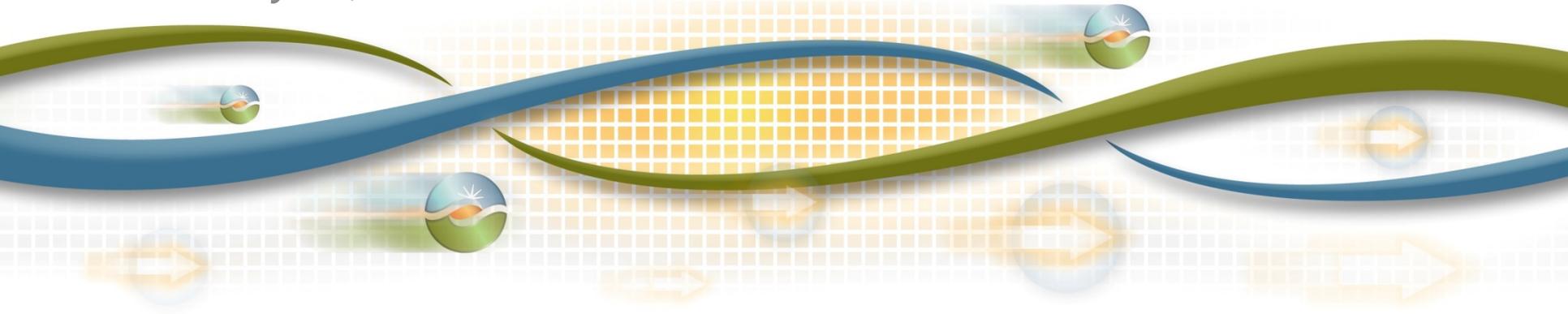




Moorpark-Pardee 230 kV No. 4 Circuit Project

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*2017-2018 Transmission Planning Process Stakeholder Call
January 11, 2018*



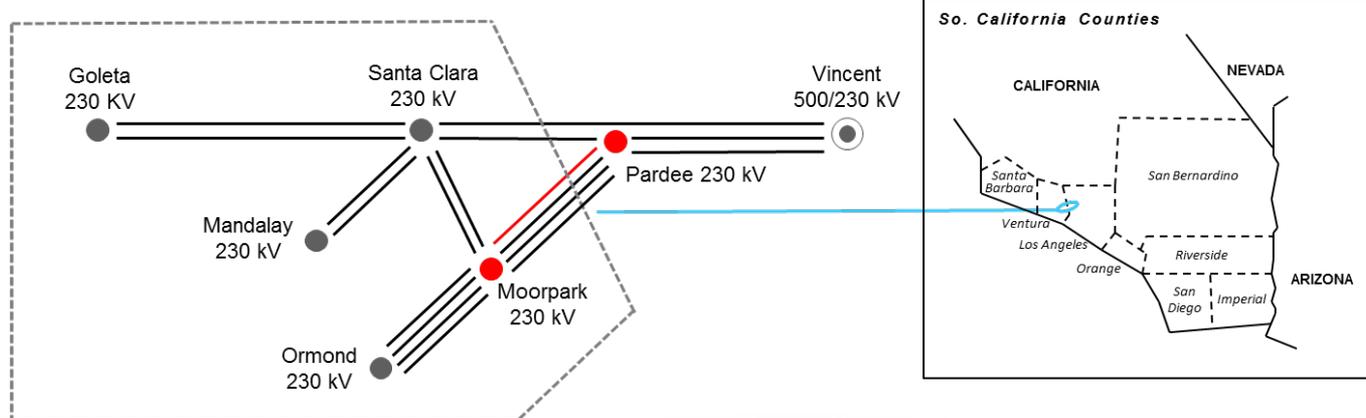
This review is taking place in light of:

- The announced/expected retirement of more than 2000 MW of generation in the Moorpark area including Mandalay Unit 3
- CEC's announced intention to issue a proposed decision that recommends denial of NRG's application for the Puente Power Project and its subsequent decision to suspend the proceedings in response to NRG's request
- The procurement plan for Moorpark local capacity and Goleta resiliency needs SCE submitted to the CPUC for approval

Project overview

- The project is proposed by SCE to address the local capacity deficiency in the Moorpark subarea and involves:
 - stringing a fourth Moorpark-Pardee 230 kV circuit approximately 26 miles on existing structures
 - installing terminal equipment at Moorpark and Pardee Substations and
 - relocating existing circuit terminations in the 230 kV switchrack at Moorpark Substation.

Moorpark Local Capacity Sub-Area



Project overview – cont'd

- The project has an estimated cost of \$45 million.
- The required in service date is 12/31/2020 to coincide with the retirement of OTC generation in the area
- SCE has requested ISO approval by March 2018 in order to meet the required in service date.

Current projection of post-2020 local capacity need in the Ventura Area

	Moorpark LCR	Santa Clara LCR	SCE's Goleta Resiliency Needs
2022 LCR (Note 1)	554 MW	289 MW	N/A
Resources available post 2020 (Note 2)	236 MW	203 MW	
Existing generation	2336 MW	808 MW	
Announced/expected retirements	(2076) MW	(560 MW)	
Ellwood assumed unavailable (Note 3)	(54 MW)	(54 MW)	
Existing/approved preferred resources	30 MW	9 MW	
Deficiency w/o Moorpark-Pardee No. 4	~318 MW	~86 MW	105 MW
Deficiency with Moorpark-Pardee No. 4	0 MW	~86 MW	105 MW

Note 1: LCR is dependent on location, reactive power capability and other characteristics of the resources that fill the need and is subject to change in the future due to changes in the CEC load forecast.

Note 2: Amount does not include the 10 MW energy storage contract SCE submitted to the CPUC for approval.

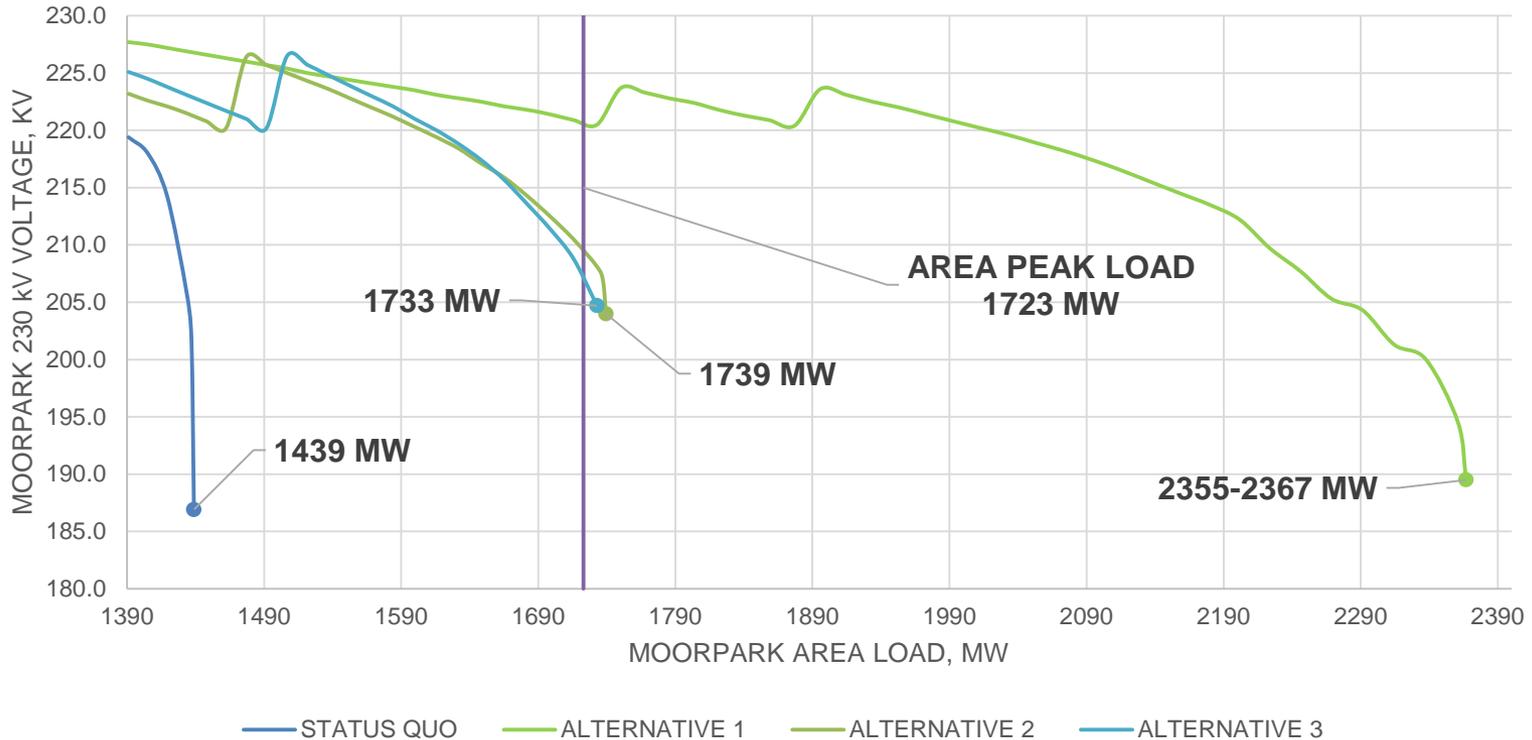
Note 3: SCE's contract with NRG to refurbish the Ellwood generating station, which is 43 year old, was denied by the CPUC.

Alternatives considered

- Alternative 1 – Pardee-Moorpark project to address Moorpark LCR need coupled with 86 MW to 105 MW (NQC) of local capacity located downstream of Goleta to address Santa Clara LCR and SCE's Goleta resiliency needs
- Alternative 2 – Approximately 318 MW (NQC) of local capacity to address Moorpark LCR need of which 105 MW is located downstream of Goleta to address Santa Clara LCR and SCE's Goleta resiliency needs
- Alternative 3 – 240 Mvar dynamic reactive power support coupled with 135 MW (NQC) of local capacity to address Moorpark LCR need of which 105 MW is located downstream of Goleta to address Santa Clara LCR and SCE's Goleta resiliency needs

Comparison of effectiveness in addressing Moorpark local capacity need

Moorpark Subarea P-V Analysis for the Critical Contingency



Note: Due to run-time limitation of resources such as demand response and energy storage, diurnal variability of solar PV and charging requirements of energy storage, an hour by hour analysis is needed to confirm whether such a resource mix meets LCR criteria in addition to the NQC-based analysis performed here. The ISO Moorpark Sub-Area Local Capacity Alternative Study (http://www.caiso.com/Documents/Aug16_2017_MoorparkSub-AreaLocalCapacityRequirementStudy-PuentePowerProject_15-AFC-01.pdf) provides such analysis and examples of validated resource portfolios along with very high level cost estimates.

Comparison of alternatives

Criteria	Alternative 1 (Tx + 86 MW to 105 MW LC)	Alternative 2 (318 MW LC)	Alternative 3 (240 Mvar + 135 MW LC)
Increase in post contingency voltage stability area load limit	916-928 MW	300 MW	294 MW
Maximum thermal loading under critical contingency	<100%	159% (Pardee-Santa Clara 230 kV)	189% (Pardee-Santa Clara 230 kV)
Grid resiliency	Neutral	Better	Neutral
Operational complexity due to variability, run-time limitation and charging needs of local capacity resources	Lower	Higher	Lower
Capital cost	Lower	Much higher	Higher
Required 12/31/2020 in-service date	Achievable	Highly aggressive	Achievable

Conclusion

- ISO will include a recommendation in the draft transmission plan to be issued on January 31st, 2018