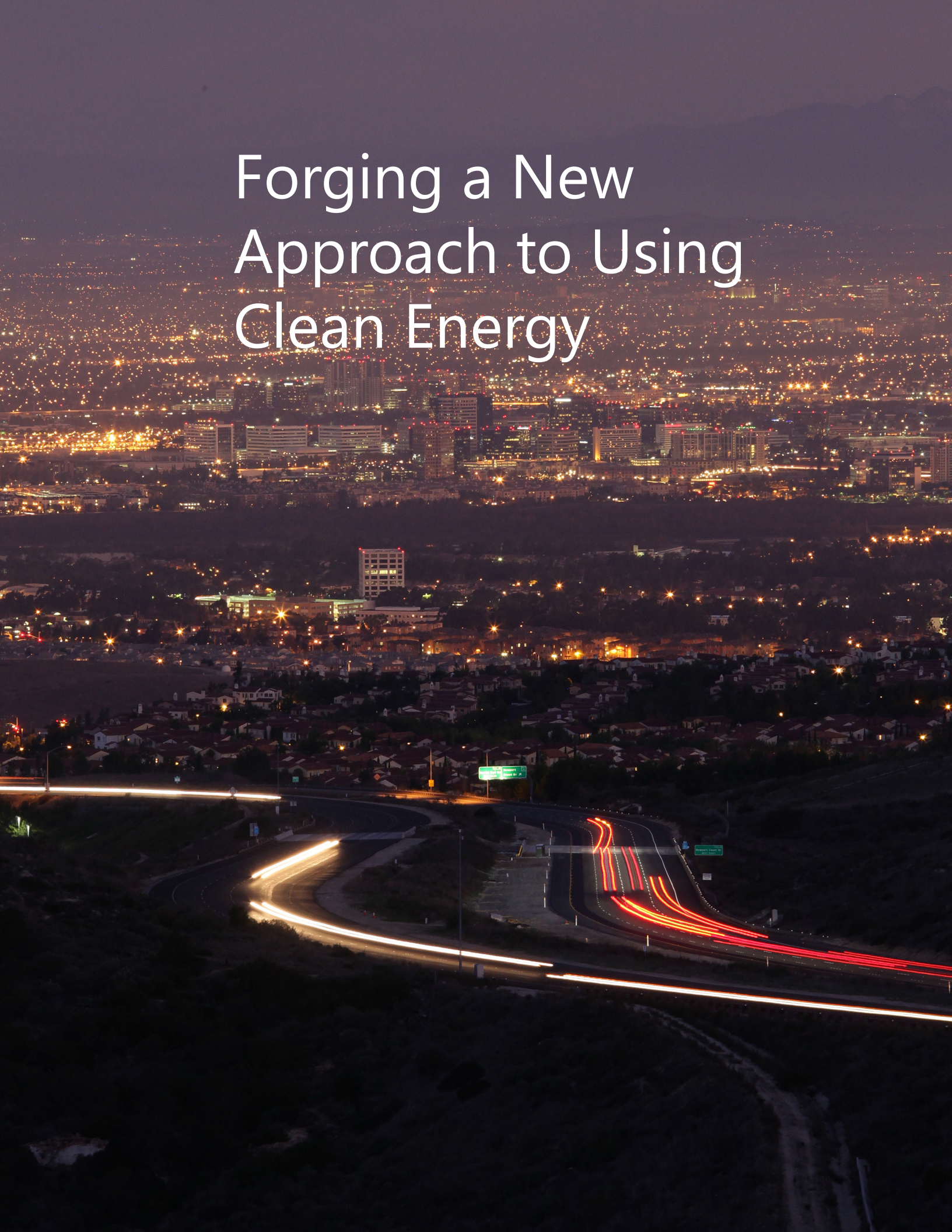




Preferred Resources Pilot Midyear Report

July 2015

Forging a New Approach to Using Clean Energy



Executive Summary

Southern California Edison (SCE) began the Preferred Resources Pilot (PRP) in November 2013 to identify and determine if a new portfolio of clean energy resources could address a transmission constraint.

Now in its second phase (2015-2017, Demonstration and Proof), the pilot is working to achieve the following milestone:

Demonstrate the ability to acquire and deploy a mix of preferred resources that meets the 2022 forecasted local needs. Measure the performance capabilities of those resources to defer or eliminate the need for new gas-fired generation in the PRP region.

To meet that milestone, the current design portfolio shows that more than 300 additional megawatts (MW) will be needed to meet the expected load growth in the PRP region through 2022. This need is due in part to the closure of the San Onofre Nuclear Generating Station (SONGS). Another contributing factor is the impending retirement of nearby ocean-cooled power plants, which may impact grid reliability.

SCE established a 2015 acquisition goal of 100 MW for delivery by year-end 2017. As of May, the company has acquired 91 MW. Progress and activities during the first half of 2015 have been promising and challenging, pushing SCE to seek innovative ways of acquiring the needed clean energy resources.

For example, SCE worked closely with one owner of several commercial buildings to develop a

solution to a barrier that previously made it more difficult for the building owner to participate in some Energy Efficiency (EE) programs on behalf of its tenants. That solution is being tested to determine how it can be more broadly deployed.

In addition, obtaining site control and working through the interconnection process were identified as barriers in the PRP Renewable Distributed Generation (DG) Request for Offers (RFO) that was launched in November. SCE responded by making adjustments to the solicitation and continues to work on longer term solutions.

The breadth of challenges facing the pilot is not unusual given the uncharted work that is required. This trailblazing includes analyzing data in new ways and for new purposes, such as partnering with industry experts to more accurately capture data, particularly behind-the-meter solar and EE savings information.





Another critical activity is expanding the way our customers think about and optimize the use of preferred resources. Therefore, stakeholder engagement has been an important part of the PRP's efforts. Earlier this year, SCE conducted outreach with more than 1,000 commercial and industrial customers within a smaller region of the PRP. The outreach resulted in the identification of about 200 customers who are considering new EE upgrades.

Another important outreach took place in June 2015 when the PRP team met with the California Energy Efficiency Industry Council, an organization whose constituents deliver energy efficiency (EE) and demand response (DR) offerings. SCE began an important dialogue on potential solutions to overcome barriers to greater adoption. The valuable feedback is being studied and expanded to determine the most effective ways to implement changes.

Now, and moving forward, SCE is committed to a stakeholder engagement approach, fully understanding that the PRP's success will be driven by customer participation and market delivery.

SCE welcomes your input and feedback. Please send your comments to:
preferredresources@sce.com

What Are Preferred Resources?

Energy Efficiency (EE)	Demand Response (DR)	Energy Storage (ES)	Renewable Distributed Generation (DG)
 <p>Business and residential programs for buildings and appliances that conserve and manage energy consumption. EE allows the delivery of more services for the same amount of energy, or the same amount of energy services for a smaller amount of energy.</p> <p>Example: A light bulb that uses less power (watts) to produce the same amount of light, like an LED.</p>	 <p>Reduction in electric usage by customers from their normal consumption patterns in response to periods of peak demands on the power grid and increases in electricity prices.</p> <p>Demand response customers are provided incentives to respond, when needed, to help ease temporary strains on the electricity system.</p>	 <p>Technology used to store energy for later use. When used in collaboration with renewable distributed generation, ES can complement DG and create a dependable and predictable amount of power delivered over a period of time.</p> <p>Promising advances in this technology combined with state policy goals will soon make ES more prevalent.</p>	 <p>Local electrical generation from renewable resources such as solar, rather than large, centralized generating facilities.</p> <p>Although the PRP region is not suited geographically or economically to wind-generated electricity, wind power is used in other regions of SCE's territory.</p>

Additional Resources

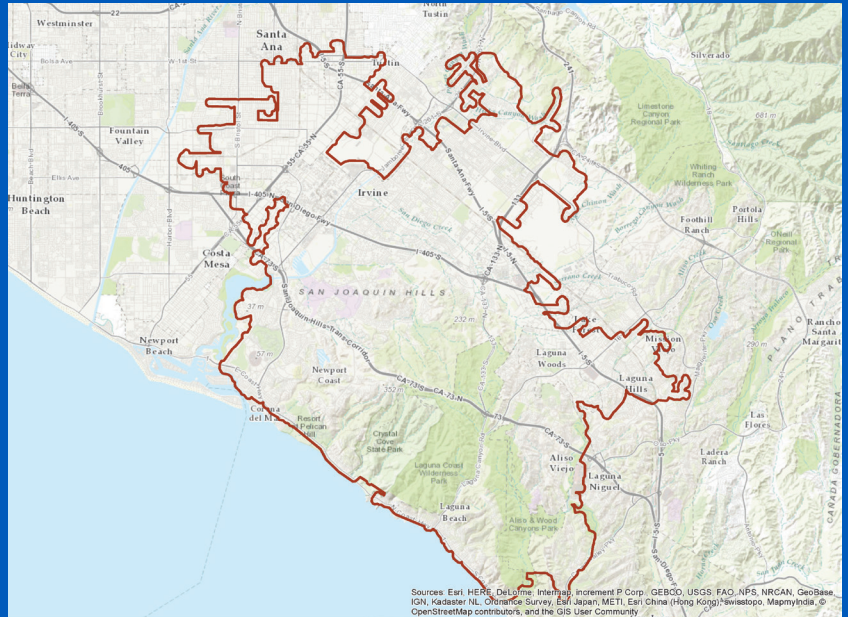
Advanced Technology (AT) - Maximizing the benefits of preferred resources will require the use of advanced technology. For example, in the PRP Distributed Generation RFO, a preference may be given to solar generating systems that enable "smart" capabilities. Additionally, within a smaller region of the PRP, SCE is accelerating deployment of preferred resources and will test advanced automation, enhanced communication networks and grid management control systems to enable the integration of a concentrated amount of preferred resources on a limited number of distribution circuits.

Behavioral Initiatives - Since the PRP is focused on reducing the peak demand for electricity, SCE intends to glean insights from the statewide Time-of-Use (TOU) Initiative as applied to non-residential customers. Under the initiative, rates are lower when the demand for energy is low and conversely, rates are higher during periods of high demand.



PRP Region

The PRP region in Orange County encompasses a large part of the cities of Irvine, Tustin, Santa Ana and Newport Beach, as well as all or parts of the cities of Aliso Viejo, Corona del Mar, Costa Mesa, Laguna Beach, Laguna Woods, Laguna Hills, Laguna Niguel, Lake Forest and Mission Viejo. The area is composed of approximately 204,000 residential customers and 30,000 commercial and industrial (C&I) customers.



Four Major Work Streams

Portfolio Design

Key Activities: Forecasts the electrical demand growth through 2022 and the required performance attributes of preferred resources. Assesses customer and market potential for obtaining the needed preferred resources and designs preferred resource portfolio options.

Key Learning: Demand for electricity in the PRP region had a growth rate of 28 MW/year in 2013 and 32 MW/year in 2014. This increasing rate of growth is forecast to continue based on regional demographics.

Acquisition

Key Activities: Identifies and acquires the appropriate mix of preferred resources and establishes a pipeline to meet the need for more than 300 additional MW.

Key Learning: Flexibility and ability to quickly respond to changing market conditions are critical to the acquisition of preferred resources in a local, highly urbanized area, as demonstrated by the changes SCE implemented in its PRP DG RFO.

Measurement

Key Activities: Measures grid-level impacts (i.e., demand reduction and production) to confirm preferred resources can meet reliability needs and informs Portfolio Design, Acquisition and Implementation.

Key Learning: Some EE measures may be used more tactically to offset demand at a circuit level.

Implementation

Key Activities: Works to ensure successful deployment of resources, including addressing barriers to deployment, demonstrating viable approaches to realizing the PRP pipeline and ultimately providing feedback to Design and Acquisition to better inform strategies.

Key Learning: Grid reinforcement may be needed to increase the distribution grid capacity to accommodate higher preferred resources penetration.

How Much Power Do We Need?



Current Acquisitions (MW)⁺

Energy Efficiency 34

Demand Response 31

Distributed Generation 25

Energy Storage 1

Total 91

⁺ Resources as of May 2015 for delivery by year-end 2017. (See PRP's Acquisition Progress graph on Page 5.)

2015 Objective

100 MW
for delivery by
year-end
2017



2016 Objective

150 MW*
for delivery by
year-end
2018



2017 Objective

Implement,
measure and
confirm
pipeline

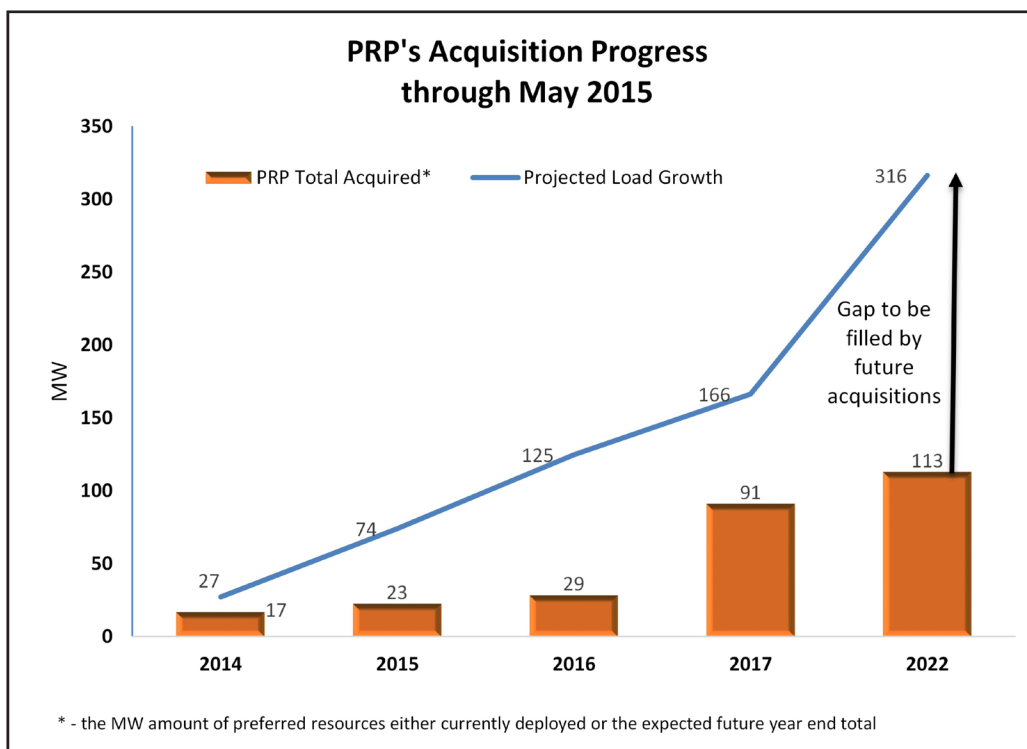


2018 Decision

PRP Milestone
decision**
anticipated in
first quarter



* Cumulative MW
** Determine capability of preferred resources



“The PRP is all about the future of electrical generation, grid reliability and protecting our environment. While the benefits of preferred resources are numerous, at its heart it is a comprehensive effort to provide a safe and cost-effective alternative to building new carbon-emitting power plants.”

- Pete Dietrich, SCE Senior VP, Transmission and Distribution

“This pilot is a real-world test where SCE is exploring how cleaner energy resources can help maintain or improve electric service reliability in a densely populated area and potentially lessen dependence on natural gas generation. The pilot is a timely and necessary step to facilitating optimal use of preferred resources.”

- Caroline McAndrews, Director, PRP

PRP Milestone 1 (Anticipated First Quarter 2018):

Demonstrate the ability to acquire and deploy a mix of preferred resources that meets the 2022 forecasted local needs. Measure the performance capabilities of those resources to defer or eliminate the need for new gas-fired generation in the PRP region.

Activity 1 - Establish a pipeline of preferred resources (acquire) to meet the 2022 load growth.

Acquisition Strategy

1. Leverage existing customer EE and DR programs and customer self-generated power (typically solar and energy storage).
2. Use existing solicitations to contract with third parties to deliver preferred resources. Current examples include the Local Capacity Requirements (LCR) and Solar Photovoltaic Program (SPVP) RFOs.
3. Implement PRP-specific solicitations or grants in response to PRP needs. Current examples include the PRP Renewable DG RFO.

Progress Update (Through May)

- Total of 91 MW deployed or committed for delivery by year-end 2017:
 - 23.1 MW from existing customer programs and customer self-generated power.
 - 67.4 MW from existing solicitations.
 - 1 MW from a California Energy Commission (CEC) grant.
- Launched PRP Renewable DG RFO in November 2014; submission deadline was July 10, 2015.

Lesson Learned

Obtaining site control within the original RFO timeline and working through the interconnection process were identified as barriers. The following actions were taken to assist developers:

- Lowered minimum output requirement from 500 to 250 kW
- Eliminated requirement to submit, as part of the offer, a completed fast track or study.
- Extended the offer due date by three months.

SCE will determine if distribution grid investments are needed to facilitate a higher generation of preferred resources

- Worked with industry expert to complete a solar siting survey in March, identifying potential target areas where approximately 160 MW can be acquired for systems of 500 kW and above.
- Completed Resource Gap Analysis in May, identifying need for a combination of solar, demand response and energy storage.

- Executed and received approval for a 1.4 MW project with SunEdison through the Solar Photovoltaic Program (SPVP) RFO No. 4.
- Launched SPVP RFO No. 5 in early July with a submission deadline of Sept. 21, 2015.
- Applied for DOE SHINES grant, in partnership with SolarCity, Pacific Northwest National Laboratory and Electricore, Inc., to develop and demonstrate integrated, scalable and cost-effective technology combining solar and energy storage technologies (0.5 MW). Among finalists and waiting for results.

Stakeholder Engagement

- Continued to meet with multiple vendors to understand the products they may bring to the PRP to fulfill "resource gap" needs and to better understand and encourage market participation.
- SCE's IDEEA 365 Request for Abstracts soliciting EE and DR ideas is posted on the state's Proposal Evaluation & Proposal Management website. The website highlights the PRP and seeks to fund innovative programs that enhance electric system reliability.

Listening and Learning



Earlier this year, SCE worked with a customer to develop a solution to an owner-tenant barrier that made it more difficult for the building owner to participate in some EE programs on behalf of its tenants.

SCE is now testing an amended program to determine how these changes may be more broadly deployed. The changes are expected to attract more businesses to EE programs within the PRP.

Resources for Reliability: Closing the Gap

To support the PRP, SCE included a preference in its Local Capacity Requirement (LCR)* RFO for resources delivering into the PRP area. As a result, SCE has contracted for 88 MW in the PRP through the LCR RFO with 66 MW expected in 2017.

These LCR contracts will improve SCE's ability to reliably serve customers and help build a pipeline of resources to inform SCE's decision to defer or eliminate plans for additional gas-fired generation in the region.

At right is a list of suppliers from the LCR RFO that have been selected to provide preferred resources in the PRP region.

Supplier	Resource Type
Onsite Energy Corporation	EE
Sterling Analytics	EE
NRG	EE
NRG	DR
Stem	DR (Energy Storage)
Advanced Microgrid Solutions	DR (Energy Storage)
Ice Bear SPV 1	DR (Permanent Load Shifting)
Sunpower	Renewable DG

* The minimum amount of local resources that are needed to maintain reliability.

Activity 2 - Deploy (develop, install and put into operation) a sufficient mix of preferred resources to support integrated use.

Deployed Preferred Resources (MW Through May 2015)			
Resource	2014 Achieved	2015 Achieved/Target	Total Achieved
EE	8.5	2.5/8.0	11.0
DR	0.0	0.0/3.0	0.0
DG - CSI	6.3	0.4/4.6	6.7
DG - Non-CSI	2.3	3.1	5.4
			23.1*

*MW deployed of the total 91 expected by year-end 2017.



Progress Update

- SCE developed the EE and DR portfolio and California Solar Initiative (CSI) 2015 PRP goals as follows:

	(MW)
EE	8.0
DR	3.0
DG (CSI)	4.6

- In 2015, SCE was authorized to offer an enhanced locational EE incentive. As a result, non-residential customers in the PRP region who implement certain EE programs may receive \$30/kW on top of the standard \$150/kW incentive as part of the pilot.
- In April, SCE entered into a Memorandum of Understanding (MOU) with the Irvine Ranch Water District to identify, study, research and recommend actions and strategies to benefit IRWD and the PRP. The partnership seeks to align customer energy products and benefits with grid

reliability needs. The team will be evaluating energy efficiency and self-generation activities to offset the electrical demand.

- SCE launched the LED Retrofit Project in second quarter 2015 to business customers within the PRP who are considering replacing existing 4-foot T-8 linear fluorescent lamps with LED tube lamps. Application deadline was June 30, 2015.

Stakeholder Engagement

- SCE Customer Service has scheduled an Integrated Demand Side Management (IDSMS) Summer Readiness Workshop for businesses to show how they can better control and manage electricity usage and demand while qualifying for financial incentives.
- “Feet on the Street” - Account managers visited approximately 1,000 small business customers within a small region of the PRP

to inform them of PRP goals and engage them in the installation of preferred resources.

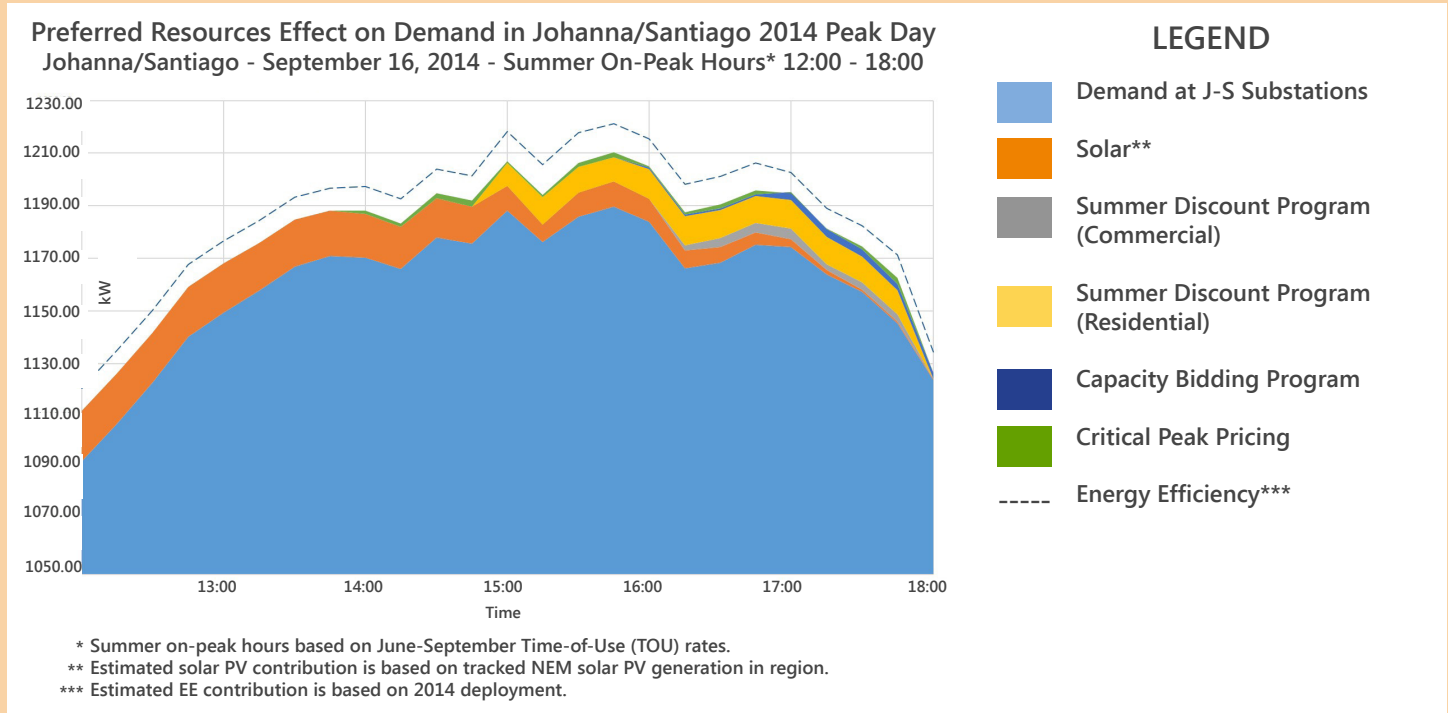
- In June 2015, SCE met with the California Energy Efficiency Industry Council (CEEIC), a group of vendors who deliver several EE and DR programs. Participants began an important dialogue on barriers to greater adoption as well as potential solutions. SCE will continue to work with CEEIC to better deliver EE and DR programs for grid reliability purposes.



Partnering for Progress

SCE's Energy Related Services Program completed a project in the PRP region that optimizes lighting, heating, ventilation and air-conditioning efficiencies. Also included in the project was a 130 kW solar rooftop system. Workers in this photo are installing mechanical window shades, which automatically adjust based on the sun's position, and lighting controls that raise or lower the light level based on available sunlight. Changes have significantly lowered cooling and lighting requirements.

Activity 3 - Measure preferred resources capabilities to meet peak load.



Progress Update

- SCE is broadening its work with Clean Power Research to better understand the specific generation attributes of behind-the-meter solar customers. Each system has unique characteristics, so individual modeling provides a clearer picture of the solar generation profile. The scope of individually modeled systems was roughly doubled to include all non-California Solar Initiative behind-the-meter customers. This work is important because:
 - Additional data will provide improved generation estimates for all behind-the-meter solar in the PRP (approximately 3,400 systems).
 - Additional data will allow analysis of seasonal

variations and coincidence of peak solar generation with peak demand for the PRP.

- SCE completed two studies to examine grid-level impacts of a sample of commercial and industrial customers who installed energy efficiency upgrades. (See Analyzing for Answers on Page 11.)

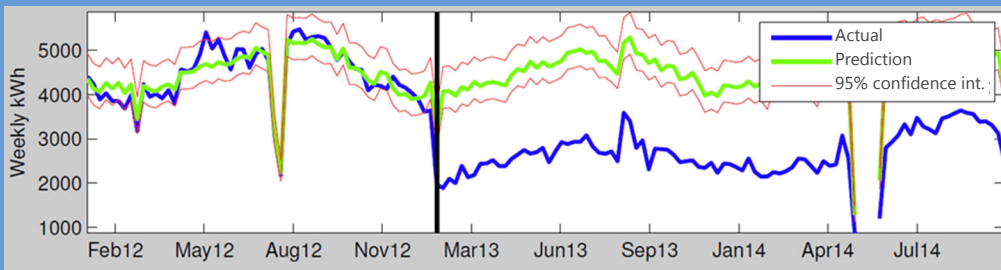
Stakeholder Engagement

- At the 33rd annual West Coast Energy Management Congress (WCEMC) in June 2015, SCE shared PRP insights for serving the region's needs with preferred resources. (See graph above.) The event is among the largest energy conferences and technology expos held on the West Coast. SCE co-sponsored the event, which is presented by the Association of Energy Engineers (AEE).

“The California Energy Commission looks forward to learning with SCE through the Preferred Resources Pilot how preferred resources may be best used to meet system needs.”

- Robert B. Weisenmiller, Ph.D.
 Chair, California Energy Commission

Analyzing for Answers



↑
Date of EE upgrade

The sample graph at left depicts a customer's net decrease in energy use after installing EE upgrades.

Graph provided courtesy of FirstFuel.

The tactical deployment of EE upgrades may help to defer or avoid distribution-level investments.

EE analyses performed by vendors identified groups of customers with predictable, repeatable energy use patterns. Their meter data show a net decrease in peak period demand after installing EE upgrades.

The PRP is looking to identify facilities that, when paired with certain EE upgrades, may show a similar and predictable net decrease in peak period demand.

Identifying these types of facilities in the PRP region could support testing of tactical deployment of EE upgrades.

Understanding Behind-the-Meter Challenges



The phrase "behind-the-meter" (BTM) refers to electricity that's produced at a customer's home or facility, which is directly fed into a customer's main electrical panel. In BTM installations, the electricity is used by the customer or exported to the grid. However, SCE does not always have knowledge of the system's actual production, since separate metering of solar is not usually required.

The challenge from an operational perspective is the limited ability to see or forecast the output from BTM systems. Limited information makes it difficult for utility system operators to make decisions in response to outages or necessary system configurations, as well as decisions for long-term planning of the system. As the number and capacity of BTM systems increase, solving this challenge will become increasingly important.

Moving Forward

As the PRP moves forward, SCE will continue to assess the use of preferred resources and adjust the portfolio design to meet our current milestone and beyond.

Activities will include expanded stakeholder engagement to identify untapped markets and to build stronger partnerships with customers. This engagement will also help to bring to light solicitation and implementation barriers for thoughtful and timely resolution.

Measurement information currently being collected and analyzed will also assist SCE to better understand the grid-level impact of preferred resources at times of peak demand.

As the PRP knowledge base continues to expand with better and more detailed information, SCE will be well-equipped to determine the availability and capabilities of preferred resources in meeting 2022 forecasted local needs.

The pilot remains focused on supporting the company's core mission - safely meeting customer needs with reliable and affordable electricity. The PRP is taking that mission one step further by increasing acquisition of low-carbon, clean energy sources to meet future load growth needs.

Use of Energy Efficiency (EE) Resources Helps to Reduce Energy Consumption



New LED lighting installations in the PRP region provide the same amount of light but use less power, therefore lowering energy costs.



Community Choice: The Future is Now

More and more of SCE's customers are taking an active role in serving and managing some of their own energy needs. One school district in the PRP region made the choice to use solar to supplement their energy requirements. This is just one very good example of how community decisions can positively impact the future of energy.



Reprinted with permission of the Newport-Mesa Unified School District.

"On September 9, 2014, the Newport-Mesa Unified School District Board of Education approved the installation of solar photovoltaic structures in the form of carports and lunch shelters to be installed across numerous sites within the District. The District has completed the design and location of the structures at thirty-two (32) district sites where such structures are feasible and cost-effective...

The total project budget is \$13 million. A portion (\$3 million) will be funded with a no-interest loan from the California Energy Commission, \$5 million will be funded from Proposition 39 funds and the remaining \$5 million will be funded from the District's Special Reserve Funds for Capital Outlay. The savings from the photovoltaic installations will pay back the District its investment and provide an income stream over the twenty-five (25) year life of the system. No general funds which could have been used in classrooms will be employed in the projects."

SCE conducted a webinar for developers interested in bidding into the Solar Photovoltaic Program (SPVP) RFO 5, launched in early July. The SPVP seeks to enter into contracts with independent power producers that have generating capacities greater than or equal to 500 kW.



PRP Efforts Recognized

"SCE's Preferred Resources Pilot serves as a template for the future. My hope is that one day we will look back at this as where holistic, sustainable and integrated electricity programs truly began."

Joseph K. Lyou, Ph.D., President and CEO,
Coalition for Clean Air

"SCE's Preferred Resources Pilot program moves the ball forward on several different opportunities which can help reduce our reliance on fossil-fueled generation in California, including efficiency, demand-side management and renewables."

David Pettit, Senior Attorney,
Natural Resources Defense Council

"SCE's Preferred Resources Pilot is a model for investigating and demonstrating the effectiveness of distributed energy resources."

Craig Lewis, Executive Director,
Clean Coalition



Appendix



Websites:

SCE's PRP website:
on.sce.com/preferredresources

Edison International preferred resources website:
edison.com/preferred-resources

PRP DG RFO website:
sceprprfo.accionpower.com

PRP Solar Siting Survey:
clean-coalition.org/resource/solar-siting-surveys/

IDEEA 365 website:
pepma-ca.com/Public/PublicEvents.aspx?type=1



Topics of Interest:

Newsletter of the California Energy Commission:
energy.ca.gov/commission/newsletter/newsletterArticle.php?new No=45

Contact Information:

preferredresources@sce.com



A Few Solar Projects in the PRP Region



Solar panels on carports



Rooftop solar on an office building



Solar on parking structures