

The Reliability of Energy Commission Forecasts of the Socioeconomic Impacts of the Proposed Hidden Hills Solar Electric Generating System (HHSEGS)

Assignment

As requested by Inyo County, Gruen Gruen +Associates (GG+A) has reviewed the final California Energy Commission (CEC) staff's analysis (FSA) of the proposed HHSEGS impacts on the County's fiscal viability, economic base and social conditions. In their summary of conclusions, the California Energy Commission's staff accepts the estimates and recommendations made in the report authored by Dr. Richard McCann and attached to the FSA as "Appendix 1: Socioeconomic and Fiscal Impacts of the Hidden Hills Solar Electric Generating System on Inyo County."

Standards of Reliability

We evaluated the estimates contained and recommended in the McCann report with the standards generally applied to the review of predictions made by social scientists. While they may include reference to statistical terms, models and technical jargon, the logic of the evaluations does not differ from what is used in everyday life and in courts of law. In essence, the models or assumptive framework of the methodology used to predict the effects of a future event must provide a reasonably accurate representation of the variables that can be expected to link the future event (the proposed construction and operation of HHSEGS), and be quantified, to historically relevant empirical data (evidence).

Summary of Opinion Concerning Forecast of Induced Expenditures

As discussed in more detail below, we believe the forecasts of the expenditures accepted by the CEC staff fail to meet the minimum standards of reliability, because the methodology used data extrapolated to the proposed project from a database of 18 proposed energy generation projects, of which only one project is operating, some of the remaining projects are in pre-construction phases and may never be built, while the remainder are under construction. All the extrapolations and predictive judgments made from these projects are drawn not from actual experience, but from analysis completed to forecast the impacts of these projects before any of them are completed and in operation.

In addition to the obvious flaws associated with using predictions about impacts that have yet to happen as the basis for predicting the impacts of the HHSEGS, a review of the 18 projects indicates that both their scale and technology, as well as the conditions on the other sites, differ significantly from the proposed project and its relation to conditions within Charleston View. For example, the maximum number of construction workers at proposed HHSEGS is estimated by CH2MHill to be at least twice the number of workers at some of the 18, and about 40 times the workers at one of the projects used as the empirical basis for



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the estimates accepted in the FSA. Further, none of the 18 projects is as far away from existing County services as would be the case if the HHSEGS is constructed and operated. Simply put, the empirical bases of the expenditure predictions contained in the report prepared by Aspen are hypothetical rather than real, and do not constitute valid representations of relevant relationships similar to those that can be expected should the proposed project be constructed at the Inyo County site.

In stark contrast to the methodology and data used to make the expenditure predictions accepted by the CEC staff, the County of Inyo's forecasts were based on the experience of public service providing staff familiar with both past cost determinants in the County and conditions in Charleston View. While reliance on past experiences of professionals familiar with the unique social, geographic and economic conditions of Inyo County and Charleston View is clearly more likely to be the basis for predicting the future expenditures than comparables drawn from non-existing projects in areas that are dissimilar from Inyo County, the forecasts provided by the County staff do not meet an acceptable level of reliability.

The County forecasts of expenditures are uncertain because they are based on limited knowledge of the on-the-ground effects to be generated by the project itself. Examples include information about the housing options likely to be taken by the large construction area workforce. The Updated Workforce Analysis by CH2MHill estimated the total personnel requirements during construction to be approximately 32,933 person-months. The number of workers is estimated to peak at approximately 2,293 workers in month 19 of the construction period. These approximations were higher than what was estimated in the May Aspen report, and significantly larger than many of the so-called 18 comparables listed in the appendix to this opinion paper. It should be noted that the maximum or peak construction workforce for the HHSEGS project is significantly larger than any of the other proposed, under construction, or operating projects that have been used as the basis for the estimate of induced County expenditures accepted in the FSA. We also note that the AFC update shows the operating workforce would be 100 workers, not the 120 previously indicated.

The Updated Workforce Analysis indicates that 70 percent of the construction workforce will be drawn from Inyo, Kern, Mono, San Bernardino and Riverside Counties in California, with the remaining 30 percent drawn from Nevada – 25 percent from Clark County and 5 percent from Nye. There is nothing in either the Aspen report or the AFC that links the demand and preferences of a large portion of the workforce expected to come long distances from their homes in California counties to work 10-hour days on the site, that at least during the work week they will not be able to commute back to their homes. The AFC approximates that 5 percent of the total workforce will stay in Tecopa and Shoshone in Inyo County, were there are few hotel or motel rooms or RV spaces. Fifteen percent of the total workforce is assumed to find accommodations in Pahrump, NV, with “the remaining 50 percent of the total workforce coming from California are assumed to stay in the Las Vegas area about 45 miles to the east of the project site.” None of the workers are assumed to dry camp near the site or move trailers or pickup trucks to vacant off-road sites not served with



utilities. Thus, the Inyo County department heads seeking to estimate what services or monitoring will have to be provided this workforce cannot be certain about the public safety, health, or social services and monitoring that will be required.

Summary of Opinion Concerning Forecasts of Induced Revenues

As further discussed in subsequent sections of this opinion, the forecasts of the sales and property tax revenues contained in the McCann report fail to meet the standards of reliability summarized above, for two reasons:

1. In the McCann report, the project's proponents are stated as stipulating to the provision of certain sales tax revenue agreements that the proponent (Bright Source Energy) publically denied in testimony before the Inyo County Board of Supervisors.
2. Caveats included in the McCann report cast serious doubt on the certainty of key assumptions about taxing and appraisal laws and the way in which they will be interpreted to value the HHSEGS site after construction, and allow the County of Inyo to collect sales taxes on the materials and equipment used in the construction of the project.

Summary of Opinion Concerning Forecasts of Induced Economic Benefits during Construction and Operation

The forecasts of induced Inyo County jobs and income presented in McCann report were drawn by inputting data on the expected workforce, taken from the AFC, into the regional economic model JEDI. We have no criticisms of the JEDI input-output model per-se, but because of the small amount of available goods and services in and around the California side of the market for such goods and services in Charleston View, we believe the forecast derived from the model greatly overstates the actual amount of jobs and incomes the construction and operation of the project is likely to bring to Inyo County. Our rationale for this opinion is discussed in more detail below.

Basis of Opinion Concerning the Uncertainty Regarding Forecasts of Induced Expenditures

Citing the Aspen Report as the source of their forecasts, the December 11th BSE presentation projected that the County expenditures that would result from the services required during the construction period would total \$2,191,600, an estimate that is \$8,338,166, or almost 400 percent, less than the \$11,129,766 that the County staff and Gruen Gruen + Associates ("GG+A"), the writers of this opinion, estimated as the marginal cost increases that would be imposed on the County during the project's approximately 29-month construction period. The difference between the forecast cited by BSE and the



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County's estimate of the costs likely to impact the County during the approximately 25 years of the project's operation was only slightly less huge. The BSE cited estimate was \$388,000 per year plus 5% per year increase for inflation, while the County's estimate of \$1,791,600 exclusive of inflation, was \$1,403,600 or 360 percent higher than the BSE estimate.

As summarized above, the County's approach was to utilize a case study approach, drawing on the experience of the staff in the service-providing departments who were intimately familiar with the costs of historically delivered services, the contracts and regulations that governed salary and workforce rules in the County, the unique geographical, topographical and social conditions in the County, and the land use and infrastructure conditions that exist in the Charleston View area. The County and GG+A agree with the methodological dictum spelled out on page 12 of the Aspen Report, which pointed to the need to identify the "marginal costs" induced in order to estimate the fiscal expenditures that will be induced by projects such as the proposed HHSEGS. The County also agrees with the Aspen Report's recognition of the economic cannon that some increased service outputs will generate "lumpy costs" when a service cannot merely be provided by an incremental expansion of the existing base of service-providing staff and capital facilities.

Our review of the BSE presentation of December 11, 2012 and the Aspen Report of May, 2012 suggests that neither of the two referenced methodological cannons have been followed in derivation of the forecasts in the Aspen Report. In nearly all the services considered, the default assumption of the report and its interpretation by BSE is that the needed services can be provided with existing staff and facilities, or by slight additions to those capacities, with no significant increases in the fixed costs of either staff or capital facilities. These assumptions stem partially from the approach to the cost variable investigation, which is to assume away the uniqueness of the present Charleston View service demands and their distance from the bases of existing service providers. For example, when considering the project-induced cost of the services provided by the County Sheriff's office, BSE's December 11 PowerPoint presentation includes the following statements:

"The Aspen Report states, there will not be a significant increases in response requirements. This is based on an analysis of 16 similar projects."¹

"The Aspen Report describes a possible requirement for two (2) deputies during construction to be phased out through natural attrition. These deputies are to be based out of the existing Tecopa/Shoshone substation."

The "18 similar projects"¹ were not only considered to be comparables for use in estimating the likely services and costs that the project will require of the Sheriff's Department, but these alleged comparables were also used as the foundation for the other estimates in the Aspen report accepted by the FSA. One of these projects, the Rio Mesa project, has been abandoned by BrightSource, and the same fate could possibly apply to some of the others

¹ While we believe the BSE PowerPoint suggested the number 16 because two of the projects were combined, the actual count was 18 projects.



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where no construction has started. Only one of the 18 projects is actually constructed and in operation. Further, as shown by the matrix of the number of employees estimated to be employed during the construction periods of these other projects, assuming they were to be built, the scale of most of these projects is significantly different than the construction workforce scale of the project proposed for Inyo County. Also, it appears that Ivanpah is the only project out of the 18 noted that has a similar solar installation.

The same is true, as mentioned above, regarding the hotel facilities available near the other projects. The Ivanpah project is located only six miles from Primm, NV, which has a supply of 2,642 hotel rooms, with historical vacancy rates that suggest the availability of these to workers wanting to stay during the work week and then returning to their homes on the weekends. Further, Primm is only 38.5 miles from Las Vegas on an interstate highway with excess capacity. Barstow, which is a little over 100 miles from the Ivanpah project, is located on Hwy 15.

The speed that law enforcement officers are trained to make when responding to emergencies over such roads is significantly higher than on the roadways between Inyo County Sheriff stations and the project's location in Charleston View. Driving time, not mileage, is routinely used for evaluating the market for new projects and agglomerations, as well as to enable an accurate analysis of the adequacy of existing infrastructure. When measured in time, not distance, it is clear that the responses of police stationed near Ivanpah will be significantly faster than the response time from the Inyo County's Sheriff station closest to the HHSEGS project. Driving great distances through Death Valley in a sheriff's car will be significantly slower than driving over the interstate from Barstow to Ivanpah.

Basis for Concluding that FSA Forecasts of Revenues Likely to be Generated by the Proposed Project are Uncertain

The Aspen Report utilized a revenue estimate of \$86,500,000 during the construction period and \$1,100,000 per year during the 25-year operation period. Therefore, the *net present value* fiscal impact was positive, even using the County's estimate of induced expenditures, because the very large construction period revenue estimate offset the annual loss of \$650,000 per year that resulted when the Aspen estimate of \$1,100,000 was subtracted from the County's annual expenditure estimate of \$1,700,000 induced by the operations of HHSEGS.

The County has never accepted the validity of the \$86,500,000 construction period revenue estimate, and has pointed out that to garner anything close to the \$34,755,000 that CH2MHill indicated was an estimate provided by BSE would require the implementation of a very special, specific agreement between BSE and the County. Estimates of anything close to \$1,000,000 per year during the 25 or so years of the project's operation are primarily based on forecasts of an annual property tax at or above that amount. But all Aspen Report forecasts are presented with a broad variety of caveats about the assumptions that underpin



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these property tax estimates. The laws that exempt alternative energy elements from the property tax base could be expected to result in valuation appeals that, if not turned down by the courts, could easily reduce the taxable base of the project well below the \$1,700,000 estimated annual costs to the County. Further, as also pointed out in the Aspen Report, annual depreciation charges could further erode the initial property tax base, which would have to be set as some percentage of initial construction costs since BSE has already indicated that the County will not be provided with the income data that would be required to value the property by the income approach.

In discussing the possibility that annual depreciation charges will further lower the original base, the Aspen Report states that the base would be increased again by future buyers of the project. This statement about the effect of future sales raising the property tax base of the project is either naïve or disingenuous. In line with the policy of most major non-residential property sales since the institution of Proposition 13, the seller will not be selling the property but the corporate entity that owns the project, so that the new owner picks up the depreciated base of the original owner.

To further elaborate on the likelihood that revenues will be far below what the Aspen Report forecasts does not seem worthwhile in the face of the presentation that BSE made before the Inyo County Board of Supervisors on December 11, 2012. BrightSource offered to guarantee construction period payments of only about \$7.8 million. No guarantees were suggested for the 25-year operating period. Thus, there is a large and very real disconnect between the revenues that have been forecast in the Aspen and related reports with what BSE is actually willing to commit. If the Inyo County Board had accepted the proposition that was put to them on December 11, they may very well have been setting the County up for a future fiscal loss that would have exceeded \$21 million in present value dollars.

For the reasons described above, constructing the proposed Hidden Hills Solar Electric Generating System in Inyo County would very likely impose what could be a very significant negative gap between imposed and induced costs and revenues on the County. In no way would the income forecast contained in the FSA be large enough to offset any significant requirement on the part of the County to subsidize the project. The forecast of jobs and income accepted in the FSA is very likely to overstate these economic benefits. Below, we once again summarize our reasons for this belief.

The regional economic model, JEDI, was used to estimate the economic benefits of both the construction and ongoing impacts of the project during operation. Important inputs to the model included estimates that during the construction phase, thirty-two (32) jobs would be created in the County directly from construction activity, and then the model was used to forecast that another seventy-seven (77) jobs would be induced through increased activity in the County. This means that during construction, total earnings by County residents would increase by \$12.1 million, while the output of the Inyo County economy would increase by \$73.8 million in the full 29-month period, or about \$30.5 million per year.



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The model was also used to look at the effect of assuming that six (6) jobs out of a total of 120 jobs during the operation period would be filled by local residents. These jobs were forecast to “multiply” to create an additional fourteen (14) jobs, with total annual earnings of \$1.1 million, with \$2.3 million in output. While these contributions to the County economy are relatively small compared to the previously discussed effect of taxable construction spending and increases in the property tax base forecast, they are nevertheless quite questionable because of the JEDI model’s failure to take cognizance of the geographic distribution of economic activity within Inyo County.

“Small area analysis is notorious for over-estimating local impacts.” This comment was made by Prof. Geoffrey J.D. Hewings, the Director of the Regional Economic Applications Laboratory at the University of Illinois, an internationally-respected expert in regional economic analysis. Hewings’ comment reflects the reality that economic activity is never spread evenly through space, but concentrated within differentiated agglomerations. Simply put, in those cases where a proposed new economic activity or construction project is located near other activity centers, input-output models such as JEDI can be reasonably depended upon, even when they deal with areas as small as a single county. However, given the sparseness of economic activity near the proposed site but within Inyo County, models such as JEDI can be quite misleading.

The area around the proposed project has very little to offer in terms of economic activity, but is close to much larger and more attractive activity in Nevada. Sixty-five percent of Inyo County’s taxable sales are made in the incorporated City of Bishop. Bishop is 241 miles and, according to Mapquest, a 4-hour and 13-minute drive from Tecopa. Tecopa, again according to Mapquest, is 26 miles and 39 minutes driving time to Pahrump, while Las Vegas, NV is 82 miles and 1 hour and 38 minutes driving time.

The implicit assumptions of the generalizations of the JEDI model, which are built on an economic model which was first proposed by Nobel Laureate Wassily Leontief in the late 1930s, was preceded by Reilly’s Law of Retail Gravitation to predict the area from which customers will come to various retail outlets. Reilly’s Law noted that the attraction of retail outlets increased with their size and decreased with their distance from potential customers. The use of the JEDI model to estimate the indirect jobs and output that will be induced by local residents of the County working at the site violates Reilly’s law, which neither Leontief nor any other economist has ever rejected. While it’s impossible to make a sure-footed forecast of how many local residents will work at the project during its construction or operation, the JEDI’s estimate of their multiplier effect within the County is very likely to be over optimistic.



