

Moorpark Subarea Local Capacity Alternative Study

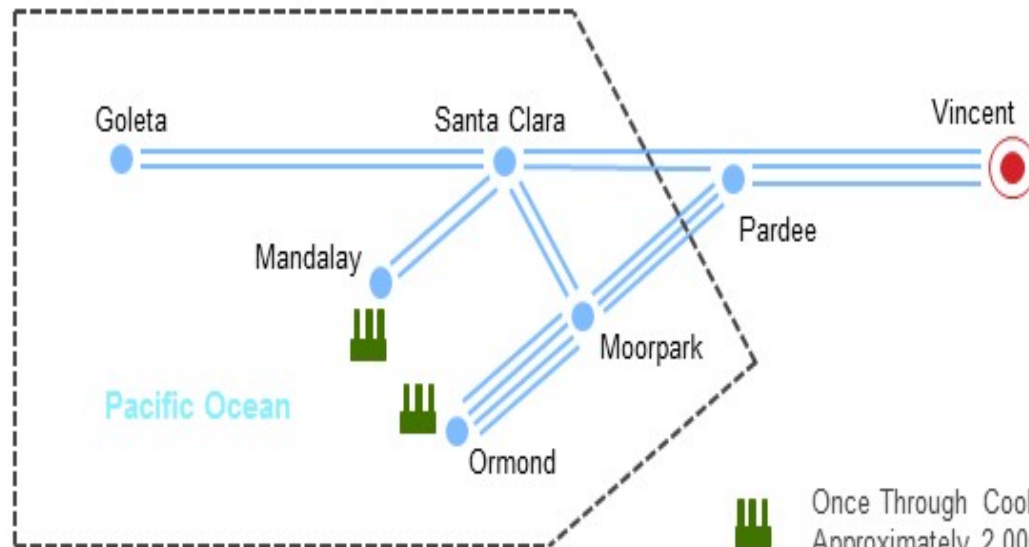
*Preferred Resource Scenarios Stakeholder Call
June 30, 2017*





New local capacity resources are needed in the Moorpark area

- 1930 MW of gas-fired generation currently serving the Moorpark area is expected to retire by December 31, 2020 due to state once-through-cooling (OTC) policy
- Mandalay 3 (130 MW) is not an OTC unit, but is also expected to be retired by NRG when the OTC units are retired
- To avoid degradation of electric service to customers in Ventura and Santa Barbara counties in the post 2020 period, the CPUC authorized SCE to procure the gas-fired Puente Power Project (262 MW) along with a mix of preferred resources and energy storage (12 MW)

The minimum local capacity requirement (LCR) in the Moorpark area is established to protect against voltage collapse under contingency conditions

Moorpark Local Capacity Sub-Area



-  Once Through Cooling generation expected to retire by 12/2020
Approximately 2,000 MW total
-  230 kV transmission line
-  230 kV substation
-  500 kV substation

Latest forecast of Moorpark area post-2020 local capacity need

- Based on the ISO's latest LCR study, the post-2020 local capacity deficiency in the Moorpark area, absent Puente and Mandalay 3, is 264 MW.

Available capacity (MW)	290
2022 LCR (MW)	554
Deficiency (MW)	264

- The available capacity value includes 18 MW of existing demand response and 12 MW of CPUC-authorized distributed energy resources in addition to existing conventional resources
- Projected amounts of additional achievable EE (72-111 MW) and behind-the-meter PV (196-373 MW) were also used as load modifiers to reduce the LCR need

Moorpark area resources expected to be available post 2020

Resource ID	Generator Name	Current Aug NQC	Available Capacity Post 2020	Remark
ORMOND_7_UNIT 1	ORMOND BEACH GEN STA. UNIT 1	741.3	0.0	Expected to retire by 2021 (OTC unit)
ORMOND_7_UNIT 2	ORMOND BEACH GEN STA. UNIT 2	775.0	0.0	Expected to retire by 2021 (OTC unit)
MNDALY_7_UNIT 1	MANDALAY GEN STA. UNIT 1	215.0	0.0	Expected to retire by 2021 (OTC unit)
MNDALY_7_UNIT 2	MANDALAY GEN STA. UNIT 2	215.3	0.0	Expected to retire by 2021 (OTC unit)
MNDALY_7_UNIT 3	MANDALAY GEN STA. UNIT 3	130.0	0.0	Expected to retire by 2021
GOLETA_6_ELLWOD	ELLWOOD ENERGY SUPPORT FACILITY	54.0	54.0	Long-term availability uncertain if long-term contract is not approved
GOLETA_6_EXGEN	EXXON COMPANY USA	3.7	3.7	
MNDALY_6_MCGRTH	McGrath Beach Peaker	47.2	47.2	
SNCLRA_6_OXGEN	E.F. OXNARD INCORPORATED	33.5	33.5	
SNCLRA_6_PROCGN	PROCTER AND GAMBLE OXNARD II	44.5	44.5	
SNCLRA_2_UNIT1	New Indy Oxnard	16.3	16.3	formerly SNCLRA_6_WILLMT
MOORPK_6_QF	MOORPARK QFS (CAMGEN - O.L.S. ENERGY - CAMARILLO STATE HOSPITAL)	26.1	26.1	
SNCLRA_2_HOWLNG	Houwelings Nurseries Oxnard, Inc	7.6	7.6	
N/A	CHARMIN	15	15	
GOLETA_2_QF	GOLETA QFS	0.1	0.0	
GOLETA_6_GAVOTA	Point Arguello Pipeline Company	0.5	0.0	
GOLETA_6_TAJIGS	GOLETA_6_TAJIGS	2.9	0.0	
MOORPK_2_CALABS	Calabasas Gas-to-Energy Facility	4.9	0.0	These resources are used to reduce load when establishing the LCR and are not counted to meet the residual need to avoid double counting.
MOORPK_7_UNITA1	WEME- Simi Valley Landfill	2.1	0.0	
SNCLRA_6_QF	SANTA CLARA QFS	0.0	0.0	
SNCLRA_2_SPRHYD	Springville Hydroelectric Generator	0.5	0.0	
N/A	Aggregate fast-response demand response	18.1	18.1	
N/A	Aggregate LTPP 2012 Track 1 preferred resources	0.0	12.2	
N/A	WDT251 (LA County Sanitation Agoura)	12	12	
	Total	2365.5	290.2	
N/A	Aggregate slow-response demand response	30.1	30.1	A joint ISO-CPUC effort is underway to establish availability requirements for these resources to count for local RA

Puente Power Project

- Puente Power Project consists of one 262 MW generating unit with approximately 120 Mvar reactive power capability
- Conventional quick start resource with ability to maintain full output continuously when needed.
- The project is sufficient to fill the identified LCR need

Objective of this Moorpark Subarea Local Capacity Alternative Study

- Objective of this ISO study is to identify and evaluate potential resource portfolio alternatives to the Puente Project to meet the local resource adequacy need in the Moorpark area
- The study is performed for the purpose of informing the CEC's proceeding regarding NRG's application to construct the Puente Project
- The study will be based on the parameters and assumptions stipulated in the CEC order regarding the study
- The study does not assess the cost, timing or feasibility of procurement of the alternative resources

Parameters and assumptions stipulated in the CEC order

- The necessary resources will be in place in 2021
- The current OTC compliance dates are not extended
- Include presently existing generation, contracted generation, and preferred resources and storage expected to be on line by 2021 and
- To the extent that it may be helpful in identifying the type and quantity of new preferred resources and storage that could be available by 2021, review and consider SCE's 2015 Preferred Resources Pilot RFO, 2016 Aliso Canyon Energy Storage RFO, and the 2016 Aliso Canyon Design, Build, and Transfer RFP.

Resource portfolio options developed in collaboration with SCE will be considered as follows

Scenario 1: Base scenario comprised of 135-150 MW of distributed preferred resources and storage with the remainder of need filled with minimum 4-hour in front of meter (IFOM) battery storage with reactive power capability — Mandalay 3 assumed retired

Scenario 2: Similar to Scenario 1 with the addition of a ~ 240 Mvar reactive device and reduced battery storage

Scenario 3: Similar to Scenario 1 but with Ellwood retired and amount of battery storage increased.

Resource portfolio options

Resource	Maximum capacity (MW)	Output Characteristics
EE (with new measures; includes permanent load shift products)	15 MW (see Note 1)	constant
Demand response (load reduction/behind the meter energy storage)	80 MW	4-hour
PV solar/energy storage hybrid	25 MW	7-hour
Storage enabled existing slow-responding demand response	~ 30 MW	6-hour
Preferred resources total	150	
Battery storage	≥ 114 MW *	Minimum 4-hour
	* 150+114=264	

Notes:

(1) As ~111 MW (2026) of additional achievable energy efficiency in the Moorpark area is already included in ISO studies based on information provided by the CEC, this 15 MW is assumed to contribute towards that additional achievable energy and not modeled in addition to the 111 MW.

(2) The procurement viability, timing and cost of developing these resources is not part of the scope of this study

Study scope

- The study will be based on LCR power flow analysis coupled with a spreadsheet evaluation of hourly load and resource output
- The analysis will be used to test and adjust resource portfolio options to meet the LCR need
- The resource portfolio options will be evaluated against the hourly load shape taking into account
 - hourly variation of PV output
 - Energy or runtime limitation of demand response and energy storage resources
 - Availability of time windows for energy storage charging between discharging duties

Study Schedule

Description	Date
SCE provides input on portfolios	June 26
Resource scenarios stakeholder call	June 30
Stakeholder comments on resource portfolio options	July 5
Submit analysis to the CEC	August 16