



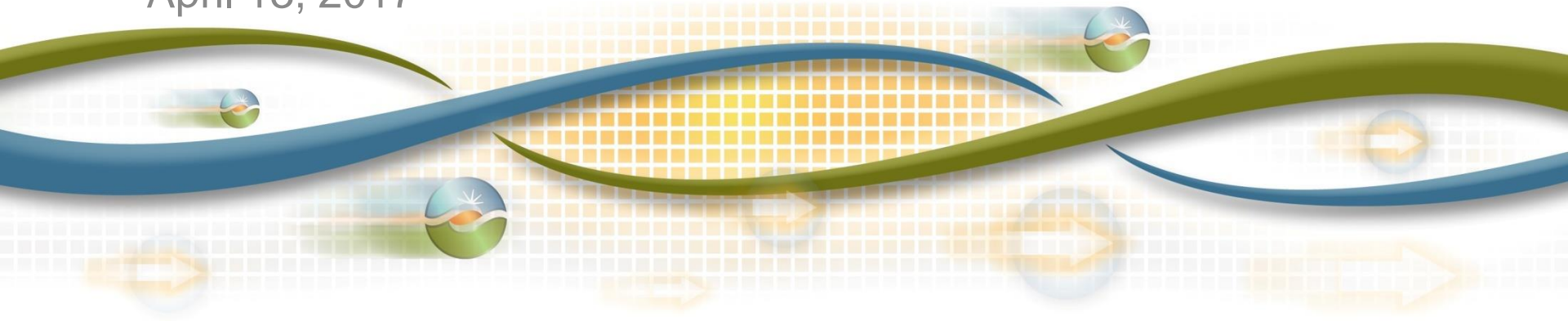
2018 & 22 Final LCR Study Results Sierra and Stockton Areas

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Stakeholder Call

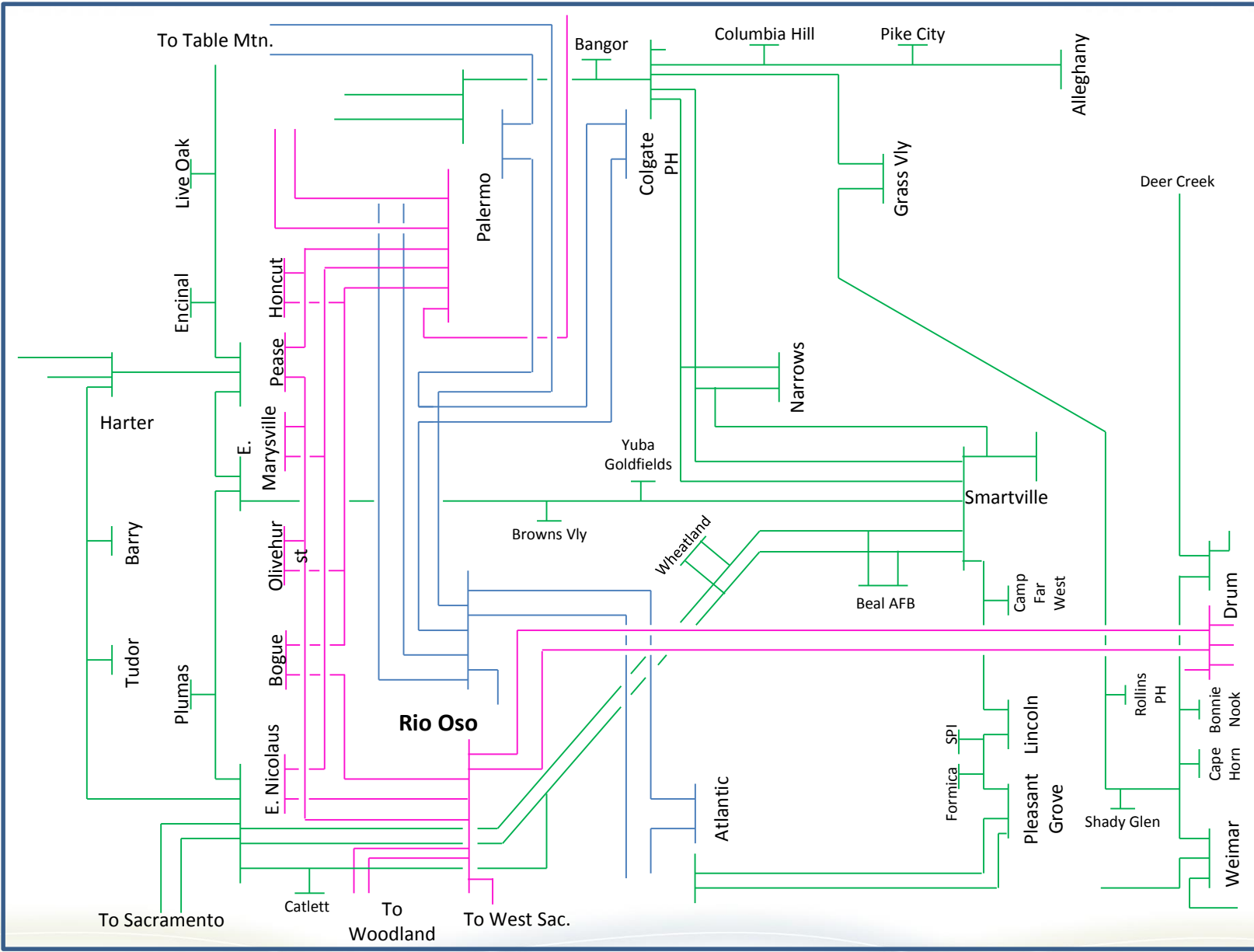
April 13, 2017



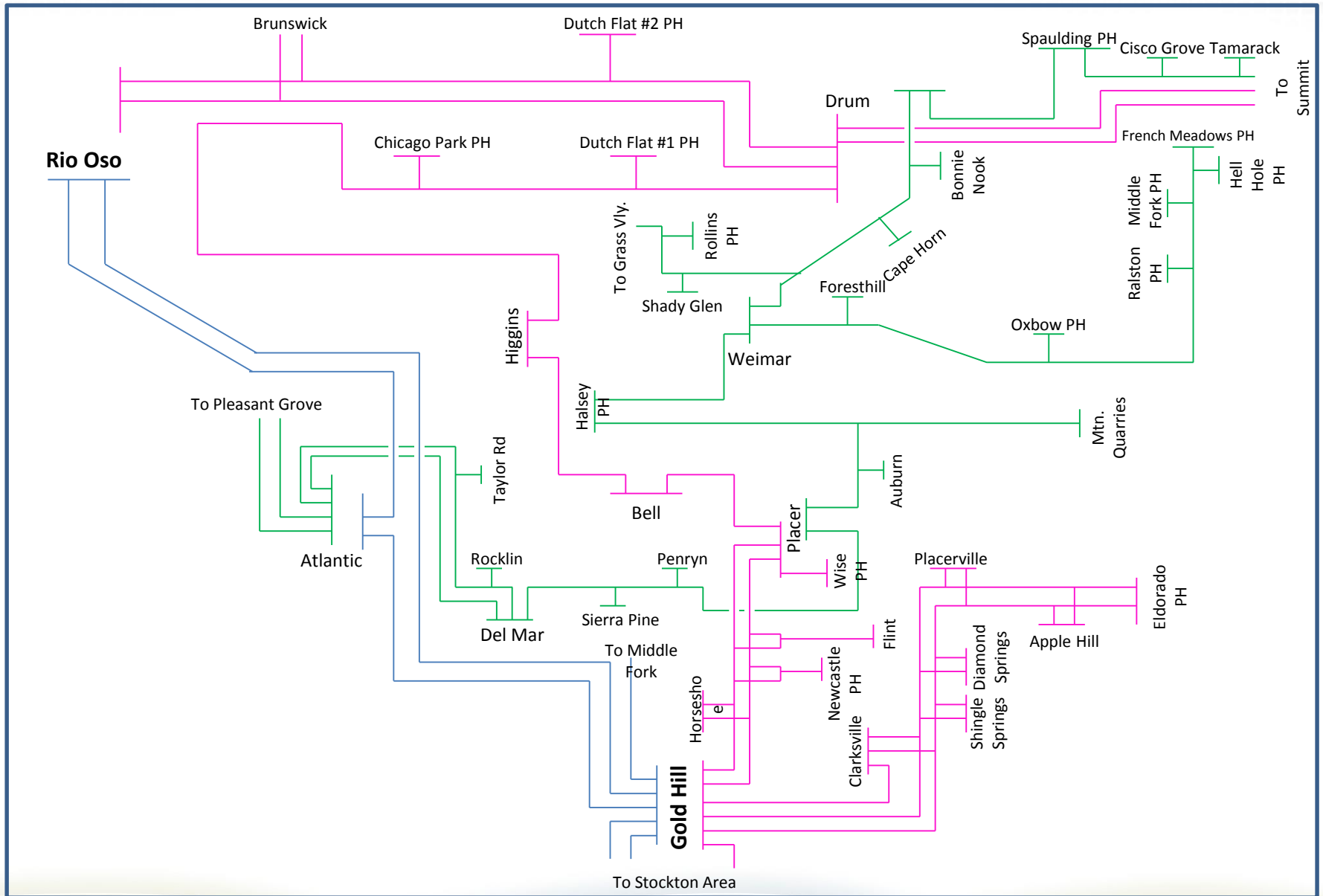
Sierra Area Load and Resources (MW)

		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	=	949	949
Muni Generation	=	1,119	1,119
QF Generation	=	57	57
Total Qualifying Capacity	=	2,125	2,125

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	77
	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 Rio Oso-Pease 115 kV line

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

2018 LCR need: Same as Cat B

2022 LCR need: 86 MW

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

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

2022 LCR need: 77 MW

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

2022 LCR need: 77 MW

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 48 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

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

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 (includes 47 MW of deficiency)

2022 LCR need: 770 MW (includes 30 MW of 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

2022 LCR need: 389 MW

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 196 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 Oso 115 kV line

2018 LCR need: 1,215 MW

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

2022 LCR need: 1,905 MW

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

Sierra Area LCR: Aggregate

Available generation	Market (MW)	Muni (MW)	QF (MW)	Max. Qualifying Capacity (MW)
2018	949	1,119	57	2,125
2022	949	1,119	57	2,125

	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	836	0	836
Category C (Multiple)	1,826	287	2,113	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 corrected LCR needs for the South of Table Mountain sub-area vs. the under-reported 2021 value.

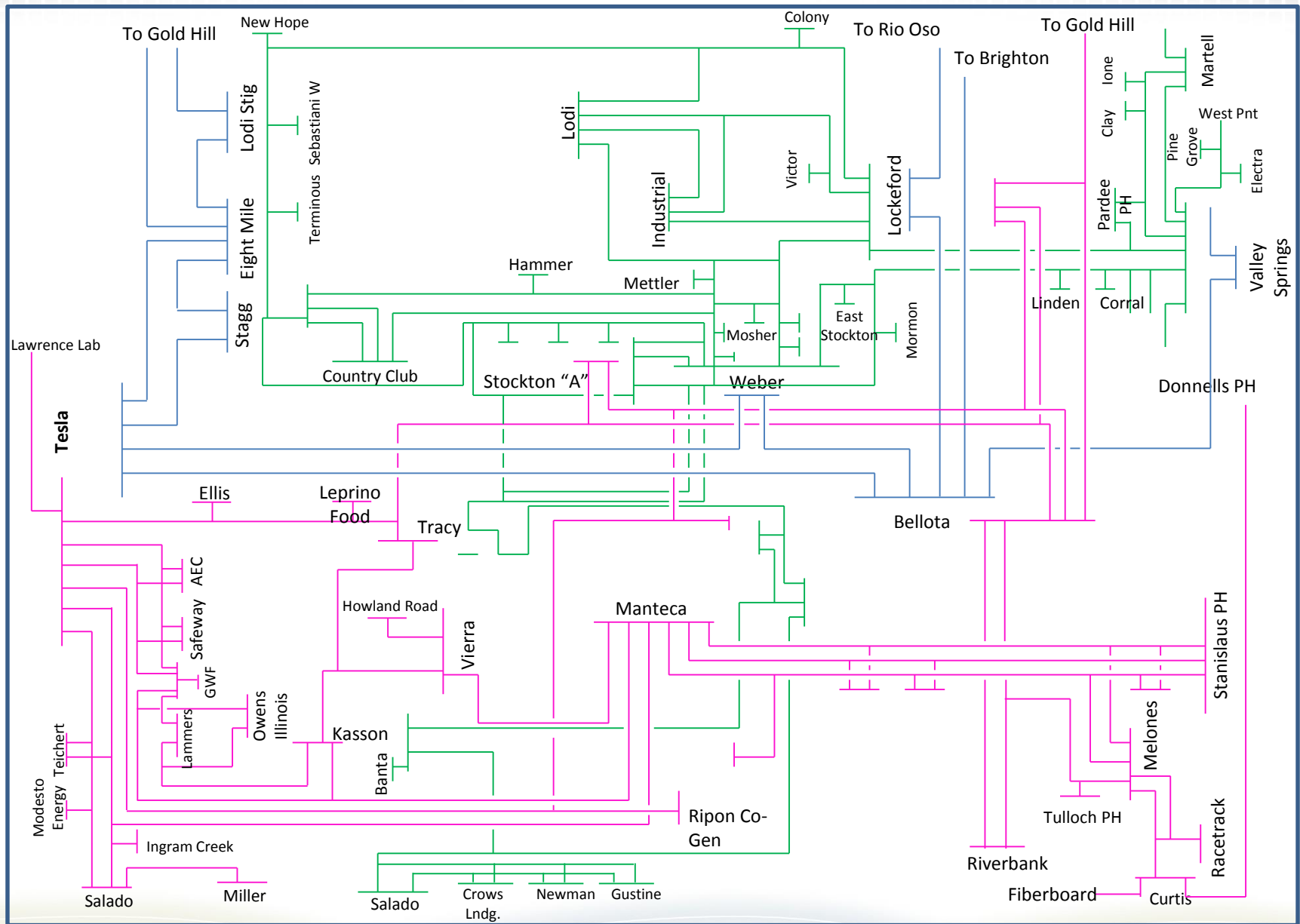
Since last stakeholder meeting:

- Updated NQC.

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	=	16	16
Muni Generation	=	123	123
Market Generation	=	466	466
Total Qualifying Capacity	=	605	605

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	-	-	-	-
	Cat C	Stockton A-Weber #3	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	620	643
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

2022 LCR need: 28 MW

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 45 MW of deficiency)

2022 LCR need: 31 MW (includes 8 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

2022 LCR need: 144 MW

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 (includes 276 MW of deficiency).

2022 Need: 526 MW (includes 288 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: 344 MW

2022 Need: 355 MW

2018 LCR need: 620 MW (includes 276 MW of deficiency)

2022 LCR need: 643 MW (includes 288 MW of 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

2022 LCR Need: 355 MW

Stockton Area LCR: Aggregate

Available generation	Market (MW)	Muni (MW)	QF (MW)	Max. Qualifying Capacity (MW)
2018	466	123	16	605
2022	466	123	16	605

Contingency	2018			2022		
	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)	398	321	719	406	296	702

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 decreased by 26 MW due to decrease in deficiency as result of new transmission project.
- 2022 load forecast went down by 151 MW vs. 2021.
- Overall LCR need has increased by 298 MW due to delay in project implementation.

Since last year stakeholder meeting:

- Updated NQC.

Your comments and questions are welcome.

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