California State Senate

COMMITTEE ON ENERGY, UTILITIES AND COMMUNICATIONS

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AGENDA
INFORMATIONAL HEARING

Energy Efficiency: All Negawatts Are Created Equal, But Some Are More Equal Than Others

Monday, January 28, 2013

State Capitol, Room 3191
3:00 p.m.

I. Welcome and Opening Statement

- Senator Alex Padilla, Chairman

II. LAO Finds Lack of Statewide Strategy, Inter-Agency Coordination, and Metrics

- Tiffany Roberts, Senior Fiscal and Policy Analyst – Energy and Climate Change
  Legislative Analyst's Office

III. State Process to Identify Energy Needs Yields Conflicting Views on How Energy Efficiency Programs Reduce Need for New Power Plants

- Robert B. Weisenmiller, Chairman
  California Energy Commission
- Edward Randolph, Director, Energy Division
  California Public Utilities Commission
- Keith Casey, Vice President of Market and Infrastructure Development
  California Independent System Operator

IV. Public Comment

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ENERGY EFFICIENCY: All Negawatts Are Created Equal, But Some Are More Equal Than Others

Introduction

The primary goal of California's substantial – and growing – investment in energy efficiency has always been reducing the need for new power plants. To date, California has invested billions in ratepayer and taxpayer funds for energy efficiency programs including standards for new appliances and buildings, and customer rebates and financial incentives for new efficient appliances, windows, heating and cooling systems, and whole-house retrofits, among others. The state promotes and justifies these programs in terms of kilowatts or megawatts of energy saved or never used ("negawatts"[1]), which is equated to a specific number of power plants that do not have to be built. Although individual programs have a variety of complex metrics to determine cost-effectiveness, the long-held overarching purpose and goal of energy efficiency investment is to avoid building power plants, which in turn reduces the cost of energy and greenhouse gas emissions.[2]

There is a question, however, whether claimed energy savings from efficiency investments are appropriately captured when the state considers the need for new power plants. The three state entities involved in forecasting energy demand and procurement planning – California Public Utilities Commission (CPUC), California Energy Commission (CEC), and the California Independent System Operator (CAISO) – do not always agree on whether energy efficiency is reliable enough to displace the need for a power plant to meet future demand. This issue is currently under debate in proceedings pending at the CPUC related to new power plants in southern California. Even if all negawatts created from energy efficiency help reduce overall

[1] The term "negawatt" is reported to have been first coined by Armory Lovins, chairman of the Rocky Mountain Institute, as a contraction of negative watt on the model of similar compounds like megawatt.

[2] See, for example, CPUC press release dated September 4, 2012, "CPUC Report Outlines Energy Efficiency Success; Consumers Help State Avoid Building New Power Plants and Improve Environment" at http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M027/K105/27105125.PDF .

system-wide demand, they do not necessarily reduce demand at the time or location of peak demand. Thus, when it comes to determining whether new power plants are needed to meet energy needs, it may be that not all negawatts are created equal.

A better understanding of how to design energy efficiency programs to meet operational requirements may be critical at this time, as California is now on the cusp of a huge expansion of energy efficiency investment while also pursuing aggressive renewable energy goals. Proposition 39, approved by voters in November 2012, is expected to add up to $550 million per year in taxpayer funds to the billions in ratepayer funds the state already dedicates to energy efficiency. Thus, in order to promote prudent investment of these precious funds, this hearing will focus on how energy efficiency investments can most effectively create the kind of negawatts that actually reduce the need for power plants and that the entities involved in energy procurement can count on to keep the lights on throughout California.

State Policy Requires Energy Efficiency as Top Strategy to Meet Demand

Energy efficiency is California's top strategy for reducing energy use. The "loading order" requires all California utilities to first meet their energy needs through cost-effective energy efficiency measures before renewable and conventional generation (Public Utilities Code Sections 454.5 and 9615). The state's investor owned utilities (IOUs) administer programs approved by the CPUC in three-year portfolios designed to meet pre-established energy savings goals funded at about $1 billion per year with a ratepayer surcharge. The state's publicly owned utilities (POUs), to varying degrees, also administer energy efficiency programs with ratepayer funds. AB 2021 (Levine 2006) set targets for all the state's utilities to reduce energy demand through efficiency by 10 percent over 10 years and requires the CEC to track their progress and verify claimed energy savings.

California's Title 24 energy efficiency building regulations, first adopted by the CEC in 1978 and updated every three years, specify requirements relating to lighting, insulation, windows, HVAC systems, and other construction details designed to reduce energy consumption and lower energy bills for consumers. The CEC also adopts Title 20 energy efficiency appliance regulations that specify energy use standards for most major household and commercial appliances that must be met in order to be sold in California, including recently adopted standards for battery chargers.[3]

Most energy experts cite the building and appliance standards, along with IOU and POU programs, as the reason California's per capita energy use has remained stable for more than 30 years while the national per capita average has steadily increased and is nearly double that of California. Nonetheless, the CPUC and Governor Brown have made it a priority to seek even greater energy efficiency gains by refocusing investment to long-term "market transformation"

[3] For a comprehensive review of the state's energy efficiency investments, including about $500 million from the American Recovery and Reinvestment Act of 2009, see this committee's 2011 informational hearings on May 17, June 7, August 1, October 31, and December 15 at http://seuc.senate.ca.gov/hearings .

strategies. The state's 2008 Energy Efficiency Strategic Plan defines market transformation as reducing barriers to adoption of energy efficiency measures to the point where subsidies and public intervention are no longer required and energy efficiency is a way of life in California. A major initiative is to provide financing for whole-house retrofits of old buildings.

LAO Finds Lack of Statewide Strategy, Inter-Agency Coordination, and Metrics

The Legislative Analyst Office (LAO), in a report issued December 19, 2012, made the following findings about California programs that are intended to support the development of energy efficiency and alternative energy:

- California lacks a comprehensive framework that fully coordinates state programs to ensure that the state's energy goals are being met in the most cost-effective manner;

- California lacks a uniform metric to compare the effectiveness of energy efficiency investments across programs;

- The cost-effectiveness of California's IOU energy efficiency programs has steadily declined over the past 8 years from a benefit of $2.67 to $1.36 in energy savings for every $1 invested, suggesting diminishing returns;

- The CPUC is increasing emphasis on "market transformation" energy efficiency programs while acknowledging the uncertainty of their cost-effectiveness, especially in the near term; and

- Developing a comprehensive strategy, improve inter-agency coordination, and developing a metric to determine which programs produce the most benefit is especially important as the Legislature decides how to effectively invest revenues generated from Proposition 39 and cap-and-trade revenues.

State Entities Differ on How Energy Efficiency Reduces Need for New Power Plants

The CEC, CPUC, and CAISO each have a significant role in determining whether new power plants are needed to meet the state's energy needs. Because of the long lead time needed for financing, permitting and construction to bring a new power plant online, these entities are required to forecast energy demand, and determine if new power plants are needed to meet that demand, up to ten years into the future.

California Energy Commission

The CEC is required by statute to develop a biennial Integrated Energy Policy Report (IEPR) that provides information on trends and issues concerning electricity and natural gas, transportation, energy efficiency, renewables, and a ten-year forecast of expected energy demand. To develop this forecast, the CEC has, since 2007, convened a demand analysis working group (DAWG) with stakeholders, including representatives of the CPUC and CAISO.

The CEC produces a base forecast, and a separate analysis of adjustments to that forecast due to energy efficiency.

Adjustments to the ten-year forecast for energy efficiency are based on reports the IOUs and POUs submit to CEC on their energy efficiency programs, including the calculation of verified and expected energy savings from those programs. The CEC distinguishes between "committed" energy savings already realized from existing programs and "uncommitted" (also referred to as "incremental uncommitted") energy savings expected from future programs. The CEC includes in the base forecast committed energy savings – all savings from energy efficiency programs since the 1970s, including building and appliance standards. The CEC's base forecast for 2012 to 2022 estimated 15,000 MW of committed energy efficiency savings.

The CEC next determines how this base forecast of future demand can be further reduced because of energy not needed due to continuation of existing programs, or initiation of new programs during the forecast period. It estimates a low, mid, and high level of uncommitted savings based on different scenarios of effectiveness of future programs. CEC includes expected savings from various programs that are expected to continue, such as IOU programs, but does not include expected savings from future Title 24 updates required by statute or various federal standards that already have been adopted such as standards for commercial refrigerators, clothes washers, small motors, and vending machines. CEC estimated 5,500 MW of uncommitted savings for the 2012 to 2022 forecast period.

California Public Utilities Commission

The CPUC is required to ensure that utilities provide safe, reliable energy at reasonable rates. In order to ensure an adequate supply of energy, the CPUC conducts a biennial long term procurement plan (LTPP) proceeding, which ends in a CPUC decision identifying a specified MW of power needed for a ten-year period, or a finding of no need to authorize new power plants. Each 500 MW of demand identified equates to a need for one large power plant. After need is identified, individual utilities accept competitive bids from independent energy producers for new generation to meet that need, and then apply for CPUC approval of the contracts.

The CPUC considers the CEC's ten-year demand forecast in its LTTP proceedings. In addition, the CPUC considers analysis from CAISO modeling that evaluates the resources needed to maintain system reliability under various forecast conditions and operational flexibility requirements. The CPUC adopts assumptions for CAISO to use in its modeling, and the CAISO reports the results of its modeling back to the CPUC for consideration in its final determination of need for the LTTP forecast period. In the CPUC's current LTTP proceeding for the 2012 to 2022 period, the CPUC recently adopted assumptions for the CAISO modeling, which included about half of the uncommitted energy efficiency savings that CEC identified (about 3,000 MW of the 5,500 MW in CEC's estimate). Some parties, including the Natural Resources Defense Council, claim this assumption underestimates energy efficiency savings that are reasonably expected to occur and could cost ratepayers $1 to $2 billion in unnecessary power plants unless the CPUC corrects for this in its final LTPP decision next year.

California Independent System Operator

CAISO is required to ensure reliability of the electric transmission grid and maximize availability of generation resources needed to meet the needs of California's electricity consumers. CAISO prepares an annual transmission plan and studies local capacity requirements to ensure compliance with reliability requirements under federal law. CAISO is a party in the CPUC's LTPP proceeding and conducts modeling of projected energy use for the CPUC, although the CPUC is not required to rely on CAISO conclusions. The impact of California's renewable energy goals on the grid has led to CAISO being more actively involved in the CPUC's procurement planning in recent years.

CAISO generally does not include any incremental, uncommitted energy efficiency in its analysis of future energy need, claiming that its reliability obligations make it more prudent to not rely on future savings, even though that results in higher expected demand and generation needs. CAISO claims that it is uncertain that future programs will be funded and that energy savings will actually materialize. In addition, while energy efficiency may reduce overall system-wide demand, it is not a dispatchable resource that can be tapped to meet demand on short notice on hot summer days. As stated in one CAISO report to its board, "the consequences of having insufficient resources to reliably operate the grid are much more significant than the consequences of over-procurement," citing "severe economic consequences [and] electricity outages caused by a shortage of the flexible resources needed to reliably operate the system."[4]

CAISO's view is based on consideration of overall system-wide reliability and local reliability requirements. For example, southern California faces a potential loss of up to 7,000 MW by 2021 with the retirement of once through cooling (OTC) units. In addition, the same region faces the risk of losing all or some of the 2,300 MW capacity of the two San Onofre Nuclear Generating Stations (SONGs) units, for a total potential loss of 9,000 MW of supply during the current LTTP planning horizon. CAISO also seeks to account for grid impacts from state renewable energy goals, including the need for additional flexible generation resources to compensate for inherent variability of wind and solar power. For example, with the surge in solar generation growing in coming years, more conventional generation will be called on to reduce output in the morning when solar generation comes online and to increase output in the late afternoon and into the evening as solar output wanes. The timing of reduced use of energy from efficiency measures does not necessarily match up with this increased demand from integration of renewables.

How to Count Efficiency Is Major Issue in Pending Proceedings

The reliability of energy efficiency savings to reduce demand is an issue in the pending application of San Diego Gas & Electric Company (SDG&E) to procure up to 343 MW of local generation capacity beginning in 2018, a need the CPUC identified in its 2006 LTTP decision. SDG&E is seeking approval of power purchase tolling agreements with Escondido Energy Center (45 MW), Pio Pico Energy Center (305 MW), and Quail Brush Power Station (100 MW).

[4] Memorandum of Keith Casey, Vice President, Market and Infrastructure Development, to CAISO Board of Governors, August 18, 2011.

CAISO's modeling of SDG&E's need did not count uncommitted energy efficiency, stating that its statutory duty to maintain the reliability of the grid precludes it from relying on savings from programs not yet implemented, especially given local capacity impacts from OTC and SONGs. CAISO asserts that failure to bring new resources online creates too great a risk that it will have to use more costly emergency resources to meet demand.

Although the CPUC has not made a final decision on the application, at least one proposed decision rejects the CAISO's view, counts some of the uncommitted energy efficiency savings that CEC identified in its demand forecast, and concludes that there is no longer a near-term need for the additional resources in the application. This proposed decision cites the CPUC's statutory responsibility to ensure just and reasonable rates by limiting unnecessary costs for new generation that is not needed. SDG&E is caught between ISO's demand for more generation and CPUC recommended denial of contracts. In the meantime, plant developers have been approved for construction or are at least well through the siting process leading to approval by the licensing agencies.

Similar issues on energy efficiency and demand are under debate in a proposed decision to authorize Southern California Edison to procure between 1,050 and 1,500 MW of electrical capacity in a western section of the Los Angeles basin to meet local capacity requirements by 2021.