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Ormat Technologies Inc. comments on RETI 2.0 Plenary Report

Additional submitted attachment is included below.



January 10, 2017

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Docket Unit
California Energy Commission
Docket No. 15-RETI-02
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

Re: Comments on RETI 2.0 Plenary Report issued December 16, 2016

Ormat Technologies, Inc. (Ormat) appreciates the opportunity to submit comments on the RETI 2.0 Plenary Report. The report provides valuable insight into the challenges that California will face in meeting its aggressive Greenhouse Gas reduction and renewable portfolio goals. Ormat's comments focus on issues related to the value of a diverse renewable portfolio to most efficiently meet the long-term goals.

Headquartered in Reno, Nevada, Ormat is a leading geothermal company and the only vertically integrated company solely engaged in geothermal and recovered energy generation (REG), with the objective of becoming a leading global provider of renewable energy. The Company has over five decades of experience in the development of state-of-the-art, environmentally sound power solutions. Ormat designs, develops, builds, owns and operates geothermal and recovered energy-based power plants. Ormat currently operates 710 MW with 515 MW in the US (California, Nevada, Colorado, Minnesota, Montana, North Dakota, and South Dakota). The in-depth knowledge gained from these operations gives the Company the competitive edge by enabling efficient maintenance and timely response to operational issues. In addition to owning and operating geothermal power plants in the United States and other countries, Ormat designs, manufactures and sells power generating equipment as well as complete power plants on a turnkey basis.

Ormat's comments herein are provided in response to specific questions raised in the January 3, 2017, Draft Plenary Report Presentation.

Renewable Resource Potential

Conclusions regarding the cost and value of renewable resources noted in the report are generally reasonable, though it is important to continue to assess and quantify changes in production cost. It is also important to emphasize that integration and related costs identified in the Low Carbon Grid Study (LCGS) should be clearly identified and appropriately allocated to variable resources. It is appropriate to update integration costs and the value of flexibility on an ongoing basis as more information becomes available. For example, over-generation, ramping levels, and curtailment of renewable resources due to increasing levels of solar PV generation has been occurring sooner and more often than anticipated even recently. The potential risk of under-estimating the impact should not be ignored.

Ormat also notes that while the Report accurately describes the increasing cost-effectiveness of

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geothermal generation, the enhanced flexibility capabilities of binary geothermal generation resources should not be underestimated. Because geothermal does not rely on a variable or external fuel supply, it has the ability to provide flexibility and ancillary services whenever needed. The Report references the Walton Family Fund sponsored study on the Value of Salton Sea Geothermal Development in California's Carbon Constrained Future. Ormat notes that the benefits identified in that study are not limited to the Salton Sea area. Resources in other Known Geothermal Resource Areas (KGRAs) can provide similar benefits. Indeed, lower temperature geothermal basins may be more amenable to providing increased flexibility.

Diverse and Balanced Portfolio

The Report correctly identifies the need for integration solutions to mitigate potential costs resulting from over-reliance on solar PV resources. Ormat believes that it is important to regularly update both the changing characteristics of integration services required, options for achieving needed integration, and the relative costs of various options. The reduction in the initial cost of solar PV generation and the comparative ubiquity of the resource has resulted in excessive reliance on this single resource. As we have been reminded again and again, there is truth to the old maxim that it can be dangerous to put all your eggs in one basket. As has been demonstrated in both the LCGS and the Geothermal Study, integration costs, capacity value, incremental transmission costs, and curtailment costs have a significant impact on overall lifecycle ratepayer costs. Resource diversity can be considered an additional qualitative benefit independent of easily measurable cost impacts. For example, reliance on gas-fired generation to provide flexibility and ramping capability can have more of an impact than increased GHG emissions. By relying on an external fuel source that could be subject to substantial short-term (intra-day) price spikes, there is some probability that actual costs would be considerably higher than could reasonably be anticipated. This kind of potential should be accounted for in resource assessment. Ormat realizes that much of this risk is intended to be incorporated into the RPS Calculator, but notes that the current version of the Calculator contains capital cost-related anomalies that unrealistically inflate the expected cost of geothermal resources, and will hopefully be corrected in future releases. We also note that capital costs estimates inconsistent with ultimate PPA costs (\$/MWh) should counsel for reassessment of the capital cost estimates. Ultimately, California is at the cutting edge of energy development and policy. It is important that the ongoing changes are continually identified and updated.

The TAFE assessment provides some very interesting information, most notably that adding large transmission projects to the California grid will be environmentally and economically challenging. Environmental opposition to any new transmission facility, particularly within California, is ubiquitous. Increasing transmission rates over the last decade have made transmission-dependent utilities very skeptical of new transmission. As the summary of proposed transmission projects shows, the cost of major new transmission is not insignificant. Therefore, RETI 2.0 focus on resources that could be interconnected without substantial transmission expansion is warranted, whether as energy only or in areas with available delivery capacity. Smaller base load projects that can provide more energy with less incremental transmission capacity also warrant consideration.

Ormat's only suggestion regarding the TAFE assessment regards Path 52 (Silver Peak-Control). While this is a small line with very limited capability, it is also in the same area as the existing 230 kV Oxbow line, which is currently operated as a gen-tie from Nevada geothermal resources to Control. The viability of incorporating this line into the transmission grid has been proposed and could warrant further consideration. While the TAFE study assumes up to 500 MW of additional imports from northern Nevada, Ormat believes that up to 1,000 MW of geothermal resources could be developed in the area.



It is easy to ignore potential geothermal development. Geothermal resources tend to be small increments than solar or wind and are even more geographically constrained than either of the intermittent resources. However, as a baseload resource, geothermal can deliver three to four times as much energy per MW as wind or solar. As a result, much less transmission capacity is needed to deliver geothermal energy, which, as pointed out in the LCGS and Salton Sea study, significantly reduces the potential need for curtailment during low load periods and the slope of morning and evening net load ramps. Additionally, because geothermal resources do not rely on cyclical “fuel” supplies, they can easily be configured to operate in such a way to provide need flexibility without requiring costly storage facilities.

Ormat looks forward to continuing to help California meet its aggressive RPS and GHG reduction targets by developing and operating highly efficient, flexible and cost-effective geothermal and other resources in the future.

Sincerely,

A handwritten signature in black ink, appearing to read "Josh A. Nordquist". The signature is fluid and cursive, with a prominent initial "J".

Josh A. Nordquist
Director of Business Development