



2020 & 2024 Final LCR Study Results Sierra Area

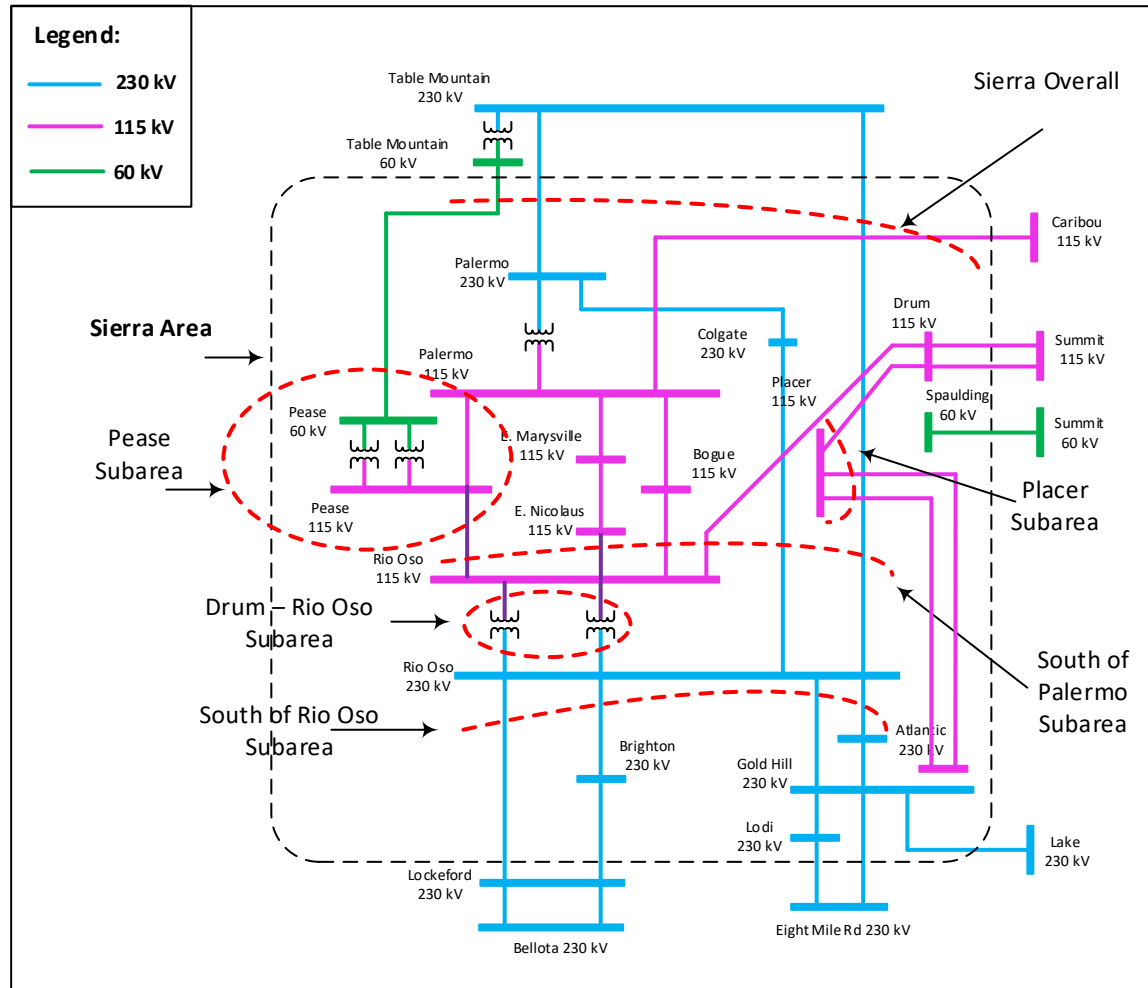
Ebrahim Rahimi

Lead Regional Transmission Engineer

Stakeholder Call

April 10, 2019

Sierra Area Transmission System & LCR Subareas



New major transmission projects

Project Name	Expected ISD
Year 2020	
Gold Hill-Missouri Flat #1 and #2 115 kV line reconductoring	In Service (May-18)
Pease 115/60 kV Transformer Addition	Mar-20
Year 2024	
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	Nov-22

Power plant changes

Additions:

- No new resource addition

Retirements:

- No new retirements

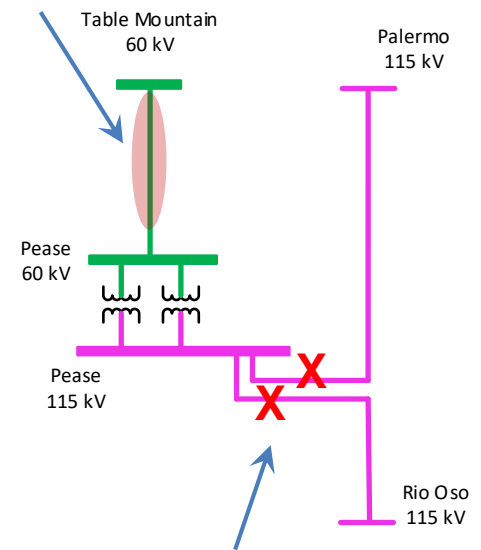
Sierra Area Overall: Load and Resources

Load (MW)	2020	2024	Generation (MW)	2020	2024
Gross Load	1,798	1,847	Market/ Net Seller/ Battery	986	986
AAEE	-22	-66	Solar	6	6
Behind the meter DG	0	0	Wind	0	0
Net Load	1,776	1,781	Muni	1,129	1,129
Transmission Losses	86	83	QF	39	39
Pumps	0	0	Future preferred resource and energy storage	0	0
Load + Losses + Pumps	1,862	1,864	Total Qualifying Capacity	2,160	2,160

Pease Sub Area: Requirements

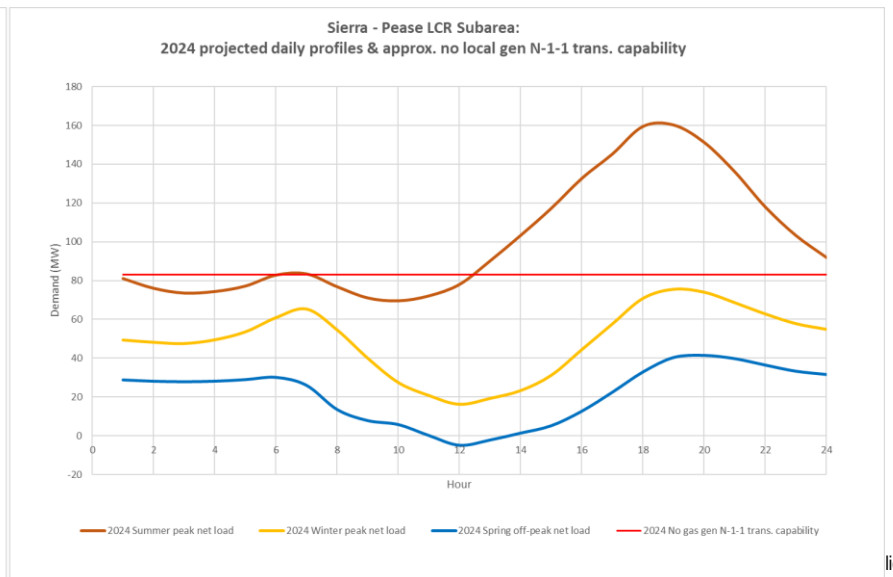
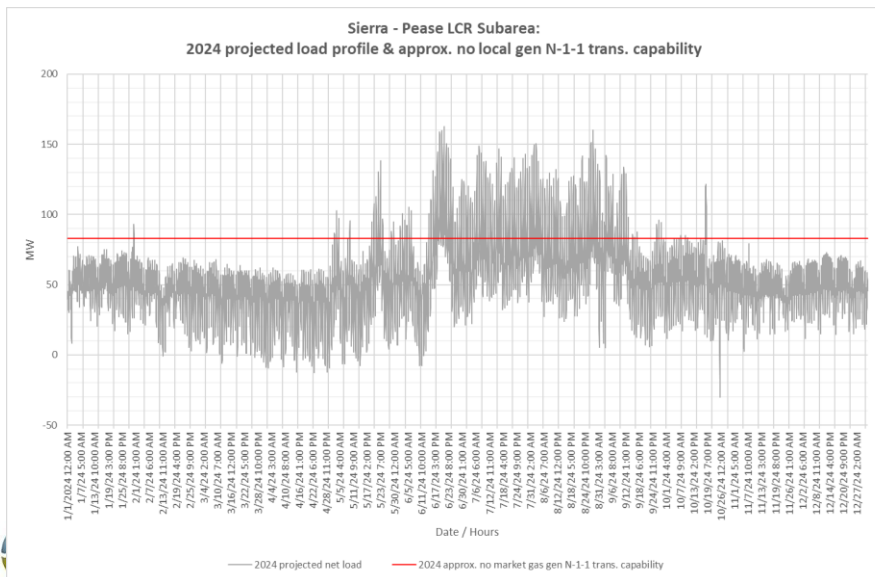
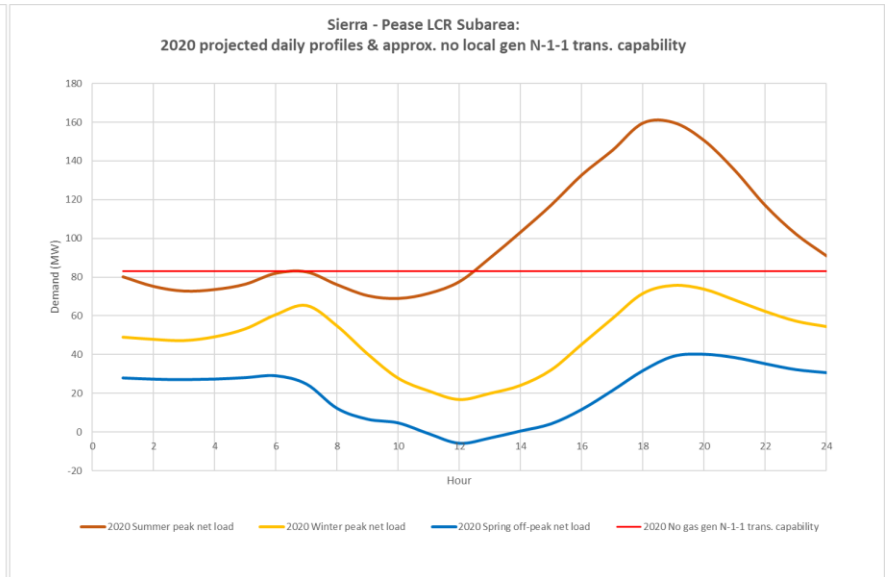
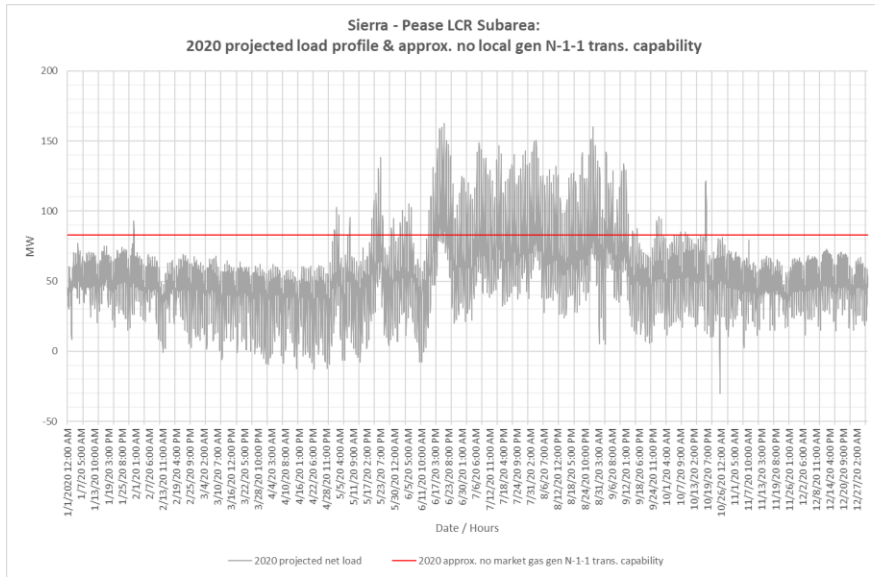
Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2020	B	Table Mountain – Pease 60 kV line	Palermo – Pease 115 kV and Yuba City unit	59
2020	C	Table Mountain – Pease 60 kV line	Palermo – Pease 115 kV and Pease – Rio Oso 115 kV	88
2024	B	None	None	No requirement
2024	C	Low voltage at Pease 115 kV Bus	Palermo – Pease 115 kV and Pease – Rio Oso 115 kV	95

Overload

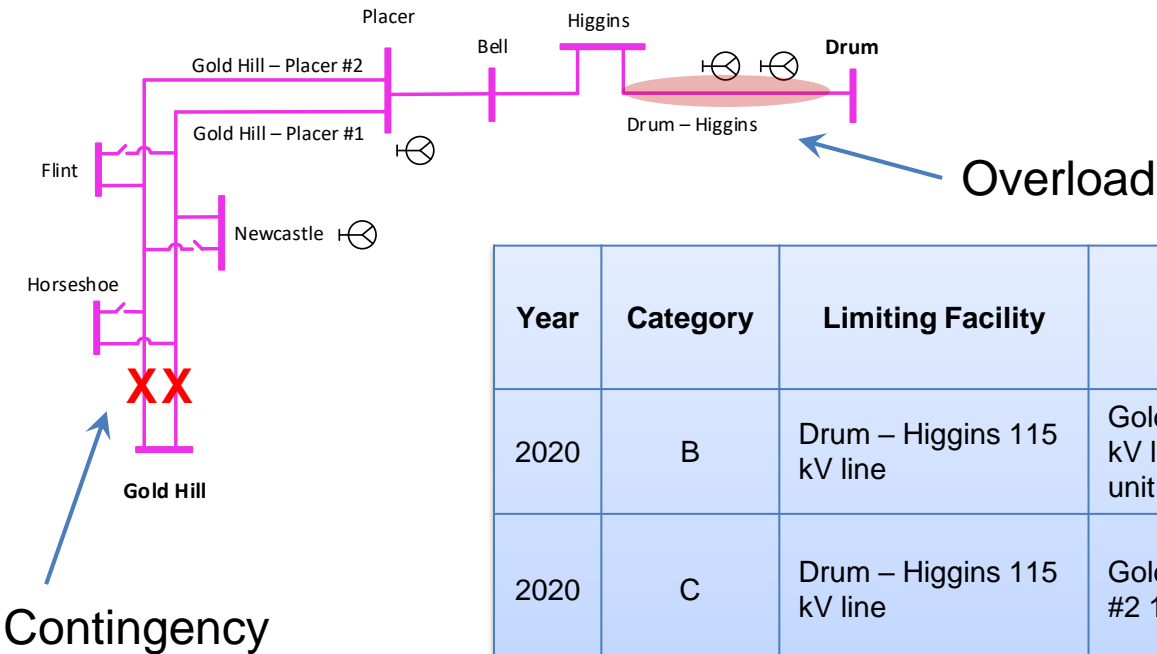


Contingency

Pease Subarea: Load Profiles

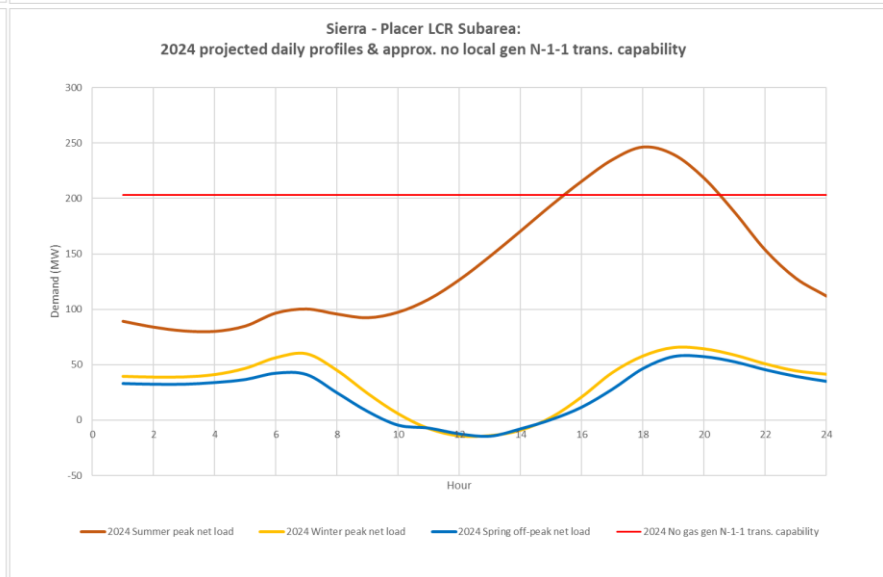
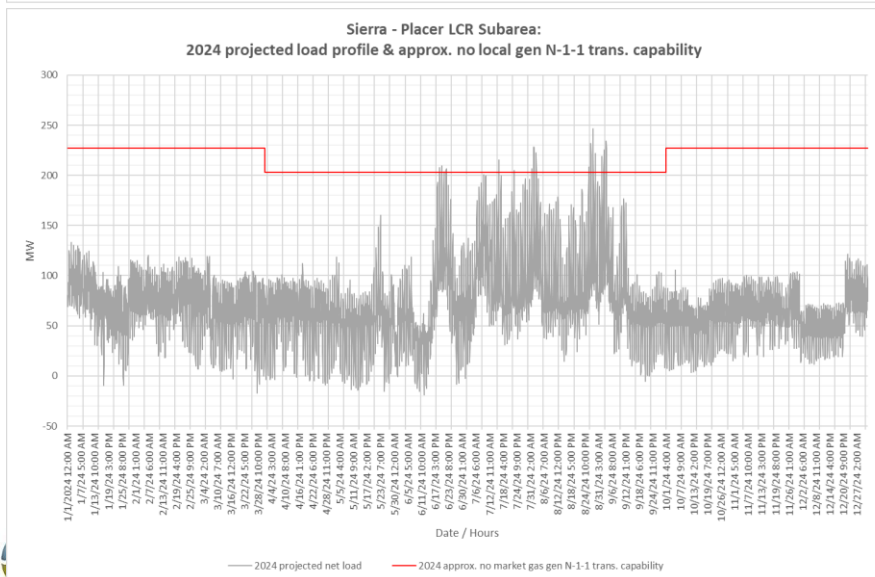
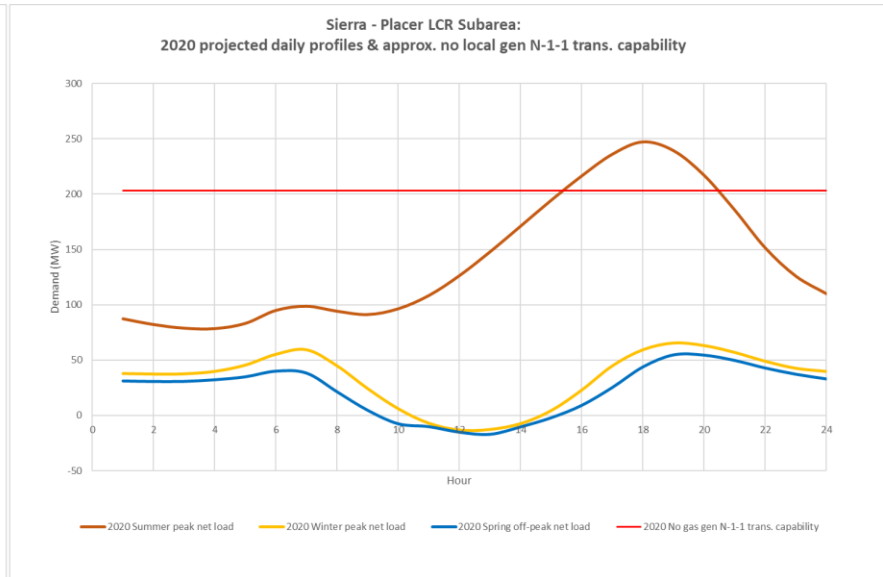
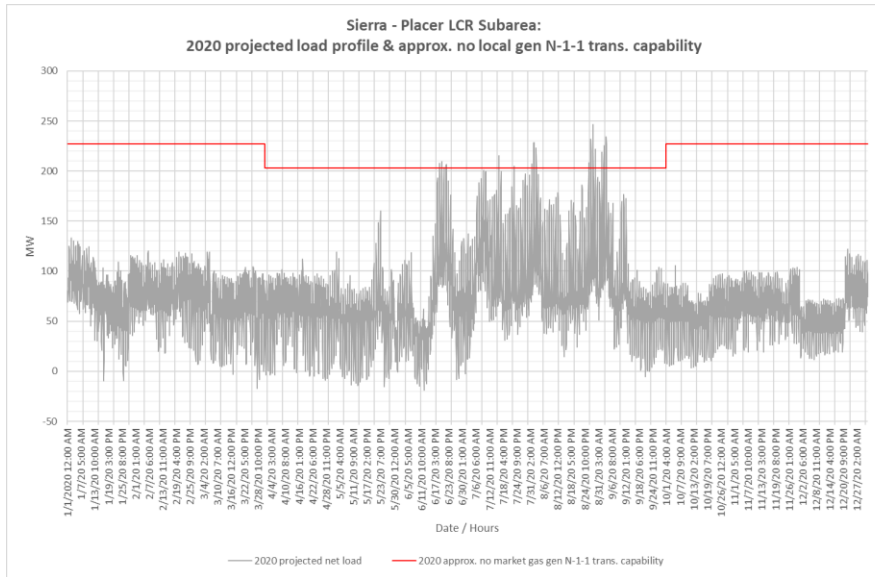


Placer Sub Area: Requirements



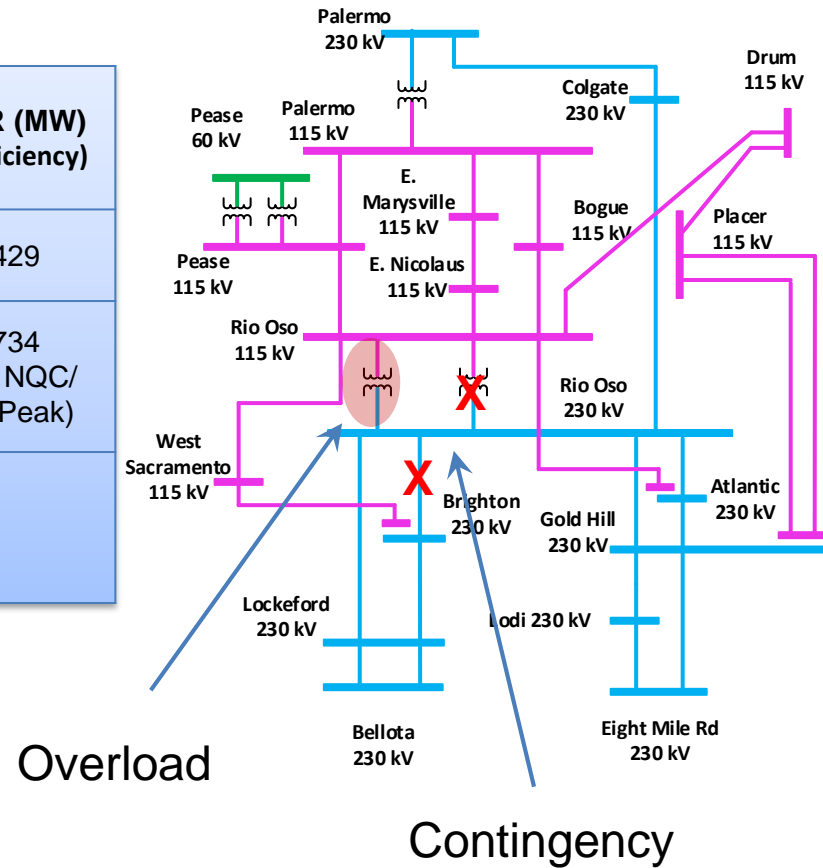
Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2020	B	Drum – Higgins 115 kV line	Gold Hill – Placer #1 115 kV line and Chicago Park unit	56
2020	C	Drum – Higgins 115 kV line	Gold Hill – Placer #1 and #2 115 kV lines	93
2024	B	Drum – Higgins 115 kV line	Gold Hill – Placer #1 115 kV line and Chicago Park unit	67
2024	C	Drum – Higgins 115 kV line	Gold Hill – Placer #1 and #2 115 kV lines	89

Placer Subarea: Load Profiles

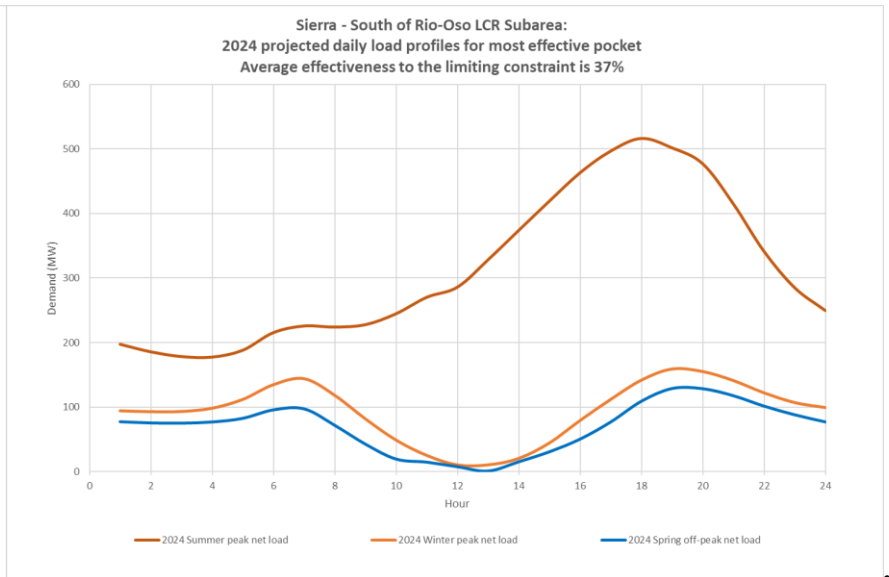
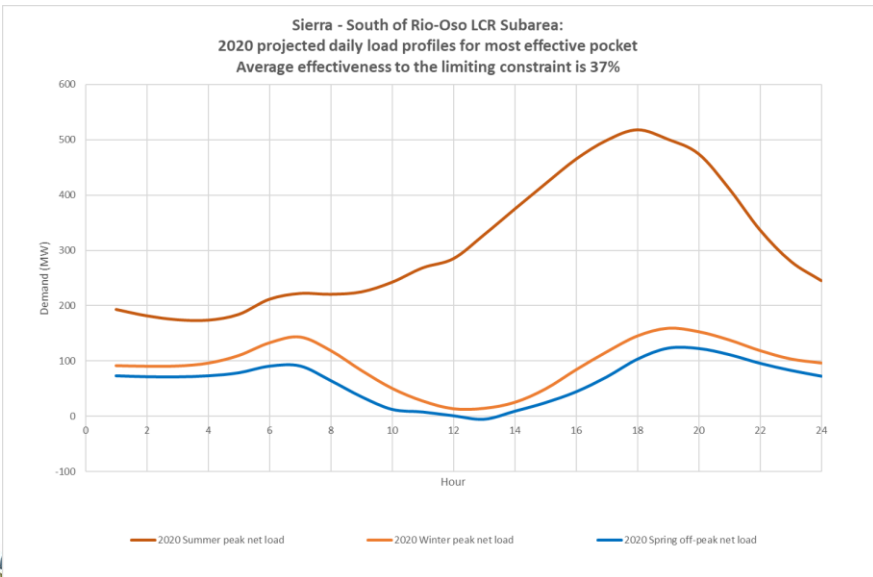
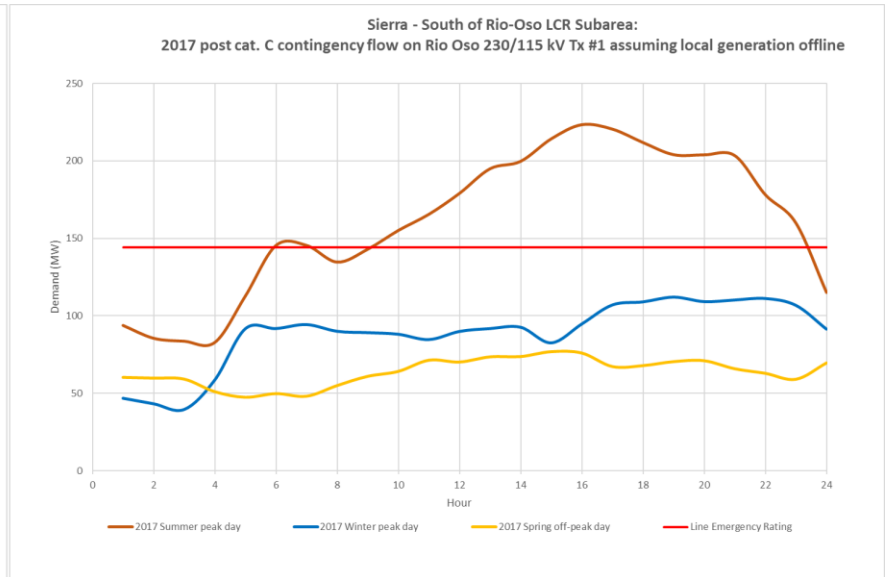
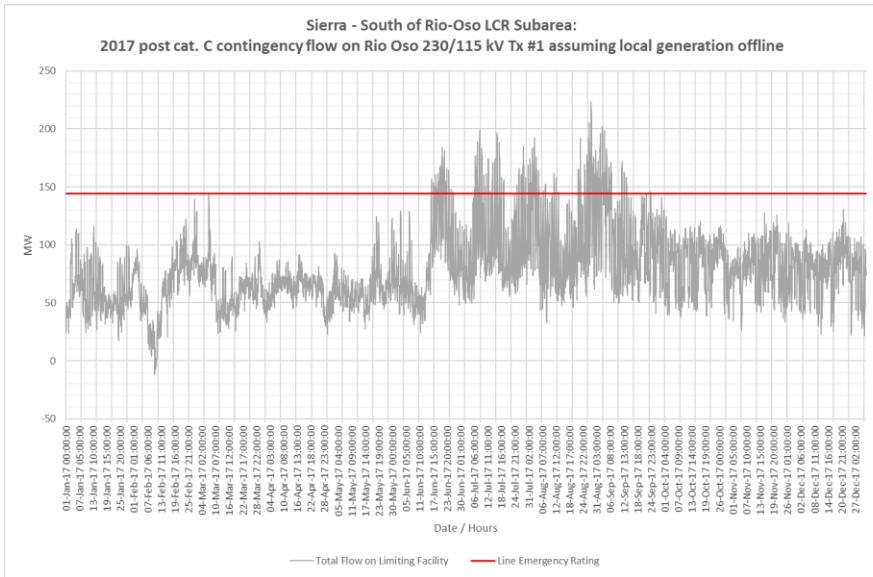


Drum – Rio Oso Sub Area: Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2020	B	Rio Oso 230/115 kV #2 Transformer	Palermo 230/115 kV #2 Transformer	429
2020	C	Rio Oso 230/115 kV #1 Transformer	Rio Oso 230/115 kV #2 Transformer and Rio Oso Brighton 230 kV line	734 (39 NQC/45 Peak)
2024	B/C	No Requirement due to Rio Oso 230/115 kV Transformer Upgrade project		

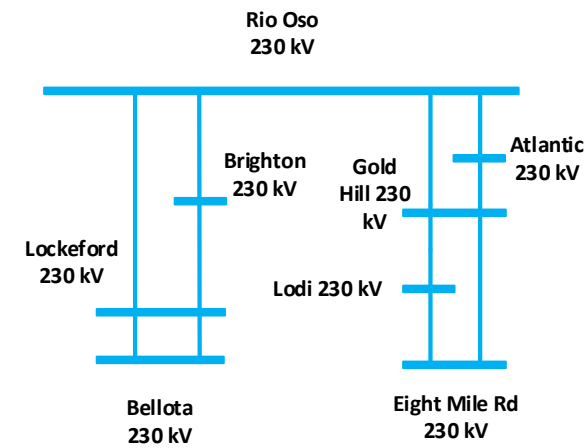


Drum Rio Oso Subarea: Flow Profiles

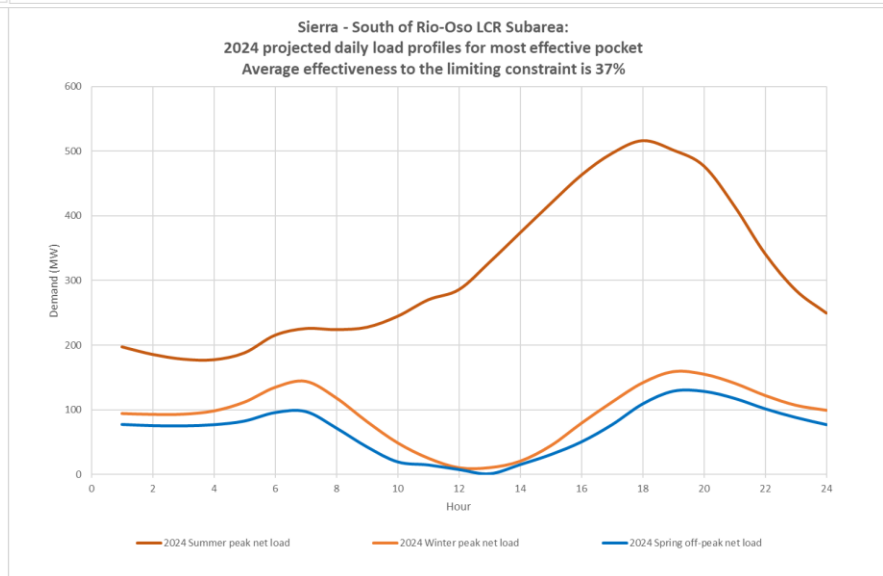
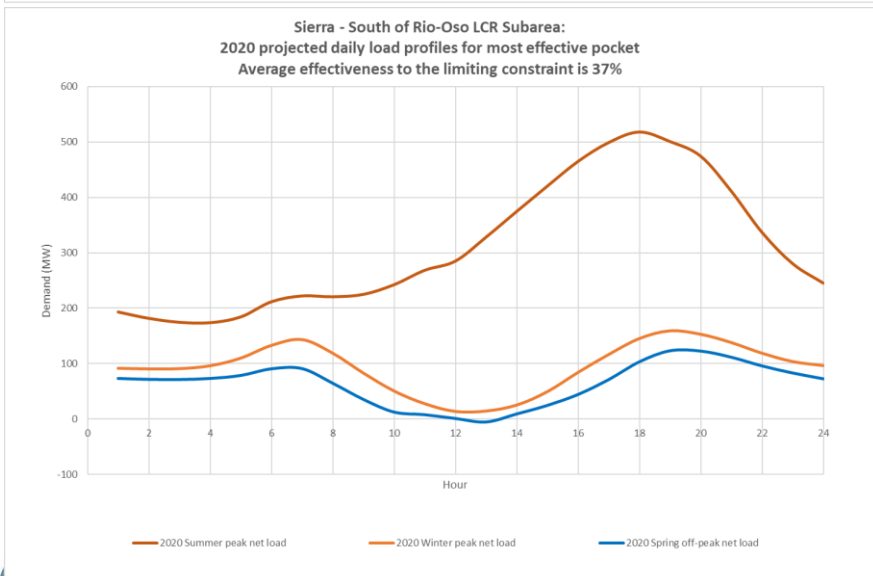
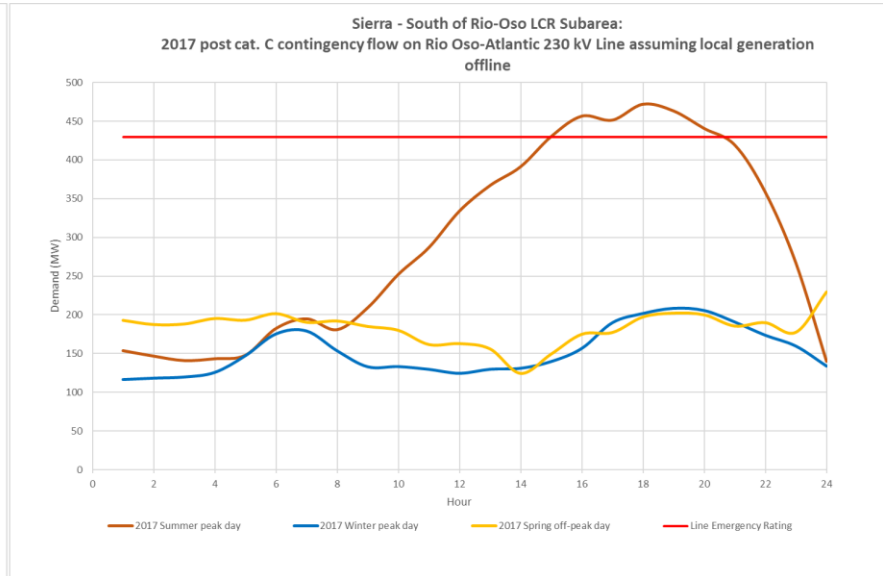
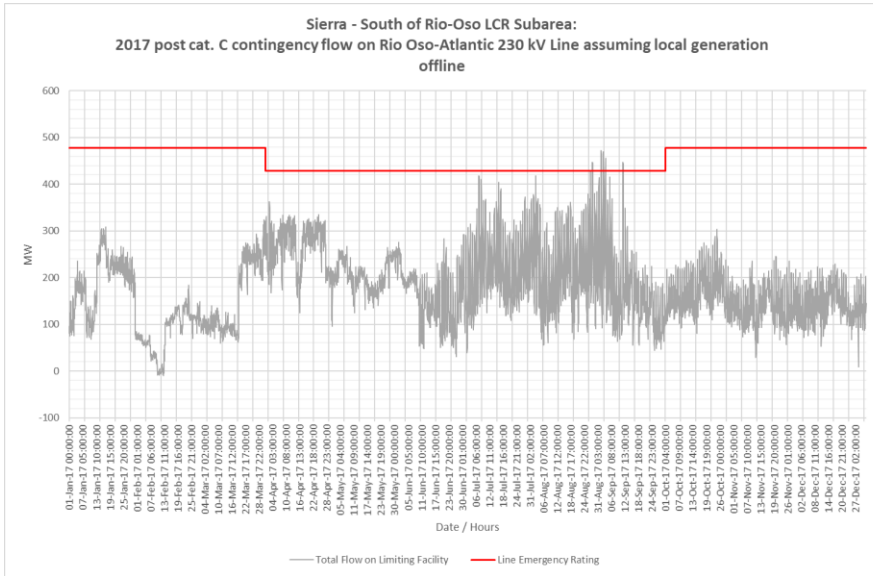


South of Rio Oso Sub Area: Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2020	B	Rio Oso – Atlantic 230 kV	Rio Oso – Gold Hill 230 kV and Ralston unit	276
2020	C	Rio Oso – Atlantic 230 kV	Rio Oso – Gold Hill 230 kV Rio Oso – Brighton 230 kV	831 (88)
2024	B	Rio Oso – Atlantic 230 kV	Rio Oso – Gold Hill 230 kV and Ralston unit	185
2024	C	Rio Oso – Atlantic 230 kV	Rio Oso – Atlantic 230 kV Rio Oso – Brighton 230 kV	185

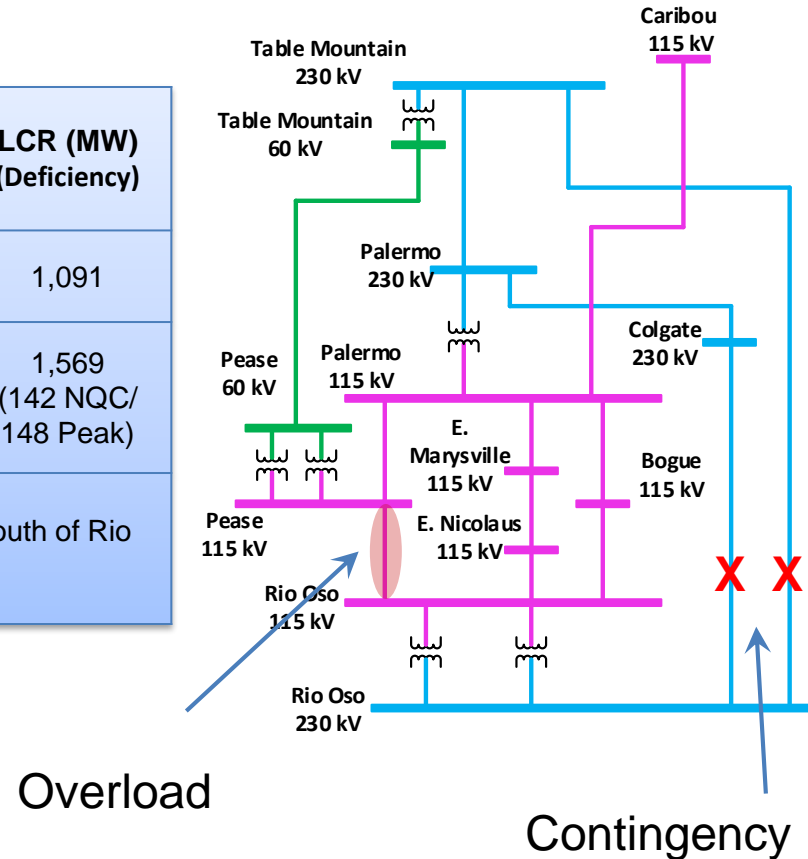


South of Rio Oso Subarea: Flow Profiles

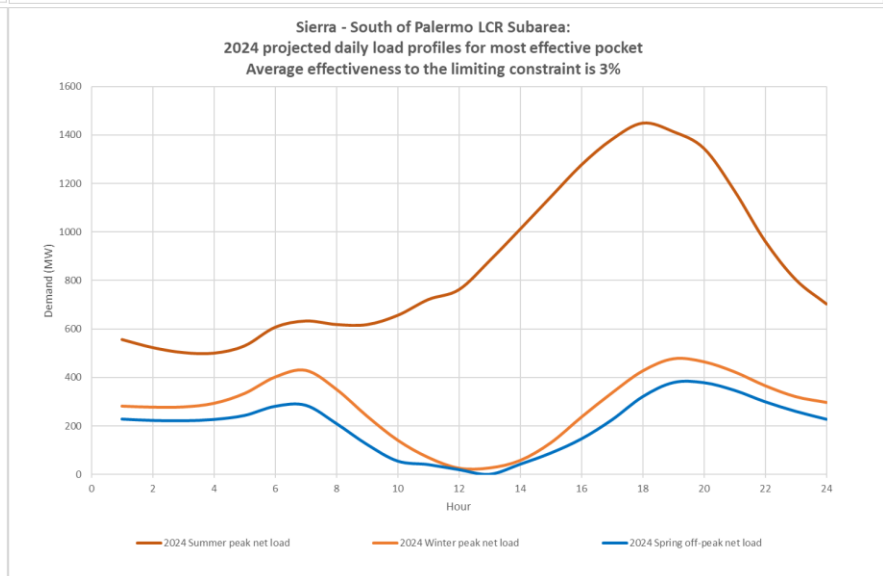
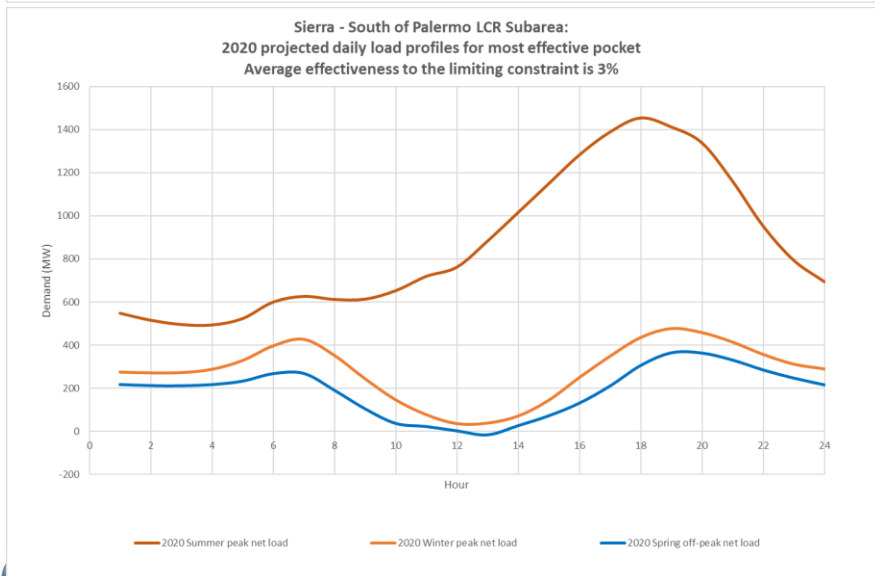
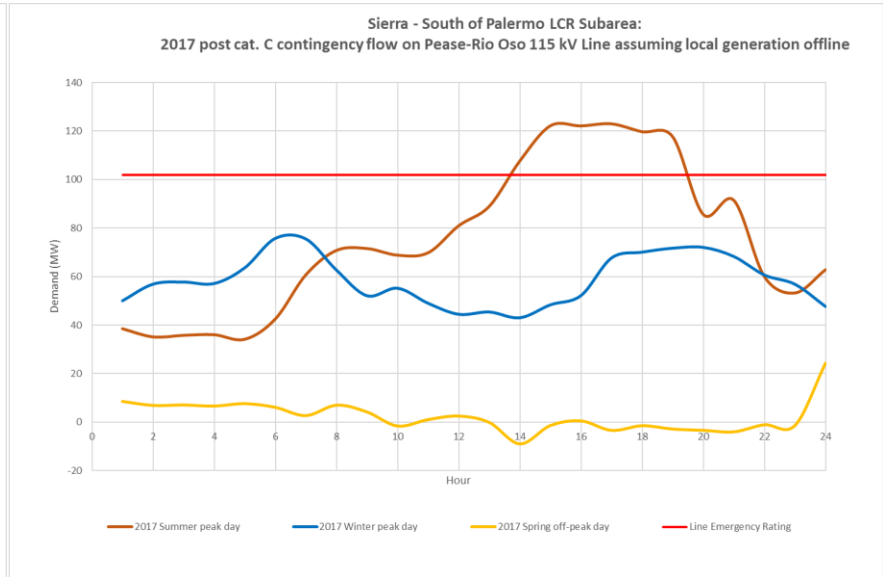
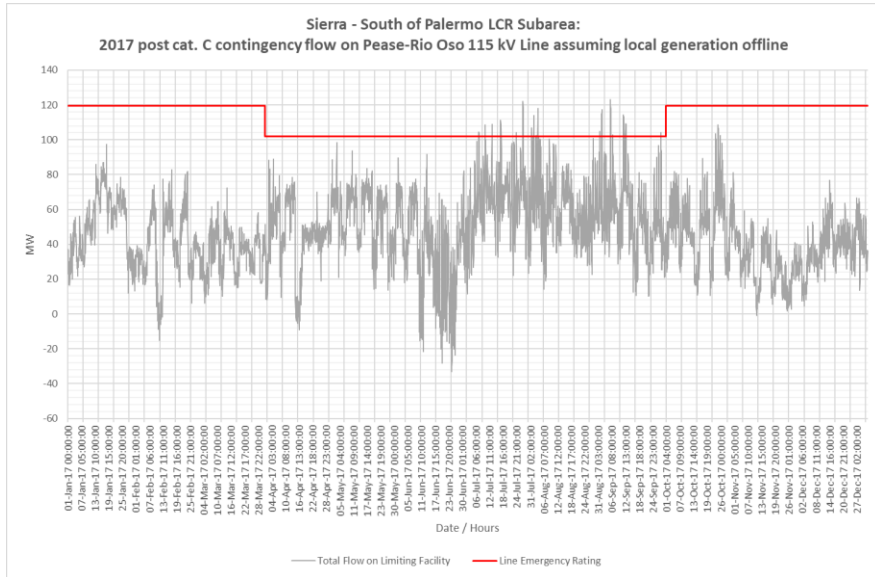


South of Palermo Sub Area: Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2020	B	Pease - Rio Oso 115 kV line	Table Mtn.- Rio Oso 230 kV line and Belden unit	1,091
2020	C	Pease - Rio Oso 115 kV line	DCTL of Table Mt. – Rio Oso and Colgate-Rio Oso 230 kV lines	1,569 (142 NQC/ 148 Peak)
2024	B/C	No additional requirements beyond what is needed for South of Rio Oso and Placer sub areas. (274 MW)		

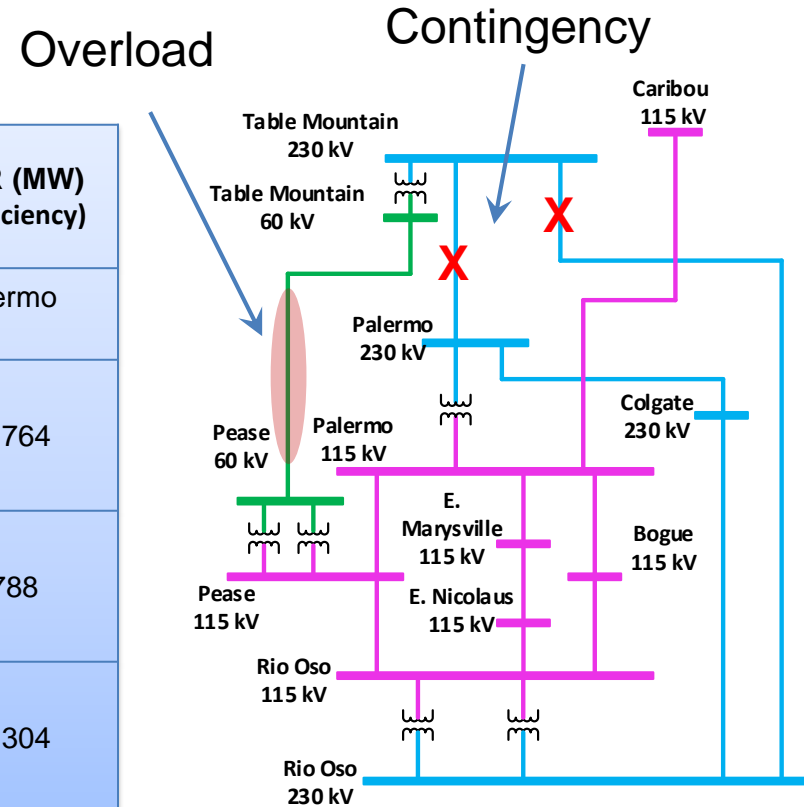


South of Palermo Subarea: Flow Profiles

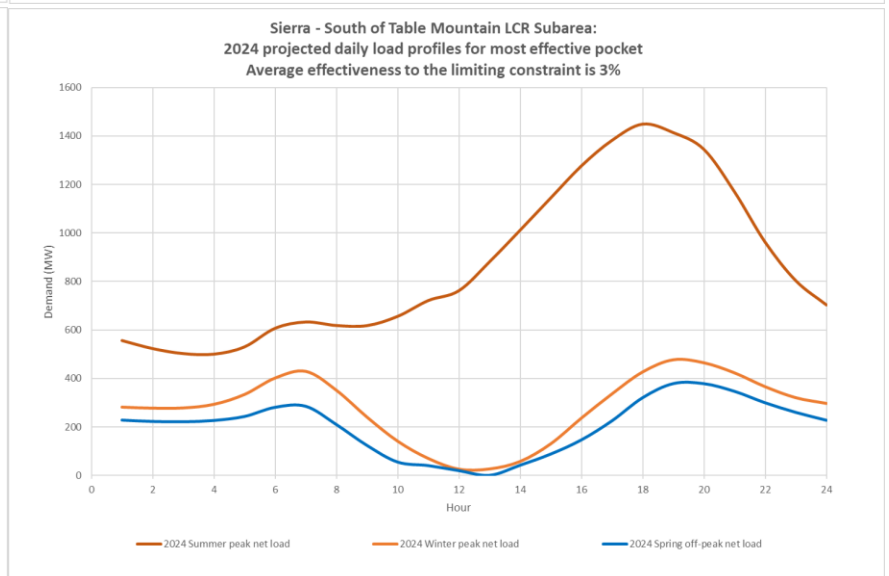
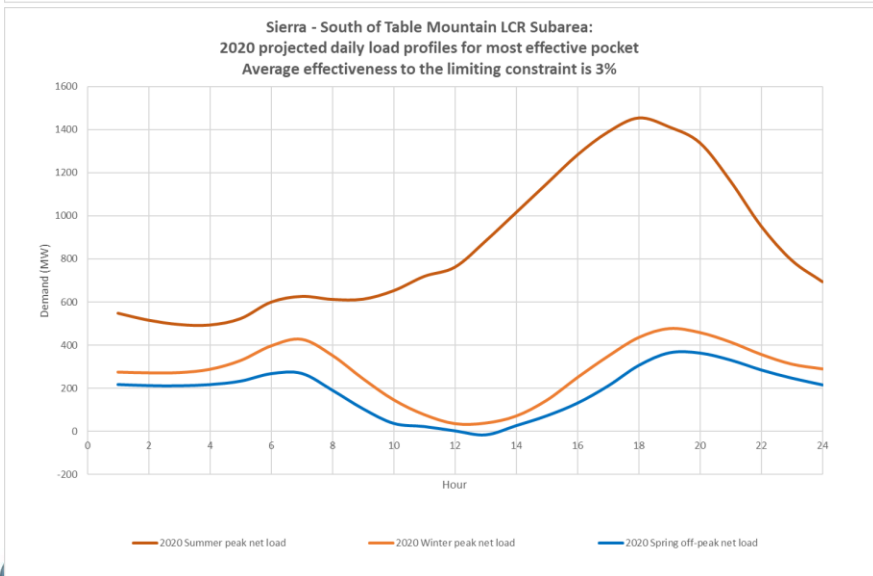
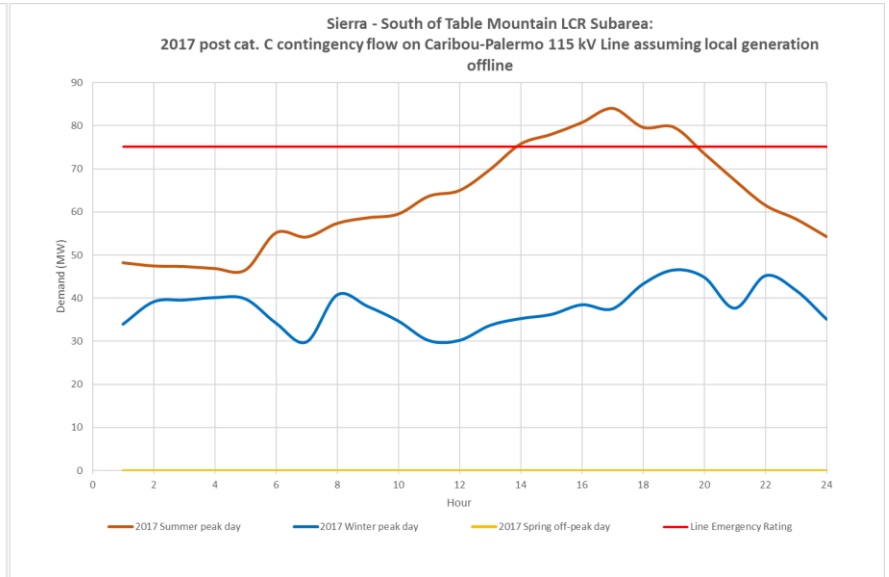
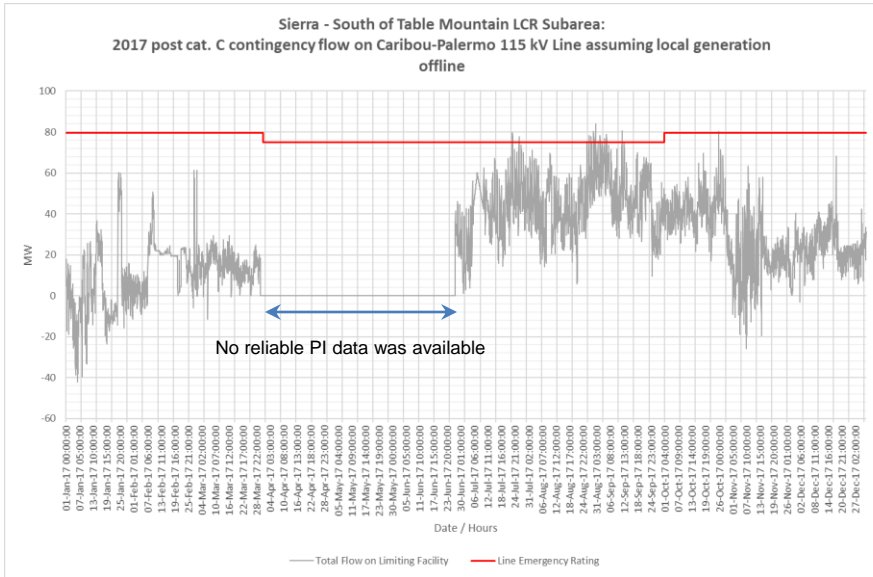


Sierra LCR Area Overall: Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2020	B	No requirement beyond what is needed for South of Palermo (1569 MW)		
2020	C	Table Mountain – Pease 60 kV	DCTL of Table Mtn. – Palermo and Table Mtn. Rio Oso 230 kV lines	1,764
2024	B	Table Mountain – Palermo 230 kV	Table Mountain – Rio Oso 230 kV and Belden unit	788
2024	C	Table Mountain – Pease 60 kV	DCTL of Table Mtn. – Palermo and Table Mtn. Rio Oso 230 kV lines	1,304



South of Table Mountain Subarea: Flow Profiles



Changes from 2019 to 2020

Subarea	2019		2020	
	Load	LCR	Load	LCR
Pease	150	92	159	88
Placer	168	77	172	93
Drum-Rio Oso	N/A	506	N/A	734
South of Rio Oso	N/A	831	N/A	831
South of Palermo	N/A	1,702	N/A	1,569
South of Table Mountain	N/A	1,964	N/A	1,764
Total	1,758	2,247	1,862	2,068

LCR decrease is mostly due to new transmission project implementation.

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

Changes from 2023 to 2024

Subarea	2023		2024	
	Load	LCR	Load	LCR
Pease	157	75	157	95
Placer	174	89	174	89
Drum-Rio Oso	N/A	0	N/A	0
South of Rio Oso	N/A	554	N/A	185
South of Palermo	N/A	<629	N/A	<274
South of Table Mountain	N/A	1,924	N/A	1,304
Total	1,822	1,924	1,863	1,304

LCR reduction in 2024 is due to new transmission project implementation and generation adjustment within adjacent subarea after the first contingency.

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

Sierra Area Total LCR Need

2020 LCR Need	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Need
Category B (Single)	1,091	0	1,091
Category C (Multiple)	1,764	275 NQC/ 281 Peak	2,045

2024 LCR Need	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Need
Category B (Single)	761	0	761
Category C (Multiple)	1,304	0	1,304