



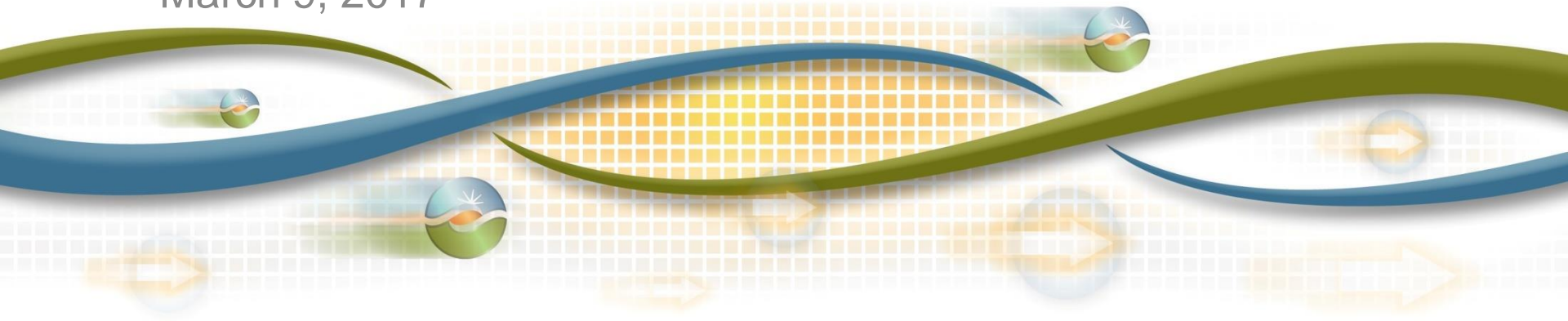
# 2018 & 22 Draft LCR Study Results Fresno Area

Vera Hart

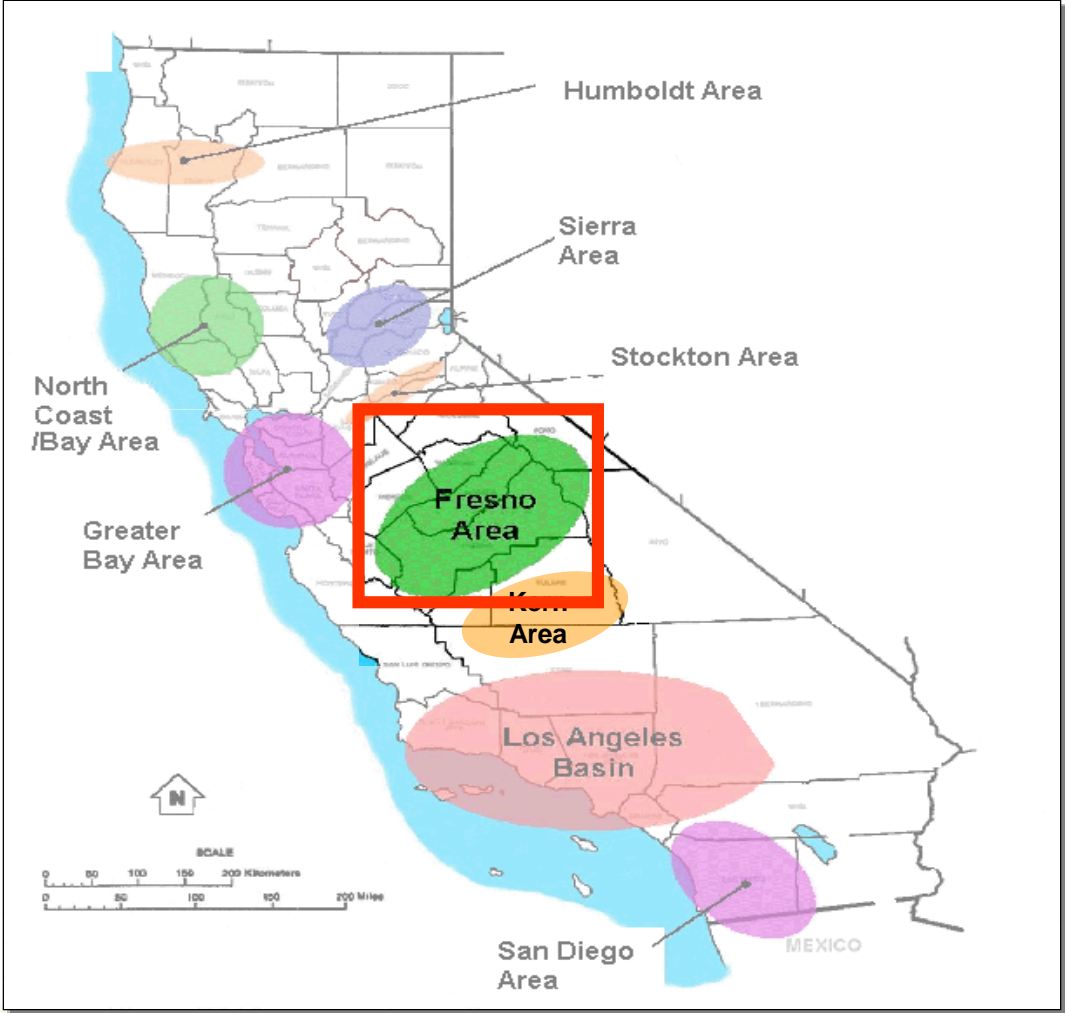
Sr. Regional Transmission Engineer

Stakeholder Meeting

March 9, 2017



# Fresno LCR Area



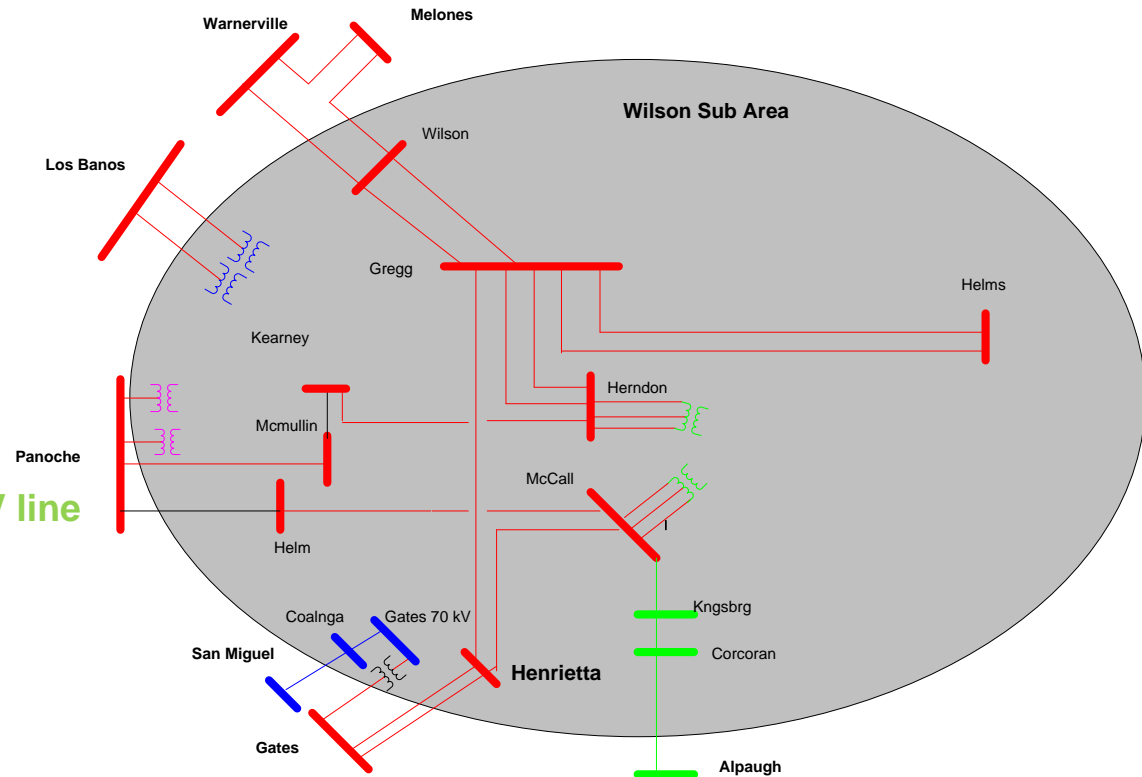
# Greater Fresno Area

## Electrical Boundaries and LCR Sub-Areas

### Electrical Boundaries:

- Gates – Mustang #1 230 kV line
- Gates – Mustang #2 230 kV line
- Panoche – Tranquility #1 230 kV line
- Panoche – Tranquility #2 230 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)

|                                  |   | <b>2018</b> | <b>2022</b> |
|----------------------------------|---|-------------|-------------|
| Gross Load                       | = | 3374        | 3544        |
| AAEE                             | = | -46         | -99         |
| DG                               | = | -139        | -198        |
| <b>Net Load</b>                  | = | <b>3189</b> | <b>3247</b> |
| Transmission Losses              | = | 101         | 105         |
| <b>Net Load + Losses</b>         | = | <b>3290</b> | <b>3352</b> |
| Market Generation                | = | 3072        | 3072        |
| Muni Generation                  | = | 167         | 167         |
| QF Generation                    | = | 64          | 64          |
| <b>Total Qualifying Capacity</b> | = | <b>4357</b> | <b>4357</b> |

## New transmission projects modeled:

1. Series Reactor on Warnerville-Wilson 230 kV Line (Dec 2017)
2. Helm - Kerman 70 kV Line Reconductor (Dec 2017)
3. Reedley-Orosi 70 kV Line Reconductor (2018)
4. Gregg - Herndon #2 230 kV Line Circuit Breaker Upgrade (2018)
5. Los Banos - Livingston Jct - Canal 70 kV Switch Replacement (2018)
6. Gregg-Herndon #2 230 kV Line Circuit Breaker (2018)
7. Oro Loma 115 kV Breaker-and-a-Half Installation (2018)
8. Ashlan-Gregg and Ashlan-Herndon 230 kV Reconductor (2018)
9. Reedley-Dinuba 70 kV Line Reconductor (2019)
10. Kearney-Herndon 230 kV Line Reconductor (2019)
11. Helm-Stroud Switching Station 70 kV Line Reconductoring Project (2019)

## New transmission projects modeled Continues

12. Kearney-Caruthers 70 kV Reconductoring (2019)
13. Kingsburg-Lemoore 70 kV Line Reconductoring (2019)
14. Caruthers - Kingsburg 70 kV Reconductoring (2019)
15. Wilson 115 kV Area Reinforcement (2019)
16. Oro Loma- Mendota 115 kV Conversion Project
17. Reedley 70 kV Reinforcement (2020)
18. Wilson-Legrand 115 kV Reconductoring (2020)
19. Panoche-Oro Loma 115 kV Reconductoring (2020)
20. Kearney-Kerman 70 kV Line Reconductor (2021)
21. McCall - Reedley 115 kV Line No. 2 Project (2022)

# Fresno Area LCR

## Hanford Sub-Area

### Limiting Contingencies:

#### Category P7:

- L-2 Gates-Mustang #1 and Gates-Mustang #2 230kV Lines
- Constraint McCall-Kingsburg #1 115kV line

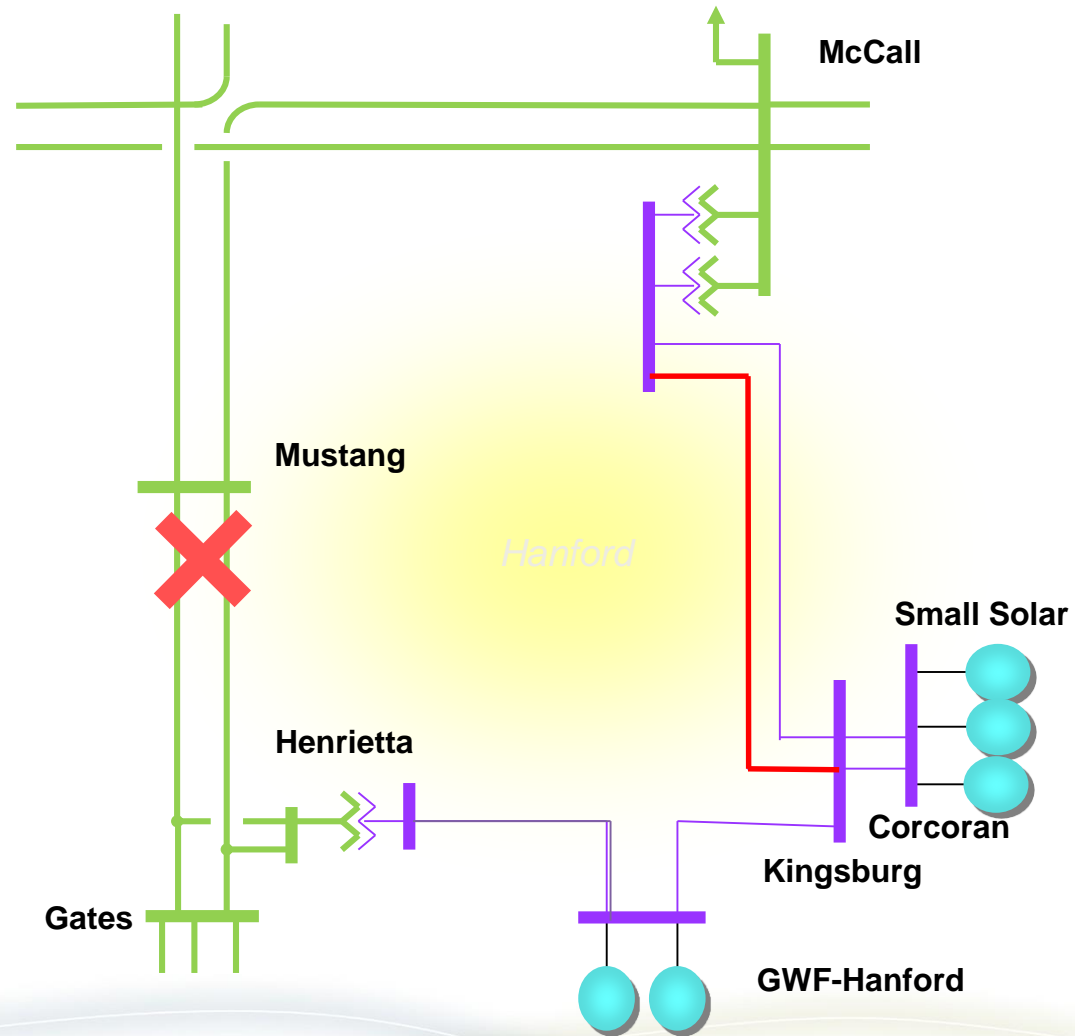
#### Category P1: No LCR need

#### LCR Results (MW):

| Contingency | Cat. P7.<br>P15 S-N |
|-------------|---------------------|
| 2018 LCR    | 150                 |
| 2022 LCR    | 148                 |

Including:

|            |   |
|------------|---|
| QF         | 0 |
| Muni       | 0 |
| Deficiency | 0 |



# Fresno Area LCR

## Coalinga Sub-Area

### Limiting Contingencies:

#### Category P1-P7:

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

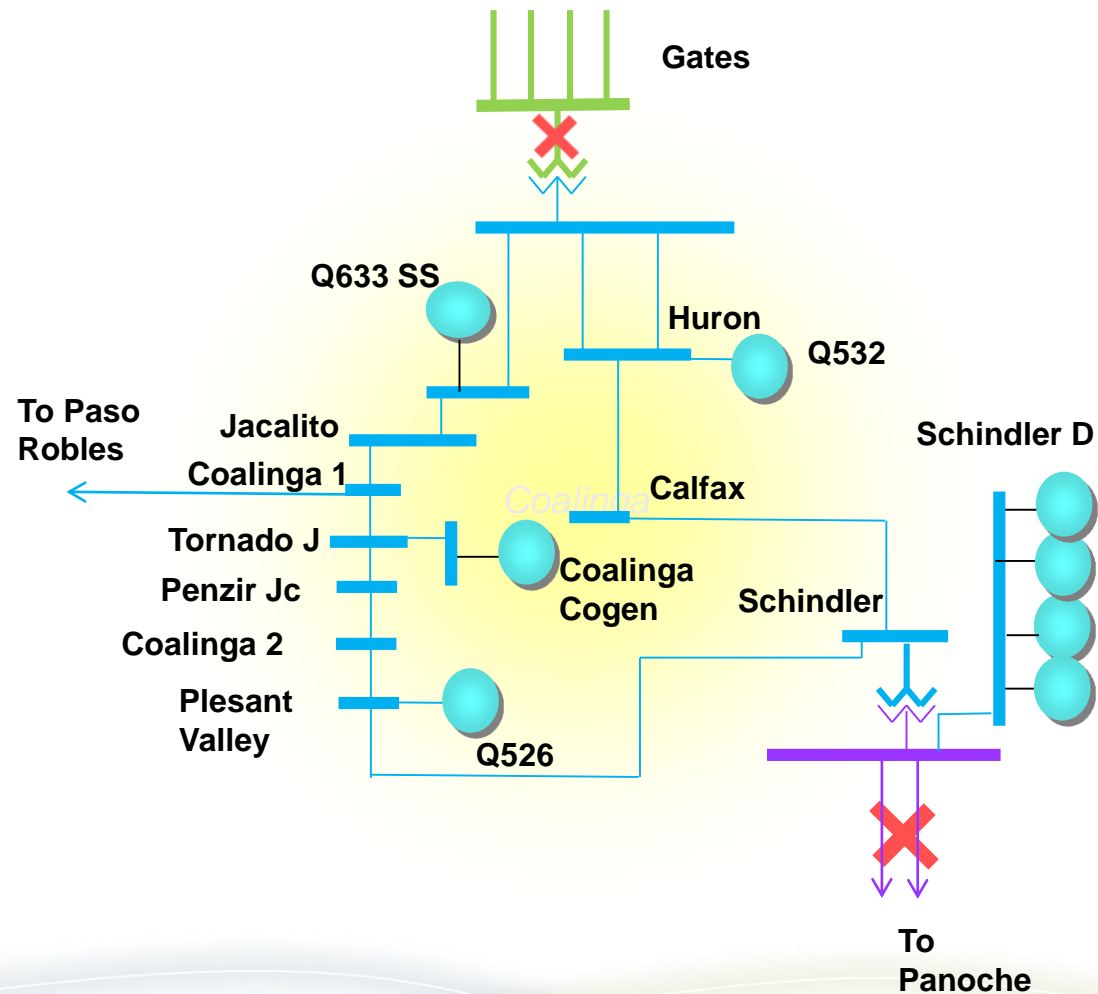
#### Category P1: No LCR need

#### LCR Results (MW):

| Contingency | Cat. P1-P7 N-S |
|-------------|----------------|
| 2018 LCR    | 28             |
| 2022 LCR    | 32             |

Including:

|            |   |
|------------|---|
| QF         | 2 |
| Muni       | 0 |
| Deficiency | 0 |





# Fresno Area LCR

## Borden Sub-Area

### Limiting Contingencies:

Category P1: No LCR need

Category P6:

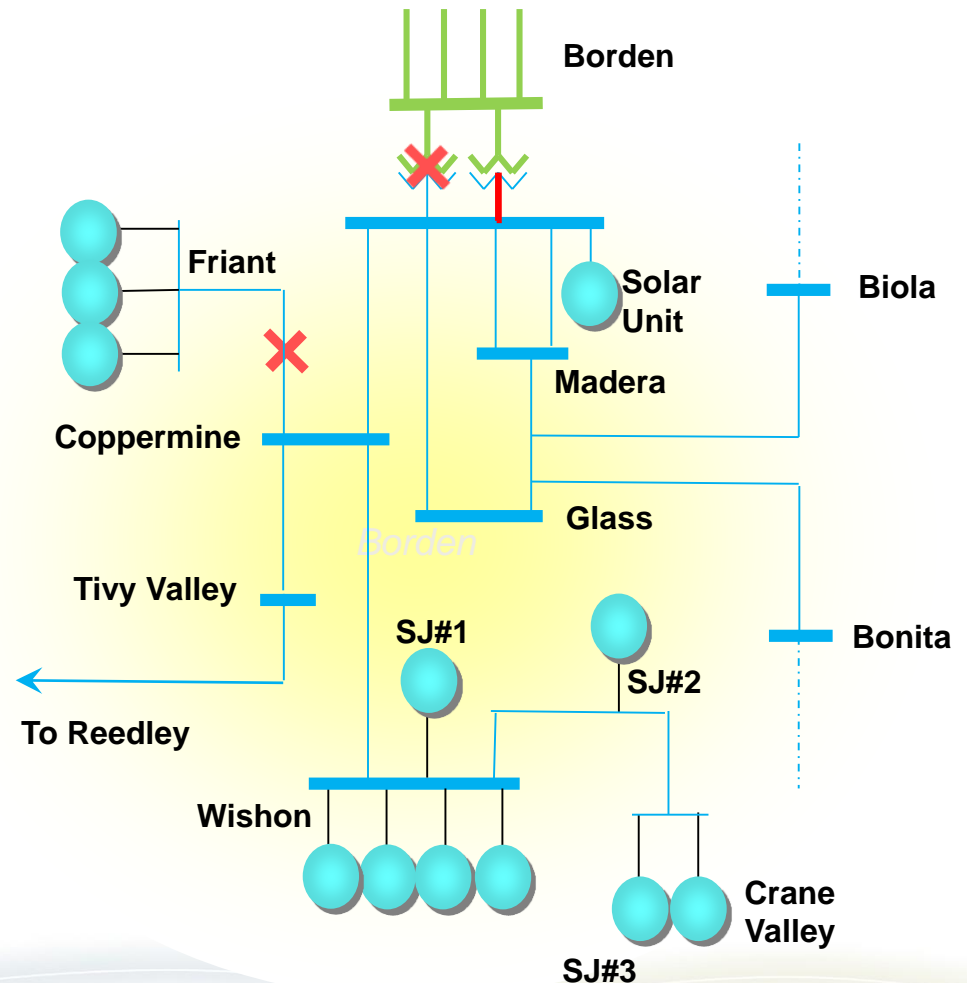
- L-1/T-1: Friant - Coppermine 70 kV and Borden 230/70 kV # 2
- Constraint: Borden 230/70 kV # 1

LCR Results (MW):

| Contingency | Cat. P6 |
|-------------|---------|
| 2018 LCR    | 18      |
| 2022 LCR    | 19      |

Including:

|            |   |
|------------|---|
| QF         | 0 |
| Muni       | 0 |
| Deficiency | 0 |



# Fresno Area LCR

## Reedley Sub-Area

### Limiting Contingencies:

#### Category P6:

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

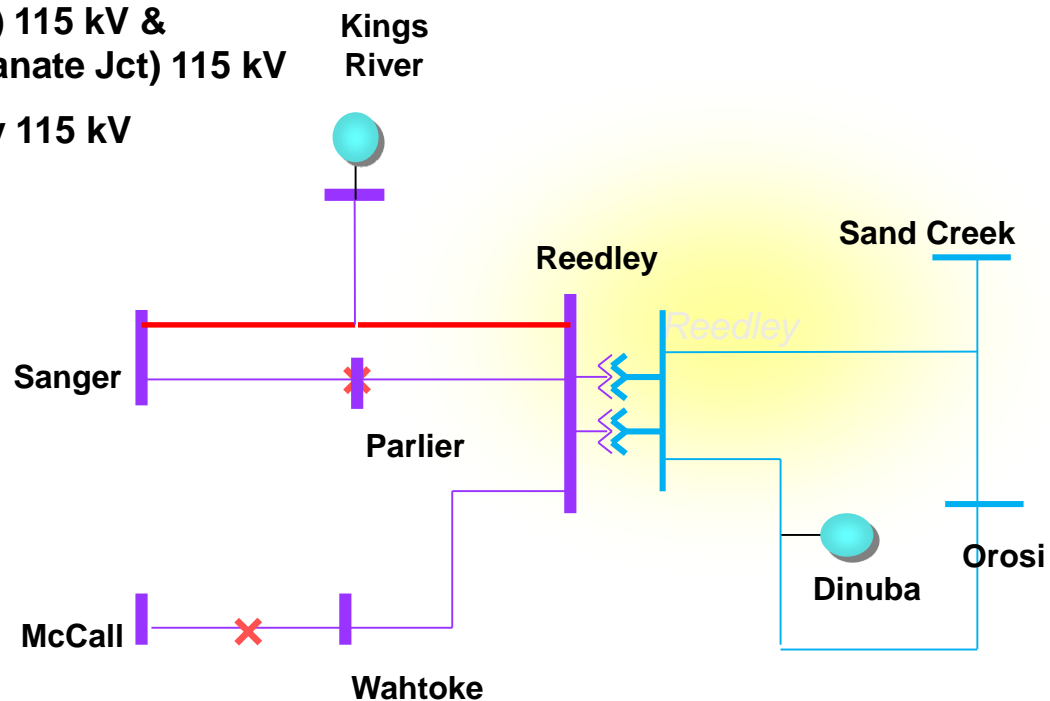
#### Category P1: No LCR need

#### LCR Results (MW):

| Contingency | Cat. P6 S-N |
|-------------|-------------|
| 2018 LCR    | 19          |
| 2022 LCR    | 0           |

Including:

|            |   |
|------------|---|
| QF         | 0 |
| Muni       | 0 |
| Deficiency | 0 |



In 2022 eliminated due to McCall-Reedley # 2 115 kV line project.

# Fresno Area LCR

## 2018 Herndon Sub-Area

### Limiting Contingency:

#### Category P3:

- G-1/L-1: Herndon-Barton 115kV & Balch 1
- Constraint: Herndon-Manchester 115 kV

#### Category P6:

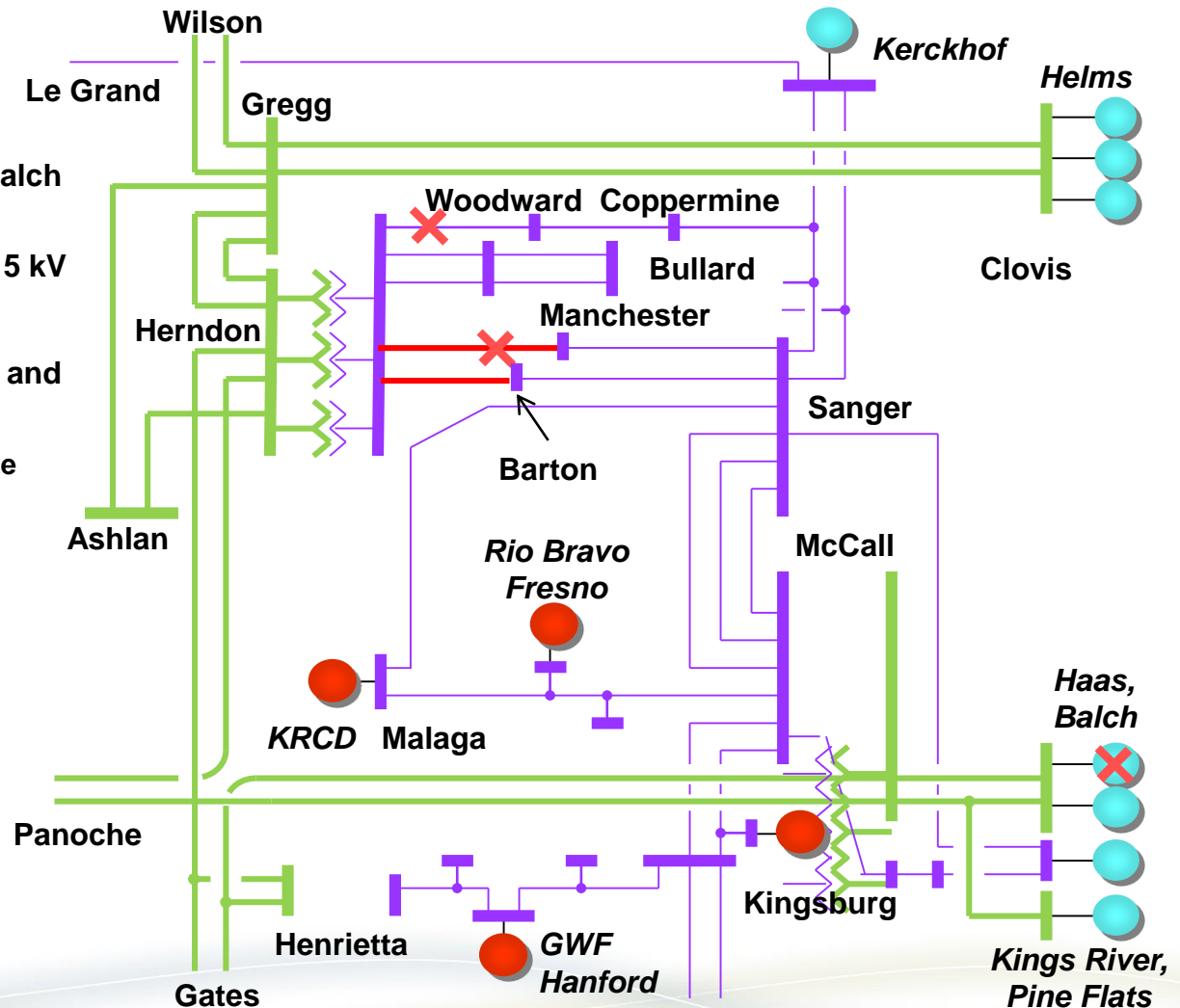
- L-2: Herndon-Woodward 115kV line and Herndon-Manchester 115kV
- Constraint: Herndon-Barton 115kV line

### LCR Results (MW):

| Contingency | Cat. P3<br>N-S | Cat. P6<br>N-S |
|-------------|----------------|----------------|
| LCR         | 425            | 880            |

Including:

|      |    |    |
|------|----|----|
| QF   | 23 | 23 |
| Muni | 66 | 66 |



# Fresno Area LCR

## 2022 Herndon Sub-Area

### Limiting Contingency:

#### Category P3:

- G-1/L-1: Herndon-Barton 115 kV line and Balch 1 unit
- Constraint: Herndon-Manchester 115 kV line

#### Category P6:

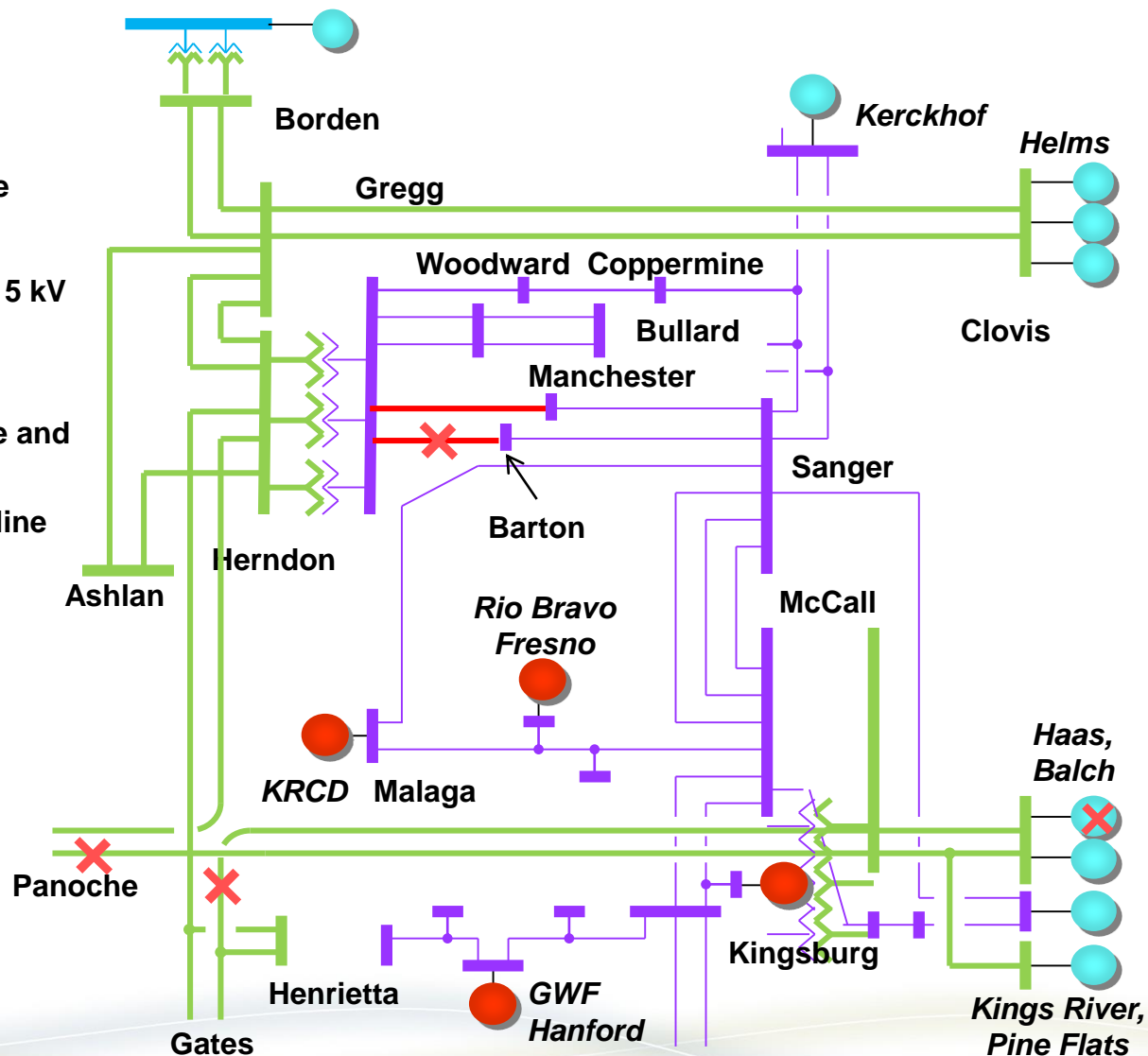
- L-2: Herndon-Woodward 115kV line and Herndon-Manchester 115kV
- Constraint: Herndon-Barton 115kV line

### LCR Results (MW):

| Contingency | Cat. P3 | Cat. P6 |
|-------------|---------|---------|
| LCR         | 327     | 852     |

Including:

|      |    |    |
|------|----|----|
| QF   | 23 | 23 |
| Muni | 66 | 66 |



# Fresno Area LCR

## 2018 Overall (Wilson Sub-Area)

### Limiting Contingencies:

#### Category P3:

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

#### Category P7:

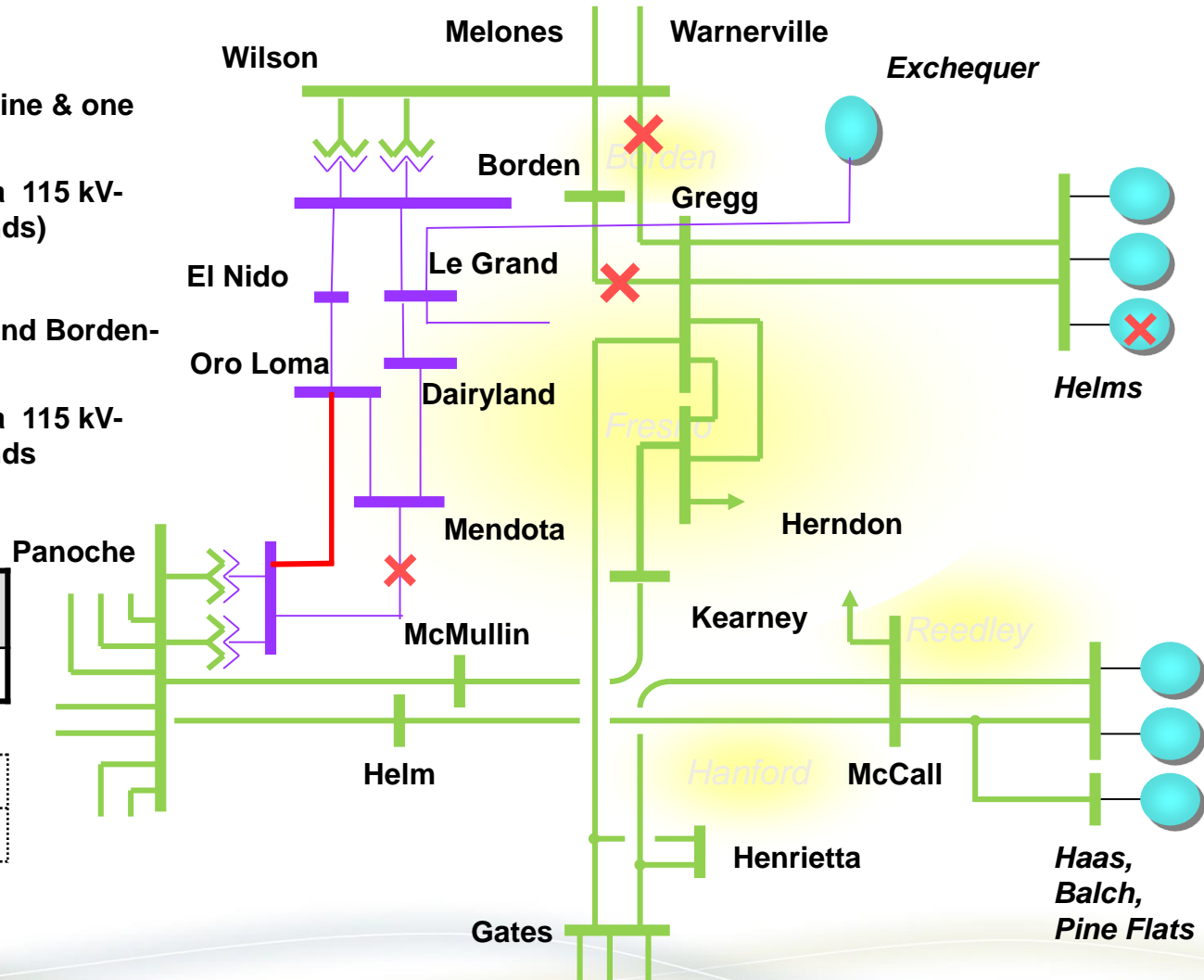
- L-2: Wilson-Gregg 230kV line and Borden-Gregg 230kV line
- Constraint: Panoche-Oro Loma 115 kV- (From Panoche Jn To Hammonds)

### LCR Results (MW):

| Contingency | Cat. P3<br>S-N | Cat. P7<br>S-N |
|-------------|----------------|----------------|
| LCR         | 1949           | 2081           |

Including:

|      |     |     |
|------|-----|-----|
| QF   | 114 | 114 |
| Muni | 168 | 168 |



# Fresno Area LCR

## 2022 Overall

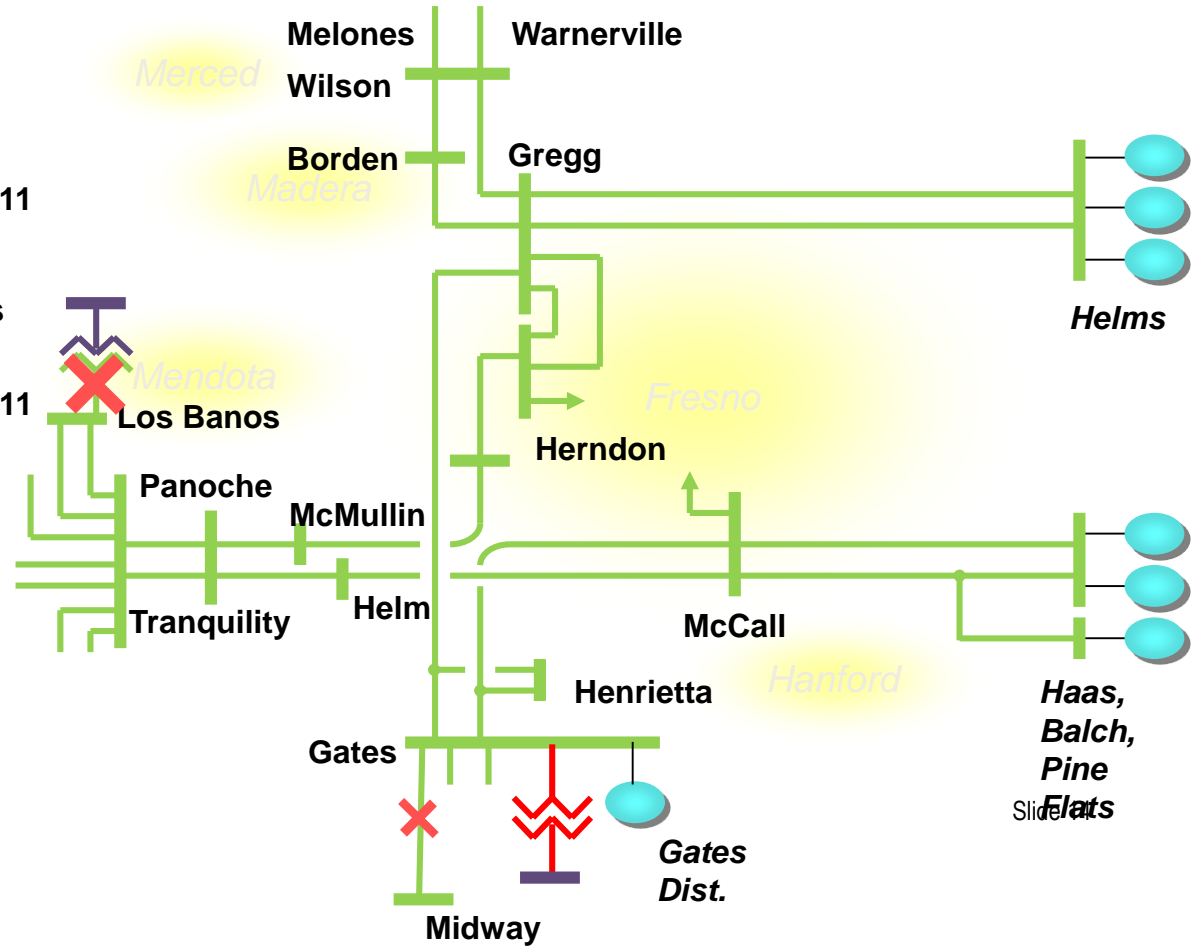
### Limiting Contingencies:

#### Category P3:

- T-1: Los Banos 500/230kV TB line
- Constraint: Gates 500/230kV TB #11

#### Category P6:

- L-2: Gates-Midway 230kV and Los Banos 500/230kV TB 1
- Constraint: Gates 500/230kV TB #11



### LCR Results (MW):

| Contingency | Cat. P3<br>S-N | Cat. P6;<br>S-N |
|-------------|----------------|-----------------|
| LCR         | 1478           | 1860            |

Including:

|      |     |     |
|------|-----|-----|
| QF   | 114 | 114 |
| Muni | 168 | 168 |

# Changes

## Since last year:

- 1) 2018 load increased by 326 MW vs. 2017
- 2) LCR has increased by 322 MW due to load increase.
- 3) 2022 Load increased by 112 MW vs 2021
- 4) LCR has increased by 700 MW (vs. the under-reported 2021 need) due to: load increase, Path 15 being studied from S-N which helped us identify new Limiting Contingency and Limiting element, as well as the delay in the Northern Fresno 115 kV Reinforcement project.

**Your comments and questions are welcome.**

**For written comments, please send to: [RegionalTransmission@caiso.com](mailto:RegionalTransmission@caiso.com)**