Agenda
Reliability Assessment and Study Updates

Isabella Nicosia
Stakeholder Engagement and Policy Specialist

2020-2021 Transmission Planning Process Stakeholder Meeting
September 23-24, 2020

2020-2021 Transmission Planning Process Stakeholder Call – Agenda

Topic	Presenter
Day 1 – September 23	
Overview & Key Issues	Jeff Billinton
Reliability Assessment - North	RTN - Engineers
Reliability Assessment - South	RTS - Engineers
SDG&E Proposed Reliability Solutions	SDG&E
PG&E Proposed Reliability Solutions	PG&E
Day 2 – September 24	
10-year Local Capacity Technical Study	RTN & RTS - Engineers
Wildfire Impact Assessment – PG&E Area	RTN - Engineers
Next Steps	Isabella Nicosia

2030 Draft LCR Study Results – Overall Summary

Catalin Micsa
Senior Advisor Regional Transmission Engineer

2020-2021 Transmission Planning Process Stakeholder Meeting
September 23 - 24, 2020

Long-Term Local Capacity Technical Study

Based on the alignment of the CAISO Transmission Planning Process (TPP) with the CEC Integrated Energy Policy Report (IEPR) demand forecast and the CPUC Integrated Resource Plan (IRP), the Long-Term LCR assessment is to be evaluated ***every two years.***

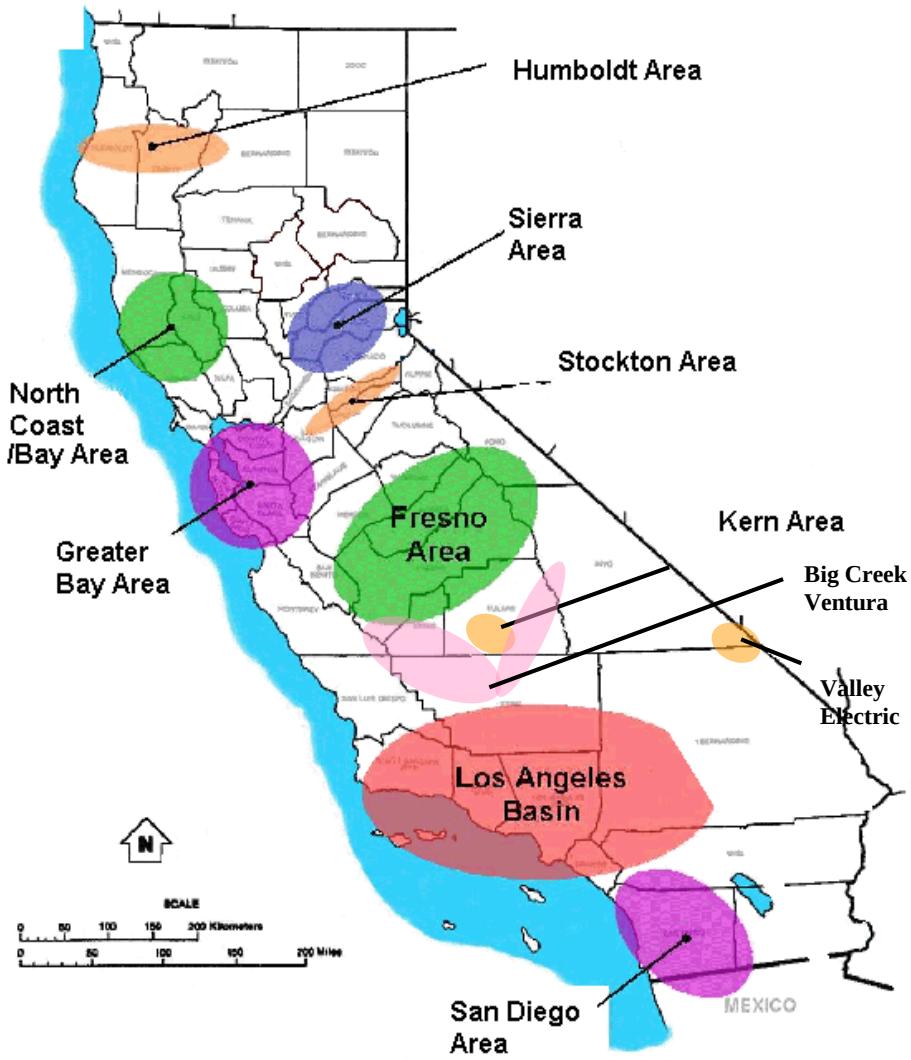
In the 2020-2021 transmission planning process all LCR areas within the CAISO BAA will be evaluated for long-term assessment.

Scope plus Input Assumptions, Methodology and Criteria

The scope of the LCR studies is to reflect the minimum resource capacity needed in transmission constrained areas in order to meet NERC, WECC and CAISO mandatory standards.

For latest study assumptions, methodology and criteria see the October 31, 2019 stakeholder meeting. This information along with the 2021 LCR Manual can be found at: http://www.caiso.com/informed/Pages/StakeholderProcesses/LocalCapacityRequirementsProcess.aspx.

LCR Areas within CAISO



2030 Draft LCR Needs

	Qualifying Capacity				Capacity Available At Peak	2030 LCR Need
Local Area Name	**QF/MUNI (MW)**	**Non-Solar (MW)**	**Solar (MW)**	**Total (MW)**	**Total (MW)**	**Capacity Needed**
Humboldt	0	191	0	**191**	**191**	**135**
North Coast / North Bay	119	723	0	**842**	**842**	**636**
Sierra	1183	938	5	**2126**	**2121**	**1518**
Stockton	115	487	11	**613**	**602**	**613**
Greater Bay	604	6732	8	**7344**	**7344**	**7344**
Greater Fresno	216	2815	361	**3392**	**3191**	**2296**
Kern	5	330	78	**413**	**335**	**413**
Big Creek/Ventura	424	3524	250	**4198**	**4198**	**1151**
LA Basin	1197	6204	11	**7412**	**7412**	**6194**
San Diego/ Imperial Valley	2	4017	394	**4413**	**4019**	**3718**
Total	3865	25961	1118	**30944**	**30255**	**24018**

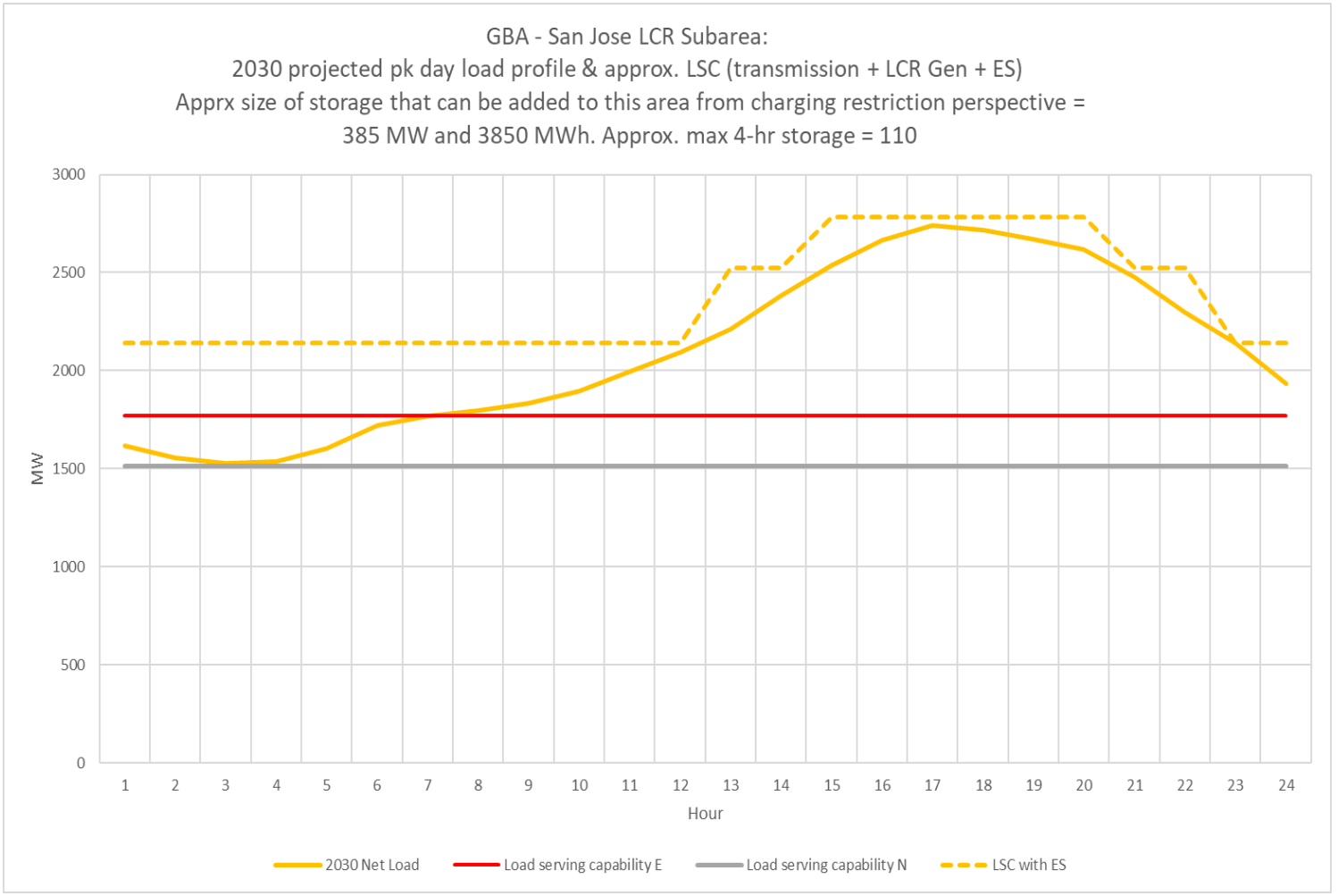
Battery Storage

- Currently there is high regulatory and commercial interest in this technology
- Highest interest is in building 4-hour resources, mostly due to RA counting rules.
- Mixed expectations
  - maximize the local and system RA value
  - minimize the CAISO back-stop costs
- For all “4 hour” batteries installed in local areas, once the local need passes the 4-hour mark, they do not eliminate the local need for other local resources on a 1 for 1 MW bases.

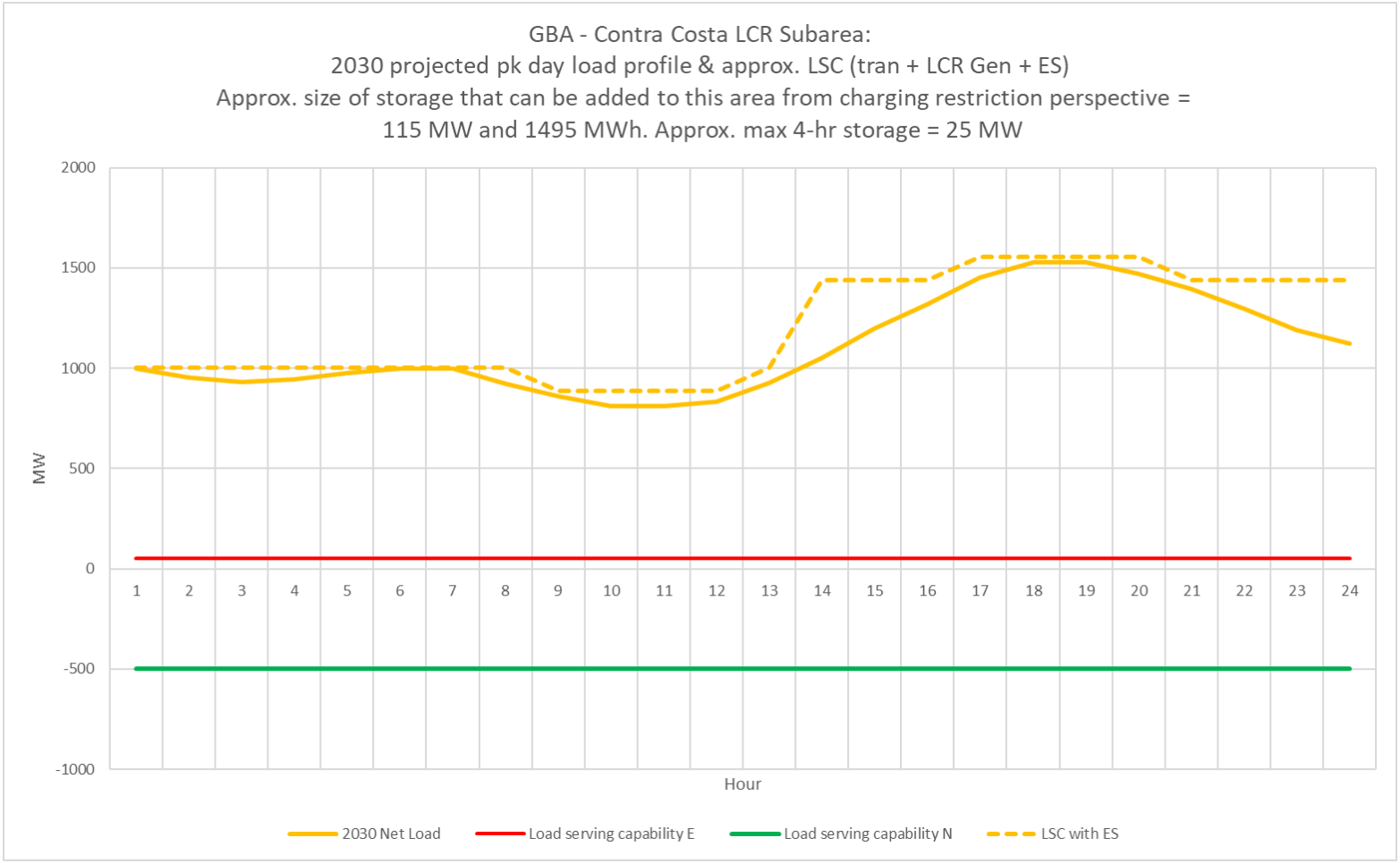
Battery Storage Characteristics - Assumptions

- Storage replacing existing resources are assumed to have the same effectiveness factors
- Charging/discharging efficiency is 85%
- Energy required for charging, beyond the transmission capability is produced by other LCR required resources
- Daily charging required is distributed to all non-discharging hours proportionally using delta between net load and the total load serving capability (transmission + remaining resources)
- Hydro resources are considered to be available for production during off-peak hours
- The study assumes the ability to provide perfect dispatch; CAISO software improvements and/or augmentations are required in order to achieve this goal
- Deliverability for incremental capacity is not evaluated

Example: non-flow through area and sub-area



New enhancement: flow through area and sub-area



Battery Storage - Graph

- Maximum storage (MW and MWh) that can charge under contingency conditions in order to be available the next day to meet local needs
- New enhancement – Maximum 4-hour storage, added per stakeholder request – it is the maximum MW value where the technical local need = RA counting on a 1 for 1 MW basis
- The results represent an estimate of future buildout – actuals could differ mainly due to effectiveness factors
- The new estimates for flow-through areas have a much higher degree of uncertainty because the need to mitigate the main constraint may not follow the “estimated” load curve and could impact the charging/discharging cycle.

RA Counting or Qualifying Capacity

- Local Regulatory Agencies (LRAs) like CPUC have the authority to set the Qualifying Capacity:
  - CAISO has default rules (in case LRAs don't have their own rules)
- Per CPUC rulings and CAISO Tariff, each resource ***must*** have a single QC (NQC) value.
- The only reason a resource counts for local is because is located inside a local area.
- ISO can decrease the QC to NQC, for testing (Pmax), performance criteria (not used) and deliverability.

The Local Capacity Technical Study

- Does not establish RA counting
- Does establish the local RA resources (by delimiting the local area boundaries)
- Does establish the individual local RA requirement for each LSE based on their load share ratio within the TAC vs. the total LCR requirement for that TAC
- Does establish the technical requirements.
  - Total MW need by TAC (RA individual enforcement + ISO back stop)
  - MW need by local area or sub-area (RA guidance only + ISO back stop)
  - Effectiveness factors (RA guidance only + ISO back stop)
  - Load charts (RA guidance only + ISO back stop)
  - Battery charging parameters (RA guidance only + ISO back stop)

CAISO local CPM enforcement

- Total MW need by TAC + MW need by local area or sub-area + Effectiveness factors
  - First costs are allocated to individual deficient LSEs on their month by month deficiency bases as available in their year ahead annual showing
  - Second remaining costs are allocated to all LSEs
- The technical requirements (justification for the local CPM) are public in the LCR report
- Currently energy needs (like load charts and battery charging) are not used to CPM
- During RA Enhancement initiative the CAISO is seeking authority to enforce local CPM for energy needs. Potentially starting as early as RA year 2022.

CAISO local RMR enforcement

- RMR is not automatic – a resource must be non-RA and must ask (by submitting a signed affidavit) for retirement or mothball
- CAISO can enforce any reliability need (Total MW need by TAC + MW need by local area or sub-area + Effectiveness factors + Load charts + Battery charging limits)
- Costs are divided to all the LSEs in the appropriate TAC(s) that drive the local need.
- The technical requirements (justification for these local RMR contracts) must be made public (if not already public in the LCR reports).

Example:

- A new battery resource with Pmax of 800 MW and energy of 800 MWh is located in a local area
- The local area has an LCR need of 800 MW (with other 1,000 MW of available resources), and a maximum battery charging capability of 110 MW (780 MWh) and a maximum 4-hour battery of 35 MW.
- The new resource will count towards each LSEs individual RA responsibility as 200 MW (both system and local).
- Technically for local only 110 MW (780 MWh) can be used. If the total RA showings (including this resource) is above 890 MW (assuming all units just as effective) then the technical needs are met; else the CAISO could RMR and hopefully in a few years CPM additional resources.

CAISO will perform an economic study as part of this transmission planning cycles

- Identify potential transmission upgrades that would economically lower gas-fired generation capacity requirements in local capacity areas or sub-areas
  - Retirement of gas-fired generation in the IRP has not identified significant retirement, as such methodology for economic assessment will be the same as in the 2018-2019 and 2019-2020 transmission planning process
- Explore and assess alternatives – conventional transmission and preferred resources - to reduce or eliminate need for gas-fired generation in all existing areas and sub-areas.

Alternative submittals

- Potential alternatives may be submitted to reduce or eliminate the gas-fired generation for targeted LCR areas and sub-areas
- The potential alternatives need to be included as part of your comments to this stakeholder meeting
- The potential alternatives should not be submitted in the CAISO Request Window (unless the area or sub-area is proven to be deficient in the 10 year out study).

Schedule

- September 23-24 TPP stakeholder Meeting
  - 10-year LCR assessment results
    - Include update on storage capability
  - Stakeholder comments and alternatives
- November 17 TPP stakeholder meeting
  - Preliminary alternative assessment
  - Stakeholder comments
- January 31, 2021 Draft Transmission Plan
  - Final analysis and recommendations (if any)

2030 Long-Term LCR Study Draft Results Greater Bay Area

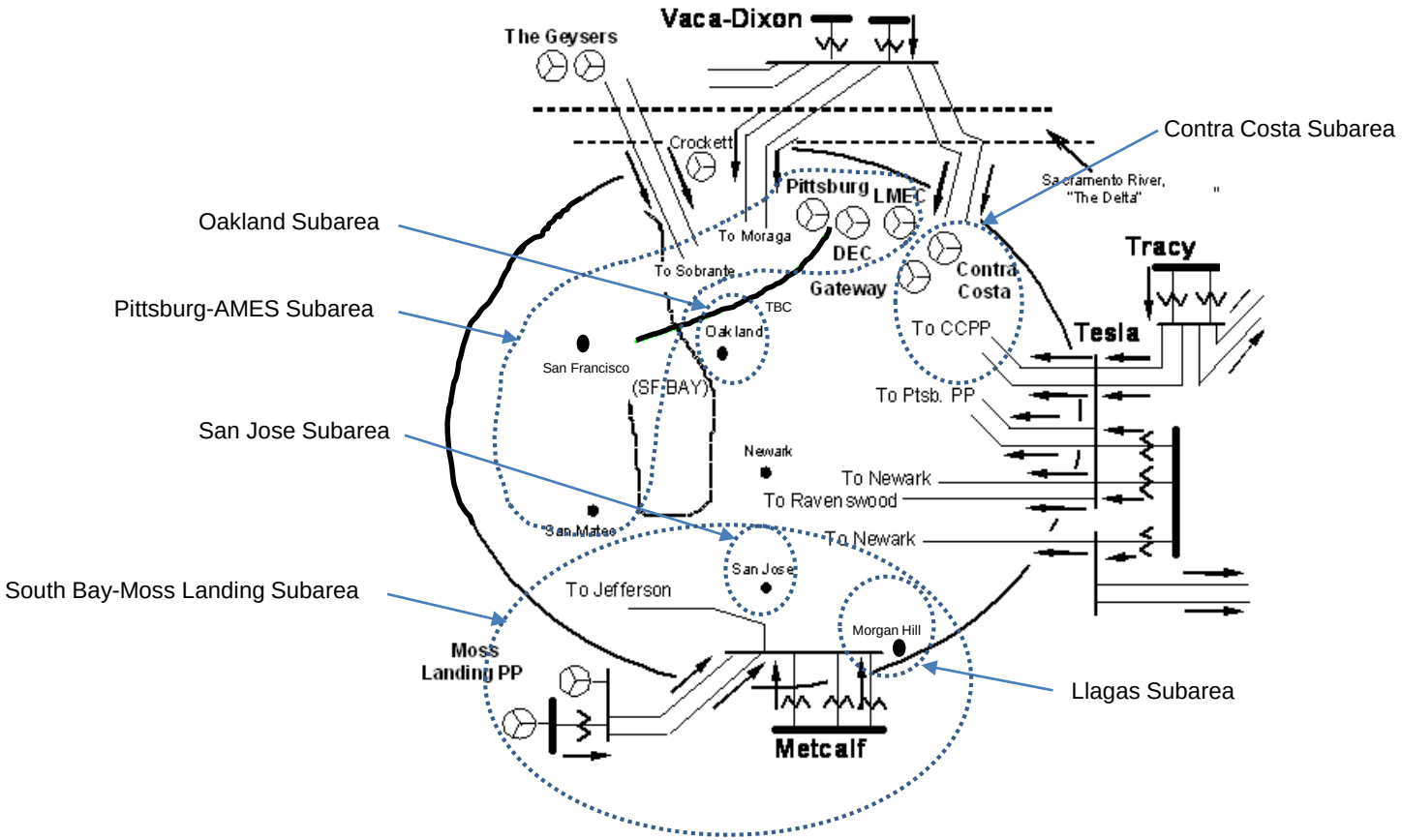
Abhishek Singh

Regional Transmission Engineer Lead

2020-2021 Transmission Planning Process Stakeholder Meeting

September 23 - 24, 2020

Greater Bay Area Transmission System & LCR Subareas



New major transmission projects

Project Name	Expected ISD
East Shore-Oakland J 115 kV Reconductoring Project	Jun-22
Morgan Hill Area Reinforcement (revised scope)	Dec-22
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	Dec-21

Power plant changes

Additions:

- OCEI Energy Storage modeled
- Resolution E-4949 energy storage

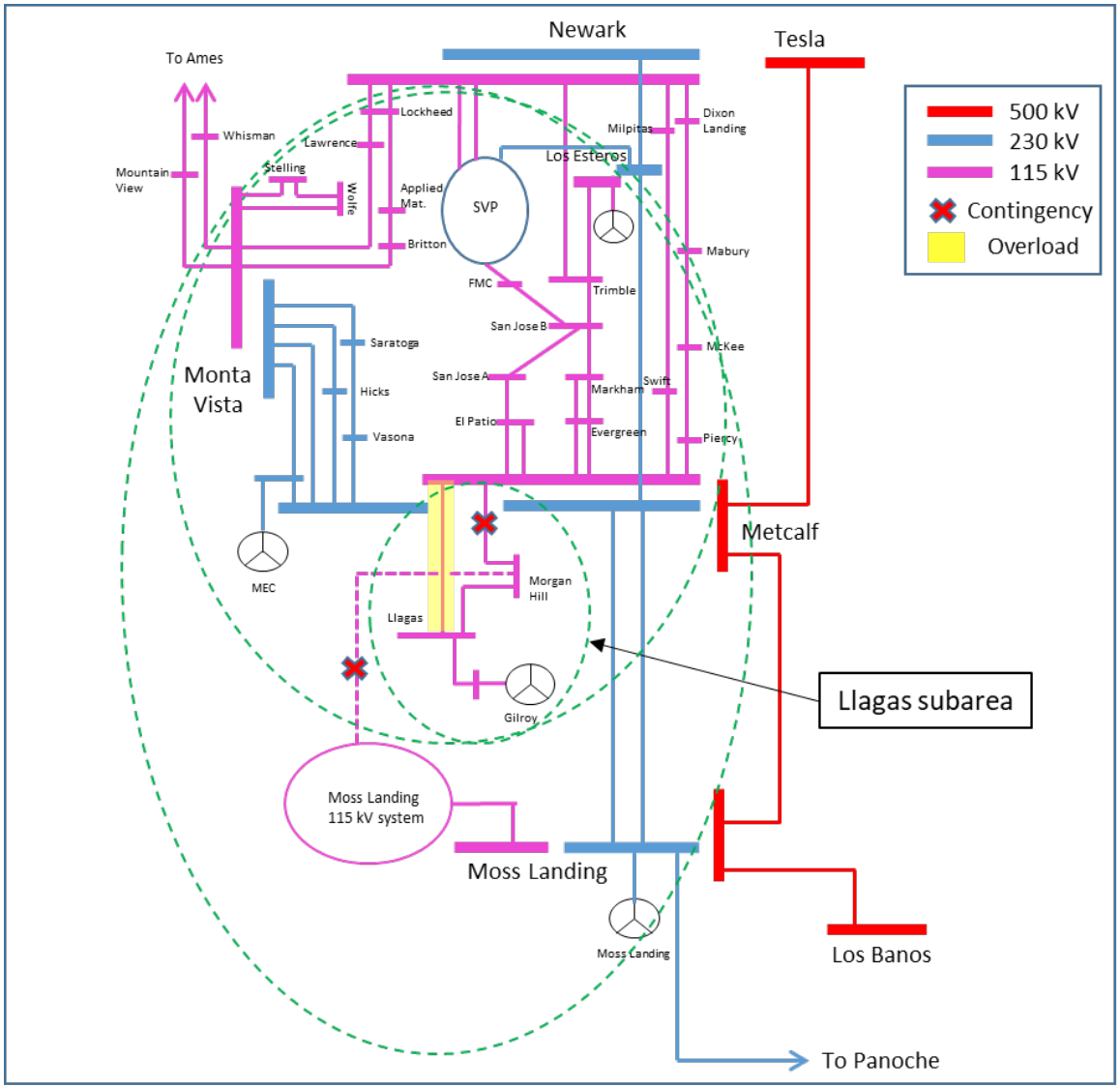
Retirements:

- No new retirements
- Oakland CTs considered offline

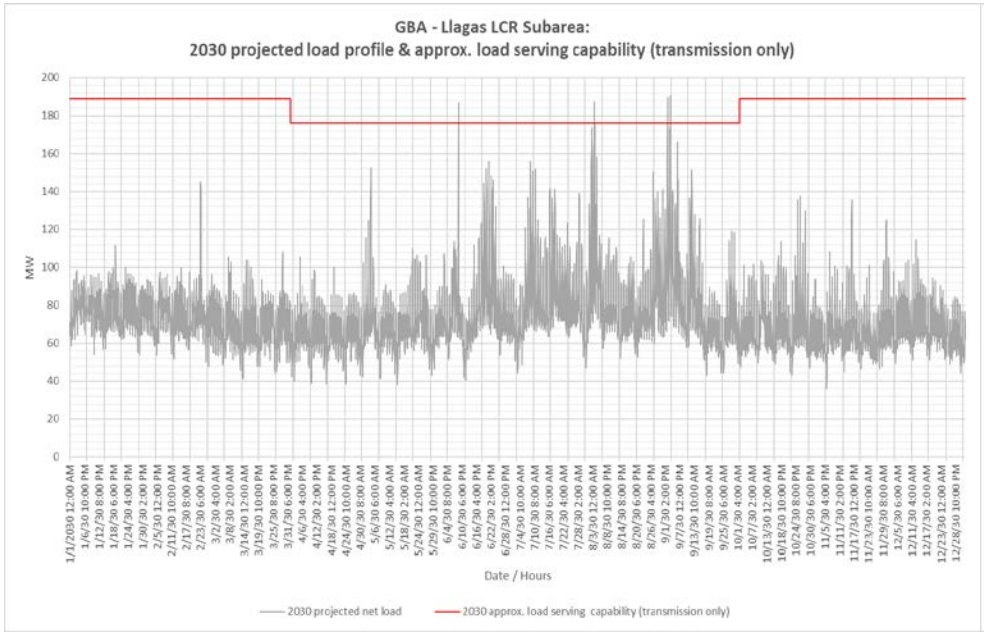
Llagas Sub-area: Load and Resources

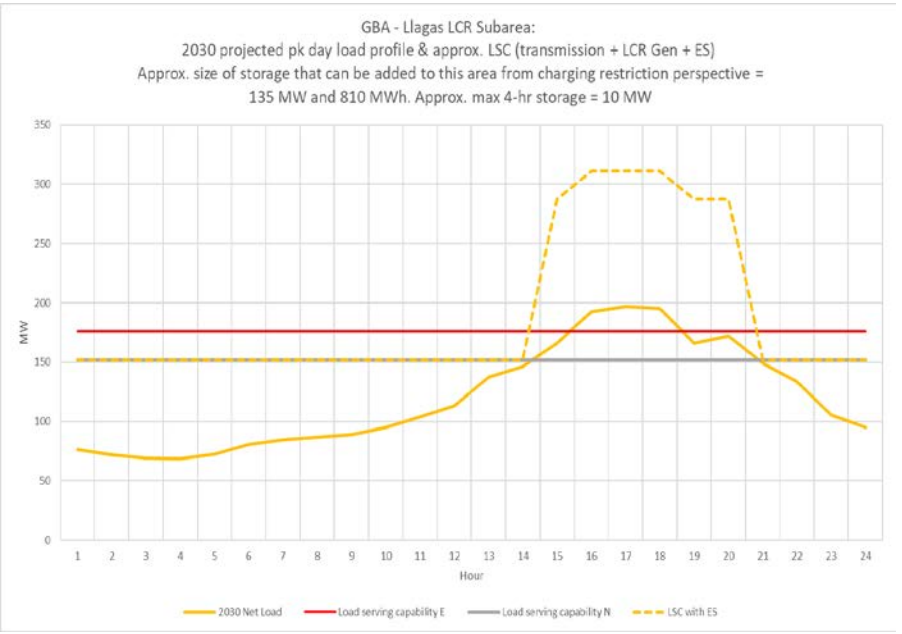
Load (MW)	2030	Generation (MW)	2030
Gross Load	202	Market	246
AAEE	-4	Wind	0
Behind the meter DG	0	Muni	0
Net Load	**198**	QF	0
Transmission Losses	0	Future preferred resource and energy storage	0
Pumps	0	**Total Qualifying Capacity**	**246**
Load + Losses + Pumps	**198**		

Llagas Subarea : One-line diagram



Llagas Subarea : Load Profiles





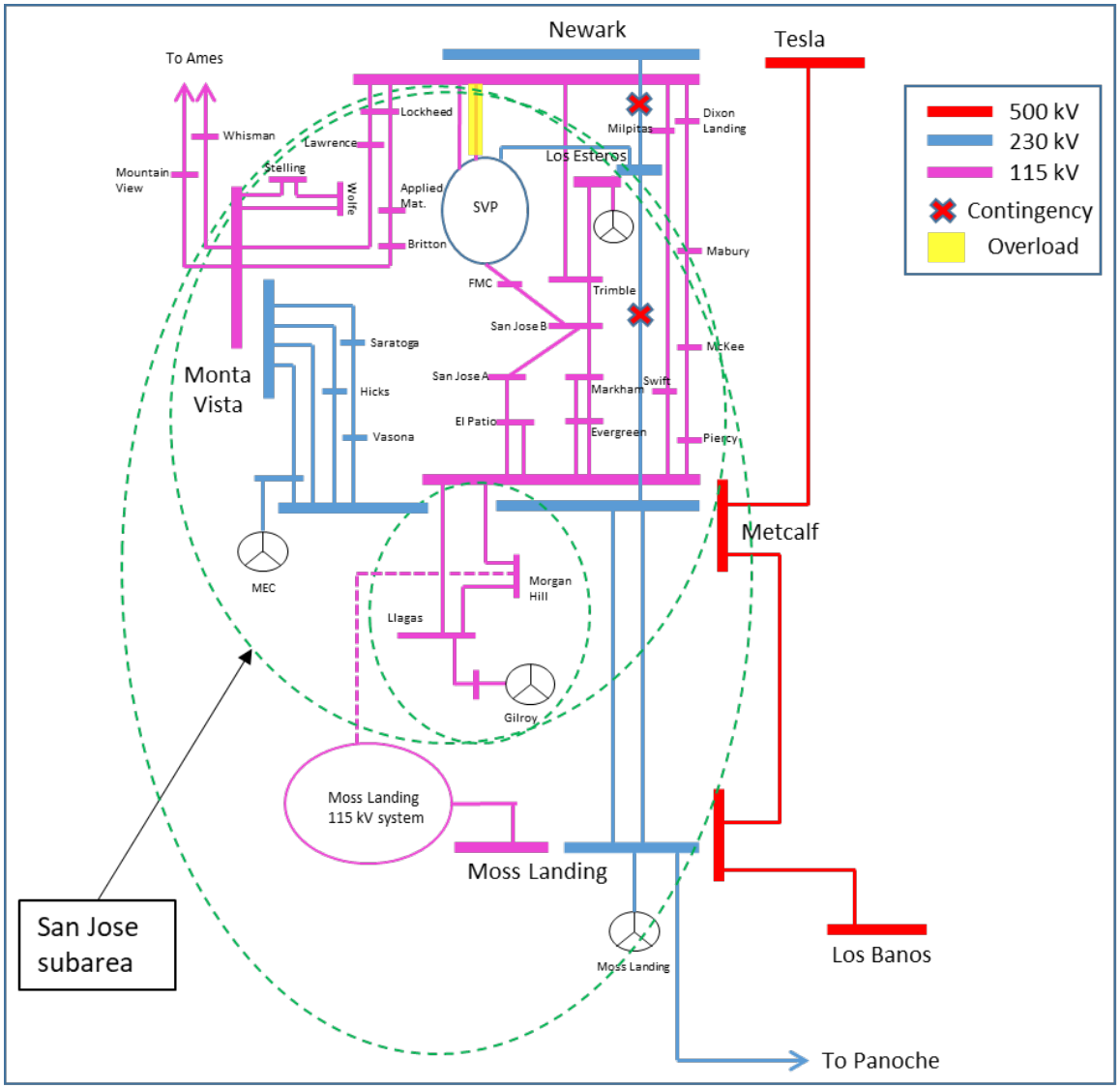
Llagas Subarea : Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	P6	Morgan Hill-Llagas 115 kV line	Metcalf-Morgan Hill and Morgan Hill-Green Valley 115 kV lines	31

San Jose Sub-area: Load and Resources

Load (MW)	2030	Generation (MW)	2030
Gross Load	2,737	Market	575
AAEE	-61	Wind	0
Behind the meter DG	0	Muni	198
Net Load	**2,676**	QF	0
Transmission Losses	76	Future preferred resource and energy storage	75
Pumps	0	**Total Qualifying Capacity**	**848**
Load + Losses + Pumps	**2,752**		

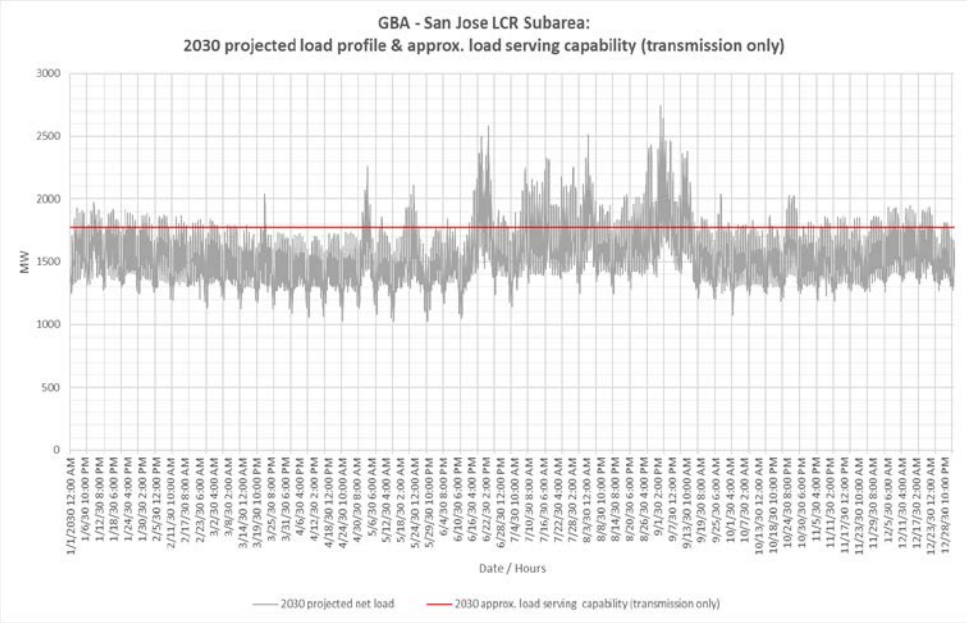
San Jose Subarea : One-line diagram

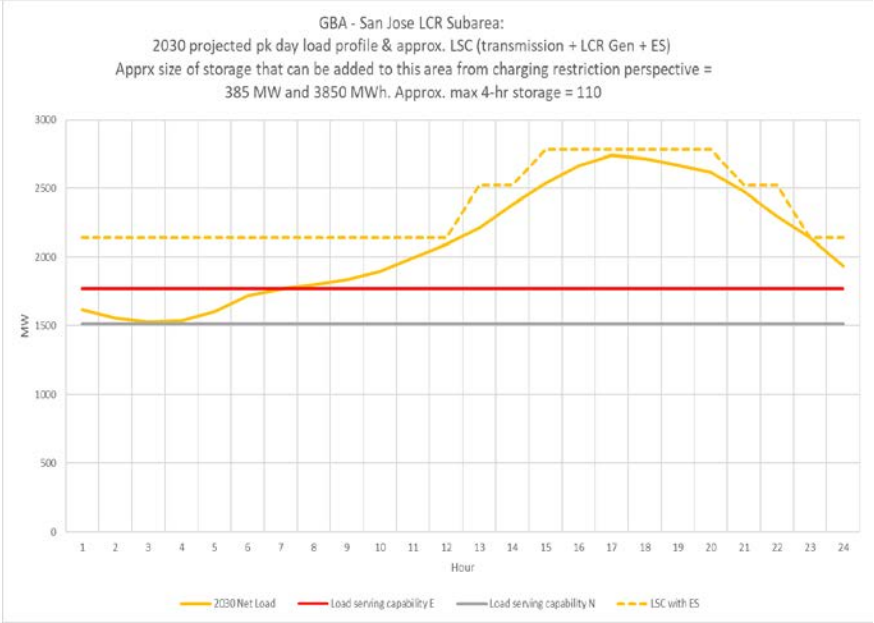


San Jose Subarea : Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	P2-4	Metcalf 230/115 kV transformer # 1 or # 3	METCALF 230kV - Section 2D & 2E	918 (250)

San Jose Subarea : Load Profiles

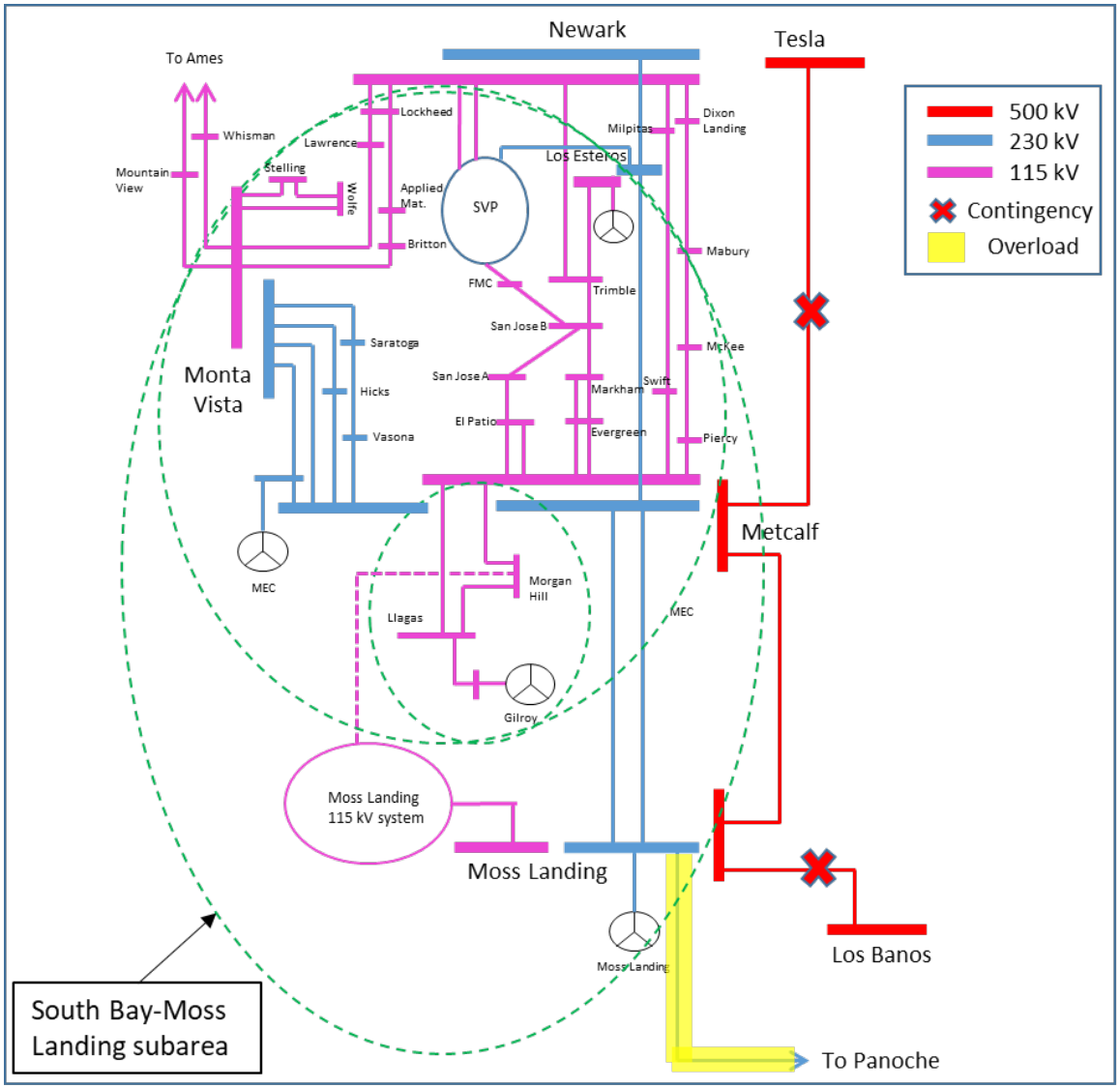




South Bay-Moss Landing Sub-area: Load and Resources

Load (MW)	2030	Generation (MW)	2030
Gross Load	4435	Market	2165
AAEE	-95	Wind	0
Behind the meter DG	0	Muni	198
Net Load	**4,340**	QF	0
Transmission Losses	128	Future preferred resource and energy storage	558
Pumps	0	**Total Qualifying Capacity**	**2,921**
Load + Losses + Pumps	**4,468**		

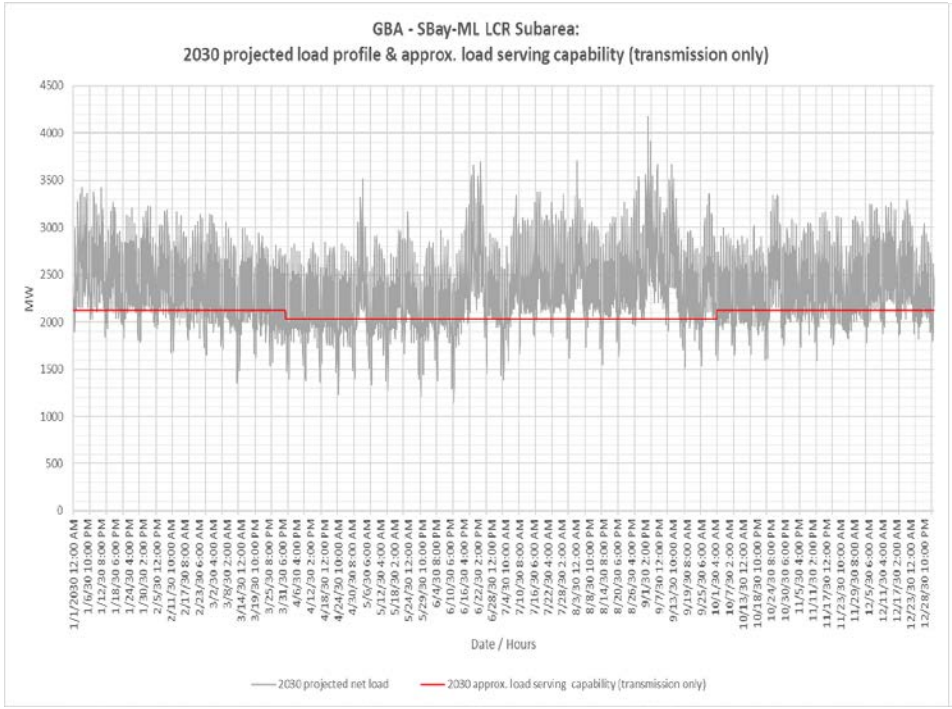
South Bay-Moss Landing Subarea : One-line diagram

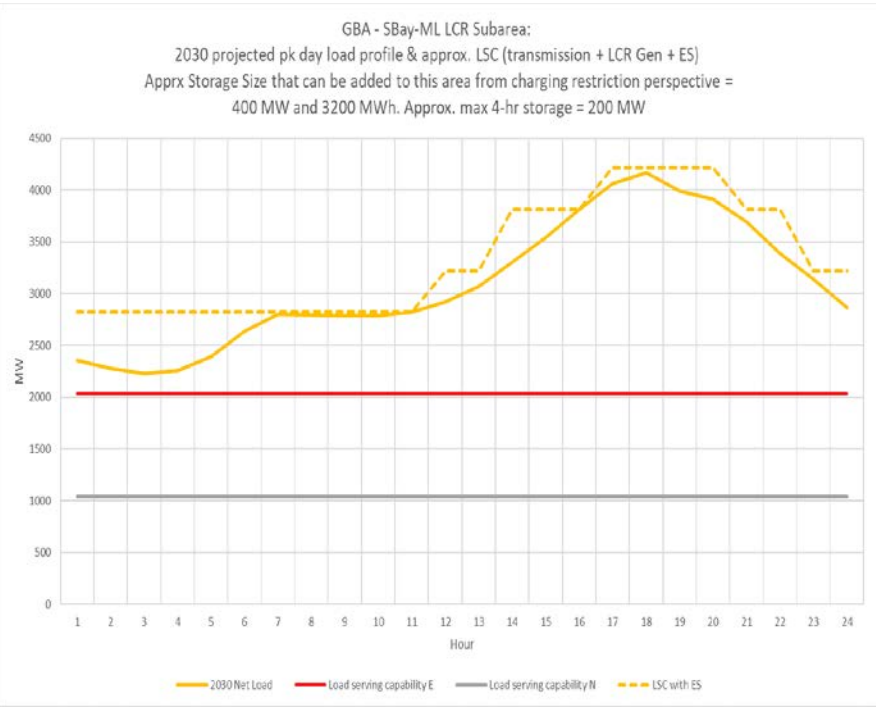


South Bay-Moss Landing Subarea : Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	P6	Moss Landing-Las Aguilas 230 kV	Tesla-Metcalf 500 kV and Moss Landing-Los Banos 500 kV	2185

South Bay-Moss Landing Subarea : Load Profiles

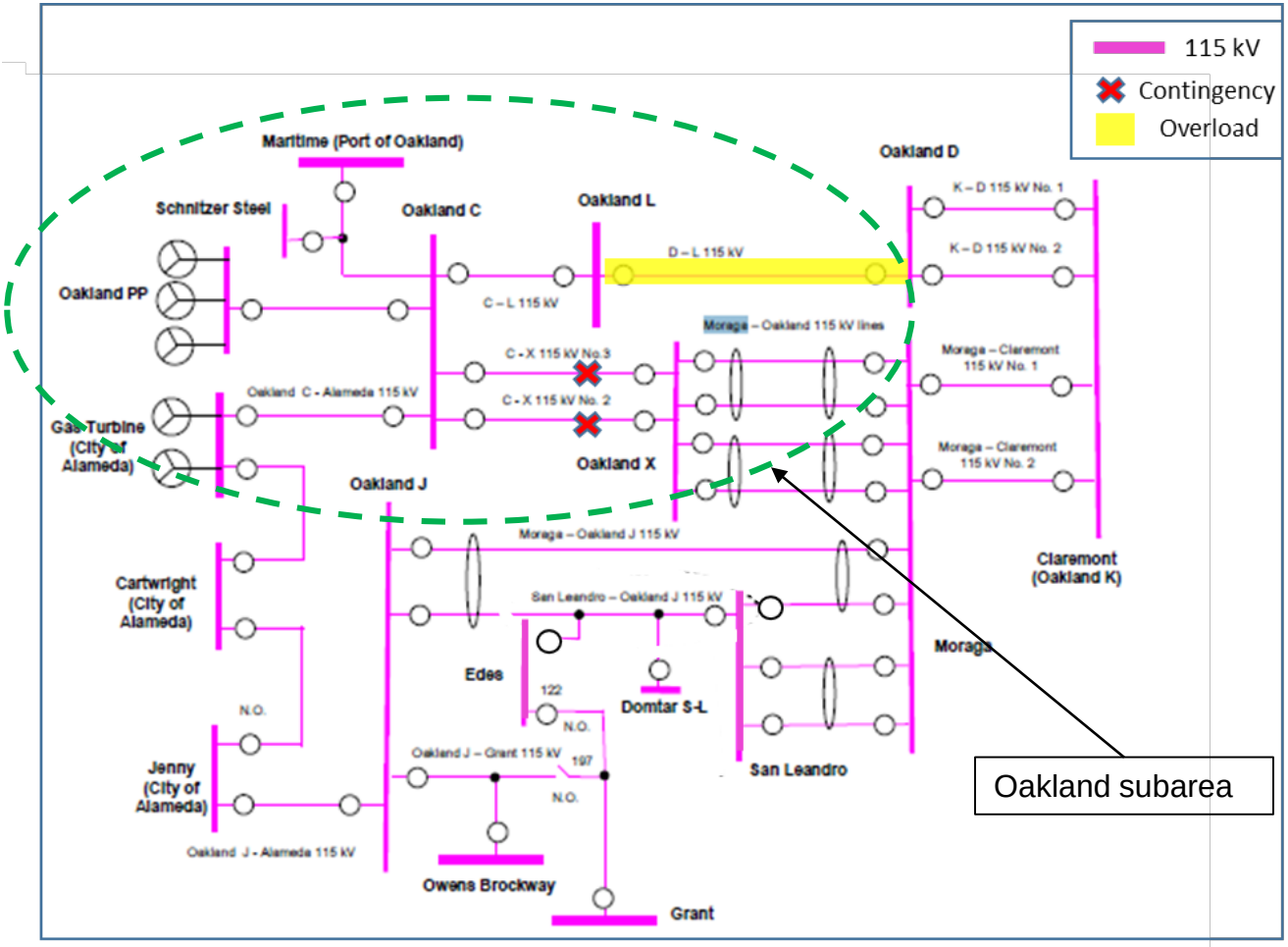




Oakland Sub-area: Load and Resources

Load (MW)	2030	Generation (MW)	2030
Gross Load	193	Market	0
AAEE	-4	Wind	0
Behind the meter DG	0	Muni	48
Net Load	**189**	QF	0
Transmission Losses	0	Future preferred resource and energy storage	36
Pumps	0	**Total Qualifying Capacity**	**84**
Load + Losses + Pumps	**189**		

Oakland Subarea : One-line

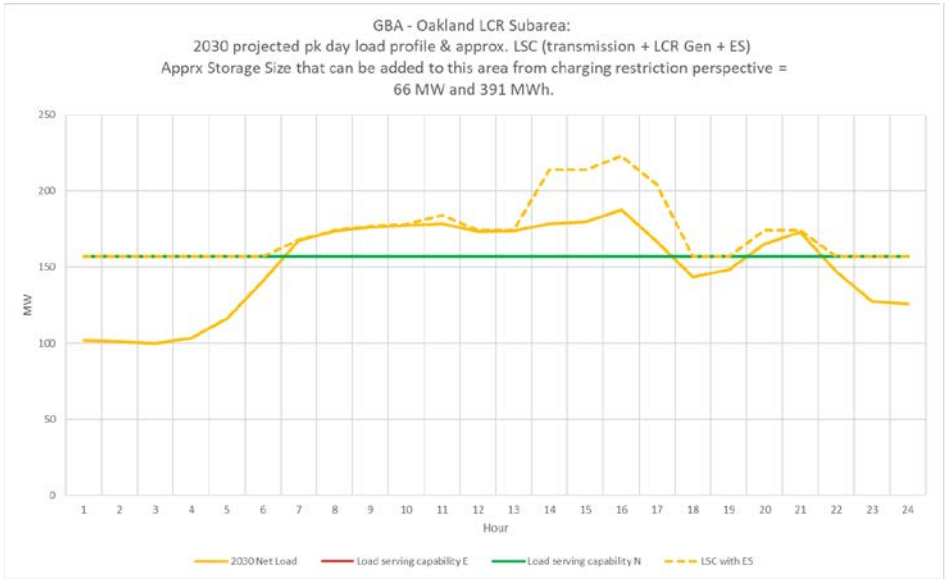


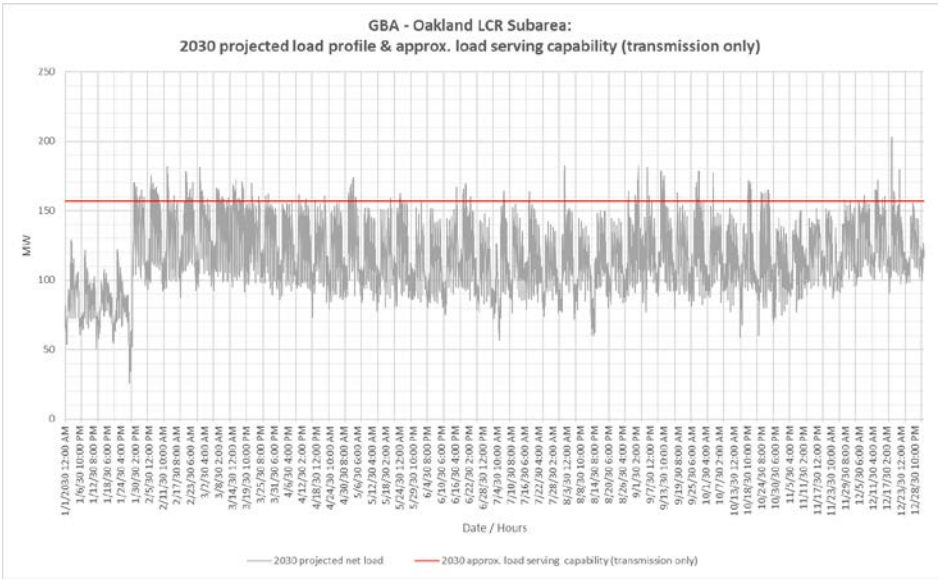
Oakland Subarea : Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	P6	Oakland D-L 115 kV	Oakland C-X #2 & #3 115 kV cables	36*

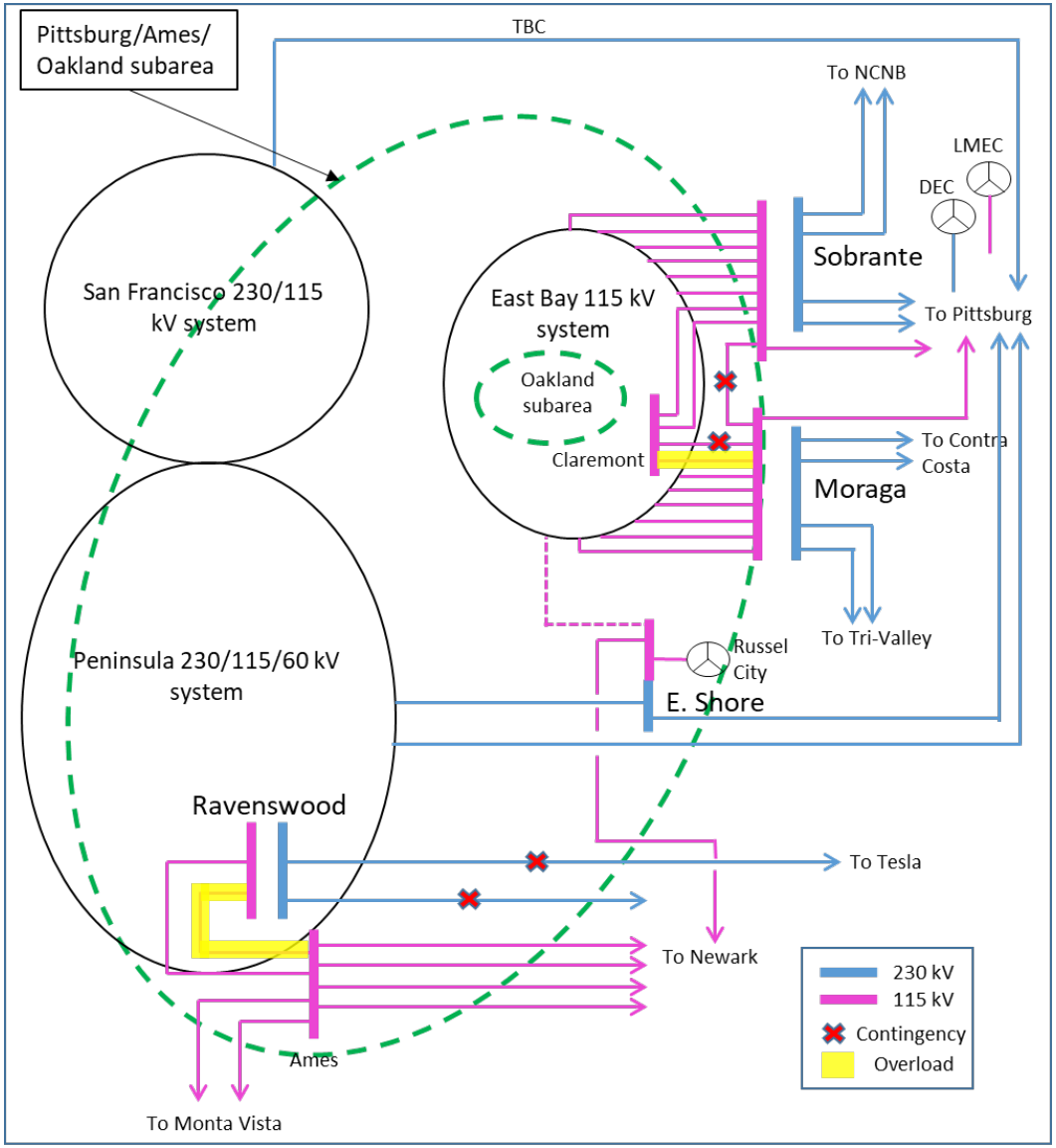
Note:
*This requirement doesn't reflect potential load transfer that could occur following the first contingency. An approved operating procedure including this load transfer could reduce this requirement.

Oakland Subarea : Load Profiles





Ames/Pittsburg/Oakland Subarea : One-line diagram



Ames/Pittsburg/Oakland Subarea : Requirements

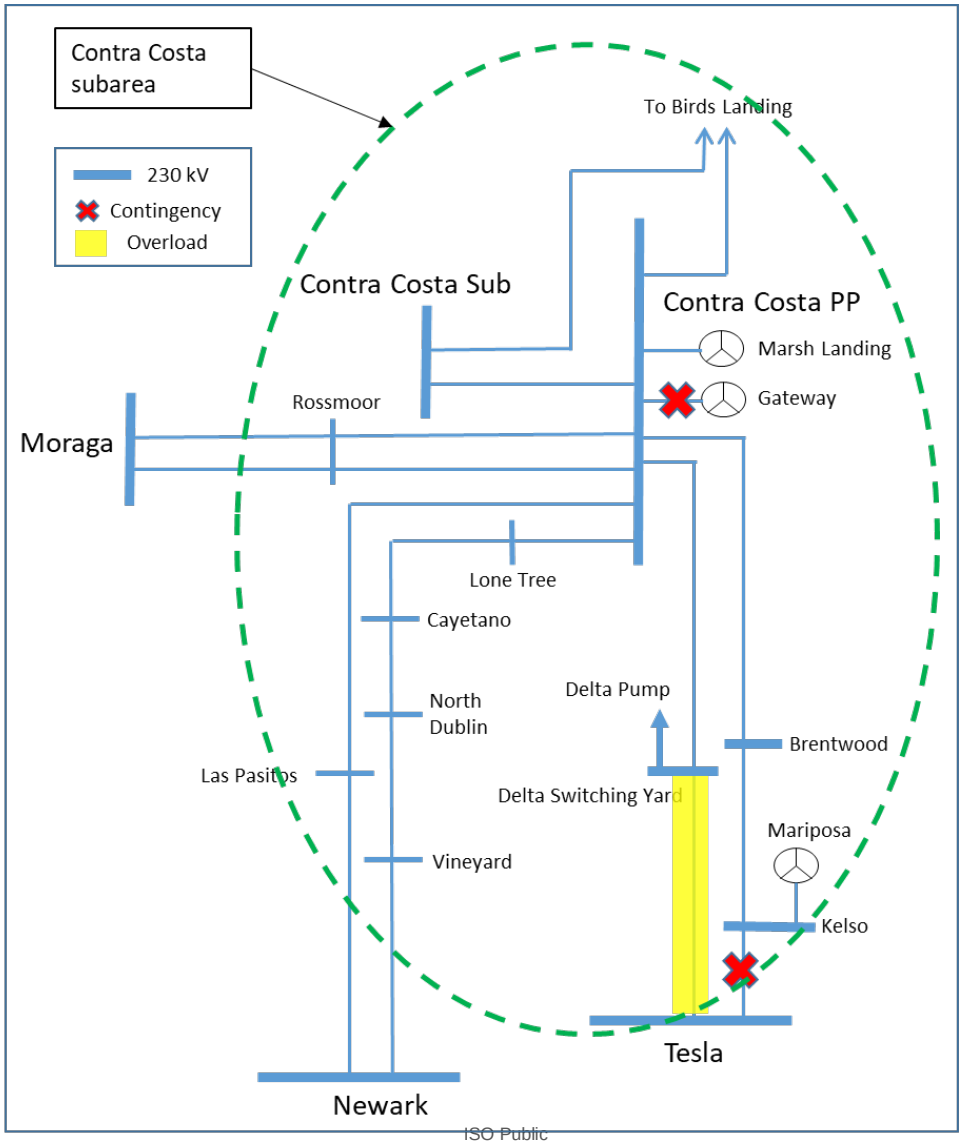
Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	P2 and P7	Ames-Ravenswood #1 115 kV line	Newark-Ravenswood & Tesla-Ravenswood 230 kV lines	1643
		Martinez- Sobrante 115 kV line	Pittsburg Section 1D & 1E 230 kV	

Load Profiles were not created for this sub area as it is a flow through area

Lakeville Sub Area : Requirements

Year	Limit	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	First limit	P6	Thermal overload on Eagle Rock-Cortina 115 kV line	Fulton-Lakeville and Fulton-Ignacio 230 kV lines	636

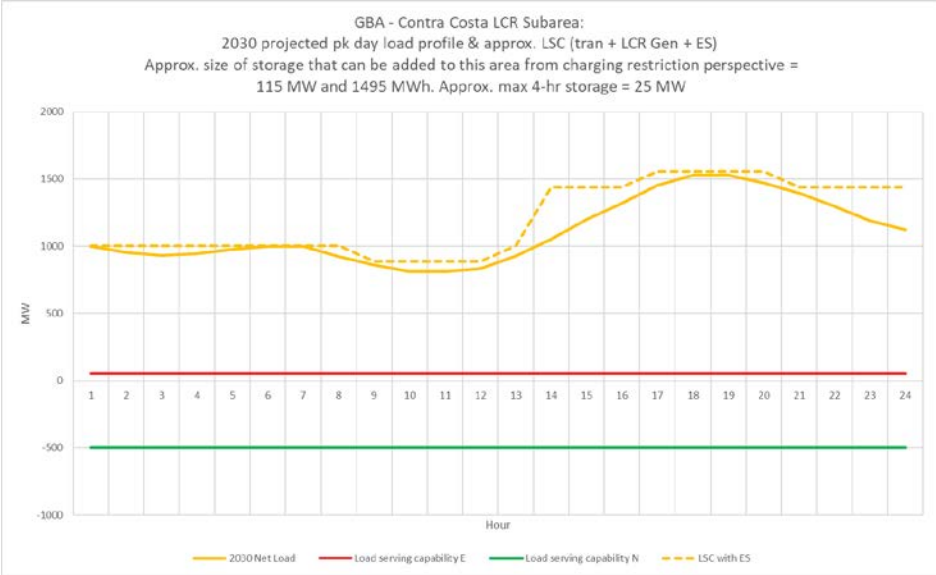
Contra Costa Subarea : One-line

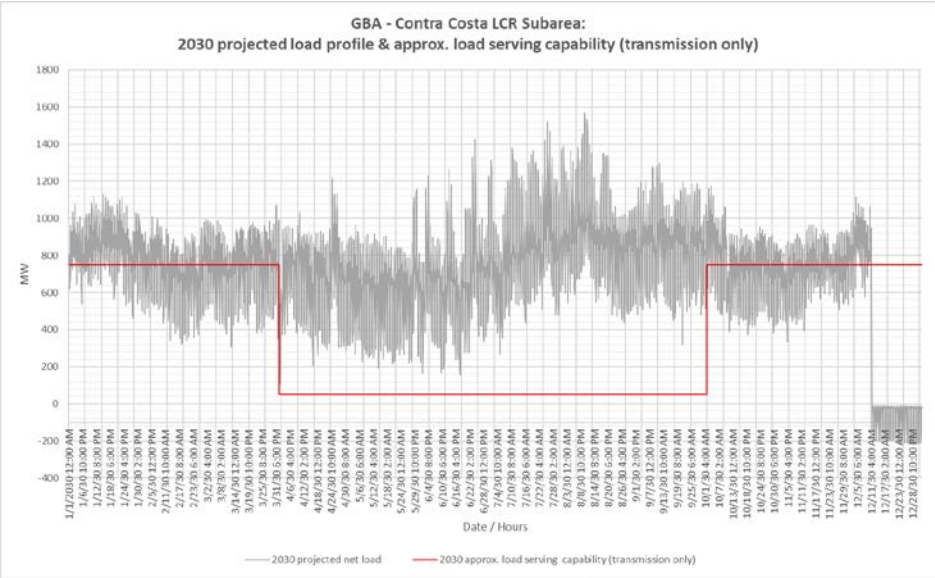


Contra Costa Subarea : Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	P3	Delta Switching Yard-Tesla 230 kV line	Kelso-Tesla 230 kV line and Gateway Unit off-line	1460

Contra Costa Subarea : Load Profiles





Note: Contra Costa is a flow through sub-area. Energy storage amount is calculated using load profile of the most effective load pocket to the sub-area constraint.

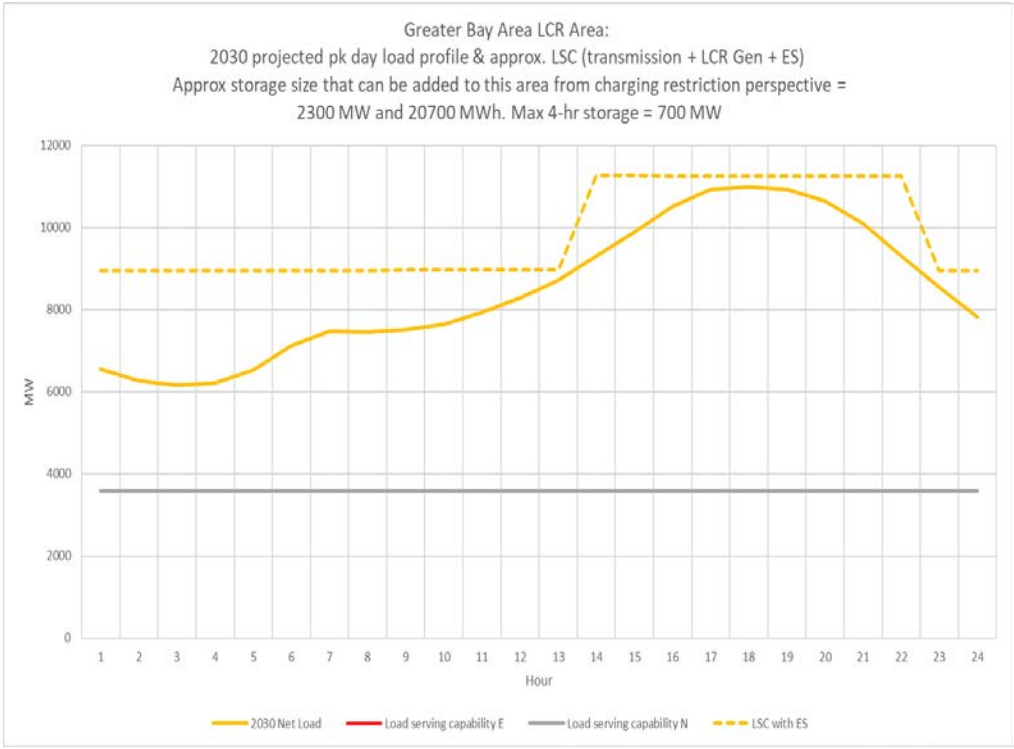
Greater Bay Area Overall: Load and Resources

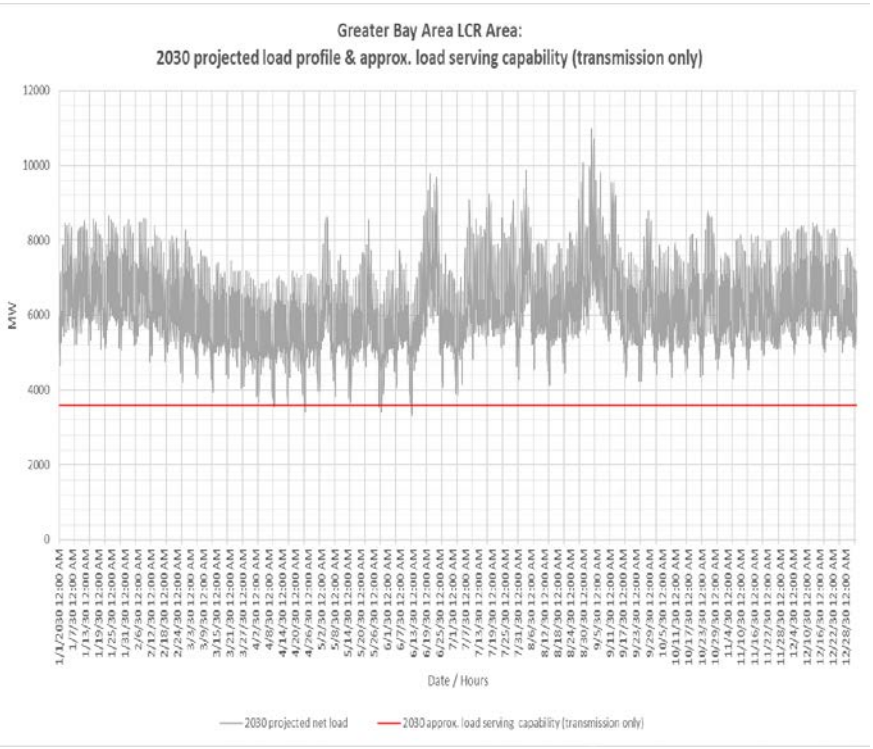
Load (MW)	2030	Generation (MW)	2030
Gross Load	10889	Market/ Net Seller/ Battery	5,895
AAEE	-217	Solar	8
Behind the meter DG	0	Wind	244
Net Load	**10,672**	Muni	377
Transmission Losses	259	QF	227
Pumps	264	Future preferred resource and energy storage	593
Load + Losses + Pumps	**11,195**	**Total Qualifying Capacity**	**7,344**

Greater Bay Area Overall: Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	Multiple	Aggregate of subareas		6272 (250)
2030	P6	Metcalf 500/230 kV #13 transformer	Metcalf 500/230 kV #11 & #12 transformers	7455 (111)

Greater Bay 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
	5903	244	377	227	593	7344

2030 LCR Need	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Need
P6	7344	111	7455

Changes Compared to Previous LCR Requirements

Subarea	2021		2025		2030	
	Load	LCR	Load	LCR	Load	LCR
Llagas	199	31	201	33	198	31
San Jose	2543	793	2527	862(14)	2745	918(250)
South Bay – Moss Landing	4145	1783	4124	1784	4457	2185
Oakland	218	99	219	71	189	36
Pittsburg – Ames – Oakland	NA*	1967	NA*	1761	NA*	1643
Contra Costa	NA*	1119	NA*	1417	NA*	1459
Overall	10780	6353	10743	6110	11195	7455(111)

2030 Draft LCR Study Results
Kern Area

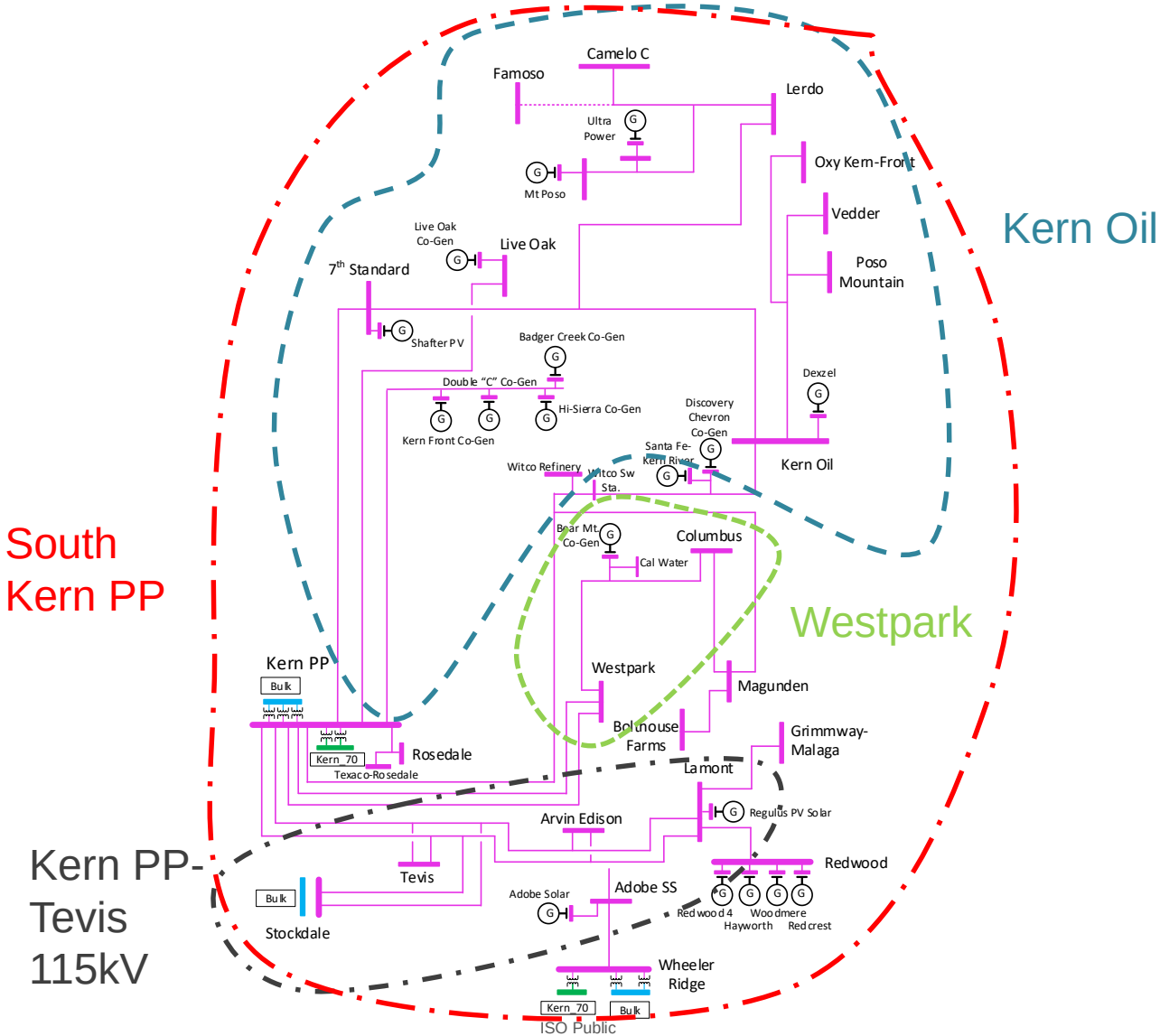
Lindsey Thomas

Regional Transmission Engineer

2020-2021 Transmission Planning Process Stakeholder Meeting

September 23 - 24, 2020

Kern Area LCR Sub-Areas



New Major Projects

Project Name	Expected ISD
Kern PP 230 kV Area Reinforcement	2021
Kern PP 115 kV Area Reinforcement Project	2023
Midway – Kern PP #2 230 kV Line	2023
Wheeler ridge Junction Station Project	On Hold

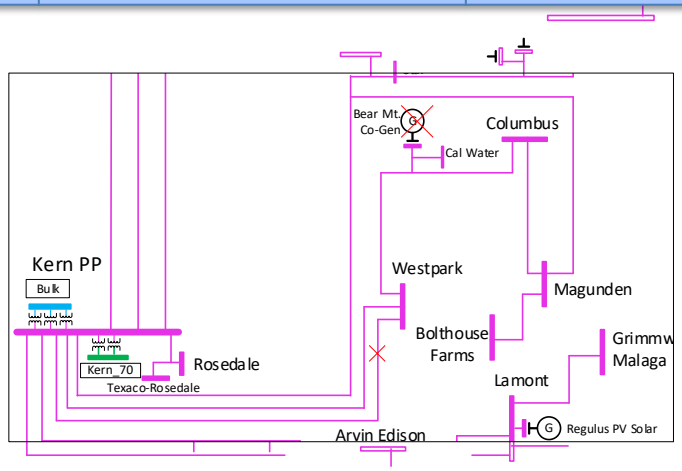
Kern Area Overall: Load and Resources

Load (MW)	2025	2030	Generation (MW)	2025	2030
Gross Load	1327*	1125	Market/ Net Seller/ Battery	330	330
AAEE	-11	-26	Solar	78	78
Behind the meter DG	0	0	Wind	0	0
Net Load	**1316**	**1099**	Muni	0	0
Transmission Losses	15	11	QF	5	5
Pumps	320	0	Future preferred resource and energy storage	0	0
Load + Losses + Pumps	**1651**	**1110**	**Total Qualifying Capacity**	**413**	**413**

*Kern Area LCR definition was changed due to modeling of approved transmission upgrades that are now on Hold.

Kern Area LCR
Westpark Sub-Area

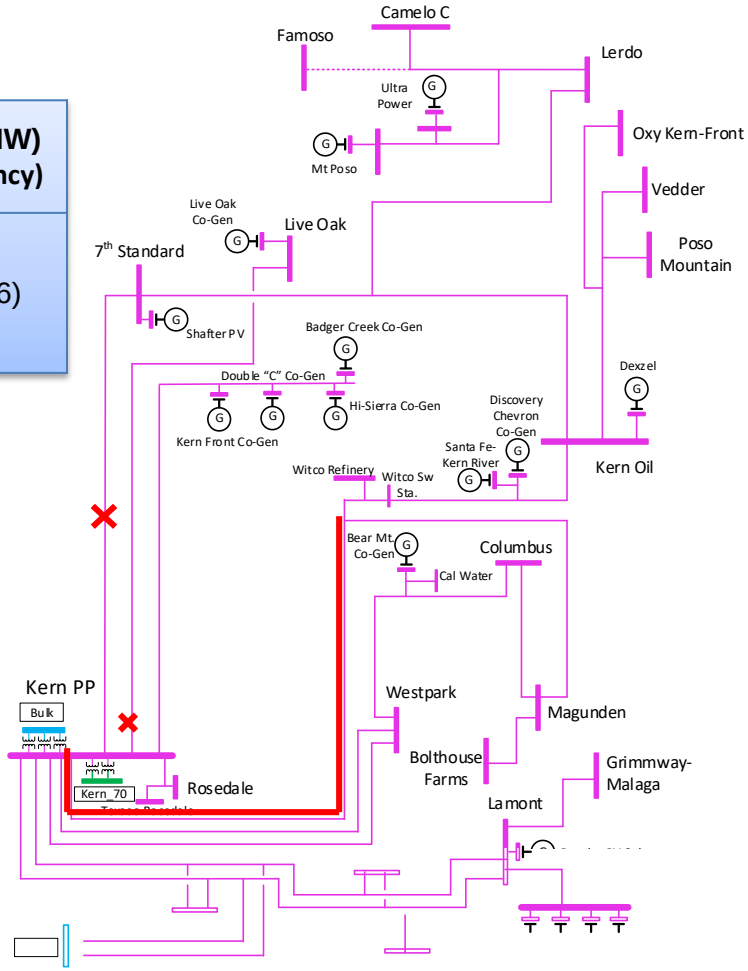
Year	Cat	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	P3	Kern-West Park #2 115 kV	Kern-West Park #1 115 kV and PSE-Bear Generation	150(7)



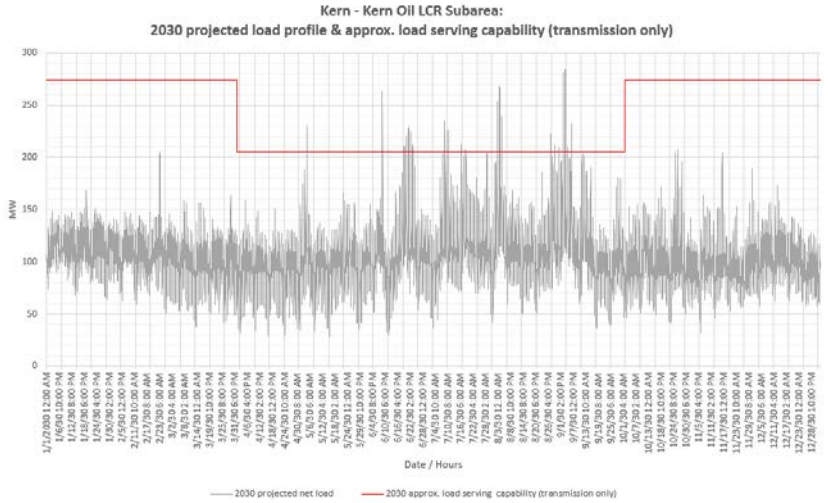
Kern Area LCR

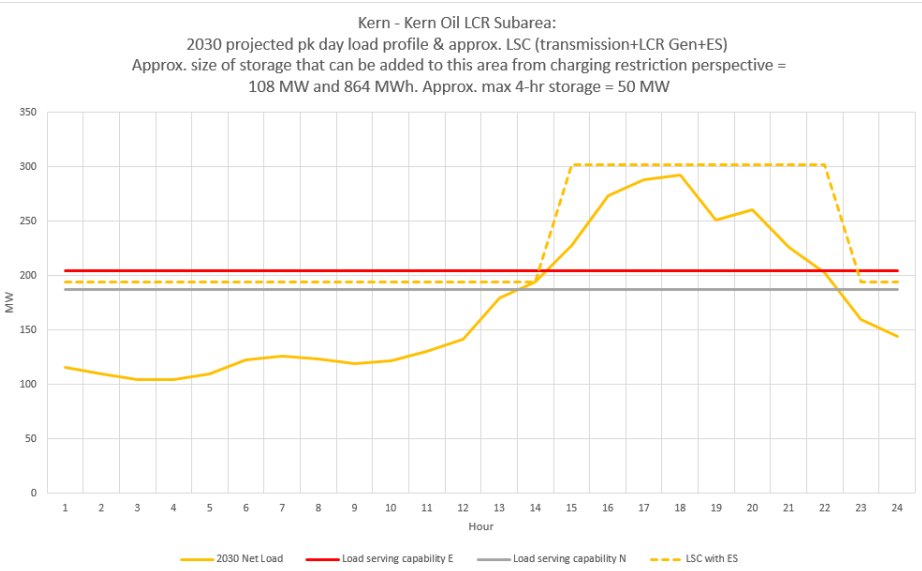
Kern Oil Sub-Area

Year	Cat	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	P6	Kern Power to Kern Water 115 kV line section	Kern PP-7th Standard 115 kV lines & Kern PP-Live Oak 115 kV Line	115(16)



Kern Oil Sub-Area : Load Profile and Maximum Storage

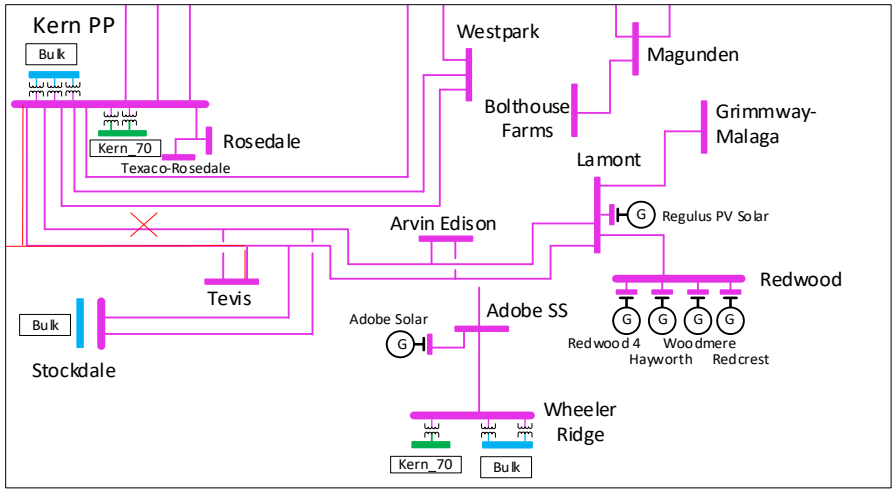




Kern Area LCR

Kern PP-Tevis 115kV Sub-Area

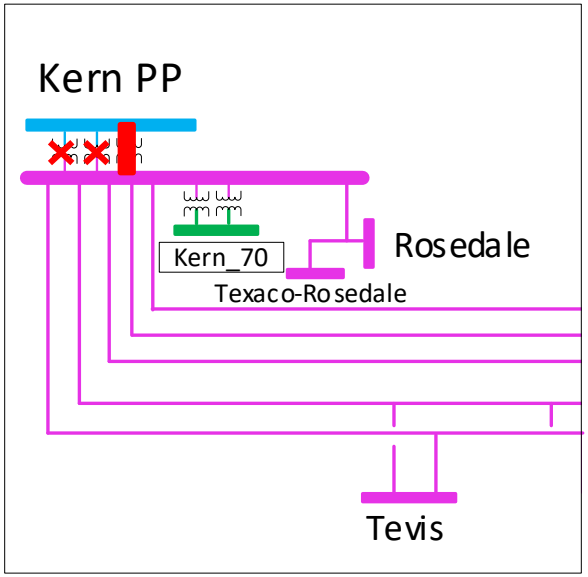
Year	Cat	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	P2	Kern Power -TevisJ2 115 kV Line	KERN-TEVIS-STOCKDALE 115kV (KERN PWR-TEVISJ1)	(57)



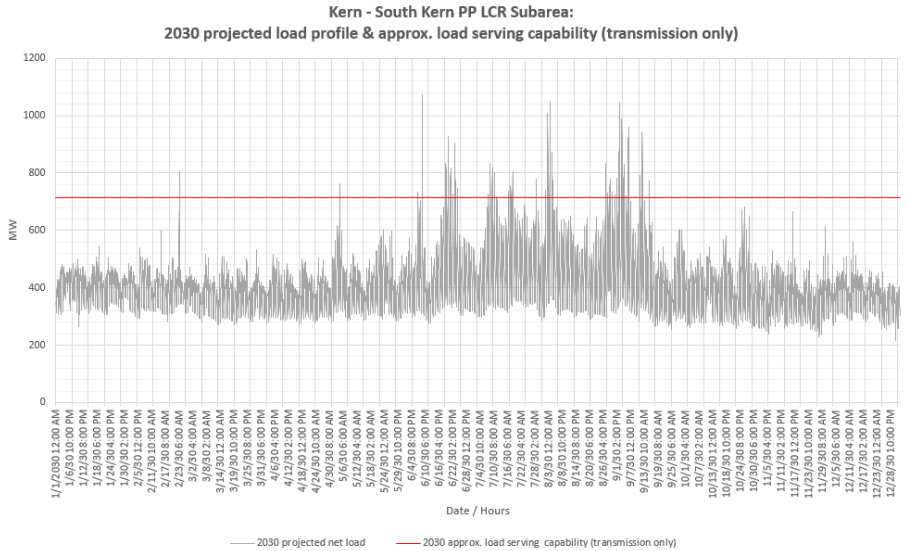
Kern Area LCR

South Kern PP Sub-Area

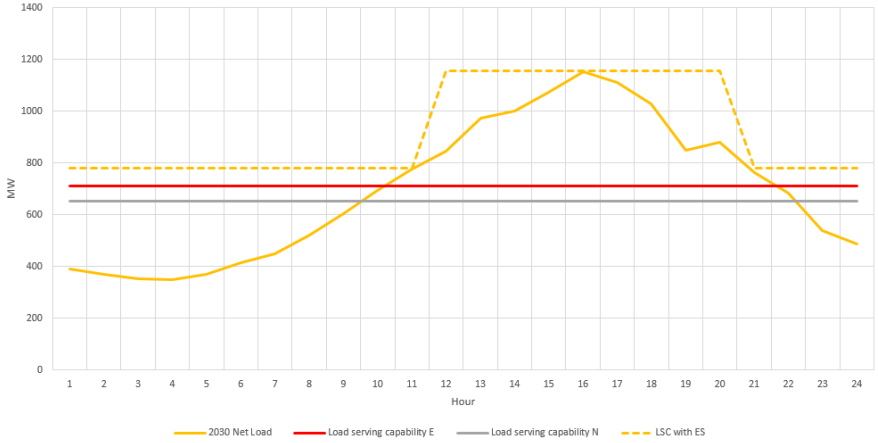
Year	Cat	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	P6	Kern 230/115 kV T/F # 5	Kern 230/115 kV T/F # 3 & Kern 230/115 kV T/F # 4	502(95)



South Kern PP Sub-Area : Load Profile and Maximum Storage



Kern - South Kern PP LCR Subarea:
2030 projected pk day load profile & aprx. LSC (transmission+LCR Gen+ES)
Aprx. size of storage that can be added to this area from charging restriction perspective =
377MW and 3393MWh. Aprx. max 4-hr storage = 153MW



Kern Total LCR Need

2030 LCR Need	Existing Generation Capacity Needed (MW)	NQC Deficiency (MW)	Total MW Need
Category P6 (Multiple)	413	89	502

Changes Compared to Previous LCR Requirements

Subarea	2021		2025		2030	
	Load	LCR	Load	LCR	Load	LCR
Kern PP 70 kV	226	81*	243	90*	NA	NA
West Park	162	58*	465	20	434	150*
Kern Oil**	768	156*	780	69	619	115*
KernPP-Tevis 115 kV	198	55*	NA	NA	185	57*
South Kern	1285	632*	1636	186	1110	502*
Kern Overall	1285	632*	1651	276*	1110	502*

Load is Net Load+Losses

* Includes Deficiency

** Kern Oil Load includes West Park & Tevis Loads

- In 2025 area load had increased due to addition of Pumping load, Bakersfield, Stockdale and additional 70 kV load due to closing of Weedpatch Shoofly . This resulted in bigger Kern LCR area definition.

2030 Long-Term LCR Study Draft Results North Coast & North Bay Area

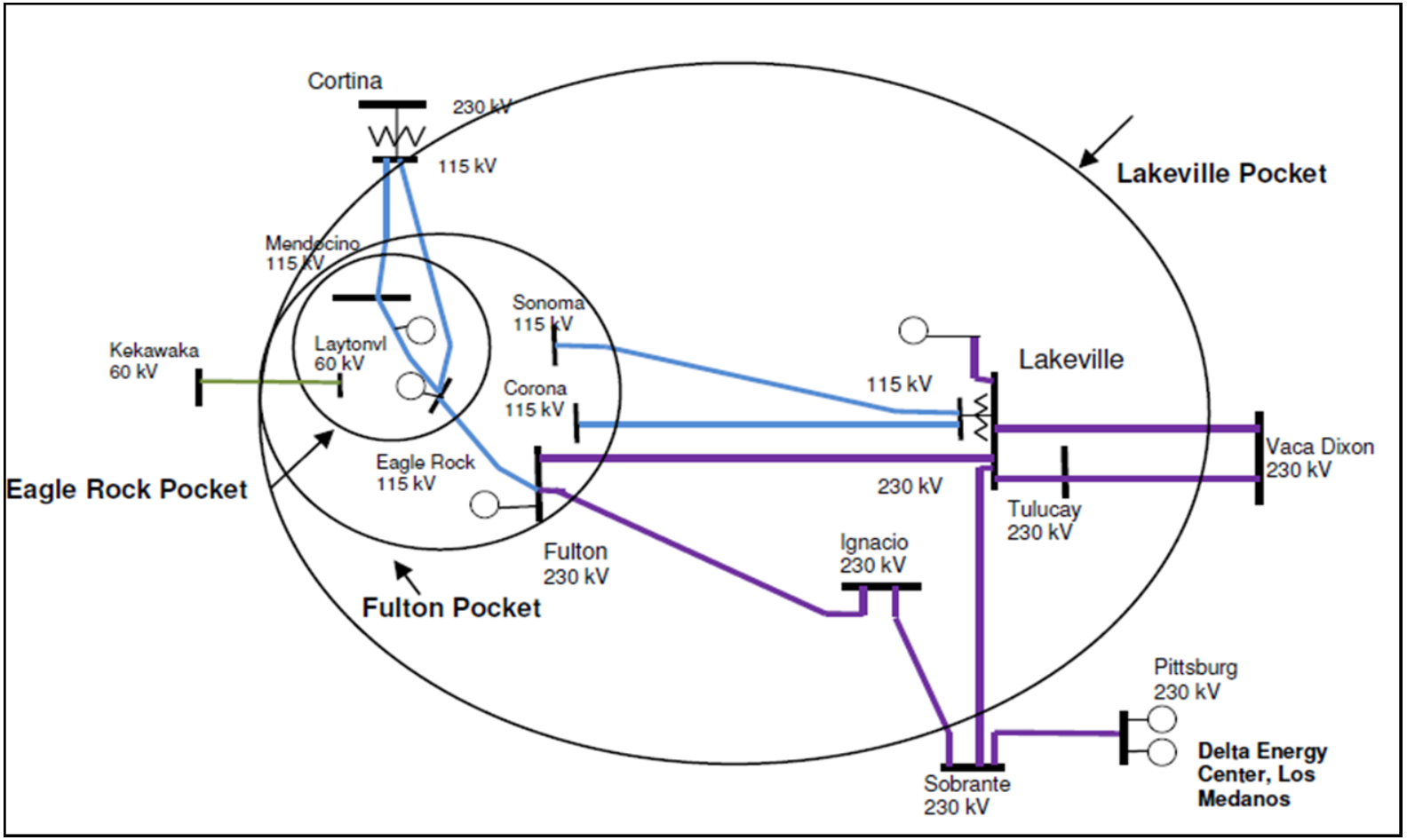
Bryan Fong

Senior Regional Transmission Engineer

2020-2021 Transmission Planning Process Stakeholder Meeting

September 23 - 24, 2020

North Coast & Bay Area Transmission System



New major transmission projects

Project Name	Expected ISD
Clear Lake 60kV System Reinforcement - Revised Scope	2023
Ignacio-Alto 60kV Line Conversion - Revised Scope	2023
Lakeville 60kV Area Reinforcement	2021
Vaca-Lakeville 230kV Corridor Series Compensation	2020

Power plant changes

Additions:

- No new resource addition

Retirements:

- None

Load and Resources

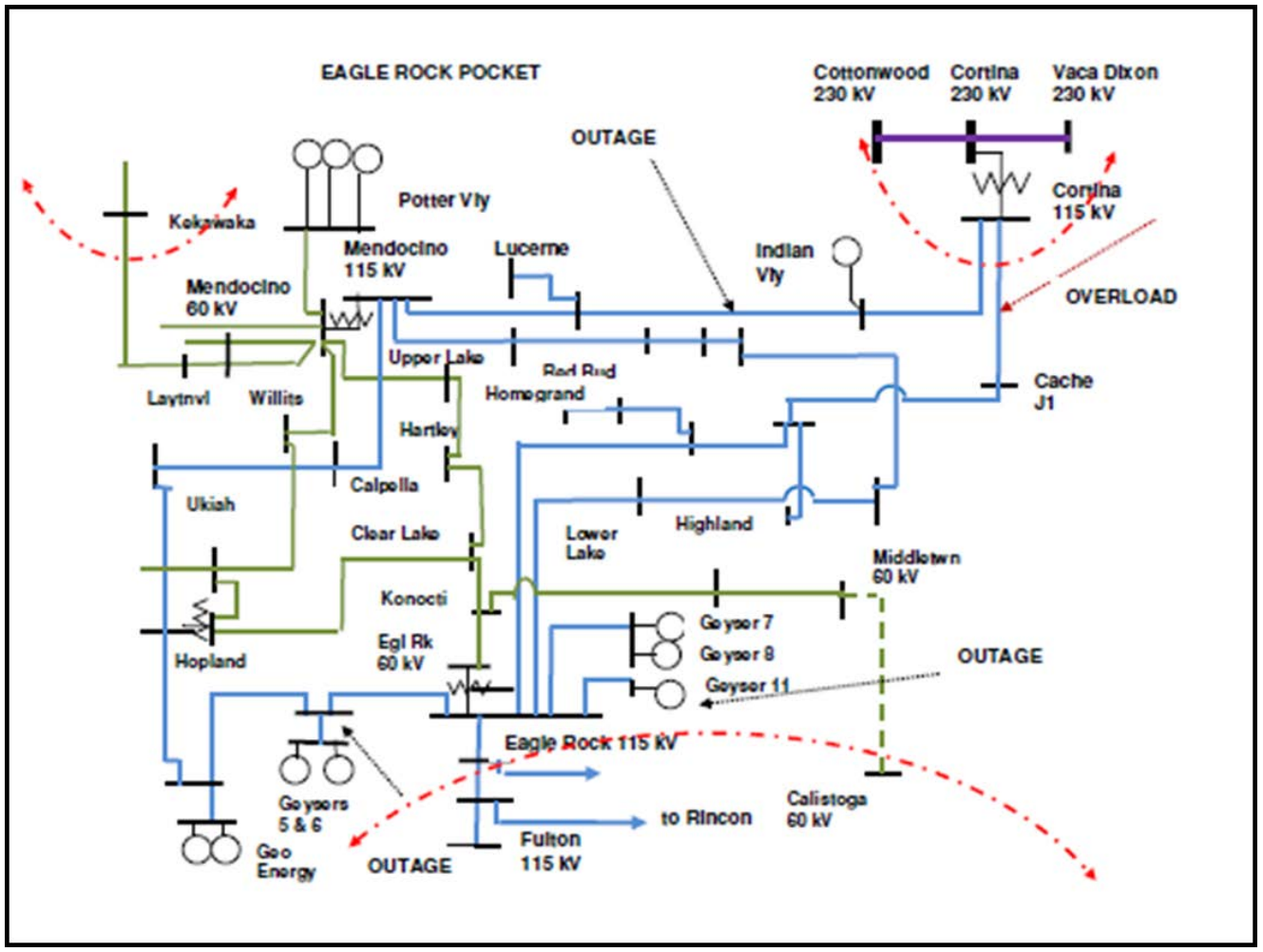
Load (MW)		Generation (MW)	
Gross Load	1492	Market	723
AAEE	-31	Wind	0
Behind the meter DG	0	Muni	114
Net Load	**1,461**	QF	5
Transmission Losses	53	**Total Qualifying Capacity**	**842**
Pumps	0		
Load + Losses + Pumps	**1,514**		

Eagle Rock Sub Area : Requirements

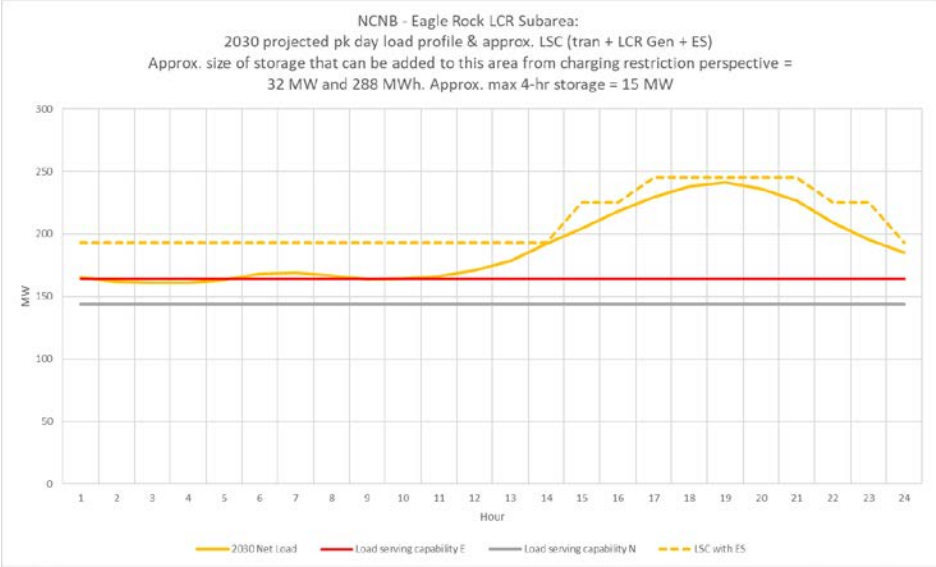
Year	Limit	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	First Limit	P3	Thermal overload on Eagle Rock-Cortina 115 kV line*	Cortina-Mendocino 115 kV line with Geyser #11 unit out of service	122
2030	First Limit	P6	Thermal overload on Eagle Rock-Cortina 115 kV line*	Cortina-Mendocino and Geysers #3-Geysers #5 115 kV lines	125

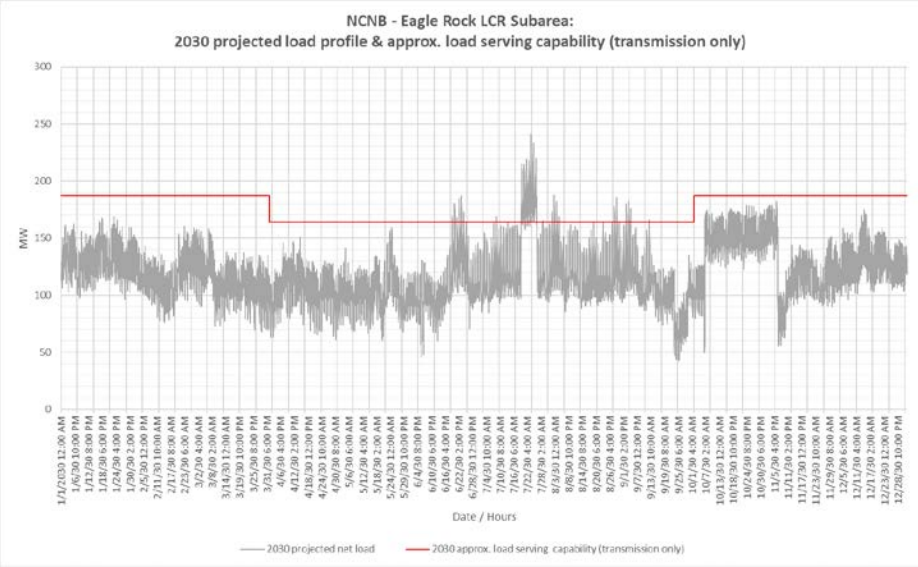
*Note: With Vaca Dixon-Lakeville and Vaca Dixon-Tulucay 230kV line reactors bypassed

Eagle Rock Sub Area : Requirements

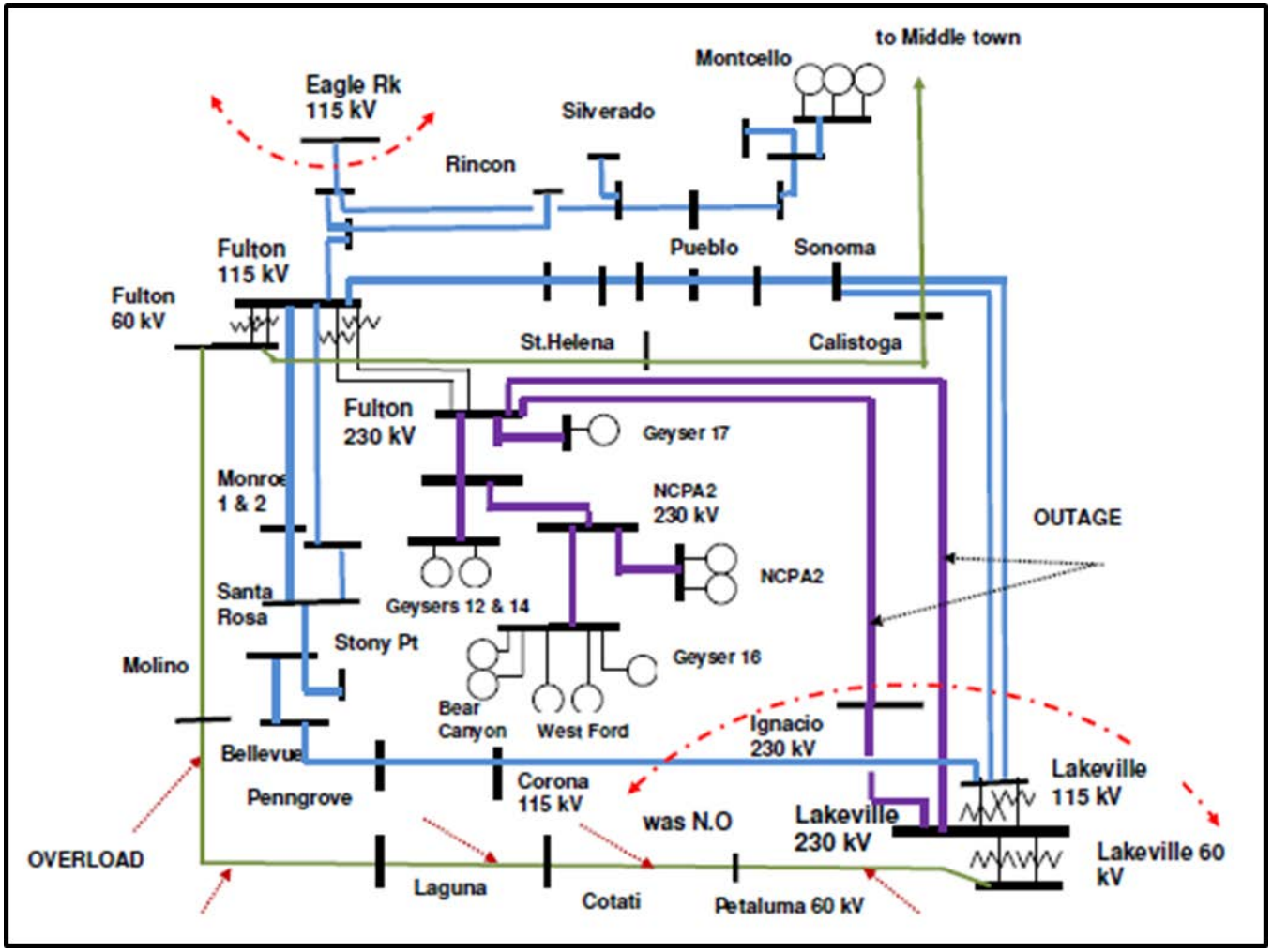


Eagle Rock Sub Area : Load Profiles





Fulton Sub Area : Removed



Fulton Sub Area : Removed

Before

- Contingency: Fulton-Lakeville and Fulton-Ignacio 230 kV lines
- Limiting component: Thermal overload on Lakeville-Petaluma-Cotati 60 kV Line

Now - Lakeville-Petaluma-Cotati 60 kV permanently open

- Contingency: Fulton-Lakeville and Fulton-Ignacio 230 kV lines
- Limiting component: Thermal overload on Eagle Rock-Cortina 115 kV line
- Same as Lakeville Pocket

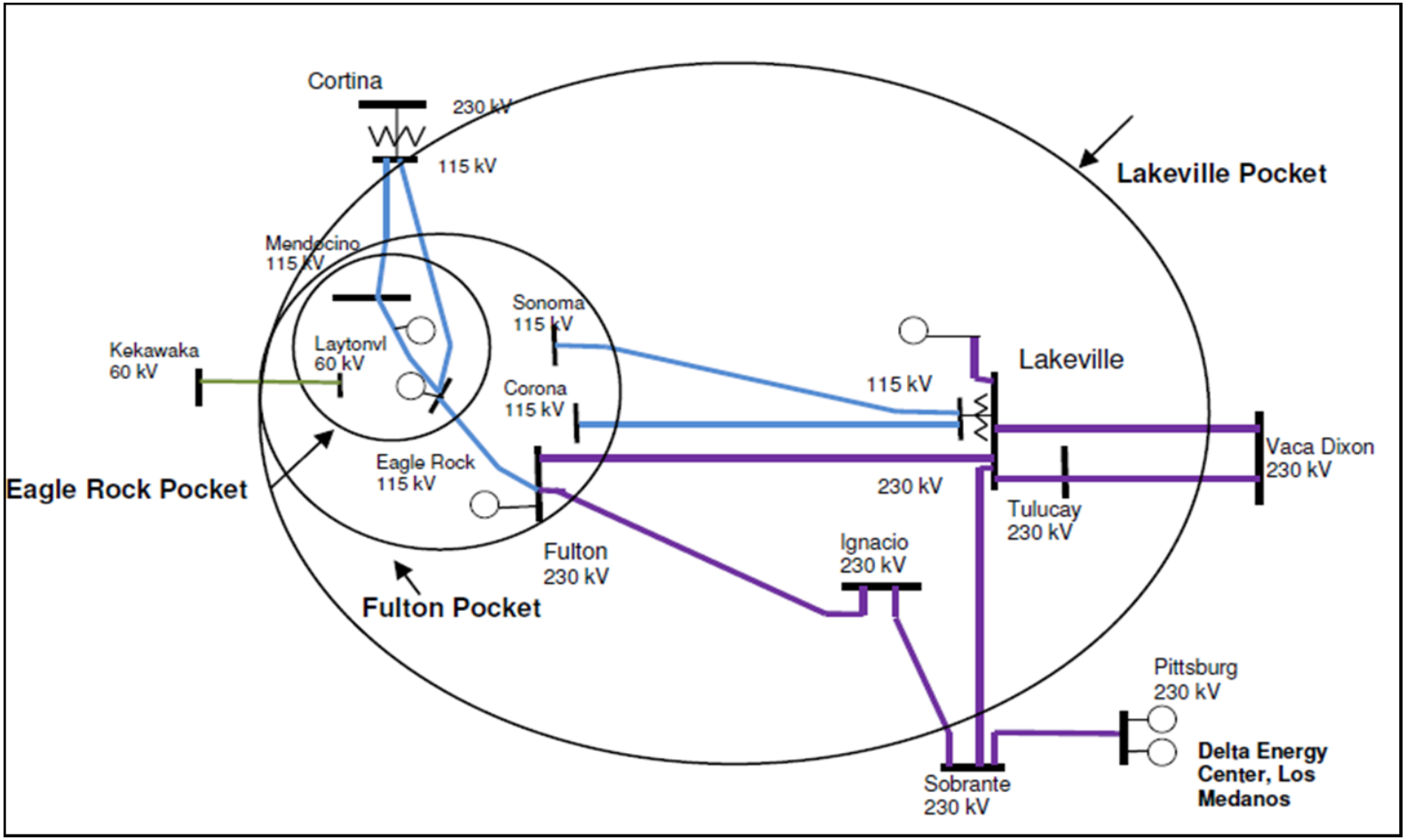
Lakeville Sub Area : Requirements

Year	Limit	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	First limit	P6	Thermal overload on Eagle Rock-Cortina 115 kV line	Fulton-Lakeville and Fulton-Ignacio 230 kV lines	636

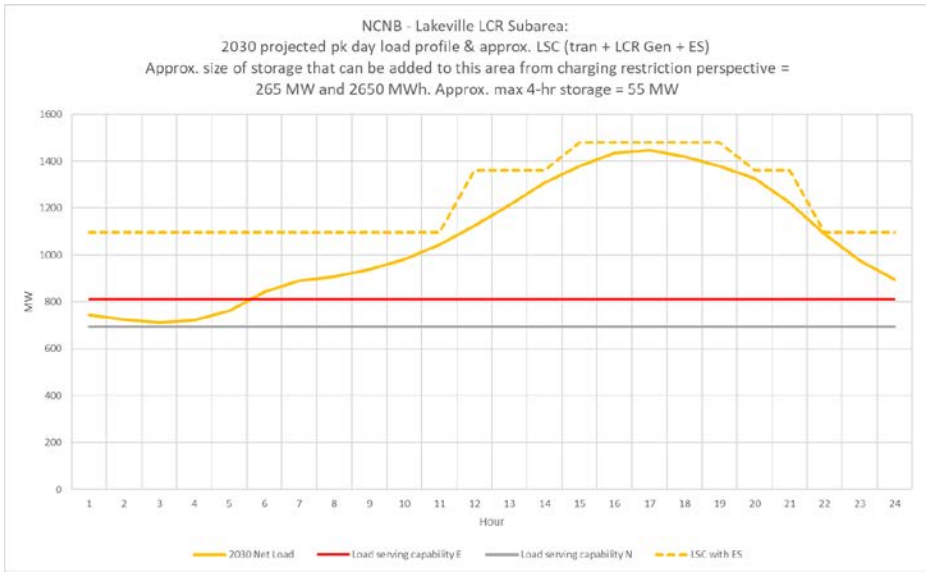
Associated Ames/Pittsburg/Oakland Area : Requirement

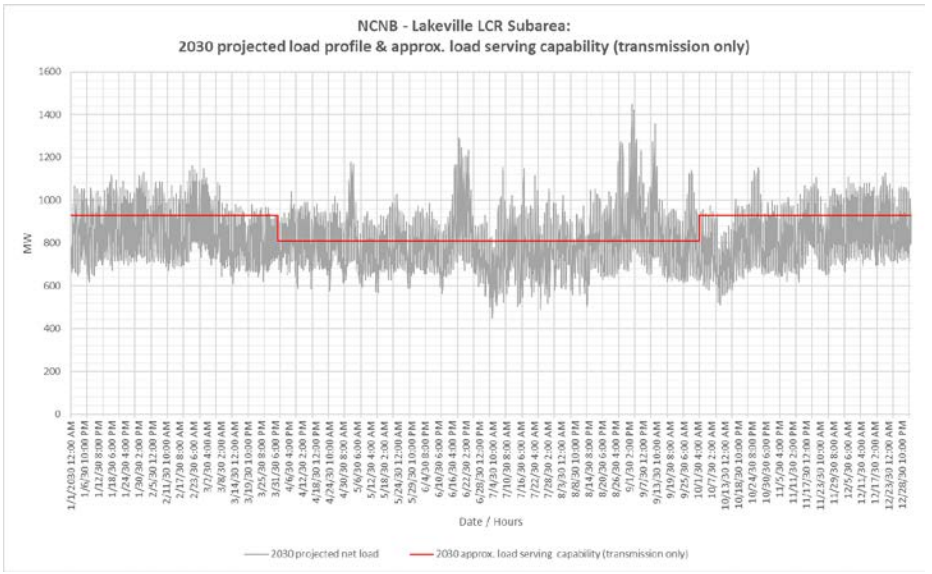
Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	P2 and P7	Ames-Ravenswood #1 115 kV line	Newark-Ravenswood & Tesla-Ravenswood 230 kV lines	1643
		Martinez-Sobrante 115 kV line	Pittsburg Section 1D & 1E 230 kV	

North Coast & Bay Area Transmission System



Lakeville Sub Area : Load Profiles





North Coast & North Bay Area
Total LCR Need

2030 LCR Need	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Need
P6	636	0	636

Changes Compared to Previous LCR Requirements

Subarea	2021		2025		2030	
	Load	LCR	Load	LCR	Load	LCR
Eagle Rock	232	184	235	188	240	125
Fulton	866	340	872	272	N/A	N/A
Overall	1456	843	1481	837	1514	636

2030 Long-Term LCR Study Draft Results Sierra Area

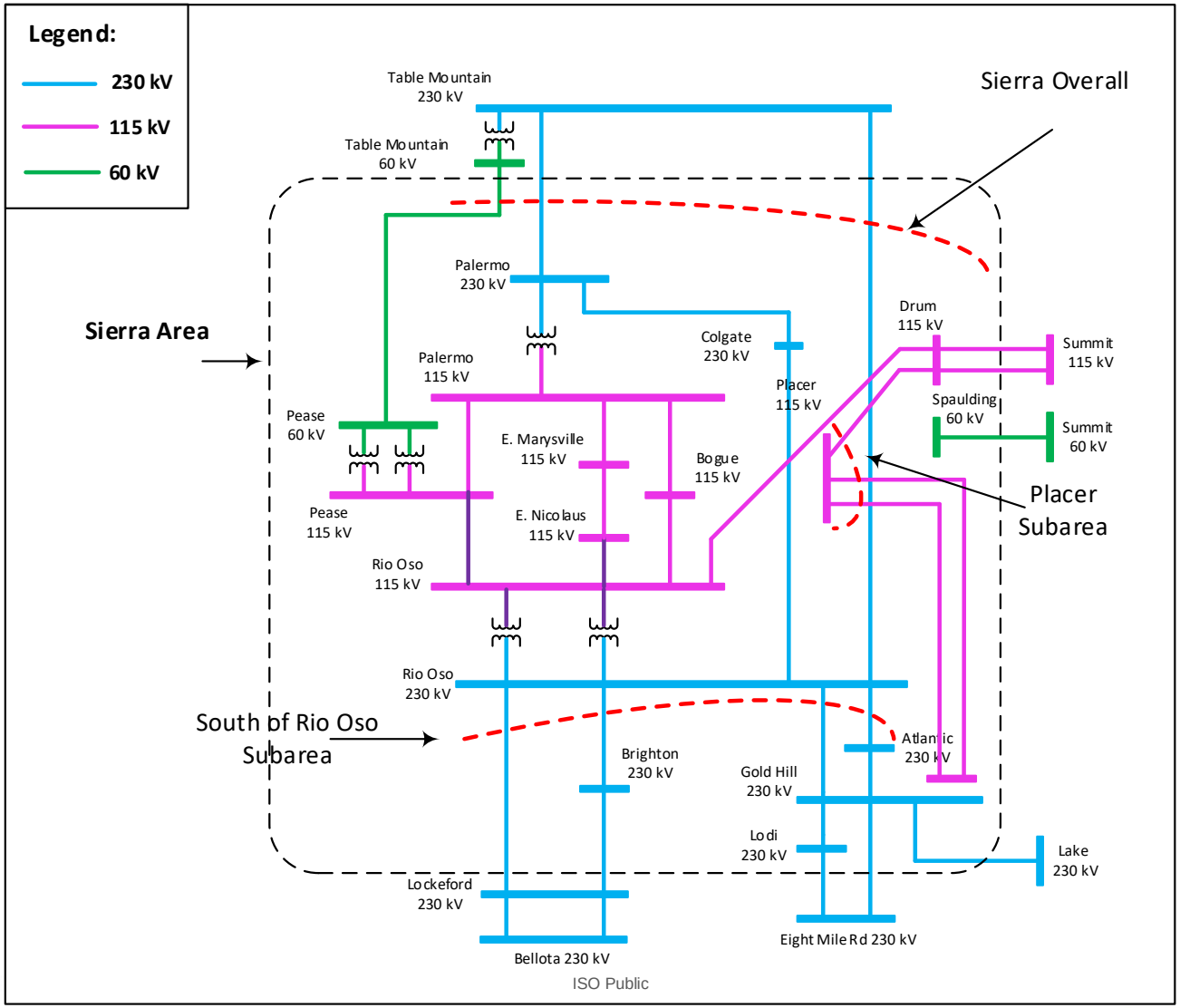
Ebrahim Rahimi

Regional Transmission Engineer Lead

2020-2021 Transmission Planning Process Stakeholder Meeting

September 23 - 24, 2020

Sierra Area Transmission System & LCR Sub-areas



New major transmission projects

Project Name	Expected ISD
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
East Marysville 115/60 kV	Dec-22
Gold Hill 230/115 kV Transformer Addition	Dec-24

Power plant changes

Additions:

- Grizzly PH POI change

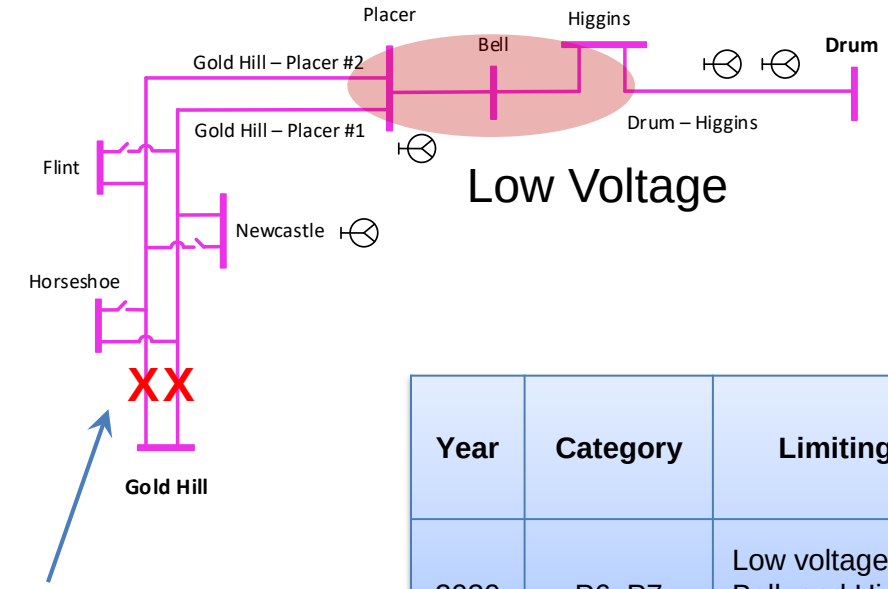
Retirements:

- Greenleaf 1

Sierra Area Overall:
Load and Resources Forecast in 2030

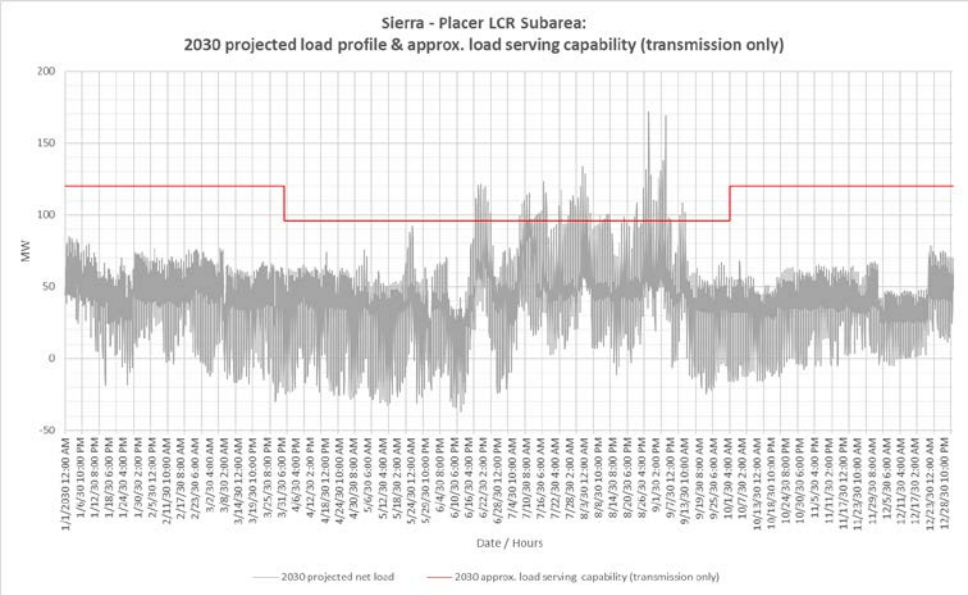
Load (MW)		Generation (MW)	
Gross Load	1,911	Market/ Net Seller/ Battery	938
AAEE	-42	Solar	5
Behind the meter DG	0	Wind	0
Net Load	**1,869**	Muni	1,142
Transmission Losses	87	QF	41
Pumps	0	Future preferred resource and energy storage	0
Load + Losses + Pumps	**1,957**	**Total Qualifying Capacity**	**2,126**

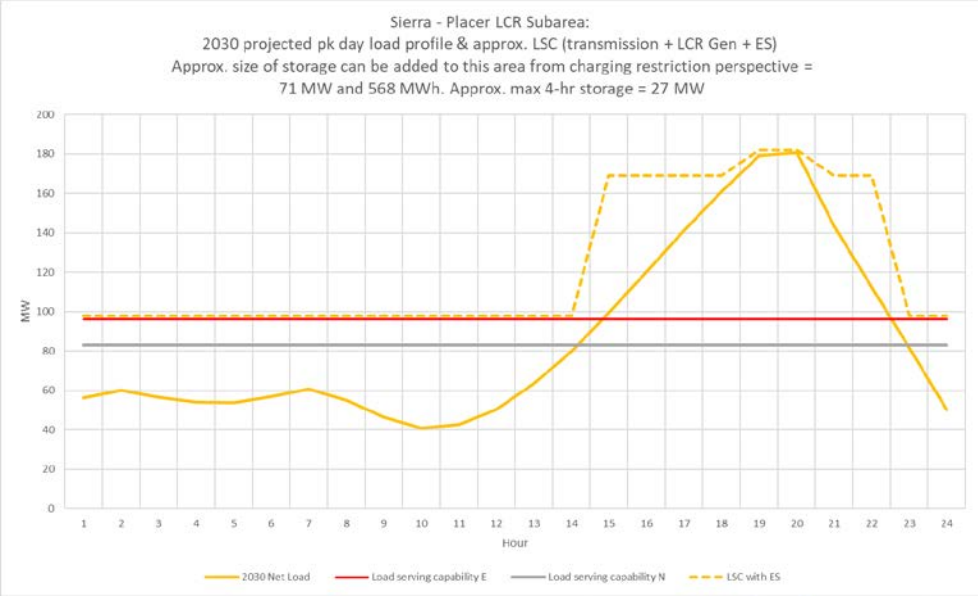
Placer Sub-Area: Requirements



Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	P6, P7	Low voltage at Placer, Bell, and Higgins 115 kV buses	Gold Hill – Placer #1 and #2 115 kV lines	106 (13)

Placer Sub-Area : Load Profile and Maximum Storage

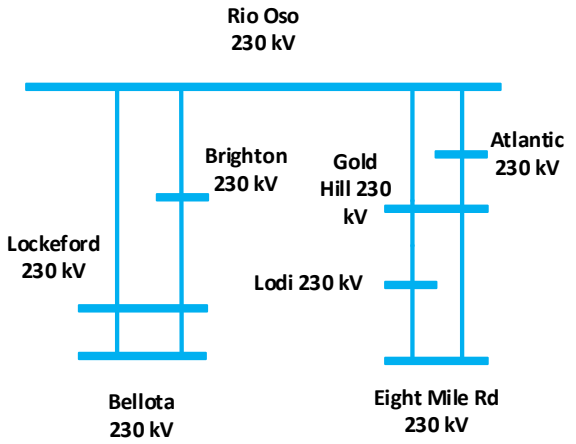




California ISO

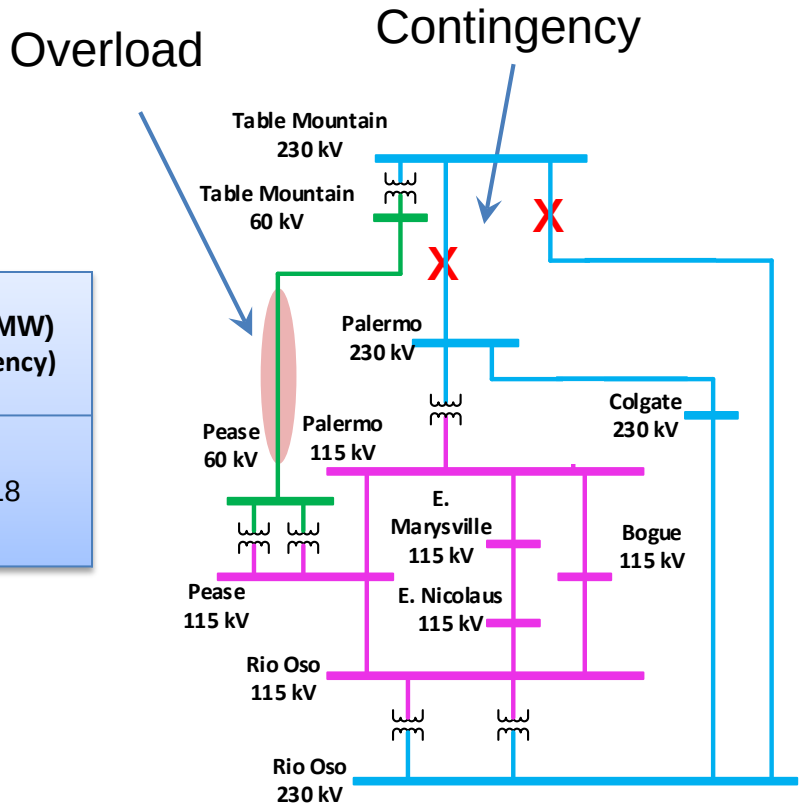
South of Rio Oso Sub-Area: Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	P6	Rio Oso – Atlantic 230 kV	Rio Oso – Gold Hill 230 kV Rio Oso – Brighton 230 kV	227



South of Table Mountain Sub-Area: Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	P6, P7	Table Mountain – Pease 60 kV	DCTL of Table Mtn. – Palermo and Table Mtn. Rio Oso 230 kV lines	1,518



Changes Compared to Previous LCR Requirements

Subarea	2021		2025		2030	
	Load	LCR	Load	LCR	Load	LCR
Placer	178	93	179	93	181	106
South of Rio Oso	N/A *	665	N/A *	223	N/A *	227
South of Table Mountain	N/A *	1,821	N/A *	1,367	N/A *	1,518
Gold Hill - Drum	508	416	512	142	Not an LCR subarea after project implementation	
Pease	155	83	Not an LCR subarea after project implementation			
Drum - Rio Oso	N/A	700	Not an LCR subarea after project implementation			
South of Palermo	N/A	1,587	Not an LCR subarea after project implementation			
Total	1,865	2,110	1,918	1,412	1,957	1,531

Note: LCR increases from 2025 to 2030 are mostly due to increase in load forecast.

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

Sierra Area Total LCR Need

Study Year	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Need
2030	1,518	13	1,531

2030 Long-Term LCR Study Draft Results Stockton Area

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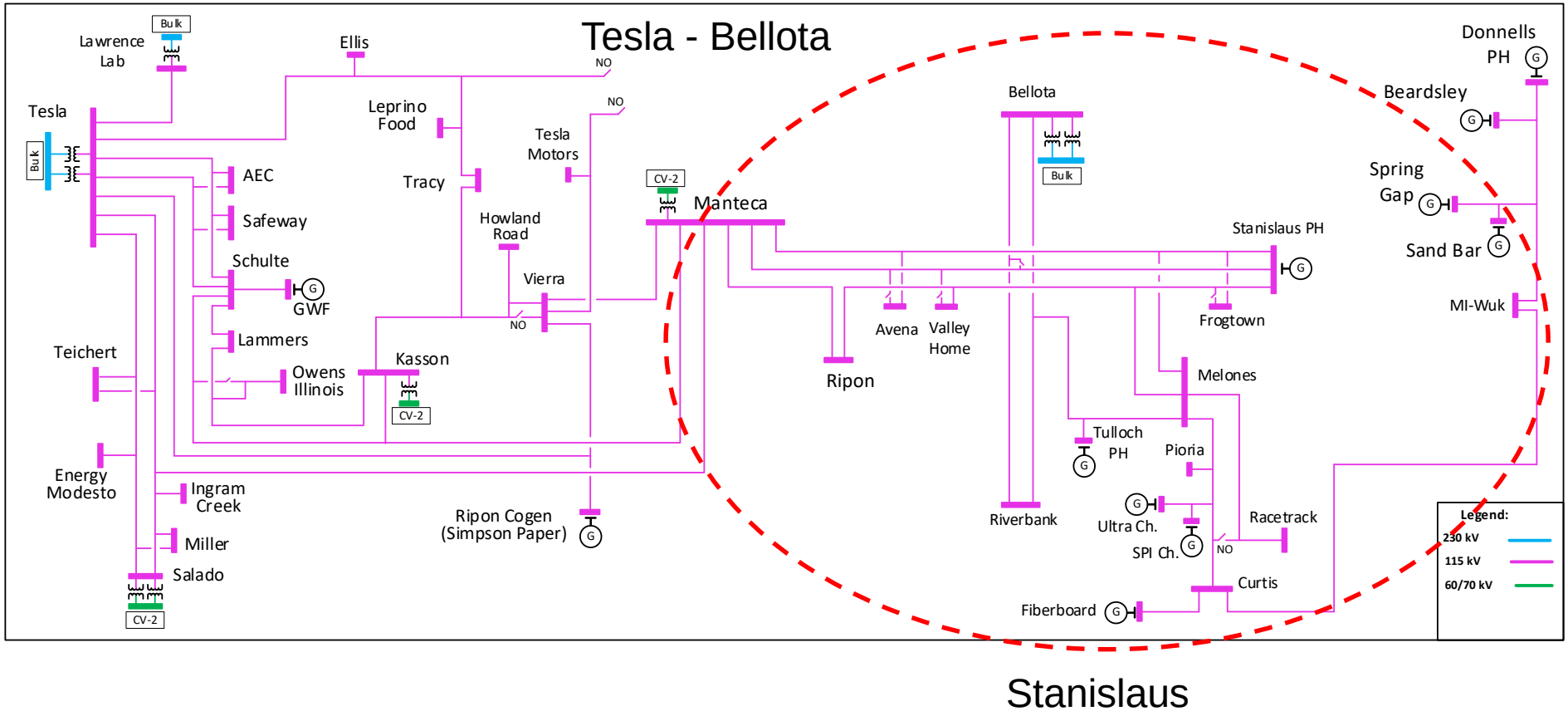
Regional Transmission Engineer Lead

2020-2021 Transmission Planning Process Stakeholder Meeting

September 23 - 24, 2020

Stockton Area Transmission System & LCR Subareas in 2030



New major transmission projects

Project Name	Expected ISD
Vierra 115 kV Looping Project	Jan-23
Tesla 230 kV Bus Series reactor	Dec-23
Lockeford-Lodi Area 230 kV Development	Jun-25

Power plant changes

Additions:

- No new resource addition

Retirements:

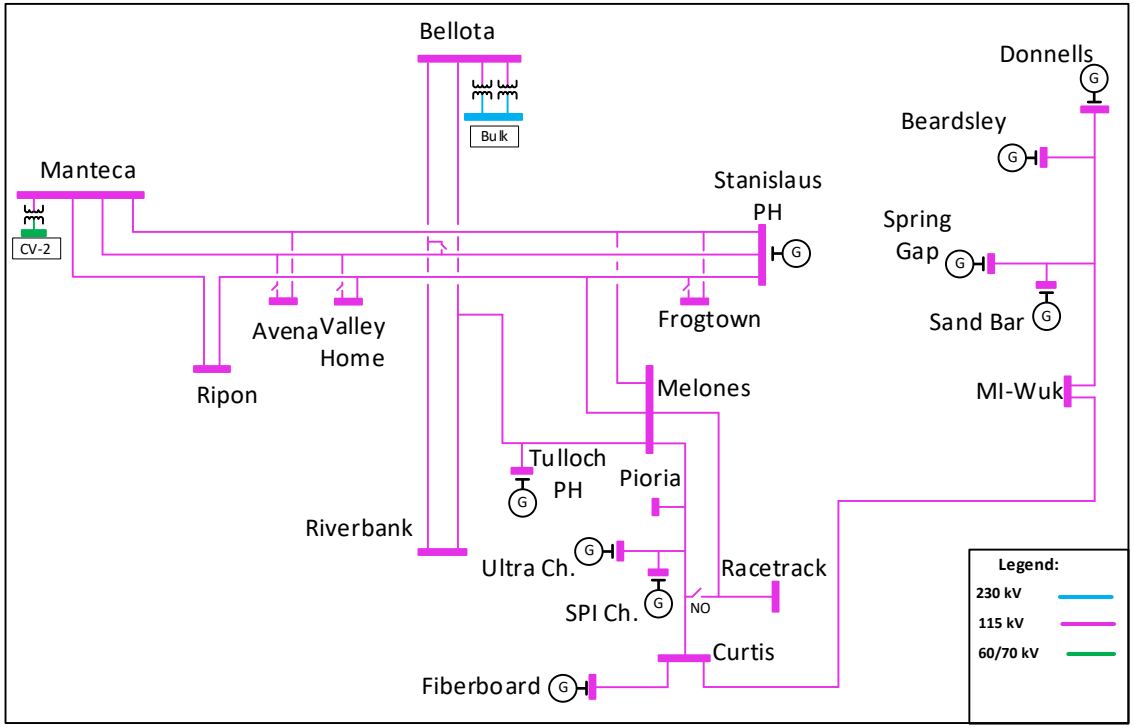
- No new retirements

Load and Resources Forecast in 2030

Load (MW)		Generation (MW)	
Gross Load	964	Market/ Net Seller/ Battery	487
AAEE	-20	Solar	11
Behind the meter DG	0	Wind	0
Net Load	**944**	Muni	115
Transmission Losses	20	QF	0
Pumps	0	Future preferred resource and energy storage	0
Load + Losses + Pumps	**964**	**Total Qualifying Capacity**	**613**

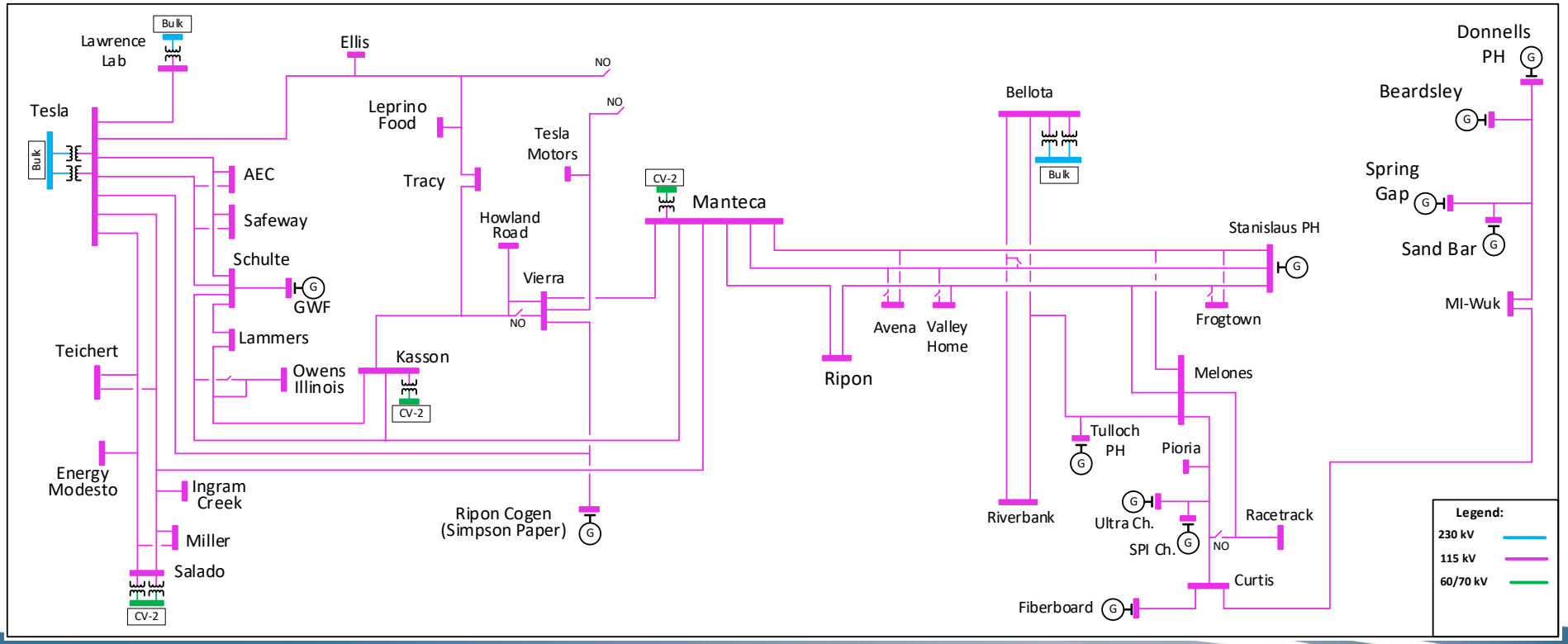
Stanislaus Sub Area : Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	P3	Manteca - Ripon 115 kV Line	Bellota-Riverbank-Melones 115 kV line and Stanislaus PH unit	212 (12)

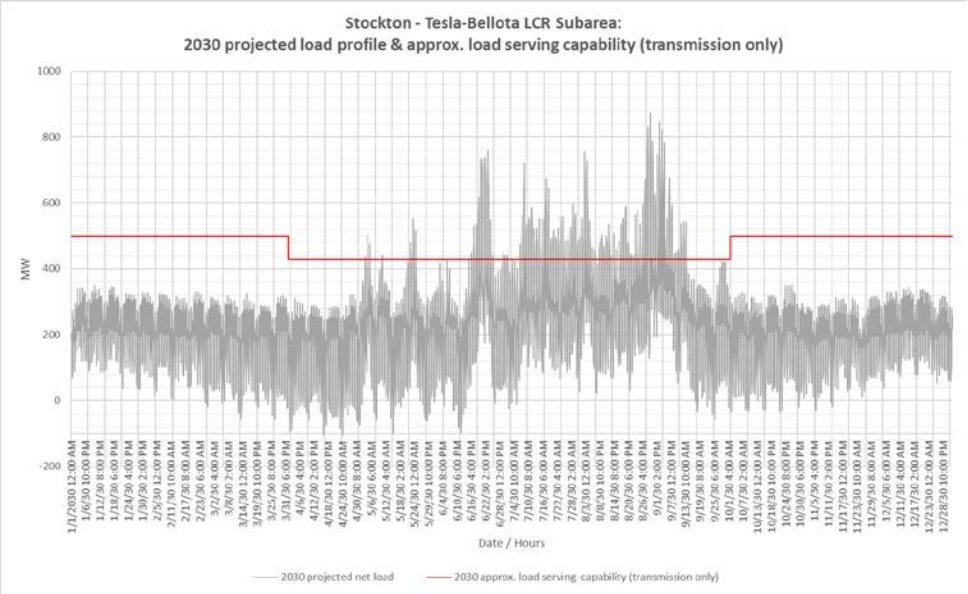


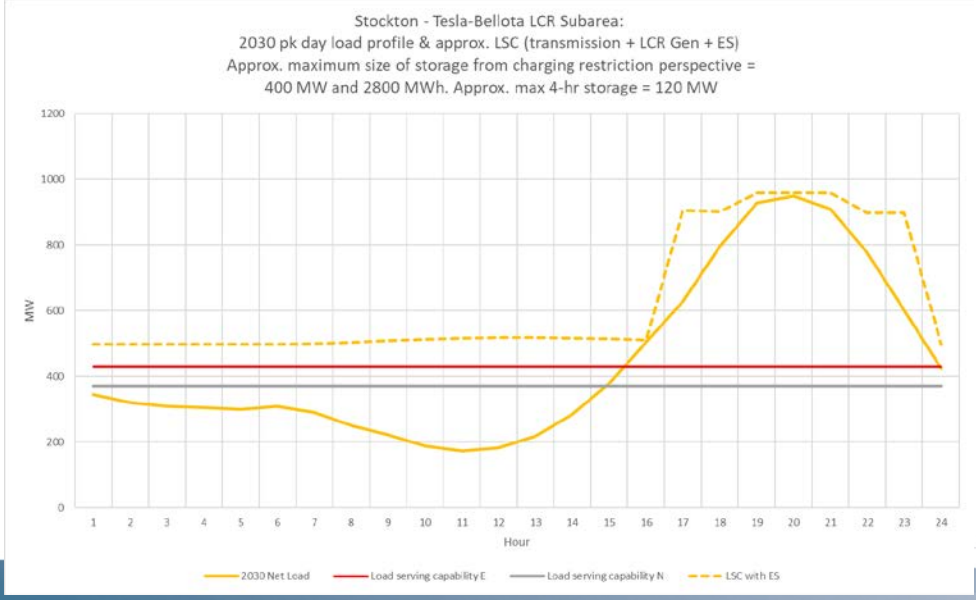
Tesla - Bellota Sub-Area : Requirements

Year	Category	Limiting Facility	Contingency	LCR (MW) (Deficiency)
2030	P2-4	Stanislaus – Melones – Riverbank Jct line	Tesla 115 kV bus	748 (145)
2030	P6	Schulte-Kasson-Manteca 115 kV lines	Schulte – Lammers and Tesla – Tracy 115 kV line	609 (315)
Total LCR Need in 2030				918 (315)



Tesla - Bellota Sub-Area : Load Profile and Maximum Storage





Stockton Area Total LCR Need

Study Year	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Need
2030	613	315	928

Changes Compared to Previous LCR Requirements

Subarea	2021		2025		2030	
	Load	LCR	Load	LCR	Load	LCR
Lockeford	194	36 (12)	Not an LCR area after project implementation			
Stanislaus	N/A *	205 (7)	N/A *	213 (12)	N/A *	212 (12)
Tesla-Bellota	898	1,218 (668)	950	740 (190)	964	928 (315)
Overall	1,092	1,254 (680)	950	740 (190)	964	928 (315)

Note: LCR increases from 2025 to 2030 are mostly due to update in transmission line ratings. The Lockeford Area 230 kV Development Project removes the need for LCR in Lockeford subarea.
** Flow-through area. No defined load pocket.*

2030 Draft LCR Study Results Greater Fresno Area

Vera Hart

Senior Regional Transmission Engineer

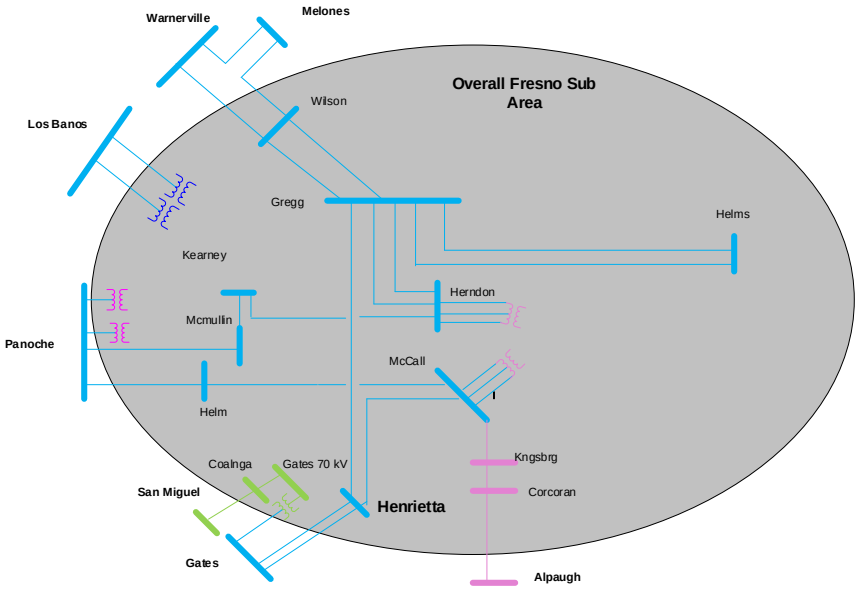
2020-2021 Transmission Planning Process Stakeholder Meeting

September 23 - 24, 2020

Greater Fresno Area
Electrical Boundaries and LCR Sub-Areas

Electrical Boundaries:

- Gates – Mustang #1 230 kV line
- Gates – Mustang #2 230 kV line
- Panoche – Tranquility #1 230 kV line
- Panoche – Tranquility #2 230 kV line
- Warnerville – Wilson 230 kV line
- Melones – Wilson 230 kV line
- Panoche 230/115 kV transformer #1
- Panoche 230/115 kV transformer #2
- Smyrna – Alpaugh – Corcoran 115 kV line
- Los Banos #3 230/70 kV transformer
- Los Banos #4 230/70 kV transformer
- San Miguel – Coalinga #1 70 kV line
- Gates 230/70 kV transformer #5



New major transmission projects

Project Name	Expected ISD
Northern Fresno 115 kV Area Reinforcement (Northern Fresno Reliability)	Jan-21
Wilson-Legrand 115 kV Reconductoring	Apr-21
Wilson Voltage Support (Wilson 115 kV STATCOM)	May-21
Kingsburg-Lemoore 70 kV Line Reconductoring	Mar-22
Herndon - Bullard 115 kV Reconductoring	Apr-22
Panoche-Oro Loma 115 kV Reconductoring	Jul-22
Wilson 115 kV Area Reinforcement	May-23
Oro Loma 70 kV Area Reinforcement	Apr-24
Giffen Line Reconductoring	Apr-24
Borden 230/70 kV Transformer Bank #1 Capacity Increase	Jan-25
Wilson-Oro Loma 115 kV Line Reconductoring	Jan-26
Bellota-Warnerville 230kV Reconductoring	24-Mar
Gregg-Herndon #2 230 kV Line Circuit Breaker Upgrade	20-Jan
Reedley 70 kV Reinforcement (Renamed to Reedley 70 kV Area Reinforcement Projects Include Battery at Dinuba)	22-May

Power plant changes

Resource Additions:

- None

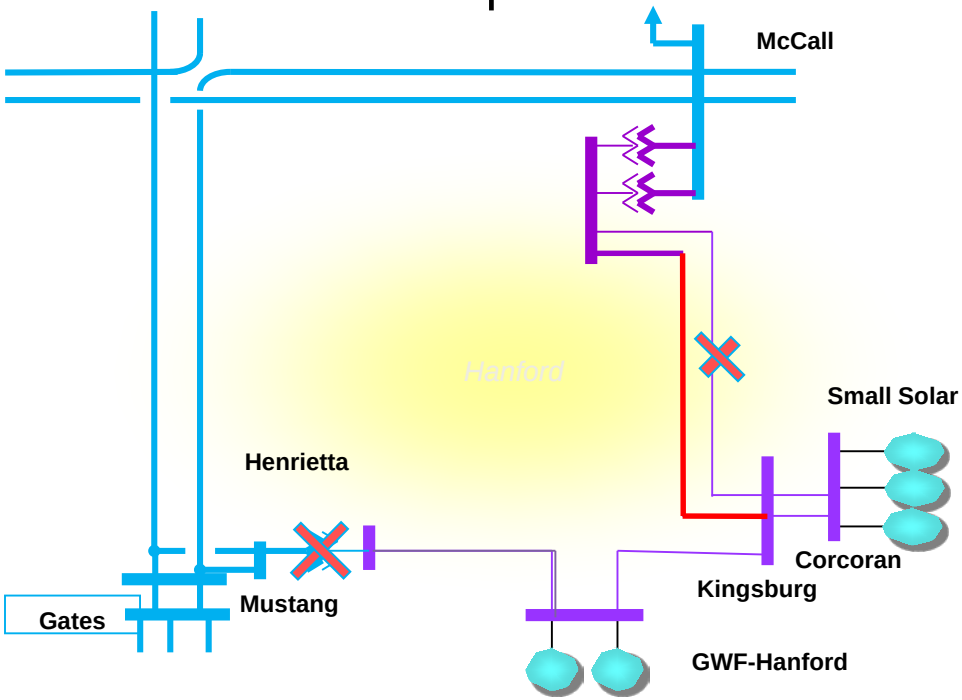
Resource Retirements:

- None

Hanford Sub-area: Load and Resources

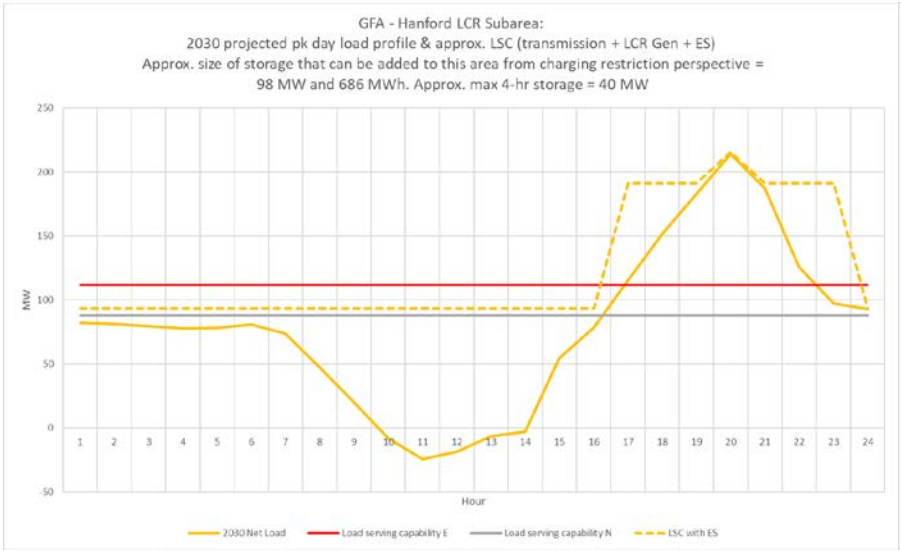
Load (MW)	2030	Generation (MW)	2030
Gross Load	217	Market	125
AAEE	-4	Solar	25
Behind the meter DG	0	MUNI	0
Net Load	**213**	QF	0
Transmission Losses	5		
Pumps	0	**Total Qualifying Capacity**	**150**
Load + Losses + Pumps	**218**		

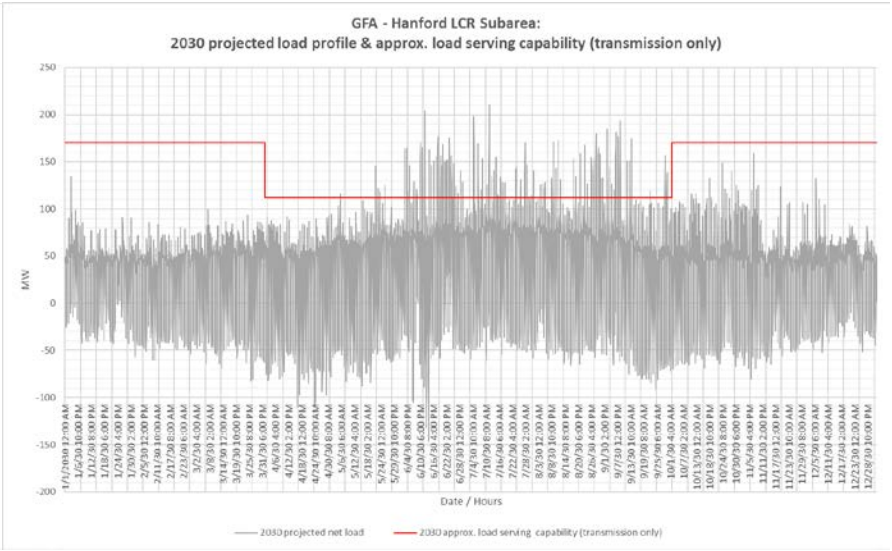
Hanford Sub-Area Requirements



Limit	Category	Limiting Facility	Contingency	2030 LCR (MW)
First Limit	P6	McCall-Kingsburg #2 115kV Line	McCall-Kingsburg #1 115kV line and Henrietta 230/115kV TB#3	69

Hanford Sub-area: Load Profiles

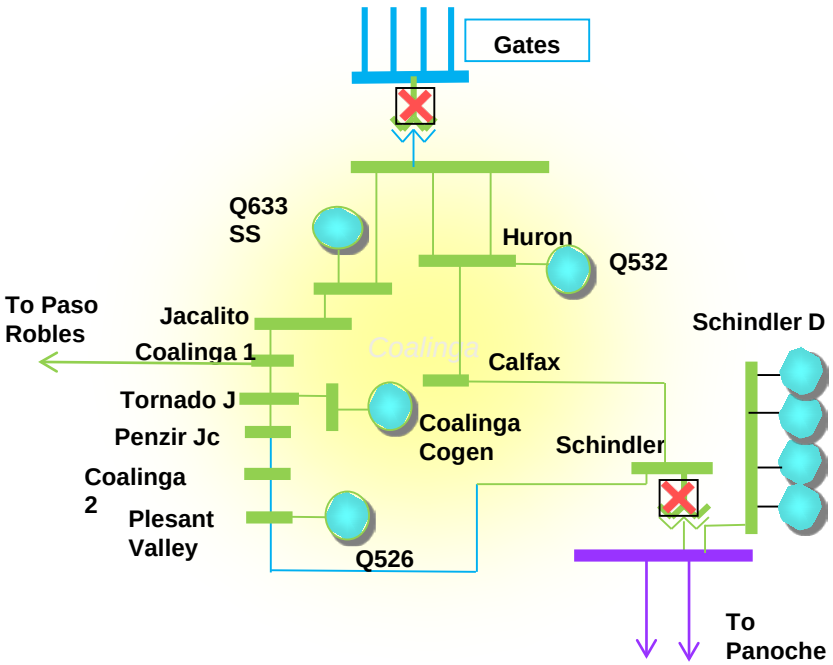




Coalinga Sub-area: Load and Resources

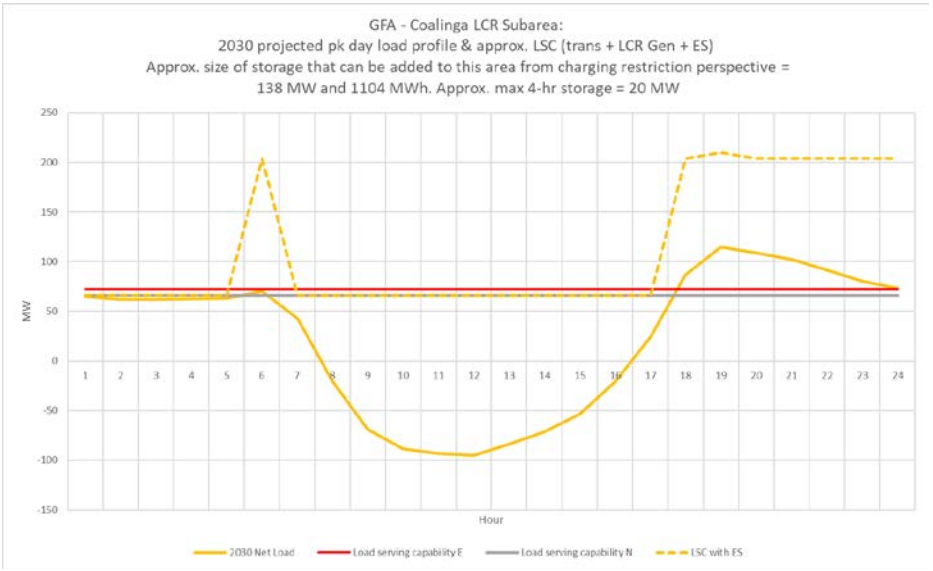
Load (MW)	2030	Generation (MW) Update	2030
Gross Load	117	Market	0
AAEE	-2	Solar	13
Behind the meter DG	0	MUNI	0
Net Load	**115**	QF	3
Transmission Losses	2	Mothballed	0
Pumps	0	**Total Qualifying Capacity**	**16**
Load + Losses + Pumps	**117**		

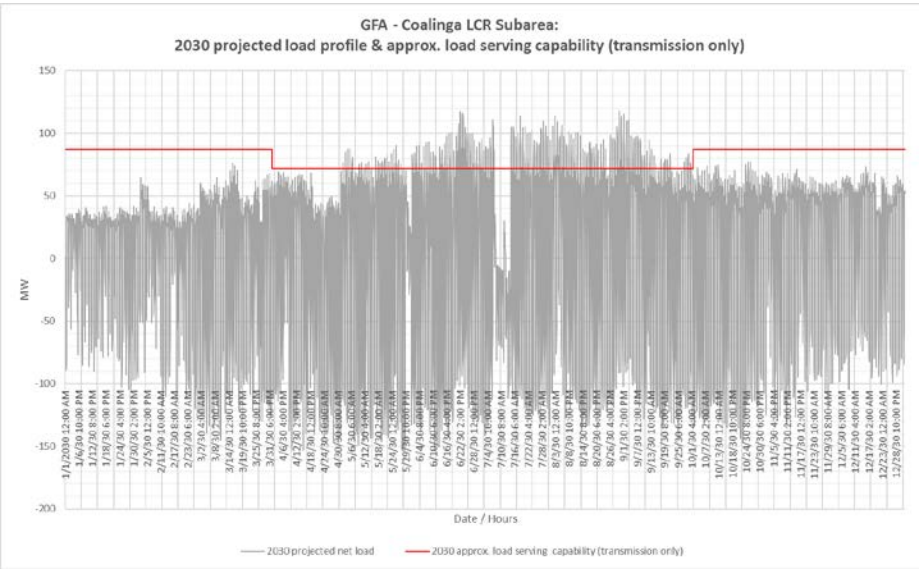
Coalinga Sub-Area Requirements



Limit	Category	Limiting Facility	Contingency	2030 LCR (MW)
First Limit	P6	Overload on San-Miguel-Coalinga 70kV Line and Voltage Instability	T-1/T-1: Gates 230/70kV TB #5 and Schindler 115/70 kV TB#1	75 (70 at Peak) (64 NQC)

Coalinga Sub-area: Load Profiles



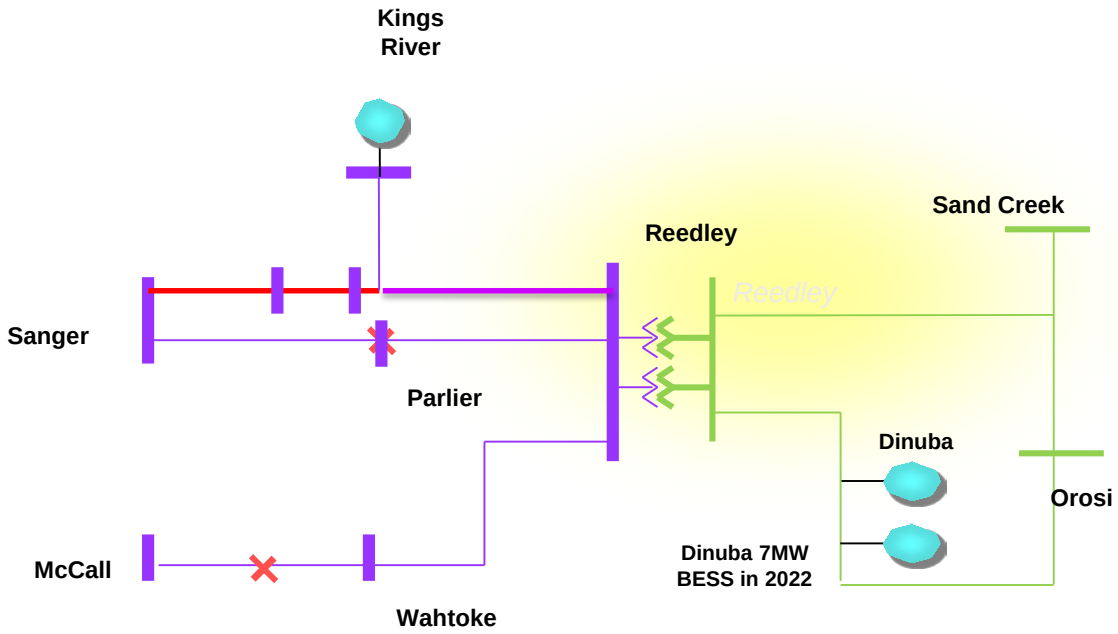


Borden Sub-area: Eliminated due to the Borden Transformer Capacity Increase Project

Reedley Sub-area: Load and Resources

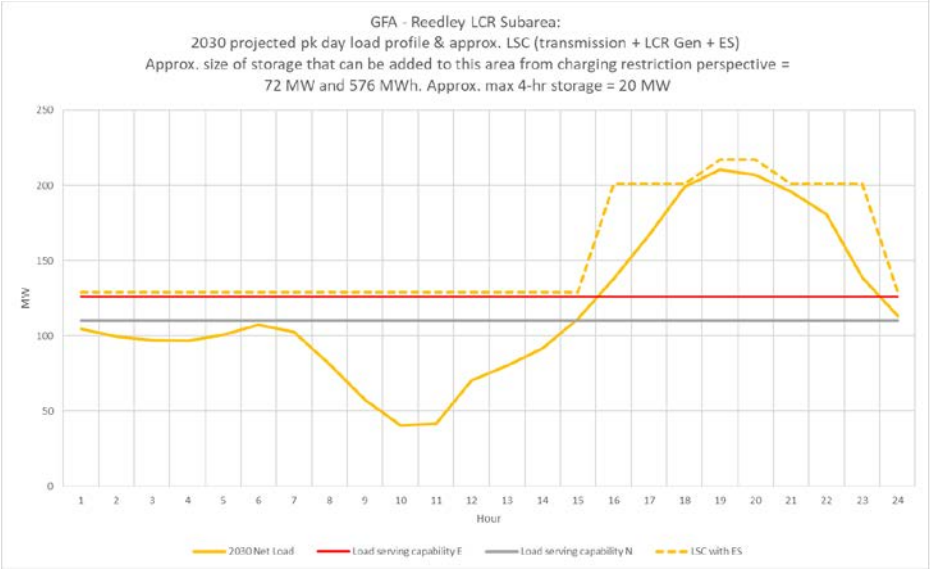
Load (MW)	2030	Generation (MW)	2030
Gross Load	239	Market	51
AAEE	-5	Solar	0
Behind the meter DG	0	MUNI	0
Net Load	**233**	QF	0
Transmission Losses	39		
Pumps	0	**Total Qualifying Capacity**	**51**
Load + Losses + Pumps	**272**		

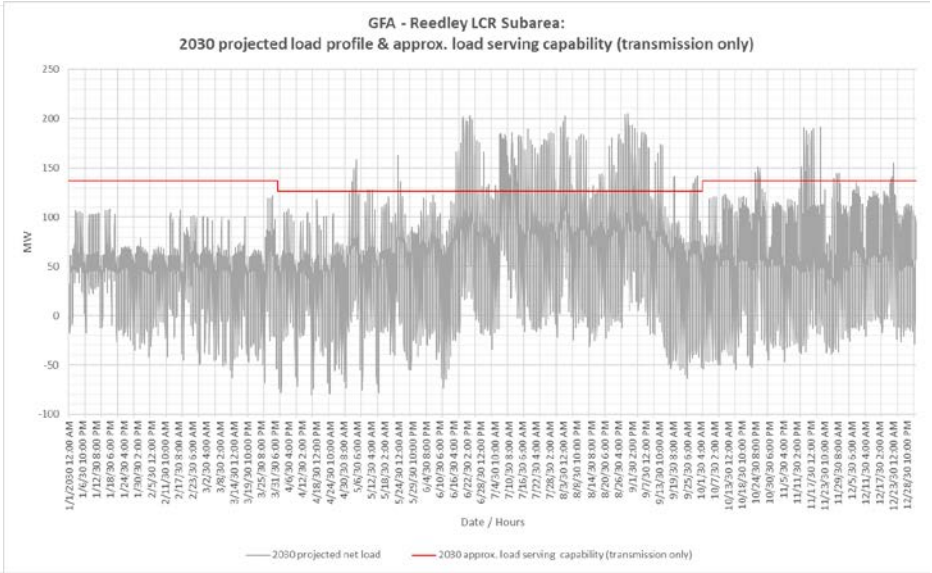
Reedley Sub-Area Requirements



Limit	Category	Limiting Facility	Contingency	2030 LCR (MW)
First Limit	P6	Kings River-Sanger-Reedley 115kV line with Wahtoke load online	McCall-Reedley 115kV Line & Sanger-Reedley 115kV line	120 (72)

Reedley Sub-area: Load Profiles

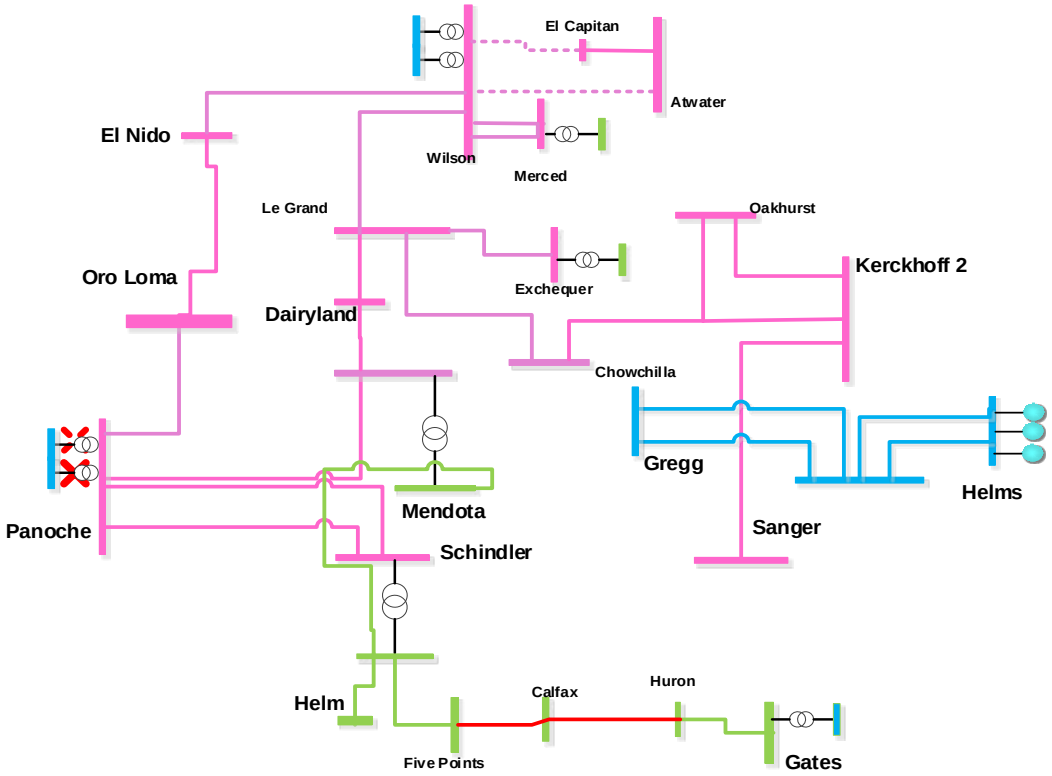




NEW Panoche 115-70 kV Sub-area: Load and Resources

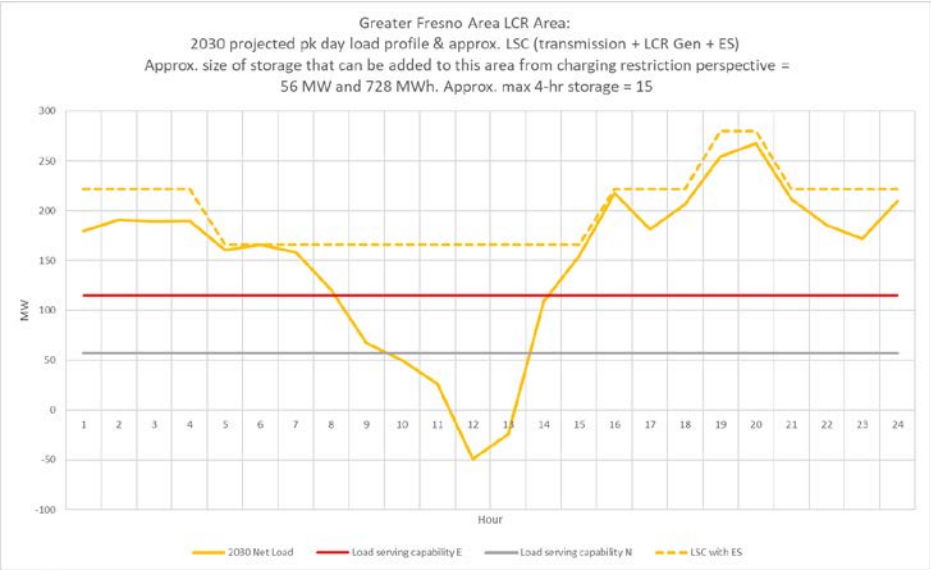
Load (MW)	2030	Generation (MW)	2030
Gross Load	486	Market/Net Seller	282
AAEE	-9	Solar	89
Behind the meter DG	-1	MUNI	100
Net Load	**477**	QF	3
Transmission Losses	16		
Pumps	0	**Total Qualifying Capacity**	**474**
Load + Losses + Pumps	**493**		

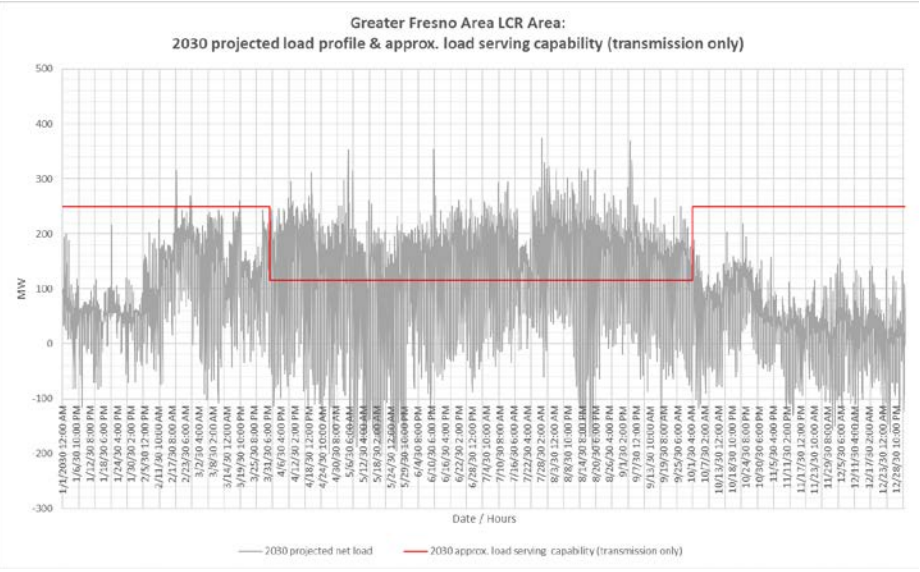
Panoche 115-70 kV Sub-Area Requirements



Limit	Category	Limiting Facility	Contingency	2030 LCR (MW)
First Limit	P6	Five Points-Huron-Gates 70kV line	Panoche 230/115kV TB #2 and Panoche 230/115kV TB #4	275

Panoche Sub-area: Load Profiles



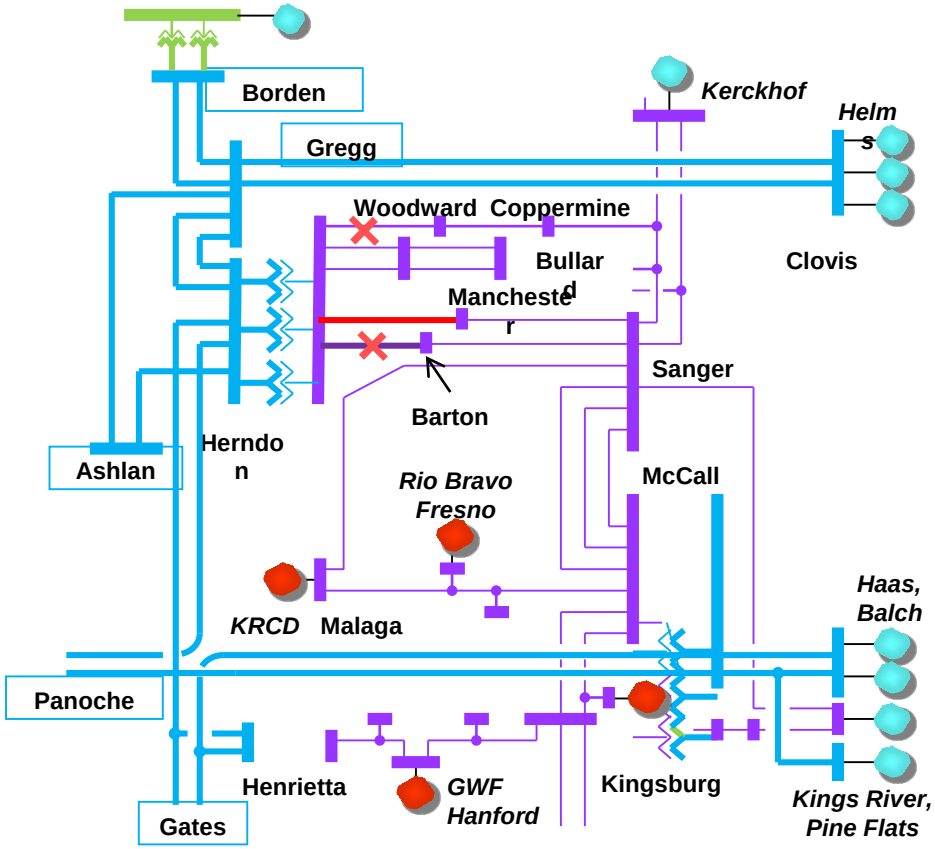


Wilson 115 kV Sub-area-Eliminated due to the 3rd Wilson 115/230kV Transformer coming into service

Herndon Sub-area: Load and Resources

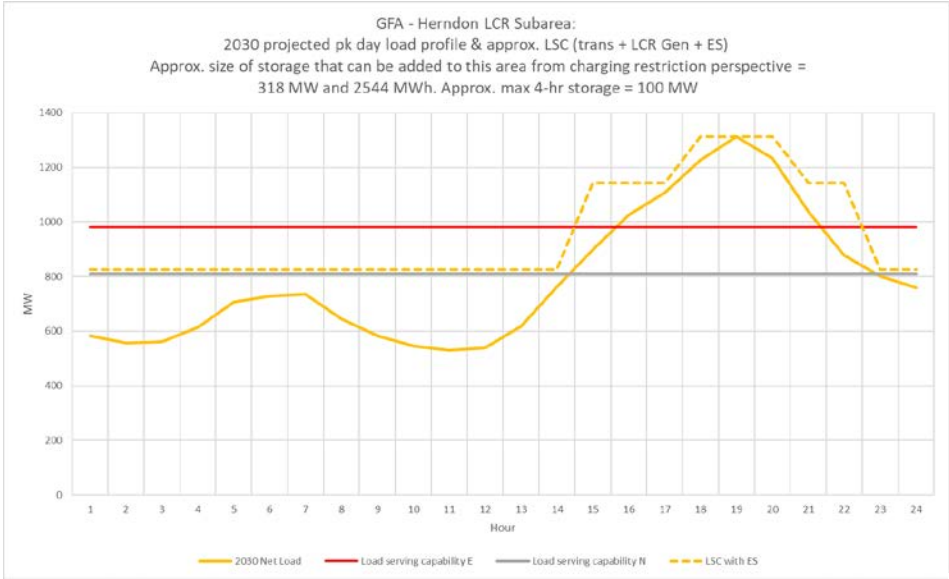
Load (MW)	2030	Generation (MW)	2030
Gross Load	1680	Market	997
AAEE	-35	Solar	63
Behind the meter DG	-	MUNI	98
Net Load	**1644**	QF	1
Transmission Losses	33		
Pumps	0	**Total Qualifying Capacity**	**1159**
Load + Losses + Pumps	**1677**		

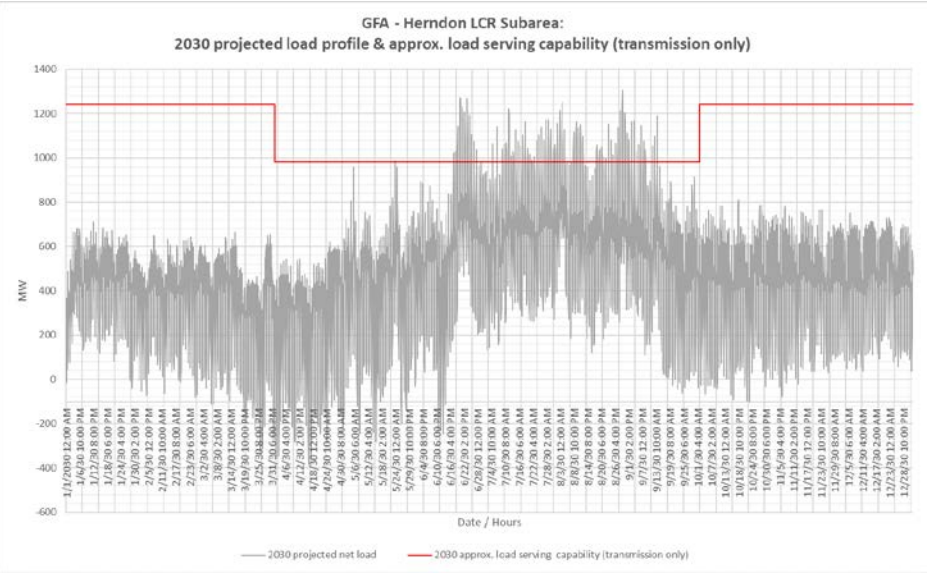
Herndon Sub-Area Requirements



Limit	Category	Limiting Facility	Contingency	2030 LCR (MW)
First limit	P6	Herndon-Manchester 115 kV line	Herndon-Woodward 115 kV line and Herndon-Barton 115 kV line	476

Herndon Sub-area: Load Profiles

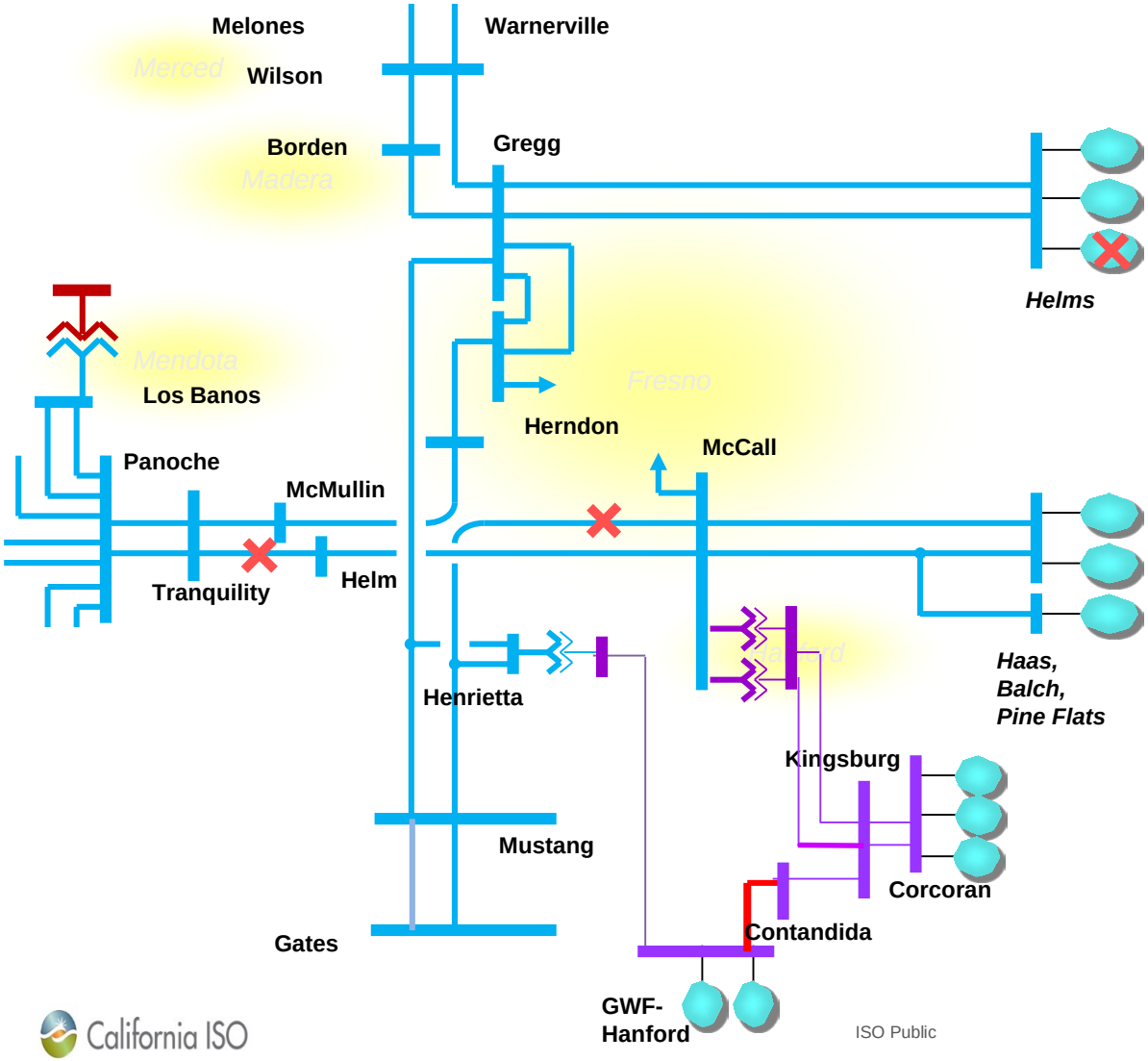




Overall Load and Resources

Load (MW)	2030	Generation (MW)	2030
Gross Load	3536	Market/Net Seller	2515
AAEE	-76	Solar	361
Behind the meter DG	-0	MUNI	212
Net Load	**3461**	QF	4
Transmission Losses	128	Battery	300
Pumps	0		
Load + Losses + Pumps	**3589**	**Total Qualifying Capacity**	**3392**

Overall Sub-Area Requirements

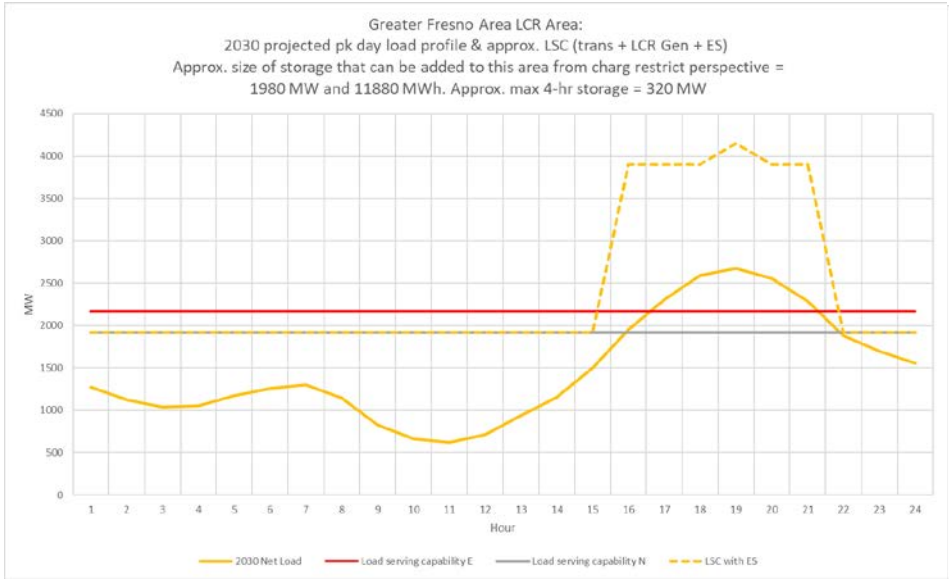


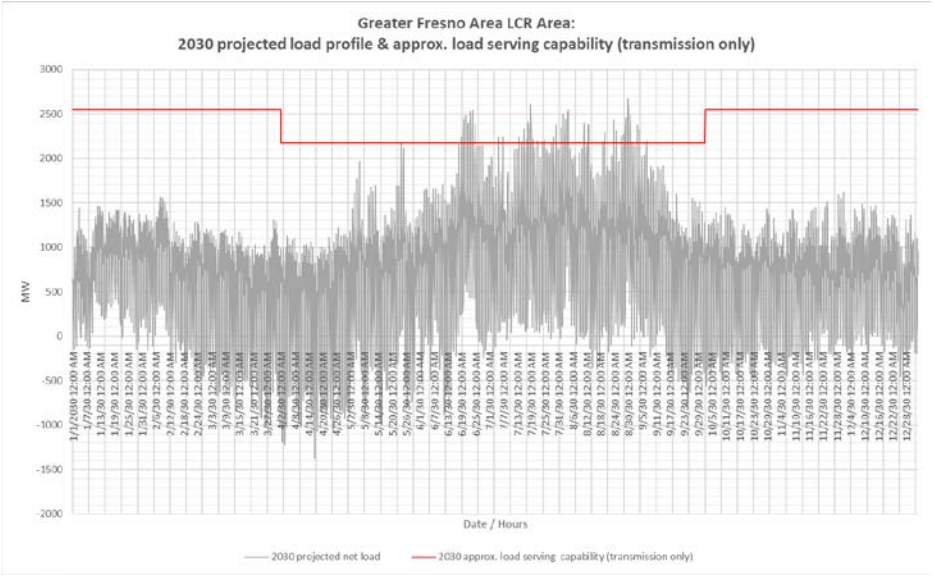
Overall Fresno Area : Requirements

Limit	Category	Limiting Facility	Contingency	2030 LCR (MW)
First limit	P6	GWF-Contandida 115kV Line	Panoche-Helm 230kV Line and Gates-McCall 230kV line	2296

Study Year	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Need
2030	2296	136	2432

Overall Sub-area: Load Profiles





Changes Compared to Previous LCR Requirements

Sub-area	2025		2030	
	Load	LCR	Load	LCR
Hanford	210	58	218	69
Coalinga	89	52 (36)	117	75 (64)
Borden	137	4	N/A	Eliminated due to Project
Reedley	270	91 (33)	273	120 (72)
Panoche 115 kV	430	164	493	275
Herndon	1532	441	1677	476
Overall	3279	1971	3589	2296

LCR increase mostly due to increase in load forecast.

2030 Long-Term LCR Study Draft Results Humboldt

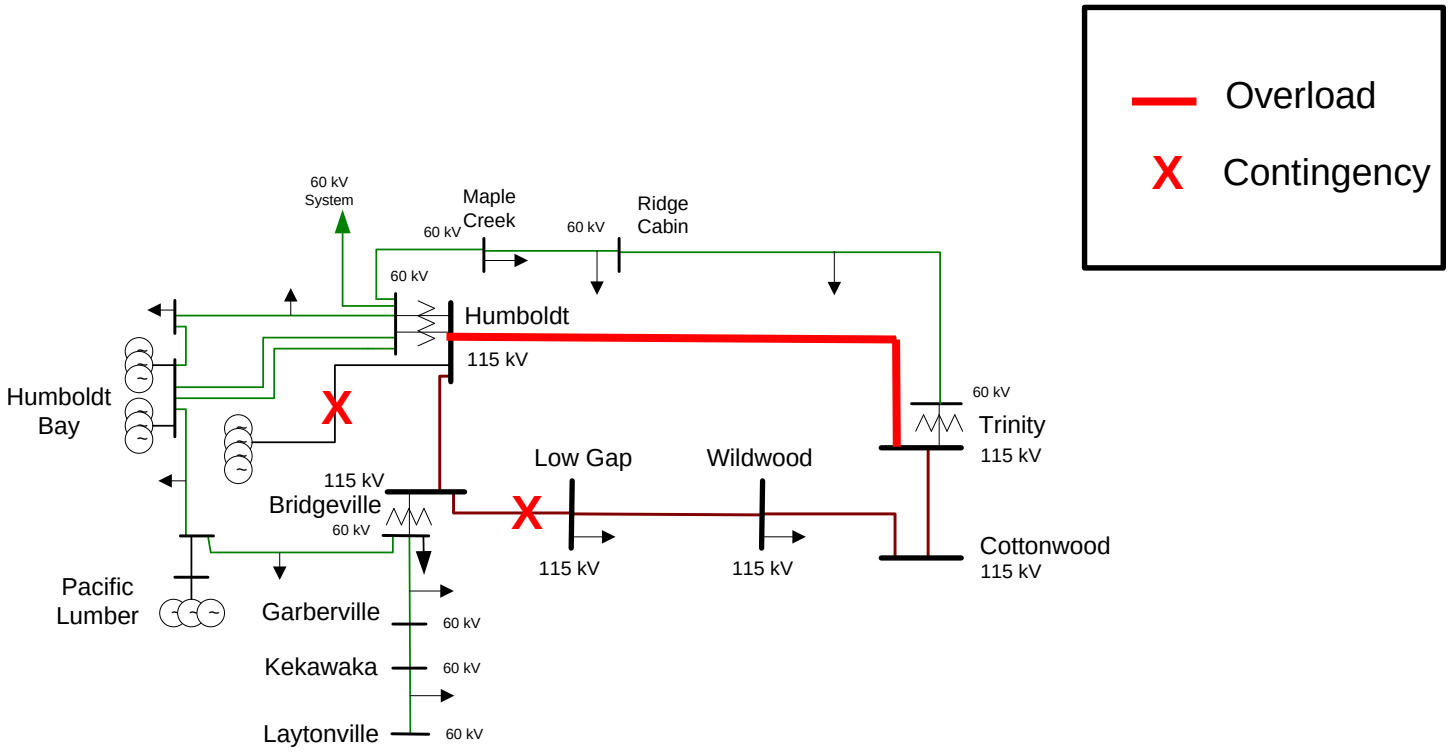
Krithika Gurusankar

Regional Transmission Engineer

2020-2021 Transmission Planning Process Stakeholder Meeting

September 23 - 24, 2020

Humboldt Area Transmission System



Humboldt: Load and Resources

Load (MW)		Generation (MW)	
Gross Load	160	Market	191
AAEE	-2	Wind	0
Behind the meter DG	0	Muni	0
Net Load	**158**	QF	0
Transmission Losses	9		
Pumps	0	**Total Qualifying Capacity**	**191**
Load + Losses + Pumps	**167**		

Topology changes

Transmission Additions:

- Maple Creek Reactive Support

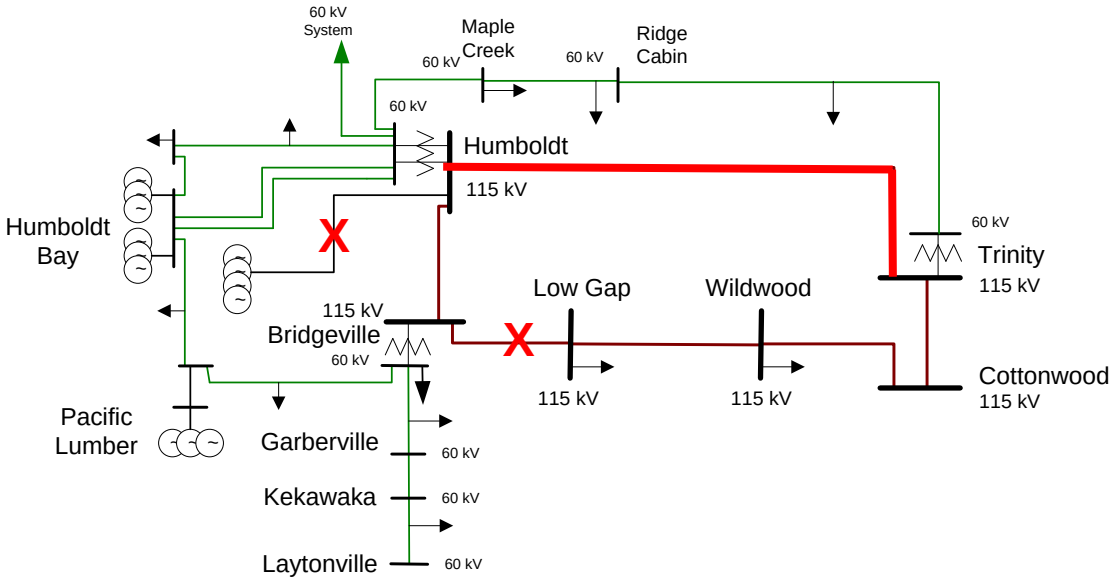
Resource Additions:

- No new resource additions

Resource Retirements:

- No new retirements

Humboldt Area: Requirements

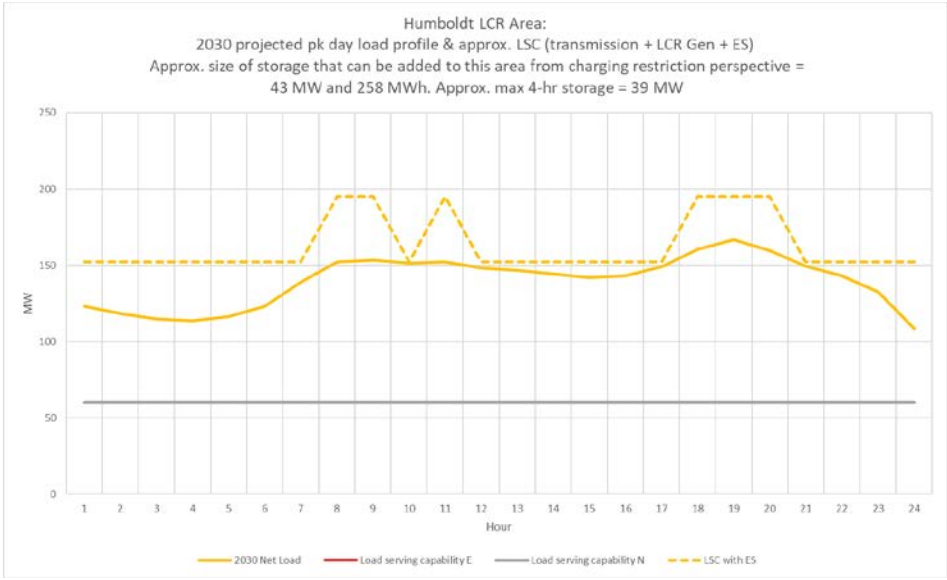


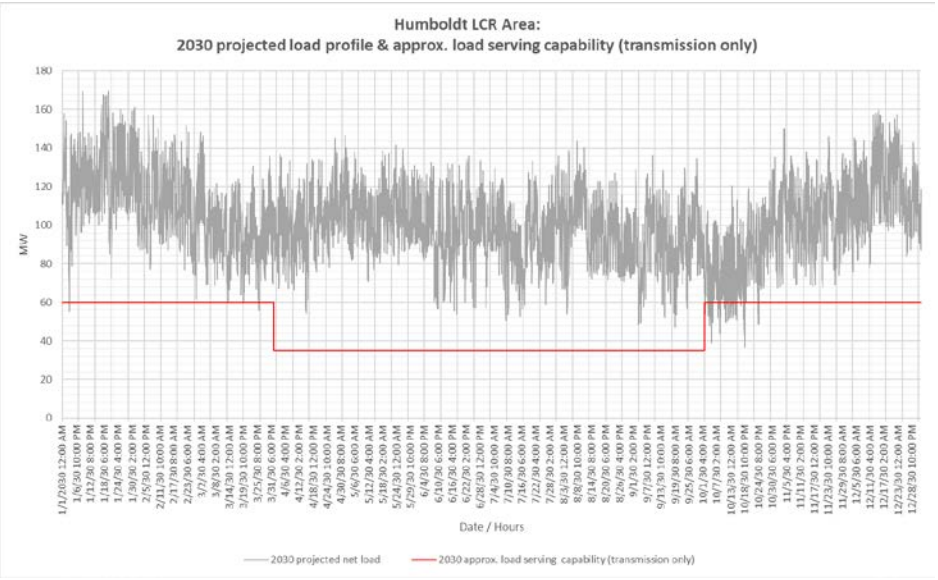
Overload

X Contingency

Year	Category	Limiting Facility	Contingency	LCR (MW)
2030	P6	Thermal overload of Humboldt -Trinity 115 kV	Cottonwood – Bridgeville 115 kV line + Humboldt – Humboldt Bay 115kV line	135

Humboldt Area: Load Profiles





Changes between years

Subarea	2025		2030	
	Load	LCR	Load	LCR
Humboldt	153	132	166	135

Humboldt Area Total LCR Need

2030	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total (MW)
LCR Need	135	0	135

2030 Draft LCR Study Results for the LA Basin and Overall San Diego-Imperial Valley Areas

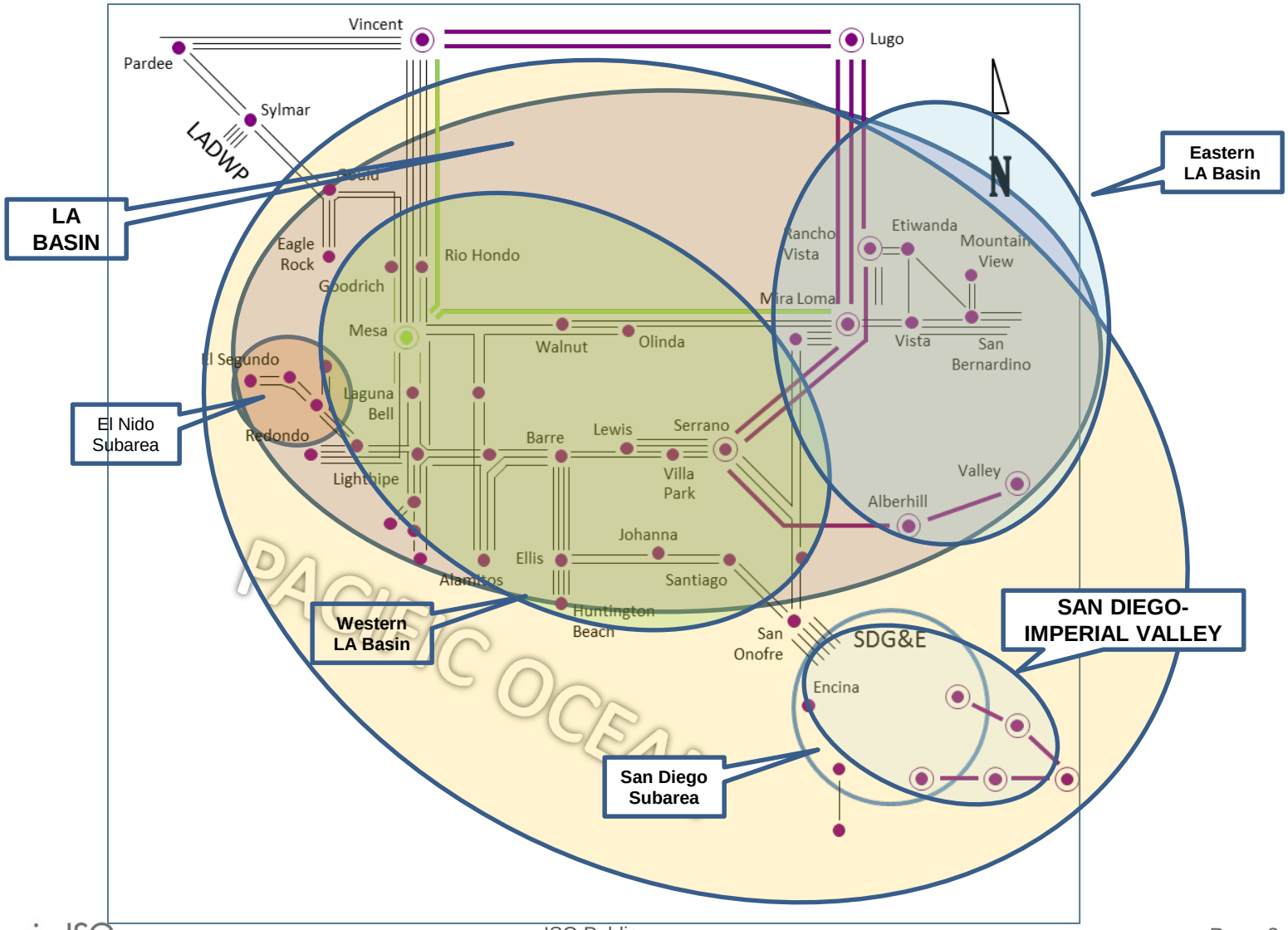
David Le
Senior Advisor Regional Transmission Engineer

2020-2021 Transmission Planning Process Stakeholder Meeting
September 23 - 24, 2020

Overview of the Draft Results

- Providing draft results for the LCR needs for the following areas:
  - El Nido sub-area
  - Western LA Basin sub-area
  - Eastern LA Basin sub-area
  - Overall LA Basin area
  - Bulk San Diego sub-area
  - Overall San Diego – Imperial Valley area
- Providing load shapes and estimated charging capability for energy storage under critical contingency for the above LCR areas and subareas

LA Basin and San Diego-Imperial Valley Areas



Major New Transmission and Resource Assumptions

Project Name	Service Areas	Expected ISD
New Transmission Projects		
Imperial Valley – El Centro 230 kV ("S" line) upgrades	IID / SDG&E	12/31/2021
Mesa Loop-In Project (230kV Loop-In)	SCE	6/1/2021
Mesa Loop-In Project (500kV Loop-In)	SCE	3/2022
New Resource Projects		
Alamitos Repowering Project	SCE	2/7/2020
Huntington Beach Repowering Project	SCE	2/4/2020
Stanton Energy Reliability Center	SCE	9/2020
Alamitos 100 MW Battery Energy Storage System	SCE	Early 2021
Local Capacity Area Preferred Resources (EE, DR, BTM BESS)	SCE	6/1/2021*

Notes:
* Based on contract dates

LA Basin Area: Loads and Resources

Loads (MW)	2030	Resources NQC* (MW)	2030
Gross Load	19503	Market, Net Seller, Wind, IFM Battery	5737
AAEE	-563	Muni	1056
Behind the meter DG (production at time of net peak load at 7 p.m.)	0	QF	141
Net Load	18940	LTPP LCR Preferred Resources (BTM BESS, EE, DR, PV)	208
Transmission Losses	284	Existing Demand Response	259
Pumps	20	Solar generation* (production is “0” at 20:00 hr.)	11
Net Load + Losses + Pumps	19244	Total Qualifying Capacity	7412

*August NQC for RA accounting purpose (solar generation is not available at evening peak load)

San Diego-Imperial Valley Area: Loads and Resources

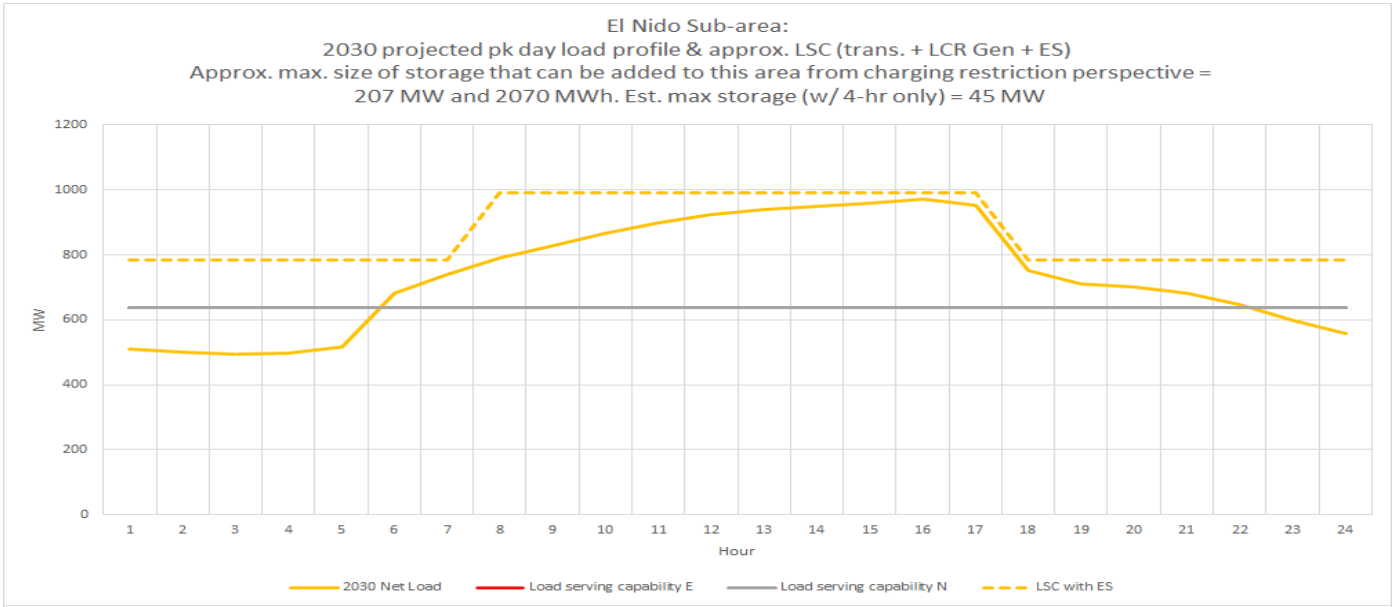
Loads (MW)	2030	Resources NQC* (MW)	2030
Gross Load	4857	Market, Net Seller, Battery, Wind	4010
AAEE	-108	Solar (Production is “0” at 20:00 hr.)	394
Behind-the-meter DG (production at time at net peak load at 7 p.m.)	0	QF	2
Net Load	4749	Muni	0
Transmission Losses	108	LTPP Preferred Resources	0
Pumps	0	Existing Demand Response	7
		Mothballed	0
Loads + Losses	4857	Total Qualifying Capacity	4413

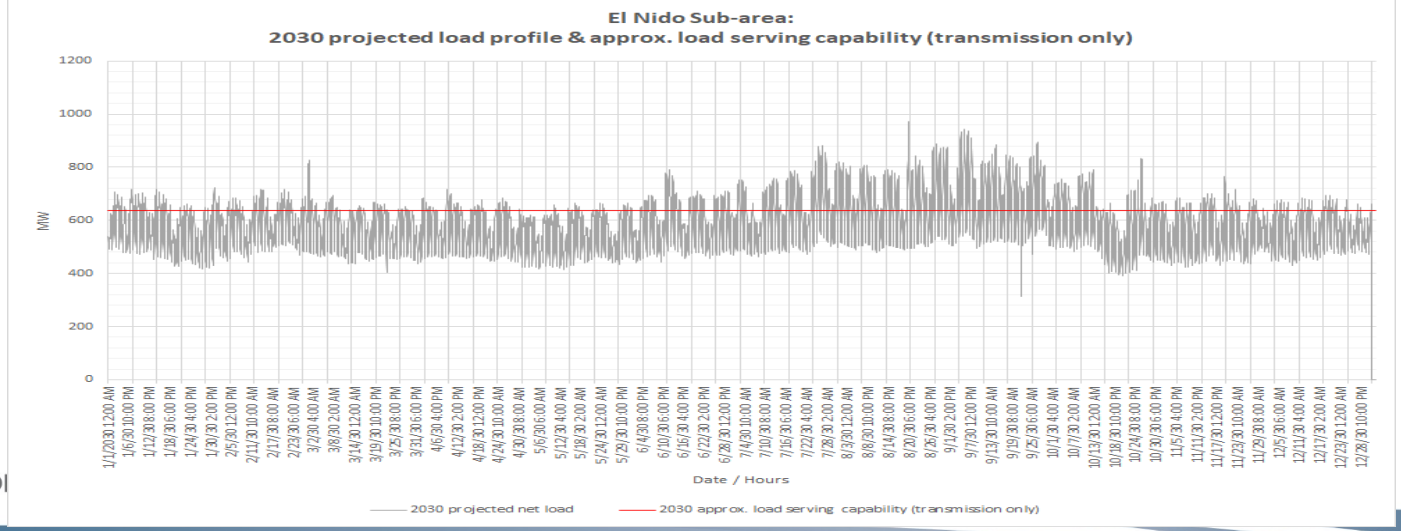
*August NQC for RA accounting purpose

El Nido Sub-area LCR (LA Basin)

Year	Category	Limiting Facility	Contingency	LCR (MW) (deficiency)
2030	P7	La Fresa-La Cienega 230 kV	La Fresa – El Nido #3 & 4 230 kV lines	355

El Nido Subarea Load Shape and Estimated Energy Storage Charging Capability Under Critical Contingency

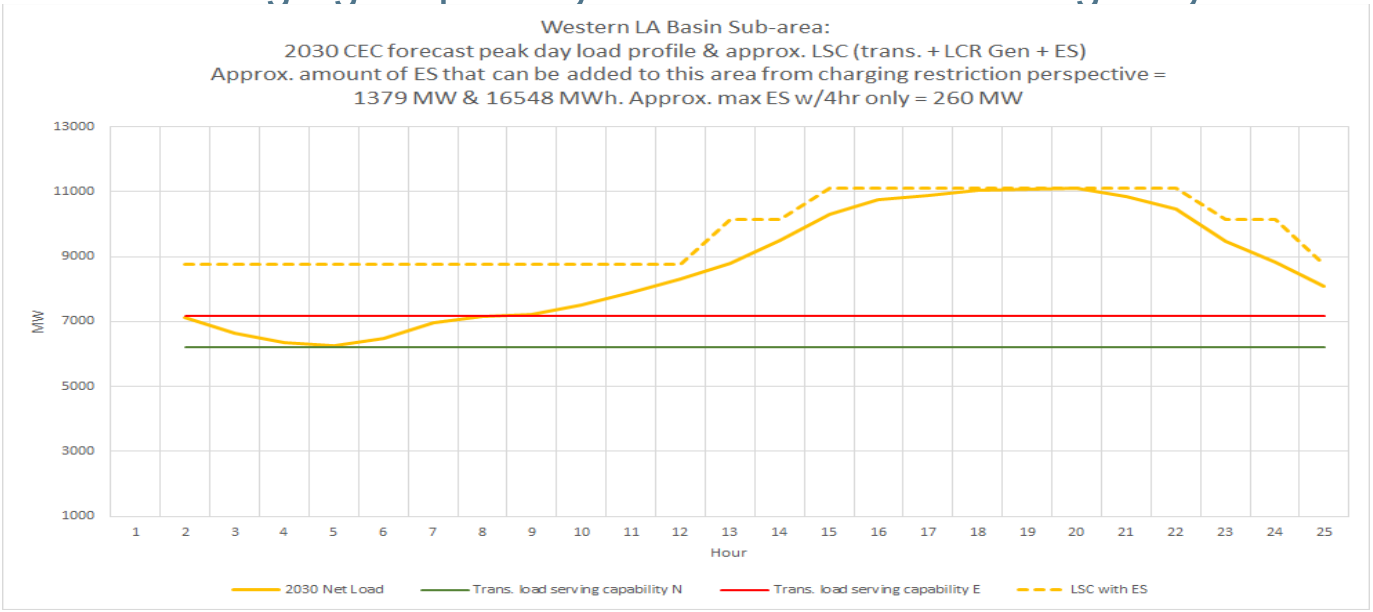


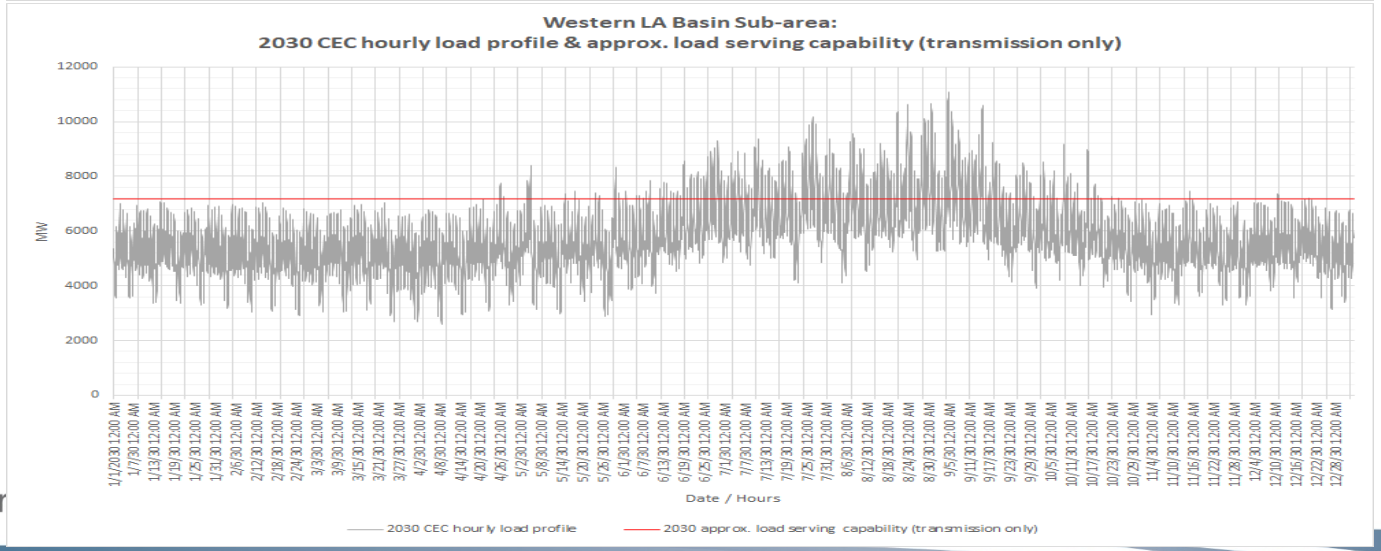


Western LA Basin Sub-area LCR

Year	Category	Limiting Facility	Contingency	LCR (MW) (deficiency)
2030	P6	Mesa-Laguna Bell 230 kV	Mesa-Redondo 230 kV, followed by Mesa-Lighthipe 230 kV line, or vice versa	3924

Western LA Basin Subarea Load Shape and Estimated Energy Storage Charging Capability Under Critical Contingency

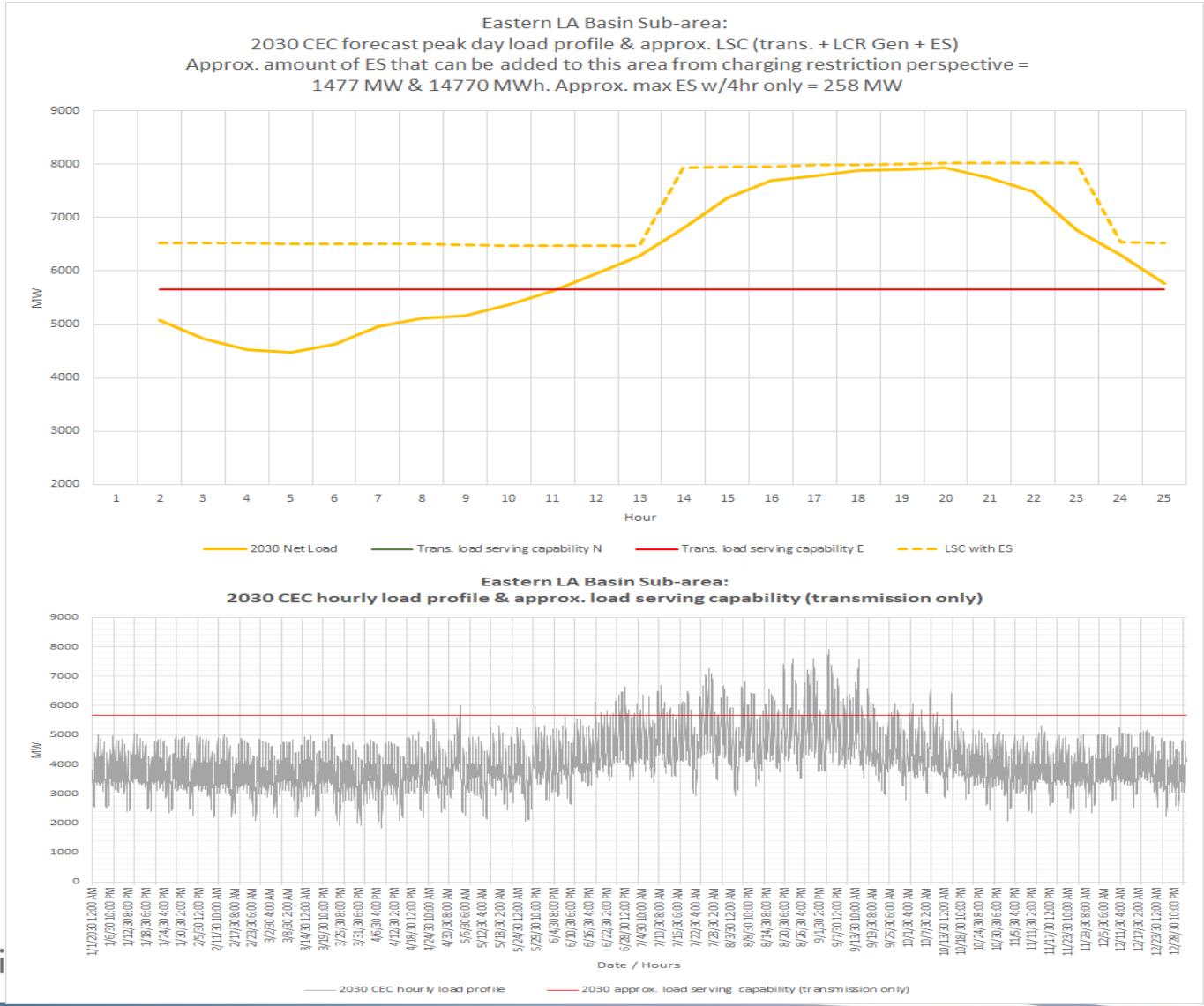




Eastern LA Basin Sub-area LCR

Year	Category	Limiting Facility	Contingency	LCR (MW) (deficiency)
2030	Extreme (N-1-2)	Post-transient voltage stability	Serrano-Alberhill 500 kV line, followed by Devers – Red Bluff 500 kV #1 and 2 lines	2270

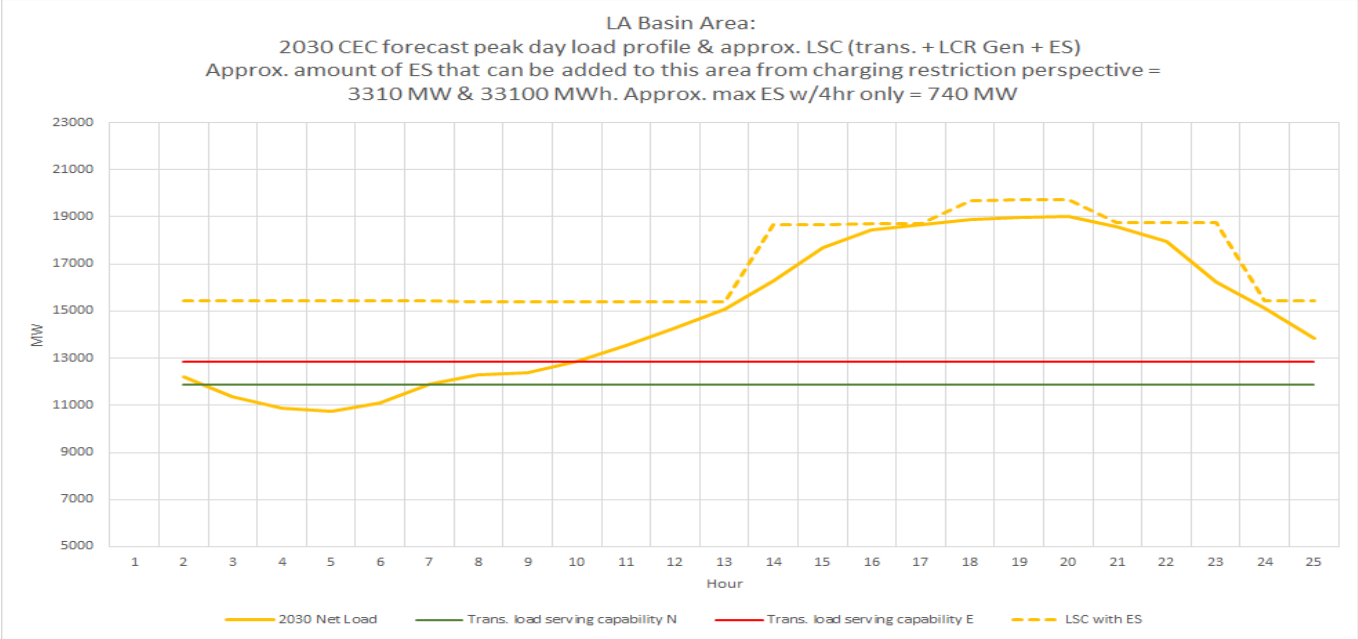
Eastern LA Basin Subarea Load Shape and Estimated Energy Storage Charging Capability Under Critical Contingency

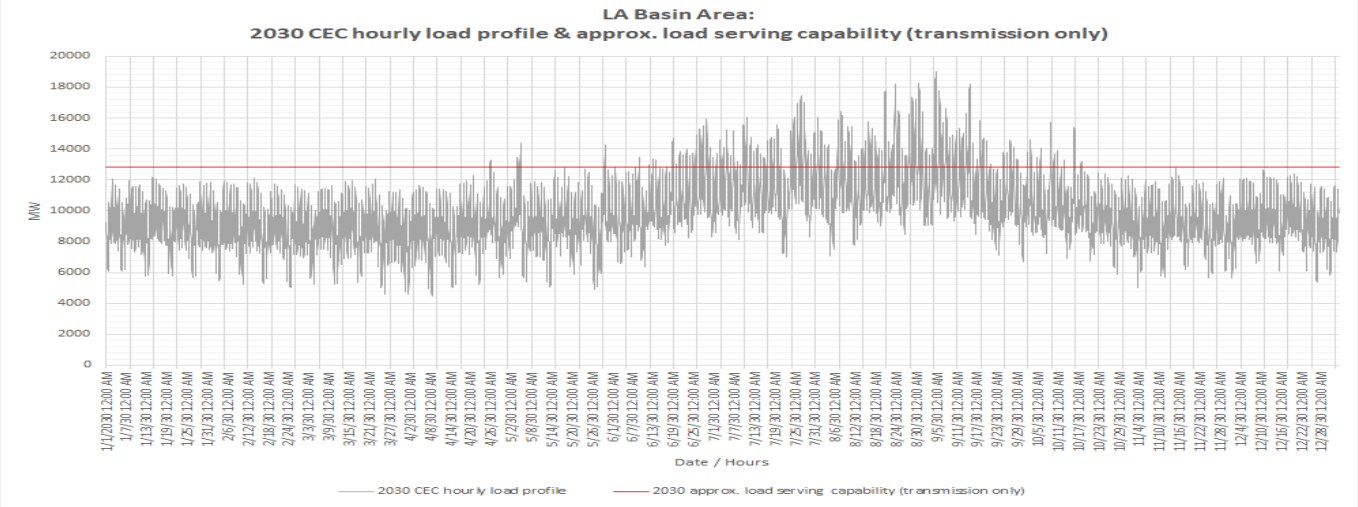


Overall LA Basin LCR

Year	Limiting Facility	Limiting Facility	**Contingency**	2030 LCR (MW) (deficiency)
2030	Sum of Western and Eastern LA Basin LCR needs	See Western and Eastern LA Basin LCR results	See Western and Eastern LA Basin LCR results	6194
2030	P3	El Centro 230/92 kV Transformer	TDM generation, system readjustment, followed by Imperial Valley-North Gila 500 kV line (N-1)	6194

Overall LA Basin Area Load Shape and Estimated Energy Storage Charging Capability Under Critical Contingency

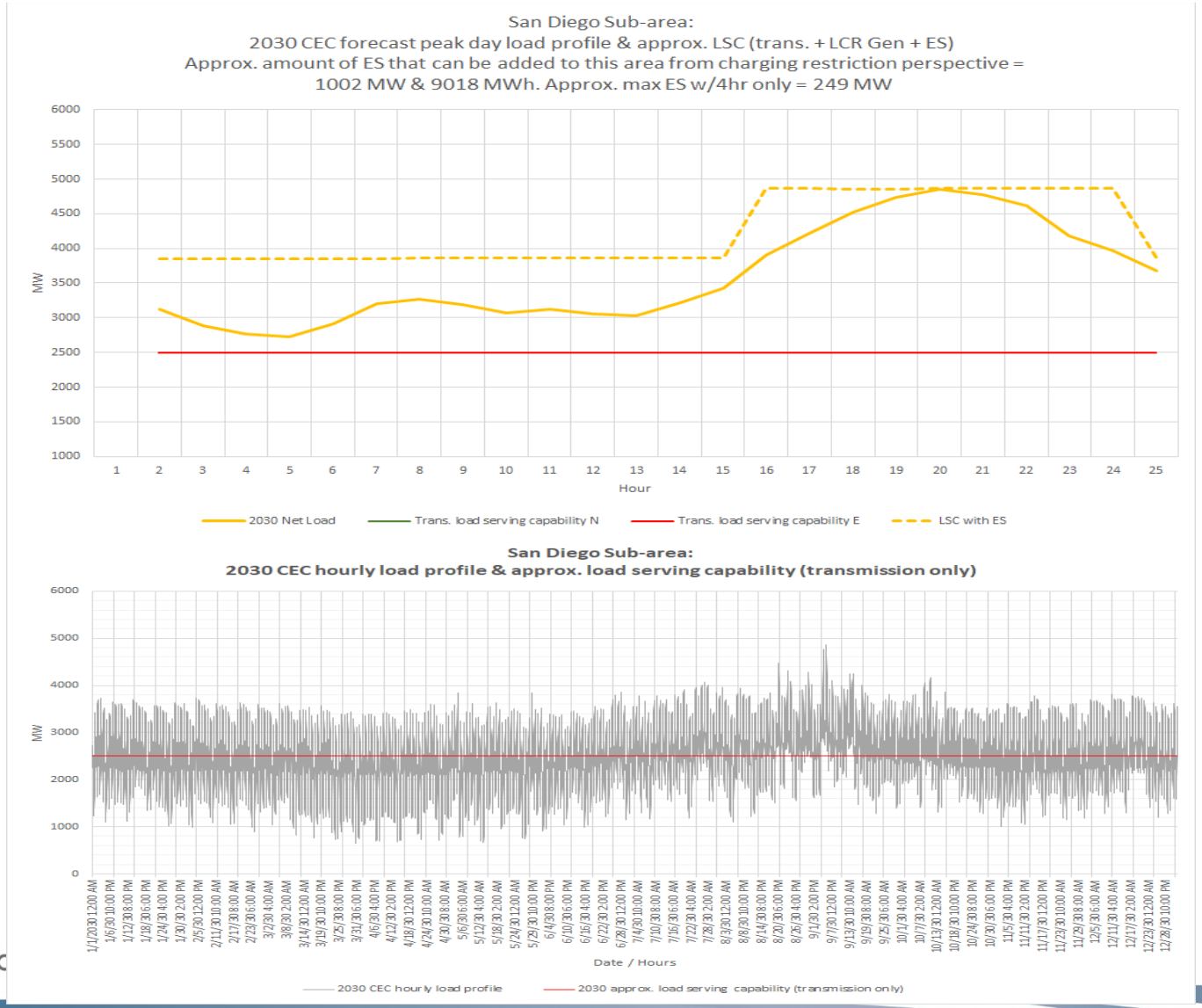




San Diego Bulk Sub-area LCR

Year	Category	Limiting Facility	Contingency	LCR (MW) (deficiency)
2030	P6	Remaining Sycamore-Suncrest 230 kV line	ECO-Miguel 500 kV line, system readjustment, followed by one of the Sycamore-Suncrest 230 kV lines	2842

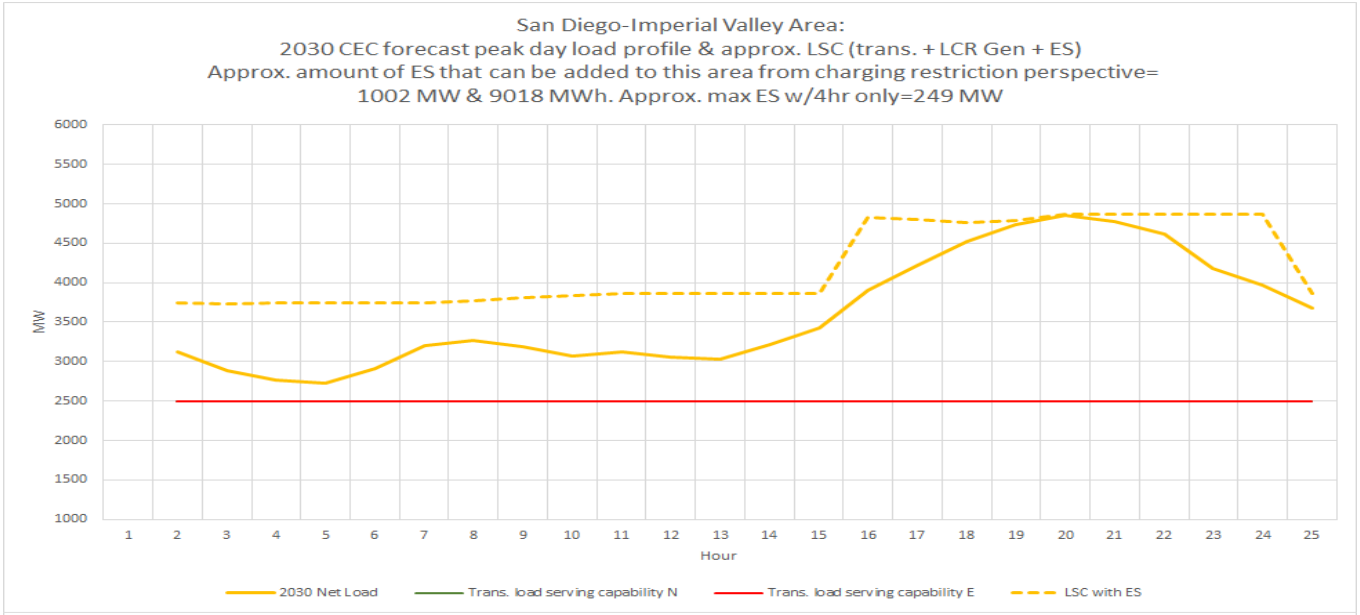
San Diego Bulk Subarea Load Shape and Estimated Energy Storage Charging Capability Under Critical Contingency

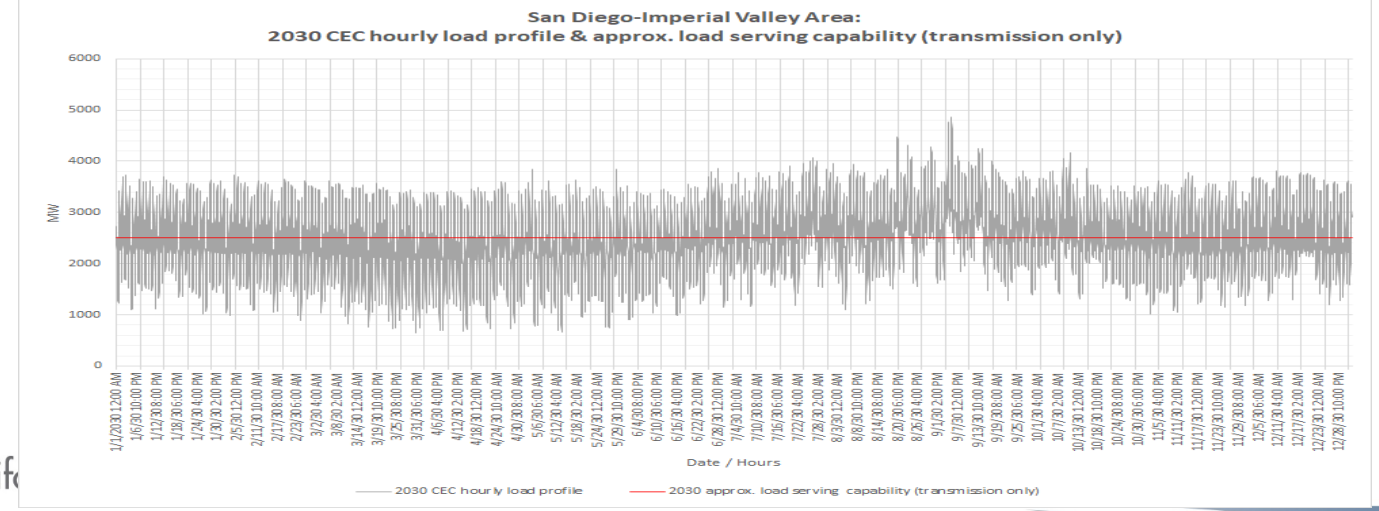


Overall San Diego – Imperial Valley Area LCR

Year	Category	Limiting Facility	Contingency	LCR (MW) (deficiency)
2030	P3	Yucca – Pilot Knob 161 kV line	TDM generation, system readjustment, followed by Imperial Valley-North Gila 500 kV line (N-1)	3718

Overall San Diego-Imperial Valley Area Load Shape and Estimated Energy Storage Charging Capability Under Critical Contingency





Changes Compared to Previous LCR Requirements

Subarea	2021		2025		2030	
	Load	LCR	Load	LCR	Load	LCR
El Nido	1007	394	1020	409	974	355
Western LA Basin	11403	3303	11291	3943	11100	3924
Eastern LA Basin	7522	2867	7530	2366	7933	2270
Overall LA Basin	18930	6170	18826	6309	19244	6194
San Diego Subarea	4523	2270	4675	2791	4857	2842
Overall San Diego – Imperial Valley Area	4523	3888	4675	3557	4857	3718

2030 Preliminary LCR Study Results
Big Creek/Ventura Area

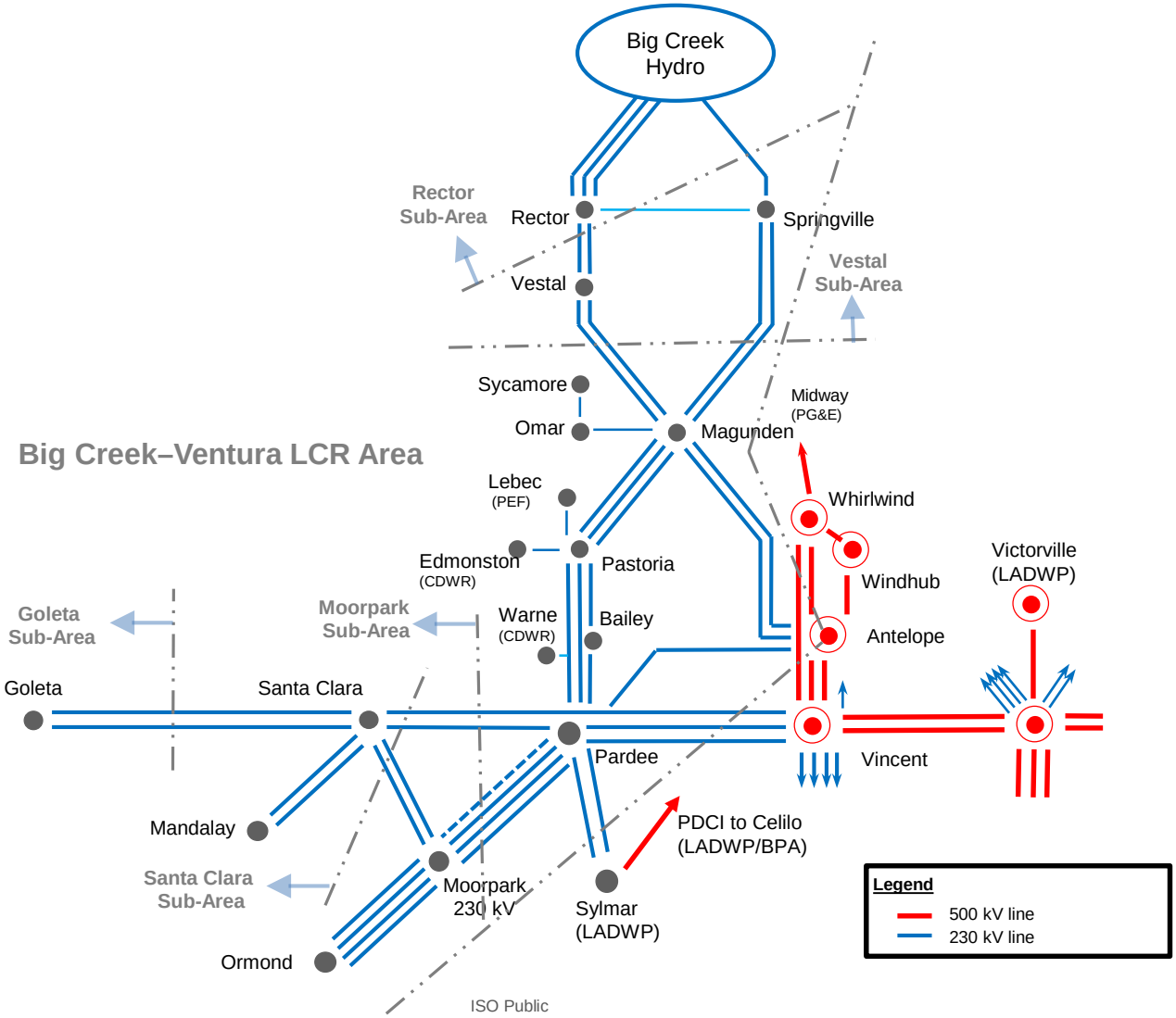
Nebiyu Yimer

Regional Transmission Engineer Lead

2020-2021 Transmission Planning Process Stakeholder Meeting

September 23 - 24, 2020

Big Creek - Ventura Area Transmission System



Major transmission projects

- Pardee-Moorpark No. 4 230 kV Transmission Project (ISD - 6/1/2021)
- Pardee-Sylmar 230 kV Rating Increase Project (ISD- 5/31/2023)

Resource Assumptions

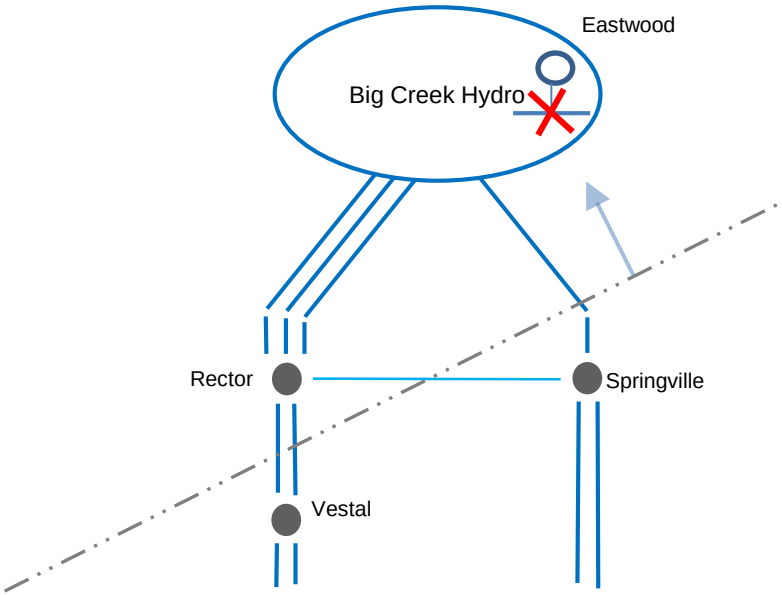
- CPUC-approved battery storage resources for the Santa Clara area (195 MW/780 MWh) are modeled
- Generators older than 40 year are assumed to be retired

Load and Resources

Load (MW)		Generation NQC (MW)	
	2030		**2030**
Gross Load	4,293	Market/Net Seller	2,656
AAEE	-106	Solar (Sept. NQC)	262
Behind the meter PV*	0	Muni	312
Net Load	**4,187**	QF	112
Transmission Losses	68	Demand Response and other Preferred Resources	70
Pumps	223	Energy Storage	798
Load+Losses+Pumps	**4,478**	**Total Qualifying Capacity**	**4,210**

Rector Sub-Area Requirements

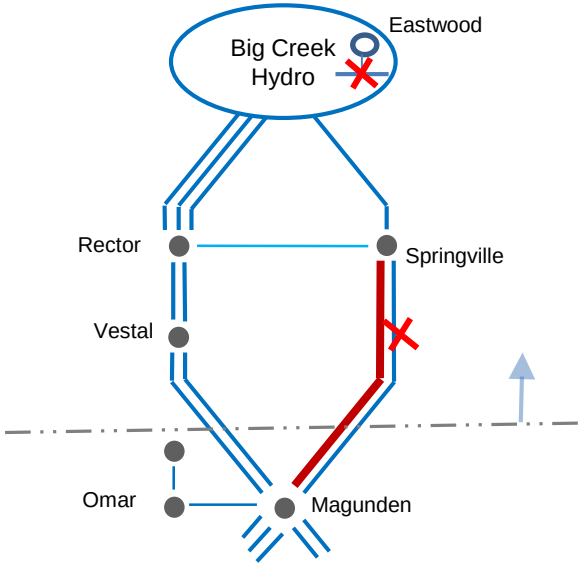
Category	Limiting Facility	Contingency	2030 LCR (MW)
LCR for Rector is satisfied by the LCR of the larger Vestal sub-area			



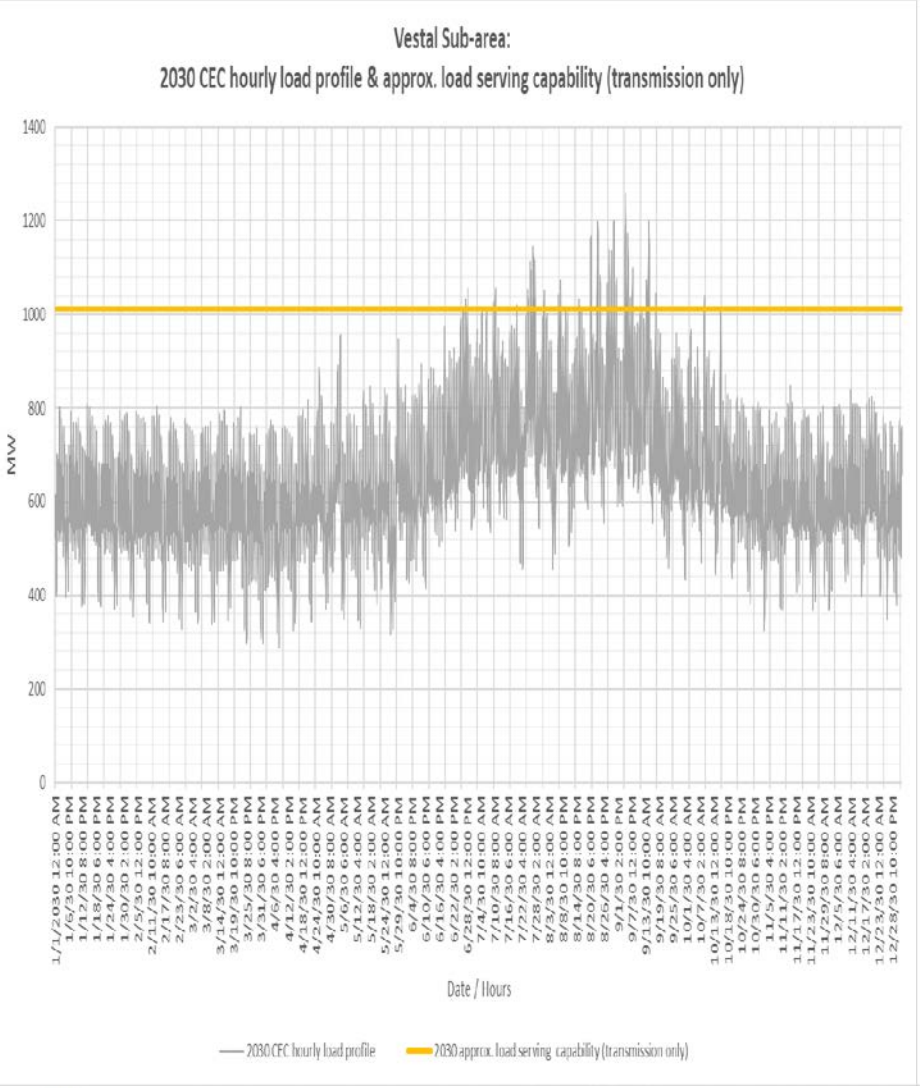
Vestal Sub-Area Requirements

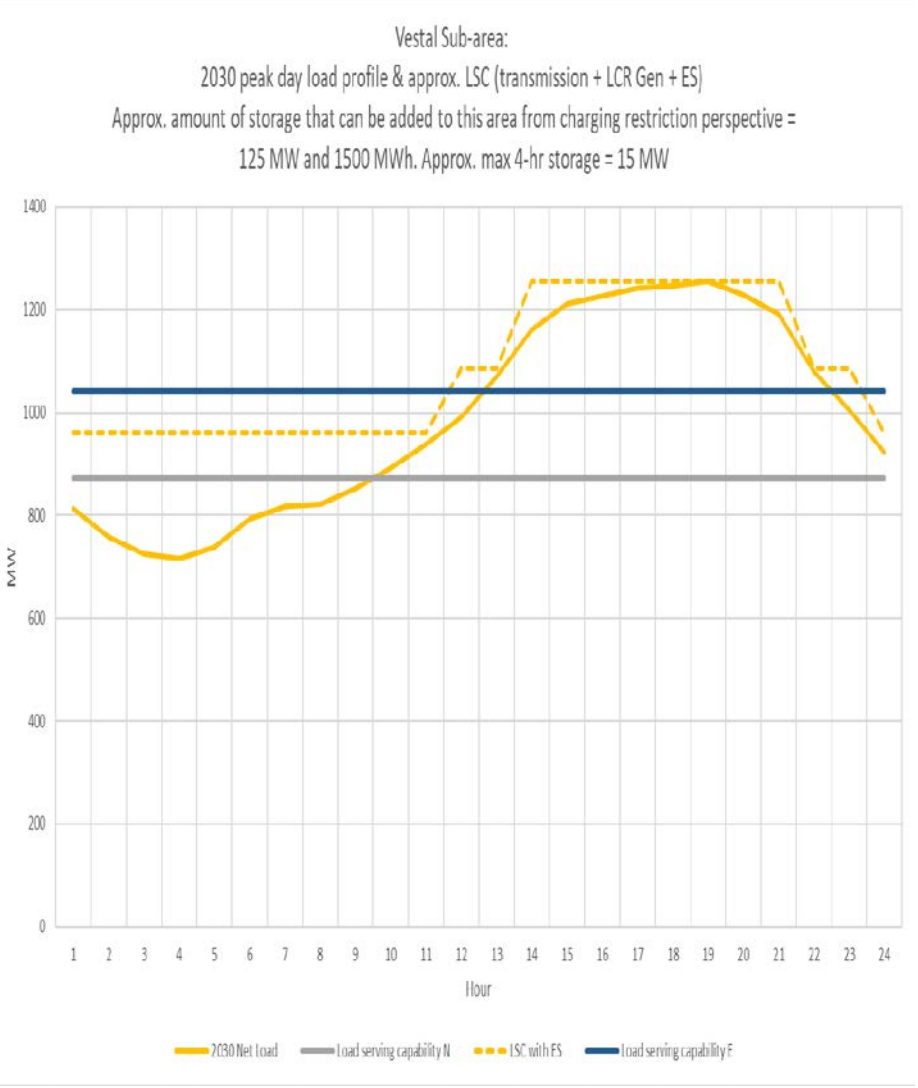
	Category	Limiting Facility	Contingency	2030 LCR (MW)
First Limit	P3	Magunden–Springville #2 230 kV line	Magunden–Springville #1 line with Eastwood out of service	434
Second Limit*	P3	Magunden–Vestal 230 kV line	Remaining Magunden–Vestal 230 kV line with Eastwood out of service	419

* Due to the larger difference between normal and emergency ratings of the limiting facility associated with the second limit compared to that associated with the first limit, the second limit is the binding constraint for energy storage local capacity. Therefore, the energy storage local capacity analysis is performed based on the second limit



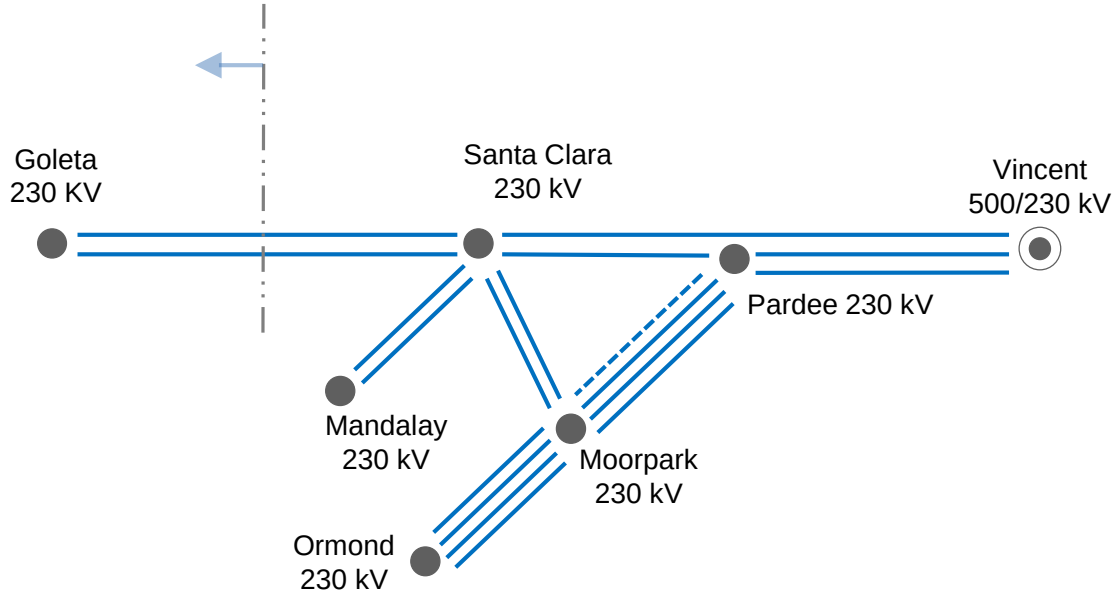
Vestal Sub-area Load Profiles and ES Capability





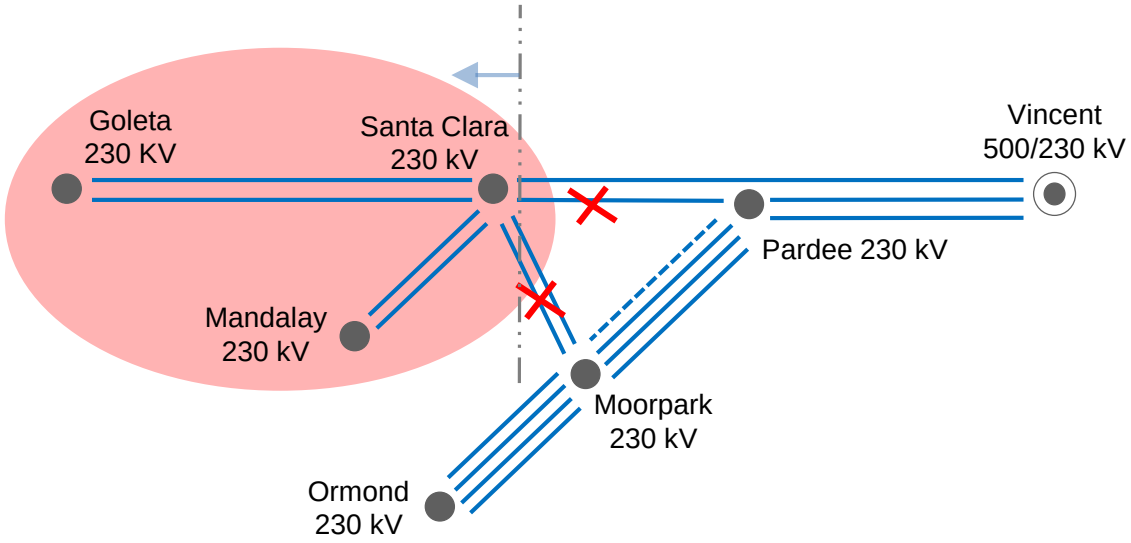
Goleta Sub-Area Requirements

Category	Limiting Facility	Contingency	2030 LCR (MW)
LCR for Goleta is satisfied by the LCR of the larger Santa Clara sub-area			

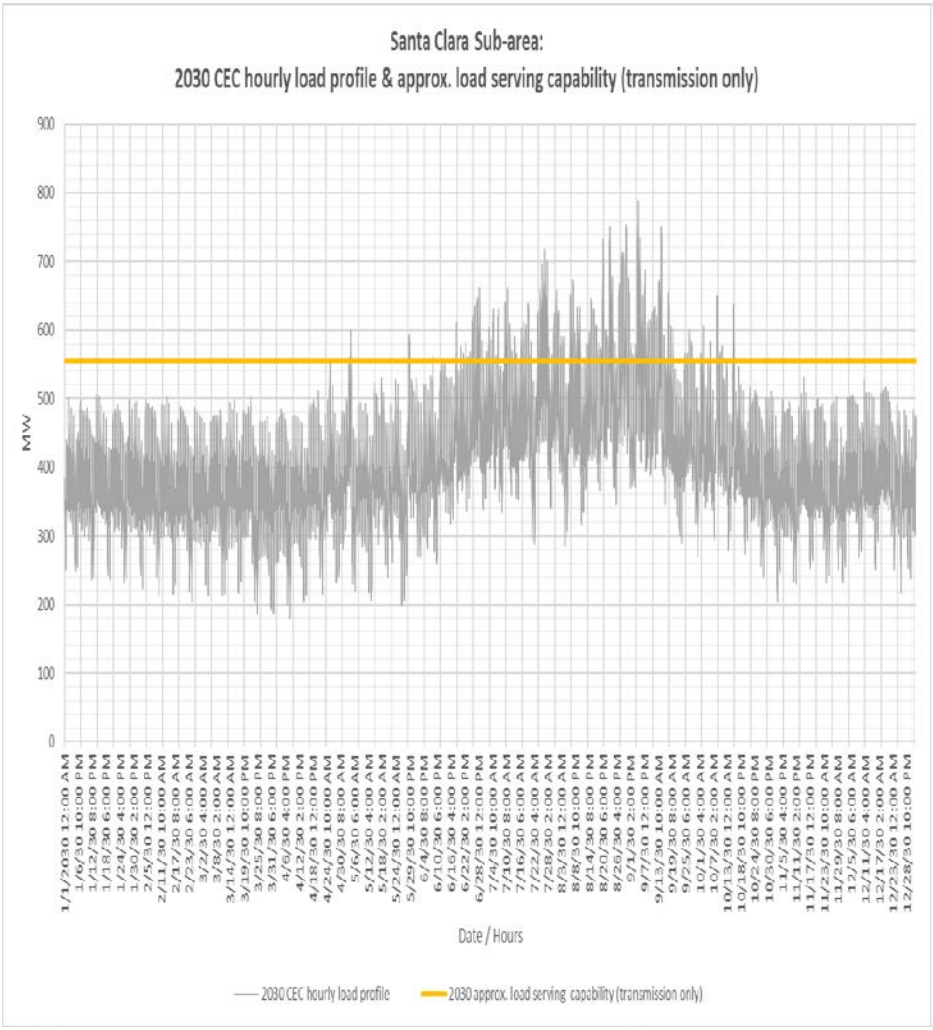


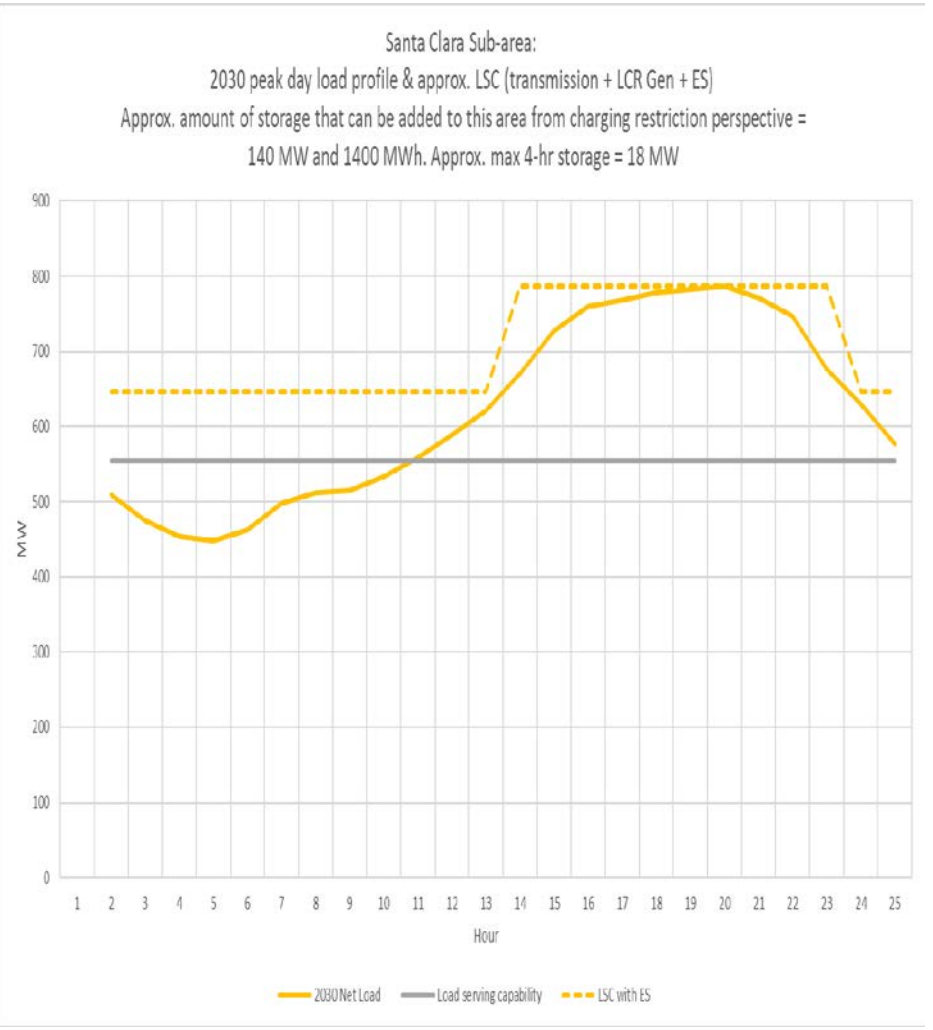
Santa Clara Sub-Area Requirements

Category	Limiting Facility	Contingency	2030 LCR (MW)
P1+P7	Voltage collapse	Pardee–Santa Clara 230 kV line followed by Moorpark–Santa Clara #1 and #2 230 kV DCTL	191



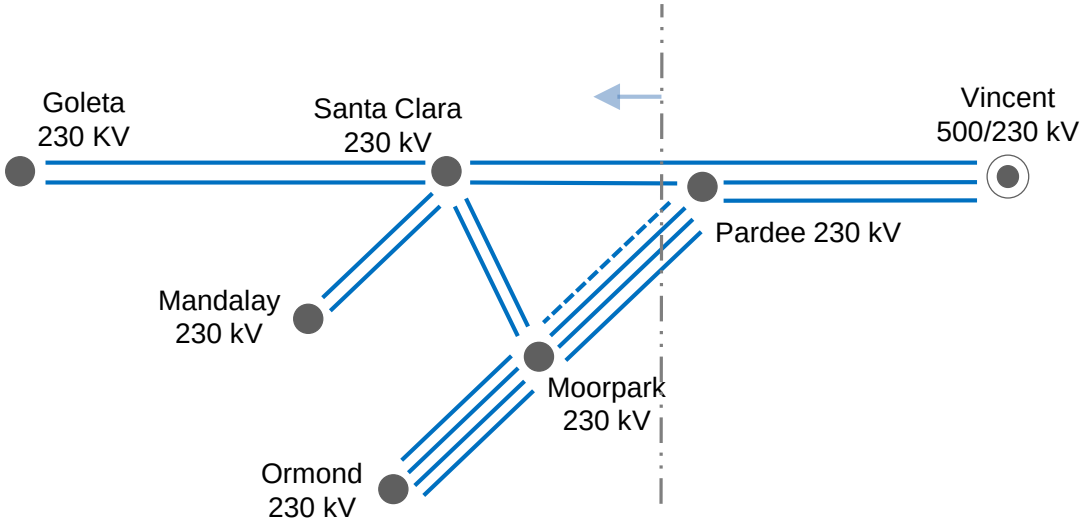
Santa Clara Sub-area Load Profiles and ES Capability





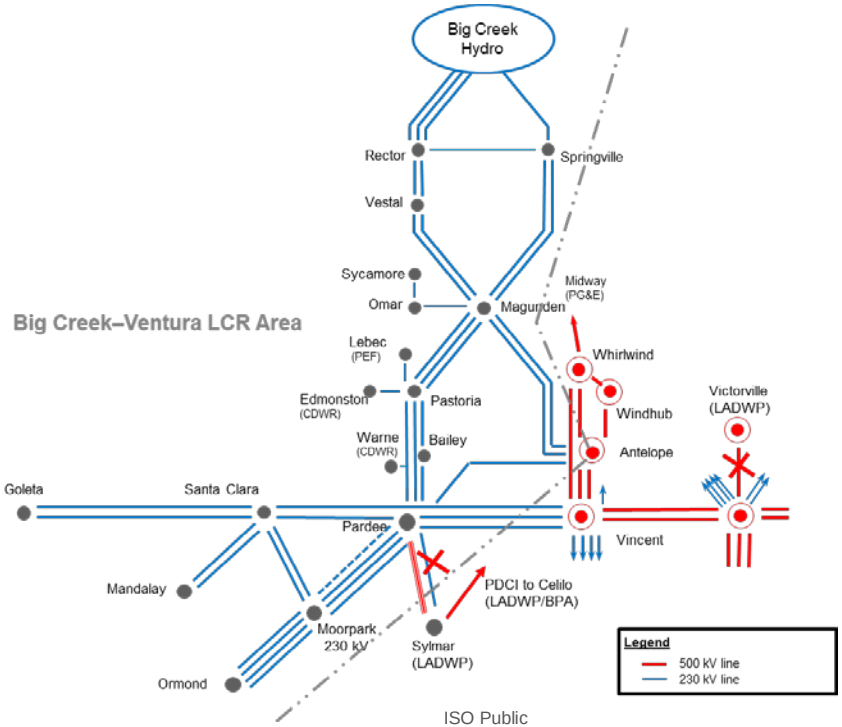
Moorpark Sub-Area Requirements

Category	Limiting Facility	Contingency	2030 LCR (MW)
No LCR requirement identified due to the Pardee–Moorpark 230 kV Project			



Overall Big Creek-Ventura Area Requirements

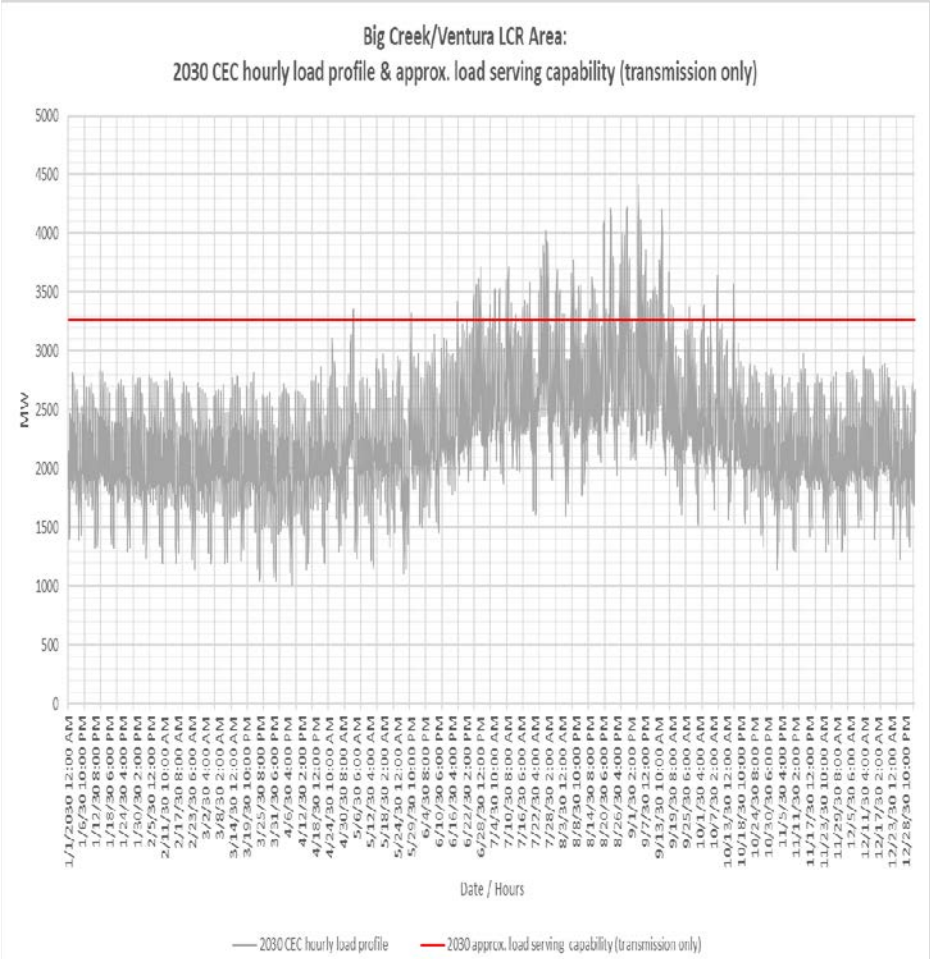
Category	Limiting Facility	Contingency	2030 LCR (MW)
P6	Pardee-Sylmar #1 or #2 230 kV line	Overlapping outage of Lugo–Victorville 500 kV line and one Pardee-Sylmar 230 kV line	1,151

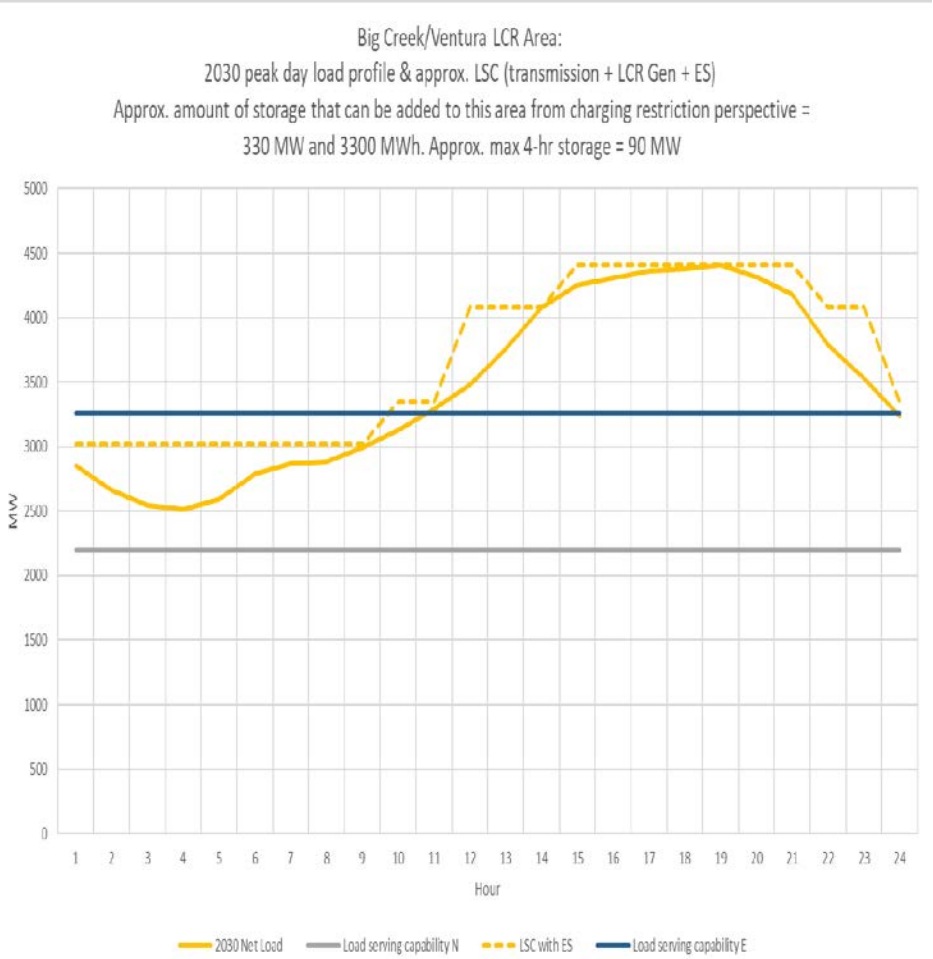


Big Creek/Ventura Area Total LCR Need

2030 LCR Need	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Need
Category P6	1,151	0	1,151

Big Creek/Ventura Area Load Profiles and ES Capability





Changes In LCR Compared to Previous LCR Results

Sub-Area	2021		2025		2030		Reason for LCR Change
	Load (MW)	LCR (MW)	Load (MW)	LCR (MW)	Load (MW)	LCR (MW)	
Rector	722	-	737	-	794	-	N/A
Vestal	1,184	304	1,199	310	1,256	434	Load increased
Goleta	242	-	244	-	246	-	N/A
Santa Clara	807	229	793	225	787	191	Load decreased
Moorpark	1,532	-	1,492	-	1,472	-	N/A
Overall Big Creek Ventura	4,386	2,296	4,370	1,002	4,410	1,151	Sylmar–Pardee Project, Load increased

Energy Storage Local Capacity Assessment Summary

Area	LCR (2030), MW	Approximate maximum energy storage that can be added		Approximate 4-hour energy storage that can be added	Remark
		Capacity (MW)	Energy (MWh)	Capacity (MW)	
Rector	0	N/A	N/A	N/A	No LCR requirement
Vestal	434	125	1,500	15	No gas-fired local capacity requirement
Goleta	0	N/A	N/A	N/A	No LCR requirement
Santa Clara	191	140	1,400	18	Amount includes approved 195 MW/780 MWh ES
Moorpark	0	N/A	N/A	N/A	No LCR requirement
Overall Big Creek–Ventura	1,151	330	3,300	90	No gas-fired local capacity requirement other than in the Santa Clara Sub-area

2030 Draft LCR Study Results - San Diego Non-Bulk Sub-Areas

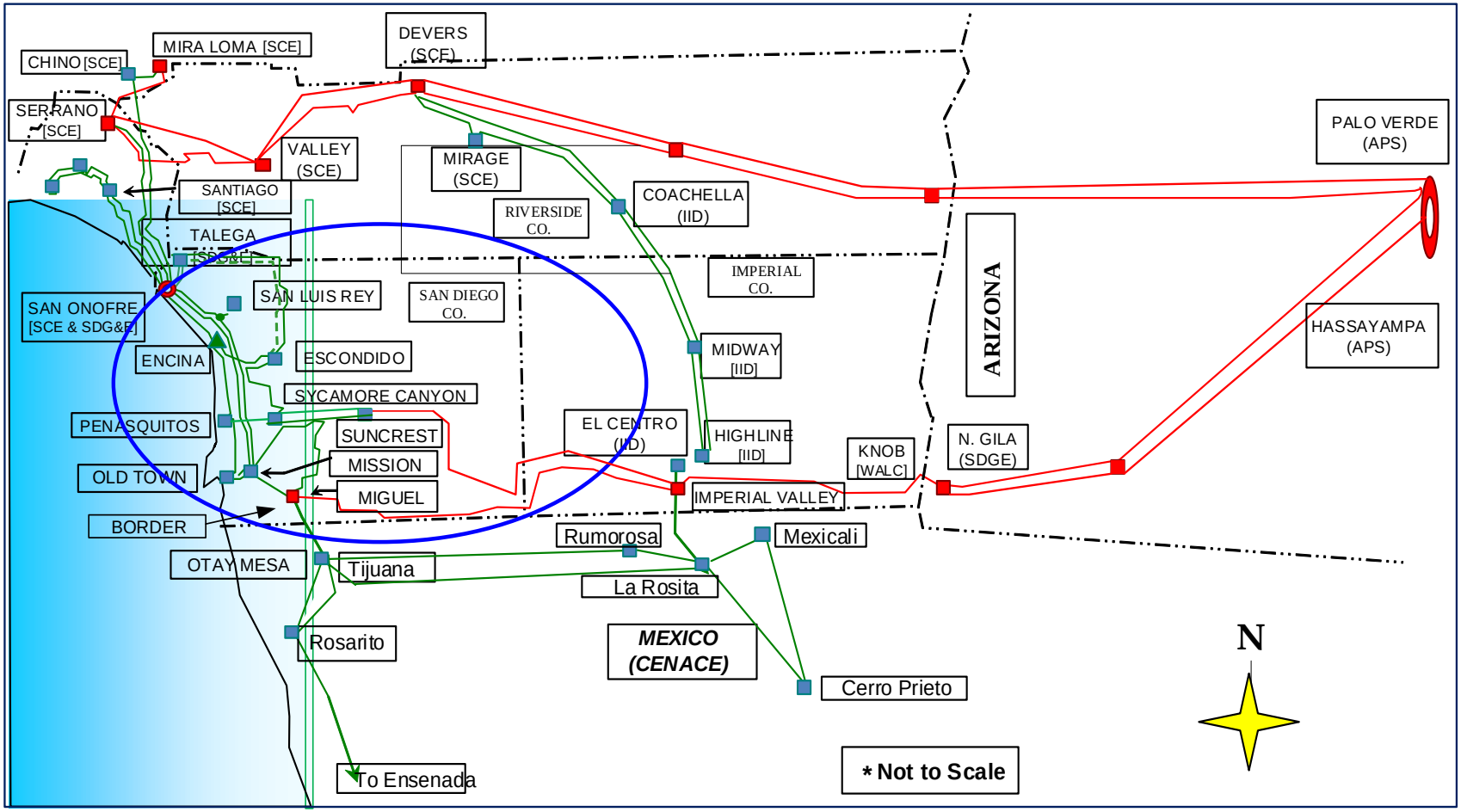
Frank Chen

Regional Transmission Engineer Lead

2020-2021 Transmission Planning Process Stakeholder Meeting

September 23 - 24, 2020

San Diego Area



Major Network Upgrades And New Resource by 2030

1. TL632 Granite loop-in and TL6914 reconfiguration
2. Upgrade Bernardo - Rancho Carmel 69kV line
3. Re-conductors of Japanese Mesa–Basilone–Talega Tap 69 kV lines
4. 2nd San Marcos–Escondido 69 kV line
5. TL6983 2nd Pomerado – Poway 69 kV Circuit
6. Artesian 230 kV substation
7. TL605 Silvergate – Urban Reconductor
8. TL600 Kearny–Clairemont Tap Reconductor & Loop into Mesa Heights
9. Reconductor of Stuart Tap–Las Pulgas 69 kV line (TL690E)
10. Open Sweetwater Tap (TL603) and Loop into Sweetwater
11. South Orange County Reliability Enhancement
12. IID's S-Line Upgrade
13. By-passing 500 kV series capacitor banks on SWPL and SPL
14. Energy storage projects (total of 389 MW/615 MWh)

Sub-areas studied:

- Border sub-area
- El Cajon sub-area
- Esco sub-area
- Pala sub-area
- Mission sub-area
- Miramar sub-area

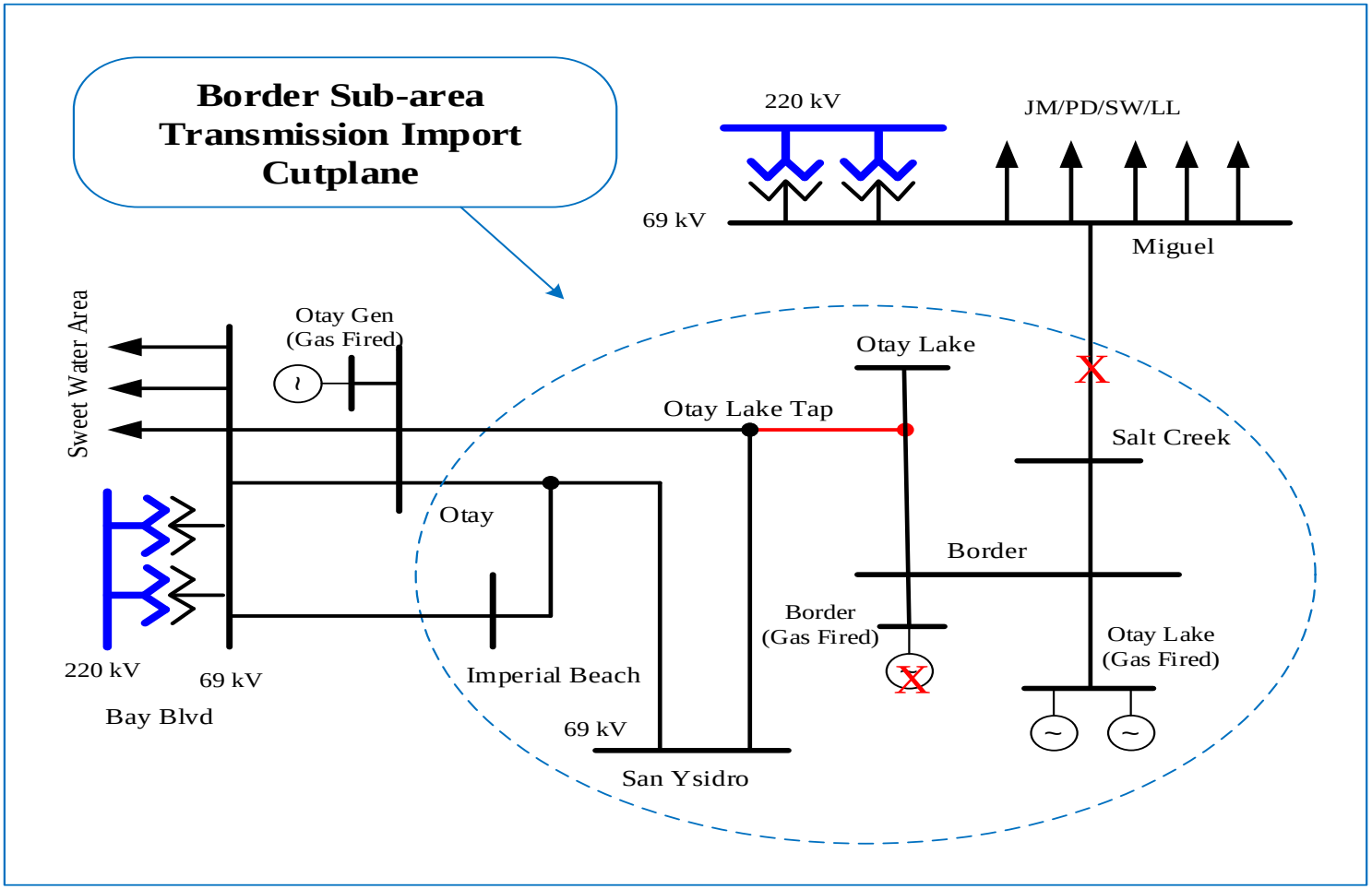
Sub-areas without LCR requirement in 2030 due to the LCR criteria change and network upgrade

- Esco sub-area
- Pala sub-area
- Mission sub-area
- Miramar sub-area
- El Cajon Sub-area

Border Sub-area: Load and Resources

		2030
Load (MW)	Gross Load	173
	AAEE	-3
	Behind-The-Meter PV	0
	Net Load	167
	Transmission Loss	3
	Net Load + Loss	170
Resources (MW)	Gas-Fired	145
	Solar PV	0
	Wind	0
	QF/Other	0
	Demand Response	0
	Energy Storage	0

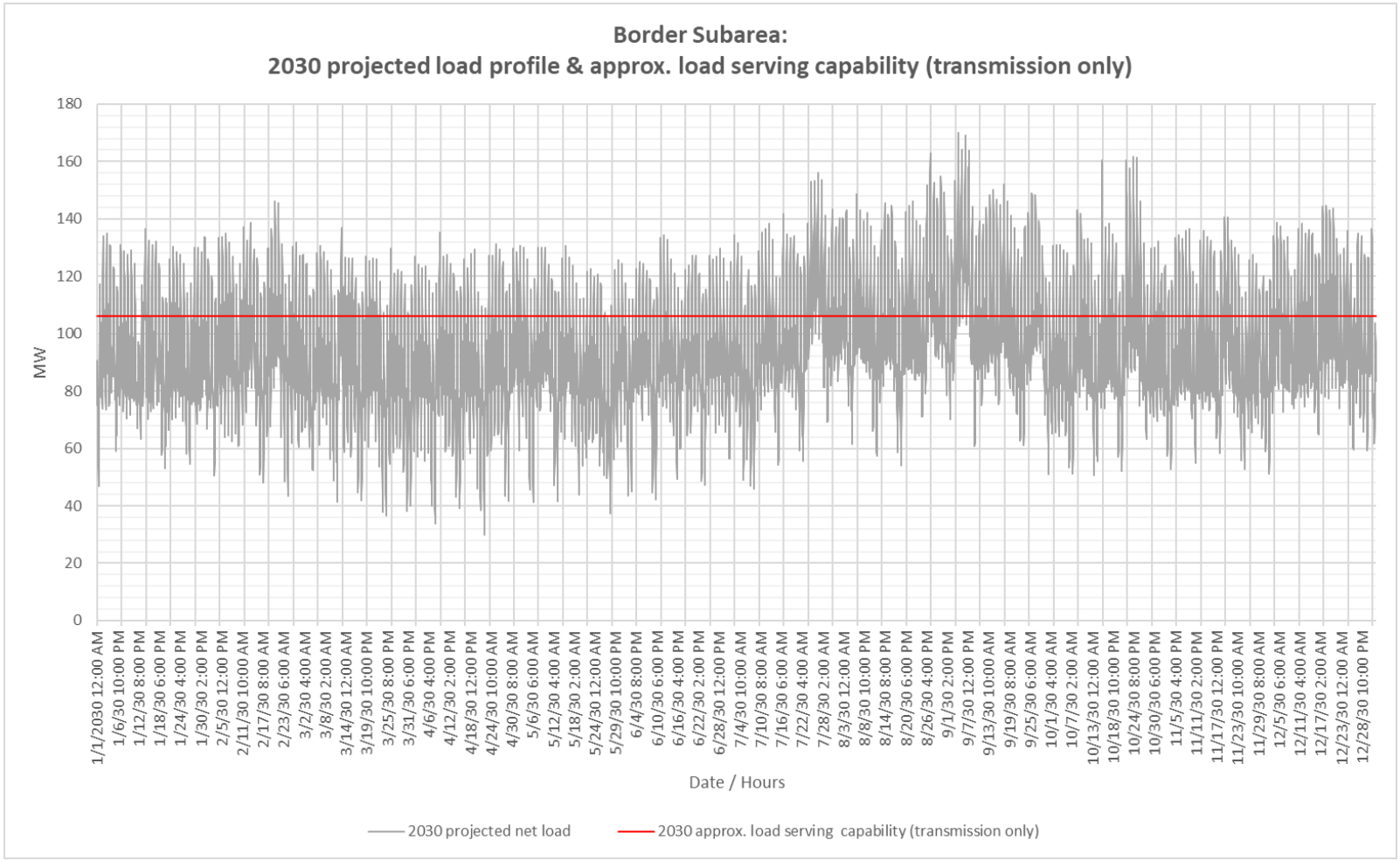
Border Sub-area: One-line diagram



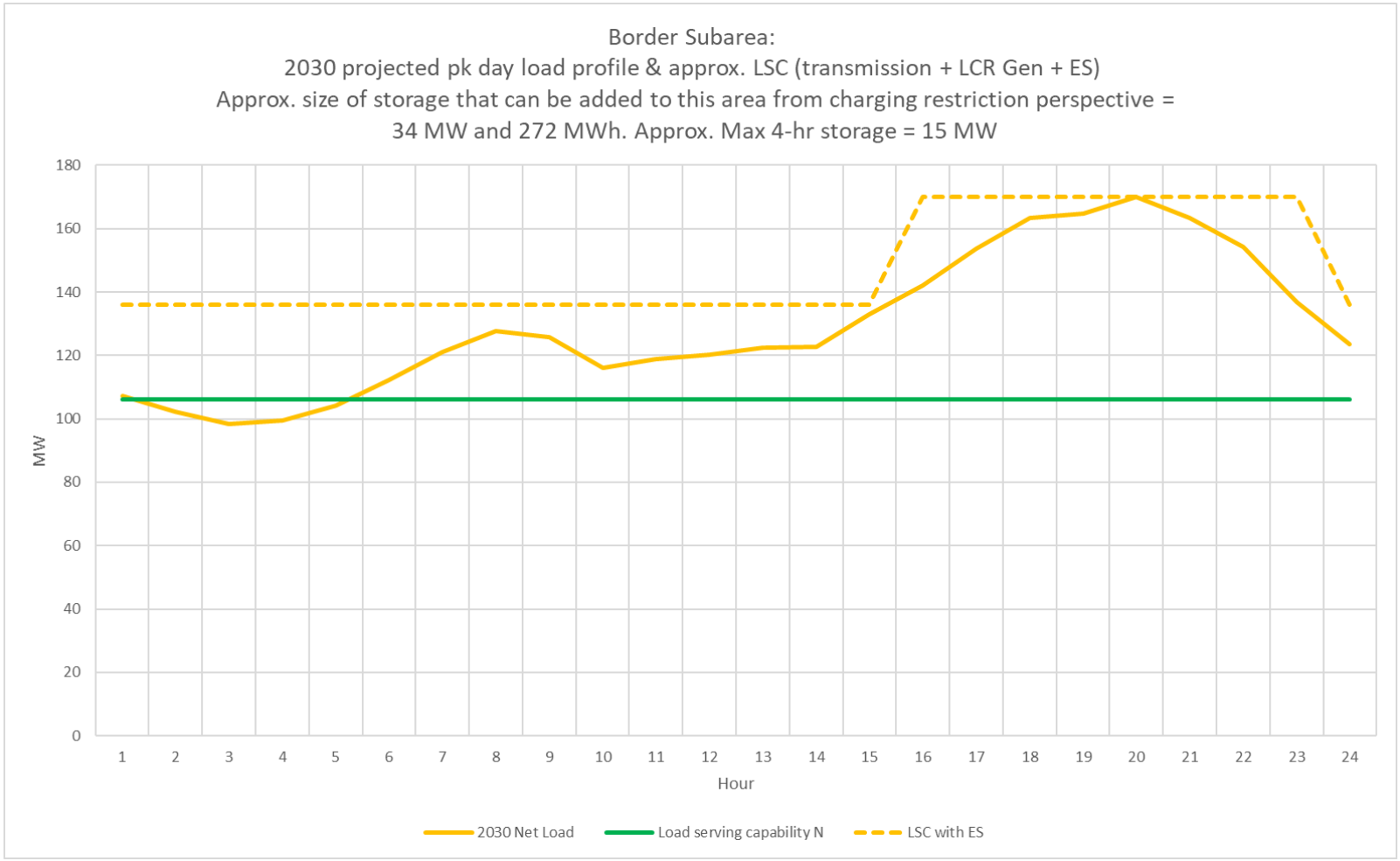
Border Sub-area: LCR Requirement

Year	Category	Contingency	Limiting Facility	LCR (MW)
2030	P3	Border unit out of service followed by the outage of Miguel-Salt Creek 69 kV #1 (TL6910)	Otay-Otay Lake Tap 69 kV (TL649)	93

Border Sub-area Yearly Load Profiles - 2030



Daily Load Profiles and G-1/L-1 Load Serving Capability - 2030



Changes Compared to Previous LCR Requirements

Sub-Area	2028 LCR	2030 LCR	Major Reason for LCR Change
	LCR (MW)	LCR (MW)	
Border	70	93	Load growth and criteria change
El Cajon	76	0	network upgrade and criteria change
Esco	0	0	NA
Pala	26	0	criteria change
Mission	0	0	NA
Miramar	0	0	NA

2020-2021 TPP Wildfire Impact Assessment Preliminary Results

Binaya Shrestha
Manager, Regional Transmission – North

2020-2021 Transmission Planning Process Stakeholder Meeting
September 23-24, 2020

Presentations available on Market Participant Portal

Day 2 - Wrap-up
Reliability Assessment and Study Updates

Isabella Nicosia
Stakeholder Engagement and Policy Specialist

2020-2021 Transmission Planning Process Stakeholder Meeting
September 23-24, 2020

Request Window Submissions for Reliability Assessment

- Request Window closes October 15
  - Request Window is for alternatives in the reliability assessment
  - Stakeholders requested to submit comments to: requestwindow@caiso.com
  - ISO will post Request Window submission on the market participant portal

Stakeholder Comments

- Stakeholder comments to be submitted by October 8
  - Stakeholder comments are to include potential alternatives for economic LCR assessment for
  - Stakeholders requested to submit comments to: regionaltransmission@caiso.com
  - Stakeholder comments are to be submitted within two weeks after stakeholder meetings
  - ISO will post comments and responses on website