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SCTY Comments - Draft Aliso Canyon Action Plan

Additional submitted attachment is included below.



April 22, 2016

Chair Robert B. Weisenmiller
California Department of Energy
Dockets Office, MS-4
Re: Docket No. 16-IEPR-02
1516 Ninth Street
Sacramento, CA 95814-5512

RE: Aliso Canyon Action Plan for Local Energy Reliability – Summer 2016

Dear Chair Weisenmiller,

SolarCity respectfully submits the following comments on the draft Aliso Canyon Action Plan.

Background

SolarCity is a full service solar power provider for homeowners and businesses – a single source for engineering, design, installation, monitoring, and support. At present, the company has more than 6,000 California employees, based at more than 40 facilities around the state and had installed solar energy systems for over 230,000 customers nationwide as of December 31, 2015.

In addition to rooftop solar, SolarCity develops and deploys other non-solar distributed energy resources (DER) for both residential and commercial applications. Specifically, SolarCity offers smart thermostats, smart electric water heaters, and battery energy storage systems to help customers manage their energy use. Accordingly, SolarCity has a strong interest deploying technologies that help reduce the state's greenhouse gas (GHG) emissions and meet its climate and clean energy goals.

Overall Comments

SolarCity commends the leadership of the California Public Utilities Commission (CPUC), the California Energy Commission (CEC), the California Independent System Operator (CAISO), and the Los Angeles Department of Water and Power (LADWP), collectively the Joint Agencies, and staff in developing the Aliso Canyon Action Plan in a timely and efficient manner. The electric reliability issues created by the situation at Aliso Canyon highlight the wisdom of California's decision to move aggressively to promote rooftop solar, energy efficiency, and demand response over the past 15 years. If the state had not chosen to promote these distributed fossil-free resources following the last reliability crisis in 2000, the state would be in a much more dire position today.

We therefore appreciate the opportunity to comment in particular on the mitigation measures recommended by the Joint Agencies including using new and existing programs asking customers to reduce natural gas and electricity consumption.¹

¹ Aliso Canyon draft Action Plan, p.30 *available at* http://www.energy.ca.gov/2016_energypolicy/documents/2016-04-08_joint_agency_workshop/Aliso_Canyon_Action_Plan_to_Preserve_Gas_and_Electric_Reliability_for_the_Los_Angeles_Basin.pdf

Reduce Natural Gas and Electricity Use

As part of the mitigation measure strategy “Reduce Natural Gas and Electricity Use” referenced in the draft Action Plan, the Joint Agencies include several examples of existing programs that would decrease reliance on fossil fuels, reduce greenhouse gases, and promote energy efficiency and renewable energy resources. While all of the programs referenced will help drive the state toward meeting the mitigation goals, SolarCity notes that there are several additional actions that can be taken in the near term to improve local energy reliability in the Los Angeles (L.A.) Basin.

As referenced in SolarCity’s comments regarding the California Air Resources Board (ARB)² draft mitigation program and during the public comment period provided at the Joint Agencies workshop on April 8, 2016, SolarCity believes that offering incentives for replacing natural gas end use appliances is an essential strategy for ensuring reliability in the L.A. Basin this year as well as moving California closer to its long term greenhouse gas (GHG) emission goals. In particular, we believe that incentivizing consumers to invest in rooftop solar photovoltaics (PV) paired with energy storage and replace their natural gas water heater with electric water heating powered by carbon-free solar electricity are near term strategies that will not only provide the desired emission reduction and reliability benefits but also prove cost effective.

Rooftop Solar PV

Rooftop solar is an ideal resource to meet the summer afternoon peak demand for natural gas-fired electric generation: it can be deployed easily in transmission-constrained load pockets; it generates energy during the peak hours; and it can be deployed quickly without the need for extensive environmental review, new transmission lines or other infrastructure.

There is already nearly 500MW of rooftop solar installed in the LA Basin³, and it is clear that the potential gas curtailments identified in the Aliso Canyon Risk Assessment Technical Report would be significantly higher without these PV systems.⁴ Based on the production profile of solar on the peak day from 2015⁵, the rooftop solar already in place can be expected to offset over 20 million cubic feet of gas usage on this summer’s peak day⁶. This represents nearly 25% of the Curtailment Volume identified in Scenario 1 of the Joint CAISO/LADWP analysis within the report.⁷ Increasing adoption by another 300MW by the summer of 2017 would reduce the Curtailment Volume in this scenario by more than 40%.

There are several specific measures that could help accelerate the deployment of behind-the-meter solar in the L.A. Basin. Such measures could include:

1. Utilities promoting the benefits of solar in these local areas and promoting solar PV in outreach to customers, especially “Super-Users.”
2. Allowing power purchase agreements (PPAs) in LADWP territory to increase solar installations for large commercial projects.

² SolarCity Comments on Draft ARB Aliso Canyon Mitigation program submitted on Mar 24, 2016, *available at* <http://www.arb.ca.gov/lists/com-attach/40-alisompdraft-ws-UiFXMgRxV30KU1Q3.pdf>

³ Source: CSI database; MWs installed in LA and Orange Counties as of Jan 1st 2016

⁴ Aliso Canyon Risk Assessment Technical Report, Appendix A, p.53, *available at* http://www.energy.ca.gov/2016_energy_policy/documents/2016-04-08_joint_agency_workshop/Aliso_Canyon_Risk_Assessment_Technical_Report.pdf

⁵ Assumed solar profile is from PV Watts for Long Beach Airport weather station

⁶ Assumes an average heat rate of the natural gas fleet of 8000 BTU/kWh

⁷ *Id.*, p. 33

3. Accelerating interconnection for PV in areas in most need of local reliability services.
4. Implementing the recalculation and raising of LADWP's net energy metering (NEM) cap.
5. Postponing the requirement that SCE net energy metering successor tariff (NEM 2.0) customers take service on Time-of-Use rates until after the reliability concerns have been resolved.

Promoting Solar PV to Customers

As the primary agents of outreach and customer communications, utilities have a unique opportunity to educate customers about the benefits of rooftop solar and other distributed energy technologies. Unfortunately, the opportunity is often overlooked. For example, in Advice Letter 3294-E, Southern California Edison submitted plans for outreach to "Super-Users" (those customers using more than 400% of baseline) that did not include mention of distributed generation as a potential means to reduce consumption. Utilities should be required to include distributed generation as part of their integrated demand-side education and outreach efforts.

PPAs and Community Solar

One specific opportunity to reach the goal of deploying an additional 300MW of solar by summer of 2017 is allowing PPAs in LADWP territory thereby increasing the installation of large scale commercial projects. These projects could also be utilized for enabling community solar. Allowing LA Unified School District (LAUSD) schools to participate in PPAs for solar can provide a major boost for solar capacity in the Aliso Canyon area and directly benefit local schools by lowering energy costs. In particular, waving the PPA restriction for schools in low income neighborhoods in the greater L.A. area could potentially enable the school to sell excess energy to the neighborhood as part of a community solar program.

Accelerating Interconnection

The draft Action Plan specifically points out "LADWP offers financial incentives for solar PV for both residential and commercial customers and has taken steps to reduce approval times for solar system installations."⁸ Accelerated interconnection could be further accomplished by hiring additional Electric Service Representatives (ESRs) and adopting a Renewable Meter Adapter (RMA). This would minimize delays for the many installations that require a main panel upgrade.

LADWP NEM Cap

In December 2015, LADWP agreed to recalculate and raise its NEM cap to align with the aggregate peak demand calculation methodology utilized by the investor owned utilities (IOUs). In order to ensure that solar in LADWP territory continues to be deployed at an increasing rate, the process to implement the NEM cap calculation should be expedited. As an alternative, LADWP could uncap the program entirely, as New York City recently decided to do.

SCE Time-of-Use Requirement for NEM 2.0

As part of the Decision implementing NEM 2.0, the CPUC required new NEM customers to take service on time-of-use (TOU) rates. SolarCity supports this decision and feels that time-of-use will be a critical tool in promoting renewable integration and helping the state reach its climate goals. Nevertheless, moving to mandatory TOU will be a challenge for the solar industry that will likely slow solar adoption in the near term. Since the hours of peak gas demand largely coincide with the hours of peak solar PV production (1-9 pm),⁹ and the natural gas storage constraint is largely a daily problem, the state should seek to promote maximum solar PV output during the critical hours by delaying the TOU requirement for NEM 2.0 until after the crisis has passed.

⁸ Aliso Canyon draft Action Plan, p.32

⁹ Aliso Canyon Risk Assessment Technical Report, Figure 19, p. 44

Electric Water Heating Paired with Solar PV

More than ten million California homes burn natural gas to heat their water today¹⁰, consuming over 180 trillion BTUs of fossil energy per year.¹¹ By switching the heating fuel source from natural gas to solar-generated electricity in these homes, over 9.5 million metric tons of greenhouse gas emissions could be avoided annually, yielding societal benefits of \$550 million per year based on the Environmental Protection Agency's (EPA) societal cost of carbon (\$36 per metric ton).¹² Over the life of these water heaters, more than \$8 billion of nominal greenhouse gas benefits could be created.

As important, these electric water heaters could significantly increase California's capability to cost-effectively integrate additional solar energy, further decarbonizing California's energy sector. Widespread electrification of water heating with controls could unlock an additional 20 gigawatts (GW) of solar hosting capacity on California's grid, more than the total amount of solar installed in California today. Additionally, 20 GW of solar-enabled electric water heating would produce enough energy for over 8 million California homes and avoid \$3.2 billion annually in energy purchases from conventional resources, among other benefits.¹³ Further benefits would be delivered by these systems in the form of peak demand capacity, conservation voltage reduction, and reactive power support, among others. Additional details on the full benefits of rooftop solar can be found at www.solarcity.com/gridx.

In 2015, California residents installed roughly 1,000 MW of rooftop solar PV systems, eliminating or substantially reducing the use of carbon-intensive grid electricity at around 200,000 homes. While this achievement in itself significantly reduced the state's natural gas consumption, those households could have reduced natural gas use even further for a small additional cost if they had added extra solar PV panels and switched from natural gas to electric water heaters programmed to heat water in the daytime using solar-generated electricity.

The idea of using rooftop solar PV to heat water using an electric resistance water heater – which effectively acts as a battery, storing the solar-generated energy – is not novel. In Hawaii, where electricity prices are high, the practice of installing programmable electric water heaters to store solar energy is beginning to gain traction. While abnormally low natural gas prices in California make the economics of switching away from natural gas water heating challenging for residential customers, a relatively small state rebate would likely kick-start this market and bring the practice of pairing solar PV with electric water heating more into the mainstream.

Grid Services

In addition to pairing electric water heaters with solar PV to eliminate natural gas use for water heating, switching to electric water heaters even without solar PV can be an effective strategy for reducing natural gas use, as long as those water heaters are able to respond to grid needs and heat water at times when the carbon content of electricity is low. As California increases its supply of large-scale solar PV resources, there will be an increasing need for end-uses that can shift consumption into the daytime hours.

¹⁰ U.S. Energy Information Administration, Residential Energy Consumption Survey, Water Heating in U.S. Homes, 2009.

¹¹ Based on average water heater usage (64 gallons per day) and typical natural gas heater efficiency (60%) across 10.3 million homes in California relying on natural gas for water heating.

¹² Based on the EPA's 2015 Societal Cost of Carbon with a 3% societal discount rate.

<https://www3.epa.gov/climatechange/EPAactivities/economics/scc.html>

¹³ Assuming 1600 kwh/kw-year average solar production and 6,500 kwh/year average residential consumption based on EIA California residential data.

Technologies like grid-enabled electric water heating cannot only absorb excess renewable power at certain times of the year, but they can also provide grid services such as frequency regulation and load balancing through regulation reserves and reduce the need for certain types of flexible fossil generation.¹⁴

Existing Incentives for Reducing Natural Gas in Water Heating

As noted in the draft Action Plan, California currently seeks to reduce natural gas use in water heating through the CSI-Thermal program, which offers rebates for solar thermal water heating systems that use solar thermal collectors with heat exchangers to reduce (but not completely eliminate) the amount of natural gas used in domestic water heating.¹⁵

While solar thermal systems are an important resource in California's energy mix, there are likely instances where it would be more cost-effective to use solar PV and electric water heating to eliminate natural gas use. For example, in cases where a homeowner is already installing solar PV to reduce electric demand, the customer could leverage the economies of scale from the solar PV installation by adding an additional 5-10 panels and switching the natural gas water heater to an electric water heater with controls that allow it to charge with daytime solar energy. Displacing natural gas water heating and natural-gas fired home electric load with a single solar PV system can create efficiencies (such as permitting, labor and design), compared with using two different systems (solar PV + solar thermal) to accomplish that goal.

It is also important to note that due to limited roof space, a customer might not be able to install both a solar PV system and a solar thermal system, and thus the installation of a solar PV system might preclude the customer from installing a solar thermal system. SolarCity feels the state is missing a critical opportunity to address natural gas in domestic water heating that could be captured at the time customers install a solar PV system, simply by sizing the PV system slightly larger and switching to controllable or grid-enable electric water heating.

Under the CSI-Thermal program, residential customers can earn rebates of up to \$4,366 for installing a solar thermal water heater that costs roughly \$9,000¹⁶ and reduces natural gas usage in water heating by 50 - 80%.¹⁷ By contrast, there are no incentives available for electric water heaters paired with solar PV, which can eliminate 100% of the home's natural gas used for water heating.

L.A. Basin Pilot Program

In spite of the favorable economics for solar PV paired with electric water heating, the state's extraordinarily low natural gas prices provide relatively little incentive for customers to make the investment in an electric water heater and in general, do not provide a competitive environment for electric water heaters. Thus, in order to overcome market barriers in the near term and foster market transformation of this technology, SolarCity recommends the state consider adopting a rebate program for grid-enabled electric water heaters paired with rooftop solar PV.

Because there are a number of technical issues – such as rebate levels, technology requirements, etc. – that should be examined before adopting a statewide rebate program, and due to the urgent nature of the

¹⁴ NRDC and NRECA, "The Hidden Battery Opportunities in Electric Water Heating," available at <http://www.nreca.coop/wp-content/uploads/2016/02/The-Hidden-Battery-01-25-2016.pdf>

¹⁵ Aliso Canyon draft Action Plan, p. 32

¹⁶ CSI-Thermal Program data: <http://csithermalstats.org/>

¹⁷ U.S Department of Energy: <http://energy.gov/energysaver/estimating-cost-and-energy-efficiency-solar-water-heater>



reliability issues in the L.A. basin, SolarCity recommends the state adopt a limited 2-year pilot program in the L.A. Basin for grid-enabled electric water heaters paired with rooftop solar PV. The pilot program could be utilized to test rebate levels and technology standards as a first step for a larger statewide incentive program.

SolarCity estimates that with a rebate of \$3,000 to \$4,000 per water heater customers would be sufficiently motivated to replace their natural gas water heater with electric at the same time they install a solar PV system. This rebate should not be taken from CSI-Thermal program funds, as SolarCity feels the development of the solar thermal market is important and should have a dedicated source of funding. Instead, funding could come through cap and trade funding or any penalties that are assessed on SoCal Gas for the Aliso Canyon leak. SolarCity estimates that a pilot program sufficient to install 10,000 grid-enabled electric water heaters in the L.A. Basin would cost roughly \$40 million.

Disadvantaged Communities

Disadvantaged communities can directly and indirectly benefit from water heating paired with solar PV through elimination of natural gas bills. A successful incentive program for this technology could easily be incorporated into the state's existing low-income solar programs and potentially into new programs currently under consideration at the CPUC. As previously discussed, community solar also provides an opportunity to reach these disadvantaged communities, particularly the rental market surrounding schools or sites where a PPA would be appropriate.

Energy Storage Paired with Solar PV

Energy storage coupled with PV is a fully dispatchable carbon free solution that can help with meeting the challenge Aliso Canyon poses to local peaking plant capacity. SolarCity's PV paired energy storage systems are maximally flexible generation that are fully controlled and dispatchable in real time, which can guarantee a flattening of peak load and firm the onsite renewable generation (removing any concerns that may be created from the intermittent nature of PV).

SolarCity understands that the natural gas constraints caused by Aliso Canyon are largely a problem of daily rather than hourly supply, and thus battery storage that both absorbs and dispatches solar PV generation on a critical demand day might not solve the shortfall. Nevertheless, it is still possible for battery storage to charge from solar PV on non-critical days and then discharge on critical days to help meet electric demand at times when natural gas might be curtailed to electric generators. Moreover, to the extent that power outages pose a risk to customers in the L.A. Basin, deployment of batteries for backup power can help provide customers with relief from outages for their families and neighbors.

For these reasons, SolarCity believes taking measures to accelerate the deployment of PV systems paired with energy storage could further assist in meeting the local load requirements and reliability concerns.

Specific measures that will help facilitate the deployment of PV paired energy storage systems include:

- **Expedite approval of the reformed Self-Generation Incentive Program (SGIP):** Currently, SGIP is the state's primary means for promoting distributed energy storage, but program funds are on hold pending a CPUC Decision on program reform pursuant to SB 861 and to a recent CPUC staff proposal that recommended removing natural gas technologies from the program. SolarCity notes that beyond the greenhouse gas benefits, the Aliso Canyon reliability issues provide further justification for removing natural gas technologies from the program. As part of SGIP reform, the CPUC could institute a "locational adder" as previously proposed by the CPUC Energy Division staff for storage system located in the affected area.



- **Accelerate and expedite interconnection and permitting process for PV paired with energy storage:** Remove additional metering and interconnection requirements for energy storage systems paired with PV. Energy storage is a readily available technology already deployed throughout California and should receive similar interconnection requirements as PV systems including fast track processing.
- **Expedite rule changes that would allow distributed batteries to serve as dispatchable demand response (DR) or generating resources:** Improve performance estimation methodologies and baseline requirement that facilitate multi-use application of distributed storage and accelerate integration in wholesale electricity markets as supply-side DR. Encourage distributed energy resource (DER) aggregations by ensuring rigorous interconnection processes such as Wholesale Distribution Access Tariff are not imposed for all sub-resources including behind-the-meter storage. The CPUC recently issued a ruling on March 23 that directed SCE to take immediate steps to enhance their demand response efforts. SCE should focus on energy storage within their demand response program enhancement measures.

Conclusion

It is important that programs beyond those specifically referenced in the draft Action Plan are given consideration. The state should strongly consider expanding the opportunities for deploying rooftop solar, energy storage and electric water heaters paired with solar in the L.A. Basin. This can be accomplished through various near term measures including requiring utilities to promote the benefits of solar in these local areas, allowing power purchase agreements (PPAs) in LADWP territory to increase solar installations for large commercial projects, accelerating site identification and permitting approval for solar PV and energy storage in areas in most need of local reliability services, and creating a pilot program to incentivize grid enabled electric water heating paired with solar. In the medium term, the state should pursue strategies to promote renewables and incentivize grid enabled electric water heating to reduce reliance on natural gas and provide renewable integration benefits through a larger statewide rebate program. This has the potential to move the state towards a cleaner, less expensive and more resilient electric grid that achieves California's ambitious climate goals in a cost-effective manner.

SolarCity thanks the Joint Agencies for the opportunity to comment on the draft Aliso Canyon Action Plan. We look forward to providing any additional details that may be helpful as you evaluate the mitigation measures in the context of increasing local energy reliability in the LA Basin and reducing California's greenhouse gas emission.

Respectfully submitted,

Damon Franz
Director, Policy and Electricity Markets
SolarCity

cc: Joint Agencies - Chairman Nichols (ARB), President Picker (CPUC), Steve Berberich (CAISO), President Levine (LADWP), Commissioner Douglas (CEC Lead Commissioner, 2016 Integrated Energy Policy Report Update)