2018 & 22 Draft LCR Study Results Sierra and Stockton Areas

Ebrahim Rahimi

Lead Regional Transmission Engineer

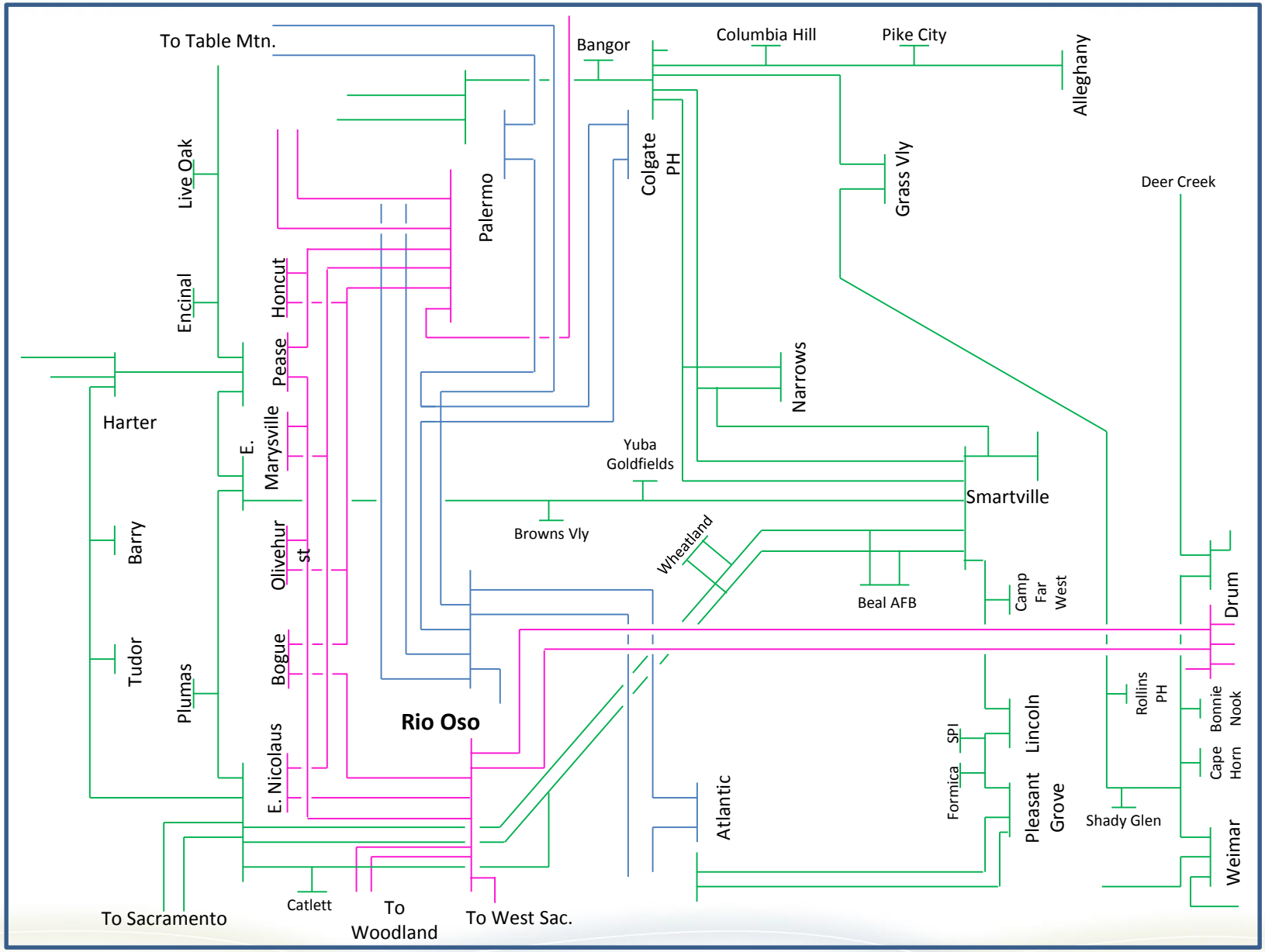
Stakeholder Meeting

March 9, 2017

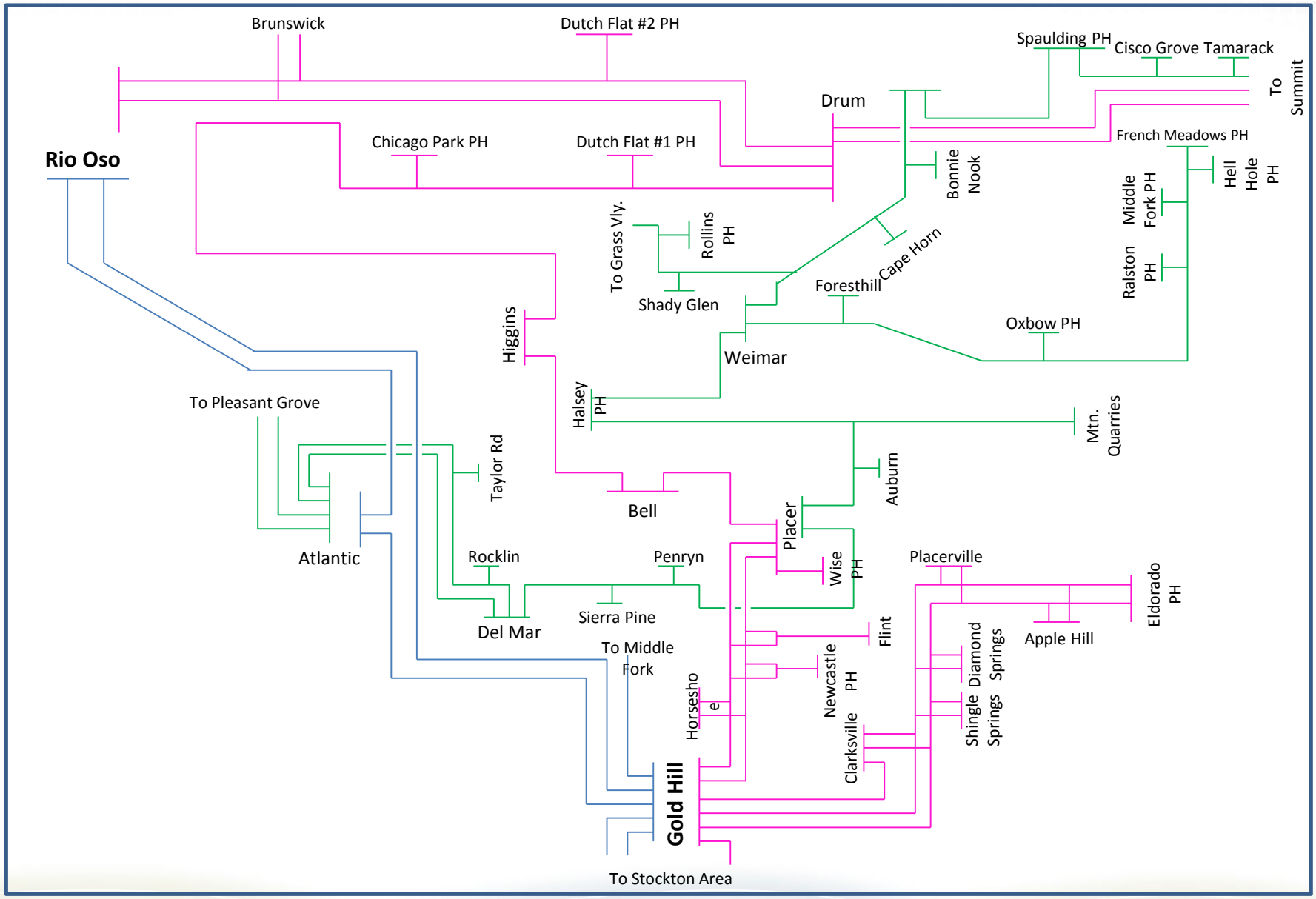
Sierra Area Load and Resources (MW)

		2018	2022
Load	=	1,862	1,940
AAEE	=	-30	-63
BTM-PV	=	- 107	-144
Transmission Losses	=	93	81
Total Load	=	**1,818**	**1,814**
Market Generation	=	890	890
Muni Generation	=	1110	1,110
QF Generation	=	66	66
Total Qualifying Capacity	=	**2,066**	**2,066**

Northern Sierra



Southern Sierra



New transmission projects modeled:

Only in 2022

1. Gold Hill-Missouri Flat #1 and #2 115 kV line reconductoring
2. Rio Oso #1 and #2 230/115 kV transformer replacement
3. Pease 115/60 kV transformer addition
4. South of Palermo 115 kV Reinforcement

Summary of Results – Sierra Area

		Monitored Element	Outages	2018	2022
Placer	Cat B	Drum-Higgins 115 kV	Gold Hill-Placer #1 115 kV Chicago Park Unit	82	75
	Cat C		Gold Hill-Placer #1 115 kV Gold Hill-Placer #2 115 kV	85	77
Pease	Cat B	Palermo-Pease 115 kV	Palermo - E. Nicolaus 115 kV YCEC Unit	101	0
	Cat C	Table Mountain-Pease 60 kV	Palermo - Pease 115 kV Rio Oso - Pease 115 kV	-	86
Drum - Rio Oso	Cat B	Rio Oso 230/115 kV Tx #1	Palermo 230/115 kV Tx No. 2	347	0
	Cat C		Rio Oso 230/115 kV Tx 2 Rio Oso-Brighton 230 kV	575	0
South of Rio Oso	Cat B	Rio Oso-Atlantic 230 kV	Rio Oso-Gold Hill 230 kV Ralston Unit	446	389
	Cat C	Rio Oso-Lincoln 115 kV	Rio Oso-Gold Hill 230 kV Rio Oso-Atlantic 230 kV	787	770
South of Palermo	Cat B	Rio Oso-Pease 115 kV	Colgate-Rio Oso 230 kV Belden Unit	1,215	0
	Cat C		Colgate-Rio Oso 230 kV Table Mountain - Rio Oso 230 kV	1,625	0
South of Table Mountain	Cat B	Table Mountain-Pease 60 kV	Table Mountain - Rio Oso 230 kV Belden Unit	<1,215	836
	Cat C	Caribou-Palermo 115 kV	Table Mountain - Rio Oso 230 kV Table Mountain - Palermo 230 kV	1,826	1,905
Placerville	Cat B	-	-	-	0
	Cat C	Gold Hill - Missouri Flat #1 115 kV	Gold Hill - Clarksville 115 kV Gold Hill - Missouri Flat #2 115 kV	78	0

Pease Sub-Area

Pease Sub-area – Category C

Contingency: Palermo-Pease 115 kV line and Pease 115/60 kV Tx No. 2
Limiting component: Thermal overload on Table Mountain-Pease 60 kV line

2018 LCR need: Same as Cat B

2022 LCR need: 86 MW (includes 35 MW of QF generation)

Pease Sub-area – Category B

Contingency: Palermo-East Nicolaus 115 kV line and YCEC unit

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

2018 LCR need: 101 MW (includes 35 MW of QF generation)

2022 LCR need: No requirement

Placer Sub-Area

Placer Sub-area – Category C

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

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

2018 LCR need: 85 MW (38 MW of QF and Muni, and 3 MW of deficiency)

2022 LCR need: 77 MW (includes 38 MW of QF and Muni)

Placer Sub-area – Category B

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

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

2018 LCR need: 82 MW (includes 38 MW of QF and Muni)

2022 LCR need: 75 MW (includes 38 MW of QF and Muni)

Placerville Sub-Area

Placerville Sub-area – Category C

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

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

2018 LCR need: 78 MW (includes 0 MW of QF and Muni generation as well as 52 MW of deficiency)

2022 LCR need: No requirements.

Placerville Sub-area – Category B

2018 and 2022 LCR need: No requirements

Drum-Rio Oso Sub-Area

Drum-Rio Oso Sub-area – Category C

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

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

2018 LCR need: 575 MW (66 MW of QF and 201 MW of Muni gen)

Drum-Rio Oso Sub-area – Category B

Contingency: Palermo #2 230/115 kV transformer

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

2018 LCR need: 347 MW (66 MW of QF and 201 MW of Muni gen)

2022 LCR need: No requirements.

South of Rio Oso Sub-Area

South of Rio Oso Sub-area – Category C

Contingency: Rio Oso-Gold Hill and Rio Oso-Brighton 230 kV lines for 2018 and Rio Oso-Gold Hill and Rio Oso-Atlantic 230 kV lines for 2022

Limiting component: Thermal overload on the Rio Oso-Atlantic 230 kV line for 2018 and Rio Oso-Lincoln 115 kV line for 2022

2018 LCR need: 787 MW (21 MW QF, 593 MW Muni, and 83 MW deficiency)

2022 LCR need: 770 MW (21 MW QF, 593 MW Muni, and 62 MW deficiency)

South of Rio Oso Sub-area – Category B

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

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

2018 LCR need: 446 MW (21 MW of QF and 593 MW of Muni generation)

2022 LCR need: 389 MW (21 MW of QF and 593 MW of Muni generation)

South of Palermo Sub-Area

South of Palermo Sub-area – Category C

Contingency: DCTL Table Mountain-Rio Oso and Colgate-Rio Oso 230 kV lines

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

2018 LCR need: 1,625 MW (includes 26 MW of QF and 638 MW of Muni generation as well as 243 MW of deficiency)

South of Palermo Sub-area – Category B

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

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

2018 LCR need: 1,215 MW (includes 26 MW of QF and 638 MW of Muni generation)

2022 LCR need: No additional requirements. Units needed for Pease and South of Rio Oso sub-areas, satisfy Category B and C requirements for this area.

Overall Sierra

South of Table Mountain Sub-area – Category C

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

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

2018 LCR need: 1,826 MW (includes 66 MW of QF and 1110 MW of Muni generation)

2022 LCR need: 1,905 MW (includes 66 MW of QF and 1110 MW of Muni generation)

South of Table Mountain Sub-area – Category B

2018 LCR need: No additional category B requirement. Units required for South of Palermo satisfy the category B requirement for this sub-area.

Contingency: Table Mountain-Rio Oso 230 kV line with Belden Unit out

Limiting component: Table Mountain-Pease 60 kV line

2022 LCR need: 836 MW (includes 66 MW of QF and 1110 MW of Muni generation)

Sierra Area LCR: Aggregate

Available generation	Market (MW)	Muni (MW)	QF (MW)	Max. Qualifying Capacity (MW)
2018	890	1,110	66	2,066
2022	890	1,110	66	2,066

	2018			**2022**		
Contingency	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Need	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Need
Category B (Single)	1,215	0	1,215	389	0	389
Category C (Multiple)	1,826	306	2,132	1,905	62	1,967

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

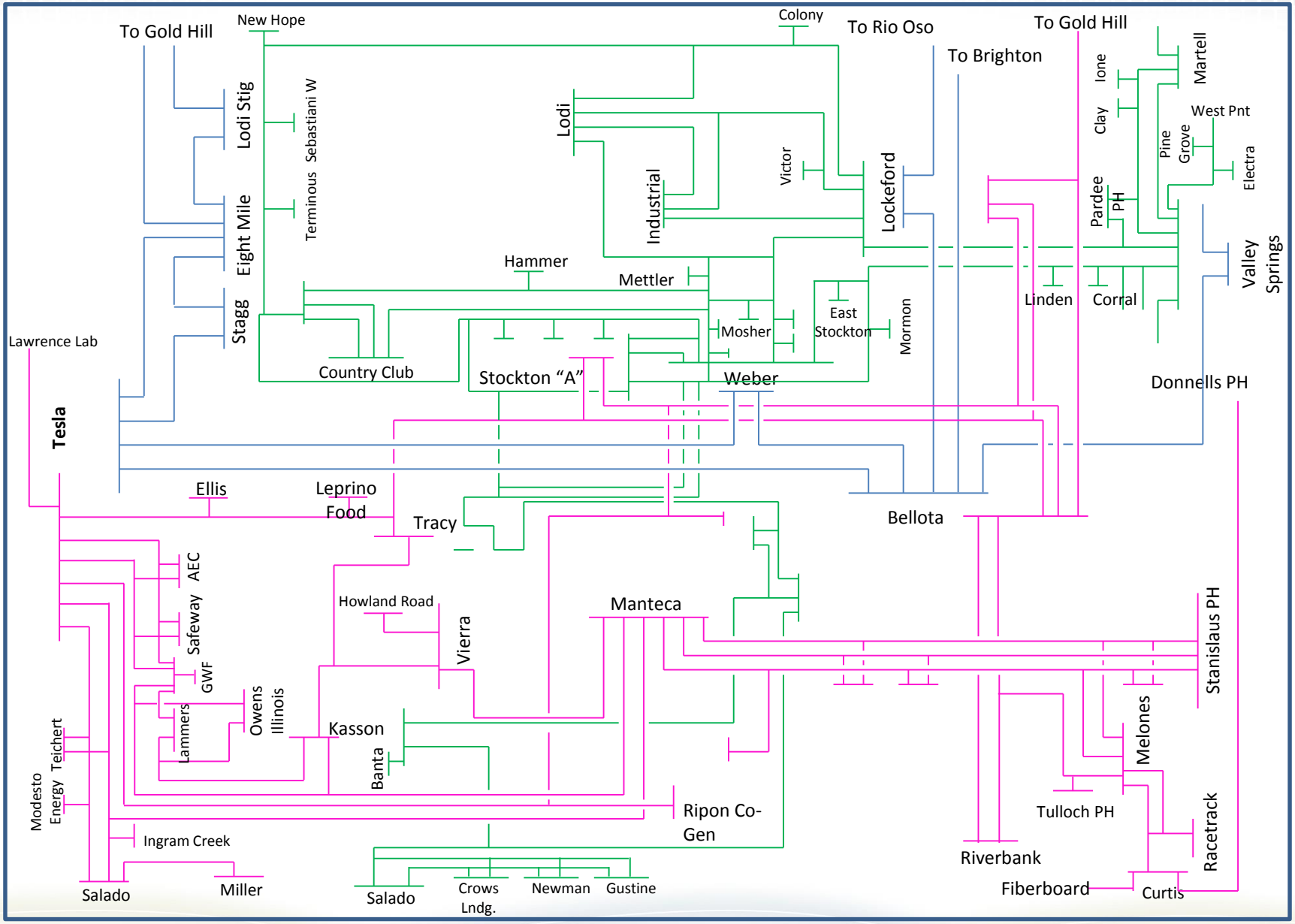
Since last year:

- 2018 load forecast went up by 61 MW vs. 2017.
- Overall LCR need has increased by 89 MW due to increase load forecast.
- 2022 load forecast went down by 8 MW vs. 2021.
- Overall LCR need has increased by 281 MW due to delay in project implementation.

Stockton Area Load and Resources (MW)

		2018	2022
Load	=	1,213	1,124
AAEE	=	-26	-56
BTM-PV	=	-38	-51
Transmission Losses	=	20	18
Total Load	=	**1,169**	**1,035**
QF Generation	=	20	20
Muni Generation	=	129	129
Market Generation	=	449	449
Total Qualifying Capacity	=	**598**	**598**

Stockton Area



New transmission projects modeled:

2018 and 2022

1. Weber-Stockton A #1 & #2 60 kV lines Reconductor
2. Ripon 115 kV Line

Summary of Results – Stockton Area

		Monitored Element	Outages	2018	2022
Lockeford	Cat B	-	-	-	0
	Cat C	Lockeford-Lodi Jct. section of the Lockeford-Lodi #3 60 kV	Lockeford-Industrial 115 kV Lockeford-Lodi #2 115 kV	68	31
Weber	Cat B	Stockton A-Weber #3	-	-	-
	Cat C		Stockton A-Weber #1 Stockton A-Weber #2	31	28
Tesla-Bellota	Cat B	Tesla Schutle #1 115 kV	Tesla Schutle #2 115 kV GWFTRACY #3 Unit	358	355
	Cat C	Tesla-Tracy 115 kV	Schutle-Lammers 115 kV Schutle-Kasson-Manteca 115 kV	606	631
Stanislaus	Cat B	Mantica-Rippon Jct. 115 kV	Bellota-Riverbank-Melones 115 kV Stanislaus Unit	158	144
	Cat C	-	-	-	

Weber Sub-Area

Weber Sub-area – Category C

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

Limiting component: Stockton A-Weber #3 60 kV

2018 LCR need: 31 MW (includes 37 MW of QF generation)

2022 LCR need: 28 MW (includes 37 MW of QF generation)

Weber Sub-area – Category B

2018 and 2022 LCR need: No requirement

Lockeford Sub-Area

Lockeford Sub-area – Category C

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

2018 LCR need: 68 MW (includes 2 MW of QF and 23 MW of Muni generation as well as 43 MW of deficiency)

2022 LCR need: 31 MW (includes 2 MW of QF and 23 MW of Muni generation as well as 6 MW of deficiency)

Lockeford Sub-area – Category B

2018 and 2022 LCR need: No category B requirement.

Stanislaus Sub-Area

Stanislaus Sub-area – Category C

2018 and 2022 LCR need: Same as Category B.

Stanislaus Sub-area – Category B

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

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

2018 LCR need: 158 MW (includes 16 MW of QF and 93 MW of Muni generation)

2022 LCR need: 144 MW (includes 16 MW of QF and 93 MW of Muni generation)

Tesla-Bellota Sub-Area

Tesla-Bellota Sub-area – Category C

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

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

2018 Need: 514 MW (16 MW QF,106 MW of Muni and 254 MW of deficiency).
2022 Need: 526 MW (16 MW QF,106 MW of Muni and 280 MW of deficiency).

Contingency 2: Tesla-Tracy 115 kV line and Tesla-Schulte #1 115 kV line.
Limiting component 2: Thermal overload on the Tesla-Schulte #2 115 kV line.
2018 Need: 352 MW (includes 16 MW of QF and 106 MW of Muni generation).
2022 Need: 351 MW (includes 16 MW of QF and 106 MW of Muni generation).

2018 LCR need: 606 MW (16 MW QF, 106 MW Muni, and 254 MW deficiency)
2022 LCR need: 631 MW (16 MW QF, 106 MW Muni, and 280 MW deficiency)

Tesla-Bellota Sub-area – Category B

Contingency: Tesla-Schulte #1 115 kV line and the loss of GWF Tracy #3.

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

2018 LCR Need: 358 MW (16 MW of QF and 106 MW of Muni generation).

2022 LCR Need: 355 MW (16 MW of QF and 106 MW of Muni generation).

Stockton Area LCR: Aggregate

Available generation	Market (MW)	Muni (MW)	QF (MW)	Max. Qualifying Capacity (MW)
2018	449	129	20	598
2022	449	129	20	598

	2018			2022		
Contingency	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Need	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Need
Category B (Single)	358	0	358	355	0	355
Category C (Multiple)	408	297	705	404	286	690

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

Since last year:

- 2018 load forecast went up by 12 MW vs. 2017.
- Overall LCR need has increased by 4 MW due to increase in load forecast.
- 2022 load forecast went down by 153 MW vs. 2021.
- Overall LCR need has increased by 256 MW due to delay in project implementation.

Your comments and questions are welcome.

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