

MR. COOK: From a utility perspective, you can look at it as a threat or you can look at it as an opportunity. Investing in distributed solar allows a utility to expand outside its service territory. Rather than talk about cannibalization, you could look at it as a potential expansion. I think we will see more utilities that see this as more of an opportunity than a threat to enter the market. ☺

Keys To Getting California Power Contracts Approved

by William A. Monsen and Laura Norin with MRW & Associates, LLC in Oakland, California

Policy concerns beyond the traditional focus on project need and project economics appear to have had strong influence on recent procurement decisions by the California Public Utilities Commission.

In 2012 and early 2013, the CPUC approved several projects that were not the “least-cost” options. In at least one instance, the CPUC approved a project even though a need for the project’s capacity had not been established.

These procurement decisions are noteworthy in light of the normal process in California for evaluating utility contracts to buy electricity from independent generators and utility plans to purchase or develop power plants.

The process begins with an assessment of each utility’s need for capacity, which may also specify a need for capacity of a particular variety, such as renewable capacity or local capacity in specific areas. It is followed by a solicitation for capacity to meet the identified need. Bids submitted in the solicitation are evaluated on a “least-cost best-fit” basis, meaning that the winning bids are those that provide the highest value to ratepayers when considering both the costs and the value of the energy and capacity being offered in light of the utility’s needs. Bilateral contracts entered into outside of a solicitation are also evaluated on a least-cost best-fit basis by comparing these offers to bids from the most nearly contemporaneous competitive solicitation.

However, in a number of cases over the last year, the CPUC found that policy concerns overrode these basic tenets of procurement.

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States. The guarantees can trigger a deemed repatriation of earnings or subject income a foreign subsidiary earns from providing offshore services to current US tax as if the services had been performed from the United States The Congressional Budget Office told a House Science subcommittee in March that 74% of the estimated \$16.4 billion that will be spent on energy-related tax incentives in fiscal year 2013 will go to energy efficiency and renewable energy as compared to nuclear energy, oil and gas. However, incentives for oil and gas production are permanent and have been in the US tax code since 1916, while most incentives for renewable energy have either already expired or are scheduled to do so in the next few years The IRS ruled that a partnership was created between a US company and a foreign affiliate, even though customers dealing with the “partnership” thought they were dealing with the US company. The foreign affiliate took an X% interest in profits from the US company’s branches in a region in exchange for a cash investment equal to the same X% of the branches’ market value. No separate legal entity was created. All property remained held in the name of the US company. The ruling is Private Letter Ruling 201305006. The IRS made it public in February.

— contributed by Keith Martin in Washington

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In the first set of cases, the CPUC appears to have been guided in large part by economic development concerns unrelated to the energy sector. In the second set of cases, the CPUC was clearly guided by energy policy considerations, in particular the policy goal of encouraging the development of energy storage.

Contracts That Promote Economic Development

The CPUC approved two controversial contracts in 2012 ostensibly for their economic development benefits: a contract to buy the Oakley gas-fired combined-cycle power plant and a long-term contract to buy electricity from the Bottle Rock geothermal project. Pacific Gas & Electric was the utility involved in both of these contracts.

PG&E first requested approval of the Oakley contract, one of the winning bids in PG&E's 2008 power solicitation, in September 2009. The proposed project was a 586-megawatt combined-cycle plant to be developed by Contra Costa Generating Station LLC and then sold to PG&E when the plant is completed in 2014. In July 2010, the CPUC rejected the contract, determining that the remaining winning bids in the 2008 solicitation better reflected the CPUC's environmental priorities and fully met PG&E's projected need. However, the CPUC allowed PG&E to resubmit the project if it could prove additional need, either due to failure or retirement of another project or a determination by the California grid operator that additional capacity will be needed to balance the growing amount of intermittent electricity being put on the grid from renewable generators.

PG&E appealed the decision and proposed delaying the online date of the Oakley gas-fired plant by two years to better match the utility's needs.

The CPUC denied PG&E's appeal on procedural grounds, but then took the procedurally questionable step of approving the deal by considering PG&E's appeal as a new application. Notably, the CPUC approved the deal even though it did not find that PG&E needed the capacity from Oakley. In fact, the one dissenting commissioner noted that PG&E not only did not have a need for Oakley, but also was expected to have a reserve margin of 69% in 2020 even without the Oakley plant.

The CPUC's decision approving Oakley raised the ire of many interest groups, who objected to the lack of opportunity for

public comment and other alleged procedural lapses. One, a consumer watchdog group named The Utility Reform Network or "TURN," took the case to a California appeals court. In March 2012, the court overturned the CPUC's decision, finding that the CPUC failed to follow its own rules when it approved the Oakley plant purchase.

PG&E responded to the court's decision by immediately filing yet another application seeking approval for essentially the same deal that the CPUC had approved previously. The timing of PG&E's application was critical. Three weeks later, the CPUC barred PG&E and the other California investor-owned utilities from submitting bids for self-build projects or accepting bids to purchase power plants in their competitive solicitations for electricity, unless there are special circumstances. (The decision is D.12-04-046.) The utilities are now allowed to purchase or develop utility-owned power plants only if there has already been a failed competitive solicitation for the capacity. This decision raised the stakes for PG&E for the Oakley project, since it might be the last opportunity to buy a power plant. Indeed, PG&E's application for Oakley was allowed for consideration only because it was filed before the decision.

The CPUC considered the Oakley deal for the third time from April through December 2012. The administrative law judge that oversaw these deliberations recommended rejecting the application because a need for this capacity had still not been proven and there was no evidence that Oakley would be the least-cost best-fit alternative for meeting PG&E's as-yet undetermined need. Yet, in December 2012, the CPUC approved the project for the second time. The reasons given included that the project was ready to start construction and would serve as a hedge against risks caused by regulatory lag, it would reduce pollution and help stabilize the grid, it would use less water than other conventional power plants, and it would probably help reduce electricity prices.

These reasons are notable for what they exclude. The CPUC did not say that PG&E needs the additional capacity or that the plant is the least-cost best-fit alternative. Without need, it is generally not in ratepayers' interest to develop a new plant, even a highly efficient, flexible plant. Without a least-cost best-fit determination, it is not clear which plant meets a specified need at the best value for ratepayers.

The CPUC skirted both these issues. Instead of a need determination, the CPUC relied loosely on statements made by the California grid operator in other contexts to indicate that there will probably be a need for additional capacity beginning in

2017 or 2018, even though the Oakley project would come on line in 2016. The decision acknowledged that the project may lead to near-term excess capacity but determined, without any support in the administrative record, that the risk of not approving another project in time to meet an as-yet unproven need required approval of the Oakley project. To address the least-cost best-fit requirement, the CPUC found, contrary to the administrative law judge's finding, that the project satisfied the requirement based on the four-year old solicitation rather than an up-to-date need assessment.

Discussion about the project at the business meeting of the CPUC at which the project was approved shed some light on the reasons for the project's approval. The CPUC president, Michael Peevey, acknowledged that PG&E had not proven a need for the additional generating capacity, but said that he supports the project because it is more efficient than PG&E's other fossil fuel plants and will, therefore, reduce greenhouse gas emissions. He said there were other policy benefits, including promoting renewable energy via good ramping capability and reducing reliance on plants that use once-through cooling.

However, what he stressed most were the project's potential economic development benefits: the project is fully permitted and ready to go and uses American technology that will create good union jobs in an economically-distressed area that needs jobs and has embraced the project.

Commissioner Timothy Simon also cited the policy benefits of the efficient, flexible plant and then emphasized the "tremendous benefit to the California economy" from the project, noting that Oakley will create 740 union jobs and \$4 million in purchases and that all elected officials who spoke at an all-party meeting supported the project. He said the project is in a part of California that was particularly hard hit by the economic downturn in 2008.

Of the three other commissioners, one voted to approve the Oakley deal, one voted against it, and a third, Commissioner Mike Florio, abstained, since he had been the senior attorney for TURN and had opposed the project when it was first proposed. The project was approved on a three-to-one vote.

The Oakley decision came just three months after the CPUC relied in large part on economic development benefits to justify approval of another controversial contract. This contract was an amendment to an existing power purchase agreement between PG&E and Bottle Rock Power LLC (Bottle Rock) for power from an existing 10-megawatt geothermal facility in Lake County, California. The approved PPA is the third amend-

ment to an existing PPA between the parties. Each of these amendments has reduced performance guarantees or increased the electricity price. The most recent amendment grew out of the inability of the project owner to raise the capital necessary to boost production at the facility, as required by the prior PPA. The amendment increased the PPA price by 56% for the first 10 years of electricity sales, waived significant damages that had accrued after the project owner failed to ramp up capacity, and extended the contract term in exchange for providing stronger guarantees that Bottle Rock would invest the capital needed to boost production at the facility and maintain a specified employment level. Bottle Rock had indicated that it would shut the plant were this PPA amendment not approved.

Shortly prior to filing for approval of the amended PPA, PG&E had run a solicitation for renewable power, and the shortlisted bids from that solicitation, including bids from four other geothermal projects, had much lower prices and higher value than the amended Bottle Rock PPA. Significantly, some of these bids, including two of the geothermal bids, were also for existing projects. PG&E justified the amended PPA with Bottle Rock based on undisclosed "non-price factors."

The CPUC said PG&E was wrong to try to justify the project based on non-price factors. Nevertheless, the CPUC approved the project on a three-to-two vote, with economic development benefits being a key factor in the decision. The CPUC did not provide any other compelling explanation for its decision.

At a later CPUC business meeting, Commissioner Timothy Simon commended Bottle Rock for staying in California, noted the letters received from Bottle Rock employees asking the CPUC to keep the project alive, and said, "In the difficult recovery that we're having . . . that ability to attract and retain capital, to provide the infrastructure that our state desperately needs in the energy sector and the jobs related to that, are primary factors, in my view, of our decision-making process."

Similarly, the CPUC president, Michael Peevey, said, "You have a situation of existing output there, existing people working, unemployment high in Lake County. These are good jobs. It's tough for me to turn my back on all that."

In summary, while the Bottle Rock proceeding was a contentious case, the CPUC determined that having an in-state project with a commitment to maintaining employment levels and investing further in the plant infrastructure provided enough economic development benefits to offset an apparently high cost of power from the project

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compared to alternatives.

Commissioner Simon's vote was critical to getting both Oakley and Bottle Rock approved. He has since left the CPUC and been replaced by Commissioner Carla Peterman. While Peterman has not yet had an opportunity to vote on new controversial power projects and her future votes cannot be predicted, it is worth observing that she formerly served on the board of directors for TURN, the same consumer watchdog group that sued the CPUC for approving the Oakley project. TURN is also the former employer of Commissioner Mike Florio, the only Commissioner who did not vote for either project. The change in commission membership, along with apparently improving economic conditions in California, may reduce the importance of economic development as a reason for approving power projects. However, the precedent set by Oakley and Bottle Rock may still hold sway, especially given California Governor Jerry Brown's focus on job creation.

Several power contracts have been approved recently in California that were not the least-cost options for utilities.

Encouraging Electricity Storage

The CPUC has also recently set aside its least-cost best-fit framework to support energy storage.

Energy storage development is a goal of both the CPUC and Governor Brown, who included the development of energy storage in his clean energy jobs plan.

In December 2010, the CPUC opened a rulemaking to determine whether energy storage should be considered a "preferred resource" and the amount of energy storage, if any, that the commission should order each utility to have in place by 2015 and 2020.

The promotion of energy storage is not without controversy

because energy storage is expensive. At a January 14, 2013, workshop and in subsequent workshop comments, the California investor-owned utilities opposed storage procurement targets because of the burden on ratepayers. For example, San Diego Gas & Electric said in February 2013 comments, "Ratepayers should not be burdened with the cost of uneconomic energy storage systems installed simply to meet a mandated procurement target." The utilities and others, including the Independent Energy Producers Association of California, argue that many of the benefits of storage could be provided by other generation types and are urging that procurement be conducted on a technology-neutral basis.

However, CPUC President Michael Peevey is clearly headed in the direction of storage procurement targets or other means to treat storage as a preferred resource. He said:

"I believe the commission's energy storage policy is the bridge to our long-term future, not only 10 years from now, but 40 years from now and beyond. And we must start building that bridge or we will never reach our 2050 goals to reduce greenhouse gas emissions by 80% from 1990 levels. Our

responsibility to think further ahead for future generations weighs heavily on me, and that is why I am hopeful that energy storage will be a cornerstone to that future."

While the CPUC has not yet ruled on whether storage should be considered a preferred resource in its own right, it treated storage as a preferred resource in effect when approving solar contracts between

Southern California Edison and BrightSource Energy.

In November 2011, just weeks after releasing the shortlist from its 2011 renewable power solicitation, Edison requested approval of five amended and restated PPAs for solar thermal projects with BrightSource. Edison awarded the PPAs after a 2008 renewable power solicitation, but the contracts had been significantly revised since then, in part in response to a federal plan to preserve the desert where the projects were planned. The revisions included moving sites and adding molten salt storage to three of the proposed projects.

The CPUC rejected two of the proposed projects with molten salt storage on account of incompatibility with nearby

military training and questionable transmission availability. Of the remaining three projects, the CPUC found that the two without storage, Rio Mesa units 1 and 2, were highly uncompetitive compared with 18 of the 19 solar thermal projects that bid into a 2011 renewable power solicitation by Edison, and that the remaining project with storage, Sonoran West, was uncompetitive compared with the shortlisted contracts from the 2011 solicitation, though competitive compared to other contracts recently approved by the CPUC and to other solar thermal projects offered in the solicitation.

The CPUC said that, from a purely economic standpoint, none of the contracts should have been approved since they were all more expensive than other projects bid into Edison's 2011 renewable power solicitation. However, the CPUC wanted to approve Sonoran West to promote energy storage.

BrightSource said Sonoran West could not be built on its own and that a second-generation power tower, such as one of the Rio Mesa projects, would need to be financed before BrightSource could finance a third-generation project like Sonoran West. Therefore, the CPUC approved the Rio Mesa 2 project, even while acknowledging that its price was uncompetitive compared with other readily available options, in order to provide an opportunity for the first solar thermal project with storage to be built. The CPUC made it clear that approval of the Rio Mesa 2 and Sonoran West projects came as a package deal. It would have preferred to reject Rio Mesa 2, given the high cost. The two PPAs were approved unanimously.

In approving this package of uneconomic PPAs, Commissioner Florio, the former TURN senior attorney, made it clear that storage was the lynchpin to the deals:

"Getting to cost-effective storage technology really is critical for our future . . . While I normally don't support ratepayers taking technological risk, our whole push to a clean energy future is at risk. If we're going to get . . . to a truly clean and low-carbon energy future, we're going to have to take some risks like this."

While the CPUC has not yet decided whether to set storage targets for utilities, it has already established a storage procurement requirement for Southern California Edison. It required Edison in February 2013 (decision D.13-02-015) to procure at least 50 megawatts of storage to help meet Edison's 2021 local capacity requirement need of 1,400 megawatts in the west Los Angeles local reliability area. The decision explains that this requirement comes from the CPUC's interest in promoting "promising technologies with a / continued page 48

Will Storage Remain a Preferred Resource?

The likely procurement carve-out for energy storage is a response to the need to integrate an increasing amount of intermittent renewable resources on to the California electricity grid. As California builds towards a 33%-by-2020 renewable portfolio standard and considers mandates for even higher levels of renewable generation in subsequent years, integration needs will continue to drive procurement decisions. However, storage is not the only option for meeting renewable integration needs. "Flexible capacity" from natural gas-fired power plants that can ramp up or down rapidly is another option that is also gaining favor.

The CPUC is considering beginning in 2014 to set specific procurement requirements for flexible capacity that can help to integrate intermittent renewable resources.

Preliminary proposals would require flexible resources to, at minimum, be able to ramp up and sustain energy output for a minimum of three hours. There may be other requirements. These requirements, along with mechanisms for determining and satisfying flexible capacity compliance obligations and implementation, contracting issues, and validation issues, are being addressed in a resource adequacy proceeding (R.11-10-023). A proposed decision on these matters is scheduled for late May 2013. Once these matters have been determined, then specific flexible capacity requirements are likely to appear in the utilities' solicitations for medium- and long-term power contracts, as well as their solicitations for short-term resource adequacy capacity.

As integration needs become better understood, the CPUC's policies regarding energy storage and flexible capacity are likely to be refined. There is already a push to better define "flexibility" and perhaps to define several types of flexibility to more closely match system needs in different time periods. Storage, some argue, is an expensive means of obtaining flexibility, since thermal power plants can provide these services more cheaply. As a result, it is not clear that energy storage will remain classified as a preferred resource over the longer term barring significant cost reductions.

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strong potential to effectively meet [local capacity requirement] needs.” The CPUC said that it is not known at this time how many viable energy storage facilities will emerge by 2021 that will be able to be used for these purposes (none exists today) and described the 50-megawatt set aside as “an opportunity to assess the cost and performance of energy storage resources.”

Edison opposed this storage mandate. The Independent Energy Producers Association also opposed the mandate, suggesting instead that the CPUC should remove any barriers to bidding by energy storage owners in all-source solicitations. At a February 14, 2013 CPUC business meeting, Commissioner Florio said, “We don’t want paralysis by analysis with respect to energy storage. It’s time to move forward and get some real-world experience on whether storage can do the job economically and at a reasonable price.” The CPUC unanimously adopted the mandate, with the possibility for an exception only if the utility can show that the storage bids it received were unreasonable.

The CPUC went a step further and treated energy storage like a preferred resource in the Edison decision by including energy storage as a procurement option each time a preferred resource is required. In all, Edison is required to procure 50 megawatts of energy storage and 150 megawatts of preferred resources or energy storage. Edison is also authorized to procure up to 600 megawatts of additional capacity from preferred resources or energy storage. Unless the cost for storage drops significantly in next few years, storage is unlikely to contribute a large share of this “preferred-resource” capacity. Still, it is notable that the CPUC is treating energy storage on par with preferred resources such as wind and solar before deciding to classify it as such.

In light of the treatment of storage as equivalent to a preferred resource, the staunch support of the CPUC president for energy storage and the unanimous approval of all five commissioners for the relatively high-priced BrightSource contracts and for the 50-megawatt storage mandate for Edison, the direction of the CPUC seems clear: Barring a major policy shift at the CPUC or in the state legislature, the CPUC is likely to approve a preference for energy storage and an energy storage procurement target soon.

Lessons

Developers would be wise to consider not just project economics, but also conformity with the commission’s policy goals when considering project development opportunities.

In 2012, projects with economic development value and projects with energy storage were given priority, even at the cost of overriding need and least-cost best-fit considerations.

The window for getting projects approved primarily on economic development grounds may be closing, but the CPUC is likely to continue to be sensitive to public support for a project and whether the project will create jobs in economically distressed areas. The CPUC’s priority for storage is likely to be formalized and specific procurement targets are likely to be established before an October 1, 2013 legislative deadline for a decision.

The lesson from these recent procurement decisions is not that economic development and energy storage should be added to project bids, but rather that the CPUC’s policy objectives have a strong role in driving decisionmaking and can override basic need assessments and cost comparisons.

Having an economically competitive project is not always sufficient. The BrightSource projects, for example, were selected in place of much more cost-effective bids that had been submitted to Edison in its 2011 solicitation. Therefore, to develop a winning bid, it is important to look beyond project economics and to consider also the CPUC’s ever-evolving priorities. A project with attributes consistent with the system needs as seen by the CPUC, including the need to support long-term policy goals, can be more competitive than a lower-cost bid. ☺

The State of Project Financing in the Near East

Financing projects in the Near East remains challenging. The commercial banks have largely disappeared. However, Saudi and other regional banks are active and are offering attractive terms. The Japan Bank for International Cooperation and the Korean export credit agencies have become increasingly aggressive in finding ways to support contractors and investors

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ConocoPhillips and Japan Oil Gas & Metals National Corporation demonstrated a field method to unlock natural gas from methane hydrate.

Methane hydrate exists in Alaska and offshore in continental shelf lands all over the world. According to the US Bureau of Ocean Energy Management, the mean in-place gas hydrate resource volume for the lower 48 states within the limits of the 200 nautical-mile US exclusive economic zone is 1,453 trillion cubic meters or 51,338 trillion cubic feet. However, this does not mean that this amount of methane hydrate is technically or even economically recoverable. Surveys of the methane hydrate resources associated with Alaska are underway. For comparison, in 2011 the US Energy Information Administration reported an estimated 862 trillion cubic feet of recoverable shale reserves in the United States.

Methane hydrate is a three-dimensional lattice ice structure loaded with trapped methane. Some call it fire ice since methane is the primary component of natural gas. According to the US Department of Energy, one cubic meter of methane hydrate can release 164 cubic meters of natural gas.

Methane hydrate exists all over the world as shown by the US Geological Survey map on the previous page, and, for some countries, could be a game changer. However, there is considerable concern about potential environmental impacts associated with the extraction process, including the release of methane to the atmosphere. Methane is a greenhouse gas and is estimated to be more than 20 times more powerful as CO₂ as a greenhouse gas.

Wastewater Discharge Guidelines

Lenders and investors in power plants that make steam as an intermediate step to generate electricity should watch for release of wastewater effluent guidelines for the industry by the US Environmental Protection Agency in April. Some fear the new guidelines will require significant spending on retrofits. The guidelines will address mercury, zinc and selenium, among other pollutants.

The EPA is required to issue proposed rules by April 19, 2013 and to issue final rules by May 22, 2014 under a consent decree to which it and private litigants agreed in *Defenders of Wildlife v. EPA*, No. 10-cv-01915 (D.D.C.). It has been more than 30 years since these regulations were updated, a time period during which air emissions limits for many other pollutants have been ratcheted down. Instead of being released into the air, these pollutants can end up being discharged in wastewater effluent. Industry is concerned that new pollution limits may require significant new spending to retrofit existing power plants to comply with the new limits.

— contributed by Sue Cowell in Washington

Project Finance NewsWire

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Chadbourne & Parke LLP

New York
30 Rockefeller Plaza
New York, NY 10112
+1 (212) 408-5100

Washington, DC
1200 New Hampshire Avenue, NW
Washington, DC 20036
+1 (202) 974-5600

Los Angeles
350 South Grand Avenue, 32nd Floor
Los Angeles, CA 90071
+1 (213) 892-1000

Mexico City
Chadbourne & Parke SC
Paseo de Tamarindos, No. 400-B Piso 22
Col. Bosques de las Lomas
05120 México, D.F., México
+ 52 (55) 3000-0600

São Paulo
Av. Pres. Juscelino Kubitschek, 1726
16º andar
São Paulo, SP 04543-000, Brazil
+55 (11) 3372-0000

London
Chadbourne & Parke (London) LLP
Regis House, 45 King William Street
London EC4R 9AN, UK
+44 (0)20 7337-8000

Moscow
Riverside Towers
52/5 Kosmodamianskaya Nab.
Moscow 115054 Russian Federation
+7 (495) 974-2424
Direct line from outside C.I.S.:
(212) 408-1190

Warsaw
Chadbourne & Parke
Radzikowski, Szubielska i Wspólnicy sp.k.
ul. Emilii Plater 53
00-113 Warsaw, Poland
+48 (22) 520-5000

Kyiv
25B Sahaydachnoho Street
Kyiv 04070, Ukraine
+380 (44) 461-7575

Istanbul
Chadbourne & Parke
Apa Giz Plaza
34330 Levent, Istanbul, Turkey
+90 (212) 386-1300

Dubai
Chadbourne & Parke LLC
Boulevard Plaza Tower 1, Level 20
PO Box 23927, Burj Khalifa District
Dubai, United Arab Emirates
+971 (4) 422-7088

Beijing
Beijing Representative Office
Room 902, Tower A, Beijing Fortune Centre
7 Dongsanhuan Zhonglu, Chaoyang District
Beijing 100020, China
+86 (10) 6530-8846

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