

of RUC zones would not have a significant impact on rates, terms and conditions of service. Edison had complained that the creation of RUC zones could increase the possibility of congestion and decrease competition within a zone, and had asked for a review process to determine whether new zones would result in "just and reasonable" rates.

Finally, FERC took on a rehearing request from California's State Water Project, which had complained about the grid operator's proposal to allocate residual-unit commitment costs to participating load.

FERC found that if participating load underschedules its load because of Cal-ISO dispatch instructions, then it would be unfair to impose Tier 1 RUC costs. "This exemption provides appropriate protection for participating load," FERC ruled.

But when deviations are not tied to dispatch instructions, the State Water Project should not be exempt. "All market participants must weigh the costs and benefits of deviating from their forward market bids," FERC ruled [C. R.].

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## Regional Roundup

### [14] Solar Thermal's New Worry: Water Usage (from [1])

FPL Group made a splash in March 2008 when it announced it would build the Beacon Solar Energy Project, a \$1 billion, 250 MW solar power plant in the Mojave Desert. The project marked the entrée of a Fortune 500 company into the young utility-scale solar industry, which is dominated by startup companies. Now however, despite California's appetite for renewable energy, Beacon is under fire for an environmentally unfriendly aspect of its design: its proposed wet-cooling tower, which requires hundreds of millions of gallons of water a year.

The amount of water Beacon will consume annually—1,600 acre-feet, or more than 500 million gallons—is many times more than a comparable plant that uses air cooling. Wet cooling technology, which in this case would use water to cool the steam turbine exhaust, was until recently the norm for most of the state's fossil-fuel power plants. But in recent years dry-cooling technology, which uses fans for cooling, has become the de facto standard for new facilities.

With dozens of solar power plants proposed in remote desert regions of the state, the issue of water usage is a critical one right now for California, which is facing a significant water crisis that experts say even a wet 2008 will not totally relieve.

"When you look at the water crisis that we're having in the state of California right now and the limitations on the resource, it is incumbent on all of our state agencies to look at ways to reduce water use with the projects we're involved in," said Paul Marshall, senior engineering geologist at the California Energy Commission.

California is facing a third year of drought, but drought is just one part of the water problem, according to the California Department of Water Resources. In its 2009 update, released last month, DWR noted what it called as assortment of existing crises:

- The Sacramento-San Joaquin River Delta, which supplies water to two-thirds of the state's population and millions of acres of agricultural land, is

suffering from a declining ecosystem and fish populations at record lows. Water flow from the Delta has been restricted by court order.

- Groundwater basins around the state suffer from pollution.
- The Colorado River, which supplies water to Southern California, is deep in a multiple-year drought.

To date, Beacon is the only solar thermal power plant proposing to use wet cooling technology in California, according to the CEC, although some existing solar thermal plants use the technology. The water would come from groundwater wells built onsite.

FPL subsidiary NextEra Energy Resources LLC is a co-owner and operator of several older solar thermal plants, totaling 310 MW, built in the 1980s and 1990s that use wet cooling.

"For that much, (wet cooling) is not that big a deal," said solar consultant and engineer Bill Powers. "But if we're talking about 10,000 MW or tens of thousands of megawatts and it's water cooled, we better be prepared for the implications of that." Powers said he expects thin-film and lower-cost PV plants to ultimately win the utility-scale

solar race, as those projects have few or no moving parts, use relatively little water and will have a low cost in the marketplace.

One of the attractions of wet-cooling is its lower cost compared with dry cooling.

"We believe that the only way the Beacon project will be economic is with wet cooling," said Steve Stengel, a spokesman for FPL Group. "And based on our analysis, there is enough groundwater available for that on the project site that it will not have any negative environmental impacts."

According to an economic analysis by engineering firm WorleyParsons that FPL submitted to the energy commission Feb. 1, installed capital costs for the Beacon plant using wet cooling are \$460.7 million. That figure jumps to between \$529 million and \$540.3 million with different dry cooling alternatives, or to between \$501.4 million and \$512.8 million using different hybrid approaches.

**'If we're talking tens of thousands of megawatts and it's water cooled, we better be prepared for the implications.'**

Energy commission staff requested its own analysis of Beacon's proposal equipment and the wet cooling process. A preliminary staff assessment is scheduled to be filed Feb. 10, but it is unlikely the PSA will be ready by then.

Meanwhile, with an eye to state water policy calling for keeping fresh water for power plant cooling to a minimum, the energy commission is "really pushing hard to get solar thermal to go to dry cooling," said Marshall at the CEC. "Whenever an applicant comes to us and proposes to use fresh water, that's a red flag to us," he added, "especially as it relates to cooling."

Environmental groups are following the water issue closely, and are concerned over ecosystem impacts from extensive use of groundwater.

"Renewable energy takes a number of different shapes," said Mike Cipra, desert program manager at the National Parks Conservation Association. "It requires us to think really carefully about the costs and benefits of specific projects." While dry cooling may be more expensive right now, investments in the technology could drive those costs lower, he said.

Still, dry cooling is not the perfect answer. In addition to higher costs, there is a drop in efficiency at solar plants using dry cooling.

Says consultant Powers, "you get a big dip when you need it—at 2, 3, or 4 in the afternoon in July and August."

That has not dissuaded other developers from using the technology. Keely Wachs, senior director of corporate communications at BrightSource Energy Inc., which is developing the 400 MW Ivanpah Solar Electric Generating System solar concentrating power plant in San Bernardino County, said BrightSource is using dry cooling "because it is the right thing to do."

"We think (dry cooling) is something that all solar thermal plants in California should employ," he added. As for the loss of efficiency, Wachs contends the loss is marginal, as BrightSource's design is already more efficient than other types of solar thermal technology, he said.

While large solar photovoltaic plants also use water—mostly for washing the solar panels—they do not generate heat in producing electricity, so do not need large amounts of water for cooling purposes [Mavis Scanlon].

#### [14.1] Drought: California to Lean More on Northwest Hydro

As it heads towards a third dry year, California could soon witness what the Department of Water Resources called "the worst drought in modern history."

A DWR snow survey taken in late January indicated a statewide snowpack water content of 61 percent of normal, as opposed to 111 percent of normal this time last year. In addition, Lake Oroville, the principal reservoir used by the State Water Project, is at only 28 percent of capacity and 43 percent of its average for the year. As a result, DWR said it will be

able to deliver only 15 percent of its SWP water this year to the Bay Area, the San Joaquin Valley, the Central Coast and Southern California. Several California cities have warned of imminent water rationing, with one—Bollinas—already restricting water use to the equivalent of one 15-minute shower each day.

The drought, if it continues, is also expected to decimate growers in the Central Valley, the world's largest agricultural region, as well as the grape-growing regions in Sonoma and Mendocino Counties.

In a Tuesday memo, California Independent System Operator CEO Yakout Mansour stressed that there are still two months left of snow accumulation, so it

was "premature" to issue an official supply-demand forecast. The early forecast, however, is that Cal-ISO would have about 3,000 MW less of lower hydroelectric supplies, out of a total of 14,000 MW of in-state hydro.

However, the grid operator counted 1,500 MW of net qualifying capacity from new generation coming online by summer 2009 (15 MW of renewables).

By the end of 2009, another 1,125 MW of renewables is expected to come online.

Mansour said the grid operator also anticipated a reduction in peak demand because of the slowing economy. "A dampened rate of growth in demand for electricity would tend to counterbalance the drop in hydro production," he said.

The grid operator is also counting on importing hydroelectricity from the Northwest at a rate comparable to last year. The state imported 9,263 GWh of hydro from the Pacific Northwest in 2007, according to the California Energy Commission.

"Most of the precipitation that typically falls in California has shifted to the north," the CEC said in a statement. "It is expected the Pacific Northwest will have large amounts of surplus electricity."

The CEC also stated that low in-state hydro levels would not "compromise" electricity generation. "During high and normal hydro generation periods, natural-gas fired facilities operate at higher levels. There is sufficient generation in California to make up for low amounts of hydro generation that may occur this year" [C. R.].

#### [15] Setting Caps and Thresholds Among Challenges as CARB Implements AB 32 (from [5])

California expects to see greater reductions in overall greenhouse gas reductions through its participation in the Western Climate Initiative.

Even as the California Air Resources Board hammers out the regulatory framework for AB 32, it is working closely with the Western Climate Initiative to develop a regional carbon trading market that will encompass sources that cover 90 percent of the region's emissions.

Over the next two years, the air board is tasked with implementing the regulatory measures and a

**'Whenever an applicant comes to us and proposes to use fresh water, that's a red flag to us.'**