



2021 & 2025 Final LCR Study Results Big Creek/Ventura Area

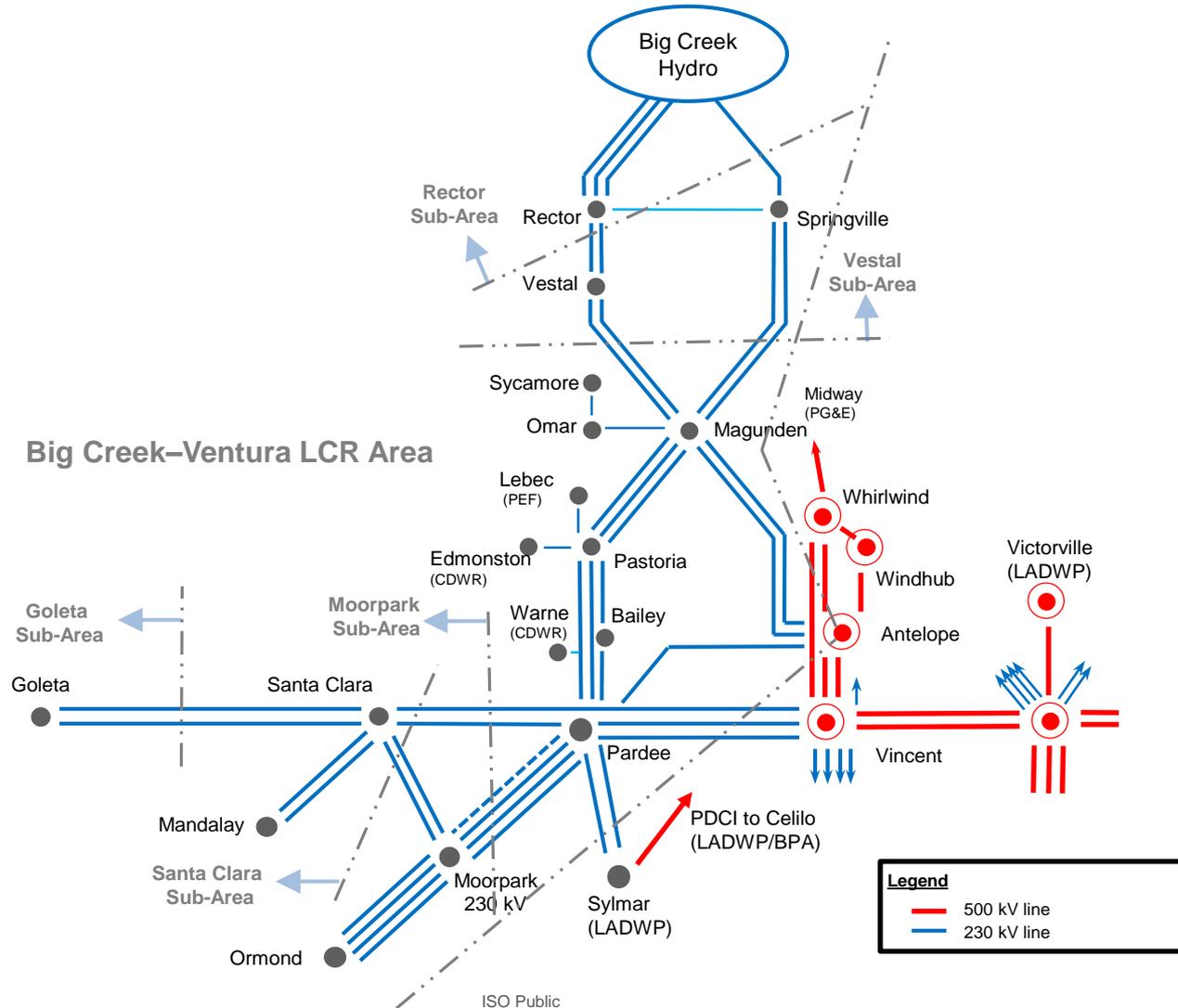
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Stakeholder Call

April 13, 2020

Big Creek - Ventura Area Transmission System



Major transmission projects

- Big Creek Corridor Rating Increase Project (Completed)
- Pardee-Moorpark No. 4 230 kV Transmission Project (ISD-12/31/2020)
- Pardee-Sylmar 230 kV Rating Increase Project (ISD- May 2023)

Resource Assumptions

- Ormond Beach is assumed to be available in 2021 but not in 2025
- Generators that have previously given notice to retire or mothball (Ellwood, E.F. Oxnard, and Channel Islands Power) are assumed unavailable and may be used only as last resort in meeting standards.
- CPUC-approved battery storage resources for the Santa Clara area (195 MW/780 MWh) are modeled

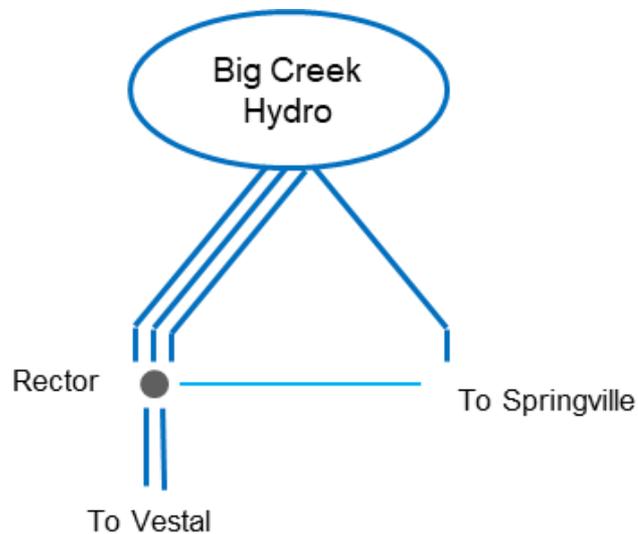
Load and Resources

Load (MW)			Generation NQC (MW)* (Sept.)		
	2021	2025		2021	2025
Gross Load	4,435	4,574	Market/Net Seller	4,045	2,554
AAEE*	-30	-76	Solar	212	212
Behind the meter PV*	-294	-403	Muni	305	305
Net Load	4111	4,095	QF	64	64
Transmission Losses	65	59	LTPP Pref. Res & ES	207	207
Pumps	275	275	Demand Response	100	100
Load+Losses+Pumps	4,451	4,429	Total Qualifying Capacity	4,933	3,442

* Generation capacity excludes Ellwood, E.F. Oxnard (Oxgen) and Channel Islands Power (Camgen). 2025 capacity excludes Ormond Beach.

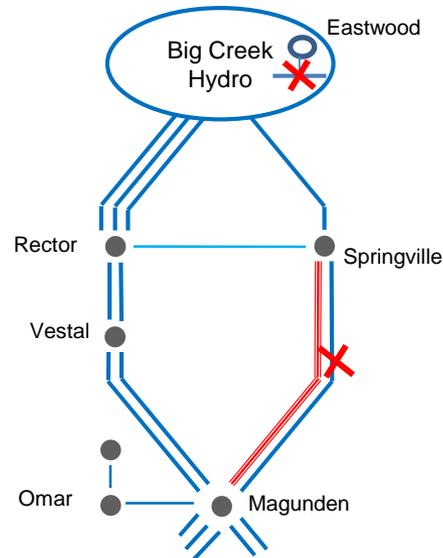
Rector Sub-Area Requirements

Category	Limiting Facility	Contingency	LCR (MW)	
			2021	2025
	LCR for Rector is satisfied by the LCR of the larger Vestal sub-area		0	0



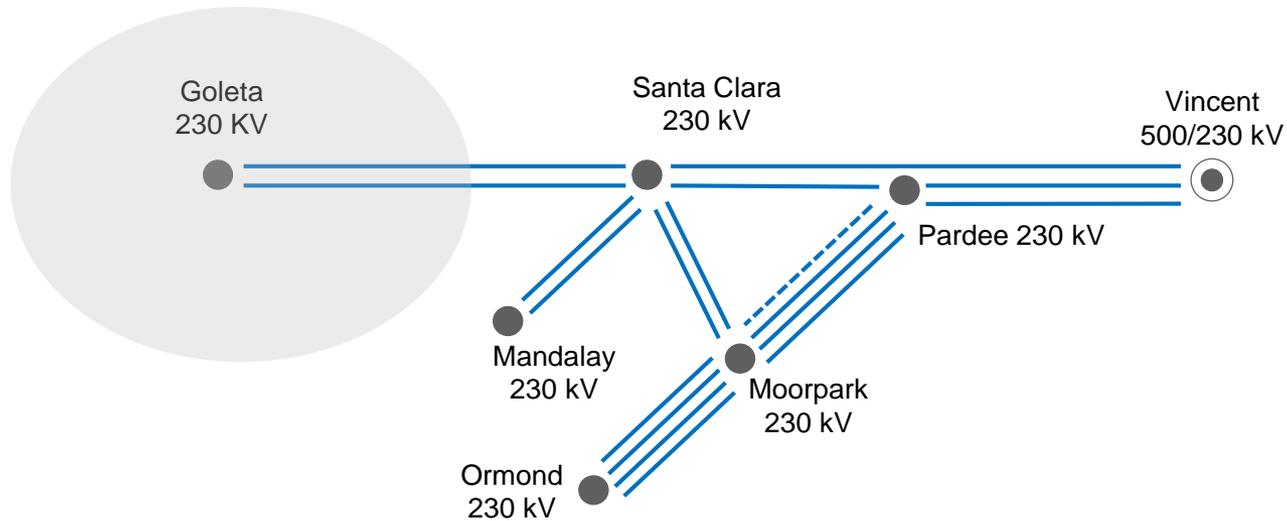
Vestal Sub-Area Requirements

Category	Limiting Facility	Contingency	LCR (MW)	
			2021	2025
P3/P6	Magunden–Springville #2 230 kV line	Magunden–Springville #1 230 kV line with Eastwood out of service	304	310



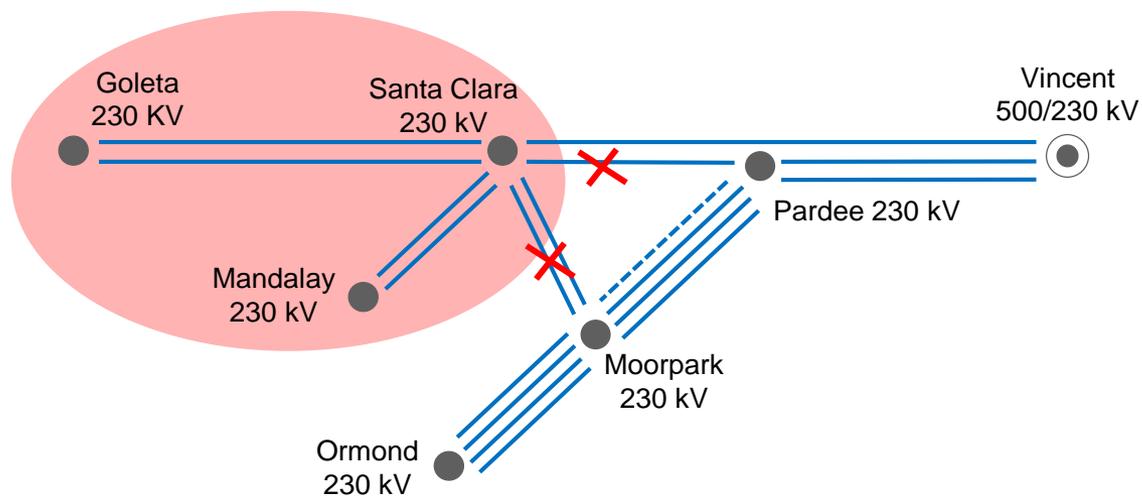
Goleta Sub-Area Requirements

Category	Limiting Facility	Contingency	LCR (MW)	
			2021	2025
	LCR for Goleta is satisfied by the LCR of the larger Santa Clara sub-area		0	0



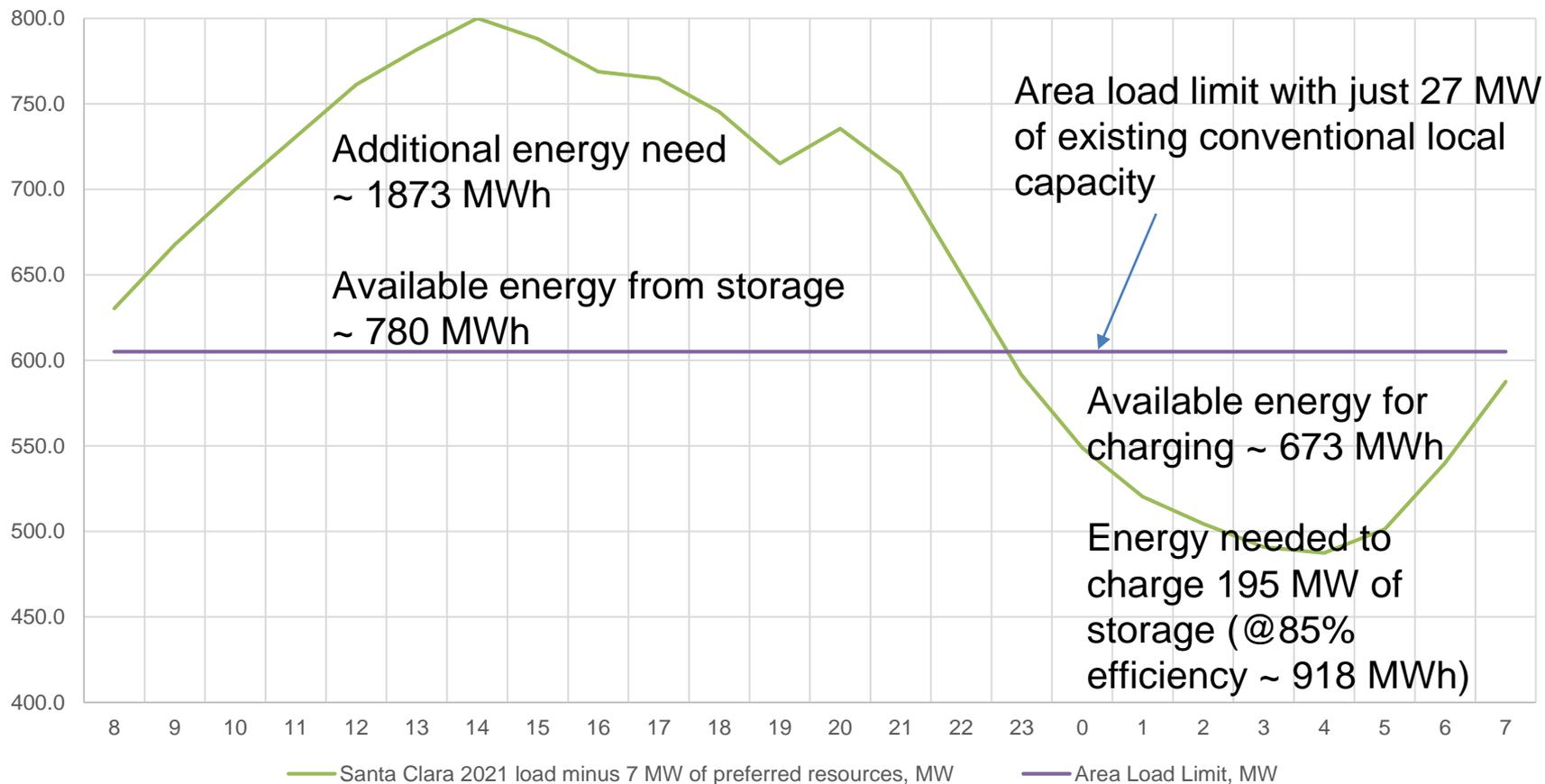
Santa Clara Sub-Area Requirements

Category	Limiting Facility	Contingency	LCR (MW)	
			2021	2025
P1+P7	Voltage Collapse	Pardee–Santa Clara 230 kV line followed by Moorpark–Santa Clara #1 and #2 230 kV DCTL	229	225



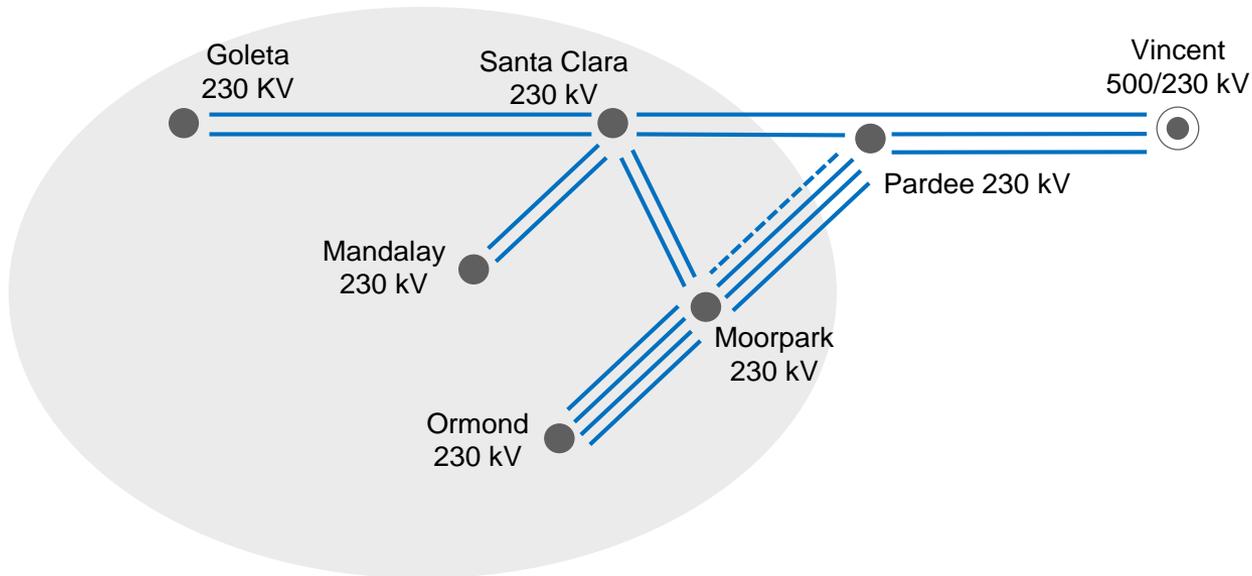
2021 Santa Clara sub-area local energy need and charging capability (based on 2019 recorded load shape)

- Shows scenario where 229 MW LCR is to be filled with 195 MW of contracted storage, 7 MW of existing preferred resources and the remainder 26 MW with gas



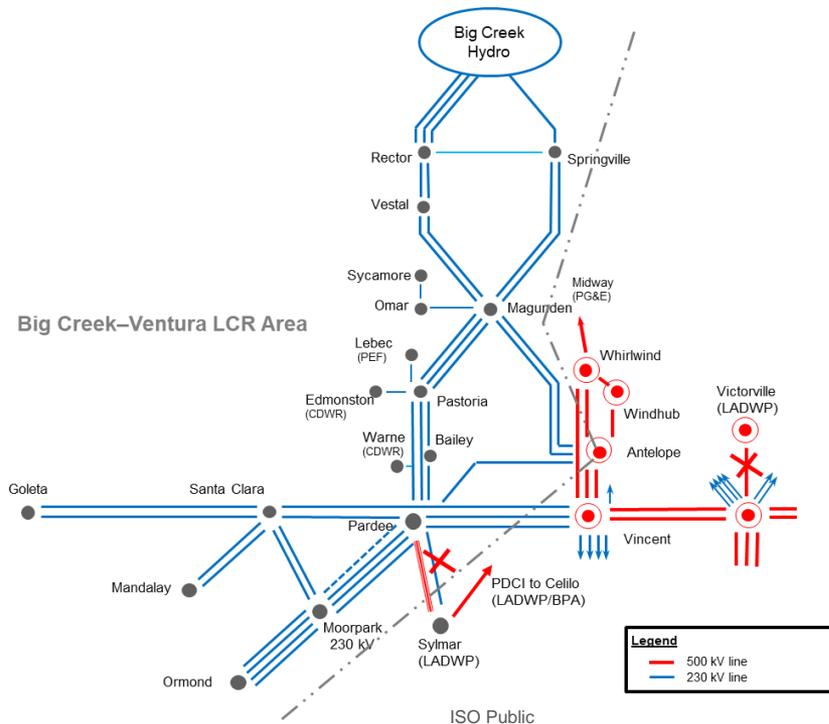
Moorpark Sub-Area Requirements

Category	Limiting Facility	Contingency	LCR (MW)	
			2021	2025
	None identified	None	0	0



Overall Big Creek-Ventura Area Requirements

Case	Category	Limiting Facility	Contingency	LCR (MW)	
				2021	2025
Pardee-Sylmar project not modeled	P6	Pardee-Sylmar #1 or #2 230 kV line	Overlapping outage of Lugo-Victorville 500 kV line and one Pardee-Sylmar 230 kV line	2,296	2,652
Pardee-Sylmar project modeled				N/A	1,002



Big Creek Area Total LCR Need

2021 LCR Need	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Need
Category P6	2,296	0	2,296

2025 LCR Need	Category	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Need
W/o Pardee-Sylmar	P6	2,652	0	2,652
With Pardee-Sylmar	P6	1,002	0	1,002

Changes Compared to Last year's LCR Results - 2021

Sub-Area	2020		2021		Reason for LCR Change
	Load (MW)	LCR (MW)	Load (MW)	LCR (MW)	
Rector	810	-	722	-	
Vestal	1,315	425	1,184	304	Load decreased
Goleta	320	-	242	-	
Santa Clara	898	288-298	807	229	Load decreased
Moorpark	1,780	514	1,532	0	Moorpark–Pardee 230 kV Project
Overall Big Creek Ventura	4,956	2,410	4,386	2,296	Load decreased

* Load values do not include losses

Changes Compared to Last Year's LCR Results - 2025

Sub-Area	2024		2025		Reason for LCR Change
	Load (MW)	LCR (MW)	Load (MW)	LCR (MW)	
Rector	810	-	737	-	
Vestal	1,307	461	1,199	310	Load decreased
Goleta	316	27	244	0	Load decreased
Santa Clara	891	309-348	793	225	Load decreased
Moorpark	1767	-	1,492	-	
Overall Big Creek Ventura	4,888	2,577	4,370	1,002	Pardee-Sylmar Project

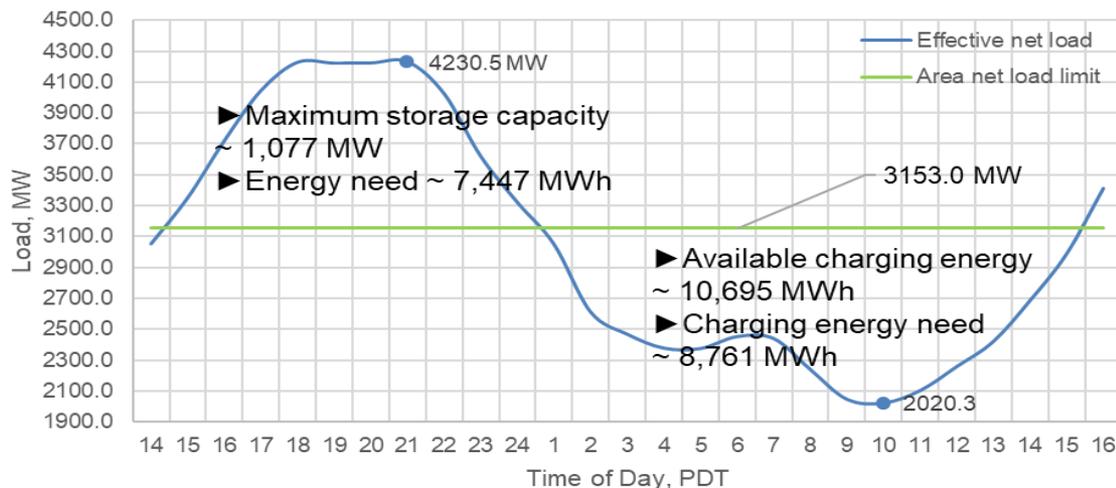
* Load values do not include losses

Energy Storage Local Capacity Assessment

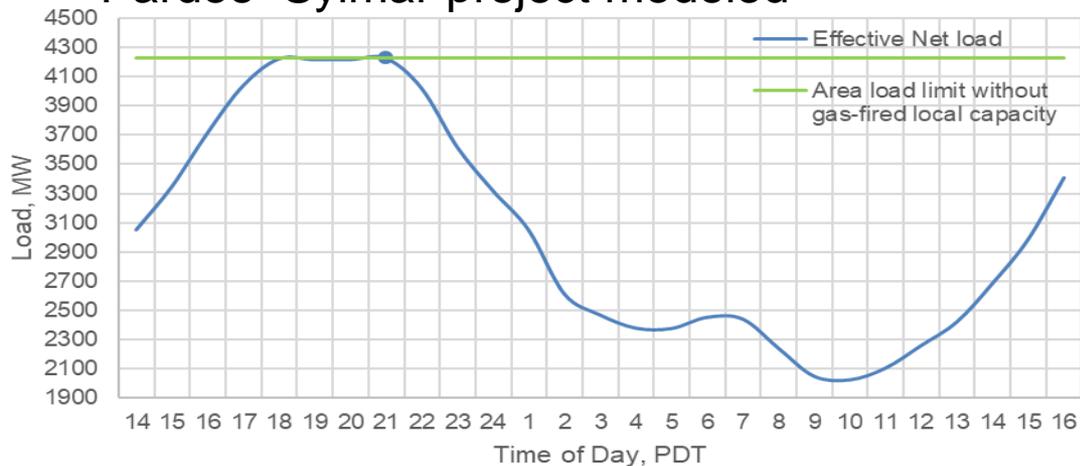
- Adding storage in Rector, Vestal, Goleta, Santa Clara or Moorpark sub-areas will not enable displacing gas-fired generation
 - The sub-areas either do not have a local capacity requirement or the local capacity requirement is met by non gas-fired resources such as hydro
 - The Santa Clara sub-area is already saturated with planned energy storage local capacity resources (see slide 9)
- Analysis is performed for the greater Big Creek-Ventura area
 - Analysis is based on the 2025 scenario
 - Load shape based on the CEC hourly forecast for SCE TAC area
 - Energy storage is assumed to be added at the same location and amount as the displaced gas generation.
 - A round-trip efficiency of 85% is assumed for energy storage

Energy Storage Local Capacity Analysis

Pardee–Sylmar project not modeled



Pardee–Sylmar project modeled



- Effective net load= hourly load minus hourly area IFOM PV output adjusted for effectiveness minus hourly area DR dispatch
- Area net load limit is iteratively calculated to equalize the area above load limit line with area below, taking into account battery efficiency
- HE17, HE21 and D+1, HE10 were tested in power flow and initial estimate was reduced due to charging constraints related to HE10
- Post Pardee–Sylmar project LCR can be fully met with non-gas resources that new energy storage is not anticipated to replace.

Energy Storage Local Capacity Assessment Summary

Area	LCR (2025), MW	Maximum energy storage that can be added to replace gas generation		Remark
		Capacity (MW)	Energy (MWh)	
Rector	0	0	0	No LCR requirement
Vestal	310	0	0	No gas-fired local capacity requirement
Goleta	0	0	0	No LCR requirement
Santa Clara	225	0	0	Area is saturated with approved energy storage
Moorpark	0	0	0	No LCR requirement
Overall Big Creek–Ventura Total	2,652	1,077	7447	This is without the approved Pardee–Sylmar Project
Overall Big Creek–Ventura Incremental to approved ES		882	6667	
Overall Big Creek–Ventura Post Pardee–Sylmar Project	1002	0	0	No gas-fired local capacity requirement post Pardee–Sylmar Project

Conclusion:

- Locating new energy storage in the greater Big Creek–Ventura area is not expected to allow displacing gas-fired local capacity in the area.

Changes Compared to Preliminary Results

- Fixed counting errors in the Big Creek-Ventura 2025 load and LCR
 - 2025 LCR (without Pardee–Sylmar Project) changed from 2,468 MW to 2,652 MW
 - 2025 total load changed from 4,449 MW to 4,429 MW
- Total solar resource NQC was updated
- Due to subsequent approval of the Pardee–Sylmar project LCR results with the project modeled were added for 2025.
- Storage local capacity assessment was added