

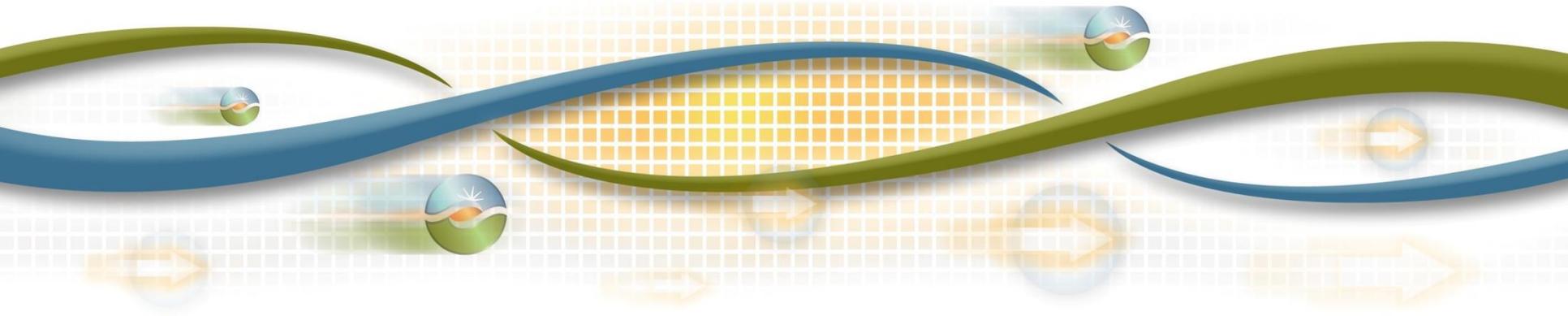
2016-2020 Draft LCR Study Results Sierra and Stockton Local Areas

Binaya Shrestha

Senior Regional Transmission Engineer

Stakeholder Meeting

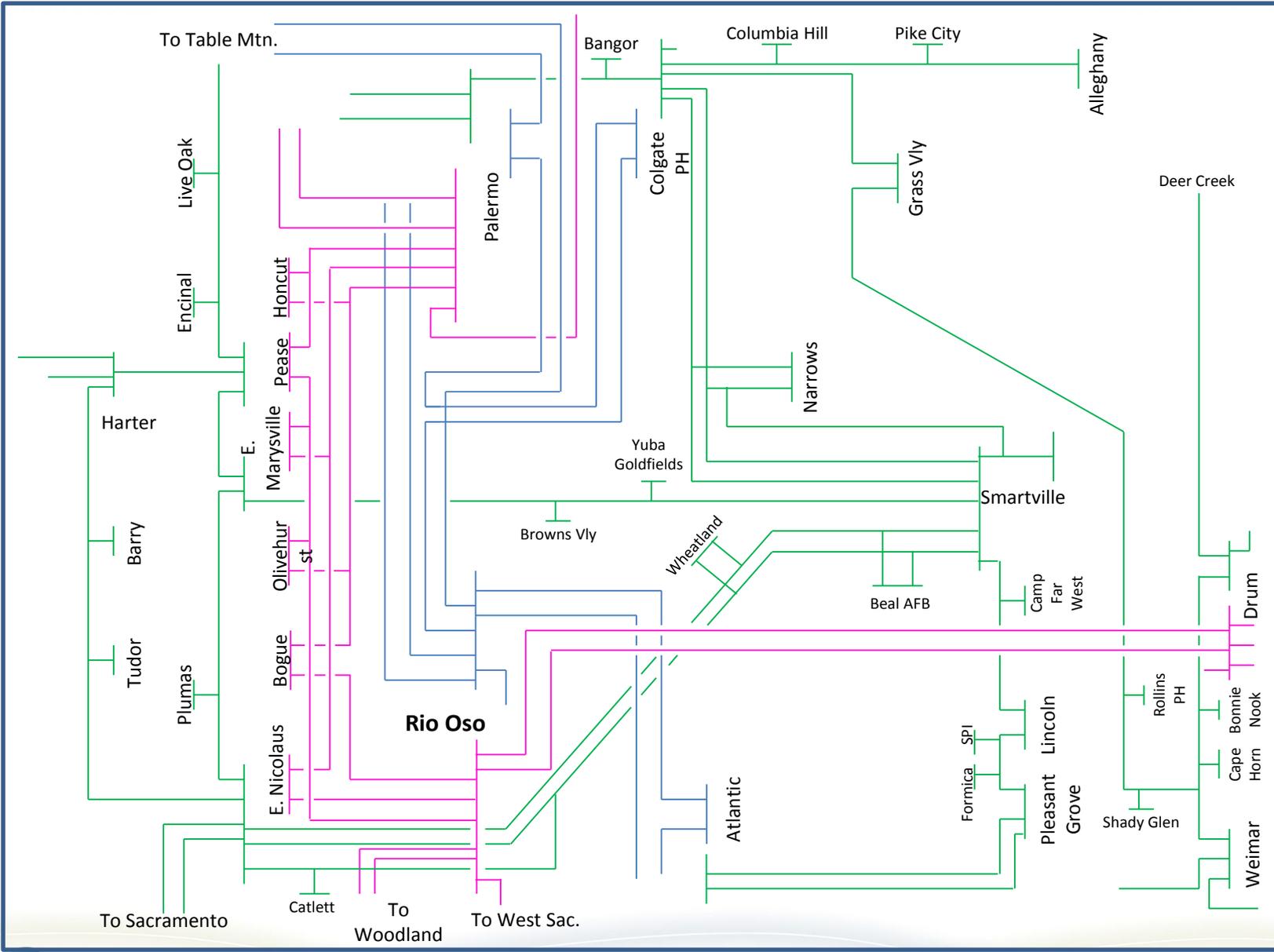
March 9, 2015



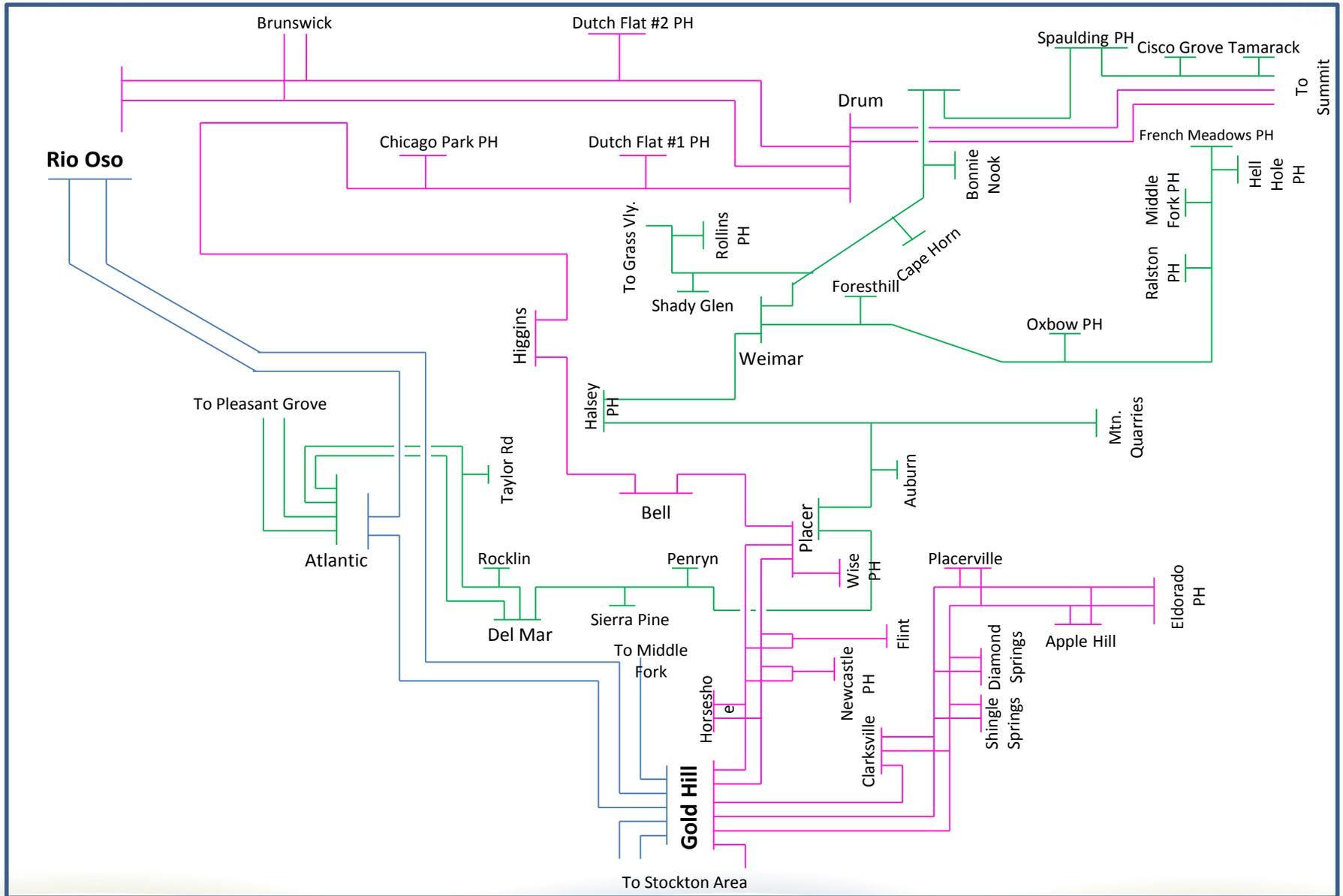
Sierra Area Load and Resources (MW)

		2016	2020
Load	=	1837	1977
AAEE	=	-27	-72
Transmission Losses	=	96	89
Total Load	=	1906	1994
Market Generation	=	769	769
Muni Generation	=	1134	1134
QF Generation	=	218	218
Total Qualifying Capacity	=	2121	2121

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)

Critical Sierra Area Contingencies

South of Table Mountain

South of Table Mountain Sub-area – Category C

2016 LCR need: 1765 MW (includes 192 MW of QF and 1107 MW of Muni generation)

2020 LCR need: 1688 MW (includes 192 MW of QF and 1107 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: 1632 MW (includes 192 MW of QF and 1107 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 61 MW of QF and 639 MW of Muni generation as well as 189 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: 586 MW (includes 61 MW of QF and 639 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 61 MW of QF and 639 MW of Muni generation)

Contingency: Palermo-E. Nicolaus 115 kV line with Belden unit out of service

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

2020 LCR need: 280 MW (includes 61 MW of QF and 639 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 192 MW of QF and 197 MW of Muni generation)

2020 LCR need: 73 MW (includes 192 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 192 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 46 MW of deficiency)

2020 LCR need: 742 MW (includes 31 MW of QF and 593 MW of Muni generation as well as 32 MW of deficiency)

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)

2020 LCR need: 480 MW (includes 31 MW of QF and 593 MW of Muni generation)

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

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

Critical Sierra Area Contingencies

Pease

Pease Sub-area – Category C

2016 LCR need: Same as Category B.

2020 LCR need: 105 MW (includes 70 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 70 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 70 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 12 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: 43 MW (includes 38 MW of QF and Muni generation)

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

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

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

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	769	1134	218	2121
2020	769	1134	218	2121

	Existing Generation Capacity Needed (MW)		Deficiency (MW)		Total MW Need	
	2016	2020	2016	2020	2016	2020
Category B (Single)	1139	1632	0	0	1139	1632
Category C (Multiple)	1765	1688	247	32	2012	1720

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 188 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 618 MW.
- The increase in LCR is due to delay in transmission projects implementation.

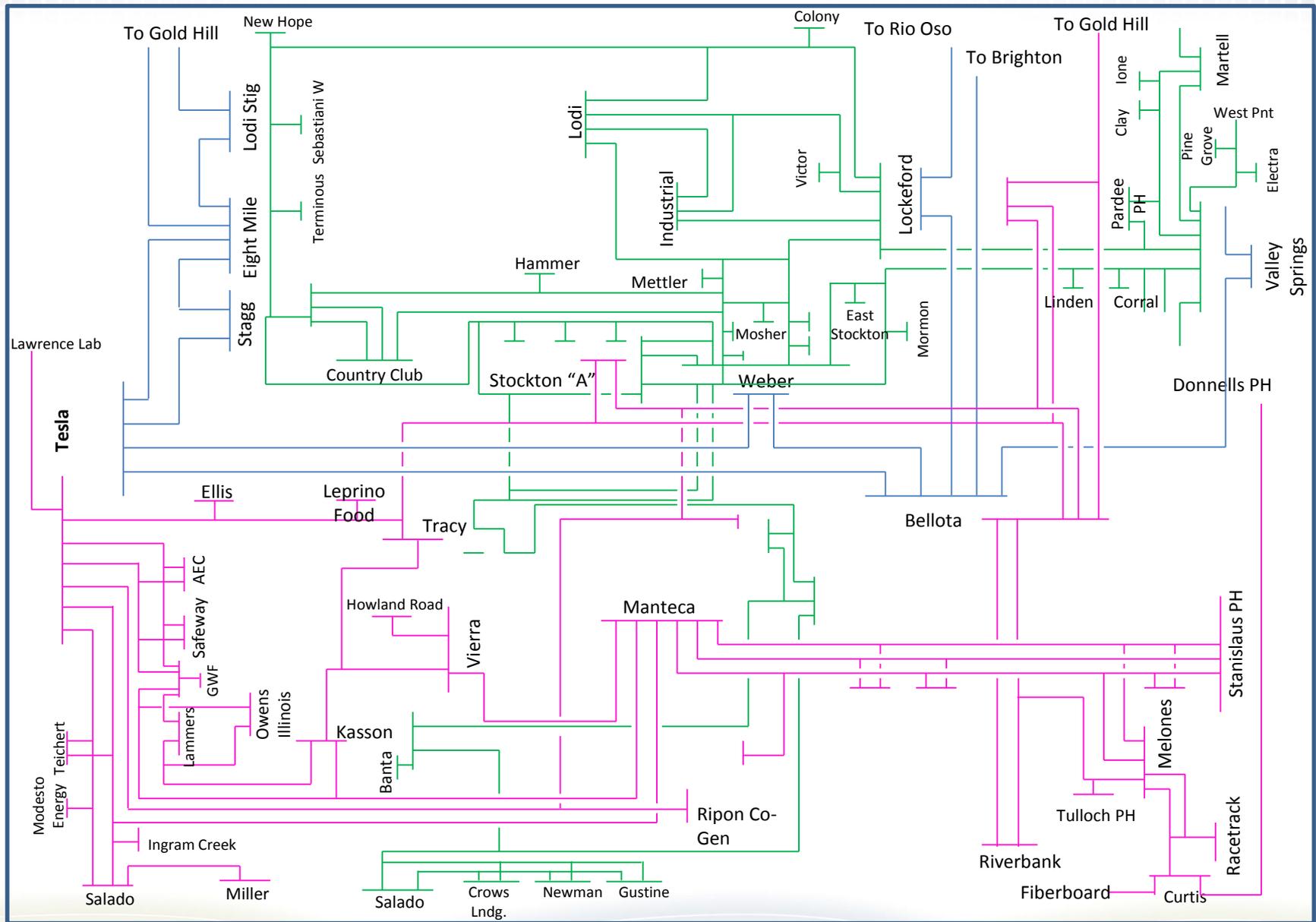
Your comments and questions are welcome.

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	=	36	117
Muni Generation	=	142	142
Market Generation	=	464	464
Total Qualifying Capacity	=	644	732

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: 681 MW (30 MW of QF and 114 MW of Muni and 311 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 (30 MW of QF and 114 MW of Muni and 311 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 30 MW of QF and 114 MW of Muni generation).

2020 LCR need: 284 MW (129 MW of QF and 114 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 30 MW of QF and 114 MW of Muni generation).

2020 LCR Need: 246 MW (includes 129 MW of QF and 114 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 19 MW of QF and 94 MW of Muni generation)

2020 LCR need: 141 MW (includes 19 MW of QF and 94 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 25 MW of QF and Muni generation as well as 61 MW of deficiency)

2020 LCR need: 88 MW (includes 25 MW of QF and 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: 31 MW (includes 27 MW of QF generation)

2020 LCR need: 29 MW (includes 27 MW of QF generation)

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	464	142	36	644
2020	464	142	117	732

	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)	426	338	372	63	798	401

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 50 MW due to increase in load forecast.

Your comments and questions are welcome.

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