2020 & 2024 Final LCR Study Results Greater Bay Area

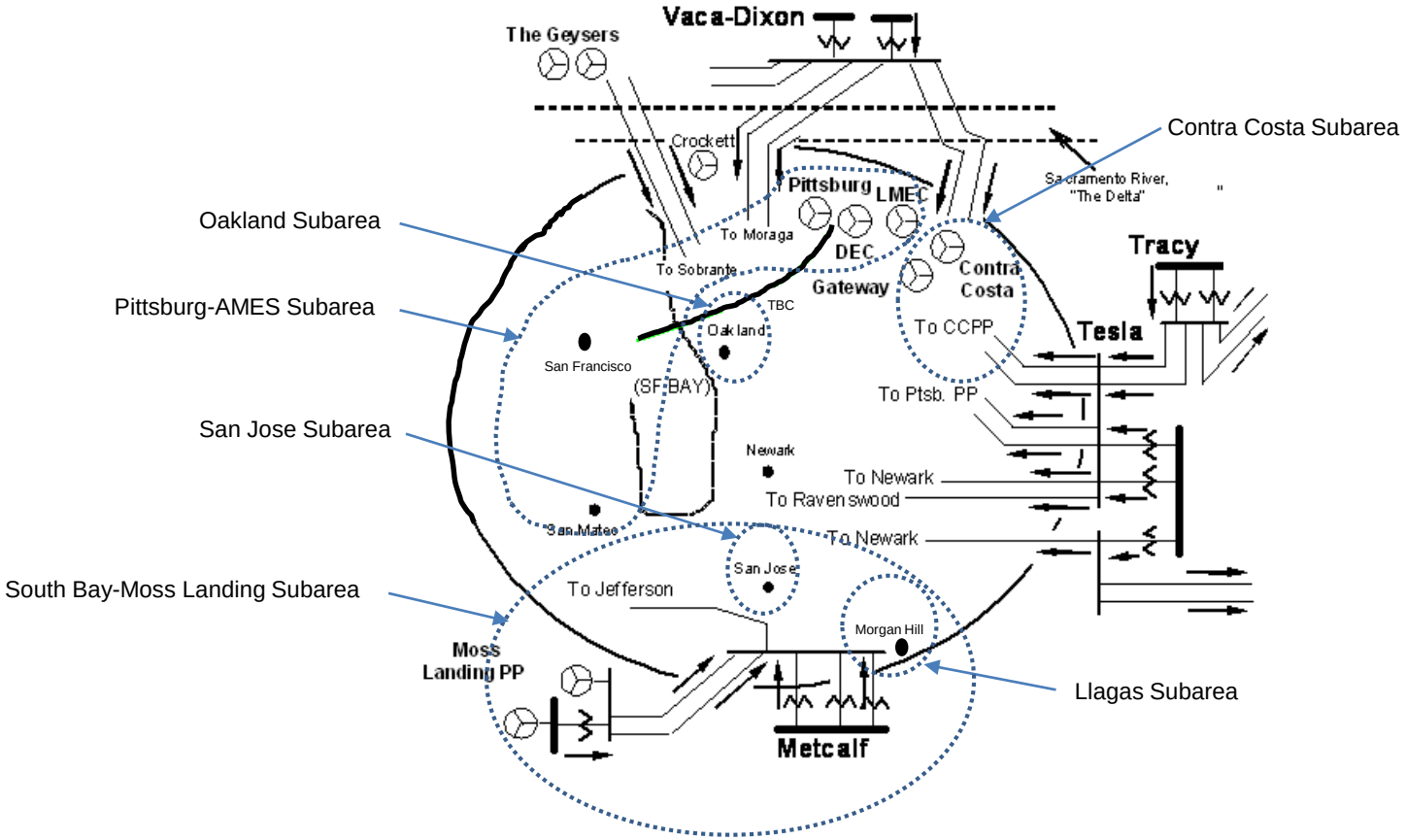
Binaya Shrestha

Regional Transmission Engineer Lead

Stakeholder Call

April 10, 2019

Greater Bay Area Transmission System & LCR Subareas



New major transmission projects

Project Name	Expected ISD
Trimble-San Jose B 115 kV Line Limiting Facility Upgrade	Feb-19
Moss Landing–Panoche 230 kV Path Upgrade	Jan-19
Trimble-San Jose B 115 kV Series Reactor	Feb-19
South of San Mateo Capacity Increase (revised scope)	Feb-19 Mar-26
Metcalf-Evergreen 115 kV Line Reconductoring	May-19
East Shore-Oakland J 115 kV Reconductoring Project	Apr-21
Morgan Hill Area Reinforcement (revised scope)	May-21
Metcalf-Piercy & Swift and Newark-Dixon Landing 115 kV Upgrade	Apr-22
Oakland Clean Energy Initiative Project	Aug-22
Vaca Dixon-Lakeville 230 kV Corridor Series Compensation	Aug-22

Power plant changes

Additions:

- No new resource addition
- Resolution E-4949 modeled in 2024

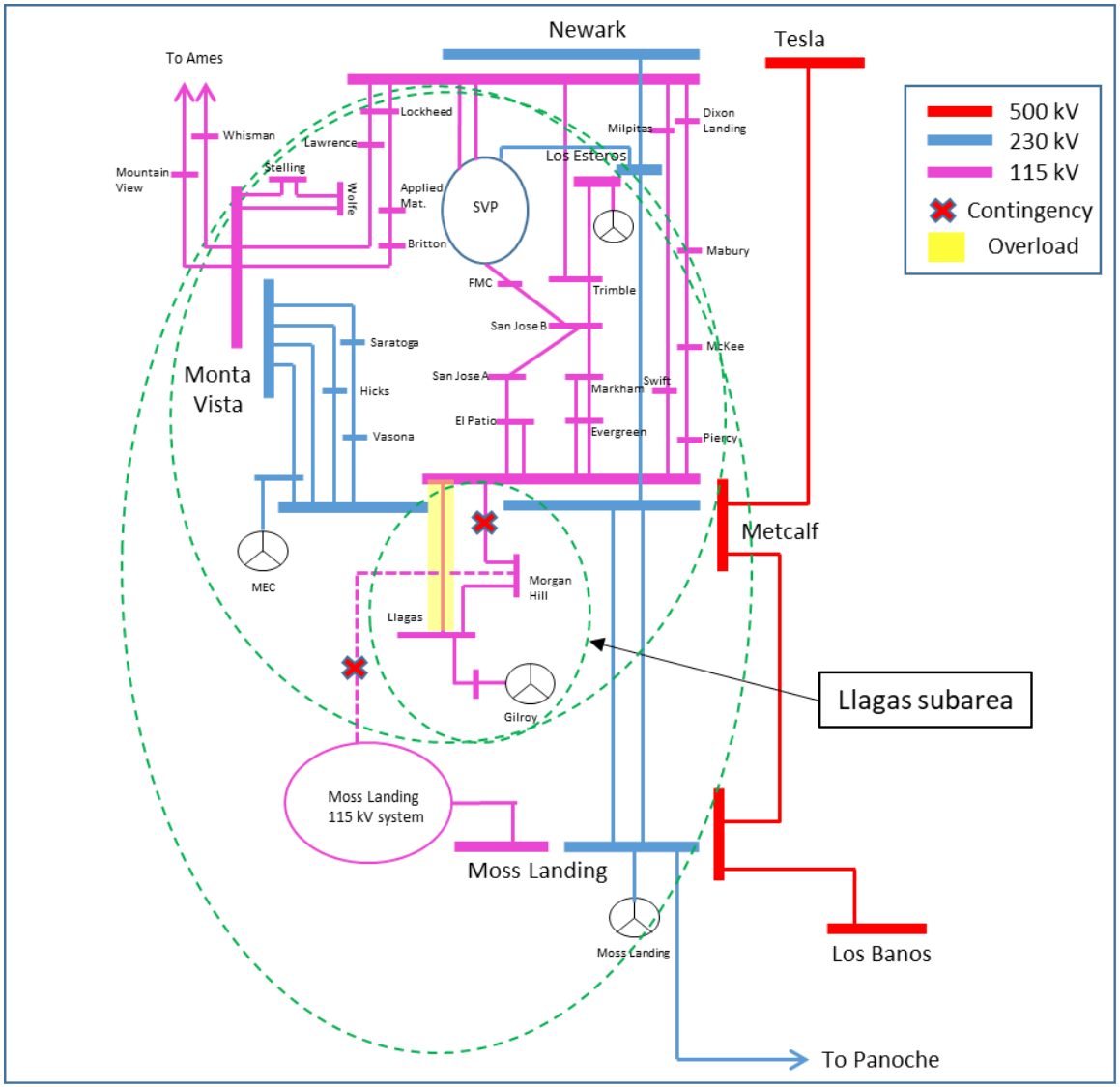
Retirements:

- No new retirements
- Oakland CTs considered offline in 2024

Llagas Subarea: Load and Resources

Load (MW)	2020	2024	Generation (MW)	2020	2024
Gross Load	190	195	Market	246	246
AAEE	-2	-7	Wind	0	0
Behind the meter DG	-8	-11	Muni	0	0
Net Load	**180**	**177**	QF	0	0
Transmission Losses	0	0	Future preferred resource and energy storage	0	75
Pumps	0	0	**Total Qualifying Capacity**	**246**	**321**
Load + Losses + Pumps	**180**	**177**			

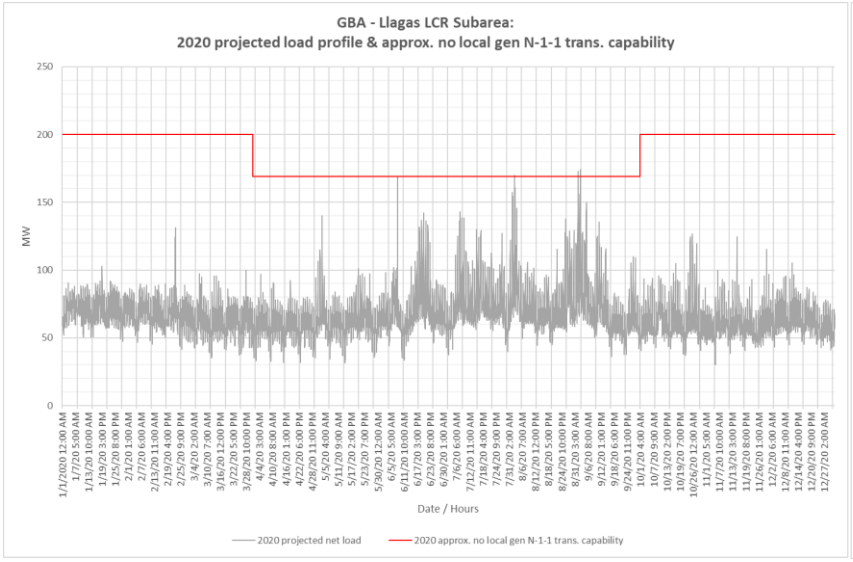
Llagas Subarea: One-line diagram

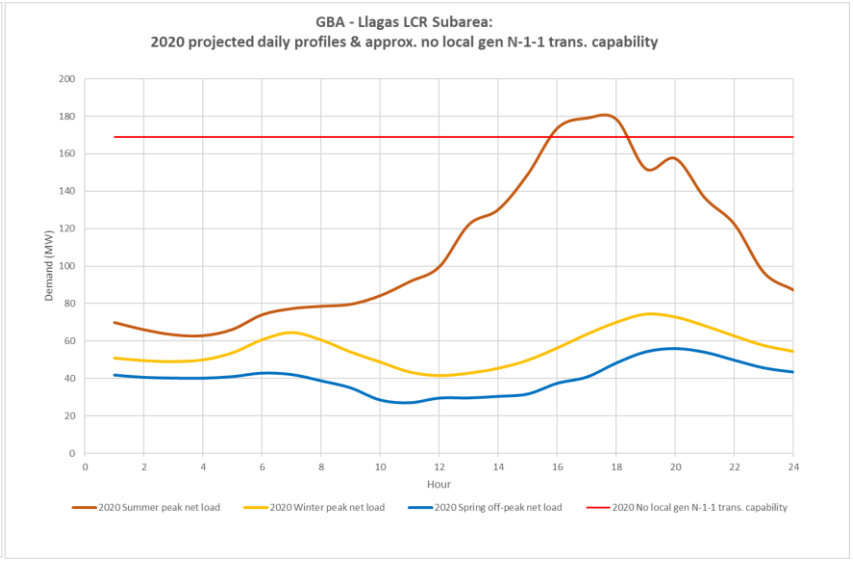


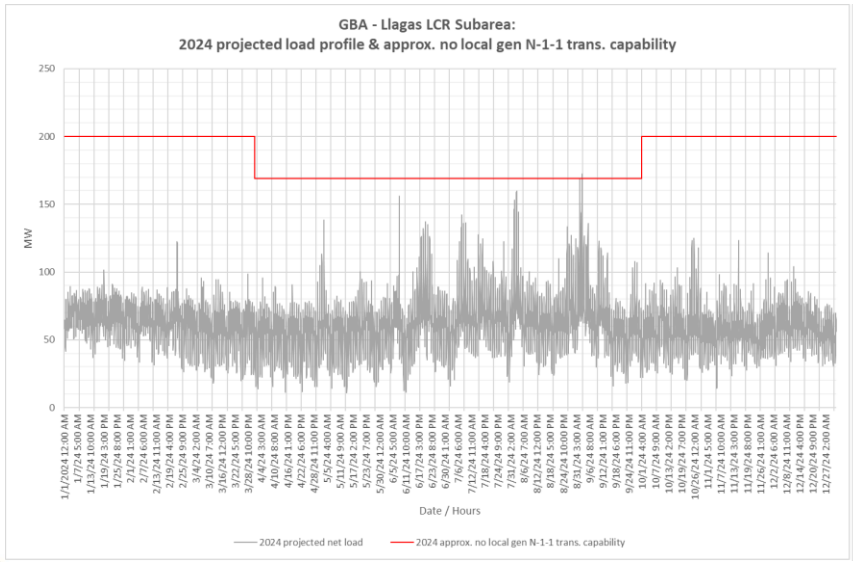
Llagas Subarea: Requirements

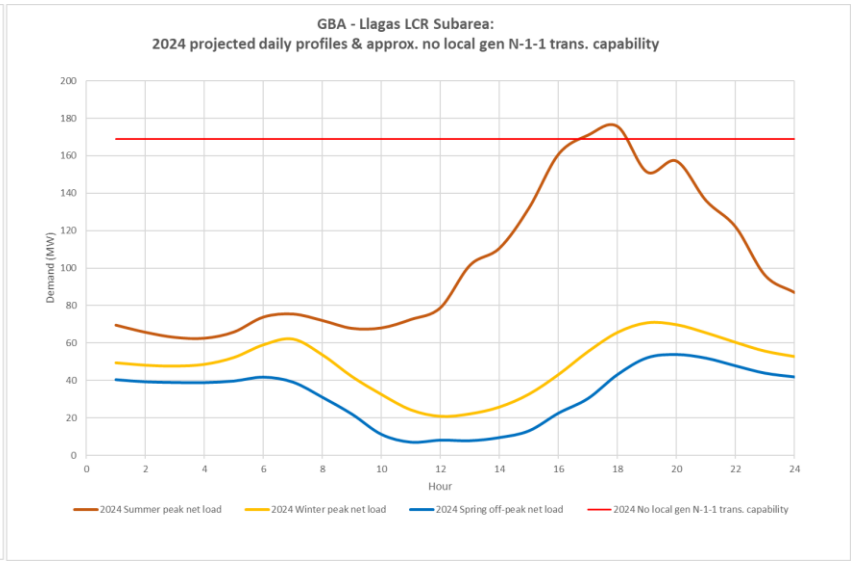
Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2020	B	Metcalf-Llagas 115 kV line	Metcalf D-Morgan Hill 115 kV with one of the Gilroy peakers off line	79
	C	Same as category B		
2024	B	No requirement		
	C	Metcalf-Llagas 115 kV line	Metcalf-Morgan Hill & Morgan Hill-Green Valley115kV	16

Llagas Subarea: Load Profiles





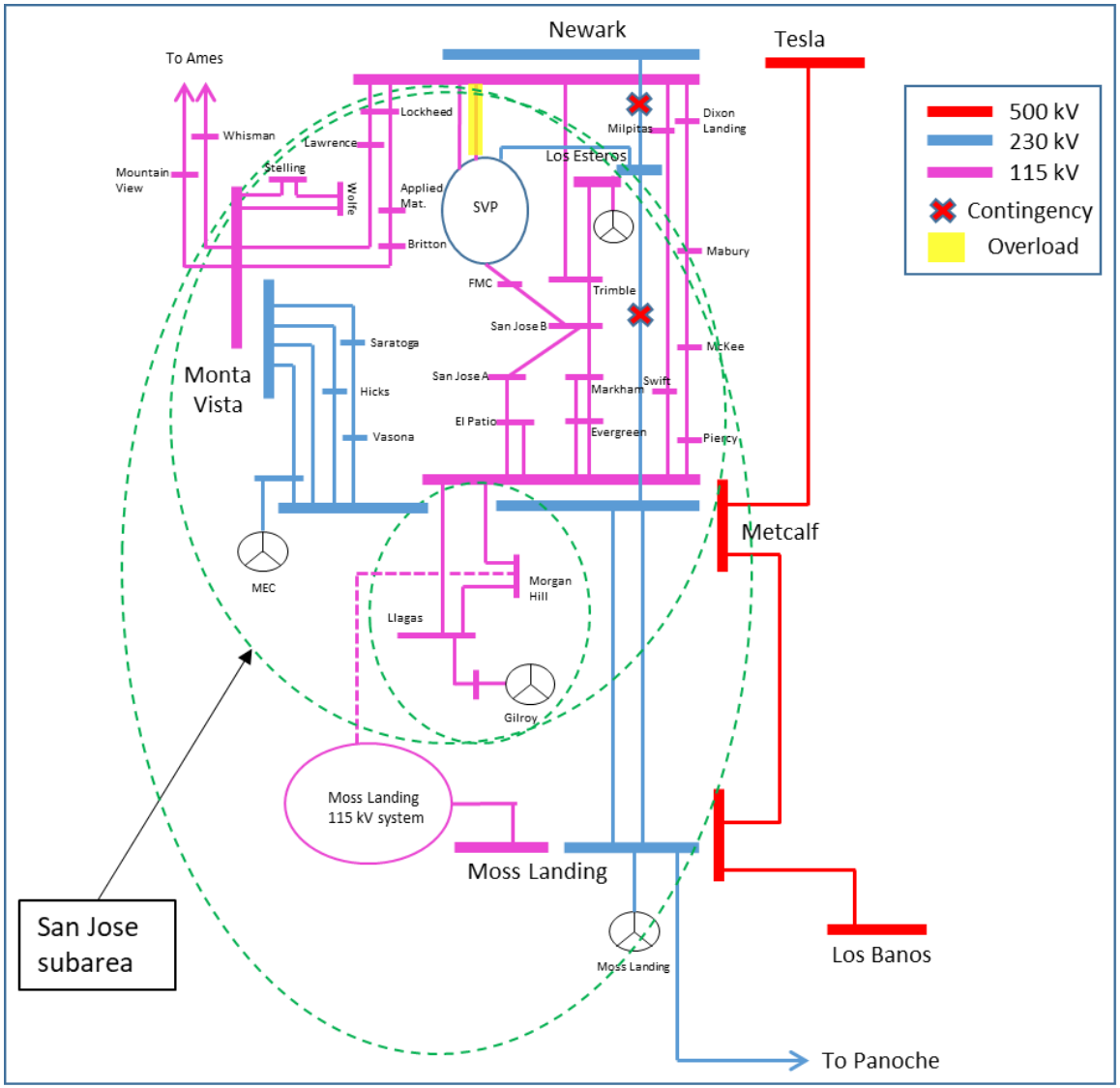




San Jose Subarea: Load and Resources

Load (MW)	2020	2024	Generation (MW)	2020	2024
Gross Load	2465	2639	Market	338	338
AAEE	-34	-111	Wind	0	0
Behind the meter DG	-46	-70	Muni	202	202
Net Load	**2385**	**2458**	QF	0	0
Transmission Losses	67	69	Future preferred resource and energy storage	0	0
Pumps	0	0	**Total Qualifying Capacity**	**540**	**540**
Load + Losses + Pumps	**2452**	**2527**			

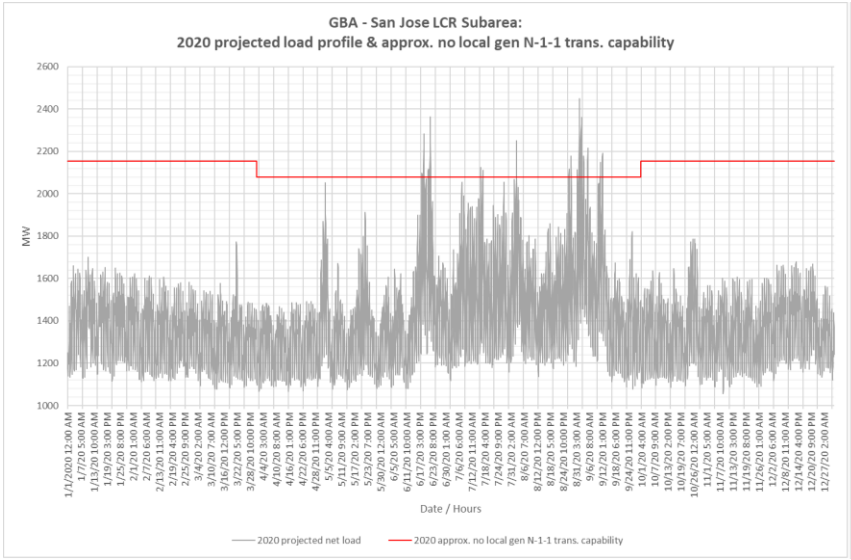
San Jose Subarea: One-line diagram

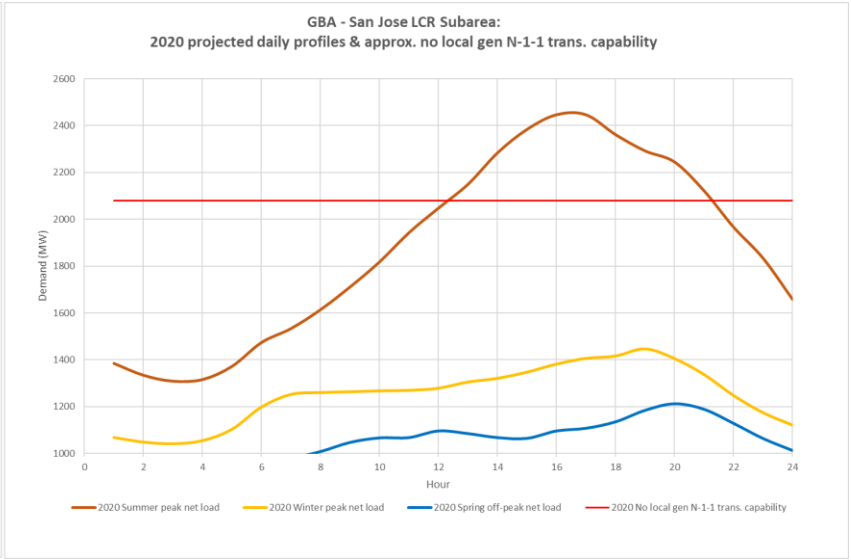


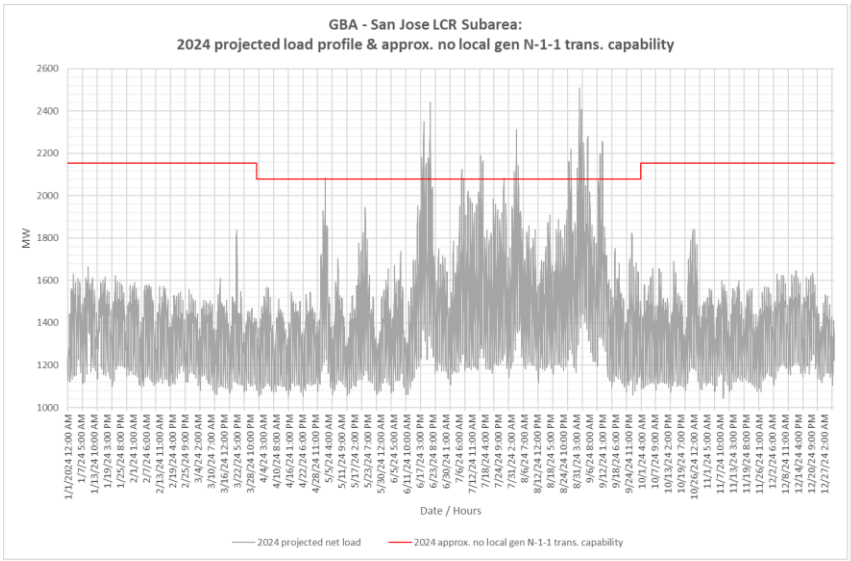
San Jose Subarea: Requirements

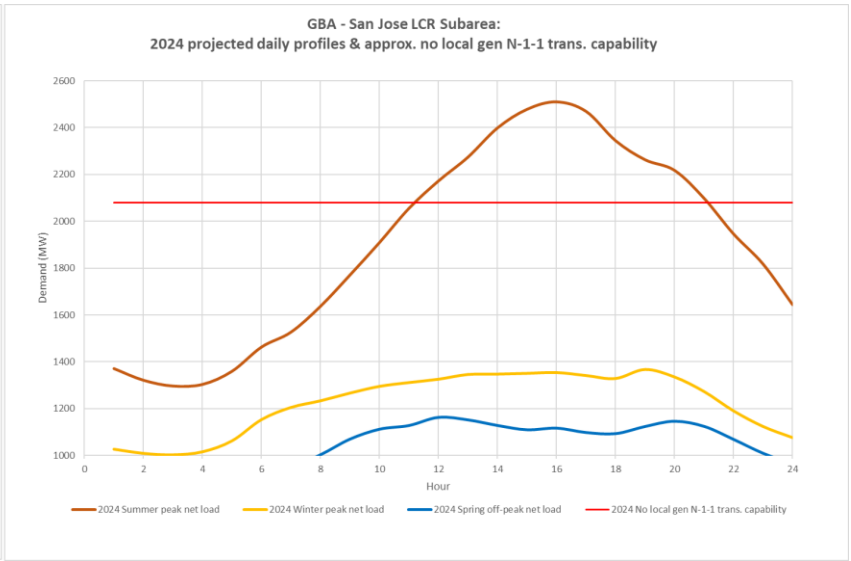
Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2020	B	No requirement		
	C	El Patio-San Jose 'A' 115 kV line	Stone-Evergreen-Metcalf & Metcalf-Evergreen #1 115kV	305
2024	B	No requirement		
	C	El Patio-San Jose 'A' 115 kV line	Stone-Evergreen-Metcalf & Metcalf-Evergreen #1 115kV	462

San Jose Subarea: Load Profiles





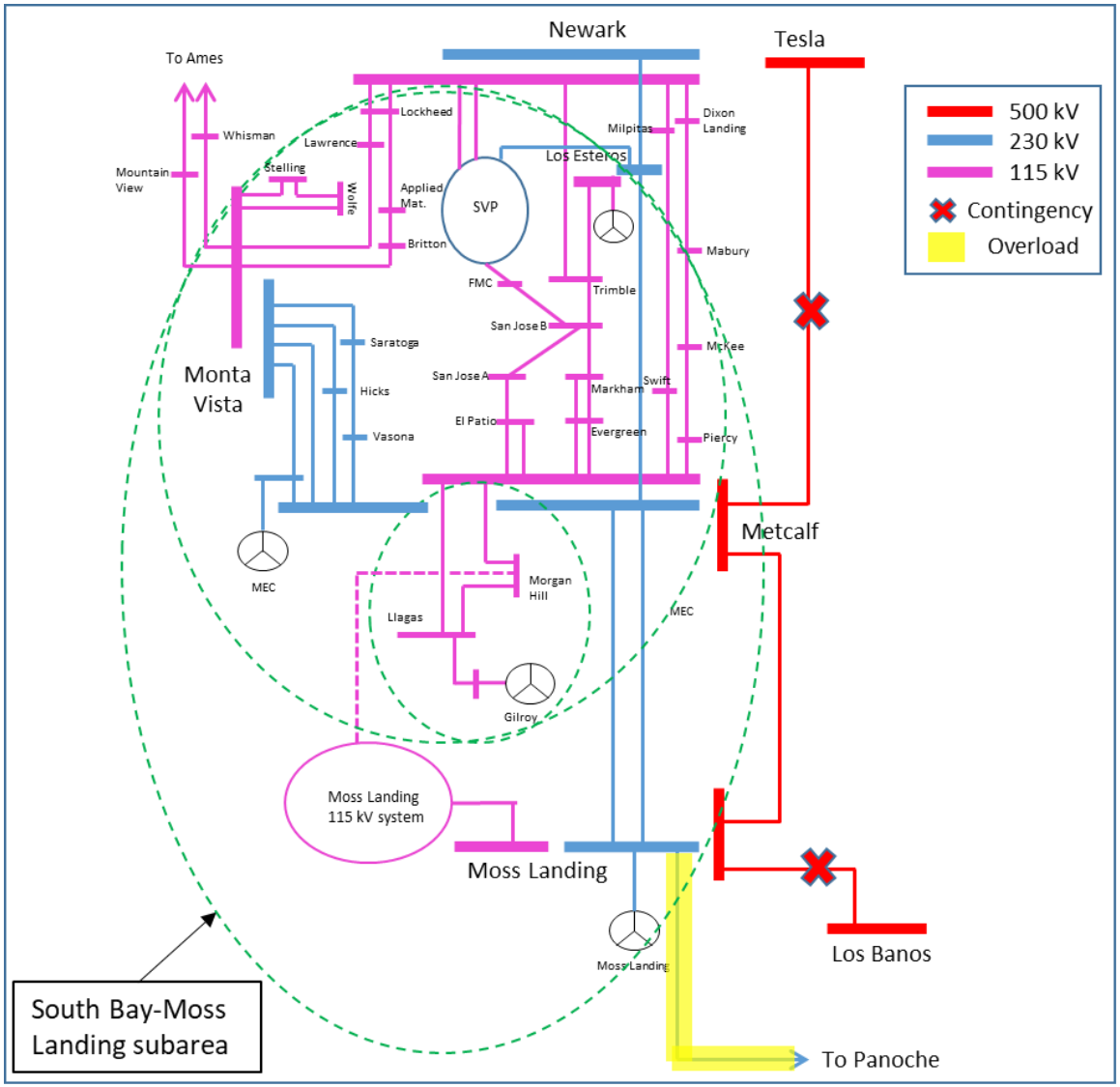




South Bay-Moss Landing Subarea: Load and Resources

Load (MW)	2020	2024	Generation (MW)	2020	2024
Gross Load	4089	4283	Market	2175	2175
AAEE	-52	-165	Wind	0	0
Behind the meter DG	-93	-139	Muni	202	202
Net Load	**3944**	**3979**	QF	0	0
Transmission Losses	108	112	Future preferred resource and energy storage	0	558
Pumps	0	0	**Total Qualifying Capacity**	**2377**	**2935**
Load + Losses + Pumps	**4052**	**4091**			

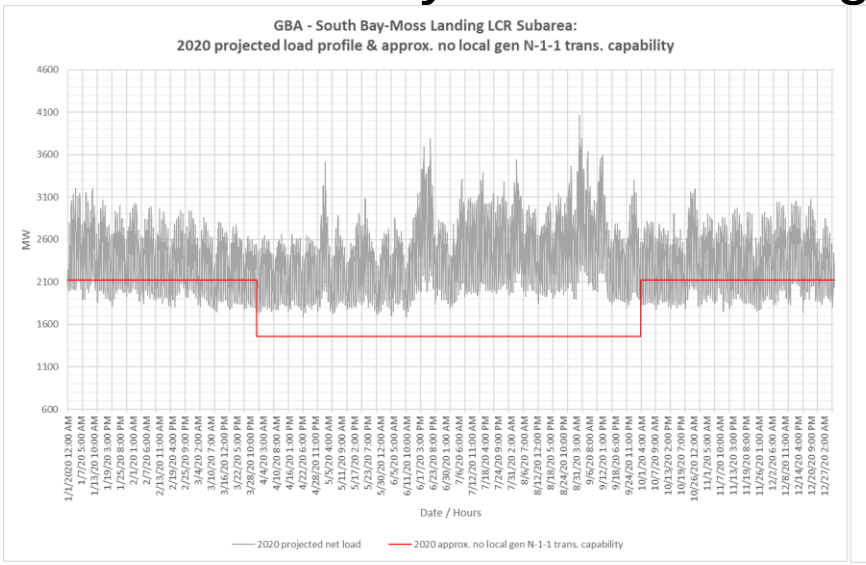
South Bay-Moss Landing Subarea: One-line diagram

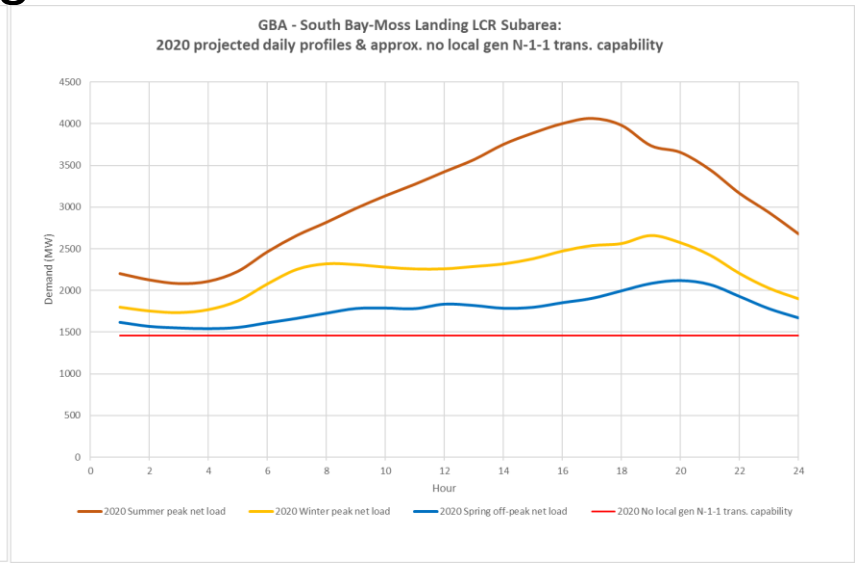


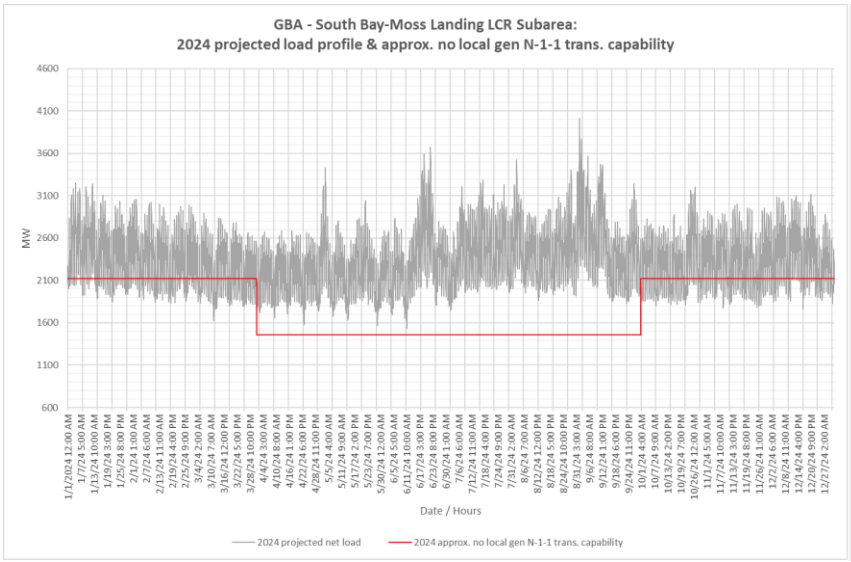
South Bay-Moss Landing Subarea: Requirements

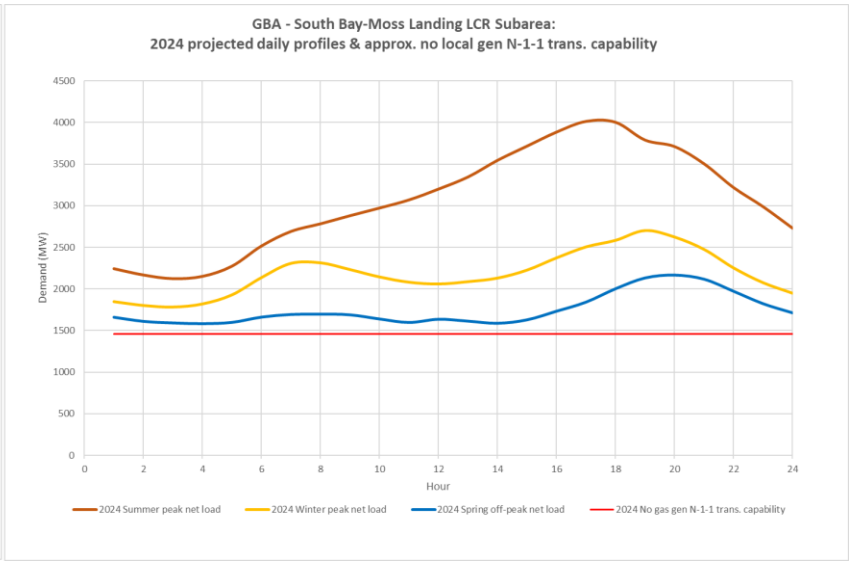
Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2020	B	None-binding		
	C	Moss Landing-Las Aguilas 230 kV	Tesla-Metcalf 500 kV and Moss Landing-Los Banos 500 kV	1781
2024	B	None-binding		
	C	Moss Landing-Las Aguilas 230 kV	Tesla-Metcalf 500 kV and Moss Landing-Los Banos 500 kV	1781

South Bay-Moss Landing Subarea: Load Profiles





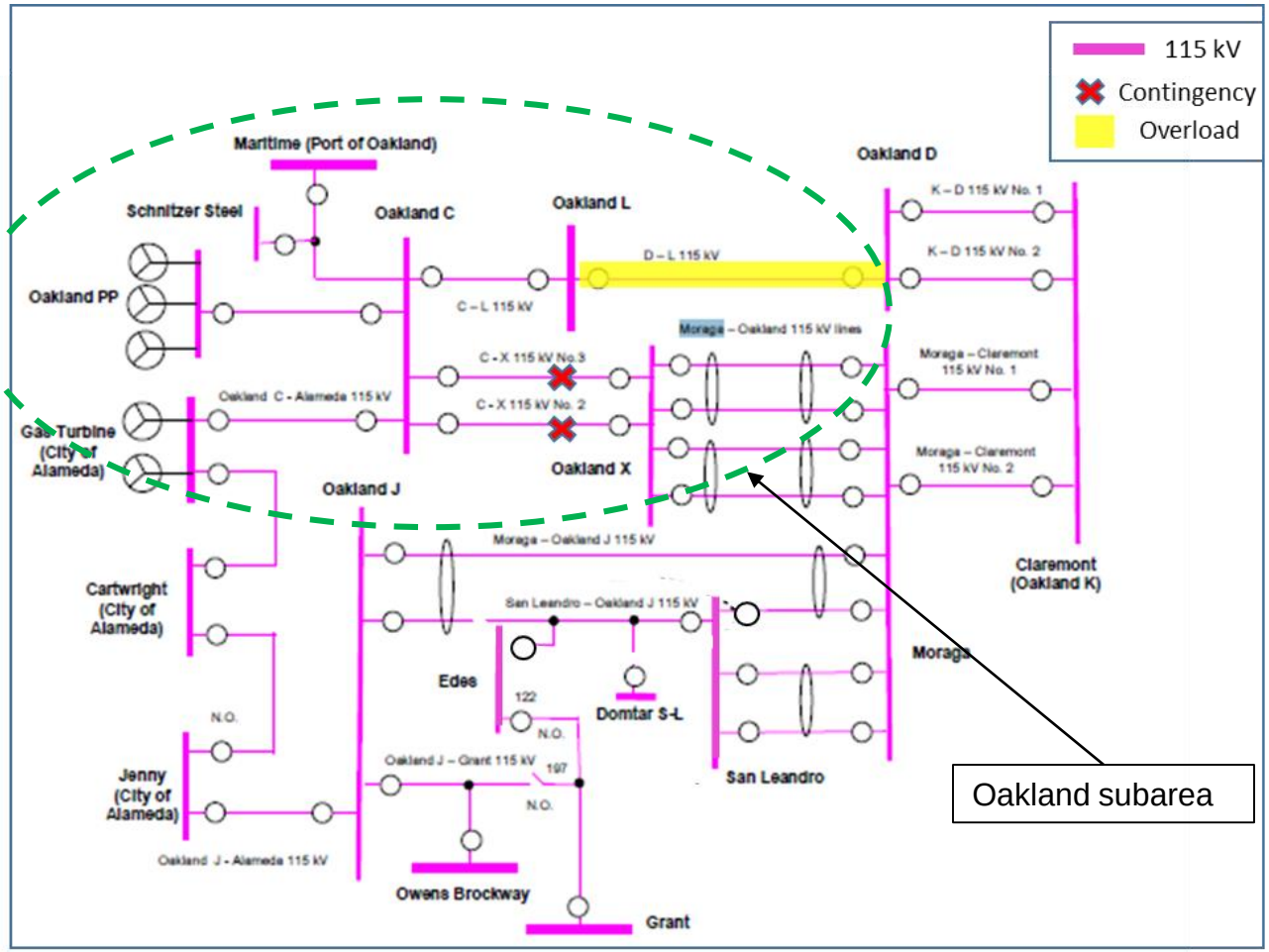




Oakland Subarea: Load and Resources

Load (MW)	2020	2024	Generation (MW)	2020	2024
Gross Load	196	196	Market	165	165
AAEE	-3	-8	Wind	0	0
Behind the meter DG	-6	-8	Muni	48	48
Net Load	**187**	**180**	QF	0	0
Transmission Losses	0	0	Future preferred resource and energy storage	0	15
Pumps	0	0	**Total Qualifying Capacity**	**213**	**228**
Load + Losses + Pumps	**187**	**180**			

Oakland Subarea: One-line diagram

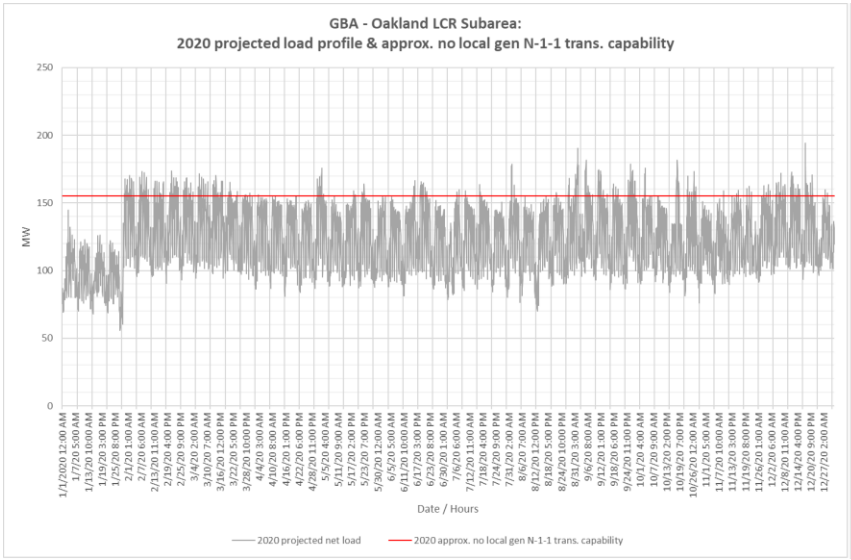


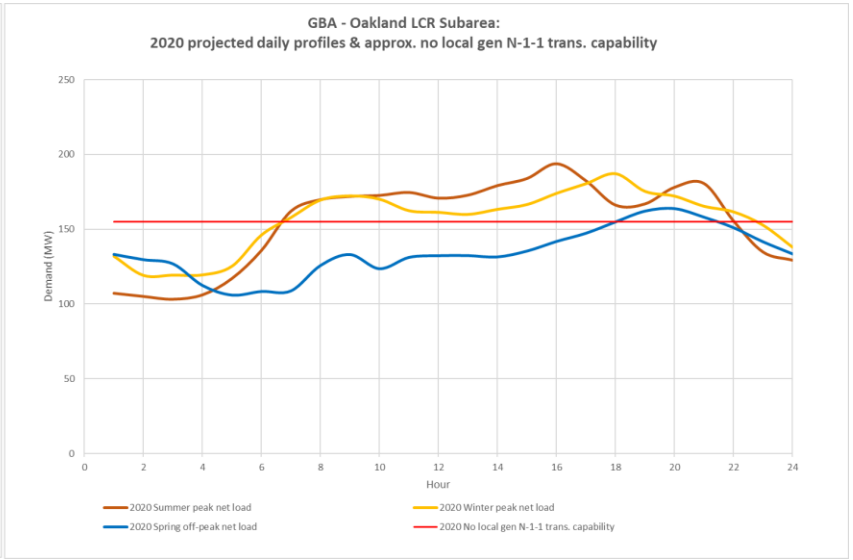
Oakland Subarea: Requirements

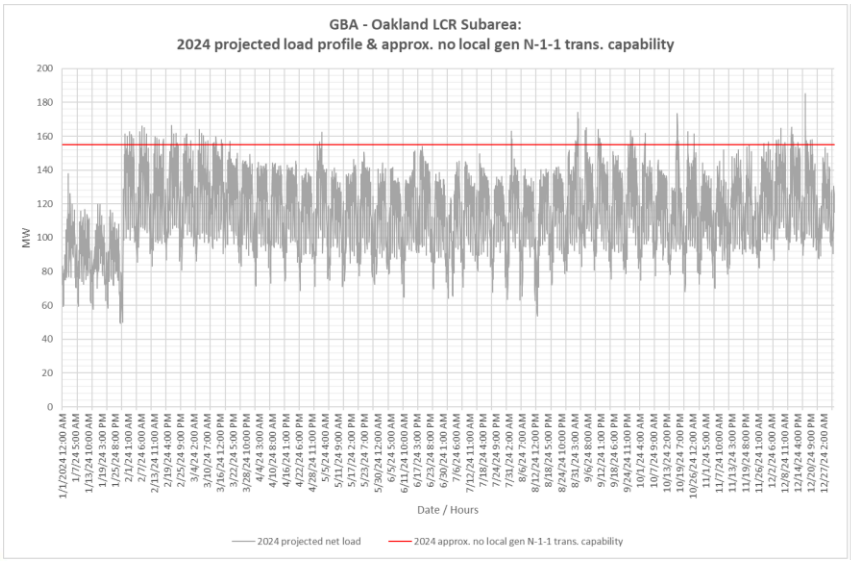
Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2020	B	No requirement		
	C	Oakland D-L 115 kV cable	Oakland C-X #2 & #3 115 kV cables	32
2024	B	No requirement		
	C	Moraga-Claremont #2 115 kV	Oakland C-X #2 & #3 115 kV cables	27[1]

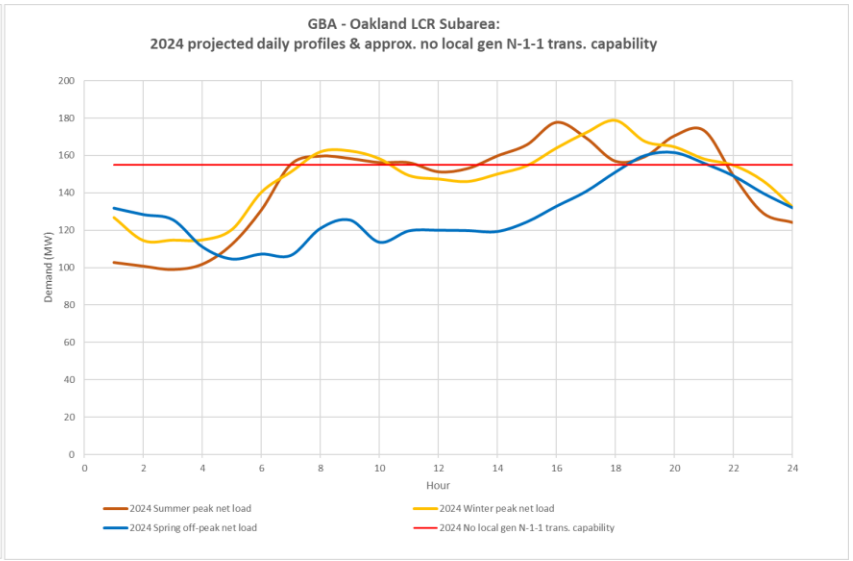
Note:
[1] This requirement doesn't reflect potential load transfer that could occur following the first contingency. An approved operating procedure including this load transfer could reduce this requirement to about 6 MW.

Oakland Subarea: Load Profiles





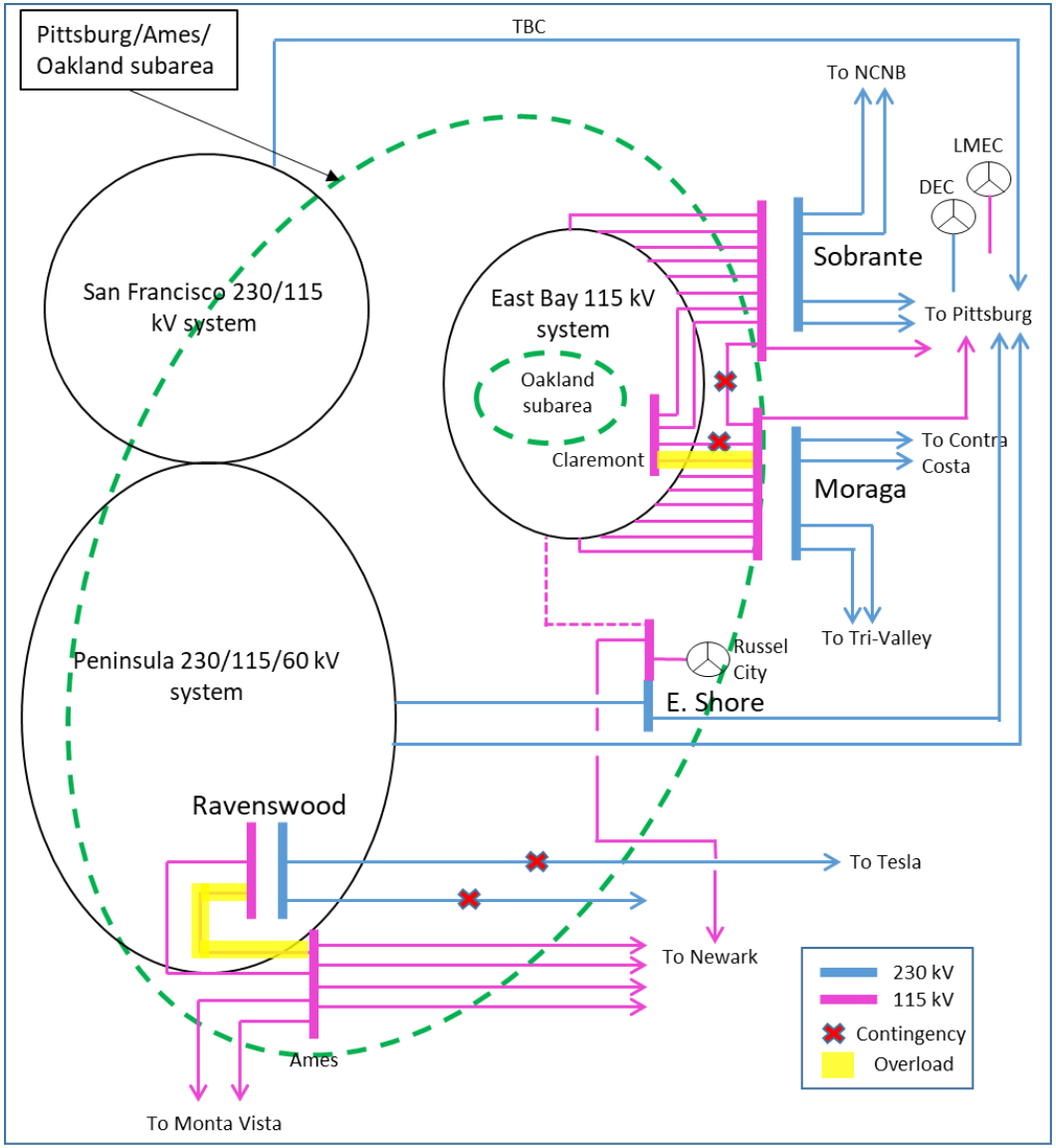




Pittsburg-Ames-Oakland Subarea: Load and Resources

Load (MW)	2020	2024	Generation (MW)	2020	2024
Gross Load	**NA – Flow through area.**		Market/ Net Seller / Battery	2182	2181
AAEE			Solar	8	8
Behind the meter DG			Wind	0	0
Net Load			Muni	48	48
Transmission Losses			QF	232	233
Pumps			Future preferred resource and energy storage	0	15
Load + Losses + Pumps			**Total Qualifying Capacity**	**2470**	**2485**

Ames/Pittsburg/Oakland Subarea: One-line diagram



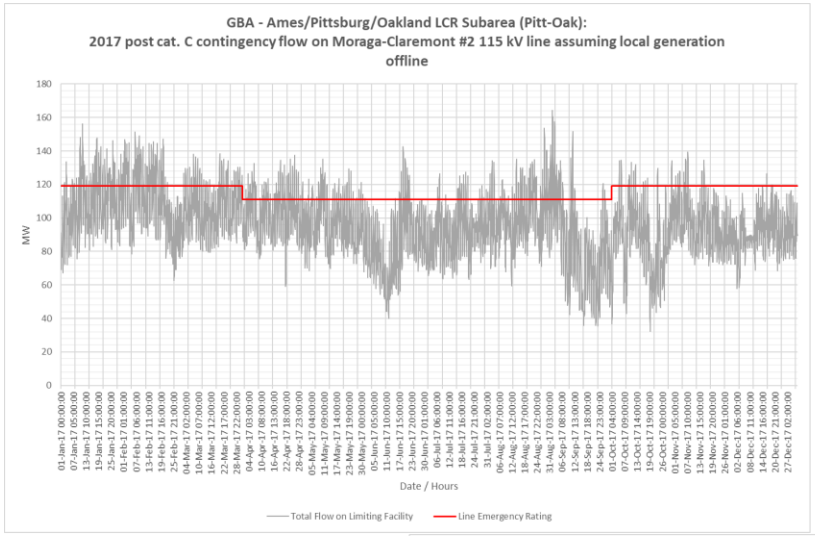
Ames/Pittsburg/Oakland Subarea: Requirements

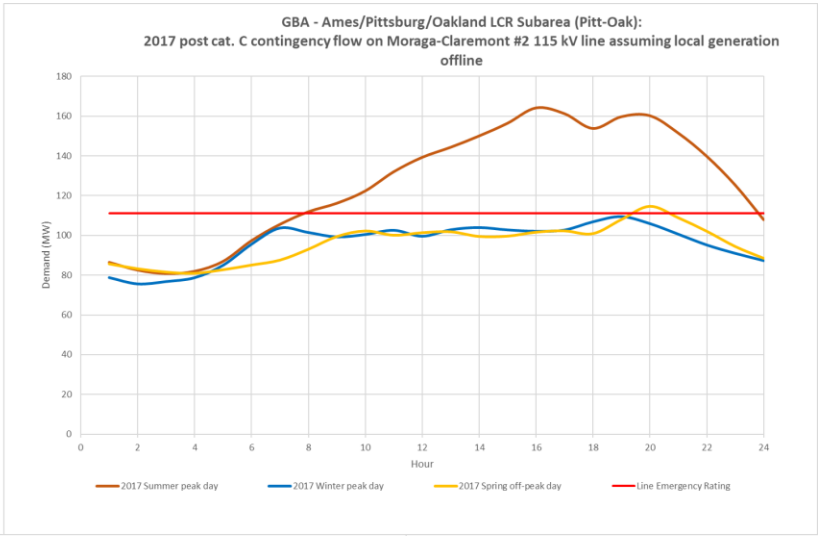
Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2020	B	None-binding		
	C	Ames-Ravenswood #1 115 kV line	Newark-Ravenswood & Tesla-Ravenswood 230 kV lines	1614
		Moraga-Claremont #2 115 kV line	Moraga-Sobrante & Moraga-Claremont #1 115 kV lines	
2024	B	None-binding		
	C	Ames-Ravenswood #1 115 kV line	Newark-Ravenswood & Tesla-Ravenswood 230 kV lines	1563
		Moraga-Claremont #2 115 kV line	Moraga-Sobrante & Moraga-Claremont #1 115 kV lines	

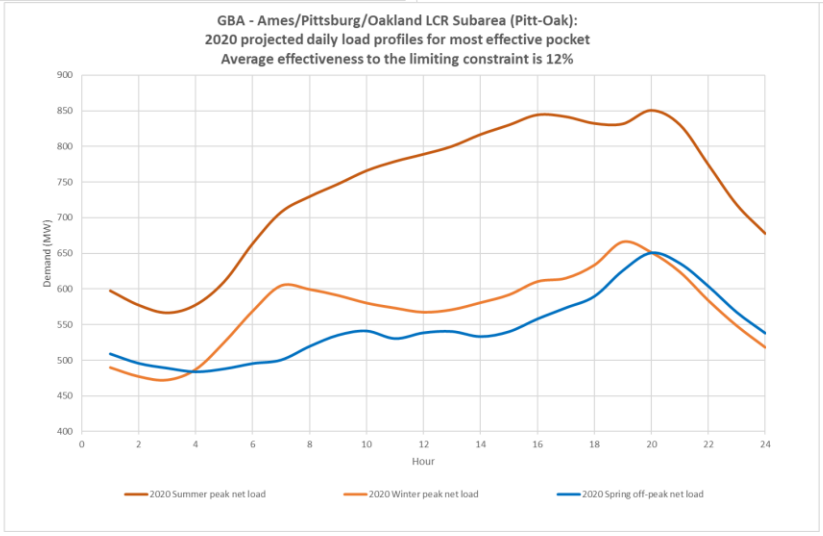
Associated NCNB Area: Requirement

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2020	B/C	Vaca Dixon-Lakeville 230 kV line	Vaca Dixon-Tulucay 230 kV line with Delta Energy Center power plant out of service	742
2024	B/C	Vaca Dixon-Lakeville 230 kV line	Vaca Dixon-Tulucay 230 kV line with Delta Energy Center power plant out of service	706

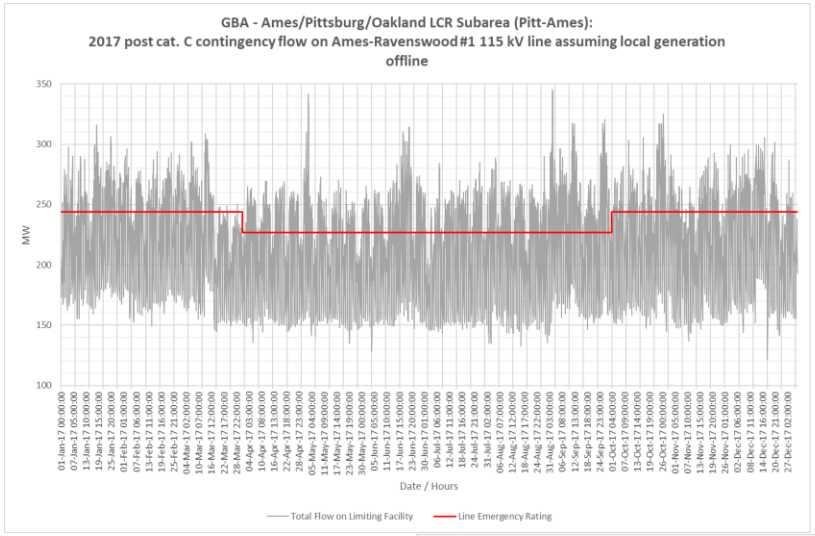
Ames/Pittsburg/Oakland Subarea (Pitts-Oak): Flow Profiles

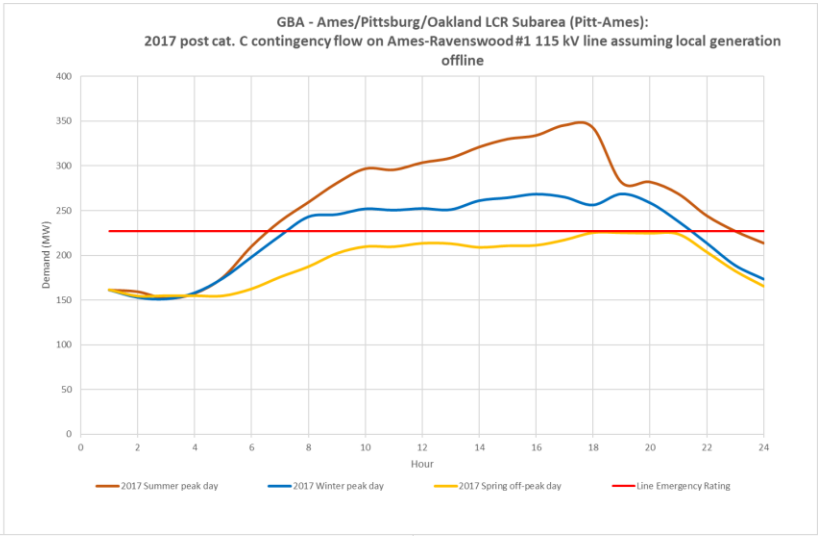


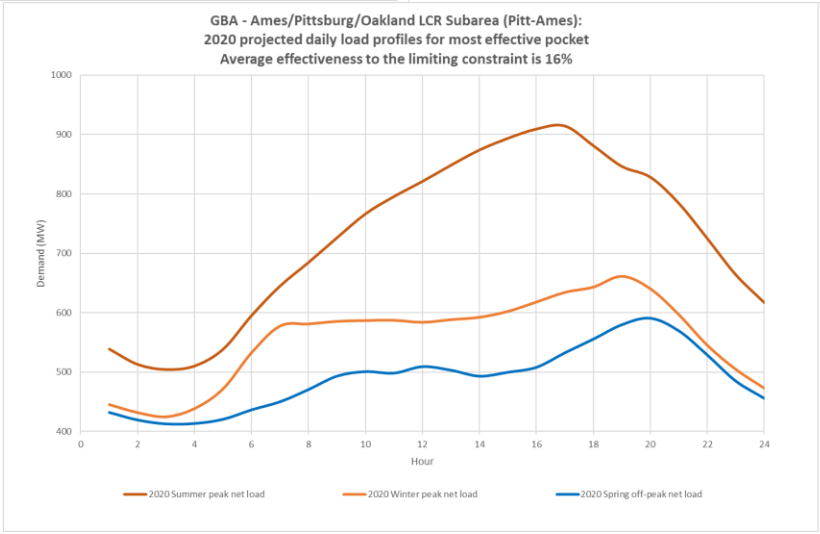




Ames/Pittsburg/Oakland Subarea (Pitts-Ames): Flow Profiles



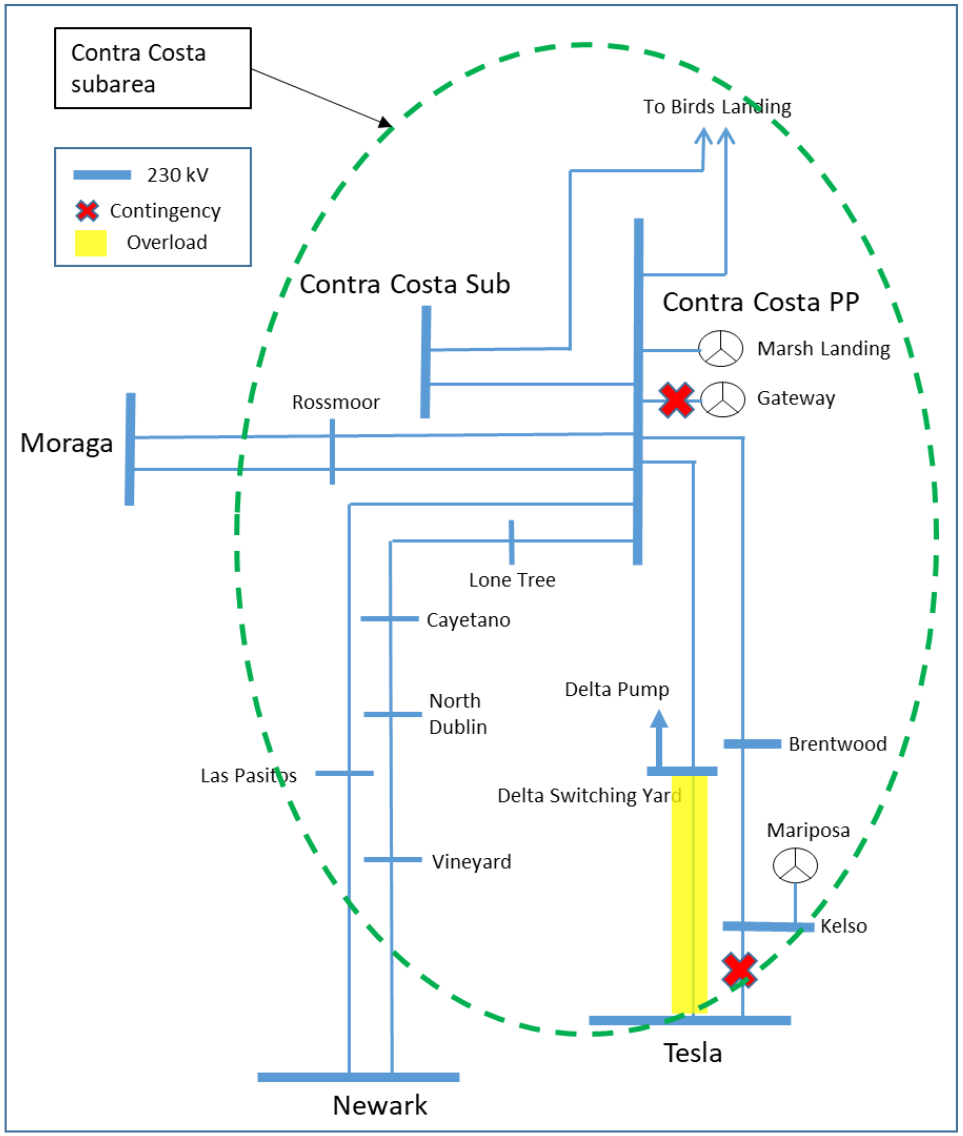




Contra Costa Subarea: Load and Resources

Load (MW)	2020	2024	Generation (MW)	2020	2024
Gross Load	**NA – Flow through area.**		Market	1748	1748
AAEE			Wind	307	307
Behind the meter DG			Muni	127	127
Net Load			QF	0	0
Transmission Losses			Future preferred resource and energy storage	0	0
Pumps			**Total Qualifying Capacity**	**2182**	**2182**
Load + Losses + Pumps					

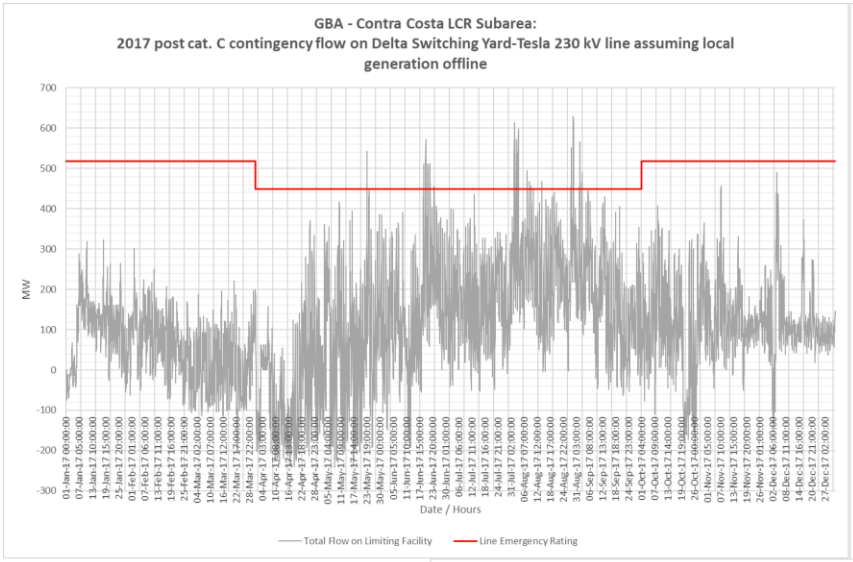
Contra Costa Subarea: One-line diagram

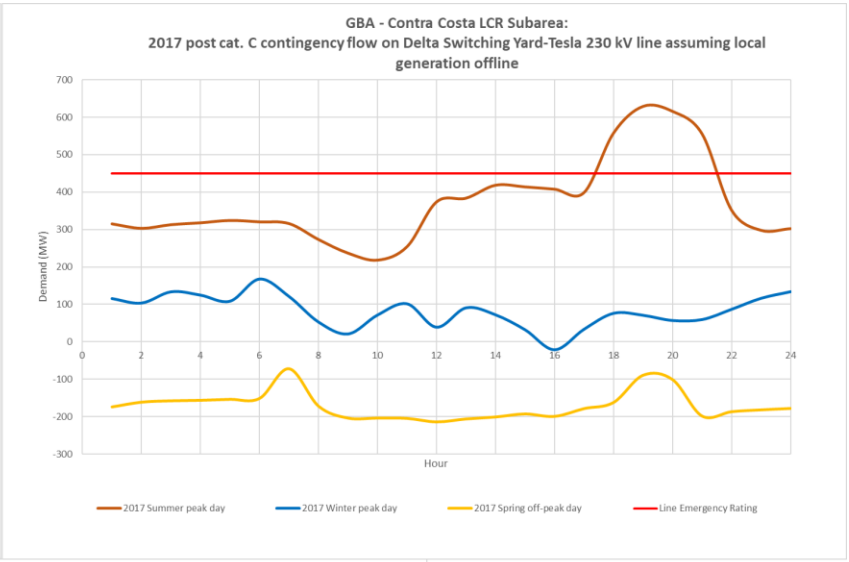


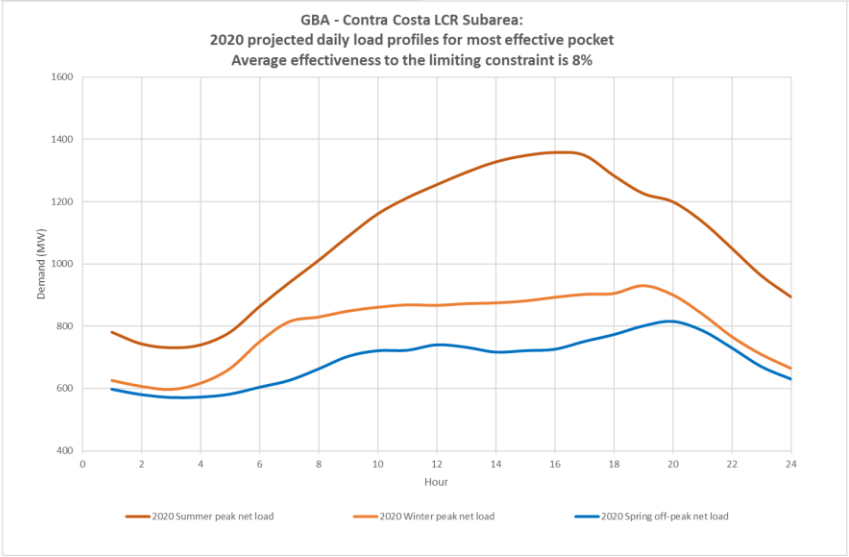
Contra Costa Subarea: Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2020	B	Delta Switching Yard-Tesla 230 kV Line	Kelso-Tesla 230 kV with the Gateway off line	1155
	C	Same as category B		
2024	B	Delta Switching Yard-Tesla 230 kV Line	Kelso-Tesla 230 kV with the Gateway off line	1051
	C	Same as category B		

Contra Costa Subarea: Flow Profiles







Greater Bay Area Overall: Load and Resources

Load (MW)	2020	2024	Generation (MW)	2020	2024
Gross Load	10336	10650	Market/ Net Seller/ Battery	6131	6131
AAEE	-118	-366	Solar	12	12
Behind the meter DG	-235	-362	Wind	307	307
Net Load	**9983**	**9922**	Muni	382	382
Transmission Losses	241	241	QF	235	235
Pumps	264	264	Future preferred resource and energy storage	0	573
Load + Losses + Pumps	**10488**	**10427**	**Total Qualifying Capacity**	**7067**	**7640**

Greater Bay Area Overall: Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2020	B	Reactive margin	Tesla-Metcalf 500 kV line & DEC unit	3970
	C	Aggregate of subareas		4550
2024	B	Reactive margin	Tesla-Metcalf 500 kV line & DEC unit	3494
	C	Aggregate of subareas		4395

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
2020	6143	307	382	235	0	7067
2024	6143	307	382	235	573	7640

Year	LCR Need	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Need
2020	Category B (Single)	3970	0	3970
	Category C (Multiple)	4550	0	4550
2024	Category B (Single)	3494	0	3494
	Category C (Multiple)	4395	0	4395

Changes Compared to Previous Year's LCR Requirements
(There are no changes from the draft results presented in March)

Subarea	2019		2020		2023		2024	
	Load	LCR	Load	LCR	Load	LCR	Load	LCR
Llagas	179	77	180	79	181	13	177	16
San Jose	2374	177	2462	305	2517	293	2527	462
South Bay – Moss Landing	3977	1653	4062	1781	4192	1977	4091	1781
Oakland	177	20	187	32	175	0	179	27
Pittsburg – Ames – Oakland	NA*	1741	NA*	1614	NA*	1630	NA*	1563
Contra Costa	NA*	1067	NA*	1155	NA*	1145	NA*	1051
Overall	10230	4461	10488	4550	10441	4752	10427	4395

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