



Aliso Canyon Demand-Side Resource Impact Report (May 2017 Update)

Executive Summary

A major gas leak was discovered at the Southern California Gas Company's (SoCalGas) Aliso Canyon natural gas storage facility (Aliso Canyon) on October 23, 2015. On January 6, 2016, the governor ordered SoCalGas to maximize withdrawals from Aliso Canyon to reduce the pressure in the facility. The California Public Utilities Commission (CPUC) subsequently required SoCalGas to leave 15 Billion cubic feet (Bcf) of working gas in the facility that could be withdrawn in an emergency. On May 10, 2016, Senate Bill (SB) 380 was approved, prohibiting the reinjection of gas into the facility until a comprehensive safety review is completed.

Gas storage is used to meet peak daily and seasonal gas demand and to hedge against price volatility in natural gas commodity markets. The reduced availability of Aliso Canyon threatened gas and electric reliability in Southern California. In response, the CPUC enacted a series of policies to increase reliability by reducing demand for natural gas. This report summarizes the impacts of these mitigation efforts. This is the third version of this report, and this update differs from the previous two versions in several important ways.

First, this update provides expected impacts of both summer and winter gas reduction efforts. Second, rather than estimating cumulative totals of these impacts, this report estimates the reduced gas demand on peak summer and winter days and compares this to our estimate of the withdrawals from the Aliso facility that we estimate are needed to meet summer and winter reliability. Note that many simplifying assumptions were needed to develop these peak day estimates, as described throughout the document. Third, instead of converting units of electricity saved into gas savings via a simple physical conversion of electricity to therms, this update estimates the gas savings that result from electricity reductions using the heat rates of the marginal electric generation facilities that would be operating on peak summer days or during

local reliability emergencies, including a 10% line loss.¹ On the other hand, because transmission lines are not constrained in the winter, this report assumes that electricity reductions in the winter do not result in gas reductions in the Aliso-impacted area. Fourth, electricity reductions in all of Southern California Edison's (SCE's) territory except Big Creek/Ventura, as well as all of SDG&E's territory, are assumed to reduce gas demand during peak summer days.

Finally, in addition to estimating impacts of our Aliso-related efforts, this report also provides information on resources that have been added to Aliso-impacted areas since 2010 that reduce summer and winter gas demand, as well as future resources that have already been authorized or are anticipated to be procured within the next five years. As is the case with the peak day reduction estimates, many simplifying assumptions described throughout the document were needed to develop savings estimates for these existing/planned or authorized/anticipated resources.

The purpose of this additional information is to provide a better understanding of the wide breadth of customer-facing resources already installed or planned to reduce reliance on natural gas, which in turn impacts the number of additional opportunities that exist to achieve further reductions.² Given the host of factors associated with planning to meet gas demand over time in the region, or any region, and the fact that (unlike the Aliso leak) the majority of these resources already exist or have been planned for, it would be misleading to include them in an assessment of what has been accomplished due to our Aliso mitigation efforts. Consequently, estimated savings from these resources are provided in the resource-specific sections of this document but are not included in Table 1 below, which summarizes the impacts of mitigation measures specifically put into place to respond to uncertainty related to re-opening the Aliso Canyon facility.³

It is important to note that report only looks at the impacts of mitigation measures ordered by the Commission and/or implemented by entities overseen by the Commission. It does not look at the success of mitigation measures adopted by the publicly owned electric utilities such as LADWP except in limited instances in which SoCalGas partnered with LADWP on combined electric and

¹ These assumptions result in a conversion factor of 12 MMBtu/MWh, and MMBtu are converted to BCF by dividing MMBtu by 10⁶.

² Note that this report focuses on demand-side reductions. Significant additional efforts to reduce California's reliance on fossil fuels are also being implemented on the supply side — most notably the increasingly aggressive renewable goals that are dramatically reducing demand for natural gas in the state.

³ One exception to this is the revised gas balancing rules, which are having significant impacts on daily gas demand despite being developed just prior to (and therefore unrelated to) the Aliso leak. Therefore, the impacts of gas balancing rules on summer and winter peak day gas demand are included in Table 1.

gas reduction efforts, nor does the report review the ability of these entities to implement mitigation measures similar to some of the successful measures outlined in it.

SoCalGas' 2016 demand forecast estimates that on a peak summer day, 3.301 billion cubic feet per day (Bcfd) of natural gas are used in the SoCalGas service territory.⁴ On a peak winter day, a more recent estimate found that 4.939 Bcfd are needed.⁵ To ensure reliability on peak days, the CPUC estimated that Aliso Canyon should be able to withdraw .906 Bcfd in the summer and .839 Bcfd in the winter.⁶ The necessary withdrawal capacity is higher in summer than in winter because of the need to respond to rapid ramps in demand to supply gas-fired electric generation. This occurs on high heat days when "peaker" plants are needed to meet cooling demand.

As summarized in Table 1 and explained in further detail in the balance of this document, the CPUC's gas balancing rule changes and Aliso-related mitigation efforts undertaken to date reduce imbalances and/or demand by approximately .491 bcf in the summer, which represents slightly over half of the estimated reliability-based peak day gas withdrawal requirements from Aliso during a summer peak day. The vast majority of this reduction is the result of the gas balancing rule changes, which accomplish approximately 90% of this reduction.

The estimated winter impact of the CPUC's gas balancing rule changes and Aliso-related mitigation efforts undertaken to date tell a very different story — average peak day gas imbalances increased by -.303 Bcfd in the winter. This increased imbalance is due to core customers shifting from past practices of frequently scheduling large overdeliveries to scheduling underdeliveries on peak days.

As explained in the gas balancing rules section of this report, the analysis supporting these balancing rule impacts is based on averages of limited historical data. It does not represent the full range of past deliveries nor does it guarantee that the same quantity of gas would be delivered on a future high sendout day. It is also important to note that the unavailability of the Aliso facility would likely have resulted in significant changes in behavior even absent these rule changes. However, it is impossible to determine what portion of the increase in daily imbalances would have occurred without the tighter rules, so for the purposes of this document all of the increase is being attributed to the rule change.

⁴ 2016 California Gas Report, p. 93: <https://www.socalgas.com/regulatory/documents/cgr/2016-cgr.pdf>.

⁵ Aliso Canyon Working Gas Inventory, Production Capacity, Injection Capacity, and Well Availability for Reliability Revised Report, January 17, 2017, p. 10: http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/News_Room/News_and_Updates/AlisoGas1-9-715.pdf.

⁶ Ibid, p. 4.

Besides the impacts being attributed to the gas balancing rules, the net impact of the other winter gas demand mitigation measures is relatively small – far less than summer impacts – since the majority of the demand-side resources regulated by the CPUC are electric resources. While many of these resources do reduce electricity demand in the winter, they do not reduce the demand for gas to operate Aliso-impacted electric power plants. This is because electric transmission lines are not at capacity during winter peak demand days. Consequently, winter electric demand reductions do not result in decreases in the operation of Aliso-impacted power plants – they simply result in decreased electricity imports.

Table 1: Aliso Mitigation Measure Peak Day Reductions (Bcf/d)⁷

	Summer	Winter
Gas Balancing	0.481	-0.304
Energy Efficiency	0.003	0.0003
Energy Savings Assistance Program	0.0003	0.0001
California Solar Initiative: Thermal	0.00011	0.00011
Marketing and Outreach	0.01248	0
Energy Storage	0.004	0
Demand Response	0.00168	0.0006
Total	0.503	-0.303
Reliability Need from Aliso	0.906	0.839
Remaining Need from Aliso	0.403	1.142
% of Need Met by Mitigation Measures	55.5%	-36.1%

⁷ While most of the gas savings estimates throughout this document are reported in therms, for the purpose of comparing them to estimates of reliability-based withdrawals needed from Aliso on peak days, these values were converted to billion cubic feet per day (Bcf/d) in this table by dividing therms by 10⁷.

I. Gas Balancing Rules

Estimated Peak Day Reductions (Therms)

	Summer	Winter
Existing/Previously Planned Resources Online by 2017	4,813,660	-3,044,290
Additional Aliso-Specific Resources Online by 2017	0	0
Authorized/Anticipated Future Resources	0	125,940

Background

Gas balancing is the need for gas supply to match gas demand. For natural gas pipeline systems to remain physically “in balance,” they must operate within a set range of pressures. If there is not enough gas in the system, the pressure falls and gas does not flow properly. If there is too much gas, the pressure rises, posing a risk to the structural integrity of the pipelines.

SoCalGas is responsible for maintaining the system’s balance, but it does not control all gas procurement. The utility purchases gas for most of the residential and small business customers known as core customers.⁸ The remainder of the gas is procured by ‘noncore customers.’ – large gas users such as electric generation plants, refineries, and some manufacturers.

Noncore customers purchase their own gas and pay the utility to transport it to their facilities. Historically, noncore customers only had to balance their gas deliveries to within 10% of their gas usage by the end of the month. In the winter, additional balancing rules applied, but they were relatively lax, in most cases requiring customers to supply at least 50% of their burn over a five-day period.

The 2016 Summer assessment found that the non-core customers who failed to balance supply with demand on peak days was a key cause of needing to withdraw from Aliso on peak summer demand days, because SoCalGas must withdraw gas from storage to balance the system if non-core customers have not procured sufficient gas to meet their demand on their own.

Several policies to reduce customers’ daily imbalances were initiated before the Aliso Canyon gas leak. In the aftermath of the leak, the CPUC further tightened those new policies through the Summer and Winter Balancing Settlement Agreements.⁹

⁸ Some core customers are supplied by core wholesale customers or core transport agencies.

⁹ The Summer Settlement Agreement (D.16-06-021) became effective June 1, 2016, and expired November 30, 2016. The Winter Settlement Agreement (D.16-12-015) became effective December 1, 2016. It was initially set to expire on March 31, 2017, but was extended through November 30, 2017.

Tighter balancing rules do not result in less natural gas usage. They do, however, reduce the need for storage by lessening the utility's need to quickly withdraw gas to remedy a shortage or inject gas to reduce a surplus.

Existing or Previously Planned Resources Online by 2017

A. Implementing Low Operational Flow Order Procedures: The CPUC approved Low Operational Flow Order (OFO) procedures on June 16, 2015, which went into effect on December 3, 2015.¹⁰ Under the new rules, a Low OFO is triggered when there is not enough gas forecasted to be coming into the system to meet demand. The Low OFO procedures allow SoCalGas to require customers to deliver up to 95% of their daily gas usage and to impose increasingly severe financial penalties for noncompliance.

B. Reducing the Monthly Balancing Requirement: The monthly balancing requirement was reduced from 10% to 8% in a non-Aliso-related decision that went into effect on September 1, 2016.¹¹

Additional Aliso-Related Resources Online by 2017

A. Implementing the Summer and Winter Balancing Settlement Agreements: On June 1, 2016, a settlement agreement went into effect that temporarily reduced the High OFO band of permissible overdeliveries from 110% to 105% of a customer's actual burn¹² and acknowledged that SoCalGas' existing rules allow the utility 1) to call simultaneous high and Low OFOs and 2) to set the OFO trigger, i.e. the amount of allowable gas imbalance, based on operational conditions rather than using a constant number. In practice, the latter provision allowed SoCalGas to reduce the trigger from .348 Bcf to as low as .137 Bcf depending on conditions. The Winter Balancing Settlement Agreement extended these terms, which are now set to expire on November 30, 2017.

Results

Tightening the gas balancing rules has had a profound effect on the SoCalGas system. Customers have changed their behavior, more closely matching their gas deliveries with their burn even on days when no Operational Flow Orders are called. Together, the rules have reduced cumulative negative daily imbalances by 60%. However, quantifying the impact of

¹⁰ Decision (D.) 15-06-004 and Resolution G-3511, respectively.

¹¹ D.16-06-039.

¹² High OFOs are the inverse of Low OFOs. Customers are subject to penalties if they bring in more than 105% of their actual (noncore) or forecast (core) gas burn.

these policies on peak days is difficult because there are so few data points¹³ and because of other complicating factors.¹⁴ Disaggregating the incremental impacts of each individual policy on a peak day is even more complex because the policies build on each other. Such an analysis is beyond the scope of this report. It is also important to note that the analysis below is based on averages of limited historical data.¹⁵ It does not represent the full range of past deliveries nor does it guarantee that the same quantity of gas would be delivered on a future high sendout day.

Since the characteristics of gas usage vary significantly by season, separate results are presented for summer and winter. In the summer, noncore customers account for roughly 79% of total peak day demand; in the winter, they account for about 40% of peak demand.

Summer

Average combined core and noncore deliveries changed from 10% *less* than scheduled burn in 2015 to 5% *more* than burn in 2016 for a total average change of 4.81 million therms.¹⁶ This shift was driven in part by a change in behavior by the core, which went from underdelivering by an average of 15% on 2015 peak days to overdelivering by 19% in 2016. The noncore also improved significantly, going from average peak day underdeliveries of 5% in 2015 to overdeliveries of 5% in 2016. The new gas rules also reduced the volatility of deliveries. On some high sendout days in summer 2015, the core undelivered by over 85% and the noncore by over 40%. In 2016, the core never underdelivered on a high sendout day, and the noncore never exceeded the 5% imbalance tolerance when a Low OFO was called.

Winter

Total winter peak day negative imbalances actually increased under the new rules. Imbalances went from a 3% average *overdelivery* in the winter of 2014-15 to a 5% *underdelivery* in 2016-17 for a total change of -3.04 million therms.¹⁷ However, this seeming

¹³ For the purpose of this evaluation, a winter peak day had total system sendout of at least 4 Bcf and a summer peak day had sendout of at least 3.2 Bcf. Data for winters 2014-15, 2015-16, and 2016-17 were examined. There were four high sendout days in winters 2014-15 and 2015-16 and three in 2016-17. For summer, a comparison between the summers of 2015 and 2016 was used. There were 14 high sendout days in summer 2015 and six in 2016.

¹⁴ One such factor is the emergency withdrawal of Aliso gas from December 2016 through January 2017, which impacted the behavior of customers and the system operator. For example, a Low OFO was called on only one high sendout day in winter 2015-16, likely because all the high sendout days occurred during the period of emergency withdrawals.

¹⁵ All disaggregated daily information for core and noncore customers was deemed confidential by SoCalGas.

¹⁶ This figure only includes 2016 high sendout days when a Low OFO was called. August 18, 2016, was a high sendout day but no Low OFO was called, so it is not included in this analysis.

¹⁷ Winter 2015-16 is not included here because all four high sendout days occurred while Aliso was on emergency withdrawal, so only one Low OFO was called.

failure of the policy masks a significant shift. On peak days in winter 2014-15, core customers delivered 12% more gas, on average, than they burned, while noncore customers underdelivered by 6%. By 2016-17, core customers were underdelivering by an average of 6% on peak days while noncore customers were overdelivering by 4%.

Tighter balancing rules caused noncore customers to deliver 1.626 million therms more gas, on average, on 2016-17 peak days than they did in 2014-15, but that was not enough to compensate for the reduction in core deliveries.

Authorize/Anticipated Future Resources

A. Changing Core Balancing Rules: The Winter 2016 Action Plan identified several mitigation measures intended to help compensate for the unavailability of Aliso Canyon. Among them was a measure to change balancing rules for core customers. Currently, on OFO days, core customers served by the utility¹⁸ have to balance to a forecast of the day's gas use rather than actual use. This means that on a Low OFO day, these core customers do not incur financial penalties as long as they bring in 95% of their forecasted burn. There is no penalty for the forecast being wrong. Noncore customers, in contrast, must balance to their actual use.

As part of the Winter Balancing Settlement Agreement, SoCalGas agreed to file an application by September 30, 2017, that addresses the feasibility of incorporating Advanced Metering Infrastructure data into the core balancing process. This proceeding could have the outcome of changing the current core balancing rules.

If the outcome of the proceeding was to make core customers responsible for balancing to their actual burn, there would likely be no change in average peak day deliveries for summer and a modest increase in such deliveries for winter.

B. Further Refinement of Noncore Balancing Rules: The implementation of the new balancing rules has had the desired effect of causing noncore customers to shift strategies in how they procure and schedule natural gas. As these sophisticated buyers adapt to the new rules, it is likely that they will also find ways to comply in ways that reduce their costs but don't increase system reliability. The CPUC will need to continually monitor the application of these new rules and be prepared to force minor adjustments if necessary.

¹⁸ Core wholesale customers and core transport agents have to balance to actual, not forecasted, burn.

II. Energy Efficiency

Estimated Peak Day Reductions

	Summer/Winter (therms)	Summer (MWh)
Existing or Previously Planned Resources Online by 2017	479,401	7,457
Additional Aliso-Related Resources Online by 2017 ¹⁹	2,740	252
Authorized/Anticipated Future Resources	383,561	3,562

Background

The CPUC authorizes approximately \$76 million per year for the SoCalGas energy efficiency portfolio. The majority of gas-saving energy efficiency projects installed are due to codes and standards, which are not directly related to the Aliso Canyon efforts but help to alleviate demand load growth nonetheless. The savings from codes and standards are excluded from this update, however, since they occur in new load and do not reduce existing demand.

In response to Aliso Canyon, the CPUC directed SoCalGas to accelerate custom energy efficiency projects and expand deemed program offerings in the Los Angeles Basin. SoCalGas also made efforts to ramp up its program activities through more aggressive marketing and outreach to achieve energy efficiency savings at a faster pace than in previous years.

Existing or Previously Planned Resources Online by 2017

Peak day savings resulting from energy efficiency efforts vary by program and measure, and summer peak day savings vary from winter peak day savings. However, it was not possible to calculate peak day savings for the efficiency portfolio, so average daily savings of efficiency measures installed since 2010 were used instead.²⁰ In addition, electricity savings have been discounted by 50% to reflect the electric savings that reduce gas demand from Aliso-impacted electric generation facilities between the hours of 1 pm and 9 pm on peak summer demand days, as described in the Executive Summary.

¹⁹ A previous version of this document included all savings from SoCalGas' energy efficiency portfolio beginning January 1, 2016. For consistency with other demand-side response activities discussed in this document, the Aliso-Related energy efficiency impacts in this category are limited to those specifically developed in response to the Aliso leak.

²⁰ This likely represents a conservative estimate. For many of these measures, more energy is saved when more energy is used. On the other hand, some of these measures have effective useful lives that are shorter than seven years, so some of the savings from the early years of this calculation may not be persisting.

While this represents only one third of the day, it also represents the period of peak energy consumption. Energy efficiency measures therefore generate higher energy savings during these hours, so a two-thirds reduction would underestimate savings. Consequently, a 50% adjustment is applied instead.

The table below summarizes the cumulative gross annual savings per day from utility energy efficiency portfolios from 2010 through 2016 and the projected 2017 savings, after applying the summer peak 50% electricity adjustment described above. Projected savings data for 2017 show a marked increase from the previous year; actual savings data from installations in 2017 are not available at this time.²¹ For SCE, gross savings stemming from energy efficiency portfolio activity in the Big Creek/Ventura local reliability area is excluded since electric demand savings in this area would not impact electricity generation that takes gas from the Aliso facility. For SoCalGas, MWh savings are attributed to programs that targeted residential whole-building upgrades and retrofits.

Energy Efficiency Portfolio Results

Year		2010	2011	2012	2013	2014	2015	2016	2017	Total
SoCal Gas	Therm/day	54,026	89,824	82,818	53,455	58,286	40,630	39,766	60,596	479,401
	MWh/day	3.2	11.3	14.5	11.2	9.3	18.6	12.8	No data	81
SCE	Therm/day	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	MWh/day	641	596	568	616	802	724	606	559	5,112
SDGE	Therm/day	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	MWh/day	316	353	416	213	242	212	194	319	2,264

Additional Aliso-Related Resources Online by 2017

Resources reported here are tracked starting from the time period that additional actions were undertaken (May 2016) and extending through the period covered by this report. The savings provided below represent annual savings reported by utilities. For the purposes of the peak day savings estimates in the table at the beginning of this section (and in the Executive Summary), all values were divided by 365 and electric savings were reduced by an additional 50%, consistent with the methodology described in the existing resources subsection above.

A. Custom Projects: Custom projects involve site-specific energy efficiency activities that usually include complex processes that result in significant energy savings. SoCalGas identified 71 custom projects that may provide relief in the Aliso Canyon impact area through an incentive kicker, accelerated ex ante review, additional technical assistance, or support in obtaining local permits. Of the 71 custom projects, three have been accelerated to

²¹ Savings calculated from building and appliance standards and Energy Assistance Savings Programs are excluded.

date, 50 have cleared ex ante review or are awaiting additional data from SoCalGas, eight projects were identified as out of the Aliso Canyon impact area or adding new gas load rather than reducing it, two were canceled or on hold; and eight project reviews are currently in progress.

In working with SoCalGas to identify custom projects that could be accelerated, Commission staff found that customers implementing custom projects have difficulty accelerating project installation schedules due to long project lead times and the need to purchase, manufacture, or install unique, project-specific equipment. Additional efforts are underway, including the installation of steam trap projects, which will be reported on in the next update of this report.

Results: 274,000 therms in savings were achieved ahead of schedule.

- B. Commercial Direct Install Program:** The CPUC approved a new program²² that includes a three-pronged approach to deliver measures to the small commercial market. SoCalGas is working in partnership with the Los Angeles Department of Water and Power (LADWP) and SCE to target hard-to-reach small- to medium-sized commercial businesses throughout the SoCalGas territory and to install no- or low-cost energy efficiency equipment.

Results: 151,037 MWh and 127,904 therms have been saved in partnership with LADWP.

- C. Targeted Measure Rebate Kickers:** All pipe and tank insulation, pool covers and heaters, and process boilers purchased and installed between June 1, 2016, and March 31, 2017, are eligible to receive an incentive kicker. These measures were selected for additional incentives because they can be installed quickly and have significant potential.

Results: 383,324 therms via 51 projects.

- D. New Measure Offerings:** New rebates have been added for ENERGYSTAR® High Efficiency Dryers, laminar flow restrictors for healthcare facilities, tub spout thermostatic diverters, smart thermostats, and AC/furnace tune ups. These measures may save natural gas, electricity, and/or water.

Results: 36,703 therms via 6,242 ENERGYSTAR® high efficiency dryers.

Authorized/Anticipated Future Resources

The utilities have submitted Business Plans to address energy efficiency program activity through 2025. The CPUC's commitment to the long-term, 10-year funding cycle is a key step to building an energy efficiency network capable of supporting SB350 goals.

²² Advice Letter 4950.

SoCalGas forecast an additional 140 million therms of savings through program year 2022, the end of the fifth year since the business plan kickoff. SCE and SDG&E forecast an additional 2,600 GWh of savings over the same time frame. For the purposes of the peak day savings estimates in the table at the beginning of this section and in the Executive Summary, these annual values were divided by 365, and electric savings were reduced by an additional 50%, consistent with the methodology described in the existing resources subsection above.

III. Energy Savings Assistance Program Measures

Estimated Peak Day Reductions

	Summer/Winter Gas (therms)	Summer Electric (MWh)
Existing or Previously Planned Resources Online by 2017	24,600	330
Additional Aliso-Related Resources Online by 2017	690	22
Authorized/Anticipated Future Resources	13,800	130

Background

The Energy Savings Assistance (ESA) Program provides no-cost weatherization, energy efficient appliances, and energy education services to low income households that meet the income and program guidelines. Services provided may include attic insulation, energy efficient refrigerators, evaporative coolers, air conditioners, weather stripping, caulking, low-flow showerheads, water heater blankets, and door and building envelope repairs. The program’s objective is to help income-qualified customers reduce their energy consumption and costs while increasing their health, comfort, and safety in the home.

Existing or Previously Planned Resources Online by 2017

SoCalGas, SCE, and San Diego Gas & Electric (SDG&E) collectively have treated approximately 1.3 million households with ESA Program services since 2010. The cumulative average savings attributed to these existing or previously planned resources is approximately 24,600 therms and 330 MWh per day. Similar to the estimates of the peak day savings from the mainstream energy efficiency portfolio, these savings estimates represent the total of daily average savings resulting from these programs, and electric savings have been reduced by 50%.

Additional Aliso-Related Resources Online by 2017

In response to the Aliso Canyon gas leak, the CPUC directed SoCalGas and SCE to take immediate steps to intensify existing Energy Savings Assistance programmatic efforts in affected low-income communities. Specifically, the CPUC initially authorized the use of unspent funds (\$158.6 million for SoCalGas and \$89.7 million for SCE) and also suspended the “three measure minimum” and “go back” program rules in the impacted area to facilitate deeper energy savings.

In 2016, SoCalGas treated 18,181 homes and SCE treated 9,286 homes under ESA intensified efforts. Average annual peak day savings attributed to this activity is approximately 690 therms and 22 MWh per day. There were no intensified efforts directed for San Diego Gas & Electric in 2016. Beginning in 2017, the revised rules that were used to support the intensified Aliso efforts have been adopted for the entire ESA portfolio. Consequently, the Aliso-related intensification

savings are only calculated separately in this document for 2016; additional efforts in the Aliso area in 2017 and beyond are captured in the “Existing or Previously Planned” and “Potential Future Resources” savings estimates in this section.

Authorized/Anticipated Future Resources

The CPUC recently eliminated “three measure minimum” and “go back” rules statewide across all service territories and credited Aliso Canyon ESA response efforts for this decision. The CPUC also authorized funding, adopted new ESA program measures, and established annual savings targets for the ESA Program through 2020. The total daily average savings attributed to these authorized future resources by 2020 is approximately 13,800 therms and 130 MWh per day (electric savings estimates have been reduced by 50%).

IV. California Solar Initiative: Thermal Program

Estimated Peak Day Reductions (therms)

	Summer / Winter
Existing or Previously Planned Resources Online by 2017	6,100
Additional Aliso Canyon-Related Resources Online by 2017	1,070
Authorized/Anticipated Future Resources	N/A

Background

At the request of the CPUC, SoCalGas implemented temporary changes to its California Solar Initiative (CSI)-Thermal Program budget to reduce natural gas use in the area impacted by the Aliso Canyon gas leak. These changes provided higher incentives for SoCalGas service territory customers who installed natural gas-displacing solar water heating systems by December 31, 2016. As detailed below, the temporary higher incentive structure increased program participation, thus displacing natural gas demand in the target area.

Due to the success of the high incentives in raising program participation rates and the continued need for Aliso Canyon-related mitigation efforts, the installation deadline for projects with building permit applications dated on or before October 7, 2016, was extended to accommodate projects that did not meet the December 31, 2016 installation deadline. As a result, higher program participation rates are expected for the SoCalGas service territory up to summer 2017.

The temporary higher incentive program was a success to the extent that, by October 2016, the budget dedicated to the effort was exhausted, especially in the single-family residential sector. As a result, the CPUC requested that SoCalGas dedicate more funds to the effort and allow certain projects with building permits issued in 2016 to receive the higher incentive if the systems are installed in the first half of 2017.

The CSI Thermal Program's annual natural gas savings calculations are based on inputs including OG-100²³ collector data, California climate zones, gallons per day for various load profiles, and other configurations. As a result, seasonal energy savings for solar thermal systems are highly variable. For example, while a system may collect more heat energy on a peak summer day, it is possible for that same system to actually offset more natural gas on a peak winter day when there is more demand for hot water and ground water temperatures are colder. For the purposes of this report, natural gas savings are given for an average day for both summer and winter 2017.

²³ OG-100 is the Solar Rating & Certification Corporation (SRCC) certification for solar thermal collectors.

Existing or Previously Planned Resources Online by 2017

Established in 2010, the CSI-Thermal Program provides financial incentives for solar water heating installations to retail customers. By the end of 2016, 1,645 solar water heating projects were completed. The following sections provide a breakdown of the resulting daily natural gas savings generated by these projects for the following CSI-Thermal sub-programs: single-family, commercial/multifamily, low income, and solar pool heating.

- A. Single-Family, Multifamily, and Commercial Programs:** By the end of 2016, 889 single-family residential and 190 commercial/multifamily residential solar water heating systems have been installed, which are expected to yield a natural gas savings of 1,300 therms per day in 2017.

- B. Low-Income Program:** The CSI-Thermal program includes a \$50 million budget allocated to low-income single- and multifamily residential projects. By the end of 2016, 323 low-income single-family and 42 low income multi-family residential project had been installed. These projects are expected to reduce natural gas demand in the SoCalGas service territory by 1,500 therms per day in 2017.

- C. Solar Pools Program:** AB 2249 (Buchanan, 2012) expanded the definition of solar water heating systems to include solar pool heating systems, although single-family residential solar pool heating systems were specifically excluded.²⁴ By 2017, 532 project installations were completed under the SoCalGas Solar Pools program, which represent an expected natural gas savings of 3,300 therms per day in 2017.

Additional Aliso-Related Resources Online by 2017

- A. Additional Incentives for Systems Installed Before December 31, 2016:** On May 6, 2016, Energy Division approved²⁵ temporary changes to incentives for solar water heating systems installed in the SoCalGas service territory by the end of 2016. This decision increased incentive levels for general market, single-family, and multifamily/commercial projects.²⁶

²⁴ The Commission implemented this change with D.13-08-004, which allowed non-single-family solar pool heating systems into the CSI- Thermal Program.

²⁵ By disposition letter approving SoCalGas Advice Letter 4953.

²⁶ Incentives were increased from \$29.85/therm to \$70/therm for single-family and from \$20.19/therm to \$25/therm for multifamily and commercial projects.

By December 31, 2016, an additional 84 commercial/multifamily residential projects were installed at the temporary higher incentive rate. The expected 2017 natural gas savings for these projects is 650 therms per day. By December 31, 2016, an additional 947 single-family residential projects were installed at the temporary higher incentive rate. The expected 2017 natural gas savings for these projects is 370 therms per day.

Due to the success of the temporary higher incentive program — which led to increased applications, especially for the single-family residential sector — the CPUC’s Energy Division asked SoCalGas to extend the higher incentive installation deadline for projects that met the permit application deadline of October 7, 2016, but did not meet the December 31, 2016, installation deadline. As a result of the deadline extension, SoCalGas anticipates 125 single-family systems will be installed by June 2017. The expected average natural gas savings of these projects is 50 therms per day.

The total Aliso-related savings from these combined efforts total 1,070 therms per day.

Authorized/Anticipated Future Resources

The authority for CSIThermal Program sunsets on December 31, 2017. Assembly Bill (AB) 797 (Irwin) currently pending in the legislature aims to extend the CSI Thermal Program through July 2020.

V. Customer-Side Solar PV Electricity Generation

Estimated Peak Day Reductions (MWh)

	Summer
Existing or Previously Planned Resources Online by 2017	5,400
Additional Aliso Canyon-Related Resources Online by 2017	N/A
Authorized/Anticipated Future Resources	3,300

Background

Customer-side solar photovoltaic (PV) systems offset the need for conventional natural gas peaker plants by providing clean renewable electricity generation to customers directly or to the grid. In 2007, the Commission established the California Solar Initiative (CSI) Program to incentivize customer-side solar PV installations in the state's three major IOU territories. The CSI Program later expanded its scope to provide solar PV incentives to low-income households through the Single-Family Affordable Solar Homes (SASH) and Multifamily Affordable Solar Homes (MASH) programs. Although the CSI General Market Program closed to applications on December 31, 2016, solar customers continue to be eligible for the State's Net Metering Program (NEM), which provides financial credit for customer-generated power fed back to the electric grid.

Existing or Previously Planned Resources Online by 2017

From 2010 to 2017, there were 275,853 NEM interconnected solar PV systems installed in the Aliso Canyon impacted region, including those installed under the CSI General Market, MASH, and SASH Programs and under only the NEM tariff. The 2017 estimated energy production for systems installed since 2010 is 10,800 MWh per day. Given that the hours these facilities generate electricity only partially overlap with the 1 to 9 p.m. summer peak hours, this generation is reduced by 50% to provide an approximate, conservative estimate of the peak day avoided electricity resulting from the deployment of these resources.

Additional Aliso-Related Resources Online by 2017

Due to the success and continued growth of the PV programs that were already in place, no additional Aliso Canyon targeted programs to accelerate PV adoptions were developed.

Authorized/Anticipated Future Resources

Using data from the 2016 Integrated Energy Policy Report (IEPR), we can estimate that the customer-side PV market in California is expected to grow at around 11 percent per year. At this growth rate, solar production from newly installed solar PV systems over the next five years (systems installed between 2018 and 2022) is anticipated to equal 6,600 MWh per day. As with the existing PV resources, this generation is reduced by 50% to provide a conservative estimate of the peak day avoided electricity resulting from the deployment of these resources since the hours these facilities generate electricity only partially overlap with the summer peak hours.

VI. Marketing and Outreach

Estimated Peak Day Reductions²⁷

	Summer (MWh)	Winter (therms)
Existing/Previously Planned Resources Online by 2017	1,040	0
Additional Aliso-Related Resources Online by 2017	1,040	N/A ²⁸
Authorized/Anticipated Future Resources	1,040	0

Background

Marketing and Outreach campaigns can be used to encourage customers to change behavior during extreme events to help avoid energy supply shortages or to support customer adoption of the various demand-side resources described in this report.

The statewide *Flex Your Power* outreach program that was developed during the 2000-2001 energy crisis that followed California's electricity restructuring effort is an example of a Marketing and Outreach campaign. This campaign was eventually divided into two different efforts: the *Energy Upgrade California* program,²⁹ which endeavors to educate energy customers about a variety of opportunities available to them to reduce or re-shape their energy usage, and the *Flex Alert* program, which focused on peak summer demand reduction to avoid outages, and consisted of both earned (unpaid) and paid media.

Similar to *Spare the Air* days, *Flex Alerts* are called by the California Independent System Operator (CAISO) on anticipated high use days, usually as a result of hot weather. Alerts are broadcast by the news media, advertised, and sent directly to people who sign up for them through the *Flex Alert* website. They ask people to reduce their electricity usage, especially in the late afternoon and early evening.

In 2015, the CPUC decided to end ratepayer funding of the paid media portion of the *Flex Alert* program and focus *Flex Alert* efforts exclusively on earned media opportunities, under the management of CAISO.

Existing or Previously Planned Resources Online by 2017

²⁷ These impact results assume that half of the *Flex Alert* demand reductions estimated by the CAISO are caused by earned media and half are caused by paid media and that 50% of the peak reduction occurs across the eight-hour summer peak day demand period of 1 to 9 p.m.

²⁸ Results for Conserve Energy So Cal effort, including the 2016-17 winter gas conservation activities focused on Aliso-impacted areas, are not currently available.

²⁹ Formerly Engage 360.

Energy Upgrade California and the *Flex Alert* earned media campaign are the primary statewide Marketing and Outreach programs supporting demand-side activities.

Because *Energy Upgrade California* encourages customers to participate in specific resource programs, savings resulting from these efforts are captured within those individual programs. As described in the following subsection, the CPUC authorized funding for additional paid media in 2016 due to the Aliso leak. Consequently, the CAISO does not have information regarding how much demand reductions could be expected from earned media alone. For the purposes of this report, it is assumed that 50% of the reduction attributed to recent *Flex Alerts*, or approximately 260 MW, would result from earned media alone, and that on average, 50% of this peak reduction occurs throughout the eight-hour summer peak day demand period of 1 to 9 p.m.

Additional Aliso-Related Resources Online by 2017

As a result of the Aliso gas leak and resulting summer electricity reliability concerns, the CPUC authorized \$11 million in marketing, outreach, and education programs in response to Aliso Canyon-related natural gas supply reductions. Two strategies were deployed. First, paid media support for *Flex Alerts* was re-authorized for summer electricity demand in Aliso-impacted areas. Second, a general education campaign was authorized with strategies to get residents to use less energy and to raise awareness of the need to conserve in the summer and winter as a result of the Aliso Canyon gas leak.

- A. *Flex Alert* Funding.** Three *Flex Alert* days were called in summer 2016: on June 20, July 27, and July 28. The CAISO estimates that these *Flex Alerts* resulted in peak demand reductions of 530 MW, 490 MW, and 540 MW, respectively, for an average peak demand reduction of 520 MW.³⁰ As noted in the previous section, absent any better data this report assumes that approximately half of this demand reduction can be attributed to earned media and half to paid media, and that on average, 50% of this peak reduction occurs throughout the eight-hour summer peak day demand period of 1 to 9 p.m.

- B. Conserve Energy SoCal:** In 2016, \$6 million was allocated for a general electricity and gas reduction campaign. SoCalGas was ordered to lead an advisory committee of 10 local governments and utilities in a coordinated campaign. Strategies included social media, earned media (news coverage), and event outreach. Information can be found at: www.conserveenergysocal.com. (Note: This effort is separate from the Natural Gas Conservation Notification Campaign supporting gas demand response described in the Gas Demand Response section of this document.)

Tactics included the above-referenced website; outreach on social media; promotion at

³⁰ These peak demand reductions are separate from reductions resulting from Demand Response programs. These CAISO estimates have not independently verified by the CPUC.

events such as outdoor movie screenings; sponsoring a weekly energy conservation theme at Pacific Park on the Santa Monica Pier; and the “Hot Days, Hot Deals” and “Cool Days, Cool Deals” promotions that encouraged people to get out of their homes and into local businesses offering special deals. These were made “open source” for local governments and public utilities to use. Appendix A provides screen shots and images of collateral developed for the Conserve Energy So Cal campaign.

Opinion Dynamics evaluated the impacts of the program using a split panel survey of residents in the Los Angeles Area during summer and fall 2016. A total of 1,200 residents were surveyed in each of two survey waves, with half of the first wave repeated in the second wave (meaning 1,800 were surveyed).

Results: Savings estimates for the Conserve Energy So Cal campaign are not available at this time. Survey results are as follows:

- Over 50% of respondents reported hearing or seeing the Conserve Energy So Cal campaign and *Flex Alerts*.
- Radio ads were the most effective: about 40% of respondents reported hearing about the campaign on the radio.
- Over 25% of respondents who heard about *Flex Alert* alerts signed up for them.
- About 97% of respondents reported taking at least one action.
- The most common action taken was turning off a power strip when not in use.
- The average number of total reported actions per respondent was just over nine.

Funding for both of these marketing efforts ran out at the end of 2016. While most activities have stopped, the Conserve Energy So Cal website is still operational. Given the continued uncertainty around when, if, and to what extent the Aliso facility will be available in the future, the CPUC is currently considering re-authorizing spending on a similar effort for 2017, and running through winter of 2018. A final decision is expected in May 2017. For the purposes of this report, it is assumed that the funding will be re-authorized, although the Commission will make this decision.

Authorized/Anticipated Future Resources

It is unknown at this time whether *Flex Alerts* or other marketing and outreach programs will be authorized beyond the coming summer and winter seasons. At a minimum, peak day *Flex Alert* reductions resulting from earned media can be assumed to continue into the future.

VII. Accelerated Deployment of Electricity Storage

Estimated Peak Day Reductions (MWhs)

	Summer
Existing or Previously Planned resources On-line by 2017	258 ³¹
Additional Aliso-Related Resources Online by 2017	318 ³²
Authorized/Anticipated Future Resources	1,900 ³³

Background

Electricity storage can reduce demand for natural gas during periods of peak electricity demand by charging the storage resource during off-peak times and discharging the resource during peak hours, reducing the demand for conventional natural gas-powered peaking generation. Between SCE and SDG&E, a total of 190.9 MWs of storage is already on-line, 98.5 MW of which was brought online on an accelerated schedule in response to the Aliso leak. Under the California Energy Storage program, SCE has an obligation to procure a total of 580 MWs by 2020, and SDG&E has an obligation to procure a total of 165 MWs by 2020.

Existing or Previously Planned Resources Online by 2017

When the Commission established the storage program, SCE had 33.24 MWs of existing projects, and SDG&E had 59.15 MWs of existing projects.

Additional Aliso-Related Resources Online by 2017

A. Expedited Storage Procurements: The CPUC ordered SCE to hold an expedited energy storage procurement solicitation to mitigate potential Aliso Canyon-related reliability problems. The resolution required that storage resources solicited in the expedited storage procurement be located in front of the meter; be operational by December 31, 2016; interconnect in a location that helps to alleviate electric reliability concerns associated with

³¹ Assumptions: 40 MWs pumped hydro, 23.4 MWs batteries, and 9 MWs ice storage. Based on actual procurement. MWh estimate based on maximum dispatch in August. Assumed maximum 100 hours/month for pumped hydro and batteries, and 8 hours/day weekday dispatch of ice storage. Divided by 31 to estimate August Day.

³² Assumption: 98.5 MWs of batteries. Based on actual procurement. Assumed maximum 100 hours/month for batteries. Divided by 31 to estimate August Day.

³³ This includes the remaining obligation for SCE and SDG&E, including approved contracts for SCE that have not yet come on-line. It assumes 300 MWs of batteries; 100 MWs pumped hydro; 80 MWs ice storage; and 74.8 MWs flywheels, V2G, and “emerging” technologies. Assumed maximum 100 hours/month for pumped hydro and batteries, 8 hours/day weekday dispatch of ice storage, and maximum 70 hours/month for flywheels, V2G and “emerging”. Divided by 31 to estimate August Day.

Aliso Canyon; qualify for Resource Adequacy credit; be price competitive with previous solicitations; and have a contract term of 10 years or less.

Results

- 22 MW of in-front-of-the-meter storage through capacity-only contracts with two different suppliers, AltaGas Pomona Energy Storage, Inc. (20 MW)³⁴ and Grand Johanna LLC (2 MW).
- 20 MW of storage from two 10 MW projects installed by Tesla at the Mira Loma 1 and 2 peaker power plants.
- 1 MW of incremental resource adequacy capacity from storage integrated at two existing peaker plants (Grapeland and Center).

B. SDG&E Accelerated Deployment of Electricity Storage: SDG&E sought bidders from its existing 2016 Preferred Resources Local Capacity Requirement Request for Offer who could bring energy storage projects online by the end of the year. Due to lead times for ordering necessary equipment, the deadline was extended to January 31, 2017. SDG&E sought and received Commission approval for two lithium-ion battery energy storage facilities to be located at two SDG&E substations. The projects are being constructed on a turnkey basis with AES Energy Storage and came online in February 2017.

Results: 37.5 MW from two projects

C. Expedited Customer Storage Interconnection: In order to accelerate installation of customer-owned storage that could reduce electric demand at peak times, Energy Division worked with SCE to identify projects that should be given expedited interconnection review in order to be online by the end of 2016. This effort resulted in at least 18 MW customer-owned energy storage projects online by the end of 2016.

Results: 18 MW of behind-the-meter storage

Authorized/Anticipated Future Resources

A. Remaining Procurement Obligation — SCE and SDG&E: Both Southern California electric utilities have a total remaining procurement obligation of 305.13 MWs. This remaining procurement obligation will be met through at least the following solicitations – the currently open 2016 solicitation for SCE, the remaining local capacity requirement solicitation by SDG&E, contracts resulting from SCE’s Preferred Resources Pilot that are currently awaiting CPUC approval, and the 2018 and 2020 storage solicitations that apply to all three electric utilities. By statute, storage resources procured pursuant to the storage

³⁴ A third, 5 MW project by Western Grid Development, LLC was initially approved by the CPUC but was later cancelled due to a permitting delay.

mandate must be brought online by 2024. SCE's remaining procurement obligation is 236.8 MWs. SDG&E's remaining procurement obligation is 68.4 MWs.

B. Approved Resources with COD in Future Years: The CPUC has approved 249.64 MWs of contracts for SCE with storage facilities that will come on-line between 2018 and 2020.

VIII. Electric Demand Response

Estimated Peak Day Reductions (MWh)³⁵

	Summer
Existing or Previously Planned Resources for 2017	5,350
Additional Aliso-Related Resources Online for 2017	141
Authorized / Anticipated Future Resources	5,491

Background

Demand response programs provide financial incentives to end-use electricity customers to reduce their electricity demand on certain days and hours. These programs can be separated into two broad categories: emergency programs and economic (or price-responsive) programs. Emergency demand response programs are used when grid reliability is threatened, such as when demand is forecasted to exceed existing supply or if a local contingency occurs such as a failed transmission line.

Economic demand response programs are primarily used by utilities to reduce procurement costs of wholesale power, but they can also be used to help alleviate stress on the grid or to respond to emergency situations. The utilities have traditionally operated demand response programs, but a growing amount of demand response is now offered by third party providers known as “Demand Response Providers” (DRPs) or “aggregators” who are under contracts with the utilities to acquire certain amounts of demand response capacity. Customers from all sectors (residential, commercial, etc.) can participate in demand response, but the program details will vary in terms of eligibility, expectations, and incentives. The CPUC authorizes the funding for demand response programs, which are eventually recovered through retail rates.

Existing or Previously Planned Resources Online by 2017

SCE’s and SDG&E’s 2017 demand response portfolio of programs were approved and authorized by the CPUC in June 2016. SCE’s entire demand response portfolio for 2017 can provide a maximum of approximately 808 MWs across the LA Basin territory during a typical system peak. SDG&E’s demand response portfolio is expected to provide a maximum of 37 MWs in its entire territory during a typical system peak.

³⁵ Assumptions: Demand response resource is dispatched under 1-in-10 system peak conditions between the hours of 1:00 to 9:00 PM. Values provided here reflect one day of load reduction within the assumed scenario.

For a one-day heat wave during the peak period in 2017,³⁶ SCE's emergency programs can deliver approximately 3,896 MWh of load reduction in the LA Basin. SDG&E's emergency programs can deliver approximately 3 MWh of load reduction throughout its territory.

For that same extended heat wave, SCE's price responsive programs can deliver approximately 1,366 MWhs of load reduction in the LA Basin, while SDG&E's price-responsive programs can deliver 164 MWh in load reduction.

In addition to the utility-operated demand response programs, third party DRPs/aggregators can also provide additional MWhs of demand response via capacity contracts they hold with SCE and SDG&E via the Demand Response Auction Mechanism (DRAM). To date SCE's DRAM is projected to provide approximately .4 MW in load reduction while SDG&E's DRAM is projected to provide 12 MW of load reduction. It should be noted, however, that the dispatch of DRAM resources is dependent on their price bid as these resources are bid directly into CAISO wholesale markets and are therefore not dispatched by the utilities. Consequently, megawatt hours cannot be calculated at this time due to the lack of detail on program implementation.

Additional Aliso-Related Resources Online by 2017

In response to the Aliso Canyon outage, the CPUC took additional actions (such as authorizing additional funding) to intensify SCE's demand response portfolio. Specifically, SCE was directed to take the following actions:

- Targeted marketing to increase enrollment in its air conditioner (AC) cycling program, also known as "Summer Saver." This program delivers approximately 52 MWh in load reductions.
- Increase enrollment in its Base Interruptible Program (BIP) and Agricultural and Pumping — Interruptible (AP-I), its two main emergency demand response programs. Load reductions from these two programs provide approximately 78 MWh.
- Offer a \$50 rebate for participants who already own smart thermostats (also known as a "downstream rebate") and \$75 for participants who do not yet own smart thermostats to sign up for its Peak Time Rebate program ("upstream rebate"). This program delivers 12 MWh in load reductions.
- Retain the Demand Bidding Program (DBP), which was scheduled to be terminated per an earlier CPUC decision. If this program had been discontinued, there would be a loss of 19.6 MWh from SCE's demand response reductions.

The resulting total values from these actions are reflected in the second row of the Estimated Peak Day Impacts Table at the beginning of this section.³⁷

³⁶ SCE's system typically reaches its peak in August, while SDG&E reaches its peak in September.

In addition to the efforts above, the CPUC may be able to further increase enrollment in SCE's Emergency demand response programs, if it applied more flexible interpretations to certain restrictions on the growth of such programs (there is a MW cap in place for Emergency Demand Response programs). The specifics on this issue are still being analyzed. Therefore no MW estimate is available at this moment.

Authorized/Anticipated Future Resources

Both SCE and SDG&E have applications pending before the CPUC for demand response portfolios for 2018-22. These proposed portfolios contain many of the same type of programs described earlier (emergency and price-responsive). In addition to ensuring that the proposed programs are cost-effective, the CPUC has signaled that it will be evaluating the portfolios in terms of location (i.e. are the program located in areas of highest value to the grid that could defer investment in traditional generation/distribution/transmission resources). To the extent that Aliso Canyon remains a concern for reliability, the CPUC could require changes to the proposed portfolio to address those concerns.

SCE and SDG&E are in the midst of completing another DRAM solicitation process for delivery of third party demand response MWs in 2018. The confirmed amount and location of these new demand response MWs will not be known until end of June 2017. By mid-2017, SDG&E is anticipated to propose contracts resulting from its preferred resource request for offers process. There may be demand response resources that could emerge from that effort.

Given all these uncertainties, the value of anticipated future resources estimated for this report is set equal to the existing demand response resources. This is likely to be a conservative assumption given the likelihood that this resource will increase over time.

³⁷ All of the values provided, with the exception of those for Demand Bidding Program (DBP) are incremental. The continuance of DBP beyond its originally-planned retirement avoids a loss of MWh. These MWh are captured in the "Existing or Previously Planned Resources for 2017" row of the Estimated Peak Reductions Table at the top of this section.

IX. Gas Demand Response

Estimated Peak Day Reductions (therms)

	Summer	Winter
Existing or Previously Planned Resources Online by 2017	N/A	N/A
Additional Aliso-Related Resources Online by 2017	N/A	6,358 ³⁸
Authorized/Anticipated Future Resources	N/A	N/A

Background

On September 13, 2017, Energy Division’s Director sent a letter to SoCalGas requesting that they submit a Tier 3 advice letter proposing gas demand response program(s) to be in place for customer participation by December 1, 2016. The letter stated that SoCalGas’ programs should be designed to incentivize reductions in gas consumption on peak days when the gas system is stressed and should leverage their smart meters as much as possible to measure load reductions.

SoCalGas proposed the following programs: the Natural Gas Conservation Notification Campaign; the Noncore, Non-Electric Generation, Natural Gas Conservation Notifications; and the Natural Gas Conservation Pilot Rebate Program.³⁹

In addition, SoCalGas also sought Commission approval for their proposed Winter Seasonal Saver Pilot, which was approved on December 22, 2016.⁴⁰

Existing or Previously Planned Resources Online by 2017

There were no previous gas demand response programs.

Additional Aliso-Related Resources Online by 2017

A. The Natural Gas Conservation Notification Campaign: The campaign utilizes a mass media outreach campaign is to stimulate voluntary reductions in gas usage when the gas system is forecasted to be stressed, similar to the statewide CAISO *Flex Alert* campaign.

The Natural Gas Conservation Notification Campaigns were called December 18 through 20, 2016, and January 23 through 26, 2017. Therm reductions from the event days are currently not available and will be included in the Winter Gas Demand Response Impact Evaluation. The program spent \$1.76 million of out of the \$2.5 million budget requested by SoCalGas.

³⁸ This only includes the Natural Gas Pilot Rebate and results from the other programs will be available after the Impact Evaluation is completed by the SoCalGas contracted evaluator in mid-May.

³⁹ These programs were proposed via Advice Letter 5035-G, which was adopted with some modifications in the Commission-approved Resolution G-3522.

⁴⁰ This program was proposed via Advice Letter 5028-A

Results from the first SoCalGas Natural Gas Conservation Campaign (December 18-20, 2016) include:

- Traditional Radio: 24 stations with an average of 10 spots per day (6.8M total impressions)
- Digital Radio: Pandora delivered 800,000 impressions
- SoCalGas e-mail notifications: Approximately 3.2 million per deployment
- SoCalGas SMS notifications: 3,200 text messages deployed
- Social Media: Over 1.8 million impressions
 - All mass notification activities delivered in both English and Spanish

Results from the second SoCalGas Natural Gas Conservation Campaign (January 23-26, 2017) include:

- Traditional Radio: 24 stations with an average of 10 spots per day (6.8M total impressions)
- Digital Radio: Pandora delivered 800,000 impressions
- SoCalGas e-mail notifications: Approximately 3.2 million per deployment
- SoCalGas SMS notifications: 3,200 text messages deployed
- Social Media: Over 1.8 million impressions
 - All mass notification activities delivered in both English and Spanish

B. The Noncore, Non-Electric Generation, Natural Gas Conservation Notifications: This program encourages noncore customers to voluntarily conserve natural gas. Notifications are posted to SoCalGas' electronic bulletin board when the gas system is forecasted to be stressed. These notifications will be supplemented by direct outreach to noncore customers through SoCalGas account executives.

Noncore, Non-Electric Generation, Natural Gas Conservation Notifications were called December 18 through 20, 2016, and January 23 through 26, 2017. Therm reductions from the event days are not currently available and will be included in the Winter Gas Demand Response Impact Evaluation. SoCalGas requested no addition budget for this program.

C. The Natural Gas Conservation Pilot Rebate Program: This program evaluates the cost-effectiveness and savings impacts from providing customer incentives to reduce gas usage during periods when the gas system is forecasted to be stressed. The program solicited a sample of the following customer segments, including: residential customers enrolled on SoCalGas' My Account; residential customers not enrolled on SoCalGas' My Account; customers served by Core Transportation Agents;⁴¹ and customers that own Ecobee Smart Thermostats and opted to enroll in a direct load control program. SoCalGas was also directed

⁴¹ Core Transport Agents are non-utility gas suppliers who purchase gas on behalf of residential and small commercial end-use customers.

to solicit the 10,000 non-core customers with the highest winter gas load to enroll in the program.

The Natural Gas Conservation Pilot Rebate program events were called December 18 through December 20, 2016, and January 23 through January 26, 2017. Total estimated therm reductions below customers' baseline therm use during these events was 6,358, according to SoCalGas' preliminary evaluation results. Total enrollment in the pilot program was about 3,700 customers. Finally, the program cost about \$300,000 to implement, with rebates to be paid at the end of the winter period (March 31, 2017)⁴² out of a total allocated budget of \$4.02 million.

D. Winter Seasonal Savings Pilot: The pilot evaluates whether a proprietary algorithm created by Nest can result in additional therm savings for homeowners with a Nest smart thermostat by gradually adjusting the customers heating, ventilation, and air conditioning (HVAC) set points and run times. The program launched on January 19, 2017, with Nest sending out notifications to a randomly selected sample of their customers to participate.

To evaluate the effectiveness of the Seasonal Savings pilot, SoCalGas used randomized control trial design to measure the savings from the algorithm, which includes the following control and treatment groups: First, a control group is identified that consists of randomly chosen Nest smart thermostat owners who are not offered the algorithm. Second, a treatment group consisting of Nest smart thermostat owners to whom the algorithm is deployed is broken into two separate groups: residential customers who accept the deployment of the Seasonal Savings algorithm for their smart thermostats and residential customers who don't accept the deployment of the Seasonal Savings algorithm for their smart thermostats. The results from the three groups are later evaluated by an independent third party contractor, to measure incremental savings achieved by the algorithm.

Therm reductions from the event days are currently unavailable and will be included in the Winter Gas Demand Response Impact Evaluation. Energy Division staff believes that a conservative estimate of the percentage reduction in therms usage from heating load from the Seasonal Saver program will be at least 3 percent over the winter of 2017.⁴³

⁴² SoCalGas estimates that incentive payments to all customer segments in this program to be slightly less than \$16 thousand.

⁴³ This estimate is based on the Massachusetts Seasonal Saver pilot which saw participants' set points declined by an average of 1.3°F over the course of the three-week algorithm deployment and reduced heating usage by an average of 3.5% over the course of the winter based on a weather-adjusted analysis of run times that included a control group from neighboring states (MA Department of Energy Resources Impact Evaluation published July 21, 2015).

SoCalGas funded the program through their residential Energy Efficiency Energy Advisor subprogram's approved budgets. SoCalGas estimated it would cost \$500,000 for the winters of 2016/17 and 2017/18 to implement the program. The Seasonal Saver pilot enrolled 45,000 customers into the program and 67% of the customers who were contacted enrolled.

Potential Future Resources Under Consideration

A. Summer Seasonal Savings Pilot: The Season Savings program could be a year round program run by SoCalGas in the winter and SCE during the summer. Marin Clean Energy is piloting this approach for both heating and cooling seasons. PG&E has also proposed piloting the program for both heating and cooling seasons as part of their programs to comply with AB 793. That legislation, adopted in 2015, requires utilities to offer software and hardware solutions that allow customers to better understand and control their energy consumption. Depending on when a potential program can be implemented by SCE, they could target a greater number of customers to enroll in the program than the SoCalGas pilot and enroll a control and treatment group of up to 120,000 for the randomized controlled trial. Given the high percentage of customers who opted into the SoCalGas pilot, SCE should be able to enroll at least 75,000 customers for the treatment group.

A summer pilot by SCE is likely lead to greater savings than the SoCalGas winter program since the program would launch for a full cooling season, while the SoCal program launched mid-winter. We also would expect the impacts per household to be greater since the climate zones impacted by the leak at Aliso Canyon generally have more cooling days than heating days. This program can be implemented cheaply, as shown by the SoCalGas budget request. The program will likely achieve 5% incremental cooling savings, have high enrollment, and the randomized control design and third party evaluation will lead to continuous improvements to the algorithm.

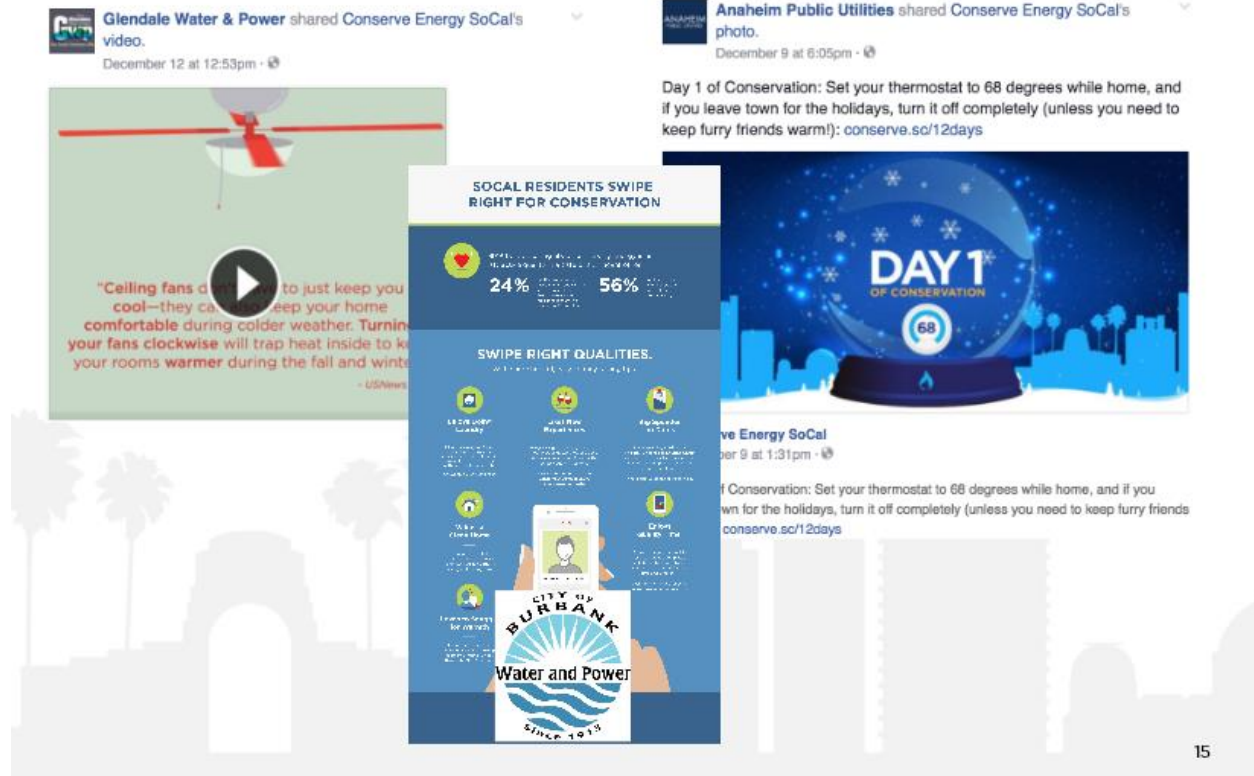
The procedural and implementation steps are relatively straightforward to get this program running by the start of summer. The simplest way would be for SCE to add this measure to an existing residential energy efficiency subprogram, such as Energy Advisor or Plug Loads and Appliances. If SCE thinks this requires an advice letter, they could fairly easily put one together based on those previously submitted MCE and SoCalGas. If the program is not protested, Energy Division could approve it in an expedited manner. Also, the program could be included in the AB 793 Compliance advice letters that the utilities are required to file within 45 days after April 6, 2017, when the AB 793 Resolution was adopted.

However, using this approach is probably the least desirable as the AB 793 Compliance Filings are likely to be more controversial and require more review than a standalone advice letter proposing a Summer Season Savings pilot. Implementing the programs is largely done by third parties who already have the needed materials and infrastructure in place. SoCalGas'

program was approved on December 22, 2016, and the program launched January 19, 2017. Thus the program could be launched within a couple of weeks after an advice letter is approved or SCE decides to add the program to their residential energy efficiency offerings.

Appendix A: Marketing, Education, and Engagement Collateral and Screenshots

Examples of Facebook Posts



Website Screenshot



Collateral

