Finance Design Panel
Discussion Paper

ISSUE OVERVIEW

The panel purpose is to evaluate the existing distributed generation procurement mechanisms and program incentives (customer- and system-side generation), including financial products to determine 1) if they provide sufficient regulatory certainty to stimulate renewable distributed generation investment in California and 2) if they adequately address the needs of the various distributed generation market segments.

BACKGROUND

The panel participants were asked to consider a list of potential guiding principles that the state could use to evaluate the efficiency and effectiveness of existing and potentially new procurement mechanisms and program incentives for renewable distributed generation. The guiding principle all panel participants generally support in implementing the Governor's distributed generation goals is building a sustainable, long-term market.

However, there are differing approaches to being faithful to this principle. Most panelists support encouraging competition among and between distinct technologies despite differing levels of commercialization and potential value. Competition is viewed as a pathway to lower costs and long term sustainability. However, others argue that a sustainable and long-term market requires resource diversity and as such should allow for higher costs in the short-term. These panelists state that such a consideration may be necessary in order to achieve a more diverse and competitive long-term distributed generation market.

Despite differing definitions for sustainable and long-term market, panel participants generally agree that the suite of existing procurement programs have the potential to

fulfill their visions. The programs that have been part of our discussions and which will be referred to throughout this paper include the following:

Distributed Generation Procurement Programs

Customer-side generation is defined as generation that is generated onsite and consumed onsite. System-side (utility-side) generation is generation that is sold to a utility (i.e., not consumed onsite). Having said that, there are programs and incentives, such as an excess sales contract under the feed-in tariff and net surplus compensation, that bridge both sides of the utility meter.

Customer Side Programs

California Solar Initiative (Senate Bill 1)

The total installed solar capacity in the investor-owned utility (IOU) service territories is 924 MW at 94,891 individual sites through the first quarter of 2011. This capacity has been installed through a variety of state and local incentive programs dating back to the 1990s.

The IOU California Solar Initiative (CSI) offers solar incentives to energy users (except new homes) in investor-owned utility territories in California. The CSI Program has a goal to install 1,940 MW of new solar by 2017. The CSI is the country's largest solar program, with a $2.2 billion budget. Under Senate Bill (SB) 1 (2006), the CSI was expanded to include publicly owned utilities. The POU CSI programs have an overall goal of 660MW and a $784 million budget.

New Solar Home Partnership (SB1)

The New Solar Homes Partnership (NSHP) provides financial incentives and other support for installing eligible solar energy systems on new residential buildings in investor-owned utility territories. The NSHP is a 10-year, $400 million program and specifically targets market-rate and affordable housing single-family and multifamily sectors. The NSHP has a goal of 400 MW by the end of 2016.

Emerging Renewables Program

The Emerging Renewables Program (ERP) offers cash incentives to promote the installation of grid-connected small wind and fuel cell renewable energy electric-generating systems. Since the Emerging Renewables Program's beginning in 1998 through June 2010, 28,542 emerging renewable systems (including solar PV until 2007)

have been installed with support from the program, representing 126.1 MW of distributed renewable capacity, bringing total disbursements to about $406 million.

Self-Generation Incentive Program

The CPUC's Self-Generation Incentive Program (SGIP) provides incentives to support existing, new, and emerging distributed energy resources. SGIP functions by providing one-time upfront incentives for the installation of new, qualifying self-generation equipment installed to meet all or a portion of the electric needs of a facility. Qualifying technologies include wind turbines, fuel cells, and corresponding energy storage systems. As of December 2009, the SGIP stands as one of the single largest and longest-running DG incentive programs in the country with over 1,299 projects online and over 348 MW installed.

Net Energy Metering

Net Energy Metering, or NEM, allows a customer-generator to receive a financial credit for power generated by their onsite system and fed back to the utility-- the credit is used to offset the customer's electricity bill. NEM provides a long-term, predictable benefit tied to market value (bundled retail rates) for the customer, improving the financial viability of DG investments. Customers who install small solar, wind or fuel cell facilities (1 MW or less) to serve all or a portion of onsite electricity needs are eligible for the state's net metering program. California utilities also offer "net surplus compensation" as one part of the Net Energy Metering tariffs for electricity generated in excess of on-site load over a 12-month period. Until 2010, biogas-electric facilities up to 1 MW statewide were eligible for net metering under the NEMBIO program. Under this program, participants received a generation bill credit for energy production, but not a credit of the full retail rate.

Utility-Side Programs

Feed-in Tariffs

In February 2008, the CPUC made feed-in tariffs available for the purchase of up to 480 MW of renewable generating capacity from small facilities (1.5 MW or less) throughout California. These "feed-in tariffs" present a simple mechanism for small renewable generators to sell power to the utility at predefined terms and conditions, without contract negotiations. The feed-in tariff is available to all RPS-eligible generators, and also cover biomass and geothermal, for which there are no onsite generation incentive programs.

SB 32 (2009) amends the CPUC feed-in tariff and raises the project size cap to 3 MW from 1.5 MW, requires the POUs to offer a feed-in tariff, raises the statewide program cap from 500 MW to 750 MW, and requires the inclusion and consideration of environmental and distributed generation attributes in the tariff price. SB 32 also requires all utilities that sell to 75,000 or more customers make a similar tariff available. A CPUC Rulemaking is currently underway to implement recent statutory changes to the program as required by the statute.

Sacramento Municipal Utility District (SMUD) adopted a 100 MW-capped feed-in tariff program in 2009 for solar and combined heat and power (CHP) projects sized at 5 MW or less. In January 2010, all 100 MW were fully subscribed within a week by solar PV projects. The SMUD feed-in tariff rates reflect its marginal cost for a new long-term generation asset (market price, ancillary services, generation capacity, transmission and sub-transmission capacity); and for eligible renewable resources, the costs of avoided greenhouse gas mitigation and risk avoidance of future natural gas prices. The rates are also adjusted for time of delivery periods.

Renewable Auction Mechanism

The Renewable Auction Mechanism, or RAM, is a simplified and market-based procurement mechanism for renewable DG projects up to 20 MW on the system side of the meter. The CPUC adopted RAM in December 2010 as the primary procurement tool for IOU system-side renewable DG. The RAM allows bidders to set their own price, use a standard contract for each utility, and allows all executed contracts to be submitted to the CPUC through an expedited regulatory review process. The CPUC ordered the utilities to hold two auctions per year and select bids based on lowest cost. The first auction will occur in the fourth quarter of 2011. To begin the program, the CPUC ordered the utilities to procure 1,000 megawatts through RAM. Going forward, the capacity authorization will reflect each utility's need for system-side DG under 20 MW.

IOU Solar PV Programs

The CPUC authorized Southern California Edison (SCE), Pacific Gas and Electric Company (PG&E), and San Diego Gas & Electric Company (SDG&E) to own and operate solar PV facilities as well as to execute solar PV power purchase agreements with independent power producers (IPP) through a competitive solicitation process. In total, these programs will yield up to 1,100 MW of new solar PV capacity in California over the next five years. SCE has 4.8 MW of utility-owned generation (UOG) online, and 35 MW under construction. PG&E has 2 MW of UOG online, and 50 MW under construction. In total, the programs authorize 526 MW of UOG and 574 MW of power procured directly through independent power producers.

CHALLLENGES

California is home to numerous and diverse renewable resources. This has resulted in creating several renewable markets with distinct needs and benefits. Continued attention to both the cost and the ultimate value particular resources and technologies provide to ratepayers, the electricity system and the state's economy will be necessary to further develop these markets.

Central to this continued development is agreeing on a clear set of guiding principles. Changes in government priorities, the continuous introduction of new programs, changes to the rules, and financial conditions in the state increase investor risk and are viewed by some as an impediments to further distributed generation development. While some uncertainty is likely unavoidably in a developing area such as this, it can be minimized with clear guiding principles and goals that are used to develop existing and future tools to serve this market.

Let a Thousand (or More) Flowers Bloom?

In order to promote the development of a wide range of renewable distributed generation, California has pursued a piecemeal strategy of varying programs dedicated to particular renewable resources, system or project sizes, technologies of a certain level of commercialization, and/or customer classes. Some of these programs have proven successful, like CSI; some like the state's feed-in tariff program, can be modified to attract new market participants; and some are just taking off, like the Renewable Auction Mechanism. By letting a thousand flowers bloom, California has provided more distinct avenues for renewable energy development than any other state in the union. This strategy has attracted criticism. Some complain that California has too many programs and that, in some instances, there is duplication and inefficiencies. Others recognize the value of establishing different programs for delivering different outcomes, each calibrated to mining a different value for diverse participants and stakeholders.

Some argue that such a piecemeal approach has resulted in program gaps and a potential need for more distinct programs unless current programs are adjusted to accommodate new resources, technologies and/or business models. For example, some bioenergy representatives believe existing customer-side distributed generation procurement mechanisms and incentives are too narrowly focused and do not currently support the development of a broad and diverse array of distributed generation technologies, and in particular small (less than 5 MW) distributed generation. One representative also argues that the AB 1969 feed-in tariff program pricing mechanism has not achieved its significant potential to encourage development of small renewable

distributed generation projects. The representative also highlight that the existing Net Energy Metering, Emerging Renewables Program and the Self-Generation Incentive Program are not available to all renewable technologies and that SGIP and ERP are limited to customer-side projects.

One representative of the commercial real estate industry has also identified gaps in existing programs. Current programs work best for entities that own and operate out of a certain facility. The CSI and SGIP programs and the NEM concept are ideal for those entities seeking to offset on-site load. These programs do not work for commercial real estate companies that lease large facilities, like warehouses. For these facilitiesthe leases typically are in the 3 -5 year range, but tenants are renewing options on an annual basis in order to buy time to evaluate market conditions.

The frequent turnaround of occupants does not incent participation in these customer-side programs. In addition, this industry is generally not able or may be less willing to spend the upfront capital for an endeavor outside of its core business. Therefore, new programs may be needed for this distinct business model given the hundreds of thousands of square feet of rooftop available and being managed in California by the larger commercial real estate companies. On the other hand, the commercial real estate industry could lease its rooftops to a project developer. These alternative must be considered when contemplating how best to serve this market segment.

What is "Value"?

The cost of developing a distributed renewable energy project differs greatly given such variables as the type of technology and its level of commercialization, project size and placement, and type of fuel resource. What also differs greatly is the "value" each of these potential projects can provide to ratepayers and the electricity system. However, there is no consensus on how best to define, measure, and compensate the value of varying distributed generation projects. Defining "value" should be a central theme of this panel, as well as a key element of any guiding principles that are developed.

This panel's participants reflect the differing opinions on defining and measuring the value of DG projects. Some representatives from the solar industry see higher value in projects that offset the need for distribution system upgrades, reduce peak demand, result in lower line losses and potentially avoid the need for transmission upgrades. In addition, some solar representatives believe development on rooftops have great value given it allows undeveloped land to be utilized for other economic, social or environmental purposes.

Bioenergy interests place particular value on having a diverse set of resources and technologies for utilities to procure from. In addition, these interests posit that technology and resource characteristics should be tagged with varying values. For instance, renewable resources and technologies can be assigned distinct values based on their ability to provide baseload or peak power, as well as on their environmental benefits.

Others consider "value" a less preferable metric as it suggests inclusion of proxies or non-quantifiable benefits. Cost and time could be more appropriate metrics to assess what the correct resource allocation may be. For instance, "value" can be found in ground-mounted projects of scale that significantly bring down costs by avoiding a rooftop-by-rooftop approach to generating similar quantities of electricity.

Need for financial products

Financial products provide capital to customer and system-side DG projects, and if properly designed can reduce investor risk and lower the final project and delivered power costs. Examples of financial products include Clean Renewable Energy Bonds, tax credits, third-party leases, Agriculture's Rural Utilities Service (RUS) loan program, tax-exempt municipal debt, and the PACE financing program.

Panelists' views differ on the need for additional financial products. Some argue that the current financial market provides sufficient debt capacity for all viable renewable projects. However others note that the current financial market does not support smaller, but viable, projects. For example, distributed solar representatives note that government PACE programs are a desired financing mechanism, but that the program is threatened. Under the program, cities set up special clean energy finance districts capable of issuing low-interest bonds. Participating homeowners can opt to use the bond money to pay for renewable energy and energy efficiency improvements, and then pay the loan back through a long-term assessment on their property taxes. This arrangement spreads the cost of a new solar energy system out across a 20-year payment plan that is easily transferable to the next property owner – a particular benefit to solar which can have longer payback periods. Also noted was the importance of the federal investment tax credit (ITC) cash grant for all renewable projects and the development carbon credits markets as tools for further financing distributed generation.

POTENTIAL SOLUTIONS

In order to further incentivize DG, panel participants generally support scaling these existing programs in a manner proportionate to their ability to deliver on the goal of

12,000 MW. Panel participants also seem to agree that expanding the NEM, feed-in tariff, and RAM programs are the most important steps in that process. There is some disagreement however on the extent to which these programs should be expanded financially and in technology scope.

Small distributed generation interests point out that the current system-side programs will chiefly deliver large (10-20 MW) ground-mounted solar PV systems in rural areas with great solar insolation. Therefore, if the state prefers siting on rooftops or bioenergy projects, then existing procurement mechanisms can be adjusted or new ones adopted in order to deliver these outcomes. With these comments in mind, the panelists proposed the following solutions for further discussion:

- Expand the net metering program to all eligible renewable technologies.
- Increase or remove the net metering cap in order to further allow customer self-generation.
- Implement SB 32 (Negrete-McLeod), which was chaptered in 2009 and revised by SB 2 (1x) in 2011.
- Develop policies that better align with real estate business models that choose to own and operate generation, including roof life cycle, tariff contracts, and tenant leases
- Scale up the Reverse Auction Mechanism beyond the current 1,000 MW capacity.