

**BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking to  
Continue Implementation and  
Administration of California Renewables  
Portfolio Standard Program.

Rulemaking R.11-05-005

**REPLY COMMENTS OF THE GREEN POWER INSTITUTE ON THE  
PROPOSED DECISION OF ALJ DEANGELIS**

November 12, 2013

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Pursuant to Rules 14.3 and 14.6 of the Commission's Rules of Practice and Procedure, in Proceeding R-11-05-005, the **Order Instituting Rulemaking to Continue Implementation and Administration of California Renewables Portfolio Standard Program**, the Green Power Institute, the renewable energy program of the Pacific Institute for Studies in Development, Environment, and Security (GPI), provides these *Reply Comments of the Green Power Institute on the Proposed Decision of ALJ DeAngelis*. Our *Comments* focus on two topics: renewables integration, and the need for future RPS procurement.

**Renewables Integration**

One item on which nearly all of the parties agree is that the issue of the integration of intermittent renewables needs to be dealt with sooner rather than later. The GPI agrees, but we caution the parties that this is not only a complex issue, it is an issue that has changed in its basic nature substantially over time, and it is not at all clear that it will not continue to evolve over the coming years as California struggles to increase the size of its renewable-generating infrastructure.

Renewables integration deals with two renewable resources, solar and wind, and the integration issues related to these two different resources are completely different. To complicate matters further, there are different technologies within the category of solar, and these different technologies have different integration implications and needs. It is worth noting that when renewables integration was initially recognized as a concern in California, the focus of the discussion was almost entirely on wind. Today the focus is almost entirely on solar, and more specifically, solar PV. Had we acted in a substantial way on integration three or four years ago as we understood it then, we would still face the same integration

needs that we do today in the absence of having acted. This observation should inject a note of caution into how we address this issue in the future.

Annual wind-power generation in California has increased from approximately 3,500 GWh when the RPS program went into effect, to greater than 12,000 GWh in 2012. Despite early fears, the system appears to have been able to integrate this amount of increased wind power without undue strain on the system, and projections of future growth of wind generation in the state show it leveling out at about 16,000 GWh/year, only moderately more than in 2012, which should happen by 2014. In effect, wind appears to have been integrated into the state's system without any of the problems that were being envisioned just a couple of years ago.

Integration concerns relating to wind are mainly connected to the short-term fluctuations in output that result from changes in wind speed, and secondarily connected to diurnal and seasonal mismatches with system-demand profiles. Integration concerns relating to PV, by way of contrast, are mainly connected to the aggregate impact of the generators on the residual system demand profile, and only secondarily connected to fluctuations in output caused by, for example, changing cloud cover.

Annual solar-power generation in California has increased from approximately 700 GWh when the RPS program went into effect, to greater than 2,200 GWh in 2012. The 700 GWh/year of generating capacity that was operating at the beginning of the program was virtually entirely solar-thermal power generation. Nearly all of the solar-generating capacity that has been installed since 2008 has been PV. In their August 2013, *RPS Compliance reports*, the utilities project that solar will be contributing 22,000 GWh/year by 2018, of which 3,500 GWh/year of the projected new (post-2012) capacity will come from solar thermal generators, and the remaining 17,800 GWh/year will come from PV.

Adding nearly 18,000 GWh/year of PV-generating capacity over a six-year period, from an installed base of approximately 1,500 GWh/year today, has the potential to structurally alter the residual system-demand profile in a way that exacerbates the late afternoon/early

evening need for ramping, especially during the wintertime. The problem is that, compared with the current system, the projected high-PV system will have approximately the same residual need for power in the 5:00 – 8:00 pm peak-time period, but a lower residual need for power in the middle of the day when PV output is at its maximum. The problem is greatest in the winter months when PV output cuts-out earlier in the day, while the demand curve retains its 6:00 – 8:00 pm peak. The depression in daytime residual demand, and the associated expanded ramp-up to evening residual demand, currently is the main concern of renewable integration discussion.

The GPI agrees that if the future growth of renewables in California is almost entirely PV, as current projections suggest it will be, then the integration issues as currently understood are certainly in need of prompt action. Indeed, one of the reasons that we have been arguing in favor of promoting greater resource and technological diversity in the RPS program is to mitigate this very problem. Another one of our concerns is that there is a real risk that achieving this extreme amount of growth in PV installations over the next several years will simply not occur. Failure to achieve the predicted PV growth would be a big hit to the RPS program, especially in light of the fact that none of the other renewable options appear to be experiencing any kind of growth at all right now, but it would have the somewhat perverse consequence of lessening the structural impact of PV on the system's residual demand curve from what is being projected today.

There is a second potential structural change to California's electricity demand that may be on the horizon that could effectively cancel the mid-day residual demand depression associated with large PV deployment. Large-scale plug-in electric vehicle deployment has the potential to add a large new source of demand to the grid. The conventional hope for EVs has been that charging would be done at night, thus smoothing out the traditional (pre-PV) daily demand profile. On the other hand, it is recognized that there could certainly be a market demand for mid-day charging, for example in commercial lots while people are at work, and in a California with nearly 20,000 GWh/year of PV power generation, the integration needs could be counteracted in whole or part by daytime charging of vehicles. We know that this may sound like heresy to traditional EV planners, but it may very well

be the best direction for a future energy system that includes high PV generation and high EV penetration.

### **Need for Future RPS Procurement**

As L. Jan Reid points out in his *Opening Comments*, there are a number of issues left unaddressed in this track of the proceeding that need to be addressed in the final Decision on the 2013 RPS procurement plans, particularly the issue of minimum RPS procurement. The GPI has argued in favor of the inclusion of a high-economic growth scenario, which would increase demand for future RPS procurement, as well as more realistic assumptions concerning project-development success rates:

The GPI urges the Commission to order the utilities to include a substantially higher demand growth rate sensitivity case in their *RPS Procurement Plans*, to employ realistic and reasonable estimates for project-development risk, and to adopt prudent over-procurement margins in their plans. [July 12 Comments on the 2013 RPS Procurement Plans, pg 5.]

We agree with Reid that this issue needs to be addressed in the final Decision.

Dated November 12, 2013  
Respectfully Submitted,

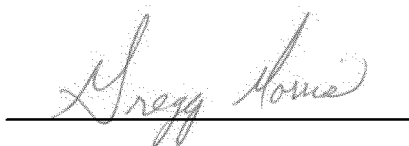


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VERIFICATION

I, Gregory Morris, am Director of the Green Power Institute, and a Research Affiliate of the Pacific Institute for Studies in Development, Environment, and Security. I am authorized to make this Verification on its behalf. I declare under penalty of perjury that the statements in the foregoing copy of *Reply Comments of the Green Power Institute on the Proposed Decision of ALJ DeAngelis*, filed in R.11-05-005, are true of my own knowledge, except as to matters which are therein stated on information or belief, and as to those matters I believe them to be true.

Executed on November 12, 2013, at Berkeley, California.

A handwritten signature in cursive script, reading "Gregory Morris", is written above a solid horizontal line.

Gregory Morris