2022 & 2026 Draft LCR Study Results Greater Bay Area

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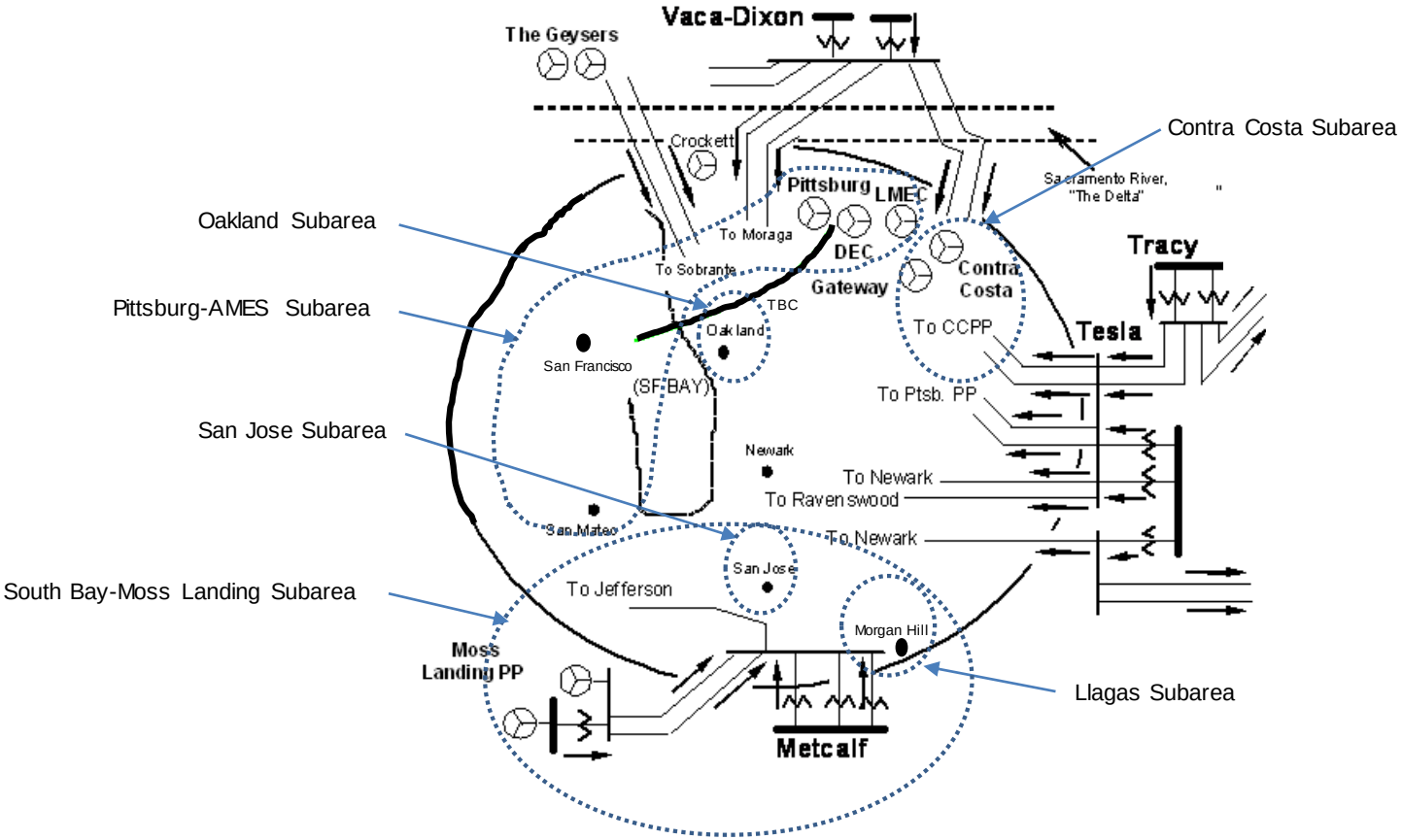
Stakeholder Call

March 11, 2021

Greater Bay Area Transmission System & LCR Subareas



New major transmission projects

Project Name	Expected ISD
East Shore-Oakland J 115 kV Reconductoring Project	May-22
Cooley Landing-Palo Alto and Ravenswood-Cooley Landing 115 kV Line Rerate	Feb-22
Oakland Clean Energy Initiative Project	Aug-22
Morgan Hill Area Reinforcement (revised scope)	Jul-26
East Shore 230 kV Bus Terminals Reconfiguration	May-26

Power plant changes

Additions:

- OCEI Energy Storage modeled in 2026
- Resolution E-4949 energy storage modeled in 2022 & 2026
- New Energy Storage Project at Pittsburg substation

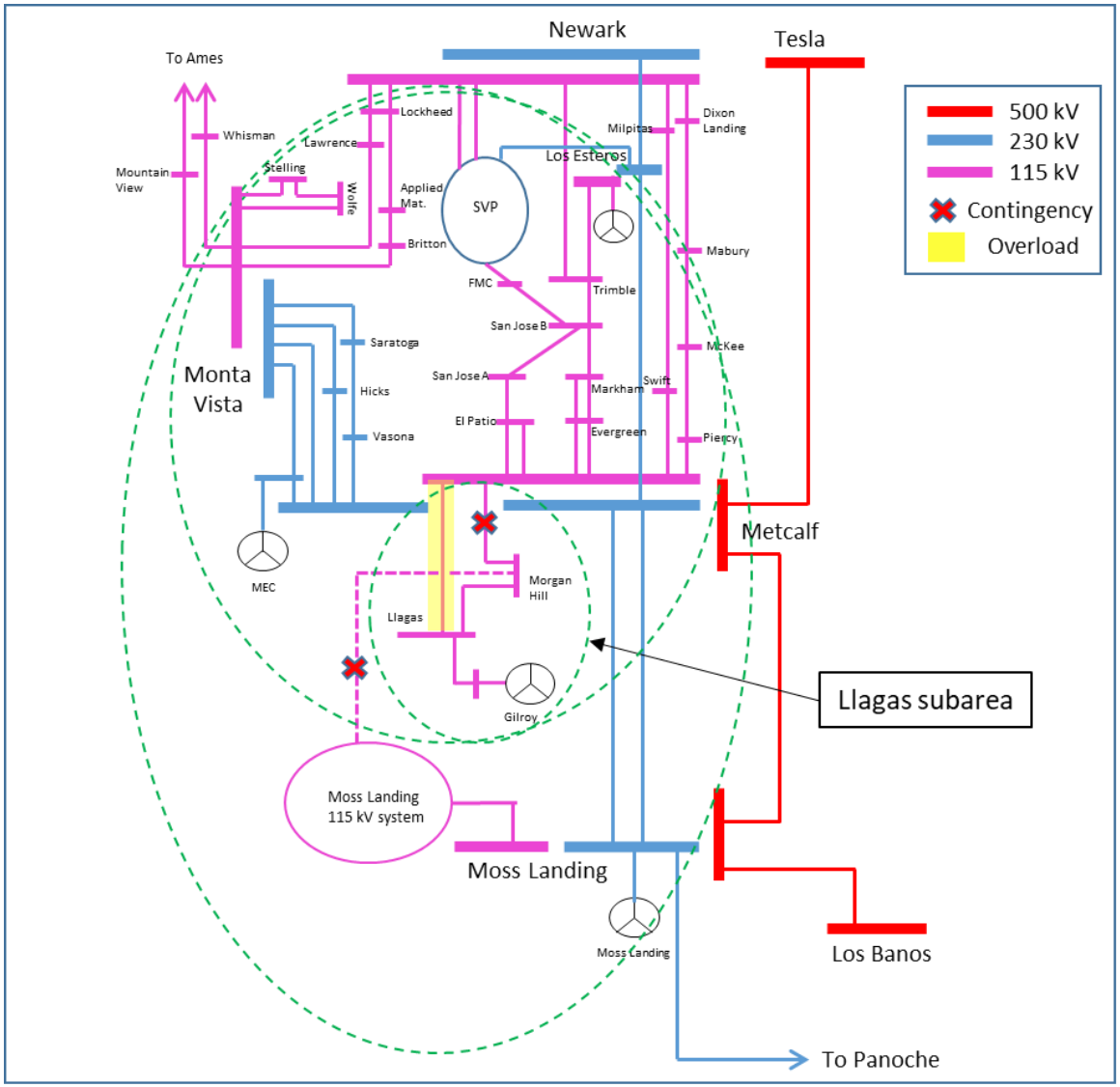
Retirements:

- All Oakland CTs considered offline in 2026

Llagas Sub-area: Load and Resources

Load (MW)	2022	2026	Generation (MW)	2022	2026
Gross Load	200	208	Market	246	246
AAEE	-2	-2	Wind	0	0
Behind the meter DG	-11	-11	Muni	0	0
Net Load	187	195	QF	0	0
Transmission Losses	1	1	Future preferred resource and energy storage	0	0
Pumps	0	0	**Total Qualifying Capacity**	**246**	**246**
Load + Losses + Pumps	188	196			

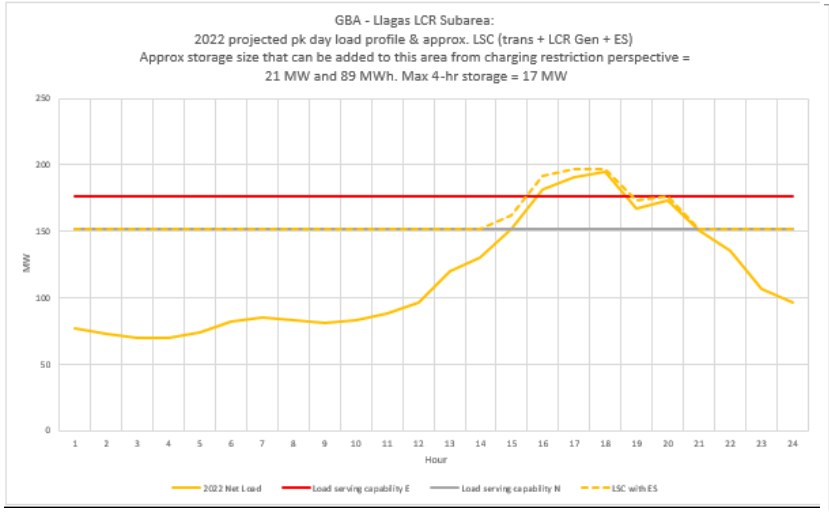
Llagas Sub-area: One-line diagram

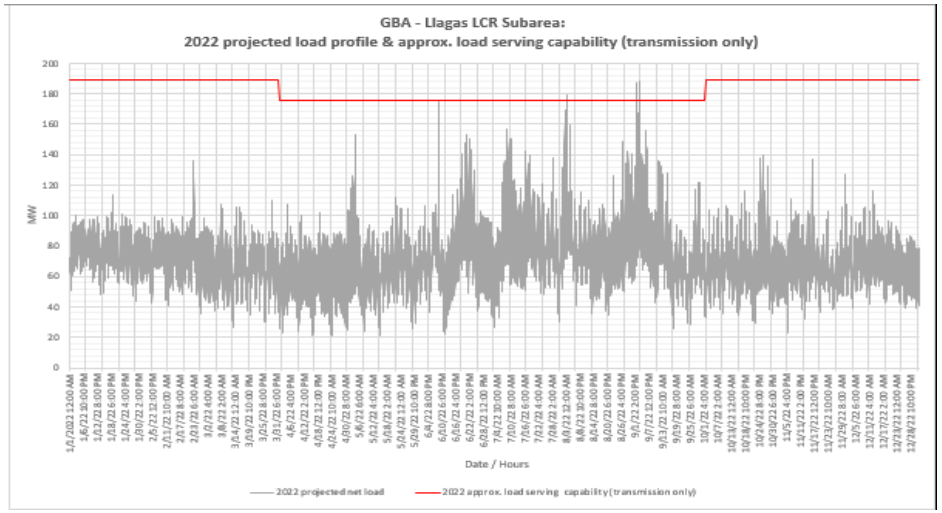


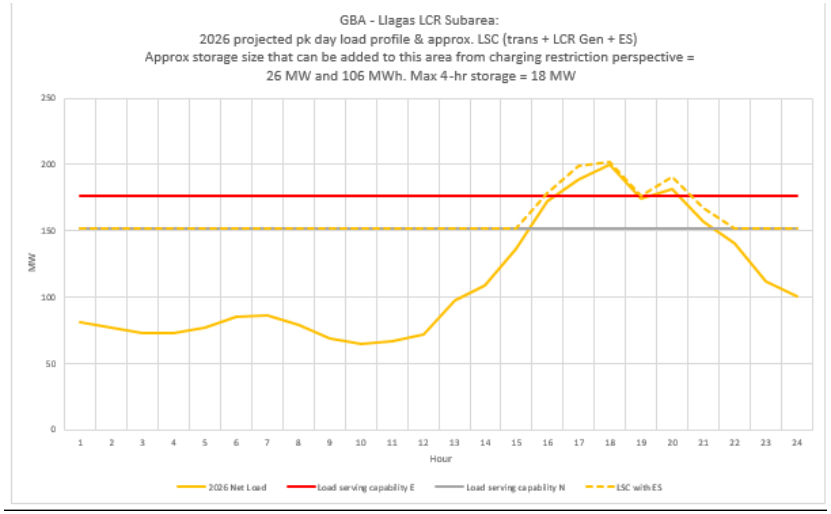
Llagas Sub-area: Requirements

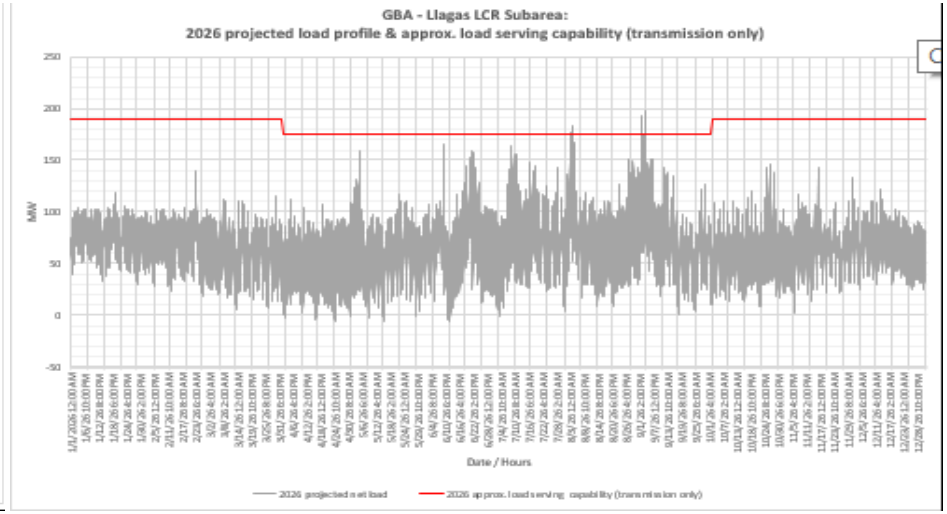
Year	Category	Limiting Facility	Contingency	LCR (MW)
2022	P6	Metcalf-Llagas 115 kV line	Metcalf-Morgan Hill & Morgan Hill-Green Valley115kV	20
2026	P6	Metcalf-Llagas 115 kV line	Metcalf-Morgan Hill & Morgan Hill-Green Valley115kV	25

Llagas Sub-area: Load Profiles





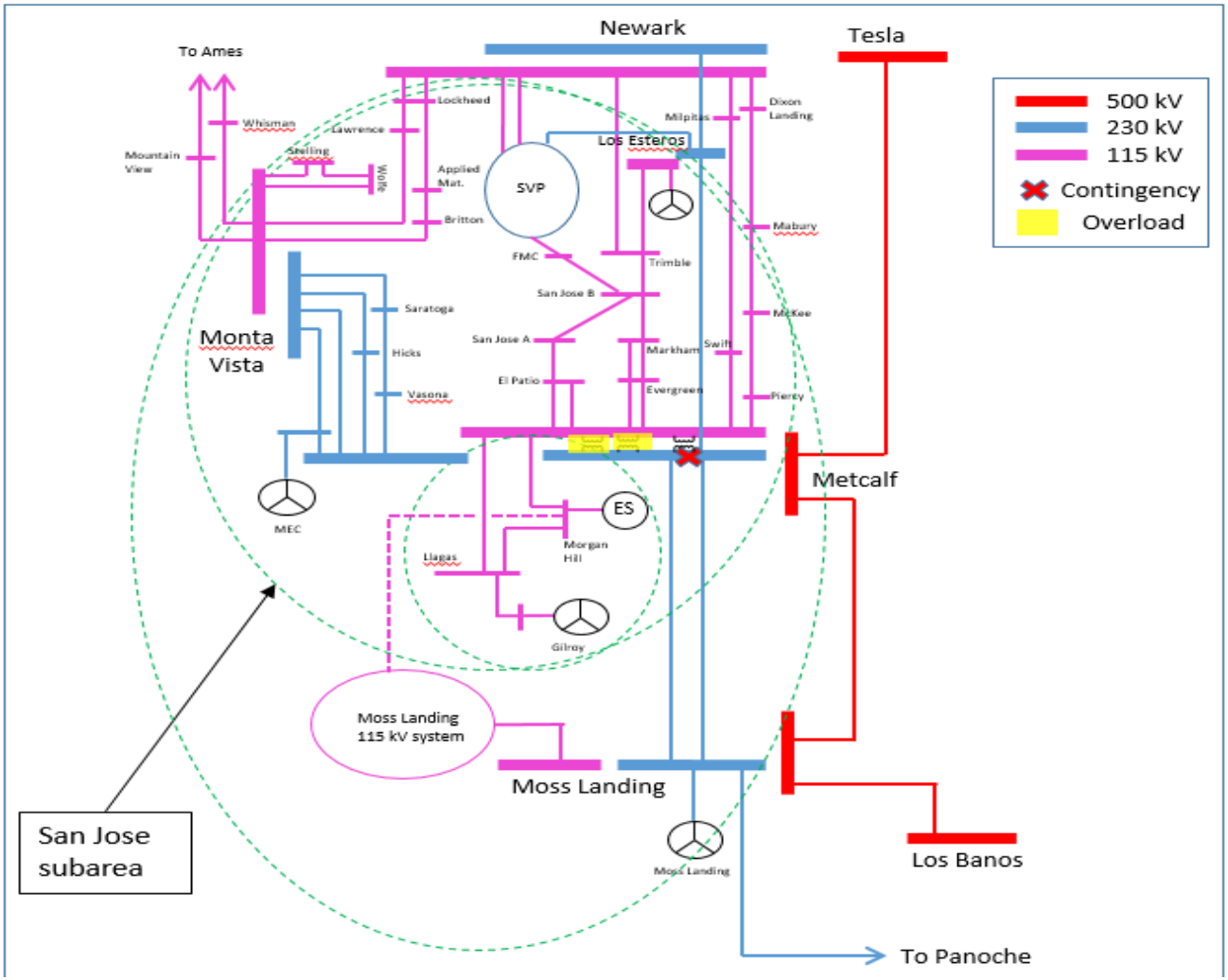




San Jose Sub-area: Load and Resources

Load (MW)	2022	2026	Generation (MW)	2022	2026
Gross Load	2664	3065	Market	575	575
AAEE	-20.9	-40	Wind	0	0
Behind the meter DG	-55.8	-57	Muni	198	198
Net Load	2588	2968	QF	0	0
Transmission Losses	94.4	114	Future preferred resource and energy storage	75	75
Pumps	0	0	**Total Qualifying Capacity**	**848**	**848**
Load + Losses + Pumps	2683	3082			

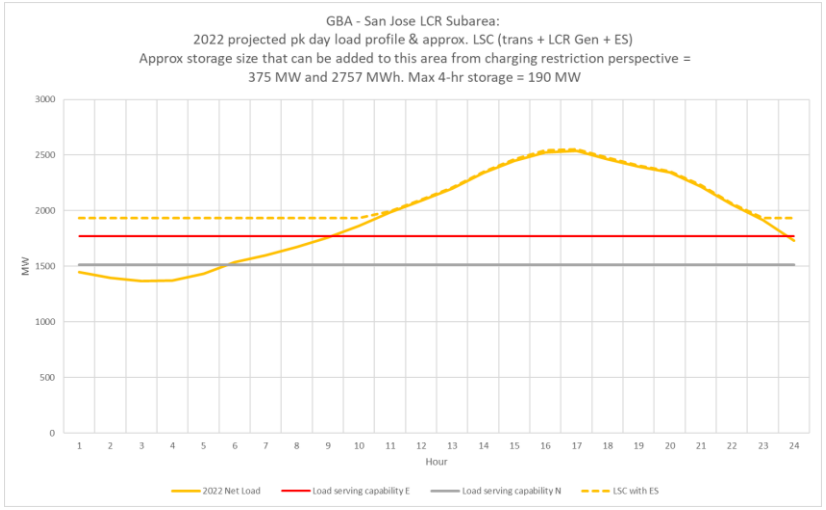
San Jose Sub-area: One-line diagram

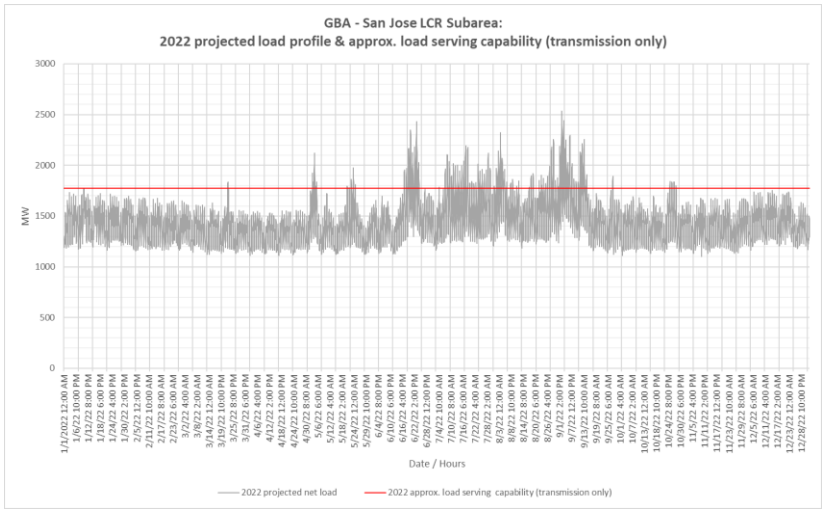


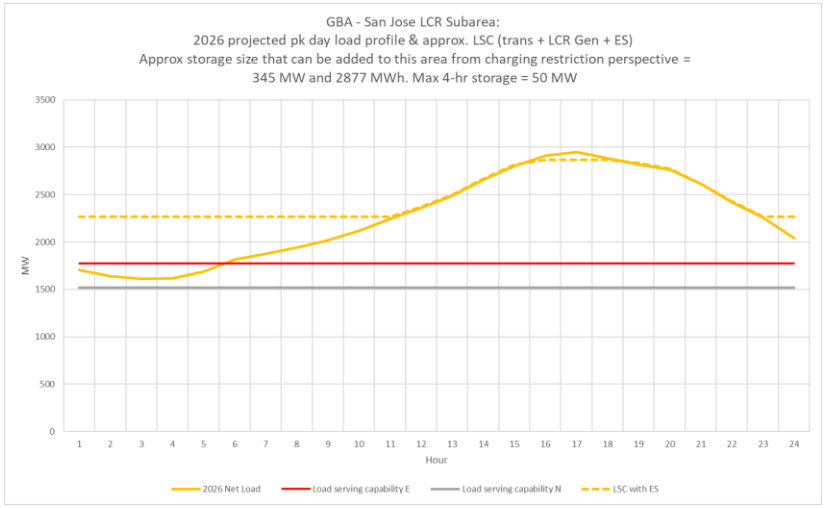
San Jose Sub-area: Requirements

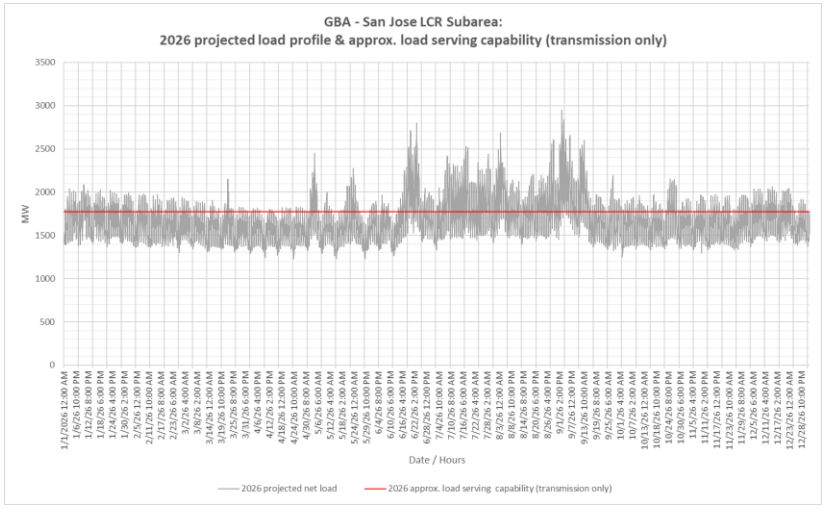
Year	Category	Limiting Facility	Contingency	LCR (MW) (deficiency)
2022	P2-4	Metcalf 230/115 kV transformer # 1 or # 3	METCALF 230kV - Section 2D & 2E	989 (141)
2026	P2-4	Metcalf 230/115 kV transformer # 1 or # 3	METCALF 230kV - Section 2D & 2E	1096 (248)

San Jose Sub-area: Load Profiles





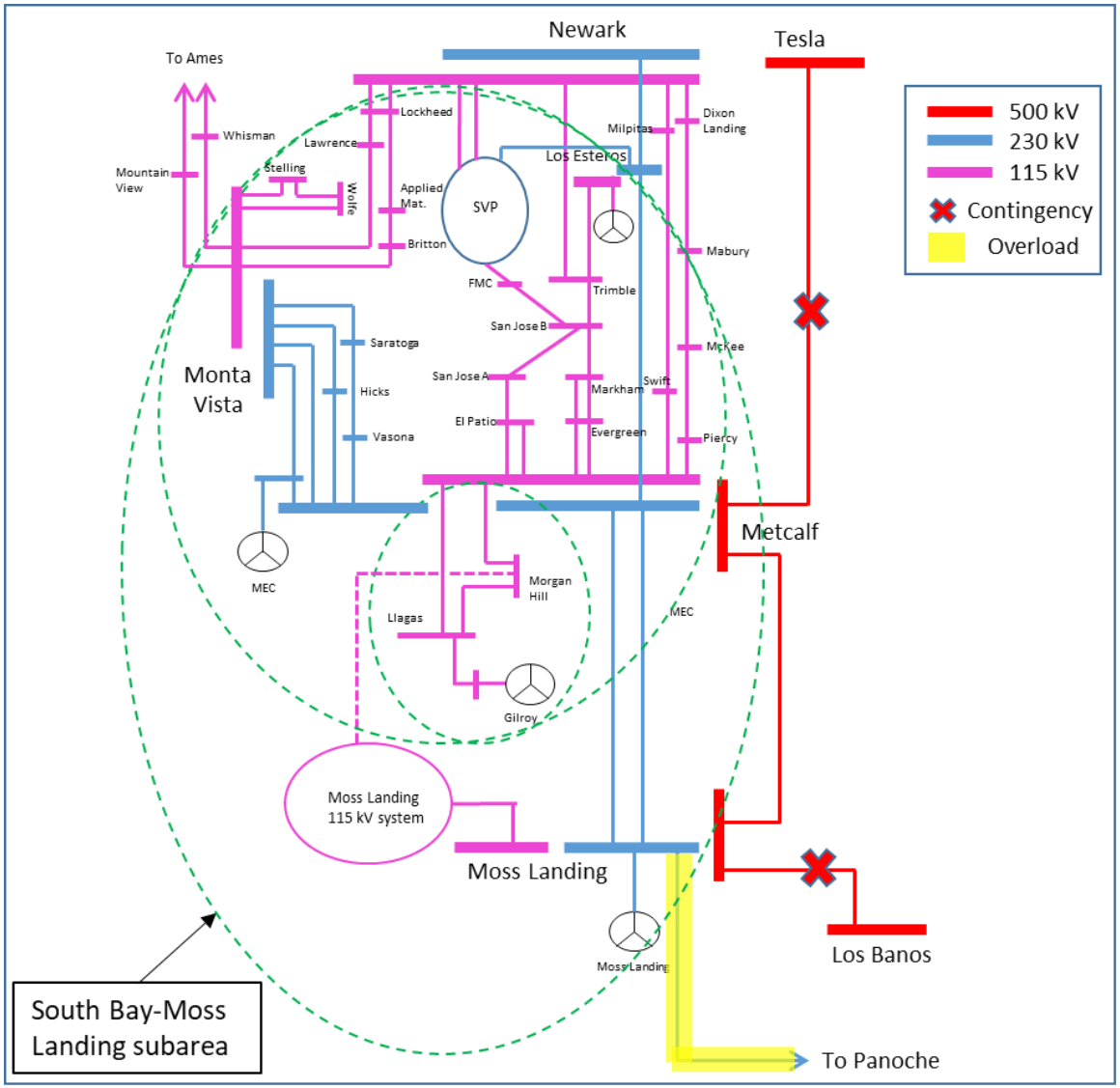




South Bay-Moss Landing Sub-area: Load and Resources

Load (MW)	2022	2026	Generation (MW)	2022	2026
Gross Load	4338	4834	Market	2165	2165
AAEE	-32	-61	Wind	0	0
Behind the meter DG	-112	-107	Muni	198	198
Net Load	**4194**	**4,666**	QF	0	0
Transmission Losses	127	143	Future preferred resource and energy storage	558	558
Pumps	0	0	**Total Qualifying Capacity**	**2,921**	**2,921**
Load + Losses + Pumps	**4321**	**4809**			

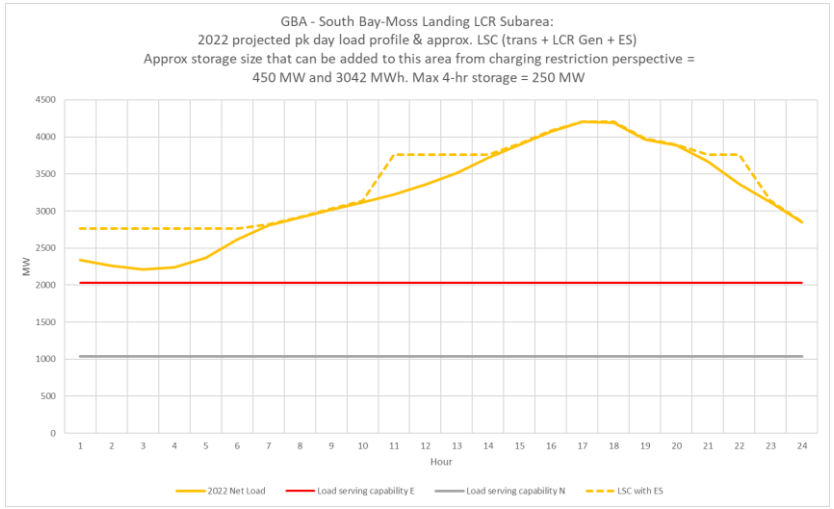
South Bay-Moss Landing Sub-area: One-line diagram

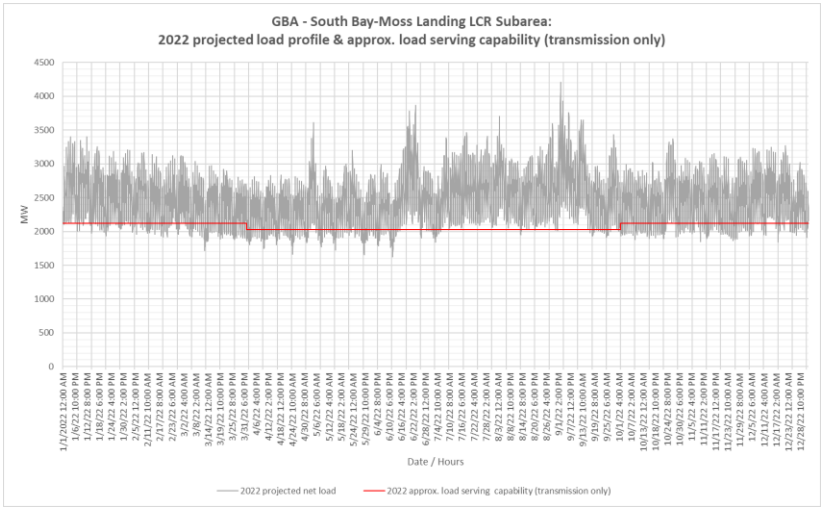


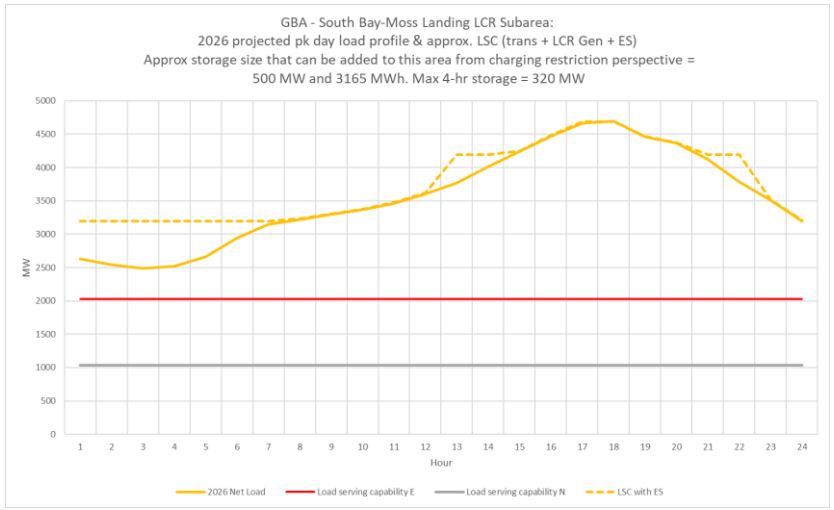
South Bay-Moss Landing Sub-area: Requirements

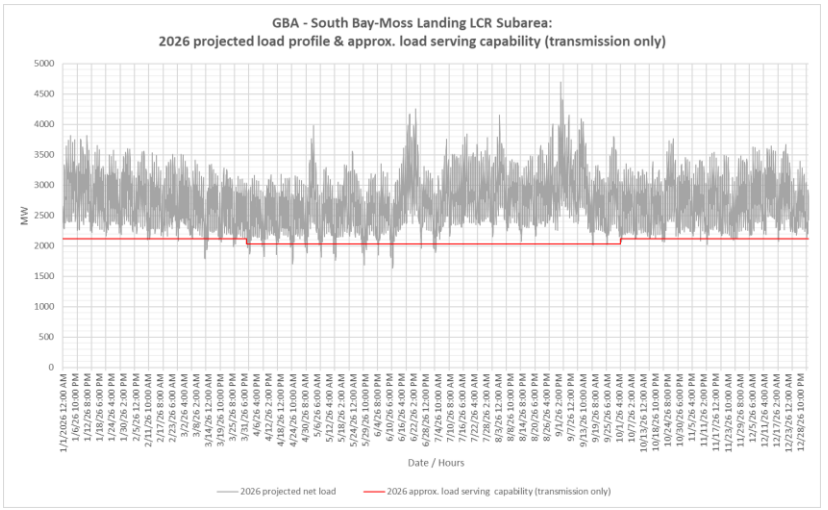
Year	Category	Limiting Facility	Contingency	LCR (MW)
2022	P6	Moss Landing-Las Aguilas 230 kV	Tesla-Metcalf 500 kV and Moss Landing-Los Banos 500 kV	2293
2026	P6	Moss Landing-Las Aguilas 230 kV	Tesla-Metcalf 500 kV and Moss Landing-Los Banos 500 kV	2535

South Bay-Moss Landing Sub-area: Load Profiles









Oakland Sub-area: Load and Resources

Load (MW)	2022	2026	Generation (MW)	2022	2026
Gross Load	184	181	Market	110	0
AAEE	-1	-2	Wind	0	0
Behind the meter DG	-2	-1	Muni	48	48
Net Load	**181**	**178**	QF	0	0
Transmission Losses	0	0	Future preferred resource and energy storage	0	36
Pumps	0	0	**Total Qualifying Capacity**	**158**	**84**
Load + Losses + Pumps	**181**	**178**			

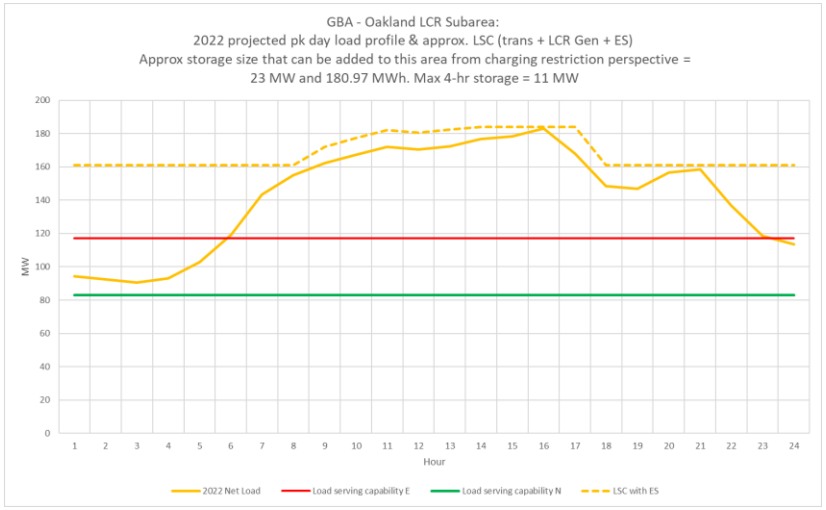
Oakland Sub-area: Requirements

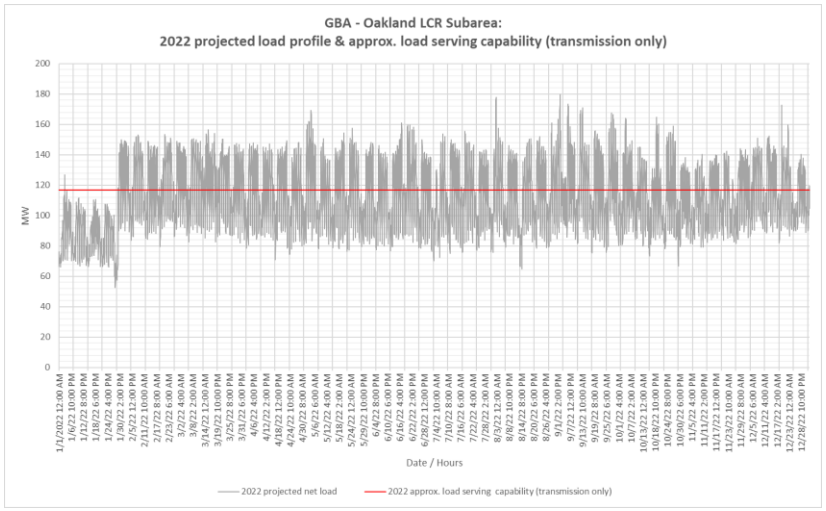
Year	Category	Limiting Facility	Contingency	LCR (MW)
2022	P2-4	Moraga-Oakland X# 3	Moraga 115kV - Section 1D & 2D	101
2026	P6	Moraga-Claremont #2 115 kV	Oakland C-X #2 & #3 115 kV cables	31*

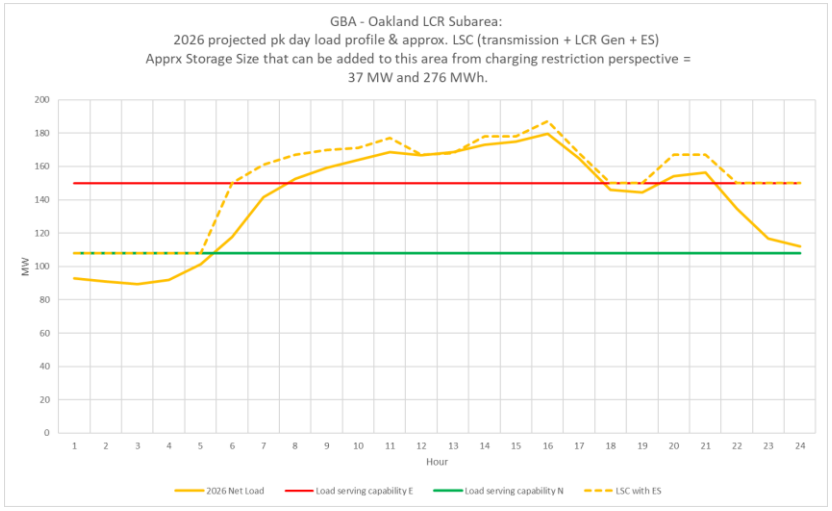
Note:
*This requirement doesn't reflect potential load transfer that could occur following the first contingency. An approved operating procedure including this load transfer could reduce this requirement.

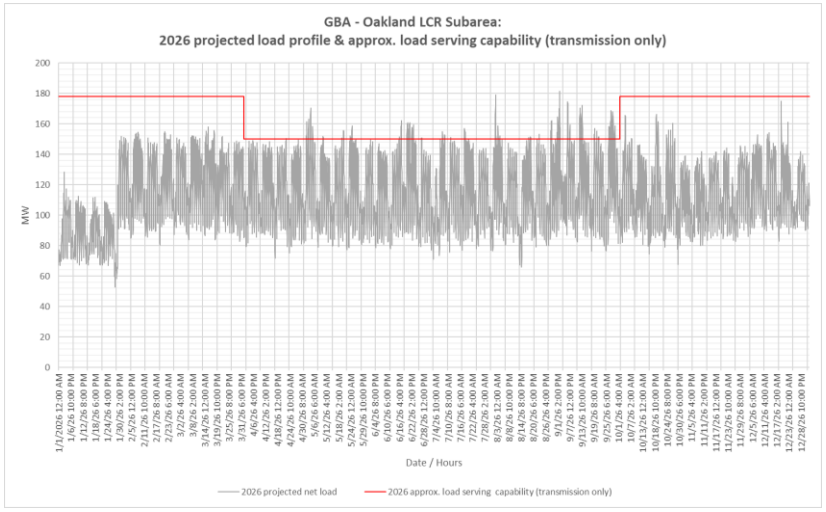
OCEI is not modeled in 2022 LCR cases

Oakland Sub-area: Load Profiles





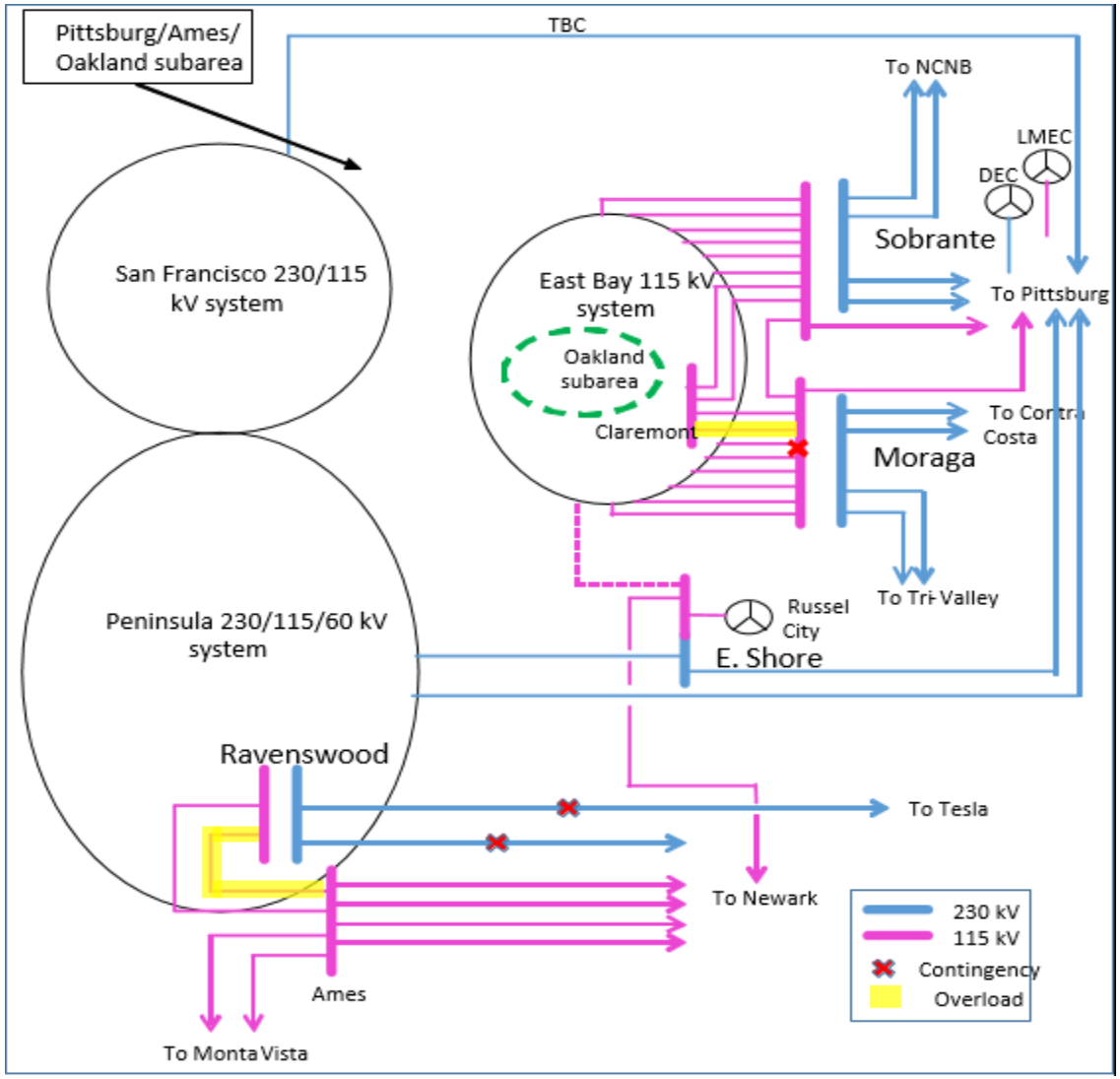




Pittsburg-Ames-Oakland Sub-area: Load and Resources

Load (MW)	2022	2026	Generation (MW)	2022	2026
Gross Load	**NA – Flow through area.**		Market/ Net Seller / Battery	2374	2264
AAEE			Solar	5	5
Behind the meter DG			Wind	0	0
Net Load			Muni	47	48
Transmission Losses			QF	224	224
Pumps			Future preferred resource and energy storage	0	36
Load + Losses + Pumps			**Total Qualifying Capacity**	**2,650**	**2,577**

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



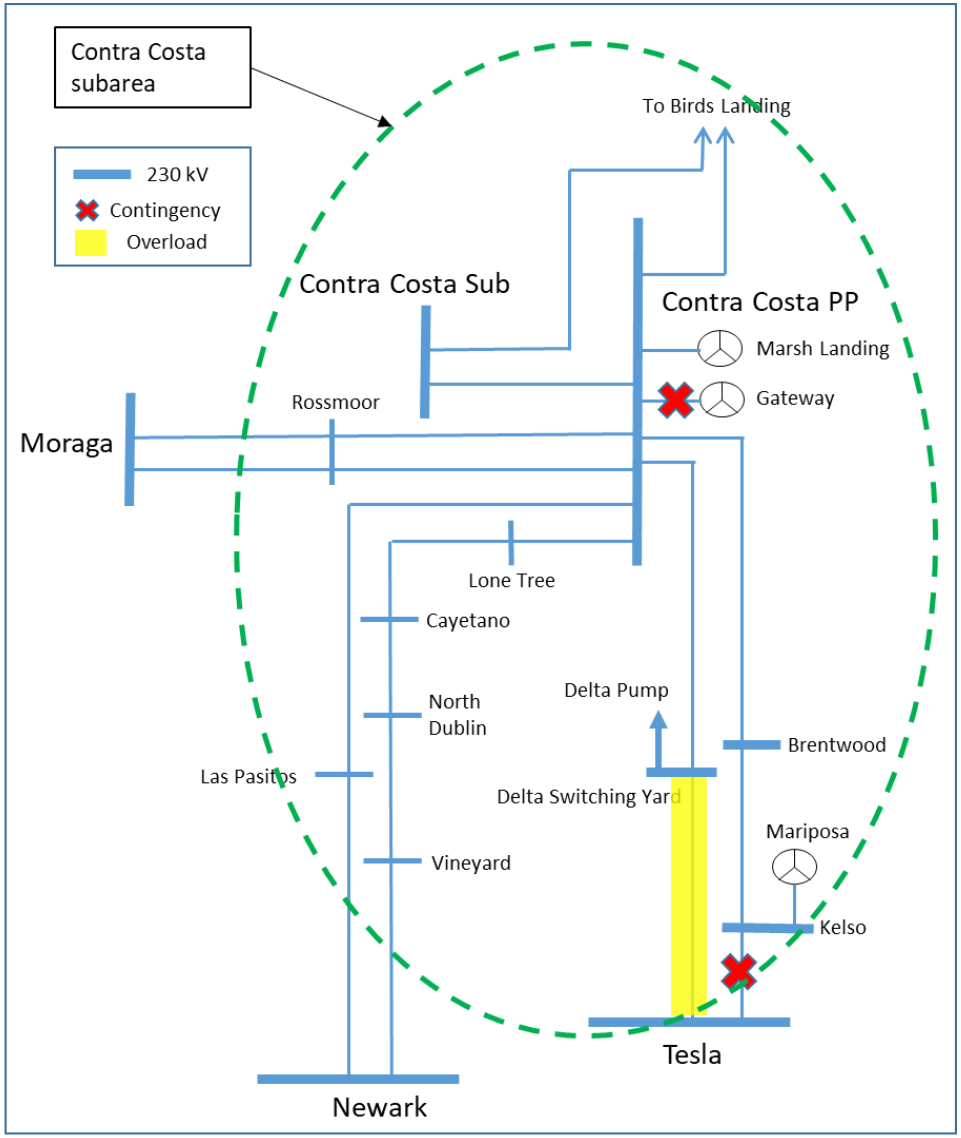
Ames/Pittsburg/Oakland Sub-area: Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2022	P7	Ames-Ravenswood #1 115 kV line	Newark-Ravenswood & Tesla-Ravenswood 230 kV lines	1791
	P2-4	Moraga-Claremont #2 115 kV line	Moraga 115kV - Section 2D & 2E	
2026	P7	Ames-Ravenswood #1 115 kV line	Newark-Ravenswood & Tesla-Ravenswood 230 kV lines	1763
	P2-4	Oakland C-L	Moraga 115KV - Section 1C & 2C	

Contra Costa Sub-area: Load and Resources

Load (MW)	2022	2026	Generation (MW)	2022	2026
Gross Load	**NA – Flow through area.**		Market	1669	1669
AAEE			Wind	244	244
Behind the meter DG			Muni	127	127
Net Load			QF	0	0
Transmission Losses			Future preferred resource and energy storage	0	0
Pumps					
Load + Losses + Pumps			**Total Qualifying Capacity**	**2,040**	**2,040**

Contra Costa Sub-area: One-line diagram



Contra Costa Sub-area: Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2022	P3	Delta Switching Yard-Tesla 230 kV Line	Kelso-Tesla 230 kV with the Gateway off line	1208
2026	P3	Delta Switching Yard-Tesla 230 kV Line	Kelso-Tesla 230 kV with the Gateway off line	1815

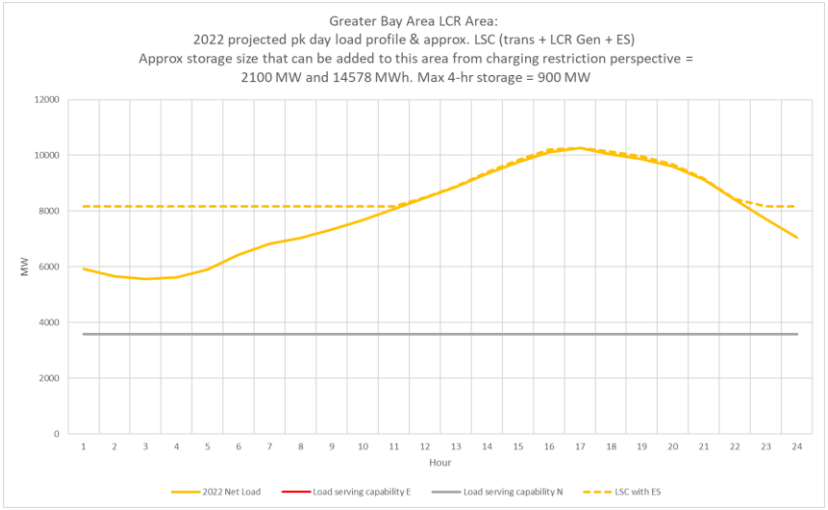
Greater Bay Area Overall: Load and Resources

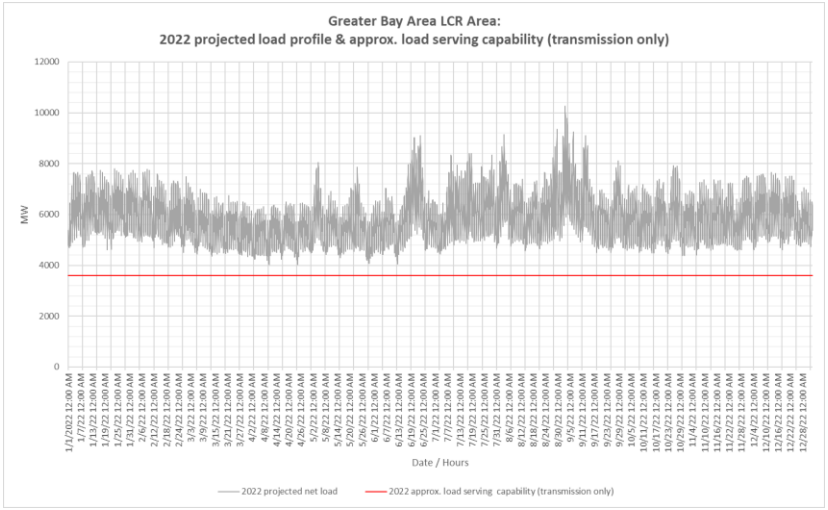
Load (MW)	2022	2026	Generation (MW)	2022	2026
Gross Load	10,611	11364	Market/ Net Seller/ Battery	6,225	6,115
AAEE	-75	-133	Solar	8	8
Behind the meter DG	-271	-269	Wind	244	244
Net Load	**10,264**	**10,960**	Muni	377	377
Transmission Losses	217	327	QF	227	227
Pumps	264	264	Future preferred resource and energy storage	558	593
Load + Losses + Pumps	**10,746**	**11,551**	**Total Qualifying Capacity**	**7,639**	**7,564**

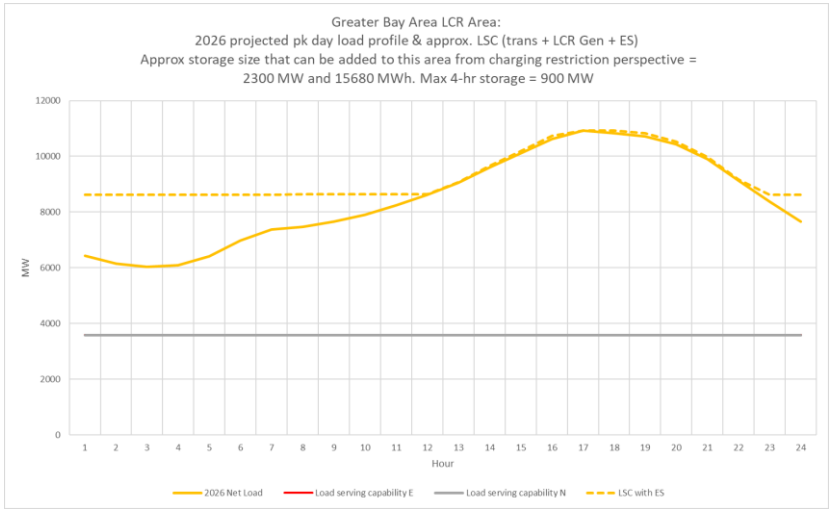
Greater Bay Area Overall: Requirements

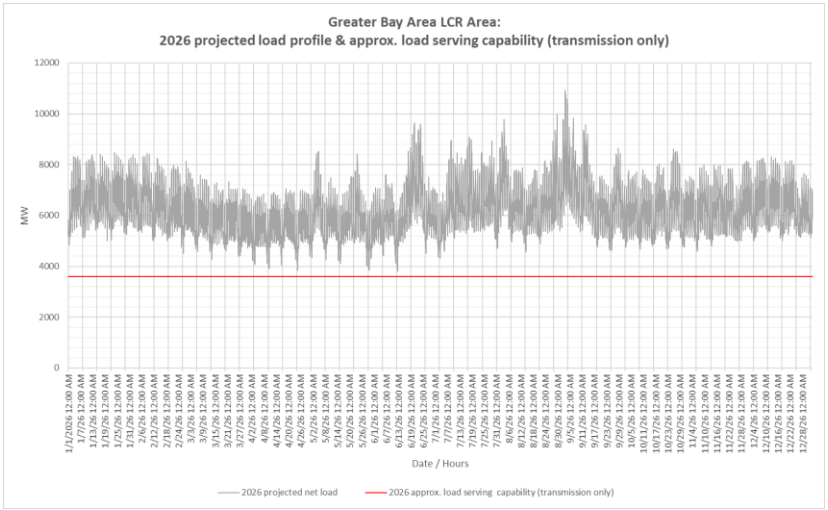
Year	Category	Limiting Facility	Contingency	LCR (MW)
2022	P6	Metcalf 500/230 kV #13 transformer	Metcalf 500/230 kV #11 & #12 transformers	7423
2026	P6	Metcalf 500/230 kV #13 transformer	Metcalf 500/230 kV #11 & #12 transformers	7979 (415)

Greater Bay Area Sub-area: Load Profiles









Greater Bay Area Total Generation & LCR Need

Generation	Market (MW)	Wind (MW)	Muni (MW)	QF (MW)	Future preferred resource and energy storage (MW)	Total MW
2022	6333	244	377	227	558	7639
2026	6123	244	377	227	593	7564

Year	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Need
2022	7423	141	7564
2026	7564	415	7979

The overall LCR requirement has increased mostly due to load growth seen in the San Jose area (SVP) and it being very effective on the Metcalf 500/230 kV transformer banks. With all San Jose resources previously being used, the increased need had to be picked up by bigger amounts of less effective resources in other parts of the Bay Area.

Changes Compared to Previous Year's LCR Requirements

Sub-area	2021		2022		2025		2026	
	Load	LCR	Load	LCR	Load	LCR	Load	LCR
Llagas	199	31	188	20	201	33	196	25
San Jose	2543	793	2683	989 (141)	2527	862 (14)	3082	1096 (248)
South Bay – Moss Landing	4145	1783	4321	2293	4124	1784	4821	2535
Oakland	218	99	181	101	219	71	178	31
Pittsburg – Ames – Oakland	NA*	1967	NA*	1791	NA*	1761	NA*	1763
Contra Costa	NA*	1119	NA*	1208	NA*	1417	NA*	1815
Overall	10780	6353	10746	7423	10743	6110	11551	7979 (415)

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