2024 & 2028 Final LCR Study Results Greater Bay Area

Uriel Rangel Diaz

Senior Regional Transmission Engineer

Stakeholder Call

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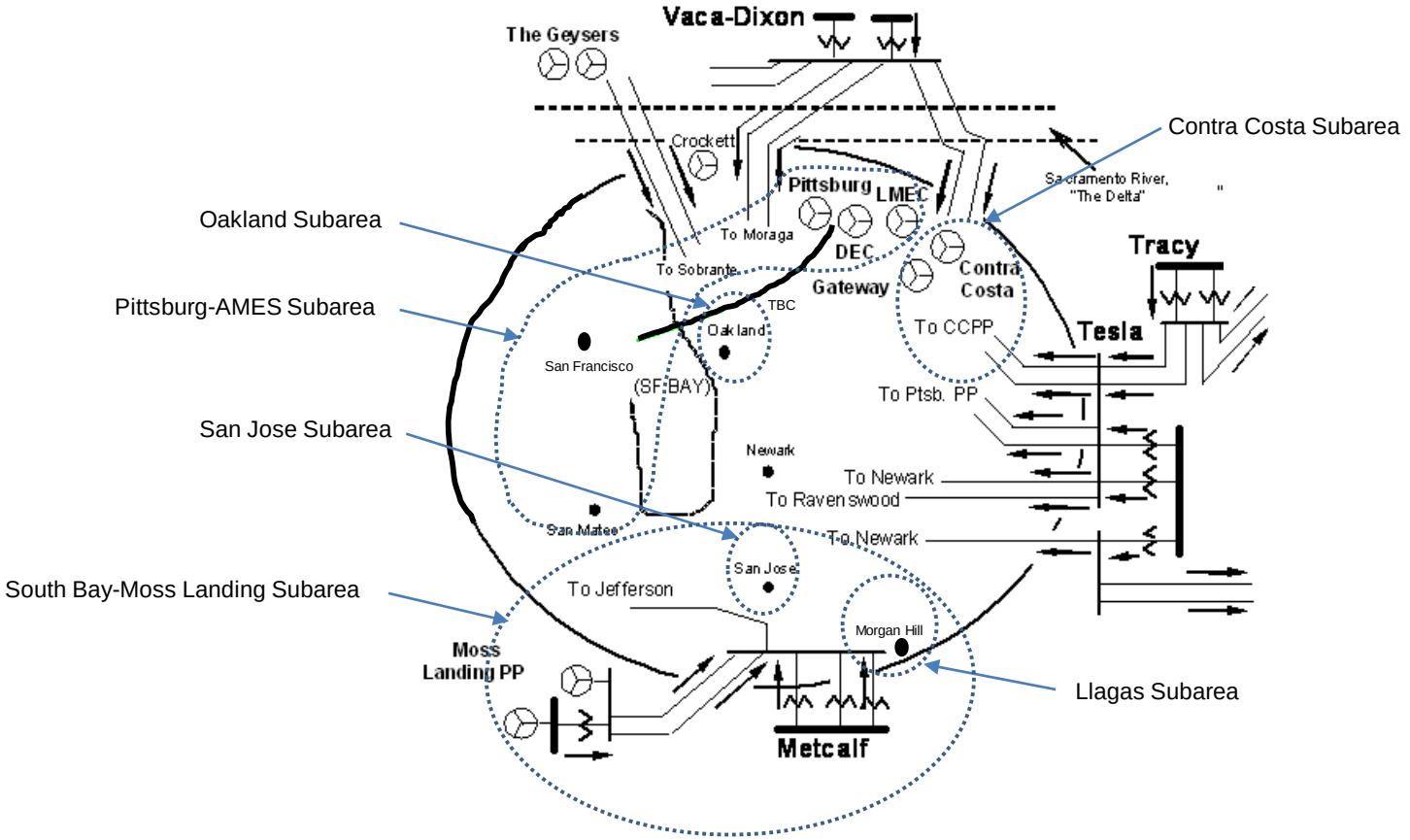
Greater Bay Area Transmission System & LCR Subareas



New major transmission projects

Project Name	In-service Year
East Shore-Oakland J 115 kV Reconductoring Project (name changed from East Shore-Oakland J 115 kV Reconductoring Project & Pittsburg-San Mateo 230 kV Looping Project since only the 115 kV part was approved)	2023
Series Compensation on Los Esteros-Nortech 115 kV Line	2023
Oakland Clean Energy Initiative	2023
Ravenswood – Cooley Landing 115 kV Line Reconductor	2023
Newark-Milpitas #1 115 kV Line Limiting Facility Upgrade	2024
Ravenswood 230/115 kV transformer #1 Limiting Facility Upgrade	2024
Pittsburg 230/115 kV Transformer Capacity Increase	2025
Vasona-Metcalf 230 kV Line Limiting Elements Removal Project	2025
Morgan Hill Area Reinforcement (formerly Spring 230/115 kV substation)	2026
Newark 230/115 kV Transformer Bank #7 Circuit Breaker Addition	2026
Metcalf 230/115 kV Transformers Circuit Breaker Addition	2026
San Jose Area HVDC Line (Newark - NRS)	2028
San Jose Area HVDC Line (Metcalf – San Jose)	2028
Christie-Sobrante 115 kV Line Reconductor	2028
New Collinsville 500 kV substation	2028

Power Plant Changes

Additions modeled in 2024 & 2028:

- Energy Storage off Metcalf 115 kV substation
- Oakland area energy storage

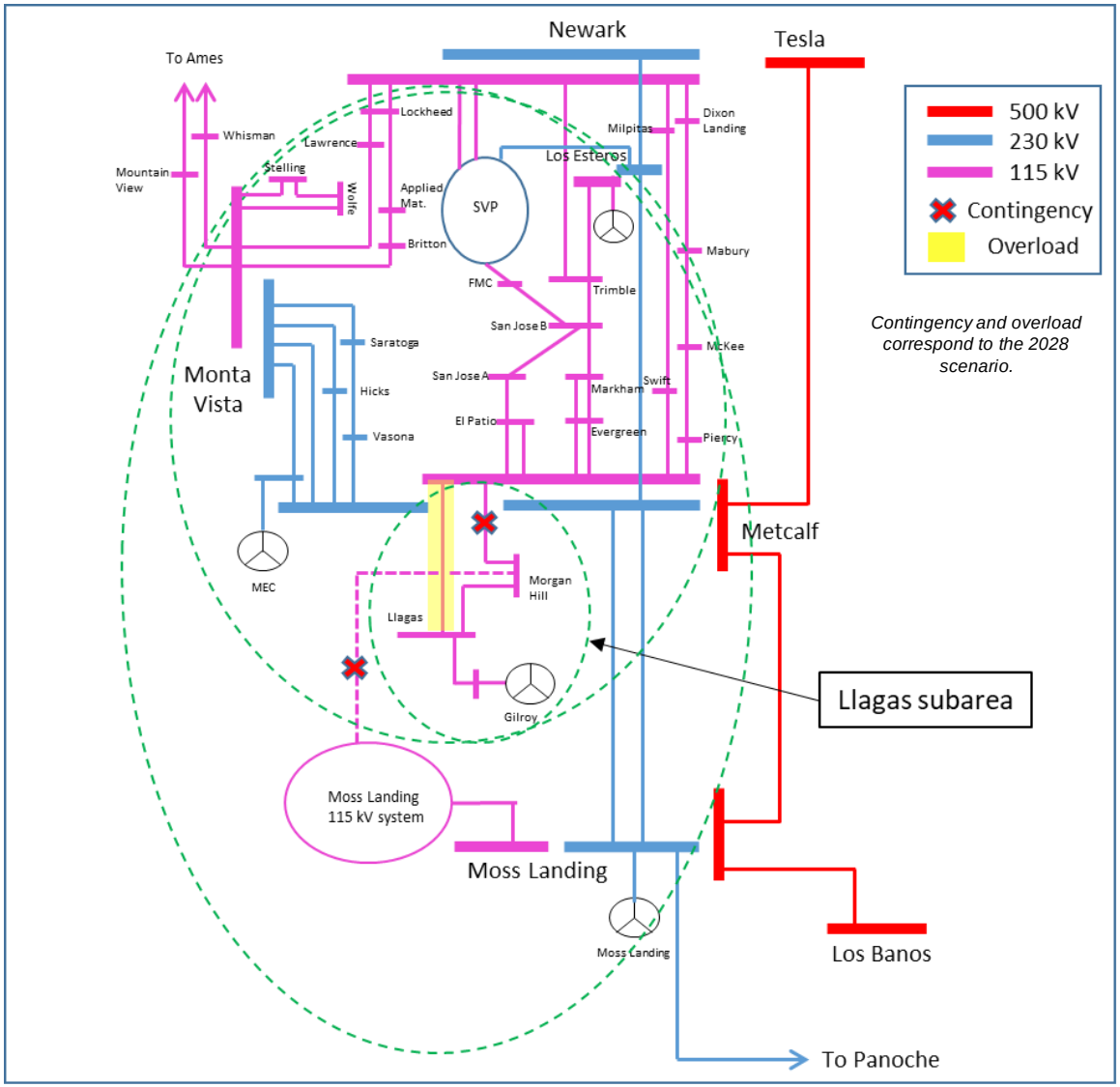
Retirements:

- Oakland CTs projected to retire after Oakland area energy storage is in-service (exact date 2024)

Llagas Sub-area: Load and Resources

Load (MW)	2024	2028	Generation (MW)	Aug NQC
Gross Load	268	288	Market/Net Seller	256
AAEE	-1	-3	Battery	0
Behind the meter DG	-4	0	Muni/QF	0
Net Load	**263**	**285**	Solar	0
Transmission Losses	1	1	Existing 20-minute Demand Response	0
Pumps	0	0	Mothballed	0
Load + Losses + Pumps	**264**	**286**	**Total**	**256**

Llagas Sub-area: One-line diagram

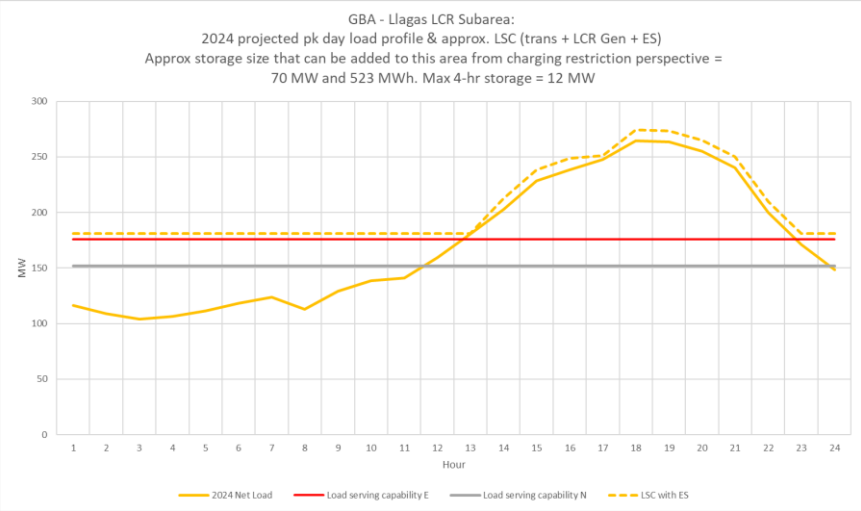


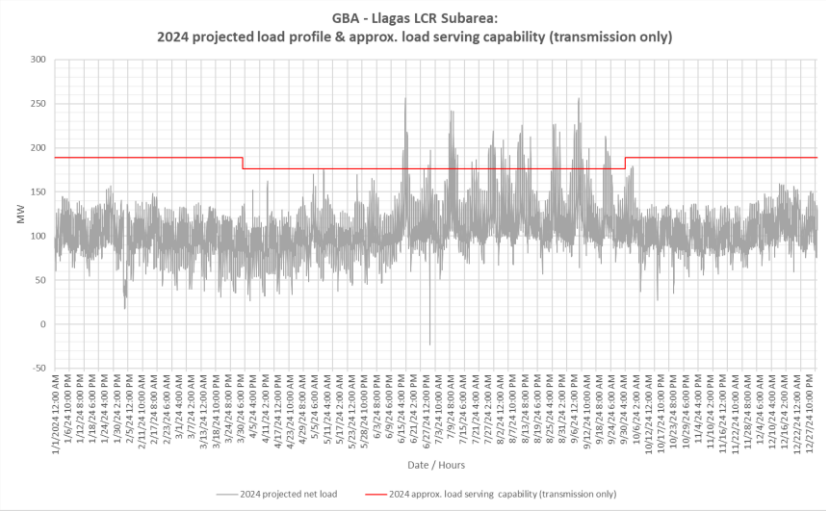
Llagas Sub-area: Requirements

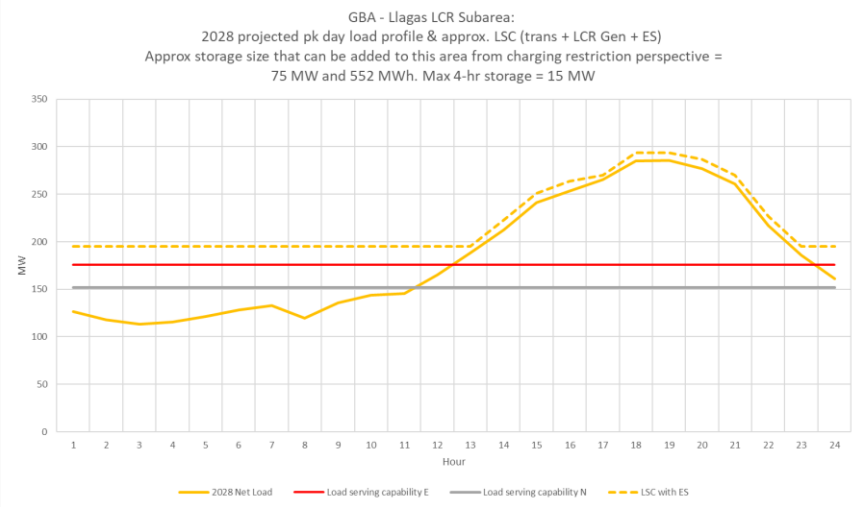
Year	Category	Limiting Facility	Contingency	LCR (MW)
2024	P3	Metcalf-Llagas 115 kV line	Metcalf-Morgan Hill + Gilroy Cogen Unit 1	158
2028	P6	Metcalf-Llagas 115 kV line	Metcalf-Morgan Hill & Morgan Hill-Green Valley115 kV lines	131*

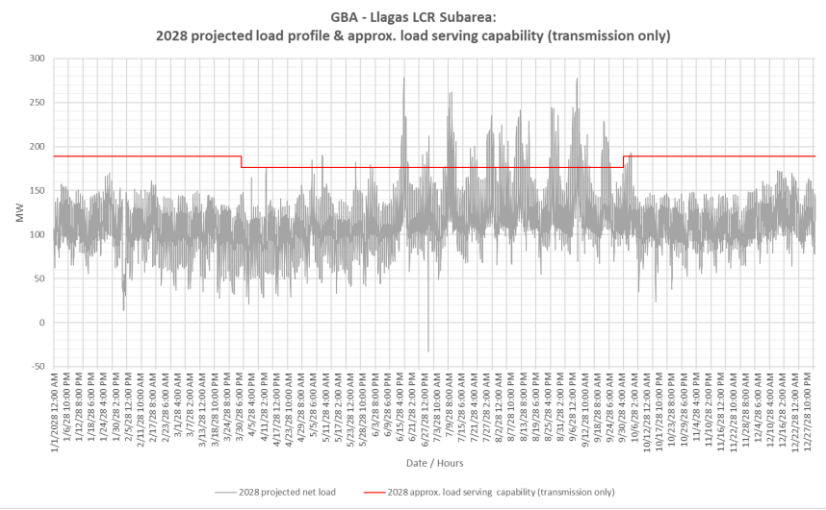
*The worst constraint in the Llagas sub-area is mitigated in the 2028 scenario by the Morgan Hill Area Reinforcement (formerly Spring 230/115 kV substation) project approved in the past TPP cycles.

Llagas Sub-area: Load Profiles





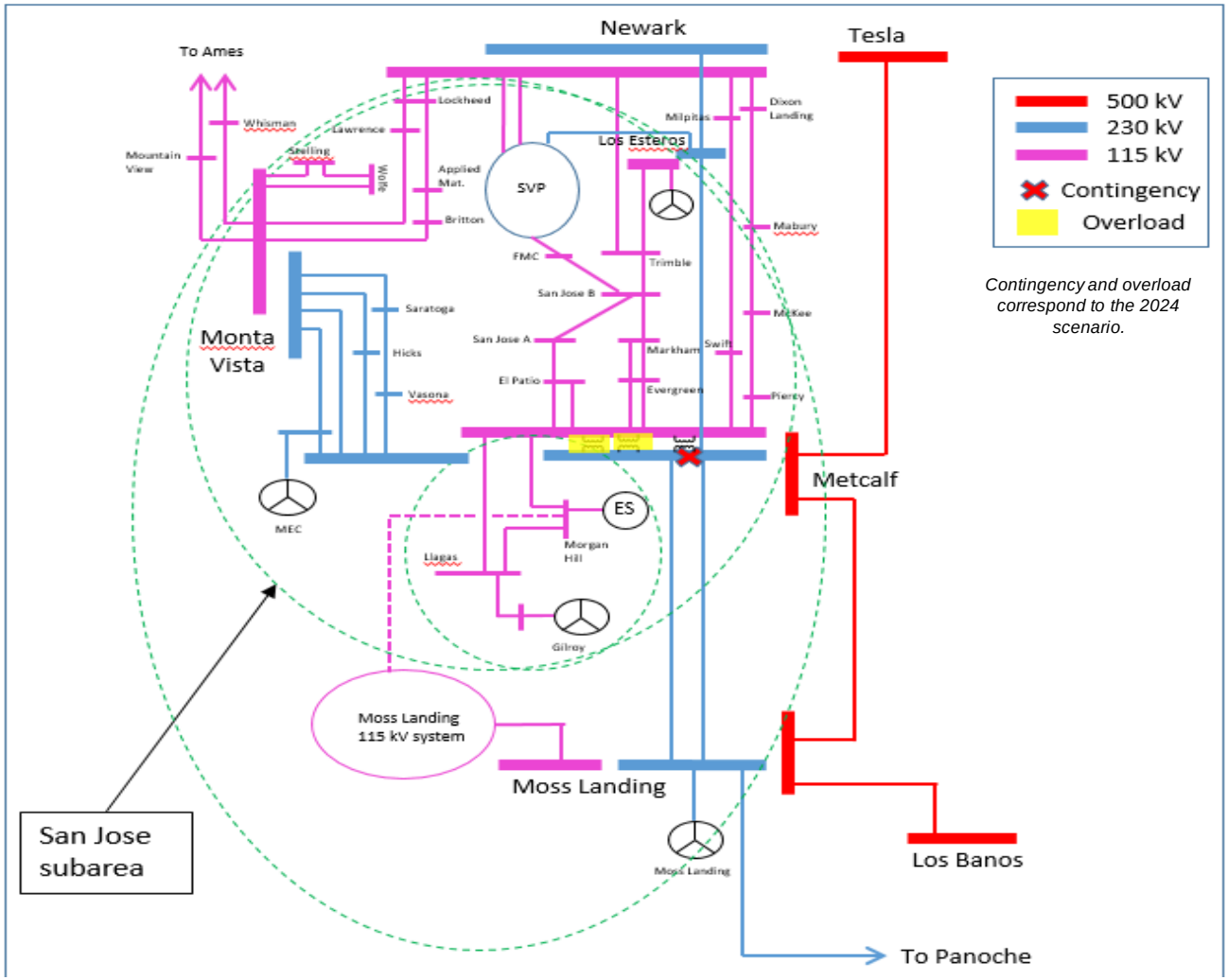




San Jose Sub-area: Load and Resources

Load (MW)	2024	2028	Generation (MW)	Aug NQC
Gross Load	2,783	3,099	Market/Net Seller	584
AAEE	-20	-34	Battery	75
Behind the meter DG	-20	0	Muni/QF	197
Net Load	**2,743**	**3,065**	Solar	0
Transmission Losses	102	76	Existing 20-minute Demand Response	0
Pumps	0	0	Mothballed	0
Load + Losses + Pumps	**2,845**	**3,141**	**Total**	**856**

San Jose Sub-area: One-line diagram

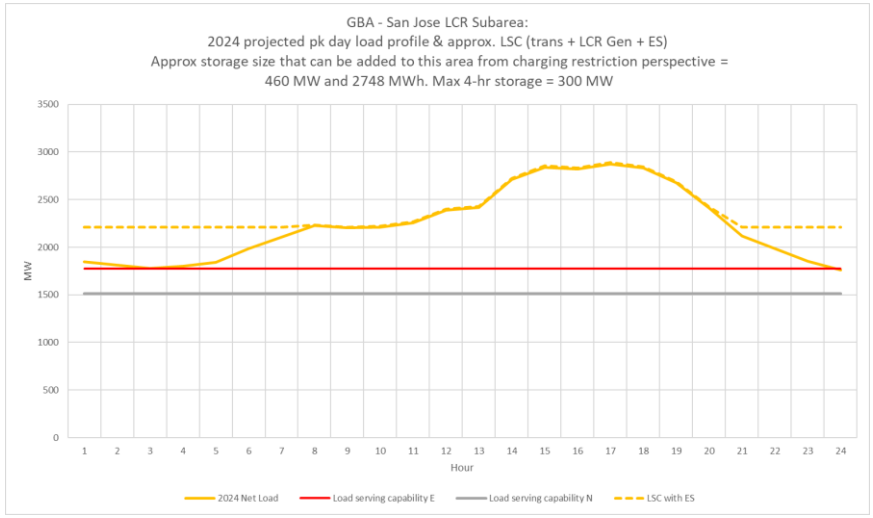


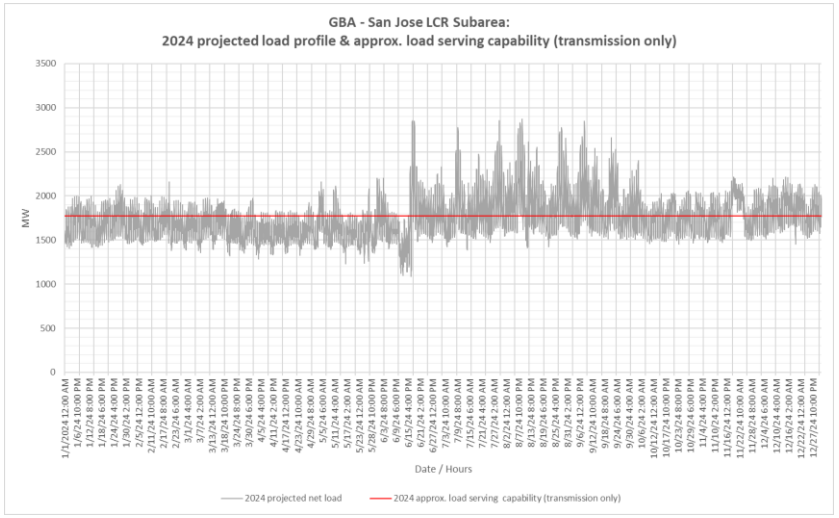
San Jose Sub-area: Requirements

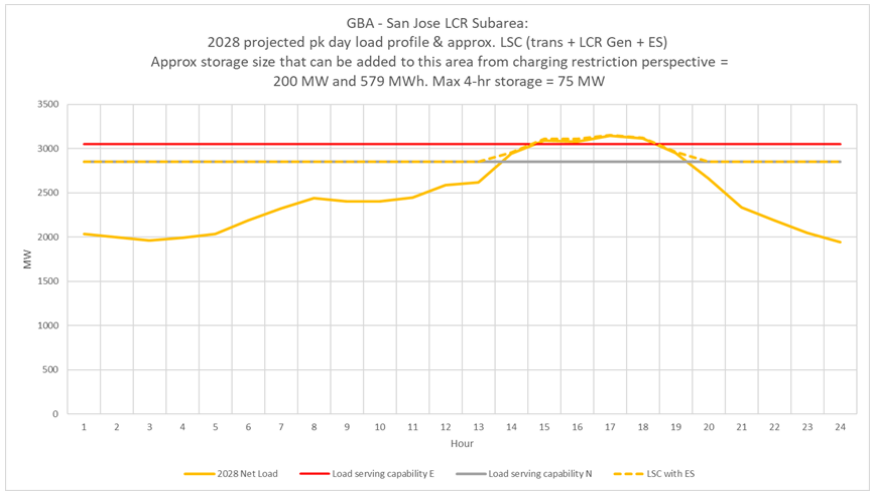
Year	Category	Limiting Facility	Contingency	LCR (MW) (deficiency)
2024	P2	Metcalf 230/115 kV transformer # 1 or # 3	Metcalf 230 kV Bus Section 2D & 2E	1,170 (324)
2028	P2	Metcalf 230/115 kV transformer # 1	Metcalf 115 kV Section 1D	200

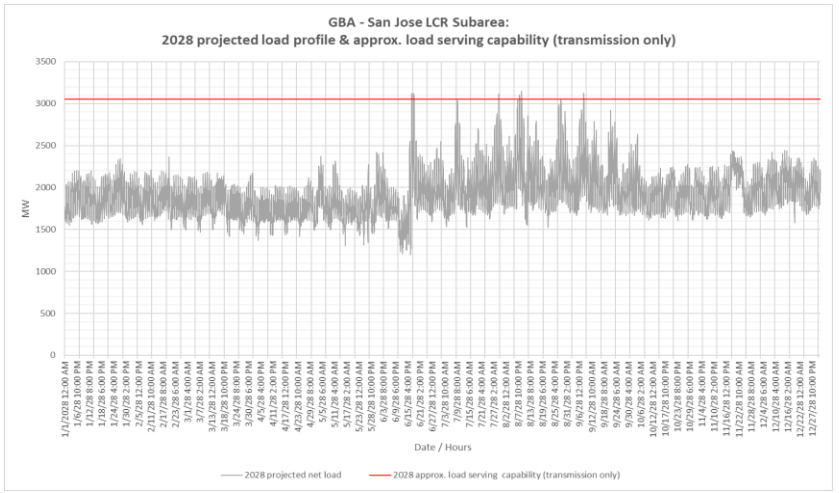
*The worst constraint in the San Jose sub-area is mitigated in the 2028 scenario by the Metcalf 230/115 kV Transformers Circuit Breaker Addition project approved in 2022-2023 TPP.

San Jose Sub-area: Load Profiles





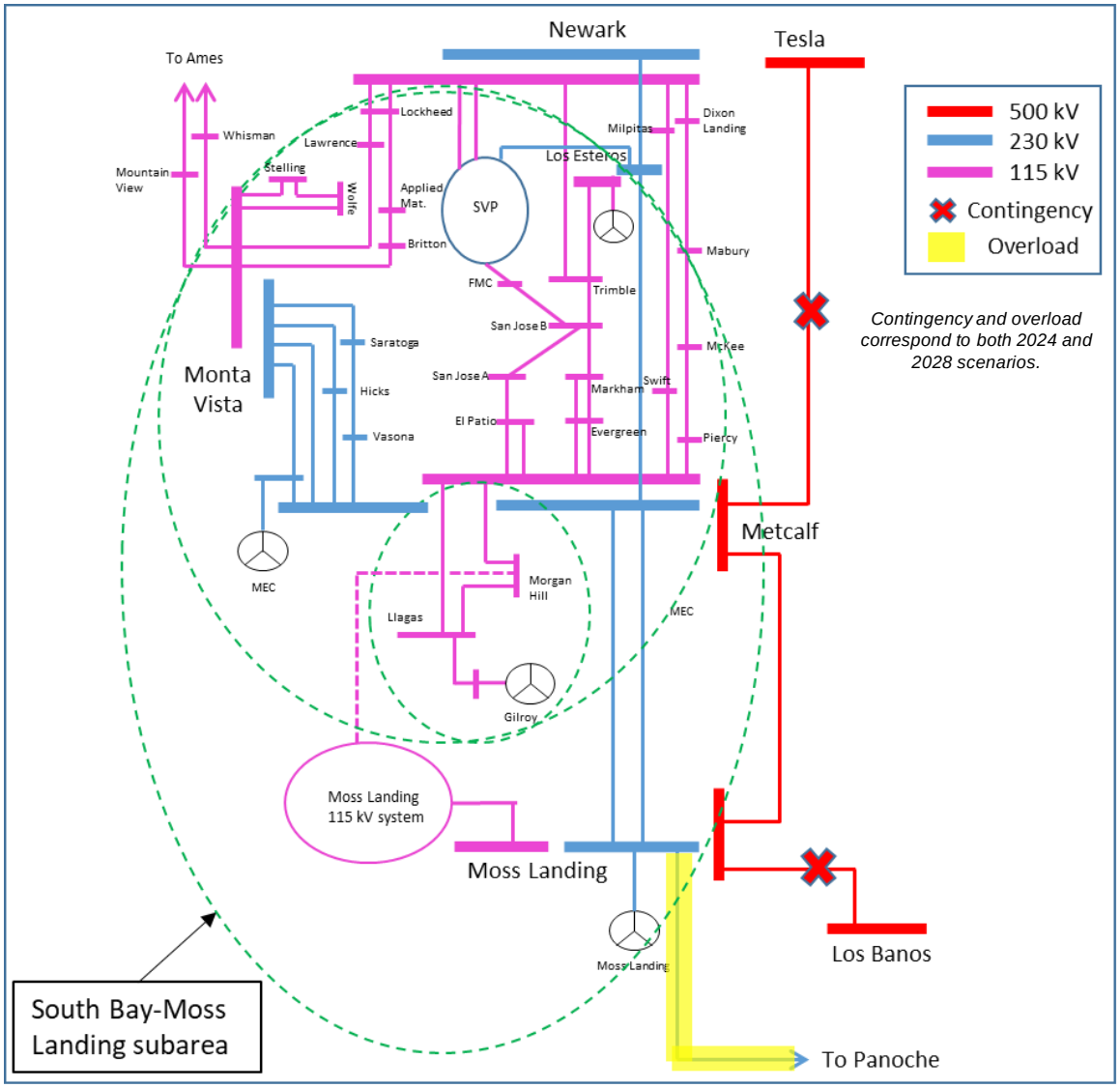




South Bay-Moss Landing Sub-area: Load and Resources

Load (MW)	2024	2028	Generation (MW)	Aug NQC
Gross Load	4,393	4,792	Market/Net Seller	2,201
AAEE	-35	-61	Battery	658
Behind the meter DG	-42	-1	Muni/QF	197
Net Load	**4,316**	**4,730**	Solar	0
Transmission Losses	131	118	Existing 20-minute Demand Response	0
Pumps	0	0	Mothballed	0
Load + Losses + Pumps	**4,447**	**4,848**	**Total**	**3,056**

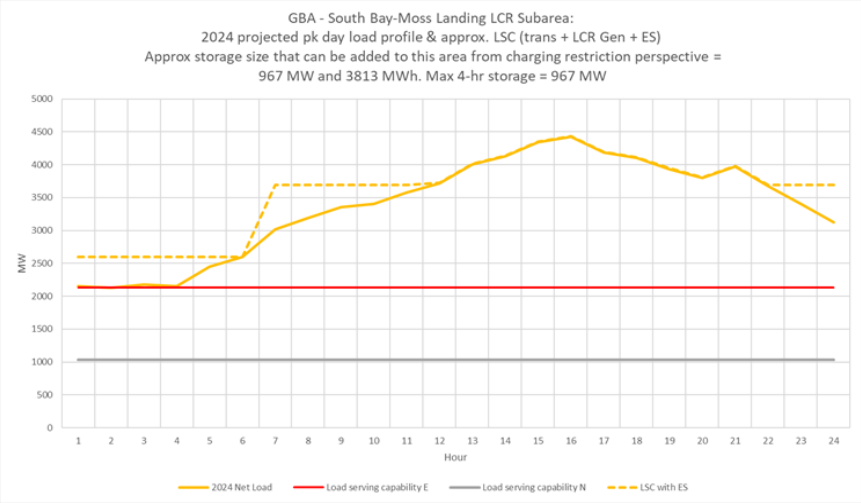
South Bay-Moss Landing Sub-area: One-line diagram

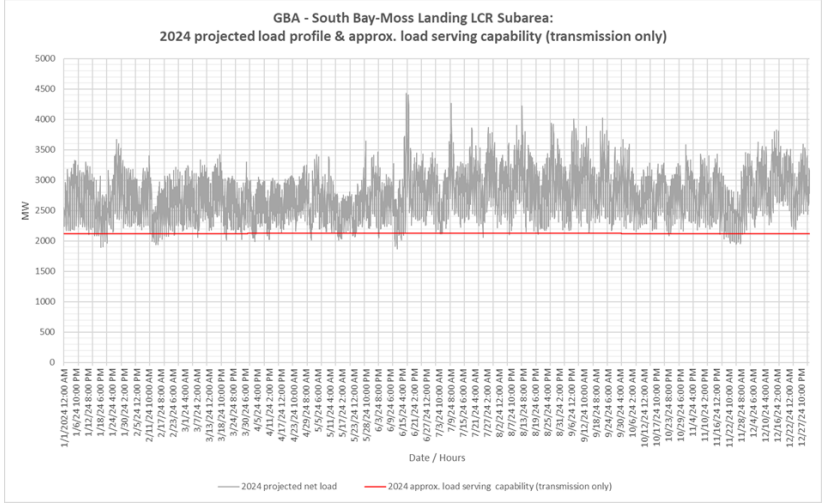


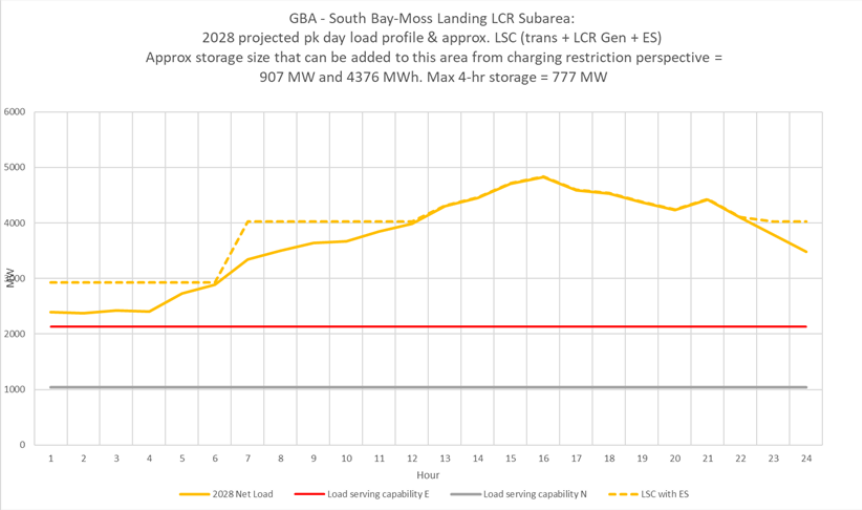
South Bay-Moss Landing Sub-area: Requirements

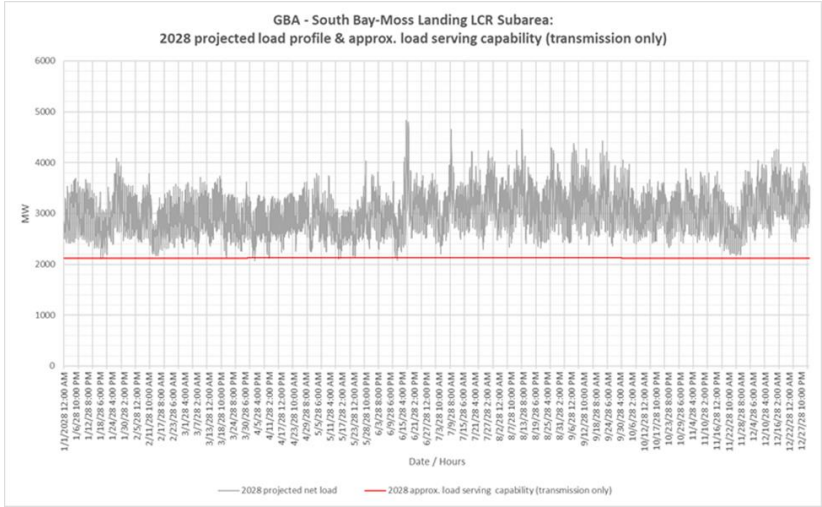
Year	Category	Limiting Facility	Contingency	LCR (MW) (deficiency)
2024	P6	Moss Landing-Las Aguilas 230 kV	Tesla-Metcalf 500 kV and Moss Landing-Los Banos 500 kV	2,124
2028	P6	Moss Landing-Las Aguilas 230 kV	Tesla-Metcalf 500 kV and Moss Landing-Los Banos 500 kV	2,385

South Bay-Moss Landing Sub-area: Load Profiles









Oakland Sub-area: Load and Resources

Load (MW)	2024	2028	Generation (MW)	Aug NQC
Gross Load	177	185	Market/Net Seller	55
AAEE	-1	-1	Battery	55
Behind the meter DG	-1	0	Muni/QF	48
Net Load	**175**	**184**	Solar	0
Transmission Losses	0	0	Existing 20-minute Demand Response	0
Pumps	0	0	Mothball	0
Load + Losses + Pumps	**175**	**184**	**Total**	**158**

Oakland Sub-area: Requirements

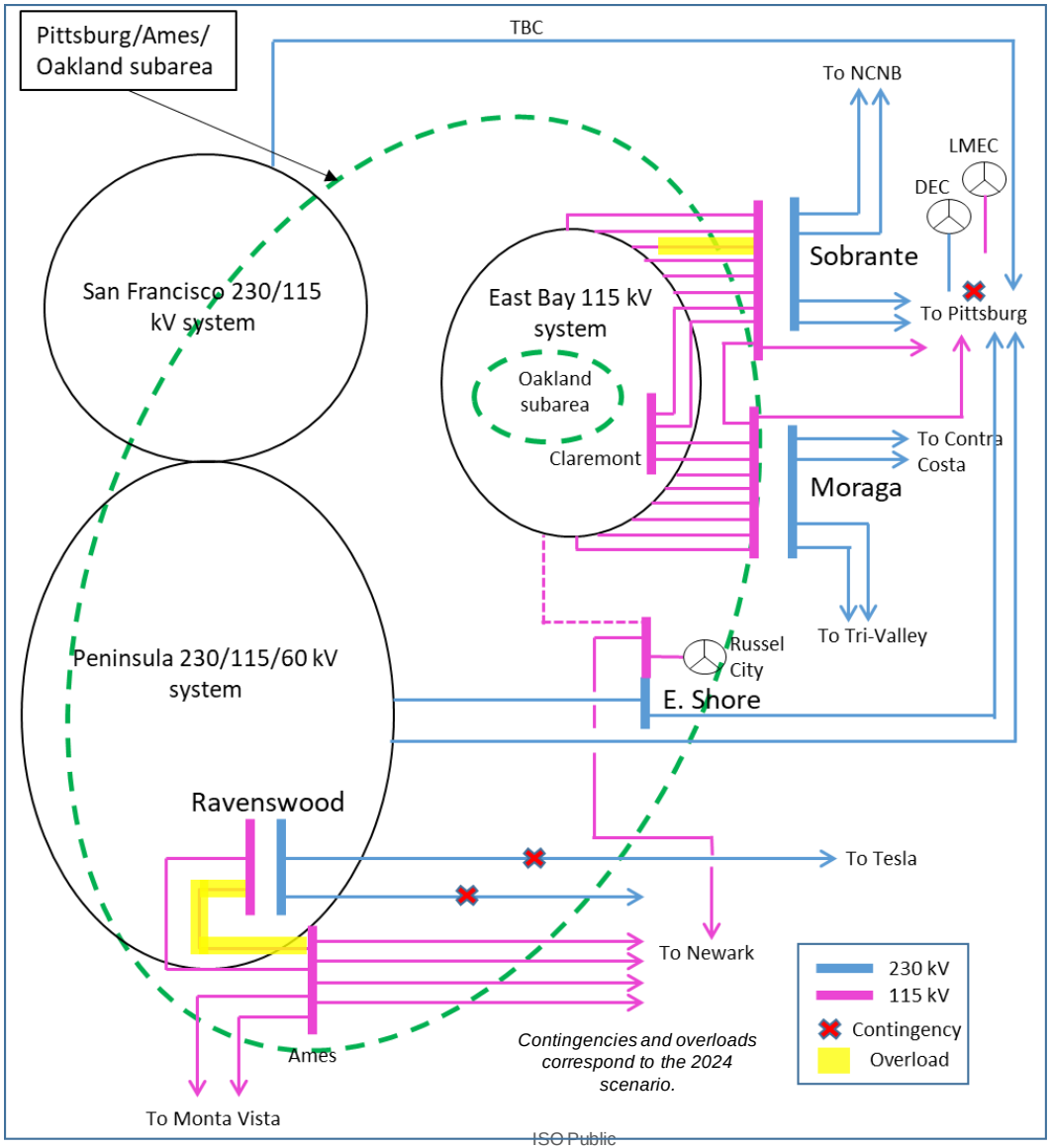
Year	Category	Limiting Facility	Contingency	LCR (MW)
2024	P6	Oakland C-X #2 115 kV cable	Oakland C-X #3 & D-L #1 115 kV lines	31*
2028	P6	Oakland C-X #2 115 kV cable	Oakland C-X #3 & D-L #1 115 kV lines	40*

Notes:
*This requirement doesn't reflect potential load transfer that could occur following the first contingency. An approved operating procedure including this load transfer could reduce this requirement.

Ames-Pittsburg-Oakland Sub-area: Load and Resources

Load (MW)	**2024**	**2028**	**Generation (MW)**	**Aug NQC**
Gross Load	**NA – Flow through area.**		Market/Net Seller	2,158
AAEE			Battery	325
Behind the meter DG			Muni/QF	287
Net Load			Solar	2
Transmission Losses			Existing 20-minute Demand Response	0
Pumps			Mothballed	0
Load + Losses + Pumps			**Total Qualifying Capacity**	**2,772**

Ames/Pittsburg/Oakland Sub-area: One-line diagram



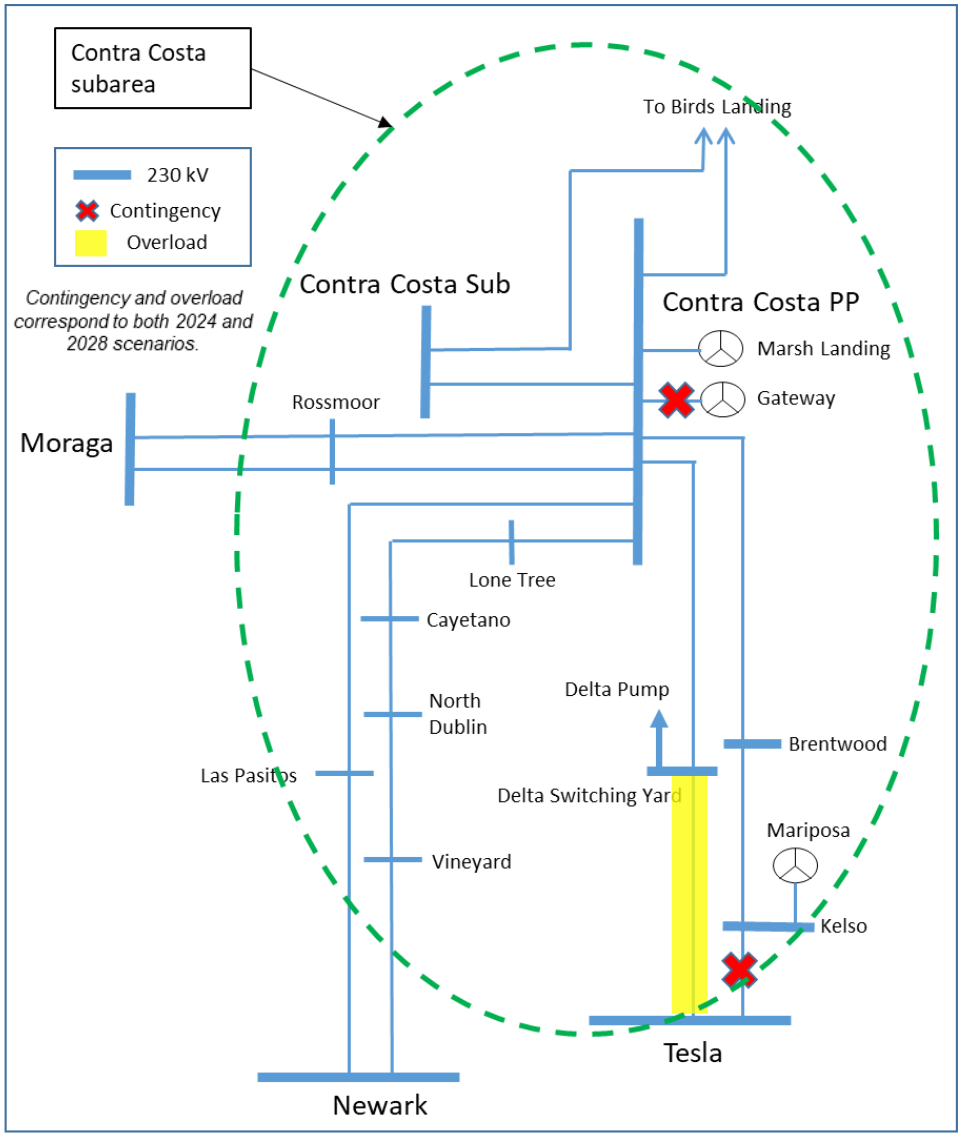
Ames/Pittsburg/Oakland Sub-area: Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW)
2024	P6	Ames-Ravenswood #1 115 kV line	Newark-Ravenswood & Tesla-Ravenswood 230 kV lines	2,086
	P2	Martinez-Sobrante 115 kV line	Pittsburg Section 1D & 1E 230 kV	
2028	P6	San Mateo-Pittsburg E #1 230 kV line or Newark E-Ames #2 115 kV line	Newark-Ravenswood & Tesla-Ravenswood 230 kV lines	1,787
	P2	Sobrante 230/115 kV transformer #1	Pittsburg Section 1D & 1E 230 kV	

Contra Costa Sub-area: Load and Resources

Load (MW)	2024	2028	Generation (MW)	Aug NQC
Gross Load	NA – Flow through area.		Market/Net Seller	1,671
AAEE			Wind	248
Behind the meter DG			Battery	0
Net Load			Muni/QF	127
Transmission Losses			Solar	0
Pumps			Existing 20-minute Demand Response	0
Load + Losses + Pumps			**Total**	**2,046**

Contra Costa Sub-area: One-line diagram



Contra Costa Sub-area: Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW)
2024	P3	Delta Switching Yard-Tesla 230 kV Line	Kelso-Tesla 230 kV Line and Gateway unit	960
2028	P3	Delta Switching Yard-Tesla 230 kV Line	Kelso-Tesla 230 kV Line and Gateway unit	737

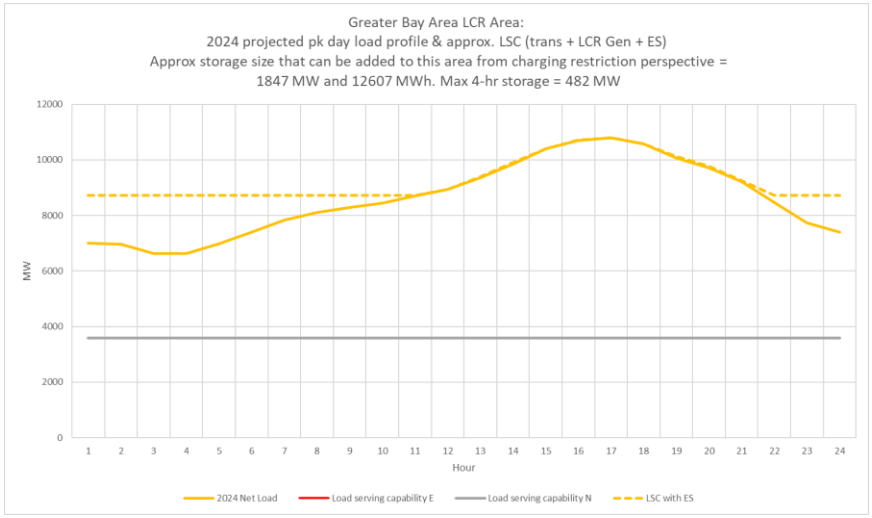
Greater Bay Area Overall: Load and Resources

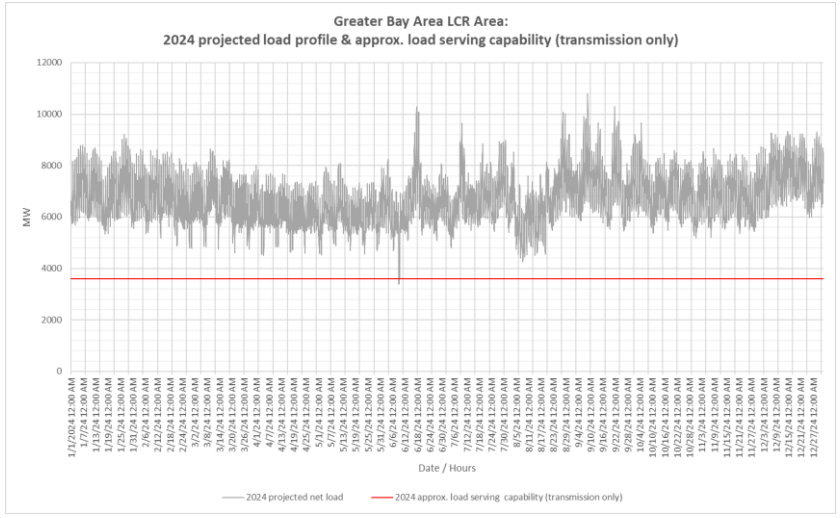
Load (MW)	**2024**	**2028**	**Generation (MW)**	**Aug NQC**
Gross Load	10,767	11,382	Market/Net Seller	6,032
AAEE	-73	-121	Wind	248
Behind the meter DG	-115	-1	Battery	982
Net Load	**10,579**	**11,260**	Muni/QF	617
Transmission Losses	282	277	Solar	4
Pumps	220	220	Existing 20-minute Demand Response	65
Load + Losses + Pumps	**11,081**	**11,757**	**Total**	**7,948**

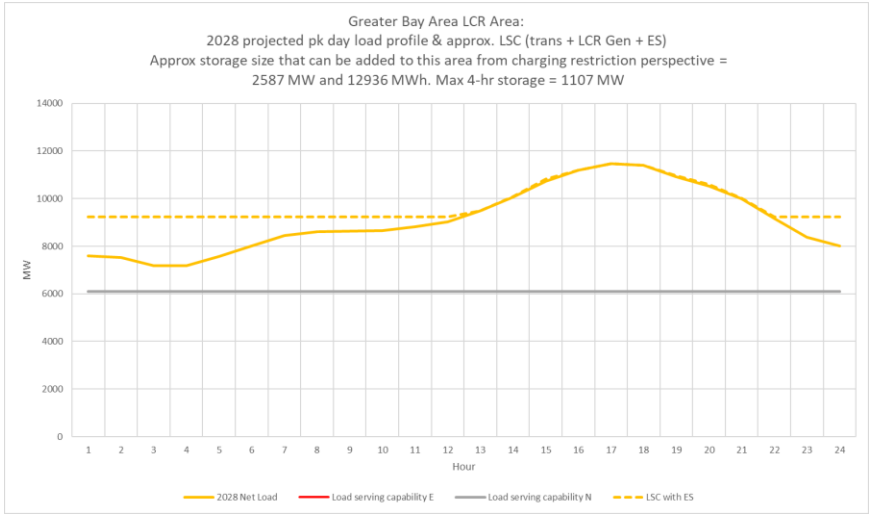
Greater Bay Area Overall: Requirements

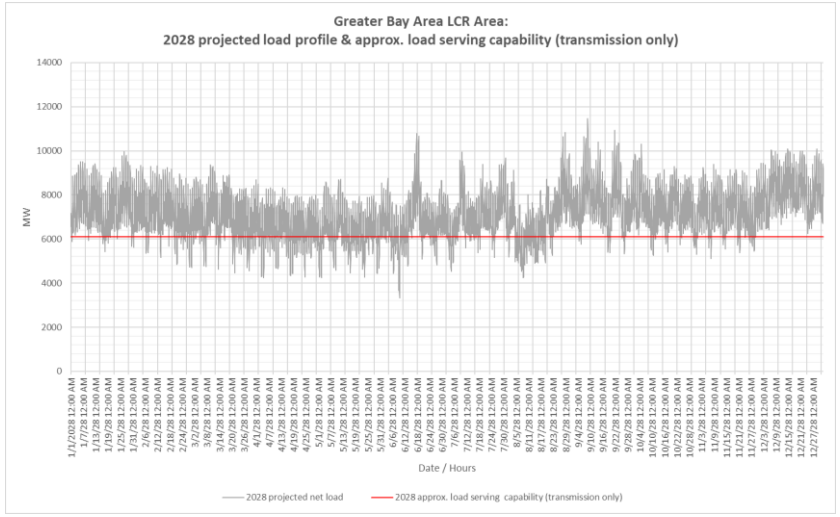
Year	Category	Limiting Facility	Contingency	LCR (MW) (deficiency)
2024	P6	Metcalf 500/230 kV #13 transformer	Metcalf 500/230 kV #11 & #12 transformers	7,329
2028	P6	Moss Landing-Las Aguilas #1 230 kV line	Tesla-Metcalf & Moss Landing-Los Banos 500 kV lines	6,261

Greater Bay Area Sub-area: Load Profiles









Greater Bay Area Total Generation & LCR Need

Generation	Market/Net Seller (MW)	Wind (MW)	Muni/QF (MW)	Solar (MW)	Existing 20-minute Demand Response (MW)	Battery (MW)	Total MW
Aug NQC	6,032	248	617	4	65	982	7,948

Year	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Need
2024	7,329	324	7,653
2028	6,261	0	6,261

The overall LCR requirement has increased in 2024 mostly due to load growth.
The overall LCR requirement has decreased in 2028 mostly due to approved projects.

Changes Compared to Previous Year's LCR Requirements

Sub-area	2023		2024		2027		2028	
	Load	LCR	Load	LCR	Load	LCR	Load	LCR
Llagas	247	150	264	158	259	86	286	131
San Jose	2,783	1,058 (179)	2,845	1,170 (324)	3,121	1,103 (224)	3,141	0
South Bay – Moss Landing	4,427	2,487	4,447	2,124	4,830	2,543	4,848	2,385
Oakland	192	35	175	31	194	39	184	40
Pittsburg – Ames – Oakland	NA*	1,898	NA*	2,086	NA*	2,187	NA*	1,787
Contra Costa	NA*	1,177	NA*	960	NA*	1,373	NA*	893
Overall	11,136	7,312	11,081	7,329	11,733	7,540 (170)	11,757	6,261

Note:
** Flow-through area. No defined load pocket.*