



CALIFORNIA ENERGY COMMISSION

**PETITION OF
AMERICAN LUNG ASSOCIATION IN CALIFORNIA, ASIAN PACIFIC
ENVIRONMENTAL NETWORK, BRIGHTLINE DEFENSE PROJECT,
CALIFORNIA CENTER FOR SUSTAINABLE ENERGY, CALIFORNIA
ENVIRONMENTAL JUSTICE ALLIANCE, CALIFORNIA SOLAR ENERGY
INDUSTRIES ASSOCIATION, COALITION FOR CLEAN AIR, DISTRIBUTED
ENERGY CONSUMER ADVOCATES, ENVIRONMENT CALIFORNIA
RESEARCH & POLICY CENTER, ENVIRONMENTAL DEFENSE FUND,
INTERSTATE RENEWABLE ENERGY COUNCIL, INC., LOCAL ENERGY
AGGREGATION NETWORK, DR. LUIS PACHECO, PRESENTE.ORG,
SIERRA CLUB, SOLAR ENERGY INDUSTRIES ASSOCIATION, AND
THE VOTE SOLAR INITIATIVE
FOR
SOCIETAL COST-BENEFIT EVALUATION
OF CALIFORNIA'S NET ENERGY METERING PROGRAM**

Pursuant to the general authority granted to the California Energy Commission (“Commission”) by Public Resources Code Sections 25400, 25000.1, and 25001, American Lung Association in California, Asian Pacific Environmental Network, Brightline Defense Project, California Center for Sustainable Energy, California Environmental Justice Alliance, California Solar Energy Industries Association, Coalition for Clean Air, Distributed Energy Consumer Advocates, Environment California Research & Policy Center, Environmental Defense Fund, Interstate Renewable Energy Council, Inc., Local Energy Aggregation Network, Dr. Luis Pacheco, Presente.org, Sierra Club, Solar Energy Industries Association, and the Vote Solar Initiative (“Petitioners”) respectfully submit this petition to request that the Commission undertake a study of the societal costs and benefits of the net energy metering (“NEM”) program authorized by Public Utilities Code Section 2827 and prepare a report to the Legislature.

NEM is an important part of California’s energy policy framework, and it is expected to play a significant role in helping achieve Governor Brown’s goal of installing 12,000 MW of local renewable energy capacity by 2020.¹ Among other things, the continued existence of the

¹ See Jeffrey Russell and Steven Weissman, “California’s Transition to Local Renewable Energy: 12,000 Megawatts By 2020” (Berkeley Law Center for Law, Energy & the Environment) (June 7, 2012).

NEM program is necessary to accomplish the goals of the New Solar Homes Partnership (“NSHP”), a component of the California Solar Initiative administered by the Commission. The primary goal of the NSHP is to help create a self-sustaining market for the construction of new, energy efficient solar homes. NEM also is critical to the success of other programs and goals under the Commission’s purview related to distributed or onsite renewable generation, including the Zero Net Energy (“ZNE”) goals for new construction buildings adopted as part of the Commission’s long-term planning through the Integrated Energy Policy Report (“IEPR”). Achieving ZNE building goals will continue to depend on the existence of NEM, which enables customers to offset nighttime power use with more valuable daytime, peak power exported to the grid to achieve “zero” net energy consumption.

Specifically, Petitioners request that the Commission take the following actions:

- (1) Undertake a narrowly tailored study of the societal costs and benefits of the NEM program — quantifying the value of energy generated by NEM customers that is exported to the grid and the value of all energy generated by NEM customers that is used on-site — to supplement the California Public Utilities Commission’s (“CPUC”) forthcoming ratepayer impact cost-effectiveness evaluation of the NEM program, and prepare and submit a report on the Commission’s study to the Legislature by December 1, 2013; and
- (2) Establish an expedited process to incorporate consideration of the societal costs and benefits of the NEM program into the 2013 IEPR.

The scope of Petitioners’ request is limited and tailored to draw on this Commission’s special expertise and experience examining the societal benefits of energy programs. As explained in this petition, there are various economic, environmental, and air quality benefits of NEM; Petitioners are not aware of any societal costs of NEM for non-participant ratepayers.²

This petition should be granted because it is reasonable, in the public interest, and supports the Commission’s administration of vital energy programs and initiatives. Petitioners encourage the Commission to expeditiously consider this petition, as the CPUC is required by

² Petitioners note that, for the purposes of supplementing the CPUC’s cost-effectiveness study, it is not necessary or appropriate for the Commission to consider any cost of the NEM program to participants as a societal cost.

statute (Public Utilities Code Section 2827.1) to complete an updated ratepayer impact cost-effectiveness study of the NEM program (including quantification of the costs and benefits of NEM to participants and non-participants) by October 1, 2013 and report the results of the study to the Legislature within 30 days of its completion. Preparation of the requested societal cost-benefit study of the NEM program by the Commission will provide decision-makers and stakeholders with a more comprehensive picture of whether NEM policy is a net cost or benefit for the State of California.

I. Identification of Petitioners

A. American Lung Association in California

The American Lung Association in California is a non-profit organization that works to save lives by improving lung health and preventing lung disease. In support of this mission, the organization has taken a leading role in advocacy for clean, renewable energy sources to reduce air pollution and climate change impacts on the health of all Californians.

B. Asian Pacific Environmental Network

Asian Pacific Environmental Network (“APEN”) is a grassroots environmental justice organization organizing low income immigrant Asian Pacific American families in Richmond, Oakland and statewide. APEN has won local clean air campaigns, passed state climate policy prioritizing disadvantaged communities, and has been instrumental in mobilizing voters of color in defending AB 32 and supporting clean energy goals.

C. Brightline Defense Project

Brightline Defense Project is a non-profit policy advocacy organization dedicated to protecting and empowering communities. The organization’s efforts have included campaigns to shut down dirty fossil fuel power plants, promote renewable energy and efficiency at the local, regional and state levels, and develop local hiring policies to increase clean energy employment opportunities for residents of economically disadvantaged neighborhoods and environmental justice communities.

D. California Center for Sustainable Energy

The California Center for Sustainable Energy (“CCSE”) is an independent non-profit organization that helps residents, businesses and public agencies save energy, reduce grid demand and generate their own power through a variety of rebate, technical assistance and education programs. CCSE also provides the community with objective information, research, analysis and long-term planning on energy issues and technologies.

E. California Environmental Justice Alliance

The California Environmental Justice Alliance (“CEJA”) is a statewide coalition of grassroots, environmental justice organizations that work to achieve environmental justice by organizing in low-income communities and communities of color – those most impacted by environmental hazards – and by pushing for policies at the federal, state, regional and local levels that protect public health and the environment.

F. California Solar Energy Industries Association

The California Solar Energy Industries Association (“CALSEIA”) is the state-level, non-profit trade association for companies involved in all aspects of solar, including contractors, developers, manufacturers, utilities, and service providers. Since 1978, CALSEIA has been advancing the use of solar technologies in California by means of legislative, regulatory and advocacy initiatives.

G. Coalition for Clean Air

Coalition for Clean Air (“CCA”) is California’s only statewide non-profit organization exclusively advocating for healthy air. CCA is known for spearheading innovative air quality policies, such as the Smog Check program, a ban on toxic dry cleaning chemicals, and incentive funding for alternative fuels; all of which serve as nationwide standards. With offices in Sacramento, Los Angeles and Fresno, CCA reduces air pollution and improves public health through advocacy, outreach and education.

H. Distributed Energy Consumer Advocates

Distributed Energy Consumer Advocates (“DECA”) is a technology-neutral California public benefit organization that advocates on behalf of residential electricity customers who seek to more directly control their investments in energy infrastructure. DECA’s California members

live and invest throughout the state, including in the service territories of California’s largest investor-owned and municipal utilities.

I. Environment California Research & Policy Center

Environment California Research & Policy Center is a non-profit organization with more than ten years of experience advocating on clean energy issues in California. The organization is dedicated to protecting California’s air, water, and open spaces, and investigates problems, crafts solutions, educates the public and decision-makers, and helps the public make their voices heard in local, state and national debates over the quality of our environment and our lives.

J. Environmental Defense Fund

Environmental Defense Fund is dedicated to protecting the environmental rights of all people, including the right to clean air, clean water, healthy food and flourishing ecosystems. Guided by science, we work to create practical solutions that win lasting political, economic and social support because they are nonpartisan, cost-effective and fair.

K. Interstate Renewable Energy Council, Inc.

The Interstate Renewable Energy Council, Inc. is a non-profit organization that works to enable greater use of clean energy in a sustainable way by (i) introducing regulatory policy innovations that empower consumers and support a transition to a sustainable energy future, (ii) removing technical constraints to distributed energy resource integration, and (iii) developing and coordinating national strategies and policy guidance to provide consistency on these policies centered on best practices and solid research.

L. Local Energy Aggregation Network

LEAN Energy US (Local Energy Aggregation Network) is a non-profit membership organization committed to the accelerated expansion and competitive success of clean energy Community Choice Aggregation (“CCA”) nationwide. LEAN Energy US brings together existing aggregation programs and agencies, local governments interested in pursuing CCA, technical experts, consumers, and allied organizations to help communities achieve their CCA objectives on an accelerated timeline.

M. Dr. Luis Pacheco

Luis Pacheco, M.D. is Medical Director of the Transitional Care Unit at California Hospital Medical Center in downtown Los Angeles. Dr. Pacheco is board-certified in family medicine and has been recognized for his public health advocacy by the American Diabetes Association and other organizations. He is one of the most widely recognized physicians in the U.S. Latino community.

N. Presente.org

As the largest online Latino advocacy organization in the nation, with a growing community of more than 300,000 members, Presente.org elevates issues of importance to the Latino community through cutting-edge use of organizing, culture, art, and technology. Presente.org uses technical skill, political savvy, and national reach to boost the Latino voice in America until it's so loud it can't be ignored.

O. Sierra Club

Sierra Club is a national environmental organization, founded in 1892 and headquartered in San Francisco. It advocates for clean, renewable energy to help reduce air pollution, water pollution and the effects of climate disruption associated with the use of carbon-based energy. Sierra Club has helped pass laws and regulations that are helping increase the proportion of renewable energy in the State's energy portfolio.

P. Solar Energy Industries Association

The Solar Energy Industries Association ("SEIA") is the national trade association of the U.S. solar energy industry. Through advocacy and education, SEIA and its 1,000 member companies work to make solar a mainstream and significant energy source by expanding markets, removing market barriers, strengthening the industry and educating the public on the benefits of solar energy.

Q. The Vote Solar Initiative

The Vote Solar Initiative is a California non-profit organization working to fight global warming, increase energy independence, decrease fossil fuel dependence, and foster economic development by bringing solar energy into the mainstream.

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II. Background

A. NEM Is a Major Driver of California's Solar Market Because it Creates Value for Customer-Generators that Install Clean, Onsite Generation

California is the nation's leading market for the installation of solar photovoltaic ("PV") generation to serve the on-site electric demands of homes, businesses, schools, and institutions. 1,560 megawatts (MW) of solar PV installations are now operating on the homes and other buildings of 150,000 Californians.³ The State has ambitious goals for deployment of renewable distributed generation, including the Governor's goal of installing 12,000 MW of local renewable energy capacity by 2020, more than half of which is expected to come from behind-the-meter solar PV.⁴ NEM is a core public policy that has enabled this success, and California's early adoption of NEM has contributed significantly to its status as the national leader in installed solar capacity and solar industry jobs. NEM will be equally important to continuing this success.

³ See <http://gosolarcalifornia.ca.gov/>. Data as of May 16, 2013, for all of California.

⁴ See California Energy Commission Staff analysis, "California's Path to 12,000 Megawatts of Local Renewables", Table 1, p. 4 for breakdown of 5,210 MW of behind-the-meter generation (rooftop PV in most cases), 3,420 MW of wholesale generation (up to 20 MW ground mount in most cases), and 3,370 MW of "undefined mix." Undated analysis, prepared for July 25, 2012 conference on the 12,000 MW goal. Available at http://gov.ca.gov/docs/ec/ConferencePaper_regional_target.pdf.

First enacted in 1995,⁵ California’s NEM law applies to the state’s electric utilities, including the three major investor-owned electric utilities.⁶ NEM is a simple billing arrangement that allows customers who install solar PV or other Renewable Portfolio Standard (“RPS”)-eligible electricity sources up to one MW in system size to “run the meter backward” when their production of renewable power exceeds their immediate needs. The simplicity and understandability of NEM has reduced the barriers to consumer acceptance of solar PV. NEM has been instrumental in extending the benefits of clean, renewable solar PV generation to a broad range of California energy consumers, and it is particularly suited to enabling customers to utilize the full output of variable generating technologies, such as solar PV facilities, without having to fully consume the system output in real time. In this way, NEM policy allows customers to size systems appropriately to meet overall annual load while taking into account that at any given time of the day, or in any given month, the system output will not perfectly match onsite load. From a customer’s perspective, NEM captures a value that otherwise would be lost or significantly diminished—the full value of energy exports that serve nearby retail loads on the distribution system—and helps provide an economic basis to purchase or install clean, onsite generation. California has experienced robust solar market development since enacting NEM.

It is important to note that NEM customers have both: (1) the ability to export electricity that is not consumed instantaneously; and (2) the ability to serve load directly from the onsite generator. For the portion of generation that is consumed directly onsite, a customer that reduces load supplied by the grid by engaging in NEM is functionally very similar to a customer that reduces load by installing a more efficient appliance or air conditioning system. As a January 2013 Crossborder Energy report explains, NEM customers exist in essentially three “states” or types of relationships to the utility’s grid:

- **The “Retail Customer State.”** The sun is down and there is no solar PV production. All electricity consumed flows into the property from the grid. The customer is a typical

⁵ SB 656 in 1995 (Stats. 1995, ch.369).

⁶ The NEM law does not apply to the Los Angeles Department of Water and Power (“LADWP”). Public Utilities Code § 2827(b)(3). Nonetheless, LADWP provides NEM for systems up to one MW in system size.

utility customer, just like those who are not utilizing NEM.

- **The “Energy Efficiency State.”** The sun is up and there is some solar PV production, but not enough to serve all of a customer’s instantaneous load. Here the customer is served both with power from their solar system as well as with power flowing in from the grid. In this state, the solar PV serves as a means to reduce the customer’s load on the grid, in the same fashion as a more efficient appliance or other energy efficiency measure. None of the solar customer’s output flows out to the utility grid. Collectively, approximately 55% to 75% of the output of solar PV systems across California will be used onsite, without touching the utility’s grid.⁷
- **The “Power Export State.”** The sun is high overhead and solar PV production exceeds the customer’s instantaneous use. In this state, the solar power flows into the property to serve the entire load, with the excess power flowing back out to the neighborhood distribution grid. As a matter of physics, this power will serve neighboring loads with 100% renewable energy, displacing power that the utility otherwise would generate at a more distant power plant and deliver to that local area over its transmission and distribution (“T&D”) system. It is critical to recognize that a NEM customer’s generation only touches the grid in this third, “power export” state. As the inverse of the figure provided above, just 25% to 45% of the output of a California NEM customer’s generation is exported to the grid in this third state.⁸

The Crossborder Energy report makes clear that the relevant customer “state” to examine, for purposes of understanding what makes NEM policy unique and accurately evaluating this policy, is the “power export state.” It is by netting exported electricity against overall monthly consumption that NEM distinctly creates a value for customers that would not exist in absence of

⁷ *Introduction to the Net Energy Metering Cost Effectiveness Evaluation* (2010 E3 Study) at p. 7 (March 2010). Available at http://www.cpuc.ca.gov/PUC/energy/DistGen/nem_eval.htm.

⁸ Thomas Beach and Patrick McGuire, *Evaluating the Benefits and Costs of Net Energy Metering in California*, prepared for the Vote Solar Initiative (Crossborder Energy 2013 Study) at p. 9 (2013), available at <http://www.seia.org/research-resources/evaluating-benefits-costs-net-energy-metering-california>.

the policy. The report also finds that at the current statutory cap on NEM,⁹ net metered customers of the three major investor-owned utilities will provide \$92 million in net benefits each year to non-participating ratepayers.

B. The NEM Program Participation Limit Has Evolved Steadily to Consider the Balance of Public and Private Benefits Created by NEM

The societal benefits of NEM were important considerations to the Legislature in establishing the NEM program. Public Utilities Code Section 2827(a) sets forth the Legislature’s findings “that a program to provide net energy metering [. . .] for eligible customer-generators is one way to encourage substantial private investment in renewable energy resources, stimulate in-state economic growth, reduce demand for electricity during peak consumption periods, help stabilize California’s energy supply infrastructure, enhance the continued diversification of California’s energy resource mix, reduce interconnection and administrative costs for electricity suppliers, and encourage conservation and efficiency.” These societal benefits complement the ratepayer benefits of NEM policy that the CPUC is measuring. Consideration of these societal benefits will lead to a fair and complete valuation of energy exports from NEM systems enjoyed by utility customers, which is an essential means to encourage private investment in clean, distributed generation.

When the first NEM legislation was passed in 1995, the Legislature established a very modest program cap on the amount of net metering that utilities would be required to provide.¹⁰ The cap initially was defined by statute as “0.1 percent of the utility’s peak electricity demand forecast for 1996” and the statute included the exact, static maximum capacity figures based on the 1996 system peak forecast for each utility. The statute subsequently was modified on several occasions, which has resulted in gradual expansion of the statutory NEM program cap to allow for additional generation under the program. The NEM program cap currently is set forth in Pub. Util. Code Section 2827(c)(1), which provides:

⁹ The cap on NEM is established by statute at 5% of aggregate customer peak demand, as defined in CPUC Decision 12-05-036.

¹⁰ This appears to be in large part in response to concerns expressed by some utilities, including that NEM was “a bold scam by the solar power industry” and a “ratepayer ripoff.” Letter from PG&E to the Hon. Alquist opposing SB 656 (1994), March 20, 1995.

Every electric utility shall develop a standard contract or tariff providing for net energy metering, and shall make this standard contract or tariff available to eligible customer-generators, upon request, on a first-come-first-served basis until the time that the total rated generating capacity used by eligible customer-generators exceeds 5 percent of the electric utility's aggregate customer peak demand.

In May 2012, the CPUC issued Decision 12-05-036, which clarifies the methodology for calculating the 5% statutory cap on the NEM program set forth in Section 2827(c)(1), at least for the investor-owned utilities subject to CPUC jurisdiction. Specifically, the CPUC clarified that the term "aggregate customer peak demand" means the aggregation, or sum, of individual customers' peak demands, i.e., their non-coincident peak demands. This interpretation of the statute and manner of calculation significantly increased the total generation available under the NEM program, as compared to the utilities' interpretation that the cap percentage was a function of utility system peak demand and not the sum of individual customer peak demands.

The CPUC's decision also requires that the CPUC's Energy Division oversee the preparation of an updated NEM cost-effectiveness study to be completed no later than October 1, 2013. The decision provides that the analysis be conducted using multiple NEM penetration scenarios, including the capacity needed to reach the solar PV goals of the CSI program and the estimated NEM capacity at the 5% statutory cap as defined in the decision. In addition, the decision provides that the CPUC may suspend the NEM program for new customer-generators as of January 1, 2015 if the CPUC has not, by that time, issued new policy rules for the NEM program.¹¹

Subsequent to the CPUC's issuance of Decision 12-05-036, the Legislature enacted AB 2514 (2012), which requires the CPUC to complete a study of "who benefits from, and who bears the economic burden, if any, of, the net energy metering program authorized pursuant to Section 2827" and requires the CPUC report to the Legislature by October 31, 2013.¹² The legislation requires that, in addition to considering energy generated by NEM customers that is exported to the grid, the study consider "all electricity generated by renewable electric generating

¹¹ Several parties filed applications for rehearing of CPUC Decision 12-05-036, challenging the CPUC's authority to suspend NEM. As of this date, the CPUC has not acted upon those applications.

¹² Pub. Util. Code § 2827.1(a).

systems, including the electricity used onsite to reduce a customer's consumption of electricity that otherwise would be supplied through the electrical grid."¹³ At this time, it is expected that the CPUC's forthcoming NEM cost-effectiveness study will influence the Legislature's consideration of the future of the NEM program.

C. The CPUC's Cost-Effectiveness Study Will Not Consider the Societal Benefits of the NEM Program

The CPUC has selected the consulting firm Energy + Environmental Economics ("E3") to design and complete the study, and in late 2012 stakeholders commented on the proposed methodology that will be used for the forthcoming study. Petitioners understand that E3's study is well underway and results may be released soon. E3's scope of work document shows that it will focus on ratepayer impacts of NEM by, in part, comparing the value of exported energy, interconnection costs and administrative costs against the various avoided-cost benefits of net-metered systems. The E3 study scope of work states that the study is focused solely on ratepayer impacts and explicitly excludes consideration of societal benefits: "the results of the study will not speak to the overall societal value of the renewable DG under NEM."¹⁴

By utilizing a ratepayer impact test, the E3 study will exclude societal benefits of the NEM program that are potentially significant. As described in a February 2012 Berkeley Law report examining the benefits of the statewide NEM program,¹⁵ NEM is responsible for significant job growth in the solar industry in California and for reducing greenhouse gas emissions and localized air impacts from emissions from conventional, fossil fuel generating facilities, including natural gas peaker plants. In this way, NEM avoids air pollutants that are known to increase the frequency and severity of asthma attacks and the risk of developing other respiratory illnesses in vulnerable populations. As well, customer-sited solar PV has been shown

¹³ *Id.*

¹⁴ *Net Energy Metering Cost-Benefit Study Phase 1 Scope and Method Post-workshop Update* (Final E3 Scope of Work) at p. 5 (December 19, 2012), available at www.cpuc.ca.gov/NR/rdonlyres/AB3B14B7-C278-418E-8DDF-686A9890C2E8/0/RevisedNEMStudySOW_Dec2012_FINAL.doc.

¹⁵ Steven Weissman and Nathaniel Johnson, *The Statewide Benefits of Net-Metering In California & the Consequences of Changes to the Program* (Berkeley Law) at p. 7 (February 2012), available at www.law.berkeley.edu/files/The_Statewide_Benefits_of_Net-Metering_in_CA_Weissman_and_Johnson.pdf.

to lower market prices for electricity due to decreased demand. These societal benefits, which are quantifiable, will not be considered in the E3 study and, therefore, will not be presented to the Legislature absent Commission action.

III. Argument

A. The Commission Has Significant Interest in California’s NEM Program

The NEM program is a cornerstone of clean energy policy that directly supports and advances several programs or initiatives within the Commission’s purview. Indeed, the ability to achieve ZNE and NSHP goals rests on the continued ability of customers to derive value from energy exports that economically justifies their investment in or installation of clean, onsite energy systems. The overarching goal of the California Solar Initiative (“CSI”), which was established by the Legislature, is to establish a sustainable solar market in California, a goal that is highly dependent on retaining the vitality of NEM and the value customers receive for energy exports.

1. *NEM supports ZNE goals because it encourages customers to size clean, onsite generation systems to equal onsite load*

ZNE is a concept that combines energy efficiency and onsite renewable generation to enable a building to meet all of its energy needs. Implicit in this arrangement is the need to obtain a credit for any power from renewable generation that is not consumed instantaneously—and the understanding that solar PV is the most dominant form of onsite, distributed generation in California. ZNE buildings are not contemplated to be stand-alone facilities that are isolated from the grid. The vision for ZNE buildings counts on customers utilizing grid-supplied energy, but at amounts that are reduced through energy efficiency and equaled by onsite renewable generation output. A ZNE building’s usage of the grid will “net out,” but the onsite generation does not necessarily “net out” the customer’s electricity bill.

ZNE has a prominent place in California’s energy future. The Commission, the CPUC and the California Air Resources Board (“ARB”) have adopted closely aligned policy goals of achieving ZNE building standards in the near future. In the Commission’s 2007 *IEPR*, the Commission set out this goal to “increase the efficiency standards for buildings so that, when combined with on-site generation, newly constructed buildings can be net zero energy by 2020

for residences and by 2030 for commercial buildings.”¹⁶ Governor Brown’s 2010 “Clean Energy Jobs Plan” echoes this aspiration and calls for “a plan and a timeline to make new homes and commercial buildings in California ‘zero net energy’...”¹⁷ In September 2010, the Commission, ARB, CPUC, and the California Environmental Protection Agency jointly released *California’s Clean Energy Future*, a strategy document reinforcing the importance of “ZNE buildings as the top priority for addressing California’s energy demand.”¹⁸ The separate *Implementation Plan*, also jointly released by these agencies in late September 2010, notes that California’s goal was for existing residential buildings to achieve “40% reduction in energy purchases... by 2020” and to encourage 50% of all existing commercial buildings to move on a path toward ZNE.¹⁹ The Commission has the legislative authority to “develop, adopt, and implement regulations for energy ratings and improvements for existing buildings.”²⁰ Achieving ZNE for new residential and commercial buildings thus is an important part of the Commission’s overall plan to reduce California’s demand for electricity.²¹

It will be difficult for the Commission to meet these ambitious ZNE goals without a robust NEM policy to encourage customers to install sufficient onsite renewable generation capacity to offset at least a substantial portion of grid usage. While the concept of achieving “net zero” overall usage is distinct from the billing practice of NEM (i.e., with NEM a customer can

¹⁶ California Energy Commission 2007, *2007 Integrated Energy Policy Report*, CEC-100-2007-008-CMF, at p.5, available at www.energy.ca.gov/2007publications/CEC-100-2007-008/CEC-100-2007-008-CMF.pdf.

¹⁷ Governor Brown’s *Clean Energy Jobs Plan* (June 15, 2010), available at http://www.jerrybrown.org/Clean_Energy.

¹⁸ *Achieving Energy Savings in California Buildings* (CEC Draft Staff Report), CEC-400-2011-007-SD, p. 5 (July 2011), available at www.energy.ca.gov/2011publications/CEC-400-2011-007/CEC-400-2011-007-SD.pdf.

¹⁹ *California’s Clean Energy Future Implementation Plan* (CEC/CPUC/ARB/CalEPA), at p. 37 (September 2010), available at www.cacleanenergyfuture.org/documents/CCEFIImplementationPlan.pdf.

²⁰ *Achieving Energy Savings in California Buildings*, at 1 (citing Assembly Bill 758 (Chapter 470, Statutes of 2009), codified at Public Resources Code Section 25943. See Footnote 18 for link to report.

²¹ *The Road to ZNE: Mapping Pathways to ZNE Buildings in California*, Heschong Mahone Group, Inc., Dec. 20, 2012, available at www.energydataweb.com/cpucFiles/pdaDocs/897/Road%20to%20ZNE%20FINAL%20Report.pdf.

achieve a net zero bill even if the customer's kWh production is less than its kWh usage), achieving ZNE for buildings is less practical without the existence of NEM. NEM policy is the most cost-effective way—at least until energy storage is cost-effective—for most customers to economically utilize power exports and to encourage the sustainable growth of the ZNE concept in California. A recent Commission draft report, with an analysis performed by E3, concludes that rooftop solar would be cost-effective for most customers by 2020, and relies on the assumption that full retail NEM will remain available.²² The results of this draft report underscore the continuing importance of full retail NEM to the Commission's building-related activities, including development of building energy efficiency standards and achieving ZNE goals.

Absent the ability to value exports at the retail rate of purchased electricity, rational customers will size onsite renewable generation systems to meet their coincident load (i.e., when the system is in the “energy efficiency state”), rather than sizing these systems to meet their overall energy usage. For example, if an onsite renewable generation system is expected to be in the “power export state” for one third of its overall production, a customer with an average monthly usage of 1,800 kWhs would use 1,200 kWhs behind the meter, i.e. in the “energy conservation state”, if they sized their system to meet overall annual load (i.e. 1,800 kWhs of average monthly usage). Without NEM, the rational customer would size their system substantially smaller to meet only the 1,200 kWhs of average monthly energy consumption that is coincident with the system's output. With NEM in place, the customer could offset the remaining 600 kWh of usage (i.e, electricity delivered by the utility while the customer-generator was in the “retail customer state”) and avoid the retail purchase rate for that usage.

Without NEM, a customer may receive a payment rate for exports at the utility's avoided cost or wholesale generation rate, which is significantly lower than the full retail rate offset currently available. Assuming the differential between the retail rate and avoided cost is

²² *Cost-Effectiveness of Rooftop Photovoltaic Systems for Consideration in California's Building Energy Efficiency Standards*, prepared by E3 for the California Energy Commission, (“CEC Draft Rooftop PV Report”) at pp.6-8 (May 2013), available at <http://www.energy.ca.gov/2013publications/CEC-400-2013-005/CEC-400-2013-005-D.pdf> (for a solar PV system to be cost-effective for a customer, it must have a ratio greater than 1 when the life-cycle benefits of the system are divided by the life-cycle costs).

approximately \$0.10/kWh, for simplicity of calculation, in the example above, a customer trying to net out all onsite usage would lose approximately \$60 of value each month in the absence of NEM (600 kWh of exports × \$0.10/kWh). In such a case, the customer will have significantly less incentive to size a system to meet overall needs and may instead choose to size the system to match the highest instantaneous demand at times of solar production, which would likely fall well short of meeting overall annual usage and achieving ZNE for that customer’s building.

Accordingly, some policy mechanism is needed to encourage customers to zero out their usage and, at this time, NEM policy is the most effective and well-understood means of fairly capturing the significant value of power exports.

2. *NEM is critical to the NSHP goal of supporting a sustainable solar market*

The purpose of the NSHP program, created as part of the CSI, is to “create a self-sustaining market for solar homes where builders incorporate high levels of energy efficiency and high-performing solar energy systems.”²³ The Commission has implementation responsibility for and oversight of the NSHP, with the goal of supporting 400 MW of installed solar capacity in California by the end of 2016.²⁴ Consistent with the goals of the CSI to create a sustainable market for solar energy systems, the NSHP seeks to develop a sustainable market for solar integration into new residential construction. Just as ZNE goals rest on the ability of NEM to provide customer’s value for exported energy, the marketability and value of new construction with integrated solar energy systems depends, in part, on the ongoing value that the purchasing homeowner will derive from the onsite generation. This is equally true for the other components of the CSI, including the Single-family Affordable Solar Homes (SASH) Program and the Multi-family Affordable Solar Housing (MASH) Program, which depend on the existence of NEM to achieve program goals.

There is a symbiotic relationship between the Commission’s NSHP goals, ZNE goals, and the development of building energy efficiency standards. For example, for projects receiving

²³ California Energy Commission 2013, *New Solar Homes Partnership Guidebook*, sixth edition (2013 NSHP Guidebook), CEC-300-2013-009-ED6-CMF, at p. 1 (April 2013), available at www.energy.ca.gov/2013publications/CEC-300-2013-009/CEC-300-2013-009-ED6-CMF.pdf.

²⁴ *Id.*

an incentive that reflects qualification under Tier II level energy efficiency measures, the Commission recognizes that the “Tier II level is expected to achieve an immediate positive cash flow for homeowners and encourages builders to move toward constructing zero-net-energy residential buildings.”²⁵ The value of energy efficiency measures and onsite generation, thus, factor into the home purchase decision, and the existence of “positive cash flow” would depend on the purchasing homeowner receiving value for the onsite generation that exceeds the embedded cost of the system in the purchase price. The continued existence of NEM, with full retail value for energy exports, is a key factor in ensuring that solar PV will be cost-effective for California ratepayers, as discussed in the Commission’s recent draft report on rooftop solar PV.²⁶ The cost-effectiveness of rooftop solar PV for customers is an important consideration for the Commission as it considers future changes to building standards.²⁷ The ability of NEM to leverage the value of exported power, thus, directly supports the value proposition of new homes with solar energy systems and promotes a self-sustaining market for new solar homes, furthering multiple Commission goals. Any changes to the existing value of onsite solar energy systems, as realized through existing NEM policy, could have substantial impacts on the efficacy of current incentive levels to achieve the long term goal of market sustainability.

B. The Commission Has the Authority and Prerogative to Provide Supplemental Consideration of the Societal Costs and Benefits of the NEM Program

The Commission has broad authority to consider environmental and labor market benefits in determining the cost-effectiveness of an energy resource. With regard to the environment, Public Resources Code Section 25000.1(c) provides that “[i]n calculating the cost effectiveness of energy resources, including conservation and load management options, the commission shall include a value for any costs and benefits to the environment, including air quality.”²⁸ Nothing

²⁵ 2013 NSHP Guidebook, at p. 2.

²⁶ See CEC Draft Rooftop PV Report at pp. 1-2 (executive summary).

²⁷ *Id.* at p. 7.

²⁸ Public Utilities Code 701.1(c) provides the CPUC with parallel authority to consider environmental benefits, but with the added provision that those costs and benefits be considered “in addition to other ratepayer protection objectives.” Accordingly, the Commission arguably has a broader authorization to consider statewide societal costs and benefits without the CPUC’s limited scope to jurisdictional ratepayers.

precludes the Commission from considering economic benefits as well. Certainly, a Commission study of societal benefits, including both environmental and economic benefits, will supplement the limited scope of the CPUC's cost-benefit study of NEM and provide the Legislature, other decision-makers, and stakeholders with a more complete and accurate picture of NEM's impact on California's economy and environment.

Petitioners submit that the Commission can achieve this objective without intruding on the jurisdiction of the CPUC or modifying or affecting the results or conclusions of the CPUC's study. A properly scoped study of the societal costs and benefits of NEM will, instead, provide a more comprehensive picture of whether NEM policy is a net cost or benefit for the State of California.²⁹

The Commission has a history of undertaking coordinated efforts with the CPUC to determine distributed generation benefits and the cost-effectiveness of programs that promote the adoption of solar energy systems. For example, when the CPUC opened Rulemaking 04-03-017 to consider distributed generation issues—including a methodology to determine the costs and benefits of distributed generation—this Commission opened a parallel proceeding (04-DIST-GEN-1), working cooperatively and providing additional analysis on the costs and benefits of distributed generation.³⁰ Although the CPUC did not reach a final decision in R.04-03-017, the Commission and the CPUC worked collaboratively, through workshops, to identify “specific types of costs, benefits, and potential methodologies to quantify them.”³¹ In 2006, the Legislature enacted Senate Bill 1 (2006), which called for the CPUC to conduct a cost-benefit analysis of California's investor-owned utility NEM programs, in coordination with this Commission, to address the impacts of NEM policy on participating and non-participating customers. Additionally, Public Resources Code Section 25000.1(c) requires the Commission to work

²⁹ The 2010 E3 study identifies utility costs of NEM, primarily consisting of lost revenues, and also including administrative costs. The updated study will apparently also include interconnection costs borne by the utility. Petitioners are unaware of any societal costs of NEM for non-participant ratepayers.

³⁰ See Mark Rowson, *Distributed Generation Costs and Benefits Issue Paper*, PIER/CEC 005-04-048 (July 2004).

³¹ See CPUC *Decision Adopting Cost-Benefit Methodology for Distributed Generation*, Decision No. 09-08-026 at p. 9 (issued August 21, 2009) (discussing procedural history of CPUC Rulemaking 04-03-017).

cooperatively with the CPUC to determine the value of costs and benefits, or to provide separate justification where the values it uses are different than the CPUC's values.³²

C. Commission Consideration of Societal Costs and Benefits of the NEM Program Will Supplement the CPUC's Efforts and Aid the Legislature, and Is Consistent with Legislative Intent.

Solar PV resources bring many substantial benefits to the state that will not be captured in the CPUC study, due to its exclusion of societal benefits. For example, job creation benefits are not part of a ratepayer impact analysis, but they provide real benefits to the State by adding employment opportunities for California citizens, and helping to stimulate local economies with construction and related economic activities that increase tax revenues. Solar energy technologies have zero emissions and therefore provide emissions reductions (including reduction of greenhouse gas ("GHG") emissions) and public health benefits by offsetting conventional fossil-fuel generation resources. Solar PV also reduces overall electricity and natural gas demands and thereby reduces the market price for both wholesale electricity and natural gas. Absent action by this Commission, the Legislature may be placed in the position of evaluating the NEM program based on information that does not account for the many significant societal benefits of solar PV.

There is no barrier to the Commission supplementing the CPUC's study to consider the societal costs and benefits of NEM contemplated in Public Utilities Code Section 2827. AB 2514 requires the CPUC to undertake an updated cost-effectiveness examination of NEM policy; it is silent on any concurrent responsibilities for the Commission. The bill does not preclude the Commission from conducting its own study and submitting its findings to the Legislature to supplement the CPUC's study. As expressed in AB 2514, the Legislature endeavors to know "who bears the burden" and "who benefits" from NEM policy. It is, thus, appropriate for the

³² Pub. Res. Code § 25000.1(c) ("The commission shall ensure that any values it develops pursuant to this section are consistent with values developed by the Public Utilities Commission pursuant to Section 701.1 of the Public Utilities Code. However, if the commission determines that a value developed pursuant to this subdivision is not consistent with a value developed by the Public Utilities Commission pursuant to subdivision (c) of Section 701.1 of the Public Utilities Code, the commission may nonetheless use this value if, in the appropriate record of its proceedings, it states its reasons for using the value it has selected.")

Commission to supplement the work of the CPUC’s consultant to provide the Legislature a full picture of costs, if any, and benefits that go beyond consideration of ratepayer impacts.

Not only is there no barrier to the Commission’s consideration of societal benefits, but the overall legislative goals of NEM policy are explicitly broader than ratepayer benefits. The legislative intent of Public Utilities Code Section 2827 is to “encourage substantial private investment in renewable energy resources, stimulate in-state economic growth, reduce demand for electricity during peak consumption periods, help stabilize California's energy supply infrastructure, enhance the continued diversification of California's energy resource mix, reduce interconnection and administrative costs for electricity suppliers, and encourage conservation and efficiency.”

The institutional scope of the Commission—to study and develop policy recommendations regarding the state’s energy future—makes it well suited to provide a supplemental analysis to capture the benefits of these more generalized legislative goals of NEM, which are beyond the CPUC’s focus on jurisdictional ratepayers.

Petitioners believe it is important to examine the overall societal costs and benefits of NEM, and that the Commission should focus its efforts on supplementing the exported power scenario in E3’s study. Examining the value of exported power is important because, as explained in Section III, it is the ability to value customer exports that differentiates NEM policy from other self-generation options. Given the significance of the value of exported power to customers to facilitate the Commission’s ZNE and NSHP goals, producing a study focused on this aspect will provide a relevant “apples to apples” comparison to the benefits and costs determined under the “exported power” scenario in the E3 study.

It also is relevant to consider the societal benefits of NEM generation that is consumed onsite. The ability of NEM customers to reduce purchases from the grid, and to reduce demand at times of peak load, has a potentially significant societal value. Since the E3 study will consider all generation from NEM systems, the Commission should supplement this aspect of the cost-effectiveness assessment and evaluate the societal costs and benefits of both exported power and generation consumed onsite. Limiting the Commission’s consideration of costs and benefits to societal costs and benefits will ensure there is no duplication of the efforts underway at the CPUC and will avoid encroaching on CPUC-specific concerns with ratepayer impacts. In this

way, societal costs and benefits can be overlaid on the CPUC's ratepayer impact findings and would complement but not alter the conclusions of the E3 study.

Supplementing the E3 study necessarily entails limiting the Commission's review to the societal costs and benefits related to NEM facilities of the customers of the State's three major investor-owned utilities. The CPUC's jurisdiction limits its focus to consideration of the rate impact of NEM systems within the investor-owned utilities' service territories, and a supplement to the E3 study should consider the statewide societal costs and benefits of those same NEM systems. It also would be feasible to look at all costs and benefits for NEM within the service territories of municipal utilities, but that is not immediately necessary and would be a more resource-intensive study. Petitioners are requesting only that the Commission supplement the E3 study.³³

For these reasons, Petitioners respectfully request that the Commission undertake a narrowly tailored study of the societal cost and benefits of the NEM program by examining both the "exported power" scenario and the value of all onsite generation, and submit a report to the Legislature to supplement the CPUC's forthcoming ratepayer impact cost-effectiveness evaluation of the NEM program. While the Commission's study would supplement the E3 study, and should be consistent with that study's basic parameters, there is no reason that the Commission must wait for completion of the E3 study to commence work on its own societal cost-benefit study. Accordingly, Petitioners request that the Commission also incorporate its consideration of the societal costs and benefits of the NEM program into the 2013 IEPR and establish an expedited abbreviated procedure to include consideration of these benefits in the final 2013 IEPR.

³³ In addition to supplementing the E3 NEM study, petitioners note that consideration of societal benefits will provide a helpful complement to the Commission's report on the cost-effectiveness of rooftop solar PV for inclusion in building standards. *See* CEC Draft Rooftop PV Report at p. 6. As indicated in the draft report, there are several categories of benefits, including avoided land use impacts and reduced water consumption by thermal generation cooling, that were not included in that analysis that would be included in the proposed list of societal benefits described in this petition.

IV. Proposed Study of Societal Benefits

For the current purposes of supplementing the CPUC's forthcoming E3 study, Petitioners suggest that the Commission's study of societal benefits (and costs, if any) should, to the extent possible, follow certain base assumptions and parameters used in the E3 study. In particular, a study of societal costs and benefits should assume the same amount of solar energy capacity enrolled in the program over the same time horizon and should consider the extent to which societal costs and benefits are linked to the various customer classes being considered in the E3 study. As discussed in Section II, the Commission's study should focus on the value of exported energy, as this is the portion of NEM policy to examine for relevance to Commission programs, but it also should establish the societal costs and benefits associated with generation used on-site, as the E3 study is required to do for ratepayer impacts.

Other stakeholders and the Commission may develop additional categories, but Petitioners propose the following preliminary list of societal benefits to be examined and quantified on a per kilowatt-hour basis, to match how the E3 study is likely to express net benefits or net costs of the program:

- Increased employment and downstream economic effects: The number of solar jobs created in California across the entire solar value chain, including sales, finance, installation, and operation and maintenance, are significant. NEM supports many of the more than 43,000 solar jobs in California,³⁴ and these are mostly local jobs throughout the state that cannot be outsourced. Moreover, NEM supports growth of jobs available to workers in the construction industry, which has been slow to recover from the recession. One indicator of the solar industry's job creation is that California now has more solar workers than actors.³⁵
- Market price impacts of NEM resources: By reducing demand during peak hours, when the price of electricity is its highest, solar PV generation reduces the overall load on utility systems and reduces the amount of energy purchased on the market. In this way,

³⁴ National Solar Jobs Census 2012, The Solar Foundation, November 2012 and State Jobs Map, The Solar Foundation, April 2013.

³⁵ *Solar jobs outnumber ranchers in Texas, actors in California*, CNN Money report, based on The Solar Foundation report, April 22, 2013. Available at <http://money.cnn.com/2013/04/22/news/economy/solar-jobs/index.html>.

by reducing the need for expensive peak generation, solar PV reduces the cost of wholesale energy to all ratepayers.³⁶ This benefit is not captured by E3's analysis of avoided cost of energy and capacity associated with NEM facilities. Solar PV generation has the same impact on natural gas prices, as the marginal source of generation which solar displaces is gas-fired in most hours. Thus, NEM helps reduce the demand for natural gas, and its price.

- Encouraging other NEM-eligible technologies: While all NEM-eligible technologies provide some degree of societal benefits, the ability of the program to facilitate the growing market for non-solar NEM systems is important. The growing use of alternate technologies could expand the universe of benefits by diversifying the aggregate production profile of NEM systems, which could boost the ability of NEM to reliably offset new capacity additions. Additionally, growth of these new technology markets in California creates a home-grown industry for emerging technologies.
- Grid security benefits: Renewable DG resources are installed as many small, distributed systems and thus are highly unlikely to fail at the same time. They also are located at the point of end use, and thus reduce the risk of outages due to transmission or distribution system failures. This reduces the economic impacts of power outages. In contrast, central station plants carry the risk of single contingencies that can result in prolonged outages and substantial costs for replacement power. California currently is experiencing one such single contingency at a major central station unit – the design flaw in the steam generators at the San Onofre Nuclear Generating Station in Southern California.
- Leveraging private capital: A key component of a self-sustaining market for solar energy systems is the ability to obtain adequate sources of financing to meet the upfront capital costs of installation and construction. Financial institutions are familiar with NEM policy, as it is a long-established and well-understood mechanism that has become a part of the business model for many companies operating in California and in other parts of the country. NEM helps provide stable assumptions about what customers can afford when

³⁶ See Perez, R. et al., *The Value of Distributed Solar Electric Generation to New Jersey and Pennsylvania* (Clean Power PA and NJ solar study), at p. 9 (2012), available at communitypowernetwork.com/sites/default/files/MSEIA-Final-Benefits-of-Solar-Report-2012-11-01.pdf.

they enter contracts for the purchase of solar systems, or solar leases or power purchase agreements. In turn, these instruments help to attract private capital to support continued market growth in the residential and commercial sectors, especially for installation of third-party owned systems. NEM has helped facilitated billions of dollars in private investment in California over the past five years.³⁷

- Leveraging available federal tax benefits: Federal tax benefits, including the Investment Tax Credit³⁸ and accelerated depreciation, provide substantial savings to customers whether they are able to enjoy those benefits directly, by claiming those against personal tax liability, or through a third party financing partner who owns the system and monetizes the available tax savings through an agreement with the end user. Even with these savings, however, the tax benefits alone typically are insufficient to motivate customers to install distributed generation systems. NEM provides sufficient bill savings and helps California citizens to leverage federal tax benefits that would otherwise be left underutilized.
- Avoided energy expenditures enable customers to increase discretionary spending and stimulate their local economy: An important aspect of NEM is that it creates a positive cash flow for customers. In other words, customers invest in or install onsite generation because it is economically advantageous and they will realize real monetary savings on their electricity bills. Customers that save on energy expenditures are likely to put those savings back into their local economy (rather than elsewhere in the State) by spending the money in other expenditure categories.
- Increased tax base for state and local governments: Installation and construction associated with onsite generation facilities is inherently local in nature, as contractors or installers must be within reasonably close geographic proximity to economically install a system and be present for building inspections. Accordingly, the solar industry creates local jobs and generates revenue within many jurisdictions throughout California. The economic activity associated with the growing rooftop solar industry thus creates

³⁷ See www.seia.org/state-solar-policy/california.

³⁸ In the federal tax code, the ITC is a 30 percent investment tax credit for solar systems on residential (under Section 25D) and commercial (under Section 48) properties.

additional tax revenue at the state and local levels, as installers purchase supplies, goods and other related services locally (subject to state and local sales tax) and pay payroll taxes to the State of California.

- Avoided morbidity and mortality associated with fossil-fuel generation: The health care burden associated with fossil fuel generation has been well documented, including by the U.S. Environmental Protection Agency (“EPA”).³⁹ In particular, outdoor air pollution can increase the severity of asthma attacks and other respiratory illnesses in vulnerable populations living in close proximity to fossil fuel-fired plants.⁴⁰ NEM supports the installation of zero emission generation systems that result in reduced fossil fuel generation in California, especially from less efficient peaker plants that result in more air pollution per kWh produced during times of peak demand. Avoiding the use of less efficient natural gas peaker plant generation, in turn, reduces air pollutants associated with those plants. Considering the fact that peaker plants are often located in disadvantaged communities, NEM thus lowers the health care burden from electricity generation on these populations and avoids emissions of air pollutants that are known to increase the frequency and severity of asthma attacks and the risk of developing other respiratory illnesses in vulnerable populations.
- Increased welfare and productivity: The above-referenced health care burden directly impacts the welfare and economic productivity of California citizens.⁴¹ NEM supports the installation of zero emission generation systems that result in reduced fossil fuel use in California, and thus increased welfare and economic productivity.

³⁹ See *The Health Costs of Inaction with Respect to Air Pollution*, Organization for Economic Cooperation and Development, Environmental Working Papers, No. 2. Pascale Scapecchi June 2008; and *The Benefits and Costs of the Clean Air Act from 1990 to 2020* [Summary Report], Office of Air and Radiation, U.S. Environmental Protection Agency, March 2011.

⁴⁰ See X. Liu, L. Lessner and D. Carpenter, *Association between Residential Proximity to Fuel-Fired Power Plants and Hospitalization Rate for Respiratory Diseases*, Environ. Health Perspect. v. 120:807-810 (June 2012) (finding a significant elevation in rates of hospitalization for respiratory diseases among individuals over 10 years of age living near a fuel-fired power plant), available at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3385425/>.

⁴¹ *The Benefits and Costs of the Clean Air Act from 1990 to 2020* [Summary Report], Office of Air and Radiation, U.S. Environmental Protection Agency, March 2011.

- Reduced GHG emissions/climate change impacts: The E3 study will include the cost of CO₂ emissions in marginal generation (i.e., the compliance cost for utilities), but it will not consider the incremental environmental value of displacing GHG emissions. Climate change makes California vulnerable to the increasing frequency and intensity of drought conditions, which only worsens California’s historically severe wild fires. The reduction of harmful GHGs incrementally slows the acceleration of climate change and the impacts it has on the natural environment. In this way, reducing GHG emissions should carry an incremental benefit of slowing the impacts of climate change-induced economic and environmental impacts.
- Avoided air pollution costs: In the CPUC’s 2010 CSI Impact Evaluation report, the CSI general market program and the Self-Generation Incentive Program (“SGIP”) were estimated to be responsible for reducing over 400,000 tons of CO₂ emissions in 2010. Additionally, the report estimated that the CSI general market program and the SGIP provided over 52,000 pounds of PM₁₀ and over 92,000 pounds of NO_x emissions reductions in 2010.⁴² The CPUC is currently working on an update of the CSI Impact Evaluation report, which should be complete in late 2013. As a separate benefit, avoided air pollution costs should be exclusive of the already enumerated health benefits, to the extent they are not included in the E3 study’s ratepayer impacts.
- 100% Renewable Attribute Value: E3’s study considers the ability of NEM systems to reduce the RPS compliance baseline by reducing customer purchases of electricity. Because utilities must meet 20% to 33% of all retail sales with renewable generation, any reduced utility generation due to self-generation by NEM customers gets a credit for 20% to 33% of the value of RPS compliance costs per kWh. This fails to account for the fact that behind the meter consumption and energy exports are 100% renewable generation, provide a societal benefit, which arguably should be valued at 100% of the RPS value.⁴³

⁴² CPUC California Solar Initiative 2010 Impact Evaluation (Itron), at p. ES-2 (2011), available at http://www.cpuc.ca.gov/NR/rdonlyres/E2E189A8-5494-45A1-ACF2-5F48D36A9CA7/0/CSI_2010_Impact_Eval_RevisedFinal.pdf.

⁴³ Thomas Beach and Patrick McGuire, *Evaluating the Benefits and Costs of Net Energy Metering in California*, prepared for the Vote Solar Initiative (Crossborder 2013 Study)

- Avoided environmental, safety and economic costs: Distributed solar energy resources help avoid accidents, pollution and economic loss associated with the extraction, transportation, distribution, and processing of natural gas.⁴⁴ Methane losses from transmission and distribution pipelines contribute to the State’s GHG emission inventory, and gas transmission poses risk of explosion and fire. In addition, gas production sites in California release methane and other air pollution emissions, and risk water contamination and land use disturbances affecting recreation and wildlife. Avoided environmental benefits considered here should be exclusive of the avoided greenhouse gas costs that are considered earlier under a separate heading and associated directly with emissions from generation.
- Reduced water consumption: The literature is replete with documentation of the water intensity of electricity production by fossil fuel generation. For example, according to the American Water Works Association, household water consumption associated with energy use is greater than all other water uses combined. Approximately 25 gallons of water are used to produce one kilowatt-hour of electricity.⁴⁵ In 2010, the U.S. EPA estimated that fracking shale wells can use anywhere from 2 to 10 million gallons of water per well.⁴⁶ Presumably, the E3 study will account for reduced utility costs associated with water that did not need to be purchased due to lower utility generation, but utilities often have water rights at a cost below the value of the water. The benefit of not using the water for fossil-fuel generation should be based on the value of the water.
- Improved residential and recreational visibility benefits due to pollution reduction: Many studies have quantified the increased benefits associated with improved visibility due to emission reductions from power generation. Increasing distributed solar energy resources, including NEM systems, is one strategy for meeting U.S. EPA visibility

at pp.18-21 (2013), *available at* <http://www.seia.org/research-resources/evaluating-benefits-costs-net-energy-metering-california>.

⁴⁴ The largest user of natural gas is electricity generation, using about half of all natural gas in California. *See* <http://energyalmanac.ca.gov/naturalgas/>.

⁴⁵ *See* <http://spectrum.ieee.org/energy/environment/how-much-water-does-it-take-to-make-electricity>; accessed June 4, 2013.

⁴⁶ *The Hidden Costs of Electricity: Comparing the Hidden Costs of Power Generation Fuels*, Synapse Energy Economics. G. Keith et al. September 2012.

impairment requirements that are expected to result in \$67 billion in residential and recreational visibility benefits in 2020.⁴⁷

- Avoided land use impacts: By encouraging on-site consumption, NEM encourages efficient siting decisions by placing generation in close proximity to load, reducing the need for new central generation and new transmission and distribution facilities for delivery of that electricity. The potential land use and environmental impacts of new generation and transmission projects that will be needed to meet load are reduced in large part or eliminated entirely with NEM systems. In the case of solar PV, this typically means that a NEM system is placed on the rooftop of a residence or on the rooftop or parking lot of a commercial or government building. The natural constraint of sizing a system to match on-site load means that even ground-mounted NEM systems will be scaled appropriately to a customer's property.
- Ratepayer impacts: The Commission should incorporate the findings of the E3 study in regards to ratepayer impacts and should not "double count" avoided-cost benefits included in that study. The scope of the E3 study includes a consideration of ratepayer costs as: (1) bill reductions from the NEM credit mechanism; (2) billing and administrative costs for NEM; (3) interconnection costs not borne by the NEM customer; and (4) system integration costs. For benefits, the E3 study will consider the avoided cost of otherwise supplying energy to meet customer load, including: (1) avoided energy (i.e., wholesale price); (2) avoided generation capacity; (3) avoided ancillary services; (4) avoided transmission and distribution capacity; (5) cost of CO₂ emissions associated with marginal generation resources; (6) avoided line losses; and (7) avoided RPS purchases (i.e., the 33% RPS value described above).⁴⁸

Petitioners look forward to working with other stakeholders to assist the Commission in considering how to best quantify these benefits.

⁴⁷ *The Benefits and Costs of the Clean Air Act from 1990 to 2020* [Summary Report], Office of Air and Radiation, U.S. Environmental Protection Agency, March 2011. These benefits alone exceed the Clean Air Act's total compliance cost of \$65 billion in 2020.

⁴⁸ E3 Final Scope of Work at pp. 12-13.

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