



June 27, 2014

Via email

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California Energy Commission

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RE: Cost of New Generation

Dear Mr. Rhyne:

The Large-Scale Solar Association (“LSA”) is comprised of leading owners and developers of utility-scale solar projects. LSA appreciates the opportunity to provide comments on the California Energy Commission (“CEC”) Draft Staff Report on the Estimated Cost of New Renewable and Fossil Generation in California (“Draft Report”). LSA’s comments focus on the methodology used to develop the cost estimates in the Draft Report and on Chapters 4 and 5 of the Draft Report, which addresses Solar Photovoltaic (PV) costs and Solar Thermal costs, respectively.

General Comments on Methodology

LSA is concerned that approach used in the Draft Report does not produce a rational set of cost metrics or ranges for solar projects. While the Draft Report is clear that it limits the analysis to the costs that may be borne by a developer, it does not bound these costs based on real world costs that the market will actually bear. While the report notes some of these limitations, in LSA’s view the ranges and scenarios in the report distort actual and likely solar costs. For example, the instant cost methodology uses a range of possible solar costs – some of them quite high. However, only when development costs are kept to a minimum across all categories can projects be successfully built. This is due to a highly competitive market that pressures developers to offer low but achievable prices to serve the IOU’s and POU’s renewable resource needs. In no case can projects have high costs across all the cost categories and be built.

One example of the current state of the market, the CPUC's 2014 Padilla report, shows that Solar PV projects executed in 2013 had costs in the 8-9c/kWh range. These projects will not be able to renegotiate with utilities for higher costs – they must deliver at the contracted cost or terminate the contract. LSA recommends the CEC incorporate these real world bookends to the cost ranges in the Draft Report. In addition, LSA recommends the CEC consider other methodologies such as those used by Lawrence Berkeley National Labs in its projections of solar pricing trends or E3's recent Capital Cost Review of Power Generation Technologies Report prepared for the Western Electric Coordinating Council.¹ LSA has found these studies are more reflective general industry knowledge and that the results are easier to communicate and compare in various settings.

Solar Cost Assumptions

The input assumptions for solar costs in the Draft Report are not sufficiently transparent. The Draft Report generally cites work done by Navigant and Itron for the CEC but it is not clear what sources these firms used or which years formed the basis for the solar cost assumptions. An initial review of the other sources cited in the Draft Report suggests that some of the data used may be from the 2011 or 2012 time frame. As the Draft Report notes, solar costs have dropped significantly over the last few years, however, it is not clear whether these declines have been fully incorporated into the Draft Report. The Draft Report also includes a number of figures for solar projects with a 2013 start, which LSA assumes means a solar project that has reached commercial operation in 2013. These costs are not reflective of the current and significant downward solar PV costs, as today's all in fixed costs are generally half of what is presented in the Draft Report and as drafted may confuse the reader about the current state of the market. LSA recommends the Draft Report be amended to provide further detail on the cost assumptions used and work to incorporate the most up-to-date information available. This includes clarifying how projects were selected for the various scenarios. In addition, it would be helpful to understand why the Draft Report finds that installed costs are always higher than instant costs.

Transmission Cost Assumptions

LSA would like to further understand how the Transmission Access Charge (TAC) assumptions in Chapter 3 were used in developing the solar cost ranges under the various scenarios. The TAC is only applicable to projects if the generation is not used within the CAISO or in cases where generation is wheeled-through CAISO and used by another balancing authority. It would be

¹See <http://emp.lbl.gov/publications/utility-scale-solar-2012-empirical-analysis-project-cost-performance-and-pricing-trends> and http://www.wecc.biz/committees/BOD/TEPPC/External/2014_TEPPC_Generation_CapCost_Report_E3.pdf

inappropriate to use the TAC in developing the solar cost ranges, as these costs are not generally borne by generators. Solar projects need varying levels of network upgrades in order to come on-line and these costs are defined and understood relatively early in the development of a project -- it is these costs, rather than the TAC that should be used as the basis for estimating the transmission costs of solar projects.

Land Cost Assumptions

The land cost assumptions are also not transparent in the Draft Report. If the assumptions include very high land costs, this could be contributing to the distortion of solar costs. As noted above, in order for a project to be successfully developed it needs to keep all costs at a minimum. To do this the developer engages in a sophisticated desktop survey of potential sites factoring in proximity to interconnection opportunities, biological richness, hydrology, geology, topography, solar resource, and agricultural activity. This process results in many potential sites that must then under go further due diligence including, contacting landowners and negotiating a land option agreement. In many cases, the landowner has not previously put their land up for sale and the terms are highly negotiable. With this level of optionality, a developer will not choose a site with very high land costs unless there is some other aspect of the project that will off-set those costs and ensure that project will be competitive (e.g. low or non-existent transmission upgrade costs).

Solar Photovoltaic

LSA has the following observations on the characterization of Solar PV. First, we want to note that with newer lower balance of system costs, single axis tracking systems are becoming more standard across the industry. In addition, there continues to be both thin-film and crystalline technologies used in California and the Draft Report would benefit from updating this information. In addition, the Draft Report does not appear to accurately calculate the different land and installed capacity needs for fixed-tilt and thin-film projects, which generally need more land and installed capacity to generate the same output. It should also be noted that thin-film projects can be either fixed or tracking.

Solar Thermal

The Draft Report appears to conflate cost and capacity factors to derive the high and low cost scenarios for Solar Thermal technologies. This can be seen on page 86 of the Draft Report, where under the high costs scenario for Solar Thermal Tower projects with 6 hours of storage, uses a 36% Net Capacity Factor (NCF) along with approximately \$6,500 in capital costs. This methodology effectively penalizes solar thermal projects. NCF is a function primarily of Direct Normal Insolation (DNI), or location, and the solar multiple, which is the ratio of a solar field's

generation potential to a facility's turbine output capacity. DNI is unrelated to capital costs while the solar multiple is correlated with capital costs, rather than anti-correlated as could be interpreted from the table on page 86. In order to address this, LSA recommends the Draft Report consider:

- 1) Assuming a single DNI scenario across the low, mid and high to produce the NCF;
- 2) Assuming that the solar multiple is optimized to produce the lowest LCOE for a given configuration at the assumed component costs; and/or
- 3) Reduce the differential between the high and low NCFs by picking an excellent and good DNI site, respectively, rather than a poor site, which is not a realistic assumption since CSP will not be constructed in a poor DNI location.

In any event, LSA recommends that these assumptions be made explicit in the Draft Report.

In addition, it would be helpful to note in Chapter 5 that Solar Thermal projects, particularly those built with storage, will be built based on net system costs. This does not only take into account the levelized cost of energy but also a project's energy, ancillary services and resource adequacy values over time.

Please do not hesitate to contact me should you have any questions or if I can be of assistance in addressing the above items.

Sincerely,



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