



2021 & 2025 Final LCR Study Results Sierra Area

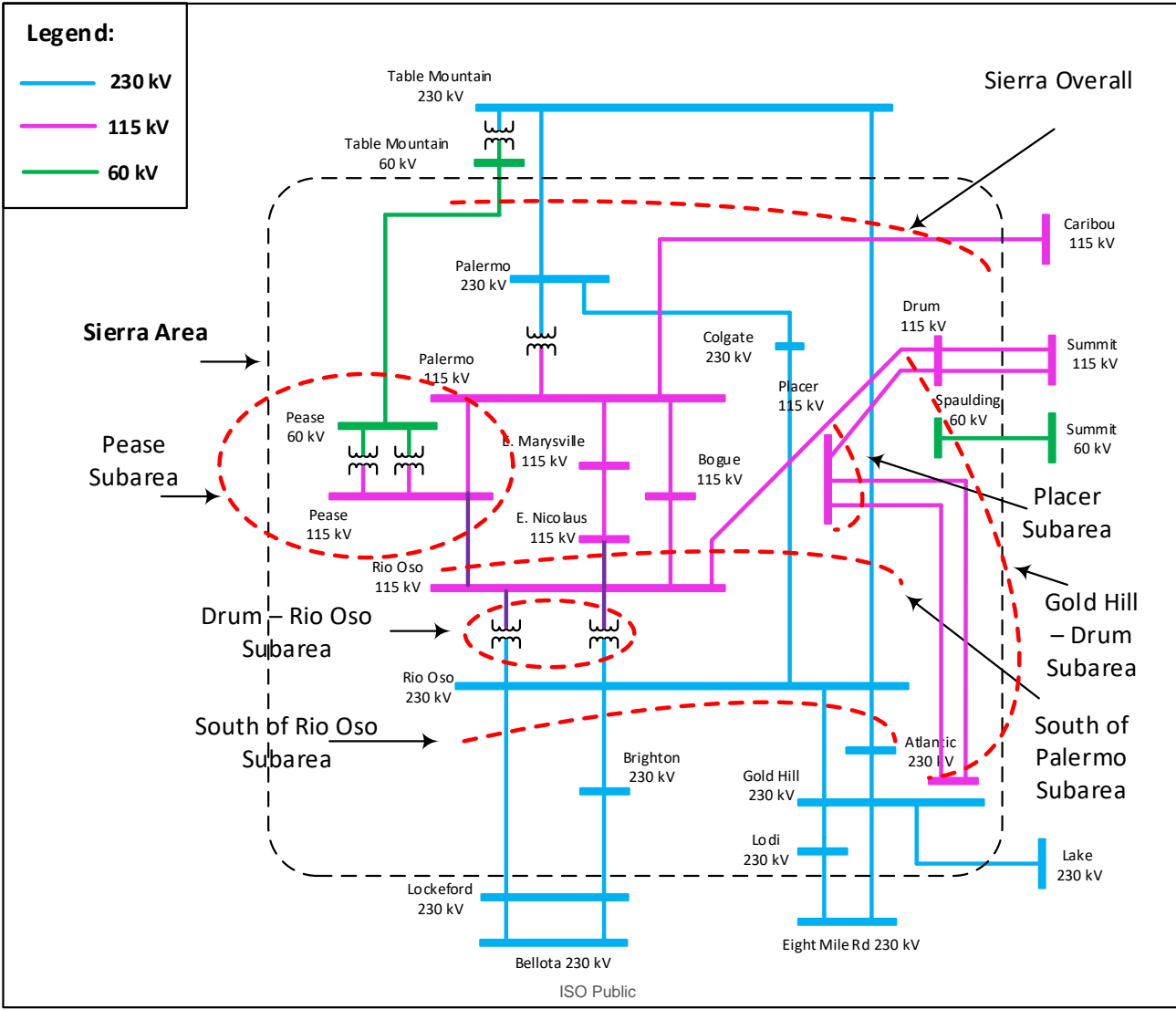
Ebrahim Rahimi

Lead Regional Transmission Engineer

Stakeholder Call

April 13, 2020

Sierra Area Transmission System & LCR Sub-areas



New major transmission projects

Project Name	Expected ISD
Year 2021	
Pease 115/60 kV Transformer Addition	Mar-20
South of Palermo 115 kV Reinforcement Project (Pease to Palermo Line)	Apr-20
Year 2025	
Rio Oso 230/115 kV Transformer Upgrades	Jun-22
Rio Oso Area 230 kV Voltage Support	Jun-22
South of Palermo 115 kV Reinforcement Project (Pease to Rio Oso Line)	Nov-22
East Marysville 115/60 kV	Dec-22
Gold Hill 230/115 kV Transformer Addition	Dec-24

Power plant changes

Additions:

- No new resource addition

Retirements:

- Greenleaf 1

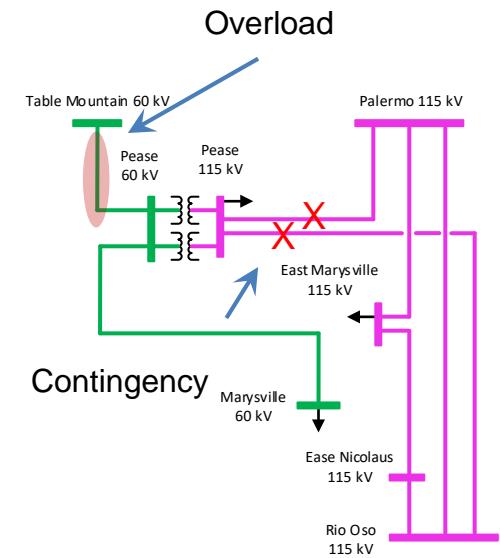
Sierra Area Overall: Load and Resources

Load (MW)	2021	2025	Generation (MW)	2021	2025
Gross Load	1,789	1,849	Market/ Net Seller/ Battery	920	920
AAEE	-7	-16	Solar	5	5
Behind the meter DG	0	0	Wind	0	0
Net Load	1,782	1,833	Muni	1,142	1,142
Transmission Losses	84	84	QF	41	41
Pumps	0	0	Future preferred resource and energy storage	0	0
Load + Losses + Pumps	1,865	1,918	Total Qualifying Capacity	2,108	2,108

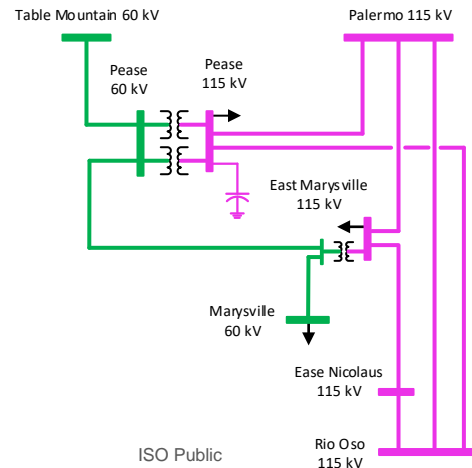
Pease Sub-Area: Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2021	P6, P7	Table Mountain – Pease 60 kV line	Palermo – Pease 115 kV and Pease – Rio Oso 115 kV	83
2025	All	No requirements due to implementation of East Marysville 115/60 kV project		

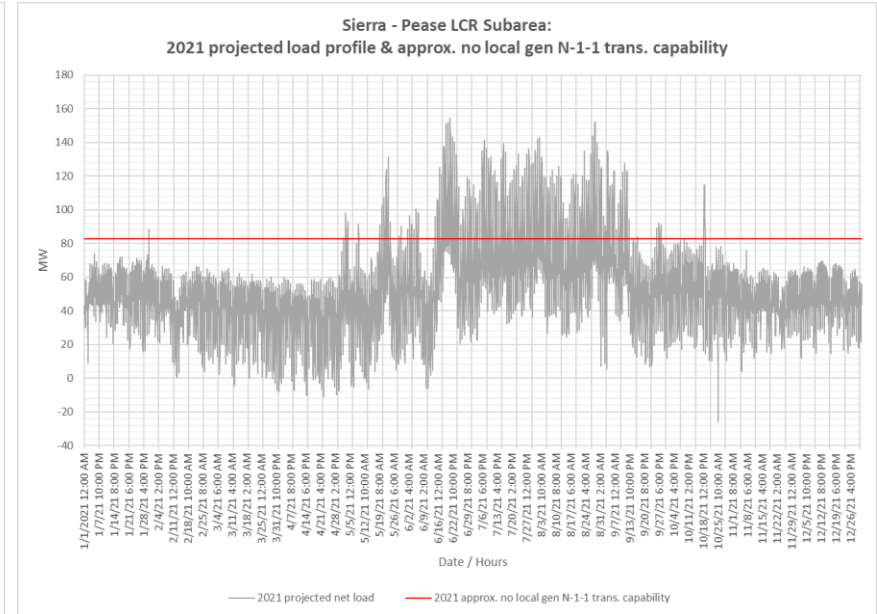
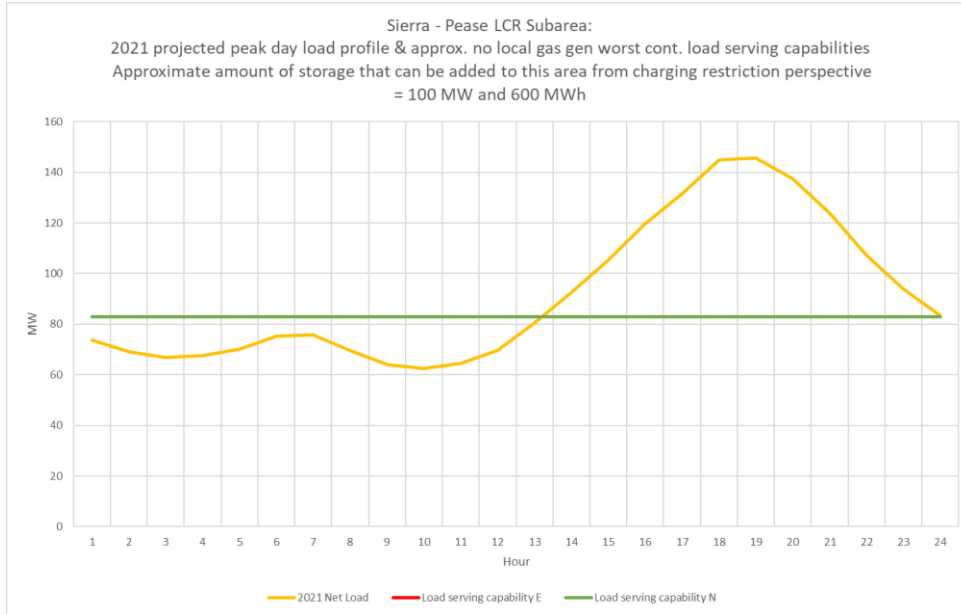
Year 2021



Year 2025

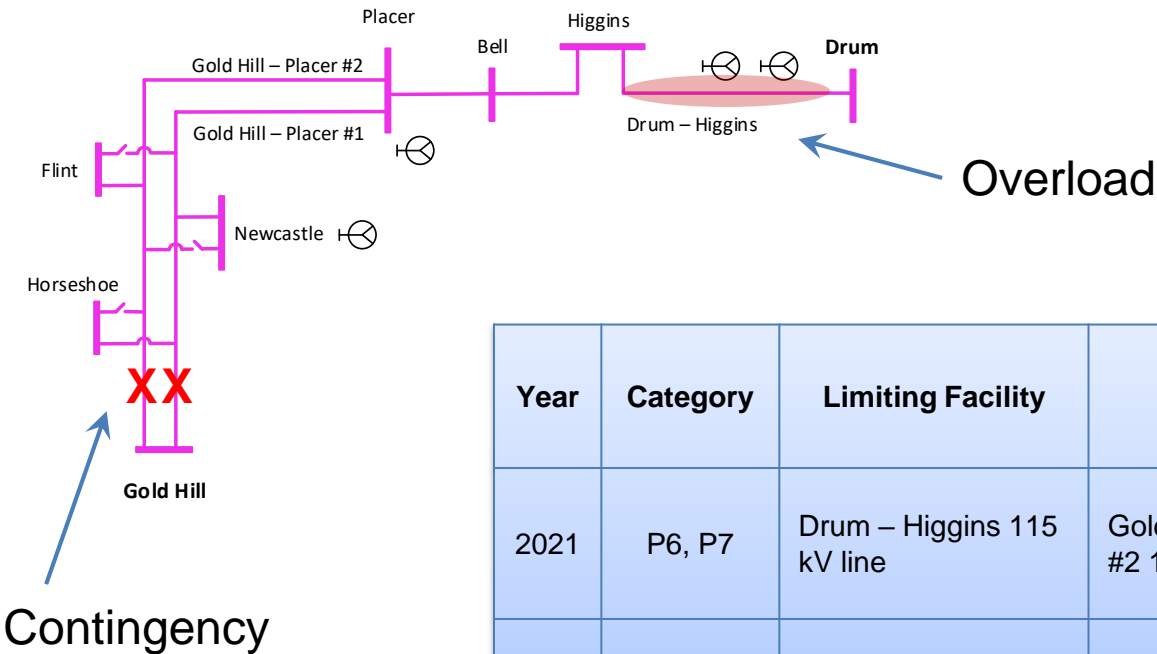


Pease Sub-area: Load Profiles



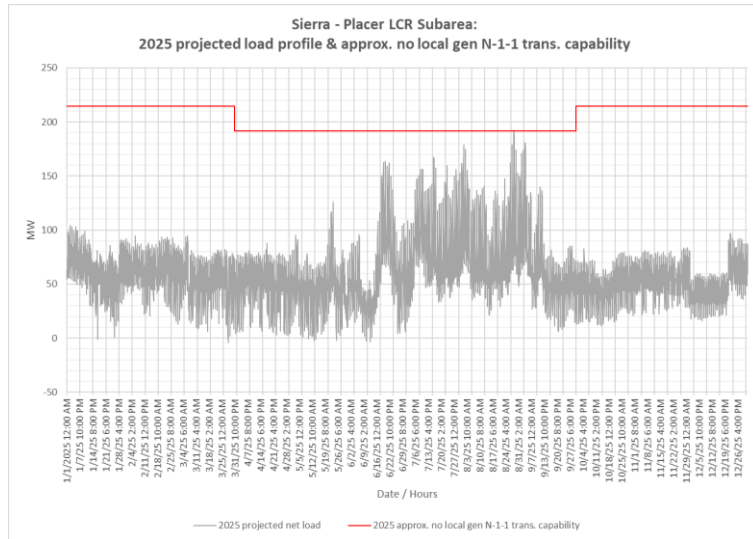
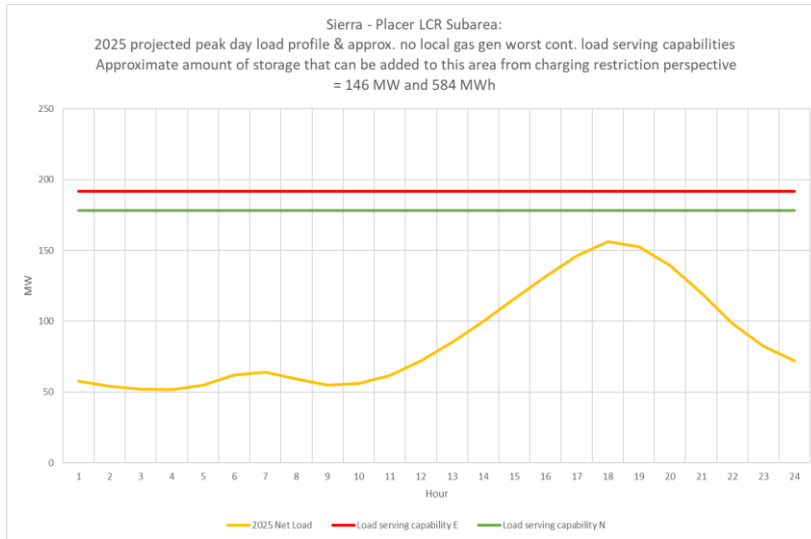
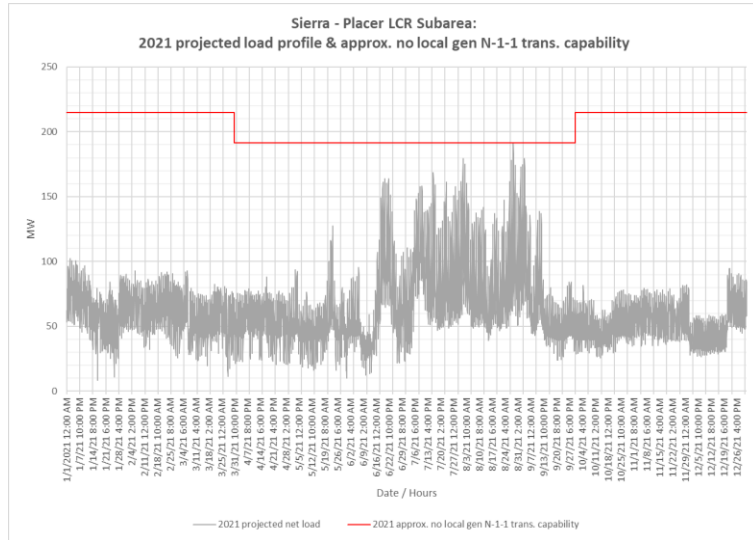
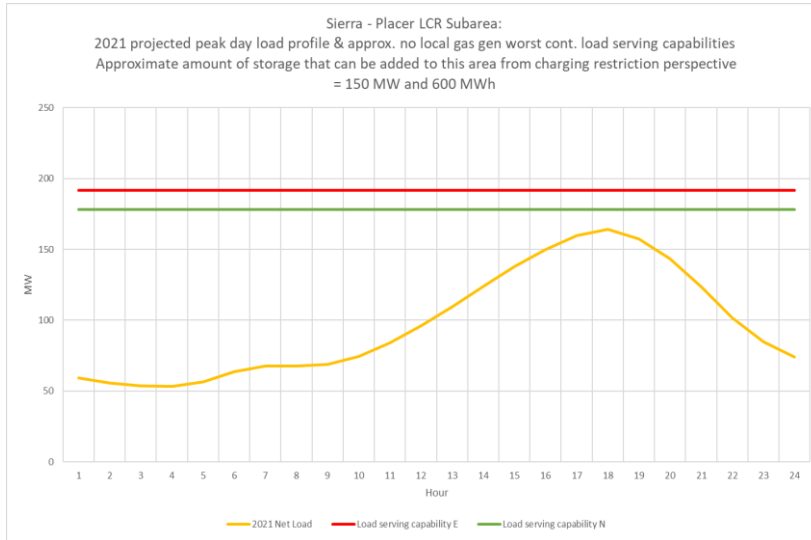
Pease Sub-area will be eliminated due to the East Marysville 115/60 kV transmission project expected to be in service in Dec. 2022

Placer Sub-Area: Requirements



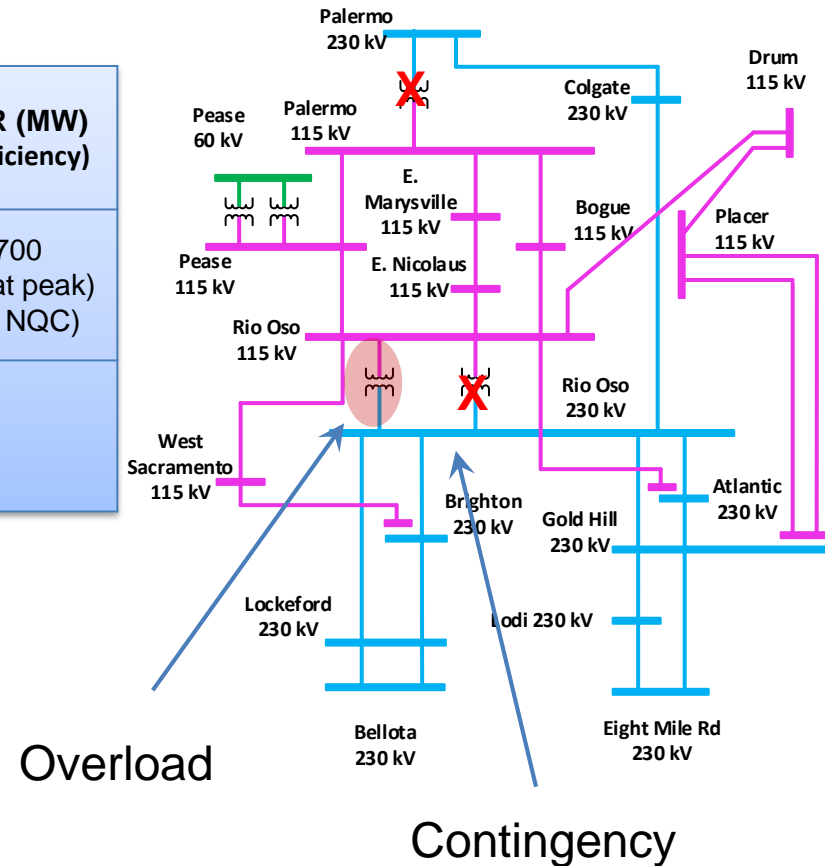
Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2021	P6, P7	Drum – Higgins 115 kV line	Gold Hill – Placer #1 and #2 115 kV lines	93
2025	P6, P7	Drum – Higgins 115 kV line	Gold Hill – Placer #1 and #2 115 kV lines	93

Placer Sub-area: Load Profiles



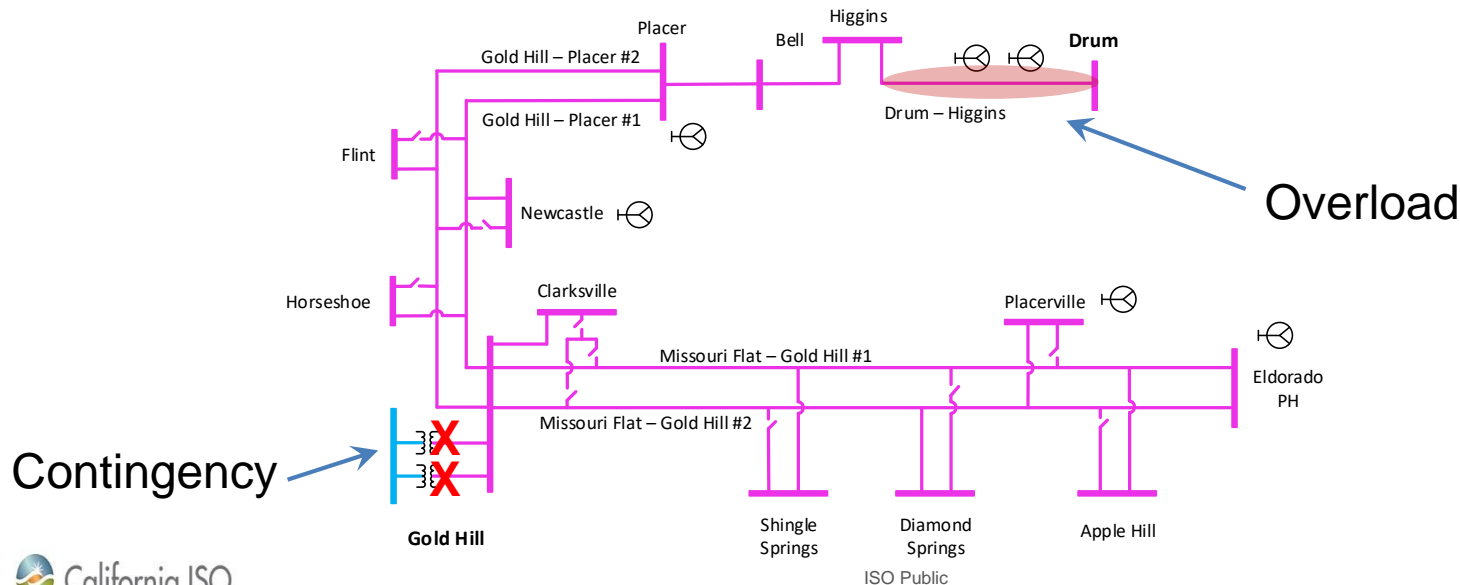
Drum – Rio Oso Sub-Area: Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2021	P6	Rio Oso 230/115 kV #1 Transformer	Rio Oso 230/115 kV #2 and Palermo 230/115 kV #2 Transformers	700 (60 at peak) (55 NQC)
2025	All	No requirement due to Rio Oso 230/115 kV Transformer Upgrade project		

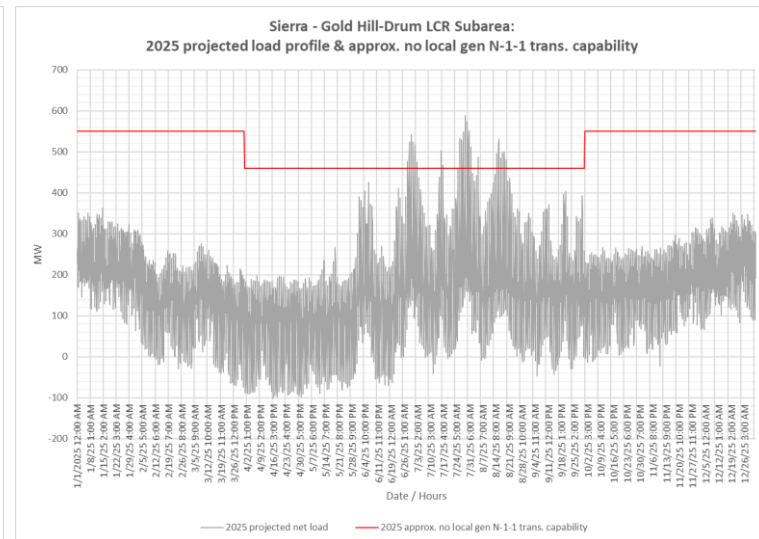
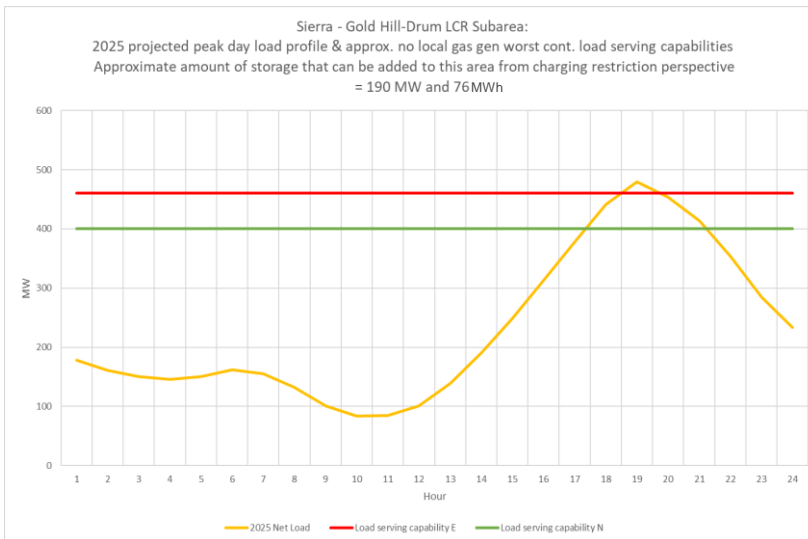
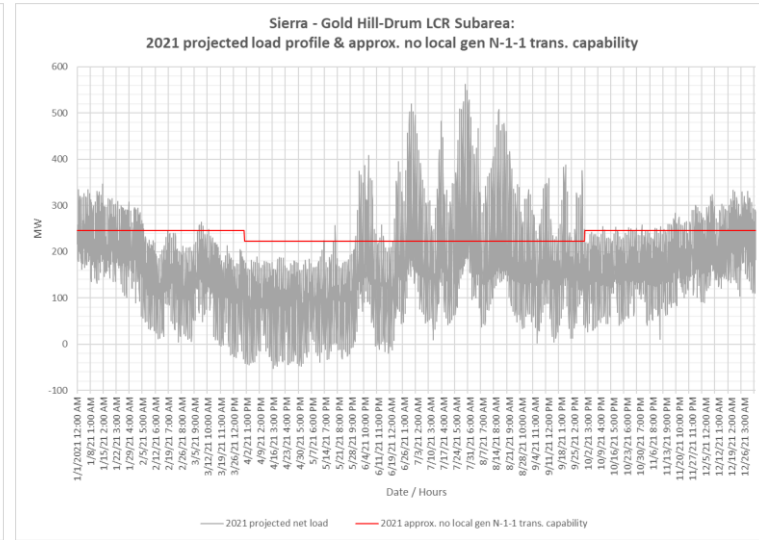
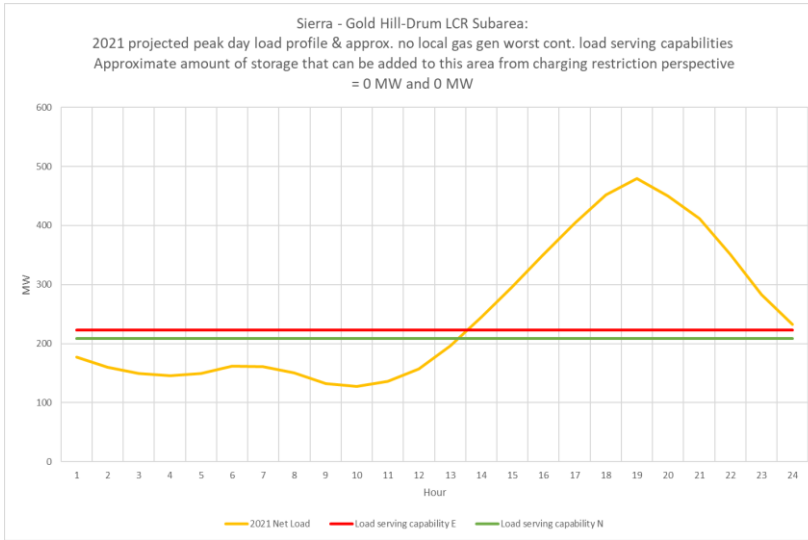


Gold Hill - Drum Sub-Area: Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2021	P6	Drum – Higgins 115 kV	Gold Hill 230/115 kV #1 and Gold Hill 230/115 kV #2 Transformers	416 (289)
2025	P2	Drum – Higgins 115 kV	Bus-tie-breaker (P2-4) at Gold Hill 115 kV substation	142 (45)

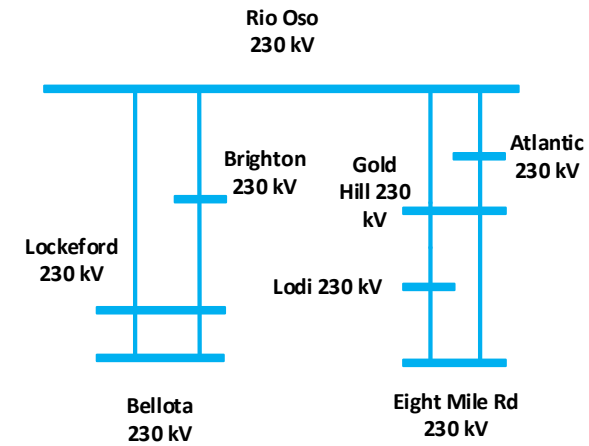


Gold Hill - Drum Sub-area: Load Profiles



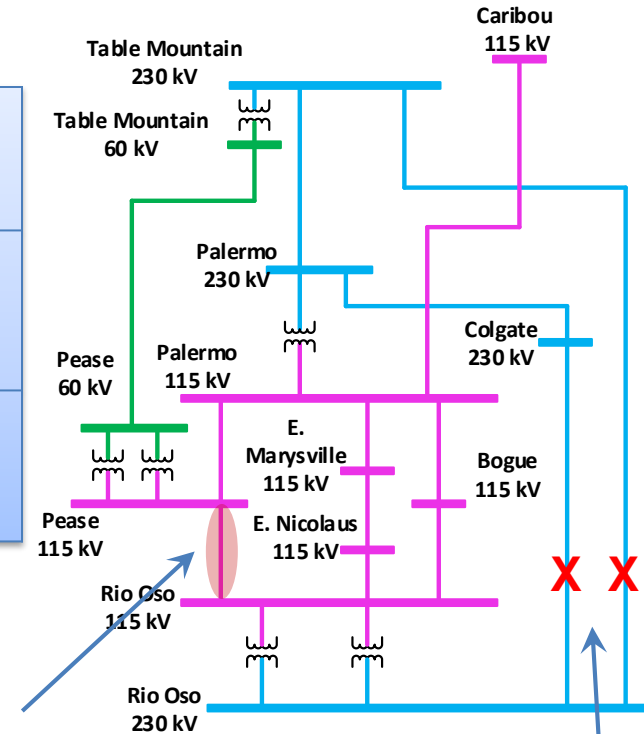
South of Rio Oso Sub-Area: Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2021	P6	Rio Oso – Atlantic 230 kV	Rio Oso – Gold Hill 230 kV Rio Oso – Brighton 230 kV	665
2025	P6	Rio Oso – Atlantic 230 kV	Rio Oso – Gold Hill 230 kV Rio Oso – Brighton 230 kV	223



South of Palermo Sub-Area: Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2021	P6, P7	Pease - Rio Oso 115 kV line	DCTL of Table Mt. – Rio Oso and Colgate-Rio Oso 230 kV lines	1,587 (169 at peak) (164 NQC)
2025	All	No requirements due to implementation of South of Palermo project.		

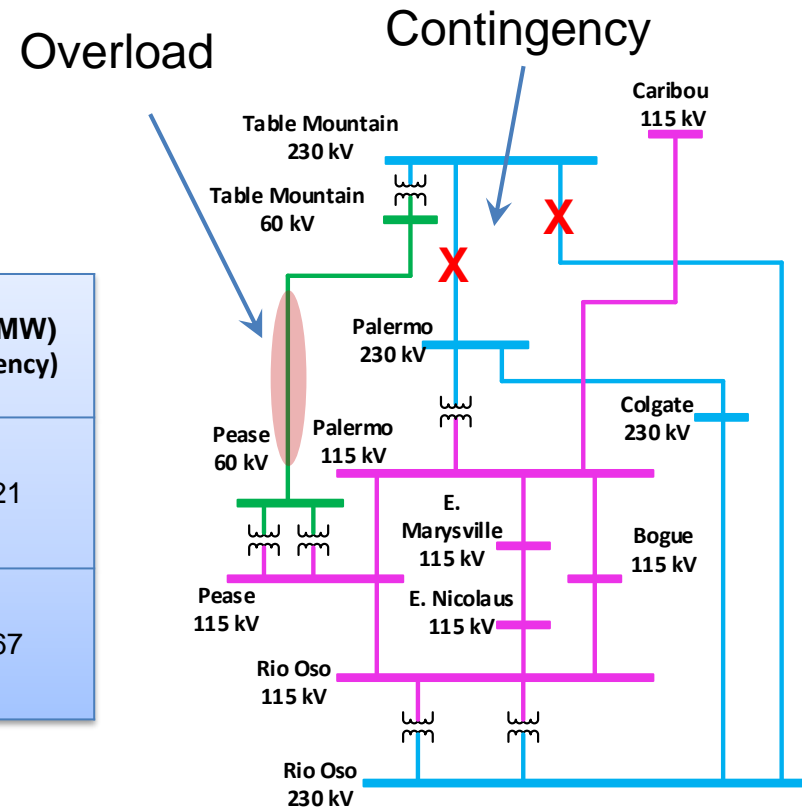


Overload

Contingency

South of Table Mountain Sub-Area: Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2021	P6, P7	Table Mountain – Pease 60 kV	DCTL of Table Mtn. – Palermo and Table Mtn. Rio Oso 230 kV lines	1,821
2025	P6, P7	Table Mountain – Pease 60 kV	DCTL of Table Mtn. – Palermo and Table Mtn. Rio Oso 230 kV lines	1,367



Changes from 2020 to 2021

Sub-area	2020		2021	
	Load	LCR	Load	LCR
Pease	159	88	155	83
Placer	178 ¹	93	178	93
Drum - Rio Oso	N/A	734	N/A	700
Gold Hill - Drum	Not a sub-area		508	416
South of Rio Oso	N/A	831	N/A	665
South of Palermo	N/A	1,569	N/A	1,587
South of Table Mountain	N/A	1,764	N/A	1,821
Total	1,862	2,068	1,865	2,110

Gold Hill – Drum sub-area is added to cover P2 contingencies in the area.

N/A=Flow-through area. No defined load pocket.

¹ *This value is updated from last year studies to make it consistent with other areas that include losses*

Changes from 2024 to 2025

Sub-area	2024		2025	
	Load	LCR	Load	LCR
Pease	157	95	161	0
Placer	176 ¹	89	179	93
Gold Hill - Drum	Not a sub-area		512	142
South of Rio Oso	N/A	185	N/A	223
South of Table Mountain	N/A	1,304	N/A	1,367
Total	1,863	1,304	1,918	1,412

The East Marysville 115/60 kV project eliminates the LCR in Pease sub-area, however due to addition of Gold Hill – Drum sub-area to cover the P2 contingencies in the area, and the higher load forecast, the overall LCR requirement is higher in 2025 as compared to 2024.

N/A=Flow-through area. No defined load pocket.

¹ *This value is updated from last year studies to make it consistent with other areas that include losses*

Sierra Area Total LCR Need

Study Year	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Need
2021	1,821	289	2,110
2025	1,367	45	1,412