



California ISO

2019 & 23 Draft LCR Study Results Sierra and Stockton Areas

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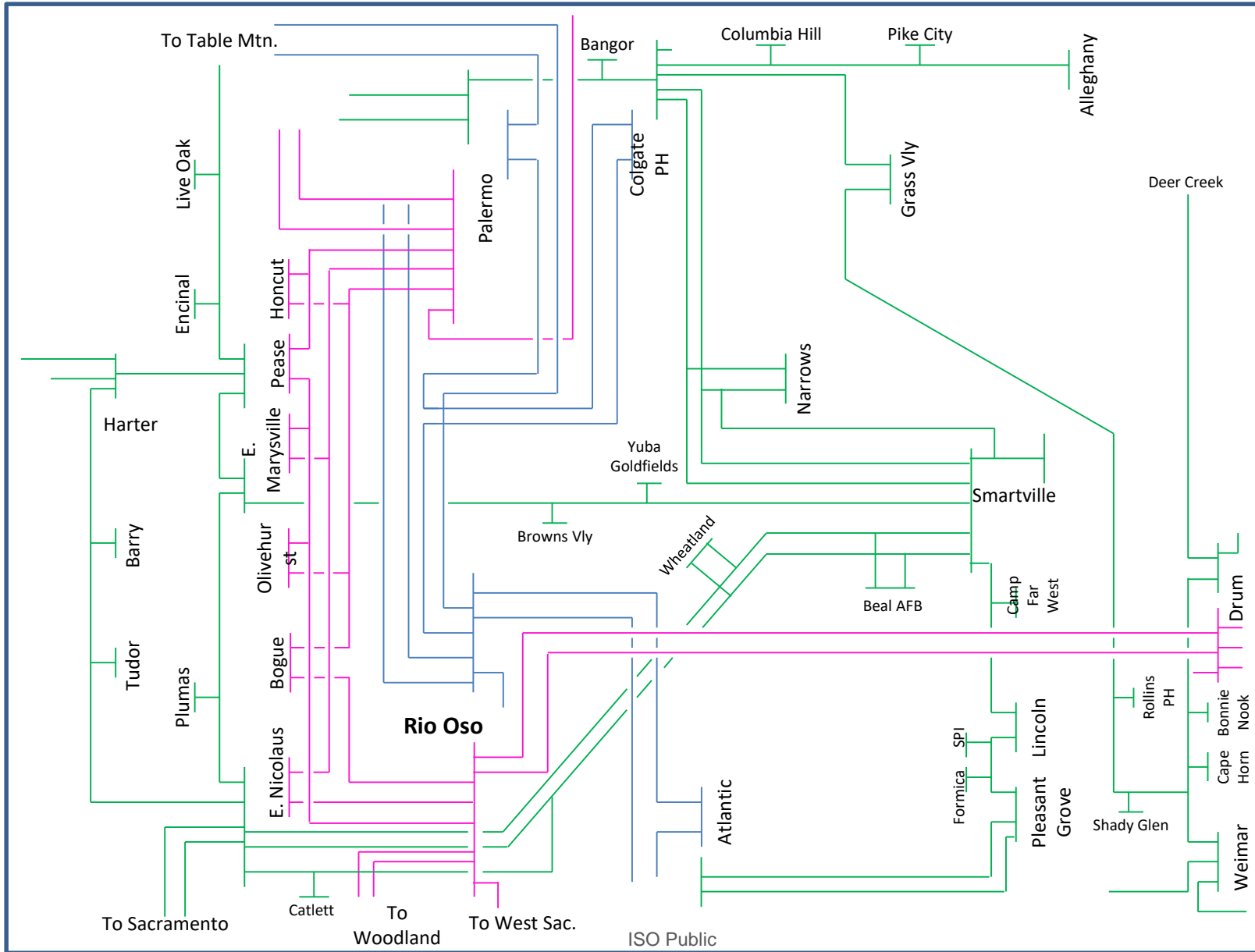
Stakeholder Meeting

April 9, 2018

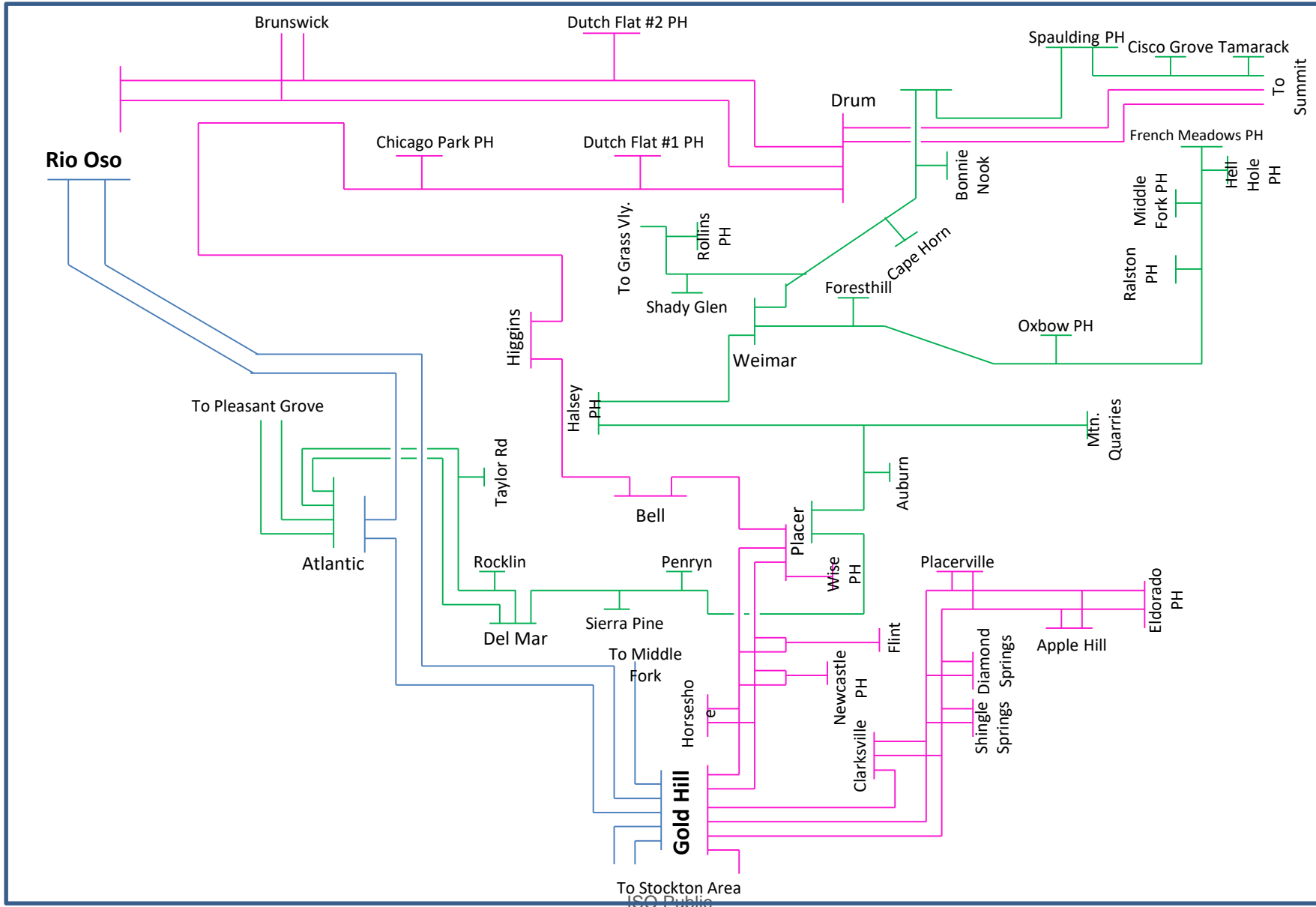
Sierra Area Load and Resources (MW)

| | | 2019 | 2023 |
|----------------------------------|---|--------------|--------------|
| Load | = | 1,768 | 1,819 |
| AAEE | = | -19 | -66 |
| BTM-PV | = | -78 | -18 |
| Transmission Losses | = | 87 | 87 |
| Total Load | = | 1,758 | 1,822 |
| Market Generation | = | 999 | 999 |
| Muni Generation | = | 1,108 | 1,108 |
| QF Generation | = | 38 | 38 |
| Total Qualifying Capacity | = | 2,145 | 2,145 |

Northern Sierra



Southern Sierra



New transmission projects modeled:

2019

1. Gold Hill-Missouri Flat #1 and #2 115 kV line reconductoring

2023

1. Rio Oso #1 and #2 230/115 kV transformer replacement
2. Pease 115/60 kV transformer addition
3. South of Palermo 115 kV Reinforcement

Pease Sub-Area

Pease Sub-area – Category C

Contingency: 2019: Pease 115/60 kV Tx and Yuba City Unit.

2023:Palermo-Pease 115 kV line and Rio Oso-Pease 115 kV line

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

2019 LCR need: 92 MW

2023 LCR need: 75 MW

Pease Sub-area – Category B

Contingency: Palermo-East Nicolaus 115 kV line and Yuba City unit

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

2019 LCR need: 79 MW

2023 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

2019 LCR need: 77 MW

2023 LCR need: 82 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

2019 LCR need: 64 MW

2023 LCR need: 89 MW

Placerville Sub-Area

Placerville Sub-area – Category C

2019 and 2023 LCR need: No requirements

Placerville Sub-area – Category B

2019 and 2023 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.

2019 LCR need: 506 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.

2019 LCR need: 378 MW

2023 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-Atlantic 230 kV lines for 2019 and Rio Oso-Gold Hill and Rio Oso-Brighton 230 kV lines for 2023

Limiting component: Thermal overload on the Rio Oso-Brighton 230 kV line for 2019 and Rio Oso-Atlantic 230 kV line for 2023

2019 LCR need: 831 MW (includes 104 MW of deficiency)

2023 LCR need: 554 MW

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

2019 LCR need: 507 MW

2023 LCR need: 416 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

2019 LCR need: 1,702 MW (includes 287 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

2019 LCR need: 1,283 MW

2023 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

2019 LCR need: 1,964 MW

2023 LCR need: 1,924 MW

South of Table Mountain Sub-area – Category B

2019 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

2023 LCR need: 1,268 MW

Sierra Area LCR: Aggregate

| Available generation | Market (MW) | Muni (MW) | QF (MW) | Max. Qualifying Capacity (MW) |
|----------------------|-------------|-----------|---------|-------------------------------|
| 2019 | 999 | 1,108 | 38 | 2,145 |
| 2023 | 999 | 1,108 | 38 | 2,145 |

| | 2019 | | | 2023 | | |
|-----------------------|--|-----------------|---------------|--|-----------------|---------------|
| Contingency | Existing Generation Capacity Needed (MW) | Deficiency (MW) | Total MW Need | Existing Generation Capacity Needed (MW) | Deficiency (MW) | Total MW Need |
| Category B (Single) | 1,362 | 0 | 1,362 | 1,268 | 0 | 1,268 |
| Category C (Multiple) | 1,964 | 287 | 2,251 | 1,924 | 0 | 1,924 |

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

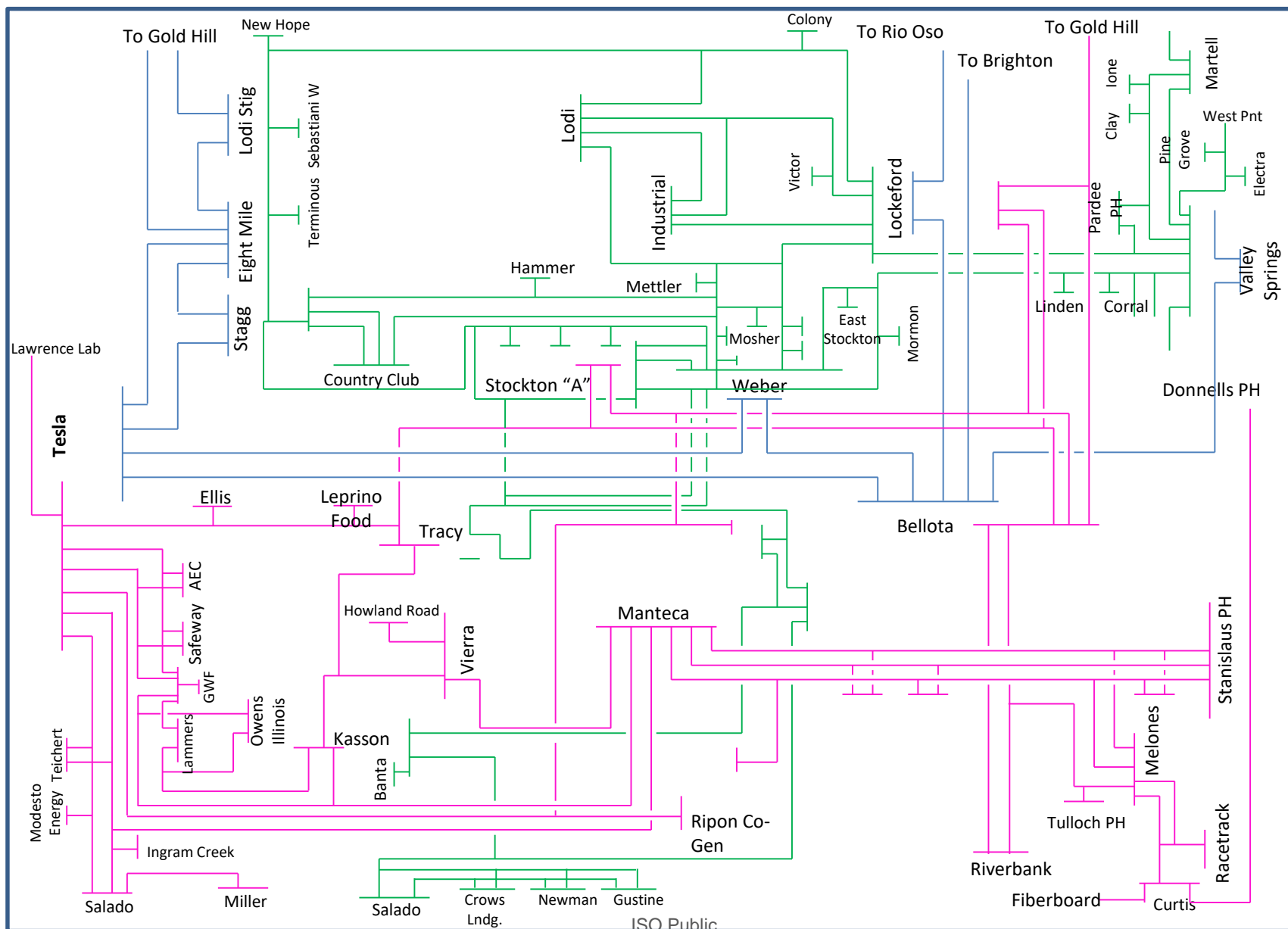
Since last year:

- Updated NQC
- 2019 load forecast went down by 60 MW vs. 2018.
- Overall LCR need has increased by 138 MW due to load and generation distribution.
- 2023 load forecast went up by 8 MW vs. 2022.
- Overall LCR need has decreased by 43 MW as transmission development addressed deficient area

Stockton Area Load and Resources (MW)

| | | 2019 | 2023 |
|----------------------------------|---|--------------|--------------|
| Load | = | 1,204 | 1,278 |
| AAEE | = | -18 | -63 |
| BTM-PV | = | -32 | -8 |
| Transmission Losses | = | 20 | 20 |
| Total Load | = | 1,174 | 1,227 |
| | | | |
| QF Generation | = | 18 | 18 |
| Muni Generation | = | 126 | 126 |
| Market Generation | = | 492 | 543 |
| Total Qualifying Capacity | = | 636 | 687 |

Stockton Area



New transmission projects modeled:

2019

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

2023

3. Vierra 115 kV Looping Project

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

2019 LCR need: 21 MW

2023 LCR need: 17 MW

Weber Sub-area – Category B

2019 and 2023 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 #3 60 kV line

2019 LCR need: 83 MW (includes 59 MW of deficiency)

2023 LCR need: 103 MW (includes 79 MW of deficiency)

Lockeford Sub-area – Category B

Contingency: Lockeford-Industrial Line and Lodi CT Unit

Limiting component: Thermal overload on the Lockeford-Lodi #2 60 kV line

2019 LCR need: 29 MW (includes 5 MW of deficiency)

2023 LCR need: 44 MW (includes 20 MW of deficiency)

Stanislaus Sub-Area

Stanislaus Sub-area – Category C

2019 and 2023 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

2019 LCR need: 152 MW

2023 LCR need: 147 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.

2019 Need: 532 MW (includes 291 MW of deficiency).

2023 Need: 319 MW (includes 78 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.

2019 Need: 382 MW

2023 Need: 201 MW

2019 LCR need: 673 MW (includes 291 MW of deficiency)

2023 LCR need: 319 MW (includes 78 MW of deficiency)

Tesla-Bellota Sub-area – Category B

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.

2019 LCR Need: 381 MW

2023 LCR Need: 201 MW

Stockton Area LCR: Aggregate

| Available generation | Market (MW) | Muni (MW) | QF (MW) | Max. Qualifying Capacity (MW) |
|----------------------|-------------|-----------|---------|-------------------------------|
| 2019 | 492 | 126 | 18 | 636 |
| 2023 | 543 | 126 | 18 | 687 |

| | 2019 | | | 2023 | | |
|-----------------------|--|-----------------|---------------|--|-----------------|---------------|
| Contingency | Existing Generation Capacity Needed (MW) | Deficiency (MW) | Total MW Need | Existing Generation Capacity Needed (MW) | Deficiency (MW) | Total MW Need |
| Category B (Single) | 405 | 5 | 410 | 225 | 20 | 245 |
| Category C (Multiple) | 427 | 350 | 777 | 282 | 157 | 439 |

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:

- Updated NQC.
- 2019 load forecast went up by 5 MW vs. 2018.
- Overall LCR need has increased by 58 MW mostly due to increase in deficiency.
- 2023 load forecast went up by 192 MW vs. 2022
- Overall LCR need has decreased by 263 MW due to new transmission projects.

THANK YOU

Your comments and questions are welcome.

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

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