



2020 & 2024 Draft LCR Study Results Stockton Area

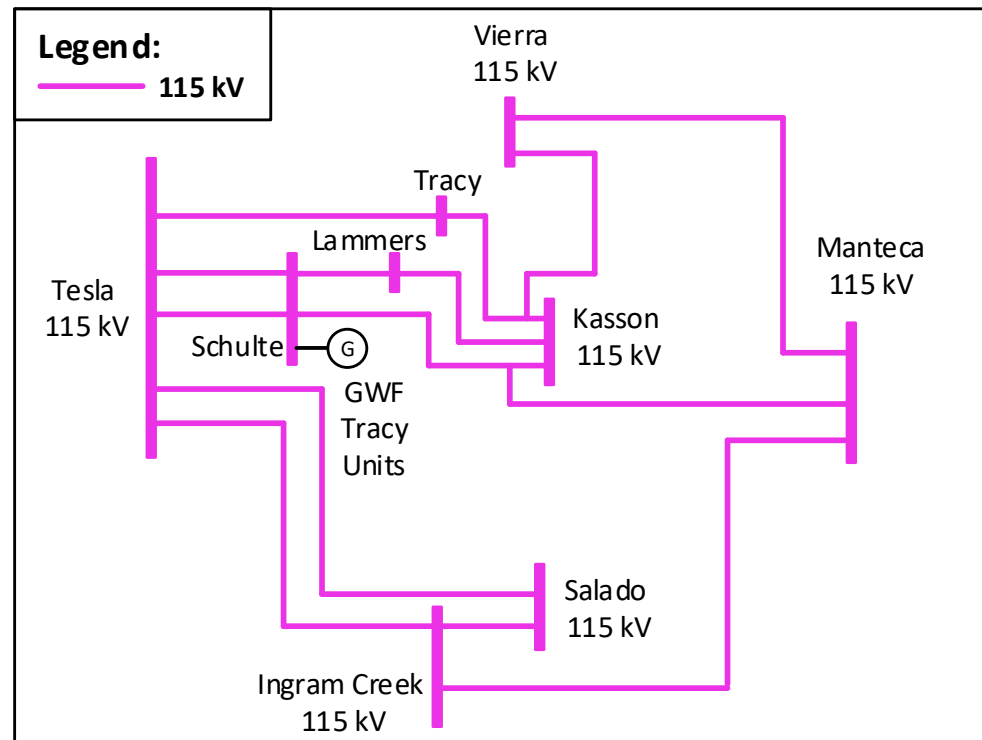
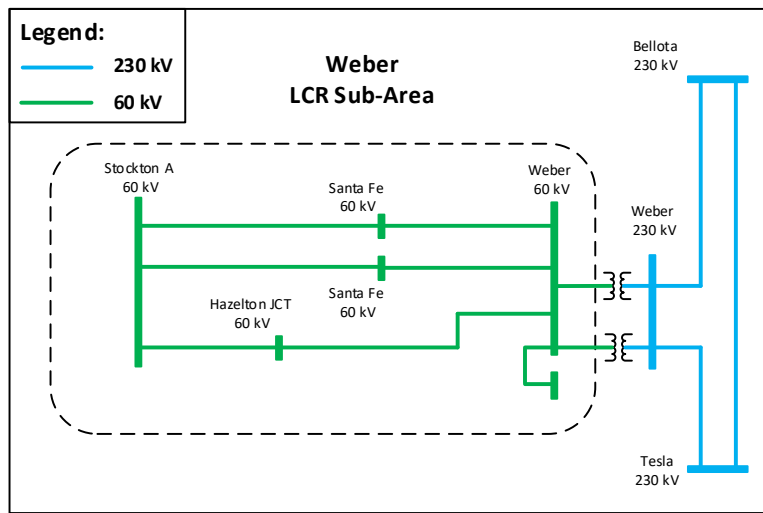
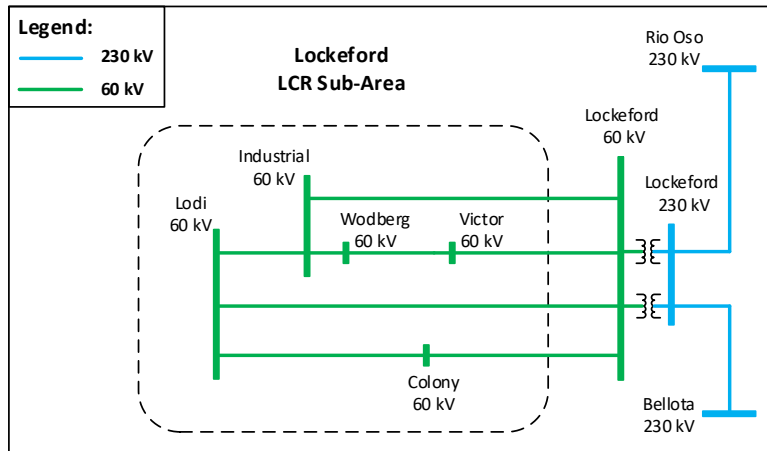
Ebrahim Rahimi

Lead Regional Transmission Engineer

Stakeholder Meeting

March 14, 2019

Stockton Area Transmission System & LCR Subareas



New major transmission projects

| Project Name | Expected ISD |
|--|--------------|
| Year 2020 | |
| Ripon 115 kV Line | Apr-19 |
| Stockton A – Weber #1 & #2 60 kV lines Reconductor | May-19 |
| Year 2024 | |
| Vierra 115 kV Looping Project | Feb-23 |

Power plant changes

Additions:

- No new resource addition

Retirements:

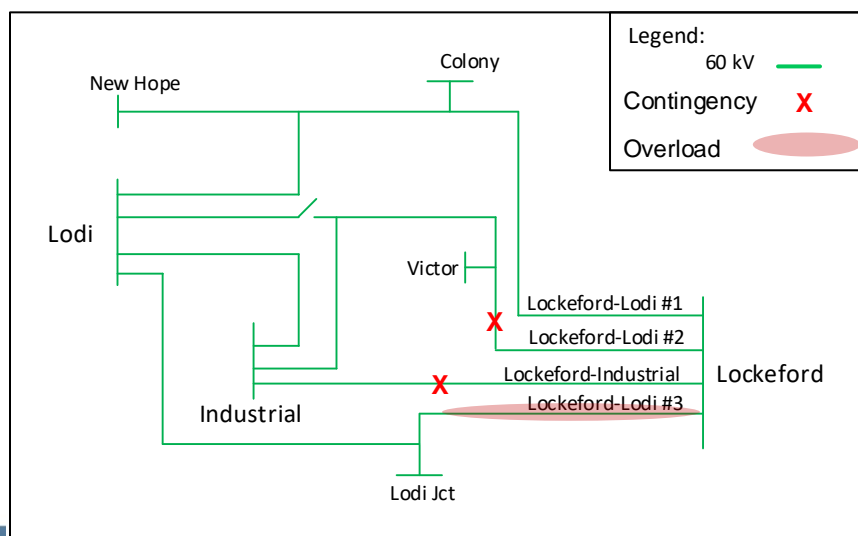
- No new retirements

Stockton Area Overall: Load and Resources

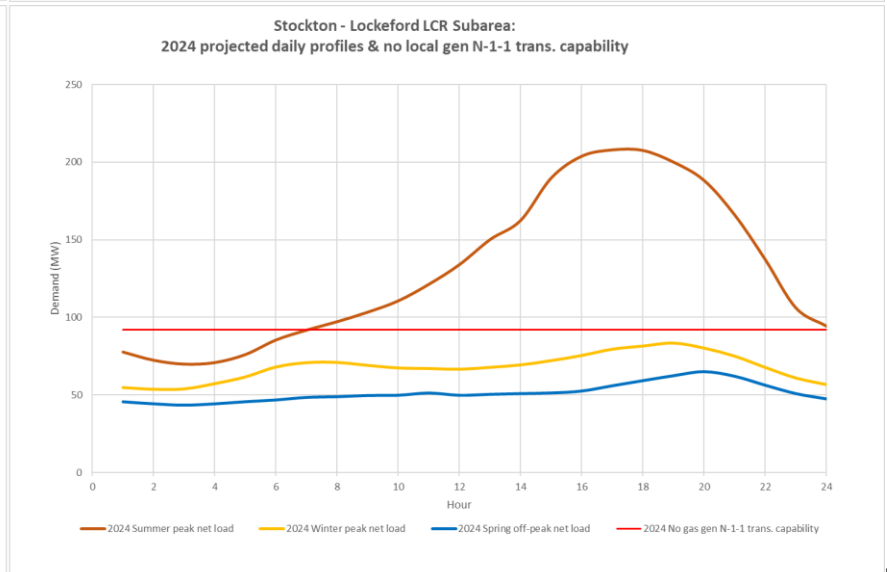
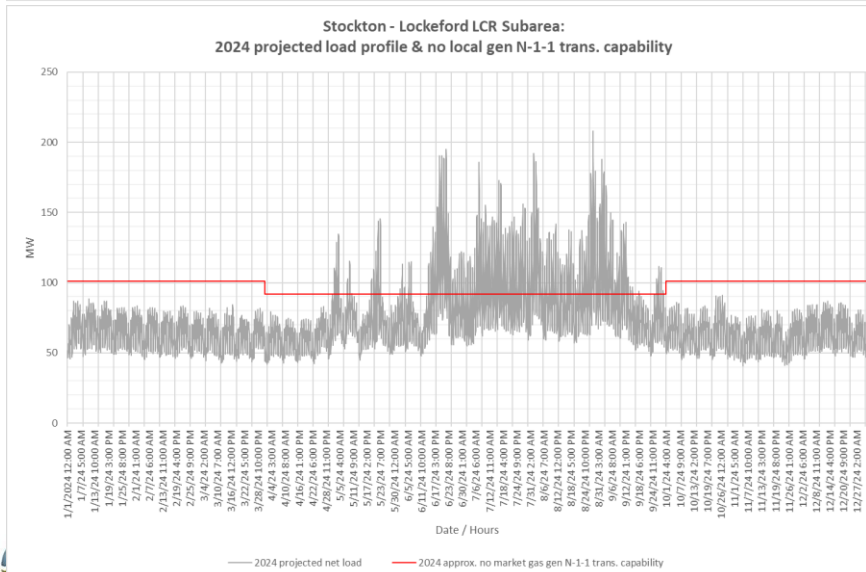
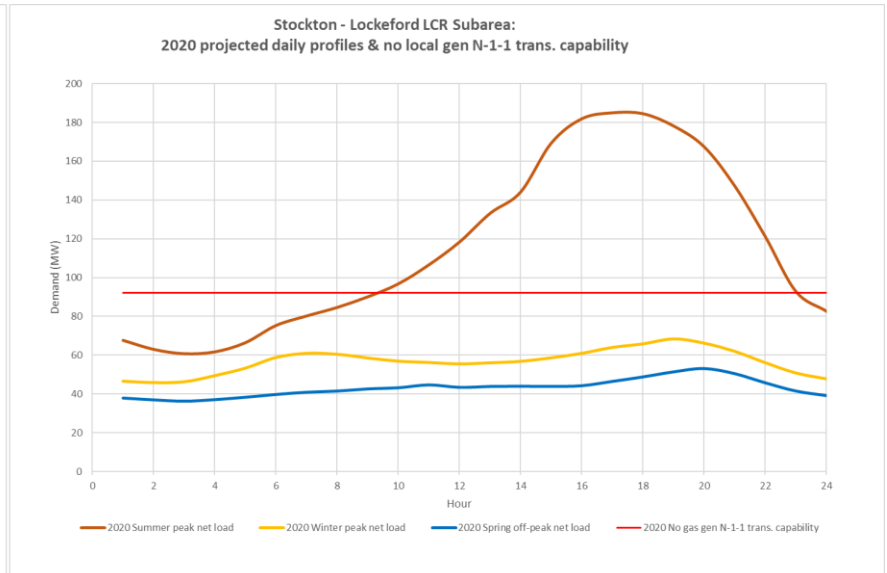
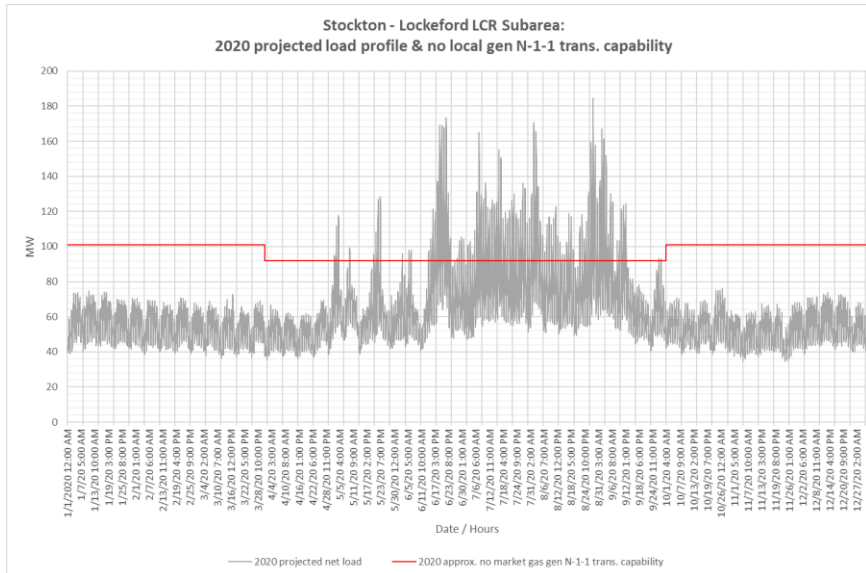
| Load (MW) | 2020 | 2024 | Generation (MW) | 2020 | 2024 |
|----------------------------------|--------------|--------------|---|------------|------------|
| Gross Load | 1,270 | 1,360 | Market/ Net Seller/ Battery | 497 | 543 |
| AAEE | -16 | -52 | Solar | 1 | 1 |
| Behind the meter DG | 0 | 0 | Wind | 0 | 0 |
| Net Load | 1,254 | 1,308 | Muni | 137 | 137 |
| Transmission Losses | 22 | 21 | QF | 18 | 18 |
| Pumps | 0 | 0 | Future preferred resource and energy storage | 0 | 0 |
| Load + Losses + Pumps | 1,275 | 1,329 | Total Qualifying Capacity | 653 | 699 |

Lockeford Sub Area : Requirements

| Year | Category | Limiting Facility | Contingency | LCR (MW) (Deficiency) |
|------|----------|---------------------------|--|--------------------------|
| 2020 | B | Lockeford – Lodi #2 60 kV | Lockeford-Industrial 60 kV line and Lodi CT | 48 (24) |
| 2020 | C | Lockeford – Lodi #3 60 kV | Lockeford-Industrial and Lockeford – Lodi #2 60 kV lines | 97 (73) |
| 2024 | B | Lockeford – Lodi #2 60 kV | Lockeford-Industrial 60 kV line and Lodi CT | 53 (29) |
| 2024 | C | Lockeford – Lodi #3 60 kV | Lockeford-Industrial and Lockeford – Lodi #2 60 kV lines | 102 (78) |

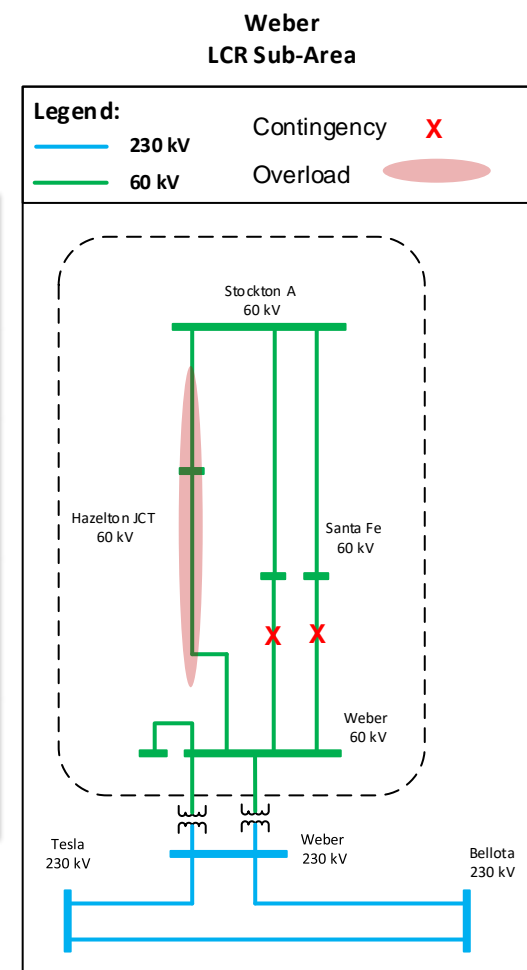


Lockeford Subarea: Load Profiles

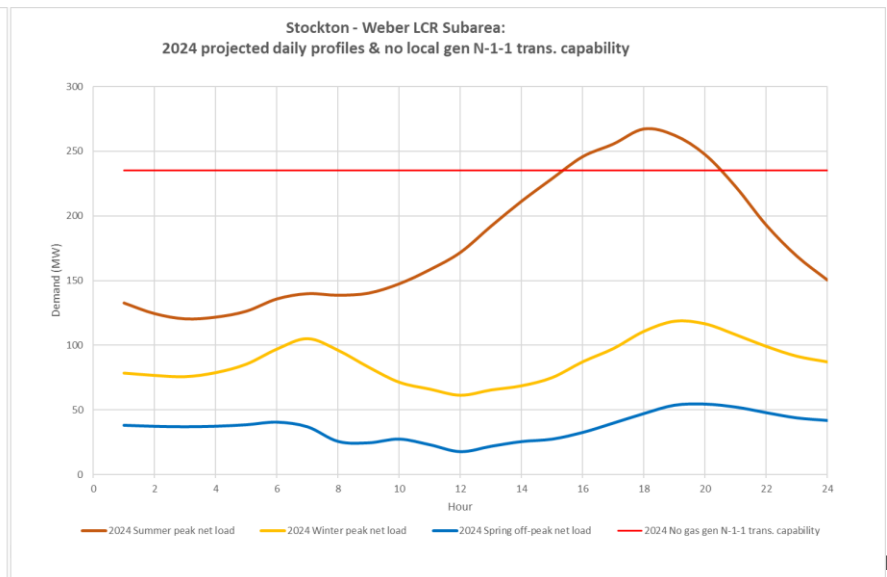
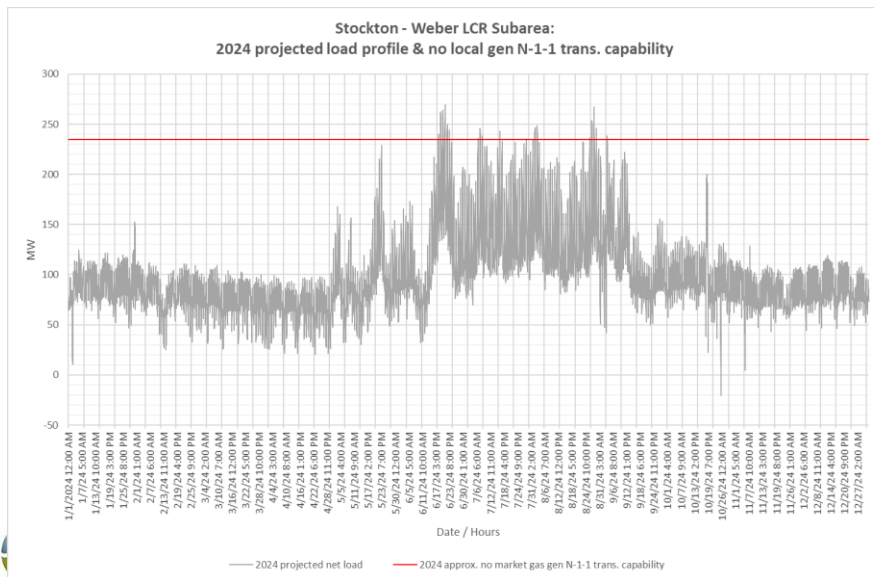
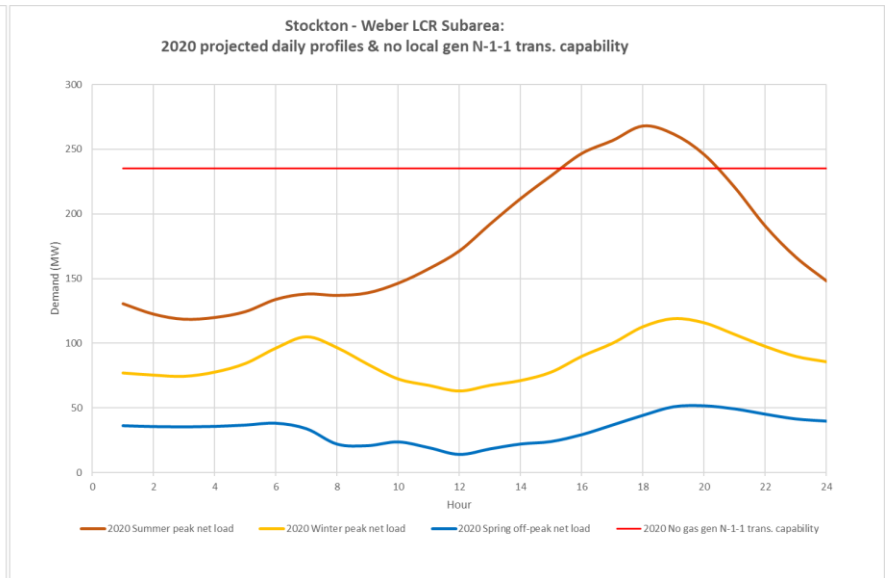
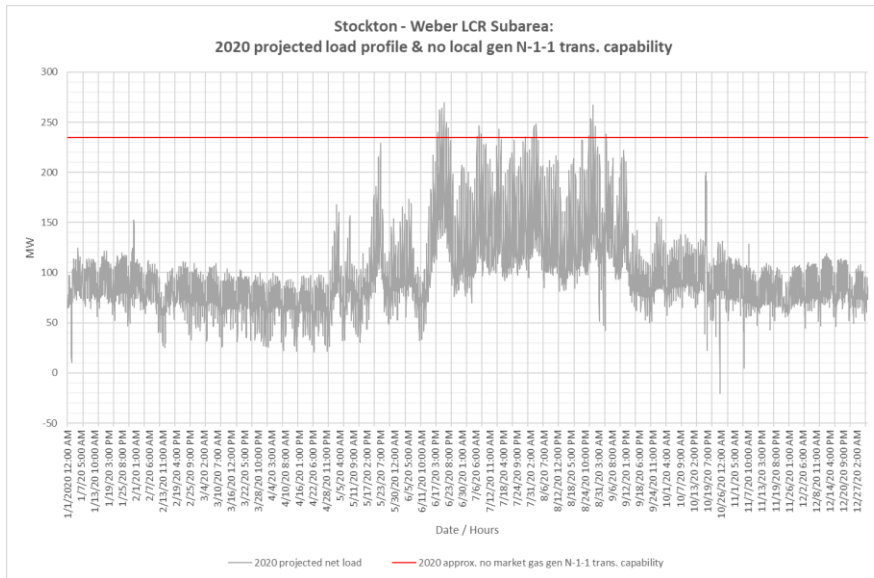


Weber Sub Area : Requirements

| Year | Category | Limiting Facility | Contingency | LCR (MW) (Deficiency) |
|------|----------|---------------------|---|--------------------------|
| 2020 | B | None | None | No requirement |
| 2020 | C | Stockton A-Weber #3 | Stockton A-Weber #1 and #2 60 kV lines | 26 |
| 2024 | B | None | None | No requirement |
| 2024 | C | Stockton A-Weber #3 | Stockton A-Weber #1 and #2 60 kV lines | 26 |

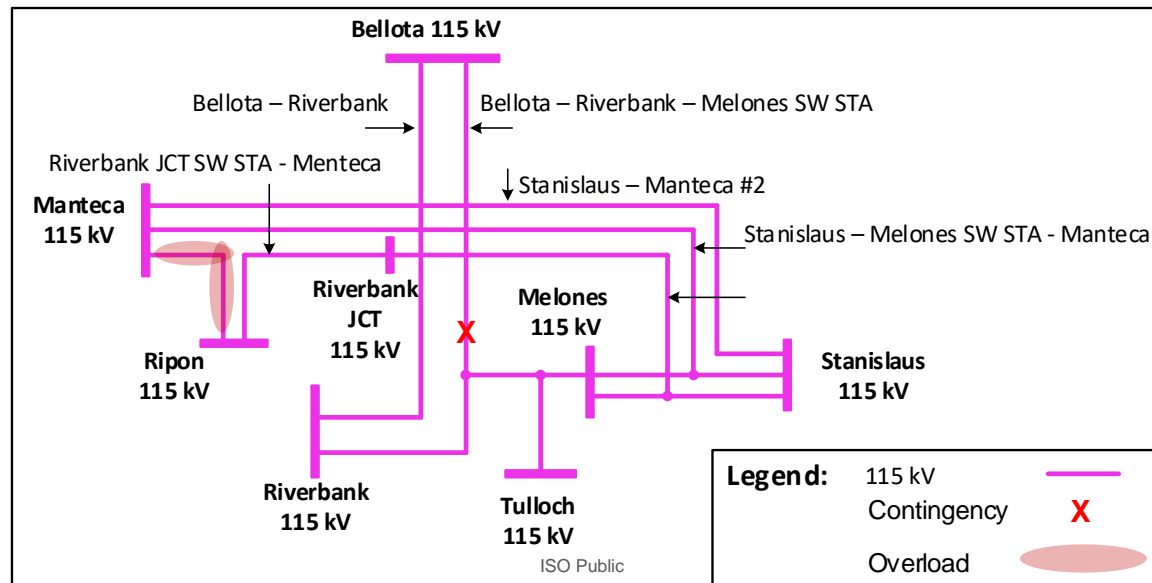


Weber Subarea: Load Profiles



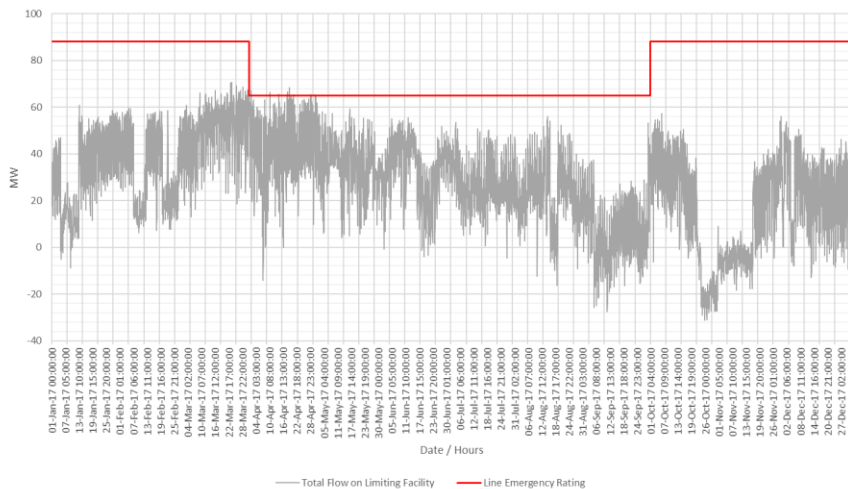
Stanislaus Sub Area : Requirements

| Year | Category | Limiting Facility | Contingency | LCR (MW) (Deficiency) |
|------|----------|-----------------------------|--|--------------------------|
| 2020 | B | Manteca - Ripon 115 kV Line | Bellota-Riverbank-Melones 115 kV line and Stanislaus PH unit | 179 |
| 2020 | C | Same as Category B | | |
| 2024 | B | Manteca - Ripon 115 kV Line | Bellota-Riverbank-Melones 115 kV line and Stanislaus PH unit | 185 |
| 2024 | C | Same as Category B | | |

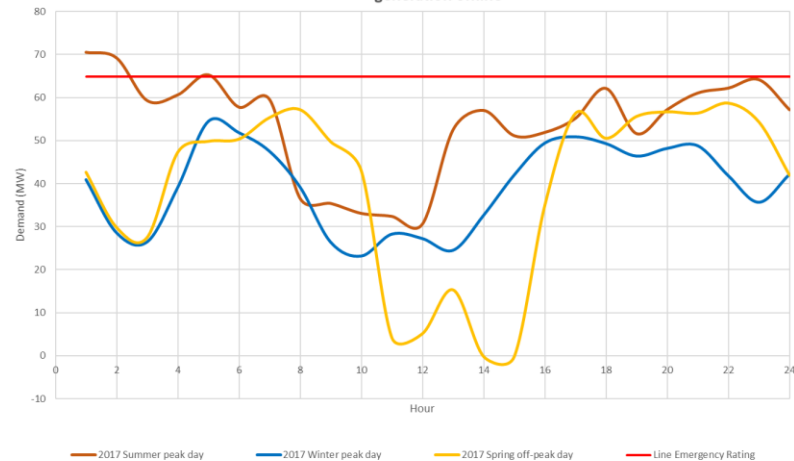


Stanislaus Subarea: Flow Profiles

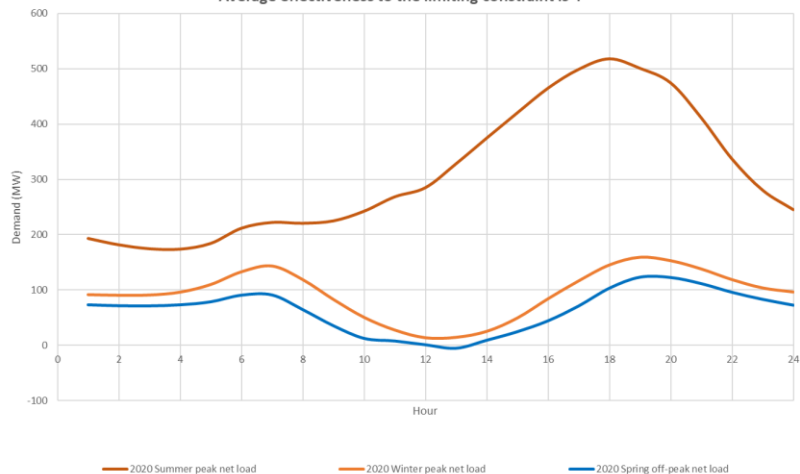
Stockton - Stanislaus LCR Subarea:
2017 post cat. C contingency flow on Riverbank Jct. - Manteca 115 kV line assuming local
generation offline



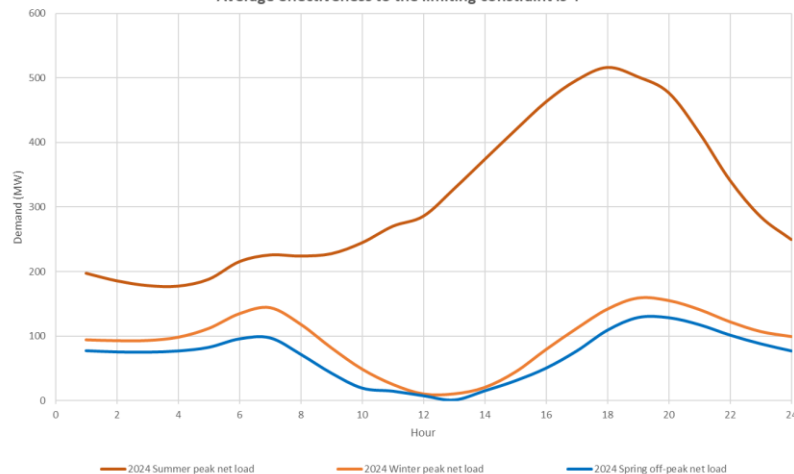
Stockton - Stanislaus LCR Subarea:
2017 post cat. C contingency flow on Riverbank Jct. - Manteca 115 kV line assuming local
generation offline



Stockton - Stanislaus LCR Subarea:
2020 projected daily load profiles for most effective pocket
Average effectiveness to the limiting constraint is 4



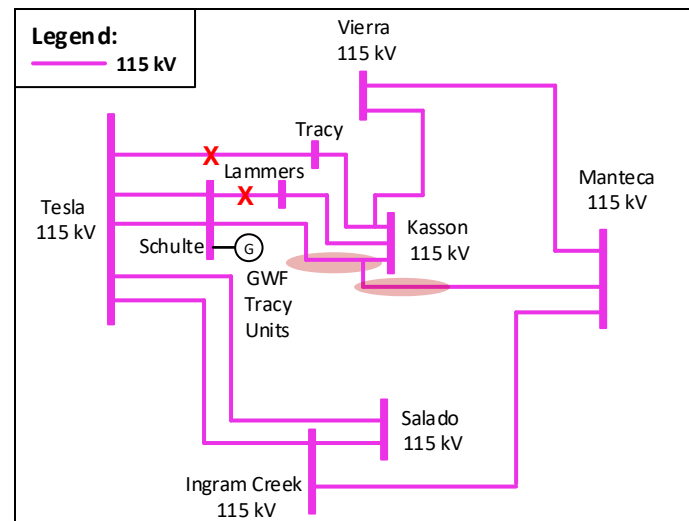
Stockton - Stanislaus LCR Subarea:
2024 projected daily load profiles for most effective pocket
Average effectiveness to the limiting constraint is 4



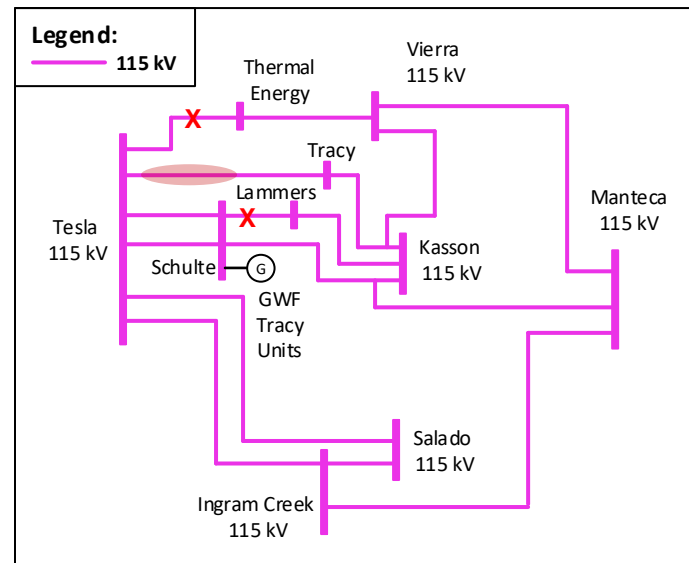
Tesla - Bellota Sub Area : Requirements

| Year | Category | Limiting Facility | Contingency | LCR (MW) (Deficiency) |
|------|-----------|--|---|--------------------------|
| 2020 | B | Tesla – Tracy 115 kV line | Schulte – Lammers 115 kV and GWF Tracy #3 unit | 639 (65) |
| 2020 | C | Schulte- Kasson- Manteca 115 kV lines | Schulte – Lammers and Tesla – Tracy 115 kV lines | 1,117 (543) |
| 2024 | B | Tesla – Vierra 115 kV line | Tesla – Tracy 115 kV and GWF Tracy #3 unit | 364 |
| 2024 | C (1) | Tesla – Tracy 115 kV line | Schulte – Lammers and Tesla – Vierra 115 kV lines | 756 (135) |
| 2024 | C (2) | Tesla – Vierra 115 kV line | Schulte – Lammers and Schulte-Kasson- Manteca 115 kV lines | 552 (260) |
| 2024 | C (total) | | | 881 (260) |

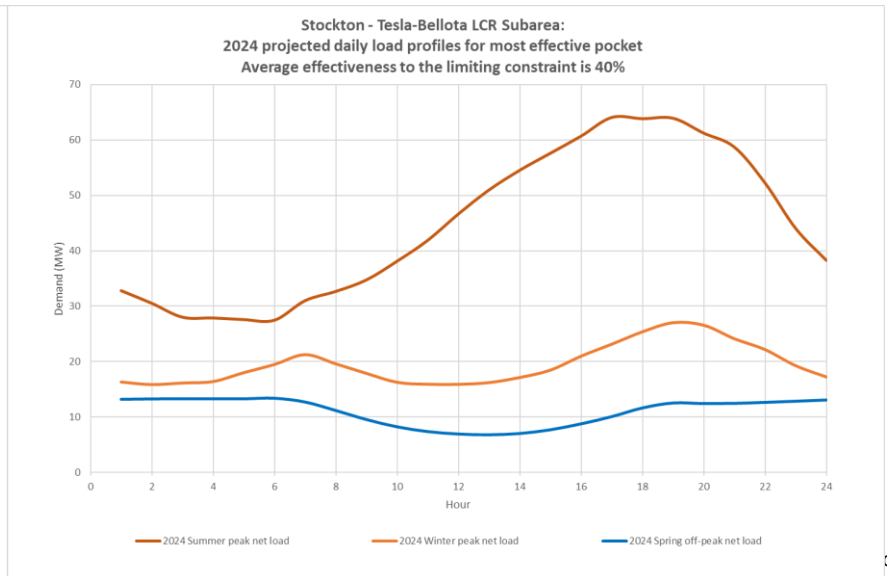
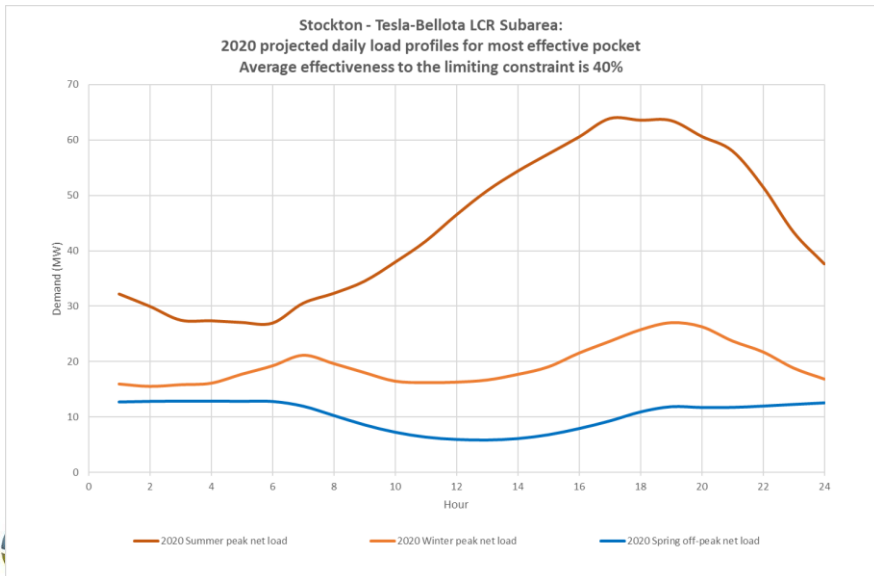
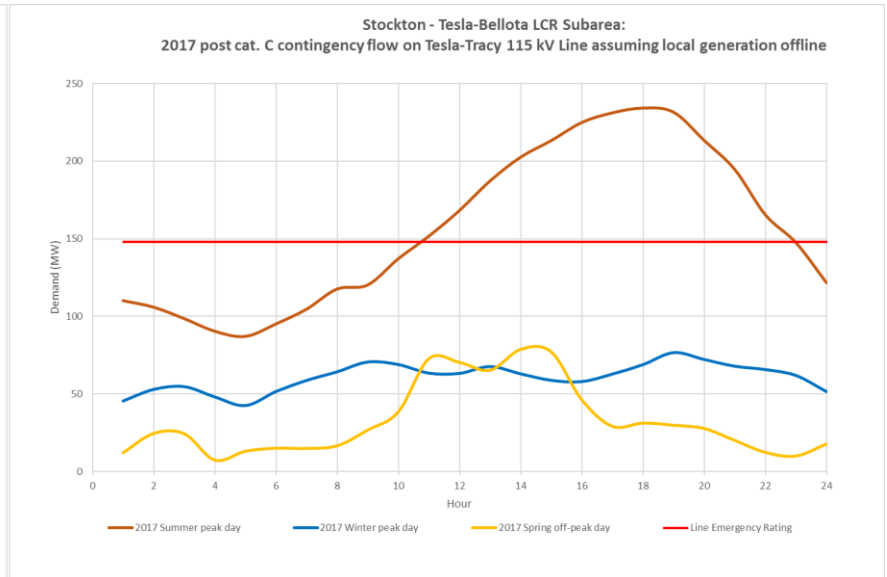
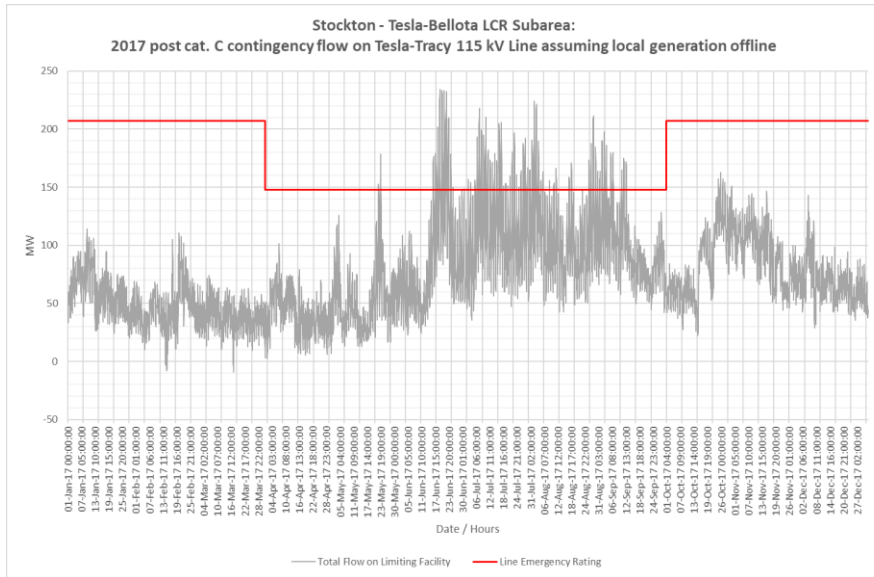
Tesla-Bellota LCR Sub-Area in 2020



Tesla-Bellota LCR Sub-Area in 2024



Tesla-Bellota Subarea: Flow Profiles



Changes from 2019 to 2020

| Subarea | 2019 | | 2020 | |
|-----------------|-------|-----------|-------|-------------|
| | Load | LCR | Load | LCR |
| Lockeford | 184 | 83 (59) | 190 | 97 (73) |
| Weber | 229 | 21 | 238 | 26 |
| Stanislaus | N/A | 152 | N/A | 179 |
| Tesla - Bellota | 761 | 673 (291) | 848 | 1,117 (543) |
| Total | 1,174 | 777 (350) | 1,275 | 1,241 (616) |

LCR increases is mostly due to load increase. The load has a much higher effectiveness factor than the most effective resource.

N/A=Flow-through area. No defined load pocket.

Changes from 2023 to 2024

| Subarea | 2023 | | 2024 | |
|-----------------|-------|-----------|-------|-------------|
| | Load | LCR | Load | LCR |
| Lockeford | 198 | 103 (79) | 193 | 102 (78) |
| Weber | 219 | 21 | 238 | 26 |
| Stanislaus | N/A | 147 | N/A | 185 |
| Tesla - Bellota | 809 | 319 (78) | 899 | 881 (260) |
| Total | 1,174 | 439 (157) | 1,275 | 1,009 (338) |

LCR increases is mostly due to load increase. The load has a much higher effectiveness factor than the most effective resource.

N/A=Flow-through area. No defined load pocket.

Stockton Area Total LCR Need

| 2020 LCR Need | Existing Generation Capacity Needed (MW) | Deficiency (MW) | Total MW Need |
|-----------------------|--|-----------------|---------------|
| Category B (Single) | 598 | 89 | 687 |
| Category C (Multiple) | 625 | 616 | 1,240 |

| 2024 LCR Need | Existing Generation Capacity Needed (MW) | Deficiency (MW) | Total MW Need |
|-----------------------|--|-----------------|---------------|
| Category B (Single) | 388 | 29 | 417 |
| Category C (Multiple) | 671 | 338 | 1,009 |