states:

"Although the calculation of wind power illustrates important features about wind turbines, the best measure of wind turbine performance is annual energy output."

Wind power is NOT A CALCULATION. It is a measurement. Annual Energy output is a calculation because that standardizes the data to a normal site, and takes wind speed distribution on a given site out of the equation. Annual Energy Production from a single size cannot be used to estimate annual energy production at another site.

If you could explain the issues regarding the two sites in the IEC document on the DyoCore web site, the graph with estimated energy output can also be shown to be inaccurate. I know you don't want to hear that.

It is clear that whoever is producing this stuff doesn't really know what they are doing. I don't know how else to say it and show you other than explain all of the issues with it. I would hope that this would spur DyoCore to learn how to do the right thing.

Sincerely,
Mike

--- On **Fri, 2/11/11, David Raine <*dave@dyocore.com*>** wrote:

From: David Raine <dave@dyocore.com>
Subject: RE: [s-w-h] Solar verses wind efficiency
To: "'Michael Klemen'" <wind4energy@yahoo.com>
Date: Friday, February 11, 2011, 10:42 AM

Thank you.

David Raine
DyoCore
www.dyocore.com
p&f. 866-404-2428
c. 760-580-4271
dave@dyocore.com

From: Michael Klemen [mailto:wind4energy@yahoo.com]
Sent: Friday, February 11, 2011 4:28 AM
To: David Raine
Subject: Re: [s-w-h] Solar verses wind efficiency

David,

On this list, hit Reply All. Remove any recipients
you do not want to send to.

While I appreciate the offer to visit your facility,
I can save a lot of money simply looking at the
data. The data simply does not add up, so a
visit would not help with any of these issues.

Mike

--- On **Thu, 2/10/11, David Raine <*dave@dyocore.com*>** wrote:

From: David Raine <dave@dyocore.com>
Subject: Re: [s-w-h] Solar verses wind efficiency
To: "Michael Klemen" <wind4energy@yahoo.com>
Date: Thursday, February 10, 2011, 11:52 PM

I am responding from my iPad, I simply hit reply.

David Raine
760-580-4271

On Feb 10, 2011, at 9:07 PM, Michael Klemen <wind4energy@yahoo.com> wrote:

David,

Please post that to the list. :)

This is not book knowledge. If you're getting this kind of power in the wind tunnel, the physics of that is perfectly explainable. I understand the idea of a roof mount and forcing the wind over the roof can add energy to the turbine. However, there is nothing in the publicly consumable data that indicates what a correct rating of the turbine would be in any other type of installation.

Please humor me for a moment and show me where your blogs talk about reconciling your numbers to real life. Please also humor my post regarding the document on the DyoCore web site that references the IEC standards. From everything that is plain to see, the reference is in words only, and that is all. The testing was not done in accordance with the IEC standards or any resemblance thereof.

Please humor me and post your first reply to the list, or are you afraid to? I'm not afraid of a discussion in public. It will demonstrate how serious you are about wanting to bring your technology to the mainstream. Hiding off the list and talking like this tells me more than anything else of this conversation.

Please demonstrate as you have said you can:

"The betz law does not and could not ever reflect real world conditions, I can demonstrate even under the most difficult conditions that direct force/volume never exists in the real world."

Words are easy to say...let's see your numbers!

Sincerely,
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This a great point towards my contention with those that stick to numbers only, all of which is outlined in our blogs very thoroughly. The betz law does not and could not ever

reflect real world conditions, I can demonstrate even under the most difficult conditions that direct force/volume never exists in the real world. Anyone can pick up a book and be a self proclaimed genius, but a book does you absolutely no good in the real world. Your math is simply wrong. You are wrong.

David Raine
760-580-4271

On Feb 10, 2011, at 6:43 PM, Michael Klemen <wind4energy@yahoo.com> wrote:

David,

I appreciate passion for something that is good and responsible!

It is hard to ignore some of the obvious things you mentioned.

"Professionals" don't have to do as you suggest. People with experience such as Mike Bergey do not need to spend a moment in your testing facility or test your turbine to know that what information that is publicly available tells us that the claims are totally impossible. It is physically impossible to capture energy that doesn't exist.

I do note that you haven't talked about what Mike Bergey or myself said about the product. We weren't talking about a sales pitch or feelings.

Testing a wind turbine in a wind tunnel can be useful for a manufacturer, but cannot be used for any type of energy or performance information for public consumption.

Low speed wind conversion can be accomplished, but at what cost? If you refer to my Perfect Turbine page (which I sent in my prior post), you'll see that at a 35% conversion efficiency, you will only get 4.74 kWh per month per square meter of capture area. That assumes a Rayleigh distribution.

Do the math. The DyoCore turbine is just over 1 square meter. The installed cost of a turbine to generate 75 cents of electricity per month (15 c/kwh) has got to be cheaper than dirt! I recall that you previously claimed that 6 mph was a decent wind site for installing a wind turbine. A single nominal 100 watt solar panel for 4 sun hours/day would yield .4 kWh/day or 12 kWh/month. At $2/watt, that would be a $200 investment plus an inverter. That would generate 3 times the energy at 1/8 the cost!

I'm just trying to keep your statements in perspective.

There just isn't enough energy in the wind at that average

wind speed to make it worthwhile. At 10 mph, the energy available for harvest is 5 times higher than 6 mph. Now generating 25 kWh per month per m^2, this gets to be more credible. Compared to the PV, that's now twice the energy than the PV at 8 times the cost.

> I believe strongly low wind conversion can be
> accomplished. Maybe not today but very soon. I invite
> this group to think a bit more about that flying
> pig.

So, given the physics, what kind of a flying pig is it? You can't capture energy that doesn't exist. That's just reality.

> We stand behind our product 100%! We accept returns NO
> QUESTIONS ASKED full refund if our customers feel SolAir
> will not fit their needs

But do you also refund installation costs when the turbine doesn't perform as expected? You cannot refund the faith that people had in a product when it disappoints. You cannot refund the faith and hope people had in wind energy when it doesn't deliver. That's why we're asking these questions.

> We are most likely the only turbine manufacture with an
> in-house wind tunnel for testing.

Nope. Southwest Wind Power has a wind tunnel for research. I bet there are more.

Sincerely,
Mike Klemen

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subscribe to a daily digest of the list,
or stop receiving the list by e-mail
(and read it on the Web), go to

http://www.yahoogroups.com/list/small-wind-home .
. An FAQ on small wind systems is located at
http://www.ndsu.nodak.edu/ndsu/klemen .

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Subject: RE: [s-w-h] Solar verses wind efficiency

From: David Raine (dave@dyocore.com)

To: wind4energy@yahoo.com;

Date: Monday, February 14, 2011 4:01 PM

Hi Michael, looks like your post was just to me but you are welcome to post this for everyone in your forum.

Yes the "Wind Pit" is a great learning experience for us and for the industry. Not many companies get to actually test their products in a controlled environment.

I can understand your assumptions and initially would have thought the same myself, however, it turns out quite the opposite.

1. Exact volume – Betz's law (60" wind tunnel – 60" blade diameter) will create lower results than could be experienced in the real world. http://www.symscape.com/blog/virtual-wind-turbine-breaks-betz-law
2. Betz's law is the basis for most turbine power curves
3. Our tunnel does not produce exact volume, though I appreciate your assumption we are not engineers and did not create a "perfect" volume tunnel.
4. We have found at a lower wind speeds that that we do get better results in the tunnel due to "constant" wind, has nothing to do with volume.
5. At higher wind speeds in the tunnel we get lower results than in the real world, has everything to do with volume.
6. Creating a power curve from any one piece of data is negligent and we are not utilizing the tunnel to create power curves, the purpose of our tunnel is to develop the best solution with the resources we have today.

In the real world a 10mph average wind is a very misleading number. The accelerated increase in energy production and conversion efficiency as the wind speed increases is so great that the difference between 10mph and 11mph could be almost doubled. Understanding this then applying it to trying to get a range of wind vs power in "average" conditions almost becomes impossible. An average wind speed of 10mph really means varying wind between maybe 5mph and 15mph. this would indicate that 50% of your energy production was greater than 10mph and at the accelerated power production your gross production is going to be greater than a wind tunnel test at 10mph. This is unfortunately how we applied our original power curve data and learned later that the "real world" can NOT be duplicated in a wind tunnel.

Unfortunately where we disagree is in I feel Betz, though a good starting point, does not represent a real word power curve. But we are striving to find a nice medium.

Exhibit 57

You appear to be very angry about our direction and development of a solution. I hope we have not offended you in our objectives to solve for what we feel is a very important solution. Are you a manufacturer of a product? Are you an engineer developing a solution for the average homeowner? Maybe if I understood your position within the industry I could better answer your comments.

I assure you we are not getting rich off our product which is the lowest priced turbine within our industry. We are a small privately owned company, we have NO government funding, not even a bank loan, we are growing and in a very poor economy employ quite a few people. Our customers understand/acknowledge our barriers and love our product. We have a 100% return policy – no questions asked. I would think this is very important and responsible. We constantly strive to improve our product and our resources for our clients.

I come personally from a completely different industry and have no engineering experience. I welcome your comments and appreciate your time to take such an interest in what we are doing.

I'm going to stop responding this blog feed, it's does not seem productive to me, I'm going to post this response and your comments our blog site on our DyoCore page, I would be happy to answer any questions you have posted to our blog to share with our clients.

Thanks for your input!

David Raine

DyoCore

www.dyocore.com

p&f. 866-404-2428

c. 760-580-4271

dave@dyocore.com

From: Michael Klemen [mailto:wind4energy@yahoo.com]
Sent: Saturday, February 12, 2011 5:58 AM
To: David Raine
Subject: RE: [s-w-h] Solar verses wind efficiency

David,

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Mike

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Subject: RE: [s-w-h] Solar verses wind efficiency
To: "'Michael Klemen'" <wind4energy@yahoo.com>
Date: Friday, February 11, 2011, 10:42 AM

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David Raine
DyoCore
www.dyocore.com
p&f. 866-404-2428
c. 760-580-4271
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David,

On this list, hit Reply All. Remove any recipients
you do not want to send to.

While I appreciate the offer to visit your facility,

I can save a lot of money simply looking at the
data. The data simply does not add up, so a
visit would not help with any of these issues.

Mike

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Do the math. The DyoCore turbine is just over 1 square meter. The installed cost of a turbine to generate 75 cents of electricity per month (15 c/kwh) has got to be cheaper than dirt! I recall that you previously claimed that 6 mph was a decent wind site for installing a wind turbine. A single nominal 100 watt solar panel for 4 sun hours/day would yield .4 kWh/day or 12 kWh/month. At $2/watt, that would be a $200 investment plus an inverter. That would generate 3 times the energy at 1/8 the cost!

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I bet there are more.

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subscribe to a daily digest of the list,
or stop receiving the list by e-mail
(and read it on the Web), go to
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http://www.ndsu.nodak.edu/ndsu/klemen .

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Subject: RE: [s-w-h] Solar verses wind efficiency

From: Michael Klemen (wind4energy@yahoo.com)

To: dave@dyocore.com;

Date: Monday, February 14, 2011 5:04 PM

David,

Yes, I replied to you only, as it seemed like you weren't interested in carrying the conversation in public. I thought maybe it would be productive anyways.

It sounds like you realize that there are drawbacks and limitations to what you can do testing your turbine in a controlled environment. That's good. That's the bottom line of what I was trying to communicate about the wind tunnel.

What I am trying to tell you about the DyoCore wind tunnel is that if the flow gets blocked too much, air is forced through the wind turbine in ways that are not going to happen in the real world. The walls are constraining the air. In real life, on a real tower, the wind can blow past the turbine, around it. In the DyoCore wind tunnel, the walls are forcing the air to go through the turbine, which is going to give measurements higher than in the real world. So don't be surprised when they don't match. It sounds like you know they won't match anyways for other reasons.

Yes, I fully understand the point about an average wind speed of 10 mph. Yes, you get winds from 5 mph to 15 mph, depending on the actual wind during the measurement. But that's the point. Sometimes the turbine is speeding up, and you don't realize a gain in RPM during the gust. Likewise, when the wind slows down, you take momentum out of the turbine when the wind energy just isn't there. A 10 mph average is just that...an average. The shorter the averaging time, the more you resemble the real output of a wind turbine at that instantaneous wind speed. It works itself out in the end.

#2) Betz' law is not the basis for a real power curve. A real power curve is MEASURED. Measure the wind speed. Measure the Power. Average

Exhibit 58

it. It has nothing to do with Betz. It never has. It never will. Read the IEC standard. It doesn't mention Betz when talking about Power Performance measurement. It tells you how to measure the data and how to take it so that you are actually measuring the right data. You can actually make a turbine, test it to the standard, and not even know about Betz.

I didn't mention volume. I don't understand why you keep mentioning it. The kicker is AREA, not volume. The air is either going to go around the turbine if the blockage is low enough, or be forced through the turbine if the blockage is too high. It's Area that counts, not volume.

"6. Creating a power curve from any one piece of data is negligent "

The standards define how to measure a power curve. It's pretty simple in theory. Harder to do in practice. The purpose of a power curve for the most part is to provide a basis for calculating expected annual energy performance. If you don't do the power curve this way, the energy calculation becomes less than accurate.

Regarding this comment: "Unfortunately where we disagree is in I feel Betz, though a good starting point, does not represent a real word power curve."

You are the only one that keeps bringing Betz into the equation regarding the power curve. Betz has no relationship to a power curve directly. It is simply a checkpoint to make sure your measurements pan out. Betz isn't a factor in measuring a power curve or calculating turbine performance (energy). I don't know how to say it any more clearly. Read the IEC standards or the AWEA standards. Betz is not a starting or an ending point for a real world power curve. The DyoCore web site references Betz with the power curve, and that indicates a lack of knowledge about both Betz and the power curve.

As for me, I am an educated consumer that has more wind turbine data than many manufacturers. I've been burned by manufacturers and have tested a dozen or so wind turbines in the field. I sat in on discussions in creating the AWEA standard. I'm not sure that it really matters my perspective in the industry. I do have an engineering and computer science background. I can tell you more, but that ought to be enough.

You might have a 100% return policy, but according to the CEC rebates that in theory are available, if somebody spends nothing on your product,

and get nothing from it, would they even bother returning it? It doesn't seem like much of a talking point to me. I know people who have installed cheap turbines and walked away from them when things didn't work...it wasn't worth their time and effort to resolve any issues.

My goals in these discussions have been:

1) To hopefully get DyoCore to remove the false information from the web site.

2) Educate DyoCore about the wind tunnel. (done)

3) Encourage DyoCore to get correct information about their turbine on the web site.

I tried showing you lots of reasons there are issues with the DyoCore data on the web site. I tried to get you to look at the issues. If you could do it methodically instead of trying to defend the data, I was hoping it would make sense, and DyoCore could fix the issues voluntarily.

Sincerely,
Mike

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From: David Raine <dave@dyocore.com>
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2. Betz's law is the basis for most turbine power curves
3. Our tunnel does not produce exact volume, though I appreciate your assumption we are not engineers and did not create a "perfect" volume tunnel.
4. We have found at a lower wind speeds that that we do get better results in the tunnel due to "constant" wind, has nothing to do with volume.
5. At higher wind speeds in the tunnel we get lower results than in the real world, has everything to do with volume.
6. Creating a power curve from any one piece of data is negligent and we are not utilizing the tunnel to create power curves, the purpose of our tunnel is to develop the best solution with the resources we have today.

In the real world a 10mph average wind is a very misleading number. The accelerated increase in energy production and conversion efficiency as the wind speed increases is so great that the difference between 10mph and 11mph could be almost doubled. Understanding this then applying it to trying to get a range of wind vs power in "average" conditions almost becomes impossible. An average wind speed of 10mph really means varying wind between maybe 5mph and 15mph. this would indicate that 50% of your energy production was greater than 10mph and at the accelerated power production your gross production is going to be greater than a wind tunnel test at 10mph. This is unfortunately how we applied our original power curve data and learned later that the "real world" can NOT be duplicated in a wind tunnel.

Unfortunately where we disagree is in I feel Betz, though a good starting point, does not represent a real word power curve. But we are striving to find a nice medium.

You appear to be very angry about our direction and development of a solution. I hope we have not offended you in our objectives to solve for what we feel is a very important solution. Are you a manufacturer of a product? Are you an engineer developing a solution for the average homeowner? Maybe if I understood your position within the industry I could better answer your comments.

I assure you we are not getting rich off our product which is the lowest priced turbine within our industry. We are a small privately owned company, we have NO government funding, not even a bank loan, we are growing and in a very poor economy employ quite a few people. Our customers understand/acknowledge our barriers and love our product. We have a 100% return policy – no questions asked. I would think this is very important and responsible. We constantly strive to improve our product and our resources for our clients.

I come personally from a completely different industry and have no engineering experience. I welcome your comments and appreciate your time to take such an interest in what we are doing.

I'm going to stop responding this blog feed, it's does not seem productive to me, I'm going to post this response and your comments our blog site on our DyoCore page, I would be happy to answer any questions you have posted to our blog to share with our clients.

Thanks for your input!

David Raine
DyoCore
www.dyocore.com
p&f. 866-404-2428

c. 760-580-4271
dave@dyocore.com

From: Michael Klemen [mailto:wind4energy@yahoo.com]
Sent: Saturday, February 12, 2011 5:58 AM
To: David Raine
Subject: RE: [s-w-h] Solar verses wind efficiency

David,

Regarding the WindPit, DyoCore has a lot to learn about what would produce a reasonable result in a wind tunnel. The wind tunnel blockage is too high. Power performance as measured in this wind tunnel with the turbine pictured will be higher than anybody will experience when the turbine is place is free and clear wind. Energy production will be overstated if power data is used from this setup.

If any data is published from the WindPit, it will be in error, negligent, and incorrect.

Regarding the Power Curve that is on the DyoCore web site, it is clear that whoever created it does not understand the standards and how to acquire data. The data has absolutely nothing to do with Betz.

On this page:

http://www.dyocore.com/windpower.html

It states: "The difficulty in answering this question is compounded by the difficulty in obtaining accurate data to make energy production assumptions. Below is our attempt to simplify the answer. Though we can almost identify maximum capabilities it is difficult to accurately estimate wind speeds, consistency and conversion capabilities of the equipment being used"

The answer is not difficult. It is not difficult to obtain the necessary data according to the IEC or SWCC standards. The process is outlined pretty clearly. There is no need to accurately estimate anything. All you have to do is just measure it.

Further, it states:

"The following table provides a power curve as applied to the Betz law;"

Well, it is clear that whoever wrote this page and whoever took the data doesn't understand the difference between power performance measurement and the guideline provided by Betz. Power Curves are never applied to the Betz law. The

resultant power curve can be compared to the Betz law for reasonability.

Furthermore, on that same page, point #3 says: "Equipment efficiency is the final factor." Equipment efficiency is not a factor at all. The measured result of the power curve includes the equipment efficiency. It is built in to the measurement. There is no need to factor it in.

Lastly, this same web page states:

"Although the calculation of wind power illustrates important features about wind turbines, the best measure of wind turbine performance is annual energy output."

Wind power is NOT A CALCULATION. It is a measurement. Annual Energy output is a calculation because that standardizes the data to a normal site, and takes wind speed distribution on a given site out of the equation. Annual Energy Production from a single size cannot be used to estimate annual energy production at another site.

If you could explain the issues regarding the two sites in the IEC document on the DyoCore web site, the graph with estimated energy output can also be shown to be inaccurate. I know you don't want to hear that.

It is clear that whoever is producing this stuff doesn't really know what they are doing. I don't know how else to say it and show you other than explain all of the issues with it. I would hope that this would spur DyoCore to learn how to do the right thing.

Sincerely,
Mike

--- On **Fri, 2/11/11, David Raine** ***<dave@dyocore.com>*** wrote:

From: David Raine <dave@dyocore.com>
Subject: RE: [s-w-h] Solar verses wind efficiency
To: "'Michael Klemen'" <wind4energy@yahoo.com>
Date: Friday, February 11, 2011, 10:42 AM

Thank you.

David Raine
DyoCore
www.dyocore.com
p&f. 866-404-2428
c. 760-580-4271
dave@dyocore.com

From: Michael Klemen [mailto:wind4energy@yahoo.com]
Sent: Friday, February 11, 2011 4:28 AM
To: David Raine
Subject: Re: [s-w-h] Solar verses wind efficiency

David,

On this list, hit Reply All. Remove any recipients
you do not want to send to.

While I appreciate the offer to visit your facility,
I can save a lot of money simply looking at the
data. The data simply does not add up, so a
visit would not help with any of these issues.

Mike

--- On **Thu, 2/10/11, David Raine** ***<dave@dyocore.com>*** wrote:

From: David Raine <dave@dyocore.com>
Subject: Re: [s-w-h] Solar verses wind efficiency
To: "Michael Klemen" <wind4energy@yahoo.com>
Date: Thursday, February 10, 2011, 11:52 PM

I am responding from my iPad, I simply hit reply.

David Raine

760-580-4271

On Feb 10, 2011, at 9:07 PM, Michael Klemen <wind4energy@yahoo.com> wrote:

> David,
>
> Please post that to the list. :)
>
> This is not book knowledge. If you're getting this kind
> of power in the wind tunnel, the physics of that is
> perfectly explainable. I understand the idea of a
> roof mount and forcing the wind over the roof can
> add energy to the turbine. However, there is nothing
> in the publicly consumable data that indicates what
> a correct rating of the turbine would be in any other
> type of installation.
>
> Please humor me for a moment and show me where
> your blogs talk about reconciling your numbers to real
> life. Please also humor my post regarding the document
> on the DyoCore web site that references the IEC standards.
> From everything that is plain to see, the reference is in
> words only, and that is all. The testing was not done
> in accordance with the IEC standards or any resemblance
> thereof.

Please humor me and post your first reply to the list, or are you afraid to? I'm not afraid of a discussion in public. It will demonstrate how serious you are about wanting to bring your technology to the mainstream. Hiding off the list and talking like this tells me more than anything else of this conversation.

Please demonstrate as you have said you can:

"The betz law does not and could not ever reflect real world conditions, I can demonstrate even under the most difficult conditions that direct force/volume never exists in the real world."

Words are easy to say...let's see your numbers!

Sincerely,
Mike

--- On **Thu, 2/10/11, David Raine** ***<dave@dyocore.com>*** wrote:

From: David Raine <dave@dyocore.com>
Subject: Re: [s-w-h] Solar verses wind efficiency
To: "Michael Klemen" <wind4energy@yahoo.com>
Date: Thursday, February 10, 2011, 9:57 PM

This a great point towards my contention with those that stick to numbers only, all of which is outlined in our blogs very thoroughly. The betz law does not and could not ever reflect real world conditions, I can demonstrate even under the most difficult conditions that direct force/volume never exists in the real world. Anyone can pick up a book and be a self proclaimed genius, but a book does you absolutely no good in the real world. Your math is simply wrong. You are wrong.

David Raine
760-580-4271

On Feb 10, 2011, at 6:43 PM, Michael Klemen <wind4energy@yahoo.com> wrote:

> David,
>
> I appreciate passion for something that is good and responsible!
>
> It is hard to ignore some of the obvious things you mentioned.
>
> "Professionals" don't have to do as you suggest. People with experience such as Mike Bergey do not need to spend a moment in your testing facility or test your turbine to know that what information that is publicly available tells us that the claims

are totally impossible. It is physically impossible to capture energy that doesn't exist.

I do note that you haven't talked about what Mike Bergey or myself said about the product. We weren't talking about a sales pitch or feelings.

Testing a wind turbine in a wind tunnel can be useful for a manufacturer, but cannot be used for any type of energy or performance information for public consumption.

Low speed wind conversion can be accomplished, but at what cost? If you refer to my Perfect Turbine page (which I sent in my prior post), you'll see that at a 35% conversion efficiency, you will only get 4.74 kWh per month per square meter of capture area. That assumes a Rayleigh distribution.

Do the math. The DyoCore turbine is just over 1 square meter. The installed cost of a turbine to generate 75 cents of electricity per month (15 c/kwh) has got to be cheaper than dirt! I recall that you previously claimed that 6 mph was a decent wind site for installing a wind turbine. A single nominal 100 watt solar panel for 4 sun hours/day would yield .4 kWh/day or 12 kWh/month. At $2/watt, that would be a $200 investment plus an inverter. That would generate 3 times the energy at 1/8 the cost!

I'm just trying to keep your statements in perspective.

There just isn't enough energy in the wind at that average wind speed to make it worthwhile. At 10 mph, the energy available for harvest is 5 times higher than 6 mph. Now generating 25 kWh per month per m^2, this gets to be more credible. Compared to the PV, that's now twice the energy than the PV at 8 times the cost.

> I believe strongly low wind conversion can be
> accomplished. Maybe not today but very soon. I invite
> this group to think a bit more about that flying
> pig.

So, given the physics, what kind of a flying pig is it? You can't capture energy that doesn't exist. That's just reality.

> We stand behind our product 100%! We accept returns NO
> QUESTIONS ASKED full refund if our customers feel SolAir
> will not fit their needs

But do you also refund installation costs when the turbine doesn't perform as expected? You cannot refund the faith that people had in a product when it disappoints. You

cannot refund the faith and hope people had in wind energy when it doesn't deliver. That's why we're asking these questions.

> We are most likely the only turbine manufacture with an
> in-house wind tunnel for testing.

Nope. Southwest Wind Power has a wind tunnel for research. I bet there are more.

Sincerely,
Mike Klemen

__._,_.___
Reply to **sender** | Reply to **group** | Reply **via web post** | **Start a New Topic**
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- **New Photos** 1
- **New Links** 1

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. Join the list by sending a blank e-mail to:
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. To view previous messages from the list,
subscribe to a daily digest of the list,
or stop receiving the list by e-mail
(and read it on the Web), go to
http://www.yahoogroups.com/list/small-wind-home .
. An FAQ on small wind systems is located at
http://www.ndsu.nodak.edu/ndsu/klemen .

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__,_._,___

Subject: RE: [s-w-h] Solar verses wind efficiency

From: David Raine (dave@dyocore.com)

To: wind4energy@yahoo.com;

Date: Tuesday, February 15, 2011 8:53 PM

Hi Mike,

Thanks for your overview. I appreciate your patience with us. We are learning quite a bit as we grow and do not have all the answers / solutions today.

Yes, we had no idea what the Betz curve was or how it applied when we did our testing. We also at the time reached out to as many people and companies as we could to do our testing including the AWEA. Unfortunately it was too early on in the stages of small wind, even today I feel the industry is still way to young and not near enough resources exist to support and educate the real small wind market.

I get a lot of inquires that our power curve is "outside" the Betz curve, so my response was miss-directed to you, I thought this was your question.

When calculating our average annual wind we used the actually pooled "average" wind speed. Each pool was compiled of 10 minute data sets which further flawed our calculations. We should have used an average that was slightly higher to account for the dramatic production escalation during gusts. The HOBO equipment we additionally used at one location only measured wind production power, not conversion power. this was another flaw in our early stages. At one location we charged batteries with a dump load, at the other location we tied directly to the grid with a resistance meter.

However, this still demonstrated a great platform for an Average Annual Wind Speed calculation of our turbines, in the end the average wind that we recorded showed the results we indicated. The battery bank with a dump load was not an exact science and results where a bit higher than expected (San Marcos location) but this was also because we had no step up, in most conditions we easily produced enough constant low wind voltage that our battery charging efficiency was very high. We've gained a tremendous amount of experience through this frustrating process. Would we do it different going forward – YES, and we are!

We are currently testing again right now and looking at more field data from over a 100 installs. By mid this year up to about 500 install sites both in the US and Internationally – some by colleges and testing facilities. These all tied to inverters that collect all production data, on a few we will be collecting wind and other environmental/performance data that is not readily available within the community. It will be about 6 more months to a year before we able to provide

Exhibit 59

more details on these sites, some of which do very well, others that do not, it will be a great mix. At current our IL location with two units now is actually doing better than our initial results, but average annual wind speeds at this location have gone up about 50%! Additionally our in-house testing is allowing us to improve greatly on the conversion efficiency and even somewhat on the performance of the turbine in rapidly changing wind conditions.

Working with David Zahn we are very close to almost 500% greater efficiency in voltage ranges under 25v!

Unfortunately until you build up some market momentum the resources to even do these tests are not financially reasonable or even readily available. Getting funding or even a professional facility to test our product 4 years ago was like talking someone into jumping off a bridge. Even today facilities are asking for 50 to 100k to test a product with no guarantee of costs or timeline. What small company has this capability or funding in today's economy. I hope to not only build a great product but to extend our experience and resources to other manufacturers FREE!

I regret your experience with small wind and more importantly small wind manufactures has been so negative. Mine as well but that is why I created SolAir and DyoCore, I never wanted to manufacture turbines, I simply wanted to make energy at my home which is somewhat the average home in the US. A large 60' pole mount turbine was not an option for me and I felt not a real option for about 99% of Americans.

Like you our objectives are very similar we want accurate information, we want to educate and we want satisfied clients. It appears you are aware of the CA rebate, we could easily sell tens of thousands of turbines right now in CA, our objective is to sell what will work, not what is free! Only a few hundred turbines a month go through our family owned factory. I get offers daily because of our listing and certifications for the buyout of our company or manufacturer thousands of our turbine – I wouldn't consider either. I personally spend most of my days talking clients out of buying our product. You really need wind conditions over 10mph to get even a small reasonable amount of annual production, live able conditions are 12mph or greater annually, optimal are 18mph or greater but not many every experience these conditions.

Everyone that buys my product is very aware of these facts and the potential that SolAir will be a simple air vane on their roof if they do not have the right conditions. For every turbine we sell we have a dozen or so we turned down. We take every dollar (keep in mind we also have the lowest cost turbine on the CEC list) and turn it back into the improvement of our product and the conversion of energy in which we then support in the field 100% for the continued improvement of our market. I wish even one turbine manufacturer demonstrated this integrity, I would stop building mine tomorrow and buy theirs!

I really don't know who to make our information more accurate other than what we do now. I regret if you still feel we negligent in our product and direction.

My background is also computer science. And who your are, what you did and what you do now always matters- even if it's only to yourself.

David Raine

DyoCore

www.dyocore.com

p&f. 866-404-2428

c. 760-580-4271

dave@dyocore.com

From: Michael Klemen [mailto:wind4energy@yahoo.com]
Sent: Monday, February 14, 2011 3:04 PM
To: David Raine
Subject: RE: [s-w-h] Solar verses wind efficiency

David,

Yes, I replied to you only, as it seemed like you weren't interested in carrying the conversation in public. I thought maybe it would be productive anyways.

It sounds like you realize that there are drawbacks and limitations to what you can do testing your turbine in a controlled environment. That's good. That's the bottom line of what I was trying to communicate about the wind tunnel.

What I am trying to tell you about the DyoCore wind tunnel is that if the flow gets blocked too much, air is forced through the wind turbine in ways that are not going to happen in the real world. The walls are constraining the air. In real life, on a real tower, the wind can blow past the turbine, around it. In the DyoCore wind tunnel, the walls are forcing the air to go through the turbine, which is going to give measurements higher than in the real world. So don't be surprised when they don't match. It sounds like you know they won't match anyways for other reasons.

Yes, I fully understand the point about an average wind speed of 10 mph. Yes, you get winds from 5 mph to 15 mph, depending on the actual wind during the measurement. But that's the point. Sometimes the turbine

is speeding up, and you don't realize a gain in RPM during the gust. Likewise, when the wind slows down, you take momentum out of the turbine when the wind energy just isn't there. A 10 mph average is just that...an average. The shorter the averaging time, the more you resemble the real output of a wind turbine at that instantaneous wind speed. It works itself out in the end.

#2) Betz' law is not the basis for a real power curve. A real power curve is MEASURED. Measure the wind speed. Measure the Power. Average it. It has nothing to do with Betz. It never has. It never will. Read the IEC standard. It doesn't mention Betz when talking about Power Performance measurement. It tells you how to measure the data and how to take it so that you are actually measuring the right data. You can actually make a turbine, test it to the standard, and not even know about Betz.

I didn't mention volume. I don't understand why you keep mentioning it. The kicker is AREA, not volume. The air is either going to go around the turbine if the blockage is low enough, or be forced through the turbine if the blockage is too high. It's Area that counts, not volume.

"6. Creating a power curve from any one piece of data is negligent "

The standards define how to measure a power curve. It's pretty simple in theory. Harder to do in practice. The purpose of a power curve for the most part is to provide a basis for calculating expected annual energy performance. If you don't do the power curve this way, the energy calculation becomes less than accurate.

Regarding this comment: "Unfortunately where we disagree is in I feel Betz, though a good starting point, does not represent a real word power curve."

You are the only one that keeps bringing Betz into the equation regarding the power curve. Betz has no relationship to a power curve directly. It is simply a checkpoint to make sure your measurements pan out. Betz isn't a factor in measuring a power curve or calculating turbine performance (energy). I don't know how to say it any more clearly. Read the IEC standards or the AWEA standards. Betz is not a starting or an ending point for a real world power curve. The DyoCore web site references Betz with the power curve, and that indicates a lack of knowledge about both Betz and the power curve.

As for me, I am an educated consumer that has more wind turbine data than many manufacturers. I've been burned by manufacturers and have tested a dozen or so wind turbines in the field. I sat in on discussions in creating the AWEA standard. I'm not sure that it really matters my perspective in the industry. I do have an engineering and computer science background. I can tell you more, but that ought to be enough.

You might have a 100% return policy, but according to the CEC rebates that in theory are available, if somebody spends nothing on your product, and get nothing from it, would they even bother returning it? It doesn't

seem like much of a talking point to me. I know people who have installed cheap turbines and walked away from them when things didn't work...it wasn't worth their time and effort to resolve any issues.

My goals in these discussions have been:

1) To hopefully get DyoCore to remove the false information from the web site.

2) Educate DyoCore about the wind tunnel. (done)

3) Encourage DyoCore to get correct information about their turbine on the web site.

I tried showing you lots of reasons there are issues with the DyoCore data on the web site. I tried to get you to look at the issues. If you could do it methodically instead of trying to defend the data, I was hoping it would make sense, and DyoCore could fix the issues voluntarily.

Sincerely,
Mike

--- On **Mon, 2/14/11, David Raine** ***<dave@dyocore.com>*** wrote:

From: David Raine <dave@dyocore.com>
Subject: RE: [s-w-h] Solar verses wind efficiency
To: "'Michael Klemen'" <wind4energy@yahoo.com>
Date: Monday, February 14, 2011, 4:01 PM

Hi Michael, looks like your post was just to me but you are welcome to post this for everyone in your forum.

Yes the "Wind Pit" is a great learning experience for us and for the industry. Not many companies get to actually test their products in a controlled environment.

I can understand your assumptions and initially would have thought the same myself, however, it turns out quite the opposite.

1. Exact volume – Betz's law (60" wind tunnel – 60" blade diameter) will create lower results than could be experienced in the real world. http://www.symscape.com/blog/virtual-wind-turbine-breaks-betz-law

2. Betz's law is the basis for most turbine power curves

3. Our tunnel does not produce exact volume, though I appreciate your assumption we are not engineers and did not create a "perfect" volume tunnel.

4. We have found at a lower wind speeds that that we do get better results in the tunnel due to "constant" wind, has nothing to do with volume.

5. At higher wind speeds in the tunnel we get lower results than in the real world, has everything to do with volume.

6. Creating a power curve from any one piece of data is negligent and we are not utilizing the tunnel to create power curves, the purpose of our tunnel is to develop the best solution with the resources we have today.

In the real world a 10mph average wind is a very misleading number. The accelerated increase in energy production and conversion efficiency as the wind speed increases is so great that the difference between 10mph and 11mph could be almost doubled. Understanding this then applying it to trying to get a range of wind vs power in "average" conditions almost becomes impossible. An average wind speed of 10mph really means varying wind between maybe 5mph and 15mph. this would indicate that 50% of your energy production was greater than 10mph and at the accelerated power production your gross production is going to be greater than a wind tunnel test at 10mph. This is unfortunately how we applied our original power curve data and learned later that the "real world" can NOT be duplicated in a wind tunnel.

Unfortunately where we disagree is in I feel Betz, though a good starting point, does not represent a real word power curve. But we are striving to find a nice medium.

You appear to be very angry about our direction and development of a solution. I hope we have not offended you in our objectives to solve for what we feel is a very important solution. Are you a manufacturer of a product? Are you an engineer developing a solution for the average homeowner? Maybe if I understood your position within the industry I could better answer your comments.

I assure you we are not getting rich off our product which is the lowest priced turbine within our industry. We are a small privately owned company, we have NO government funding, not even a bank loan, we are growing and in a very poor economy employ quite a few people. Our customers understand/acknowledge our barriers and love our product. We have a 100% return policy – no questions asked. I would think this is very important and responsible. We constantly strive to improve our product and our resources for our clients.

I come personally from a completely different industry and have no engineering experience. I welcome your comments and appreciate your time to take such an interest in what we are doing.

I'm going to stop responding this blog feed, it's does not seem productive to me, I'm going to post this response and your comments our blog site on our DyoCore page, I would be happy to answer any questions you have posted to our blog to share with our clients.

Thanks for your input!

David Raine
DyoCore
www.dyocore.com
p&f. 866-404-2428
c. 760-580-4271
dave@dyocore.com

From: Michael Klemen [mailto:wind4energy@yahoo.com]
Sent: Saturday, February 12, 2011 5:58 AM
To: David Raine
Subject: RE: [s-w-h] Solar verses wind efficiency

David,

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http://www.dyocore.com/windpower.html

It states: "The difficulty in answering this question is compounded by the difficulty in obtaining accurate data to make energy production assumptions. Below is our attempt to simplify the answer. Though we can almost identify maximum capabilities it is difficult to accurately estimate wind speeds, consistency and conversion capabilities of the equipment being used"

The answer is not difficult. It is not difficult to obtain the necessary data according to the IEC or SWCC standards. The process is outlined pretty clearly. There is no need to accurately estimate anything. All you have to do is just measure it.

Further, it states:

"The following table provides a power curve as applied to the Betz law;"

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Furthermore, on that same page, point #3 says: "Equipment efficiency is the final factor." Equipment efficiency is not a factor at all. The measured result of the power curve includes the equipment efficiency. It is built in to the measurement. There is no need to factor it in.

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"Although the calculation of wind power illustrates important features about wind turbines, the best measure of wind turbine performance is annual energy output."

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If you could explain the issues regarding the two sites in the IEC document on the DyoCore web site, the graph with estimated energy output can also be shown to be inaccurate. I know you don't want to hear that.

It is clear that whoever is producing this stuff doesn't really know what they are doing. I don't know how else to say it and show you other than explain all of the issues with it. I would hope that this would spur DyoCore to learn how to do the right thing.

Sincerely,
Mike

--- On **Fri, 2/11/11, David Raine** ***<dave@dyocore.com>*** wrote:

From: David Raine <dave@dyocore.com>
Subject: RE: [s-w-h] Solar verses wind efficiency
To: "'Michael Klemen'" <wind4energy@yahoo.com>
Date: Friday, February 11, 2011, 10:42 AM

Thank you.

David Raine

DyoCore
www.dyocore.com

p&f. 866-404-2428

c. 760-580-4271

dave@dyocore.com

From: Michael Klemen [mailto:wind4energy@yahoo.com]
Sent: Friday, February 11, 2011 4:28 AM
To: David Raine
Subject: Re: [s-w-h] Solar verses wind efficiency

David,

On this list, hit Reply All. Remove any recipients
you do not want to send to.

While I appreciate the offer to visit your facility,
I can save a lot of money simply looking at the
data. The data simply does not add up, so a
visit would not help with any of these issues.

Mike

--- On **Thu, 2/10/11, David Raine** ***<dave@dyocore.com>*** wrote:

From: David Raine <dave@dyocore.com>
Subject: Re: [s-w-h] Solar verses wind efficiency
To: "Michael Klemen" <wind4energy@yahoo.com>
Date: Thursday, February 10, 2011, 11:52 PM

I am responding from my iPad, I simply hit reply.

David Raine

760-580-4271

On Feb 10, 2011, at 9:07 PM, Michael Klemen <wind4energy@yahoo.com> wrote:

> David,
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> Please post that to the list. :)
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> This is not book knowledge. If you're getting this kind
> of power in the wind tunnel, the physics of that is
> perfectly explainable. I understand the idea of a
> roof mount and forcing the wind over the roof can
> add energy to the turbine. However, there is nothing
> in the publicly consumable data that indicates what
> a correct rating of the turbine would be in any other
> type of installation.
>
> Please humor me for a moment and show me where
> your blogs talk about reconciling your numbers to real
> life. Please also humor my post regarding the document
> on the DyoCore web site that references the IEC standards.
> From everything that is plain to see, the reference is in
> words only, and that is all. The testing was not done
> in accordance with the IEC standards or any resemblance
> thereof.

Please humor me and post your first reply to the list, or are you afraid to? I'm not afraid of a discussion in public. It will demonstrate how serious you are about wanting to bring your technology to the mainstream. Hiding off the list and talking like this tells me more than anything else of this conversation.

Please demonstrate as you have said you can:

"The betz law does not and could not ever reflect real world conditions, I can demonstrate even under the most difficult conditions that direct force/volume never exists in the real world."

Words are easy to say...let's see your numbers!

Sincerely,
Mike

--- On **Thu, 2/10/11, David Raine** ***<dave@dyocore.com>*** wrote:

From: David Raine <dave@dyocore.com>
Subject: Re: [s-w-h] Solar verses wind efficiency
To: "Michael Klemen" <wind4energy@yahoo.com>
Date: Thursday, February 10, 2011, 9:57 PM

This a great point towards my contention with those that stick to numbers only, all of which is outlined in our blogs very thoroughly. The betz law does not and could not ever reflect real world conditions, I can demonstrate even under the most difficult conditions that direct force/volume never exists in the real world. Anyone can pick up a book and be a self proclaimed genius, but a book does you absolutely no good in the real world. Your math is simply wrong. You are wrong.

David Raine
760-580-4271

On Feb 10, 2011, at 6:43 PM, Michael Klemen <wind4energy@yahoo.com> wrote:

> David,
>
> I appreciate passion for something that is good and responsible!
>
> It is hard to ignore some of the obvious things you mentioned.
>
> "Professionals" don't have to do as you suggest. People with experience such as Mike Bergey do not need to spend a moment in your testing facility or test your turbine to know that what information that is publicly available tells us that the claims are totally impossible. It is physically impossible to capture

energy that doesn't exist.

I do note that you haven't talked about what Mike Bergey or myself said about the product. We weren't talking about a sales pitch or feelings.

Testing a wind turbine in a wind tunnel can be useful for a manufacturer, but cannot be used for any type of energy or performance information for public consumption.

Low speed wind conversion can be accomplished, but at what cost? If you refer to my Perfect Turbine page (which I sent in my prior post), you'll see that at a 35% conversion efficiency, you will only get 4.74 kWh per month per square meter of capture area. That assumes a Rayleigh distribution.

Do the math. The DyoCore turbine is just over 1 square meter. The installed cost of a turbine to generate 75 cents of electricity per month (15 c/kwh) has got to be cheaper than dirt! I recall that you previously claimed that 6 mph was a decent wind site for installing a wind turbine. A single nominal 100 watt solar panel for 4 sun hours/day would yield .4 kWh/day or 12 kWh/month. At $2/watt, that would be a $200 investment plus an inverter. That would generate 3 times the energy at 1/8 the cost!

I'm just trying to keep your statements in perspective.

There just isn't enough energy in the wind at that average wind speed to make it worthwhile. At 10 mph, the energy available for harvest is 5 times higher than 6 mph. Now generating 25 kWh per month per m^2, this gets to be more credible. Compared to the PV, that's now twice the energy than the PV at 8 times the cost.

> I believe strongly low wind conversion can be
> accomplished. Maybe not today but very soon. I invite
> this group to think a bit more about that flying
> pig.

So, given the physics, what kind of a flying pig is it? You can't capture energy that doesn't exist. That's just reality.

> We stand behind our product 100%! We accept returns NO
> QUESTIONS ASKED full refund if our customers feel SolAir
> will not fit their needs

But do you also refund installation costs when the turbine doesn't perform as expected? You cannot refund the faith that people had in a product when it disappoints. You cannot refund the faith and hope people had in wind energy

11

when it doesn't deliver. That's why we're asking these questions.

> We are most likely the only turbine manufacture with an
> in-house wind tunnel for testing.

Nope. Southwest Wind Power has a wind tunnel for research. I bet there are more.

Sincerely,
Mike Klemen

__.__,__.____

Reply to **sender** | Reply to **group** | Reply **via web post** | **Start a New Topic**
Messages in this topic **(41)**

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__,__.__,____

Subject: [s-w-h] Article on DyoCore

From: Mike Bergey (mbergey@bergey.com)

To: small-wind-home@yahoogroups.com;

Date: Monday, March 21, 2011 6:16 AM

We've discussed DyoCore on this listserv. The following article covers DyoCore's crashing the CEC rebate program. Be sure to read the comments.

http://www.greentechmedia.com/articles/read/have-small-wind-manufacturers-exploited-loopholes-in-california-rebates/

I believe there's a follow-on article in the works.

Mike Bergey
President
Bergey Windpower Co.
2200 Industrial Blvd.
Norman, OK 73069 USA
Tel: 405-364-4212
Fax: 405-364-2078
E-mail: mbergey@bergey.com
Web Site: www.bergey.com

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Subject: RE: [s-w-h] Article on DyoCore

From: David (dave@dyocore.com)

To: mbergey@bergey.com; small-wind-home@yahoogroups.com;

Date: Monday, March 21, 2011 7:45 AM

It's very unfortunate Mr. Bergey feels very threatened by DyoCore. I regret he has not shown any professionalism or restraint. His stance is bias against low wind and even more bias against products that demonstrate how overpriced his own product is in comparison. If anyone would like to take a more formal approach to learning about DyoCore, our vision, objectives and development please contact me directly at anytime. We have worked very hard over these past several years to make small wind affordable, practical and reliable for the average homeowner. It is not a small accomplishment and we have a long way to go.

DyoCore has a great relationship with the CEC and is working with the CEC to hopefully qualify installations of our product in the future. Unfortunately products like Bergy only represent less than 1% of all Californians in possibly of application and less than maybe a tenth of that in affordability. Until SolAir the average homeowner, who also funds the program, couldn't afford or get permitting for a solution. Over the past year we have changed this dramatically and now allow the program to represent a significantly broader base of the very residents that fund the program. It's our goal within the next year to double that list.

We are working aggressively with many industry leaders in making Small Wind a very real and viable solution. DyoCore has accomplished more than any other wind manufacturer in CA, hopefully with greater resources and professional assistance we can continue to make small wind a real solution.

To learn more about DyoCore, www.dyocore.com

Exhibit 61

Best wishes,

David Raine

dave@dyocore.com

www.dyocore.com

From: small-wind-home@yahoogroups.com
[mailto:small-wind-home@yahoogroups.com] On Behalf Of Mike Bergey
Sent: Monday, March 21, 2011 4:17 AM
To: small-wind-home@yahoogroups.com
Subject: [s-w-h] Article on DyoCore

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Subject: RE: [s-w-h] Article on DyoCore

From: Michael Klemen (wind4energy@yahoo.com)

To: small-wind-home@yahoogroups.com;

Date: Monday, March 21, 2011 12:18 PM

David,

I have to totally disagree with you on Mike Bergey's professionalism. In my opinion, it is you that has shown no restraint and lack of professionalism.

Mike Bergey is not threatened by DyoCore. It is the entire small wind industry that he has been part of for decades that is threatened. When a product that cannot deliver on its promises is sold, that makes all similar products look bad. When that product is purchased with taxpayer money, it makes the entire industry look bad. DyoCore wasn't in business back in the '80's (I think) when Federal Tax money was spent on small wind energy. The aftermath of those first subsidies nearly destroyed the industry.

David, you and I carried on a private conversation about DyoCore's turbine and the lack of quality data and how out of sorts your web site is with reality. It was absolutely clear to me that DyoCore really doesn't know what they're doing with performance measurement. You never addressed the discrepancies in the data that I pointed out. You only wanted me to come to your site and see one in action. Seeing one in action doesn't change anything. Based on all of the data that Dyocore made available, there is no need for me to come to your site. DyoCore needs to learn more and get their message to be consistent with reality. Some of the comments on the article are exactly the same things that I said to you.

Here's something DyoCore can do. Get this turbine certified

Exhibit 62

by the SWCC. That will separate the wheat from the chaff, and we'll see where things stand. I'll get off my soap box. I promise. In fact, I bet Mike Bergey and everybody else will quit complaining about DyoCore. Why? Because the issues with the data will be addressed by the certification. DyoCore would then be held accountable for its marketing materials - and they would then be comparable to every other certified turbine in the industry.

It's sad to me that with so many people explaining such basic things about wind energy to DyoCore, that it's been totally ignored. There are people in the industry that know what they're talking about - if DyoCore would only listen.

I understand DyoCore wants to believe in themselves and their product, but there should come a time even in the believer's mind that a good reality check is not a bad thing. It could save a lot of effort, a lot of money, some credibility, and maybe even a company.

Lastly, I'll quote you: "If anyone would like to take
a more formal approach to learning about DyoCore, our
vision, objectives and development"

I'd like so see DyoCore take a formal approach to providing the correct facts about it's turbine. Marketing should be 2nd place to factual information.

Sincerely,
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Subject: RE: [s-w-h] Article on DyoCore

From: Dave Merrill (dmerrill7@juno.com)

To: wind4energy@yahoo.com;

Cc: small-wind-home@yahoogroups.com;

Date: Monday, March 21, 2011 2:26 PM

Mike, Well written and articulated. I especially liked the last line - "Marketing should be 2nd place to factual information". There are soooo many marketing / fund raising intensive wind turbine manufacturers, and toooo few engineering orientated wind turbine manufacturers. And it gets complicated when the "new comers" are blinded by their own product literature and won't accept wisdom and physics facts from others in the field. Liked the letter, Dave Merrill
SunAir Systems
NABCEP, Certified Solar Installer
(815) 234-2530
(815) 262-2831 cell

---------- Original Message ----------
From: Michael Klemen <wind4energy@yahoo.com>
To: small-wind-home@yahoogroups.com
Subject: RE: [s-w-h] Article on DyoCore
Date: Mon, 21 Mar 2011 10:18:46 -0700 (PDT)

David,

I have to totally disagree with you on Mike Bergey's professionalism.• In my opinion, it is you that has shown no restraint and lack of professionalism.

Mike Bergey is not threatened by DyoCore.• It is the entire small wind industry that he has been part of for decades that is threatened.• When a product that cannot deliver on its promises is sold, that makes all similar products look bad.• When that product is purchased with taxpayer money, it makes the entire industry look bad.• DyoCore wasn't in business back in the '80's (I think) when Federal Tax money was spent

Exhibit 63

on small wind energy.• The aftermath of those first subsidies nearly destroyed the industry.

David, you and I carried on a private conversation about DyoCore's turbine and the lack of quality data and how out of sorts your web site is with reality.• It was absolutely clear to me that DyoCore really doesn't know what they're doing with performance measurement.• You never addressed the discrepancies in the data that I pointed out.• You only wanted me to come to your site and see one in action.• Seeing one in action doesn't change anything. Based on all of the data that Dyocore made available, there is no need for me to come to your site.• DyoCore needs to learn more and get their message to be consistent with reality. Some of the comments on the article are exactly the same things that I said to you.

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Subject: RE: [s-w-h] Article on DyoCore

From: David (dave@dyocore.com)

To: wind4energy@yahoo.com; small-wind-home@yahoogroups.com;

Date: Monday, March 21, 2011 6:53 PM

Hi Michael, hope you are well. Yes I answered your questions and posted the information directly to our site. As I mentioned I try to stay away from this blog as it has taken a wrong direction. A forum towards education and development support would be a stronger approach.

If our product was installed on a 100 foot pole with a similar wind diameter to a larger system it would perform exactly like other available turbines and the only additional cost would be the pole and larger blades. Still placing the price considerably less than the comparison. Our motor can be configured for a wide range of performance expectations. This is a very simple accomplishment in changing the windings and poles to meet your expectations. Our blade size and application appear to be the contention.

To address cost would be wrong as our turbine retails for only $1800. This is the amongst the lowest cost solutions in the market and backed 100% by us. There are very few comparable products on the market.

Our target however is the residential market, not remote farmers or large property owners. Our product applies to a much broader spectrum and is sold all over the world. CA is a very small market for us in comparison. Yes we have only been developing since 2004 but we are self-funded and have taken no government funding. This additionally is something most turbine manufacturers cannot say though I'm not indicating this is a specific benefit other than it demonstrates our integrity. We did not develop our product around a program and had no idea the CEC program existed a few years ago.

We cannot simply dismiss the potential of low wind just because it is not very efficient today, this will change and regardless of the CEC rebate or any federal program we are working hard to encourage the development of greater efficiencies and products within this space. We have accomplished a lot in just this last year alone. The quality of our product and our motor performance is solid, it was designed for lower wind conditions. Yes with a smaller blade diameter we are limited to the mathematical potential of the available wind torque, but these numbers show a lot of promise in making small wind a real solution for the majority opposed to the few.

We are working with the SWCC towards certification. We are more importantly working with complete independent companies and direct reporting of systems on actual homes over the next year that will be readily available directly from our site. Both the good and the bad. For the past year we have been reaching out to be more involved within the community and to encourage similar product, applications and development.

Exhibit 64

From: small-wind-home@yahoogroups.com [mailto:small-wind-home@yahoogroups.com] **On Behalf Of** Michael Klemen
Sent: Monday, March 21, 2011 10:19 AM
To: small-wind-home@yahoogroups.com
Subject: RE: [s-w-h] Article on DyoCore

David,

I have to totally disagree with you on Mike Bergey's professionalism. In my opinion, it is you that has shown no restraint and lack of professionalism.

Mike Bergey is not threatened by DyoCore. It is the entire small wind industry that he has been part of for decades that is threatened. When a product that cannot deliver on its promises is sold, that makes all similar products look bad. When that product is purchased with taxpayer money, it makes the entire industry look bad. DyoCore wasn't in business back in the '80's (I think) when Federal Tax money was spent on small wind energy. The aftermath of those first subsidies nearly destroyed the industry.

David, you and I carried on a private conversation about DyoCore's turbine and the lack of quality data and how out of sorts your web site is with reality. It was absolutely clear to me that DyoCore really doesn't know what they're doing with performance measurement. You never addressed the discrepancies in the data that I pointed out. You only wanted me to come to your site and see one in action. Seeing one in action doesn't change anything. Based on all of the data that Dyocore made available, there is no need for me to come to your site. DyoCore needs to learn more and get their message to be consistent with reality. Some of the comments on the article are exactly the same things that I said to you.

Here's something DyoCore can do. Get this turbine certified by the SWCC. That will separate the wheat from the chaff, and we'll see where things stand. I'll get off my soap box. I promise. In fact, I bet Mike Bergey and everybody else will quit complaining about DyoCore. Why? Because the issues with

the data will be addressed by the certification. DyoCore would then be held accountable for its marketing materials - and they would then be comparable to every other certified turbine in the industry.

It's sad to me that with so many people explaining such basic things about wind energy to DyoCore, that it's been totally ignored. There are people in the industry that know what they're talking about - if DyoCore would only listen.

I understand DyoCore wants to believe in themselves and their product, but there should come a time even in the believer's mind that a good reality check is not a bad thing. It could save a lot of effort, a lot of money, some credibility, and maybe even a company.

Lastly, I'll quote you: "If anyone would like to take a more formal approach to learning about DyoCore, our vision, objectives and development"

I'd like so see DyoCore take a formal approach to providing the correct facts about it's turbine. Marketing should be 2nd place to factual information.

Sincerely,
Mike Klemen

--- On Mon, 3/21/11, David <dave@dyocore.com> wrote:

> From: David <dave@dyocore.com>
> Subject: RE: [s-w-h] Article on DyoCore
> To: "'Mike Bergey'" <mbergey@bergey.com>, small-wind-home@yahoogroups.com
> Date: Monday, March 21, 2011, 7:45 AM
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> To learn more about DyoCore, www.dyocore.com
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> Best wishes,
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> David Raine
>
> dave@dyocore.com
>
> www.dyocore.com
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> [mailto:small-wind-home@yahoogroups.com]
> On Behalf Of Mike Bergey
> Sent: Monday, March 21, 2011 4:17 AM
> To: small-wind-home@yahoogroups.com
> Subject: [s-w-h] Article on DyoCore
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> ploited-loopholes-in-california-rebates/
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> I believe there's a follow-on article in the works.
>
> Mike Bergey
> President
> Bergey Windpower Co.
> 2200 Industrial Blvd.
> Norman, OK 73069 USA
> Tel: 405-364-4212
> Fax: 405-364-2078
> E-mail: mbergey@bergey.com
> <mailto:mbergey%40bergey.com>
> Web Site: www.bergey.com
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__,_._,___

Subject: [s-w-h] Re: Article on DyoCore

From: Doug (doug@selsam.com)

To: small-wind-home@yahoogroups.com;

Date: Tuesday, March 22, 2011 9:30 AM

I feel compelled to stand up and state the obvious here:
1) This turbine falls into the same exact category as so many others who have "crashed" this list, claiming to make more power than is even contained in a given wind, etc.

2) We should construct a list of these turbines in sequence, as they all make similar claims, and always end up going away with tail between legs: How 'bout Alex Kollitz www.nexwindenergy.com? Remember how vehement he was? Over the top! Where is their "superior machine" today? Looks like the domain has gone into "parked" mode... When I google Nexwindenergy, the only link I pick up goes to my own site whyareyousolame.com wherein I started exposing these scam turbines but got bored with it.

3) I guarantee Mike Bergey does NOT feel threatened by Dyocore, in the sense of product comparison. Where everyone SHOULD feel threatened is that this baseball game has a new player who does not understand a "force out" which is what happens when new turbine manufacturers come onto the scene exaggerating output to impossible levels. Why does Mike Bergey NOT feel threatened by Dyocore? because Mike knows that Mother Nature will do the job of sorting out the winners and losers.
4) How 'bout Windtree? Remember how long they were kicking and screaming about their superior output? Where is one of theirs today? We need a list of these.

4) Why exactly is it called "Dyocore"? Is it something about the "core" that is "Dyo"?

5) Video of a 5-foot diameter turbine hitting 4-5 kW showing meters - (could definitely not be accomplished using only 1 rotor).

Doug Selsam
PS: How windy was it the other day Doug? We lost a fence: the steel poles were bent over. Lost a few concrete roof times too.

--- In small-wind-home@yahoogroups.com, "David" <dave@...> wrote:
>

Exhibit 65

> It's very unfortunate Mr. Bergey feels very threatened by DyoCore. I regret
> he has not shown any professionalism or restraint. His stance is bias
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> To learn more about DyoCore, www.dyocore.com
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> Best wishes,
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> David Raine
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> dave@...
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> Sent: Monday, March 21, 2011 4:17 AM
> To: small-wind-home@yahoogroups.com
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Subject: Re: [s-w-h] Article on DyoCore

From: Nando (nando37@tx.rr.com)

To: dave@dyocore.com; small-wind-home@yahoogroups.com;

Date: Tuesday, March 22, 2011 10:51 AM

David:

Again I ask, and again I ask, why do you NOT address the constant and many messages about the Physical laws your wind mill is defying.

Why your response is always around the wind mill but never on the wind mill specifically ?.

The Kinetic energy a wind mill can harvest is defined by the air mass and velocity = volume that impinges the wind mill blades frontal area.

Please , do not encourage similar products, we are too few to show the non technical people (THE USERS) that the product is a Scam.---

I dare you to take the offer that Randylane_pilot@yahoo.com has presented, or at least to prove the world wind mill community wrong, place the wind mill in a certified site that has the data available to examine clearly un-altered .

Many of us will believe that such demonstration will be not be available -- EVER !!

Nando

----- Original Message -----
From: David
To: 'Michael Klemen' ; small-wind-home@yahoogroups.com
Sent: Monday, March 21, 2011 6:53 PM
Subject: RE: [s-w-h] Article on DyoCore

Exhibit 66

Hi Michael, hope you are well. Yes I answered your questions and posted the information directly to our site. As I mentioned I try to stay away from this blog as it has taken a wrong direction. A forum towards education and development support would be a stronger approach.

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Sent: Monday, March 21, 2011 10:19 AM
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Subject: RE: [s-w-h] Article on DyoCore

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> Tel: 405-364-4212
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Subject: Re: [s-w-h] CEC suspension

From: Michael Klemen (wind4energy@yahoo.com)

To: small-wind-home@yahoogroups.com;

Date: Wednesday, March 23, 2011 12:51 PM

Dan,

Your points are part of the stuff I talked with David about in a private conversation a month and a half ago.

You aren't the one doing the fuzzy math here.

The installation and the data don't jive at all. They make an interesting pass at the IEC standards in that document you referenced, however the basis for their data collection is entirely WRONG. They don't even have it on a site that would qualify for testing to the standards. That's the first egregious error that makes everything after that totally flawed. I explained it, and DyoCore doesn't care. But to the unknowledgeable consumer, it sure looks like a great paper.

Mike

--- On Wed, 3/23/11, buckvillian <danb@otherpower.com> wrote:

> From: buckvillian <danb@otherpower.com>
> Subject: Re: [s-w-h] CEC suspension
> To: small-wind-home@yahoogroups.com
> Date: Wednesday, March 23, 2011, 12:37 PM
> I really should get to work but I
> cannot help to add a bit more. I fret way too much
> about this small wind fantasy stuff, it keeps me up at night
> sometimes.
>

Exhibit 67

> >
> > It is not appropriate to try to leverage the CEC
> program to sustain your
> > business.
>
> Nor is it appropriate to dishonestly rate small turbines
> and lie about the performance. I've just been looking
> at the dyocore site a bit more and the .pdf that talks about
> actual installations and their performance. You folks
> either have really badly calibrated meters or you're just
> plain pulling numbers out of the air on this page:
> http://www.dyocore.com/material/IEC_Standard_61400-SolAir.pdf
> Or you've figured out some magic and if those power curves
> and 'actual measured' energy production figures are even
> half true... I want one of these machines!!! But I
> don't believe a word of it.
>
> > This presents quite a few problems and one of
> which everyone is
> > pointing a finger at DyoCore. We have thrived
> before the rebate program and
> > will do quite well after it.
>
> Anybody that tells folks want they 'want' to hear will
> thrive (at least until the customers come back to bite,
> which I hope they do in this case).
>
> > The solution is education towards applicable
> > wind conditions and the equipment applied to those
> conditions.
>
> We agree 100% on that bit.
> >
>
> > Companies like DyoCore will sustain long after any
> rebate program due to
> > demand of a solution that works for everyone, not one
> limited to a very very
> > small few.
>
> There is no small wind solution that works for everyone...

> but if you imply that there is, yes... I'm sure you can part
> lots of folks from their hard earned dollars and in some
> cases the government out of my tax dollars, which I hate to
> see wasted on this stuff.
>
> >
> > I encourage you to develop products that meet the
> market demand.
>
> I think you should be encouraged to develop products that
> produce real energy that is cost effective. If you
> really believe in this 'green' stuff, then you should be
> concerned that valuable resources are not wasted. You
> should be concerned that the 'people' have a realistic
> understanding of wind energy. Be part of the solution,
> not the problem.
>
> You keep saying the testing has been done - real results
> are in. I expect you are talking of this pdf: http://www.dyocore.com/material
/IEC_Standard_61400-SolAir.pdf
>
> Real quick... some math (correct me if I'm wrong). In
> 'figure 3' dyocore talks about cP.
> P=.5 x rho x A x V^3 x cP
> P is Watts
> rho (at sea level which you have corrected for =
> 1.23kg/m^3)
> A=m^2, in this case, for dyocore 1.13
> V=meters/sec
> I'll plug in Betz for cP (.593)
> so real quick lets go pick 2 of the data points.
>
> At 3.6 meters/sec (8.1mph), best you can do is 19 Watts.
> Figure 3 claims .41kW, or 410 Watts
> So beating the laws of physics just slightly by about
> 2158%
>
> On the high end, 8.8m/s (or 19.6mph)
> Figure 3 claims the output of the machine to be 1600
> Watts.
> Betz says a perfect wind turbine the size of dyocore could

> do 279 Watts.
> So at this speed the claimed output is slightly more
> realistic, only beating the laws of physics by about 573%,
>
> Is my math off, or is there a serious problem here?
> It is absolutely fair for any company that is clearly in
> competition with this sort of fantasy to complain loudly
> about it. It should be absolutely fair for any
> customer who buys a product based on such false stuff to
> demand their money back + some for wasted time and punitive
> damages in my opinion.
>
>
> >
> >
> >
> > From: small-wind-home@yahoogroups.com
> > [mailto:small-wind-home@yahoogroups.com]
> On Behalf Of hgengineer
> > Sent: Tuesday, March 22, 2011 10:23 PM
> > To: small-wind-home@yahoogroups.com
> > Subject: [s-w-h] CEC suspension
> >
> >
> >
> >
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> >
> >
> > Hello all,
> >
> > I'm developing a power point to address the CEC's
> suspension of the emerging
> > renewables program. Hopefully, this can speed up the
> process, because the
> > suspension has almost halted new business.
> > (Thank you very much, Dyocore.)
> >
> > I've developed some key points in the
> presentation(some listed below). If
> > you have any additional comments or suggestions, feel

> free to respond.
> >
> > The Problem
> >
> > >Turbine manufacturers claiming unreal production
> values (E.G.Dyocore)
> > >Turbines that constantly are plagued with failures
> and long shipment dates.
> > (E.G. Redriven, Century wind, etc.)
> > >Turbine manufacturers and installers claiming
> you'll "get your system
> > installed for $1".
> > >Turbine manufacturers and installers siting wind
> systems in ridiculous
> > locations.
> > (E.G. on roofs, near trees, some even on a measly 12'
> "poles")
> >
> > Revisions
> >
> > >Mandate that ALL CEC eligible turbines(that
> haven't done so already)
> > complete an approved two year duration test that
> monitors power
> > production/Structural integrity, wear and tear.
> >
> > >Mandate 30 meter wind data logging within "X"
> miles of proposed turbine
> > sites. We can't be reliant on 80 meter wind maps,
> every site is different.
> >
> > >Base rebate payments on VALIDATED power outputs at
> 25 mph(11m/s) wind
> > speed.
> > (Ex. Bergey produces 8200 watts @ 25 MPH, so $24,600
> rebate.
> > Xzeres produces 10,000 watts @ 25 MPH, so $30,000
> rebate.)
> >
> > >Require remediation by fraudulent turbine
> companies.

> > (Ahem, Dyocore...)
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> > >Ban ALL roof mounted turbines. (please, who can
> expect a nice, constant
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> > >Extend $3.00 per Watt rebate another year. With
> the money now saved, why
> > not?
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> > >Require warranty insurance for turbine companies
> under 3 years old.
> > (If we want a good name for our industry, we need to
> protect the consumer.)
> >
> > -Hunter Gasca
> >
> > Tech
> >
> > S.G.E.I.
> > Tel:(760) 885-9862
> > Hgengineer@... <mailto:Hgengineer%40gmail.com>
> >
> > SoCalWindandSolar.com
> >
> >
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Subject: Re: [s-w-h] CEC suspension

From: hgengineer (hgengineer@yahoo.com)

To: small-wind-home@yahoogroups.com;

Date: Wednesday, March 23, 2011 1:26 PM

No sir, what isn't appropriate is how your company has helped slow down not only my business, but all the other reputable installers/manufacturers like Gausti const. and Xzeres, to name a few.

And you're right, i'm leveraging the CEC to improve not only my business, but the hundreds of other reputable small wind installers/manufacturers in California.
I'm stating the facts, something which you and your company seem to have a hard time doing.

Perhaps if your product obeyed the laws of physics and wasn't mounted in such horrible conditions, you wouldn't have the small wind industry on your tail and people pointing fingers.

-Hunter

--- In small-wind-home@yahoogroups.com, "David" <dave@...> wrote:
>
> It is not appropriate to try to leverage the CEC program to sustain your
> business. This presents quite a few problems and one of which everyone is
> pointing a finger at DyoCore. We have thrived before the rebate program and
> will do quite well after it. The solution is education towards applicable
> wind conditions and the equipment applied to those conditions.
>
>
>
> It is unfortunate that a very few "manufacturers" have taken such a stance

Exhibit 68

> towards the suspension of the program. This is a great opportunity for the
> industry to re-address applicable conditions in which an appropriate turbine
> might apply.
>
>
>
> Companies like DyoCore will sustain long after any rebate program due to
> demand of a solution that works for everyone, not one limited to a very very
> small few. This inevitable will lead to greater resources towards
> applicable solutions and low wind efficiency improvement.
>
>
>
> I encourage you to develop products that meet the market demand.
>
>
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> [mailto:small-wind-home@yahoogroups.com] On Behalf Of hgengineer
> Sent: Tuesday, March 22, 2011 10:23 PM
> To: small-wind-home@yahoogroups.com
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> (Thank you very much, Dyocore.)
>
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> >Turbine manufacturers and installers claiming you'll "get your system
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> (E.G. on roofs, near trees, some even on a measly 12' "poles")
>
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> >Mandate 30 meter wind data logging within "X" miles of proposed turbine
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> (Ex. Bergey produces 8200 watts @ 25 MPH, so $24,600 rebate.
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> (Ahem, Dyocore...)
>
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> >Ban ANY turbine installation in areas where average wind speed falls below
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> yard ornaments.
>
> >Extend $3.00 per Watt rebate another year. With the money now saved, why
> not?
>
> >Require warranty insurance for turbine companies under 3 years old.
> (If we want a good name for our industry, we need to protect the consumer.)
>
> -Hunter Gasca
>

> Tech
>
> S.G.E.I.
> Tel:(760) 885-9862
> Hgengineer@... <mailto:Hgengineer%40gmail.com>
>
> SoCalWindandSolar.com
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Subject: RE: [s-w-h] Article on DyoCore

From: Michael Klemen (wind4energy@yahoo.com)

To: small-wind-home@yahoogroups.com; dave@dyocore.com;

Date: Sunday, March 27, 2011 9:18 AM

David,

When I look at:

http://www.smallwindcertification.org/certified_turbines.html

It does not show the DyoCore wind turbine to even be in a pending status with the SWCC. In your response to my email you stated:

"We are working with the SWCC towards certification."

So, can you explain what you meant when you're working with the SWCC towards certification? It doesn't appear that DyoCore has even applied.

Thanks,
Mike

From: small-wind-home@yahoogroups.com [mailto:small-wind-home@yahoogroups.com] On Behalf Of Michael Klemen
Sent: Monday, March 21, 2011 10:19 AM
To: small-wind-home@yahoogroups.com
Subject: RE: [s-w-h] Article on DyoCore David,

I have to totally disagree with you on Mike Bergey's professionalism. In my opinion, it is you that has shown no restraint and lack of professionalism.

Mike Bergey is not threatened by DyoCore. It is the entire small wind industry that he has been part of for decades that is threatened. When a product that

Exhibit 69

cannot deliver on its promises is sold, that makes all similar products look bad. When that product is purchased with taxpayer money, it makes the entire industry look bad. DyoCore wasn't in business back in the '80's (I think) when Federal Tax money was spent on small wind energy. The aftermath of those first subsidies nearly destroyed the industry.

David, you and I carried on a private conversation about DyoCore's turbine and the lack of quality data and how out of sorts your web site is with reality. It was absolutely clear to me that DyoCore really doesn't know what they're doing with performance measurement. You never addressed the discrepancies in the data that I pointed out. You only wanted me to come to your site and see one in action. Seeing one in action doesn't change anything. Based on all of the data that Dyocore made available, there is no need for me to come to your site. DyoCore needs to learn more and get their message to be consistent with reality. Some of the comments on the article are exactly the same things that I said to you.

Here's something DyoCore can do. Get this turbine certified by the SWCC. That will separate the wheat from the chaff, and we'll see where things stand. I'll get off my soap box. I promise. In fact, I bet Mike Bergey and everybody else will quit complaining about DyoCore. Why? Because the issues with the data will be addressed by the certification. DyoCore would then be held accountable for its marketing materials - and they would then be comparable to every other certified turbine in the industry.

It's sad to me that with so many people explaining such basic things about wind energy to DyoCore, that it's been totally ignored. There are people in the industry that know what they're talking about - if DyoCore would only listen.

I understand DyoCore wants to believe in themselves and their product, but there should come a time even in the believer's mind that a good reality check is not

a bad thing. It could save a lot of effort, a lot of
money, some credibility, and maybe even a company.

Lastly, I'll quote you: "If anyone would like to take
a more formal approach to learning about DyoCore, our
vision, objectives and development"

I'd like so see DyoCore take a formal approach to
providing the correct facts about it's turbine.
Marketing should be 2nd place to factual information.

Sincerely,
Mike Klemen

--- On Mon, 3/21/11, David <dave@dyocore.com> wrote:

> From: David <dave@dyocore.com>
> Subject: RE: [s-w-h] Article on DyoCore
> To: "'Mike Bergey'" <mbergey@bergey.com>, small-wind-home@yahoogroups.com
> Date: Monday, March 21, 2011, 7:45 AM
> It's very unfortunate Mr. Bergey
> feels very threatened by DyoCore. I regret
> he has not shown any professionalism or restraint.
> His stance is bias
> against low wind and even more bias against products that
> demonstrate how
> overpriced his own product is in
> comparison. If anyone would like to take
> a more formal approach to learning about DyoCore, our
> vision, objectives and
> development please contact me directly at anytime. We
> have worked very hard
> over these past several years to make small wind
> affordable, practical and
> reliable for the average homeowner. It is not a small
> accomplishment and we
> have a long way to go.
>
>
>
> DyoCore has a great relationship with the CEC and is

> working with the CEC to
> hopefully qualify installations of our product in the
> future. Unfortunately
> products like Bergy only represent less than 1% of all
> Californians in
> possibly of application and less than maybe a tenth of that
> in
> affordability. Until SolAir the average
> homeowner, who also funds the
> program, couldn't afford or get permitting for a
> solution. Over the past
> year we have changed this dramatically and now allow the
> program to
> represent a significantly broader base of the very
> residents that fund the
> program. It's our goal within the next year to double
> that list.
>
>
>
> We are working aggressively with many industry leaders in
> making Small Wind
> a very real and viable solution. DyoCore has
> accomplished more than any
> other wind manufacturer in CA, hopefully with greater
> resources and
> professional assistance we can continue to make small wind
> a real solution.
>
>
>
> To learn more about DyoCore, www.dyocore.com
>
>
>
> Best wishes,
>
>
>
> David Raine
>

> dave@dyocore.com
>
> www.dyocore.com
>
>
>
> From: small-wind-home@yahoogroups.com
> [mailto:small-wind-home@yahoogroups.com]
> On Behalf Of Mike Bergey
> Sent: Monday, March 21, 2011 4:17 AM
> To: small-wind-home@yahoogroups.com
> Subject: [s-w-h] Article on DyoCore
>
>
>
>
>
> We've discussed DyoCore on this listserv. The following
> article covers
> DyoCore's crashing the CEC rebate program. Be sure to read
> the comments.
>
> http://www.greentechmedia.com/articles/read/have-small-wind-manufacturers-ex
> ploited-loopholes-in-california-rebates/
>
> I believe there's a follow-on article in the works.
>
> Mike Bergey
> President
> Bergey Windpower Co.
> 2200 Industrial Blvd.
> Norman, OK 73069 USA
> Tel: 405-364-4212
> Fax: 405-364-2078
> E-mail: mbergey@bergey.com
> <mailto:mbergey%40bergey.com>
> Web Site: www.bergey.com
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> [Non-text portions of this message have been removed]
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Subject: Re: [s-w-h] Article on DyoCore

From: David Raine (dave@dyocore.com)

To: wind4energy@yahoo.com;

Date: Sunday, March 27, 2011 11:49 AM

We have spoke to them several times, unfortunately they are still in their own development stages, the industry still has not adopted guidelines towards formal testing. Within the next few months hopefully they will have some general direction. We are working with TUV, how has formally tested many turbines. Out us TUV lab has reached out to the Ireland Lab towards certification at their facility.

What is it specifically you are looking for? Contacting the SWCC will verify we are speaking with them and working on a program. It will also verify they have not yet formally tested any turbine but are working towards a program. Hopefully we can participate in this program if it is independent. But I think you knew this and maybe that was not your question.

I recently posted a blog, www.Dyocore.com, that overviews these barriers in a formal process. And the unfortunate position it puts both manufacturers and buyers in.

This blog is continuing to be more of a complaint box than a resolution to the problems the industry faces. Maybe a better focus would be to use all this talent to create a formal process and guidelines. A basic consumer guide. One that provides education for both sides.

There are plenty of good products on the market, but all have their problems, some cost, some performance, some mgf support, and some permitting. Matching a turbine to your specific needs is a mind bending task but one that could be simplified with some guidance.

At DyoCore we would like to be part of a process that provides solutions and education to the consumers, I would personally be very happy to assist towards this direction.

David Raine
760-580-4271

On Mar 27, 2011, at 7:18 AM, Michael Klemen <wind4energy@yahoo.com> wrote:

> David,

Exhibit 70

When I look at:

http://www.smallwindcertification.org/certified_turbines.html

It does not show the DyoCore wind turbine to even be in a pending status with the SWCC. In your response to my email you stated:

"We are working with the SWCC towards certification."

So, can you explain what you meant when you're working with the SWCC towards certification? It doesn't appear that DyoCore has even applied.

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> Fax: 405-364-2078
> E-mail: mbergey@bergey.com
> <mailto:mbergey%40bergey.com>
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Messages in this topic (**5**)

RECENT ACTIVITY:

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___,__.__,_____

Subject: Re: [s-w-h] Article on DyoCore

From: Michael Klemen (wind4energy@yahoo.com)

To: dave@dyocore.com;

Date: Sunday, March 27, 2011 11:53 AM

Dave,

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Exhibit 71

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760-580-4271

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From: David Raine (dyocore@gmail.com)

To: wind4energy@yahoo.com; dave@dyocore.com;

Date: Sunday, March 27, 2011 12:59 PM

You are welcome to view and comment directly to our site. I would enjoy working towards productive solutions.

Sent from my Windows Phone

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Exhibit 72

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___,_._,___

Subject: RE: [s-w-h] Article on DyoCore

From: Michael Klemen (wind4energy@yahoo.com)

To: dave@dyocore.com;

Date: Sunday, March 27, 2011 2:09 PM

Davd,

You said:

"I would enjoy working towards productive solutions."

How about in the public forum so I don't have to repeat myself?

Thanks,
Mike

Sent from my Windows Phone

From: Michael Klemen
Sent: Sunday, March 27, 2011 9:53 AM
To: David Raine
Subject: Re: [s-w-h] Article on DyoCore

Dave,

Please post to the discussion list. I have some answers for you.

Mike

--- On **Sun, 3/27/11, David Raine** ***<dave@dyocore.com>*** wrote:

From: David Raine <dave@dyocore.com>
Subject: Re: [s-w-h] Article on DyoCore
To: "Michael Klemen" <wind4energy@yahoo.com>
Date: Sunday, March 27, 2011, 11:49 AM

We have spoke to them several times, unfortunately they are still in their own development stages, the industry still has not adopted guidelines towards formal testing. Within the next few months hopefully they will have some general direction. We are working with TUV, how has formally tested many turbines. Out us TUV lab has reached out to the Ireland Lab towards certification at their facility.

Exhibit 73

What is it specifically you are looking for? Contacting the SWCC will verify we are speaking with them and working on a program. It will also verify they have not yet formally tested any turbine but are working towards a program. Hopefully we can participate in this program if it is independent. But I think you knew this and maybe that was not your question.

I recently posted a blog, www.Dyocore.com, that overviews these barriers in a formal process. And the unfortunate position it puts both manufacturers and buyers in.

This blog is continuing to be more of a complaint box than a resolution to the problems the industry faces. Maybe a better focus would be to use all this talent to create a formal process and guidelines. A basic consumer guide. One that provides education for both sides.

There are plenty of good products on the market, but all have their problems, some cost, some performance, some mgf support, and some permitting. Matching a turbine to your specific needs is a mind bending task but one that could be simplified with some guidance.

At DyoCore we would like to be part of a process that provides solutions and education to the consumers, I would personally be very happy to assist towards this direction.

David Raine
760-580-4271

On Mar 27, 2011, at 7:18 AM, Michael Klemen <wind4energy@yahoo.com> wrote:

> David,
>
> When I look at:
>
> http://www.smallwindcertification.org/certified_turbines.html
>
> It does not show the DyoCore wind turbine to even be in a pending status with the SWCC. In your response to my email you stated:
>
> "We are working with the SWCC towards certification."
>
> So, can you explain what you meant when you're working with the SWCC towards certification? It doesn't appear that DyoCore has even applied.
>
> Thanks,
> Mike

From: small-wind-home@yahoogroups.com [mailto:small-wind-home@yahoogroups.com] **On Behalf Of** Michael Klemen
Sent: Monday, March 21, 2011 10:19 AM
To: small-wind-home@yahoogroups.com
Subject: RE: [s-w-h] Article on DyoCore

David,

I have to totally disagree with you on Mike Bergey's professionalism. In my opinion, it is you that has shown no restraint and lack of professionalism.

Mike Bergey is not threatened by DyoCore. It is the entire small wind industry that he has been part of for decades that is threatened. When a product that cannot deliver on its promises is sold, that makes all similar products look bad. When that product is purchased with taxpayer money, it makes the entire industry look bad. DyoCore wasn't in business back in the '80's (I think) when Federal Tax money was spent on small wind energy. The aftermath of those first subsidies nearly destroyed the industry.

David, you and I carried on a private conversation about DyoCore's turbine and the lack of quality data and how out of sorts your web site is with reality. It was absolutely clear to me that DyoCore really doesn't know what they're doing with performance measurement. You never addressed the discrepancies in the data that I pointed out. You only wanted me to come to your site and see one in action. Seeing one in action doesn't change anything. Based on all of the data that Dyocore made available, there is no need for me to come to your site. DyoCore needs to learn more and get their message to be consistent with reality. Some of the comments on the article are exactly the same things that I said to you.

Here's something DyoCore can do. Get this turbine certified by the SWCC. That will separate the wheat from the chaff, and we'll see where things stand. I'll get off my soap box. I promise. In fact, I bet Mike Bergey and everybody else will quit complaining about DyoCore. Why? Because the issues with the data will be addressed by the certification. DyoCore would then be held accountable for its marketing materials - and they would then be comparable to every other certified

turbine in the industry.

It's sad to me that with so many people explaining such basic things about wind energy to DyoCore, that it's been totally ignored. There are people in the industry that know what they're talking about - if DyoCore would only listen.

I understand DyoCore wants to believe in themselves and their product, but there should come a time even in the believer's mind that a good reality check is not a bad thing. It could save a lot of effort, a lot of money, some credibility, and maybe even a company.

Lastly, I'll quote you: "If anyone would like to take a more formal approach to learning about DyoCore, our vision, objectives and development"

I'd like so see DyoCore take a formal approach to providing the correct facts about it's turbine. Marketing should be 2nd place to factual information.

Sincerely,
Mike Klemen

--- On Mon, 3/21/11, David <dave@dyocore.com> wrote:

> From: David <dave@dyocore.com>
> Subject: RE: [s-w-h] Article on DyoCore
> To: "'Mike Bergey'" <mbergey@bergey.com>, small-wind-home@yahoogroups.com
> Date: Monday, March 21, 2011, 7:45 AM
> It's very unfortunate Mr. Bergey
> feels very threatened by DyoCore. I regret
> he has not shown any professionalism or restraint.
> His stance is bias
> against low wind and even more bias against products that
> demonstrate how
> overpriced his own product is in
> comparison. If anyone would like to take
> a more formal approach to learning about DyoCore, our
> vision, objectives and
> development please contact me directly at anytime. We
> have worked very hard
> over these past several years to make small wind
> affordable, practical and
> reliable for the average homeowner. It is not a small
> accomplishment and we

> have a long way to go.
>
>
>
> DyoCore has a great relationship with the CEC and is
> working with the CEC to
> hopefully qualify installations of our product in the
> future. Unfortunately
> products like Bergy only represent less than 1% of all
> Californians in
> possibly of application and less than maybe a tenth of that
> in
> affordability. Until SolAir the average
> homeowner, who also funds the
> program, couldn't afford or get permitting for a
> solution. Over the past
> year we have changed this dramatically and now allow the
> program to
> represent a significantly broader base of the very
> residents that fund the
> program. It's our goal within the next year to double
> that list.
>
>
>
> We are working aggressively with many industry leaders in
> making Small Wind
> a very real and viable solution. DyoCore has
> accomplished more than any
> other wind manufacturer in CA, hopefully with greater
> resources and
> professional assistance we can continue to make small wind
> a real solution.
>
>
>
> To learn more about DyoCore, www.dyocore.com
>
>
>
> Best wishes,
>
>
>
> David Raine
>
> dave@dyocore.com
>

> www.dyocore.com
>
>
>
> From: small-wind-home@yahoogroups.com
> [mailto:small-wind-home@yahoogroups.com]
> On Behalf Of Mike Bergey
> Sent: Monday, March 21, 2011 4:17 AM
> To: small-wind-home@yahoogroups.com
> Subject: [s-w-h] Article on DyoCore
>
>
>
>
>
> We've discussed DyoCore on this listserv. The following
> article covers
> DyoCore's crashing the CEC rebate program. Be sure to read
> the comments.
>
> http://www.greentechmedia.com/articles/read/have-small-wind-manufacturers-ex
> ploited-loopholes-in-california-rebates/
>
> I believe there's a follow-on article in the works.
>
> Mike Bergey
> President
> Bergey Windpower Co.
> 2200 Industrial Blvd.
> Norman, OK 73069 USA
> Tel: 405-364-4212
> Fax: 405-364-2078
> E-mail: mbergey@bergey.com
> <mailto:mbergey%40bergey.com>
> Web Site: www.bergey.com
>
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___,_._,___

Subject: RE: [s-w-h] TLG Wind Turbines, Possible Scam

From: Michael Klemen (wind4energy@yahoo.com)

To: small-wind-home@yahoogroups.com;

Date: Wednesday, April 6, 2011 5:42 PM

David,

This question is very easily answered. The power in the wind is:

P = 0.5 * air density * Area * V^3.

The Betz limit is 59.6% of that quantity.

For simplicity's sake, I tabulated this many years ago here:

http://www.ndsu.edu/ndsu/klemen/Perfect_Turbine.htm

If you go to the TLG web site for the 75" turbine

http://www.tlgwindpower.com/images/newgen/TLG_1800_GT_Output.jpg

You see they tell us at 25 mph, they expect to get 1172 watts.

Going back to my perfect turbine page, at 25 mph, you see that the Betz limit shows 46.06 watts per square foot. Their turbine is 30.67 ft^2. 46.06 x 30.67 = 1412 watts. While under Betz, it is very optimistic. A very good turbine (the last column in that graph) would perhaps get 27.3 W/ft^2, or 837 watts of output.

At 15 mph, they claim to produce 254 watts, the Betz limit shows a limit of 305 watts...again, extremely optimistic because the best turbines could perhaps produce 181 watts.

While within Betz, it is entirely doubtful. Their output graph, for example, really does not show an understanding of how

Exhibit 74

the wind blows. The standards do not calculate energy that way. It is intended either to deceive (probably not) or simply show that they don't understand the reality of wind energy. Wind energy for a year at 30 mph is totally irrelevant for probably 99.99% of the population. And their wind energy for a year calculation is simply the energy in the wind at X mph multipled by the time in a year. It shows nothing of a wind distribution. So in that sense, they are probably doing themselves a disservice. There will be more energy in the wind with an average wind speed of 10 mph given a wind speed distribution than the energy in a constant 10 mph wind.

You statement: "Surface area might but this could be put into the equation." Is entirely out of place. Betz has absolutely nothing to do with surface area.

Mike

--- On Wed, 4/6/11, David Raine <dave@dyocore.com> wrote:

> From: David Raine <dave@dyocore.com>
> Subject: RE: [s-w-h] TLG Wind Turbines, Possible Scam
> To: "'hgengineer'" <hgengineer@yahoo.com>, small-wind-home@yahoogroups.com
> Date: Wednesday, April 6, 2011, 3:24 PM
> Hi Hunter,
>
>
>
> Can you send or publish the formula and results you used in
> making this
> assumption pertaining Betz? I'm showing they are well
> within Betz. "blade
> lift" would not have anything to do with Betz.
> Surface area might but this
> could be put into the equation. Honeywell's published
> material is very
> similar with a smaller blade radius at 60" (1500w at
> 31mph). I'm thinking a
> billion dollar company wouldn't make too many mistakes on
> their data.

>
>
>
> David Raine
>
> DyoCore
>
> dyo_gr_lgo
> www.dyocore.com
>
> p&f. 866-404-2428
>
> c. 760-580-4271
>
> dave@dyocore.com
>
>
>
> From: small-wind-home@yahoogroups.com
> [mailto:small-wind-home@yahoogroups.com]
> On Behalf Of hgengineer
> Sent: Saturday, April 02, 2011 7:30 PM
> To: small-wind-home@yahoogroups.com
> Subject: [s-w-h] TLG Wind Turbines, Possible Scam
>
>
>
>
>
> Just wanted to let everyone know that I saw a TLG wind
> turbine at our local
> home show. Reminds me of DyoCore, same alternator, same
> aluminum blades, but
> it has a tail. The seller promises the system costs 1
> dollar after the CEC
> rebates (6 turbines for a 10kW system).Anything "free"
> seems too good to be
> true. I am really getting sick of these "turbines".
>
> Here are the "specs"-
>

> Rotor diameter is 75 inches, or roughly 2 meters. Claims
> 1800 watts at 30
> mph. I confronted the seller, showed him Betz Law with the
> figures plugged
> in (I got 1600 watts with a Cp of 59.3%)and he said Betz
> law doesn't apply
> because the blades have some sort of special "lift". I call
> BS.
>
> What do you guys think? Have you heard of TLG? Any testing
> on these things?
>
> -Hunter
>
>
>
>
>
> [Non-text portions of this message have been removed]
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Subject: RE: [s-w-h] Re: How is generating capacity measured?

From: David Raine (dave@dyocore.com)

To: wind4energy@yahoo.com;

Date: Monday, July 25, 2011 5:06 PM

Hi Michael,

We have spoke in the past and I appreciate your experience within the industry. After your post I found some information on AWP turbines and it looks like you have done some discovery with them.

Would you be interested in assisting us in a similar objective. We would like to get a good resource to take a look at our turbine not just as a standalone but configured with 2 to 4 units. Though we have lots of data we really don't have the experience base to know what to do with it or even how to test according to standards that might provide a good baseline of expectations.

We have learned quite a bit this past year and as we learn more we find we are in dire need of some professional assistance especially in continuing our objectives towards making small wind work for the urban market.

Though it is my understanding that testing directly on a roof top is not an intended "standard" for testing, however, this is our application. Unfortunately it's a very daunting one in which we know our results are going to be subject to substantial limitations of the site that include the mount surface itself. However, it's our objective to provide our customers with a very realistic expectation of performance based on common residential conditions.

We have recently had some of our distributors do some pole mounted applications and have some very good data from these applications, we looking at setting up a similar "controlled" test and applying your testing knowledge/advice to our test site to make sure we have some solid baseline data that we can depend on.

Thank you for your consideration and in any event, thank you for keeping the group open to the further development of these types of solutions that apply to a broader base of alternative energy users.

David Raine

DyoCore

Exhibit 75

www.dyocore.com

p&f. 866-404-2428

c. 760-580-4271

dave@dyocore.com

From: small-wind-home@yahoogroups.com [mailto:small-wind-home@yahoogroups.com] **On Behalf Of** Michael Klemen
Sent: Monday, July 25, 2011 11:03 AM
To: small-wind-home@yahoogroups.com
Subject: Re: [s-w-h] Re: How is generating capacity measured?

Doug,

You say that I am using 4 oddball turbines. Hmmm. The turbines are what they are. You're trying to rationalize the turbines to being the same, and I think that's missing the boat a little.

The manufacturer can do as they please, and I'm OK with that.

There's nothing wrong with the Bergey's pultruded blades. That is how they chose to design them. That is a factor in how the overall machine performs. I don't consider it a negative. As

a designer, sure you could get better performance with a different

blade, but at what cost? The manufacturer chose this over other

options. That does not make it bad. The fact is, it's still flying and other turbines I have flown are not. If all of the

parts of a turbine work well together, that's what matters most.

It almost sounds like you're saying the AWP is bad for having a

small generator and governing early. That's the thing I like

the MOST about it. I love that turbine for that reason. I can

count on energy every day off of it. I don't rely on the peak

winds to generate energy. It looks like you were trying to

rationalize it down to the capacity factor level of other

turbines. I don't see a need to do that. In this case, the
manufacturer had options, and this is what they chose to do.
As with the Bergey, it is still flying.

To suggest something is working harder and that it will have a

shorter life doesn't make sense to me. It's all in the design.

The AWP was designed for this. It isn't a fatal flaw. It's

not like putting a small engine in a big car...it's saying

simply when the wind is blowing hard, I'm not going to be

greedy. I am not trying to capture the most energy...I'm

going to take a little piece of the action, and protect myself.

In your case, you add more swept area to your turbine by going

3-D. That's just your choice as a manufacturer. As a consumer,

it isn't good or bad. It's just your design choice. If I don't

like the result, I don't have to buy it, but I certainly won't

be telling you to change it!

In all honesty, I wish there were more turbines like the AWP!
It could be a huge selling point for small wind. Small wind
could be the grid-friendliest renewable energy arena

available (with the exception of hydro).

Mike

From: Doug <doug@selsam.com>
To: small-wind-home@yahoogroups.com
Sent: Friday, July 22, 2011 7:29 PM
Subject: [s-w-h] Re: How is generating capacity measured?

OK well since this IS a small wind discussion, I will let you win that one... but only on a technicality of your throwing in oddball turbines (like I should talk about "oddball" turbines...).
BUT
Note that the two "normal" turbines exhibit capacity factors of 19% for one with proper tapered and twisted blades, and 16.8% for the one with pultruded, but still adequate blades. Put regular blades on the Bergey and

you would have 19% capacity factor for both turbines.

I was talking about normal turbines. In the small turbine world there are a lot of rules broken, since individuals are more tolerant of, or unaware of, bad performance, than big companies with bean-counters and investors to answer to.

The AWP is specifically configured with a small generator relative to the larger swept area and a solid, early furling regimen that keeps it from destroying itself despite the small generator.
They then claim a lower peak output, and so the capacity factor is higher, mostly by proclamation. Kind of like putting a smaller engine in your car - of course it will have to work that much harder. But will the car last longer? Is it then suddenly a better designed vehicle? Or are they just stretching the rules and playing with words and statistics? Put a larger generator on that AWP and it, too will have the same capacity factor as the others. And if we are talking about windfarms, the turbines are a lot more similar.

Throwing in an Air-X is interesting, but as you point out, it governs using electronic stall control, which, in order to avoid a runaway overspeed rotor and a burned out alternator, must govern way too early and often (like voting?), since it only takes ONE runaway event to smoke the turbine (I hate when that happens...).

If a turbine is deficient in design, of course part of that sucking sound may be a lower capacity factor, but I'm not talking about abberant machines, or machines that stretch sensible design parameters, I'm just talking about turbines that are, well, just normal.

Place 4 "normal" turbines together, even small ones, and your capacity factors will be much more similar than when you have a couple of oddball turbines way different from the rest.

Put those 4 normal turbines in Manhattan and your capacity factor will be low. Put them in your yard or mine and they will be high. That is any of them, or all of them.

Swap out regular blades for a straight profile nontapered, nontwisted blade and of course you are going to lose a few percent output. Stall the machine by shortiung it out at the first hint of wind and you will stay safe and have a very low capacity factor. Then again, it's only the alleged high peak rating from which this is extrapolated. Is the cited peak output realistic? Especially if that "peak" level is just barely possible and mostly avoided?

:)
Doug S.

--- In small-wind-home@yahoogroups.com, Michael Klemen <wind4energy@...> wrote:
>
> Doug,
>
> Capacity factor is a lousy way to try to compare sites or turbines.
>
> From:
>
>
> http://www.ndsu.edu/ndsu/klemen/Wind_Turbines_Home.htm
>
> You can see that the capacity factor of my different
> turbines is:
>

> Air-X:ï¿½ï¿½ï¿½ 5.8%
> WT 2500: 19.0%
> AWP 3.6: 28.6%
> XL.1:ï¿½ï¿½ï¿½ 16.8%
>
> You said:
>
> "Contrarily, at the same site, capacity factor varies NARROWLY by model."
> Well, if you talk about CF of 23% to be narrow, I guess you're right!
>
>
> You also said:
>
> "Now put them in a site with very high winds: They will ALL exhibit
>
> a higher capacity factor."
>
> That is not a truthful blanket statement.ï¿½ With very high winds, governing
> will come into play.ï¿½ Peak power isn't maintained, so CF will drop off if
> the wind speed gets too high.
> I stand by the data.ï¿½ CF is a lousy way to classify a site,
> and it's a poor way to compare turbines.ï¿½
>
> Mike
>
>
>
>
> _____
> From: Doug <doug@...>
> To: small-wind-home@yahoogroups.com
> Sent: Thursday, July 21, 2011 11:43 AM
> Subject: [s-w-h] Re: How is generating capacity measured?
>
> Hi Mike:
> Thanks for attempting to correct my statement, but I do not think your statement is true:
> What you said was: "the capacity factor of a turbine is
> > > more a result of the turbine than the site."
>
> That was in reply to my statement that the numbering of windclasses might be replaced by a typical capacity factor figure, for each site.
>
> My statement was based on the realization that most utility-scale turbines, and really most turbines in common use, are designed for economical energy capture within the range of wind speeds where economical energy capture is possible.
>
> Given the choice of commercially-available turbines, one could pick any brand, say a G.E. or a Vestas, a Suzlon, or a Siemens, install them all side-by-side at a windfarm, and you'd find that they would all exhibit a similar capacity factor, within a few percentage points, at the same site.
>
> Now put any of them, or all of them, at a site with low winds:ï¿½ you'll see a lower capacity factor for all.

>
> Now put them in a site with very high winds: They will ALL exhibit a higher capacity factor.
>
> The capacity factor of the same turbine can vary WIDELY depending on the site, certainly much more than a few percentage points.
> Contrarily, at the same site, capacity factor varies NARROWLY by model.
>
> So, capacity factor can vary a few percentage points, depending on model and brand, at a given site.ï¿½ And capacity factor can vary from zero to 100% for the same turbine at different sites.
>
> Therefore the capacity factor varies more with the site than with the model.
>
> Therefore the site is more determinant of capacity factor than the specific turbine.
>
> From your statement, that it's the turbine, not the site, that mostly determines capacity factor, we'd install the same model of turbine, say a G.E. 1.5 MW machine, in low wind sites, medium wind sites, and high wind sites, and all would exhibit a similar capacity factor.
> That would be the result of your statement, if it were true.
>
> Clearly this is wrong.ï¿½ Clearly, the same turbine in a low wind site will have a low capacity factor, and that same turbine installed in a medium wind site will have a medium capacity factor, and that same turbine installed in a high wind site will have a high capacity factor.
>
> To summarize:
> All mainstream brands will produce similar capacity factors at similar windclass sites.
> Any of these same turbines will produce widely different capacity factors, at sites having widely different wind classes.
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> The correlation is so high that I believe it might be more instructive to call out the windclasses by capacity factor.
>
> Was that any clearer?
>
> Doug S.
>
>
> --- In small-wind-home@yahoogroups.com, Michael Klemen <wind4energy@> wrote:
> >
> > Doug,
> >
> > Would you like to put that back into context?ï¿½ You said:
> >
> > "Rather than numbering the wind classes 1-7, maybe we should name them by capacity factor."
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> > From: Doug <doug@>
> > To: small-wind-home@yahoogroups.com
> > Sent: Tuesday, July 19, 2011 1:33 PM
> > Subject: [s-w-h] Re: How is generating capacity measured?
> >
> > Mike K.:
> > Really? OK what's the capacity factor of a Whisper 100?
> > Doug S.
> >
> > Michael Klemen <wind4energy@> wrote:
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> >
> > ==========
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> > ----------
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> > ï¿½ http://www.yahoogroups.com/list/small-wind-home .ï¿½
> > . An FAQ on small wind systems is located at
> > ï¿½ http://www.ndsu.nodak.edu/ndsu/klemen .
> >
> > ---
> > Yahoo! Groups Links
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> > [Non-text portions of this message have been removed]
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[Non-text portions of this message have been removed]

__.__.____

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Messages in this topic **(22)**

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- **New Members 5**

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__,__.__,____

Subject: Re: [s-w-h] Re: How is generating capacity measured?

From: Michael Klemen (wind4energy@yahoo.com)

To: dave@dyocore.com;

Date: Wednesday, July 27, 2011 11:26 PM

Hi David,

Seeing as how I am now on the Certification Commission for the SWCC, it would be a conflict of interest for me to do any testing for a company that may bring their product to us for certification.

Sincerely,
Mike

From: David Raine <dave@dyocore.com>
To: 'Michael Klemen' <wind4energy@yahoo.com>
Sent: Monday, July 25, 2011 5:06 PM
Subject: RE: [s-w-h] Re: How is generating capacity measured?

Hi Michael,

We have spoke in the past and I appreciate your experience within the industry. After your post I found some information on AWP turbines and it looks like you have done some discovery with them.

Would you be interested in assisting us in a similar objective. We would like to get a good resource to take a look at our turbine not just as a standalone but configured with 2 to 4 units. Though we have lots of data we really don't have the experience base to know what to do with it or even how to test according to standards that might provide a good baseline of expectations.

We have learned quite a bit this past year and as we learn more we find we are in dire need of some professional assistance especially in continuing our objectives towards making small wind work for the urban market.

Though it is my understanding that testing directly on a roof top is not an intended "standard" for testing, however, this is our application. Unfortunately it's a very daunting one in which we know our results are going to be subject to substantial limitations of the site that include the mount surface itself. However, it's our objective to provide our customers with a very realistic expectation of performance based on common residential conditions.

We have recently had some of our distributors do some pole mounted applications and have some very good data from these applications, we looking at setting up a similar "controlled" test and applying your testing knowledge/advice to our test site to make sure we have some solid baseline data that we can depend on.

Thank you for your consideration and in any event, thank you for keeping the group open to the further development of these types of solutions that apply to a broader base of alternative energy users.

Exhibit 76

David Raine
DyoCore
www.dyocore.com
p&f. 866-404-2428
c. 760-580-4271
dave@dyocore.com

From: small-wind-home@yahoogroups.com [mailto:small-wind-home@yahoogroups.com] **On Behalf Of** Michael Klemen
Sent: Monday, July 25, 2011 11:03 AM
To: small-wind-home@yahoogroups.com
Subject: Re: [s-w-h] Re: How is generating capacity measured?

Doug,

You say that I am using 4 oddball turbines. Hmmm. The turbines are what they are. You're trying to rationalize the turbines to being the same, and I think that's missing the boat a little.

The manufacturer can do as they please, and I'm OK with that.

There's nothing wrong with the Bergey's pultruded blades. That is how they chose to design them. That is a factor in how the overall machine performs. I don't consider it a negative. As

a designer, sure you could get better performance with a different

blade, but at what cost? The manufacturer chose this over other

options. That does not make it bad. The fact is, it's still flying and other turbines I have flown are not. If all of the

parts of a turbine work well together, that's what matters most.

It almost sounds like you're saying the AWP is bad for having a

small generator and governing early. That's the thing I like

the MOST about it. I love that turbine for that reason. I can

count on energy every day off of it. I don't rely on the peak winds to generate energy. It looks like you were trying to

rationalize it down to the capacity factor level of other

turbines. I don't see a need to do that. In this case, the manufacturer had options, and this is what they chose to do. As with the Bergey, it is still flying.

To suggest something is working harder and that it will have a

shorter life doesn't make sense to me. It's all in the design.

The AWP was designed for this. It isn't a fatal flaw. It's

not like putting a small engine in a big car...it's saying

simply when the wind is blowing hard, I'm not going to be

greedy. I am not trying to capture the most energy...I'm

going to take a little piece of the action, and protect myself.

In your case, you add more swept area to your turbine by going

3-D. That's just your choice as a manufacturer. As a consumer,

it isn't good or bad. It's just your design choice. If I don't

like the result, I don't have to buy it, but I certainly won't

be telling you to change it!

In all honesty, I wish there were more turbines like the AWP! It could be a huge selling point for small wind. Small wind could be the grid-friendliest renewable energy arena

available (with the exception of hydro).

Mike

From: Doug <doug@selsam.com>
To: small-wind-home@yahoogroups.com
Sent: Friday, July 22, 2011 7:29 PM
Subject: [s-w-h] Re: How is generating capacity measured?

OK well since this IS a small wind discussion, I will let you win that one... but only on a technicality of your throwing in oddball turbines (like I should talk about "oddball" turbines...).
BUT
Note that the two "normal" turbines exhibit capacity factors of 19% for one with proper tapered and twisted blades, and 16.8% for the one with pultruded, but still adequate blades. Put regular blades on the Bergey and you would have 19% capacity factor for both turbines.

I was talking about normal turbines. In the small turbine world there are a lot of rules broken, since individuals are more tolerant of, or unaware of, bad performance, than big companies with bean-counters and

investors to answer to.

The AWP is specifically configured with a small generator relative to the larger swept area and a solid, early furling regimen that keeps it from destroying itself despite the small generator.
They then claim a lower peak output, and so the capacity factor is higher, mostly by proclamation. Kind of like putting a smaller engine in your car - of course it will have to work that much harder. But will the car last longer? Is it then suddenly a better designed vehicle? Or are they just stretching the rules and playing with words and statistics? Put a larger generator on that AWP and it, too will have the same capacity factor as the others. And if we are talking about windfarms, the turbines are a lot more similar.

Throwing in an Air-X is interesting, but as you point out, it governs using electronic stall control, which, in order to avoid a runaway overspeed rotor and a burned out alternator, must govern way too early and often (like voting?), since it only takes ONE runaway event to smoke the turbine (I hate when that happens...).

If a turbine is deficient in design, of course part of that sucking sound may be a lower capacity factor, but I'm not talking about abberant machines, or machines that stretch sensible design parameters, I'm just talking about turbines that are, well, just normal.

Place 4 "normal" turbines together, even small ones, and your capacity factors will be much more similar than when you have a couple of oddball turbines way different from the rest.

Put those 4 normal turbines in Manhattan and your capacity factor will be low. Put them in your yard or mine and they will be high. That is any of them, or all of them.

Swap out regular blades for a straight profile nontapered, nontwisted blade and of course you are going to lose a few percent output. Stall the machine by shortiung it out at the first hint of wind and you will stay safe and have a very low capacity factor. Then again, it's only the alleged high peak rating from which this is extrapolated. Is the cited peak output realistic? Especially if that "peak" level is just barely possible and mostly avoided?

:)
Doug S.

--- In small-wind-home@yahoogroups.com, Michael Klemen <wind4energy@...> wrote:
>
> Doug,
>
> Capacity factor is a lousy way to try to compare sites or turbines.
>
> From:
>
>
> http://www.ndsu.edu/ndsu/klemen/Wind_Turbines_Home.htm
>
> You can see that the capacity factor of my different
> turbines is:
>
> Air-X:ï¿½ï¿½ï¿½ 5.8%
> WT 2500: 19.0%
> AWP 3.6: 28.6%
> XL.1:ï¿½ï¿½ï¿½ 16.8%

>
> You said:
>
> "Contrarily, at the same site, capacity factor varies NARROWLY by model."
> Well, if you talk about CF of 23% to be narrow, I guess you're right!
>
>
> You also said:
>
> "Now put them in a site with very high winds: They will ALL exhibit
>
> a higher capacity factor."
>
> That is not a truthful blanket statement.ï¿½ With very high winds, governing
> will come into play.ï¿½ Peak power isn't maintained, so CF will drop off if
> the wind speed gets too high.
> I stand by the data.ï¿½ CF is a lousy way to classify a site,
> and it's a poor way to compare turbines.ï¿½
>
> Mike
>
>
>
>
> _____
> From: Doug <doug@...>
> To: small-wind-home@yahoogroups.com
> Sent: Thursday, July 21, 2011 11:43 AM
> Subject: [s-w-h] Re: How is generating capacity measured?
>
> Hi Mike:
> Thanks for attempting to correct my statement, but I do not think your statement is true:
> What you said was: "the capacity factor of a turbine is
> > > more a result of the turbine than the site."
>
> That was in reply to my statement that the numbering of windclasses might be replaced by a typical capacity factor figure, for each site.
>
> My statement was based on the realization that most utility-scale turbines, and really most turbines in common use, are designed for economical energy capture within the range of wind speeds where economical energy capture is possible.
>
> Given the choice of commercially-available turbines, one could pick any brand, say a G.E. or a Vestas, a Suzlon, or a Siemens, install them all side-by-side at a windfarm, and you'd find that they would all exhibit a similar capacity factor, within a few percentage points, at the same site.
>
> Now put any of them, or all of them, at a site with low winds:ï¿½ you'll see a lower capacity factor for all.
>
> Now put them in a site with very high winds: They will ALL exhibit a higher capacity factor.
>
> The capacity factor of the same turbine can vary WIDELY depending on the site, certainly much more than

5

a few percentage points.
> Contrarily, at the same site, capacity factor varies NARROWLY by model.
>
> So, capacity factor can vary a few percentage points, depending on model and brand, at a given site.ï¿½ And capacity factor can vary from zero to 100% for the same turbine at different sites.
>
> Therefore the capacity factor varies more with the site than with the model.
>
> Therefore the site is more determinant of capacity factor than the specific turbine.
>
> From your statement, that it's the turbine, not the site, that mostly determines capacity factor, we'd install the same model of turbine, say a G.E. 1.5 MW machine, in low wind sites, medium wind sites, and high wind sites, and all would exhibit a similar capacity factor.
> That would be the result of your statement, if it were true.
>
> Clearly this is wrong.ï¿½ Clearly, the same turbine in a low wind site will have a low capacity factor, and that same turbine installed in a medium wind site will have a medium capacity factor, and that same turbine installed in a high wind site will have a high capacity factor.
>
> To summarize:
> All mainstream brands will produce similar capacity factors at similar windclass sites.
> Any of these same turbines will produce widely different capacity factors, at sites having widely different wind classes.
>
> The correlation is so high that I believe it might be more instructive to call out the windclasses by capacity factor.
>
> Was that any clearer?
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> Doug S.
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> --- In small-wind-home@yahoogroups.com, Michael Klemen <wind4energy@> wrote:
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> > From: Doug <doug@>
> > To: small-wind-home@yahoogroups.com
> > Sent: Tuesday, July 19, 2011 1:33 PM
> > Subject: [s-w-h] Re: How is generating capacity measured?
> >
> > Mike K.:
> > Really? OK what's the capacity factor of a Whisper 100?
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> > Michael Klemen <wind4energy@> wrote:
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Messages in this topic (**22**)

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__.__.__

-----Original Message-----
From: "David Raine" <dave@dyocore.com>
To: "David Raine" <dave@dyocore.com>
Subject: testing update
Date: Fri, 9 Jul 2010 14:50:15 -0700

Hi, Hope you all had a great holiday!
Good news is we are more confident now than before that our turbines produce significant power but unfortunately through the conversion of modern inverters the efficiency in transferring that power is very low, very similar to Solar panels at the moment. We are working hard on a solution to improving this. We are working with several companies and hope to have a 3rd party solution that will interface between the Ginlong/ any inverter and the SolAir very soon.
We coordinated with Power One and should be receiving the Aurora for testing by mid next week. We will immediately put it under testing.
We have a solid lower level power curve but it's very basic and can still be improved upon. We have tested it and it works great up to about 100v from the turbine. Anything greater is right now a guessing game. We're getting our product to two of these companies we're working with that both indicate with confidence they have a solution and both are able to get the higher curve testing done at their facilities within the next week or so.
About our power curve work:
We identified when meeting with one of the engineering companies that we were not effectively doing our Amp/power testing. We made some corrections and immediately doubled our previous power output results – this still was not the best setup and left room for improvement. We will be doing some field tests this coming week that should give us some better accuracy for actual power curve testing and wind speed vs RPM.
Getting Two units is a bit more tricky to track a curve due to the aggressive and rapid increase/decrease in power for wind at the lower levels (jumping from 0 to 60 volts is quick and doesn't leave much margin for the placement of an accurate power curve. However on the higher level 2 units work great and provide a higher efficiency since most inverters sweet point for maximum performance/conversion occurs at about 250v.
3 units presents the possibly of damage to the equipment and wiring in high wind conditions and is not recommended any longer with the GinLong. During a recent testing we experienced winds in excess of 60mph that caused substantial power and resulted in visual damage to a solar film, and all testing equipment hooked up to the system, we estimate the output exceeded 6000 watts.
This has been a very dynamic learning curve for us and the engineers we've been working with. Thank you for your continued support and patience!

David Raine
DyoCore
www.dyocore.com
p&f. 866-404-2428
c. 760-580-4271
dave@dyocore.com

Exhibit 77

From: beth@ocsmallwind.com [mailto:beth@ocsmallwind.com]
Sent: Friday, July 09, 2010 12:07 PM
To: David Raine
Subject: [FWD: RE:]

David, .

I want to make sure you understand that I will be placing the system of: two SolAir turbines and one Ginlong 2kw inverter at Santiago Canyon College (SCC) ASAP.

Because DyoCore's name will be all over the system I don't want there to be any doubts that the system wil work. Let me know if you would like me to hold off on

Santiago Canyon College's system of: two SolAir turbines and one Ginlong 2kw inverter

beth

Elizabeth "Beth" Bradford

Small Wind OC
www.smallwindoc.com (http://www.smallwindoc.com/)

p. 714 526-3437

f. 888 217-1416

c. 707 685-2633

beth@smallwindoc.com (mailto:beth@smallwindoc.com)

------ Original Message ------
Subject: RE:
From: _beth@ocsmallwind.com_ (mailto:beth@ocsmallwind.com)
Date: Fri, July 09, 2010 11:43 am
To: "David Raine" <_dave@dyocore.com_ (mailto:dave@dyocore.com) >

David, thank you for contacting Todd.

When did you talk to John Hildebrand Phone:(714)680-9152, e-mail:_jhildebrand41@yahoo.com_ (mailto:jhildebrand41@yahoo.com) ? I know you emailed hime prior to Chicago. I know he can help.

Again, are you confident the Guinlong 2kw and two SolAir turbines will work as a system?

Elizabeth "Beth" Bradford

Small Wind OC
www.smallwindoc.com (http://www.smallwindoc.com/)

p. 714 526-3437

f. 888 217-1416

c. 707 685-2633

beth@smallwindoc.com (mailto:beth@smallwindoc.com)

------- Original Message -------
Subject:
From: "David Raine" <_dave@dyocore.com_ (mailto:dave@dyocore.com) >
Date: Fri, July 09, 2010 10:36 am
To: '"Todd McKinstry"' <_toddmckinstry1@yahoo.com_ (mailto:toddmckinstry1@yahoo.com) >
Cc: <_beth@ocsmallwind.com_ (mailto:beth@ocsmallwind.com) >, <_rick@dyocore.com_ (mailto:rick@dyocore.com) >

Hi Todd,

Can you send over some information we talked about if available and your comfortable sharing this with us:

1. The package you use to sign up clients and collect $500

1. The package you use in permitting

1. Any contacts you might have at Sacramento

1. The names of the cities you have successfully filed permits in

Thank you!

David Raine

DyoCore
www.dyocore.com (http://www.dyocore.com/)

p&f. 866-404-2428

c. 760-580-4271

dave@dyocore.com (mailto:dave@dyocore.com)

DyoCore, Inc.
3125 Tiger Run Court, #104
Carlsbad, CA 92010

P/F 866.404.2428

www.dyocore.com

August 8, 2011

TO: Dyocore Clients, Distributors, affected persons and entities:

RE: Complaint against Dyocore by the California Energy Commission

There have been significant issues raised by the California Energy Commission through the Emerging Renewable Program which impact your deposit, rebate status, and installations.

The primary issue is a complaint filed by the CEC against Dyocore Inc. alleging fraud in the company's representation of its power curve at the time of Turbine Certification for listing on the state's list of eligible equipment.

Dyocore has denied these claims based upon the program qualification procedures calling for Dyocore to submit data to a third party certifier (KEMA Labs) who thereafter configure the data into a usable power curve and then assign a rating. In this case Dyocore was assigned 1.6kw at 18 mph. KEMA arrived at these figures in April of 2009. In June of 2011 the state of California requested that KEMA review the previously submitted data and either confirm their original configuration being correct or wrong. KEMA responded to the state saying the listing was wrong based upon the data submitted. In essence, the data confirmed as right in 2009 according to KEMA is now in error.

Using the above action as cause, the state of California is attempting to have the product de-listed, all reservations for rebates declared void, and state fraud charges be filed against Dyocore. It appears that the state could be attempting to renege on its original agreement to pay for these turbines.

Dyocore Inc. asserts that all client rebates should be honored and if a mistake was made, it was not on purpose, that Dyocore followed the state recommended guidelines and procedures for product certification and if there was an error in wind speed it is KEMA's error, not Dyocore Inc.'s. In fact another firm uses the Dyocore turbine (wholesale purchase from Dyocore), is listed on the CEC list and is not under investigation. Further, it is a well-known fact to CEC that many other turbines do not meet their stated power output and in some cases vary as much as 10 to 20 percent.

The total amount of rebates being requested for the SolAir 800 is approximately $38 million dollars for 1,357 California families. San Diego Small Wind has 35 R-1 filings and some into the R-2 classification. Dyocore has retained attorneys to defend their legal position and their client's rights to obtain the filed rebates. Dyocore will fight these false allegations and further will not abandon our clients or obligations to our clients.

Exhibit 78

DyoCore, Inc.
3125 Tiger Run Court, #104
Carlsbad, CA 92010

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www.dyocore.com

CEC; Page two:

Dyocore Inc.'s financial status has been severely hampered due to these accusations causing inability to complete installations, devote effort to company growth, and added expense of legal defense of the firm. Therein, the company will be unable to refund deposits, refunds, nor complete any installations until such time as these allegations have been resolved. We estimate this time to be between 60 and 90 days.

Dyocore wants to assure current clients and future clients that it is innocent of all accusations and will defend the company, its product, and clients to their fullest extent.

During the estimated 60 to 90 day duration of the state proceedings Dyocore will continue business as usual working in the remainder of the Continental United States, and with all overseas clients.

I want to reiterate that it is Dyocore Inc.'s intention to honor each refund, deposit, or overpayments to our current clients on a dollar-for-dollar basis and to honor prevailing charges for product. As a note of record; Dyocore has refunded 25 clients their full deposits over the past year and a half due to permitting delays, unable to permit, and in some cases unexpected financial hardship, but in all cases full refund. These actions indicate by reflection a company with honorable intentions.

Best Regards:

David Raine

CEO Dyocore Inc.

Wind-Works.org

by Paul Gipe

DyoCore and Why the Rating of Small Turbines Remains a Black Art

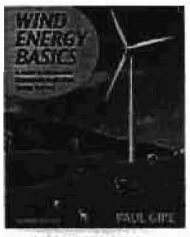
September 23, 2011

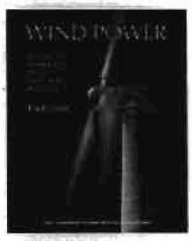
By Paul Gipe

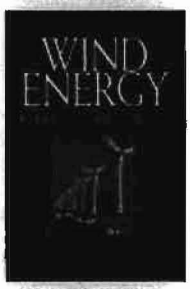
Despite my best efforts, I've been dragged into the DyoCore flap here in California. I successfully ignored Mick Sagrillo's plea to write something. I successfully ignored DyoCore's request to get involved on their behalf. Now the staff of the California Energy Commission (CEC) has weighed in asking me to clarify my statements.

Ok I give up. I can't stay on the sidelines any longer. (Isn't there someone else out there qualified to debunk all these "inventions" that plague us?)

My policy is to only comment on the most egregious examples of flim-flammery or when--for whatever reason--I've become personally involved. This can be as simple as being barraged with email requests of "Wow, what do you think of this super duper little turbine?"' or seeing my colleague's efforts at real renewable energy development getting sideswiped by the "Why do we need big (that is, real) windmills when this little one will do everything we ever need?" crowd.







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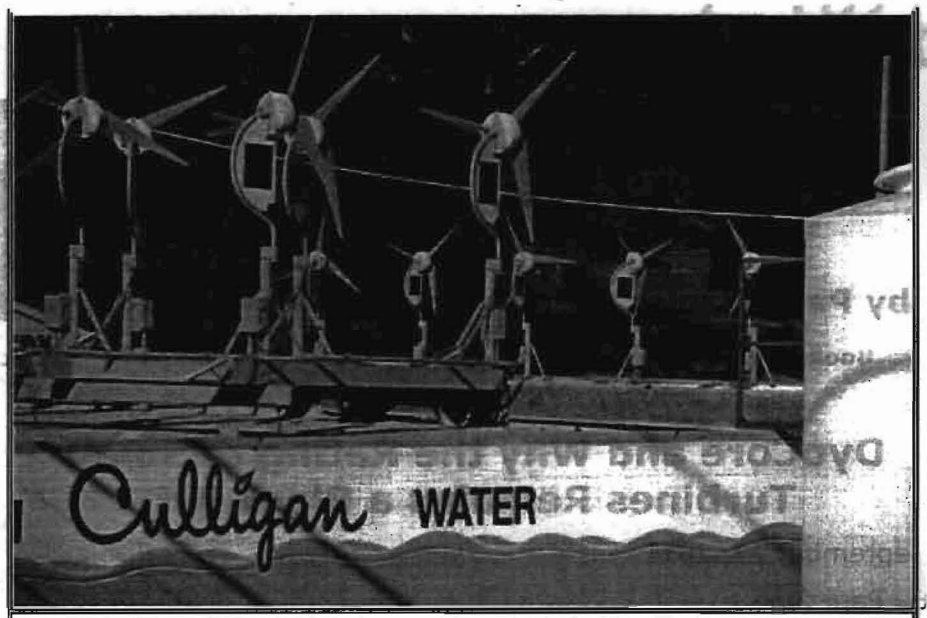
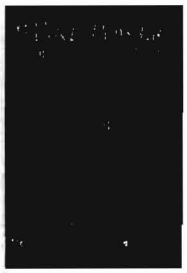


Possibly as many as two dozen DyoCore 1.2 meter diameter wind turbines atop two adjoined buildings in Morro Bay, California.



Background

Dyocore markets a micro wind turbine, the **SolAir**, 1.2 meters in diameter. This puts the DyoCore into the same category as the Ampair 300 or the Air Breeze. All intercept about 1.1 m² of the wind stream.

The San Diego, California company has sold a slew of their turbines in the sate where there is a subsidy under the CEC's Emerging Renewables Program. The subsidy is based on the turbine's power "rating" in watts or kilowatts.

The Ampair 300 is rated at 300 watts, the Air Breeze at 200 watts. (My tests indicate the Air Breeze is a reliable 150 W turbine.) However, DyoCore "rates" their turbine at--are you ready for this--1,600 watts, or 1.6 kW.

Thus, the DyoCore turbine qualifies for a hefty subsidy in California that essentially pays for the turbine.

Apparently getting the state of California to give you a free windmill is appealing to a lot of people and DyoCore "sold" a slew of machines potentially exhausting the funds in the subsidy program.

The CEC staff--playing Hamlet--felt something was rotten in DyoCore's marketing and called a halt to the program and is taking action against DyoCore.

There are a few more twists and turns in the tale, but that's the gist of it.

DyoCore and Representative Mini Wind Turbines.qpw										
					Std. Power	Mfg. Rated	Rated Wind		Perf. at Rated	Loading at Rated
		Rotor Dia.		Area	Rating*	Power	Speed		Power	Power
Manufacturer	Model	m	ft	m^2	kW	kW	m/s	mph	%	W/m^2
Marlec	Rutland 503	0.51	1.7	0.2	0.04	0.03	10.0	22	0.20	122
LVM	Aero4gen F	0.86	2.8	0.6	0.12	0.07	10.3	23	0.18	121
Marlec	Rutland 910-3F	0.91	3.0	0.7	0.13	0.09	10.0	22	0.23	138
Ampair	100	0.93	3.0	0.7	0.14	0.10	20.0	45	0.03	148
Southwest Windpower	Air Breeze	1.17	3.8	1.1	0.21	0.20	12.5	28	0.16	186
Ampair	300	1.20	3.9	1.1	0.23	0.30	12.6	28	0.22	265
Superwind	350	1.20	3.9	1.1	0.23	0.35	12.5	28	0.26	309
Dyocore	**SolAir I 800**	**1.20**	**3.9**	**1.1**	**0.23**	**1.6**	**8.0**	**18**	**4.51**	**1,415**
LVM	Aero6gen F	1.22	4.0	1.2	0.23	0.12	10.3	23	0.15	103
Kestrel	e150	1.5	4.9	1.8	0.35	0.6	13.5	30	0.23	340
Ampair	600	1.7	5.6	2.3	0.45	0.90	10.0	22	0.65	397
Windsave	WS 1000	1.8	5.7	2.4	0.48	1.00	12.0	27	0.39	416
Zephyr Corporation	Airdolphin	1.8	5.9	2.5	0.51	1.00	12.5	28	0.33	393
Windtronics Honeywell	2011	1.8	5.9	2.5	0.51	1.5	13.8	31	0.38	589
Marlec	Rutland 1803-2	1.8	6.0	2.6	0.52	0.34	10.0	22	0.21	130
Windtronics Honeywell	WT6500	1.8	6.0	2.6	0.53	1.00	11.5	26	0.41	381
J. Bornay	Inclin 600	2.0	6.6	3.1	0.63	0.60	11.0	25	0.23	191
Renewable Devices	Swift	2.1	7.0	3.5	0.71	1.50	12.5	28	0.36	425
Southwest Windpower	Whisper 100	2.1	7.0	3.6	0.72	0.90	10.0	22	0.41	252
Fortis	Espada	2.2	7.2	3.8	0.76	0.60	12.0	27	0.15	158
Bergey Windpower	XL.1	2.5	8.2	4.9	0.98	1.00	11.0	25	0.25	204
Southwest Windpower	Whisper 200	2.7	8.9	5.7	1.15	1.00	10.5	24	0.25	175
Raum Energy	1.3	2.9	9.5	6.6	1.32	1.30	11	25	0.24	197
Proven Wind Turbines	2.5	3.5	11.5	9.6	1.92	2.50	10.0	22	0.42	260
*Standard Power Rating: 200 W/m^2.										

Responsibility

Who is responsible for this mess? Let's just list them

- The Small turbine industry,
- The California Energy Commission,
- DyoCore, and
- Consumers.

The small turbine industry is partly to blame because if they'd listened to Mike Bergey 30-years ago--yes, that long ago--and had implemented a small turbine rating standard we wouldn't keep having this problem. They are also to blame for being in love with subsidy programs that base their payments on installed capacity, the watts or kilowatts that the turbine is presumed to produce. See **New Federal Subsidies Distort the US Small Wind Market: Or How to Increase the Power of the Skystream 3.7 with the Stroke of a Pen.** The state of California is at fault for not understanding wind energy and falling back on outdated policy--subsidies on installed capacity--that was proven ineffective and prone to abuse--again--30 years ago. See **Capital Subsidies Are Not Good Public Policy**.

DyCore of course. Their turbine is wildly overrated, but more on that in a moment.

And consumers are to blame for not doing their homework (that includes not reading books on wind energy--some of which I've written), and for succumbing to the greed of "getting something for nothing." As the US Postal Service warns, "If it's too good to be true, it probably is."

Power Ratings

Do I really have to go over this again? See my books. See my other articles on various small wind turbines. See **Testing the Power Curves of Small Wind Turbines**, and especially note

the sections **Power Curves** and **The Rating Game** where I first explain then rail against the power at wind speed system of rating small wind turbines.

To summarize, until very recently there was no "standard rating" of wind turbines--small or large. DyoCore's contention on this point is correct. Wind turbines can be "rated" at wind speeds from 9.5 m/s (~20 mph) to 15 m/s (~35 mph) or even higher. In wind energy, the difference between 10 m/s and 15 m/s is huge--5^3 or 125 times.

In part to remedy this problem, I began using what I call a "standard power rating" of my own creation. At the time (2000) there was little prospect of the industry reaching any kind of consensus. My intent was to provide consumers with an easy way to compare small wind turbines for those who were metrically challenged since we report swept area in m^2.

A decade later, the industry is finally getting its act together but some newcomers are reluctant to play by the new rules and we continue to have the same problems we had three decades ago.

Gipe's Standard Power Rating

What is my "standard power rating"? It's not very sophisticated, it's simply the product of the swept area times 200 W/m^2 of rotor loading. Why 200 and not some other value? Before the dominance of rare-earth magnets in small wind turbines, most small wind turbines that were rated at a reasonable wind speed had rotor loadings that hovered around that value.

For example, at my "standard rating" the Ampair 300 is "rated" at 230 W, the Air Breeze at 210 W.

Today with rare-earth magnets, and their greater power density, that standard rating could move up some. However, I have no plans to change it. Why? Remember, I based this value on the manufacturer's "rating" of their own products. My tests at the Wulf Test Field found that all the turbines I tested, save one, substantially failed to meet their proffered power curves. The Air Breeze, for example, at the manufacturer's specified rated speed should be rated at 150 W, which is less than the 210 W in my "standard rating system".

Where does DyoCore fit in the "Gipe standard rating system"? Since it's the same size as the Ampair 300, the DyoCore would be rated at 230 W. The manufacturer's "rating" of 1.6 kW is nearly seven times greater than in my system.

DyoCore's Rating

DyoCore's web site says that their turbine will generate 1.6 kW in a wind of 8 m/s, that is, the turbine is "rated" at 1.6 kW at 8 m/s (visited 20 September, 2011).

Can it do that? Not on this planet. The 1.6 kW rating at 8 m/s is more than four times the energy in the wind at that speed. Forget the Betz Limit, there is simply not the energy in the wind to do what DyoCore says its turbine will do.

DyoCore is now saying privately that the turbine will generate 1.6 kW at 17 m/s (38 mph). Can it do that? Possibly, it is at least back in the realm of the real world.

Nevertheless, DyoCore's web site was still reporting the 8 m/s wind speed and that's what consumers must go on.

In the end, the DyoCore rating flap is a distraction. Ratings are only useful for a crude comparison among turbines. The flap is only important because the CEC pays out subsidies on "ratings" and the DyoCore turbine is outrageously over-rated.

In the over-rating sweepstakes, DyoCore ranks right up there with inventors of Diffuser Augmented Wind Turbines (DAWT) or wind turbines that use shrouds. DyoCore's rotor loading at rated power of 1,400 W/m² is just shy of the world record for wind turbine hype now claimed by Geneva's Elena Energie (see **Elena Diffuser Augmented Wind Turbine (DAWT): Have Parisians Drunk the Coolaid?**) of 2,100 W/m². DyoCore just edges out Wind Cube's 1,300 W/² (see **Wind Cube Squarely Over the Top**) to take the number two slot.

DyoCore Annual Energy Estimates								
	4	m/s		4.9	m/s		5.4	m/s
AEO	Spec.	Approx		Spec.	Approx		Spec.	Approx
000	Yield	%	AEO	Yield	%	AEO	Yield	%
kWh	kWh/m2	eff	kWh	kWh/m2	eff	kWh	kWh/m2	eff
1.5	1326	2.03	2.17	1919	1.80	2.461	2176	1.36

Energy Estimates Out of This World

What really matters of course is how much electricity these little devils produce. All the rest is puffery and marketing.

The good news is that the DyoCore's estimates of Annual Energy Production, or the Annual Energy Output of earlier days, are not as outlandish as their power ratings.

Alas, DyoCore's estimates can't be met on this planet, possibly on another planet with a thicker atmosphere, but then we don't live there and certainly the CEC gives subsidies only for wind turbines installed in California.

At an annual average wind speed of 4 m/s, the turbines are advertized to generate 2 times the energy in the wind.

At an annual average wind speed of 4.9 m/s, the turbines are advertized to generate 1.6 times the energy in the wind.

At an annual average wind speed of 5.4 m/s, the turbines are advertized to generate 1.4 times the energy in the wind.

Solution to the Rating Black Art

The solution should be fairly obvious, don't base payments for small wind turbines on installed capacity.

In a subsequent post, I'll try to explain why the CEC and California should simply exclude small wind from the Emerging Renewables Program. Instead, small wind should be paid its cost of generation, that is, a rate per kWh of actual generation. The

small wind industry won't like it. They'll fight it, but it's the only sure way for the small wind industry to mature. If the British can do it, so can we.

-End-

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Exhibit 80

Exhibit 81

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C. P. "Case" van Dam

Warren and Leta Giedt Professor and Department Chair

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Education

- **B.S.** (1975) Aerospace Engineering, Delft University of Technology, the Netherlands
- **M.S.** (1978) Aerospace Engineering, University of Kansas, USA
- **M.S.** (1979) Aerospace Engineering, Delft University of Technology
- **D. Engr.** (1983) Aerospace Engineering, University of Kansas

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Professional Experience

July 2010 - Present

Warren and Leta Giedt Professor, Chair of the Department of Mechanical and Aerospace Engineering

March 2002 - Present

Director, California Wind Energy Collaborative (California Wind Energy Collaborative)

July 1985 - Present

Exhibit 82

Assistant Professor (1985 - 1989), Associate Professor (1989 - 1995) and Professor (1995 - Present) in the Department of Mechanical and Aeronautical Engineering of the University of California, Davis. Teaching undergraduate and graduate courses in a wide variety of subject areas including fluid-aerodynamics, aircraft design, and wind energy. Consultant for NASA, several aircraft companies, sailing yacht designers, and wind energy companies.

April - July 1992, June - December 1993, January - March 1996

Visiting Researcher at NASA Langley Research Center conducting research on high-lift aerodynamics in support of Subsonic Aircraft High-Lift Flight Project.

January 1984 - August 1985

Research Associate, Vigyan Research Associates, Inc., Hampton, Virginia. Worked on the design and optimization of advanced technology lifting systems with special emphasis on cruise drag and high-angle of-attack (stall/spin) lift characteristics. Also studied the shaping of airplane fuselages for minimum drag.

January - December 1983

NRC Postdoctorate at NASA Langley Research Center. Investigated the possibilities for and the potential benefits of extensive amounts of natural laminar flow on devices such as wingtip-mounted winglets.

Technical Interests

Research interests include:
- Aerodynamics including design and optimization
- Aircraft design
- Experimental and computational fluid dynamics
- Biofluiddynamics
- Wind energy
- Aero-hydrodynamics of sailing

Current research includes:

- Prediction, measurement and reduction of aerodynamic drag
- Multi-disciplinary design of aircraft high-lift systems
- In-flight infrared imaging of boundary-layer transition and separation
- Aerodynamics of wind turbines and aircraft at dynamic conditions
- Micro-electro-mechanical systems for aerodynamic load control

Also see links to Aero Research Group and California Wind Energy Collaborative.

Professional Activities and Honors

- Elected AIAA Associate Fellow, September 2007.
- U.S. Department of Energy award for "Outstanding Research and Development Partnership to Advance Wind Energy Technology" in partnership with Knight & Carver, and Sandia National Laboratories, May 2006.
- Associated Editor of Wind Energy for the international journal Solar Energy, Aug 2003 - July 2004.
- Member of Peer Review Panel to evaluate NASA research on Basic Aerodynamics, Langley Research Center, Hampton, VA, January 2004.

- Co-Director of Von Karman Institute for Fluid Dynamics Lecture Series on CFD-Based Aircraft Drag Prediction And Reduction, Rhode Saint Genese, Belgium, February 3-7, 2003.
- AIAA Fluids 2000 Art of Flow Control Artistic Award for Active Load Control and Lift Enhancement using MEM Translational Tabs, June 2000.
- Member of Peer Review Panel to evaluate NASA research on High-Lift Aerodynamics, Langley Research Center, Hampton, VA, November 1999.
- NASA Certificate of Recognition for work on In-Flight Infrared Surface Flow Visualization, October 1998.
- Member of Science Panel to review test of NREL research wind turbine in the NASA Ames 80' x 120' wind tunnel, Boulder, CO, October 1998.
- NASA-ASEE Summer Faculty Fellowship Awards, 1993 and 1994.
- Co-edited book titled Fluid Dynamics in Biology, Contemporary Mathematics, Vol. 141, 1993.
- Co-organized/co-chaired the AMS/IMS/SIAM Joint Summer Research Conference on Biofluiddynamics, University of Washington, Seattle, WA, July 6-12, 1991.
- NASA Certificate of Recognition for the development of Crescent Wing Planforms, December 1989.
- AIAA Lawrence Sperry Award for major innovative contributions in Applied Aerodynamics, 1989.
- NASA Certificate of Recognition for the development of an Aircraft Stall-Spin Entry Deterrent System, March 1988.
- Outstanding Advisor Award of the University of California, Davis, School of Engineering, 1985 - 1986.
- Group Achievement Award, Aerial Applications Research Team, NASA Langley Research Center, October 1983.
- National Research Council Postdoctoral Research Associateship Award, 1983.
- Member of Sigma Gamma Tau (National Honor Society in Aerospace Engineering).

Teaching

Undergraduate courses

- Aeronautical Engineering Fundamentals
- Applied Aircraft Aerodynamics
- Aircraft Performance
- Aircraft Preliminary Design
- Fluid Dynamics
- Mechanical Engineering Design Project
- Thermal Fluids Laboratory

Graduate courses

- Advanced Aerodynamics - Viscous Flow
- Advanced Aerodynamic Design and Optimization
- Aerodynamics of Flight Vehicles
- Advanced Wind-Tunnel Testing
- Wind Power Engineering

Short Courses

- Applied Aerodynamic Drag Reduction
- Aerodynamic Drag Reduction - Fundamentals and Applications
- High-Lift Systems & Aerodynamics for General Aviation and Subsonic Transport Aircraft
- Aerodynamic Design Improvements: High-Lift and Cruise
- Wind Energy for Technicians
- Small Wind Energy Systems

Also see link to Aerospace Short Courses and CWEC Courses .

Patents

AIRCRAFT STALL-SPIN ENTRY DETERRENT SYSTEM, U.S. Patent No. 4,776,542, C. P.van Dam, Issued October 11, 1988.

ACTIVE SYSTEM FOR CONTROL OF AERODYNAMIC LOADING USING MICROFABRICATED TRANSLATIONAL TABS, U.S. Patent No. 7,028,954, C. P.van Dam, Issued April 18, 2006.

METHOD AND APPARATUS FOR AUTOMATICALLY GENERATING AIRFOIL PERFORMANCE TABLES, U.S. Patent No. 7,124,038, C. P.van Dam, Issued October 17, 2006.

Selected Publications

FLIGHT EVALUATION OF THE EFFECT OF WINGLETS ON PERFORMANCE AND HANDLING QUALITIES OF SINGLE-ENGINE GENERAL AVIATION AIRPLANE, B. J. Holmes, C. P. van Dam, P. W. Brown, and P. L. Deal, NASA TM 81892, Dec. 1980.

LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF THE ATLIT AIRPLANE, J. Roskam, C. P. van Dam, and M. Griswold, Journal of Aircraft, Vol. 18, No. 6, Jun. 1981, 495-496.

EFFECT OF WINGLETS ON PERFORMANCE AND HANDLING QUALITIES OF GENERAL AVIATION AIRCRAFT, C. P. van Dam, B. J. Holmes and C. Pitts, Journal of Aircraft, Vol. 18, No. 7, Jul. 1981, pp. 587-591.

AN EXPERIMENTAL AND THEORETICAL INVESTIGATION OF DEPOSITION PATTERNS FROM AN AGRICULTURAL AIRPLANE, D. J. Morris, C. C. Croom, C. P. van Dam, and B. J. Holmes, NASA TP 2348, Sep. 1984.

NATURAL LAMINAR FLOW AND AIRPLANE STABILITY AND CONTROL, C. P. van Dam, Laminar Flow Aircraft Certification, NASA CP 2413, Proceedings of a workshop held in Wichita, KS, Apr. 14-15, 1985.

SWEPT WING-TIP SHAPES FOR LOW-SPEED AIRPLANES, C. P. van Dam, SAE Paper 851770, Oct. 1985 (SAE Transactions, Vol. 94, 1986, pp. 355).

EFFICIENCY CHARACTERISTICS OF CRESCENT-MOON SHAPED WINGS AND CAUDAL FINS,C. P. van Dam, Nature,Vol. 325, No. 6103, Feb. 1987, pp. 435-437.

SHAPING OF AIRPLANE FUSELAGES FOR MINIMUM DRAG, S. S. Dodbele, C. P. van Dam, P.M.H.W. Vijgen, and B. J. Holmes, Journal of Aircraft, Vol. 24, No. 5, May 1987, pp. 298-304.

BOUNDARY-LAYER TRANSITION EFFECTS ON AIRPLANE STABILITY AND CONTROL, C. P. van Dam, and B. J. Holmes, Journal of Aircraft, Vol. 25, No. 8, Aug. 1988, pp. 702-709.

EFFECTS OF COMPRESSIBILITY ON DESIGN OF SUBSONIC NATURAL LAMINAR FLOW FUSELAGES, P.M.H.W. Vijgen, S. S. Dodbele, B. J. Holmes, and C. P. van Dam, Journal of Aircraft, Vol. 25, No. 9, Sep. 1988, pp. 776-784.

IN WIND AND WATER, C. P. van Dam, The Sciences, Jan-Feb. 1988, pp. 36-39.

KEEL DESIGN FOR LOW VISCOUS DRAG, C. J. Obara, and C. P. van Dam, Journal of Ship Research, Vol. 33, No. 2, Jun. 1989, pp. 145-155.

SHEARED WING-TIP AERODYNAMICS: WIND-TUNNEL AND COMPUTATIONAL INVESTIGATION, P.M.H.W. Vijgen, C. P. van Dam, and B. J. Holmes, Journal of Aircraft, Vol. 26, No. 3, Mar. 1989, pp. 207-213.

WIND-TUNNEL INVESTIGATIONS OF WINGS WITH SERRATED SHARP TRAILING EDGES, P.M.H.W. Vijgen, C. P. van Dam, B. J. Holmes, and F. G. Howard, Low Reynolds Number Aerodynamics, Lecture Notes in Engineering, No. 54, T. J. Mueller (Ed.), Springer-Verlag, 1989, pp. 295-313.

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COMPARISON OF ITERATIVE AND DIRECT SOLUTION METHODS FOR VISCOUS FLOW PROBLEMS, C. P. van Dam, and M. Hafez, AIAA Journal, Vol. 27, No. 10, Oct. 1989, pp. 1459-1461.

UNSTEADY VISCOUS FLOW CALCULATIONS INCLUDING SURFACE HEATING AND COOLING EFFECTS, C. P. van Dam, M. Hafez, D. Brucker, and S. Elli, Notes on Numerical Fluid Mechanics, P. Wesseling (Ed.), Vol. 29, Vieweg, 1990, pp.79-88.

CALCULATIONS OF VISCOUS FLOW WITH SEPARATION USING NEWTON'S METHOD AND DIRECT SOLVER, C. P. van Dam, M. Hafez, J. Ahmad, AIAA Journal, Vol. 28, No. 5, May 1990, pp. 938-940.

CALCULATION AND MEASUREMENT OF INDUCED DRAG AT LOW SPEEDS, C. P. van Dam, K. Nikfetrat, P.M.H.W. Vijgen, and C. M. Fremaux, SAE Paper 901935, Oct. 1990.

COMMENT ON "OPTICAL BOUNDARY-LAYER TRANSITION DETECTION IN A TRANSONIC WINDTUNNEL," P.M.H.W. Vijgen, C. P. van Dam, and C. J. Obara, AIAA Journal, Vol. 28, No. 12, Dec. 1990, pp. 2142-2143.

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Last modified: July 14, 2010

Determining a Power Curve of a Wind Turbine.

The following notes are loosely based on International Standard IEC61400-12 (Wind Turbine Power Performance Testing) and provide a general overview of the measurements and analyses required to produce a power curve of a wind turbine. Figure 1 depicts a typical power curve for a small wind turbine with wind turbine power output in watt (W) or kilowatt along the vertical axis and wind speed in meter per second (m/s) along the horizontal axis.

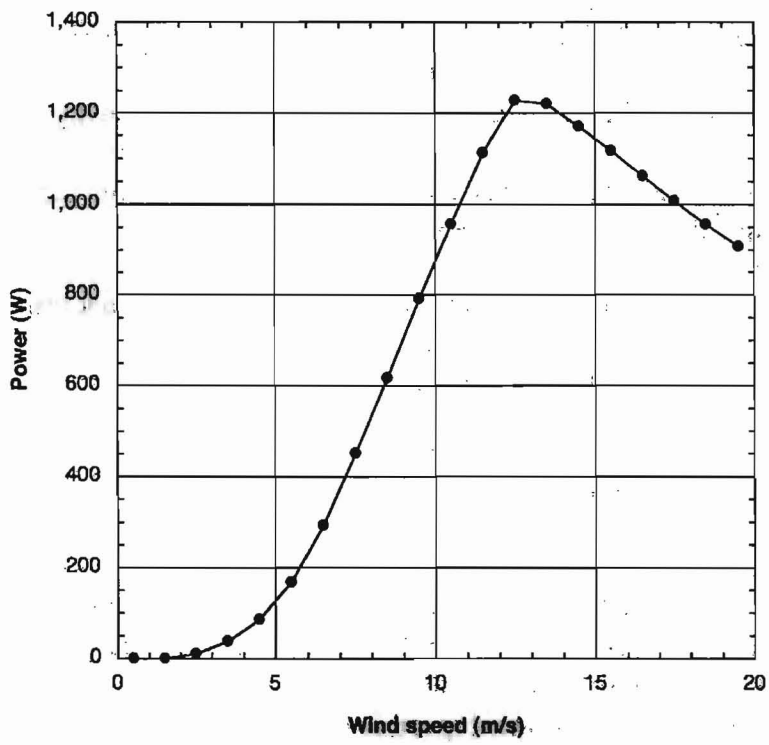

Fig. 1: Normalized power curve of a wind turbine

Required test equipment:

- Electric power measurement device based on electric current and voltage
- Wind speed measurement instrument, typically a cup anemometer that is installed at hub height (height of center of rotor)
- Wind direction measurement instrument, typically a wind vane that is mounted near hub height
- Air temperature measurement instrument needed to determine air density
- Air pressure measurement instrument needed to determine air density
- Data acquisition system to collect the above data as a function of time

Measurement procedure:

- Wind turbine should operate normally with all data collected contiguously
- Power and wind data should be collected at a data rate of at least twice per second
- Temperature and pressure data should be collected at a data rate of at least once per minute

Exhibit 83

- Measurements should cover wind speed range to 1.5 times the wind speed at 85% of rated power

Data analysis:

- Data sets are based on 10 minute periods
- Discard data sets acquired while the turbine is unavailable
- Discard data sets acquired when test equipment is failing
- Discard data sets acquired for wind directions outside the measurement sector
- For each data set determine average power (P_10min in watt or kilowatt), average wind speed (V_10min in meter/second), average air pressure (p_10min in pascal), and average air temperature (T_10min in kelvin)
- For each data set calculate average air density using following equation:

  $$\rho\_10min = p\_10min / (287 \times T\_10min)$$

  where ρ_10min is the average air density in kilogram/cubic-meter
- Normalize the data sets by correcting for air density that is not standard (ρ_10min = 1.225 kilogram/cubic-meter):
  - For stall controlled turbines operating at constant rpm:
    $Pn\_10min = P\_10min \times 1.225 / \rho\_10min$
    $Vn\_10min = V\_10min$
  - For turbines with active power control:
    $Pn\_10min = P\_10min$
    $Vn\_10min = V\_10min \times (\rho\_10min / 1.225)^{1/3}$

Power curve determination:

- Sort the normalized data sets using 0.5 meter/second wind speed bins
- Each wind speed bin shall have at least 30 minutes of data (3 data sets)
- Average the normalized power for each wind speed bin
- Average the normalized wind speed for each wind speed bin
- Plot the averaged normalized power as a function of the normalized wind speed (see Fig. 1 in the case of 1 meter/second wind speed bins)

Exhibit 84

Exhibit 85

COMMISSION GUIDEBOOK

RENEWABLE ENERGY PROGRAM OVERALL PROGRAM GUIDEBOOK

Third Edition

CALIFORNIA
ENERGY COMMISSION

Edmund G. Brown, Jr., Governor

JANUARY 2011

CEC-300-2010-008-CMF

Exhibit 86

VII. Enforcement Action

A. Recovery of Overpayment

The Committee, with the concurrence of the Energy Commission, may direct the Energy Commission's Office of Chief Counsel to commence formal legal action against any awardee or former awardee to recover any portion of a funding award that the Committee determines the awardee or former awardee was not otherwise entitled to receive.

B. Fraud and Misrepresentation

The Committee may initiate an investigation of any awardee who the Committee has reason to believe may have misstated, falsified, or misrepresented information in applying for registration, funding, or RPS certification, invoicing for a funding award payment, or reporting any information required by these *Guidelines*. Based on the results of the investigation, the Committee may take any action it deems appropriate, including, but not limited to, revocation of the registration, cancellation of the funding award or RPS certification, recovery of any overpayment, and, with the concurrence of the Energy Commission, recommending the Attorney General initiate an investigation and prosecution pursuant to Government Code Section 12650, et seq., or other provisions of law.

CALIFORNIA
ENERGY
COMMISSION

EMERGING RENEWABLES PROGRAM

Tenth Edition

FINAL GUIDEBOOK

April 2010

CEC-300-2010-003-F

Arnold Schwarzenegger, *Governor*

Exhibit 87

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EFFICIENCY AND RENEWABLE ENERGY DIVISION

These guidelines were formally adopted by the California Energy Commission on February 19, 2003, pursuant to Public Utilities Code section 383.5, subdivision (h), and subsequently revised pursuant to this authority and Public Resources Code section 25747, subdivision (a), on December 17, 2003, May 19, 2004, June 30, 2004, January 19, 2005, June 22, 2005, January 18, 2006, June 29, 2006, December 13, 2006, February 25, 2009 and April 7, 2010.

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Abstract

The Emerging Renewables Program provides rebates and production incentives to end-use consumers who purchase and install renewable energy technologies, specifically small wind systems and fuel cells, for on-site generation. Payments from the Emerging Renewables Program are intended to reduce the net cost of generating equipment using emerging renewable technologies and thereby stimulate substantial sales of such systems. Increased sales of generating equipment are expected to encourage manufacturers, sellers, and installers to expand their operations and reduce their costs per unit.

Along with expanding the sales of emerging renewable technology systems, another goal of the Emerging Renewables Program is to encourage the siting of small, reliable distributed generating systems throughout California in locations where the produced electricity is both needed and consumed.

This Guidebook describes the rules and process for applying and claiming a rebate under the Emerging Renewables Program. This Guidebook also contains copies of all the forms necessary for the rebate process.

Keywords: emerging, renewable, program, ERP, California Energy Commission, small wind, fuel cell, rebate, incentive, electricity production, distributed generation, guidelines, eligibility

What's New in This Guidebook?

Below are the major changes in this edition of the *Emerging Renewables Program Guidebook* as compared to the February 2009 edition of the *ERP Guidebook*.

- The rebate level and structure for small wind have been changed. The new rebate for small wind is **$3.00/watt for the first 10 kW, through April 7, 2011, and $1.50/watt for increments greater than 10 kW and less than 30 kW.**

- The conversion efficiency test, continuous power test and tare loss test requirements for inverters has been removed. The requirements for UL 1741 certification remains. This requirement is for inverters that will be used exclusively with small wind turbines and fuel cells.

- Incentives for small wind turbines and fuel cells are calculated by multiplying the rated output by the incentive level. Inverter efficiency is no longer used to calculate rebate amounts.

- The reservation period is now 12 months.

- Retailers and installers no longer need to submit the R4 Equipment Seller Information Form to the Energy Commission. Retailers and installers must now register themselves via on-line website.

- Clarifies requirements and restrictions regarding leasing renewable energy systems.

I. Introduction

This *Emerging Renewables Program Guidebook* is one of several guidebooks the California Energy Commission (Energy Commission) has adopted to implement the Renewable Energy Program pursuant to Senate Bill 1038[1], Senate Bill 183[2], Senate Bill 1250[3], and Senate Bill 107.[4] It describes the requirements for receiving funding for the installation and operation of non-solar renewable energy systems under the Emerging Renewables Program (ERP) element of the Renewable Energy Program.

The Energy Commission has adopted additional guidebooks to address the requirements for the other elements of the Renewable Energy Program and guidelines governing the overall administration of the Renewable Energy Program. The *Overall Program Guidebook* describes how the Renewable Energy Program will be administered and includes information and requirements that apply to all program elements of the Renewable Energy Program.

Applicants requesting funding under the Emerging Renewables Program must satisfy the requirements contained in both the *Overall Program Guidebook* and this *Emerging Renewables Program Guidebook*. This guidebook replaces the previous guidebook governing the Emerging Renewables Program (*the Emerging Renewables Program Guidebook, Ninth Edition*). Applications for funding approved under the previous program guidebook remain governed by the previous guidebook until the projects are completed, expired, or cancelled.

Funding for the installation and operation of solar photovoltaic systems on new residential construction is available under the Energy Commission's *New Solar Homes Partnership*. Funding for the installation and operation of solar photovoltaic systems on existing residential and new and existing non-residential buildings is available under the California Public Utilities Commission's *California Solar Initiative*. Information on these two programs can be found at [www.gosolarcalifornia.org].

A. Purpose

The ERP was created to help develop a self-sustaining market for renewable energy systems that supply on-site electricity needs across California. Through this program, the Energy Commission provides funding to offset the cost of purchasing and installing new renewable energy systems using emerging renewable technologies.

The goal of the ERP is to reduce the net cost of on-site renewable energy systems to end-use consumers, and thereby stimulate demand and increased sales of such systems. Increased sales are expected to encourage manufacturers, sellers, and installers to expand operations, improve distribution, and reduce system costs.

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1 Stats. 2002, Ch. 515, §§ 15 & 16, as codified in Public Utilities Code §§ 383.5 and 445.
2 Stats. 2003, Ch. 666, §§ 1 & 2, as codified in Public Resources Code §§ 25401.6, and 25740 – 25751.
3 Stats, 2006, Ch. 512, §§ 9-14, as codified in Public Resources Code §§ 25740.5 – 25747.
4 Stats, 2006, Ch. 464, §§ 7 & 9, as codified in Public Resources Code §§ 25744.5 and 25746.

Funding for the Renewable Energy Program is collected from the ratepayers of four investor-owned utilities in California to support existing, new, and emerging renewable electricity generation technologies. For more information about the Renewable Energy Program, please visit the Energy Commission's website at [www.energy.ca.gov/renewables].

For consumer tips on purchasing a renewable energy system to supply on-site electricity needs please refer to Appendix 2 of this guidebook. Also see *Buying a Small Wind Electric System, February 2002* for further information. This and other documents are available on the Energy Commission's website at [www.consumerenergycenter.org].

B. Overview

The ERP provides electricity consumers with a financial incentive to install renewable energy systems on their property. The financial incentive varies based on system size, technology, and type of installation and is paid once the system is installed and operational. The consumer must apply to the Energy Commission for funding using the protocols in this guidebook.

To qualify for an incentive, both the consumer and the renewable energy system must satisfy a number of requirements. The consumer must receive electricity distribution service at the site of installation from an existing in-state electrical corporation contributing funds to support the program. These electrical corporations are Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), San Diego Gas & Electric Company (SDG&E), and Golden State Water Company (doing business as Bear Valley Electric Service (BVES)).

The renewable energy system must utilize one of two emerging renewable technologies: fuel cells using renewable fuels or small wind turbines.[5] The system must also use new components that are certified or tested to be reliable and come with a five-year warranty. In addition, the renewable energy system must generate electricity to offset the consumer's on-site electrical load. Lastly, the system must be interconnected to the utility distribution grid, unless the system is a fuel cell system used for backup generation for emergency, safety, or telecommunication purposes.

A "backup generation system" is defined as a generation system that is designed to serve as a backup in the event of a temporary failure or interruption in the flow of power from the primary electricity source or utility distribution grid.

In most cases, an applicant submits a Reservation Request Form (CEC-1038 R1) and supporting documentation to reserve a fixed amount of program funds. For fuel cell systems, a CEC-1038 R1 A form is also required to verify the eligibility and use of renewable fuel. Once the Reservation Request Form is reviewed and approved, the Energy Commission sends the applicant a Payment Claim Form (CEC-1038 R2) that identifies the amount of funds reserved and the date upon which the reservation expires. The applicant then proceeds to install an eligible system. When the system is completed and operational, the applicant then submits the

5 Rebates are available for systems less than 30 kilowatts in size (wind systems up to 50 kilowatts in size may participate, but the rebates for such systems are limited to less than 30 kilowatts).

Payment Claim Form and supporting documentation to the Energy Commission. If the applicant installs an eligible system, meets all program requirements, and submits a completed Payment Claim Form, with supporting documentation prior to the expiration date of the reservation, the Energy Commission reviews the amount reserved and the incentive the applicant is eligible to receive and makes the appropriate payment.

For forms or additional information, contact the Energy Commission's Call Center at: (800) 555-7794 or go to [www.consumerenergycenter.org/erprebate/forms.html].

II. Program Eligibility Requirements

Effective January 1, 2007, two technologies are eligible for ERP funding. They are the following:

1. Small Wind Turbines - small electricity-producing, wind-driven generating systems with a rated electrical generating capacity no greater than 50 kilowatts;

2. Fuel Cells - technologies that generate electricity through an electrochemical reaction using a renewable fuel, with a generating capacity not greater than 30 kW. For purposes of fuel cell eligibility, "renewable fuel" is limited to the following:

a) Landfill gas, digester gas, and other gases that meet the definition of an "eligible renewable energy resource" as defined in Public Utilities Code section 399.12(c) with reference to Public Resources Code section 25741(b).

b) Hydrogen or hydrogen rich gases derived from a non-fossil fuel or feedstock through the use of power generated by an "eligible renewable energy resource."[6]

In addition, fuel cell technologies must meet additional eligibility requirements of Public Resources Code section 25744(b)(3) which identifies "fuel cell technologies with an emission profile equivalent or better than the State Air Resources Board 2007 standard."

Systems that use the above technologies must satisfy the following eligibility criteria as explained in this chapter. Other technologies may be added to this category if they meet the criteria identified in Appendix 3 to the Energy Commission's satisfaction.

A. System Ownership

Eligible renewable energy systems may not be owned by an electrical corporation as defined in Public Utilities Code section 218, or by a local publicly owned electric utility as defined in Public Utilities Code section 224.3.

B. System Location

6 An example of a renewable fuel is hydrogen derived from water through an electrolysis process energized with electricity generated by a solar photovoltaic system. In this example, the hydrogen is derived from water (a non-fossil fuel or feedstock) through a process energized with electricity from an eligible renewable energy resource (a solar photovoltaic system). The electricity used to energize the process must be bundled with the associated renewable attributes, so that renewable energy is used to produce the hydrogen. If the renewable attributes are unbundled from the electricity and disposed of separately, the hydrogen will be produced with null power and will not be considered a renewable fuel for purposes of fuel cell eligibility under the ERP.

The renewable energy system and eligible renewable energy resource must be located on the same site where the customer's own electricity demand is located. To meet this requirement a fuel cell system and its renewable fuel storage tank must be installed at the site where the customer's own electricity demand is located. However, the renewable fuel may be produced at another location and transported to the customer's site.

C. Grid Interconnection

The renewable energy system must be permanently interconnected to the electrical distribution grid of the utility serving the customer's electrical load. This requirement does not apply to fuel cell systems used for backup generation for emergency, safety, or telecommunication purposes.

Portable systems are not eligible. The site where the system is installed must receive electrical distribution service from PG&E, SCE, SDG&E, or BVE. The system's interconnection to the electricity distribution system must also comply with applicable electrical codes and utility interconnection requirements.

D. System Components

The major system components must be certified or approved as described in Appendix 3. Approved major components are on the Energy Commission's lists of eligible equipment and are available at [www.consumerenergycenter.org/erprebate/equipment].

The applicant should confirm that the components purchased for a system are eligible when applying for ERP funding. Energy Commission staff will confirm that equipment identified in a reservation application meets eligibility requirements prior to an application being approved. However, if the applicant begins or completes the installation before the Energy Commission has approved the reservation, equipment lists may have changed, and significant and costly changes may be needed for the system to comply with the eligibility criteria.

E. New Equipment

All major system components (requiring certification per section C) must be new and must not have been previously placed in service in any other location or for any other application. Equipment purchased or installed more than 18 months before applying for a reservation is not eligible.

F. System Sized to Offset On-site Electricity Load

For all eligible systems, regardless of technology, the system must be sized so that the amount of electricity produced by the system primarily offsets part or all of the customer's electrical needs at the site of installation. The expected production of electricity by the system may not be

more than the historical or expected electrical needs of the electricity consumer at the site of installation. See Appendix 4 for further details on how to determine the maximum allowed system size.

G. System Installation

All systems, if installed under contract, must be installed by appropriately licensed California contractors in accordance with rules and regulations adopted by the State of California Contractors State Licensing Board. Installation contractors must have an active A, B, or a C-10 license.

Systems may also be self-installed by the purchaser (owner). While such installations are eligible for funding without the licensing requirements listed, they will be eligible only for a lesser rebate as described in Chapter III.

In all cases, systems must be installed in conformance with the manufacturer's specifications and with all applicable electrical and building codes and standards.[7]

H. Five-Year Warranty Requirements

All systems must have a minimum five-year warranty to protect the purchaser against system or component breakdown. The warranty must cover, and provide for no-cost, repair or replacement of the system or system components including any associated labor for five years. The warranty must also cover the major components of the generating system against breakdown or degradation in electrical output of more than 10 percent from their originally rated electrical output during the five-year period. Major components are defined as wind turbine generators, fuel cell reformers and fuel cells, fuel processing and storage systems, and inverters. The warranty may be provided in combination by the manufacturer and installer.

Self-installed systems must have a minimum five-year warranty to protect the purchaser against breakdown or electrical output degradation of major system components. In this case, the warranty need not cover the labor costs associated with removing or replacing major components, because any repairs would be done by the self-installer or at the self-installer's expense.

I. System Performance Meter

All systems must be installed with a performance meter[8] so that the customer can determine the amount of energy produced by the system. The meter must be listed with the Energy

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7 For information on restrictions placed on owner-builders or self-installers, contact the Contractors State License Board at (800) 321-CSLB to obtain a current edition of the *Contractor's License Law and Handbook.*

Commission and measure the total energy produced by the system in kilowatt hours (or watt hours) and have a manufacturer's uncertainty specification of ±5 percent. The meter must retain the kilowatt-hour production data in the event of a power outage and must provide a display of system output that the customer can easily view and understand. A system need not include a separate meter if the system is installed with an inverter that contains internal metering and display equipment that meets the meter requirements above. The meter requirement also applies to system additions if the existing system does not include a performance meter. A list of eligible performance meters and inverters that have built-in meters is available at [www.consumerenergycenter.org/erprebate/equipment.html].

J. Equipment Sellers/ Installers

To participate in the ERP, companies that sell and/or install system equipment must be self-registered on the Energy Commission's Contractors, Installers, and Sellers Database. Equipment sellers/installers should have the following information available prior to self-registration:

1. Business name, address, phone, fax, and e-mail address
2. Owner or principal contact
3. Business license number
4. Contractor license number (if applicable)
5. Proof of good standing on the records with the California Secretary of State, as required for corporate and limited liability entities
6. Reseller's license number

This information must be submitted to the Energy Commission through the self-registration process before a company can become eligible to participate in the ERP. To remain eligible, this information must be resubmitted annually by March 31.

Self-registration can be done on-line at:
http://gosolarcalifornia.ca.gov/database/addcompany.php.

Sellers, contractors, or installers that are listed in the online Database should maintain their information on a regular basis. This can be done using the log-on account name and password provided when the company has registered. Updates can be done online at:

http://www.gosolarcalifornia.ca.gov/database/updates.php

The Energy Commission will send out emails periodically to remind companies to update their online information, contacts, and other data.

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8 A performance meter is a device which measures and displays the energy output of the renewable energy system.

It is the responsibility of each company to maintain its online information. If the Energy Commission's e-mails are returned as undeliverable, and the Energy Commission cannot reach that company by phone or by regular U.S. mail, the Energy Commission reserves the right to remove the company from the online database after a three-month period.

The above information must be on file with the Energy Commission before the applicant can receive any reservation confirmation or payment. The Energy Commission will compile the information and make it available to consumers to assist them in making purchase decisions and effectuating remedial action. Information about registered equipment sellers will be posted on the Energy Commission's website at [www.gosolarcalifornia.ca.gov/retailers/search-new.php].

Payment requests must be mailed, but reservation requests, and responses to Energy Commission correction requests may be faxed.

K. Audits and Inspections

The Energy Commission will conduct audits of the applications it receives to verify that the information provided in the applications is true and correct. The Energy Commission may also conduct field inspections to verify systems are operating properly and installed as specified in the reservation request and payment claim applications.

In the event that a contractor, equipment seller, or purchaser provides information in a reservation application or payment request that appears to be questionable, the Energy Commission may take the following steps to clarify the questionable information:

1. Stop review of the application containing the questionable information to investigate further.

2. Require additional documentation from the contractor, equipment seller, and/or purchaser to verify the accuracy of the questionable information.

If the questionable information appears to be false or misrepresented, the Energy Commission will take one or more of the following corrective measures:

1. Reject the reservation application, or if a payment application, reject the payment request and cancel the reservation.

2. Notify the proper authorities, including the Contractors State Licensing Board, so appropriate enforcement action may be taken.

3. Suspend review of all other applications submitted by or associated with the contractor, equipment seller, or purchaser to review whether false or misrepresented information was provided in those applications.

4. Require additional documentation from the contractor, equipment seller, or purchaser to verify if false or misrepresented information was provided with these other applications.

5. Notify purchasers identified in these other applications that additional information will be required to keep approved applications active or to process payment requests, and that the processing of any such applications will likely be delayed.

6. Require supporting documentation for all new applications and payment requests submitted by or associated with the contractor or equipment seller.

7. Require that all payment requests submitted by or associated with contractor, equipment seller, or purchaser be supported by additional verification of payments made by the purchaser, including bank statements, cancelled checks, credit card statements, or other similar documentation.
8. Post information on the Energy Commission website which informs consumers that:

    1) Additional information is required when applying for reservations or payments using the contractor or equipment seller, and

    2) Any applications submitted by or associated with the contractor or equipment seller will be subject to a more thorough review which will delay the processing of these applications.

III. Incentives Offered Through This Program

A. Rebates Offered

The rebates offered through this program are based on the generating capacity of a system and vary by system size, technology, and type of installation. The incentive must be used to reduce the purchase or lease cost of the eligible system, or the cost of electricity produced by the eligible system for the on-site customer.

The rebates offered for professionally installed new systems are identified below in Table 1. A 15 percent lower rebate is also available for self-installed systems. Additionally, special rebates may be available for systems installed for affordable housing. Because these special rebates target specific groups or classes of customers, they are discussed separately in Chapter VIII of this Guidebook. Under no circumstance will the incentive from the ERP exceed the net purchase price of the system to the final customer (before ERP incentives).[9]

Table 1 lists the rebate levels available as of April 7, 2010, by size category and technology type. The rebate level for the first 10 kW of a small wind system is $3.00 per watt through April 6, 2011, and will revert to $2.50 per watt on April 7, 2011. The Energy Commission will conduct a review on the adequacy of the rebate level before April 7, 2011.

Table 1: Rebates Available for Emerging Renewable Systems

Technology Type	Size Category	Rebate Offered
Fuel Cells using a renewable fuel	<30 kW	$3.00 per watt
Wind	First 10 kW	$3.00 per watt through April 6, 2011 $2.50 per watt beginning April 7, 2011
	Increments between > 10 kW and <30 kW	$1.50 per watt

9 The net system price is based on the system's eligible costs as described in Chapter VII of this guidebook.

B. Other Incentives May Affect Rebate Amount

The rebate amount received from the Energy Commission may be reduced for applicants who receive incentives from sources other than the ERP that lower the cost of a generating system. No less than 5 percent of incentives received or expected must be subtracted from the rebate amounts listed in Table 1 if the applicant receives incentives from other utility incentive programs, a State of California sponsored incentive program, or a federal government sponsored incentive program, other than tax credits. The percent reduction will be increased as necessary to ensure the sum of all incentives received or expected from all sources, including the ERP, does not exceed the total cost of the system. No applicant may be issued a reservation or receive payment from the ERP for any system or portion of a system that has received payment from the Energy Commission's New Solar Homes Partnership, California Public Utilities Commission-approved Self-Generation Incentive Program or California Solar Initiative, the Rebuild a Greener San Diego program, or any other rebate program using electric utility ratepayer funds, or that is participating in and eligible to receive payment under such programs.

See Chapter VIII of this guidebook for information regarding rebate levels for qualifying affordable housing.

C. Adjustment of Rebate Levels

The rebate levels for all technology types, over time, may be periodically reduced and will be included in future editions of the *ERP Guidebook*.

IV. Reservation Process

Through this program, funding is reserved for applicants who have committed to purchase and install an eligible system at a given site. A funding reservation provides the purchaser assurance that the reserved funds will be available when the payment claim is made. The standard reservation period is for 12 months. The reservation period for systems installed on public and charter schools and new construction is 18 months. Multiple systems at each site are treated as a single system for purposes of determining the appropriate rebate. The site is defined as a single parcel of real property plus any improvements on that site.

In cases where multiple systems are installed, all generating capacity on the site is treated as a single system. For example, a 5 kW renewable energy system and a 3 kW renewable energy system on the same property are treated as a single 8 kW system for purposes of reserving funds and calculating the rebate payment. However, in cases where there are five or more high density dwelling units, such as condominiums or apartments on a single parcel, utility meter numbers will be used to determine the number of reservations that may be granted for systems installed at the site. For example, an apartment complex comprised of five separate apartments each with its own designated electric utility meter is eligible to receive five separate reservations up to a maximum of 30 kW each.

Applicants with an 18-month reservation period cannot reapply for a new reservation during the term of their original reservation period. These applicants may reapply for a new reservation only after the term of their original reservation period expires, and may qualify for rebate levels available at that time.

Funding reservations are made only for complete applications on a first-come, first-served basis. Applications that are missing application forms or have omissions or discrepancies will not be approved or processed. The applicants that submitted these applications will be notified and directed to submit new applications if interested in applying for program funding. The applications that are rejected will normally be kept by the Energy Commission for approximately three months after being rejected. In the case of omissions that do not affect eligibility or the amount reserved, the purchaser and equipment seller may be asked to provide additional information to clarify the application.[10] If additional information is requested, the application will not be processed unless the requested information is provided within the time period specified in the request (usually 30 days). If the requested information is not provided within the time period specified in the request, the purchaser will be notified to reapply as specified above.

No payment will be made unless the installed system meets all applicable ERP requirements even if funds are reserved.

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10 Examples of omissions that do not affect eligibility include situations where the required information is provided in an application, but the information is not legible, or where pertinent information is missing from an application's supporting documentation, as in the case of a partial utility bill that does not clearly specify a street address.

Only one reservation and one rebate payment will be allowed for each site with a standard 12 month reservation period.[11] The application information and funding reserved can be modified (except for the reservation expiration date) within that 12- month reservation period with supporting documentation and if sufficient funds are available.

A. Reserving a Rebate

This section describes the paperwork that is normally required to reserve funding for a standard rebate. Please be sure to submit a complete reservation application and provide all the supporting documentation as described below to receive your reservation approval. The application will not be reviewed if incomplete and will be rejected. The reservation process will be delayed if incorrect or non-complying information is received. To obtain a rebate reservation, all applicants must submit at minimum the following items:

- A completed Reservation Request Form (CEC-1038 R1)
- Copy of agreement(s) to purchase and install a system
- Evidence that site electricity load is supplied by an eligible utility
- Payee data record (Form STD-204) for the rebate recipient
- For fuel cell systems, a completed Fuel Cell Supplemental Informal Form (CEC-1038-R1A) is required.

Please see Chapter V for the documentation requirements to claim a rebate payment.

Chapter VIII covers the special funding requirements for the rebates offered for affordable housing. Appendix 5 covers new construction, systems installed on property owned by retailers and/or contractors, adding to existing systems, and systems that are leased by the end-use customer or provide electricity to the end-use customer under a power purchase agreement.

1. Reservation Request Form

The Reservation Request Form (CEC-1038 R1) is a form that identifies most of the information needed about the proposed system and specifies what information must be submitted with the application.

The purchaser of the system must always sign the Reservation Request Form. If the equipment seller is designated as the payee, the seller (retailer or wholesaler) must also sign the Reservation Request Form. The purchaser must use a registered equipment seller. A listing of registered equipment sellers may be found at [www.gosolarcalifornia.ca.gov/retailers/search-new.php].

11 An applicant with a standard reservation may only cancel his or her reservation and reapply for a new reservation within the original 12-month reservation period if the rebate level has dropped at least one level from the rebate granted in the original reservation. A letter explaining the request must be submitted with a new reservation request form and signed by the purchaser and seller.

Eligible equipment sellers need to have registered online with the Energy Commission to be eligible to participate in the program. Reservation requests that identify ineligible retailers will not be approved unless the required business information is filed with the Energy Commission. Please refer to Section J of Chapter II for registration details.

Detailed instructions are included with the Reservation Request Form (CEC-1038 R1). These instructions also provide information on how the rebate is calculated when the rated system output exceeds the inverter(s) capacity. Appendix 1 includes a blank copy of the Reservation Request Form and accompanying instructions. To obtain additional blank forms, call the Energy Commission Call Center at (800) 555-7794 or download the forms online from the following Energy Commission website [www.consumerenergycenter.org/erprebate/forms.html].

2. Evidence of Agreement to Purchase and Install a System

Evidence of an agreement(s) to purchase and install a system must be demonstrated. How this is demonstrated depends upon whether the system is 1) owner-installed; 2) contractor-installed where the equipment seller is a separate entity; or 3) contractor-installed where the contractor is also the equipment seller.

In each of these three cases, information concerning the contractual agreements must be provided in the Reservation Request Form (CEC-1038 R1) and must be consistent among agreements and with the Form, or the application may be rejected. Regardless of the situation, agreements for the purchase of a system or system equipment must be in writing and clearly include, at a minimum, the following information:

1. The quantity, make and model number (as shown on the Energy Commission lists of eligible equipment) for the inverters, system performance meters, wind turbines or other generating equipment, including fuel cell systems.

2. The total purchase price of the system before applying the rebate.

3. Language indicating the purchaser's commitment to buy the system.

4. Printed names and signatures of the purchaser and equipment seller's authorized representative.

Installation contracts must comply with the Contractors State License Board (CSLB) requirements. In addition, these contracts must contain the following information:

1. Name, address and contractor's license number of the company performing the system installation.

2. Site address for the system installation.

3. Description of the work to be performed.

4. Total agreed price to install the system.

5. Payment terms (payment dates and dollar amounts).

6. Printed names and signatures of the purchaser and the company's authorized representative.

Please refer to the CSLB website for more information on CSLB guidelines at [www.cslb.ca.gov].

Applications with installation contracts that appear to be deficient may be forwarded by the Energy Commission to the CSLB for verification. Entities without a valid A, B or C-10 contractor's license may not offer installation services or charge for installation in any agreement.

The above requirements are sufficient evidence of an agreement to purchase and install a system for the case where a contractor sells and installs the system. For the other two cases, the following case-specific requirements must be satisfied:

A. Owner or Self-Installed System

In situations where the system is installed by the system owner, the applicant must provide the following information:

- An equipment purchase agreement as described above, OR
- In cases where there is not a signed agreement to purchase equipment the purchaser may provide invoices or receipts showing that at least 10 percent of the system equipment purchase price (generating equipment and inverters) has been paid to the seller(s).[12]

B. Professionally Installed System with Separate Seller and Installer

In situations where the purchaser is purchasing the system from one company and hiring a separate company (licensed contractor) for installation, the purchaser must obtain proof of his or her commitment to purchase and install the system in separate documents as follows:

- An equipment purchase agreement as described above, OR
- In cases where there is not a signed purchase agreement the purchaser may provide invoices or receipts showing that at least 10 percent of the system equipment purchase price (generating equipment and inverters) has been paid to the seller(s), AND
- An installation contract from the second company as described above.

12 An example of this situation is where the purchaser buys new equipment via the Internet or mail order.

3. Evidence That Site Electricity Load Is Supplied by an Eligible Utility

If the installation location currently has electrical service, the applicant must submit a recent copy of the utility bill showing the service address of the installation site, the name of the applicant, electric energy usage, and the utility name. Submit all pages of a utility bill to ensure that this information is provided. **The utility bill should be no older than six months from the date of application.** If the customer name on the utility bill is not the same as the applicant's, provide an explanation. This or other documentation must show that the annual on-site electrical load justifies the proposed system size before payment will be made (see Appendix 4).

Exception only for new construction - If the installation location is a new facility without electrical service, the applicant must identify on the Reservation Request Form (CEC-1038 R1) the electric utility that will provide electric service to the site. Documentation to show that the annual on-site electrical load justifies the system size will need to be provided before payment will be made. (See Appendix 4 for program requirements for on-site electrical loads. See also Appendix 5, Section A for additional requirements.)

4. Payee Data Record (Form STD-204)

This form must be completed by the person or business entity identified as the rebate payee on the Reservation Request Form (CEC-1038 R1). The payee data record is still required even if the rebate payee chooses to assign the payment to another party. If the designated payee has submitted a complete STD-204 form with a prior application and has already received a rebate payment within the last two years from the Energy Commission, a new STD-204 is not needed again. In these cases the Energy Commission will use data from the previously submitted STD-204 form. If the data provided in a previously submitted STD-204 has changed, the payee must notify the Energy Commission and submit a new STD-204 form.

5. Submitting Your Complete Reservation Application

The complete reservation request application must be delivered by FAX to (916) 653-2543 or by mail to:

ERP Reservation Request
California Energy Commission
1516 - 9th Street, MS-45
Sacramento, CA 95814-5512

If the application is mailed close to a scheduled rebate level decline, it must be postmarked no later than the last day before the decline to be considered for the higher rebate level. No funding will be reserved if an application is incomplete or illegible, has conflicting information or does not otherwise comply with the program requirements. The application will be approved for a reservation based on the date it is deemed complete and not the date it was first submitted. The

rebate level and other program criteria applicable on the date the application is deemed complete will apply.

As described earlier in this chapter, if the reservation request application is missing required forms or has other omissions or discrepancies, the purchaser will be notified that the application will not be approved. Any new application will be subject to the program requirements and funding availability. **Applicants are strongly encouraged to keep copies of all applications and supporting documentation submitted to the Energy Commission.**

The available rebate amount may change during the term of the program. Therefore, the Energy Commission recommends that applicants wait to install system equipment until after they receive a confirmation indicating the amount of funding that has been reserved for their rebate.

V. Payment Process

A. Claiming a Rebate Payment

To receive rebate payment, all program requirements must be in compliance and a complete claim for payment must be made before the expiration of the reservation.

1. Payment Claim Form

The Energy Commission will send a copy of the Payment Claim Form (CEC-1038 R2) to the purchaser and designated payee to confirm the amount of funding reserved on the purchaser's behalf. In most cases, the parties entering into the purchase and installation agreement(s) (purchaser and equipment seller and/or installer) must read, sign, and date the Payment Claim Form. If the purchaser alone applied for and is to receive the rebate, only the purchaser needs to sign the Payment Claim Form. This form must be returned to the Energy Commission by mail, as original signatures are required to process a payment. Please sign the form so that it is clear the signatures are original. Signing in black ink can make it difficult to distinguish whether the signature is original or a copy. In some cases, a new form with clearly original signatures may be requested. Stamped signatures are not acceptable.

Any changes to the information provided on the previously submitted Reservation Request Form (CEC-1038 R1) must be noted in the space provided on the Payment Claim Form (CEC-1038 R2). Changes from the previously submitted Reservation Request Form, such as changes in equipment, installer or equipment seller must be identified on the Payment Claim Form. If additional space is required to note such changes, additional pages may be attached to the Payment Claim Form. Changes in equipment from that identified in the previously submitted Reservation Request Form or other changes may affect the eligibility and amount of the rebate.

2. Documentation Confirming Final Payment and System Installation

Applicants must submit final system cost documentation clearly identifying the final amount paid or legally incurred to purchase the system and the final amount paid to install the system. The cost documentation must provide proof of the final amount paid or legally incurred by the applicant to the equipment seller and/or installer and provide sufficient information to clearly identify the equipment purchased and the labor paid. The final amount paid or legally incurred to the equipment seller and/or the final amount paid to the installer must match the cost information identified in the Payment Claim Form (CEC-1038 R2). To meet this requirement, the applicant must submit final invoices or a copy of the final agreement. The actual amount paid or legally incurred by the purchaser to the equipment seller and/or the actual amount paid to the installer must be clearly indicated. If there is no direct proof of actual payment from the applicant to an appropriately licensed installer, the rebate will be reduced to the owner-installed rebate level.

In addition, the final invoices or agreements should clearly indicate the extent to which the Energy Commission's rebate lowered the cost of the system to the applicant. If the applicant has entered into an agreement to pay the equipment seller over time rather than in lump sum, the final agreement must indicate the terms of payment and the amount of any deposits or payments paid by applicant to the equipment seller to date. The cost of any system installation must be paid by the applicant prior to submitting a payment request to the Energy Commission.

The Energy Commission will conduct spot checks to verify that payments were made as identified in the final invoices or agreements provided by equipment sellers and/or installers. As part of these spot checks, the Energy Commission will require applicants to submit copies of cancelled checks, credit card statements, or equivalent documentation to substantiate payments made to the equipment seller and/or installer. (When submitting this documentation, applicants are encouraged to remove their personal account numbers or other sensitive information identified in the documentation.) Applicants must explain the difference if the final amount paid by the applicant is different from the amount of the purchase or installation shown in any agreement or invoice or in the previously submitted Reservation Request Form (CEC-1038 R1).

3. Final Building Permit and Final Inspection Sign-Off

Applicants must submit a copy of the building permit and the final inspection signoff for the system installation. The name and address on the final building permit and final inspection signoff must match the name and address shown on the Payment Claim Form (CEC-1038 R2) as well as the previously submitted Reservation Request Form (CEC-1038 R1).[13]

4. Five-Year Warranty

A standard full five-year warranty form (CEC-1038 R3) must be completed and signed by the appropriate party(ies) and given to the purchaser. Submit a copy of this form with the Payment Claim Form (CEC-1038 R2) to claim the maximum incentive. If the applicant is unable to obtain warranty coverage for labor, the application will be treated as an owner installed system and will receive a rebate amount 15 percent lower.

Exception for owner installed systems - Submit copies of the manufacturer's five-year warranties for the inverters and generating equipment.

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13 Instead of a building permit and final inspection signoff, public schools, community colleges and public buildings subject to the jurisdiction of the Department of General Services, Division of the State of Architect (DSA), must submit documentation from DSA confirming either compliance with DSA standards, or an exemption from DSA standards.

5. Evidence That Site Electricity Load Is Supplied by an Eligible Utility

If the site of installation was a new facility without electrical service when the reservation request was submitted, a copy of the applicant's utility statement or other proof from the utility must be submitted before payment can be made. Other proof may include written confirmation from the utility that a meter has been installed at the site and verifying that the site had electrical service prior to the expiration of the reservation. In addition, if an electric utility bill is not provided, the applicant must provide a separate letter from a qualified architect, engineer, or electrical contractor (C-10 licensed) that identifies the expected electricity consumption at the site and verifies that the consumption will satisfy program requirements for system size.

6. System Interconnection With Utility Grid

The applicant must demonstrate that the system is interconnected to the utility distribution grid and that the utility has approved this interconnection for the system's operation at the site of installation. The applicant must demonstrate this by submitting from the utility a letter of authorization to interconnect the system.

Backup generation systems are exempt from the above requirements, unless they are serving grid-connected electrical loads.

By applying for program funding, purchasers authorize the Energy Commission during the term of the ERP to exchange purchaser information with the purchaser's utility in order to verify compliance with program requirements, including requirements for system interconnection to the utility grid.

7. Renewable Fuel Supplier Attestation

A Renewable Fuel Supplier Attestation (CEC-1038 R2A) is required for all fuel cell systems to verify the eligibility of the renewable fuel that will be used in the system. Fuel cell systems that use a non-renewable fuel, such as hydrogen produced from natural gas or other fossil fuels or produced through a process energized with power from a non-eligible renewable energy resource, are not eligible for funding under the ERP. In many, if not all cases, the purchaser of the fuel cell system will have no control over how the fuel for his or her system is produced. For this reason, the supplier of the renewable fuel must provide an attestation to verify that the fuel supplied to the purchaser meets the criteria for "renewable fuel" specified in Chapter II of the guidebook.

As discussed in Chapter II, electricity from an eligible renewable energy resource may be used to make renewable fuel only when the electricity is bundled with the associated renewable attributes, so that renewable energy is used to produce the fuel. If the renewable attributes are unbundled from the electricity and disposed of separately, the fuel will be produced with null

power[14] and will not be considered a renewable fuel for purposes of fuel cell eligibility under the ERP.

8. Payee Data Record (Form STD-204)

If the data provided in a previously submitted STD-204 has changed, the payee must notify the Energy Commission and submit a new STD-204. If the payee originally identified has changed, a STD-204 form must be submitted (if the new payee was not previously paid by the Energy Commission). The STD-204 form may be found in Appendix 1 of this guidebook.

B. Submitting a Payment Claim

Once a system is installed, grid-connected[15] and operating satisfactorily, the following documents must be submitted to claim a rebate payment:

- Rebate Payment Claim Form (CEC-1038 R2).
- Documentation confirming what equipment and labor was purchased including the final amount(s) paid to purchase and install the system.
- Final building permit and final signoff.
- Five-year warranty for the system and labor, if applicable (CEC-1038 R3 form).
- If not already provided, a copy of a recent utility bill (or in the case of a new home or facility, other proof of utility service and expected electricity consumption at the site).
- A copy of the utility letter authorizing interconnection to utility grid.
- For fuel cell systems, a Renewable Fuel Supplier Attestation (CEC-1038 R2A).
- Payee data record (STD-204), if not provided with the initial application or the payee was not previously paid by the Energy Commission within the last two years.
- Payment Assignment Form (CEC-1038 R5) with wet signature, if the designated payee is assigning payment to another individual or entity.

Mail the complete Payment Claim Form (CEC-1038 R2) and supporting documentation to the Energy Commission at the address shown below on or before the expiration date specified on the Payment Claim Form. The Payment Claim Form cannot be submitted by FAX as original signatures are required on the Payment Claim Form to process rebate payments. The request for payment must be received or postmarked on or before the reservation expiration date. Be sure to keep a copy of the Payment Claim Form together with the purchase and installation agreements, contracts, receipts, evidence of payment, building permit and final signoff, utility bill, etc. for your records. If the payment is being assigned to a third party, an original signature of the payee is also required on the Payment Assignment Form (CEC-1038 R5).

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14 Null power refers to renewable energy that has been stripped or unbundled from its renewable attributes. These renewable attributes may be disposed of separately.
15 This does not apply to backup generation systems, unless the systems are serving grid-connected electrical loads.

Payment Claim Forms should not be submitted unless a complete application can be provided and all eligibility requirements can be met. The application must document that utility service existed at the site and that the system's installation was signed off by the building department prior to the expiration date of the applicant's reservation, otherwise the system does not meet the conditions of the reservation and the applicant will be required to reapply under the program rules and funding availability in effect at the time of reapplication.

If the payment request application is incomplete, the Energy Commission may request the provision of all missing or unclear information from the appropriate party (purchaser, equipment seller, or installer) to process the request. In that event, the Energy Commission will allow the submitting party up to 60 days to respond with all the required information to approve payment.

The request for payment will be denied if all the requested information is not received within the time period specified by the Energy Commission. Participants submitting a claim that is not received by the expiration date of the applicant's reservation or is otherwise ineligible will be sent a written notice stating the reasons why the claim was rejected. If the claim is made after the expiration date of the reservation or is otherwise ineligible, the applicant may reapply for a rebate reservation, but will be subject to the eligibility requirements, incentives, and funding available at that time of reapplication.

All required forms and supporting documentation required to claim payment shall be mailed to:

ERP Payment Claim
California Energy Commission
1516 9th Street, MS-45
Sacramento, CA 95814- 5512

The Energy Commission intends to make incentive payments within 6 to 8 weeks of receipt of a complete rebate payment claim application. Payment will be made to the seller or purchaser, as designated on the Reservation Request Form (CEC-1038 R1), unless the payee has assigned the payment to a third party, and will be mailed to the address provided by the recipient on the Payee Data Record (Form STD-204), previously submitted to the Energy Commission.

C. Claiming a Rebate Payment Without a Prior Reservation

If a rebate payment is claimed for a system not previously approved for a rebate reservation, the Payment Claim Form (CEC-1038 R2) and required documentation must also be accompanied by a completed and signed Reservation Request Form (CEC-1038 R1). The submittal should meet all requirements needed for approval and payment as described herein. Applicants without a prior reservation should be aware that program eligibility requirements and rebate levels may have changed since installation and may require the applicant to make significant and costly changes to the system in order for it to qualify for an incentive.

D. Assignment of Rebate Payment

The designated payee of the rebate payment may assign his or her right to receive the payment to a third party by completing the Reservation Payment Assignment Form (CEC-1038 R5) and submitting it with the Payment Claim Form (CEC-1038 R2). The Reservation Payment Assignment Form may not be submitted by FAX as original signatures are required to process the assignment. Payees that assign their rebate payment to a third party will still be reported as the recipients of said payments for tax purposes.

VI. Modifications or Changes to Reservations

A. Can Installed System Be Different Than Reservation?

The Energy Commission expects a system to be installed as described in the Reservation Request Form (CEC-1038 R1), but recognizes that minor changes may result during installation. Minor changes do not require prior approval, but must be documented on the Payment Claim Form (CEC-1038 R2) and may change the rebate amount. Minor changes include decreases in the system size (while staying within the Energy Commission size categories), changes in the equipment seller and/or installer, and changes from one make or model of a certified system component to another. Any changed rebate amount that occurs is subject to availability of funding.

1. How Do Changes Affect the Rebate Amount?

Modifications to an approved reservation may be made prior to a payment claim or when the complete payment claim is submitted. When a modification includes parameters that affect incentive amounts, a new incentive amount will be calculated and the calculation will be based on the program parameters at the time a modification request, with supporting documentation, is deemed complete. Parameters affecting the incentive include the installation type, system size, and technology. If any change results in the installed system differing in its rated electrical output or other parameters from the system originally specified in the Reservation Request Form (CEC-1038 R1), a new rebate payment amount will be calculated.

If any change occurs that would have decreased the original rebate calculation, the amount reserved will also be decreased by the same factor. For example, if the installed system is smaller in output than originally specified in the Reservation Request Form, the new rebate amount will be determined by prorating the amount reserved downward (using the same rebate level that was used to calculate the original rebate amount).

Any change that may result in a higher incentive will be recalculated and either reserved or paid without requiring a new application to be submitted. If a system's total calculated capacity is increased in size, the incremental increase in capacity will be calculated at the rebate level available at the time the modification request was made. Similarly, if the installation type changes from a professional install to an owner-install, the incentive is reduced by 15 percent.

The amount reserved will be increased if the incentive calculated for the entire proposed project is higher than the amount already reserved, provided there is adequate ERP funding for the increased rebate amount. The Energy Commission may not be able to increase the rebate amount reserved if no additional funds are available. See Appendix 5 for additions to existing systems.

Table 2: Example Rebate Payment Calculations

Description of application information and resulting rebate calculations after changes are made	*Rebate Calculation*	*Total Rebate*
Base Case – Funding reserved for a 10,000 watt wind system installed by contractor with a $3.00/watt and $1.50/watt rebate level	**(10,000 x $3.00) =**	**$ 30,000**
Change to owner install during **$3.00/watt and $1.50/watt** rebate level with no other changes to base case (owner-installed systems receive 85% of full rebate)	**(10,000 x $3.00) x .85 =**	$25,500
Add 1,000 watts during **$3.00 and $1.50** rebate level with no other changes from base case	**(10,000 x $3.00) + (1,000 x $1.50) =**	$31,500
Add 1,000 watts and change to owner install at **$3.00 and $1.50** rebate level	**(10,000 x $3.00) + (1,000 x $1.50) x .85 =**	$ 26,775
Reduce size by 500 watts during **$3.00 and $1.50** rebate level *	**(9,500 x $3.00) =**	$ 28,500

*The above examples are for a system that was reserved funds at $3.00/w, but then modified (increased or decreased in size) before requesting a rebate payment.

VII. Eligible System Costs

In most cases, the system cost will not affect the eligible incentive amount, but is needed for a variety of reasons. First, the Energy Commission is interested in having information about system prices to evaluate future rebate levels and monitor whether the program goals are being achieved. Second, total costs are needed to assure the incentive does not exceed the net purchase price of the system.

A. What System Costs Are Eligible?

In addition to the cost of permits issued by local building departments or appropriate government entities, the labor to install the electricity generation system and sales tax, the program covers only the following specific eligible components and equipment:

Small Wind: The wind turbine, tower, wire, inverter, foundation (for free standing systems), kWh system performance meters, and utility required interconnection equipment.

Fuel Cells: The renewable gas pre-treatment equipment (but not the gas collection or production equipment), fuel processor, cell stacks, fuel storage for backup unit generation, inverter and power conditioning equipment, cooling equipment, foundation (for free-standing systems), simple kWh system performance meters, and utility required interconnection equipment.

B. What Costs Are Not Eligible?

Many of the system costs included in the purchase or installation contracts may not be eligible. The purchaser or equipment seller must provide details to separate these costs from eligible costs. The cost of any equipment used to store the electricity produced is not eligible (e.g., batteries, charge controllers, battery cables, etc.). The cost of tools is not eligible.

Other ineligible costs include items that are not typically required for the installation of an eligible system. These ineligible costs include, but are not limited to, tree trimming, fencing, re-roofing, roof repairs or reinforcement, landscaping, relocating vent pipes, and moving HVAC or other equipment. Additionally, financing fees or costs incurred by either the purchaser or the equipment seller are ineligible.

VIII. Special Funding

A. Special Funding for Affordable Housing Projects

Pursuant to Assembly Bill 58 (Keeley, Chapter 836, Statutes of 2002), the Energy Commission has established a higher rebate level for qualifying systems installed on affordable housing projects. Qualifying systems include systems connected to and serving the energy needs of: 1) residential units subject to affordability requirements, 2) the office and residential unit of the project manager, provided all other residential units in the project are subject to affordability requirements, and 3) the common areas of the project, such as laundry rooms and parking structures, provided all residential units in the project (except the manager's unit) are subject to affordability requirements.

Qualifying systems installed on affordable housing projects will receive a rebate 25 percent higher than the standard rebate level, not to exceed 75 percent of the system cost, if the following additional criteria are met:

- The affordable housing project was undertaken pursuant to section 50052.5, 50053 or 50199.4 of the Health and Safety Code or other affordable housing law. Applicants must demonstrate this by providing documentation that identifies the statutory basis under which the project was undertaken. In addition, the applicant must provide a copy of the regulatory agreement or approval for the project's development that identifies 1) the project, 2) the number of residential units in the project subject to affordability requirements, and 3) the applicable affordability requirements for these residential units. The regulatory agreement or approval must expressly limit residency in the affordable residential units to persons with extremely low, very low, lower or moderate income persons as defined by the Health and Safety Code section 50052.5, 50053, 50199.4, or regulations adopted by the California Department of Housing and Community Development for a period of 45 years.

- Each residential unit (apartments, multifamily homes, etc.) for which a system is being installed has an individual electric utility meter. Applicants must provide documentation from the electric utility confirming service and meter number.

- Each residential unit for which a system is being installed is at least 15 percent more energy efficient than the current standards specified in Title 24 of the California Code of Regulations or has already taken or will take measures to reduce the unit's energy use by at least 15 percent as calculated pursuant to Title 24 compliance models (usually C2R model runs). When systems are installed to serve the energy needs of a project's common areas, the entire affordable housing project must be at least 15 percent more energy efficient than the current standards specified in Title 24 of the California Code of Regulations or must have already taken or will take measures to reduce the entire project's energy use by at least 15 percent as calculated pursuant to Title 24 compliance models. Applicants must provide the energy efficiency calculations performed by an individual certified by the California Association of Building Energy Consultants (CABEC). For a list of Certified Energy Plans

Examiners, visit the Energy Commission's website at [www.energy.ca.gov/efficiency/cabec_roster.html].

Appendix 1 Forms and Worksheets

CEC-1038 R1-	Reservation Request Form (All technologies)
CEC-1038 R1A -	Fuel Cell Supplemental Information Form (Fuel Cell technologies only)
STD 204 -	Payee Data Record
CEC-1038 R2 -	Payment Claim Form
CEC-1038 R2A -	Renewable Fuel Supplier Attestation (Fuel Cell technologies only)
CEC-1038 R3 -	Minimum Warranty Form
CEC-1038 R5 -	Reservation Payment Assignment Form

CEC-1038 R1, (1-2007)

R1

RESERVATION REQUEST FORM
EMERGING RENEWABLES PROGRAM

☐ Modify Existing Record # _____
☐ Affordable Housing Project
☐ New Construction

1. Physical Site of System Installation

Street Address:

City: | State: | Zip

2. Purchaser Name and Mailing Address

Phone: ( ) | Fax: ( )

3. Equipment Seller (Must be registered)

Company:

City: | CEC ID (if known)

Phone: ( ) | Fax: ( )

4. System Installation (Write "Owner" if not hiring contractor)

Company:

City: | License No.:

Phone: | Fax:

5. Electric Utility (Attach all pages of monthly statement)

☐ PG&E ☐ SCE ☐SDG&E ☐ BVE | Service ID:

Billing Period: | KWh Used:

Note: If new construction attach building permit. Permit No. _____

Submit complete application by fax at (916) 653-2543 or by mail to:

California Energy Commission
Emerging Renewables Program (MS-45)
1516 Ninth Street
Sacramento, CA 95814-5512

6. Equipment (Turbines, fuel cells, inverters, meters)

	Quantity	Manufacturer, Model (see CEC lists)
Generating Equipment		
Inverters, Meters		

Estimated annual energy production ____ **kWh/Year**

7. Rebate and Other Incentives

System Rated Output _____ watts

Total System Cost: $ _____

Expected Rebate: $ _____

Pay Rebate to: ☐ Purchaser ☐ Seller

8. Fuel Cell System. ☐ No ☐ Yes. If yes attach completed R1A Fuel Cell Supplemental Information Form.

Other Incentives: $ _____
Source/Record No.: _____

9. Declaration

The undersigned parties declare under penalty of perjury that the information provided in this form and the R1A form, if applicable, and the supporting documentation submitted herewith is true and correct to the best of their knowledge and that the following is true:

1. All system equipment is new and unused and has been purchased within the last 18 months;
2. The generating system is intended primarily to offset Purchaser's electrical needs at the site of installation;
3. The generating system will be operated at the above site of installation for its useful life or the duration of the applicable lease agreement;
4. If the generating system is a fuel cell system, it will only use renewable fuel;
5. If the generating system is leased or provides electricity under a power purchase agreement the undersigned parties will comply with the special reporting requirements and will repay some or all of the ERP funding he or she receives if the lease agreement or power purchase agreement is terminated within five years of the system's installation or the start date of the agreement, whichever is later; and
6. The generating system will be interconnected with the distribution system of the electric utility identified above, unless the system is for backup generation that will not be serving grid-connected electrical load.

The undersigned parties further acknowledge that they are aware of the requirements and conditions of receiving funding under the Emerging Renewables Program (ERP) and agree to comply with all such requirements and conditions as provided in the Energy Commission's ERP Guidebook and Overall Program Guidebook as a condition to receiving funding under the ERP. The undersigned Purchaser authorizes the Energy Commission during the term of the ERP to exchange information on this form with the Purchaser's electric utility to verify compliance with the requirements of the ERP.

Purchaser Signature	Equipment Seller Signature
Print Name: _____	Print Name: _____
Signature: _____ Date: _____	Signature: _____ Date: _____

Necessary Supporting Documentation.
1. All pages of a monthly electric utility bill.
2. Agreements to purchase and install equipment.
3. Payee Data Record (Form STD-204) if payee identified has not previously been paid by the Energy Commission.
4. If not a standard rebate application, attach other required documentation as specified in the ERP Guidebook.
5. For fuel cell systems – A Fuel Cell Supplemental Information Form (CEC-1038 R1A).

INSTRUCTIONS FOR THE RESERVATION REQUEST FORM (CEC-1038 R1)

Title Box: Indicate if the request is to modify an existing reservation application, is for affordable housing, or new construction.

Section 1. Physical Site of System Installation
Provide the complete address for the site (parcel) of installation. Note that the site is the legal parcel of land on which the system is installed.

Section 2. Purchaser
Provide the purchaser name, company name if appropriate, and complete mailing address (as it would be written on a letter to be mailed). Enter the site address information even if it is the same as the site of installation address. Also enter the phone number and fax number of the purchaser.

Section 3. Equipment Seller Information
Provide the name of the equipment seller's company and city where located. If known also enter the CEC ID number for the seller available from the list of eligible equipment sellers [www.consumerenergycenter.org/erprebate] for most companies. Also enter the phone number and fax number. The equipment seller must register with the Energy Commission each year for the application to be considered. If not already registered provide a filled out Seller Registration Form (CEC-1038 R4) with the application. The seller must also sign and date the application form if the seller is the designated payee of the rebate. Enclose a copy of the purchase agreement with the application form.

Section 4. System Installation
Identify the name of the company hired to install the system or write in "owner install" (if a contractor is not hired and paid by the purchaser to install the system, the application will qualify for a 15% lower rebate). If installed by a licensed contractor, provide the contractor's license number, phone and fax number. All contractors must have an active "A", "B" or "C-10". A standard five year warranty form (Form CEC-1038 R3) must be submitted when payment is requested for systems installed by a contractor to qualify for the full rebate amount. Enclose a copy of the signed contract with the application form.

Section 5. Utility Bill
Identify the Purchaser's electric utility provider at the site where the system will be installed. Also identify from a monthly billing statement the service ID number, billing start and end period, and the energy usage in kWh for that monthly period. Provide all pages of the monthly billing statement with the application.

Section 6. System Equipment (Turbines, inverters, performance meters and other)
Provide the quantity, name of the manufacturer and exact model number for the eligible equipment as identified at [www.consumerenergycenter.org/erprebate]. Clearly identify the generating equipment such as wind turbines in the upper section. Also identify the inverters and system performance (kWh) meters (some inverters contain eligible performance meters). Eligible generating equipment, inverters and rating information is located on the Commission's website [www.consumerenergycenter.org/erprebate]. Calculate and include the system output by multiplying the inverter efficiency rating by the quantity and rating of the generating equipment used.

Section 7. Rebate and Other Incentive Information
Calculate and include the system output by multiplying the quantity of generating equipment, and the generating equipment rating in watts.

Quantity x Equipment Rating = System Output (watts)

Provide the system installed cost (before the ERP rebate). The ERP requires that incentives from other sources be accounted for before determining the rebate from the ERP. Five percent of any incentive received or expected from a utility incentive program, a State of California or federal government sponsored incentive program, other than tax credits, must be subtracted from the ERP rebate amount requested. The "Total Request" should therefore be based on the ERP rebate level in place at the time the application is received by the Commission and the system cost after subtracting other incentives.

Check the box indicating whether the incentive is to be paid to the purchaser or seller. If any, identify incentives expected or received from other sources. If an incentive from the ERP was received previously for this site, include the incentive amount and, if known, the reservation number, for the prior application.

Section 8. Fuel Cell Systems
Identify whether the renewable energy system is a fuel cell system. Applicants of fuel cell systems must submit a completed Fuel Cell Supplemental Information Form (CEC-1038 R1A) with their Reservation Request Form.

Section 9. Declaration and Signatures:
The purchaser must always print and sign his or her name on the form. If the seller is designated as the payee, the seller must also sign his or her name on the form.

Submit your request by fax (916) 653-2543 or by mail to:
ERP, Reservation Request
California Energy Commission
1516 9th Street, MS-45
Sacramento, CA 95814-5512

R1A	FUEL CELL SUPPLEMENTAL INFORMATION *EMERGING RENEWABLES PROGRAM*	Please submit form to: California Energy Commission Renewable Energy Program 1516 Ninth Street, MS-45 Sacramento, CA 95814-5512

SUPPLEMENTAL INFORMATION

1. Expected Type(s) of Renewable Fuel To be Used by Fuel Cell System:	*2. Expected Hours of Annual Operational for Fuel Cell System:*	*3. Expected Renewable Fuel Usage Annually (ft^3, gallons):*
4. Expected Heat Input of Renewable Fuel (mmBTU/ ft^3 or gallon of fuel):	*5. Expected Onsite Storage Capacity of Renewable Fuel (ft3,gallons):*	*6. Renewable Fuel Supplier (Name and Address):*
7. Backup Generation. Will fuel cell system be used for backup generation? ☐ *No* ☐ *Yes.* If yes, will fuel cell system provide back up generation for the following purposes? a. Emergency ☐ *No* ☐ *Yes* b. Safety ☐ *No* ☐ *Yes* c. Telecommunication ☐ *No* ☐ *Yes*		

This Fuel Cell Supplemental Information Form is submitted by the undersigned parties as part of their Reservation Request Application to the Energy Commission's Emerging Renewables Program (ERP). The information provided in this Fuel Cell Supplemental Information Form is subject to the declaration provided by the undersigned parties in their completed Reservation Request Application form (CEC-1038 R1).

The undersigned parties declare under penalty of perjury that the information provided in this form and any supporting documentation submitted herewith is true and correct to the best of their knowledge. The undersigned parties acknowledge that they are aware of the requirements and conditions of receiving funding under the ERP and agree to comply with all such requirements and conditions as provided in the Energy Commission's ERP Guidebook and Overall Program Guidebook as a condition of receiving funding under the ERP.

[PURCHASER SIGNATURE]	***[EQUIPMENT SELLER SIGNATURE]***
*Signature:*_____	*Signature:*_____
*Print Name:*_____	*Print Name:*_____

STATE OF CALIFORNIA-DEPARTMENT OF FINANCE

PAYEE DATA RECORD

(Required when receiving payment from the State of California in lieu of IRS W-9)

STD. 204 (Rev. 6-2003)

1

INSTRUCTIONS: Complete all information on this form. Sign, date, and return to the State agency (department/office) address shown at the bottom of this page. Prompt return of this **fully completed** form will prevent delays when processing payments. Information provided in this form will be used by State agencies to prepare Information Returns (1099). See reverse side for more information and Privacy Statement.

NOTE: Governmental entities, federal, State, and local (including school districts), are not required to submit this form.

2

PAYEE'S LEGAL BUSINESS NAME (Type or Print)	
SOLE PROPRIETOR – ENTER NAME AS SHOWN ON SSN (Last, First, M.I.)	**E-MAIL ADDRESS**
MAILING ADDRESS	**BUSINESS ADDRESS**
CITY, STATE, ZIP CODE	**CITY, STATE, ZIP CODE**

3

PAYEE ENTITY TYPE

CHECK ONE BOX ONLY

ENTER FEDERAL EMPLOYER IDENTIFICATION NUMBER (FEIN): ___ - _____

☐ **PARTNERSHIP**

☐ **ESTATE OR TRUST**

CORPORATION:

- ☐ **MEDICAL** (e.g., dentistry, psychotherapy, chiropractic, etc.)
- ☐ **LEGAL** (e.g., attorney services)
- ☐ **EXEMPT** (nonprofit)
- ☐ **ALL OTHERS**

☐ **INDIVIDUAL OR SOLE PROPRIETOR**
ENTER SOCIAL SECURITY NUMBER: ___ - __ - ____

(SSN required by authority of California Revenue and Tax Code Section 18646)

NOTE: Payment will not be processed without an accompanying taxpayer I.D. number.

4

PAYEE RESIDENCY STATUS

☐ California resident - Qualified to do business in California or maintains a permanent place of business in California.

☐ California nonresident (see reverse side) - Payments to nonresidents for services may be subject to State income tax withholding.

- ☐ No services performed in California.
- ☐ Copy of Franchise Tax Board waiver of State withholding attached.

5

I hereby certify under penalty of perjury that the information provided on this document is true and correct. Should my residency status change, I will promptly notify the State agency below.

AUTHORIZED PAYEE REPRESENTATIVE'S NAME (Type or Print)		**TITLE**
SIGNATURE	**DATE**	**TELEPHONE** ( )

6

Please return completed form to:

Department/Office: California Energy Commission

Unit/Section: Emerging Renewables Program

Mailing Address: 1516 9th Street, MS 45

City/State/Zip: Sacramento, CA 95814-5512

Telephone: (___) _____ **Fax:** (___) _____

E-mail Address: _____

STATE OF CALIFORNIA-DEPARTMENT OF FINANCE

PAYEE DATA RECORD

STD. 204 (Rev. 6-2003) (REVERSE)

1	**Requirement to Complete Payee Data Record, STD. 204** A completed Payee Data Record, STD. 204, is required for payments to all non-governmental entities and will be kept on file at each State agency. Since each State agency with which you do business must have a separate STD. 204 on file, it is possible for a payee to receive this form from various State agencies. Payees who do not wish to complete the STD. 204 may elect to not do business with the State. If the payee does not complete the STD. 204 and the required payee data is not otherwise provided, payment may be reduced for federal backup withholding and nonresident State income tax withholding. Amounts reported on Information Returns (1099) are in accordance with the Internal Revenue Code and the California Revenue and Taxation Code.
2	Enter the payee's legal business name. Sole proprietorships must also include the owner's full name. An individual must list his/her full name. The mailing address should be the address at which the payee chooses to receive correspondence. Do not enter payment address or lock box information here.
3	Check the box that corresponds to the payee business type. Check only one box. Corporations must check the box that identifies the type of corporation. The State of California requires that all parties entering into business transactions that may lead to payment(s) from the State provide their Taxpayer Identification Number (TIN). The TIN is required by the California Revenue and Taxation Code Section 18646 to facilitate tax compliance enforcement activities and the preparation of Form 1099 and other information returns as required by the Internal Revenue Code Section 6109(a). The TIN for individuals and sole proprietorships is the Social Security Number (SSN). Only partnerships, estates, trusts, and corporations will enter their Federal Employer Identification Number (FEIN).
4	**Are you a California resident or nonresident?** A corporation will be defined as a "resident" if it has a permanent place of business in California or is qualified through the Secretary of State to do business in California. A partnership is considered a resident partnership if it has a permanent place of business in California. An estate is a resident if the decedent was a California resident at time of death. A trust is a resident if at least one trustee is a California resident. For individuals and sole proprietors, the term "resident" includes every individual who is in California for other than a temporary or transitory purpose and any individual domiciled in California who is absent for a temporary or transitory purpose. Generally, an individual who comes to California for a purpose that will extend over a long or indefinite period will be considered a resident. However, an individual who comes to perform a particular contract of short duration will be considered a nonresident. Payments to all nonresidents may be subject to withholding. Nonresident payees performing services in California or receiving rent, lease, or royalty payments from property (real or personal) located in California will have 7% of their total payments withheld for State income taxes. However, no withholding is required if total payments to the payee are $1,500 or less for the calendar year. For information on Nonresident Withholding, contact the Franchise Tax Board at the numbers listed below: Withholding Services and Compliance Section: 1-888-792-4900 E-mail address: wscs.gen@ftb.ca.gov For hearing impaired with TDD, call: 1-800-822-6268 Website: www.ftb.ca.gov
5	Provide the name, title, signature, and telephone number of the individual completing this form. Provide the date the form was completed.
6	This section must be completed by the State agency requesting the STD. 204.
	Privacy Statement Section 7(b) of the Privacy Act of 1974 (Public Law 93-579) requires that any federal, State, or local governmental agency, which requests an individual to disclose their social security account number, shall inform that individual whether that disclosure is mandatory or voluntary, by which statutory or other authority such number is solicited, and what uses will be made of it. It is mandatory to furnish the information requested. Federal law requires that payment for which the requested information is not provided is subject to federal backup withholding and State law imposes noncompliance penalties of up to $20,000. You have the right to access records containing your personal information, such as your SSN. To exercise that right, please contact the business services unit or the accounts payable unit of the State agency(ies) with which you transact that business. All questions should be referred to the requesting State agency listed on the bottom front of this form.

CEC-1038 R2 (1-2007)

R2 REBATE PAYMENT CLAIM FORM
EMERGING RENEWABLES PROGRAM

RENEWABLE ENERGY PROGRAM
CALIFORNIA ENERGY COMMISSION

Mail complete payment claim to:
California Energy Commission
ERP, Payment Claim
1516 Ninth Street (MS-45)
Sacramento, CA 95814-5512

Record Number _____

Payee Number _____

[CEC use only]

[CEC use only]

Total Eligible Cost: $_____ Date CFA: _____

SRO watts: _____ Rebate @ _____ = $_____

1. Confirmation of Reservation Amount

_____ has been granted a reservation of $ _____ for a _____ kW renewable energy generating system. The reservation will expire on _____. The system is being installed at _____ and is expected to produce _____ (kWh per year). The payment will be made to the _____.

The generation system must be completed and the claim submitted with the appropriate documentation by the deadline. Claims must be postmarked by the expiration date or the reservation will expire. This reservation is non-transferable. System must be installed at the installation address and sold to the above.

2. System Equipment (Wind Turbines, Fuel Cell, Inverters, kWh Meters)

Number	Manufacturer	Model

Total System Price $ _____

Amount paid by purchaser to date: $_____

Is this the same equipment identified in the R1 Reservation Request Form? ☐ Yes ☐ No

3. Modifications

Has any of the information in section 1 or from the R1 or R1A form changed? ☐ Yes ☐ No
If yes note the changes before claiming payment.

_____

_____

_____

The undersigned parties declare under penalty of perjury that the information provided in this form and the supporting documentation submitted herewith is true and correct to the best of their knowledge. The parties further declare under penalty of perjury that the following statements are true and correct to the best of their knowledge:

(1) The electrical generating system described above and in any attached documents meets the terms and conditions of the Energy Commission's Emerging Renewables Program and has been installed and is operating satisfactorily as of the date stated below.
(2) The electrical generating system described above and in any attached documents is either a) properly interconnected to the utility distribution grid and approved by the utility or will be issued utility approval to operate the system as interconnected to the distribution grid, or b) a fuel cell system for backup generation for emergency, safety, or telecommunication purposes that is serving electrical load that is not interconnected to the utility distribution grid.
(3) The rated electrical output of the generating system, the physical location of the system, and the equipment identified were installed as stated above.
(4) The electrical generating system described above and in the attached documents will only use renewable fuel if it is a fuel cell system.
(5) Except as noted above, there are no changes in the information regarding the seller, installer, purchaser, generating system specifications, installation location, price, expected operation, or renewable fuel type, expected usage or supplier from that information provided in the Reservation Request Form originally submitted by the undersigned.

The undersigned parties further acknowledge that they are aware of the requirements and conditions of receiving funding under the Emerging Renewables Program (ERP) and agree to comply with all such requirements and conditions as provided in the Energy Commission's ERP Guidebook and Overall Program Guidebook as a condition to receiving funding under the ERP. As specified in the ERP Guidebook, the undersigned Purchaser authorizes the Energy Commission during the term of the ERP to exchange purchaser information on this form with the Purchaser's electric utility in order to verify compliance with the ERP requirements. If a copy of the utility "letter of authorization to operate" the system is not submitted with this payment claim form, the undersigned Purchaser understands that he/she is obligated to submit a copy of this letter to the Energy Commission once it is received.

Purchaser	***Seller***	***Is payment assigned to another party?*** ☐ Yes ☐ No
Print Name: _____	Print Name: _____	**If yes, attach the payment assignment form (CEC-1038 R5) with original signatures.**
Signature: _____	Signature: _____	
Date: _____	Date: _____	

IMPORTANT - Necessary Supporting Documentation

1. Final building permit and final inspection signoff; 2. Final invoice(s) confirming the total amount paid for the system equipment and installation; 3. Five-year warranty (CEC-1038 R3 form); 4. Utility letter of authorization to interconnect the system 5. Utility bill or other proof of electrical service and consumption at the site of installation if not previously provided; 6. Renewable Fuel Supplier Attestation (CEC-1038 R2A), 7. Lease or Power Purchase Agreement, if applicable 8. Payee Data Record (STD-204)

INSTRUCTIONS FOR THE REBATE PAYMENT CLAIM FORM (CEC-1038 R2)

The CEC-1038 R2 form is used to request payment for a completely installed and operational renewable energy system. The form specifies information about the renewable energy system that was to be installed at the time the reservation request was initiated. It also serves as a means of documenting what changes occurred from the time the reservation request was processed until the time the system was installed. The payment claim form must be submitted before the reservation expires.

Section 1. Confirmation of Reservation Amount
Self explanatory.

Section 2. System Equipment Installed
Fill in the equipment information requested including the number of units, the make, complete model number, and voltage (if applicable). Enter the total system price and the amount paid by purchaser to date. If the system is a wind system, identify the height and site wind class.

Section 3. Modifications
Check the "yes" box if changes were made to the system and note any changes in the information from the previously submitted Reservation Request Form. If more space is required to note changes, additional pages may be added to the form. Changes in equipment from the original application may affect its eligibility and the amount of the rebate. If no changes were made, check the "no" box.

Signatures:
The purchaser must always print and sign their name on the form. If the seller is the rebate payee, the seller must also print and sign their name on the form. Enter the date of each signature. Original signatures are required on the form.

Please indicate whether the rebate payment is to be assigned to a third party. A third party is an entity other than the purchaser or seller. If yes, please fill in the name and address in the space provided and attach the original of the assignment form (CEC-1038 R5). The assignment form must contain original signatures. Payees that assign the rebate payment to a third party will still be reported as the recipient of the payment(s) for tax purposes.

Attachments:
Several attachments to the form must also be submitted before the claim will be processed. These include:

- A copy of the final building permit and final signoff
- A copy of the final invoices confirming the total amount paid for the system equipment and installation
- A copy of the completed and signed CEC-1038 R3 form (attach equipment warranty forms, if required)
- For grid-connected applications only, letter of authorization from the utility to interconnect the system.
- Copy of the utility bill or other proof of electrical service and consumption at the site of installation if not previously provided.
- For fuel cell systems, a completed and signed Renewable Fuel Supplier Attestation(CEC-1038 R2A)

Building Permit and Final Signoff:
The name and address on the building permit must match the installation address on the payment claim form.

Invoices:
The invoices must clearly identify the work that was done and the amount paid. This includes identifying the quantity, make and model numbers of major equipment installed and the labor charge for installation. To meet this requirement you may submit a copy of the final invoice(s) or a copy of the final contract(s) showing a zero balance or the amount paid by the purchaser. The invoice or contract should also indicate the extent to which the Commission's rebate lowered the cost of the system. Copies of bank statements, cancelled checks, or credit card statements may also be requested by Energy Commission staff. The final system price paid by the purchaser should match the price shown on any contract or invoice previously submitted. Any differences must be explained.

Warranty:
Complete and attach the CEC-1038 R3 form. See instructions on form for details.

Proof of Utility Interconnection:
For grid-connected systems only, utility letter of authorization to interconnect the system is required. The address in document must match the address of the installed system.

Claiming a Rebate without a Prior Reservation
To claim a rebate without a previously approved reservation, you must also submit a completed and signed Reservation Request Form (CEC-1038 R1).

Submit your request only by mail to:
ERP, Payment Claim
California Energy Commission
1516 9th Street, MS-45
Sacramento, CA 95814-5512

Allow at least 6 to 8 weeks from receipt of a complete payment claim application for payment. Payment will be mailed to the retailer or purchaser as indicated on the Reservation Request Form at the address indicated on the Payee Data Record form (STD-204), unless you have assigned payment to a third party.

R2A	RENEWABLE FUEL SUPPLIER ATTESTATION *EMERGING RENEWABLES PROGRAM*	**Please submit form to:** **California Energy Commission** **Renewable Energy Program** **1516 Ninth Street, MS-45** **Sacramento, CA 95814-5512**

I. Purchaser of Renewable Fuel Information

Purchaser Name:

Purchaser Address.

Street: City: State: Zip:

System Installation Site (street address where Purchaser's fuel cell system is installed), if different from above.

Street: City: State: Zip:

Purchaser's Fuel Cell System. Type:_____ System Rated Output (Watts):_____

Backup Generation: ☐ Yes, ☐ No. Onsite Fuel Storage Capacity (ft^3,gallon):_____ ERP Rebate No.:_____

II. Renewable Fuel Supplier Information

Company Name of Renewable Fuel Supplier:

Company Address:

Street: City: State: Zip:

Renewable Fuel Production Site (street address where renewable fuel is produced), if different from above.

Street: City: State: Zip:

Name and Title of Company Representative Completing Sections II through IV of this Form:

III. Renewable Fuel Information

Type of Fuel (e.g. hydrogen from water):

Feedstock Used to Produce the Fuel (must be from a non-fossil fuel or non-fossil feedstock):

Process Used to Produce Fuel (e.g. Electrolysis):

Source of Electricity Used to Energize Process to Produce Fuel:

Is the source of electricity used to produce the fuel an "eligible renewable energy resource" as defined in Public Utilities Code Section 399.12, with reference to Public Resources Code Section 25741? ☐ Yes, ☐ No.

If Yes, is the source of electricity a facility that has been Certified or Pre-Certified by the Energy Commission as eligible for the California Renewables Portfolio Standard (RPS)? ☐ Yes, ☐ No.

If Yes, provide the RPS Certification or Pre-Certification Identification No.:_____

Were the renewable attributes associated with the electricity used to produce the fuel disposed of separately in the form of renewable energy credits or other credits or offsets, or otherwise separated from the electricity and available for disposition, transfer or sale in the future? ☐ Yes, ☐ No.

(The electricity used to produce the fuel must remain bundled with the associated renewable attributes, so that renewable energy is used to produce the fuel. If the renewable attributes are unbundled from the electricity and disposed of separately, the fuel will not be produced with renewable energy and will not be considered a "renewable fuel" for purposes of fuel cell eligibility under the ERP.)

Energy Content of Fuel (mmBTU/ft^3,gallon):
Quantity of Fuel Supplied to Purchaser (ft^3,gallon):
Date Fuel Supplied to Purchaser:

Section IV. Renewable Fuel Supplier Attestation

I, the undersigned party, hereby declare under penalty of perjury that the information provided in Sections II through IV of this form is true and correct to the best of my knowledge. I further declare under penalty of perjury that the following is true and correct to the best of my knowledge:

1) I am an authorized representative of the company identified in Section II above and am authorized to make this attestation on the company's behalf;
2) I am aware of the requirements and conditions for receiving funding under the California Energy Commission's Emerging Renewables Program (ERP) as described in the California Energy Commission's ERP Guidebook and Overall Program Guidebook for the Renewable Energy Program;
3) I am aware that fuel cell systems are only eligible for ERP funding if they use a renewable fuel as defined in the ERP Guidebook; and
4) I am aware that the Purchaser identified in Section I above has secured funding from the ERP based on the fuel cell system described in Section I and based on the Purchaser's attestation that this fuel cell system will use the renewable fuel described in Section III above as supplied by the company identified in Section II above.

Renewable Fuel Supplier

Print Name and Title:_____

Signature: _____ Date:_____

CEC-1038 R3 (1-2007)

R3 MINIMUM WARRANTY FORM
EMERGING RENEWABLES PROGRAM

System Information

This warranty applies to the following _____ kW renewable energy electric generating system
Description: _____
Located at: _____

What is Covered

This five year warranty is subject to the terms below (check one of the boxes):

☐ **All components of the generating system AND the system's installation.** Said warrantor shall bear the full cost of diagnosis, repair and replacement of any system or system component, at no cost to the customer. This warranty also covers the generating equipment against breakdown or degradation in electrical output of more than ten percent from the originally rated output (Manufacturers rating for wind turbines); or

☐ **System's installation only.** Said warrantor shall bear the full cost of diagnosis, repair and replacement of any system or system component, exclusive of the manufacturer's coverage. (Copies of five-year warranty certificates for the major system components (i.e., wind turbines, etc. and inverter- MUST be provided with this form.)

General Terms

This warranty extends to the original purchaser and to any subsequent purchasers or owners at the same location during the warranty period. For the purpose of this warranty, the terms "purchaser," "subsequent owner," and "purchase" include a lessee, assignee of a lease, and a lease transaction. This warranty is effective from _____ (date of completion of the system installation).

Exclusions

This warranty does not apply to:

- Damage, malfunction, or degradation of electrical output caused by failure to properly operate or maintain the system in accordance with the printed instructions provided with the system.
- Damage, malfunction, or degradation of electrical output caused by any repair or replacement using a part or service not provided or authorized in writing by the warrantor.
- Damage malfunction, or degradation of electrical output resulting from purchaser or third party abuse, accident, alteration, improper use, negligence or vandalism, or from earthquake, fire, flood, or other acts of God.

Obtaining Warranty Service

Contact the following warrantor for service or instructions:

Name: _____ Phone: ( )
Company: _____ Fax: ( )
Address: _____

Signature: _____ Date: _____

CEC-1038 R5 (01-2007)

R5 RESERVATION PAYMENT ASSIGNMENT FORM

EMERGING RENEWABLES PROGRAM

RENEWABLE ENERGY PROGRAM

CALIFORNIA ENERGY COMMISSION

Record Number _____

Payee ID Number _____

Reservation Information

Payee Name: _____

Payee Address: _____

_____

Payee Contact: _____

Payee Phone #: _____

Assignment Request

I, _____, the designated payee or authorized representative of the payee, hereby assign the right to receive payment for the above noted reservation under the Emerging Renewables Program to the following individual or entity:

Name: _____

Address: _____

_____

Phone #: _____

I request that payment be forwarded to this individual or entity at the address noted. Upon request proof of payment will be forwarded to me.

Acknowledgement

As the designated payee or authorized representative, I understand that I remain responsible for complying with the requirements of the Emerging Renewables Program and will remain liable for any tax consequences associated with the reservation payment, despite the payment's assignment. I further understand that I may revoke this payment assignment at any time prior to the Energy Commission's processing of the payment by providing written notice to the Energy Commission's Renewable Energy Office. Such notice shall be provided to: Emerging Renewables Program, California Energy Commission, 1516 9th Street, MS-45, Sacramento, CA 95814-5512.

Executed on: _____

Signature: _____

Name: _____

Title: _____

This completed form may be submitted with either the Reservation Request Form (CEC-1038 R1) or the Payment Claim Form (CEC-1038 R2) for standard rebates. This form may not be submitted by telefax, as original signatures are needed to process assignment requests.

Appendix 2 Tips for Consumers

This Appendix provides some basic guidelines for those who are not familiar with renewable energy systems and may be interested in learning more. The Energy Commission has a variety of sources of additional information about choosing a renewable energy system, finding retailers, or estimating a system's energy output. This information can be obtained by visiting the Energy Commission's website at [www.consumerenergycenter.org/].

A. Choosing a Contractor

Make sure the contractor is licensed by the Contractors State License Board. State law specifies that any job that costs $500 or more (labor and materials) requires the services of a licensed contractor. As with any large purchase decision, the Energy Commission recommends that a customer obtain at least two or three bids before selecting an installer or agreeing to purchase a renewable energy system. The final contractor selection should be based on various factors including company reputation, warranty service, and installed system price. The Contractors State License Board [www.cslb.ca.gov] provides helpful consumer information, has a process to address complaints against contractors, and maintains information about the status of contractor licenses. The Energy Commission recommends that the status of the installer's contractor license be verified for consumer protection.

B. Choosing a Retailer

The Energy Commission maintains a list of renewable energy system retailers to make it easier to find products in your area. The list is available on the Energy Commission's webpage at [www.gosolarcalifornia.ca.gov/retailers/search-new.php].

C. How Much Energy Does a System Produce?

The annual amount of energy from an eligible renewable energy system can be estimated and in most cases can be guaranteed by the system retailer or installer. The annual amount of wind energy at a given location can be estimated, but is somewhat difficult to predict accurately without sufficient site wind speed data. It is important to note that wind turbines are rated at a wind speed of 28 miles per hour and some wind turbines do not produce any energy until the wind speed exceeds 12 miles per hour.

Battery backup systems are an option when purchasing renewable energy system and have the advantage of providing power during a utility outage. However, adding battery back-up significantly increases the cost of the generating system, requires additional maintenance, and reduces the useful energy output of the system by about 10 to 20 percent compared to a similar system without batteries.

Be sure to compare the energy output that contractors prepare before choosing a contractor. The energy output from a system is a much better indicator of the system performance than is the systems rated output. Also, be sure to verify that your installed system has an easy to read meter installed that measures the energy produced in kilowatt hours. A meter is required by the ERP so that you will be able to determine if your system is operating properly. The utility meter only provides the net energy used at your home but does not tell you how much energy your system produces.

You may wish to consider purchasing a pre-designed packaged system to reduce the chance of safety or performance problems with mismatched equipment. Of course, all systems are not the same and may not suit your particular situation. Also, be sure that your system warranty clearly identifies the responsible party for repairing your system in the event of a malfunction or break down. Although you may be able to obtain lower prices by purchasing system components and equipment separately, keep in mind that the money you save may be more than offset by increased installation costs and lower energy output because of mismatched equipment. This, in turn, could affect your warranty coverage.

System prices vary depending on the technology, equipment type, local labor rates, site conditions, and other factors. The following table lists a range of system prices and annual energy production that are typical for wind energy system installations.

Table 3: Typical Wind Energy System Prices and Energy Production

Technology Type	Typical Energy Production (kWh/year)	Typical Installed System Prices[1]
Wind Energy Systems[2]		
3 kW	4,990 to 8,500	$12,000-18,000
10 kW	8,400 to 16,440	$30,000-50,000

1. Price examples are for 2002. The incentives will decrease to promote similar reduction in price.
2. Wind calculations based on manufacturer's predicted monthly energy production for a site with average wind speeds of 11 mph and 14 mph.

Appendix 3 Criteria for Listing Components as Eligible

This Appendix summarizes the criteria used for listing which components can be used to create a renewable energy system that is eligible for a rebate from the Emerging Renewables Program.

The equipment must meet national or internationally recognized electrical standards or other appropriate criteria. Until the equipment is listed, it is not eligible and no funding will be reserved or paid. Equipment that has not met the aforementioned requirements will not be placed on the lists.

If a component becomes decertified according to the testing requirements described below, and is removed from the Energy Commission's lists of eligible components before a reservation is granted, applicants may be required to modify their systems by replacing the decertified component with a certified component before a payment is issued.

Generating equipment (e.g. wind turbines), inverters, and performance meters are periodically added and removed from the lists of eligible equipment.

A. Small Wind

There are two options to achieve ERP eligibility for small wind systems:

1. Small wind turbines must be certified as meeting the requirements of a small wind turbine-specific safety and/or performance standard adopted by a national or international standards setting body, including, but not limited to International Electrical Code (IEC) 61400-2. The Energy Commission will monitor, review, and may participate in the Interstate Renewable Energy Council's efforts to create a national certification program.

   OR

2. Manufacturers of small wind systems must provide monthly data of average energy produced (kWh) and average wind speed for one consecutive year for each model of system they wish to be considered eligible for this program to demonstrate reliable operation of that model of equipment at a site with average annual wind speeds of at least 12 mph.

B. Fuel Cells

All fuel cells must be certified as meeting the requirements of ANSI/CSA America FC 1-2004 for fuel cell power plants.

C. Inverters

All inverters must be certified as meeting the requirements of UL 1741 **for inverters that will be used exclusively with small wind turbines or fuel cells.** Only inverters that have completed the testing will be listed as eligible equipment.

Additional testing is required by a qualified Nationally Recognized Test Laboratory for inverters that will be used with solar photovoltaic systems participating in the California Solar Initiative or the New Solar Homes Partnership.[16]

The Energy Commission also plans to consider if changes should include adjusting the ratings for inverters with battery-backup to account for losses inherent in battery back-up systems or for wind specific applications.

D. Metering Criteria

Meters must retain the kilowatt-hour production data in the event of a power outage and must be easy to read for the customer's benefit. The meter must measure the total energy produced by the system in kilowatt-hours (or watt hours) and have a manufacturer's uncertainty specification of plus or minus five percent.

E. Other Technologies

New technologies may be added by petitioning the Energy Commission, through the appropriate Committee. Applicants must submit the proper documentation satisfying all of the following criteria:

1) Financial assistance is required for these technologies to become commercially viable.
2) The technology must be commercially available with at least one vendor available for the sale of the system.
3) Vendors of any generating systems employing the technology must offer at least a five-year full warranty on the entire generating system.
4) The technology must show at least one year of demonstrated reliable, predictable, and safe performance by a full-scale facility using this technology under field conditions.
5) The available data must show that generating systems using the technology have a useful design life of at least 20 years.

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16 Nationally Recognized Testing Laboratories shall be those laboratories that have been recognized by the U.S. Department of Labor, Occupational Safety & Health Administration (OSHA), in accordance with Title 29 of the Code of Federal Regulations, section 1910.7, and are approved to conduct test UL 1741 under the scope of their OSHA recognition. A list of all current Nationally Recognized Testing Laboratories is available on OSHA's web page at [www.osha.gov/dts/otpca/nrtl/index.html]. Please note, not all of the Nationally Recognized Testing Laboratories identified on OSHA's list are approved to conduct test UL 1741.

6) The technology must be designed so that it can produce grid-connected electricity, unless the system purpose is for backup generation used for emergency, safety, or telecommunications.
7) The technology represents a new electricity generating process not well represented among existing grid-connected renewable generating facilities, rather than some evolutionary or incremental improvements to renewable technologies used in existing renewable resource technology generating facilities (examples of such evolutionary or incremental improvements will be: a) an improved blade design for wind turbines, b) less expensive well drilling techniques for geothermal, or c) a more efficient burner design for a biomass plant).
8) The project must be designed exclusively for the purpose of producing electricity for on-site use or sale (excluding demonstration projects that may sell to one specific customer), in contrast to a research or demonstration facility, which is designed primarily for collecting additional research data.

Appendix 4 Maximum System Size Calculations

This Appendix describes the method used to determine the maximum system size eligible for incentives from the program. Because the average annual residential electricity consumption in California is about 7000 kWh/yr system, 5 kW and under are exempt from the maximum size limitation.

In cases where the proposed system size is greater than 5 kW, the system must be sized that the expected production of the system is no greater than 100 percent of the building's on-site estimated annual electricity consumption. The customer may submit either a recent utility bill, the estimated annual electricity consumption of the building based on a detailed energy use calculation signed by a professional energy rater or a letter from a qualified architect, engineer, or electrical contractor (C-10 licensed) detailing expected energy consumption. In cases where the expected electricity production is greater than 100 percent of the estimated annual consumption, the rebate reserved will be reduced by an amount equal to the ratio between the estimated annual consumption and the expected system production.

If the Energy Commission calculates a reduced rebate amount, the applicant may submit subsequent utility bills within the following three months to receive their full reservation amount, provided there are sufficient program funds available at that time to make an additional payment.

Appendix 5 Atypical Incentive Applications

A. New Construction (Building Permit)

For sites that currently do not have electrical service, a copy of the building permit for the new home or major site improvement must be included with the reservation application (not remodeling projects). All approved applications for new construction will receive 18 month reservations.

B. Systems Installed by Sellers or Contractors for Their Own Personal or Business Use

Renewable energy system sellers (e.g., retailers, wholesalers, manufacturers) or contractors who arrange to have a system installed by a separate company on their own home or place of business may qualify for the full rebate. To receive a reservation, the applicant must submit documentation consistent with that of an individual independently buying a system. When an equipment seller purchases equipment for the seller's own use, the purchase agreement (or proof of purchase) must be between the purchaser and the generating equipment supplier, in most cases the wholesaler.

The supplier must be identified as the seller on the application form and must be registered with the Energy Commission. If the labor installation is done by a contractor on his own home or place of business, the application will be treated as an owner installed system unless the contractor hires an independent company to do the system installation and is able to document payments to the independent company. The purchase and installation agreements must be between two independent entities. Documentation of a purchase between two principals or owners within the same entity or between spouses is not acceptable, nor is a purchase agreement if signed by the same individual.

C. Adding to Existing Systems

Additions to existing systems will only be allowed for systems that met past program requirements and were partially funded by participating in the Energy Commission's program. For these projects, the Energy Commission has the records and documentation identifying the equipment that was installed previously, the program warranty, and system equipment standards and warranties that were met by the originally installed equipment. The newly added generating equipment must be selected from the current lists of eligible equipment and meet the current guidebook requirements. All of the current program eligibility criteria and documentation requirements apply to the added equipment.

The rebate calculation will be based on the incremental rated capacity of the added equipment. Under no circumstances will the rebate for the added equipment exceed the current rebate for the incremental watts added.

Because the rebate for wind decreases with the system size, the incremental calculation will be based on the incremental system size above the pre-existing system.

Sample Calculation - Incremental Calculation for Wind Systems

Existing 5,000 watt system, rebate amount is: $3.00 x 5,000 = $15,000
Adding 6,000 watts for a total of 11,000 watts (no inverter capacity limitation)
Current rebate level is $3.00 per watt for first 10 kW and $1.50 per watt for increments above 10 kW

The rebate available for the new addition is:
5,000 W x $3.00/watt + 1,000 x $1.50/watt (for contractor installation) = $16,500

D. Special Requirements for Leased Systems

Wind energy systems or fuel cells that are leased by an end-use customer or provide electricity to an end-use customer under a power purchase agreement (PPA) are eligible for ERP funding if the lease agreement or PPA is executed and has a start date on or after July 1, 2009. Lease agreements and PPAs that are executed or have a start date prior to July 1, 2009, are not eligible for funding even though the system may have been installed after this date. Lease agreements and PPAs must have an initial term of no less than 10 years and must provide the lessee or customer the option to renew the agreement, purchase the system, or remove the system at the end of the initial term of the agreement. In addition, lease agreements and PPAs must demonstrate that the ERP funding benefits the end-use customer by directly and exclusively reducing the lease payments for the system or the cost of electricity produced by the system.

For the first five years of the lease or PPA, the lessor or owner of the solar energy system, in the case of a PPA, shall provide an annual status report to the Energy Commission on the operation of the ERP-funded energy system. The annual status report shall address agreements executed through December 31 of each year, be submitted to the Energy Commission no later than January 31 of each year, and shall include the following information for each system:

1) Date that the agreement was fully executed and the start date of the agreement;
2) Operational status of the system; and
3) Status of the agreement, and if status has changed, date of change and reason for the change. (Status changes would primarily include, change in lessee or customer, system purchase, termination of agreement, and system removal.)

If any lease agreement or PPA for a system that received funding from the ERP is terminated and the system is removed from the building on which it was originally installed, the ERP

funding received by the applicant shall be repaid by the Lessor or system owner to the Energy Commission in the amounts specified below:

- If the agreement is terminated within one year of the system's installation or the start date of the agreement, whichever is later, 100 percent of the funding received shall be repaid;
- If the agreement is terminated within two years of the system's installation or the start date of the agreement, whichever is later, 80 percent of the funding received shall be repaid;
- If the agreement is terminated within three years of the system's installation or the start date of the agreement, whichever is later, 60 percent of the funding received shall be repaid;
- If the agreement is terminated within four years of the system's installation or the start date of the agreement, whichever is later, 40 percent of the funding received shall be repaid;
- If the agreement is terminated within five years of the system's installation or the start date of the agreement, whichever is later, 20 percent of the funding received shall be repaid;
- Repayment shall not be required if the agreement is terminated more than five years after the system's installation or the start date of the agreement, whichever is later.

Repayment will not be required if a system is destroyed by natural disaster or fire at no fault of the lessor/owner or lessee/customer.

Nothing in this section precludes an applicant from using an otherwise valid reservation to request a rebate for a system that is leased or provides electricity through a power purchase agreement.

E. Time Extension Requests

Time extensions to a reservation are not available under any circumstances. Applicants failing to install their systems and submit a complete reservation payment claim within the reservation period must reapply for funding at the rebate level and under the terms and conditions applicable at the time of reapplication.

Michael A. Klemen

8810 56th Ave N
Harwood, ND 58042
(701) 282-6550 (home)
(701) 261-5810 (cell)

Objective

I would like to be in a position with technical leadership responsibilities where I can use the full capabilities of my analytical skills.

Work Experience

North Dakota State University ***02/1999-present***

Assistant Director HRM/Financial Systems development 05-2009-present

- Project planning for Peoplesoft HRMS and Financial upgrades/patches
- Providing direction for development staff
- Improving communication among team members
- Providing development assistance for any team members

Patch Coordinator/Programmer Analyst 06/2007-05/2009

- Project planning for patching the PeopleSoft environments
- Technical lead - assisting other development staff, and work as a team member on both the HRMS and Finance development teams

Programmer/Analyst II 12/1999-06/2007

- Work as a team member in the analysis, design, coding, testing and documentation of major automated information systems
- Named Data Warehouse Team Leader in October 2000 to support the custom Data Warehouse (Executive Decision System)
- Wrote the Online Student Admissions Application in PeopleSoft as the University System converted to PeoleSoft (2002)
- Supported both the Finance and HRMS conversions to PeopleSoft (2003 & 2004)
- Lead developer in troubleshooting payroll problems in PeopleSoft (2005-present)
- Lead developer in patching PeopleSoft Financials and HRMS (2005-present)
- Lead developer in HRMS 8.3 to 8.9 upgrade (2006)

Programmer/Analyst I 02/1999-11/1999

Self Employed ***01/1995-01/1999***

- Wrote Windows 95/Windows 3.1 programs for commodity traders

Exhibit 88

- Wrote Windows 95 data acquisition program for analyzing renewable energy systems
- Analyzed renewable energy systems data
- Traded commodities

Bucknell University ***09/1994-01/1995***

Systems Integrator (temporary position) **12/1994-01/1995**

- Responsible for Unix system administration tasks for major campus computers
- Successfully determined why performance was poor on one machine that caused campus email to grind to a halt.

Client Services Analyst (temporary position) **09/1994-12/1994**

Education

Bucknell University (ABME) 1993

Joint degree - B.S. Mechanical Engineering, B.A. Computer Science

Coursework for Masters in Mechanical Engineering completed, including "Flow Induced Noise and Vibration" and "Acoustics"

State of North Dakota Basic Certification in Project Management April 16, 2002

PeopleSoft Training (Since 2002)

- PeopleTools 1 & 2
- PeopleCode
- Application Engine
- Workflow

Renewable Energy

1996 through Present – acquire and analyze renewable energy systems data using custom-written data acquisition and analysis programs

1997 – Home Power Magazine Article "*Wind Speed Data and its Application to Wind Generated Power*"

1998 through present - member of AWEA-Wind-Home (now Small-Wind-Home) Wind Energy discussion list on Yahoo! Groups

2000 through present (approx) – maintain a small wind energy web site, and FAQ for AWEA-Wind-Home (http://www.ndsu.edu/ndsu/klemen)

2002 - Presentation "*RE: What Really Matters (What I've Learned)*" at Midwest Renewable Energy Association's Annual Energy Fair

2003 – Board of Directors ND SEED (North Dakota Sustainable Energy for Economic Development)

2004 – Global WINDPOWER 2004 - Presentation "*Experiences in Testing Numerous Small Wind Turbines and Comments on Turbine Design*"

2005 – Small Wind Turbine Certification – was a member of the group that developed the pending AWEA Standard for Small Turbines

2008 – Presentation "*Small Wind Testing Workshop*" to be given at NREL (National Renewable Energy Labs) September 12, 2008

2009 to present - Certification Commissioner for the Small Wind Certification Council

Attachment B

California Energy Commission Agreement Number 400-07-030 with KEMA Inc.

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512

July 16, 2008

Nellie Tong
Kema, Inc.
492 Ninth Street, Suite 220
Oakland, CA 94607

Re: Agreement Number: 400-07-030
Technical Assistance for the Renewable Energy Program

Dear Ms. Tong:

Enclosed is the fully executed copy of the above-referenced Agreement for your records. You are now authorized to provide the agreed upon services.

If you have any questions or need clarification on items requested, please contact me at (916) 654-5833 or ltomita@energy.state.ca.us.

Sincerely,

LORI TOMITA
Contracts Officer

Enclosures

cc: File
Rachel Salazar
Accounting

STANDARD AGREEMENT
STD. 213 (NEW 06/03)

AGREEMENT NUMBER
400-07-030
REGISTRATION NUMBER
33600708322450

1. This Agreement is entered into between the State Agency and the Contractor named below

STATE AGENCY'S NAME
State Energy Resources Conservation and Development Commission (Energy Commission)

CONTRACTOR'S NAME
Kema, Inc. June 9, 2008

2. The term of this Agreement is: ~~May 1, 2008~~ to April 30, 2011. The effective date of this Agreement is either the start date or the approval date by the Dept. of General Services, whichever is later. No work shall commence until the effective date.

3. The maximum amount of this Agreement is: $3,681,000.00

4. The parties agree to comply with the terms and conditions of the following exhibits which are by this reference made a part of the Agreement:

Exhibit A – Scope of Work	19	Pages
Exhibit B – Budget Detail and Payment Provision	5	Pages
Exhibit B – Attachment B-1	8	Pages
Exhibit C* – General Terms and Conditions	GTC 307	
Exhibit D – Special Terms and Conditions	10	Pages
Exhibit E – Additional Provisions	7	Pages
Exhibit F – Contacts	1	Page

Items shown with an Asterisk (*), are hereby incorporated by reference and made part of this agreement as if attached hereto. These documents can be viewed at www.ols.dgs.ca.gov/Standard+Language

IN WITNESS WHEREOF, this Agreement has been executed by the parties hereto.

CONTRACTOR	California Department of General Services Use Only
CONTRACTOR'S NAME *(If other than an individual, state whether a corporation, partnership, etc.)* Kema, Inc.	
BY *(Authorized Signature)* Karin Corfee — DATE SIGNED *(Do not type)* 4/30/08	
PRINTED NAME AND TITLE OF PERSON SIGNING Karin Corfee	APPROVED JUL 11 2008 DEPT OF GENERAL SERVICES
ADDRESS 492 Ninth Street, Suite 220, Oakland, CA 94607	
STATE OF CALIFORNIA	
AGENCY NAME State Energy Resources Conservation and Development Commission (Energy Commission)	
BY *(Authorized Signature)* Cheryl Raedel — DATE SIGNED *(Do not type)* 5-21-08	☐ Exempt per:
PRINTED NAME AND TITLE OF PERSON SIGNING Cheryl Raedel, Contracts Office Manager	
ADDRESS 1516 Ninth Street, Sacramento, CA 95814	

EXHIBIT A
SCOPE OF WORK

PURPOSE

The purpose of this contract is to provide technical assistance to the California Energy Commission (Energy Commission) to support its Renewable Energy Program (REP) and responsibilities related to the California Renewables Portfolio Standard (RPS).

Primary Tasks

The amount of consultant assistance required for each project will vary depending on the availability of Energy Commission staff with expertise in specific areas and the sensitivity of issues associated with each project. Final assignment of tasks and maximum payment on individual projects will be described in work authorizations issued by the Energy Commission Contract Manager.

Through the work authorization process, the Contractor may be assigned work on a variety of tasks related to the REP or its program elements, including contract management; assistance with the Existing Renewable Facilities Program; assistance with the RPS; assistance with the New Renewable Facilities Program; assistance with the Renewable Rebate Programs or related activities (including the Emerging Renewables Program, New Solar Home Partnership, and Senate Bill 1[1] activities); assistance with the Consumer Education Program; and assistance with Evaluation as defined in the primary contract tasks below.

The major categories of work are divided into the following tasks:

Tasks	Description of Task
1	Contract Management and Reporting Requirements
2	Existing Renewable Facilities Program (ERFP)
3	Renewables Portfolio Standard (RPS)
4	New Renewable Facilities Program (NRFP)
5	Renewable Rebate Programs
6	Consumer Education Program
7	Evaluation

Task 1 – Contract Management and Reporting Requirements

The Contractor shall perform various administrative operations and management-related tasks at the direction of the Energy Commission Contract Manager including but not limited to:

A. Develop, refine and execute Energy Commission-approved work authorizations on an "as-needed" basis, in conjunction with REP staff, and appropriate assistance from subcontractors. Each work authorization shall define the scope

[1] Senate Bill 1 (stats. 2006, ch. 132)

of work, the schedule of deliverables and the estimated project budget for authorized tasks to be performed by the Contractor and its authorized subcontracting team members.

B. Prepare and issue contract agreements with subcontractors that convey all provisions contained in the contract between the Energy Commission and the Contractor.

C. Coordinate the availability of subcontractors to meet the needs of Energy Commission staff as authorized by the Energy Commission Contract Manager.

D. Hire vendors or additional subcontractors to obtain needed products and services pursuant to the Special Terms and Conditions, EXHIBIT D, Section 2, of Attachment 5 (sample Standard Agreement).

E. Audit subcontractor invoices to ensure that they correctly identify and explicitly correlate with the required information pursuant to EXHIBIT B, Section 1.D., of Attachment 5 (sample Standard Agreement).

F. Prepare and submit monthly invoices to the Energy Commission for contract management and technical support services and for payment of subcontractor invoices pursuant to EXHIBIT B, Section 1.A., of Attachment 5 (sample Standard Agreement).

G. Pay subcontractors in a timely manner for satisfactory products no later than upon receiving the payment from the Energy Commission.

H. Prepare and submit retention invoices for all completed and approved work authorizations for which final deliverables have been approved by the Energy Commission Contract Manager, but excluding all Contractor administrative task authorizations (Task 1).

I. Maintain a current contract management database capable of tracking:

- Contractor and subcontractor work authorization, and invoice activity and the implementation status of all approved work authorizations.
- Contract and individual work authorization budgets.

J. Provide verbal or written briefings regarding contract activities or budget to the Energy Commission or other entities, as authorized by the Energy Commission Contract Manager.

K. Respond to information requests or direction from the Energy Commission Contract Manager.

L. Provide administrative and/or technical support for the REP, as authorized by the Energy Commission Contract Manager through approved work authorizations.

M. Provide other REP project management tasks as authorized by the Energy Commission Contract Manager.

N. Attend program support and project-related development meetings and hold telephone discussions regarding project management issues, as requested by the Energy Commission Contract Manager.

Monthly Progress Reports

The Contractor, with assistance from appropriate subcontractors, shall provide monthly progress reports on the previous month's activities to the Energy Commission Contract Manager describing:

- Monthly progress in each work authorization and task.
- The degree of completion of each work authorization and task.
- Status of upcoming deliverables including any expected delays.
- Cumulative budget expenditures by work authorization and task.
- Cumulative budget expenditures of total contract.
- Proposed or Energy Commission Contract Manager-approved changes in task description, deliverable due date(s), and budget.
- Other information requested by the Energy Commission Contract Manager.

All monthly reports are to be submitted both electronically, and in duplicate, hard copy form to accompany and coincide with the official invoice being submitted to the Energy Commission. The Energy Commission Contract Manager will specify the report format.

Final Report

A Final Report shall be prepared which includes a description of the overall project, the work accomplished during the contract, the effectiveness of the contract in meeting the objectives of the program, and future activities recommended to increase the effectiveness of the program and this contract.

A draft Final Report is due 45 days prior to the end of the contract. The Final Report is due no later than 30 days prior to the end of the contract. The report shall be prepared in language easily understood by the public or laypersons with a limited technical background. A draft of the Final Report must be reviewed and approved by the Energy Commission Contract Manager prior to becoming final. The Final Report shall include an analysis of:

- The work accomplished during the contract.
- The effectiveness of this contract in meeting the objectives of the program.
- Recommended future activities that will increase the effectiveness of the program and this contract.

The Contractor shall meet with the Energy Commission to present the findings, conclusions, and recommendations. The Final Report must be delivered to the Energy Commission Contract Manager 30 days before the termination date indicated in the term of the contract.

The outline of the Final Report shall be prepared as indicated in the terms and conditions of the contract and the following:

- Title Page

- Executive Summary: Describe the contract goals, how the contract work was implemented, size, schedule, source of project funds, number of projects funded, and provide an overview of results from the contract listed by program (task) area.

- Table of Contents: Organize the report by program area (task number) and by work authorization number (beginning with the earliest number).

- Contract Results: Each work authorization shall be summarized. Each summary shall include the specific request, results of the work performed, and the conclusions and/or recommendations developed by the work. Each subcontractor shall be responsible for writing its own summaries and forwarding them to the Contractor and the Contractor shall be responsible for editing and combining these summaries into the reports.

Deliverables and Due Dates

All work assignments will be made through specific work authorizations and will specify the schedule of deliverables.

Task 2 – Existing Renewable Facilities Program (ERFP)

The statutory purpose of the Existing Renewable Facilities Program (ERFP) is to achieve fully competitive and self-sustaining existing in-state solid-fuel biomass, solar thermal electric, and wind facilities, and to secure for the state the environmental, economic, and reliability benefits that continued operation of these facilities will provide. California Public Resources Code section 25740.5 requires that the Energy Commission "optimize public investment and ensure that the most cost-effective and efficient investments in renewable energy resources are vigorously pursued."

The ERFP provides funding in the form of production incentives to eligible renewable energy facilities for each kilowatt-hour (kWh) of eligible electricity generated. Funds from the ERFP are reserved for renewable generators who were on-line and generating electricity for sale before September 26, 1996. Facilities eligible for funding are issued a Funding Award Notice by the Energy Commission to provide funding pursuant to the Energy Commission's *Existing Renewable Facilities Program Guidebook*, *Renewables Portfolio Standard Eligibility Guidebook*, and *Overall Program Guidebook*. The Funding Award Notice does not specify dollar amounts to be paid to the facility; rather the Notice identifies the following information:

- Pertinent information about the applicant, the facility, and the facility's power purchase agreement.
- The facility-specific target price and production incentive cap for that calendar year.
- The terms and conditions under which the ERFP funding will be provided, including any funding restrictions and prevailing wage requirements.

If approved by the Energy Commission, the Funding Award Notice must be signed by an authorized representative of the facility and an authorized representative of the Energy Commission in order to become effective. The Energy Commission will issue production incentive payments on a monthly basis in accordance with the facility-specific target price and production incentive cap and appropriate market prices, and conditional upon the recipient's: monthly invoices and submittal of written third-party verification to the Energy Commission to verify the facility's eligible generation.

Funding Award Notices are limited term awards to provide funding for one calendar year. By January 31, eligible generators must apply for funding for the current calendar year if seeking production incentive payments for that year. The Energy Commission staff annually evaluates funding applications to recommend appropriate funding awards per project. The staff, under direction of the Energy Commission's Renewables Committee, drafts Funding Award Notices that are considered for adoption by the Energy Commission.

Under this task, the Contractor will:

A. Evaluate the incentives being paid to biomass, solar thermal, and wind facilities to ensure the incentives are sufficient to maintain the operation of these renewable facilities and encourage their self-sufficiency while not providing them an unjustified bonus that has no bearing on their generating pattern.

   1. Continually monitor and evaluate the target price of incentives to ensure appropriateness and make recommendations on changes when needed.

   2. Continually monitor and evaluate the cap values for incentives to ensure appropriateness and make recommendations on changes when needed.

   3. Continually monitor and evaluate the market price(s) and/or indices used to determine incentives to ensure that their use is appropriate and that facilities are neither over nor under paid, and make recommendations on appropriate market price(s) when necessary.

   4. Continually monitor and evaluate fuel, operations, and maintenance costs for facilities and technologies eligible for ERFP funding.

   5. Continually monitor and evaluate economic factors that affect the continued operation, competitiveness, and self-sustainability of facilities eligible for ERFP.

B. Evaluate the impact these incentives have on the generating pattern of the various technologies and how the determination of what market price is used may impact their generating pattern (positive or negative).

C. Evaluate the approach and process for determining and making incentive payments.

D. Monitor and evaluate the financial assistance ERFP participants receive from other government agencies via contracts, grants, or other programs of assistance.

E. Evaluate alternative funding mechanisms for providing funding for the use of biomass fuels and determine if alternatives would be more effective in meeting program goals than the current method used.

F. Evaluate how (or if) changes in the definition of a "new" facility and the September 26, 1996, eligibility date for the ERFP will impact the program.

G. Conduct audits, as necessary, of facilities receiving ERFP funding to ensure the facilities continue to meet ERFP eligibility requirements.

H. Review, verify, and analyze financial statements, balance sheets, and other economic records retained by facilities that identify operating costs, federal and state tax credits, facility contracts for energy and capacity pricing, and other attributes.

I. Assist Energy Commission staff in collection and management of ERFP data.

J. Evaluate and propose refinements or changes as necessary to the ERFP to reflect changes in the law or changes in market conditions or policy direction.

K. Provide other needed technical support that arises for the ERFP.

Deliverables and Due Dates

All work assignments will be made through specific work authorizations and will specify the schedule of deliverables.

Task 3 – Renewables Portfolio Standards (RPS)

The objective of the RPS Program is to foster achievement of the state's 20 percent RPS targets by 2010, and to establish policies to meet that goal in the most efficient, equitable, and cost-effective manner possible. This includes developing, implementing, and updating guidelines at the Energy Commission and providing technical and policy support to the CPUC in their rulemaking process. As part of the implementation efforts, the program will address RPS implementation for IOUs, Electric Service Providers, Small and Multi-Jurisdictional Utilities, and Community Choice Aggregators. Further, the program may support implementation by publicly owned utilities. The program also includes efforts to track, evaluate, and report on program results.

Along with developing the RPS implementation guidelines, the Energy Commission has designed a renewable energy tracking and verification system known as the Western Renewable Energy Generation Information System (WREGIS) to address long-term RPS tracking needs. The Western Electricity Coordinating Council will act as the institutional home of WREGIS and will provide the necessary staff to develop and administer the program. WREGIS became operational in June 2007. WREGIS is discussed further later in the section.

Although the work required to implement the RPS is distinct from that required to implement the greenhouse gas emission reduction goals set in AB 32[2] has effectively ratcheted up the importance of achieving the state's RPS targets. Additional new RPS eligible generation is now recognized as a key strategy to achieving California's greenhouse gas emission reduction objectives as AB 32 commits the state to reducing greenhouse gas emissions to 2000 levels by 2010 and to 1990 levels by 2020. For the post 2020 timeframe, the Governor has established a greenhouse gas emission reduction goal of 80 percent below 1990 levels by 2050.[3]

Under this task, the Contractor will:

A. Assist Energy Commission staff in developing implementation rules and guidelines for retail sellers, including electric service providers, small and multi-jurisdictional utilities, and community choice aggregators, and if applicable, local publicly-owned electric utilities.

B. Assist Energy Commission staff in providing support to publicly owned utilities in their efforts to implement the RPS.

C. Assist Energy Commission staff in evaluating the applications to certify RPS-eligible renewable resources, including but not limited to applications to certify re-powered, mixed fuel use, out-of-state, and hydroelectric facilities.

D. Assist Energy Commission staff in evaluating the progress and effectiveness of the RPS Program statewide.

E. Assist Energy Commission staff in evaluating and developing implementation rules for the use of Renewable Energy Credits (RECs) in the RPS.

   1. Provide ongoing evaluation of the effects of REC trading on the renewable energy market and its efficacy in supporting RPS goals such that program corrections may be made as necessary, or modifications can be developed to enhance the program.

   2. Analyze REC trading to meet AB 32 targets to ensure it is developed in a manner that is complementary to, and not in contradiction to, REC trading for RPS requirements.

   3. Analyze REC trading in the voluntary market and evaluate how regulatory actions may help or harm the voluntary market to provide the state with a useful tool in leveraging the state's efforts to advance renewable energy with private investment.

   4. Analyze how REC trading systems are working in other states and countries with respect to advancing renewable technology development including their efforts in reducing greenhouse gas emissions.

F. Evaluate and propose refinements or changes as necessary to any aspect of RPS implementation including: evaluating RPS eligibility, developing the RPS

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[2] Assembly Bill 32 (stats. 2006, ch. 488)

[3] California Office of the Governor, Executive Order S-3-05.

Procurement Verification Report, integrating renewable distributed generation into the RPS, conducting interim tracking until an automated regional system is in place, integrating verification of delivery from out-of-state facilities into the tracking system, and evaluating options to provide financial support for RPS-eligible facilities.

G. Assist Energy Commission staff in evaluating renewable energy potential and cost trends in California and the Western Interconnect.

H. Assist Energy Commission staff in evaluating the technical potential and feasibility of specific renewable energy technologies to meet the RPS goals.

I. Assist Energy Commission staff in evaluating transmission constraints and options to cost-effectively develop transmission needed to meet RPS goals.

J. Assist Energy Commission staff in developing and evaluating new strategies to advance renewable energy development in California beyond the 20 percent by 2010 target, including:

1. Provide technical assistance to evaluate feed-in tariffs for renewable resources as a mechanism to meet statewide renewable targets.
2. Provide technical assistance to design and implement a feed-in tariff program, if requested, consistent with any applicable state policies and statutes.

K. Assist the Energy Commission in developing, implementing, and evaluating how to effectively and efficiently implement the California RPS with consideration of local, regional, state, and federal regulatory programs and voluntary renewables programs.

L. Provide other needed technical support that arises for the RPS Program.

Task 4 – New Renewable Facilities Program (NRFP)

The objective of the NRFP is to provide support to new renewable generating facilities including those whose generation will count toward the state's goal of 20 percent renewables by 2010, to help increase the amount of renewable electricity generation in California's power mix. Additionally, the NRFP is to provide support in the most efficient, equitable, and cost-effective manner possible.

Originally, funds were distributed through auctions in which project developers submitted bids for the amount of support needed to allow their project to compete in the electricity market. Bids were in the form of a cents/kWh incentive amount, and included an estimate of the first five years of generation from the project. Three auctions were held between June 1998 and September 2001. Winning projects were required to meet a series of project development and construction milestones between the auction in which they participated and their expected on-line date, and to submit regular reports to the Energy Commission describing their progress toward coming on-line. These milestones and reports are designed to enable the Energy Commission to track the progress of projects and distinguish projects with a serious intent and opportunity of becoming operational.

With the passage of SB 1038[4] and SB 1078[5] in 2002, production incentives for new renewable generating facilities are to be connected to California's RPS. Under these laws the Energy Commission was required to award production incentives as a result of competitive RPS solicitations run by IOUs, rather than through auctions administered by the Energy Commission. Additionally, the California RPS program re-defined "new" as beginning operation on or after January 1, 2002.

Under SB 1038 and SB 1078, renewable generators that were awarded a contract through a competitive RPS solicitation by the IOUs, could be eligible for NRFP production incentives from the Energy Commission. Eligible new or re-powered facilities priced above the market price referent (MPR), as determined by the CPUC, could apply for NRFP incentives from the Energy Commission to pay the difference between the contract price and the MPR. Production incentives were payable for a maximum of 10 years, and the Energy Commission had the authority to set caps on the amount of incentive payments paid per kWh, per facility, and per solicitation.

Existing law with respect to the NRFP changed recently with the enactment of SB 1036[6], which took effect January 1, 2008. Under SB 1036, responsibility for the approval of funding for that portion of RPS contracts above the MPR is transferred to the CPUC. In addition, SB 1036 requires the Energy Commission to return any unencumbered funds collected for purposes of the NRFP pursuant to SB 1038 to the IOUs that collected such funds. Under SB 1036, the CPUC will direct these IOUs how to best use the funds. Although the bulk of the Energy Commission's responsibilities for implementing the NRFP are expected to end in the near future, because of SB 1036, the Energy Commission may still be called upon to assist the CPUC in implementing its new responsibilities under SB 1036. In addition, the Energy Commission remains responsible for the administration of previously encumbered NRFP funds.

Under this Task, the Contractor will:

A. Evaluate and propose methods to levelize production incentives for new renewable facilities with long-term contracts to ensure that funds are used most efficiently and effectively.

B. Devise a method by which Energy Commission staff can determine the need for, impact of, and ways to implement caps on production incentives for new renewable facilities.

C. Conduct random audits of projects receiving NRFP production incentives to ensure that projects continue to meet eligibility requirements and maintain operations in accordance with contractual obligations.

D. Assist Energy Commission staff in identifying RPS eligible generation from facilities under long-term contracts with IOUs originally entered into before September 26, 1996 pursuant to Public Utilities Code section 399.6 (c)(1)(C).

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[4] Senate Bill 1038 (stats. 2002, ch. 515)

[5] Senate Bill 1078 (stats. 2002, ch. 516)

[6] Senate Bill 1036 (stats. 2007, ch. 685)

E. Provide technical expertise in the review of applications for RPS certification to ensure that applicants meet eligibility requirements for NRFP production incentives.

F. Assess results of NRFP production incentive awards and awarding process to evaluate where improvements or changes may be required in the future to better meet the RPS goals with a minimum of administrative burden to Energy Commission staff.

G. Provide technical expertise to assist staff in evaluating options to implement production incentives for new renewable facilities that support a time-adjusted MPR (the CPUC is considering developing MPRs that vary over time rather than set as a flat rate).

H. Provide other needed technical support that arises for the NRFP, or for the CPUC's new NRFP-related responsibilities under SB 1036.

Deliverables and Due Dates

All work assignments will be made through specific work authorizations and will specify the schedule of deliverables.

Task 5 – Renewable Rebate Programs

Emerging Renewables Program (ERP)

A primary goal of the Emerging Renewables Program (ERP) is to accelerate market development of specified emerging renewable generation technologies designed to provide part or all of a customer's on-site electrical needs by providing monetary incentives in the form of rebates to reduce the up-front costs of purchasing such technologies.

The ERP replaced the Energy Commission's Emerging Renewables Buydown Program, which focused on four emerging technologies: solar photovoltaics (PV), small wind turbines, fuel cells using renewable fuels, and solar thermal electric generation. Under the Energy Commission's Investment Plan, additional technologies may be added to the list of technologies that qualify for incentives under the ERP. The ERP continued accepting applications for these four eligible technologies through 2006. Effective January 1, 2007, only small wind systems (rated output of 50 kW or less) and fuel cells using renewable fuel, are eligible. The CSI and NSHP, discussed later in the section, have replaced the solar components of both the Energy Commission's ERP and the CPUC's Self-Generation Incentive Program.

Because emerging technologies generally have high up-front investment costs, are not well known in the marketplace and the market infrastructure has not been fully developed, accelerating market activity requires solutions to overcome these barriers. Addressing and prioritizing these market barrier issues can better achieve an orderly and sustainable market development plan. To this end, utilizing limited program funds as efficiently as possible and practicable is critical to the ERP's success.

New Solar Homes Partnership (NSHP)

On January 12, 2006, Governor Schwarzenegger's proposed Million Solar Roofs Initiative was approved in substance by the CPUC and called the CSI. This action was subsequently codified by SB 1, which created the largest solar program of its kind in any state in the nation providing over $3.35 billion in ratepayer funding over the next 10 years to help California move toward a cleaner energy future and help bring the costs of solar electricity down for California consumers. The goal of the CSI is to increase the amount of installed solar generating capacity in the state by 3,000 megawatts (MW) by the end of 2016. The CSI will be a major source of dependable and environmentally-friendly electricity, and is a major tool in the state's promise to address climate change and meet the Governor's goals to reduce greenhouse gas emissions.

For customers of IOUs, there will be two programs, one administered by the CPUC and one administered by the Energy Commission. The CPUC will be responsible for overseeing incentives to existing residential customers (retrofits), including affordable housing, and all nonresidential customers (also retrofits). The Energy Commission's mandate is to achieve 400 MW of new solar capacity on new, highly energy efficient homes by the end of 2016. The NSHP was created to achieve this objective, and an advisory committee was formed to provide additional industry guidance particularly during the development of the program. The NSHP intends to provide $400 million in financial incentives during the program period and non-financial assistance in the form of builder and market support to help create this self-sustaining market. Both programs became operational January 1, 2007.

The Energy Commission's NSHP will work with builders and developers who install photovoltaic (PV) systems on new residential building construction, to incorporate high levels of energy efficiency and high-performing solar systems to help create a self-sustaining solar market where home buyers demand energy efficient solar homes. The NSHP will specifically target single family, multi-family and affordable housing markets. As of the end of August 2007, reservation applications for a total of 1096 homes have been received under the NSHP. This represents approximately 3.2 MW of potential solar capacity.

Senate Bill 1 (SB 1)

Under SB 1, customers served by IOUs and local publicly-owned electric utilities in California will be afforded the opportunity to receive incentives for installing their own solar systems. SB 1 directs the Energy Commission to establish eligibility criteria, conditions for incentives and rating standards for all rate payer funded solar energy incentive programs in the state. Furthermore, the Energy Commission must coordinate with the CPUC to accomplish a variety of solar related activities to achieve the overall program goals of installing 3000 MW of solar electric capacity and improve energy efficiency for new and existing buildings.

Technical assistance is required to assist staff in the following aspects of program development, implementation, and administration:

A. Program processes, including database and web improvements

1. Reorganize or build database structure to more efficiently implement data tracking and review of applications
2. Develop or modify web-based rebate program forms
3. Develop or provide maintenance for web tools that estimate energy production and economic evaluation of PV or wind energy systems
4. Modify an internet-based automated application and payment request process
5. Develop or modify an internet-based data acquisition system
6. Evaluate and recommend changes to the program's application and review processes to streamline the processes and minimize delays.

B. Market research

1. Determine how the various market segments are evolving
2. Evaluate level of incentives needed
   - By technology
   - By market segment type
   - Time frame needed for incentives
   - Evaluate market impact from tax credits and deductions
3. Assess the market for small-scale renewable technologies regionally and worldwide
   - Market trends
   - Costs
   - Product adequacy – supply and demand issues
   - Coordination with other incentive programs.

C. Product development

1. Manufacturing
   - Determine relationship between production capacity, market penetration, and cost reduction
   - Determine funding requirements to reach cost-effective small-scale renewable technology systems
   - Evaluate technology innovations that can reduce costs
2. Retail Infrastructure
   - Identify ways to optimize infrastructure and related issues
   - Identify ways to expand infrastructure
   - Assess existing business models for small-scale renewable technology systems

- Develop new business models for growing the market for emerging renewable technologies.

D. Performance-based incentives

1. Transitioning the market from capacity incentives (rebates) to performance-based or expected performance-based incentives
   - Assess appropriateness of hybrid approach (combining capacity incentive with performance incentive
2. Assess the appropriate incentive level and payment period for each customer class
3. Determine metering and data reporting requirements
4. Conduct or assist with an evaluation of the pilot Performance-Based Incentive Program which began in early 2005.

E. Reliability and dependability of technologies

1. Continue and expand efforts to increase reliability and dependability
   - Monitoring performance of systems
   - Verification Program.

F. Financing and financial issues

1. Assess tax treatment of rebates and performance incentives
2. Evaluate consumer finance options including energy efficient mortgages, mortgage guarantees, Cal PERS mortgage allowance and other opportunities for homes with solar
3. Appropriateness of developing a revolving loan program.

G. New solar initiative, including SB 1

1. Assess appropriateness of mandating PV on new residential buildings
2. Determine how PV should be integrated into California's Building Energy Efficiency Standards (Title 24)
3. Determine how best to provide incentives to target solar energy technologies to specific geographic regions
4. Determine how best to incorporate advanced metering and time of use with energy efficient solar homes and buildings
5. Monitor and evaluate non-PV solar technologies and review test data.

H. Other renewable technologies

1. Determine how best to provide incentives to target other emerging renewable technologies to specific geographic regions

I. Policies to enhance the continued development of emerging renewable technologies

1. Evaluate and recommend policies to coordinate ERP and NSHP activities with Consumer Education Account activities
    - Training and workshops
    - Education and information materials for contractors, builders, consumers and others.
2. Evaluate and recommend policies to coordinate activities under SB 1

J. Conduct audits of program participants, as necessary, to ensure compliance with program requirements.

1. Audit of NSHP participants
2. Audit of CSI and/or publicly owned utility solar electric incentive program participants (SB 1 activity)

K. SB 1 related assistance, including assistance with the development, implementation, and administration of the Energy Commission's statewide eligibility criteria, conditions for incentives and rating standards.

L. Provide other needed technical support that arises for the ERP, NSHP, and CSI efforts (including ongoing work as a result of SB 1.)

Deliverables and Due Dates

All work assignments will be made through specific work authorizations and will specify the schedule of deliverables.

Task 6 – Consumer Education Program

The Consumer Education Program was created and allocated funds under the REP, to support renewable energy consumer education activities. In May 2004, the Energy Commission revised the *Consumer Education Guidebook* to clarify the type of activities that qualify for funding, including the development of information, products, and the processes that promote renewable energy markets by verifying and tracking energy generation.

Since 1999, the Consumer Education Program has funded grant projects awarded for renewable energy information and outreach activities; contracts in support and development of public awareness campaigns; and contracts in support and development of WREGIS to address long-term RPS tracking needs; updating renewable energy marketing materials for distribution at workshops, conferences, and tradeshows; and other Consumer Education activities promoting renewable energy.

WREGIS

In August 2003, the Energy Commission started collaborating with the Western Governors' Association to design and implement a regional renewable energy registry and tracking system, known as WREGIS. WREGIS is being established to meet the legislative mandate of SB 1078 to ensure the electrical output of renewable energy generation facilities is counted only once for the purpose of the RPS and for verifying

retail product claims in California and other western states within the Western Electricity Coordinating Council (WECC).

The development of WREGIS followed a very extensive stakeholder process which included surveying market participants, establishing working groups to draft the operating rules and functional requirements and establishing the WECC as the appropriate institutional home for WREGIS. The WECC will not incur any costs for housing WREGIS. The Energy Commission will cover costs for the WREGIS Administrator and other WECC costs related to housing WREGIS, which will be funded by the Consumer Education Program. Once it becomes operational, costs of administering WREGIS at the WECC are estimated to be $2.2 million for a three-year operational phase and a one-year close-out phase.

In July 2004, the WECC Board of Directors approved adding the WREGIS Committee as a Board Committee of WECC and establishing the administrative operations of WREGIS at WECC. The WREGIS Committee consists of seven members: four elected representatives of industry, states/provinces, generators, and load-serving entities; and three appointed members from the Energy Commission, Western Governor's Association, and the WECC. The WREGIS Committee provides the governance for the WREGIS Program, including the setting of WREGIS fees and the fee structure, which were approved in April 2007 and will be implemented in January 2008. WREGIS became operational in June 2007.

The primary goals of the Consumer Education Program are:

- Raise consumer awareness of renewable electricity generation and its benefits.
- Increase purchases of small-scale emerging renewable systems installed on customer premises.
- Leverage strategic alliances and partnerships with organizations connected to renewable energy in California.
- Develop and provide credible information, products, and processes that promote the renewable energy market by verifying and tracking energy generation, verifying retail product claims and verifying compliance with renewable energy policies such as the RPS (WREGIS-related goal).

To meet these goals, the technical assistance under this contract will have the following objectives:

A. Understand consumer attitudes, perceptions, knowledge and awareness about renewable energy technologies and their costs and benefits.

B. Raise consumer awareness about renewable energy resources, available technologies and opportunities in California.

C. Increase consumer knowledge about the benefits and mechanics of adopting renewable energy technologies.

D. Through outreach, marketing and education, increase purchases of renewable energy technologies in the state.

E. Conduct WREGIS-related tasks associated with modifications to WREGIS.

F. Conduct audits of program participants, as necessary, to ensure compliance with program requirements.

G. Provide other needed technical support that arises for the Consumer Education Program.

Deliverables and Due Dates

All work assignments will be made through specific work authorizations and will specify the schedule of deliverables.

Task 7 – Evaluation

A. REP

The REP is a uniquely designed, market-based financial incentive program that must operate under high levels of uncertainty in market, regulatory, and technology development conditions. Tracking and predicting these developments is an extremely complex undertaking and requires unique and special skills in economic and statistical modeling of a new market, anticipation of development and performance of advanced electric generation technologies, and continuously adjusting the design of the REP to be consistent with and take advantage of these developments. Methods proposed must, by necessity, accommodate the diverse needs of the six program elements that make up the REP, as well as the overall REP design.

To address these parameters, the following technical assistance is required to assist staff:

1. Propose methods for monitoring and predicting market, regulatory, and technology developments and incorporating these into REP design adjustments.
2. Develop techniques to isolate the effects of the REP from other influences in the market; i.e., how much of a market result is due to the operation of the REP and how much is due to other influences interwoven with the operation of the REP.

B. Integrated Energy Policy Report (IEPR)

This Energy Commission report to the Legislature and Governor evaluates and establishes the state's energy policies and is adopted every two years with an update every other year. The 2006 update to the *Integrated Energy Policy Report (IEPR)* featured a midcourse review of the RPS.[7] Additional RPS and REP topics will be addressed in the upcoming 2007 IEPR which is scheduled to be finalized and adopted by the Energy Commission in late November, 2007 and published in

[7] California Energy Commission, *2006 Integrated Energy Policy Report Update*, January 2007, publication number CEC-100-2006-001-CMF.

December, 2007. Technical support is anticipated to be needed for the 2008 and 2010 IEPR Updates as well as the 2009 IEPR. Support will be used to analyze RPS and REP policy and implementation issues and contribute to the basis for policy recommendations in future IEPRs. These issues include but are not limited to the following:

- Establishing a renewables feed-in tariff [8] to support post-2010 renewable development.
- Portfolio analysis in electric utility resource planning.
- Renewable energy Policy issues related to greenhouse gas emission reductions, including potential allowances and emissions credits for a market-based compliance system under AB 32.

These following areas require technical expertise beyond that available through Energy Commission staff, and the analysis is critical for shaping renewable energy policy in California.

1. Analysis of alternative incentive structures both nationally and internationally, in order to meet the state's longer-term goals of 33 percent renewable, and analysis of whether feed-in tariffs would spur additional renewable development.
2. Analysis of a portfolio-based valuation of renewable energy to fully account for the benefits of renewables.
3. Identify and evaluate technological, economic, and environmental risks associated with each renewable technology type and any variations resulting from various size configurations per technology.
4. Analyze and identify greenhouse gas emission effects resulting from existing and potential renewable energy policies and programs, including interactions between California, western states, federal and international greenhouse gas and climate change mitigation policies and programs.

C. Numerical Targets

A goal of the REP is to meet the state's accelerated RPS goals, with a long-term view of developing a self-supporting renewable energy supply in California. The law sets a goal that 20 percent of the electricity retail sales in California should be served with renewable electricity by 2010. The Governor has supported a longer term goal of achieving a 33 percent target by 2020. Also, the Energy Commission is considering developing utility-specific goals.

Technical assistance is required to assist staff with the following:

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[8] A feed-in tariff involves the obligation on the part of a utility to purchase electricity generated by renewable energy producers in its service area at a tariff determined by public authorities and guaranteed for a specific period of time.

1. Develop methods to evaluate progress toward meeting state RPS targets that are articulated in statute and state policy.

D. Verification and Compliance Audit

Technical assistance is required to assist staff with the following:

1. Develop and perform audits to ensure program participants are complying with Program requirements and requirements of other government and utility-related funding programs, and to make necessary programmatic adjustments.

E. Provide other needed technical support that arises for REP evaluation.

Deliverables and Due Dates

All work assignments will be made through specific work authorizations and will specify the schedule of deliverables.

NOTE:

Computer System Compatibility – The Contractor shall prepare and submit all products to the Energy Commission Contract Manager in a format compatible with the following Energy Commission-supported software or the most recent version of Energy Commission-supported software upon notification by the Energy Commission Contract Manager.

Software Type

Word Processing	Microsoft Office XP (Word 2000)
Spreadsheet and Database	Microsoft Office XP (Excel 2000, Access 2000)
Charts/Graphics	Microsoft Office XP
Presentations	Microsoft Office XP (Power Point 2000)
Desktop Publishing	Adobe Page Maker 7

Deliverables and Due Dates

All work assignments will be made through specific work authorizations and will specify the schedule of deliverables. The Contractor will prepare and submit the following to the Contract Manager:

Monthly Progress Report. The Contractor shall prepare a monthly progress report that summarizes all activities conducted by the Contractor and team. This includes a summary of Agreement expenditures to date. The monthly progress report is due to the Contract Manager within 15 working days after the end of the month. The Contract Manager will specify the report format and the number of copies to be submitted. All monthly progress reports will coincide with the invoice period.

Invoice. The Contractor will prepare a monthly invoice for all Agreement expenses performed for assigned work authorizations. The invoice is to be submitted to the

Energy Commission's Accounting Office. The Contract Manager will specify the invoice format.

Draft and Final Contract Report. A draft Final Report is due three months prior to the end of the Agreement. The Final Report is due no later than fifteen days prior to the end of the Agreement. The Final Report shall include an analysis of:

- The work accomplishments of the Agreement.
- The effectiveness of the Agreement in meeting the objectives of the program
- Future activities recommended to increase the effectiveness of the program and this Agreement.

EXHIBIT B

Budget Detail and Payment Provision

1. **INVOICING PROCEDURES:**

A. For services satisfactorily rendered, and upon receipt and approval of invoices, the Energy Commission agrees to compensate Contractor for actual allowable expenditures incurred in accordance with the rates specified in this Exhibit B. The rates in Exhibit B are rate caps, or the maximum amount allowed to be billed. Contractor can only bill for actual expenses incurred for hours worked at the Contractor's actual direct labor, fringe, and indirect rates, not to exceed the rates specified in Exhibit B.

B. Invoices shall be submitted in duplicate not more frequently than monthly. The following certification shall be included on each invoice and signed by an authorized official of the Contractor:

I certify that this invoice is correct and proper for payment, and reimbursement for these costs has not and will not be received from any other sources, including but not limited to a Government Entity contract, subcontract or other procurement method.

C. The Energy Commission will accept computer generated or electronically transmitted invoices provided Contractor sends a hard copy the same day to the Energy Commission, the address is noted below and in Agreement Contact List.

California Energy Commission
Accounting Office, MS-2
1516 9th Street
Sacramento, California 95814

D. A request for payment shall consist of, but is not limited to, the following.

1) Agreement number, date prepared, and billing period.
2) Contractor's actual hourly labor rates by individual.
3) Operating expenses, e.g., equipment, travel, and miscellaneous, as well as receipts for those expenses.
4) Copy of subcontractor invoices. Identify on invoice summary page if subcontractor is a California Certified Small Business or a Certified Disabled Veteran Business Enterprise and identify the total for current billing period.
5) Fees (fringe, direct and indirect overheads, general and administrative, profit, etc.)

6) Match fund expenditures, if applicable.
7) Invoices shall identify charges by tasks, personnel, labor rates and hours, and expenses authorized by this Agreement or Work Authorizations, if applicable.
8) Work Authorization number, if applicable

E. As detailed in Exhibit A, Scope of Work:

1) A report that documents the progress of the work during the billing period, if applicable.
2) Any other deliverables due during the billing period.

2. **BUDGET CONTINGENCY CLAUSE**: It is mutually agreed that if the Budget Act of the current year and/or any subsequent years covered under this Agreement does not appropriate sufficient funds for the work identified in Exhibit A, this Agreement shall be of no further force and effect. In this event, the State shall have no liability to pay any funds whatsoever to Contractor or to furnish any other considerations under this Agreement and Contractor shall not be obligated to perform any provisions of this Agreement.

If funding for any fiscal year is reduced or deleted by the Budget Act for purposes of this program, the State shall have the option to either: cancel this Agreement with no liability occurring to the State, or offer an Agreement Amendment to Contractor to reflect the reduced amount.

3. **TRAVEL AND PER DIEM RATES**: Contractor shall be reimbursed for travel and per diem expenses using the same rates provided to non-represented state employees. Contractor must pay for travel in excess of these rates. Contractor may obtain current rates from the Energy Commission's Web Site at http://www.energy.ca.gov/contracts/2003-03-05_TRAVEL_PER_DIEM.PDF and from the Department of Personnel Management Memorandum Reference Number 2006-045.

4. **RETENTION**: The Energy Commission shall retain from each invoice ten percent (10%) of that invoice, excluding equipment invoices. The retained amount shall be held and released only upon approval that the work has been satisfactorily completed and Final Report (if required) has been received and approved. Contractor must submit a separate invoice for the retained amount.

Retention may be released upon completion of tasks that are considered separate and distinct, i.e., the task is a stand-alone piece of work and could be done without the other tasks. The Budget will identify the tasks for which retention may be released prior to the end of the Agreement. Tasks for administration or management of the Agreement and/or subcontractors are not considered separate and distinct tasks.

5. **PAYMENT TERMS:**

Check all that apply:

- ☒ Monthly
- ☐ Quarterly
- ☐ One-Time Payment
- ☒ Itemized
- ☐ Flat Rate
- ☒ In Arrears
- ☐ Advance Payment to Public Prime Contractor Not to Exceed $_ or ___ % of the Agreement Amount
- ☐ Advance Payment to Private Prime Contractor for Public Subcontractor, (PRC section 25620.3(d)) Not to Exceed $_____ or ___% of the Subcontract Amount
- ☐ Reimbursement/Revenue
- ☐ Other (Explain)

6. **CONDITIONS**:

A. No payment shall be made in advance of services rendered.

B. Payments shall be made to Contractor for undisputed invoices. An undisputed invoice is an invoice submitted by the Contractor for services rendered and for which additional evidence is not required to determine its validity. The invoice will be disputed if all deliverables due for the billing period have not been received and approved, if the invoice is inaccurate, or if it does not comply with the terms of this Agreement. If the invoice is disputed, Contractor will be notified via a Dispute Notification Form within 15 working days of receipt of the invoice.

C. Payment will be made in accordance with, and within the time specified, in Government Code Chapter 4.5, commencing with Section 927.

D. Final invoice must be received by the Energy Commission no later than 30 calendar days after the Agreement termination date.

E. The State will pay for State or local sales or use taxes on the services rendered or equipment, parts or software supplied to the Energy Commission pursuant to this Agreement. The State of California is exempt from Federal excise taxes, and no payment will be made for any taxes levied on employee's wages.

F. No payment will be made for costs identified in Contractor invoices that has or will be reimbursed by any other source, including but not limited to a Government Entity contract or subcontract or other procurement Agreement.

7. **BUDGET REALLOCATIONS**

Contract Manager may move up to 10% of the total Agreement amount between tasks, line items or categories without formal amendment, by providing written notice with the revised budget to Contractor and Contract Officer.

8. **BUDGET DETAIL**

See attached Budget Detail

Exhibit B
BUDGET DETAIL

	FY 07/08 RRTF Tech Support	FY 07/08 RRTF Program	FY 08/09 RRTF Tech Support	FY 09/10 RRTF Tech Support	PENDING Other Contingent Funds*	TOTAL
Task 1: Contract Management & Reporting Requirements	$150,000		$150,000	$150,000	$100,000	**$550,000**
Task 2: Existing Program	$15,000		$20,000	$20,000		**$55,000**
Task 3: Renewables Portfolio Standard	$135,000		$200,000	$200,000	$300,000	**$835,000**
Task 4: New Program	$15,000		$31,000	$31,000		**$77,000**
Task 5: Renewable Rebate Programs	$87,000		$87,000	$87,000	$155,000	**$416,000**
Task 6: Consumer Education Program		$1,000,000				**$1,000,000**
Task 7: Evaluation	$78,000		$160,000	$160,000	$350,000	**$748,000**
FY BUDGET TOTALS	**$480,000**	**$1,000,000**	**$648,000**	**$648,000**	**$905,000**	**$3,681,000**

'Additional funding contingent upon other funds becoming available during the contract term including any amendments entered into hereafter.

Pre-contract redirections from FY 07/08 $675,000:
'$50,000) for ERP/NSHP Peak Load Assistance Contract
'$90,000) for NSHP Database Contract
'$27,000) for NSHP Outsourcing Contracts to IOUs
'28,000) for Operating
Total Re-directions to date $195,000

Pre-contract redirections from FY 08/09 & 09/10 $675,000:
($27,000) for NSHP Outsourcing Contracts to IOUs

Total Re-directions to date $46,000

Exhibit B
Attachment B-1
Form B-1, Labor Rates

FORM B-1 LABOR RATE EVALUATION (Primary Contractor and Subcontractors)

Bidder/Contractor: KEMA, Inc.

This table is to be completed for each firm that is part of the contract team. List all support personnel whose hours will appear on invoices

PRIMARY CONTRACTOR:

COMPANY: KEMA, Inc.

Technical Specialty: Contract management, renewable energy policies, transmission & Distribution, energy markets, database development, program evaluations

Personnel Name	Classification	A Base Hourly Rate 2007 ($/hr)	Base Hourly Rate for 3 years $/Hr	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C) ($/hr)
Karin Corfee	Senior Principal Consultant	$ 68.80	$ 71.55	198.2%	10.0%	$ 234.70
Nellie Tong	Senior Analyst	$ 33.23	$ 34.56	198.2%	10.0%	$ 113.36
Bill Brooks**	Senior Engineer	$ 150.00	$ 155.00	25.0%	10.0%	$ 213.13
Elena Schmid**	Senior Principal Consultant	$ 80.00	$ 83.20	88.2%	10.0%	$ 172.24
Liz Hicks	Senior Principal Consultant	$ 68.80	$ 71.55	198.2%	10.0%	$ 234.70
Doug Kneale	Senior Consultant	$ 47.75	$ 49.66	198.2%	10.0%	$ 162.89
Josh Kessler	Senior Researcher	$ 27.50	$ 28.60	198.2%	10.0%	$ 93.81
Pete Baumstark	Engineer	$ 40.00	$ 41.60	198.2%	10.0%	$ 136.46
Sam Golding	Analyst	$ 26.33	$ 27.38	198.2%	10.0%	$ 89.82
Karen Valter	Project Administrator	$ 17.40	$ 18.10	198.2%	10.0%	$ 59.36
Betty Seto	Senior Analyst	$ 33.23	$ 34.56	198.2%	10.0%	$ 113.36
Kevin Price	Analyst	$ 26.33	$ 27.38	198.2%	10.0%	$ 89.82
Nehemiah Stone	Principal Consultant	$ 63.00	$ 65.52	198.2%	10.0%	$ 214.92
Eugene Kong	Principal Consultant	$ 63.00	$ 65.52	198.2%	10.0%	$ 214.92
Xuemei Zhang	Principal Researcher	$ 32.16	$ 33.45	198.2%	10.0%	$ 109.71
Steve Sherwood	Senior Analyst	$ 33.23	$ 34.56	198.2%	10.0%	$ 113.36
Jackie Stalling	Senior Project Administrator	$ 19.67	$ 20.46	198.2%	10.0%	$ 67.10
Rick Fioravanti	Senior Consultant	$ 47.75	$ 49.66	198.2%	10.0%	$ 162.89
Dick Wakefield	Executive Consultant	$ 84.00	$ 87.36	198.2%	10.0%	$ 286.56
David Korinek	Senior Principal Consultant	$ 68.80	$ 71.55	198.2%	10.0%	$ 234.70
Ali Ipakchi	Executive Consultant	$ 84.00	$ 87.36	198.2%	10.0%	$ 286.56
Hans Cleijne	Senior Principal Consultant	$ 68.80	$ 71.55	198.2%	10.0%	$ 234.70
Frits Verheij	Senior Principal Consultant	$ 68.80	$ 71.55	198.2%	10.0%	$ 234.70
Karen Maoz	Engineer	$ 40.00	$ 41.60	198.2%	10.0%	$ 136.46
Daria Mashnik	Researcher	$ 23.29	$ 24.22	198.2%	10.0%	$ 79.45
Greg Reed	Executive Consultant	$ 84.00	$ 87.36	198.2%	10.0%	$ 286.56
Andy Brydges	Senior Consultant	$ 47.75	$ 49.66	198.2%	10.0%	$ 162.89
Bobbi Tannenbaum	Principal Consultant	$ 63.00	$ 65.52	198.2%	10.0%	$ 214.92

Elena Schmid and Bill Brooks are casual employees and therefore have different markups.

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

Exhibit B
Attachment B-1
Form B-1, Labor Rates

SUBCONTRACTORS:

This table is to be completed for each firm that is part of the contract team. List all support personnel whose hours will appear on invoices

COMPANY: Aspen Environmental Group

Technical Specialty: Environmental and engineering services

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Carl Linvill	Director Energy Planning	$80.00	131.00%	10%	$203.28
Suzanne Phinney	Senior Energy Analyst	$73.00	131.00%	10%	$185.49
Susan Lee	V.P. San Francisco Operations	$70.00	131.00%	10%	$177.87
Thomas Murphy	V.P. Sacramento Operations	$67.25	131.00%	10%	$170.88
Chris Cooke	Energy Analyst	$26.50	131.00%	10%	$67.34
Will Walters	Specialist II	$56.00	131.00%	10%	$142.30
Brewster Birdsall	Specialist II	$56.00	131.00%	10%	$142.30

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

COMPANY: Bates White

Technical Specialty: Economics consulting

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Lesser, Jonathan	Partner	120.00	305%	-2.3%	475
Puga, Nicolas	Principal	106.50	305%	-1.5%	425
Yang, Spencer	Manager	84.20	305%	2.6%	350
Su, Xuejuan	Senior Consultant	73.00	305%	-7.0%	275
Ciganda, Alberto	Senior Consultant	73.00	305%	-7.0%	275

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

Note:

These are estimated rates only and have not been prepared in conformance with FAR, CAS or DCAA accounting standards. Bates White does not perform work on a cost-plus basis and does not maintain accounting records to support the development of cost-plus rates.

Exhibit B
Attachment B-1
Form B-1, Labor Rates

COMPANY: BEW Engineering

Technical Specialty:

Engineering consulting services, research and development in electrical power systems for bulk power and distributed energy resource applications. Expertise in distributed generation, renewable energy systems (primarily wind and PV), and power electronics, involvement with large-scale transmission-level projects and distributed energy resources for utility-connected and remote stand-alone applications.

General areas of expertise include:

Energy system and component evaluation, commercial and prototype
Energy system electrical and mechanical design and installation support
Energy system commissioning, troubleshooting, and failure analysis
Engineering and economic analysis and studies
Design review and input for new products
Product and IP development (patent, trademark and copyright)
Domestic and international standards development
Training and Workshops
Technical writing
Data acquisition
Data analysis and reporting
Test system/equipment development
Hardware and software development

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Peter Monroe	Designer, Drafter	33.75	211%		105
Elaine Pandolfo	Office Manager	30.00	133%		70
Bill Erdman	President	110.00	105%		225
Chuck Whitaker	Principal	110.00	82%		200
Mike Bhenke	Principal	110.00	82%		200
Jeff Newmiller	Project Engineer	55.00	200%		165
Colleen O'Brien	Project Engineer	55.00	200%		165
Brad Eccles	Project Engineer	47.50	247%		165
Doug Blodgett,	Senior Engineer	77.00	140%		185
Tim Townsend	Senior Engineer	57.50	222%		185

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

COMPANY: Bite Communications

Technical Specialty: Integrated Communications (marketing and public relations)

Personnel Name	Classification	A Base Hourly Rate (50%)	B Overhead + G&A + Indirect Costs (35%)	C Agency Profit/Fee (15%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Kristina Skierka	Account Director	122.5	85.75	36.75	245
Sara Chapman	Senior Account Executive	82.5	57.75	24.75	165
Ben Eade	Account Executive	75	52.5	22.5	150

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

Exhibit B
Attachment B-1
Form B-1, Labor Rates

COMPANY: Black & Veatch
Technical Specialty: Renewable Energy Consulting / Engineering

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Bill Roush	Consultant	37.87	162%	7.5%	106.48
Bret Harper	Consultant	43.99	162%	7.5%	123.67
Larry Stoddard	Project Manager	82.50	162%	7.5%	231.97
Ric O'Connell	Consultant	70.46	162%	7.5%	198.09
Ryan Jacobson	Project Manager	72.74	162%	7.5%	204.50
Ryan Pletka	Project Manager	91.02	162%	7.5%	255.92
Tim Mason	Project Manager	76.43	162%	7.5%	214.89
Shane Williams	Consultant	83.7	162%	7.5%	235.33

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

COMPANY: Mark Bolinger, Independent Consultant
Technical Specialty: Markets and Policy

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Mark Bolinger	Principal	$150	0	0	$150

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

COMPANY: Center for Resource Solutions
Technical Specialty: Renewable Energy Policy and Certified Tracking Systems

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Jan Hamrin	Executive Director	96.15	82%		175.00
Jennifer Martin	Deputy Director	71.43	82%		130.00
Meredith Wingate	Director	60.44	82%		110.00
Lars Kvale	Program Manager	41.21	82%		75.00
Jane Valentino	Program Analyst	35.71	82%		65.00
Jeff Swenerton	Communications Director	60.44	82%		110.00
Alex Pennock	Green-e Program Manager	41.21	82%		75.00
Andrew Nourafshan	Program Analyst	35.71	82%		65.00
Matthew Lehman	Manager	41.21	82%		75.00

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

Exhibit B
Attachment B-1
Form B-1, Labor Rates

COMPANY: Clean Power Research

Technical Specialty: Solar software and consulting services

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Dr. Thomas E. Hoff	President	135	75%		236.25
Jeffrey Ressler	Product Line Manager	120	75%		210.00
Phillip Gruenhagen	Software Architect	110	75%		192.50

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

COMPANY: Energy and Environmental Economics, Inc.

Technical Specialty: CPUC RPS Regulation, Utility Procurment, Greenhouse Gas Emissions Policy, RPS Program and Guidebooks

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Dr. Ren Orans	Senior Partner	$ 105	158%	11%	300
Dr. C.K. Woo	Senior Partner	$ 105	158%	11%	300
Brian Horii	Senior Partner	$ 93	158%	11%	265
Snuller Price	Partner	$ 91	158%	11%	260
Arne Olson	Senior Consultant	$ 58	253%	18%	240
Dr. Jim Williams	Senior Consultant	$ 50	253%	18%	210
Eric Cutter	Senior Consultant	$ 54	236%	16%	210
Michele Chait	Senior Consultant	$ 57	223%	14%	210
Dr. Bill Morrow	Senior Consultant	$ 50	253%	18%	210
Amber Mahone	Consultant	$ 41	279%	21%	190
Jack Moore	Senior Associate	$ 36	300%	23%	180

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

COMPANY: Ed Holt & Associates, Inc.

Technical Specialty: Renewable energy policy and regulatory analysis, RECs, and renewable energy attribute tracking

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Edward A. Holt	President	$175	$0	$0	$175

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

Exhibit B
Attachment B-1
Form B-1, Labor Rates

COMPANY: Richard D. Ely

Technical Specialty: Renewable Energy, Science, Engineering, and Economics

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Richard D. Ely	Sole Proprietor	100	0	0	100

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

COMPANY: Engage Integrated Systems Technology

Technical Specialty: Information Technology, Project Management, Green Technology, Disaster Recovery Planning, Disaster Proof Hardware

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Louis Collins, MBA	Program Manager	$85.00	80%	10%	$168.30
Don Watson, MBA	Project Manager	$83.00	80%	10%	$164.34
Don Zook, PMP	Project Manager	$83.00	80%	10%	$164.34
Floyd Layher, PMP	Project Manager	$83.00	80%	10%	$164.34
Thom Collins	Systems Analyst II	$77.00	80%	10%	$152.46

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

COMPANY: Edwin T.C. Ing

Technical Specialty: Federal tax law and state renewable energy assistance programs

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Edwin T.C. Ing	Principal	$395.00	0	0	$395.00

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

COMPANY: Exeter Associates, Inc.

Technical Specialty: Economic and public policy consulting

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Kevin Porter	Vice President	68.08	130.0%	10.0%	172.24
Christina Mudd	Senior Analyst	50.72	130.0%	10.0%	128.31
Sari Fink	Engineer	33.90	130.0%	10.0%	85.77
Brett Morgenstern	Research Assistant	24.26	130.0%	10.0%	61.37
David Chen	Research Assistant	27.29	130.0%	10.0%	69.04

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

Exhibit B
Attachment B-1
Form B-1, Labor Rates

COMPANY: Galen Barbose (G.L. Barbose Consulting)

Technical Specialty: electricity markets and pricing, utility regulation, economic analysis

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Galen Barbose	Sole Proprieter	120	0	0	120

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

COMPANY: HDR Engineering

Technical Specialty: Biomass Energy, Waste-to-Energy (WTE), and Renewable Energy Transmission

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C) ($/hr)
Michael Brown	Renewable Energy Investment Specialist; Senior Vice President	118.67	175%	10%	358.99
Mike Greenberg	Biomass Energy and WTE Specialist; Vice President	81.55	175%	10%	246.70
Leslie Kramer	Solar PV and Energy Efficiency Specialist; Vice President	74.63	175%	10%	225.76
Lowell Rogers	Renewable Energy Transmission Specialist	57.59	180%	10%	177.38
Ian Monroe	Biomass Energy Engineer / Analyst II	40.06	185%	10%	125.58
Emily Leslie	Wind and Solar Energy Engineer / Analyst I	34.63	185%	10%	108.58
Lauren Casey	Energy Engineer / Analyst I	33.89	185%	10%	106.24
Tawni Tidwell	Energy Engineer / Analyst I	33.58	185%	10%	105.27

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

COMPANY: McNeil Technologies, Inc.

Technical Specialty:Biomass systems, solar (PV and thermal) integration

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Jack Whittier	Program Manager	$ 61.40	107%	15%	$146.16
Randy Hunsberger	Senior Engineer	$ 36.75	107%	15%	$87.48
Kevin Degroat	Operations Director	$ 77.94	107%	15%	$185.54
Lumas Kendrick	Senior Engineer	$ 43.68	107%	15%	$103.98
Jill Tietjen	Senior Engineer	$ 65.53	107%	15%	$156.00

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

COMPANY: Rickerson Energy Strategies, LLC

Technical Specialty: Policy Analysis & Development; Market Strategy & Research; Planning & Project Management; Training & International Exchange

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Wilson Rickersonn	Principal	110	0	0	110

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

Exhibit B
Attachment B-1
Form B-1, Labor Rates

COMPANY: Sustainable Energy Advantage, LLC

Technical Specialty: Renewable Energy Market, Policy and Financial Analysis

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Robert C. Grace	President	$ 202.50	$ -	$ -	$ 202.50
Jason S. Gifford	Project Manager	$ 140.00	$ -	$ -	$ 140.00
Mimi Q. Zhang	Research Staff	$ 60.00	$ -	$ -	$ 60.00

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

COMPANY: THR Associates

Technical Specialty: Renewable energy, climate, and environmental policy

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Thomas H. Rawls	President	110	0%	0%	110

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

COMPANY: Wiser Consulting

Technical Specialty: renewable energy analysis, economics, and policy

Personnel Name	Classification	A Base Hourly Rate ($/hr)	B Overhead + G&A + Indirect Costs (%)	C Agency Profit/Fee (%)	D TOTAL LOADED RATE* [(A)+(AxB)] x (1+C)
Ryan Wiser	Principal	200	n/a	n/a	200

* The loaded hourly rate shall include overhead, fringe benefits, G&A, any other indirect costs and agency profit. This will be the amount that will show up on contract invoices.

EXHIBIT D

Special Terms and Conditions

1. **CONTRACT MANAGEMENT**:

A. Contractor may change Project Manager but the Energy Commission reserves the right to approve any substitution of the Project Manager.

B. The Energy Commission may change the Contract Manager at any time and will send a written notice to the Contractor signed by the Contract Officer.

C. Commission staff will be permitted to work side by side with Contractor's staff to the extent and under conditions that may be directed by the Energy Commission Contract Manager. In this connection, Commission staff will be given access to all data, working papers, etc., which Contractor may seek to utilize.

D. Contractor will not be permitted to utilize Energy Commission personnel for the performance of services, which are the responsibility of Contractor unless the Contract Manager previously agrees to such utilization in writing and an appropriate adjustment in price is made. No charge will be made to Contractor for the services of Energy Commission employees while performing, coordinating or monitoring functions.

2. **STANDARD OF PERFORMANCE**:

Contractor shall be responsible in the performance of Contractor's/subcontractor's work under this Agreement for exercising the degree of skill and care required by customarily accepted good professional practices and procedures. Any costs for failure to meet these standards, or otherwise defective services, which require reperformance, as directed by Contract Manager or its designee, shall be borne in total by the Contractor/subcontractor and not the Energy Commission. In the event the Contractor/subcontractor fails to perform in accordance with the above standard the following will apply. Nothing contained in this section is intended to limit any of the rights or remedies which the Energy Commission may have under law.

A. Contractor/subcontractor will reperform, at its own expense, any task, which was not performed to the reasonable satisfaction of the Contract Manager. Any work reperformed pursuant to this paragraph shall be completed within the time limitations originally set forth for the specific task involved. Contractor/subcontractor shall work any overtime required to meet the deadline for the task at no additional cost to the Energy Commission.

B. The Energy Commission shall provide a new schedule for the reperformance of any task pursuant to this paragraph in the event that reperformance of a task within the original time limitations is not feasible.

C. If the Energy Commission directs the Contractor not to reperform a task; the Contract Manager and Contractor shall negotiate a reasonable settlement for satisfactory services rendered. No previous payment shall be considered a waiver of the Energy Commission's right to reimbursement.

3. **SUBCONTRACTS:** Contractor shall enter into subcontracts with the following firms and/or individuals and shall manage the performance of the subcontractors.

Aspen Environmental Group; Bates White, LLC; Behnke, Erdman and Whitaker Engineering, Inc. (BEW Engineering); Bite Communications; Black & Veatch (B&V); Center for Resource Solutions (CRS); Clean Power Research, LLC (CPR); Ed Holt & Associates; Edwin T.C. Ing; Energy and Environmental Economics, Inc. (E3); Engage Integrated Systems Technology; Exeter Associates, Inc.; G.I. Barbose Consulting, HDR Engineering; Mark Bolinger, Independent Consultant; McNeil Technologies; Richard D. Ely; Rickerson Energy Strategies; Sustainable Energy Advantage, LLC (SEA); THR Associates; and Wiser Consulting.

A. Nothing contained in this Agreement or otherwise, shall create any contractual relation between the State and any subcontractors, and no subcontract shall relieve the Contractor of his responsibilities and obligations hereunder. The Contractor agrees to be as fully responsible to the State for the acts and omissions of its subcontractors and/or persons either directly or indirectly employed by any of them as it is for the acts and omissions of persons directly employed by the Contractor. The Contractor's obligation to pay its subcontractors is an independent obligation from the State's obligation to make payments to the Contractor. As a result, the State shall have no obligation to pay or to enforce the payment of any monies to any subcontractor.

B. Contractor shall be responsible for establishing and maintaining contractual agreements with and the reimbursement of each of, the subcontractors for work performed in accordance with the terms of this Agreement. Contractor shall be responsible for scheduling and assigning subcontractors to specific tasks in the manner described in this Agreement; coordinating subcontractor accessibility to Energy Commission staff, and submitting completed products to the Contract Manager.

C. All subcontracts shall contain the following: 1) the audit rights and non-discrimination provision stated in the General Terms and Conditions (Exhibit C); 2) further assignments shall not be made to any third or subsequent tier subcontractor without additional written consent of the Contract Manager; and the confidentiality provisions in the Reports paragraph of this Agreement.

D. Additions, Removal or Substitutions of Subcontractors

The Energy Commission reserves the right to replace a subcontractor, request additional subcontractors, and approve additional subcontractors requested by the Contractor. Such changes shall be subject to the following conditions:

1) If the Energy Commission or Contractor requires the replacement or addition of subcontractor(s), the subcontractor(s) shall be selected using 1) A competitive bid process conducted in conformance with the State's and the Energy Commission's procedures for competitive bids. For example, awards shall be made to the lowest bidder meeting the requirements of the bid document and obtaining a minimum of three bids. Contractor's competitive bid process shall be approved by the Contract Manager and

Contract Officer prior to release of the bid document. 2). The Energy Commission may direct Contractor to sole source a subcontract with a specific firm, once the Contract Manager has obtained sole source approval via the Energy Commission's internal procedures. The Contract Manager shall provide justification for the sole source subcontract to the Contracts Officer using the "Subcontractor Add" memo described below.

2) The Contract Manager shall complete and submit to the Contract Officer a "Subcontractor Add" memo. This memo identifies the new subcontractor and what bidding method was used to obtain subcontractors (competitive or sole source).

3) Contractor shall submit any proposed subcontracts not originally identified in Contractor's proposal, or any substitution of subcontracts to the Energy Commission for its approval prior to Contractor entering into it. Upon the termination of any subcontract, the Contract Manager shall be notified immediately.

E. Disabled Veteran Business Enterprise (DVBE) Changes

The Contractor shall use the DVBE companies identified in its proposal or in any certifications identifying DVBE to be used in this Agreement. Contractor's failure to adhere to the DVBE participation may be cause for termination. In the event a replacement of a DVBE is necessary, the Contractor shall request written approval, in advance, from the Contract Manager and the Contract Officer. The procedure for replacing any DVBE is:

1) Contractor shall inform Contract Manager and Contract Officer in writing of the reason for the DVBE replacement.

2) Contractor shall attempt to replace the DVBE with a new DVBE providing the same services or identify other services in the Agreement a new DVBE could provide. Contractor shall complete revised DVBE certification forms (provided by the Contract Officer) identifying the new DVBE. If replacement is not a DVBE, Contractor shall complete steps in compliance with good faith efforts and submit appropriate DVBE documentation to the Contract Officer

4. **PERFORMANCE EVALUATION**:

Consistent with Public Contract Code Sections 10367 through 10371, the Energy Commission shall, upon completion of this Agreement, prepare a performance evaluation of the Contractor. Upon filing an unsatisfactory evaluation with the Department of General Services, Office of Legal Services (DGS) the Energy Commission shall notify and send a copy of the evaluation to the Contractor within 15 days. The Contractor shall have 30 days to prepare and send statements to the Energy Commission and the DGS defending his or her performance. The Contractor's statement shall be filed with the evaluation in the Energy Commission's Contract file and with DGS for a period of 36 months and shall not be a public record.

5. **REPORTS**:

A. **Progress and Final Reports**: Contractor shall prepare progress reports summarizing all activities conducted by Contractor to date on a schedule as provided in Exhibit A. At the conclusion of this Agreement, Contractor shall prepare a comprehensive Final Report, on a schedule as provided in Exhibit A.

B. **Title:** Contractor's name shall only appear on the cover and title page of reports as follows:

California Energy Commission
Project Title
Contractor Number
By (Contractor)

C. **Ownership**: Each report shall become the property of the Energy Commission.

D. **Non-disclosure**: Contractor will not disclose data or disseminate the contents of the final or any progress report without written permission of the Contract Manager, except as provided in F, below. Permission to disclose information on one occasion or at public hearings held by the Energy Commission relating to the same shall not authorize Contractor to further disclose and disseminate the information on any other occasion. Contractor will not comment publicly to the press or any other media regarding its report, or Commission's actions on the same, except to Commission staff, Contractor's own personnel involved in the performance of this Contract, or at a public hearing, or in response to questions from a legislative committee. Notwithstanding the foregoing, in the event any public statement is made by the Energy Commission or any other party, based on information received from the Energy Commission as to the role of Contractor or the content of any preliminary or final report, Contractor may, if it believes the statement to be incorrect, state publicly what it believes is correct.

E. **Confidentiality:** No record which has been designated as confidential, or is the subject of a pending application of confidentiality, shall be disclosed by the Contractor, Contractor's employees or any tier of subcontractors, except as provided in 20 California Code of Regulations, Sections 2506 and 2507, unless disclosure is ordered by a court of competent jurisdiction (20 California Code of Regulations, Sections 2501, et seq.). At the election of the Contract Manager, Contractor, Contractor's employees and any subcontractor shall execute a "Confidentiality Agreement," supplied by the Contract Manager or Contract Officer. Each subcontract shall contain provisions similar to the foregoing related to the confidentiality and nondisclosure of data.

F. **Disclosure**: Ninety days after any document submitted by the contractor is deemed by the Contract Manager to be a part of the public records of the State, Contractor may, if it wishes to do so at its own expense, publish or utilize a report or written document but shall include the following legend:

"LEGAL NOTICE"

"This report was prepared as a result of work sponsored by the California Energy Commission. It does not necessarily represent the views of the Energy Commission, its employees, or the State of California. The Energy Commission, the State of California, its employees, contractors, and subcontractors make no warranty, express or implied, and assume no legal liability for the information in this report; nor does any party represent that the use of this information will not infringe upon privately owned rights."

6. **CONTRACT DATA, OWNERSHIP RIGHTS**:

A. "Data" as used in this Agreement means recorded information, regardless of form or characteristic, of a scientific or technical nature. It may, for example, document research or experimental, developmental or engineering work, or be usable or be used to define a design or process, or to support a premise or conclusion asserted in any deliverable document required by this Agreement. The data may be graphic or pictorial delineations in media, such as drawings or photographs, data or information, etc. It may be in machine form, such as punched cards, magnetic tape or computer printouts, or may be retained in computer memory.

B. "Deliverable data" is that data which, under the terms of this Agreement, is required to be delivered to the Energy Commission and shall belong to the Energy Commission.

C. "Proprietary data" is such data as the Contractor has identified in a satisfactory manner as being under Contractor's control prior to commencement of performance of this Agreement, and which Contractor has reasonably demonstrated as being of a proprietary nature either by reason of copyright, patent or trade secret doctrines in full force and effect at the time when performance of this Contract is commenced. The title to "proprietary data" shall remain with the Contractor throughout the term of this Agreement and thereafter. The extent of the Energy Commission access to, and the testimony available regarding, the proprietary data shall be limited to that reasonably necessary to demonstrate, in a scientific manner to the satisfaction of scientific persons, the validity of any premise, postulate or conclusion referred to or expressed in any deliverable for this Agreement.

D. "Generated data" is that data, which a Contractor has collected, collated, recorded, deduced, read out or postulated for utilization in the performance of this Contract. Any electronic data processing program, model or software system developed or substantially modified by the Contractor in the performance of this Contract at the Energy Commission's expense, together with complete documentation thereof, shall be treated in the same manner as "generated data." "Generated data" shall be the property of the Energy Commission, unless and only to the extent that it is specifically provided otherwise in this Agreement.

E. As to "generated data" which is reserved to Contractor by the express terms hereof, and as to any pre-existing or "proprietary data" which has been utilized to support any premise, postulate or conclusion referred to or expressed in any

deliverable hereunder, Contractor shall preserve the same in a form which may be introduced as evidence in a court of law at Contractor's own expense for a period of not less than three years after receipt by the Energy Commission of the Final Report herein.

F. Before the expiration of the three years, and before changing the form of or destroying any data, Contractor shall notify the Energy Commission of any contemplated action and the Energy Commission may, within thirty (30) days after notification, determine whether it desires the data to be preserved. If the Energy Commission so elects, the expense of further preserving data shall be paid for by the Energy Commission. Contractor agrees that the Energy Commission may at its own expense, have reasonable access to data throughout the time during which data is preserved. Contractor agrees to use its best efforts to furnish competent witnesses or to identify competent witnesses to testify in any court of law regarding data.

7. **PUBLIC HEARINGS**: If public hearings on the scope of work are held during the period of the Contract, Contractor will make available to testify the personnel assigned to this Agreement. The Energy Commission will reimburse Contractor for compensation and travel of the personnel at the Contract rates for the testimony which the Energy Commission requests.

8. **DISPUTES**: In the event of a Contract dispute or grievance between Contractor and the Energy Commission, both parties shall follow the following two-step procedure. Contractor shall continue with the responsibilities under this contract during any dispute.

A. Commission Dispute Resolution

The Contractor shall first discuss the problem informally with the Contract Manager. If the problem cannot be resolved at this stage, the Contractor must direct the grievance together with any evidence, in writing, to the Contracts Officer. The grievance must state the issues in the dispute, the legal authority or other basis for the Contractor's position and the remedy sought. The Contracts Officer and the Program Office Manager must make a determination on the problem within ten (10) working days after receipt of the written communication from the Contractor. The Contracts Officer shall respond in writing to the Contractor, indicating a decision and explanation for the decision. Should the Contractor disagree with the Contracts Officer decision, the Contractor may appeal to the second level.

The Contractor must prepare a letter indicating why the Contracts Officer's decision is unacceptable, attaching to it the Contractor's original statement of the dispute with supporting documents, along with a copy of the Contracts Officer's response. This letter shall be sent to the Energy Commission's Executive Director within ten (10) working days from receipt of the Contracts Officer's decision. The Executive Director or designee shall meet with the Contractor to review the issues raised. A written decision signed by the Executive Director or designee shall be returned to the Contractor within twenty (20) working days of receipt of the Contractor's letter. The Executive Director may inform the Energy Commission of the decision at an Energy Commission business meeting. Should the Contractor disagree with the Executive Director's decision, the Contractor

may appeal to the Energy Commission at a regularly scheduled business meeting. Contractor will be provided with the current procedures for placing the appeal on an Energy Commission Business Meeting Agenda.

B. Binding Arbitration

Should the Energy Commission's Dispute Resolution procedure above fail to resolve a contract dispute or grievance to the satisfaction of the Contractor, the Contractor and Commission mutually may elect to have the dispute or grievance resolved through binding arbitration. If one party does not agree, the matter shall not be submitted to arbitration. The arbitration proceeding shall take place in Sacramento County, California, and shall be governed by the commercial arbitration rules of the American Arbitration Association (AAA) in effect on the date the arbitration is initiated. The dispute or grievance shall be resolved by one (1) arbitrator who is an expert in the particular field of the dispute or grievance. The arbitrator shall be selected in accordance with the aforementioned commercial arbitration rules. If arbitration is mutually decided by the parties, arbitration is in lieu of any court action and the decision rendered by the arbitrator shall be final (not appealable to a court through the civil process). However, judgment may be entered upon the arbitrator's decision and is enforceable in accordance with the applicable law in any court having jurisdiction over this Agreement. The demand for arbitration shall be made no later six (6) months after the date of the contract's termination, despite when the dispute or grievance arose, and despite the applicable statue of limitations for a suit based on the dispute or grievance. If the parties do not mutually agree to arbitration, the parties agree that the sole forum to resolve a dispute is state court.

The cost of arbitration shall be borne by the parties as follows:

1) The AAA's administrative fees shall be borne equally by the parties;
2) The expense of a stenographer shall be born by the party requesting a stenographic record;
3) Witness expenses for either side shall be paid by the party producing the witness;
4) Each party shall bear the cost of its own travel expenses;
5) All other expenses shall be borne equally by the parties, unless the arbitrator apportions or assesses the expenses otherwise as part of his or her award.

At the option of the parties, any or all of these arbitration costs may be deducted from any balance of Contract funds. Both parties must agree, in writing, to utilize contract funds to pay for arbitration costs.

9. **TERMINATION:**

The parties agree that because the Energy Commission is a state entity and contracts on behalf of all Californian rate payers, it is necessary for the Energy Commission to be able to terminate, at once, upon the default of Contractors and to proceed with the work required under the Agreement in any manner the Energy Commission deems proper. Contractor specifically acknowledges that the unilateral termination of the Agreement by the Energy Commission under the terms set forth below is an essential term of the

Agreement, without which the Energy Commission would not enter into the Agreement. Contractor further agrees that upon any of the events triggering the unilateral termination the Agreement by the Energy Commission, the Energy Commission has the sole right to terminate the Agreement, and it would constitute bad faith of the Contractor to interfere with the immediate termination of the Agreement by the Energy Commission.

This Agreement may be terminated for any reason set forth below.

A. With Cause

In the event of any breach by the Contractor of the conditions set forth in this Agreement, the Energy Commission may, without prejudice to any of its legal remedies, terminate this Agreement for cause upon five (5) days written notice to the Contractor. In such event, Commission shall pay Contractor only the reasonable value of the services theretofore rendered by Contractor, as may be agreed upon by the parties or determined by a court of law, but not in excess of the contract maximum payable. "Cause" includes without limitation:

1) Failure to perform or breach of any of the terms or covenants at the time and in the manner provided in this Agreement; or

2) Contractor is not able to pay its debts as they become due and/or Contractor is in default of an obligation that impacts his ability to perform under this Agreement; or

3) It is determined after notice and hearing by the Energy Commission or the Executive Director that gratuities were offered or given by the Contractor or any agent or representative of the Contractor, to any officer or employee of the Energy Commission, with a view toward securing an Agreement or securing favorable treatment with respect to awarding or amending or making a determination with respect to performance of the Agreement; or

4) Significant change in Commission policy such that the work or product being funded would not be supported by the Energy Commission; or

5) Reorganization to a business entity unsatisfactory to the Energy Commission; or

6) The retention or hiring of subcontractors, or the replacement or addition of personnel that fail to perform to the standards and requirements of this Agreement.

B. Without Cause

The Energy Commission may, at its option, terminate this Agreement without cause in whole or in part, upon giving thirty (30) days advance notice in writing to the Contractor. In such event, the Contractor agrees to use all reasonable efforts to mitigate the Contractor's expenses and obligations hereunder. Also, in such event, the Energy Commission shall pay the Contractor for all satisfactory services rendered and expenses incurred within 30 days after notice of

termination which could not by reasonable efforts of the Contractor have been avoided, but not in excess of the maximum payable under this Agreement.

10. **WAIVER:**

No waiver of any breach of this Contract shall be held to be a waiver of any other or subsequent breach. All remedies afforded in this Contract shall be taken and construed as cumulative, that is, in addition to every other remedy provided therein or by law. The failure of the Energy Commission to enforce at any time any of the provisions of this Contract, or to require at any time performance by Contractor of any of the provisions, shall in no way be construed to be a waiver of those provisions, nor in any way affect the validity of this Contract or any part of it or the right of the Energy Commission to thereafter enforce each and every such provision.

11. **CAPTIONS:**

The clause headings appearing in this Agreement have been inserted for the purpose of convenience and ready reference and do not define, limit, or extend the scope or intent of the clauses.

12. **PRIOR DEALINGS, CUSTOM OR TRADE USAGE:**

In no event shall any prior course of dealing, custom or trade usage modify, alter, or supplement any of these terms.

13. **NOTICE:**

Legal notice must be given using any of the following delivery methods: U.S. Mail, overnight mail, or personal delivery, providing evidence of receipt to the person identified in Exhibit F of this Agreement for legal notices. Delivery by fax or e-mail is not considered legal notice for the purpose of this clause. This clause is not intended to apply to normal, daily communication between the parties related to progress of the work. This clause applies to situations where notice is required to be given by this Agreement or the parties are asserting their legal rights and remedies.

Notice shall be effective when received, unless a legal holiday for the State commences on the date of the attempted delivery. In which case, the effective date shall be postponed until the next business day.

14. **STOP WORK:**

The Contract Officer may, at any time, by written notice to Contractor, require Contractor to stop all or any part of the work tasks in this Agreement. Stop Work Orders may be issued for reasons such as a project exceeding budget, standard of performance, out of scope work, delay in project schedule, misrepresentations and the like.

A. Compliance Upon receipt of such stop work order, Contractor shall immediately take all necessary steps to comply therewith and to minimize the incurrence of costs allocable to work stopped.

B. Equitable Adjustment An equitable adjustment shall be made by Commission based upon a written request by Contractor for an equitable adjustment. Such adjustment request must be made by Contractor within thirty (30) days from the date of receipt of the stop work notice.

C. Revoking a Stop Work Order Contractor shall resume the stopped work only upon receipt of written instructions from the Energy Commission Contract Officer canceling the stop work order.

15. **INTERPRETATION OF TERMS:**

This Agreement shall be conducted in accordance with the terms and conditions of the solicitation, if applicable. The Contractor's proposal is not attached, but is expressly incorporated by reference into this Agreement. In the event of conflict or inconsistency between the terms of this Agreement and the solicitation or proposal, this Agreement shall be considered controlling.

16. **AMENDMENTS**

This Agreement may be amended to make changes, including without limitation; additional funds, additional time, additional or modified tasks, and additional or modified terms. Amendments may be made without competitively bidding, so long as the amendment is exempt from competitive bidding pursuant to Public Contract Code section 10335, Government Code section 11010.5 and the State Contract Manual.

EXHIBIT E
Additional Provisions

1. **CONFIDENTIALITY**

A. Information Considered Confidential

If applicable, all Contractor information considered confidential at the commencement of this Agreement is designated in the Attachment to this Exhibit.

B. Confidential Deliverables: Labeling and Submitting Confidential Information

Prior to the commencement of this Agreement, if applicable, the parties have identified in the Attachment to this Exhibit, specific Confidential Information to be provided as a deliverable. All such confidential deliverables shall be marked, by the Contractor, as "Confidential" on each page of the document containing the Confidential Information and presented in a sealed package to the Commission Contracts Officer. (Non-confidential deliverables are submitted to the Accounting Office.) All Confidential Information will be contained in the "confidential" volume: no Confidential Information will be in the "public" volume.

C. Submittal of Unanticipated Confidential Information as a Deliverable

The Contractor and the Energy Commission agree that during this Agreement, it is possible that the Contractor may develop additional data or information not originally anticipated as a confidential deliverable. In this case, Contractor shall follow the procedures for a request for designation of Confidential Information specified in 20 CCR 2505. The Energy Commission's Executive Director makes the determination of confidentiality. Such subsequent determinations may be added to the list of confidential deliverables in the Attachment to this Exhibit.

D. Disclosure of Confidential Information

Disclosure of Confidential Information by the Energy Commission may only be made pursuant to 20 CCR 2506 and 2507. All confidential data, records or deliverables that are legally disclosed by the Contractor or any other entity become public records and are no longer subject to the above confidentiality designation.

2. **PROPOSAL INTERPRETATION:** This project shall be conducted in accordance with the terms and conditions of Commission Request for Proposal, number 400-07-404, titled, Technical Assistance For The Renewable Energy Program, Contractor's proposal dated January 23, 2008, and this Agreement. The Contractor's proposal is not attached, but is expressly incorporated by reference into this Agreement. In the event of conflict or inconsistency between the terms of this Agreement and the Contractor's proposal, this Agreement shall be considered controlling.

3. **WORK AUTHORIZATION PROCESS**:

A. The Contract Manager, in conjunction with the Project Manager shall prepare Work Authorizations (WA) using the format provided by the Contract Manager. No work shall begin until the WA has been approved by the authorized individuals of the Energy Commission and the Contractor. The Contract Manager shall file each signed WA with the Commission Contract Officer before payment is approved for the WA.

B. Each WA shall describe the objectives, scope of work, tasks, schedule and desired deliverables; all Contractor personnel and subcontractors who will conduct the work; and the budget. Each WA shall include but not be limited to:

1. Contract Number
2. WA Number
3. WA Title
4. Start and End Dates for the WA
5. Funding Source
6. Work Statement, Schedule, Deliverables and Contact Information
7. Detailed Budget
   - Identification of DVBE
   - Identification of Sole Source
8. Other items as required by the Contract Manager.

C. Payment for services is based upon an approved budget in each WA. Any expenses incurred by the Contractor that have not been identified in the WA shall be borne by the Contractor.

D. WA amendments.
1. Amendments include but are not limited to:
   - Changes to the Work Statement,
   - Changes to the Budget
   - Changes to personnel
   - Changes to the Term
2. Amendments require prior written approval of the authorized individuals of the Energy Commission and Contractor
3. Amendments must be made prior to the termination date of the WA.

E. The total cost of a completed WA shall not exceed the authorized amount. If, in the performance of the WA, the Contractor determines that the total costs will exceed the WA amount, Contractor shall immediately notify the Contract Manager. Upon such notification, the Contract Manager may:

1. Determine that no changes are warranted and authorize the Contractor to complete the work for the amount authorized and within the existing term of the WA.
2. Amend the WA by
   - Altering the scope of the WA to accomplish the work within the authorized amount.
   - Augmenting the amount of the WA, and, if necessary, extending the term of the WA.
3. Terminate the WA.

F. The Energy Commission reserves the right to require the Contractor to stop or suspend work on any WA. The Contract Manager, in consultation with the Contract Officer, shall provide notice in writing to the Contractor of the date work is stopped or suspended. Costs incurred up to that date shall be reimbursed in accordance with the termination clause.

G. Each WA shall be incorporated into this Agreement. However, it is understood and agreed by both parties that all of the terms and conditions of this Agreement shall remain in force with the inclusion of any such WA. A WA shall in no way constitute an independent Agreement, other than as provided pursuant to this Agreement, nor in any way amend or supersede any of the other provisions of this Agreement.

4. **RIGHTS OF PARTIES IN COPYRIGHTS, PHYSICAL WORKS OF ART AND FINE ART:**

The Contractor; by signing this Agreement, expressly grants to the Energy Commission for all copyrightable material, work of art and original work of authorship first produced, composed or authored in the performance of this Agreement a royalty-free, paid-up, non-exclusive, irrevocable, nontransferable, worldwide license to produce, translate, publish, use, dispose of, reproduce, prepare derivative works based on, distribute copies of, publicly perform, or publicly display a work of art or fine art, and to authorize others to produce, translate, publish, use, dispose of, reproduce, prepare derivative works based on, distribute copies of, publicly perform, or publicly display a work of art or fine art.

Contractor, by signing this Agreement, expressly conveys to the Energy Commission all ownership of the physical works of art and fine art produced

under this Agreement. Contractor agrees it does not reserve any rights to the physical works of art and fine art produced under this Agreement.

Contractor shall obtain these same rights for the Energy Commission from all subcontractors and others who produce copyrightable material, works of art, or works of fine art under this Agreement. Contractor shall incorporate these paragraphs, modified appropriately, into its agreements with subcontractors. No subcontract shall be entered into without these rights being assured to the Energy Commission from the subcontractor.

5. **RIGHT OF PARTIES REGARDING INTELLECTUAL PROPERTY**

A. Right in Reports First Produced Under Agreement

1) Reports produced or composed by Contractor or Subcontractors under this Agreement and specified for delivery to the Commission under this Agreement shall become the property of the Commission. The Commission may use, modify, translate, publish, reproduce, display, disseminate and dispose of these reports. The preparation of these reports by Contractor or Subcontractors shall be considered "work for hire" for copyright purposes. To the extent the preparation of reports under this Agreement is not considered work for hire under federal law, Contractor, for itself and on behalf of its Subcontractors, hereby assigns all rights and interests in said reports, including any and all copyrights and rights of reproduction to works of fine art pursuant to state law, to the Commission. Contractor shall secure the necessary assignments from its Subcontractors to effectuate the transfer of Subcontractors' rights and interests to the Commission.

2) Contractor may, if it wishes to do so at its own expense, publish or utilize reports produced under this Agreement in accordance with the provisions of Exhibit D.

B. Rights in Deliverables First Produced Under Agreement

1) Deliverables, including deliverable data as defined in paragraph 7 of Exhibit D, but excluding reports, first produced or composed by Contractor or Subcontractors under this Agreement and specified for delivery to the Commission under this Agreement shall become the property of the Commission. The Commission may use, modify, translate, publish, reproduce, display, disseminate and dispose of these deliverables. The preparation of deliverables by Contractor or Subcontractors shall be considered work for hire for copyright purposes. To the extent the preparation of deliverables under this Agreement is not considered work for hire under federal law, Contractor, for itself and on behalf of its Subcontractors, hereby assigns all rights and interests in said

deliverables, including any and all copyrights and rights of reproduction to works of fine art pursuant to state law, to the Commission. Contractor shall secure the necessary assignments from its Subcontractors to effectuate the transfer of Subcontractors' rights and interests to the Commission.

2) The Contractor is hereby granted a license to use, modify, translate, republish, reproduce, display and disseminate any deliverables, excluding reports, first produced or composed under this Agreement for the limited purposes of furthering the activities of this Agreement and in accordance with the requirements of this Contact. In consideration for the Commission's funding under this Agreement, neither the Contractor nor any Subcontractor shall use any deliverable first produced under the Agreement, or the underlying copyrights therein, in a manner that is inconsistent with or contrary to the purpose, goals, or spirit of the activities of this Agreement.

3) Contractor shall place or cause to be placed the following legend on all deliverables first produced under this Agreement and specified for delivery to the Commission under this Agreement, inserting the year of creation in the blank space:

   "Copyright © ____ *[year]* by the State of California. All rights reserved"

4) Contractor, by signing this Agreement, expressly conveys to the Commission all ownership of the physical works of art and fine art produced under this Contract pursuant to state law. Contractor agrees it does not reserve any rights to the physical works of art and fine art produced under this Agreement.

C. <u>Deliverables and Reports Not First Produced Under Agreement</u>

Deliverables and reports, including deliverable data as defined in paragraph 7 of Exhibit D, not first produced or composed by Contractor or Subcontractors under this Agreement, but specified for delivery to the Commission under this Agreement, may be used, modified, translated, republished, reproduced, displayed, disseminated and disposed of by the Commission under a royalty free, paid-up, nonexclusive, irrevocable, nontransferable worldwide, perpetual license secured by Contractor for and on behalf of the Commission. The Contractor shall secure this license for the Commission from the owner or owners of any copyrights in deliverables and reports not first produced or composed under this Agreement, but specified for delivery under the Agreement.

D. Software

In the event software is developed that is not a deliverable under the Agreement, and Contractor copyrights and/or patents such software, Contractor shall notify the Commission in writing of said software and grant the Commission a royalty-free, paid-up, no-cost, non-exclusive, irrevocable, nontransferable, worldwide, perpetual license to use, modify, translate, republish, reproduce, display, disseminate and dispose of the software for governmental purposes.

E. Intellectual Property Indemnification

Contractor warrants that Contractor will not, in its supplying work under this Agreement, knowingly infringe or misappropriate any intellectual property right of a third party, and that it will conduct a reasonable investigation of the intellectual property rights of third parties to avoid such infringement. Contractor will defend and indemnify Commission from and against any claim, lawsuit or other proceeding, loss, cost, liability or expense (including court costs and reasonable fees of attorneys and other professionals) arising out of any third party claim that a Contract deliverable infringes upon any patent, copyright, trade secret or other intellectual property right of any third party, or any third party claim arising out of the negligent or tortious act(s) or omission(s) of the Contractor, its employees, Subcontractors or agents, in connection with or related to the Agreement deliverables or the Contractor's performance under this Agreement.

6. **CONFLICT OF INTEREST:**

A. Contractor agrees to continuously review new and upcoming projects in which members of the Contractor team may be involved for potential conflicts of interest. Contractor shall inform the Contract Manager as soon as a question arises about whether a potential conflict may exist. The Contract Manager and Commission's Chief Counsel's Office shall determine what constitutes a potential conflict of interest. The Energy Commission reserves the right to redirect work and funding on a project if the Commission's Chief Counsel's Office determines that there is a potential conflict of interest.

B. The Contractor shall submit an economic interest statement (Fair Political Practices Commission's Form 700) from each employee or subcontractor whom the Energy Commission's Chief Counsel's Office, in consultation with the Contract Manager, determines is a consultant under the Political Reform Act and, thus, subject to the requirements and restrictions of the Act. Such determination will be based on the nature and duration of the work to be performed by the employee or subcontractor. The

determination as to who is a consultant under the Political Reform Act shall be requested by the Contract Manager before work by the employee or subcontractor begins. Each employee and subcontractor determined to be a consultant under the Political Reform Act shall be subject to the same disclosure category or categories applicable to the Commission staff who perform the same nature and scope of work as the consultant.

C. No person, firm, or subsidiary thereof who has been awarded a consulting services contract may submit a bid for, nor be awarded a contract for, the provision of services, procurement of goods or supplies, or any other related action which is required, suggested, or otherwise deemed appropriate in the end product of the consulting services contract. This does not apply to any person, firm, or subsidiary thereof who is awarded a subcontract of a consulting services contract which amounts to no more than 10 percent of the total monetary value of the consulting services contract.

1) Follow-on Contracts
No person, firm, or subsidiary thereof who has been awarded a consulting services contract, or a contract which includes a consulting component, may be awarded a contract for the provision of services, delivery of goods or supplies, or any other related action which is required, suggested, or otherwise deemed appropriate as an end product of the consulting services contract. Therefore, any consultant that contracts with a state agency to develop a feasibility study or provide formal recommendations for the acquisition of EDP products or services is precluded from contracting for any work recommended in the feasibility study or the formal recommendation.

EXHIBIT F

NAMES AND ADDRESSES OF AGREEMENT REPRESENTATIVES

Commission Contract Manager: Rachel Salazar California Energy Commission 1516 Ninth Street Sacramento, CA 95814 Phone: (916)654-5004 Fax: (916) 653-8251 e-mail: rsalazar@energy.state.ca.us	**Contractor Project Manager:** Karin Corfee KEMA, Incorporated 492 Ninth Street, Suite 220 Oakland, CA 94607 Phone: (510) 891-0446 Fax: (510) 891-0440 e-mail: karin.corfee@us.kema.com
Commission Contract Officer: Lori Tomita, MS-18 California Energy Commission 1516 Ninth Street Sacramento, CA 95814 Phone: (916) 654-5833 Fax: (916) 654-4423 e-mail: ltomita@energy.state.ca.us Deliver confidential deliverables to this location only.	**Contractor Contract Officer**: Nellie Tong KEMA, Incorporated 492 Ninth Street, Suite 220 Oakland, CA 94607 Phone: (510) 891-0446 Fax: (510) 891-0440 e-mail: nellie.tong@us.kema.com
Invoices, Progress Reports and Non-Confidential Deliverables to: Accounting Office, MS-2 California Energy Commission 1516 Ninth Street Sacramento, CA 95814 Phone: (916) 654-4401 Fax: (916) 653-1435	
Legal Notices: Cheryl Raedel, MS-18 Manager, Contracts Office California Energy Commission 1516 Ninth Street Sacramento, CA 95814 Phone: (916) 654-4392 Fax: (916) 654-4423 e-mail: craedel@energy.state.ca.us	Gary D. Ciavola Director of Contracts and Legal Counsel KEMA, Incorporated 67 South Bedford St., Suite 201E Burlington, MA 01803 Phone: (781) 418-5749 Fax: (781) 229-4867 e-mail: gary.ciavola@kema.com

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 10 Amendment No.

Program Area:
☒ Renewable Energy Program

Contract Task:
☐ Task 1 - Contract Admin/Reporting
☐ Task 2 - Existing Fund
☐ Task 3 - New Fund
☐ Task 4 - RPS
☒ Task 5 - Renewable Rebate Programs
☐ Task 6 - Consumer Education Fund
☐ Task 7 - Evaluation

Fund Source:
☒ RRTF Technical Support
☐ RRTF Program

This work is authorized under: Task 5, Subtasks G,H, K, and L

Project Title: Renewable Rebate Program Equipment Certification Support

Energy Commission/Contractor Project Manager: Payam Narvand/Karin Corfee (KEMA)

Assigned Contractor/Subcontractor Team:

KEMA: Karin Corfee, Nellie Tong, Pete Baumstark, Daria Mashnik, and Bill Brooks

Term: Effective Date through March 31, 2010

NOTE: The Effective Date of this work authorization is the date the Energy Commission's Contract Manager signs the work authorization. The Energy Commission's Contract Manager shall be the last party to sign. No work is authorized, nor shall any work begin, until on or after the Effective Date.

Purpose: The Contractors will provide support to staff on renewable rebate programs which are administered by the Energy Commission's Renewable Energy Program (REP), including the Emerging Renewable Program (ERP), New Solar Homes Partnership (NSHP), and requirements of Senate Bill 1 (SB 1) as it directly pertains to the Energy Commission. Specifically, the Contractors will: (1) review and provide feedback on draft guidebook language, (2) respond to requests for additions to the eligible equipment lists per certification requirements in the program guidebooks, (3) evaluating new technology requests for determining eligibility under the ERP requirements, and (4) providing updates to the eligible equipment lists to be posted on the Energy Commission's REP websites.

Reason for Amendment (if this is an amendment to an existing work authorization):

TOTAL WORK AUTHORIZATION BUDGET	**$70,004.47**	**Cumulative (after amendments)**
	$	**Incremental ($ of amendment)**

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 10 Amendment No.

IMPORTANT NOTICE

This Work Authorization may only authorize work that is within the scope and budget of the underlying prime contract. This Work Authorization cannot and does not authorize work that is beyond the scope of the work authorized by the underlying prime contract, may not expand the budget of the underlying prime contract, nor can this Work Authorization change, amend or modify any of the substantive terms and/or conditions of the underlying prime contract nor add any new substantive terms and/or conditions to the underlying prime contract. Expanding the scope of work or the budget of the underlying prime contract, and/or changing, modifying or amending any of the other substantive terms and conditions of the prime contract, requires a formal written contract amendment rather than a Work Authorization.

If a change in the scope or budget of the underlying prime contract is sought or required, then a formal contract amendment (rather than a Work Authorization) must be executed by the parties to the prime contract. If there is a conflict between the scope of the work set forth in this Work Authorization and the scope of work set forth in the underlying prime contract, the underlying prime contract shall prevail.

The actual costs of a completed, approved Work Authorization shall not exceed the authorized amount. If, in the performance of the work, the Contractor determines that the actual costs will exceed the estimated costs, the Contractor shall immediately notify the Energy Commission Contract Manager and Energy Commission Project Manager. Upon such notification, the Energy Commission Project Manager may (*with approval of the Energy Commission Contract Manager*):

(1) Alter the scope of the Work Authorization to accomplish the work within estimated costs; or
(2) Augment the Work Authorization budget; or
(3) Authorize the Contractor to complete the work for the actual costs; or
(4) Terminate the Work Authorization.

Any expenses incurred by the Contractor that have not been duly authorized shall be borne by the Contractor. No amendments to this Work Authorization shall be made for work undertaken without the specific approval of the Energy Commission Project Manager and Contract Manager (See Contract No. 400-07-030 for details of notice).

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 10 Amendment No.

BUDGET FOR PRIME CONTRACTOR:

Staff Name	*Loaded Hourly Rate*	*Total Estimated Hours*	*Total Labor*
See attached Budget	$		$
	$		$

Other Direct Costs (ODC's)[1] (list items)	*Cost*
See attached Budget	$
	$

Total Prime Contractor Labor: $ 69,704.47
Total Prime Contractor ODC's: $ 300.00

(1) Total Prime Contractor Budget: $ 70,004.47

BUDGET FOR SUBCONTRACTORS:
(Please check, if applicable: ☐ DVBE)

Individual Names by Subcontractor	*Loaded Hourly Rate*	*Total Estimated Hours*	*Total Labor*
	$		$
	$		$

Other Direct Costs (ODC's)[1] (list items)	*Cost*
	$

Total Subcontractor Labor: $ 0.00
Total Subcontractor ODC's: $ 0.00

(2) Total Subcontractor Budget: $ 0.00

TOTAL WORK AUTHORIZATION BUDGET* $ 70,004.47

*includes: (1) Prime Contractor Total and (2) Subcontractors Total

See attached Budget Detail which is incorporated as part of this work authorization.

[1] Such as shipping, reproduction, postage, telephone, and travel.

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 10 Amendment No.

WORK STATEMENT

Task No.	Title	Description	Deliverables	Due Date
1	**Equipment Certification and Power Output Ratings**			
	1.1 - ERP	The Contractors will provide ongoing support by responding to requests for additions to the ERP's current equipment eligibility lists including: obtaining information from industry representatives; developing/updating a comprehensive list of inverters, wind turbines, fuel cells and meters, that meet the certification requirements of the current ERP guidebook, Appendix 3. For each inverter, the list will include efficiency rating, continuous rated AC power, and other physical and electrical parameters as determined by the standardized test protocol adopted by the Energy Commission. New information will be obtained from the manufacturers as available. The Contractors will modify the list based on the updated information received and will submit it electronically to the Energy Commission Project Manager not less than monthly. Staff will have these updated lists posted to the state's Go Solar California website for use by manufacturers, retailers and customers.	Revised ERP Eligible Equipment List and Certifications Listings	Due by the 25th day of each month and as needed, as requested by Energy Commission Project Manager

	1.2 – SB 1	The Contractors will provide ongoing support by responding to requests for additions to the current eligibility lists including: obtaining information from industry representatives, and developing a comprehensive list of solar products consisting of inverters and meters/metering providers that meet the certification requirements for SB 1 (per the SB 1 Guidelines, CSI Handbook, and NSHP Guidebook.) For each module, the list will include module CEC-PV Calculator inputs, and other physical and electrical parameters. For each inverter, the list will include efficiency rating, continuous rated AC power, and other physical and electrical parameters as determined by the standardized test protocol adopted by the Energy Commission. New information will be obtained from the manufacturers as available. The Contractors will modify the list based on the updated information received and will submit it electronically to the Energy Commission Project Manager not less than monthly. Staff will have these updated lists posted to the state's Go Solar California website for use by manufacturers, retailers and customers.	Revised Eligible Equipment Lists and Certifications Listings	Due by the 25th day of each month and as needed, as requested by Energy Commission Project Manager

2	**Review of New Technology Requests**	Upon request and/or approval of the Energy Commission Project Manager, the Contractors will review industry representatives' requests to add products to the Eligible Equipment list that are not standard non-concentrating photovoltaic modules, meters/metering providers, inverters, fuel cells or wind turbines. The Contractors will initially determine if the information presented by the industry representative addresses all items necessary to meet the current requirements per the ERP Guidebook, Appendix 3, Section E, or SB1 Guidelines on Non-PV requirements. The Contractors will then advise the Energy Commission Project Manager on whether or not a detailed evaluation should be done. Upon approval by the Energy Commission Project Manager, the Contractors will: evaluate the technical merits of the proposal, working with the requesting party to obtain any missing information, and submit an electronic summary of the research results and recommendations to the Energy Commission Project Manager. The Energy Commission will in turn use the recommendation when deciding whether or not the new product is eligible to be added to the Eligible Equipment lists.	Written requests, updates, and evaluation summaries	As needed (e.g., when a request is received for listing a new product.) and as approved by the Energy Commission Project Manager
3	**Guidebook Support**	At the direction of the Energy Commission Project Manager, the Contractors will review and/or propose draft language to be included in the ERP, NSHP, and SB 1 guidebooks/guidelines, and will submit their comments and/or proposed language to the Energy Commission Project Manager for approval.	Comments and/or proposed draft language as directed.	As needed and as requested by the Energy Commission Project Manager
4	**Meetings and Discussions**	The Contractors will be available to participate in meetings and or discussions (e.g., conference calls, in-person, and e-mail) as needed and as requested by the Energy Commission Project Manager.	Discussions and/or e-mails	As needed and as requested by the Energy Commission Project Manager
5	**Project Management**	The Contractors will provide project management to ensure the project is completed on time and within budget. Additionally, the Contractor will provide progress updates for Energy Commission staff as requested or as necessary.	Progress Updates either verbal or in writing	As necessary and as requested by the Energy Commission Project Manager

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 10 Amendment No.

Approval:

ENERGY COMMISSION

09-21-09
Project Manager **Date**

9-21-09
Renewable Energy Program Director **Date**

9/21/09
Contract Manager **Date**

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 10 Amendment No.

KEMA, INC.

9/21/09

Principal in Charge **Date**

Work Authorization #10 INCREMENT
Renewable Energy Equipment Certification
Status: Draft
Start date: 09/21/09
End Date: 03/31/10
Months: 6

Task Number	Task Title	Total Hours	Total Expenses	KEMA				
				Karin Corfee $234.70	Nellie Tong $113.36	Pete Baumstark $136.46	Daria Mashnik $79.45	Bill Brooks $213.13
1.1	Equipment Certification - ERP	168	$ 23,420.75			36	72	60
1.2	Equipment Certification - SB1	300	$ 28,965.92			90	210	
2	Review of new technology requests	36	$ 5,030.44			24	6	6
3	Guidebook Support	30	$ 4,860.43			20		10
4	Meetings and discussions	30	$ 5,111.81	6	8	8		8
5	Project Management	14	$ 2,315.12	6	8			
Total labor hours		578	$ 69,704.47	12	16	178	288	84
Total labor expenses		check	**$69,704.47**	$2,816.46	$1,813.78	$24,289.22	$22,882.09	$17,902.92

Direct Expenses		
Miscellaneous	$	300.00
Total Direct Expenses	**$**	**300.00**

Total Estimated Costs	**$70,004.47**

Total Prime Contractor Labor Costs	$69,704.47	check
Total Subcontractor Labor Costs	$0.00	
Total Small Business Labor Costs	$0.00	
Total DVBE labor Costs	$0.00	

Assumptions for Task 1.2

# of months	Hrs/month	Hrs/month
6	15	35

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No.

Program Area:
☒ Renewable Energy Program

Contract Task:
☐ Task 1 – Contract Admin/Reporting
☐ Task 2 – Existing Fund
☐ Task 3 – New Fund
☐ Task 4 – RPS
☒ Task 5 – Renewable Rebate Programs
☐ Task 6 – Consumer Education Fund
☐ Task 7 – Evaluation

Fund Source:
☒ RRTF Technical Support
☐ RRTF Program

This work is authorized under: Task 5, Subtasks G,H, K, and L

Project Title: Renewable Rebate Program Equipment Certification Support

Energy Commission/Contractor Project Manager: Anthony Ng/Karin Corfee

Assigned Contractor/Subcontractor Team:

KEMA: Karin Corfee, Nellie Tong, Daria Mashnik, Elizabeth Steele, Chip O'Donnell, Doug Kneale, and Bill Brooks

Subcontractors: Jeff Newmiller and Tim Townsend (BEW)

Term: Effective Date through August 31, 2010

NOTE: The Effective Date of this work authorization is the date the Energy Commission's Contract Manager signs the work authorization. The Energy Commission's Contract Manager shall be the last party to sign. No work is authorized, nor shall any work begin, until on or after the Effective Date.

Purpose: The Contractors will provide support to staff on renewable rebate programs which are administered by the Energy Commission's Renewable Energy Program (REP), including the Emerging Renewable Program (ERP), New Solar Homes Partnership (NSHP), and requirements of Senate Bill 1 (SB 1) as it directly pertains to the Energy Commission. Specifically, the Contractors will: (1) review and provide feedback on draft guidebook language, (2) respond to requests for additions to the eligible equipment lists per certification requirements in the program guidebooks, (3) evaluating new technology requests for determining eligibility under the ERP requirements, and (4) providing updates to the eligible equipment lists to be posted on the Energy Commission's REP websites.

Reason for Amendment (if this is an amendment to an existing work authorization):

TOTAL WORK AUTHORIZATION BUDGET	**$49,983.04**	**Cumulative (after amendments)**
	$	**Incremental ($ of amendment)**

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No.

IMPORTANT NOTICE

This Work Authorization may only authorize work that is within the scope and budget of the underlying prime contract. This Work Authorization cannot and does not authorize work that is beyond the scope of the work authorized by the underlying prime contract, may not expand the budget of the underlying prime contract, nor can this Work Authorization change, amend or modify any of the substantive terms and/or conditions of the underlying prime contract nor add any new substantive terms and/or conditions to the underlying prime contract. Expanding the scope of work or the budget of the underlying prime contract, and/or changing, modifying or amending any of the other substantive terms and conditions of the prime contract, requires a formal written contract amendment rather than a Work Authorization.

If a change in the scope or budget of the underlying prime contract is sought or required, then a formal contract amendment (rather than a Work Authorization) must be executed by the parties to the prime contract. If there is a conflict between the scope of the work set forth in this Work Authorization and the scope of work set forth in the underlying prime contract, the underlying prime contract shall prevail.

The actual costs of a completed, approved Work Authorization shall not exceed the authorized amount. If, in the performance of the work, the Contractor determines that the actual costs will exceed the estimated costs, the Contractor shall immediately notify the Energy Commission Contract Manager and Energy Commission Project Manager. Upon such notification, the Energy Commission Project Manager may (*with approval of the Energy Commission Contract Manager*):

(1) Alter the scope of the Work Authorization to accomplish the work within estimated costs; or
(2) Augment the Work Authorization budget; or
(3) Authorize the Contractor to complete the work for the actual costs; or
(4) Terminate the Work Authorization.

Any expenses incurred by the Contractor that have not been duly authorized shall be borne by the Contractor. No amendments to this Work Authorization shall be made for work undertaken without the specific approval of the Energy Commission Project Manager and Contract Manager (See Contract No. 400-07-030 for details of notice).

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No.

BUDGET FOR PRIME CONTRACTOR:

Staff Name	*Loaded Hourly Rate*	*Total Estimated Hours*	*Total Labor*
See attached Budget	$		$
	$		$

Other Direct Costs (ODC's)[1] (list items)	*Cost*
See attached Budget	$
	$

Total Prime Contractor Labor: $ 41,983.04
Total Prime Contractor ODC's: $ 300.00

(1) Total Prime Contractor Budget: $ 42,283.04

BUDGET FOR SUBCONTRACTORS:
(Please check, if applicable: ☐ DVBE)

Individual Names by Subcontractor	*Loaded Hourly Rate*	*Total Estimated Hours*	*Total Labor*
	$		$
	$		$

Other Direct Costs (ODC's)[1] (list items)	*Cost*
	$

Total Subcontractor Labor: $ 7,700.00
Total Subcontractor ODC's: $ 0.00

(2) Total Subcontractor Budget: $ 7,700.00

TOTAL WORK AUTHORIZATION BUDGET* $ 49,983.04

*includes: (1) Prime Contractor Total and (2) Subcontractors Total

See attached Budget Detail which is incorporated as part of this work authorization.

[1] Such as shipping, reproduction, postage, telephone, and travel.

Work Authorization No. 13 Amendment No.

WORK STATEMENT

Task No.	Title	Description	Deliverables	Due Date
1	**Equipment Certification and Power Output Ratings**			
	1.1 - ERP	The Contractors will provide ongoing support by responding to requests for additions to the ERP's current equipment eligibility lists including: obtaining information from industry representatives; developing/updating a comprehensive list of inverters, wind turbines, fuel cells and meters, that meet the certification requirements of the current ERP guidebook, Appendix 3. For each inverter, the list will include efficiency rating, continuous rated AC power, and other physical and electrical parameters as determined by the standardized test protocol adopted by the Energy Commission. New information will be obtained from the manufacturers as available. The Contractors will modify the list based on the updated information received and will submit it electronically to the Energy Commission Project Manager not less than monthly. Staff will have these updated lists posted to the state's Go Solar California website for use by manufacturers, retailers and customers.	Revised ERP Eligible Equipment List and Certifications Listings	Due by the 25th day of each month and as needed, as requested by Energy Commission Project Manager

	1.2 – SB 1	The Contractors will provide ongoing support by responding to requests for additions to the current eligibility lists including: obtaining information from industry representatives, and developing a comprehensive list of solar products consisting of inverters and meters/metering providers that meet the certification requirements for SB 1 (per the SB 1 Guidelines, CSI Handbook, and NSHP Guidebook.) For each module, the list will include module CEC-PV Calculator inputs, and other physical and electrical parameters. For each inverter, the list will include efficiency rating, continuous rated AC power, and other physical and electrical parameters as determined by the standardized test protocol adopted by the Energy Commission. New information will be obtained from the manufacturers as available. The Contractors will modify the list based on the updated information received and will submit it electronically to the Energy Commission Project Manager not less than monthly. Staff will have these updated lists posted to the state's Go Solar California website for use by manufacturers, retailers and customers.	Revised Eligible Equipment Lists and Certifications Listings	Due by the 25th day of each month and as needed, as requested by Energy Commission Project Manager

2	**Review of New Technology Requests**	Upon request and/or approval of the Energy Commission Project Manager, the Contractors will review industry representatives' requests to add products to the Eligible Equipment list that are not standard non-concentrating photovoltaic modules, meters/metering providers, inverters, fuel cells or wind turbines. The Contractors will initially determine if the information presented by the industry representative addresses all items necessary to meet the current requirements per the ERP Guidebook, Appendix 3, Section E, or SB1 Guidelines on Non-PV requirements. The Contractors will then advise the Energy Commission Project Manager on whether or not a detailed evaluation should be done. Upon approval by the Energy Commission Project Manager, the Contractors will: evaluate the technical merits of the proposal, working with the requesting party to obtain any missing information, and submit an electronic summary of the research results and recommendations to the Energy Commission Project Manager. The Energy Commission will in turn use the recommendation when deciding whether or not the new product is eligible to be added to the Eligible Equipment lists.	Written requests, updates, and evaluation summaries	As needed (e.g., when a request is received for listing a new product.) and as approved by the Energy Commission Project Manager
3	**Guidebook Support**	At the direction of the Energy Commission Project Manager, the Contractors will review and/or propose draft language to be included in the ERP, NSHP, and SB 1 guidebooks/guidelines, and will submit their comments and/or proposed language to the Energy Commission Project Manager for approval.	Comments and/or proposed draft language as directed.	As needed and as requested by the Energy Commission Project Manager
4	**Meetings and Discussions**	The Contractors will be available to participate in meetings and or discussions (e.g., conference calls, in-person, and e-mail) as needed and as requested by the Energy Commission Project Manager.	Discussions and/or e-mails	As needed and as requested by the Energy Commission Project Manager
5	**Project Management**	The Contractors will provide project management to ensure the project is completed on time and within budget. Additionally, the Contractor will provide progress updates for Energy Commission staff as requested or as necessary.	Progress Updates either verbal or in writing	As necessary and as requested by the Energy Commission Project Manager

Work Authorization #13

Renewable Energy Equipment Certification

Status: Equipment Certification Budget

Start date: 05/17/10

End Date: 08/31/10

Months: 3

Task Number	Task Title	Total Hours	Total Expenses	KEMA							BEW	
				Karin Corfee $234.70	Nellie Tong $113.36	Daria Mashnik $79.45	Elizabeth Steele $79.45	Chip O'Donnell $234.70	Doug Kneale $162.89	Bill Brooks $213.13	Jeff Newmiller $165.00	Tim Townsend $185.00
1.1	Equipment Certification - ERP	78	$ 10,207.55			30	18			30		
1.2	Equipment Certification - SB1	196	$ 24,088.99			88	60			48	6	6
2	Review of new technology requests	21	$ 7,386.61			3	6	3	3	6	12	12
3	Guidebook Support	6	$ 1,278.78							6		
4	Meetings and discussions	34	$ 5,798.26	2	4	12	6	3	3	4	4	4
5	Project Management	6	$ 922.85	2	4							
Total labor hours		341	$ 49,683.04	4	8	133	90	6	6	94	22	22
Total labor expenses		check	**$49,683.04**	$938.82	$906.89	$10,567.08	$7,150.50	$1,408.20	$977.34	$20,034.22	$3,630.00	$4,070.00

Assumptions for Task 1.2

	# of months	Hrs/month	Hrs/month		Hrs/month	Hrs/month	Hrs/month
	3	30	20		16	2	2

Direct Expenses		
Miscellaneous	$	300.00
Total Direct Expenses	**$**	**300.00**

Total Estimated Costs	**$49,983.04**

Total Prime Contractor Labor Costs	$41,983.04	check
Total Subcontractor Labor Costs	$7,700.00	
Total Small Business Labor Costs	$0.00	
Total DVBE labor Costs	$0.00	

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No.

Approval:

ENERGY COMMISSION

5/17/10
Project Manager Date

5/17/10
Renewable Energy Program Director Date

5/17/10
Contract Manager Date

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No.

KEMA, INC.

5/17/10

Principal in Charge **Date**

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No. 1

Program Area:
☒ Renewable Energy Program

Contract Task:
☐ Task 1 – Contract Admin/Reporting
☐ Task 2 – Existing Fund
☐ Task 3 – New Fund
☐ Task 4 – RPS
☒ Task 5 – Renewable Rebate Programs
☐ Task 6 – Consumer Education Fund
☐ Task 7 – Evaluation

Fund Source:
☒ RRTF Technical Support
☐ RRTF Program

This work is authorized under: Task 5, Subtasks G,H, K, and L

Project Title: Renewable Rebate Program Equipment Certification Support

Energy Commission/Contractor Project Manager: Anthony Ng/Karin Corfee

Assigned Contractor/Subcontractor Team:

KEMA: Karin Corfee, Nellie Tong, Daria Mashnik, Elizabeth Steele, Chip O'Donnell, Doug Kneale, and Bill Brooks

Subcontractors: Jeff Newmiller and Tim Townsend (BEW)

Term: Effective Date through ~~August 31, 2010~~April 30, 2011

NOTE: The Effective Date of this work authorization is the date the Energy Commission's Contract Manager signs the work authorization. The Energy Commission's Contract Manager shall be the last party to sign. No work is authorized, nor shall any work begin, until on or after the Effective Date.

Purpose: The Contractors will provide support to staff on renewable rebate programs which are administered by the Energy Commission's Renewable Energy Program (REP), including the Emerging Renewables Program (ERP), New Solar Homes Partnership (NSHP), and requirements of Senate Bill 1 (SB 1) as it directly pertains to the Energy Commission. Specifically, the Contractors will: (1) review and provide feedback on draft guidebook language, (2) respond to requests for additions to the eligible equipment lists per certification requirements in the program guidebooks, (3) evaluating new technology requests for determining eligibility under the ERP requirements, and (4) providing updates to the eligible equipment lists to be posted on the Energy Commission's REP websites.

Reason for Amendment (if this is an amendment to an existing work authorization):
This Amendment extends the end-date by 8 months and increases the budget accordingly. No change to the scope of work.

TOTAL WORK AUTHORIZATION BUDGET $150,968.01 **Cumulative (after amendments)**

$100,984.97 **Incremental ($ of amendment)**

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No. 1

IMPORTANT NOTICE

This Work Authorization may only authorize work that is within the scope and budget of the underlying prime contract. This Work Authorization cannot and does not authorize work that is beyond the scope of the work authorized by the underlying prime contract, may not expand the budget of the underlying prime contract, nor can this Work Authorization change, amend or modify any of the substantive terms and/or conditions of the underlying prime contract nor add any new substantive terms and/or conditions to the underlying prime contract. Expanding the scope of work or the budget of the underlying prime contract, and/or changing, modifying or amending any of the other substantive terms and conditions of the prime contract, requires a formal written contract amendment rather than a Work Authorization.

If a change in the scope or budget of the underlying prime contract is sought or required, then a formal contract amendment (rather than a Work Authorization) must be executed by the parties to the prime contract. If there is a conflict between the scope of the work set forth in this Work Authorization and the scope of work set forth in the underlying prime contract, the underlying prime contract shall prevail.

The actual costs of a completed, approved Work Authorization shall not exceed the authorized amount. If, in the performance of the work, the Contractor determines that the actual costs will exceed the estimated costs, the Contractor shall immediately notify the Energy Commission Contract Manager and Energy Commission Project Manager. Upon such notification, the Energy Commission Project Manager may (*with approval of the Energy Commission Contract Manager*):

(1) Alter the scope of the Work Authorization to accomplish the work within estimated costs; or
(2) Augment the Work Authorization budget; or
(3) Authorize the Contractor to complete the work for the actual costs; or
(4) Terminate the Work Authorization.

Any expenses incurred by the Contractor that have not been duly authorized shall be borne by the Contractor. No amendments to this Work Authorization shall be made for work undertaken without the specific approval of the Energy Commission Project Manager and Contract Manager (See Contract No. 400-07-030 for details of notice).

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No. 1

BUDGET FOR PRIME CONTRACTOR:

Staff Name	*Loaded Hourly Rate*	*Total Estimated Hours*	*Total Labor*
See attached Budget	$		$
	$		$

Other Direct Costs (ODC's)[1] (list items)	*Cost*
See attached Budget	$
	$

Total Prime Contractor Labor: $ 142,968.01
Total Prime Contractor ODC's: $ 300.00

(1) Total Prime Contractor Budget: $ 143,968.01

BUDGET FOR SUBCONTRACTORS:
(Please check, if applicable: ☐ DVBE)

Individual Names by Subcontractor	*Loaded Hourly Rate*	*Total Estimated Hours*	*Total Labor*
	$		$
	$		$

Other Direct Costs (ODC's)[1] (list items)	*Cost*
	$

Total Subcontractor Labor: $ 7,700.00
Total Subcontractor ODC's: $ 0.00

(2) Total Subcontractor Budget: $ 7,700.00

TOTAL WORK AUTHORIZATION BUDGET* $150,968.01

*includes: (1) Prime Contractor Total and (2) Subcontractors Total

See attached Budget Detail which is incorporated as part of this work authorization.

[1] Such as shipping, reproduction, postage, telephone, and travel.

Work Authorization No. 13 Amendment No. 1

WORK STATEMENT

Task No.	Title	Description	Deliverables	Due Date
1	**Equipment Certification and Power Output Ratings**			
	1.1 - ERP	The Contractors will provide ongoing support by responding to requests for additions to the ERP's current equipment eligibility lists including: obtaining information from industry representatives; developing/updating a comprehensive list of inverters, wind turbines, fuel cells and meters, that meet the certification requirements of the current ERP guidebook, Appendix 3. For each inverter, the list will include efficiency rating, continuous rated AC power, and other physical and electrical parameters as determined by the standardized test protocol adopted by the Energy Commission. New information will be obtained from the manufacturers as available. The Contractors will modify the list based on the updated information received and will submit it electronically to the Energy Commission Project Manager not less than monthly. Staff will have these updated lists posted to the state's Go Solar California website for use by manufacturers, retailers and customers.	Revised ERP Eligible Equipment List and Certifications Listings	Due by the 25th day of each month and as needed, as requested by Energy Commission Project Manager

	1.2 – SB 1	The Contractors will provide ongoing support by responding to requests for additions to the current eligibility lists including: obtaining information from industry representatives, and developing a comprehensive list of solar products consisting of inverters and meters/metering providers that meet the certification requirements for SB 1 (per the SB 1 Guidelines, CSI Handbook, and NSHP Guidebook.) For each module, the list will include module CEC-PV Calculator inputs, and other physical and electrical parameters. For each inverter, the list will include efficiency rating, continuous rated AC power, and other physical and electrical parameters as determined by the standardized test protocol adopted by the Energy Commission. New information will be obtained from the manufacturers as available. The Contractors will modify the list based on the updated information received and will submit it electronically to the Energy Commission Project Manager not less than monthly. Staff will have these updated lists posted to the state's Go Solar California website for use by manufacturers, retailers and customers.	Revised Eligible Equipment Lists and Certifications Listings	Due by the 25th day of each month and as needed, as requested by Energy Commission Project Manager

2	**Review of New Technology Requests**	Upon request and/or approval of the Energy Commission Project Manager, the Contractors will review industry representatives' requests to add products to the Eligible Equipment list that are not standard non-concentrating photovoltaic modules, meters/metering providers, inverters, fuel cells or wind turbines. The Contractors will initially determine if the information presented by the industry representative addresses all items necessary to meet the current requirements per the ERP Guidebook, Appendix 3, Section E, or SB1 Guidelines on Non-PV requirements. The Contractors will then advise the Energy Commission Project Manager on whether or not a detailed evaluation should be done. Upon approval by the Energy Commission Project Manager, the Contractors will: evaluate the technical merits of the proposal, working with the requesting party to obtain any missing information, and submit an electronic summary of the research results and recommendations to the Energy Commission Project Manager. The Energy Commission will in turn use the recommendation when deciding whether or not the new product is eligible to be added to the Eligible Equipment lists.	Written requests, updates, and evaluation summaries	As needed (e.g., when a request is received for listing a new product.) and as approved by the Energy Commission Project Manager
3	**Guidebook Support**	At the direction of the Energy Commission Project Manager, the Contractors will review and/or propose draft language to be included in the ERP, NSHP, and SB 1 guidebooks/guidelines, and will submit their comments and/or proposed language to the Energy Commission Project Manager for approval.	Comments and/or proposed draft language as directed.	As needed and as requested by the Energy Commission Project Manager
4	**Meetings and Discussions**	The Contractors will be available to participate in meetings and or discussions (e.g., conference calls, in-person, and e-mail) as needed and as requested by the Energy Commission Project Manager.	Discussions and/or e-mails	As needed and as requested by the Energy Commission Project Manager
5	**Project Management**	The Contractors will provide project management to ensure the project is completed on time and within budget. Additionally, the Contractor will provide progress updates for Energy Commission staff as requested or as necessary.	Progress Updates either verbal or in writing	As necessary and as requested by the Energy Commission Project Manager

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No. 1

Approval:

ENERGY COMMISSION

Anthony [illegible] 8/25/10
Project Manager Date

[illegible] 8-25-10
Renewable Energy Program Director Date

Rachel Salanger
Contract Manager Date

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No. 1

KEMA, INC.

Karin Corfee 8/25/10

Principal in Charge Date

Work Authorization #13 Amendment 1
Renewable Energy Equipment Certification

Status: Equipment Certification Budget
Start date: effective date
End Date: 04/30/11
Months: 11.5

Task Number	Task Title	Total Hours	Total Expenses	KEMA							BEW	
				Karin Corfee $234.70	Nellie Tong $113.36	Daria Mashnik $79.45	Elizabeth Steele $79.45	Chip O'Donnell $234.70	Doug Kneale $162.89	Bill Brooks $213.13	Jeff Newmiller $165.00	Tim Townsend $185.00
1.1	Equipment Certification - ERP	276	$ 37,969.85	-	-	30	126	-	-	120	-	-
1.2	Equipment Certification - SB1	772	$ 86,695.87	-	-	88	510	-	-	174	6	6
2	Review of new technology requests	48	$ 11,601.67	-	-	3	18	6	3	18	12	12
3	Guidebook Support	18	$ 3,836.34	-	-	-	-	-	-	18	-	-
4	Meetings and discussions	59	$ 9,187.99	2	8	12	18	6	3	10	4	4
5	Project Management	10	$ 1,376.30	2	8	-	-	-	-	-	-	-
Total labor hours		1,183	$ 150,668.01	4	16	133	672	12	6	340	22	22
Total labor expenses		check	**$150,668.01**	$938.82	$1,813.78	$10,567.08	$53,390.40	$2,816.40	$977.34	$72,464.20	$3,630.00	$4,070.00

Assumptions for Task 1.2

	# of months	Hrs/month	Hrs/month		Hrs/month	Hrs/month	Hrs/month
	3	30	20		16	2	2

Direct Expenses		
Miscellaneous	$	300.00
Total Direct Expenses	**$**	**300.00**

Total Estimated Costs	**$150,968.01**

Total Prime Contractor Labor Costs	$142,968.01	check
Total Subcontractor Labor Costs	$7,700.00	
Total Small Business Labor Costs	$0.00	
Total DVBE labor Costs	$0.00	

Amendment 1 incremental budget $100,984.97

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No. 2

Program Area:
☒ Renewable Energy Program

Contract Task:
☐ Task 1 – Contract Admin/Reporting
☐ Task 2 – Existing Fund
☐ Task 3 – New Fund
☐ Task 4 – RPS
☒ Task 5 – Renewable Rebate Programs
☐ Task 6 – Consumer Education Fund
☐ Task 7 – Evaluation

Fund Source:
☒ RRTF Technical Support
☐ RRTF Program

This work is authorized under: Task 5, Subtasks G,H, K, and L

Project Title: Renewable Rebate Program Equipment Certification Support

Energy Commission/Contractor Project Manager: Anthony Ng/Karin Corfee

Assigned Contractor/Subcontractor Team:

KEMA: Karin Corfee, Nellie Tong, Daria Mashnik, Elizabeth Steele, Chip O'Donnell, Doug Kneale, and Bill Brooks

Subcontractors: Jeff Newmiller and Tim Townsend (BEW)

Term: Effective Date through ~~April 30, 2011~~ April 30, 2012

NOTE: The Effective Date of this work authorization is the date the Energy Commission's Contract Manager signs the work authorization. The Energy Commission's Contract Manager shall be the last party to sign. No work is authorized, nor shall any work begin, until on or after the Effective Date.

Purpose: The Contractors will provide support to staff on renewable rebate programs which are administered by the Energy Commission's Renewable Energy Program (REP), including the Emerging Renewables Program (ERP), New Solar Homes Partnership (NSHP), and requirements of Senate Bill 1 (SB 1) as it directly pertains to the Energy Commission. Specifically, the Contractors will: (1) review and provide feedback on draft guidebook language, (2) respond to requests for additions to the eligible equipment lists per certification requirements in the program guidebooks, (3) evaluating new technology requests for determining eligibility under the ERP requirements, and (4) providing updates to the eligible equipment lists to be posted on the Energy Commission's REP websites.

Reason for Amendment (if this is an amendment to an existing work authorization):
~~This~~ Amendment 1 extends the end-date by 8 months from August 31, 2010 to April 30, 2011 and increases the budget accordingly. No change to the scope of work.

Amendment 2 extends the end date from April 30, 2011 to April 30, 2012. No change in budget or scope of work.

TOTAL WORK AUTHORIZATION BUDGET **$150,968.01 Cumulative (after amendments)**
$100,984.97 Incremental ($ of amendment)

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No. 2

IMPORTANT NOTICE

This Work Authorization may only authorize work that is within the scope and budget of the underlying prime contract. This Work Authorization cannot and does not authorize work that is beyond the scope of the work authorized by the underlying prime contract, may not expand the budget of the underlying prime contract, nor can this Work Authorization change, amend or modify any of the substantive terms and/or conditions of the underlying prime contract nor add any new substantive terms and/or conditions to the underlying prime contract. Expanding the scope of work or the budget of the underlying prime contract, and/or changing, modifying or amending any of the other substantive terms and conditions of the prime contract, requires a formal written contract amendment rather than a Work Authorization.

If a change in the scope or budget of the underlying prime contract is sought or required, then a formal contract amendment (rather than a Work Authorization) must be executed by the parties to the prime contract. If there is a conflict between the scope of the work set forth in this Work Authorization and the scope of work set forth in the underlying prime contract, the underlying prime contract shall prevail.

The actual costs of a completed, approved Work Authorization shall not exceed the authorized amount. If, in the performance of the work, the Contractor determines that the actual costs will exceed the estimated costs, the Contractor shall immediately notify the Energy Commission Contract Manager and Energy Commission Project Manager. Upon such notification, the Energy Commission Project Manager may (*with approval of the Energy Commission Contract Manager*):

(1) Alter the scope of the Work Authorization to accomplish the work within estimated costs; or
(2) Augment the Work Authorization budget; or
(3) Authorize the Contractor to complete the work for the actual costs; or
(4) Terminate the Work Authorization.

Any expenses incurred by the Contractor that have not been duly authorized shall be borne by the Contractor. No amendments to this Work Authorization shall be made for work undertaken without the specific approval of the Energy Commission Project Manager and Contract Manager (See Contract No. 400-07-030 for details of notice).

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No. 2

BUDGET FOR PRIME CONTRACTOR:

Staff Name	*Loaded Hourly Rate*	*Total Estimated Hours*	*Total Labor*
See attached Budget	$		$
	$		$

Other Direct Costs (ODC's)[1] (list items)	*Cost*
See attached Budget	$
	$

Total Prime Contractor Labor: $ 142,968.01
Total Prime Contractor ODC's: $ 300.00

(1) Total Prime Contractor Budget: $ 143,968.01

BUDGET FOR SUBCONTRACTORS:
(Please check, if applicable: ☐ DVBE)

Individual Names by Subcontractor	*Loaded Hourly Rate*	*Total Estimated Hours*	*Total Labor*
	$		$
	$		$

Other Direct Costs (ODC's)[1] (list items)	*Cost*
	$

Total Subcontractor Labor: $ 7,700.00
Total Subcontractor ODC's: $ 0.00

(2) Total Subcontractor Budget: $ 7,700.00

TOTAL WORK AUTHORIZATION BUDGET* $150,968.01

*includes: (1) Prime Contractor Total and (2) Subcontractors Total

See attached Budget Detail which is incorporated as part of this work authorization.

[1] Such as shipping, reproduction, postage, telephone, and travel.

Work Authorization No. 13 Amendment No. 2

WORK STATEMENT

Task No.	Title	Description	Deliverables	Due Date
1	**Equipment Certification and Power Output Ratings**			
	1.1 - ERP	The Contractors will provide ongoing support by responding to requests for additions to the ERP's current equipment eligibility lists including: obtaining information from industry representatives; developing/updating a comprehensive list of inverters, wind turbines, fuel cells and meters, that meet the certification requirements of the current ERP guidebook, Appendix 3. For each inverter, the list will include efficiency rating, continuous rated AC power, and other physical and electrical parameters as determined by the standardized test protocol adopted by the Energy Commission. New information will be obtained from the manufacturers as available. The Contractors will modify the list based on the updated information received and will submit it electronically to the Energy Commission Project Manager not less than monthly. Staff will have these updated lists posted to the state's Go Solar California website for use by manufacturers, retailers and customers.	Revised ERP Eligible Equipment List and Certifications Listings	Due by the 25th day of each month and as needed, as requested by Energy Commission Project Manager

	1.2 – SB 1	The Contractors will provide ongoing support by responding to requests for additions to the current eligibility lists including: obtaining information from industry representatives, and developing a comprehensive list of solar products consisting of inverters and meters/metering providers that meet the certification requirements for SB 1 (per the SB 1 Guidelines, CSI Handbook, and NSHP Guidebook.) For each module, the list will include module CEC-PV Calculator inputs, and other physical and electrical parameters. For each inverter, the list will include efficiency rating, continuous rated AC power, and other physical and electrical parameters as determined by the standardized test protocol adopted by the Energy Commission. New information will be obtained from the manufacturers as available. The Contractors will modify the list based on the updated information received and will submit it electronically to the Energy Commission Project Manager not less than monthly. Staff will have these updated lists posted to the state's Go Solar California website for use by manufacturers, retailers and customers.	Revised Eligible Equipment Lists and Certifications Listings	Due by the 25th day of each month and as needed, as requested by Energy Commission Project Manager

2	**Review of New Technology Requests**	Upon request and/or approval of the Energy Commission Project Manager, the Contractors will review industry representatives' requests to add products to the Eligible Equipment list that are not standard non-concentrating photovoltaic modules, meters/metering providers, inverters, fuel cells or wind turbines. The Contractors will initially determine if the information presented by the industry representative addresses all items necessary to meet the current requirements per the ERP Guidebook, Appendix 3, Section E, or SB1 Guidelines on Non-PV requirements. The Contractors will then advise the Energy Commission Project Manager on whether or not a detailed evaluation should be done. Upon approval by the Energy Commission Project Manager, the Contractors will: evaluate the technical merits of the proposal, working with the requesting party to obtain any missing information, and submit an electronic summary of the research results and recommendations to the Energy Commission Project Manager. The Energy Commission will in turn use the recommendation when deciding whether or not the new product is eligible to be added to the Eligible Equipment lists.	Written requests, updates, and evaluation summaries	As needed (e.g., when a request is received for listing a new product.) and as approved by the Energy Commission Project Manager
3	**Guidebook Support**	At the direction of the Energy Commission Project Manager, the Contractors will review and/or propose draft language to be included in the ERP, NSHP, and SB 1 guidebooks/guidelines, and will submit their comments and/or proposed language to the Energy Commission Project Manager for approval.	Comments and/or proposed draft language as directed.	As needed and as requested by the Energy Commission Project Manager
4	**Meetings and Discussions**	The Contractors will be available to participate in meetings and or discussions (e.g., conference calls, in-person, and e-mail) as needed and as requested by the Energy Commission Project Manager.	Discussions and/or e-mails	As needed and as requested by the Energy Commission Project Manager

Work Authorization No. 13 Amendment No. 2

5	**Project Management**	The Contractors will provide project management to ensure the project is completed on time and within budget. Additionally, the Contractor will provide progress updates for Energy Commission staff as requested or as necessary.	Progress Updates either verbal or in writing	As necessary and as requested by the Energy Commission Project Manager

Approval:

ENERGY COMMISSION

4/28/11
Project Manager **Date**

4/28/2011
Renewable Energy Program Director **Date**

4/28/11
Contract Manager **Date**

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No. 2

KEMA, INC.

Kevin Corfee 4/25/11

Principal in Charge **Date**

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No. 3

Program Area:
☒ Renewable Energy Program

Contract Task:
☐ Task 1 – Contract Admin/Reporting
☐ Task 2 – Existing Fund
☐ Task 3 – New Fund
☐ Task 4 – RPS
☒ Task 5 – Renewable Rebate Programs
☐ Task 6 – Consumer Education Fund
☐ Task 7 – Evaluation

Fund Source:
☒ RRTF Technical Support
☐ RRTF Program

This work is authorized under: Task 5, Subtasks G,H, K, and L

Project Title: Renewable Rebate Program Equipment Certification Support

Energy Commission/Contractor Project Manager: Anthony Ng/Karin Corfee

Assigned Contractor/Subcontractor Team:

KEMA: Karin Corfee, Nellie Tong, Daria Mashnik, Elizabeth Steele, Chip O'Donnell, Doug Kneale, Bill Brooks, and Rob Kamisky

Subcontractors: Jeff Newmiller and Tim Townsend (BEW)

Term: Effective Date (May 17, 2010) through April 30, 2012

NOTE: The Effective Date of this work authorization is the date the Energy Commission's Contract Manager signs the work authorization. The Energy Commission's Contract Manager shall be the last party to sign. No work is authorized, nor shall any work begin, until on or after the Effective Date.

Purpose: The Contractors will provide support to staff on renewable rebate programs which are administered by the Energy Commission's Renewable Energy Program (REP), including the Emerging Renewables Program (ERP), New Solar Homes Partnership (NSHP), and requirements of Senate Bill 1 (SB 1) as it directly pertains to the Energy Commission. Specifically, the Contractors will: (1) review and provide feedback on draft guidebook language, (2) respond to requests for additions to the eligible equipment lists per certification requirements in the program guidebooks, (3) evaluating new technology requests for determining eligibility under the ERP requirements, and (4) providing updates to the eligible equipment lists to be posted on the Energy Commission's REP websites.

Reason for Amendment (if this is an amendment to an existing work authorization):

Amendment 1 extends the end-date by 8 months from August 31, 2010 to April 30, 2011 and increases the budget accordingly. No change to the scope of work.

Amendment 2 extends the end date from April 30, 2011 to April 30, 2012. No change in budget or scope of work.

Amendment 3 adds Task 1.3 into this WA and increases the budget accordingly.

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No. 3

TOTAL WORK AUTHORIZATION BUDGET **$ 176,101.41 Cumulative (after amendments)**

$ 25,133.40 Incremental ($ of amendment)

IMPORTANT NOTICE

This Work Authorization may only authorize work that is within the scope and budget of the underlying prime contract. This Work Authorization cannot and does not authorize work that is beyond the scope of the work authorized by the underlying prime contract, may not expand the budget of the underlying prime contract, nor can this Work Authorization change, amend or modify any of the substantive terms and/or conditions of the underlying prime contract nor add any new substantive terms and/or conditions to the underlying prime contract. Expanding the scope of work or the budget of the underlying prime contract, and/or changing, modifying or amending any of the other substantive terms and conditions of the prime contract, requires a formal written contract amendment rather than a Work Authorization.

If a change in the scope or budget of the underlying prime contract is sought or required, then a formal contract amendment (rather than a Work Authorization) must be executed by the parties to the prime contract. If there is a conflict between the scope of the work set forth in this Work Authorization and the scope of work set forth in the underlying prime contract, the underlying prime contract shall prevail.

The actual costs of a completed, approved Work Authorization shall not exceed the authorized amount. If, in the performance of the work, the Contractor determines that the actual costs will exceed the estimated costs, the Contractor shall immediately notify the Energy Commission Contract Manager and Energy Commission Project Manager. Upon such notification, the Energy Commission Project Manager may (*with approval of the Energy Commission Contract Manager*):

(1) Alter the scope of the Work Authorization to accomplish the work within estimated costs; or
(2) Augment the Work Authorization budget; or
(3) Authorize the Contractor to complete the work for the actual costs; or
(4) Terminate the Work Authorization.

Any expenses incurred by the Contractor that have not been duly authorized shall be borne by the Contractor. No amendments to this Work Authorization shall be made for work undertaken without the specific approval of the Energy Commission Project Manager and Contract Manager (See Contract No. 400-07-030 for details of notice).

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No. 3

BUDGET FOR PRIME CONTRACTOR:

Staff Name	*Loaded Hourly Rate*	*Total Estimated Hours*	*Total Labor*
See attached Budget	$		$
	$		$

Other Direct Costs (ODC's)[1] (list items)	*Cost*
See attached Budget	$
	$

Total Prime Contractor Labor: $ 168,101.41
Total Prime Contractor ODC's: $ 300.00

(1) Total Prime Contractor Budget: $ 168,401.41

BUDGET FOR SUBCONTRACTORS:
(Please check, if applicable: ☐ DVBE)

Individual Names by Subcontractor	*Loaded Hourly Rate*	*Total Estimated Hours*	*Total Labor*
	$		$
	$		$

Other Direct Costs (ODC's)[1] (list items)	*Cost*
	$

Total Subcontractor Labor: $ 7,700.00
Total Subcontractor ODC's: $ 0.00

(2) Total Subcontractor Budget: $ 7,700.00

TOTAL WORK AUTHORIZATION BUDGET* $176,101.41

*includes: (1) Prime Contractor Total and (2) Subcontractors Total

See attached Budget Detail which is incorporated as part of this work authorization.

[1] Such as shipping, reproduction, postage, telephone, and travel.

Work Authorization No. 13 Amendment No. 3

WORK STATEMENT

Task No.	Title	Description	Deliverables	Due Date
1	**Equipment Certification and Power Output Ratings**			
	1.1 - ERP	The Contractors will provide ongoing support by responding to requests for additions to the ERP's current equipment eligibility lists including: obtaining information from industry representatives; developing/updating a comprehensive list of inverters, wind turbines, fuel cells and meters, that meet the certification requirements of the current ERP guidebook, Appendix 3. For each inverter, the list will include efficiency rating, continuous rated AC power, and other physical and electrical parameters as determined by the standardized test protocol adopted by the Energy Commission. New information will be obtained from the manufacturers as available. The Contractors will modify the list based on the updated information received and will submit it electronically to the Energy Commission Project Manager not less than monthly. Staff will have these updated lists posted to the state's Go Solar California website for use by manufacturers, retailers and customers.	Revised ERP Eligible Equipment List and Certifications Listings	Due by the 25th day of each month and as needed, as requested by Energy Commission Project Manager

	1.2 – SB 1	The Contractors will provide ongoing support by responding to requests for additions to the current eligibility lists including: obtaining information from industry representatives, and developing a comprehensive list of solar products consisting of inverters and meters/metering providers that meet the certification requirements for SB 1 (per the SB 1 Guidelines, CSI Handbook, and NSHP Guidebook.) For each module, the list will include module CEC-PV Calculator inputs, and other physical and electrical parameters. For each inverter, the list will include efficiency rating, continuous rated AC power, and other physical and electrical parameters as determined by the standardized test protocol adopted by the Energy Commission. New information will be obtained from the manufacturers as available. The Contractors will modify the list based on the updated information received and will submit it electronically to the Energy Commission Project Manager not less than monthly. Staff will have these updated lists posted to the state's Go Solar California website for use by manufacturers, retailers and customers.	Revised Eligible Equipment Lists and Certifications Listings	Due by the 25th day of each month and as needed, as requested by Energy Commission Project Manager

1.3	**Technical Evaluation of Equipment Performance**	At the direction of the Energy Commission Project Manager, the Contractors will conduct a technical evaluation of the data and/or information provided to KEMA and/or the Energy Commission for the purposes of adding specific equipment to the Energy Commission's list of eligible equipment under the ERP and SB1. The Energy Commission Project Manager will identify specific data and/or information for the Contractors to evaluate. The evaluations should seek to determine whether the data and/or information submitted to KEMA and/or the Energy Commission for specific equipment by equipment manufacturers and/or retailers support the claims of performance, power output, capacity, and/or operational characteristics made by the manufacturers and/or retailers for the specific equipment.	Evaluation Report	As needed and as approved by the Energy Commission Project Manager

2	**Review of New Technology Requests**	Upon request and/or approval of the Energy Commission Project Manager, the Contractors will review industry representatives' requests to add products to the Eligible Equipment list that are not standard non-concentrating photovoltaic modules, meters/metering providers, inverters, fuel cells or wind turbines. The Contractors will initially determine if the information presented by the industry representative addresses all items necessary to meet the current requirements per the ERP Guidebook, Appendix 3, Section E, or SB1 Guidelines on Non-PV requirements. The Contractors will then advise the Energy Commission Project Manager on whether or not a detailed evaluation should be done. Upon approval by the Energy Commission Project Manager, the Contractors will: evaluate the technical merits of the proposal, working with the requesting party to obtain any missing information, and submit an electronic summary of the research results and recommendations to the Energy Commission Project Manager. The Energy Commission will in turn use the recommendation when deciding whether or not the new product is eligible to be added to the Eligible Equipment lists.	Written requests, updates, and evaluation summaries	As needed (e.g., when a request is received for listing a new product.) and as approved by the Energy Commission Project Manager
3	**Guidebook Support**	At the direction of the Energy Commission Project Manager, the Contractors will review and/or propose draft language to be included in the ERP, NSHP, and SB 1 guidebooks/guidelines, and will submit their comments and/or proposed language to the Energy Commission Project Manager for approval.	Comments and/or proposed draft language as directed.	As needed and as requested by the Energy Commission Project Manager
4	**Meetings and Discussions**	The Contractors will be available to participate in meetings and or discussions (e.g., conference calls, in-person, and e-mail) as needed and as requested by the Energy Commission Project Manager.	Discussions and/or e-mails	As needed and as requested by the Energy Commission Project Manager
5	**Project Management**	The Contractors will provide project management to ensure the project is completed on time and within budget. Additionally, the Contractor will provide progress updates for Energy Commission staff as requested or as necessary.	Progress Updates either verbal or in writing	As necessary and as requested by the Energy Commission Project Manager

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No. 3

KEMA, INC.

5/25/11

Principal in Charge **Date**

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No. 3

Approval:

ENERGY COMMISSION

5/26/11

Project Manager **Date**

5/26/11

Renewable Energy Program Director **Date**

5/26/11

Contract Manager **Date**

Work Authorization #13 Amendment 3
Renewable Energy Equipment Certification
Status: Equipment Certification Budget
Start date: effective date
End Date: **04/30/12**
Months: **23.5**

Task Number	Task Title	Total Hours	Total Expenses	KEMA								BEW	
				Karin Corfee $234.70	Nellie Tong $113.36	Daria Mashnik $79.45	Elizabeth Steele $79.45	Chip O'Donnell $234.70	Doug Kneale $162.89	Rob Kaminsky $195.00	Bill Brooks $213.13	Jeff Newmiller $165.00	Tim Townsend $185.00
1.1	Equipment Certification - ERP	276	$ 37,969.85	-	-	30	126	-	-		120	-	-
1.2	Equipment Certification - SB1	772	$ 86,695.87	-	-	88	510	-	-		174	6	6
	Technical Evaluation of Equipment												
1.3	Performance												
	a. Review 4 existing standards (California, other states, AWEA)	36	$ 6,557.80				4			32			
	b. Review 3 sets of sample data	44	$ 8,117.80				4			40			
	c. Summary report including recommendations	44	$ 8,117.80				4			40			
2	Review of new technology requests	48	$ 11,601.67	-	-	3	18	6	3		18	12	12
3	Guidebook Support	26	$ 5,396.34	-	-	-	-	-	-	8	18	-	-
4	Meetings and discussions	63	$ 9,967.99	2	8	12	18	6	3	4	10	4	4
5	Project Management	10	$ 1,376.30	2	8	-	-	-	-		-	-	-
Total labor hours		1,319	$ 175,801.41	4	16	133	684	12	6	124	340	22	22
Total labor expenses		check	**$175,801.41**	$938.82	$1,813.78	$10,567.08	$54,343.80	$2,816.40	$977.34	$24,180.00	$72,464.20	$3,630.00	$4,070.00

Assumptions for Task 1.2

	# of months	Hrs/month	Hrs/month	Hrs/month	Hrs/month	Hrs/month
	3	30	20	16	2	2

Direct Expenses		
Miscellaneous	$	300.00
Total Direct Expenses	**$**	**300.00**

Total Estimated Costs	**$176,101.41**

Total Prime Contractor Labor Costs	$168,101.41	check
Total Subcontractor Labor Costs	$7,700.00	
Total Small Business Labor Costs	$0.00	
Total DVBE labor Costs	$0.00	

Amendment 1 incremental budget	$100,984.97
Amendment 2 incremental budget	$0.00
Amendment 3 incemental budget	$25,133.40

Work Authorization #13 Amendment 1
Renewable Energy Equipment Certification

Status: Equipment Certification Budget
Start date: effective date
End Date: 04/30/12
Months: 23.5

Task Number	Task Title	Total Hours	Total Expenses	KEMA							BEW	
				Karin Corfee $234.70	Nellie Tong $113.36	Daria Mashnik $79.45	Elizabeth Steele $79.45	Chip O'Donnell $234.70	Doug Kneale $162.89	Bill Brooks $213.13	Jeff Newmiller $165.00	Tim Townsend $185.00
1.1	Equipment Certification - ERP	276	$ 37,969.85	-	-	30	126	-	-	120	-	-
1.2	Equipment Certification - SB1	772	$ 86,695.87	-	-	88	510	-	-	174	6	6
2	Review of new technology requests	48	$ 11,601.67	-	-	3	18	6	3	18	12	12
3	Guidebook Support	18	$ 3,836.34	-	-	-	-	-	-	18	-	-
4	Meetings and discussions	59	$ 9,187.99	2	8	12	18	6	3	10	4	4
5	Project Management	10	$ 1,376.30	2	8	-	-	-	-	-	-	-
Total labor hours		1,183	$ 150,668.01	4	16	133	672	12	6	340	22	22
Total labor expenses		check	**$150,668.01**	$938.82	$1,813.78	$10,567.08	$53,390.40	$2,816.40	$977.34	$72,464.20	$3,630.00	$4,070.00

Assumptions for Task 1.2

	# of months	Hrs/month	Hrs/month	Hrs/month	Hrs/month	Hrs/month
	3	30	20	16	2	2

Direct Expenses		
Miscellaneous	$	300.00
Total Direct Expenses	**$**	**300.00**

Total Estimated Costs	**$150,968.01**

Total Prime Contractor Labor Costs	$142,968.01	check
Total Subcontractor Labor Costs	$7,700.00	
Total Small Business Labor Costs	$0.00	
Total DVBE labor Costs	$0.00	

Amendment 1 incremental budget	$100,984.97

Work Authorization #13 Amendment 1
Renewable Energy Equipment Certification

Status: Equipment Certification Budget
Start date: effective date
End Date: 04/30/11
Months: 9

Task Number	Task Title	Total Hours	Total Expenses	KEMA							BEW	
				Karin Corfee $234.70	Nellie Tong $113.36	Daria Mashnik $79.45	Elizabeth Steele $79.45	Chip O'Donnell $234.70	Doug Kneale $162.89	Bill Brooks $213.13	Jeff Newmiller $165.00	Tim Townsend $185.00
1.1	Equipment Certification - ERP	198	$ 27,762.30				108			90		
1.2	Equipment Certification - SB1	576	$ 62,606.88				450			126		
2	Review of new technology requests	27	$ 4,215.06				12	3		12		
3	Guidebook Support	12	$ 2,557.56							12		
4	Meetings and discussions	25	$ 3,389.72		4		12	3		6		
5	Project Management	4	$ 453.44		4							
Total labor hours		842	$ 100,984.97	-	8	-	582	6	-	246	-	-
Total labor expenses		check	**$100,984.97**	$0.00	$906.89	$0.00	$46,239.90	$1,408.20	$0.00	$52,429.98	$0.00	$0.00

Assumptions for Task 1.2

	# of months	Hrs/month	Hrs/month	Hrs/month	Hrs/month	Hrs/month
	9	50	14	2	2	

Direct Expenses	
Miscellaneous	$ -
Total Direct Expenses	**$ -**
Total Estimated Costs	**$100,984.97**

Total Prime Contractor Labor Costs	$100,984.97	check
Total Subcontractor Labor Costs	$0.00	
Total Small Business Labor Costs	$0.00	
Total DVBE labor Costs	$0.00	

Work Authorization #13

Renewable Energy Equipment Certification

Status: Equipment Certification Budget
Start date: 05/17/10
End Date: 08/31/10
Months: 3

Task Number	Task Title	Total Hours	Total Expenses	KEMA							BEW	
				Karin Corfee $234.70	Nellie Tong $113.36	Daria Mashnik $79.45	Elizabeth Steele $79.45	Chip O'Donnell $234.70	Doug Kneale $162.89	Bill Brooks $213.13	Jeff Newmiller $165.00	Tim Townsend $185.00
1.1	Equipment Certification - ERP	78	$ 10,207.55			30	18			30		
1.2	Equipment Certification - SB1	196	$ 24,088.99			88	60			48	6	6
2	Review of new technology requests	21	$ 7,386.61			3	6	3	3	6	12	12
3	Guidebook Support	6	$ 1,278.78							6		
4	Meetings and discussions	34	$ 5,798.26	2	4	12	6	3	3	4	4	4
5	Project Management	6	$ 922.85	2	4							
Total labor hours		341	$ 49,683.04	4	8	133	90	6	6	94	22	22
Total labor expenses		check	**$49,683.04**	$938.82	$906.89	$10,567.08	$7,150.50	$1,408.20	$977.34	$20,034.22	$3,630.00	$4,070.00

Direct Expenses		
Miscellaneous	$	300.00
Total Direct Expenses	**$**	**300.00**

Assumptions for Task 1.2

# of months	Hrs/month	Hrs/month		Hrs/month	Hrs/month	Hrs/month
3	30	20		16	2	2

Total Estimated Costs	**$49,983.04**

Total Prime Contractor Labor Costs	$41,983.04	check
Total Subcontractor Labor Costs	$7,700.00	
Total Small Business Labor Costs	$0.00	
Total DVBE labor Costs	$0.00	

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No. 4

Program Area:
☒ Renewable Energy Program

Contract Task:
☐ Task 1 – Contract Admin/Reporting
☐ Task 2 – Existing Fund
☐ Task 3 – New Fund
☐ Task 4 – RPS
☒ Task 5 – Renewable Rebate Programs
☐ Task 6 – Consumer Education Fund
☐ Task 7 – Evaluation

Fund Source:
☒ RRTF Technical Support
☐ RRTF Program

This work is authorized under: Task 5, Subtasks G,H, K, and L

Project Title: Renewable Rebate Program Equipment Certification Support

Energy Commission/Contractor Project Manager: Anthony Ng/Karin Corfee

Assigned Contractor/Subcontractor Team:

KEMA: Karin Corfee, Nellie Tong, Daria Mashnik, Elizabeth Steele, Chip O'Donnell, Doug Kneale, Bill Brooks, and Rob Kamisky

Subcontractors: Jeff Newmiller and Tim Townsend (BEW)

Term: Effective Date (May 17, 2010)through April 30, 2012

NOTE: The Effective Date of this work authorization is the date the Energy Commission's Contract Manager signs the work authorization. The Energy Commission's Contract Manager shall be the last party to sign. No work is authorized, nor shall any work begin, until on or after the Effective Date.

Purpose: The Contractors will provide support to staff on renewable rebate programs which are administered by the Energy Commission's Renewable Energy Program (REP), including the Emerging Renewables Program (ERP), New Solar Homes Partnership (NSHP), and requirements of Senate Bill 1 (SB 1) as it directly pertains to the Energy Commission. Specifically, the Contractors will: (1) review and provide feedback on draft guidebook language, (2) respond to requests for additions to the eligible equipment lists per certification requirements in the program guidebooks, (3) evaluating new technology requests for determining eligibility under the ERP requirements, and (4) providing updates to the eligible equipment lists to be posted on the Energy Commission's REP websites.

Reason for Amendment (if this is an amendment to an existing work authorization):

Amendment 1 extends the end-date by 8 months from August 31, 2010 to April 30, 2011 and increases the budget accordingly. No change to the scope of work.

Amendment 2 extends the end date from April 30, 2011 to April 30, 2012. No change in budget or scope of work.

Amendment 3 adds Task 1.3 into this WA and increases the budget accordingly.

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No. 4

Amendment 4 increases the budget by $24,080.17 for an additional analysis of 10 small wind turbines to be completed under Task 1.3.

TOTAL WORK AUTHORIZATION BUDGET **$ 200,181.58 Cumulative (after amendments)**
$ 24,080.17 Incremental ($ of amendment)

IMPORTANT NOTICE

This Work Authorization may only authorize work that is within the scope and budget of the underlying prime contract. This Work Authorization cannot and does not authorize work that is beyond the scope of the work authorized by the underlying prime contract, may not expand the budget of the underlying prime contract, nor can this Work Authorization change, amend or modify any of the substantive terms and/or conditions of the underlying prime contract nor add any new substantive terms and/or conditions to the underlying prime contract. Expanding the scope of work or the budget of the underlying prime contract, and/or changing, modifying or amending any of the other substantive terms and conditions of the prime contract, requires a formal written contract amendment rather than a Work Authorization.

If a change in the scope or budget of the underlying prime contract is sought or required, then a formal contract amendment (rather than a Work Authorization) must be executed by the parties to the prime contract. If there is a conflict between the scope of the work set forth in this Work Authorization and the scope of work set forth in the underlying prime contract, the underlying prime contract shall prevail.

The actual costs of a completed, approved Work Authorization shall not exceed the authorized amount. If, in the performance of the work, the Contractor determines that the actual costs will exceed the estimated costs, the Contractor shall immediately notify the Energy Commission Contract Manager and Energy Commission Project Manager. Upon such notification, the Energy Commission Project Manager may (*with approval of the Energy Commission Contract Manager*):

(1) Alter the scope of the Work Authorization to accomplish the work within estimated costs; or
(2) Augment the Work Authorization budget; or
(3) Authorize the Contractor to complete the work for the actual costs; or
(4) Terminate the Work Authorization.

Any expenses incurred by the Contractor that have not been duly authorized shall be borne by the Contractor. No amendments to this Work Authorization shall be made for work undertaken without the specific approval of the Energy Commission Project Manager and Contract Manager (See Contract No. 400-07-030 for details of notice).

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No. 4

BUDGET FOR PRIME CONTRACTOR:

Staff Name	*Loaded Hourly Rate*	*Total Estimated Hours*	*Total Labor*
See attached Budget	$		$
	$		$

Other Direct Costs (ODC's)[1] (list items)	*Cost*
See attached Budget	$
	$

Total Prime Contractor Labor: $ 192,181.58
Total Prime Contractor ODC's: $ 300.00

(1) Total Prime Contractor Budget: $ 192,181.58

BUDGET FOR SUBCONTRACTORS:
(Please check, if applicable: ☐ DVBE)

Individual Names by Subcontractor	*Loaded Hourly Rate*	*Total Estimated Hours*	*Total Labor*
	$		$
	$		$

Other Direct Costs (ODC's)[1] (list items)	*Cost*
	$

Total Subcontractor Labor: $ 7,700.00
Total Subcontractor ODC's: $ 0.00

(2) Total Subcontractor Budget: $ 7,700.00

TOTAL WORK AUTHORIZATION BUDGET* $200,181.58

*includes: (1) Prime Contractor Total and (2) Subcontractors Total

See attached Budget Detail which is incorporated as part of this work authorization.

[1] Such as shipping, reproduction, postage, telephone, and travel.

Work Authorization No. 13 Amendment No. 4

WORK STATEMENT

Task No.	Title	Description	Deliverables	Due Date
1	**Equipment Certification and Power Output Ratings**			
	1.1 - ERP	The Contractors will provide ongoing support by responding to requests for additions to the ERP's current equipment eligibility lists including: obtaining information from industry representatives; developing/updating a comprehensive list of inverters, wind turbines, fuel cells and meters, that meet the certification requirements of the current ERP guidebook, Appendix 3. For each inverter, the list will include efficiency rating, continuous rated AC power, and other physical and electrical parameters as determined by the standardized test protocol adopted by the Energy Commission. New information will be obtained from the manufacturers as available. The Contractors will modify the list based on the updated information received and will submit it electronically to the Energy Commission Project Manager not less than monthly. Staff will have these updated lists posted to the state's Go Solar California website for use by manufacturers, retailers and customers.	Revised ERP Eligible Equipment List and Certifications Listings	Due by the 25th day of each month and as needed, as requested by Energy Commission Project Manager

	1.2 – SB 1	The Contractors will provide ongoing support by responding to requests for additions to the current eligibility lists including: obtaining information from industry representatives, and developing a comprehensive list of solar products consisting of inverters and meters/metering providers that meet the certification requirements for SB 1 (per the SB 1 Guidelines, CSI Handbook, and NSHP Guidebook.) For each module, the list will include module CEC-PV Calculator inputs, and other physical and electrical parameters. For each inverter, the list will include efficiency rating, continuous rated AC power, and other physical and electrical parameters as determined by the standardized test protocol adopted by the Energy Commission. New information will be obtained from the manufacturers as available. The Contractors will modify the list based on the updated information received and will submit it electronically to the Energy Commission Project Manager not less than monthly. Staff will have these updated lists posted to the state's Go Solar California website for use by manufacturers, retailers and customers.	Revised Eligible Equipment Lists and Certifications Listings	Due by the 25th day of each month and as needed, as requested by Energy Commission Project Manager

1.3	**Technical Evaluation of Equipment Performance**	At the direction of the Energy Commission Project Manager, the Contractors will conduct a technical evaluation of the data and/or information provided to KEMA and/or the Energy Commission for the purposes of adding specific equipment to the Energy Commission's list of eligible equipment under the ERP and SB1. The Energy Commission Project Manager will identify specific data and/or information for the Contractors to evaluate. The evaluations should seek to determine whether the data and/or information submitted to KEMA and/or the Energy Commission for specific equipment by equipment manufacturers and/or retailers support the claims of performance, power output, capacity, and/or operational characteristics made by the manufacturers and/or retailers for the specific equipment.	Evaluation Report	As needed and as approved by the Energy Commission Project Manager

2	**Review of New Technology Requests**	Upon request and/or approval of the Energy Commission Project Manager, the Contractors will review industry representatives' requests to add products to the Eligible Equipment list that are not standard non-concentrating photovoltaic modules, meters/metering providers, inverters, fuel cells or wind turbines. The Contractors will initially determine if the information presented by the industry representative addresses all items necessary to meet the current requirements per the ERP Guidebook, Appendix 3, Section E, or SB1 Guidelines on Non-PV requirements. The Contractors will then advise the Energy Commission Project Manager on whether or not a detailed evaluation should be done. Upon approval by the Energy Commission Project Manager, the Contractors will: evaluate the technical merits of the proposal, working with the requesting party to obtain any missing information, and submit an electronic summary of the research results and recommendations to the Energy Commission Project Manager. The Energy Commission will in turn use the recommendation when deciding whether or not the new product is eligible to be added to the Eligible Equipment lists.	Written requests, updates, and evaluation summaries	As needed (e.g., when a request is received for listing a new product.) and as approved by the Energy Commission Project Manager
3	**Guidebook Support**	At the direction of the Energy Commission Project Manager, the Contractors will review and/or propose draft language to be included in the ERP, NSHP, and SB 1 guidebooks/guidelines, and will submit their comments and/or proposed language to the Energy Commission Project Manager for approval.	Comments and/or proposed draft language as directed.	As needed and as requested by the Energy Commission Project Manager
4	**Meetings and Discussions**	The Contractors will be available to participate in meetings and or discussions (e.g., conference calls, in-person, and e-mail) as needed and as requested by the Energy Commission Project Manager.	Discussions and/or e-mails	As needed and as requested by the Energy Commission Project Manager

Work Authorization No. 13 Amendment No. 4

5	**Project Management**	The Contractors will provide project management to ensure the project is completed on time and within budget. Additionally, the Contractor will provide progress updates for Energy Commission staff as requested or as necessary.	Progress Updates either verbal or in writing	As necessary and as requested by the Energy Commission Project Manager

Approval:

ENERGY COMMISSION

Project Manager **Date** 7/15/11

Renewable Energy Program Director **Date** 7/15/11

Contract Manager **Date** 7/15/11

RENEWABLE ENERGY PROGRAM
TECHNICAL ASSISTANCE CONTRACT NO. 400-07-030

Work Authorization No. 13 Amendment No. 4

KEMA, INC.

7/14/11

Principal in Charge **Date**

Work Authorization #13 Amendment 4
Renewable Energy Equipment Certification
Status: Equipment Certification Budget
Start date: effective date
End Date: **04/30/12**
Months: **23.5**

Additional turbines 10

Task Number	Task Title	Total Hours	Total Expenses	KEMA								BEW	
				Karin Corfee $234.70	Nellie Tong $113.36	Daria Mashnik $79.45	Elizabeth Steele $79.45	Chip O'Donnell $234.70	Doug Kneale $162.89	Rob Kaminsky $195.00	Bill Brooks $213.13	Jeff Newmiller $165.00	Tim Townsend $185.00
1.1	Equipment Certification - ERP	276	$ 37,969.85	-	-	30	126	-	-		120	-	-
1.2	Equipment Certification - SB1	772	$ 86,695.87	-	-	88	510	-	-		174	6	6
	Technical Evaluation of Equipment												
1.3	Performance												
	a. Review 4 existing standards (California, other states, AWEA)	36	$ 6,557.80				4			32			
	b. Review 13 sets of sample data	124	$ 23,717.80				4			120			
	c. Summary report including recommendations	90	$ 16,597.97		6		4			80			
2	Review of new technology requests	48	$ 11,601.67	-	-	3	18	6	3		18	12	12
3	Guidebook Support	26	$ 5,396.34	-	-	-	-	-	-	8	18	-	-
4	Meetings and discussions	63	$ 9,967.99	2	8	12	18	6	3	4	10	4	4
5	Project Management	10	$ 1,376.30	2	8	-	-	-	-		-	-	-
Total labor hours		1,445	$ 199,881.58	4	22	133	684	12	6	244	340	22	22
Total labor expenses		check	**$199,881.58**	$938.82	$2,493.94	$10,567.08	$54,343.80	$2,816.40	$977.34	$47,580.00	$72,464.20	$3,630.00	$4,070.00

Assumptions for Task 1.2

	# of months	Hrs/month	Hrs/month		Hrs/month	Hrs/month	Hrs/month
	3	30	20		16	2	2

Direct Expenses		
Miscellaneous	$	300.00
Total Direct Expenses	**$**	**300.00**

Total Estimated Costs	**$200,181.58**

Total Prime Contractor Labor Costs	$192,181.58	check
Total Subcontractor Labor Costs	$7,700.00	
Total Small Business Labor Costs	$0.00	
Total DVBE labor Costs	$0.00	

Amendment 1 incremental budget	$100,984.97
Amendment 2 incremental budget	$0.00
Amendment 3 incemental budget	$25,133.40
Amendment 4 incemental budget	$24,080.17

From: <rick@dyocore.com>
To: "Mashnik, Daria" <Daria.Mashnik@US.KEMA.com>
CC: <dave@dyocore.com>
Date: 5/26/2010 7:18 AM
Subject: Re: power curve output data for SolAir - 1.6 kW
Attachments: image006.jpg; image007.jpg; image005.png; IEC_Standard_61400[1].doc

Daria, kindly find requested data attached, Rick

Exhibit 90

SolAir - IEC standard 61400-12-1
DyoCore
March 1st, 2010

Abstract

In 2006 DyoCore, a California manufacturing company began development of its small wind/solar hybrid turbine – SolAir™. Over the past few years DyoCore has collected information that relates to power performance, power quality, noise, safety and function, and endurance tests that meet or exceed the standards established by the DOE's National Renewable Energy Laboratory (NREL) established in 2008 and now part of the International Electro technical Commission (IEC) standards. These results are being provided to state and federal agencies for their consideration in allowing SolAir as an eligible alternative energy product for state incentives.

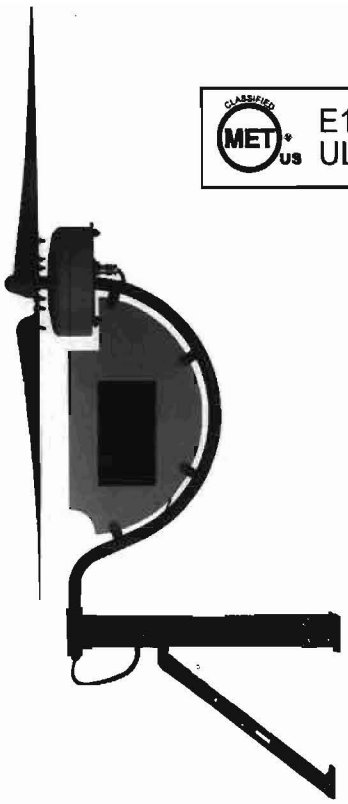
The following reports the results of SolAir actual on location installed testing to date, and puts the test results in perspective for the average consumer. Other topics addressed include independent testing results, and a discussion of SolAir's support resources.

Introduction

The basis for DyoCore's presented data was established at the National Renewable Energy Laboratory to help reduce the barriers of wind energy expansion and qualify SolAir under the IEC Standard 61400. Among these barriers is a lack of independent testing resources for small turbines and guidelines for their manufacturers. Testing results established by the NREL provide turbine manufacturers with a portion of the requirements for turbine certification and use. Turbines that meet these guidelines give consumers confidence in small turbine technology and will separate reliable turbines from those that do not perform as advertised.

Figure 1 shows the SolAir installed in San Marcos, CA. and Hampshire IL, Power performance, duration, noise, and safety and function tests were performed on both turbines presented herein. Power quality testing was performed only on single-phase applications. The available preliminary results of those tests to date are presented below and are subject to change.

	Install Date	Data Hours	cut in wind sp m/s	cut out wind sp m/s	hub height	site AEP	Avg annual wind sp m/s
San Marcos, CA	16-Sep-08	12062	2.1	16.7	27'	1674.7	2.9
Hampshire, IL	13-Jan-09	9744	2	17.1	22'	2293.3	6.3



E112995
UL 6140

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Contact: David Raine

Domestic and international distribution
Turbines also available direct from factory

Model	SolAir
Orientation	Downwind
Rated Output	1.6 kW
Output Voltage (V)	130v @ 800 rpm
Applications	Stand Alone (combined wind/solar DC output), Grid Connection, Direct Heating, and Pumping
Controller Type	Ginlong
Overspeed Protection	Osculates mechanically in high winds for auto speed control
Blade Material	Aluminum
# of Blades	3
Rotor Diameter (m)	1.2
Swept Area (m^2)	1.13
Windspeed (m/s)	
Rated	8
Cut-in	2
Cut-out	16.5
Survival	54 - known
Head Weight (kg)	20
Tower Type	Surface mount
Tower Height (m)	1.4m - 58"
Product Life (years)	15
Warranty (years)	10
Units sold	450
Years on the market	0.5
Price (USD)	MSRP: $1700 SolAir 800 hybrid wind/solar turbine. Includes turbine, rectifier, and surface mounting hardware.
Additional Info	SolAir is a dynamic hybrid vertical mill that combines wind/solar integrated into a single balanced frame/fin design. SolAir is designed so versatile it can be mounted on any flat horizontal, vertical or pitched surface and can be either bolted or ballasted down.

The SolAir wind/solar Hybrid Generator

DyoCore's SolAir in San Marcos CA was installed on September 16th, 2008. It combines is a 120 VAC, single-phase, grid-connected, permanent-magnet generator wind turbine rated at 1.6 kW and a 36 VDC Solar panel rated at 30 W. SolAir is a horizontal-axis turbine mounted on a flat roof surface, and has a rotor height of 59" above the mounted surface and a rotor area of 54". The Second SolAir unit was installed on September 28th, 2008 in Hampshire IL. At the time of this publication IEC Standard 61400 data collection for duration, safety and function, power performance testing and power quality and acoustic noise testing was complete.

SolAir, Hampshire IL

SolAir San Marcos CA

Duration Testing

The duration test is conducted according to section 9.4 of the IEC Standard 61400-2: Design Requirements for Small Wind Turbines. Duration testing provides information about the turbine's structural integrity, quality of environmental protection, and dynamic behavior. The test requires a minimum of 6 months of operation, 2,500 hours of power production in winds of any velocity, 250 hours of power production in winds of 1.2 Vave and greater, and 25 hours of power production in wind of 1.8 Vave and greater. Section 6.2 of IEC Standard 61400-2 defines Vave , which depends on the small wind turbine class as identified by the manufacturer and based on the wind speeds in which the turbine was designed to operate. The turbine must not experience any major failures during the test period and must achieve an operational time fraction of 90% or greater. The operational time fraction is defined by the following.

$$\theta = \frac{T_T - T_N - T_U - T_E}{T_T - T_U - T_E} \times 100\%$$

Where TT is the total test time, TN is the time attributed to turbine faults and manufacturer-mandated inspections and maintenance, TU is the time during which the turbine status is unknown due to lost data or data-acquisition failure and maintenance, and TE is the time that is excluded from analysis due to grid faults and laboratory-mandated inspections or stops.

Part of the reliable-operation requirement for the duration test includes no significant wear, corrosion, or damage to turbine components. The structural integrity and material degradation are investigated through inspections of the turbine before, during, and after the testing period. Blades, welds, and other turbine components were visually inspected and photographed before the test and any apparent abnormalities

documented. After the required test data is collected, the turbine is lowered and disassembled for inspection of all individual components. Routine inspections of both units during the tests have not revealed any abnormalities. Post-test inspections for the units presented have not occurred.

Duration testing on both units are still in progress. The turbines have experienced minimal and normal operational problems and none of which resulted in complete failure or termination of the testing. Both SolAir units tested were in original condition without modification at the term of the presented testing results. Problems and/or noted downtime that occurred included wrapping of the wires at the base of the unit at the IL location which required manual untwisting, test equipment failure and replacement at the CA location, and movement of unit in CA to a new location for the placement of the online live Camera.

Table 1. Preliminary Duration Results for the San Marcos CA SolAir Install

	Wind	Solar	Hours of production at ws above						Wind / Gust Average - limits				T_1	T_2	T_3	T_4	O
Month	kWh production	kWh production	0	6	8	10	12	>12	Max Wind	Average Wind	Max Gusts	Average Gusts	Hours				%
Sep-08	82.80788208	6.431632	171	103	29	35	12	0	18.4	6.3	N	N	350	72	20	24	91%
Oct-08	195.3345042	14.791154	342	262	50	66	21	3	20.7	5.8	N	N	744	0	10	8	99%
Nov-08	128.782932	14.15863	341	273	46	36	16	8	25.3	5.5	N	N	720	0	0	16	98%
Dec-08	192.5889154	12.697476	274	326	56	48	18	22	36.8	5.3	N	N	744	0	0	0	100%
Jan-09	94.00400394	13.345624	344	317	42	32	7	2	18.4	5.8	N	N	744	110	5	48	92%
Feb-09	218.5929992	13.552332	259	251	52	60	28	22	38	7.3	N	N	672	0	0	0	100%
Mar-09	251.2555455	14.882604	270	276	54	90	43	11	24.2	7.4	N	N	744	6	0	48	93%
Apr-09	340.6171748	14.950184	185	273	73	112	45	32	29.9	7.2	N	N	720	0	0	24	97%
May-09	226.7815714	14.604224	246	291	67	113	27	0	19.6	7	N	N	744	0	2	24	97%
Jun-09	296.5248076	15.705282	184	300	67	99	61	9	23	7.2	N	N	720	0	1	0	100%
Jul-09	230.5729028	17.39069	287	234	79	120	24	0	18.4	7.1	N	N	744	0	0	24	97%
Aug-09	218.7764195	19.266376	300	245	63	106	30	0	17.3	5.8	N	N	744	0	0	0	100%
Sep-09	182.7617497	17.642534	319	240	46	92	23	0	21.9	6.3	24	20	720	56	48	86	86%
Oct-09	212.153999	18.10679	283	289	59	71	26	16	26.5	6	27	21	744	0	0	0	100%
Nov-09	124.3978237	16.808882	343	273	43	42	13	6	26.5	5.8	26	23	720	1	0	0	100%
Dec-09	200.9828667	15.042874	289	312	39	54	28	22	42.6	6.7	39	26	744	0	3	0	100%
* Jan-10	233.7411242	13.852288	329	274	38	47	15	41	41.4	7.8	43	26	744	4	36	96	86%
Annual - 09	2597.4	191.3	3309.0	3301.0	684.0	991.0	355.0	120.0	25.5	6.6	29.0	22.5	730.0	14.4	4.9	21.2	97%

Hours of Power Production for San Marcos CA:
Table 1 shows the preliminary duration results for the San Marcos SolAir installation. The turbine accumulated 12,062 hours of total run time with an operational time fraction of 97%.

The low operational time fraction for January of 2009 was caused by the failure of testing equipment, Data Logger failed and had to be replaced. Investigations suggest that high output amps caused the logger to fail. The Aemc L261 Data Logger was used to log voltage utilizing two 10 k Voltage dividers combined with an inspeed anemometer and WindWare software.

Since the replacement of the Aemc L261 Data Logger with the Hobo U-30 Data Logger, the turbine has run with a high operational time fraction. The majority of the other time classified as TN during the test is attributed to recording equipment time faults, and general maintenance whereas often the generator during excessively high winds/gusts would create amps that would burn out the 10k resistors. In September 2009 both units were removed to replace the bronze bearings with sealed casted bearings. Both turbines have run without vibration, mechanical errors or operational modifications since September 2009 through the end of the testing data period.

Table 2. Preliminary Duration Results for the Hampshire IL SolAir Install

Month	Wind kWh production	Solar kWh production	Hours of production at ws above 0	6	8	10	12	>12	Wind / Gust Average - limits Max Wind	Average Wind	Max Gusts	Average Gusts	T_1 Hours	T_2	T_3	T_4	O %
Jan-09	82.80788208	4.894652	N	N	N	N	N	N	N	N	N	N	350	0	32	2	99%
Feb-09	195.3345042	12.722152	0	9	0	18	79	638	48	16.8	N	N	744	0	0	1	100%
Mar-09	128.782932	12.786694	1	35	0	40	89	555	53.8	16.7	N	N	720	0	0	0	100%
Apr-09	192.5889154	13.336386	7	10	0	27	80	620	59.5	19.1	N	N	744	0	0	6	99%
May-09	94.00400394	12.508624	0	27	0	25	97	595	56.1	16.7	N	N	744	0	0	3	100%
Jun-09	218.5929992	12.999974	0	28	0	39	90	515	60.7	14.8	N	N	672	0	0	0	100%
Jul-09	251.2555455	13.623136	1	53	0	66	184	440	48	13.7	N	N	744	0	0	0	100%
Aug-09	340.6171748	13.84832	0	59	0	69	185	407	41.1	13.1	N	N	720	0	0	0	100%
Sep-09	226.7815714	13.284678	0	103	0	87	199	355	36.5	11.9	N	N	744	0	0	16	98%
Oct-09	296.5248076	13.225654	0	84	0	65	174	397	50.3	13.3	N	N	720	0	0	0	100%
Nov-09	230.5729028	16.680728	0	23	0	29	126	566	48	15.4	24	20	744	0	24	0	100%
Dec-09	218.7764195	15.512214	0	34	0	19	127	564	44.6	15.7	24	20	744	0	0	0	100%
Jan-10	182.7617497	15.84875	10	30	0	37	102	541	40	18.1	24	20	720	0	0	0	100%
Feb-10	212.153999	10.798912	0	46	0	46	104	438	44.6	15.6	27	21	634	0	0	0	100%
Totals:	2659.4	171.3	19.0	495.0	0.0	521.0	1532.0	6193.0	47.0	14.8	24.8	20.3	9744.0	0.0	2.4	1.9	99%

Hours of Power Production for Hampshire IL:
Table 2. shows the duration results for the SolAir installed in Hamshire IL. This unit has accumulated 9,744 hours of total run time with an operational time fraction of 99%.

The low operational time fraction that occurred in September 2009 was a result of changing out the turbine's bearing from bronze to sealed casted bearings. The majority of the remaining time classified as TN during the test is attributed to the wire being twisted up at the base of the unit requiring manual untwisting. This has been solved for current production models with a free swivel joint connection that allows the wires to turn freely 360^0. Wind metering equipment that extended data being recorded from simply wind speeds to include gusts was added in November 2009, this was accompanied by an inspection of the voltage metering equipment and resulted in downtime due to adverse weather conditions that prevented reconnection of the unit until the following day.

Another factor of reliable operation is that the turbine should experience no significant power degradation. Each month the average power is plotted for each wind-speed bin and analyzed for any obvious trends in power production. Examination of power degradation plots indicated no apparent power degradation for either installed location. The dynamic behavior of the turbine is assessed by observing the turbine in a range of operating conditions. The turbine is observed at wind-speed intervals from cut-in wind speed to a maximum experienced wind speed of 53 mph at the Hampshire install site. Tower vibrations, noise, yaw behavior, and tail movement all were periodically documented for evaluations and consideration in reporting the above data.

For the San Marcos install site the following dynamic observations were made. During high winds, the frame will yaw out of the wind between approximately 5 degrees and 30 degrees which was identified as a result of wind blade wash hitting the integrated frame fin assembly. This constant yaw at higher wind speeds allowed the unit to both maintain a lower overall consistent RPM but also prevented the motor from excessive heating. Additionally, it appears that no excessive vibrations are occurring during these conditions. In winds of between 3mph and 15mph both turbines tracked the wind well with no adverse dynamic behavior observations made. No audible noise was detected from either turbine during any of the testing observations.

Power Performance Testing

Power performance testing is conducted per IEC standard 61400-12-1, Power Performance Measurements of Electricity Producing Wind Turbines, referencing Annex H for small wind turbines when appropriate. Products of the test include a measured power curve, a power coefficient (CP) curve, and an estimation of annual energy production (AEP). For small turbines, statistical data is collected in 1-minute sets and sorted into 0.5-m/s-wide wind speed bins. Data collection is complete when the wind speed bins between 1 m/s and 14 m/s contain 10 minutes of data each, and the total database consists of at least 60 relevant hours. Wind speed bins are plotted against the corresponding bin power to produce a power curve. Power curves are normalized to sea-level air density; the site-specific air density at the either observed location is relatively low, 1.0 kg/m3. The power coefficient is the ratio of power generated by the turbine to the power available in the wind. The power curve for the both turbines show power measurements that are greater than rated power. Preliminary power and CP curves for the San Marcos Install as displayed in Figure 3; Both turbines performed as expected.

The original testing voltage equipment on the San Marcos Install was optimized for power performance and was found un-reliable after several months of operation. After the failure, a production model testing solution, Hobo Equipment, was installed and operated until testing was completed with a backup data recorder on the inverter. The preliminary power and CP curves for both configurations are shown in Figure 4.

Sea-Level Air Density Normalized Power Curve
SolAir San Marcos CA

m/s	Mph	Bin Wind Speed m/s	Bin Power kW	Number Data Points	C_p
1.6	3.5	1.554	0	0	0.77
2.1	4.6	2.0424	0.01	1340	0.58
2.6	5.8	2.5752	0.12	1134	0.44
3.1	6.9	3.0636	0.14	903	0.37
3.6	8.1	3.5964	0.41	747	0.30
4.1	9.2	4.0848	0.67	476	0.25
4.6	10.4	4.6176	0.79	276	0.22
5.1	11.5	5.106	0.84	161	0.20
5.7	12.7	5.6388	0.99	65	0.18
6.2	13.8	6.1272	1.17	47	0.16
6.7	15	6.66	1.35	29	0.15
7.2	16.1	7.1484	1.42	15	0.14
7.7	17.3	7.6812	1.56	13	0.13
8.2	18.4	8.1696	1.61	12	0.12
8.8	19.6	8.7024	1.6	8	0.12

Figure 3. Preliminary power and CP data for San Marcos CA Install

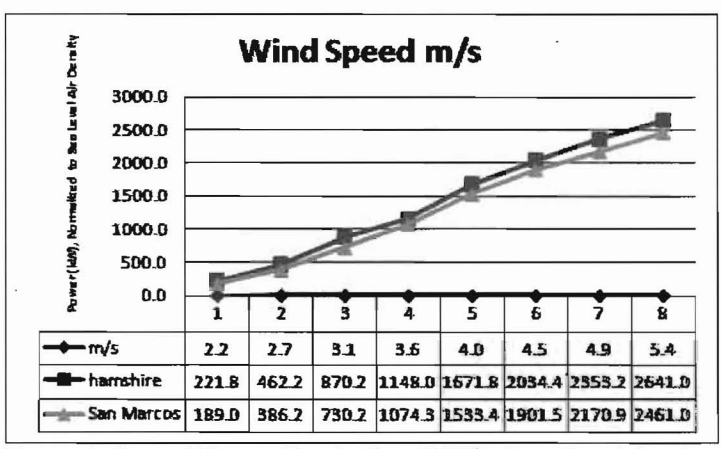

Figure 4. Annual Energy Production (AEP) at sea-level density; 1.225 kg/m^3 for normal power production

Figure 4. San Marcos CA Install preliminary power and Cp curves for the power production GinLong inverter (Inverter 1) and the Hampshire IL location shows preliminary testing inverter install (Inverter 2)

Annual energy production is estimated by applying the power curve generated from power performance testing to a Rayleigh distribution. The AEP is given for annual average wind speeds at hub height for 6.6mph to 19mph. The measurements reported below assume no energy production beyond the highest filled bin in the power performance test.

Hub Height Annual Average Wind Speed (Rayleigh) mph - m/s		San Marcos			Hampshire IL		
		AEP Measured	Standard Uncertainty		AEP Measured	Standard Uncertainty	
mph	m/s	kWh	kWh	%	kWh	kWh	%
5	2.2	189.0	117.2	62%	221.8	157.5	71%
6	2.7	386.2	104.3	27%	462.2	152.5	33%
7	3.1	730.2	131.4	18%	870.2	208.9	24%
8	3.6	1074.3	182.6	17%	1148.0	206.6	18%
9	4.0	1533.4	214.7	14%	1671.8	284.2	17%
10	4.5	1901.5	209.2	11%	2034.4	305.2	15%
11	4.9	2170.9	238.8	11%	2353.2	329.4	14%
12	5.4	2461.0	246.1	10%	2641.0	369.7	14%

Table 3. Preliminary Measured AEP for both units

Table 3 shows the preliminary AEP as measured based on power performance data for both locations.

Safety and Function Testing

Safety and function testing is conducted per IEC Standard 61400-2, section 9.6, and seeks to test the essential functions of the turbine system. However, NREL does not limit testing to the scope of the standard; other features that are not required by the standard also are inspected and tested. For each turbine, NREL collects data to characterize the turbine's power control, rotor-speed control, behavior upon loss of load, normal start-up, normal shutdown, and emergency shutdown. Additionally, NREL 8 performs turbine specific tests to verify the turbine controller's function and predicted behavior. Although safety and function testing examines the essential functions of the turbine, it does not certify whether a turbine is safe to operate.

Table 4 shows the preliminary safety and function data summary for San Marcos SolAir Install. The turbine performed as designed with one exception. When the inverter was shut down manually using the disconnect switch and then was restarted, an over-load error was present on the Inverter. The error had to be reset before the turbine could be started again.

Table 4. Preliminary Safety and Function Test Summary for the San Marcos SolAir Install

Test Method	Comment	Complies with Design
Power control	Turbine controls power output per design	Yes
Rotor speed control	Turbine controls rpm to 2100, per design	Yes
Normal start-up	Turbine starts at indicated cut-in wind speed and above, and below cut-out; over-speed error control operates as indicated	Yes
Normal shutdown	Turbine shuts down normally in winds less than cut-in and greater than cut-out	Yes
Emergency stop	Turbine when positioned out of the wind stops within 2 to 3	Yes

	seconds.	
Loss of grid	Inverter shuts off immediately upon grid loss	Yes
Undervoltage / overvoltage	In an overvoltage simulation the Inverter cuts off immediately	Yes
High wind speed shutdown	Turbine through mechanical rotation corrects in winds greater than 8 m/s to maintain lower rpm.	Yes
Rotor overspeed	Turbine by mechanical design self brakes preventing overspeed.	Yes
Generator overcharge	Inverter shuts down immediately in simulated generator overcharge	Yes
Excessive vibration	No vibration was detected	Yes
Cable twist	Swivel base wiring connection prevents twisting.	Yes

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Exhibit 91

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

IN THE MATTER OF THE COMPLAINT AGAINST
DYOCORE, INC. BROUGHT BY
ENERGY COMMISSION STAFF

Docket No. 11-CAI-03
(Revised 9/16/2011)

COMPLAINANT

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*indicates change

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Desert Power, Inc.
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San Diego Small Wind
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San Marcos, CA 92009

Apple Acres, Inc. DBA Gridnot
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DECLARATION OF SERVICE

I, Rhea Moyer, declare that on October 4, 2011, I served and filed copies of the attached Energy Commission Staff's Prehearing Conference Statement and Exhibit Lists, dated October 4, 2011. The original document, filed with the Docket Unit or the Chief Counsel, as required by the applicable regulation, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [http://www.energy.ca.gov/renewables/emerging_renewables/11-cai-03/].

The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit or Chief Counsel, as appropriate, in the following manner:

(*Check all that Apply*)

For service to all other parties:

__x__ Served electronically to all e-mail addresses on the Proof of Service list;

__x__ Served by delivering on this date, either personally, or for mailing with the U.S. Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses NOT marked "e-mail service preferred."

AND

For filing with the Docket Unit at the Energy Commission:

__x__ by sending an original paper copy and one electronic copy, mailed with the U.S. Postal Service with first class postage thereon fully prepaid and e-mailed respectively, to the address below (preferred method); *OR*

____ by depositing an original and 12 paper copies in the mail with the U.S. Postal Service with first class postage thereon fully prepaid, as follows:

CALIFORNIA ENERGY COMMISSION – DOCKET UNIT
Attn: Docket No. 11-CAI-03
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

OR, if filing a Petition for Reconsideration of Decision or Order pursuant to Title 20, § 1720:

____ Served by delivering on this date one electronic copy by e-mail, and an original paper copy to the Chief Counsel at the following address, either personally, or for mailing with the U.S. Postal Service with first class postage thereon fully prepaid:

California Energy Commission
Michael J. Levy, Chief Counsel
1516 Ninth Street MS-14
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I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

/s/ Rhea Moyer