

Preliminary Reliability Plan for LA Basin and San Diego

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Introduction

On June 7, 2013 Southern California Edison Company (SCE) announced that it would permanently close the San Onofre Nuclear Generating Station (San Onofre) in southern California. While resources are expected to be adequate in the remainder of California, the closure of San Onofre creates unprecedented challenges for maintaining reliable electric service to consumers located in the southern region of California. Additionally, the reliability risks created by the regulatory timeline for eliminating the use of once-through cooling (OTC) in the coastal areas' aging, inefficient gas-fired power plants (5,086 MW) and load growth in southern California of about 400 MW/year are also considered in this preliminary plan. These are large numbers and involve a complex mix of regulatory challenges.

San Onofre represented approximately 16% of the local electricity generation supply, serving an average of 1.4 million homes served by SCE, San Diego Gas & Electric (SDG&E) and City of Riverside in southern California. In addition to meeting essential energy needs, it was especially important because of its location on a critical transmission path between Orange County and San Diego. As a result, its closure creates more than a shortage of electricity. It also creates a shortage of voltage support – an electrical characteristic analogous to water pressure that is necessary to move power between Los Angeles and southern Orange County/San Diego.

Complicating the challenge of replacing resources that came from San Onofre is the nature of voltage support, which can only be supplied by conventional generation, combined heat and power, or specialized equipment such as synchronous condensers that operate like large electrical motors.¹ The technical discussion that follows was developed in consultation with SWRCB, SCE, SDG&E and SCAQMD and describes the coordinated actions the CPUC, CEC, and CAISO staff are pursuing in the near term (4 years) and the long-term (7 years). These actions collectively comprise a preliminary reliability plan in light of the closure of San Onofre, the expected closure of 5,068 MW of gas-fired generation that uses OTC, and the normal patterns of load-growth. The reliability plan can be summarized as three key actions identifying challenging goals that will be fully vetted in the public decision making processes of the appropriate agency:

¹ Solar photovoltaic systems, wind energy, battery storage, energy conservation, and demand response do not provide this characteristic but can reduce the amount needed.

- (1) Consider to procure/develop about 3,250 MW of preferred resources -- local energy efficiency, demand response, renewable generation, combined heat and power, and storage – for a target of about 50% of needs.²
- (2) Consider to procure/develop the transmission, including infrastructure that provides voltage support or enhances resource sharing between Orange County and San Diego, and procure/develop about 3,000 MW of conventional generation to meet the remaining needs in the region, including load growth.³
- (3) Establish backstop permits so that once-through cooling requirements can be quickly deferred and/or generation resources can be quickly deployed in the event needed resources in (1) or (2) are not fully developed on a schedule to meet reliability needs.

These recommendations have a goal to ensure reliability. In order to realize the following plan, a variety of decisions must be approved by key state agencies, elevating the importance of beginning planning now to make sure regulatory actions are made in time to meet future electricity needs in the region. This report contains the recommendations of CPUC, CEC and ISO senior staff. However, implementing the specific mitigation options discussed below will require decisions to be determined through either a CPUC proceeding, and/or through the ISO planning process, and/or through the CEC siting process – depending on the specific option.

1. BACKGROUND

Electric grid reliability in the LA Basin and San Diego is challenged by the retirement of San Onofre and the enforcement timeline of OTC regulations for power plants using ocean or estuarine water for cooling. In total, approximately 7,332 MW of generation (5,086 MW gas-fired generation and 2,246 MW San Onofre) in the region are affected. While these changes present significant reliability challenges that must be addressed, they also present a unique opportunity to reduce reliance on conventional resources in favor of “preferred resources” such as energy-efficiency and demand response, renewable resources, combined heat and power, and energy storage , in a manner that recognizes their clean, low carbon attributes to meet reliability needs.

The electrical needs of the region and potential mitigation actions are discussed in this document for two time frames: near-term (2013-2017), and long-term (2020 and beyond). Prompt action is required to address both near-term and long-term needs given that major grid infrastructure investments take considerable time to implement. Previous 2012-2013 technical studies provide the basis for the recommendations and findings described in this report. Additional study efforts and regulatory

² This requires procurement of about 1,000 MW of preferred resources in addition to what is already being counted on.

³ This requires procurement of about 1,500 MW of conventional generation in addition to what is already authorized.

proceedings are underway or planned that will help to further refine the regional needs and choice of solutions as the state moves through the coming years⁴.

2. NEAR TERM NEEDS - 2014 THROUGH 2017

2.1 Identified Needs

Industry and the regulatory agencies reacted promptly to the initial outage of the San Onofre in early 2012, with plans developed and implemented to address the summer of 2012 and 2013. While these actions have supported reliability to date, an additional number of mitigations are underway or needing consideration to ensure reliability in the near term.

2.2 Mitigations

In anticipation of an extended or permanent shutdown of San Onofre, the ISO approved in March 2013 the following transmission enhancements: synchronous condensers at the Talega substation, a Static Var Compensator at the San Onofre Mesa substation, and a new Sycamore Canyon-Penasquitos transmission line. Appropriate steps are now underway to seek approval for implementing these additions as discussed in more detail below.

Preferred Resources

Maintain Flex Alert Program – Funding for the Flex-Alert program should be extended beyond its current 2013-2014 allocation. Since the reliability concerns for the region are more pronounced during extreme system conditions, public calls for conservation during such periods through the current Flex Alert program may be effective in reducing system demand and loading of the transmission system. The CPUC will review the funding needs for the program after an effectiveness study (currently underway) is completed.

Pursue additional preferred resources in both the LA Basin and San Diego – The CPUC will take steps in 2014 to accelerate the authorization and procurement of additional preferred resources to address the loss of conventional generation. These steps should include developing near-term options that will provide additional preferred resources in the LA Basin and San Diego. Traditionally preferred resource programs are statewide and geographically neutral. Therefore the CPUC will need to consider rule changes that can allow resource authorizations to better address the local reliability needs of the LA Basin and San Diego. The CPUC is looking at modifying energy efficiency, demand response, distributed generation, CHP and storage programs to increase the development of these resources so they can effectively meet the reliability needs of the affected areas. The decision-making process will also need to extend into consideration of longer term needs, as discussed in more detail in section 3.

⁴ The ISO annual transmission planning process (first quarter of 2014) and the CPUC 's long-term procurement planning proceeding (mid 2014) are both expected to review the need for new resource authorizations in San Diego and Los Angeles in light of the permanent shutdown of SONGS.

SCE, via its CPUC resource procurement authorization, adjustment of its existing EE/DR programs, and its Preferred Resource Pilot will prepare and pending CPUC approval execute an implementation plan for attaining competitively priced preferred resources to meet reliability needs in its service area, with a target focus on the loads in west LA Basin and south Orange County.

Further, the ISO is examining the feasibility of implementing a pilot multi-year auction for energy efficiency and demand response programs targeted in the LA Basin and San Diego areas.

Transmission

Additional Reactive Power Support - To address the regional voltage needs created by the absence of San Onofre, the ISO approved the installation of two projects that provide additional reactive support devices in the electrical vicinity of San Onofre in early 2013. The first project, the installation of synchronous condensers at Talega substation, does not require additional regulatory approvals and should be in service prior to Summer 2015. The second project, the installation of a Static Var Compensator at San Onofre Mesa substation, requires an additional approval from the CPUC. SDG&E is expected to file an application for approval by mid-2014, and if approved by mid-2015, the project could be online by summer 2016.

Sycamore Canyon – Penasquitos Transmission Line⁵ –To address local transmission overloads in the northern region of San Diego system, some of which are exacerbated by the absence of San Onofre, the ISO-approved a new 230 kV transmission line from the Sycamore Canyon to Penasquitos substations to improve power flows from east to west. The online date is targeted to 2017, although permitting and construction risk may delay the final operating date. There are multiple applicants seeking to build this line. As the CPUC is the lead siting agency for all of the applicants seeking to build this line, the CPUC is responsible for selecting the project sponsor to build the line. To meet the 2017 in-service date, the selected sponsor will need to be determined in early 2014 and file for a CPCN with the CPUC in mid 2014. The CPUC should process and approve the application by mid 2015.

Pursue a modification to the Nuclear Regulatory Commission (NRC)-required San Onofre-area voltage criteria – Reducing the minimum voltage criteria of the transmission system by a fractional amount in the area around San Onofre, can allow additional power to flow to San Diego without affecting reliability or power quality. A potential reduction of needs by approximately 100 MW could be achieved because of the change in the plant's status. This criteria modification will require NRC approval since spent fuel will remain at the San Onofre site for the foreseeable future even though the plant is no longer operating. Based on engineering analysis, SCE anticipates that relaxation of the 218kV requirement for San Onofre can be in place prior to summer 2014.

Consider converting one of San Onofre generators into synchronous condenser – Similar to what was done at the Zion Nuclear Station, there is a possibility of converting one of the San Onofre generators into a synchronous condenser. Preliminary engineering estimates indicate that this conversion is

⁵ The Sycamore Canyon – Penasquitos line will also provide renewable integration benefits.

possible by the summer of 2015. A more detailed feasibility assessment will be completed by SCE in 2013.

Huntington Beach synchronous Condensers – The CAISO will be called upon to approve an expected filing from AES in each upcoming year to extend the existing Reliability Must Run contract. Current contract provisions call for the retirement of one of the synchronous condensers at the end of 2016 and the other at the end of 2017 in order for the plant owner (AES) to undertake its OTC compliance repowering plans for the entire facility, which AES has stated is contingent upon receiving a new long-term power purchase agreement. The current Reliability Must Run contract provisions would allow a yearlong extension of the synchronous condensers based on a mutual agreement by the ISO and AES. The evaluation of this option will need to consider how an extension of the synchronous condenser's operation beyond 2017 would impact the long-term repowering plans for the Huntington Beach facility.

Conventional Generation

Consider maintaining existing peaking generation in San Diego – SDG&E has taken action to delay the retirement of Cabrillo II peaking generation (188 MW) until 2015. The unit is located in San Diego, and it is currently scheduled for retirement at the end of 2013. This effort will require CPUC approval of both the land lease and the power purchase agreement. SDG&E is expected to file at the CPUC for approval in 2013 of both a land lease and power purchase agreement.

Accelerate procurement of already authorized near term resources –The CPUC has approved 343 MW of procurement for the San Diego local area beginning in 2018. SDG&E has filed an application with the CPUC seeking CPUC approval of a Power Purchase Agreement with Pio Pico (305 MW). The application contemplates that the Pio Pico generator can be on line in 2015 provided SDG&E receives CPUC approval of the PPA by December 2013.

Authorize additional conventional resources (Replacing Encina in the near term) - A CPUC Long Term Procurement Proceeding (LTPP) decision is expected in early 2014 to address reliability needs in the LA Basin and San Diego. This decision should provide procurement authorization beginning in 2016 to address the need resulting from the Encina facility's December 2017 OTC compliance deadline. There may be a variety of options considered to meet the needs caused by the retirement of Encina (950MW). One option frequently discussed is the development of a new power plant referred to as Carlsbad Energy Center⁶. This would replace units 1-3 and the remaining Encina units (Units 4 and 5 with a combined capacity of 630 MW) would be retired in accordance with the OTC compliance schedule. In May of last year, the Carlsbad Energy Center received the CEC approval of the project's Application for Certification (AFC). At this time, there are no power purchase agreements (PPA) pending for the proposed repowering project for Carlsbad Energy Center.

Contingency Permitting in Southern California – Recent experience has shown that it can take seven years or more for new generation (including repowering existing generation) to be permitted and built.

⁶ The Carlsbad Energy Center can be built without impacting the operation of the existing Encina generating station.

In light of the long lead times required that may not sync up well with procurement authorization and purely independent generation development, generation development contingency options are currently under consideration. Both SCE and SDG&E are looking into beginning to license sites in their service areas that would then be made available to independent generators under a competitive solicitation process based on identified and pre-determined resources needs. This proposal will require flexibility within the various state rules on licensing and development time frame, but could facilitate the addition of new generation in significantly shorter times if and once the need is authorized by the CPUC. The CEC has explored the options for this type of generation development contingency planning in Southern California. One option is for a utility to file an AFC with the CEC in the 4th Quarter of 2013 and then use the current 12 month CEQA permitting process.

Key actions required for this option to move forward include a CPUC review of applications for funding this type of initial development work, cooperation of the CEC to provide substantial pre-issuance review of AFCs, and potential actions by Air Boards in providing paths for emission offsets.

3. LONGER-TERM PLAN - 2020 AND BEYOND

3.1 Identified Need

- Reliability concern in the LA Basin post-2020 is driven largely by December 2020 OTC compliance dates leading to the retirement of ~3,800 MW of conventional generation, in addition to the area's load growth. Additional needs in the San Diego area are driven by continuing load growth. Both areas may see further retirement of existing resources (1,200 MW) as certain non-OTC generation reaches ages well beyond their design life.
- ISO analysis indicates that by the end of 2020 there will be a need for additional resources in the LA Basin and San Diego area of approximately 4,600 MW. These studies presume the state's RPS mandate is satisfied, and include about 1,000 MW of distributed generation such as rooftop and distributed forms of photovoltaic resources. Further, they presume 1,000 MW of incremental energy efficiency savings from programs that have not yet been authorized and 200MW of reliability based demand response that will need to be developed. Subtracting from the identified need of 4,600 MW the approximately 2,100 MW of other resources that have been authorized in earlier proceedings, the residual need is approximately 2,500 MW (assuming that the authorized resources are developed and the incremental energy efficiency is also delivered).
- Varying combinations of generation (MWs) and reactive power support (MVARs) in the LA Basin and San Diego area could meet this need. Preferred resources with appropriate capabilities and in the proper locations also could meet many of these needs. A high voltage transmission connection between the two areas could reduce the overall needs by approximately 1,000 MW.

3.2 Mitigation Options under Consideration

Preferred Resources

Pursue additional preferred resources in both the LA Basin and San Diego – To meet the long-term identified local reliability needs, competitively priced preferred resource programs are expected to be continuously refined by the CPUC as noted in section 2.2 above. The expected amount and locations of dependable capacity that will be provided by preferred resources is currently under consideration by the CPUC staff with a goal of reliably meeting roughly 50 percent of medium to long-term needs with preferred resources. This percentage is roughly consistent with the CPUC’s recent procurement authorization strategies (e.g. San Diego and LA Basin authorizations in early 2013). To achieve this goal, and considering recently prepared ISO studies prepared for, but not yet litigated in, the CPUC’s LTPP “Track 4” proceeding, it is anticipated that preferred resources beyond those already counted upon will need to meet approximately 1000 MW of the residual need in 2022.⁷ Note that this is in addition to already authorized preferred resources, and approximately 1000 MW of energy efficiency programs that are counted on in forecasting efforts but not yet authorized.

Three critical actions for relying on development of additional preferred resources are: (1) an assessment of whether physical capabilities exist to produce, procure, install, and interconnect a heightened level of preferred resources, 2) an operational assessment to review the degree to which preferred resources and conventional resources can in aggregate meet the local reliability needs, and (3) a monitoring system to ensure that programs are implemented and achieve the impacts that are being relied upon.

Transmission

Assess Transmission Alternatives as Mitigations – In its 2013/2014 transmission planning cycle, the ISO will evaluate a number of alternative transmission proposals that can assist in meeting local reliability needs, reducing the need for conventional generation in the coastal areas, and enabling a larger role for generation outside of the constrained areas. These include a range of high voltage AC, DC and submarine cable options. Feasibility, cost, and technical performance need to be considered for each of these alternatives—; obtaining rights of way and necessary permits will likely pose significant challenges to most or all of these alternatives. However, all have the potential to reduce the overall need for resource additions and, therefore, will be thoroughly considered.

Mesa Loop in Project - SCE has identified an upgrade to a transmission substation within the Los Angeles Basin that would improve regional power flows and reduce the amount of generation required within the Los Angeles Basin. Most of the upgrade activity would take place within existing SCE rights of way. SCE will submit this project to the CAISO for consideration in its regional transmission planning process in September, 2013. With appropriate approvals, the project could be online as early as 2020.

⁷ The ISO’s recently filed analysis in the LTPP Track 4 proceeding indicated a residual need (after consideration of authorized resources and consideration of forecast uncommitted energy efficiency) of approximately 2300 to 2500 MW.

Conventional Generation

Authorize additional conventional resources for the long term) – In addition to authorizing procurement to address near term needs, the CPUC’s LTPP process referred to in Section 2.2 and expected to be completed in early 2014, will address longer term needs as well. Beyond 2020, it is expected that some conventional resources may be necessary to address reliability concerns. The main challenge for the development of conventional resources will be the identification of viable power plant projects in light of the siting and air quality permitting challenges.

Contingency Plan

The advancement of preferred resources, transmission alternatives, and generation projects must be carefully monitored to ensure the resources are developing and performing as expected. Contingency plans for fast-tracking additional conventional generation may also be considered as a backstop in the event repowering projects do not proceed, preferred resources do not materialize on schedule or in the amounts required for meeting reliability needs, or in the event identified transmission projects are found to be infeasible or unavailable in a timeframe consistent with OTC policy. These contingency plans could also serve to facilitate a more competitive environment for securing the needed conventional generation at least cost to ratepayers.

Extension of OTC compliance schedule - Extensions to the OTC compliance dates, in part or whole, may be necessary in order for replacement resources (both preferred and conventional) to be developed or procured and achieve operation, without unduly limiting procurement options. It may be appropriate to complete the 558MW Carlsbad Energy Center, and then delay the retirement of the remaining Encina Units 4 and 5 (total 630 MW). After developing a detailed plan for replacing OTC capacity, approval by the State Water Resources Control Board to implement a change in compliance dates would be required. One of the first plants that will face this OTC deadline extension question will be the Encina plant, since it represents significant capacity in the area and has a compliance date at the end of 2017.

San Diego Energy Park - SDG&E has been pursuing the development of an energy park that could host several independent developments. The park would have enough land and transmission capability to provide 1,000MWs of flexible gas-fired generation and could be located on federal lands at Camp Pendleton or in northwest San Diego County. Once secured, the site would obtain the necessary CEC license and CAISO interconnection. The licensed sites would then be made available to independent generators under a competitive solicitation basis based on identified and pre-determined resources needs. This proposal will require flexibility within the various state rules on licensing and development time frame, but could facilitate the addition of new generation in significantly shorter times once the need is authorized by the CPUC.

SCE Contingent Site Permits - SCE is pursuing the development of sites for potential new peaking generation in the LA Basin to prepare for the contingency that preferred resources do not materialize as planned. The contingent generation projects would be located at sites providing the highest values for meeting local reliability standards in the LA Basin. SCE would obtain the necessary CEC license and

CAISO interconnection permission for each of the sites. Should a contingency emerge, the licensed peaker sites could then be made available for development based on the CPUC identified need.

3.3 Air Permitting in LA Basin

Construction of new greenfield power plant sites and repowering of existing power plants present different challenges for facilities in the South Coast area under the jurisdiction of South Coast Air Quality Management District (SCAQMD). Under existing rules, new greenfield plants must provide emission reduction credits (ERCs) obtained from the open market, but these ERCs are scarce and expensive.⁸ Developers wishing to repower old steam boiler facilities into modern combustion turbine facilities can use the exemption in SCAQMD Rule 1304(a)(2) to avoid providing their own emission offsets. However, in the case of repowering, in order to satisfy federal and state Clean Air Act requirements SCAQMD itself would have to provide the offsets by debiting credits from its internal bank. Such credits are limited and have other public policy uses and SCAQMD is developing a new rule to encourage developers to seek permits for the amount of emissions they realistically will have so SCAQMD can better manage the amount of credits debited from its internal offset bank. As such, without any changes in SCAQMD's rules and state law, bidding on RFOs to satisfy any new procurements will be limited to the facilities with existing utility boilers who can use SCAQMD's Rule 1304(a)(2) offset exemption. The AB1318 project report, expected later this year, uses previous local capacity studies but provides a more in-depth assessment of offset issues in SCAB.⁹

3.4 Natural Gas Availability in San Diego

Prior to the shutdown of San Onofre the capacity of the natural gas infrastructure in the San Diego region was occasional strained. Since San Onofre has shut down the natural gas fired plants located in the local reliability area have increased production. The availability of natural gas to fuel existing and new electric generation (EG) must be addressed in a post San Onofre environment to ensure gas pipelines and related infrastructure have the necessary capacity to deliver the supply to the plants. The San Diego region is already a gas capacity constrained area. Almost the entire electric generation gas load in this area is served on an "interruptible basis". This simply means if the gas supply is not sufficient to meet all gas demands, the electric generators will be the first curtailed (shut off). An additional issue that must be considered is the continuing reassessment work for Gas Transmission pipelines as required by the Transmission Pipeline Integrity regulations. This work requires extensive coordination with the CAISO as it may limit capacity in certain areas of the system as the assessments are conducted.

The key action required – Southern California Gas Company and SDG&E will be filing an application with the CPUC late in 2013 for transmission pipeline upgrades needed in both the Southern California Gas and SDG&E systems to address both system capacity and supply to address the generation

⁸ SB 288 (Sher, Chapter 476, Statutes of 2003) prohibits districts from loosening their new source review regulations relative to those in effect in 2002.

⁹ AB 1318(V. Manuel Perez, Chapter XXX, Statutes of 2009) requires ARB, in conjunction with various state agencies, to estimate capacity needed for reliability and to identify issues, if any, with permitting such capacity in SCAB.

reliability issues. The application will seek CPUC approval by the end of 2014. If approved, it is estimated that permitting and construction of the pipelines would take an additional 3-5 years.

3.5 Contingent Generator Permitting

Achieving the overall reliability in Southern California will require success in the development of preferred resources, transmission, and conventional generating resources. Yet, development in populated urban areas will most certainly raise local land use and development concerns and, in the case of conventional generation, air emission and other permitting issues. In the event these are infeasible when needed, it may be necessary to quickly bring on line some generating facilities that have already been permitted but only used on a contingency basis.

The Energy Commission's Application for Certification (AFC) process for large thermal power plants is designed to be a 12-month permitting process which includes multiple opportunities for public, agency, tribal and intervener participation. However, applicants may be able to finish the permitting process in less than 12 months if they propose good sites and provide exceptionally complete applications. If the generation is unnecessary within the 5 year permit time frame, the CEC can grant extensions of licenses. Land use planning benefits because of the early indication of potential interest in constructing a power plant. The alternative option would be for the AFC filing agent to begin discussions with the CEC about potential locations of power plants. The CEC and filing agent can then work over the next few years to identify the areas of least environmental resistance, so when the AFC is filed (if filed at all), many of the issues would have been resolved and the identified expedited approach would be possible.

4. CONCLUSION

The above identified needs and proposed mitigations are a direct response to the reliability needs in Southern California. The solution requires substantial effective coordination between the State Agencies, the ISO and the affected utilities serving load in the area. The near term approach requires monitoring to ensure it is put into service with the expected operating dates and require some specific actions to ensure they can receive the necessary regulatory approvals and be brought into operation in the timeframe needed. Finally, the long term creates more opportunities and flexibility to meet reliability needs. However, some of the solutions take many years to come into reality, thus the hard work needs to begin now.