

Replacing the San Onofre Nuclear Plant: Can We Afford More Air Pollution, Climate Disruption and Higher Bills?

This past June, Southern California Edison (“SCE”), one of the largest electric utilities in the nation, announced the permanent retirement of the 2,200 MW San Onofre Nuclear Generating Station (“San Onofre”) after significant tube damage was discovered in its steam generators. The unexpected shutdown of San Onofre presents an exciting opportunity for California to demonstrate how it can continue to meet its future energy needs without new fossil fuel plants. Unfortunately, state regulators at the California Public Utilities Commission (“CPUC”) are now considering building new gas plants in Southern California to replace San Onofre. Given the severe impacts of gas plants on public health and the environment, the region’s reduced energy needs, and the availability of clean energy solutions, there is no legitimate basis for the CPUC to approve new gas-fired power plants in response to the San Onofre shutdown.

New Gas Plants Are Costly, Increase Air Pollution, and Move Us Backwards On Meeting Our Climate Goals

New gas plants are extremely costly and would exacerbate the serious public health impacts already experienced in a region with some of the dirtiest air in the nation. New gas plants would also undermine California’s climate targets by replacing a carbon-free energy source with carbon-intensive generation. Following the shutdown of San Onofre, greenhouse gas pollution from in-state electricity generation rose 35 percent due to increased use of gas-fired power plants.¹ Authorizing new gas plants as a permanent replacement solution for San Onofre in lieu of clean energy alternatives would mark a significant and potentially unrecoverable step backward in California’s efforts to combat climate change. As recognized by the South Coast Air Quality Management District, “a transition to zero- and near-zero emission technologies is necessary to meet 2023 and 2032 air quality standards and 2050 climate goals.”²

We Don’t Have to Choose Between Reliability and Pollution

Fortunately, no new gas plants are needed. While one might reflexively assume that retirement of a facility the size of San Onofre would require at least some gas-fired replacement generation, this assumption ignores both the significant progress California has already made in transitioning toward clean energy and the additional potential to accelerate deployment of clean energy resources.

¹ California Air Resources Board, 2008-2012 Emissions for Mandatory Greenhouse Gas Emissions Reporting Summary (Nov. 4, 2013) (showing increase in in-state greenhouse gas emissions from 30,732,214 metric tons in 2011 to 41,610,182 in 2012 and attributing change to increase in use of natural gas as fuel due to decrease in hydroelectric generation and loss of San Onofre), available at <http://www.arb.ca.gov/cc/reporting/ghg-rep/reported-data/2008-2012-ghg-emissions-summary.pdf>.

² South Coast Air Quality Management District, Final 2012 Air Quality Management Plan (Dec. 2012), p. 1-20, available at <http://www.aqmd.gov/aqmp/2012aqmp/Final/Chapters.pdf>.

Due in part to incorporation of recently adopted building and appliance codes, the latest demand forecast by the California Energy Commission (“CEC”) lowers future projections of energy demand in Southern California by over half the capacity provided by San Onofre. Remaining need resulting from the retirement of San Onofre should be met by properly accounting for anticipated progress in California’s clean energy programs: energy efficiency, distributed (rooftop and small scale) solar, energy storage, and demand response (incentivized changes in energy use by consumers from their regular usage pattern). To the extent need still remains, it can be filled with additional targeted deployment of these resources.

If necessary, transmission improvements can also reduce the need for new gas-fired generation in the LA Basin. For example, the Mesa Loop-In project proposed by Southern California Edison (“SCE”) to upgrade an existing substation would reduce generation need in the LA Basin by 1,200 MW – the equivalent of two new mid-size gas plants.

Accordingly, there is no need for additional gas-fired power plants to maintain grid reliability. Procurement of new gas-fired power plants in response to the San Onofre shutdown would only serve to needlessly increase cost and environmental and public health impacts to the region’s ratepayers.

The following sets forth answers to frequently asked questions (FAQs) on the shutdown of San Onofre and evidence highlighting the lack of need for new gas plants as replacement capacity.

Frequently Asked Questions on the Impact of San Onofre Retirement and the Need for Replacement Electric Generation

1. Does the unexpected loss of the San Onofre Plant create an immediate need for new generation to “keep the lights on”?

No. Despite the loss of San Onofre, the planning reserve margin forecast for Southern California in 2013 is essentially unchanged from 2012 due in part to the recent addition of nearly 2000 MW of new gas-fired generation in the Los Angeles Basin.³ This new capacity roughly matches the 2,246 MW of capacity provided by San Onofre. There is no crisis requiring the immediate need for new generation to maintain grid reliability.

Longer term, there is a question of whether the retirement of San Onofre and other generation such as “once through cooling” (“OTC”) facilities⁴ will require new replacement generation.

³ CAISO, *2013 Summer Loads and Resources Assessment*, May 6, 2013, Tables 1 and 2, pp. 4-5, 16 (“this report assumes all 2,246 MW [of San Onofre] will not be available during 2013 summer.”). Major new generation projects coming online by mid-2013 in the Los Angeles Area include: Walnut Creek Energy Center (500 MW, City of Industry); NRG El Segundo Repowering Plant (570 MW, El Segundo); Sentinel Peaker Project (850 MW, Desert Hot Springs).

⁴ OTC plants use a technology that withdraws billions of gallons of seawater each day to cool steam for generating electricity. Due to their significant impacts on marine life, the State Water Resources Control Board (“SWRCB”) adopted a policy in 2010 requiring OTC plants to reduce their use of seawater by 93 percent. In practice, this requires the plant to shut down or modernize its equipment. Compliance dates range from 2013-2029. Several

The California Public Utilities Commission (“CPUC”) determines long-term resource needs and is making such an evaluation now in its Long-Term Procurement Planning (“LTPP”) proceeding.

2. What about the loss of reactive power (voltage support) provided by San Onofre?

One concern raised with the loss of San Onofre is whether there is a need to replace the “reactive power” provided by this facility. Reactive power is required to maintain sufficient voltage to deliver power through transmission lines and must be supplied by sources reasonably close to the load being served. The loss of this voltage support reduces the ability of transmission lines to deliver power under heavy load conditions.

San Onofre was capable of providing approximately 1,100 MVAR of reactive support.⁵ As SCE recently testified in the San Onofre proceeding before the CPUC, replacement of lost voltage support is well under way. In early 2013, 320 MVAR of capacitors were installed in Orange County immediately north of San Onofre.⁶ In March 2013, the California Independent System Operator (“CAISO”) approved the Talega Area Dynamic Reactive Support and the South Orange Reactive Support Projects, which will add an additional 740 MVAR of reactive support in the vicinity of San Onofre.⁷ An additional 150 MVAR of shut capacitors at Penasquitos 230kV Substation is also currently under development by SDG&E.⁸ *No new generation is needed to provide voltage support to compensate for the loss of San Onofre.*

In addition, distributed (rooftop and small-scale) solar and energy storage resources, paired with advanced inverters, can supply the grid with reactive power. The CPUC is also currently evaluating revisions to its technical standards to permit use of advanced inverters. Once approved, this will enable local clean energy to provide the grid with voltage support in lieu of fossil fuel generation or potentially more costly transmission system upgrades.

3. What are the San Onofre Task Force and the “Preliminary Reliability Plan for LA Basin and San Diego”?

Following SCE’s announcement in June 2013 that San Onofre would be permanently retired, Governor Jerry Brown assembled a San Onofre Task Force comprised of the CEC, CPUC, SWRCB, California Air Resources Board (“CARB”) and the CAISO. The Task Force developed a plan by mid-September identifying options to meet reliability needs resulting from San Onofre’s retirement. The “Preliminary Reliability Plan for LA Basin and San Diego” was

Southern California OTC plants, including Redondo Beach and Huntington Beach, have a compliance deadline of December 2020.

⁵ R.12-03-014, SCE Track 4 Rebuttal Testimony, p. 10. MVAR is shorthand for “mega volt amps reactive” and is the kW equivalent for measuring reactive power flow.

⁶ *Id.*

⁷ *Id.*

⁸ R.12-03-014, CAISO Track 4 Testimony, p. 15 (Sparks).

then prepared by staff of the CEC, CPUC, and ISO on August 30, 2013.⁹ The Preliminary Reliability Plan assessed impacts from the San Onofre closure, the scheduled compliance deadlines for 5,068 MW of OTC generation (largely occurring in 2020), and projected load-growth. The Preliminary Reliability Plan suggested procurement of 3,000 MW of gas-fired generation and 3,250 MW of preferred resources (energy efficiency, demand response, renewable generation, combined heat and power and energy storage) for a roughly 50/50 percent procurement split between fossil fuel generation and preferred resources.

4. Is the Preliminary Reliability Plan's recommendation to procure 3,000 MW of gas and 3,250 MW of preferred resources advisable?

No. First, the Preliminary Reliability Plan errs by attempting to recommend replacement capacity needed for both the unexpected retirement of San Onofre and compliance dates for OTC facilities. *Additional generation capacity required to replace scheduled OTC retirements has already been thoroughly evaluated and determined in Track 1 of LTPP before the PUC.* This is no longer an open question.

Second, the CPUC is the agency charged with analyzing and determining the need for new generation through a robust evidentiary process with multiple stakeholders including ratepayer advocates and environmental groups. A proceeding to determine what, if any, long-term need results from the retirement of San Onofre is now taking place in Track 4 of LTPP. The Plan's recommendation for new gas-fired plants was based on preliminary analysis by the CAISO, well in advance of the CPUC stakeholder process, and does not account for new demand forecast information by the CEC. The Preliminary Reliability Plan should not be relied upon because it is based on stale information that was never vetted through a public process.

5. How was replacement capacity for OTC retirements resolved?

The LTPP is a bi-annual proceeding at the CPUC that authorizes investor-owned utilities to procure new generation determined to be needed to maintain grid reliability. In Track 1 of the current LTPP proceeding, the CPUC examined future need in the LA Basin resulting from anticipated retirement of OTC plants.¹⁰ After a thorough analysis that included evidentiary hearings and testimony and briefing by interested parties, the CPUC authorized SCE to procure 1,400 to 1,800 MW of capacity in the LA Basin. At least 1,000 MW, but no more than 1,200 MW of that capacity could be procured from conventional gas-fired resources. At least 50 MW must be procured by energy storage and at least 150 MW must be procured by preferred resources and/or energy storage. The CPUC also authorized SCE to procure up to an additional 600 MW of capacity from preferred resources and/or energy storage.¹¹ A separate proceeding

⁹ CEC, CPUC, CAISO, Preliminary Reliability Plan for LA Basin and San Diego, Aug. 30, 2014, *available at* http://www.energy.ca.gov/2013_energy_policy/documents/2013-09-09_workshop/2013-08-30_prelim_plan.pdf.

¹⁰ D.13-02-015, Decision Authorizing Long-Term Procurement for Local Capacity Requirements, Feb. 13, 2013, *available at* <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M050/K374/50374520.PDF>.

¹¹ *Id.* at 2.

examined future need in the SDG&E Service area and authorized 298 MW of procurement beginning in 2018 assuming retirement of the Encina OTC plant.¹²

6. Why is there no additional need for new fossil fuel resources resulting from the retirement of San Onofre?

New CEC demand forecasts and projections of additional savings from energy efficiency programs significantly reduce the need for capacity provided by San Onofre. Remaining need is met as a result of the State's investments in clean energy mandates such as energy storage procurement. To the extent there is still additional need, it can be met through targeted procurement of clean energy or, if necessary, transmission system upgrades, such as the proposed Mesa Loop-In, that will allow additional import of power into the LA Basin.

The updated CEC demand forecast reduces future demand projections for the LA Basin and SDG&E Service Area by over 1,300 MW by 2022 - over half the 2,446 MW provided by San Onofre. The CPUC determines the need for procurement of new resources based on forecasts of future energy demand supplied by the CEC. The CEC periodically updates its energy demand forecast as part of its Integrated Energy Policy Report (IEPR). In examining additional need following retirement of San Onofre, the Preliminary Reliability Report used the forecast adopted by the CEC in the 2012 IEPR. However, the CEC's most recent demand forecast in the 2013 IEPR projects that peak demand in the LA Basin and SDG&E Service Area in 2022 will be over **1,300 MW less** than estimated in the 2012 IEPR. This decreased baseline projection of demand, in part due to the benefits resulting from adoption of new, more stringent building and appliance codes,¹³ meets over half the need resulting from the retirement of San Onofre.

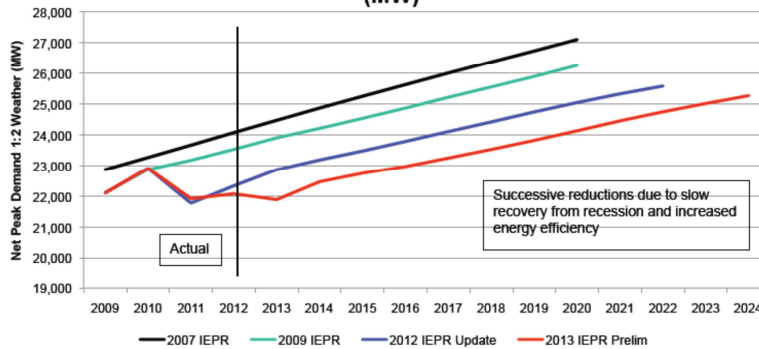
¹² D-13-03-029, Decision Determining San Diego Gas & Electric Company's Local Capacity Requirement and Granting Partial Authority to Enter into Purchase Power Tolling Agreements, Mar. 28, 2013, *available at* <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M063/K535/63535568.PDF>.

¹³ CEC, California Energy Demand 2014-2024 Preliminary Forecast, Vol 1., p. 1 (May 2013), *available at* <http://www.energy.ca.gov/2013publications/CEC-200-2013-004/CEC-200-2013-004-SD-V1.pdf>.



Evolving Demand

Peak Demand for SCE Planning Area - CEC Forecasts (MW)



14

Since at least 1990, the end-point of every CEC demand forecast has overestimated actual energy consumption.¹⁵ An evaluation of San Onofre replacement capacity should not be based on outdated and inflated estimates of future demand. Indeed, CAISO has also stated it “wants to consider incorporating the 2013 IEPR demand forecast” in assessing the need for new procurement.¹⁶ When current demand projections for the LA Basin and SDG&E Service Area are accounted for, the need for new generation resulting from the San Onofre closure is cut by more than 50 percent.

Reliability Plan Used 2012 CEC Forecast ¹⁷	2018		2022		Difference (MW)	
	2018	2022	2018	2022	2018	2022
LA Basin	21,870	22,917	20,609	21,704	(1,261)	(1,213)
SDG&E	5,652	6,056	5,705	5,948	53	(108)
Total	27,522	28,973	26,314	27,652	(1,208)	(1,321)

The Preliminary Reliability Plan significantly understated additional demand reductions from future energy efficiency. In reaching its need recommendation, the Preliminary Reliability Plan

¹⁴ Michael Jaske, CEC, Overview of Southern California Electricity Infrastructure Issue, Joint CEC/CPUC Workshop, July 15, 2013, Slide 4.

¹⁵ See, California Energy Commission, California Energy Demand 2010-2020 Adopted Forecast, p. A-10 (Dec. 2009), available at <http://www.energy.ca.gov/2009publications/CEC-200-2009-012/CEC-200-2009-012-CMF.PDF>.

¹⁶ R.12-03-014, Track 4 Testimony of Robert Sparks in Behalf of the Independent System Operator at 30, Aug. 5, 2013.

¹⁷ CEC, Documents for 2012 IEPR Update Proceeding, Mid-Case LSE and Balancing Authority Forecast, Form 1.5d http://www.energy.ca.gov/2012_energy policy/documents/index.html

¹⁸ CEC, Oct. 1, 2013 Lead Commission Workshop on Revised Electricity and Natural Gas Forecasts 2014-2024, Demand Forecast Spreadsheets, Mid Case LSE and Balancing Authority –baseline.xlsx, Form 1.5d, http://www.energy.ca.gov/2013_energy policy/documents/2013-10-01_workshop/spreadsheets/

assumes 1,000 MW of incremental energy efficiency savings by 2020.¹⁹ This estimate was based on an incomplete assessment of future energy savings and does not reflect more recent projections by the CEC on achievable savings in the 2013 IEPR. Estimates in the 2013 IEPR are more accurate because they incorporate a comprehensive analysis of energy efficiency potential in California.²⁰ Updated IEPR estimates on the “most likely” expected savings from energy efficiency (the mid-case scenario) further reduce demand by over 1,400 MW by 2020 (as compared to the 1,000 MW reduction assumed in the Preliminary Reliability Plan) and over 1,800 MW by 2022.²¹

Required procurement of 745 MW of energy storage by SCE and SDG&E can be designed to further reduce the need for fossil-fuel generation resulting from the closure of San Onofre. Need for San Onofre replacement capacity is further reduced by the deployment of energy storage.²² In its recent landmark energy storage decision, the CPUC required SDG&E and SCE to collectively procure 745 MW of energy storage by 2020.²³ Guiding principles for procurement include “optimization of the grid, including peak reduction.”²⁴ To maximize value of energy storage to ratepayers and avoid costly overprocurement of gas-fired plants, a significant portion of the energy storage requirement can and should be targeted and designed to meet peak capacity needs.

Demand response can relieve 1,000 MW of need. In determining the need for new resources, the CPUC looks at the need that would occur on the hottest day in ten years. CAISO forecasts very hot, high demand days at least a day or two in advance. Nonetheless, in estimating need, CAISO discounted 997 MW of demand response resources that the CPUC estimated would be available by 2018 on the grounds that they may not respond within 30 minutes following an unexpected contingency event, such as the loss of a transmission line due to fire.²⁵ Because demand

¹⁹ Preliminary Reliability Plan, p. 6. Similarly, in its Revised Scoping Memo, the PUC assumes only 933 MW of EE savings in the San Onofre area by 2022 based on “low” estimates of savings in the 2012 IEPR. “Mid-level” savings are defined as “most likely” to occur and should therefore be used to determine future need.

²⁰ CEC, Estimates of Additional Achievable Energy Savings, Supplement to California Energy Demand 2014-2024 Revised Forecast, Sept. 2013, p.1, available at <http://www.energy.ca.gov/2013publications/CEC-200-2013-005/CEC-200-2013-005-SD.pdf>.

²¹ CEC, Oct. 1, 2013 Lead Commission Workshop on Revised Electricity and Natural Gas Forecasts 2014-2024, Demand Forecast Spreadsheets, Mid Case LSE and Balancing Authority –AEEEE adjustment.xlsx, Form 1.5d, http://www.energy.ca.gov/2013_energypolicy/documents/2013-10-01_workshop/spreadsheets/ (reduction attributed to achievable EE is derived by subtracting baseline forecast with AEEEE adjusted forecast).

²² Energy storage is defined as “any commercially available technology that is capable of absorbing energy, storing it for a period of time, and thereafter dispatching the energy.” Pub. Util. Code § 2835(a)(1). Energy storage can include batteries, fly wheels, compressed air systems, and pumped hydro. Energy storage helps integrate renewable energy resources into the grid in a manner than minimizes greenhouse gas emissions and can reduce the need for fossil fuels to meet peak load requirements.

²³ D.13-10-040, Decision Adopting Energy Storage Procurement Framework and Design Programs, Oct. 21, 2013, p. 15, available at <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M079/K533/79533378.PDF>.

²⁴ *Id.* p. 9.

²⁵ R.12-03-014, Revised Scoping Ruling, May 21, 2013, p. 3; LTPP Track 4 Transcript, Oct. 29, 2013, pp. 1575-76 (CAISO, Sparks).

response resources are intended to be deployed on very hot days to reduce grid stress, discounting 997 MW of demand response is unwarranted.

7. What is the timing and scope of a determination by the CPUC on need for additional generation resulting from San Onofre retirement?

Because adoption of transmission solutions will significantly affect need for replacement generation for San Onofre, the CAISO initially recommended that the CPUC “wait to make a decision about the need for additional resources until the ISO has completed its studies of potential transmission mitigation solutions [in the 2013/2014 Transmission Planning Process].”²⁶ Preliminary results of the CAISO’s 2013/2014 Transmission Planning Process (“TPP”) are expected in January and final results in March. Nonetheless, the CPUC determined it would consider whether interim authorization was needed in advance of the final TPP and the parameters for that authorization, such as the types of resources and procurement process. SCE and SDG&E have both requested 500 MW of interim authorization that would allow for procurement of new gas plants. A proposed CPUC decision authorizing interim procurement is anticipated in January 2014. A final decision would take place at least 30 days after a proposed decision. Depending on the results of the TPP, additional procurement could be authorized at a later date.

8. If there is additional need, what are the best solutions to meet that need?

To the extent there is an interim authorization for any additional need, it should be met with targeted procurement of preferred resources and energy storage. This is consistent with State policy known as the “Loading Order,” which requires utilities to “invest first in energy efficiency and demand-side resources, followed by renewable resources, and only then in clean conventional electricity supply.”²⁷ A mix of clean energy resources can be strategically deployed to complement their respective attributes and maximize grid reliability and resilience. For example, SCE has initiated a “Preferred Resource Pilot” intended to use a mix of preferred resources (energy efficiency, demand response, and renewables) and energy storage to offset load growth in Orange County. This approach can be extended and applied to SDG&E.

Transmission improvements can also avoid the need for new fossil fuel generation. Because the LA Basin and SDG&E service area are transmission constrained areas, transmission improvements can significantly reduce any remaining need by allowing more power to be imported during peak periods. As one example, SCE has testified that the Mesa Loop-In project, which would primarily require improvements at an existing SCE substation on SCE owned land,

²⁶ R.12-03-014, CAISO LTTP Track 4 Testimony (Sparks) p. 30.

²⁷ CEC/CPUC Energy Action Plan, 2008 Update (Feb. 2008) p. 1, *available at* http://www.cpuc.ca.gov/NR/rdonlyres/58ADCD6A-7FE6-4B32-8C70-7C85CB31EBE7/0/2008_EAP_UPDATE.PDF

would reduce generation need in the LA Basin by 1,200 MW.²⁸ As SCE has recognized, “development of Mesa Loop-In and the strategically located Preferred Resources could displace the need for any additional LCR resources.”²⁹

Because of the high potential for transmission solutions to significantly reduce need for new generation, the CPUC should not authorize new gas plants as part of an interim procurement decision in January 2014. Authorization to procure new gas-fired plants prior to the results of the 2013/2014 TPP, which will more fully identify and evaluate transmission options, could result in costly and unneeded overprocurement of new gas-fired generation. Because development of preferred resources further California’s energy and environmental goals, procurement of these resources prior to the release of the TPP does not present the same concerns and is a “no regrets” strategy to address any immediate need the CPUC may identify to develop new resources as a result of San Onofre retirement.

Last updated Nov. 21, 2013.

²⁸ R.12-03-014, SCE LTPP Track 4 Testimony p. 36.

²⁹ *Id.* p. 3.