Agenda

April 14, 2015 Stakeholder Meeting

2016 and 2020 Final LCR Results

1. Introductions
2. LCR Area Presentations
    A. Humboldt
    B. North Coast/North Bay
    C. Greater Bay Area
    D. Sierra
    E. Stockton
    F. Fresno
    G. Kern
    H. LA Basin
    I. Big Creek/Ventura
    J. San Diego/Imperial Valley
3. Stakeholder Comments
4. General items and future steps

2016 and 2020 Final LCR Study Results - Summary of Findings

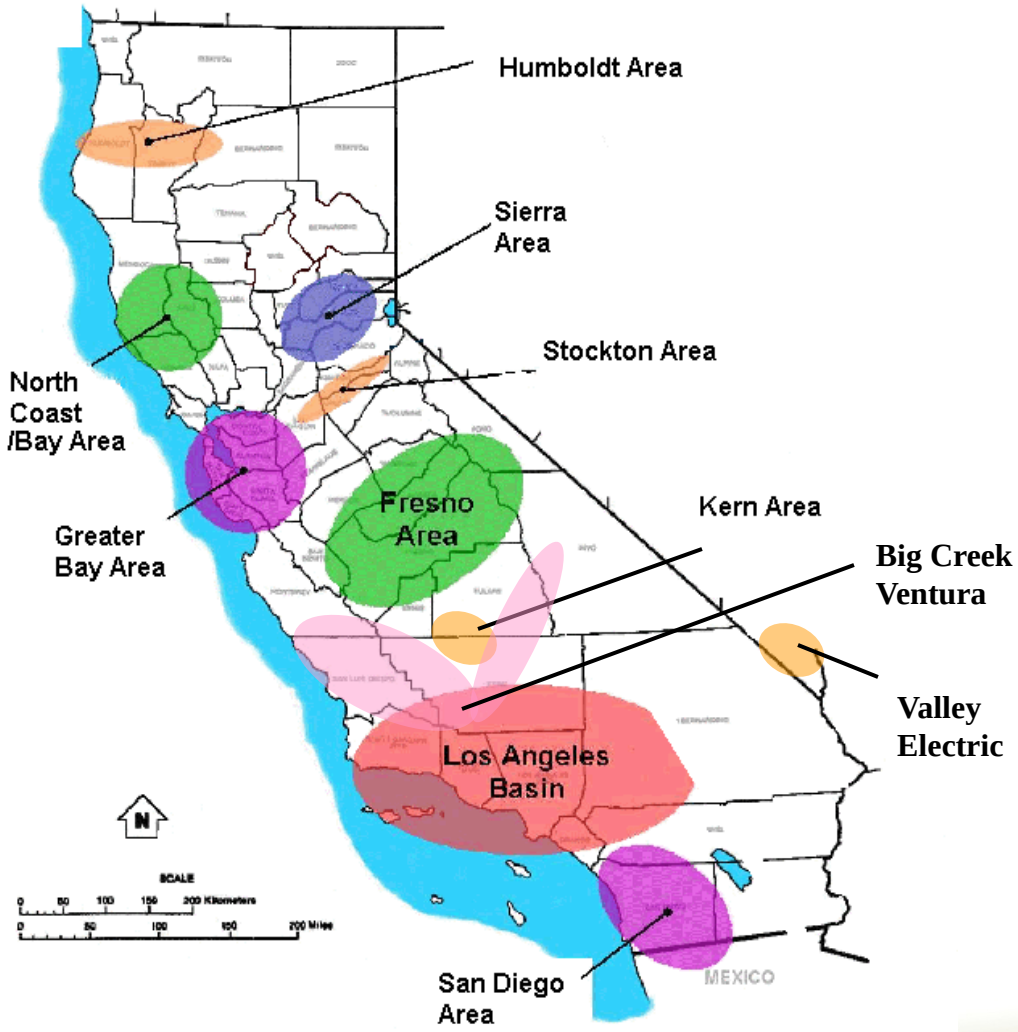
Catalin Micsa

Lead Regional Transmission Engineer

Stakeholder Teleconference

April 14, 2015

LCR Areas within CAISO



Input Assumptions, Methodology and Criteria

See October 30, 2014 stakeholder teleconference - for study assumptions, methodology and criteria. The latest information along with the 2016 LCR Manual can be found at: http://www.caiso.com/informed/Pages/StakeholderProcesses/LocalCapacityRequirementsProcess.aspx .

Transmission system configuration – all-projects with EDRO up to June 1, 2016

Generation – all-generation with COD up to June 1, 2016

Load Forecast – 1 in 10 local area peak (based on latest CEC forecast)

Criteria – see report for details

Methodology

1. Maximize Imports Capability into the local area
2. Maintain path flows
3. Maintain deliverability for deliverable units
4. Load pocket – fix definition
5. Performance levels B & C (if equal category B is most stringent)

Major Changes from last year studies

1. **Updated NQC data.**
2. **Total LCR needs have decreased by 1,000 MW or ~ 3.9% (2016) and increased by 500 MW or ~2.2% (2020).**
3. **2016 LCR needs** decrease in: **Sierra and Bay Area** due to decrease in load forecast, **Kern and LA Basin** due to new transmission projects and **San Diego** due to load forecast and transmission projects.
4. **2016 LCR needs** increase in: **Humboldt, Stockton** and **Fresno** due to load growth, **North Coast/North Bay** due to lower Pittsburg/Oakland sub-area requirements, and **Big Creek/Ventura** due to decrease in LA Basin and San Diego/Imperial Valley needs.

Role and Purpose of sub-area LCR needs:

- Provide detail local procurement information
- Need to be satisfied in order to minimize ISO back-stop
- Sum of the parts may not equal the overall need

Total 2016 Final LCR Needs

	Qualifying Capacity			2016 LCR Need Based on Category B			2016 LCR Need Based on Category C with operating procedure		
Local Area Name	**QF/ Muni (MW)**	**Market (MW)**	**Total (MW)**	**Existing Capacity Needed**	**Deficiency**	**Total (MW)**	**Existing Capacity Needed****	**Deficiency**	**Total (MW)**
Humboldt	21	208	229	118	0	**118**	167	0	**167**
North Coast/ North Bay	132	750	882	611	0	**611**	611	0	**611**
Sierra	1195	831	2026	1139	16*	**1155**	1765	253*	**2018**
Stockton	160	434	594	357	0	**357**	422	386*	**808**
Greater Bay	1122	6435	7557	3790	0	**3790**	4218	131*	**4349**
Greater Fresno	282	2647	2929	2445	0	**2445**	2445	74*	**2519**
Kern	99	430	529	214	0	**214**	400	0	**400**
LA Basin	1710	9259	10969	7576	0	**7576**	8887	0	**8887**
Big Creek/Ventura	584	4951	5535	2141	0	**2141**	2398	0	**2398**
San Diego/ Imperial Valley	228	4687	4915	2850	0	**2850**	3112	72*	**3184**
Total	5533	30632	36165	21241	16	**21257**	24425	916	**25341**

Total 2020 Final LCR Needs

	Qualifying Capacity			2020 LCR Need Based on Category B			2020 LCR Need Based on Category C with operating procedure		
Local Area Name	**QF/ Muni (MW)**	**Market (MW)**	**Total (MW)**	**Existing Capacity Needed**	**Deficiency**	**Total (MW)**	**Existing Capacity Needed****	**Deficiency**	**Total (MW)**
Humboldt	21	208	229	121	0	**121**	170	0	**170**
North Coast/ North Bay	132	750	882	202	0	**202**	509	0	**509**
Sierra	1195	831	2026	1665	0	**1665**	1703	0	**1703**
Stockton	207	497	704	246	0	**246**	336	67*	**403**
Greater Bay	1122	5775	6897	3820	0	**3820**	4191	0	**4191**
Greater Fresno	282	2647	2929	1471	0	**1471**	1867	21*	**1888**
Kern	55	119	174	132	0	**132**	135	0	**135**
LA Basin	1710	9259	10969	7978	0	**7978**	9229	0	**9229**
Big Creek/Ventura	584	4951	5535	2598	0	**2598**	2598	0	**2598**
San Diego/ Imperial Valley	283	4493	4776	2868	0	**2868**	2868	10*	**2878**
Total	5591	29530	35121	21101	0	**21101**	23606	98	**23704**

2016 and 2020 LCR Study Schedule

CPUC and the ISO have determined overall timeline

- Criteria, methodology and assumptions web conf. Oct. 30, 2014
- Submit comments by November 13, 2014
- Posting of comments with ISO response by the December 1, 2014
- Base case development started in December 2014
- Receive base cases from PTOs January 3, 2015
- Publish base cases January 15, 2015 – comments by the 29th
- Draft study completed by March 3, 2015
- ISO Stakeholder Meeting March 9, 2015 – comments by the 23rd
- ISO receives new operating procedures March 23, 2015
- Validate op. proc. – publish draft final report April 7, 2015
- ISO Stakeholder Web Conf. April 14, 2015 – comments by the 28th
- Final 2016 LCR report April 30, 2015

2015 ISO Procurement Schedule

Per ISO Tariff and BPM - overall timeline

- Final LCR Report April 30, 2015
- LSE self-guided local allocation; first week in May, 2015
- Receive new CEC coincident load forecast June 30, 2015
- ISO or CPUC to send out final local allocation; middle of July, 2015
- If Oakland under contract; LSEs to submit showings by 9/15/2015
- ISO to decide on retaining units under RMR by October 1, 2015
- Final LSE showings TBD – Usually last week of October, 2015
- ISO to send a market notice out stating deficiencies in procurement – about 3 weeks after final showing - about November 21, 2015
- ISO receives additional showing (30 days after market notice)
- ISO to enter back-stop procurement for local reasons (if needed)

Your comments and questions are welcome.

For written comments, please send to: RegionalTransmission@caiso.com

2016 and 2020 Final LCR Study Results – Humboldt and North Coast/ North Bay Areas

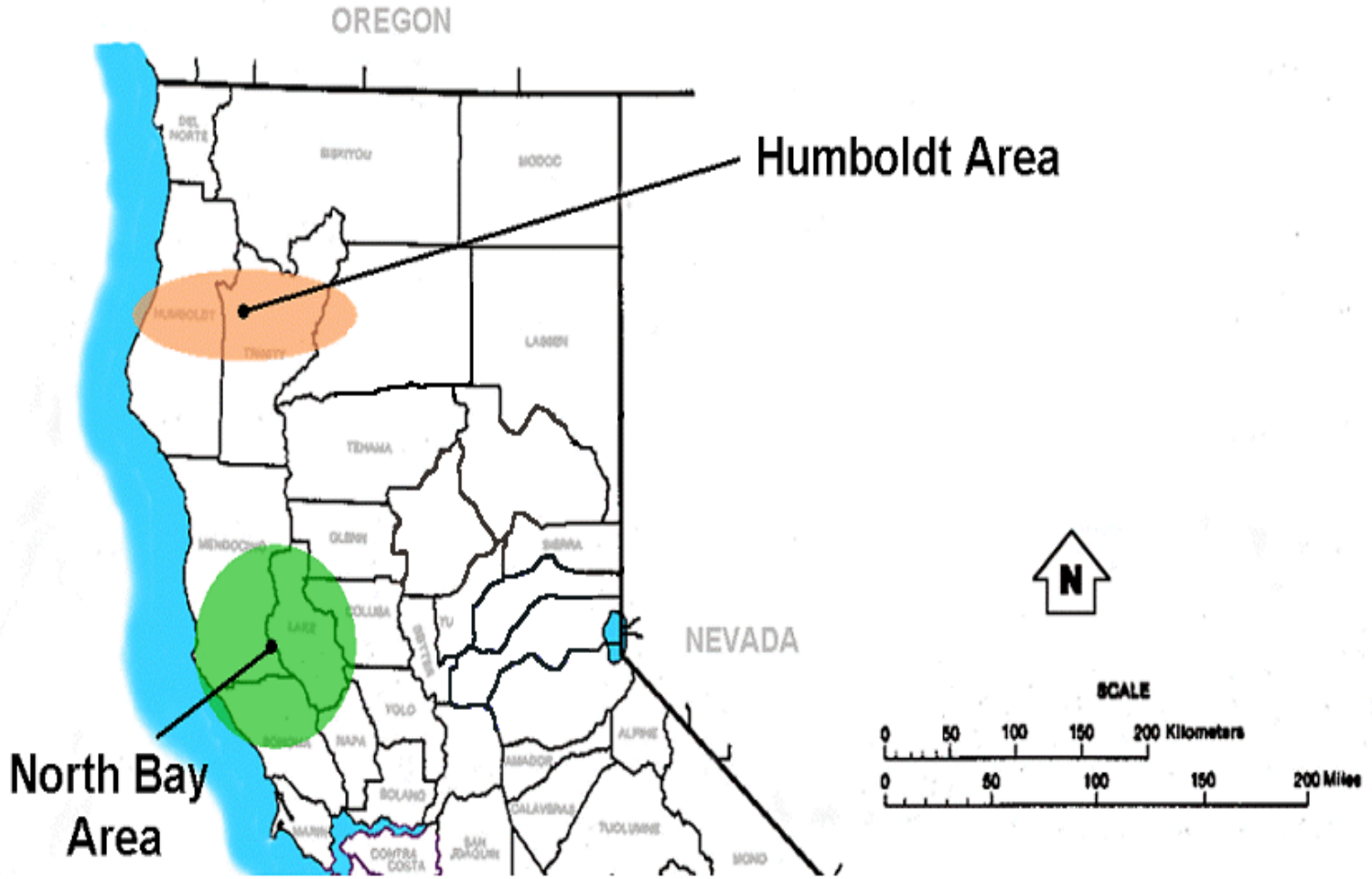
Irina Green

Regional Transmission Lead Engineer

Stakeholder Teleconference

April 14, 2015

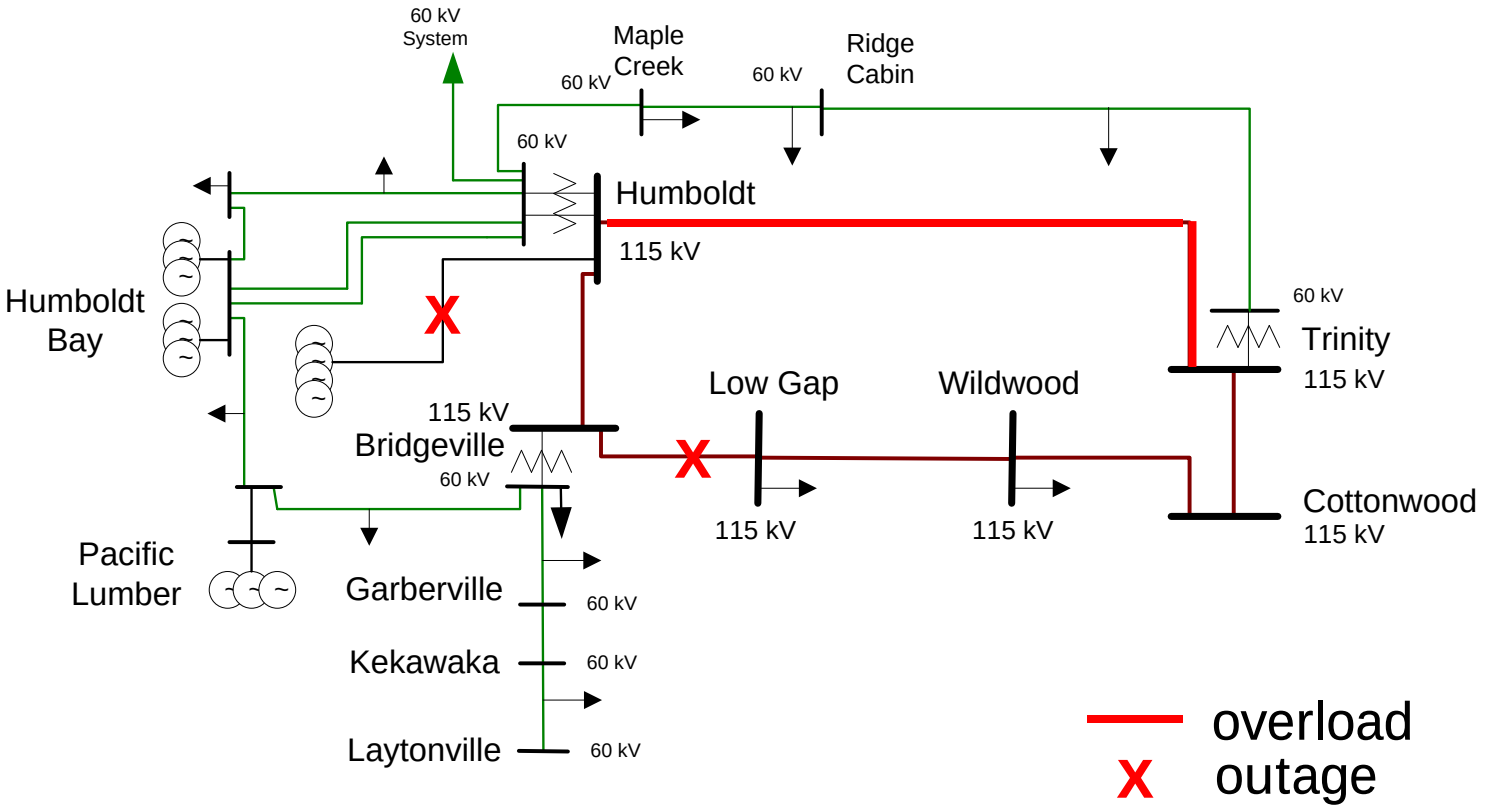
Humboldt and North Coast/North Bay



Humboldt Load and Resources (MW)

		2016	2020
Load	=	190	203
AAEE	=	-4	-12
Transmission Losses	=	10	9
Total Load	=	**196**	**200**
Market Generation	=	208	208
QF/Self-Gen Generation	=	21	21
Total Qualifying Capacity	=	**229**	**229**

Critical Contingencies
Humboldt Area



Critical Contingencies Humboldt Area

Humboldt Overall – Category B Winter Peak

Contingency: Cottonwood-Bridgeville 115 kV line + one Humboldt PP units out of service
Limiting component: Thermal overload on Humboldt -Trinity 115 kV line
2016 LCR Need: 118 MW (including 21 MW of QF/Self generation)
2020 LCR Need: 121 MW (including 21 MW of QF/Self generation)

Humboldt Overall – Category C Winter Peak

Contingency: Cottonwood – Bridgeville 115 kV line + 115 kV Gen tie to the Humboldt Bay Units
Limiting component: Thermal overload on Humboldt - Trinity 115 kV line
2016 LCR need: 167 MW (including 21 MW of QF/Self generation)
2020 LCR need: 170 MW (including 21 MW of QF/Self generation)

Changes

Since last year:

1) Load went up by 1 MW in 2016 compared with 2015
2) LCR need increased by 1 MW in 2016 compared to 2015
3) Load went down by 4 MW in 2020 compared with 2019
4) Long-Term LCR decreased by 3 MW in 2020 compared to 2019

Since last stakeholder meeting:

1) Updated NQC

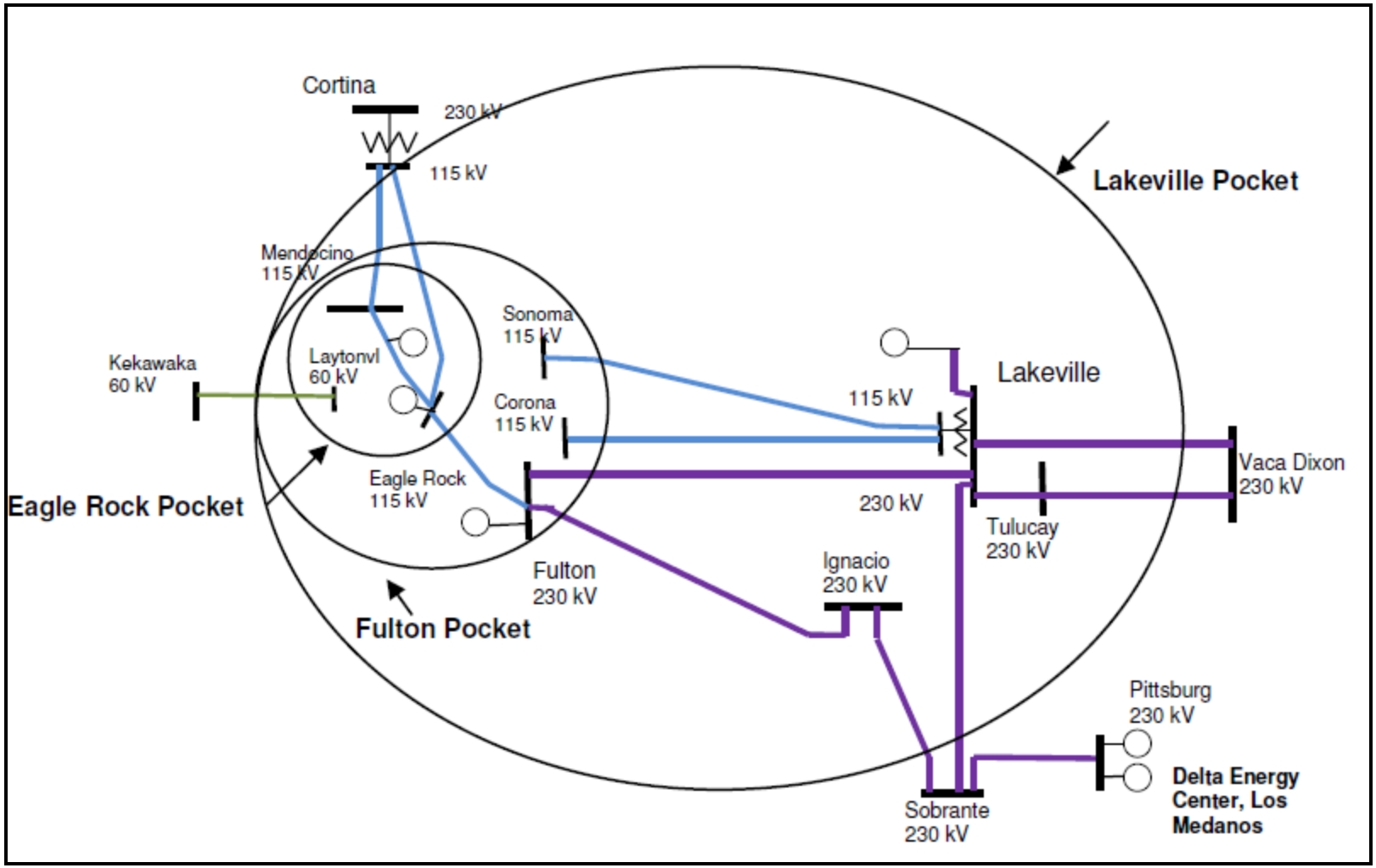
Your comments and questions are welcomed

Please send written comments to:
RegionalTransmission@caiso.com

North Coast/North Bay Load and Resources (MW)

		2016	2020
Load	=	1425	1511
AAEE	=	-28	-73
Transmission Losses	=	36	38
Total Load	=	**1433**	**1476**
Market Generation	=	750	750
Wind Generation	=	0	0
Muni Generation	=	117	117
QF Generation	=	15	15
Total Qualifying Capacity	=	**882**	**882**

North Coast and North Bay



Eagle Rock Sub-Area

Eagle Rock Sub-area – Category B

Contingency: Cortina-Mendocino 115 kV line, with Geyser #11 unit out

2016 LCR need: 176 MW (includes 2 MW of QF/Muni generation)

2020 LCR need: 202 MW (includes 2 MW of QF/Muni generation)

Limiting component: Thermal overload on Eagle Rock-Cortina 115 kV line

Eagle Rock Sub-area – Category C

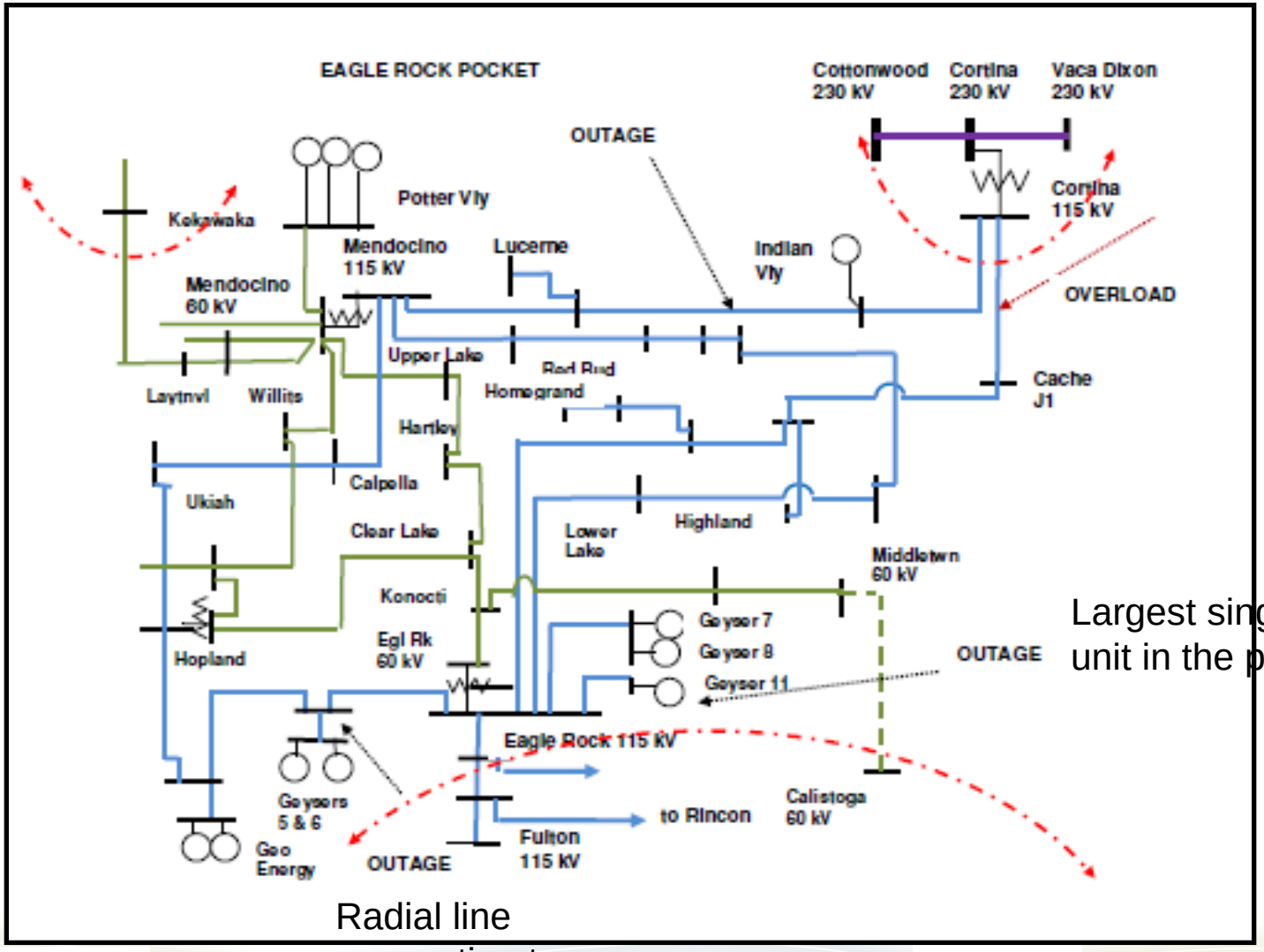
Contingency: Cortina-Mendocino and Geysers #3-Geysers #5 115 kV lines

2016 LCR need: 192 MW (includes 2 MW of QF/Muni generation)

2020 LCR need: 217 MW (includes 2 MW of QF/Muni generation)

Limiting component: Thermal overload on Eagle Rock-Cortina 115 kV line

Eagle Rock Sub-Area



Largest single unit in the pocket

Radial line connecting two units

Fulton Sub-area

Fulton Sub-area – Category B

No requirement.

Fulton Sub-area – Category C

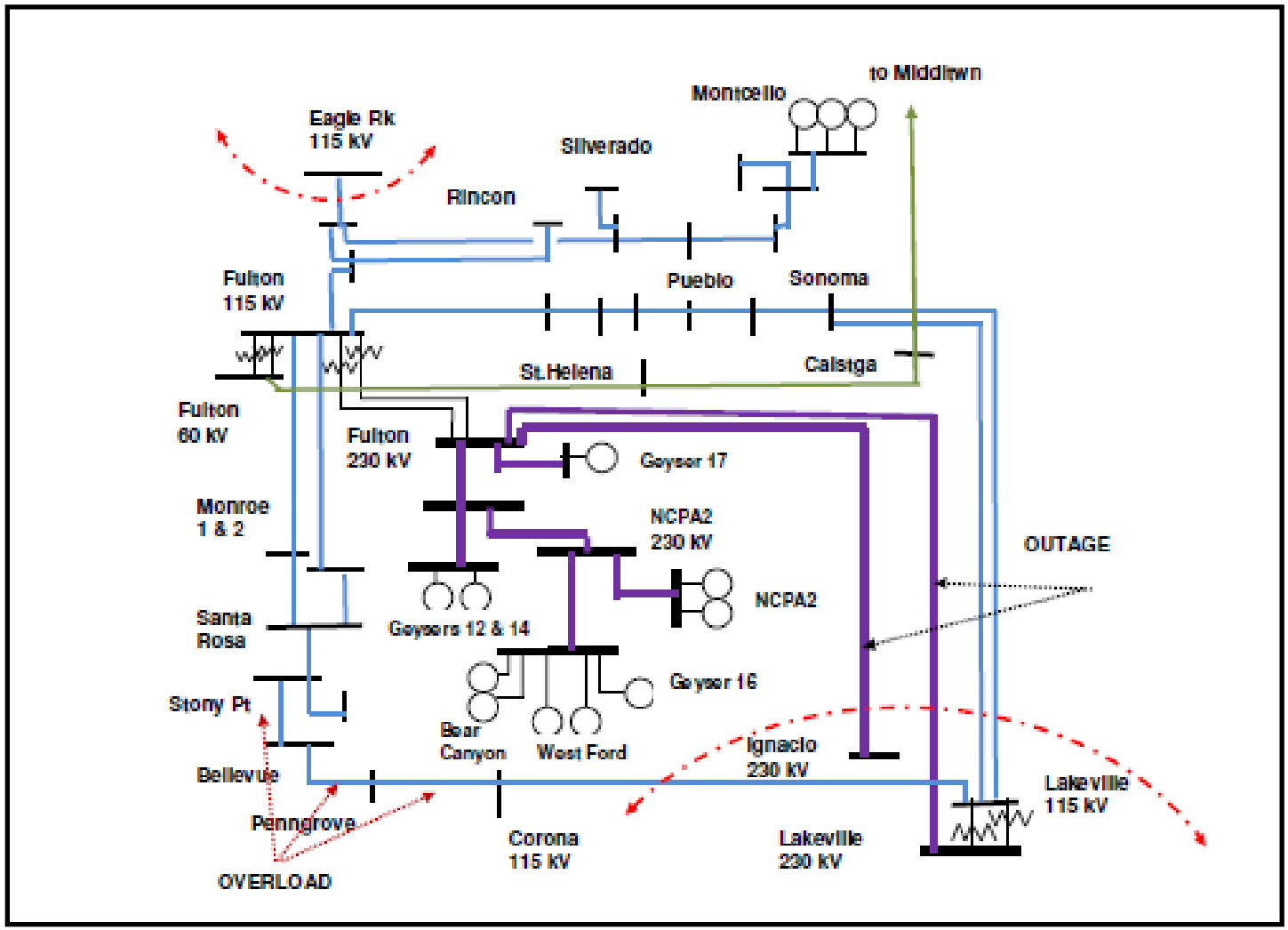
Contingency: Fulton-Lakeville and Fulton-Ignacio 230 kV lines

2016 LCR need: 282 MW (includes 69 MW of QF/Muni generation)

2020 LCR need: 303 MW (includes 69 MW of QF/Muni generation)

Limiting component: Thermal overload on Santa Rosa-Corona 115 kV line

Fulton Sub-area



Lakeville Sub-area

Lakeville Sub-area (NC/NB Overall) – Category B

Contingency: Vaca Dixon-Tulucay 230 kV line with Delta Energy Center power plant out of service

2016 LCR need: 611 MW (includes 132 MW of QF/Muni generation)

2020 LCR need: not limiting due to the system upgrades, same as Eagle Rock sub-area: 202 MW (includes 2 MW of QF/Muni generation)

Limiting component: Thermal overload on the Vaca Dixon-Lakeville 230 kV line

Lakeville Sub-area (NC/NB Overall) – Category C

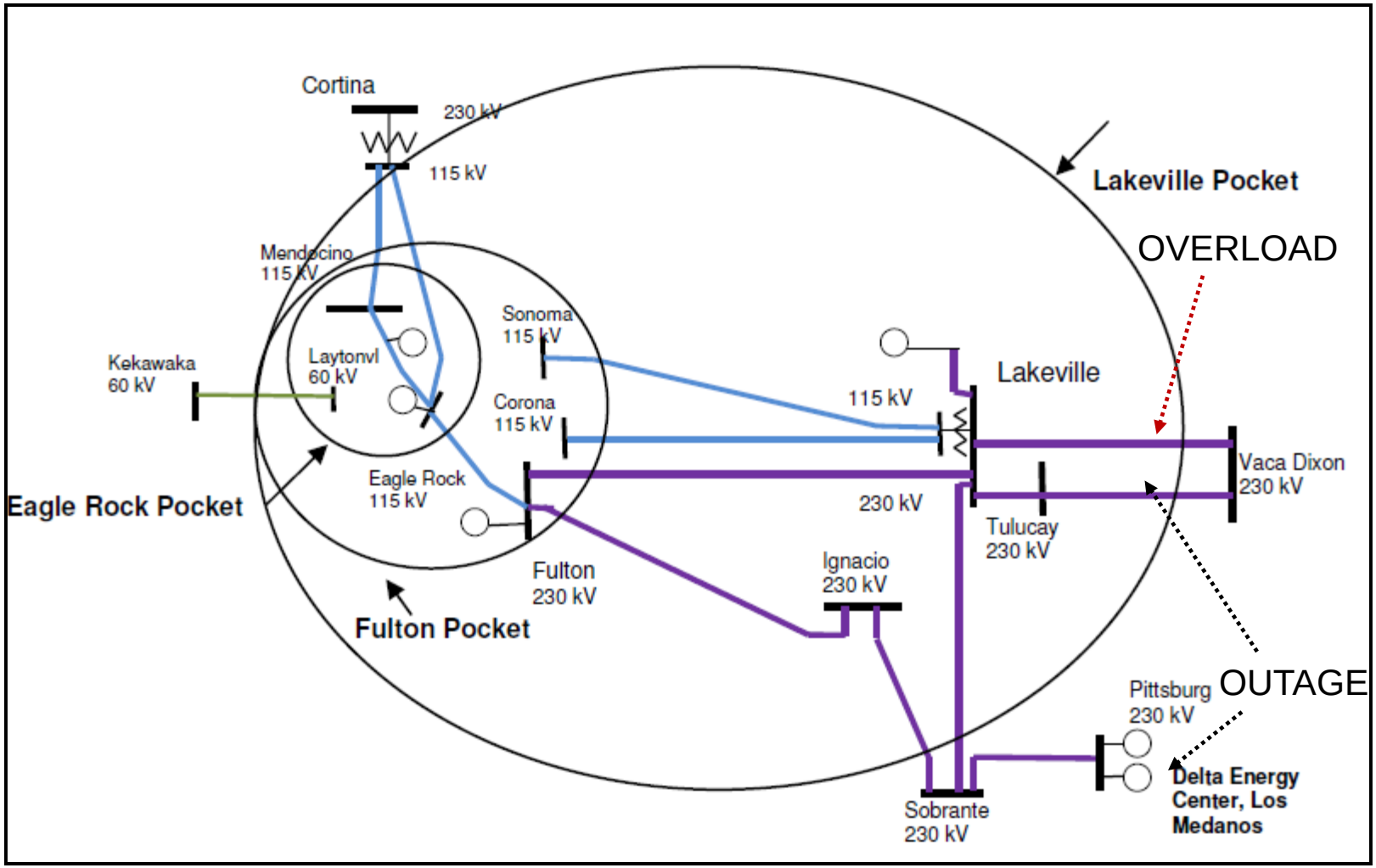
2016 LCR need: Same as Category B

2020 Contingency: Vaca Dixon-Tulucay and Vaca Dixon-Lakeville 230 kV lines

2020 LCR need: 509 MW (includes 132 MW of QF/Muni generation)

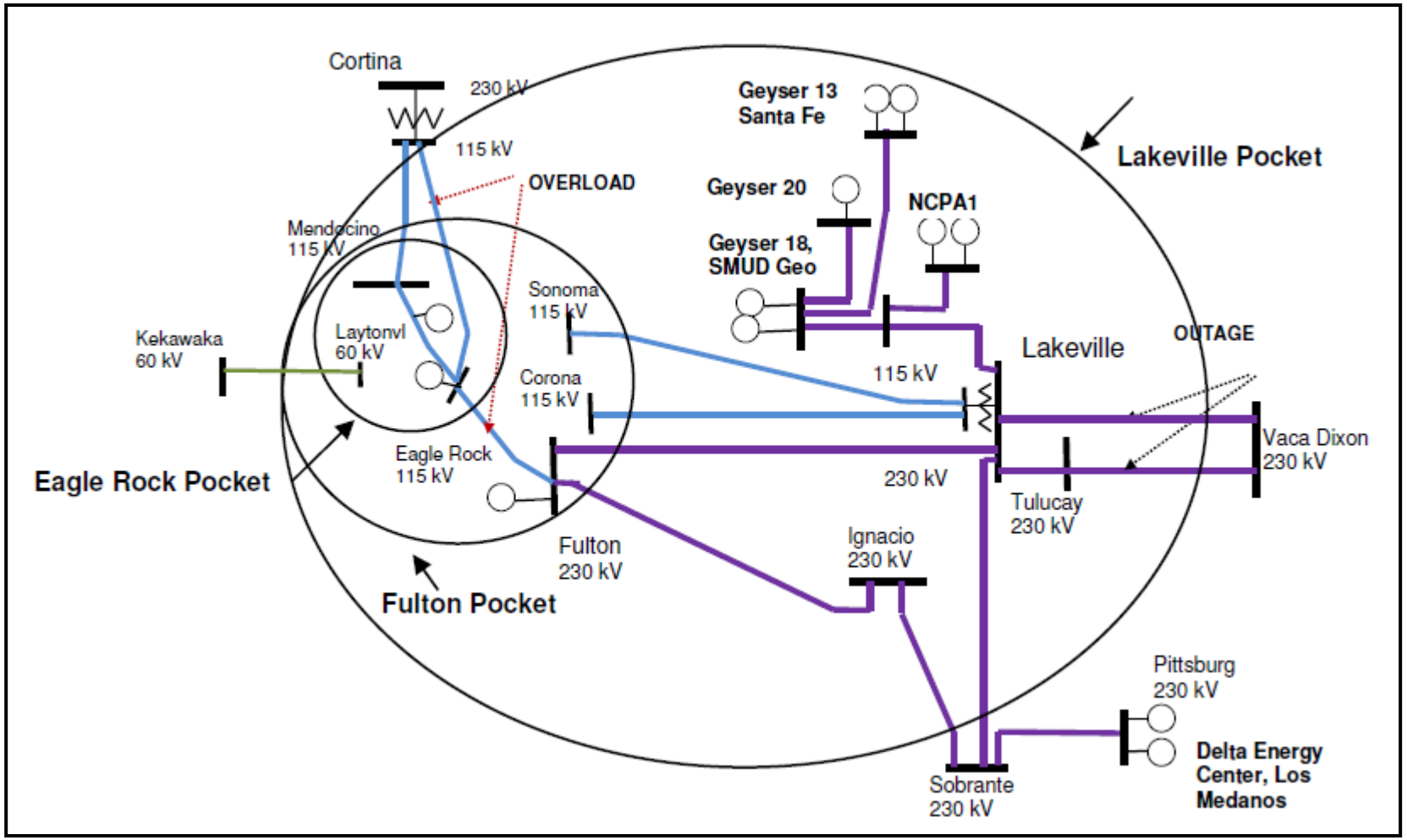
Limiting component: Thermal overload on the Eagle Rock-Cortina 115 kV line and possible overload on the Eagle Rock-Fulton 115 kV line as well as Moraga-Sobrante 115 kV line

Lakeville Sub-area Category B (2016)



No overload in 2020 due to the line reconductoring.

Lakeville Sub-area Category C (2020)



LCR need depends on the generation in the Pittsburg area.

Changes

Since last year:

1. 2016 load forecast has decreased by 25 MW vs. 2015
2. LCR need has increased by 61 MW due to lower Pittsburg area generation in the Bay Area
4. Vaca Dixon-Lakeville 230 kV Reconductoring Project – 7/2017
5. 2020 load forecast has decreased by 8 MW vs. 2019
6. Long-term LCR need has decreased by 7 MW.

Since last stakeholder meeting:

1. Updated NQC

Your comments and questions are welcomed

For written comments, please send to: RegionalTransmission@caiso.com

2016 and 2020 Final LCR Study Results - Greater Bay Area

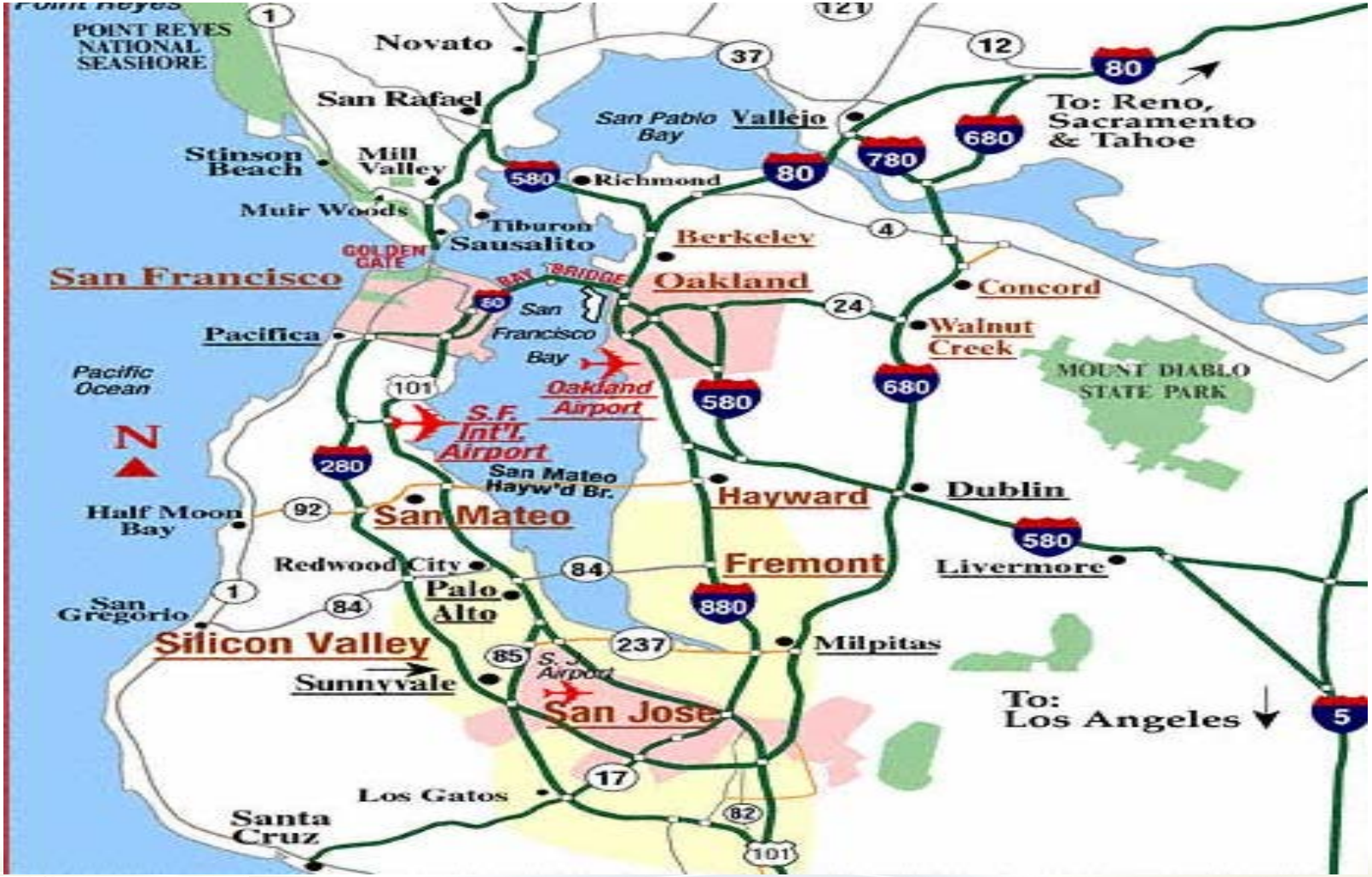
Bryan Fong

Senior Regional Transmission Engineer

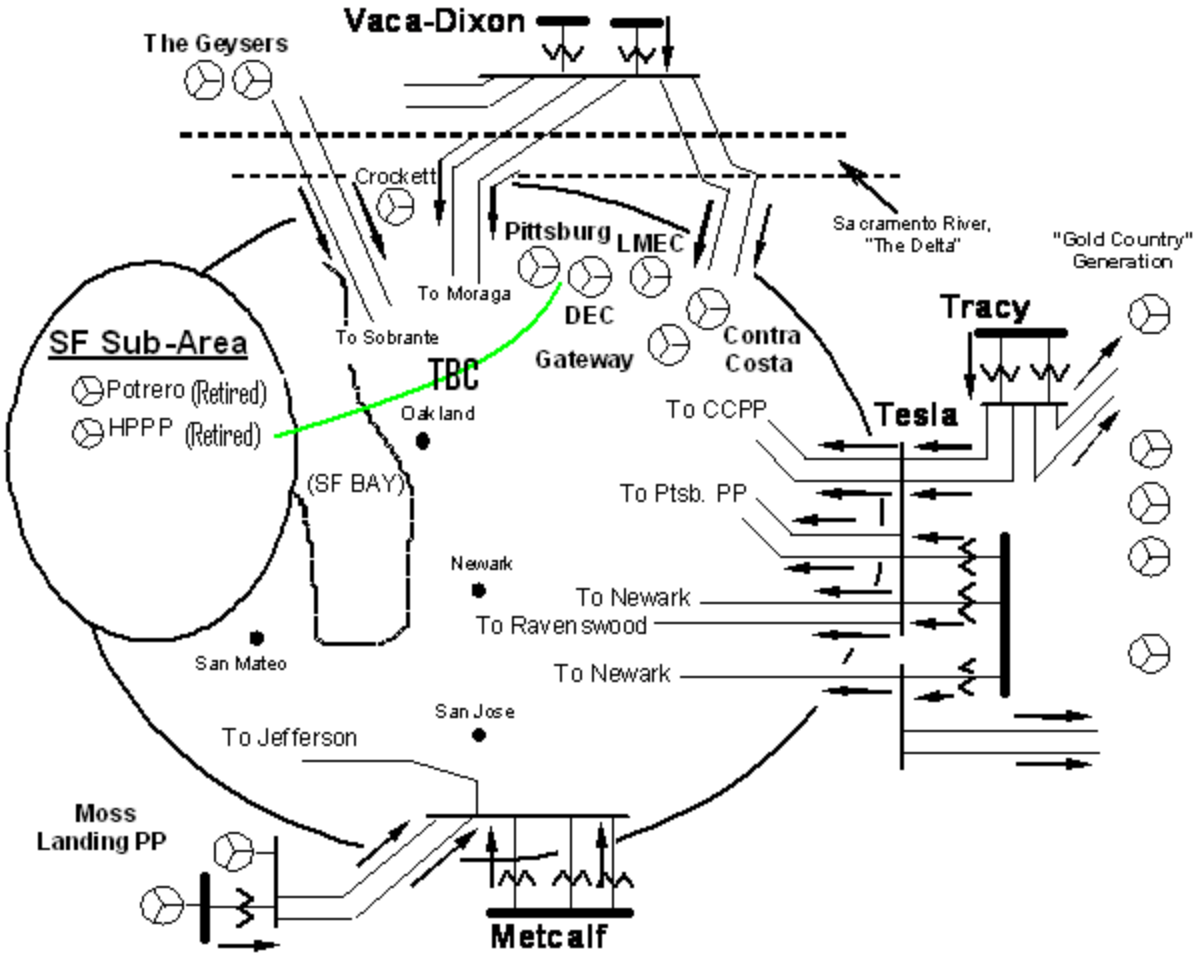
Stakeholder Teleconference

April 14, 2015

Greater Bay Area Map



Greater Bay Area Transmission System



New major transmission projects

- Contra Costa – Moraga 230 kV Line Reconductoring – 06/16
- East Shore-Oakland J 115 kV Reconductoring Project – 07/18
- Embarcadero-Potrero 230 kV Transmission Project – 04/16
- Evergreen-Mabury Conversion to 115 kV - 12/17
- Metcalf-Evergreen 115 kV Line Reconductoring – 05/19
- Metcalf-Piercy & Swift and Newark-Dixon Landing 115 kV Upgrade – 05/19
- Moraga Transformers Capacity Increase – 10/16
- Pittsburg – Tesla 230 kV Reconductoring – 10/15
- Tesla-Newark 230 kV Path Upgrade – 12/17
- Vaca Dixon-Lakeville 230 kV Reconductoring – 07/17

Power plant changes

Additions:

- A few small renewable resources
- Oakley (2020 only)

Retirements:

- Contra Costa units #6 and #7
- GWF #1-5
- United Co-gen
- Pittsburg Power Plant (by 2020)

Bay Area Load and Resources (MW)

		2016	2020
Load	=	9,790	10,048
AAEE	=	-144	-369
Transmission Losses	=	173	188
Pumps	=	264	264
Total Load	=	**10,083**	**10,131**
Market Generation	=	6,435	5,775
Wind Generation	=	278	278
Muni Generation	=	547	547
QF Generation	=	297	297
Total Qualifying Capacity	=	**7,557**	**6,897**

San Jose Sub Area

San Jose Sub-area – Category B

Contingency: Metcalf-Evergreen #2 115 kV Line with Duane PP out of service

Limiting component: Thermal overload of Metcalf-Evergreen #1 115 kV Line

2016 LCR need: 265 MW (includes 5 MW of QF and 230 MW of generation)

2020 LCR need: no LCR need

San Jose Sub-area – Category C

Contingency: Metcalf El Patio #1 or #2 overlapped with the outage of Metcalf-Evergreen #2 115 kV

Limiting component: Thermal overload of Metcalf-Piercy 115 kV Line

2016 LCR need: 687 MW (includes 5 MW of QF and 230 MW of generation as well as 131 MW of deficiency)

2020 LCR need: 522 MW (includes 5 MW of QF and 230 MW of generation)

Llagas Sub Area

Llagas Sub-area – Category B

Contingency: Metcalf D-Morgan Hill 115 kV with one of the Gilroy peakers off line
Limiting component: 5% voltage drop at the Morgan Hill substation
2016 LCR need: 135 MW (includes 0 MW of QF/Muni generation)
2020 LCR need: 158 MW (includes 0 MW of QF/Muni generation)

Llagas Sub-area – Category C

Same as Category B

Oakland Sub Area

Oakland Sub-area – Category B

Contingency: Moraga – Claremont #1 or #2 230 kV line with one Oakland CT off-line

Limiting component: Remaining Moraga – Claremont 230 kV line

2016 LCR need: No requirement

2020 LCR need: 161 MW (includes 49 MW of QF/Muni generation)

Oakland Sub-area – Category C

Contingency: overlapping C-X #2 and C-X #3 115 kV cables

Limiting component: Thermal overload on the Moraga – Claremont #1 or #2 230 kV Line.

2016 LCR need: 92 MW (includes 49 MW of QF/Muni generation)

2020 LCR need: Same as Category B

This requirement does not include the need for the Pittsburg/ Oakland sub-area

Pittsburg/Oakland Sub Area

Pittsburg/Oakland Sub-area – Category B

Contingency: Moraga #3 230/115 kV Bank

Limiting component: Thermal overload on Moraga #1 230/115 kV Bank

2016 LCR need: 1188 MW (includes 245 MW of QF and 49 MW of Muni generation)

2020 LCR need: No requirement.

Pittsburg/Oakland Sub-area – Category C

Contingency: Moraga #3 230/115 kV Bank and Delta Energy Center

Limiting component: Thermal overload on Moraga #1 230/115 kV Bank (400 MW of Trans Bay Cable run back has been used)

2016 LCR need: 2001 MW (includes 245 MW of QF and 49 MW of Muni generation)

2020 LCR need: No requirement.

Pittsburg Sub Area

Pittsburg Sub-area – Category B

2016 LCR need: Yes - Part of Pittsburg/Oakland sub-area

2020 LCR need: No requirement.

Pittsburg Sub-area – Category C

2016 LCR need: Yes - Part of Pittsburg/Oakland sub-area

Contingency: Vaca-Dixon Lakeville & Vaca-Dixon Tulucay 230 kV lines

Limiting component: Thermal overload on Moraga-Sobrante 115 kV line

2020 LCR need: 1471 MW (includes 245 MW of QF generation)

Ames Sub Area

Ames Sub-area – Category B

2016 LCR need: No requirement.

2020 LCR need: No requirement.

Ames Sub-area – Category C

Contingency: Newark-Ravenswood & Tesla-Ravenswood 230 kV lines

Limiting component: Overload of Newark-Ames #1, #2, #3 and Newark-Ames Distribution 115 kV lines

2016 LCR need: 596 MW (beyond Pittsburg/Oakland sub-area) (includes 0 MW of QF generation)

2020 LCR need: No requirements due to South of San Mateo Capacity Increase transmission project

Contra Costa Sub Area

Contra Costa Sub-area – Category B

Contingency: Kelso-Tesla 230 kV with the Gateway off line
Limiting component: Thermal overload on the Delta Switching Yard-Tesla 230 kV Line
2016 LCR need: 930 MW (includes 275 MW of Wind generation and 264 MW of MUNI pumps)
2020 LCR need: 1354 MW (includes 275 MW of Wind generation and 264 MW of MUNI pumps)

Contra Costa Sub-area – Category C

Same as Category B

Greater Bay Area Overall

Bay Area Overall – Category B

Contingency: Tesla-Metcalf 500 kV line with Delta Energy Center out of service

Limiting component: Reactive margin within the Bay Area

2016 LCR need: 3790 MW (includes 297 MW of QF, 547 MW of MUNI and 278 MW of wind generation)

2020 LCR need: 3820 MW (includes 297 MW of QF, 547 MW of MUNI and 278 MW of wind generation)

Greater Bay Area Overall

Bay Area Overall – Category C

2016 LCR need: Sum of Category C sub area requirements at 4349 MW (includes 297 MW of QF, 547 MW of MUNI and 278 MW of wind generation as well as 131 MW of deficiency)

Contingency: Tesla-Metcalf 500 kV line with Tesla-Newark #1 230 kV line

Limiting component: Tesla-Delta Switching Yard 230 kV line

2020 LCR need: 4191 MW (includes 297 MW of QF, 547 MW of MUNI and 278 MW of wind generation)

Greater Bay Area

Available Generation

Year	QF (MW)	Muni (MW)	Wind (MW)	Market (MW)	Max. Qualifying Capacity (MW)
2016	297	547	278	6435	7557
2020	297	547	278	5775	6897

Total LCR need

	Existing Generation Capacity Needed (MW)		Deficiency (MW)		Total MW Need	
	2016	2020	2016	2020	2016	2020
Category B (Single)	3790	3820	0	0	3790	3820
Category C (Multiple)	4218	4191	131	0	4349	4191

Changes

Since last year:

1) 2016 load forecast is lower by 146 MW vs. 2015
2) Sum of sub-area LCR needs drive the Bay Area total requirement in 2016
3) LCR need has decreased by 18 MW vs. 2015 – due to a combination of load and new Ames sub-area requirements.
4) 2020 load forecast is lower by 199 MW vs. 2019
5) Long-term LCR need has decreased by 33 MW vs. 2019

Since last stakeholder meeting:

1) Updated NQC
2) Small change to the Ames sub-area LCR needs

Your comments and questions are welcome.

For written comments, please send to: RegionalTransmission@caiso.com

2016-2020 Final LCR Study Results Sierra and Stockton Local Areas

Binaya Shrestha

Senior Regional Transmission Engineer

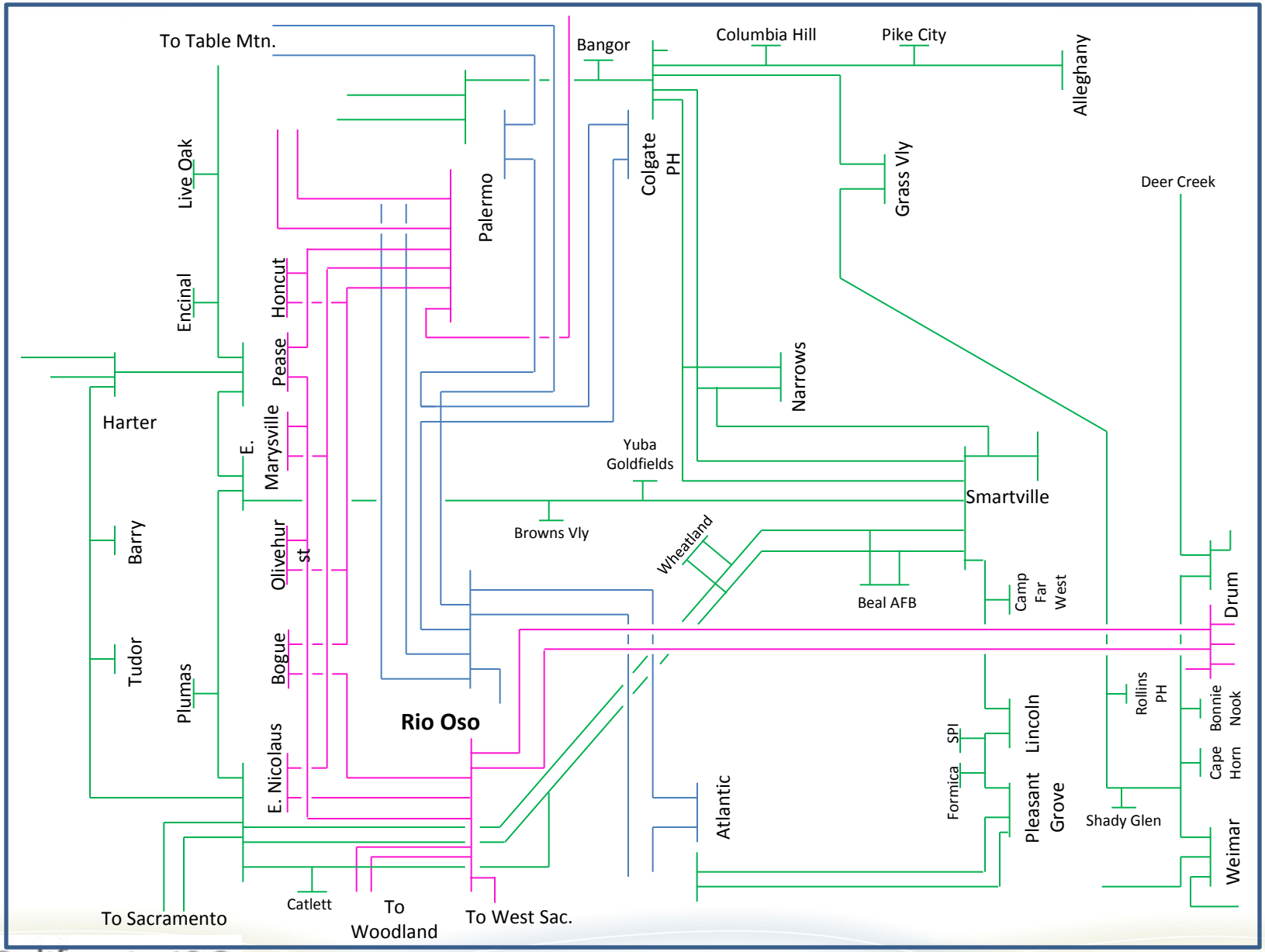
Stakeholder Teleconference

April 14, 2015

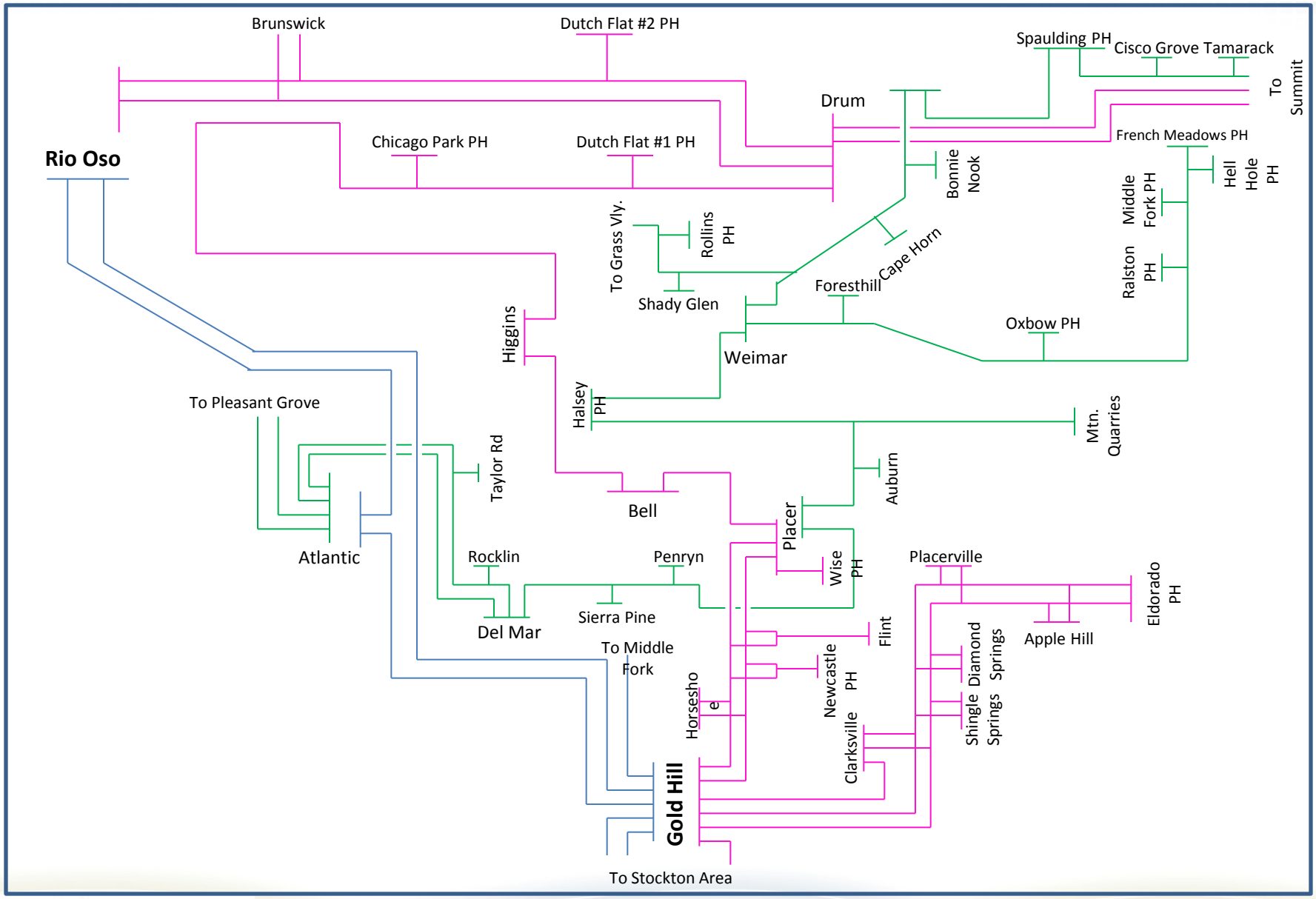
Sierra Area Load and Resources (MW)

		2016	2020
Load	=	1837	1977
AAEE	=	-27	-72
Transmission Losses	=	96	89
Total Load	=	**1906**	**1994**
Market Generation	=	831	831
Muni Generation	=	1106	1106
QF Generation	=	89	89
Total Qualifying Capacity	=	**2026**	**2026**

Northern Sierra



Southern Sierra



New transmission projects modeled:

1. Palermo-Rio Oso 115 kV Reconductoring
2. Gold Hill-Missouri Flat #1 and #2 115 kV line Reconductoring (2020 only)
3. Rio Oso #1 and #2 230/115 kV Transformer Replacement (2020 only)
4. South of Palermo 115 kV Reinforcement (2020 only)
5. New Atlantic-Placer 115 kV Line (2020 only)
6. Pease 115/60 kV Transformer Addition (2020 only)
7. New Rio Oso-Atlantic 230 kV Line (2020 only)

Critical Sierra Area Contingencies
South of Table Mountain

South of Table Mountain Sub-area – Category C

2016 LCR need: 1765 MW (includes 89 MW of QF and 1106 MW of Muni generation)

2020 LCR need: 1703 MW (includes 89 MW of QF and 1106 MW of Muni generation)

Contingency: Table Mountain-Rio Oso 230 kV and Table Mountain-Palermo 230 kV DCTL outage

Limiting component: Thermal overload on the Caribou-Palermo 115 kV line

South of Table Mountain Sub-area – Category B

2016 LCR need: No additional category B requirement. Units required for South of Palermo satisfy the category B requirement for this sub-area.

2020 LCR need: 1665 MW (includes 89 MW of QF and 1106 MW of Muni generation)

Contingency: Table Mountain-Palermo 230 kV line and Belden Unit

Limiting component: Thermal overload on the Table Mountain-Rio Oso 230 kV line

Critical Sierra Area Contingencies
South of Palermo

South of Palermo Sub-area – Category C

2016 LCR need: 1571 MW (includes 36 MW of QF and 638 MW of Muni generation as well as 247 MW of deficiency)

Contingency: Double Circuit Tower Line Table Mountain-Rio Oso and Colgate-Rio Oso 230 kV lines

Limiting component: Thermal overload on the Pease-Rio Oso 115 kV line

2020 LCR need: 607 MW (includes 36 MW of QF and 638 MW of Muni generation)

Contingency: Table Mountain-Rio Oso 230 kV and Palermo-Nicolaus 115 kV lines

Limiting component: Thermal overload on the Colgate-Rio Oso 230 kV line

South of Palermo Sub-area – Category B

2016 LCR need: 1139 MW (includes 36 MW of QF and 638 MW of Muni generation)

Contingency: Palermo-E. Nicolaus115 kV line with Belden unit out of service

Limiting component: Thermal overload on the Pease-Rio Oso115 kV line

2020 LCR need: 429 MW (includes 36 MW of QF and 638 MW of Muni generation)

Contingency: Table Mountain-Rio Oso 230 kV line with Belden unit out of service

Limiting component: Thermal overload on the Colgate-Rio Oso 230 kV line

Critical Sierra Area Contingencies
Drum-Rio Oso

Drum-Rio Oso Sub-area – Category C

2016 LCR need: 677 MW (includes 89 MW of QF and 197 MW of Muni generation as well as 30 MW of deficiency)

2020 LCR need: 34 MW (includes 89 MW of QF and 197 MW of Muni generation)

Contingency: Rio Oso #2 230/115 kV transformer and Rio Oso-Brighton 230 kV line

Limiting component: Thermal overload on the Rio Oso #1 230/115 kV transformer

Drum-Rio Oso Sub-area – Category B

2016 LCR need: 259 MW (includes 89 MW of QF and 197 MW of Muni generation)

Contingency: Rio Oso # 2 230/115 kV transformer

Limiting component: Thermal overload on the Rio Oso #1 230/115 kV transformer

2020 LCR need: No requirement due to Rio Oso Transformers Replacement project.

Critical Sierra Area Contingencies
South of Rio Oso

South of Rio Oso Sub-area – Category C

2016 LCR need: 750 MW (includes 31 MW of QF and 593 MW of Muni generation as well as 58 MW of deficiency)

2020 LCR need: 379 MW (includes 31 MW of QF and 593 MW of Muni generation)

Contingency: Rio Oso-Gold Hill 230 kV and Rio Oso-Lincoln 115 kV lines

Limiting component: Thermal overload on the Rio Oso-Atlantic 230 kV line

South of Rio Oso Sub-area – Category B

2016 LCR need: 508 MW (includes 31 MW of QF and 593 MW of Muni generation as well as 16 MW of deficiency)

Contingency: Rio Oso-Gold Hill 230 kV line and Ralston unit

Limiting component: Thermal overload on the Rio Oso-Atlantic 230 kV line

2020 LCR need: No requirement due to new Rio Oso-Atlantic 230 kV line project

Critical Sierra Area Contingencies
Pease

Pease Sub-area – Category C

2016 LCR need: Same as Category B.

2020 LCR need: 105 MW (includes 42 MW of QF generation)

Contingency: Palermo-Pease and Pease-Rio Oso 115 kV lines

Limiting component: Thermal overload on the Table Mountain-Pease 60 kV line

Pease Sub-area – Category B

2016 LCR need: 105 MW (includes 42 MW of QF generation)
Contingency: Palermo-East Nicolaus 115 kV line and YCEC unit

Limiting component: Thermal overload on the Palermo-Pease 115 kV line

2020 LCR need: 63 MW (includes 42 MW of QF generation)

Contingency: Palermo-Pease 115 kV line and YCEC unit

Limiting component: Thermal overload on the Table Mountain-Pease 60 kV line

Critical Sierra Area Contingencies
Placer

Placer Sub-area – Category C

2016 LCR need: 94 MW (includes 38 MW of QF and Muni generation as well as 17 MW of deficiency)

Contingency: Gold Hill-Placer #1 and #2 115 kV lines

Limiting component: Thermal overload on the Drum-Higgins 115 kV line

2020 LCR need: Same as Category B.

Placer Sub-area – Category B

2016 LCR need: 54 MW (includes 38 MW of QF and Muni)

Contingency: Gold Hill-Placer #1 115 kV line and Chicago Park unit

Limiting component: Thermal overload on the Drum-Higgins 115 kV line

2020 LCR need: 55 MW (includes 38 MW of QF and Muni generation)

Contingency: New Atlantic-Placer 115 kV line and Chicago Park unit

Limiting component: Thermal overload on the Drum-Higgins 115 kV line

Critical Sierra Area Contingencies
Placerville

Placerville Sub-area – Category C

2016 LCR need: 106 MW (includes 0 MW of QF and Muni generation as well as 80 MW of deficiency)

Contingency: Gold Hill-Clarksville and Gold Hill-Missouri Flat #2 115 kV lines

Limiting component: Thermal overload on the Gold Hill-Missouri Flat #1 115 kV line

2020 LCR need: No requirements due to Missouri Flat-Gold Hill 115 kV lines reconductoring project

Placerville Sub-area – Category B

2016 LCR need: No requirements

2020 LCR need: No requirements

Sierra Area LCR Aggregate

Available generation	Market (MW)	Muni (MW)	QF (MW)	Max. Qualifying Capacity (MW)
2016	831	1106	89	2026
2020	831	1106	89	2026

	Existing Generation Capacity Needed (MW)		Deficiency (MW)		Total MW Need	
	2016	2020	2016	2020	2016	2020
Category B (Single)	1139	1665	16	0	1155	1665
Category C (Multiple)	1765	1703	253	0	2018	1703

Each unit is only counted once, regardless in how many sub-areas it is needed.

In order to come up with an aggregate deficiency, where applicable the deficiencies in each smaller sub-area has been accounted for (based on their effectiveness factors) toward the deficiency of a much larger sub-area.

Changes

2016 LCR compared to 2015:

- Load forecast went down by 55 MW.
- Overall LCR need has decreased by 182 MW.
- The decrease in LCR is due to decrease in load forecast.

2020 LCR compared to 2019:

- Load forecast went down by 82 MW.
- Overall LCR need has increased by 601 MW.
- The increase in LCR is due to delay in transmission projects implementation.

Since last stakeholder meeting:

- Updated NQC.
- New Rio Oso-Atlantic 230 kV line in-service before June 1, 2020.

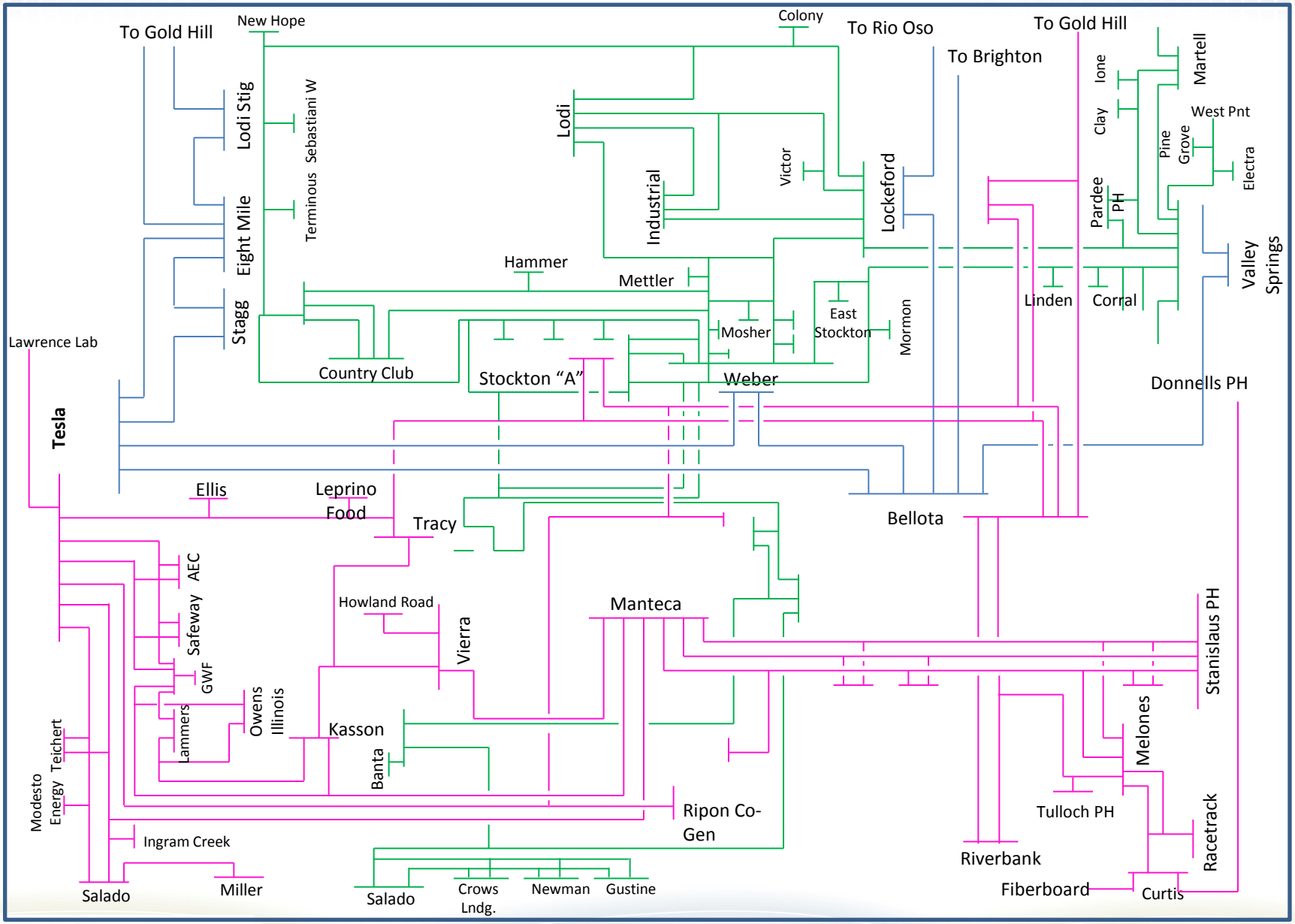
Your comments and questions are welcome.

For written comments, please send to: RegionalTransmission@caiso.com

Stockton Area Load and Resources (MW)

		2016	2020
Load	=	1181	1251
AAEE	=	-16	-41
Transmission Losses	=	21	20
Total Load	=	**1186**	**1230**
QF Generation	=	21	69
Muni Generation	=	139	138
Market Generation	=	434	497
Total Qualifying Capacity	=	**594**	**704**

Stockton Area



New transmission projects modeled:

1. Weber-Stockton A #1 & #2 60 kV lines Reconductor
2. Weber 230/60 kV Transformer Replacement
3. Ripon 115 kV line (2020 only)
4. Vierra 115 kV loop-in (2020 only)

Critical Stockton Area Contingencies
Tesla-Bellota Sub-area

Tesla-Bellota Sub-area – Category C

TOTAL 2016 LCR need: 693 MW (17 MW of QF and 116 MW of Muni and 323 MW of deficiency)

Contingency 1: Schulte-Lammers and Schulte-Kasson-Manteca 115 kV lines.

Limiting component 1: Thermal overload on the Tesla-Tracy 115 kV line.

LCR Need: 561 MW (17 MW of QF and 116 MW of Muni and 323 MW of deficiency).

Contingency 2: Tesla-Tracy 115 kV line and Tesla-Schulte #2 115 kV line.

Limiting component 2: Thermal overload on the Tesla-Schulte #1 115 kV line.

LCR Need: 370 MW (includes 17 MW of QF and 116 MW of Muni generation).

2020 LCR need: 284 MW (65 MW of QF and 116 MW of Muni generation)

Contingency: Tesla-Schulte #2 115 kV lines and Tesla-Vierra.

Limiting component: Thermal overload on the Tesla-Schulte #1 115 kV line.

Critical Stockton Area Contingencies
Tesla-Bellota Sub-area

Tesla-Bellota Sub-area – Category B

2016 LCR Need: 357 MW (includes 17 MW of QF and 116 MW of Muni generation).

2020 LCR Need: 246 MW (includes 65 MW of QF and 116 MW of Muni generation).

Contingency: Tesla-Schulte #2 115 kV line and the loss of GWF Tracy #3.

Limiting component: Thermal overload on the Tesla-Schulte #1 115 kV line.

Critical Stockton Area Contingencies
Stanislaus Sub-area

Stanislaus Sub-area – Category C

2016 LCR need: Same as Category B.

2020 LCR need: Same as Category B.

Stanislaus Sub-area – Category B

2016 LCR need: 151 MW (includes 17 MW of QF and 93 MW of Muni generation)

2020 LCR need: 141 MW (includes 17 MW of QF and 93 MW of Muni generation)

Contingency: Bellota-Riverbank-Melones 115 kV line and Stanislaus PH

Limiting component: Thermal overload on the River Bank Jct.-Manteca 115 kV line

Critical Stockton Area Contingencies
Lockeford Sub-area

Lockeford Sub-area – Category C

2016 LCR need: 86 MW (includes 2 MW of QF and 23 MW of Muni generation as well as 61 MW of deficiency)

2020 LCR need: 88 MW (includes 2 MW of QF and 23 MW of Muni generation as well as 63 MW of deficiency)

Contingency: Lockeford-Industrial and Lockeford-Lodi #2 60 kV lines

Limiting component: Thermal overload on the Lockeford-Lodi Jct. section of the Lockeford-Lodi #3 60 kV line

Lockeford Sub-area – Category B

2016 LCR need: No category B requirement.

2020 LCR need: No category B requirement.

Critical Stockton Area Contingencies
Weber Sub-area

Weber Sub-area – Category C

2016 LCR need: 29 MW (includes 2 MW of QF generation as well as 2 MW of deficiency)

2020 LCR need: 31 MW (includes 2 MW of QF generation as well as 4 MW of deficiency)

Contingency: Stockton A-Weber #1 and #2 60 kV lines

Limiting component: Thermal overload on the Stockton A-Weber #3 60 kV line

Weber Sub-area – Category B

2016 LCR need: No Category B requirement

2020 LCR need: No Category B requirement.

Stockton Area LCR Aggregate

Available generation	Market (MW)	Muni (MW)	QF (MW)	Max. Qualifying Capacity (MW)
2016	434	139	21	594
2020	497	138	69	704

	Existing Generation Capacity Needed (MW)		Deficiency (MW)		Total MW Need	
	2016	2020	2016	2020	2016	2020
Category B (Single)	357	246	0	0	357	246
Category C (Multiple)	422	336	386	67	808	403

Each unit is only counted once, regardless in how many sub-areas it is needed.

In order to come up with an aggregate deficiency, where applicable the deficiencies in each smaller sub-area has been accounted for (based on their effectiveness factors) toward the deficiency of a much larger sub-area.

Changes

2016 LCR compared to 2015:

- Load forecast went up by 81 MW.
- Overall LCR need has increased by 91 MW due to increase in load forecast.

2020 LCR compared to 2019:

- Load forecast went up by 94 MW.
- Overall LCR need has increased by 54 MW due to increase in load forecast.

Since last stakeholder meeting:

- Updated NQC.

Your comments and questions are welcome.

For written comments, please send to: RegionalTransmission@caiso.com

2016 and 2020 Final LCR Study Results - Fresno

Abhishek Singh

Senior Regional Transmission Engineer

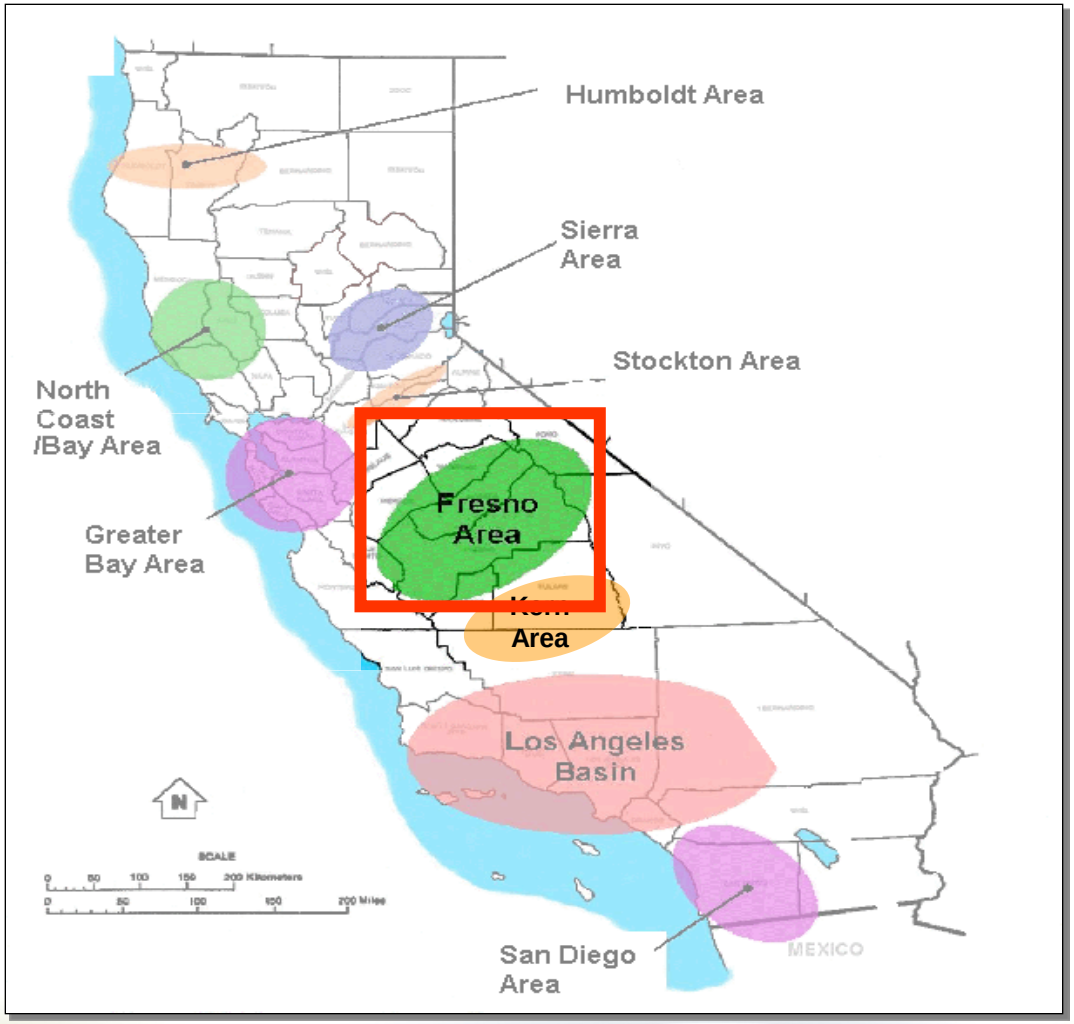
Vera Hart

Regional Transmission Engineer

Stakeholder Teleconference

April 14, 2015

Fresno LCR Area



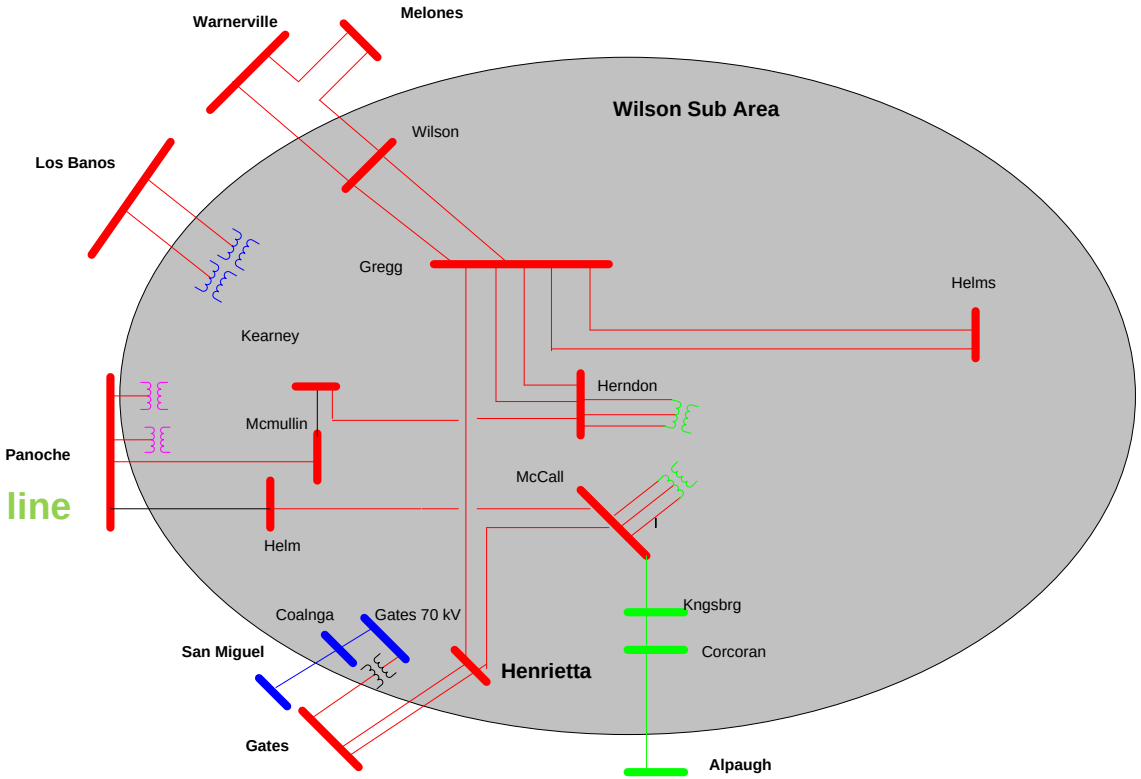
Greater Fresno Area

Electrical Boundaries and LCR Sub-Areas

Electrical Boundaries:

- Gates – McCall 230 kV line
- Gates – Gregg 230 kV line
- Panoche – Kearney 230 kV line
- Panoche – Helm 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 #1

LCR Sub-Areas:



Fresno Area Load and Resources (MW)

		2016	2020
Load	=	3275	3515
AAEE	=	-35	-93
Transmission Losses	=	91	90
Total Load	=	**3331**	**3512**
Market Generation	=	2647	2647
Muni Generation	=	168	168
QF Generation	=	114	114
Total Qualifying Capacity	=	**2929**	**2929**

New transmission projects modeled:

1. Fresno Reliability (stages: 2014, 2015, 2016, 2016)
2. Cressey - Gallo 115 kV Line (2016)
3. Lemoore 70 kV Disconnect Switches Replacement (2016)
4. Kearney 230/70 kV Transformer Addition (2017)
5. Kearney - Caruthers 70 kV Line Reconductor (2017)
6. Caruthers - Kingsburg 70 kV Line Reconductor (2017)
7. Reedley-Dinuba 70 kV Line Reconductor (2017)
8. Reedley-Orosi 70 kV Line Reconductor (2017)
9. Helm - Kerman 70 kV Line Reconductor (2017)
10. Ashlan - Gregg and Ashlan - Herndon 230 kV Line Reconductor (2017)
11. Oakhurst/Coarsegold UVLS (2017)
12. Gregg - Herndon #2 230 kV Line Circuit Breaker Upgrade (2017)
13. Los Banos - Livingston Jct - Canal 70 kV Switch Replacement (2017)
14. Warnerville - Bellota 230 kV Line Reconductoring (2017)
15. Gates No. 2 500/230 kV Transformer (2018)

New transmission projects modeled: (cont.)

16. Series Reactor on Warnerville-Wilson 230 kV Line (2018)
17. Reedley 70 kV Reinforcement (2018)
18. Reedley 115/70 kV Transformer Capacity Increase (2018)
19. Cressey - North Merced 115 kV Line Addition (2018)
20. Kearney - Kerman 70 kV Line Reconductor (2018)
21. Kearney - Herndon 230kV Line Reconductor (2019)
22. McCall - Reedley #2 115 kV Line (2019)
23. Oro Loma - Mendota 115 kV Conversion Project (2019)
24. Wilson 115 kV Area Reinforcement (2019)
25. Borden 230 kV Voltage Support (2019)
26. Northern Fresno 115 kV Area Reinforcement (2019)
27. Kerchhoff PH #2 - Oakhurst 115 kV Line (2020)
28. Oro Loma 70 kV Area Reinforcement (2020)

Fresno Area LCR

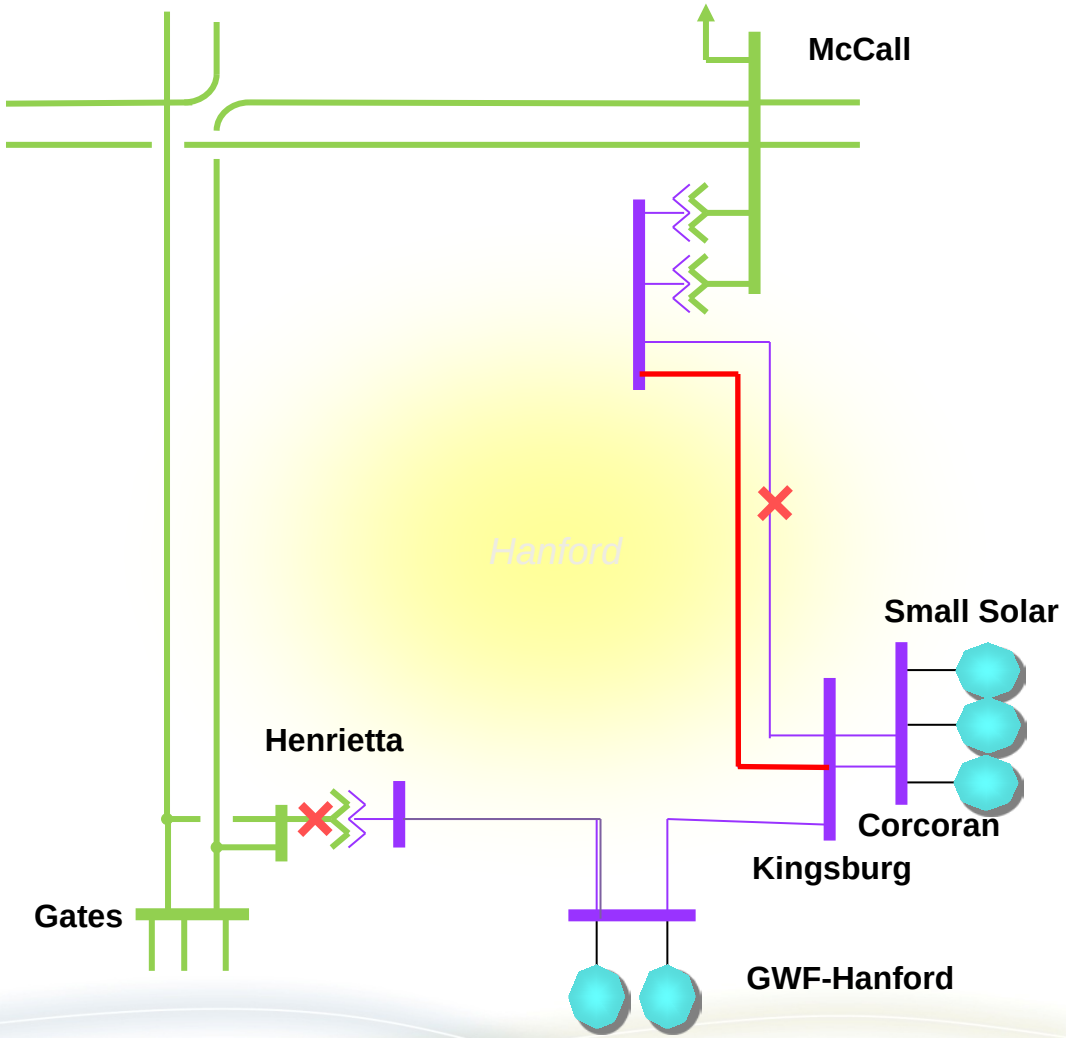
2016 Hanford Sub-Area

Limiting Contingencies:

Category C:

- **L-1/T-1: McCall-Kingsburg #2 115 kV & Henrietta 230/115kV TB #3**
- **Constraint McCall-Kingsburg #1 115kV line**

Category B: No LCR need



LCR Results (MW):

Contingency	Cat. C
LCR	91

Including:

QF	0
Muni	0
Deficiency	0

Fresno Area LCR

2016 Coalinga Sub-Area

Limiting Contingencies:

Category C:

- **T-1/L-2: Gates 230/70kV TB #5 and Panoche-Schindler #1 & #2 115kV common tower lines**
- **Constraint:**
  - **Voltage instability**

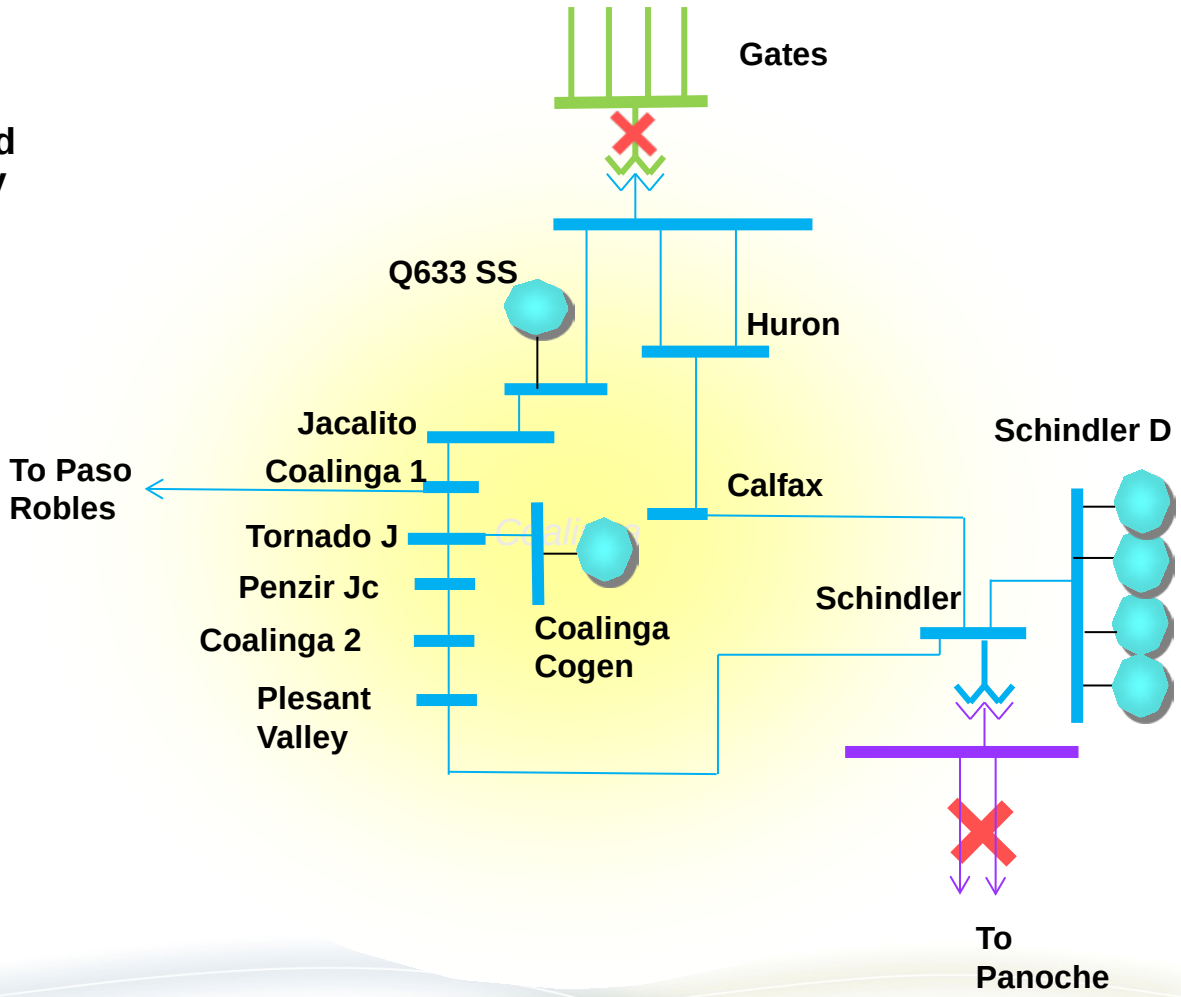
Category B: No LCR need

LCR Results (MW):

Contingency	Cat. C
LCR	93

Including:

QF	2
Muni	0
Deficiency	24



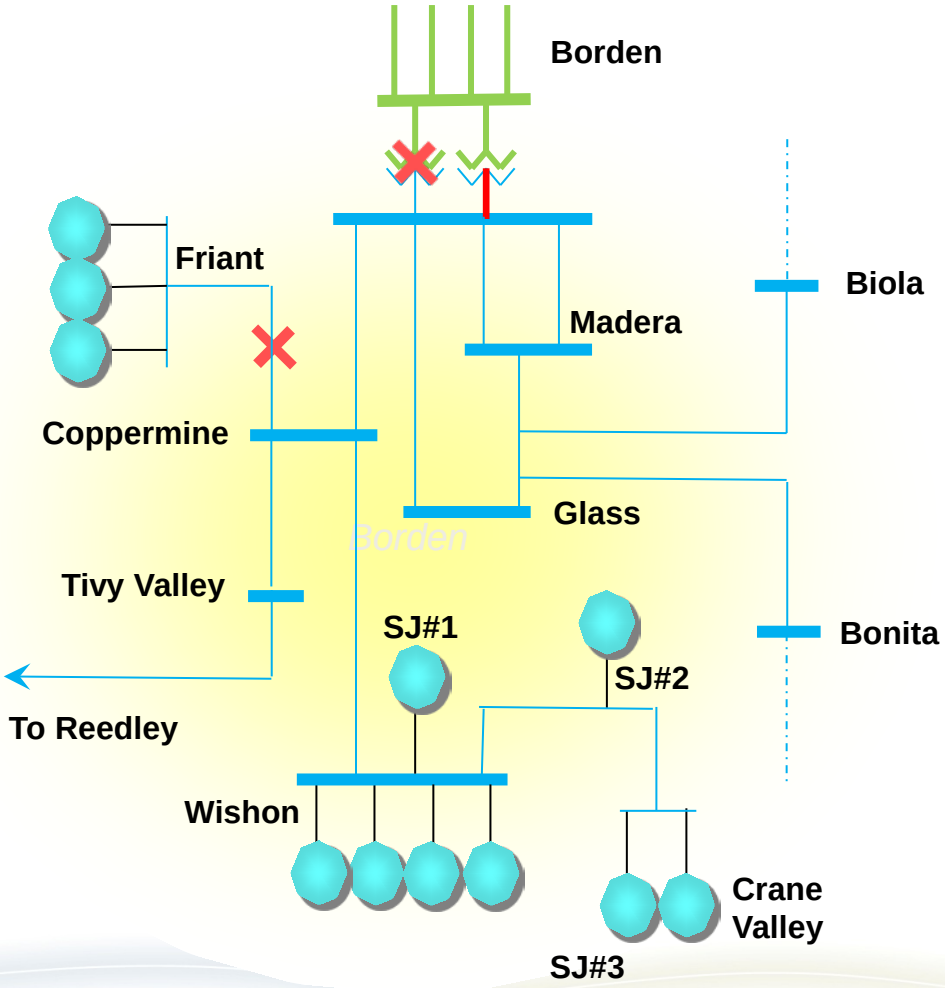
Fresno Area LCR
2016 Borden Sub-Area

Limiting Contingencies:

Category B: No LCR need

Category C:

- **L-1/T-1: Friant - Coppermine 70 kV and Borden 230/70 kV # 4**
- **Constraint: Borden 230/70 kV # 1**



LCR Results (MW):

Contingency	Cat. B	Cat. C
LCR	**0**	**23**
Including:		
QF	0	16
Muni	0	0
Deficiency	0	0

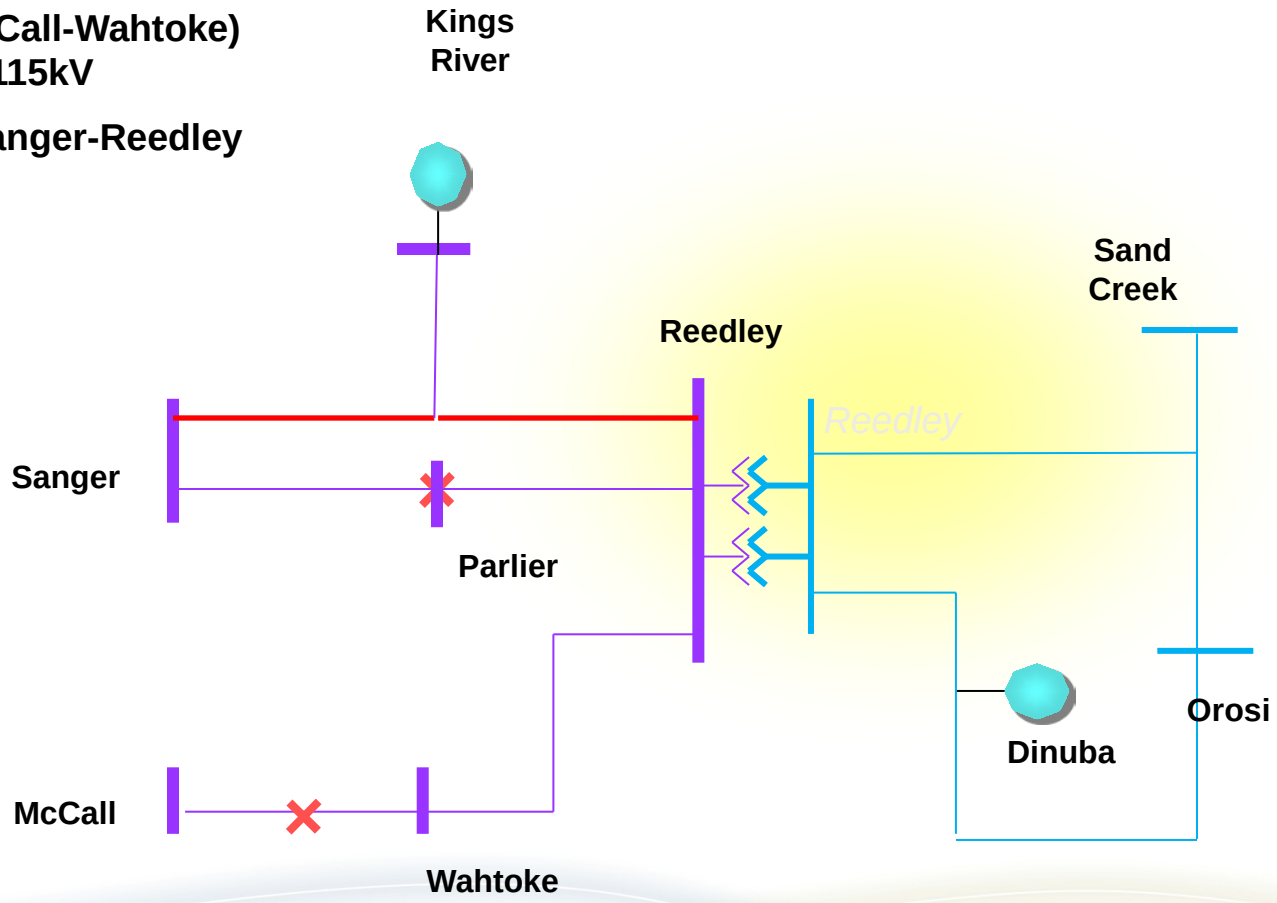
Fresno Area LCR
2016 Reedley Sub-Area

Limiting Contingencies:

Category C:

- **L-1-1: McCall-Reedley (McCall-Wahtoke) 115 kV & Sanger-Reedley 115kV**
- **Constraint: Kings River-Sanger-Reedley 115 kV**

Category B: No LCR need



LCR Results (MW):

Contingency	Cat. C
LCR	**60**

Including:

QF	0
Muni	0
Deficiency	50

Fresno Area LCR

2016 Herndon Sub-Area

Limiting Contingency:

Category B:

- **G-1/L-1: Herndon-Barton 115kV & Kerckhoff 2 PH**
- **Constraint: Herndon-Manchester 115kV**

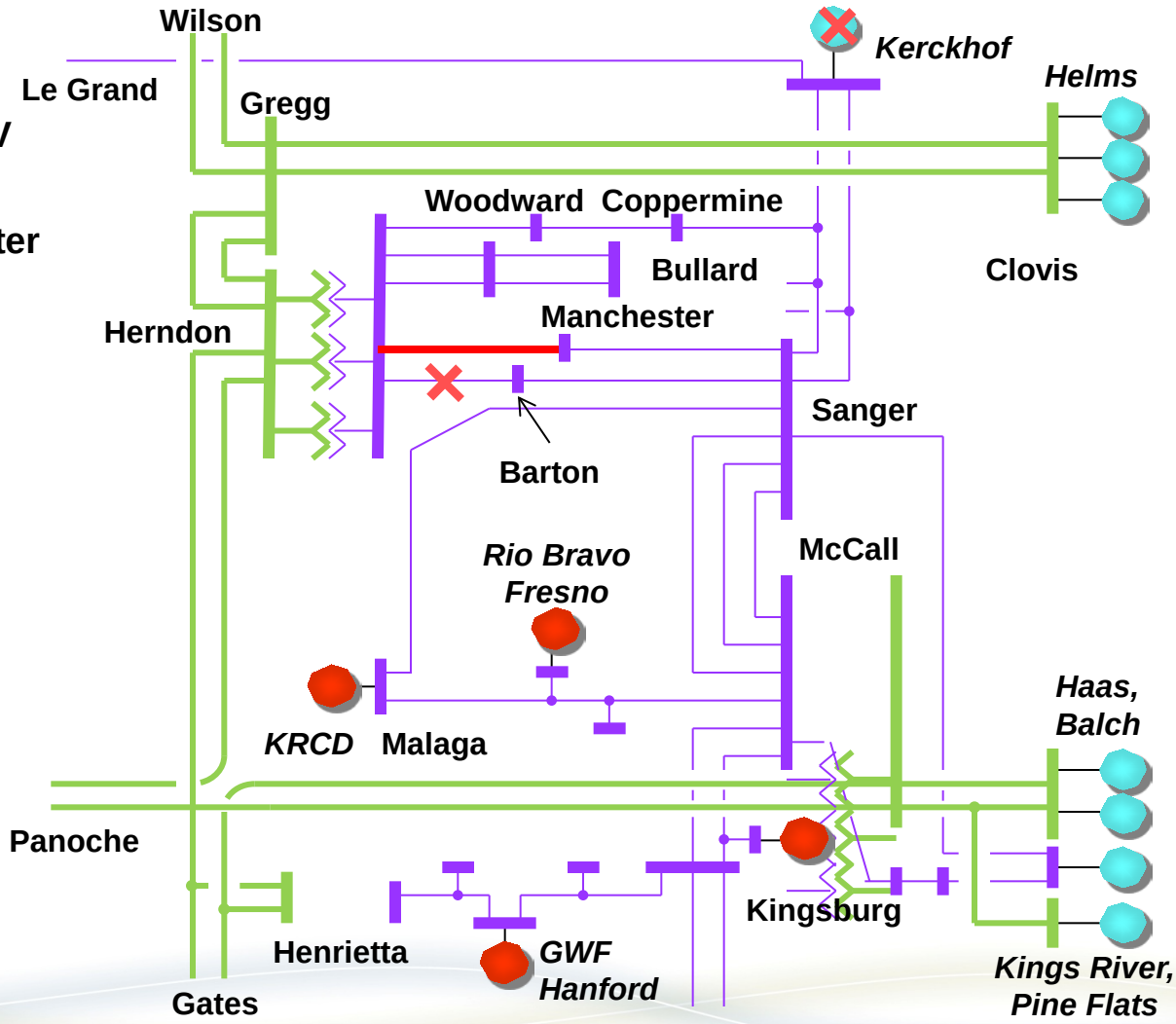
Category C: Same as Category B

LCR Results (MW):

Contingency	Cat. B
LCR	503

Including:

QF	24
Muni	66
Deficiency	0



Fresno Area LCR

2016 Wilson Sub-Area

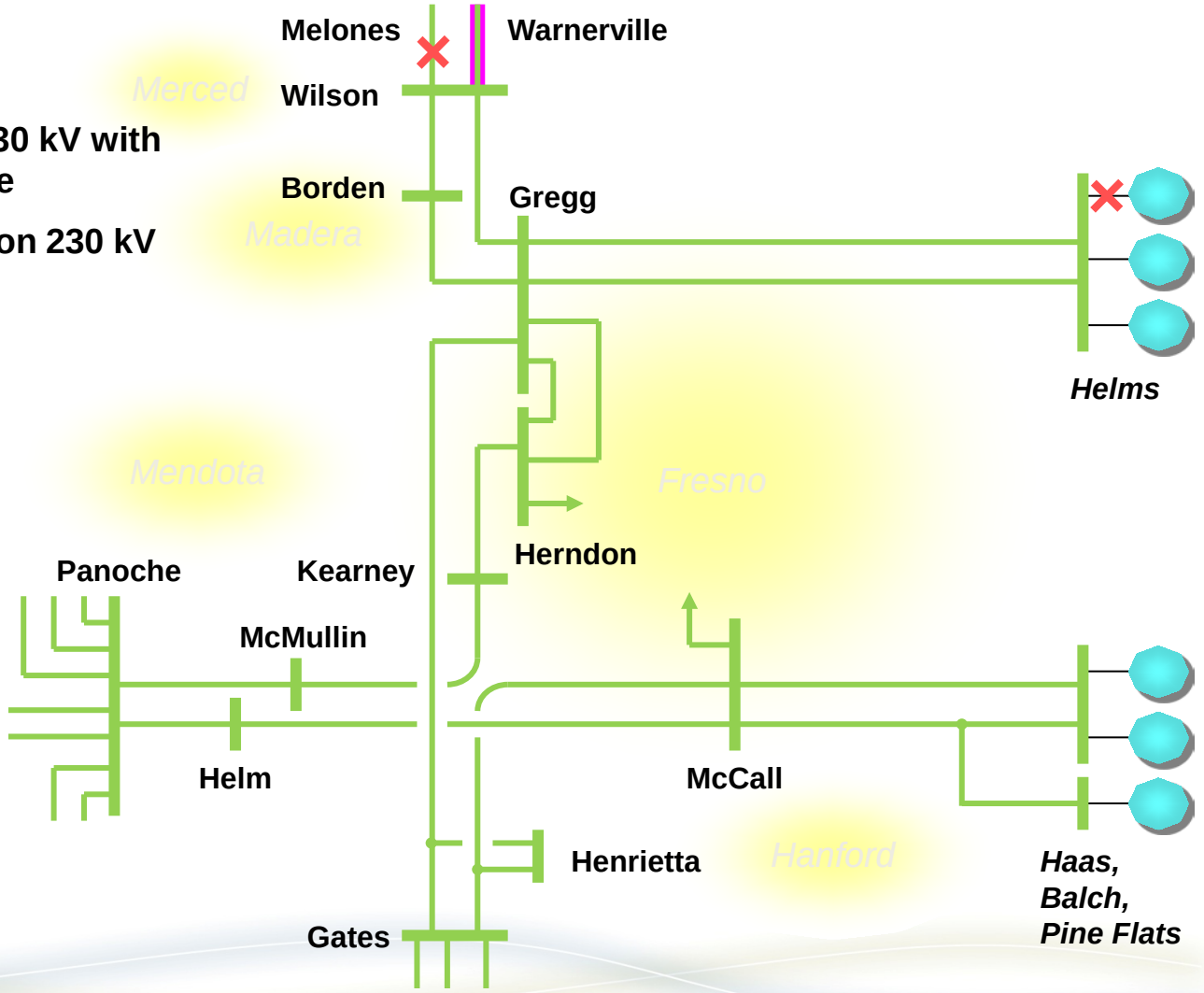
Limiting Contingencies:

Category B:

- **G-1/L-1: Melones – Wilson 230 kV with one Helms unit out of service**
- **Constraint: Warnerville-Wilson 230 kV**

Category C:

- **See next page**



LCR Results (MW):

Contingency	Cat. B
LCR	2445

Including:

QF	114
Muni	168
Deficiency	0

Fresno Area LCR

2016 Wilson Sub-Area

Limiting Contingencies:

Category C: - Contingency 1

- **L-1/G-1: Melones – Wilson 230 kV followed by one Helms unit out**
- **Constraint: Warnerville-Wilson 230 kV**
- **LCR: 2445 MW**

Category C: - Contingency 2

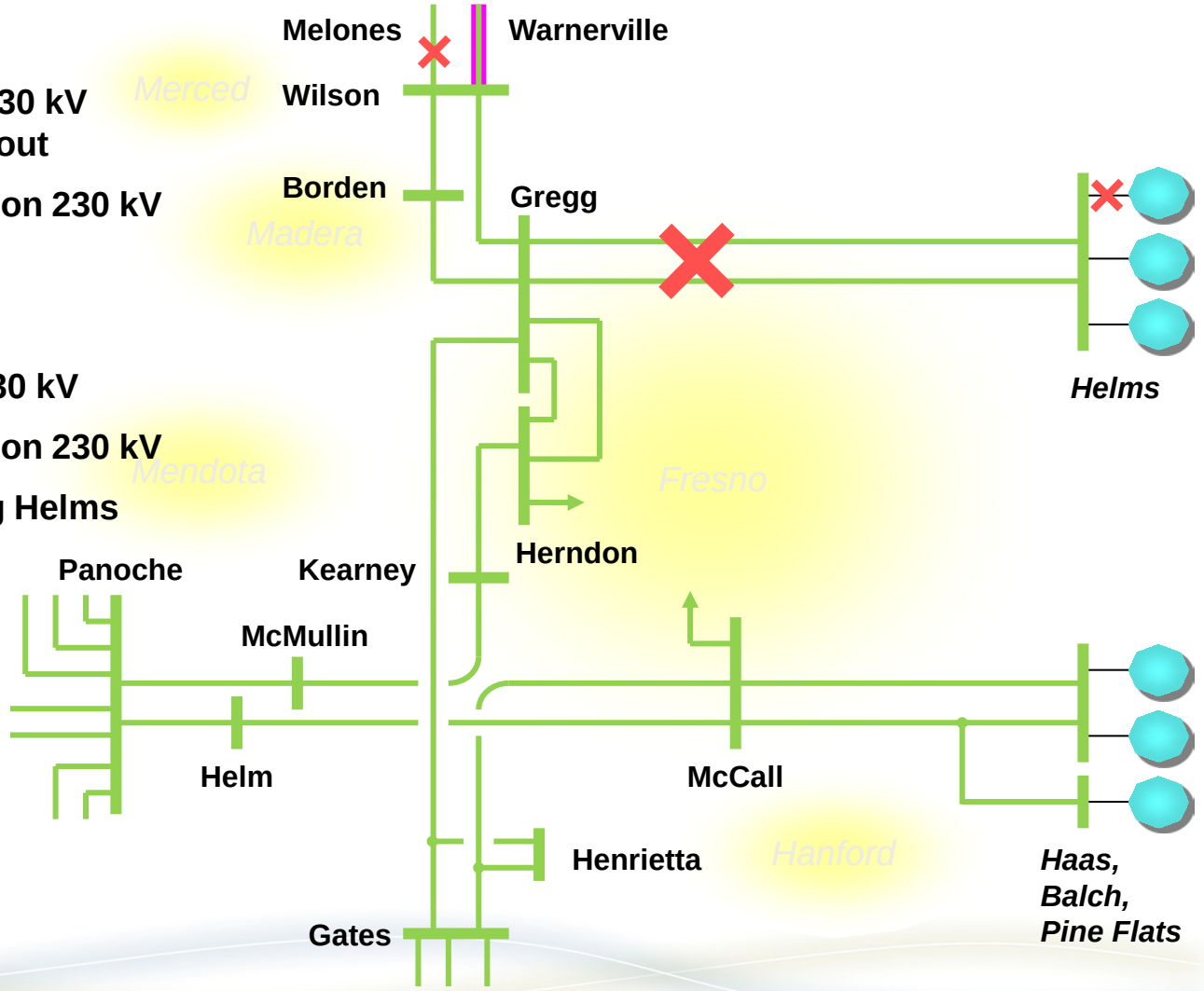
- **L-2: Gregg-Helms #1 & #2 230 kV**
- **Constraint: Warnerville-Wilson 230 kV**
- **LCR: 1618 MW not including Helms Units**

LCR Results (MW):

Contingency	Cat. C
LCR	2445

Including:

QF	114
Muni	168
Deficiency	0



Fresno Area LCR

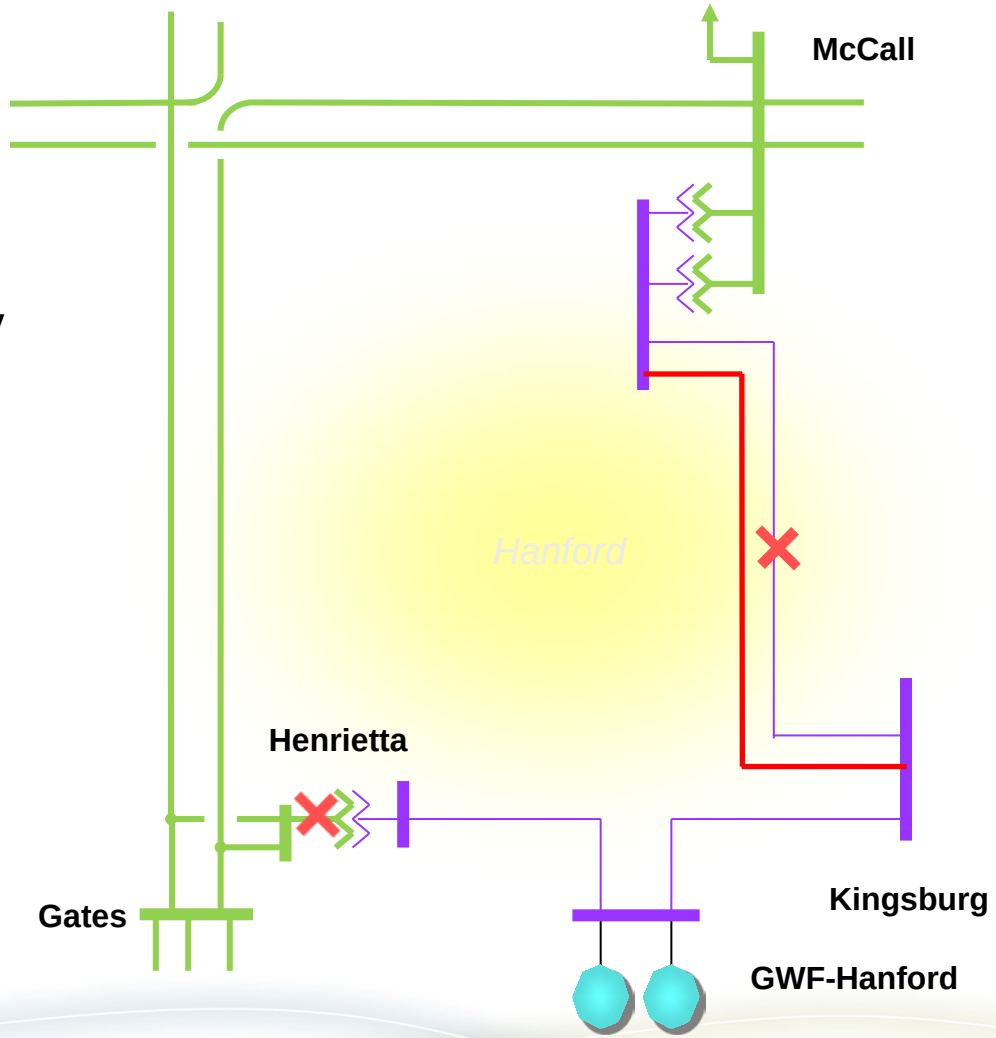
2020 Hanford Sub-Area

Limiting Contingencies:

Category B: No LCR need

Category C:

- **L-1/T-1: McCall-Kingsburg #2 115 kV & Henrietta 230/115 kV T/F**
- **Constraint: McCall-Kingsburg # 1 115 kV**



LCR Results (MW):

Contingency	Cat. B	Cat. C
2020 LCR	**0**	**67**
Including:		
QF	0	0
Muni	0	0
Deficiency	0	0

Fresno Area LCR

2020 Coalinga Sub-Area

Limiting Contingencies:

Category C:

- **T-1/L-2: Gates 230/70kV TB #5 and Panoche-Schindler #1 & #2 115kV common tower lines**
- **Constraint:**
  - **Low voltage in the pocket**

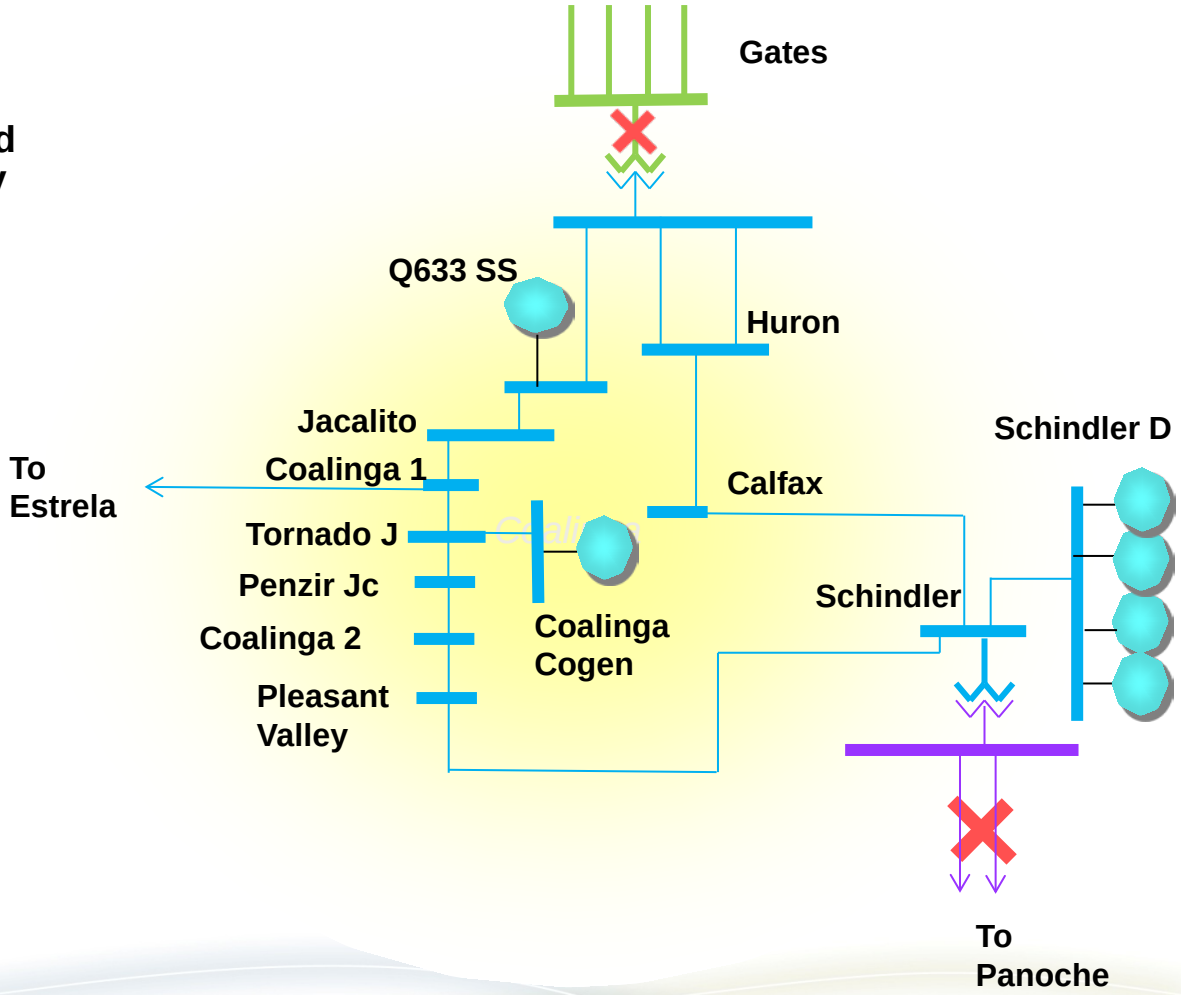
Category B: No LCR need

LCR Results (MW):

Contingency	Cat. C
2020 LCR	**90**

Including:

QF	2
Muni	0
Deficiency	21



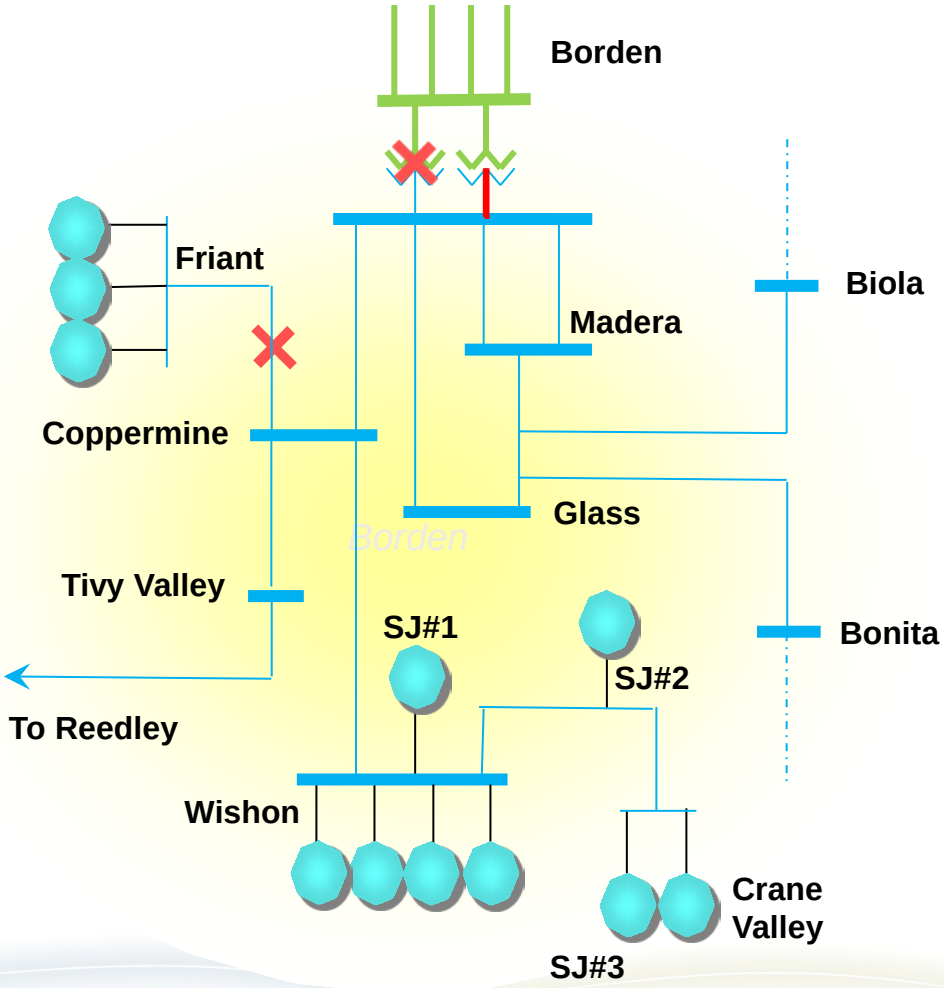
Fresno Area LCR
2020 Borden Sub-Area

Limiting Contingencies:

Category B: No LCR need

Category C:

- **L-1/T-1: Friant - Coppermine 70 kV and Borden 230/70 kV # 4**
- **Constraint: Borden 230/70 kV # 1**



LCR Results (MW):

Contingency	Cat. B	Cat. C
2020 LCR	**0**	**34**
Including:		
QF	0	16
Muni	0	0
Deficiency	0	0

Fresno Area LCR
2020 Reedley Sub-Area

Eliminated due to McCall-Reedley # 2 115 kV line project.

Fresno Area LCR
2020 Herndon Sub-Area

Eliminated due to Northern Fresno 115 kV area reinforcement project.

Fresno Area LCR

2020 Wilson Sub-Area

Limiting Contingencies:

Category B:

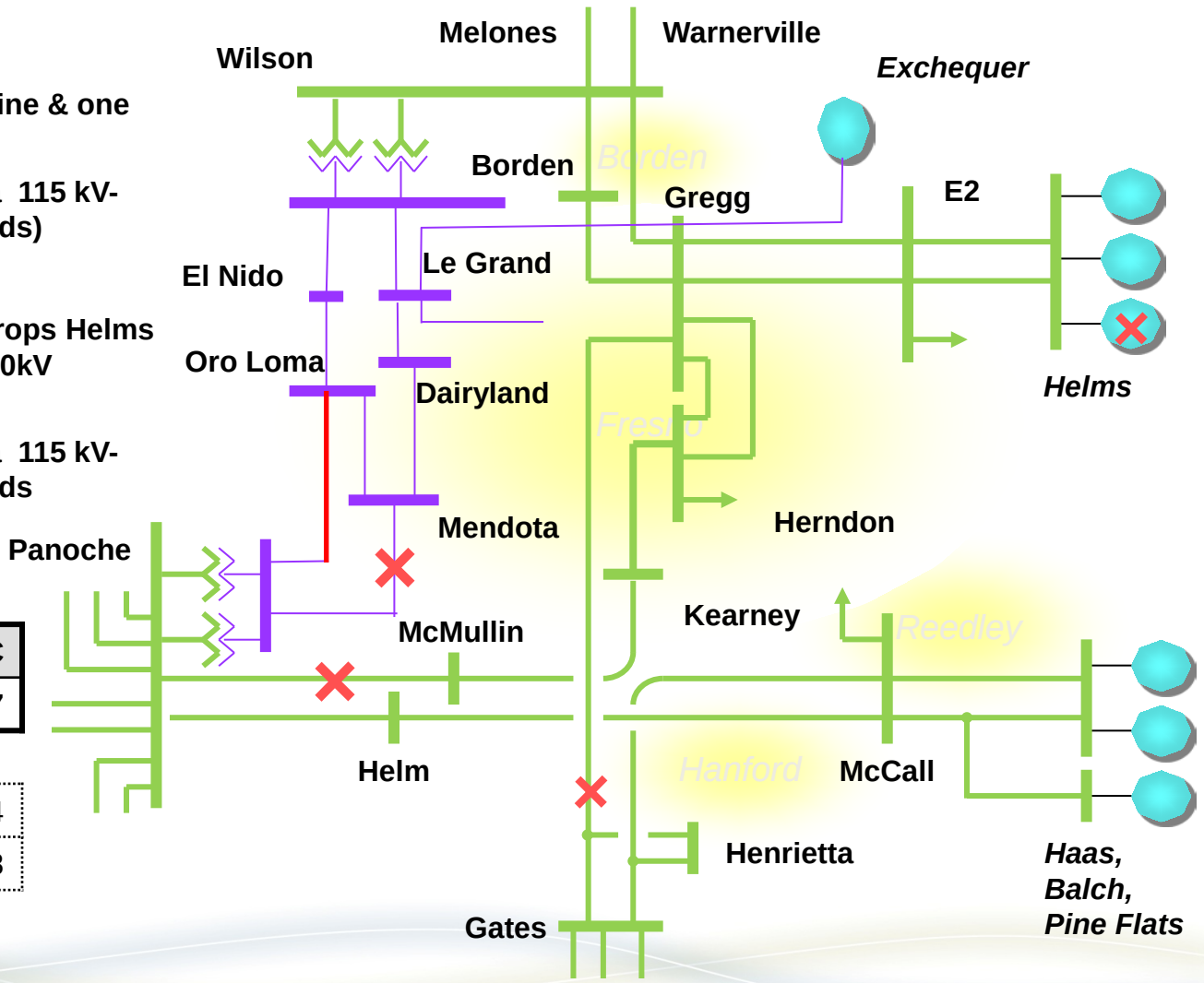
- **L-1: Panoche-Mendota 115 kV line & one Helms unit out**
- **Constraint: Panoche-Oro Loma 115 kV- (From Panoche Jn To Hammonds)**

Category C:

- **L-2: Gates-Gregg 230kV line (drops Helms Unit #3) & Panoche-Kearney 230kV common tower lines**
- **Constraint: Panoche-Oro Loma 115 kV- (From Panoche Jn To Hammonds**

LCR Results (MW):

Contingency	Cat. B	Cat. C
2020 LCR	**1471**	**1867**
Including:		
QF	114	114
Muni	168	168



Changes

Since last year:

1) 2016 load increased by 114 MW vs. 2015
2) LCR has increased by 80 MW due to load increase
3) 2020 load increased by 254 MW vs. 2019
4) LCR has increased by 299 MW mostly due to load increase and new identified limiting element

Since last stakeholder meeting:

1) Updated NQC
2) Small change to the Coalinga sub-area LCR needs

Your comments and questions are welcome.

For written comments, please send to: RegionalTransmission@caiso.com

2016 and 2020 Final LCR Study Results - Kern

Chris Mensah-Bonsu

Senior Regional Transmission Engineer

Stakeholder Teleconference

April 14, 2015

Fresno and Kern LCR Areas

Kern Load and Resources (MW)

		2016	2020
Load	=	853	282
AAEE	=	-9	-4
Transmission Losses	=	7	1
Total Load	=	**851**	**279**
Market Generation/Net Seller	=	302	99
New Market/Unit Generation	=	128	20
Muni Generation	=	0	0
QF/Self Generation	=	99	55
Total Qualifying Capacity	=	**529**	**174**

Kern Area LCR

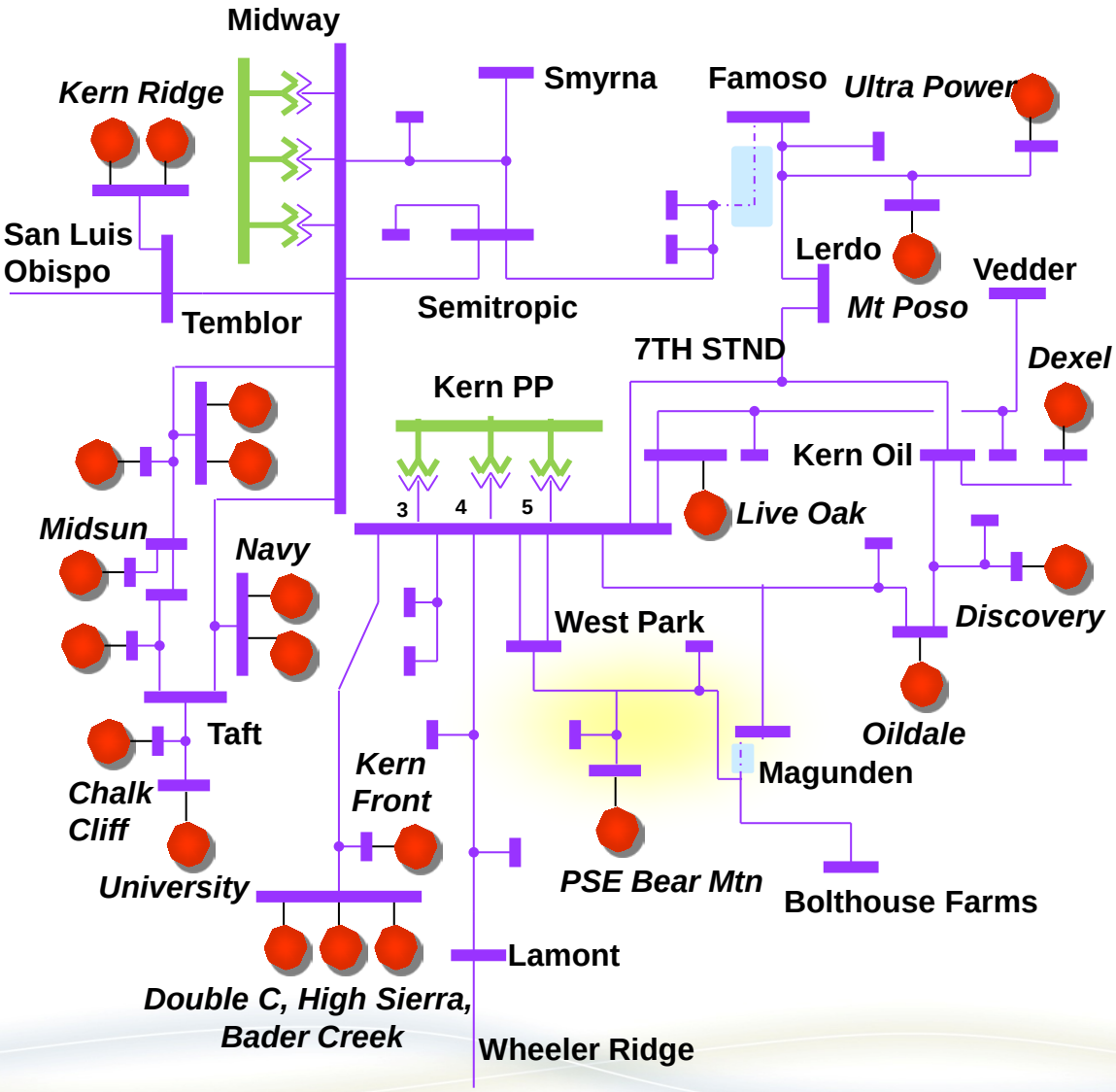
2016 West Park Sub-Area

Limiting Contingencies:

- **West Park - No longer exists**
- **Due to Normally Open Magunden CB 122**

LCR Results (MW):

Contingency	Cat. B	Cat. C
LCR	**0**	**0**
Including:		
QF	0	0
Muni	0	0
Deficiency	0	0



Kern Area LCR

2016 Kern Oil Sub-Area

Limiting Contingencies:

Category B:

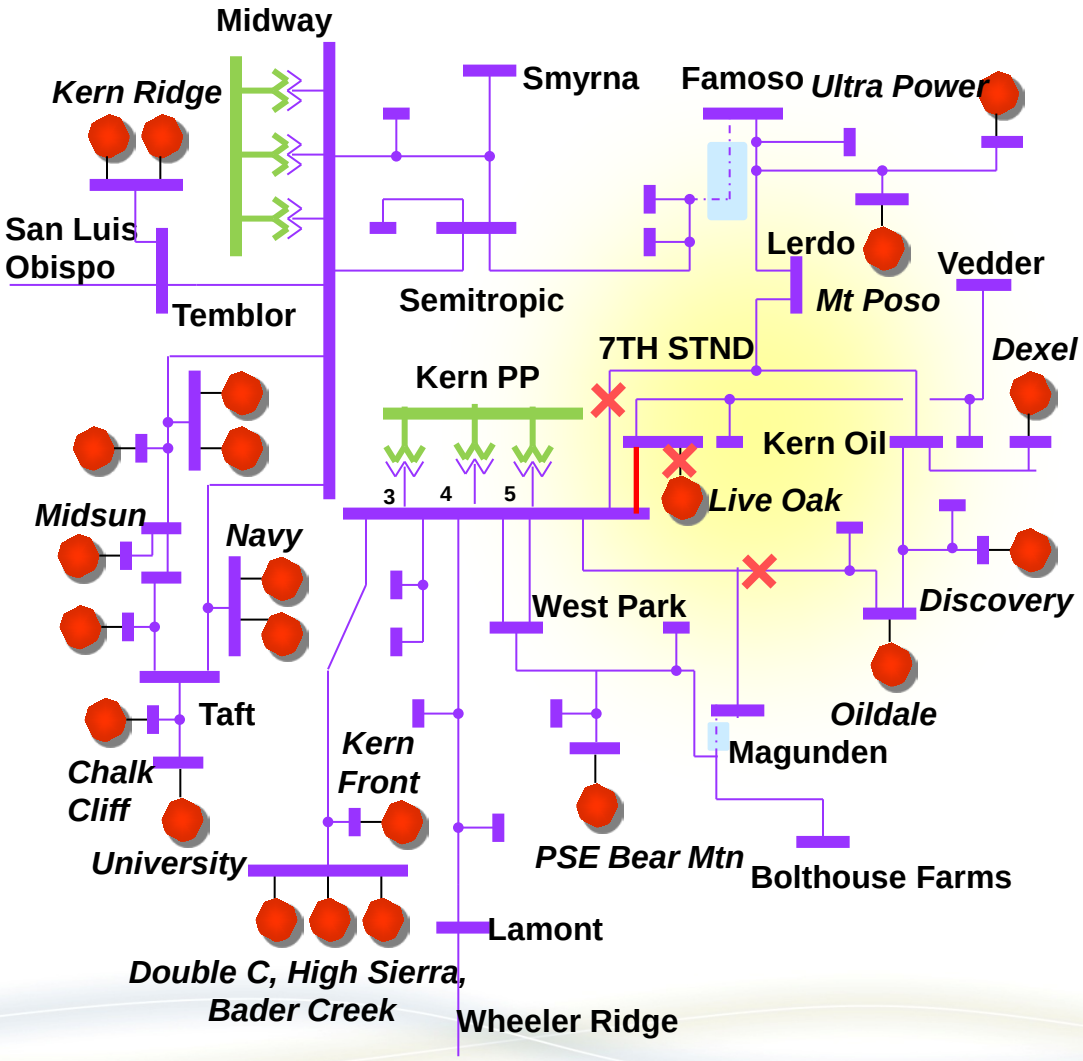
- **G-1/L-1: Kern PP-Magunden-Witco 115 kV with PSE Live Oak generation out of service**
- **Constraint: Kern PP-Live Oak 115 kV**

Category C:

- **L-1/L-1: Kern PP-Magunden-Witco and Kern PP-7th Standard 115 kV lines**
- **Constraint: Kern PP-Live Oak 115 kV**

LCR Results (MW):

Contingency	Cat. B	Cat. C
LCR	**133**	**135**
Including:		
QF	55	55
Muni	0	0
Deficiency	0	0



Kern Area LCR

2016 South Kern PP Sub-Area

Limiting Contingencies:

Category B:

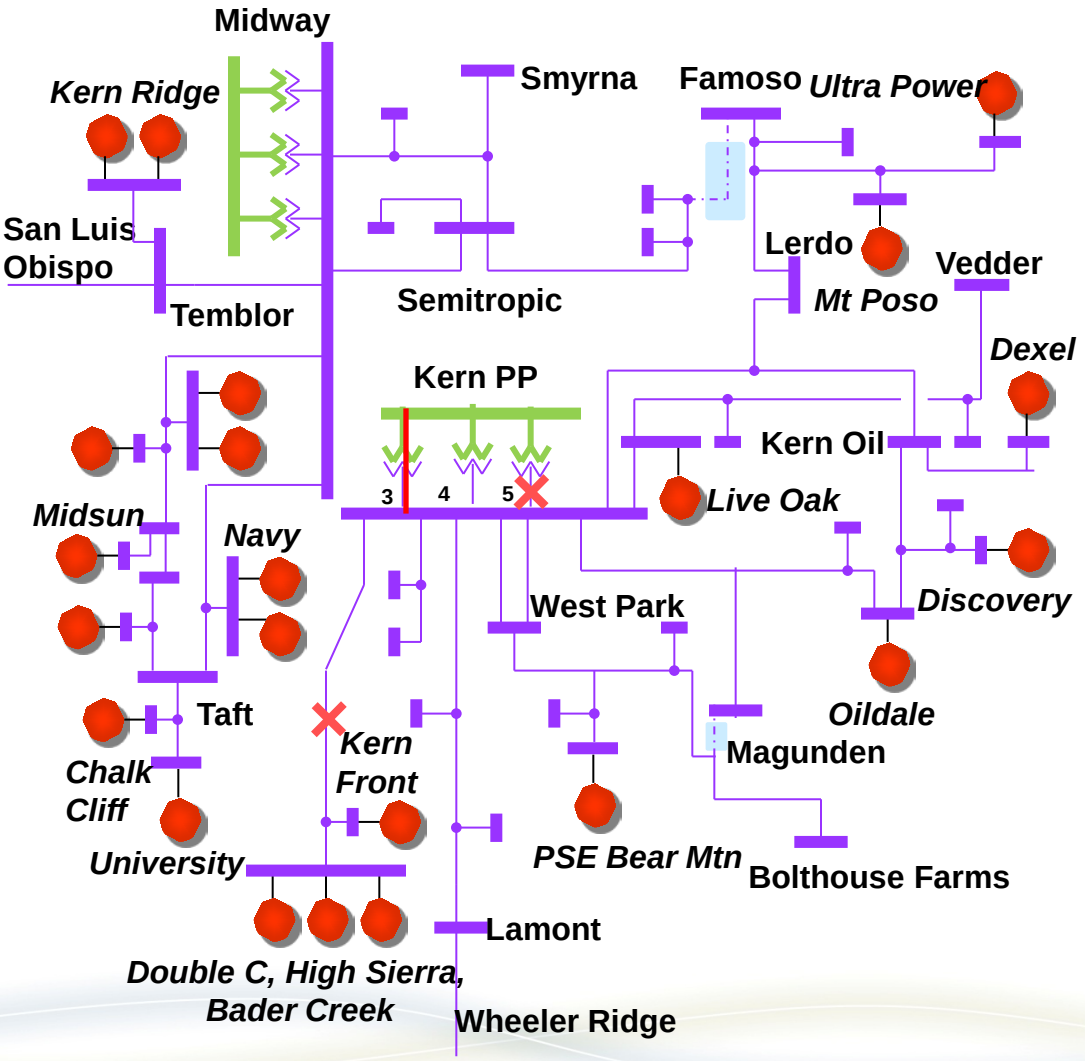
- **T-1: Kern PP #5 230/115 kV**
- **Constraint: Kern #4 230/115 kV**

Category C:

- **L-1/T-1 Kern-Kern Front 115 kV & Kern PP #5 230/115 kV**
- **Constraint: Kern PP #3 230/115 kV**

LCR Results (MW):

Contingency	Cat. B	Cat. C
LCR	**214**	**400**
Including:		
QF	99	99
Muni	0	0
Deficiency	0	0



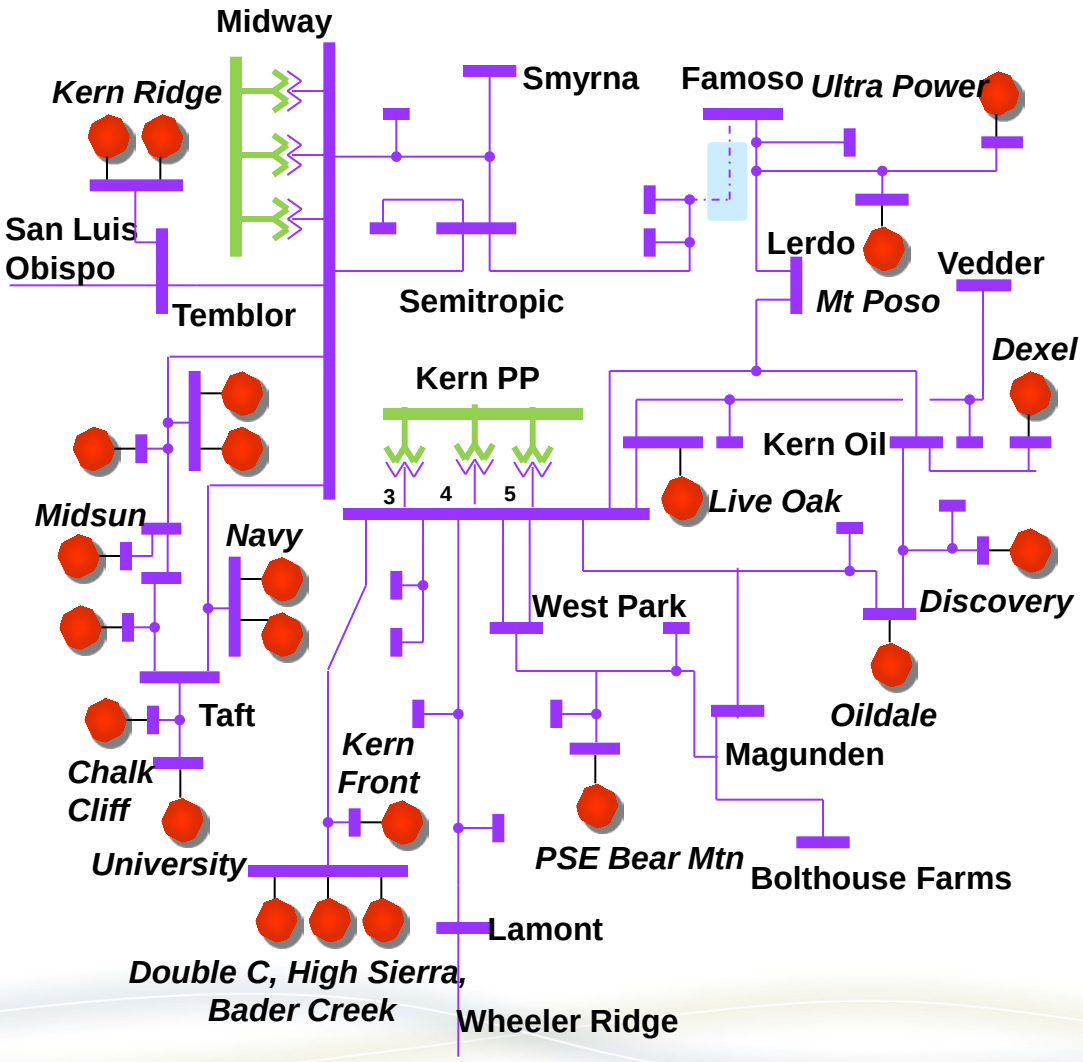
Kern Area LCR

2020 West Park Sub-Area

Limiting Contingencies:

None.

Eliminated due to Kern PP 115 kV area reinforcement.



LCR Results (MW):

Contingency	Cat. B	Cat. C
LCR	**0**	**0**
Including:		
QF	0	0
Muni	0	0
Deficiency	0	0

Kern Area LCR

2020 Kern Oil Sub-Area

Limiting Contingencies:

Category B:

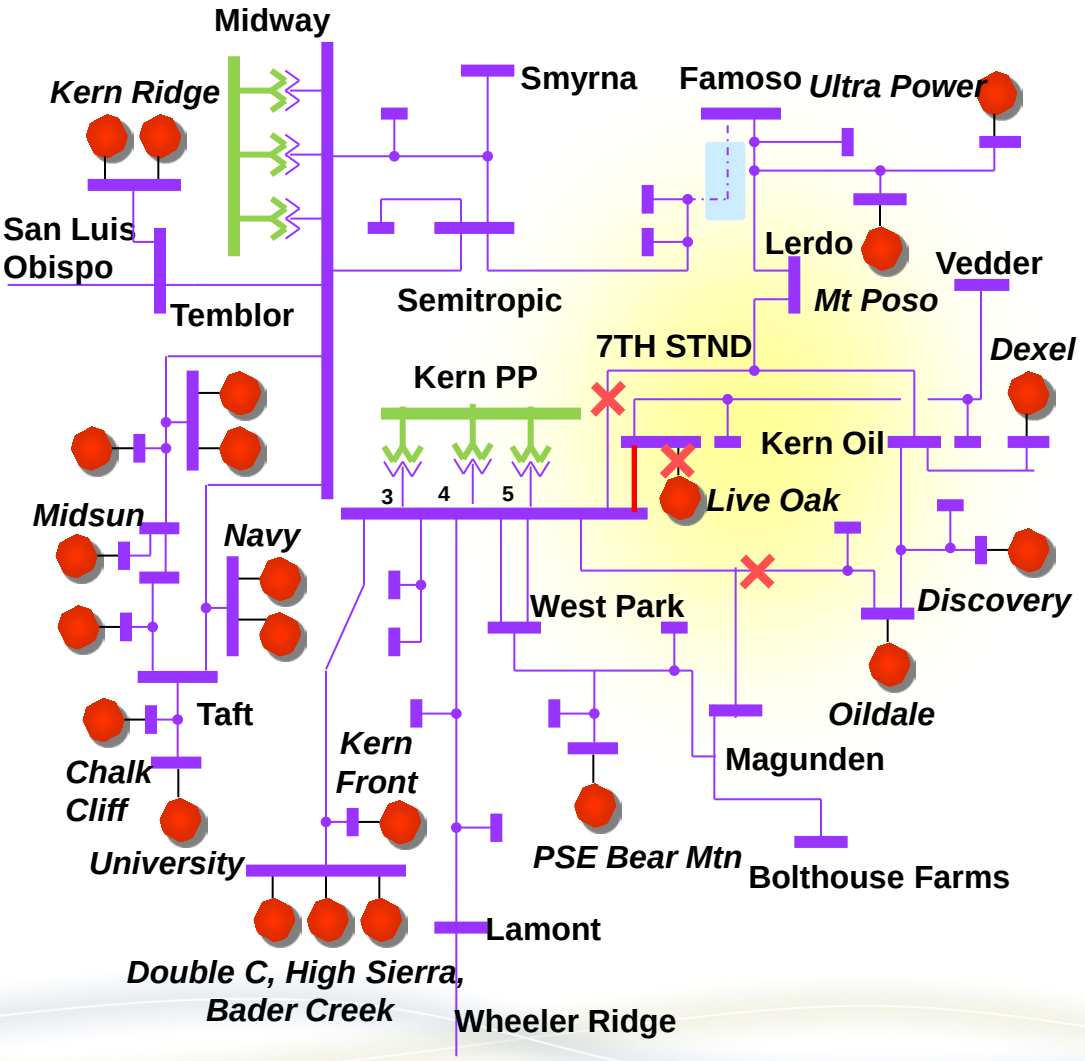
- **G-1/L-1: Kern PP-Magunden-Witco 115 kV with PSE Live Oak generation out of service**
- **Constraint: Kern PP-Live Oak 115 kV**

Category C:

- **L-1/L-1: Kern PP-Magunden-Witco and Kern PP-7th Standard 115 kV lines**
- **Constraint: Kern PP-Live Oak 115 kV**

LCR Results (MW):

Contingency	Cat. B	Cat. C
LCR	**132**	**135**
Including:		
QF	55	55
Muni	0	0
Deficiency	0	0



Kern Area LCR

2020 South Kern PP Sub-Area

No additional LCR is needed. Area is now redefined and includes just the new Kern Oil Sub-area

Limiting Contingencies:

Category B:

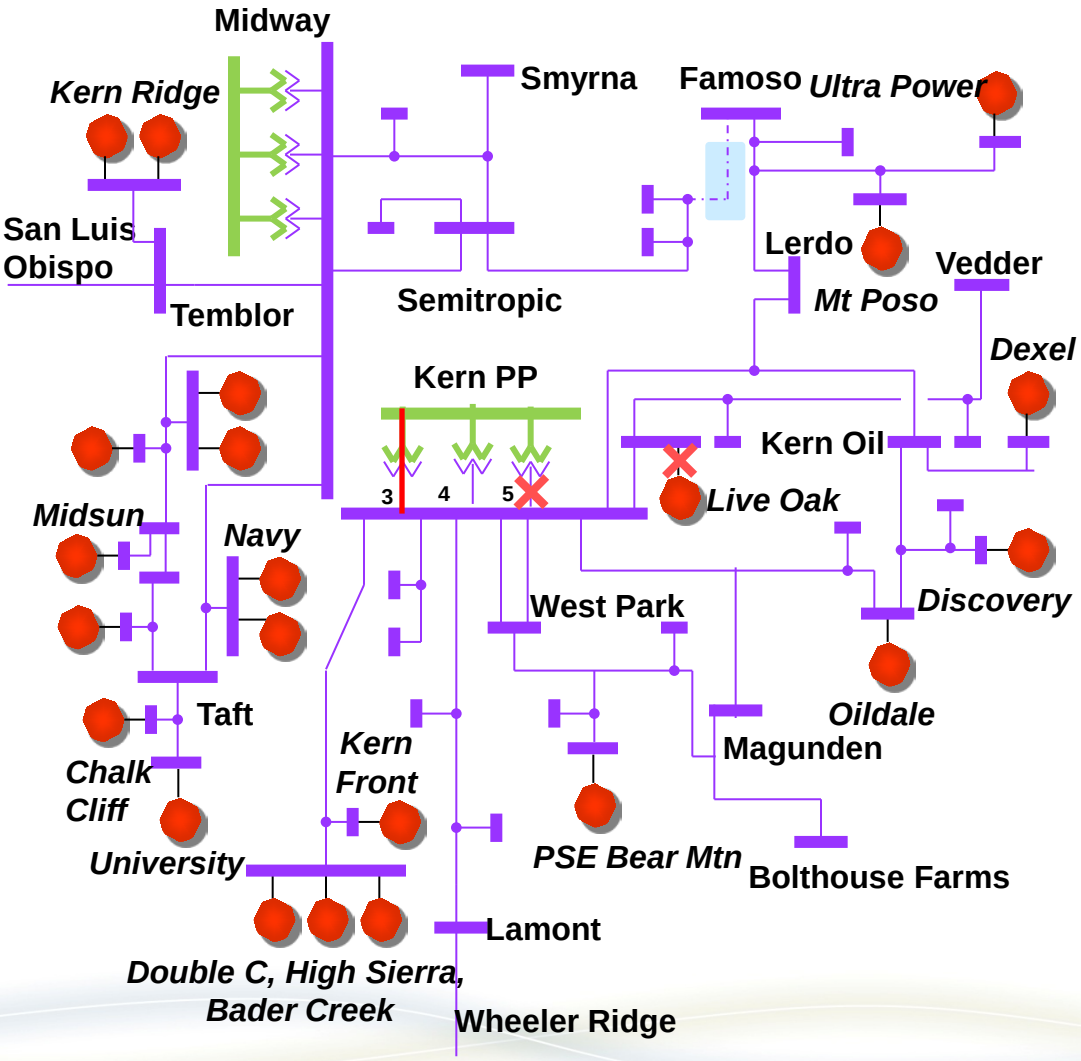
- **T-1: Kern PP #5 230/115 kV Bank**
- **Constraint: Kern PP #3 230/115 kV**

Category C:

- **G-1/T-1 Kern PP #5 230/115 kV Bank with PSE Live Oak generation out of service**
- **Constraint: Kern PP #3 230/115 kV Bank**

LCR Results (MW):

Contingency	Cat. B	Cat. C
LCR	**36**	**80**
Including:		
QF	99	99
Muni	0	0
Deficiency	0	0



Changes

Since last year:

1) West Park-Magunden 115 kV normally opened at Magunden (CB 122)
2) Identified a new Kern Oil sub-area
3) 2016 area load has increased by 120 MW from 2015
4) 2016 LCR has decreased by 37 MW from 2015 due to the Kern PP #4 230/115 kV transformer upgrade
5) Due to pocket redefinition the 2020 load total is down by 466 MW
6) 2020 LCR has decreased by 58 MW from 2019 due to area redefinition resulting from new transmission projects in the area

Since last stakeholder meeting:

1) Updated NQC
2) Before June 1, 2016 in-service date for the Kern PP #4 230/115 kV transformer upgrade

Your comments and questions are welcome.

For written comments, please send to: RegionalTransmission@caiso.com

2016 and 2020 Final LCR Study Results - LA Basin and Big Creek/Ventura Local Areas

Sanjay Patil

Senior Regional Transmission Engineer

Stakeholder Teleconference

April 14, 2015

LA Basin Area Loads & Resources

Load

Year	Load (MW)	AEEE (MW)	Pump Load (MW)	Transmission Losses (MW)	Total (MW)
2016	20248	273	76	117	20168
2020	21248	680	76	120	20764

Available Generation

Year	QF/Wind (MW)	Muni (MW)	Nuclear (MW)	Market (MW)	Max. Qualifying Capacity (MW)
2016	547	1163	0	9259	10969
2020	547	1163	0	9259	10969

Major new projects modeled

- Talega SVC
- Huntington Beach 3 and 4 Synchronous Condensers

Two additional projects modeled in 2020

- San Luis Rey Synchronous Condenser
- Mesa Loop-in

Critical Area Contingencies

El Nido Sub-area – Category C

Contingency: Hinson-La Fresa 230 kV line out followed by Double Circuit Tower Line Redondo-La Fresa #1 and #2 230 kV lines

Limiting component: Voltage Collapse

2016 LCR need: 580 MW (includes 47 MW of QF and Muni generation)

2020 LCR need: 580 MW (includes 47 MW of QF and Muni generation)

El Nido Sub-area – Category B

No requirement.

Critical Area Contingencies

West of Devers Sub-area – Category C

Contingency: San Bernardino-Etiwanda 230 kV line out followed by San Bernardino-Vista 230 kV line or vice versa

Limiting component: Voltage Collapse

2016 LCR need: 488 MW (includes 2 MW of QF generation)

2020 LCR need: 488 MW (includes 2 MW of QF generation)

West of Devers Sub-area – Category B

No requirement.

Critical Area Contingencies

Valley-Devers Sub-area – Category C

Contingency: Palo Verde-Colorado River 500 kV line out followed by ValleySC/Alberhill-Serrano 500 kV line or vice versa

Limiting component: Camino-Iron Mountain 230 kV line

2016 LCR need: 1,722 MW (includes 88 MW of QF and Wind)

2020 LCR need: 1,260 MW (includes 88 MW of QF and Wind)

Valley-Devers Sub-area – Category B

No requirement.

Critical Area Contingencies

Western LA Basin Sub-area – Category C

Contingency: Serrano-Villa Park #2 230 kV line out followed by Serrano-Lewis #1 or #2 230 kV line or vice versa

Limiting component: Serrano-Villa Park #1 230 kV line

2016 LCR need: 4,472 MW (includes 880 MW of QF, Muni, and Wind)

2020 LCR need: 4,993 MW (includes 880 MW of QF, Muni, and Wind)

Western LA Basin Sub-area – Category B

Non binding – multiple combinations possible.

Critical Area Contingencies

LA Basin Overall – Category B

Contingency: Sylmar-Gould 230 kV line out with Redondo #7 already out of service

Limiting component: Sylmar-Eagle Rock 230 kV line

2016 LCR need: 7,576 MW (includes 1,710 MW of QF, Muni, and Wind)

2020 LCR need: 7,978 MW (includes 1,710 MW of QF, Muni, and Wind)

LA Basin Overall – Category C

Contingency: Sylmar-Gould 230 kV line followed by Lugo-Victorville 500 kV line

Limiting component: Sylmar-Eagle Rock 230 kV line

2016 LCR need: 8,887 MW (includes 1,710 MW of QF, Muni, and Wind)

2020 LCR need: 9,229 MW (includes 1,710 MW of QF, Muni, and Wind)

Changes

Since last year:

1) 2016 load forecast is up by 198 MW vs. 2015.
2) Total overall LCR is down by 210 MW, mainly due to decrease in load and other new transmission projects in San Diego area.
3) 2020 load forecast is up by 258 MW vs. 2019.
4) Total Long-term LCR is up by 110 MW mainly due to load.

Since last stakeholder meeting:

1) Updated NQC

Your comments and questions are welcome.

For written comments, please send to: RegionalTransmission@caiso.com

Big Creek/Ventura Area Loads & Resources

Load

Year	Load (MW)	AEEE (MW)	Pump Load (MW)	Transmission Losses (MW)	Total (MW)
2016	4446	74	369	65	4806
2020	4596	193	369	73	4845

Available Generation

Year	QF (MW)	Muni (MW)	Market (MW)	Max. Qualifying Capacity (MW)
2016	188	396	4951	5535
2020	188	396	4951	5535

Major new projects modeled

- none

Critical Area Contingencies

Rector Sub-area – Category B

Contingency: Vestal-Rector #1 or #2 230 kV line with Eastwood out of service

Limiting component: Remaining Vestal-Rector 230 kV line

2016 LCR need: 492 MW (includes 9 MW of QF generation)

2020 LCR need: 464 MW (includes 9 MW of QF generation)

Rector Sub-area – Category C

Same as above.

Critical Area Contingencies

Vestal Sub-area – Category B

Contingency: Magunden-Vestal #1 or #2 230 kV line with Eastwood out of service

Limiting component: Remaining Magunden-Vestal 230 kV line

2016 LCR need: 739 MW (includes 73 MW of QF generation)

2020 LCR need: 703 MW (includes 73 MW of QF generation)

Vestal Sub-area – Category C

Same as above.

Critical Area Contingencies

Santa Clara Sub-area – Category C

Contingency: Pardee-S. Clara 230 kV line followed by DCTL Moorpark-S. Clara #1 and #2 230 kV lines

Limiting component: Voltage collapse

2016 LCR need: 247 MW (includes 80 MW of QF generation)

2020 LCR need: 293 MW (includes 80 MW of QF generation)

Santa Clara Sub-area – Category B

No requirement.

Critical Area Contingencies

Moorpark Sub-area – Category C

Contingency: Pardee-Moorpark #3 230 kV line followed by DCTL Pardee-Moorpark #1 and #2 230 kV lines

Limiting component: Voltage collapse

2016 LCR need: 462 MW (includes 109 MW of QF generation)

2020 LCR need: 547 MW (includes 109 MW of QF generation)

Moorpark Sub-area – Category B

No requirement.

Critical Area Contingencies

Big Creek/Ventura Overall – Category B

Contingency: Sylmar-Pardee #1 or #2 230 kV line with Ormond #2 out of service

Limiting component: Remaining Sylmar-Pardee 230 kV line

2016 LCR need: 2,141 MW (includes 584 MW of QF and Muni)

2020 LCR need: 2,598 MW (includes 584 MW of QF and Muni)

Big Creek/Ventura Overall – Category C

Contingency: Sylmar-Pardee #1 or #2 230 kV line followed Lugo-Victorville 500 kV or vice versa

Limiting component: Remaining Sylmar-Pardee 230 kV line

2016 LCR need: 2,398 MW (includes 584 MW of QF and Muni)

2020 LCR need: Same as Category B

Changes

Since last year:

1) 2016 load forecast is down by 1 MW vs. 2015.
2) Overall LCR is up by 128 MW, mainly due to LA Basin and San Diego/Imperial Valley significant reduction in LCR requirements.
3) 2020 load forecast is down by 44 MW vs. 2019.
4) Long-term LCR is down by 21 MW, mainly due to load.

Since last stakeholder meeting:

1) Updated NQC

Your comments and questions are welcome.

For written comments, please send to: RegionalTransmission@caiso.com

2016 and 2020 Final LCR Study Results San Diego-Imperial Valley

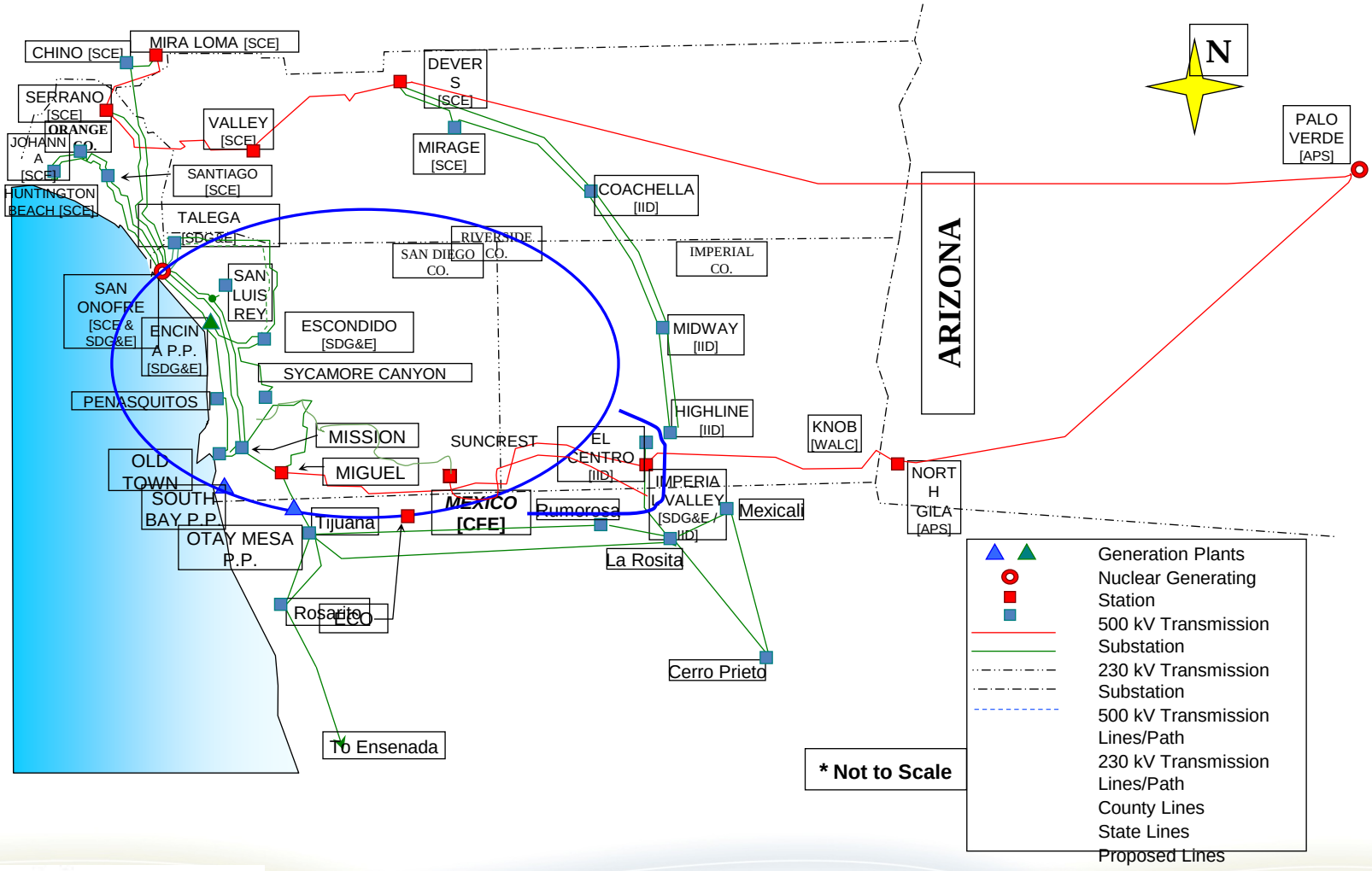
Frank Chen

Senior Regional Transmission Engineer

Stakeholder Teleconference

April 14, 2015

San Diego-Imperial Valley LCR Area



San Diego-Imperial Valley Area Load and Resources

		2016	2020
Load	=	5,206	5,450
AAEE	=	-81	-216
Transmission Losses	=	158	178
Total Area Load	=	**5,283**	**5,412**
Market Generation	=	4,687	4,493
Muni Generation	=	0	0
Wind Generation	=	87	142
QF Generation	=	141	141
Total Qualifying Capacity	=	**4,915**	**4,776**

Major New Upgrades Modeled

2016 Base Case

1. Reconductor of Los Coches–Loveland 69 kV line
2. Miguel-Otay Mesa-South Bay-Sycamore 230 kV re-configuration
3. Reactor on TL23040 Otay Mesa-Tijuna 230 kV line with 850 MVA emergency rating
4. Talega Synchronous Condenser (2x225 Mvar)
5. 2nd Encina 230/138 Bank #61
6. East County 500kV Substation (ECO)
7. Reconductor of San Lius Rey-Oceanside Tap 69 kV line
8. 2nd Hassayampa-North Gila 500 kV line
9. Imperial Valley – Dixieland 230 kV tie with IID
10. IV-Libert-FERN 230 kV tie re-configuration
11. Pio Pico Power Plant

Major New Upgrades Modeled

2020 Base Case

1. TL632 Granite Loop-In and TL6914 reconfiguration
2. San Luis Rey Synchronous Condenser (2x225 Mvar)
3. A new Sycamore – Bernardo 69 kV line
4. Reconductor Bernardo-Rancho Carmel 69 kV line
5. Reconductor of Sycamore – Chicarita 138 kV line
6. Sycamore-Penasquitos 230 kV line
7. Artesian 230/69 kV Sub and loop-in
8. Imperial Valley Flow Controller on TL23050 Tie with CFE
9. Encina Plant retirement
10. Kearny retirement
11. El Cajon GT retirement
12. Miramar GT retirement
13. Encina Repower Project

Areas and sub-areas studied:

- El Cajon sub-area
- Mission sub-area
- Esco sub-area
- Pala sub-area
- Miramar sub-area
- Border sub-area
- San Diego sub-area
- San Diego-Imperial Valley area

El Cajon Sub-area Critical Contingencies

Category B:

Contingency: loss of Miguel-Granite-Los Coches 69 kV (TL632) with one El Cajon unit out of service.

Limiting component: El Cajon-Los Coches 69 kV (TL631) overloaded

2016 LCR need: 65 MW (includes 0 MW of QF generation)

2020: no requirement due to TL632 Granite Loop-In and TL6914 reconfiguration

Category C:

Contingency: loss of El Cajon-Jamacha 69 kV (TL624) followed by the loss of Miguel – Granite – Los Coches 69 kV (TL632) or vice versa

Limiting component: El Cajon-Los Coches 69 kV (TL631) overloaded

2016 LCR need: 109 MW (includes 0 MW of QF generation)

Contingency: loss of El Cajon-Jamacha 69 kV (TL624) followed by loss of Murray-Garfield 69 kV (TL620) or vice versa

Limiting component: El Cajon-Los Caches 69 kV (TL631) overloaded

2020 LCR: 30 MW (includes 0 MW of QF generation)

Mission Sub-area Critical Contingency

Category C:

Contingency: Loss of Mission-Kearny 69 kV (TL663) followed by the loss of Mission-Mesa Heights 69kV (TL676)

Limiting component: Clairmont-Clairmont Tap 69 kV section overloads

2016 LCR: 54 MW (includes 0 MW of QF)

2020 LCR: 56 MW (includes 0 MW of QF)

Category B:

No requirement.

Esco Sub-area Critical Contingency

Category C:

2016 LCR:

Contingency: loss of Poway-Pomerado 69 kV (TL6913) followed by loss of Esco-Escondido 69kV (TL6908)

Limiting component: Bernardo-Felicita Tap 69kV (TL689) overloaded

LCR need: 110 MW (includes 38 MW of QF generation and 72 MW deficiency)

2020 LCR : 0 MW due to the 2nd Poway-Pomerado 69 kV line

Category B:

No requirement.

Pala Sub-area Critical Contingency

Category C:

Contingency: loss of Pendleton-San Luis Rey 69 kV line (TL6912) followed by loss of Lilac-Pala 69kV (TL6908)

Limiting component: Melrose-Morro Hill Tap 69kV (TL694) overloaded

2016 LCR need: 35 MW (includes 0 MW of QF generation)

2020 LCR need: 43 MW (includes 0 MW of QF generation)

Category B:

No requirement.

Border Sub-area Critical Contingency

Category C:

Contingency: loss of Bay Boulevard-Otay 69 kV #1 (TL645) followed by loss of Bay Boulevard-Otay 69 kV #2 (TL646)

Limiting component: Imperial Beach-Bay Boulevard 69 kV (TL647) overloaded

2016 LCR: 66 MW (includes 3 MW of QF generation)

2020 LCR: 67 MW (includes 3 MW of QF generation)

Category B:

No requirement.

Miramar Sub-area Critical Contingencies

Category C:

2016 Contingency: loss of Miguel-Silvergate 230 kV followed by outage of Sycamore-Palomar 230 kV line

2020 Contingency: loss of Miguel-Bay Boulevard 230 kV followed by outage of Sycamore-Penasquitos 230 kV line

Limiting component: Sycamore-Scripps 69 kV (TL6916) overloaded

2016 LCR: 118 MW (includes 0 MW of QF)

2020 LCR: 142 MW (includes 0 MW of QF and 10 MW of deficiency)

Category B:

2016 Contingency: loss of Miguel-Silvergate 230 kV overlapping with Miramar Energy Facility unit #1 or #2

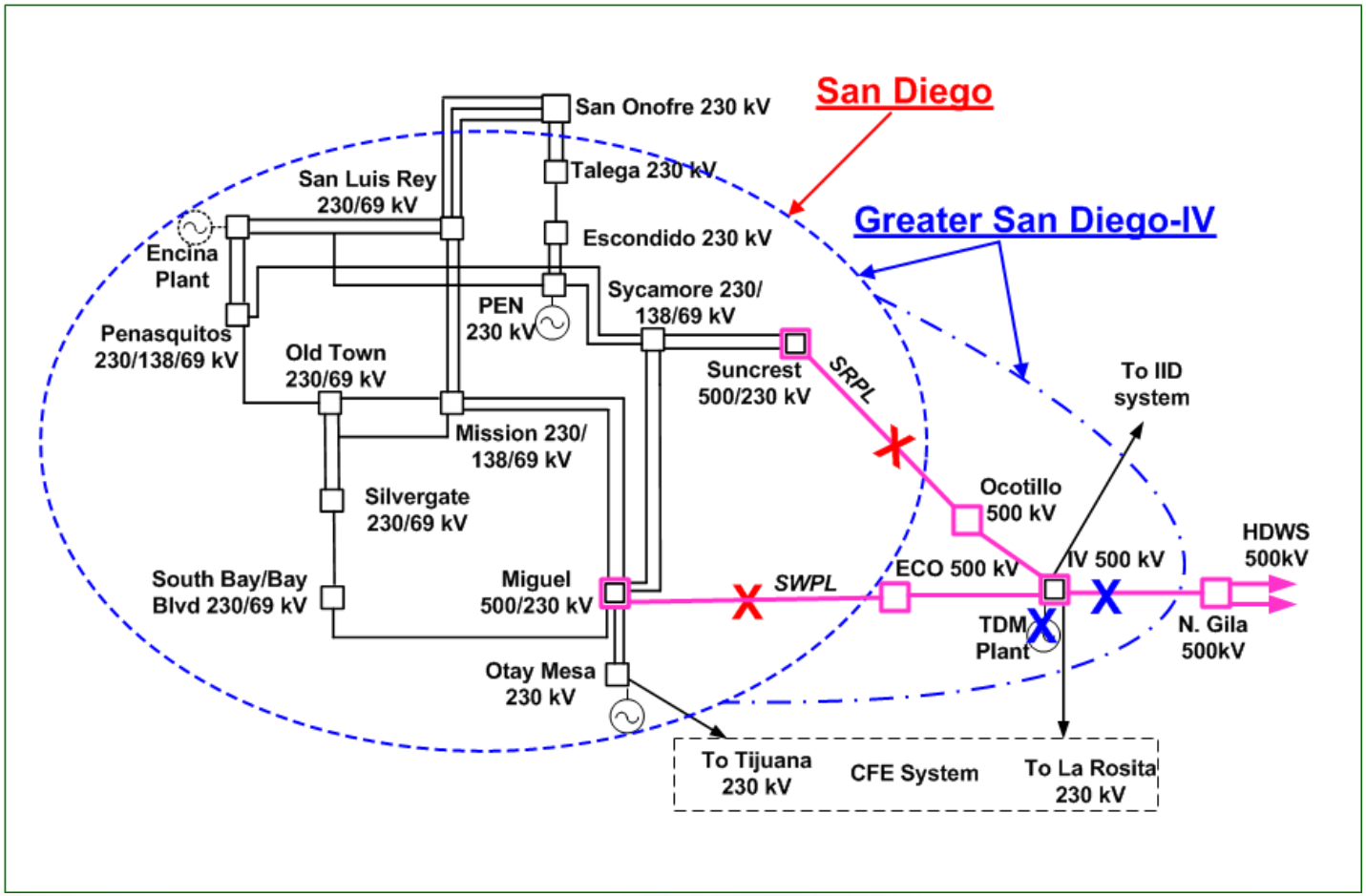
2020 Contingency: loss of Sycamore-Penasquitos 230 kV overlapping with Miramar Energy Facility unit #1 or #2

Limiting component: Sycamore-Scripps 69 kV (TL6916) overloaded

2016 LCR: 82 MW (includes 0 MW of QF)

2020 LCR: 68 MW (includes 0 MW of QF) after completion of the Miramar-Mesa Rim 69 kV System Reconfiguration

San Diego Sub-area and San Diego-Imperial Valley Area



San Diego Sub-area Critical Contingency

Category C:

Contingency: Loss of Ocotillo–Suncrest 500kV line followed by loss of ECO-Miguel 500kV line, or vise versa

Limiting component: post-transient instability in the LA Basin & San Diego areas

2016 LCR: 3,112 MW (includes 141 MW of QF and 5 MW of wind generation)

2020 LCR: Same as Category B

Category B:

Contingency: Otay Mesa Plant already out of service followed by loss of ECO-Miguel 500kV line outage

Limiting component: Suncrest-Sycamore 230 kV lines (TL23054/TL23055)

2016 LCR: 2,610 MW (includes 141 MW of QF and 5 MW of wind)

2020 LCR: 2,868 MW (includes 141 MW of QF and 5 MW of wind)

Greater San Diego-Imperial Valley Area Critical Contingencies

Category C:

2016 LCR need: Same as Category B – Non binding

2020 LCR need: Same as Category B – Non binding

Category B:

Contingency: Otay Mesa plant out of service followed by loss of IV-N.Gila 500 kV line (TL50002)

Limiting component: post-voltage instability in the SDGE-IV area

2016 LCR need: 2,850 MW (includes 141 MW of QF and 87 MW of Wind)

2020 LCR need: Non binding

San Diego – Imperial Valley Area LCR

Available Generation	Qualifying Capacity	Wind	Market	Max Qualified Capacity
	MW	MW	MW	MW
2016	141	87	4687	4915
2020	141	142	4493	4776

Study Year	Contingency Type	Generation Capacity Needed	Deficiency	Total LCR
		MW	MW	MW
2016	Category B (Single)	2850	0	2850
	Category C (Multiple)	3112	72	3184
2020	Category B (Single)	2868	0	2868
	Category C (Multiple)	2868	10	2878

Changes

2016 LCR compared to 2015:

- Net load forecast went down by 124 MW
- Overall LCR need reduced by 928 MW in 2016 mostly due to the dynamic reactive support facility added and other network upgrades in the areas as well as decrease in load forecast

2020 LCR compared to 2019:

- Net load forecast decreased by 126 MW
- Overall LCR need reduced by 412 MW mainly due to the dynamic reactive support facilities to be installed at San Luis Rey, San Onofre, and Santiago, along with other scheduled network upgrades in the areas as well as decrease in load forecast

Since last stakeholder meeting:

- Updated NQC
- San Luis Rey SC (2x225 Mvar) in service after June 1, 2016
- Small changes to LCR needs in Mission, Miramar and San Diego sub-areas

Your comments and questions are welcome

For written comments, please send to: RegionalTransmission@caiso.com