BrightSource

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RE: COMMENTS OF BRIGHTSOURCE ENERGY, INC. ON DRAFT RESOLUTION E-4433 (Options A & B)

Dear Mr. Gatchalian & Ms. Salinas:

BrightSource Energy, Inc. ("BrightSource") appreciates the opportunity to comment on the two versions of Draft Resolution E-4433 ("Draft Res. E-4433") prepared by the Energy Division for the Commission's consideration. The two options raise important, emerging policy issues on the value to California ratepayers of differing renewable generation types and of varying transmission upgrades; however, these issues deserve deeper discussion and examination than is possible through review and approval of an advice letter. To ensure California ratepayers continue to receive reliable and reasonably-priced electrical service as the nature of the energy supply undergoes unprecedented change, we must focus on overall system costs and needs, which are what truly drive the rates California customers pay, and which require broader inquiry.

The price of an individual component of the energy system alone, whether generation or transmission, simply cannot convey its net value to the system; its true value can only be assessed by considering its integration costs as well as the breadth of services it can convey to the system. In short, a least-cost system cannot be reliably built by assembling components based on price alone, without considering their contributions to system value; it can only result from conscious selection of elements that, in combination, yield the best overall value. BrightSource recommends that these issues, which the Energy Division's options admirably attempt to wrestle with, be instead addressed through consideration of least cost, best fit criteria in the Renewables Portfolio Standard ("RPS") docket. Until the Commission has had the opportunity to examine these policy issues, the Commission should allow the Investor-Owned Utilities ("IOUs") reasonable discretion to procure the diversity of renewable resources that collectively meet customers' needs for reliable, least-cost energy, provided that the contracts meet threshold viability tests and are within pricing range of contracts approved in recent years.

BrightSource does not offer any recommendations with respect to the propriety or reasonableness of the specific contract under consideration in Draft Res. E-4433. However, BrightSource offers the following insights to assist the Commission in its consideration of the options proposed by the Energy Division, which identify two central questions: (1) the extent to which solar thermal projects offer additional value relative to other solar technologies and (2) the value of transmission upgrades triggered by generator interconnections relative to the additional cost those upgrades may pose to customers.

I. Value of Solar Thermal Technologies

The operational attributes and market values of solar thermal plants should be considered in light of the tremendous power system changes to come over the next two decades, as renewable penetration increases and conventional units are displaced. The key distinction between solar thermal plants and other solar technologies is that solar thermal plants are essentially conventional power plants with a different fuel source - i.e., the sun. The physical characteristics inherent in conventional units, which are needed for reliability but that have been taken for granted as historically universal attributes, are shared by solar thermal plants but not by other wind or solar resources. The *extent* of the need for these services, as conventional units are displaced and renewable integration challenges increase, remains under study; however, there is no doubt that greater quantities of these services will be required to meet operational and reliability needs of the grid.

Analyses to date of system operations and reliability at 20-33% RPS show a need for operational flexibility and ancillary services, including currently unpriced services such as inertia and primary frequency response. Although these analyses had only begun in earnest over the past two years, the evidence to date, including the most recent California Independent System Operator Corporation ("CAISO") studies,[1] suggests that solar thermal plants bring potential value in every aspect of operations and reliability.

Solar thermal technologies use various designs to concentrate solar radiation. Nearly all of these technologies use thermal energy to create steam that is fed into conventional steam turbine generator. Most solar thermal plants can thus provide the multiple services turbines offer in addition to energy, including frequency and voltage support, reactive power and both ramping and regulation. Solar thermal's ability to easily incorporate thermal storage[2] or small quantities of conventional fuel to augment its operations enhance its potential to be dispatched during operating hours and to respond to system operator needs. These characteristics likely become more valued as future system needs are clarified, through ongoing studies by the CAISO, the National Renewable Energy Laboratory ("NREL"), and others.[3]

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[1] See http://www.caiso.com/23bb/23bbc01d7bd0.html.

[2] Solar thermal's ease of incorporating cost-effective storage is to be addressed in Rulemaking 10-12-007, which will implement A.B. 2514.

[3] The CAISO's preliminary study of system inertia and frequency response needs under 33% RPS is underway. It should be noted that the latest 33% RPS simulations (available at http://www.caiso.com/2b73/2b73796015b90.pdf) are likely to underestimate system needs for regulation and load-following for several reasons, including the long intervals being studied, which mask needs to address fluctuation over shorter time periods; assumption of a highly optimistic load reduction forecast for 2020; assumption of fully flexible dispatch of all gas plants (whereas units are often self-scheduled and have economic reasons for dispatching other than to support renewable integration); and the use of a WECC-wide model that assumes interconnection-wide redispatch and, notably, higher levels of import and export than the CAISO system has ever experienced.

A. Power system operations and reliability. The change in energy supply as variable wind and solar units increasingly displace conventional units will add considerable complexity to maintaining a reliable grid under a 33% RPS, due to variable energy output across the operating day, significant ramps, and varying abilities to forecast performance. Increased frequency of over-generation conditions, particularly in overnight and early morning light load, high wind and high hydro conditions, and in morning solar ramp periods can also be expected.[4] The increase in non-synchronous, intermittent resources could also increase the CAISO's need for reactive power and reduce primary and secondary frequency response capabilities.[5] To maintain reliability, the CAISO will have to procure additional regulation and load-following, and may need to develop new ancillary service products as well as to enforce additional constraints to preserve inertia and frequency response.[6]

In the near term, the gas generation fleet will generally provide the services needed to support integration and ensure reliability.[7] This will become more difficult as once-through cooling regulations and retirements eliminate units, and potentially more costly as remaining units are increasingly operated to support integration of variable units and not at optimal economic and emission levels.[8] Solar thermal plants with improved forecasting, some inertia and minimal augmentation could provide substantial assistance in mitigating operational needs, particularly in high-stress hours, as the gas fleet's ability to provide these services wanes.

B. Forecasting and scheduling. Forecasting the output of solar thermal plants is fundamentally different from more intermittent resources, such as wind and photovoltaics. Solar thermal projects are inherently capable of more accurate and reliable forecasts, as they are more independent of the variability of weather conditions. A solar thermal plant's output is moderated by the thermal mass of the system (e.g., the solar receiver and the working fluid), and can be further regulated through careful use of de minimis conventional fuel or thermal storage backup during periods of transient clouds. Longer-term forecasts in areas of high insolation, such as the desert, are very reliable. As a result, scheduled production from solar thermal plants is far less susceptible to very short-term variability, and again reduce integration costs and requirements.

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[4] An example of an overgeneration condition that could affect morning solar output under high wind generation down can be found in the CAISO 20% RPS study, pg. 77; available at http://www.caiso.com/2804/2804d036401f0.pdf.

[5] See, e.g., Lawrence Berkeley Lab, Use of Frequency Response Metrics to Assess the Planning and Operating Requirements for Reliable Integration of Variable Renewable Generation, available at http://www.ferc.gov/industries/electric/indus-act/reliability/frequencyresponsemetrics-report.pdf.

[6] These future needs are being examined through a number of initiatives at the CAISO, including the renewable integration market and product review; see papers available at http://www.caiso.com/2b3d/2b3d8b92f940.html.

[7] One notable exception would be when the location of generation injections changes with the addition of renewables, which could require new integration support resources in particular locations

[8] Costs of conventional power plants could increase as they are increasingly focused on supporting integration of wind and solar. Operating gas plants in less efficient manners (at or near minimum operating levels, to provide reserves and flexibility, and with frequent cycling over the operating day) will increase operating costs as well as carbon and other emissions costs. The net emissions impact are to be calculated by the CAISO 33% RPS simulations.

C. Maximizing capacity value. Solar thermal technology generally has higher net qualifying capacity ("NQC") than other solar technologies. Unlike wind and solar photovoltaic plants, the use of conventional fuel augmentation or thermal storage can increase the reliability of solar thermal plant operations at peak, while providing other operational.

D. Support for system operations. As additional quantities of power is delivered from resources that are not synchronous generators, the CAISO's need for reactive support services from solar thermal resources and other resources capable of providing reactive support services will become more important. By providing thermal mass, solar thermal plants contribute inertia to the power system, and are less likely to trigger needs for frequency response than more intermittent resources. Solar thermal plants also have the capability to provide ancillary services, including reactive support, to offset demands by more intermittent resources.

E. Dispatch & response to system operator instructions. All participating generators on the CAISO system must follow system operator instructions in the event of emergencies to the extent of their capabilities. Solar thermal plants can respond to system operator instructions in a similar fashion to conventional units. Operational control will become much more complex and the likelihood of generator uninstructed deviations[9] will increase as more plants without this ability to respond come on line. In turn, this could cause the CAISO to take other measures, such as procurement of additional reserves. These responses would tend to increase costs and reduce efficiency of the overall system.

II. Value of Transmission Upgrades

The two options presented in Draft Res. E-4433 identify the cost of transmission upgrades and the value of those upgrades as central questions to determining the reasonableness of the contract at issue. The options raise two issues: first, the appropriate consideration of countervailing value of transmission upgrades relative to their cost, and second, the extent to which the cost of that transmission should be attributed to the project under consideration, in the absence of any guarantee that other uses would share the line.

A. Values of Transmission Upgrades. Draft Res. E-4433 focuses on resource adequacy value to evaluate whether the cost of the transmission upgrade at issue is potentially merited. Resource adequacy, however, is only one of multiple considerations that should be evaluated in assessing the net value of a transmission upgrade to ratepayers. Transmission upgrades serve multiple purposes, increasing reliability of the grid in ways that resource adequacy may not address, as well as reducing congestion and its associated costs. The value of a particular transmission upgrade to the system, whether in terms of reliability or congestion relief, is not necessarily proportional to its cost, and cannot be evaluated in isolation; analysis in the context of the system that the upgrade fits into is necessary.

[9] Uninstructed deviations refers to generation production that does not correspond to the instruction of the system operator (e.g, the operator instructs the plant to produce at 80 MW, but the plant produces at 90 MW).

Even a cost assessment, such as that provided in the Large Generator Interconnection Agreement ("LGIA"), cited in Draft Res. E-4433, cannot be relied on to assess the actual value of the transmission upgrade to the system, or the costs to the system that might be required to substitute an alternative transmission upgrade. A given transmission upgrade, while appearing to be expensive on its face, may not only pay for itself in increased reliability and reduced congestion, but may well be less expensive than alternative transmission upgrades that would prove necessary if the upgrade under consideration is not built. In the absence of such a value determination, there is an insufficient basis to require modification of power supply contracts and to upset the balance of risks agreed upon by contract counterparties.

B. Attribution of Cost of Transmission Upgrades. Three factors make it highly improbable that increased transmission capacity serving high solar resource areas will go underused: (i) the great demand for transmission capacity, (ii) the relatively slow speed at which new transmission is being built, and (iii) the relatively limited areas with the high-quality solar resource that makes solar power generation most reliable and economic. The Commission and the CAISO have clearly signaled that transmission projects will be carefully evaluated and will not be built to every possible solar resource area, making those solar resource areas that will be served by increased capacity in the relatively near future in great demand. BrightSource suggests that it is most reasonable to assume that transmission projects that will increase the capacity available to high solar resource areas will be well utilized, and that the proportion of the upgrade costs attributed to an individual generator should be limited to its proportional use of the upgrade.

III. Conclusion

Lowest customer rates and reliable electric service are not merely a function of assembling low-cost components, but of wisely choosing the portfolio of reasonably-priced components that, working together, yield the lowest overall system cost. As the changing energy supply and resulting needs of the system are evaluated over the next year, the Commission should undertake careful consideration of changes to the least cost, best fit criteria that may be needed to continue to ensure overall generation portfolios provide ratepayers with reliable service at least overall cost. While the Commission undertakes this examination, it should give deference to IOUs that are relying on their extensive expertise to build their own balanced portfolio.

Respectfully submitted,

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