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California Energy Commission
Attention: John Kessler, Project Manager
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COMMENTS ON FINAL STAFF ASSESSMENT and DRAFT ENVIRONMENTAL IMPACT STATEMENT, IVANPAH SOLAR ELECTRIC GENERATING SYSTEM (07-AFC-5)

Following are comments of Public Employees for Environmental Responsibility re the subject FSA/DEIS.

These comments are lodged under protest against the restricted public review period allotted to allow input into the California Energy Commission's Evidentiary Hearing. The comments are therefore of limited scope, addressing primarily the issues of the document's hasty, premature, release, the speculative rather than substantive analyses of critical matters, and deferral of development plans and mitigations to future determination.

The sections entitled Project Design and Management Approach, Water Supply and Discharge, Project Construction and other major sections and subsections are incomplete, preliminary, dependent on the project proponent's unsubstantiated estimates, and poorly thought out. Practices that avoid unnecessary impacts and presentation of mitigation protocols have not yet been completed, and some, even though preliminary and subject to change, are included in this FSA/DEIS. Claims lodged against a No Project/No Action alternative are particularly lacking in credible objections, in places reveal bias, and do not consider conservation as an alternative. The Rational for rejection of rooftop alternatives expresses claims that are neither mature nor discriminating—most apply equally to the proposed project.

Deferral of comprehensive planning and construction procedures to future determination by the project applicant denies the public's right to comment, both on procedures and mitigations. All mitigations must be mandated in the permits, if granted. All monitoring requirements must provide oversight and periodic public reporting; monitoring plans must specify thresholds at which action is required and specification of alternative actions to be taken to problems revealed by monitoring. This and all other solar power plant projects on public lands must provide comprehensive rehabilitation plans to be conducted by independent qualified, licensed specialists

in land restoration, meet pre-specified standards, and be fully bonded before project construction begins to adequately cover restoration costs, including monitoring, maintenance, and any necessary upgrades for a period of at least 30 years.

The estimated water consumption for air-cooled and wet-cooled configurations for both the ISEGS and Alternative solar technologies would be more credible if actual amounts used by the California Solar 1 and 2 facilities, Nevada Solar 1, and other operating facilities were provided.

These problems are discussed as page-referenced comments in the following. Where the commentary mixes quotes or paraphrased text from the FSA/DEIS and PEER's comments, the former are underlined and the latter are stated in brackets.

PEER's summary conclusion at this point of review is that the ISEGS proposal is not ready for public review, and certainly not ready for any kind of decision-making regarding project approval or granting of ROWs.

Project Design and Management Approach:

p. 1-7 to 1-8. **Site Plans and Stormwater Management Approach**
Low-impact development (LID) design concept, which attempts to minimize disruption to natural stormwater flow pathways. Elements of approach include minimizing areas of direct removal of vegetation, minimizing areas of grading and leveling, and minimizing the amount of active management of stormwater in engineered channels, ponds, and culverts [I can find no information on the actual grading plan, so "minimizing" areas of grading is meaningless; in the discussion of the parabolic trough technology alternative, it is stated that the land required for 400 MW capacity represents permanent loss of habitat, "similar to the ISEGS project," but this alternative involves grading of the entire project area; the table on p. 3-2 indicates vegetation not removed would be cut and maintained at 12-18 inches in height, but this doesn't appear in the Site Plans section, nor is there any indication at all of the amount of land or its location to retain its vegetation and be so-treated][The last phrase of the quoted section is unclear and apparently inconsistent with Table 1, p. 3-2].

Project Construction
p. 1-8. [Deferral of construction plans to the future, to be developed by the applicant, effectively denies the public any right of comment. It is obvious from existing solar facilities in the southwestern deserts, that complete grading of a site is permissible under applicable LORS. The vagueness of the grading plan, if any, suggests that the information provided to CEC staff is not sufficient] "...to support this environmental analysis" [as claimed].

Staff Assessments
Summary of Project Related Impacts

Air Quality, Staff recommendations, p. 1-16 to 1-17

p. 1-17. Condition of Certification AQ-SC10 recommended to formalize applicant's stipulation that "Heat input from natural gas will not exceed 5 percent of the heat input from the sun, on an annual basis" [Good!]

Biology

p. 1-17. State project would have major impacts on biological resources of Ivanpah Valley, "...eliminating a broad expanse of relatively undisturbed Mojave Desert habitat."
[This renders meaningless the supposed minimization of vegetation removal for stormwater control (p. 1-7 to 1-8) as stormwater is distributed on an alluvial fan by a fan-wide system of rills and ephemeral gullies of a wide range of sizes—all fed by sheet wash with no discernable channels. It would be interesting to find out how it was determined there were "...approximately 2,000 ephemeral drainage segments on the ISEGS site..." (p. 1-18) and how this squares with "minimizing" vegetation removal for stormwater control.]

Facility Design

p. 1-21. How can it be concluded that the facility will "likely comply with LORS" when, at least in an April 15, 2009 CEC memo, major changes in the plan were under consideration? Were the changes implemented? Please note that an update of the memo is no longer available to the public. This whole approach does not foster confidence that the project assessment is mature and complete. Rather it supports the belief that the FSA/DEIS is premature and not ready for public review.
p. 1-21. [Why should an owner-submitted decommissioning plan be] "reasonably concluded to comply with all applicable engineering LORS"? [It appears to PEER highly unlikely that reconstruction of anything approaching the natural surface hydrology is possible. That is, engineering LORS have little application to complex surface systems].

Soil and Water Resources

p. 1-27. [It is evident from the conclusion, based on] "...the information provided to date," [that impacts to soil and water resources can be] "mitigated to a less than significant level" [is erroneous and that the information provided to date is insufficient. Soil loss that will certainly occur given the magnitude of surface disturbance cannot be replaced and represents an irretrievable loss. Moreover, soil disturbance and soil loss will inevitably negatively affect any rehabilitation plan. Saying the magnitude of the impact is uncertain indicates an absence of any literature search for applicable studies. The 50-year life of the project is quite sufficient both to remove substantial soil and to greatly impact downslope vegetation by modification of surface hydrology and denial of downslope vegetation its normal supply of water. (see, for example, Schlesinger, W.H. and C.S. Jones. 1984. The Comparative Importance of Overland Runoff and Mean Annual Rainfall to Shrub Communities of the Mojave Desert. *Botanical Gazetteer* 145:116-124; Schlesinger, W.H. et al. 1990. Biological Feedbacks in Global Desertification. *Science* 247: 1043-1048; Wilshire, H.G. et al. *The American West at Risk: Science, Myths, and Politics of Land Abuse and Recovery* (New York, Oxford University Press, 2008), Chapter 5)].

Condition of Certification SOIL& Water-5 [looks at the problems after they happen, and some of them become discernable only after decades, so this does not constitute a mitigation.

p. 1-28. It must be formalized that withdrawals from groundwater not exceed 100 acre feet/year, indicated by the project proponent as sufficient. If any effect on withdrawals is conceived as an emergency need, such emergency or emergencies must be completely defined, monitored, and limited to a stated level, beyond which operational curtailment should be specified. The need for two new wells must be justified, when all "normal uses" are (p. 3-9) satisfied by one well. If any emergency requirement for additional groundwater is conceived, impacts to groundwater supply and quality cannot be stated as less than significant. "Significant" impact to beneficial uses of the groundwater must be specified, and appropriate response defined.

Introduction

p. 2-2 [What, exactly, is meant in this.document, that the ISEGS project will produce a] "nominal 400 MWs of electricity"? [The term "nominal" is used in different ways, so its use here must be specified. It would also be useful to the public to indicate an estimated anticipation of actual annual or daily production in MWh or kWh, assuming normal weather conditions and no stoppage of operations].

Alternatives

p. 4-1. Technical analysis of 22 alternatives. "After a comprehensive evaluation, CEC concludes that none of the eight locations were found to offer reduced impacts as compared with the proposed site."

p. 4-2. "CEC concludes that rooftop solar photovoltaic (PV) facilities would...require extensive acreage, although the rooftop PV would minimize the need for undisturbed open space."[rooftop + brownfields eliminates, not minimizes, need for undisturbed open space]. However, increased deployment of rooftop solar PV faces challenges in manufacturing capacity, cost, and policy implementation. [Since the goals of ISEGS are only to "help meet" State requirements for use of renewable energy, not satisfy the entire State consumption, rooftop PV does the same. Challenges in manufacturing capacity, cost, and policy implementation are just that—challenges—but challenges that can be met, given the determination, are not bases for eliminating rooftop PV as an alternative to centralized solar].

p. 4-2. [The supposition that a No Project/No Action alternative] "would likely" delay development of renewable resources or shift development to other similar areas, and would lead to increased operation of existing power plants that use non-renewable technologies" [is simply speculation and provides no basis for rejecting that alternative].

p. 4-4. [Since one project objective is] "To demonstrate the technical and economic viability of Bright Source's technology to a commercial-scale project," [the project cannot be assumed to satisfy Objective 1], "To safely and economically construct and operate a nominal 400-MW", solar generating facility in California capable of selling competitively priced renewable energy consistent with the needs of California utilities."

p. 4-7 to 4-8. [No Project/No Action alternative discussion is primarily speculation without demonstrated consequences. For example, the supposition that no-project would require construction of other power plants, renewable and nonrenewable] "...to serve the demand for electricity" [ignores the conservation alternative and presupposes elimination of the rooftop alternative].
[The supposition that there are no other localities that would avoid the impacts of the Ivanpah project has no stated basis. The speculation that no-project] "...might lead to siting other non-solar renewable technologies to help achieve the California Renewable Portfolio Standard? [casts considerable doubt on the motives of the CEC and the BLM in promoting renewable energy production].
Why would PG&E or SCE receiving their share of the ISEGS production to satisfy the State mandate should have a bearing on a No Project/No Action alternative?

Distributed Solar Technology

p. 4-62. Distributed solar generation is generally considered to use PV technology, but at slightly larger scales, distributed solar can also be implemented using solar thermal technologies. [The examples given mix scales that are not "slightly" different, and none are relevant to rejection of the No Project/No Action alternative]

Rooftop Solar Systems

California currently has 441 MW of distributed solar PV systems which cover over 40 million square feet (CPUC 2008b [this reference is not included in the FSA]). During 2008, 158 MW of distributed solar PV was installed in California, doubling the amount installed in 2007 (78 MW) (CPUC 2009 [this reference is not included in the FSA]). While small distributed solar PV systems are relatively common in California, large distributed solar PV installations are less so [This is irrelevant-it is not necessary to have a SINGLE distributed project of equal capacity to serve as an alternative—that's what "distributed" is all about]. Examples of proposed rooftop PV systems to attain large amounts of energy are the following:

• San Diego Gas & Electric (San Diego, CA): Solar Energy Project is designed to install up to 80 MW of solar PV which would include parking structures and tracking systems on open land (SDG&E 2008 [this reference is not included in the FSA]). [To include a potential project in this list is inconsistent with eliminating potential distributed projects because they have not been implemented]

p. 4-62. • Pacific Gas & Electric (San Francisco, CA): PG&E launched a five-year program to develop 500 MW of solar PV power. The program would consist of 250 MW of utility- owned PV generation and an additional 250 MW to be built and operated by independent developers under a streamlined regulatory process. PG&E's program targets mid-sized projects, between 1 to 20 MWs, mounted on the ground or rooftop within its service area (PG&E 2009 [this reference is not included in the FSA]). [Irrelevant, same comment as above]

• City of San Jose (San Jose, CA): The City of San Jose is considering the development and implementation of 50 MW of renewable solar energy on city facilities and/or land (San Jose 2009 [this reference is not included in the FSA]). [Irrelevant, same comment as above]

• Like utility-scale PV systems, the acreage of rooftops or other infrastructure required per MW of electricity produced is wide ranging. As stated above, California has approximately 40 million square feet (approximately 920 acres) of distributed solar PV accounting for 441 MW installed (CPUC 2008b [this reference is not included in the FSA]). However, based on SCE's use of 600,000-square-feet for 2 MW of energy, 120 million square feet (approximately 2,750 acres) would be required for 400 MW. [Irrelevant. If the capacity is available, as it is, then this provides no basis for eliminating the alternative—see J. Paidipati et al., Rooftop Photovoltaics Market Penetration Scenarios, *National Renewable Energy Laboratory*, Subcontract Report, NREL/SR-581-42306, February 2008]

• Most rooftop PV systems in California are crystalline systems, and result in approximately 15 percent of sunlight converted to energy (SB 2009 [this reference is not included in the FSA]). The newer technology is thin film, which converts approximately 5 to 10 percent of sunlight to energy. [So what? Future installations do not require such systems, and indeed, there is a lot of activity directed at exploiting different panel systems for rooftop, brownlands installation]

• San Bernardino County is estimated to have the technical potential for over 2,000 MW of distributed solar PV (CEC, 2007b). However, the location of the distributed solar PV would impact the capacity factor of the distributed solar PV.2 Capacity factor depends on a number of factors including the insolation3 of the site. Because a distributed solar PV alternative would be located throughout the state of California, the insolation at some of these locations may be less than in the Mojave Desert. The Renewable Energy Transmission Initiative (RETI) assumed a capacity factor of approximately 30 percent for solar thermal technologies and tracking solar photovoltaic and approximately [it's closer to 22% for the Luz parabolic trough facilities] 20 percent capacity factor for rooftop solar PV which is assumed to be non-tracking (B&V 2008 [this reference is not included in the FSA] ; CEC 2009 [this reference is not included in the FSA) The capacity factor of the proposed installation is certainly not highlighted in public presentations of this project]

Distributed Solar Thermal Systems

p. 4-63 to 4-64. Solar thermal technology, specifically Concentrated Solar Power (CSP) technology, has also been adapted for use at distributed locations. In August 2009, eSolar began operations of a new distributed solar power tower technology. This technology uses small, flat mirrors which track the sun and reflect the heat to tower-mounted receivers that boil water to create superheated steam (eSolar 2009 [this reference is not included in the FSA]). An example of the eSolar system is the Sierra SunTower, located in Lancaster, CA, which will produce 5 MW of energy on 20 acres of land for SCE (eSolar 2009). Each eSolar module locates one tower, one thermal receiver, and 12,000 mirrors on ten acres of land and produces 2.5 MW of power. Additionally, eSolar has developed a larger module, a 46 MW CSP plant that would include sixteen towers, a turbine generator set, and a steam condenser which would be located on approximately 160 acres (eSolar 2009). [Rooftop solar hot water systems are common without the described types of installations, so what is the point?]

An additional example of a distributed solar trough power plant technology is the Andasol 1 power plant in Spain. Andasol 1, generating 50 MW of power, went online in November 2008 (Solar Millennium 2008). The Andasol 1 solar field is approximately 510,000 square meters or 127 acres (Solar Millennium 2008). This does not include the ancillary facilities. Both these technologies have been implemented recently and are described here as an example of the evolving distributed solar technologies. [Irrelevant. Andasol 1, like the above-named projects, is a centralized power plant, not "a distributed solar trough power plant technology"]

Environmental Assessment

Installations of 400 MW distributed solar PV would require between 40 to 120 million square feet. Distributed solar PV is assumed to be located on already existing structures or disturbed areas so little to no new ground disturbance would be required and there would be few associated biological impacts. Minimal grading or new access roads would be required and relatively minimal maintenance and washing of the solar panels would be required. As such, it is unlikely that the rooftop solar PV alternative would create erosion impacts. Relatively large amounts of water would be required to wash the solar panels [but this document says the Ivanpah project would require only minimal amounts of water—to replace water loss in the generation cycle and mirror washing?], especially with larger commercial rooftop solar installations; however, the commercial facilities would likely already be equipped with drainage systems. Therefore, the wash water would not contribute to runoff or to erosion.

Rationale for Elimination

Building 400 MW of distributed solar PV would require an even more aggressive deployment of PV at more than double the historic rate of solar PV than the California Solar Initiative program currently employs. Additional legislation for increased incentives may be required to achieve this level of penetration. The RETI Discussion Draft Paper California's Renewable Energy Goals – Assessing the Need for Additional Transmission Facilities, addresses the likelihood of a scenario of sufficient distributed solar PV to remove the need for utility scale renewable development. This discussion paper identified the factors likely to influence the pace of large scale deployment of distributed solar PV: subsidies, feed-in tariffs, manufacturing and installation cost, and manufacturing scale-up. [Arguments about the pace of alternative developments, subsidies, feed-in tariffs, manufacturing, installation cost, and manufacturing scale-up do not constitute a basis for elimination of a distributed solar alternative because they apply equally to centralized power plant development. Adoption of a "needs basis" to discriminate two modes of solar development has not been rationalized. The proposed project is a drop in the bucket to supply "needs" as visualized in replacement of fossil fuel electricity generation, so all of the issues cited in this last sentence apply as well to the Ivanpah project]

p. 4-65. • Subsidies. PV installations have been subsidized by a variety of programs. Go Solar California (GSC) program is projected to add approximately 3,000 MW of grid-connected PV capacity by 2016 but the GSC subsidies are designed to decline over time and be eliminated by 2016. The assumption underlying the GSC program is that the subsidies will increase installations and thereby manufacturing experience, which will in turn lower costs to a level at which PV generation is competitive with other sources of electricity. In 2008, Congress extended the 30%

federal solar investment tax credit for eight years, to 2016, and made it available to utilities, thus opening the way to utility company ownership of relatively large-scale urban PV installations. This is expected to further bolster installation of PV (and other solar equipment). The GSC program is perhaps the most ambitious PV subsidy program in the U.S., and should support continued rapid growth of PV deployment in California. But if the federal investment tax credit is not extended beyond 2016 and if California PV subsidies decline through 2016 and are absent thereafter, it may be difficult PV installations to meet current targets. [Irrelevant. "What ifs" can go either way and subsidies for distributed solar may be greatly increased—for example, as an alternative to centralized solar! This issue also applies to the Ivanpah project—free land dedicated to a single use and forever damaged is a huge subsidy, for which the future offers no guaranteed benefit]

• Feed-in Tariffs. Feed-in tariffs (FIT) are fixed long-term prices for renewable energy. In California, the CPUC has approved FITs for installations up to 1 MW and is actively considering, in one of its RPS proceedings, an expanded FIT program. In its 2008 Integrated Energy Policy Report Update, the California Energy Commission recommended that the Public Utilities Commission implement a system of feed-in tariffs for projects up to 20 MW. Legislation introduced in the California Senate would create a Feed-in Tariff program in statute. The proposed legislation would also set payment at the Market Price Referent, a proxy measure for the cost of non-renewable energy, but allow the CPUC to adjust the payment rate to reflect the value of electricity generated on a time of delivery basis. The proposed legislation would, however, cap the cumulative generating capacity able to receive the FIT rate at 500 MW. Recent changes have been made to the FIT. In October, 2009 Governor Schwarzenegger signed Senate Bill 32, which amends the feed-in tariff and raises the project size cap to 3 MW from 1.5 MW and increases the statewide cap to 750 MW. [what if the recommended, considered, etc expansions of FITs don't happen? How can this be a basis for eliminating an alternative that does not depend on FITs?]

p. 4-65 to 4-66. • Manufacturing and Installation Cost. There are signs that the cost of PV installations will continue to decline, perhaps substantially. "Thin film" PV collectors are less expensive to manufacture than conventional crystalline silicon modules. Given sufficient sales volume, economies of scale in thin film (and other PV technology) manufacturing could reduce the cost of PV installation and energy generated, perhaps to levels comparable to current energy prices. Thin film PV is less efficient than crystalline silicon PV and therefore requires substantially more collector area (i.e., many more commercial or residential rooftops or ground area) to generate comparable amounts of electric energy. According to a study [What study?? Not referenced] of PV system costs over the period 1998-2007, systems completed in 2006 or 2007 that were less than 2 kW in size averaged $9.00/Watt, while systems larger than 750 kW averaged $6.80/Watt. PV installed in residential new construction is significantly less expensive relative to retrofit installations. Widespread expansion of distributed PV beyond current programs, however, would require a large number of retrofit installations. No matter how it is installed, relying heavily on PV greatly increases the total cost of meeting state renewable energy and GHG targets. [The assertions made are unsupported and unreferenced! Furthermore there are huge benefits in eliminating major disturbance of functioning natural systems, not increasing transmission systems, reducing water demand in water-scarce areas, reducing road-building, and more, all of which have monetary value.]

• Manufacturing Scale-Up. Shipments of "thin film" PV collectors totaled approximately 500 MW globally in 2008. While PV manufacturing plants are expected to develop quickly, the availability of financing and raw material supply would need to increase proportionally to match an increased demand. Because the worldwide demand for PV is expected to continue to increase along with demand throughout the United States, the competition for this demand may affect the cost and schedule for increasing the use of distributed solar PV. Investor owned utilities, residential, and commercial deployment of distributed solar PV have increased rapidly in the last two years and contribute to the viability of this alternative. However, achieving 400 MW of distributed solar PV would depend on additional policy support, manufacturing capacity, and lower cost than currently exists. Additionally, while it is possible to achieve 400 MW of distributed solar PV, the Energy Commission's Intermittency Analysis Project Final Report assumes 3,100 MW of concentrated solar power in addition to 2,900 MW of solar PV, or a total of 6,000 MW of solar power (CEC 2007c). Achieving 6,000 MW of solar PV to provide the renewable energy required to meet the California Renewable Portfolio Standard requirements would be challenging so additional technologies, like solar thermal generation, are also necessary. [The proposed project does not achieve the goals of the last three sentences either. A challenge to industry is not a basis for eliminating an alternative that has the capacity to do what the proposed project is said to do, especially considering the alternative's vastly superior environmental impacts.]

Sincerely,

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