

Study Area: PG&E Greater Fresno

Thermal Overloads



| ID | Overloaded Facility | Worst Contingency | Category | Category Description | Loading (%) | | | | | | | | | | Potential Mitigation Solutions |
|-------------|---|---|----------|----------------------|------------------|------------------|------------------|----------------------|------------------------|-------------------|-----------------|---------------------------------------|-------------------|-----------------------------------|---|
| | | | | | 2018 Summer Peak | 2021 Summer Peak | 2026 Summer Peak | 2018 Spring Off-Peak | 2021 Spring Light Load | 2018 SP No BTM-PV | 2021 SP No AAEE | 2021 SP Heavy Renewable & Min Gas Gen | 2026 SP No BTM-PV | 2026 Retirement of QF Generations | |
| Fresno-T-1 | 34533 Q272 70.0 34540 HENRITTA 70.0 1 1 | Base Case | P0 | Base Case | 26.90 | 27.27 | 26.97 | 96.43 | 0.43 | 26.79 | 27.17 | 102.28 | 26.70 | 26.92 | Sensitivity Under Review |
| Fresno-T-2 | 30810 GREGG 230 30821 HELMS PP1 230 1 1 | P1-2:A14:8:_HELMS-GREGG #2 230kV [4880] | P1 | Single Contingency | 92.45 | <100 | <100 | NConv | <100 | 92.60 | <100 | <100 | <100 | <100 | Drop Helm,s |
| Fresno-T-3 | 30810 GREGG 230 30823 HELMS PP3 230 2 1 | P1-2:A14:7:_HELMS-GREGG #1 230kV [4870] | P1 | Single Contingency | 92.45 | <100 | <100 | NConv | <100 | 92.60 | <100 | <100 | <100 | <100 | Drop Helm,s |
| Fresno-T-4 | 30821 HELMS PP1 230 34997 E1_PGE 230 1 1 | P1-2:A14:124:_HELMS PP3-E1_PGE #2 230kV [0] | P1 | Single Contingency | <100 | 93.07 | 93.07 | <100 | 70.30 | <100 | 137.22 | 93.10 | 93.12 | 93.08 | Sensitivity Under Review |
| Fresno-T-5 | 30823 HELMS PP3 230 34997 E1_PGE 230 2 1 | P1-2:A14:123:_HELMS PP1-E1_PGE #1 230kV [0] | P1 | Single Contingency | <100 | 93.07 | 93.08 | <100 | 70.30 | <100 | 137.22 | 93.10 | 93.12 | 93.08 | Sensitivity Under Review |
| Fresno-T-6 | 34169 TORND0 J 70.0 34574 COLNGA 1 70.0 1 1 | P2-1:A14:146:_JAYNE SW STA-COALINGA 70kV [8670] (WESTLNDSS_JACALITO) | P2-1 | Single Contingency | 94.64 | 70.27 | 66.25 | 37.26 | 56.49 | 102.54 | 72.64 | 84.65 | 69.23 | 44.00 | Sensitivity Under Review |
| Fresno-T-7 | 34206 CANAL 70.0 34220 ORTIGA 70.0 1 1 | P2-1:A13:58:_LOS BANOS-LIVINGSTON JCT-CANAL 70kV [8940] (CHEVPIPE-LOS BANS) | P2-1 | Single Contingency | 98.94 | <100 | <100 | 32.78 | <100 | 103.11 | <100 | <100 | <100 | <100 | Short Term radialize; Long Term:Oro Loma 70 kV Area Reinforcement |
| Fresno-T-8 | 34220 ORTIGA 70.0 34222 MRCYSPRS 70.0 1 1 | P2-1:A13:58:_LOS BANOS-LIVINGSTON JCT-CANAL 70kV [8940] (CHEVPIPE-LOS BANS) | P2-1 | Single Contingency | 124.58 | <100 | <100 | 40.63 | <100 | 129.91 | <100 | <100 | <100 | <100 | Short Term radialize; Long Term:Oro Loma 70 kV Area Reinforcement |
| Fresno-T-9 | 34409 PNDLJ2 115 34416 BULLARD 115 1 1 | P2-1:A14:58:_HERNDON-BULLARD #1 115kV [1760] (HERNDON-PNDLJ1) | P2-1 | Single Contingency | 115.07 | 101.52 | 111.99 | 37.67 | 31.56 | 120.90 | 108.79 | 101.65 | 123.02 | 112.05 | Under Review |
| Fresno-T-10 | 30805 BORDEN 230 30810 GREGG 230 1 1 | P2-4:A14:1:_HERNDON 230kV - Section 1D & 2D | P2 | Single Contingency | 121.59 | 39.03 | 40.78 | 20.44 | 50.34 | 120.27 | 59.48 | 47.58 | 37.47 | 39.83 | Northern Fresno 115kV Area reinforcement project |
| Fresno-T-11 | 30821 HELMS PP1 230 34997 E1_PGE 230 1 1 | P2-3:A14:150:_E1_PGE 230kV - Middle Breaker Bay 2 | P2 | Single Contingency | <100 | 93.24 | 93.23 | <100 | 70.56 | <100 | 137.83 | 93.27 | 93.26 | 93.23 | Borden 230 kV Voltage Support |
| Fresno-T-12 | 30823 HELMS PP3 230 34997 E1_PGE 230 2 1 | P2-3:A14:149:_E1_PGE 230kV - Middle Breaker Bay 1 | P2 | Single Contingency | <100 | 93.24 | 93.24 | <100 | 70.56 | <100 | 137.83 | 93.27 | 93.26 | 93.23 | Under Review |
| Fresno-T-13 | 34104 ATWATER 115 34106 CASTLE 115 1 1 | P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV | P2 | Single Contingency | NConv | 97.70 | 42.14 | NConv | 33.02 | NConv | 96.57 | 88.94 | 45.09 | 42.55 | Gregg-Herndon no2 230 kV Breaker Upgrade.m |
| Fresno-T-14 | 34104 ATWATER 115 34110 ATWATR J 115 1 1 | P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV | P2 | Single Contingency | NConv | 42.45 | 32.71 | NConv | 8.96 | NConv | 36.18 | 30.68 | 35.24 | 33.71 | Northern Fresno 115 kV Area Reinforcement |
| Fresno-T-15 | 34105 CERTANJ1 115 34100 CHWCHLLA 115 1 1 | P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV | P2 | Single Contingency | NConv | 17.23 | 15.55 | NConv | 52.17 | NConv | 20.91 | 3.54 | 11.35 | 15.20 | Wilson 115kV area reinforcent or Cressy N. Merced |
| Fresno-T-16 | 34105 CERTANJ1 115 34100 CHWCHLLA 115 1 1 | P2-4:A14:1:_HERNDON 230kV - Section 1D & 2D | P2 | Single Contingency | 94.08 | 14.49 | 12.22 | 12.33 | 51.74 | 106.95 | 29.67 | 14.30 | 6.40 | 8.69 | Sensitivity Under Review |
| Fresno-T-17 | 34105 CERTANJ1 115 34121 SHARON T 115 1 1 | P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV | P2 | Single Contingency | NConv | 17.41 | 15.73 | NConv | 51.84 | NConv | 21.01 | 3.93 | 11.57 | 15.37 | Wilson 115kV area reinforcent or Cressy N. Merced |

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| | | | | | 2018 Summer Peak | 2021 Summer Peak | 2026 Summer Peak | 2018 Spring Off-Peak | 2021 Spring Light Load | 2018 SP No BTM-PV | 2021 SP No AAEE | 2021 SP Heavy Renewable & Min Gas Gen | 2026 SP No BTM-PV | 2026 Retirement of QF Generations | |
| Fresno-T-18 | 34105 CERTANJ1 115 34121 SHARON T 115 1 1 | P2-4:A14:1:_HERNDON 230kV - Section 1D & 2D | P2 | Single Contingency | 93.49 | 14.82 | 12.58 | 12.25 | 51.41 | 106.27 | 29.78 | 14.60 | 6.92 | 9.14 | Sensitivity Under Review |
| Fresno-T-19 | 34106 CASTLE 115 34138 EL CAPTN 115 1 1 | P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV | P2 | Single Contingency | NConv | 97.69 | 42.13 | NConv | 33.10 | NConv | 96.56 | 88.92 | 45.08 | 42.54 | Wilson 115kV area reinforcent or Cressy N. Merced |
| Fresno-T-20 | 34110 ATWATR J 115 34144 MERCED 115 1 1 | P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV | P2 | Single Contingency | NConv | 11.90 | 14.98 | NConv | 4.00 | NConv | 6.66 | 3.28 | 16.95 | 15.81 | Wilson 115kV area reinforcent or Cressy N. Merced |
| Fresno-T-21 | 34112 EXCHEQUR 115 34116 LE GRAND 115 1 1 | P2-3:A13:44:_EXCHEQUR - 1D 70kV & MERCED FALLS-EXCHEQUER line | P2 | Single Contingency | 68.46 | 66.42 | 67.14 | 43.71 | 41.50 | 110.35 | 110.43 | 65.86 | 69.37 | 67.13 | Sensitivity Under Review |
| Fresno-T-22 | 34112 EXCHEQUR 115 34116 LE GRAND 115 1 1 | P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV | P2 | Single Contingency | NConv | 23.90 | 27.01 | NConv | 30.99 | NConv | 52.75 | 21.17 | 26.67 | 28.30 | Wilson 115kV area reinforcent or Cressy N. Merced |
| Fresno-T-23 | 34112 EXCHEQUR 115 34232 EXCHEQUR 70.0 1 1 | P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV | P2 | Single Contingency | NConv | 18.30 | 17.33 | NConv | 4.17 | NConv | 23.30 | 19.05 | 18.35 | 16.85 | Wilson 115kV area reinforcent or Cressy N. Merced |
| Fresno-T-24 | 34121 SHARON T 115 34128 OAKH_JCT 115 1 1 | P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV | P2 | Single Contingency | NConv | 22.08 | 20.21 | NConv | 47.78 | NConv | 26.09 | 6.03 | 16.08 | 19.85 | Wilson 115kV area reinforcent or Cressy N. Merced |
| Fresno-T-25 | 34123 K1-JCT 115 34358 KERCKHF2 115 2 1 | P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV | P2 | Single Contingency | NConv | 32.80 | 33.38 | NConv | 17.27 | NConv | 36.58 | 23.17 | 34.47 | 33.23 | Wilson 115kV area reinforcent or Cressy N. Merced |
| Fresno-T-26 | 34128 OAKH_JCT 115 34123 K1-JCT 115 1 1 | P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV | P2 | Single Contingency | NConv | 32.79 | 33.38 | NConv | 17.47 | NConv | 36.58 | 23.16 | 34.47 | 33.22 | Wilson 115kV area reinforcent or Cressy N. Merced |
| Fresno-T-27 | 34134 WILSON A 115 34144 MERCED 115 1 1 | P2-2:A13:13:_WILSON B 115kV Section 2D | P2 | Single Contingency | 109.22 | 62.96 | 61.02 | 25.31 | <100 | 108.29 | 63.44 | 61.26 | 64.66 | 60.32 | Action Plan.Cressey - North Merced 115 kV Line Addition (North Merced 230 kV bank) mitigates future years. Propose operating solution in the interim. |
| Fresno-T-28 | 34136 WILSON B 115 34144 MERCED 115 2 1 | P2-2:A13:12:_WILSON A 115kV Section 1D | P2 | Single Contingency | 105.70 | 81.49 | 69.80 | 18.53 | <100 | 101.44 | 77.97 | 73.74 | 74.70 | 70.12 | Action Plan.Cressey - North Merced 115 kV Line Addition (North Merced 230 kV bank) mitigates future years. Propose operating solution in the interim. mitigates future years. Propose operating solution in the interim. |
| Fresno-T-29 | 34144 MERCED 115 34146 MERCED M 115 2 1 | P2-3:A13:15:_LE GR - MA 115kV & LE GR-CHOWCHILLA line | P2 | Single Contingency | 80.59 | 81.05 | 81.00 | 100.00 | 73.02 | 134.64 | 138.33 | 100.03 | 80.29 | 81.00 | Trip gen, use Isaac Contingency |
| Fresno-T-30 | 34144 MERCED 115 34146 MERCED M 115 2 1 | P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV | P2 | Single Contingency | NConv | 54.47 | 49.74 | NConv | 34.67 | NConv | 68.70 | 74.26 | 49.96 | 48.14 | Wilson 115kV area reinforcent or Cressy N. Merced |
| Fresno-T-31 | 34150 NEWHALL 115 34154 DAIRYLND 115 1 1 | P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV | P2 | Single Contingency | NConv | 18.67 | 20.38 | NConv | 4.20 | NConv | 2.06 | 14.25 | 24.81 | 19.84 | Wilson 115kV area reinforcent or Cressy N. Merced |

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| | | | | | 2018 Summer Peak | 2021 Summer Peak | 2026 Summer Peak | 2018 Spring Off-Peak | 2021 Spring Light Load | 2018 SP No BTM-PV | 2021 SP No AAEE | 2021 SP Heavy Renewable & Min Gas Gen | 2026 SP No BTM-PV | 2026 Retirement of QF Generations | |
| Fresno-T-32 | 34156 MENDOTA 115 34153 GILLTAP 115 1 1 | P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV | P2 | Single Contingency | NConv | 31.83 | 32.45 | NConv | 15.95 | NConv | 21.05 | 28.47 | 35.68 | 32.02 | Wilson 115kV area reinforcent or Cressy N. Merced |
| Fresno-T-33 | 34200 ORO LOMA 70.0 34162 ORO LOMA 115 2 1 | P2-4:A13:13:_PANOCHE 230kV - Section 1E & 2E | P2 | Single Contingency | <100 | 72.21 | 58.20 | <100 | 58.62 | <100 | 95.83 | 128.95 | 46.04 | 44.95 | Sensitivity Under Review |
| Fresno-T-34 | 34202 MERCED 70.0 34146 MERCED M 115 2 1 | P2-2:A13:10:_LE GR 115kV Section MA | P2 | Single Contingency | 78.78 | 79.58 | 79.53 | 97.68 | 71.12 | 123.07 | 125.71 | 97.43 | 78.87 | 79.53 | Exchequer gen dispatch SCD |
| Fresno-T-35 | 34202 MERCED 70.0 34146 MERCED M 115 2 1 | P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV | P2 | Single Contingency | NConv | 57.11 | 51.78 | NConv | 34.76 | NConv | 71.49 | 77.45 | 52.17 | 50.20 | Wilson 115kV area reinforcent or Cressy N. Merced |
| Fresno-T-36 | 34202 MERCED 70.0 34230 MRCDFLLS 70.0 1 1 | P2-2:A13:10:_LE GR 115kV Section MA | P2 | Single Contingency | 79.04 | 80.22 | 80.16 | 65.02 | 72.32 | 150.25 | 155.33 | 79.37 | 79.28 | 80.16 | Exchequer gen dispatch, SCD |
| Fresno-T-37 | 34202 MERCED 70.0 34230 MRCDFLLS 70.0 1 1 | P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV | P2 | Single Contingency | NConv | 45.75 | 39.09 | NConv | 22.40 | NConv | 67.10 | 49.60 | 39.37 | 36.84 | Wilson 115kV area reinforcent or Cressy N. Merced |
| Fresno-T-38 | 34252 MADERA 70.0 34256 BORDEN 70.0 2 1 | P2-2:A13:32:_BORDEN 70kV Section MD | P2 | Single Contingency | 111.89 | 107.12 | 107.09 | 50.53 | 47.53 | 114.59 | 110.92 | 107.39 | 113.18 | 107.14 | Madera SPS |
| Fresno-T-39 | 34321 MCSWAINJ 70.0 34230 MRCDFLLS 70.0 1 1 | P2-2:A13:10:_LE GR 115kV Section MA | P2 | Single Contingency | 90.07 | 90.46 | 90.46 | 65.58 | 69.88 | 162.38 | 166.26 | 89.86 | 90.47 | 90.46 | Madera SPS |
| Fresno-T-40 | 34321 MCSWAINJ 70.0 34232 EXCHEQUR 70.0 1 1 | P2-2:A13:10:_LE GR 115kV Section MA | P2 | Single Contingency | 99.69 | 100.38 | 100.37 | 77.04 | 67.55 | 195.36 | 200.47 | 99.80 | 100.36 | 100.37 | Madera SPS |
| Fresno-T-41 | 34252 MADERA 70.0 34256 BORDEN 70.0 2 1 | P2-3:A13:46:_BORDEN - MD 70kV & BORDEN-COPPERMINE line | P2 | Single Contingency | 111.89 | 107.12 | 107.09 | 50.53 | 47.53 | 114.59 | 110.92 | 107.39 | 113.18 | 107.14 | Madera SPS |
| Fresno-T-42 | 34321 MCSWAINJ 70.0 34232 EXCHEQUR 70.0 1 1 | P2-4:A13:11:_WILSON A Section 1D & WILSON B Section 2D 115kV | P2 | Single Contingency | NConv | 57.99 | 51.43 | NConv | 15.14 | NConv | 83.24 | 62.20 | 52.29 | 49.16 | Wilson 115kV area reinforcent or Cressy N. Merced |
| Fresno-T-43 | 34366 SANGER 115 34359 AIRWAYJ2 115 1 1 | P2-4:A14:1:_HERNDON 230kV - Section 1D & 2D | P2 | Single Contingency | 101.09 | 76.95 | 84.99 | 33.44 | 37.06 | 107.22 | 75.69 | 78.25 | 93.48 | 83.70 | Northern Fresno 115kV Area reinforcement project |
| Fresno-T-44 | 34366 SANGER 115 34370 MC CALL 115 3 1 | P2-4:A14:1:_HERNDON 230kV - Section 1D & 2D | P2 | Single Contingency | 96.03 | <100 | <100 | 33.67 | <100 | 101.15 | <100 | <100 | <100 | <100 | Sensitivity Under Review |
| Fresno-T-45 | 34408 BARTON 115 34412 HERNDON 115 1 1 | P2-4:A14:5:_MC CALL 230kV - Section 2D & 1D | P2 | Single Contingency | 118.85 | 63.18 | 73.73 | 27.13 | 19.92 | 124.78 | 64.67 | 59.66 | 86.33 | 85.70 | Northern Fresno Project |
| Fresno-T-46 | 34409 PNDLJ2 115 34416 BULLARD 115 1 1 | P2-2:A14:46:_HERNDON 115kV Section 1D | P2 | Single Contingency | 115.12 | 101.48 | 111.96 | 37.73 | 31.55 | 120.92 | 108.73 | 101.60 | 122.97 | 111.99 | Sensitivity Under Review |
| Fresno-T-47 | 34410 MANCHSTR 115 34412 HERNDON 115 1 1 | P2-4:A14:5:_MC CALL 230kV - Section 2D & 1D | P2 | Single Contingency | 120.28 | 66.41 | 75.54 | 29.30 | 21.52 | 125.79 | 68.59 | 63.02 | 87.21 | 86.78 | Northern Fresno Project |
| Fresno-T-48 | 34418 KINGSBRG 115 34428 CONTADNA 115 1 1 | P2-4:A14:5:_MC CALL 230kV - Section 2D & 1D | P2 | Single Contingency | 95.20 | 71.68 | 76.81 | 69.29 | 33.30 | 100.41 | 61.25 | 79.97 | 89.15 | 87.98 | Northern Fresno Project |
| Fresno-T-49 | 34429 GWF_HEP 115 34428 CONTADNA 115 1 1 | P2-4:A14:5:_MC CALL 230kV - Section 2D & 1D | P2 | Single Contingency | 98.63 | 74.91 | 79.75 | 72.93 | 36.79 | 103.87 | 64.73 | 83.23 | 92.10 | 90.93 | Northern Fresno Project |

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| | | | | | 2018 Summer Peak | 2021 Summer Peak | 2026 Summer Peak | 2018 Spring Off-Peak | 2021 Spring Light Load | 2018 SP No BTM-PV | 2021 SP No AAEE | 2021 SP Heavy Renewable & Min Gas Gen | 2026 SP No BTM-PV | 2026 Retirement of QF Generations | | |
| Fresno-T-50 | 34559 HURONJ 70.0 34560 CALFLAX 70.0 1 1 | P2-4:A13:12:_PANOCHE1 Section 1D & PANOCHE2 Section 2D 115kV | P2 | Single Contingency | 121.64 | 4.04 | 23.66 | 107.53 | 44.52 | 13.97 | 5.55 | 127.20 | 34.05 | 37.41 | Northern Fresno Project | |
| Fresno-T-51 | 34561 Q526TP 70.0 34566 PLSNTVLY 70.0 1 1 | P2-4:A13:12:_PANOCHE1 Section 1D & PANOCHE2 Section 2D 115kV | P2 | Single Contingency | 59.05 | 20.38 | 1.49 | 92.13 | 21.91 | 20.51 | 20.87 | 119.28 | 5.90 | 13.19 | Sensitivity Under Review | |
| Fresno-T-52 | 34562 SCHLNDLR 70.0 34567 FIVEPOINTSSS 70.0 1 1 | P2-4:A13:12:_PANOCHE1 Section 1D & PANOCHE2 Section 2D 115kV | P2 | Single Contingency | 85.68 | 10.95 | 15.38 | 96.86 | 32.35 | 3.17 | 9.65 | 103.71 | 23.39 | 27.98 | Sensitivity Under Review | |
| Fresno-T-53 | 34567 FIVEPOINTSSS 70.0 34560 CALFLAX 70.0 1 1 | P2-4:A13:12:_PANOCHE1 Section 1D & PANOCHE2 Section 2D 115kV | P2 | Single Contingency | 85.46 | 20.68 | 10.99 | 107.35 | 32.75 | 13.42 | 19.48 | 139.94 | 17.44 | 21.80 | Sensitivity Under Review | |
| Fresno-T-54 | 30796 STOREY 1 230 30800 WILSON 230 1 1 | P5-5:A14:2:_Gregg 230 kV BAAH Bus #2 (failure of non-redundent relay) | P5.5 | Multiple Contingency | NConv | 22.80 | 21.26 | 49.96 | 46.68 | NConv | 36.58 | 34.79 | 17.73 | 17.85 | Series Reactor at Wilson, Wilson 115kV Area reinforcement, Borden Voltage Support Project fixes later years | |
| Fresno-T-55 | 30796 STOREY 1 230 30810 GREGG 230 1 1 | P5-5:A14:2:_Gregg 230 kV BAAH Bus #2 (failure of non-redundent relay) | P5.5 | Multiple Contingency | NConv | <100 | <100 | 49.03 | <100 | NConv | <100 | <100 | <100 | <100 | Series Reactor at Wilson, Wilson 115kV Area reinforcement, Borden Voltage Support Project fixes later years | |
| Fresno-T-56 | 30515 WARNERVL 230 30800 WILSON 230 1 2 | P1-2:A13:17:_TRANQLTYSS-KEARNEY 230kV [0] and P1-2:A13:88:_MELONES-NMERCED #1 230kV [0] | P6 | Multiple Contingency | <100 | <100 | <100 | <100 | 100.03 | <100 | <100 | <100 | <100 | <100 | Drop Additional Pump | |
| Fresno-T-57 | 30810 GREGG 230 30835 HERNDON 230 1 1 | P1-2:A14:10:_GREGG-HERNDON #2 230kV [4840] and P1-2:A14:11:_GREGG-ASHLAN 230kV [4820] | P6 | Multiple Contingency | 100.01 | <100 | <100 | <100 | <100 | 100.01 | <100 | <100 | <100 | <100 | Northern Fresno Project | |
| Fresno-T-58 | 30810 GREGG 230 30835 HERNDON 230 2 1 | P1-2:A14:9:_GREGG-HERNDON #1 230kV [4830] and P1-2:A14:11:_GREGG-ASHLAN 230kV [4820] | P6 | Multiple Contingency | 100.01 | <100 | <100 | <100 | <100 | 100.01 | <100 | <100 | <100 | <100 | Norhern fresno | |
| Fresno-T-59 | 30821 HELMS PP1 230 34997 E1_PGE 230 1 1 | P1-2:A13:23:_BORDEN-GREGG 230kV [4400] and P1-2:A14:124:_HELMS PP3-E1_PGE #2 230kV [0] | P6 | Multiple Contingency | <100 | <100 | <100 | <100 | <100 | <100 | 100.41 | <100 | <100 | <100 | Sensitivity Under Review | |
| Fresno-T-60 | 30821 HELMS PP1 230 34997 E1_PGE 230 1 1 | P1-4:A14:22:_E2_PGE SVD=v and P1-2:A14:124:_HELMS PP3-E1_PGE #2 230kV [0] | P6 | Multiple Contingency | <100 | <100 | <100 | <100 | <100 | <100 | 100.46 | <100 | <100 | <100 | Sensitivity Under Review | |
| Fresno-T-61 | 30823 HELMS PP3 230 34997 E1_PGE 230 2 1 | P1-4:A14:22:_E2_PGE SVD=v and P1-2:A14:123:_HELMS PP1-E1_PGE #1 230kV [0] | P6 | Multiple Contingency | <100 | <100 | <100 | <100 | <100 | <100 | 100.46 | <100 | <100 | <100 | Sensitivity Under Review | |
| Fresno-T-62 | 34105 CERTANJ1 115 34100 CHWCHLLA 115 1 1 | P1-3:A13:8:_WILSON 230/115kV TB 2 and P1-3:A13:7:_WILSON 230/115kV TB 1 | P6 | Multiple Contingency | 101.24 | <100 | <100 | <100 | <100 | 100.18 | <100 | <100 | <100 | <100 | Under Review | |

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| | | | | | 2018 Summer Peak | 2021 Summer Peak | 2026 Summer Peak | 2018 Spring Off-Peak | 2021 Spring Light Load | 2018 SP No BTM-PV | 2021 SP No AAEE | 2021 SP Heavy Renewable & Min Gas Gen | 2026 SP No BTM-PV | 2026 Retirement of QF Generations | |
| Fresno-T-63 | 34112 EXCHEQUR 115 34116 LE GRAND 115 1 1 | P1-3:A13:16:_MERCED 115/70kV TB 2 and P1-3:A13:17:_EXCHEQUR 70/115kV TB 1 | P6 | Multiple Contingency | <100 | <100 | <100 | <100 | <100 | 100.69 | 99.99 | <100 | <100 | <100 | Sensitivity Under Review |
| Fresno-T-64 | 34116 LE GRAND 115 34134 WILSON A 115 1 1 | P1-2:A14:32:_KERCKHOFF-CLOVIS-SANGER #2 115kV [1900] and P1-2:A14:30:_KERCKHOFF-CLOVIS-SANGER #1 115kV [1890] | P6 | Multiple Contingency | <100 | <100 | <100 | 100.57 | <100 | 65.35 | <100 | <100 | <100 | <100 | Sensitivity Under Review |
| Fresno-T-65 | 34116 LE GRAND 115 34134 WILSON A 115 1 1 | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | 148.69 | <100 | <100 | <100 | <100 | 157.40 | <100 | <100 | <100 | <100 | Wilson-Le Grand 115kV reconductoring Project |
| Fresno-T-66 | 34118 LE GRNDJ 115 34136 WILSON B 115 1 1 | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | 100.58 | <100 | <100 | <100 | <100 | 109.91 | <100 | <100 | <100 | <100 | Wilson-Le Grand 115kV reconductoring Project |
| Fresno-T-67 | 34118 LE GRNDJ 115 34168 EL NIDO 115 1 1 | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | 100.27 | <100 | <100 | <100 | <100 | 109.55 | <100 | <100 | <100 | <100 | Wilson-Le Grand 115kV reconductoring Project |
| Fresno-T-68 | 34121 SHARON T 115 34128 OAKH_JCT 115 1 1 | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | 91.93 | <100 | <100 | <100 | <100 | 99.37 | <100 | <100 | <100 | <100 | Wilson 115kV area reinforcent or Cressy N. Merced |
| Fresno-T-69 | 34134 WILSON A 115 34144 MERCED 115 1 1 | P1-2:A13:39:_WILSON-MERCED #2 115kV [4190] and P1-2:A13:38:_EL CAPITAN-WILSON 115kV [1510] | P6 | Multiple Contingency | 103.55 | <100 | <100 | <100 | <100 | 108.44 | <100 | <100 | <100 | <100 | Wilson 115kV area reinforcent fixes later years |
| Fresno-T-70 | 34136 WILSON B 115 34138 EL CAPTN 115 1 1 | P1-2:A13:36:_WILSON-ATWATER #2 115kV [4160] and P1-2:A13:27:_ATWATER-LIVNGSTN-MERCED 115kV [1030] | P6 | Multiple Contingency | 105.72 | <100 | <100 | <100 | <100 | 110.43 | <100 | <100 | <100 | <100 | Wilson 115kV area reinforcent fixes later years |
| Fresno-T-71 | 34136 WILSON B 115 34144 MERCED 115 2 1 | P1-2:A13:37:_WILSON-MERCED #1 115kV [4180] and P1-2:A13:38:_EL CAPITAN-WILSON 115kV [1510] | P6 | Multiple Contingency | 110.59 | <100 | <100 | <100 | <100 | 115.24 | <100 | <100 | <100 | <100 | Wilson 115kV area reinforcent fixes later years |
| Fresno-T-72 | 34151 Q648SS 115 34161 DFSTP 115 1 1 | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | 104.02 | <100 | <100 | <100 | <100 | 111.74 | <100 | <100 | <100 | <100 | Wilson 115kV area reinforcent fixes later years |
| Fresno-T-73 | 34155 PANOCH1 115 34350 KAMM 115 1 1 | P1-2:A13:76:_PANOCH2-EXCELSIORSS 115kV [3231] and P1-3:A14:15:_GATES 230/70kV TB 5 | P6 | Multiple Contingency | 110.97 | <100 | 93.92 | 98.67 | <100 | <100 | <100 | 90.16 | 106.75 | 121.65 | Wilson 115kV area reinforcent or Cressy N. Merced |

Study Area: PG&E Greater Fresno

Thermal Overloads



| ID | Overloaded Facility | Worst Contingency | Category | Category Description | Loading (%) | | | | | | | | | | Potential Mitigation Solutions |
|-------------|---|---|----------|----------------------|------------------|------------------|------------------|----------------------|------------------------|-------------------|-----------------|---------------------------------------|-------------------|-----------------------------------|---|
| | | | | | 2018 Summer Peak | 2021 Summer Peak | 2026 Summer Peak | 2018 Spring Off-Peak | 2021 Spring Light Load | 2018 SP No BTM-PV | 2021 SP No AAEE | 2021 SP Heavy Renewable & Min Gas Gen | 2026 SP No BTM-PV | 2026 Retirement of QF Generations | |
| Fresno-T-74 | 34155 PANOCH1 115 34350 KAMM 115 1 1 | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A14:109:_EXCELSIORSS-PANOCH2 115kV [3231] | P6 | Multiple Contingency | 109.91 | <100 | 93.92 | 100.30 | <100 | 112.00 | <100 | 90.62 | 102.98 | 119.13 | Wilson 115kV area reinforcent or Cressy N. Merced |
| Fresno-T-75 | 34159 PANOCH1 115 34160 HAMMONDS 115 1 1 | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | 115.93 | <100 | <100 | <100 | <100 | 124.11 | <100 | <100 | <100 | <100 | Oro Loma Reconductoring Project; SOL Interim |
| Fresno-T-76 | 34160 HAMMONDS 115 34161 DFSTP 115 1 1 | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | 106.37 | <100 | <100 | <100 | <100 | 114.10 | <100 | <100 | <100 | <100 | Oro Loma Reconductoring Project; SOL Interim |
| Fresno-T-77 | 34162 ORO LOMA 115 34151 Q648SS 115 1 1 | P1-3:A13:8:_WILSON 230/115kV TB 2 and P1-3:A13:7:_WILSON 230/115kV TB 1 | P6 | Multiple Contingency | 108.49 | <100 | <100 | <100 | <100 | 116.27 | <100 | <100 | <100 | <100 | Oro Loma Reconductoring Project; SOL Interim |
| Fresno-T-78 | 34162 ORO LOMA 115 34168 EL NIDO 115 1 1 | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | 126.46 | <100 | <100 | <100 | <100 | 136.40 | <100 | <100 | <100 | <100 | Oro Loma Reconductoring Project; SOL Interim |
| Fresno-T-79 | 34169 TORND0 J 70.0 34174 PENZIR J 70.0 1 1 | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-3:A14:25:_SCHINDLR 115/70kV TB 1 | P6 | Multiple Contingency | 106.82 | <100 | 93.86 | <100 | <100 | NConv | <100 | <100 | 106.37 | <100 | Under Review |
| Fresno-T-80 | 34169 TORND0 J 70.0 34574 COLNGA 1 70.0 1 1 | P1-1:A14:55:_WESTLNDS 0kV Gen Unit 1 and P1-2:A14:98:_GATES-JAYNE SW STA 70kV [8652] | P6 | Multiple Contingency | 94.28 | <100 | <100 | <100 | <100 | 100.06 | <100 | <100 | <100 | <100 | Under Review |
| Fresno-T-81 | 34169 TORND0 J 70.0 34574 COLNGA 1 70.0 1 1 | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-3:A14:25:_SCHINDLR 115/70kV TB 1 | P6 | Multiple Contingency | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | NConv | Under Review |
| Fresno-T-82 | 34200 ORO LOMA 70.0 34162 ORO LOMA 115 2 1 | P1-2:A13:52:_LOS BANOS-LIVINGSTON JCT-CANAL 70kV [8940] and P1-3:A13:27:_MERCY S1 230/70kV TB 1 | P6 | Multiple Contingency | <100 | 99.56 | 100.22 | <100 | <100 | <100 | 99.92 | <100 | 100.60 | 100.03 | Under Review/ Replace limiting equipment |
| Fresno-T-83 | 34237 CANANDGA 70.0 34255 TRIGO J 70.0 1 1 | P1-2:A13:60:_BORDEN-MADERA #2 70kV [8520] and P1-2:A13:61:_BORDEN-MADERA #1 70kV [8710] | P6 | Multiple Contingency | 96.94 | 92.91 | 94.16 | <100 | <100 | 99.71 | 95.40 | <100 | 100.31 | 94.06 | Madera SPS |
| Fresno-T-84 | 34240 GLASS 70.0 34237 CANANDGA 70.0 1 1 | P1-2:A13:60:_BORDEN-MADERA #2 70kV [8520] and P1-2:A13:61:_BORDEN-MADERA #1 70kV [8710] | P6 | Multiple Contingency | 105.47 | 100.90 | 101.42 | <100 | <100 | 108.21 | 104.27 | <100 | 107.59 | 101.31 | Madera SPS |
| Fresno-T-85 | 34240 GLASS 70.0 34256 BORDEN 70.0 1 1 | P1-2:A13:60:_BORDEN-MADERA #2 70kV [8520] and P1-2:A13:61:_BORDEN-MADERA #1 70kV [8710] | P6 | Multiple Contingency | 113.31 | 108.31 | 108.25 | <100 | <100 | 116.04 | 112.39 | <100 | 114.45 | 108.13 | Madera SPS |
| Fresno-T-86 | 34252 MADERA 70.0 34256 BORDEN 70.0 2 1 | P1-2:A13:59:_BORDEN-GLASS 70kV [8510] and P1-2:A13:61:_BORDEN-MADERA #1 70kV [8710] | P6 | Multiple Contingency | 111.92 | 107.10 | 107.04 | <100 | <100 | 115.15 | 111.05 | <100 | 113.04 | 106.94 | Madera SPS |

| ID | Overloaded Facility | Worst Contingency | Category | Category Description | Loading (%) | | | | | | | | | | Potential Mitigation Solutions |
|-------------|---|---|----------|----------------------|------------------|------------------|------------------|----------------------|------------------------|-------------------|-----------------|---------------------------------------|-------------------|-----------------------------------|---|
| | | | | | 2018 Summer Peak | 2021 Summer Peak | 2026 Summer Peak | 2018 Spring Off-Peak | 2021 Spring Light Load | 2018 SP No BTM-PV | 2021 SP No AAEE | 2021 SP Heavy Renewable & Min Gas Gen | 2026 SP No BTM-PV | 2026 Retirement of QF Generations | |
| Fresno-T-87 | 34256 BORDEN 70.0 34252 MADERA 70.0 1 1 | P1-2:A13:59:_BORDEN-GLASS 70kV [8510] and P1-2:A13:60:_BORDEN-MADERA #2 70kV [8520] | P6 | Multiple Contingency | 112.73 | 107.80 | 107.73 | <100 | <100 | 115.42 | 111.82 | <100 | 113.83 | 107.62 | Madera SPS |
| Fresno-T-88 | 34350 KAMM 115 34352 CANTUA 115 1 1 | P1-2:A14:109:_EXCELSIORSS-PANOCHE2 115kV [3231] and P1-3:A14:15:_GATES 230/70kV TB 5 | P6 | Multiple Contingency | 101.15 | <100 | <100 | 96.24 | <100 | <100 | <100 | <100 | 97.44 | 111.47 | Under Review, Operations sees some issue also |
| Fresno-T-89 | 34358 KERCKHF2 115 34360 WWARD JT 115 1 1 | P1-2:A13:29:_CHOWCHILLA-KERCKHOFF 115kV [1252] and P1-2:A14:32:_KERCKHOFF-CLOVIS-SANGER #2 115kV [1900] | P6 | Multiple Contingency | <100 | <100 | <100 | <100 | <100 | 100.75 | <100 | <100 | <100 | <100 | Sensitivity Under Review |
| Fresno-T-90 | 34365 CLOVISJ2 115 34358 KERCKHF2 115 1 1 | P1-2:A13:29:_CHOWCHILLA-KERCKHOFF 115kV [1252] and P1-2:A14:30:_KERCKHOFF-CLOVIS-SANGER #1 115kV [1890] | P6 | Multiple Contingency | <100 | <100 | <100 | <100 | <100 | 100.01 | <100 | <100 | <100 | <100 | Sensitivity Under Review |
| Fresno-T-91 | 34561 Q526TP 70.0 34566 PLSNTVLY 70.0 1 1 | P1-2:A14:117:_SCHLNDLR-FIVEPOINTSSS #1 70kV [0] and P1-3:A14:15:_GATES 230/70kV TB 5 | P6 | Multiple Contingency | <100 | <100 | <100 | <100 | <100 | 95.92 | <100 | <100 | 90.34 | 124.21 | Sensitivity Under Review |
| Fresno-T-92 | 34562 SCHLNDLR 70.0 34561 Q526TP 70.0 1 1 | P1-2:A14:117:_SCHLNDLR-FIVEPOINTSSS #1 70kV [0] and P1-3:A14:15:_GATES 230/70kV TB 5 | P6 | Multiple Contingency | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | 115.06 | Sensitivity Under Review |
| Fresno-T-93 | 34562 SCHLNDLR 70.0 34567 FIVEPOINTSSS 70.0 1 1 | P1-2:A14:103:_SCHINDLER-COALINGA #2 70kV [9150] and P1-3:A14:15:_GATES 230/70kV TB 5 | P6 | Multiple Contingency | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | 100.21 | Sensitivity Under Review |
| Fresno-T-94 | 34566 PLSNTVLY 70.0 34570 COLNGA 2 70.0 1 1 | P1-2:A14:117:_SCHLNDLR-FIVEPOINTSSS #1 70kV [0] and P1-3:A14:15:_GATES 230/70kV TB 5 | P6 | Multiple Contingency | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | 103.04 | Sensitivity Under Review |
| Fresno-T-95 | 34567 FIVEPOINTSSS 70.0 34560 CALFLAX 70.0 1 1 | P1-2:A14:103:_SCHINDLER-COALINGA #2 70kV [9150] and P1-3:A14:15:_GATES 230/70kV TB 5 | P6 | Multiple Contingency | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | 101.21 | Sensitivity Under Review |
| Fresno-T-96 | 34998 E2_PGE 115 34997 E1_PGE 230 1 1 | P1-2:A14:121:_GREGG-E1_PGE #1 230kV [0] and P1-2:A14:122:_GREGG-E1_PGE #2 230kV [0] | P6 | Multiple Contingency | <100 | 99.80 | 99.80 | <100 | <100 | <100 | 100.02 | <100 | 99.80 | 99.80 | Sensitivity Under Review |
| Fresno-T-97 | 36354 SAN MIGL 70.0 34574 COLNGA 1 70.0 1 1 | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-3:A14:25:_SCHINDLR 115/70kV TB 1 | P6 | Multiple Contingency | 140.92 | <100 | 120.79 | <100 | <100 | 111.25 | <100 | 183.16 | 156.47 | NConv | Under Review/ Estrella Project helps mitigate |
| Fresno-T-98 | 30875 MC CALL 230 30876 MCCALL1M 115 1 1 | P1-3:A14:17:_MC CALL 230/115kV TB 2 and P1-3:A14:18:_MC CALL 230/115kV TB 3 | P6 | Multiple Contingency | 100.00 | <100 | 90.03 | <100 | <100 | 100.00 | <100 | <100 | 100.01 | 100.01 | Under Review |

Study Area: **PG&E Greater Fresno**

Thermal Overloads



| ID | Overloaded Facility | Worst Contingency | Category | Category Description | Loading (%) | | | | | | | | | | Potential Mitigation Solutions |
|--------------|---|---|----------|----------------------|------------------|------------------|------------------|----------------------|------------------------|-------------------|-----------------|---------------------------------------|-------------------|-----------------------------------|--|
| | | | | | 2018 Summer Peak | 2021 Summer Peak | 2026 Summer Peak | 2018 Spring Off-Peak | 2021 Spring Light Load | 2018 SP No BTM-PV | 2021 SP No AAEE | 2021 SP Heavy Renewable & Min Gas Gen | 2026 SP No BTM-PV | 2026 Retirement of QF Generations | |
| Fresno-T-99 | 30875 MC CALL 230 30878 MCCALL3M 115 3 1 | P1-3:A14:16:_MC CALL 230/115kV TB 1 and P1-3:A14:17:_MC CALL 230/115kV TB 2 | P6 | Multiple Contingency | 99.99 | <100 | 90.01 | <100 | <100 | 100.00 | <100 | <100 | 100.01 | 100.01 | Under Review |
| Fresno-T-100 | 30875 MC CALL 230 30878 MCCALL3M 115 3 1 | P1-3:A14:16:_MC CALL 230/115kV TB 1 and P1-3:A14:17:_MC CALL 230/115kV TB 2 | P6 | Multiple Contingency | 99.99 | <100 | 90.01 | <100 | <100 | 100.00 | <100 | <100 | 100.01 | 100.01 | Under Review |
| Fresno-T-101 | 34112 EXCHEQUR 115 34116 LE GRAND 115 1 1 | P1-3:A13:8:_WILSON 230/115kV TB 2 and P1-3:A13:17:_EXCHEQUR 70/115kV TB 1 | P6 | Multiple Contingency | 101.46 | <100 | <100 | <100 | <100 | 102.80 | <100 | <100 | <100 | <100 | Northern Fresno 115kV Area reinforcement project fixes later years |
| Fresno-T-102 | 34134 WILSON A 115 34104 ATWATER 115 1 1 | P1-2:A13:38:_EL CAPITAN-WILSON 115kV [1510] and P1-2:A13:27:_ATWATER-LIVNGSTN-MERCED 115kV [1030] | P6 | Multiple Contingency | 128.11 | <100 | <100 | <100 | <100 | 133.96 | <100 | <100 | <100 | <100 | Wilson 115kV area reinforcent |
| Fresno-T-103 | 34417 KINGS J2 115 34418 KINGSBRG 115 1 1 | P1-2:A14:54:_MCCALL-KINGSBURG #2 115kV [2301] and P1-2:A14:55:_GWF-KINGSBURG 115kV [1743] | P6 | Multiple Contingency | 94.55 | <100 | 94.14 | <100 | <100 | 100.00 | <100 | <100 | 100.15 | 97.00 | Sensitivity Under Review |
| Fresno-T-104 | 34998 E2_PGE 115 34997 E1_PGE 230 2 1 | P1-2:A14:121:_GREGG-E1_PGE #1 230kV [0] and P1-2:A14:122:_GREGG-E1_PGE #2 230kV [0] | P6 | Multiple Contingency | <100 | 99.80 | 99.80 | <100 | <100 | <100 | 100.02 | <100 | 99.80 | 99.80 | Sensitivity Under Review |
| Fresno-T-105 | 30823 HELMS PP3 230 34997 E1_PGE 230 2 1 | P7-1:A14:39:_HELMS PP1-E1_PGE #1 230kV [0] & HELMS PP1-E1_PGE #1 230kV [0] | P7 | Multiple Contingency | <100 | 93.07 | 93.08 | <100 | 70.30 | <100 | 137.22 | 93.10 | 93.12 | 93.08 | Sensitivity Under Review |
| Fresno-T-106 | 34105 CERTANJ1 115 34100 CHWCHLLA 115 1 1 | P7-1:A14:12:_KERCKHOFF-CLOVIS-SANGER #1 115kV [1890] & KERCKHOFF-CLOVIS-SANGER #2 115kV [1900] | P7 | Multiple Contingency | 95.70 | <100 | <100 | 95.61 | <100 | 145.58 | <100 | <100 | <100 | <100 | Sensitivity Under Review |
| Fresno-T-107 | 34105 CERTANJ1 115 34100 CHWCHLLA 115 1 1 | P7-1:A14:40:_E2_PGE-KERCKHF2 #1 115kV [0] & E2_PGE-KERCKHF2 #2 115kV [0] | P7 | Multiple Contingency | <100 | 96.05 | 96.24 | <100 | 95.63 | <100 | 151.08 | 88.63 | 96.22 | 96.24 | Sensitivity Under Review |
| Fresno-T-108 | 34105 CERTANJ1 115 34121 SHARON T 115 1 1 | P7-1:A14:12:_KERCKHOFF-CLOVIS-SANGER #1 115kV [1890] & KERCKHOFF-CLOVIS-SANGER #2 115kV [1900] | P7 | Multiple Contingency | 95.30 | <100 | <100 | 95.20 | <100 | 144.88 | <100 | <100 | <100 | <100 | Sensitivity Under Review |
| Fresno-T-109 | 34105 CERTANJ1 115 34121 SHARON T 115 1 1 | P7-1:A14:40:_E2_PGE-KERCKHF2 #1 115kV [0] & E2_PGE-KERCKHF2 #2 115kV [0] | P7 | Multiple Contingency | <100 | 95.63 | 95.82 | <100 | 95.23 | <100 | 150.34 | 88.24 | 95.80 | 95.82 | Sensitivity Under Review |

Study Area: PG&E Greater Fresno



Thermal Overloads

| ID | Overloaded Facility | Worst Contingency | Category | Category Description | Loading (%) | | | | | | | | | | Potential Mitigation Solutions |
|--------------|---|--|----------|----------------------|------------------|------------------|------------------|----------------------|------------------------|-------------------|-----------------|---------------------------------------|-------------------|-----------------------------------|---|
| | | | | | 2018 Summer Peak | 2021 Summer Peak | 2026 Summer Peak | 2018 Spring Off-Peak | 2021 Spring Light Load | 2018 SP No BTM-PV | 2021 SP No AAEE | 2021 SP Heavy Renewable & Min Gas Gen | 2026 SP No BTM-PV | 2026 Retirement of QF Generations | |
| Fresno-T-110 | 34116 LE GRAND 115 34134 WILSON A 115 1 1 | P7-1:A14:12:_KERCKHOFF-CLOVIS-SANGER #1 115kV [1890] & KERCKHOFF-CLOVIS-SANGER #2 115kV [1900] | P7 | Multiple Contingency | 63.32 | <100 | <100 | 105.28 | <100 | 107.06 | <100 | <100 | <100 | <100 | Wilson-Le Grand 115kV reconductoring Project |
| Fresno-T-111 | 34121 SHARON T 115 34128 OAKH_JCT 115 1 1 | P7-1:A14:12:_KERCKHOFF-CLOVIS-SANGER #1 115kV [1890] & KERCKHOFF-CLOVIS-SANGER #2 115kV [1900] | P7 | Multiple Contingency | 99.90 | <100 | <100 | 99.87 | <100 | 149.49 | <100 | <100 | <100 | <100 | Check FRTSPS, drop another pump |
| Fresno-T-112 | 34121 SHARON T 115 34128 OAKH_JCT 115 1 1 | P7-1:A14:40:_E2_PGE-KERCKHF2 #1 115kV [0] & E2_PGE-KERCKHF2 #2 115kV [0] | P7 | Multiple Contingency | <100 | 99.93 | 99.92 | <100 | 99.93 | <100 | 155.20 | 92.53 | 99.91 | 99.92 | FRTSPS, check Gen Drop as well for other cases |
| Fresno-T-113 | 34123 K1-JCT 115 34358 KERCKHF2 115 2 1 | P7-1:A14:12:_KERCKHOFF-CLOVIS-SANGER #1 115kV [1890] & KERCKHOFF-CLOVIS-SANGER #2 115kV [1900] | P7 | Multiple Contingency | 77.30 | <100 | <100 | 62.25 | <100 | 105.73 | <100 | <100 | <100 | <100 | Sensitivity Under Review |
| Fresno-T-114 | 34123 K1-JCT 115 34358 KERCKHF2 115 2 1 | P7-1:A14:40:_E2_PGE-KERCKHF2 #1 115kV [0] & E2_PGE-KERCKHF2 #2 115kV [0] | P7 | Multiple Contingency | <100 | 74.83 | 76.20 | <100 | 61.63 | <100 | 106.00 | 70.90 | 79.31 | 76.20 | Sensitivity Under Review |
| Fresno-T-115 | 34128 OAKH_JCT 115 34123 K1-JCT 115 1 1 | P7-1:A14:12:_KERCKHOFF-CLOVIS-SANGER #1 115kV [1890] & KERCKHOFF-CLOVIS-SANGER #2 115kV [1900] | P7 | Multiple Contingency | 77.29 | <100 | <100 | 62.23 | <100 | 105.72 | <100 | <100 | <100 | <100 | Sensitivity Under Review |
| Fresno-T-116 | 34128 OAKH_JCT 115 34123 K1-JCT 115 1 1 | P7-1:A14:40:_E2_PGE-KERCKHF2 #1 115kV [0] & E2_PGE-KERCKHF2 #2 115kV [0] | P7 | Multiple Contingency | <100 | 74.82 | 76.20 | <100 | 61.61 | <100 | 106.00 | 70.89 | 79.30 | 76.20 | Sensitivity Under Review |
| Fresno-T-117 | 34348 SHEPHERD 115 34998 E2_PGE 115 1 1 | P7-1:A14:38:_GREGG-E1_PGE #1 230kV [0] & GREGG-E1_PGE #2 230kV [0] | P7 | Multiple Contingency | <100 | 88.61 | 87.33 | <100 | 38.08 | <100 | 118.53 | 89.51 | 87.08 | 85.38 | Drop additional pump/ Revise Norther Fresno Project |
| Fresno-T-118 | 34414 WOODWARD 115 34348 SHEPHERD 115 1 1 | P7-1:A14:38:_GREGG-E1_PGE #1 230kV [0] & GREGG-E1_PGE #2 230kV [0] | P7 | Multiple Contingency | <100 | 79.96 | 78.18 | <100 | 40.54 | <100 | 108.93 | 80.89 | 77.96 | 76.22 | Drop additional pump/ Revise Norther Fresno Project |
| Fresno-T-119 | 34998 E2_PGE 115 34365 CLOVISJ2 115 1 1 | P7-1:A14:38:_GREGG-E1_PGE #1 230kV [0] & GREGG-E1_PGE #2 230kV [0] | P7 | Multiple Contingency | <100 | 69.45 | 70.66 | <100 | 49.00 | <100 | 101.53 | 67.80 | 71.81 | 72.24 | Sensitivity Under Review |
| Fresno-T-120 | 34998 E2_PGE 115 34997 E1_PGE 230 1 1 | P7-1:A14:38:_GREGG-E1_PGE #1 230kV [0] & GREGG-E1_PGE #2 230kV [0] | P7 | Multiple Contingency | <100 | 99.80 | 99.80 | <100 | 76.99 | <100 | 142.32 | 99.80 | 99.80 | 99.80 | Drop additional pump/ Revise Norther Fresno Project |
| Fresno-T-121 | 34998 E2_PGE 115 34997 E1_PGE 230 2 1 | P7-1:A14:38:_GREGG-E1_PGE #1 230kV [0] & GREGG-E1_PGE #2 230kV [0] | P7 | Multiple Contingency | <100 | 99.80 | 99.80 | <100 | 76.99 | <100 | 142.32 | 99.80 | 99.80 | 99.80 | Drop additional pump/ Revise Norther Fresno Project |

Study Area: PG&E Greater Fresno

Voltage Deviations



| ID | Substation | Worst Contingency | Category | Category Description | Post Cont. Voltage Deviation % | | | | | | | | | | Potential Mitigation Solutions |
|----|------------|-------------------|----------|----------------------|--------------------------------|------------------|------------------|----------------------|------------------------|-------------------|-----------------|--|-------------------|-----------------------------------|--------------------------------|
| | | | | | 2018 Summer Peak | 2021 Summer Peak | 2026 Summer Peak | 2018 Spring Off-Peak | 2021 Spring Light Load | 2018 SP No BTM-PV | 2021 SP No AAEE | 2021 SOP Heavy Renewable & Min Gas Gen | 2026 SP No BTM-PV | 2026 Retirement of QF Generations | |
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Study Area: PG&E Greater Fresno

High/Low Voltage



| ID | Substation | Worst Contingency | Category | Category Description | Voltage (PU) | | | | | | | | | | Potential Mitigation Solutions | |
|-------------|---------------------|-----------------------------------|----------|----------------------|------------------|------------------|------------------|----------------------|------------------------|-------------------|-----------------|---------------------------------------|-------------------|-----------------------------------|--------------------------------|--|
| | | | | | 2018 Summer Peak | 2021 Summer Peak | 2026 Summer Peak | 2018 Spring Off-Peak | 2021 Spring Light Load | 2018 SP No BTM-PV | 2021 SP No AAEE | 2021 SP Heavy Renewable & Min Gas Gen | 2026 SP No BTM-PV | 2026 Retirement of QF Generations | | |
| Fresno-V-1 | ALPAUGH 115 kV | Base Case | P0 | Base Case | 1.0308 | 1.0181 | 1.0384 | 1.0592 | 1.0221 | 1.0305 | 1.0175 | 1.0442 | 1.0379 | 1.0384 | Under Review | |
| Fresno-V-2 | ANGIOLA 70 kV | Base Case | P0 | Base Case | 1.0217 | 1.0239 | 1.0176 | 1.0404 | 1.0519 | 1.0191 | 1.0223 | 1.0375 | 1.0096 | 1.0133 | Under Review | |
| Fresno-V-3 | ATWELL_JCT 115 kV | Base Case | P0 | Base Case | 1.0327 | 1.0243 | 1.0418 | 1.0575 | 1.027 | 1.0324 | 1.0238 | 1.0465 | 1.0415 | 1.0418 | Under Review | |
| Fresno-V-4 | BOSWELL 70 kV | Base Case | P0 | Base Case | 1.0295 | 1.0325 | 1.0273 | 1.0432 | 1.0537 | 1.0272 | 1.031 | 1.0461 | 1.0206 | 1.0232 | Under Review | |
| Fresno-V-5 | CORCORAN 70 kV | Base Case | P0 | Base Case | 1.034 | 1.0374 | 1.0324 | 1.0458 | 1.0561 | 1.0317 | 1.036 | 1.0513 | 1.0263 | 1.0291 | Under Review | |
| Fresno-V-6 | DINUBA 70 kV | Base Case | P0 | Base Case | 1.0281 | 1.0426 | 1.0403 | 1.0456 | 1.0534 | 1.0256 | 1.0403 | 1.0343 | 1.036 | 1.0375 | Under Review | |
| Fresno-V-7 | DUNLAP 70 kV | Base Case | P0 | Base Case | 0.9971 | 1.0112 | 1.0128 | 1.0366 | 1.0514 | 0.9939 | 1.0081 | 1.005 | 1.0069 | 1.0104 | Under Review | |
| Fresno-V-8 | GATES 115 kV | Base Case | P0 | Base Case | 1.0989 | 1.0992 | 1.099 | 1.0813 | 1.0908 | 1.0982 | 1.0994 | 1.0967 | 1.0982 | 1.0987 | Under Review | |
| Fresno-V-9 | GIFFEN 70 kV | Base Case | P0 | Base Case | 1.0256 | 1.0269 | 1.0325 | 1.0508 | 1.0288 | 1.025 | 1.0263 | 1.0502 | 1.0313 | 1.0313 | Under Review | |
| Fresno-V-10 | JGBSWLL 70 kV | Base Case | P0 | Base Case | 1.0286 | 1.0315 | 1.0261 | 1.0428 | 1.0534 | 1.0262 | 1.0299 | 1.0449 | 1.0194 | 1.0219 | Under Review | |
| Fresno-V-11 | NRTHFORK 70 kV | Base Case | P0 | Base Case | 1.0354 | 1.0389 | 1.0366 | 1.0597 | 1.0482 | 1.033 | 1.0382 | 1.0383 | 1.0324 | 1.0289 | Under Review | |
| Fresno-V-12 | OLIVE_SS 115 kV | Base Case | P0 | Base Case | 1.0331 | 1.023 | 1.0415 | 1.0601 | 1.0249 | 1.0329 | 1.0224 | 1.0477 | 1.0411 | 1.0414 | Under Review | |
| Fresno-V-13 | OROSI 70 kV | Base Case | P0 | Base Case | 1.0153 | 1.0276 | 1.0293 | 1.0425 | 1.0553 | 1.0127 | 1.0254 | 1.0215 | 1.0248 | 1.027 | Under Review | |
| Fresno-V-14 | Q679 70 kV | Base Case | P0 | Base Case | 1.0256 | 1.0269 | 1.0325 | 1.0508 | 1.0288 | 1.025 | 1.0263 | 1.0502 | 1.0312 | 1.0313 | Under Review | |
| Fresno-V-15 | QUEBEC 115 kV | Base Case | P0 | Base Case | 1.0276 | 1.0126 | 1.036 | 1.0563 | 1.0166 | 1.0273 | 1.0116 | 1.0398 | 1.0355 | 1.0359 | Under Review | |
| Fresno-V-16 | REEDLEY 70 kV | Base Case | P0 | Base Case | 1.0308 | 1.0422 | 1.044 | 1.047 | 1.0551 | 1.0286 | 1.0403 | 1.0362 | 1.0403 | 1.0417 | Under Review | |
| Fresno-V-17 | SANDCRK 70 kV | Base Case | P0 | Base Case | 1.0029 | 1.0165 | 1.0179 | 1.0385 | 1.0525 | 0.9998 | 1.0137 | 1.0102 | 1.0122 | 1.0155 | Under Review | |
| Fresno-V-18 | SJNO2 70 kV | Base Case | P0 | Base Case | 1.035 | 1.0383 | 1.036 | 1.0569 | 1.045 | 1.0327 | 1.0376 | 1.0377 | 1.032 | 1.0291 | Under Review | |
| Fresno-V-19 | SJNO3 70 kV | Base Case | P0 | Base Case | 1.0358 | 1.0395 | 1.0371 | 1.0624 | 1.0514 | 1.0333 | 1.0388 | 1.0389 | 1.0328 | 1.0286 | Under Review | |
| Fresno-V-20 | STONCRRL 70 kV | Base Case | P0 | Base Case | 1.0073 | 1.0199 | 1.0212 | 1.0398 | 1.0537 | 1.0045 | 1.0177 | 1.0137 | 1.0162 | 1.0189 | Under Review | |
| Fresno-V-21 | TVY VLLY 70 kV | Base Case | P0 | Base Case | 1.0243 | 1.0362 | 1.0378 | 1.0449 | 1.0545 | 1.0219 | 1.0343 | 1.0302 | 1.0335 | 1.0355 | Under Review | |
| Fresno-V-22 | WHITERIVER_P 115 kV | Base Case | P0 | Base Case | 1.0334 | 1.0233 | 1.0417 | 1.0598 | 1.0249 | 1.0331 | 1.0227 | 1.0478 | 1.0413 | 1.0416 | Under Review | |
| Fresno-V-23 | GATES 115 kV | P1-3:A14:1:_GATES 500/230kV TB 11 | P1 | Single Contingency | 1.1033 | 1.1041 | 1.1054 | 1.086 | 1.0999 | 1.102 | 1.1022 | 1.1018 | 1.1041 | 1.1047 | Under Review | |

Study Area: PG&E Greater Fresno

High/Low Voltage



| ID | Substation | Worst Contingency | Category | Category Description | Voltage (PU) | | | | | | | | | | Potential Mitigation Solutions | |
|-------------|-----------------|--|----------|----------------------|------------------|------------------|------------------|----------------------|------------------------|-------------------|-----------------|---------------------------------------|-------------------|-----------------------------------|-------------------------------------|--|
| | | | | | 2018 Summer Peak | 2021 Summer Peak | 2026 Summer Peak | 2018 Spring Off-Peak | 2021 Spring Light Load | 2018 SP No BTM-PV | 2021 SP No AAEE | 2021 SP Heavy Renewable & Min Gas Gen | 2026 SP No BTM-PV | 2026 Retirement of QF Generations | | |
| Fresno-V-24 | CANAL 70 kV | P2-1:A13:58:_LOS BANOS-LIVINGSTON JCT-CANAL 70kV [8940] (CHEVPIPE-LOS BANS) | P2-1 | Single Contingency | 0.9008 | 1.0049 | 1.0048 | 1.0119 | 1.0439 | 0.8912 | 1.002 | 0.9997 | 1.0028 | 1.0044 | Oro Loma 70kV Reinforcement Project | |
| Fresno-V-25 | CHEVPIPE 70 kV | P2-1:A13:58:_LOS BANOS-LIVINGSTON JCT-CANAL 70kV [8940] (CHEVPIPE-LOS BANS) | P2-1 | Single Contingency | 0.8888 | 0.9951 | 0.9954 | 1.0077 | 1.0429 | 0.8788 | 0.9915 | 0.9898 | 0.9931 | 0.995 | Oro Loma 70kV Reinforcement Project | |
| Fresno-V-26 | LIVNGSTN 70 kV | P2-1:A13:58:_LOS BANOS-LIVINGSTON JCT-CANAL 70kV [8940] (CHEVPIPE-LOS BANS) | P2-1 | Single Contingency | 0.9003 | 1.0053 | 1.0049 | 1.0127 | 1.0452 | 0.8903 | 1.0021 | 1 | 1.0025 | 1.0045 | Oro Loma 70kV Reinforcement Project | |
| Fresno-V-27 | SNTA NLA 70 kV | P2-1:A13:58:_LOS BANOS-LIVINGSTON JCT-CANAL 70kV [8940] (CHEVPIPE-LOS BANS) | P2-1 | Single Contingency | 0.8888 | 0.9951 | 0.9954 | 1.0077 | 1.0429 | 0.8788 | 0.9916 | 0.9898 | 0.9931 | 0.995 | Oro Loma 70kV Reinforcement Project | |
| Fresno-V-28 | BULLARD 115 kV | P2-4:A14:1:_HERNDON 230kV - Section 1D & 2D | P2 | Single Contingency | 0.9124 | 0.9429 | 0.9332 | 0.634 | 1.0253 | 0.8964 | 0.9344 | 0.9415 | 0.9201 | 0.9314 | Drop Pumps | |
| Fresno-V-29 | DUNLAP 70 kV | P2-4:A14:5:_MC CALL 230kV - Section 2D & 1D | P2 | Single Contingency | 0.9067 | 0.97 | 0.9651 | 1.0062 | 1.0312 | 0.8873 | 0.9614 | 0.9585 | 0.948 | 0.9544 | Drop Pumps | |
| Fresno-V-30 | HERNDON 230 kV | P2-4:A14:1:_HERNDON 230kV - Section 1D & 2D | P2 | Single Contingency | 0.9072 | 0.9343 | 0.9264 | 0.6214 | 0.9958 | 0.8931 | 0.9276 | 0.9329 | 0.9157 | 0.9247 | Drop Pumps | |
| Fresno-V-31 | PNDLJ1 115 kV | P2-4:A14:1:_HERNDON 230kV - Section 1D & 2D | P2 | Single Contingency | 0.915 | 0.9452 | 0.9356 | 0.6342 | 1.0246 | 0.8992 | 0.9369 | 0.9437 | 0.9228 | 0.9337 | Drop Pumps | |
| Fresno-V-32 | PNEDLE 115 kV | P2-4:A14:1:_HERNDON 230kV - Section 1D & 2D | P2 | Single Contingency | 0.914 | 0.9444 | 0.9346 | 0.6339 | 1.0247 | 0.8982 | 0.936 | 0.9429 | 0.9218 | 0.9328 | Drop Pumps | |
| Fresno-V-33 | SANDCRK 70 kV | P2-4:A14:5:_MC CALL 230kV - Section 2D & 1D | P2 | Single Contingency | 0.9131 | 0.9755 | 0.9704 | 1.0082 | 1.0323 | 0.8939 | 0.9673 | 0.9641 | 0.9536 | 0.9598 | Drop Pumps | |
| Fresno-V-34 | STONCRRL 70 kV | P2-4:A14:5:_MC CALL 230kV - Section 2D & 1D | P2 | Single Contingency | 0.918 | 0.9791 | 0.974 | 1.0096 | 1.0336 | 0.8993 | 0.9715 | 0.9677 | 0.9579 | 0.9634 | Drop Pumps | |
| Fresno-V-35 | CHWCHLLA 115 kV | P1-2:A13:25:_LE GRAND-CHOWCHILLA 115kV [2111] and P1-1:A14:6:_KERCKHOF 14kV Gen Unit 1 | P3 | Multiple Contingency | 0.89 | >0.9 | 0.89 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8846 | 0.89 | Under Review | |
| Fresno-V-36 | MARIPOS2 70 kV | P1-3:A13:17:_EXCHEQUR 70/115kV TB 1 and P1-1:A13:14:_MCSWAIN 4kV Gen Unit 1 | P3 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8963 | >0.9 | >0.9 | 0.8997 | >0.9 | Under Review | |
| Fresno-V-37 | SHARON 115 kV | P1-2:A13:25:_LE GRAND-CHOWCHILLA 115kV [2111] and P1-1:A14:6:_KERCKHOF 14kV Gen Unit 1 | P3 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8969 | >0.9 | Under Review | |



| ID | Substation | Worst Contingency | Category | Category Description | Voltage (PU) | | | | | | | | | | Potential Mitigation Solutions | |
|-------------|-----------------|---|----------|----------------------|------------------|------------------|------------------|----------------------|------------------------|-------------------|-----------------|---------------------------------------|-------------------|-----------------------------------|---|--|
| | | | | | 2018 Summer Peak | 2021 Summer Peak | 2026 Summer Peak | 2018 Spring Off-Peak | 2021 Spring Light Load | 2018 SP No BTM-PV | 2021 SP No AAEE | 2021 SP Heavy Renewable & Min Gas Gen | 2026 SP No BTM-PV | 2026 Retirement of QF Generations | | |
| Fresno-V-38 | ATWATER 115 kV | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | 0.887 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8559 | >0.9 | >0.9 | >0.9 | >0.9 | Under Review | |
| Fresno-V-39 | ATWATR J 115 kV | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | 0.8884 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8574 | >0.9 | >0.9 | >0.9 | >0.9 | Wilson 115kV area reinforcent &Cressy N. Merced | |
| Fresno-V-40 | BER VLLY 70 kV | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-3:A13:17:_EXCHEQUR 70/115kV TB 1 | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.877 | >0.9 | Sensitivity Under Review | |
| Fresno-V-41 | BRCEBG J 70 kV | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:30:_EXCHEQUER-LE GRAND 115kV [1560] | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8641 | >0.9 | Sensitivity Under Review | |
| Fresno-V-42 | CAL AVE 115 kV | P1-2:A14:45:_SANGER-CALIFORNIA AVE 115kV [9130] and P1-2:A14:47:_MCCALL-WEST FRESNO #2 115kV [2370] | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8949 | 0.8961 | 0.8873 | >0.9 | >0.9 | Sensitivity Under Review | |
| Fresno-V-43 | CASTLE 115 kV | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | 0.8878 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8567 | >0.9 | >0.9 | >0.9 | >0.9 | Wilson 115kV area reinforcent &Cressy N. Merced | |
| Fresno-V-44 | CERTAN T 115 kV | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:31:_WILSON-LE GRAND 115kV [4170] | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8981 | >0.9 | Sensitivity Under Review | |
| Fresno-V-45 | CERTANJ1 115 kV | P1-1:A14:6:_KERCKHOF 14kV Gen Unit 1 and P1-2:A13:25:_LE GRAND-CHOWCHILLA 115kV [2111] | P6 | Multiple Contingency | >0.9 | >0.9 | 0.8905 | >0.9 | >0.9 | >0.9 | >0.9 | 0.885 | 0.8904 | >0.9 | Under Review | |
| Fresno-V-46 | CERTANJ2 115 kV | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:31:_WILSON-LE GRAND 115kV [4170] | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8981 | >0.9 | Sensitivity Under Review | |
| Fresno-V-47 | CERTTEED 115 kV | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:31:_WILSON-LE GRAND 115kV [4170] | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8972 | >0.9 | Sensitivity Under Review | |
| Fresno-V-48 | CHWCGN 115 kV | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:31:_WILSON-LE GRAND 115kV [4170] | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8974 | >0.9 | Sensitivity Under Review | |
| Fresno-V-49 | CHWCGNJT 115 kV | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:31:_WILSON-LE GRAND 115kV [4170] | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8975 | >0.9 | Sensitivity Under Review | |

Study Area: PG&E Greater Fresno

High/Low Voltage



| ID | Substation | Worst Contingency | Category | Category Description | Voltage (PU) | | | | | | | | | | Potential Mitigation Solutions | |
|-------------|-----------------|---|----------|----------------------|------------------|------------------|------------------|----------------------|------------------------|-------------------|-----------------|---------------------------------------|-------------------|-----------------------------------|---|--|
| | | | | | 2018 Summer Peak | 2021 Summer Peak | 2026 Summer Peak | 2018 Spring Off-Peak | 2021 Spring Light Load | 2018 SP No BTM-PV | 2021 SP No AAEE | 2021 SP Heavy Renewable & Min Gas Gen | 2026 SP No BTM-PV | 2026 Retirement of QF Generations | | |
| Fresno-V-50 | CHWCHLA2 115 kV | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:31:_WILSON-LE GRAND 115kV [4170] | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8974 | >0.9 | Sensitivity Under Review | |
| Fresno-V-51 | CHWCHLLA 115 kV | P1-2:A13:25:_LE GRAND-CHOWCHILLA 115kV [2111] and P1-3:A14:23:_KERCKHF2 115/13.8kV TB 1 | P6 | Multiple Contingency | >0.9 | >0.9 | 0.89 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8846 | 0.89 | >0.9 | Sensitivity Under Review | |
| Fresno-V-52 | COLNGA 1 70 kV | P1-2:A14:102:_JAYNE SW STA-COALINGA 70kV [8670] and P1-2:A14:71:_COALINGA #1-COALINGA #2 70kV [0] | P6 | Multiple Contingency | 0.8604 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8462 | >0.9 | >0.9 | >0.9 | >0.9 | Estrella mitigates future years | |
| Fresno-V-53 | CRESSEY 115 kV | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | 0.8829 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8515 | >0.9 | >0.9 | >0.9 | >0.9 | Wilson 115kV area reinforcent &Cressy N. Merced | |
| Fresno-V-54 | DANISHCM 115 kV | P1-2:A14:45:_SANGER-CALIFORNIA AVE 115kV [9130] and P1-2:A14:47:_MCCALL-WEST FRESNO #2 115kV [2370] | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.895 | >0.9 | >0.9 | Sensitivity Under Review | |
| Fresno-V-55 | EL CAPTN 115 kV | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | 0.8902 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8594 | >0.9 | >0.9 | >0.9 | >0.9 | Wilson 115kV area reinforcent &Cressy N. Merced | |
| Fresno-V-56 | EL NIDO 115 kV | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8935 | >0.9 | >0.9 | >0.9 | >0.9 | Wilson 115kV area reinforcent &Cressy N. Merced | |
| Fresno-V-57 | EXCHEQUR 115 kV | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:30:_EXCHEQUER-LE GRAND 115kV [1560] | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8556 | >0.9 | Sensitivity Under Review | |
| Fresno-V-58 | GALLO 115 kV | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | 0.8811 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8496 | >0.9 | >0.9 | >0.9 | >0.9 | Wilson 115kV area reinforcent &Cressy N. Merced | |
| Fresno-V-59 | GATES 115 kV | P1-3:A14:13:_HENRIETA 230/70kV TB 4 and P1-3:A14:1:_GATES 500/230kV TB 11 | P6 | Multiple Contingency | 1.1061 | 1.1073 | 1.1086 | >0.9 | 1.1023 | 1.1049 | 1.1064 | 1.1076 | 1.1079 | >0.9 | Under Review | |
| Fresno-V-60 | HENRIETA 230 kV | P1-2:A14:12:_GREGG-HENRIETA-MUSTANGSS 230kV [0] and P1-2:A14:18:_MC CALL-MUSTANGSS 230kV [0] | P6 | Multiple Contingency | >0.9 | >0.9 | 0.8905 | 0.8465 | 0.855 | 0.8937 | 0.8996 | 0.8862 | 0.8902 | >0.9 | Under Review | |

Study Area: PG&E Greater Fresno

High/Low Voltage



| ID | Substation | Worst Contingency | Category | Category Description | Voltage (PU) | | | | | | | | | | Potential Mitigation Solutions |
|-------------|-----------------|---|----------|----------------------|------------------|------------------|------------------|----------------------|------------------------|-------------------|-----------------|---------------------------------------|-------------------|-----------------------------------|--|
| | | | | | 2018 Summer Peak | 2021 Summer Peak | 2026 Summer Peak | 2018 Spring Off-Peak | 2021 Spring Light Load | 2018 SP No BTM-PV | 2021 SP No AAEE | 2021 SP Heavy Renewable & Min Gas Gen | 2026 SP No BTM-PV | 2026 Retirement of QF Generations | |
| Fresno-V-61 | INDN FLT 70 kV | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:30:_EXCHEQUER-LE GRAND 115kV [1560] | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8544 | >0.9 | Sensitivity Under Review |
| Fresno-V-62 | JACALITO 70 kV | P1-2:A14:98:_GATES-JAYNE SW STA 70kV [8652] and P1-2:A14:71:_COALINGA #1-COALINGA #2 70kV [0] | P6 | Multiple Contingency | 0.8646 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8488 | >0.9 | >0.9 | >0.9 | >0.9 | Wilson 115kV area reinforcment &Cressy N. Merced |
| Fresno-V-63 | JR WOOD 115 kV | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | 0.8861 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8549 | >0.9 | >0.9 | >0.9 | >0.9 | Wilson 115kV area reinforcment &Cressy N. Merced |
| Fresno-V-64 | JRWD GEN 115 kV | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | 0.8863 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8552 | >0.9 | >0.9 | >0.9 | >0.9 | Wilson 115kV area reinforcment &Cressy N. Merced |
| Fresno-V-65 | LE GRNDJ 115 kV | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8864 | >0.9 | >0.9 | >0.9 | >0.9 | Wilson 115kV area reinforcment &Cressy N. Merced |
| Fresno-V-66 | LIVNGSTN 115 kV | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | 0.8812 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8497 | >0.9 | >0.9 | >0.9 | >0.9 | Wilson 115kV area reinforcment &Cressy N. Merced |
| Fresno-V-67 | MARIPOS2 70 kV | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:30:_EXCHEQUER-LE GRAND 115kV [1560] | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.841 | >0.9 | Sensitivity Under Review |
| Fresno-V-68 | MC SWAIN 70 kV | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:30:_EXCHEQUER-LE GRAND 115kV [1560] | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8981 | >0.9 | Sensitivity Under Review |
| Fresno-V-69 | MCSWAINJ 70 kV | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:30:_EXCHEQUER-LE GRAND 115kV [1560] | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8981 | >0.9 | Sensitivity Under Review |
| Fresno-V-70 | MERCED 115 kV | P1-3:A13:8:_WILSON 230/115kV TB 2 and P1-3:A13:7:_WILSON 230/115kV TB 1 | P6 | Multiple Contingency | 0.8983 | >0.9 | >0.9 | >0.9 | >0.9 | 0.869 | >0.9 | >0.9 | >0.9 | >0.9 | Wilson 115kV area reinforcment or Cressy N. Merced |
| Fresno-V-71 | MRCDFLLS 70 kV | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:30:_EXCHEQUER-LE GRAND 115kV [1560] | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8982 | >0.9 | Sensitivity Under Review |

Study Area: PG&E Greater Fresno

High/Low Voltage



| ID | Substation | Worst Contingency | Category | Category Description | Voltage (PU) | | | | | | | | | | Potential Mitigation Solutions | |
|-------------|-------------------|---|----------|----------------------|------------------|------------------|------------------|----------------------|------------------------|-------------------|-----------------|---------------------------------------|-------------------|-----------------------------------|---|--|
| | | | | | 2018 Summer Peak | 2021 Summer Peak | 2026 Summer Peak | 2018 Spring Off-Peak | 2021 Spring Light Load | 2018 SP No BTM-PV | 2021 SP No AAEE | 2021 SP Heavy Renewable & Min Gas Gen | 2026 SP No BTM-PV | 2026 Retirement of QF Generations | | |
| Fresno-V-72 | Q633 70 kV | P1-2:A14:71:_COALINGA #1-COALINGA #2 70kV [0] and P1-2:A14:98:_GATES-JAYNE SW STA 70kV [8652] | P6 | Multiple Contingency | 0.8687 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8539 | >0.9 | >0.9 | >0.9 | >0.9 | Wilson 115kV area reinforcent &Cressy N. Merced | |
| Fresno-V-73 | SAXONCRK 70 kV | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:30:_EXCHEQUER-LE GRAND 115kV [1560] | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8634 | >0.9 | Sensitivity Under Review | |
| Fresno-V-74 | SHARON 115 kV | P1-1:A14:6:_KERCKHOF 14kV Gen Unit 1 and P1-2:A13:25:_LE GRAND-CHOWCHILLA 115kV [2111] | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8969 | >0.9 | >0.9 | Sensitivity Under Review | |
| Fresno-V-75 | SHARON T 115 kV | P1-1:A14:6:_KERCKHOF 14kV Gen Unit 1 and P1-2:A13:25:_LE GRAND-CHOWCHILLA 115kV [2111] | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8972 | >0.9 | >0.9 | Sensitivity Under Review | |
| Fresno-V-76 | WESTLNDS_SS 70 kV | P1-2:A14:98:_GATES-JAYNE SW STA 70kV [8652] and P1-2:A14:71:_COALINGA #1-COALINGA #2 70kV [0] | P6 | Multiple Contingency | 0.8683 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8526 | >0.9 | >0.9 | >0.9 | >0.9 | Oro Loma 70kV Reinforcement Project | |
| Fresno-V-77 | WILSON A 115 kV | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8748 | >0.9 | >0.9 | >0.9 | >0.9 | Sensitivity Under Review | |
| Fresno-V-78 | WILSON B 115 kV | P1-3:A13:7:_WILSON 230/115kV TB 1 and P1-3:A13:8:_WILSON 230/115kV TB 2 | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8744 | >0.9 | >0.9 | >0.9 | >0.9 | Sensitivity Under Review | |
| Fresno-V-79 | WST FRSO 115 kV | P1-2:A14:45:_SANGER-CALIFORNIA AVE 115kV [9130] and P1-2:A14:47:_MCCALL-WEST FRESNO #2 115kV [2370] | P6 | Multiple Contingency | 0.8927 | >0.9 | 0.8975 | >0.9 | >0.9 | 0.8855 | 0.8867 | 0.8779 | 0.8953 | >0.9 | load growth, Under Review | |
| Fresno-V-80 | YOSEMITE 70 kV | P1-2:A13:57:_EXCHEQUER-MARIPOSA 70kV [8640] and P1-3:A13:17:_EXCHEQUR 70/115kV TB 1 | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8978 | >0.9 | >0.9 | >0.9 | >0.9 | Sensitivity Under Review | |
| Fresno-V-81 | YOSEMITE 70 kV | P1-3:A14:15:_GATES 230/70kV TB 5 and P1-2:A13:30:_EXCHEQUER-LE GRAND 115kV [1560] | P6 | Multiple Contingency | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | >0.9 | 0.8499 | >0.9 | Sensitivity Under Review | |

Study Area: PG&E Greater Fresno

Transient Stability



| ID | Contingency | Category | Category Description | Transient Stability Performance(Voltage and frequency violations) | | | | | | | | | | Potential Mitigation Solutions |
|-------------|--|----------|----------------------|--|------------------|------------------|----------------------|------------------------|----------|----------|----------|----------|----------|--|
| | | | | 2018 Summer Peak | 2021 Summer Peak | 2026 Summer Peak | 2018 Spring Off-Peak | 2021 Spring Light Load | Select.. | Select.. | Select.. | Select.. | Select.. | |
| Fresno-TS-1 | Gates 500/230 kV Transformer No. 11 | P1 | Single Contingency | 3 | 2 | 2 | 3 | 2 | N/A | N/A | N/A | N/A | N/A | Under review |
| Fresno-TS-2 | BUS 2 FAULT AT 30835 HERNDON 230.00 | P2 | Single Contingency | 4 | 2 | 2 | 4 | 4 | N/A | N/A | N/A | N/A | N/A | Under review |
| Fresno-TS-3 | BUS FAULT AT 30875 MC CALL 230.00 | P2 | Single Contingency | 21 | 19 | 19 | 21 | 21 | N/A | N/A | N/A | N/A | N/A | Under review |
| Fresno-TS-4 | BUS-TIE BREAKER 202 FAULT AT PANOCHE 115.00 | P2 | Single Contingency | 14 | 8 | 14 | 10 | 10 | N/A | N/A | N/A | N/A | N/A | Under review |
| Fresno-TS-5 | NON-BUS-TIE BREAKER CB1122 FAULT AT 30465 MENDOTA 115.00 | P2 | Single Contingency | 26 | 26 | 26 | 17 | 17 | N/A | N/A | N/A | N/A | N/A | Under review |
| Fresno-TS-6 | BUS FAULT AT 30875 MC CALL 230.00 | P2 | Single Contingency | 21 | 19 | 19 | 21 | 21 | N/A | N/A | N/A | N/A | N/A | Under review |
| Fresno-TS-7 | HELMS 1 18.00 Generator ID 1 | P4 | Single Contingency | 2 | 0 | 0 | 4 | 0 | N/A | N/A | N/A | N/A | N/A | Northern Fresno 115kV Area reinforcement Project fixes later years |
| Fresno-TS-8 | Gates 230kV bus section | P4 | Single Contingency | 33 | 51 | 4 | 175 | 33 | N/A | N/A | N/A | N/A | N/A | Under review |
| Fresno-TS-9 | Herndon - Kearney & Herndon - Ashlan 230 kV Lines | P7 | Multiple Contingency | 7 | 5 | 5 | 8 | 8 | N/A | N/A | N/A | N/A | N/A | Under review |

Study Area: **PG&E Greater Fresno**



Single Contingency Load Drop

| ID | Worst Contingency | Category | Category Description | Amount of Load Drop (MW) | | | | | | | | | | Potential Mitigation Solutions |
|---------|-------------------|----------|----------------------|--------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|--------------------------------|
| | | | | Select.. | Select.. | Select.. | Select.. | Select.. | Select.. | Select.. | Select.. | Select.. | Select.. | |
| X-SLD-1 | | | | | | | | | | | | | | |

No single contingency resulted in total load drop of more than 250 MW.

Study Area: **PG&E Greater Fresno**



Single Source Substation with more than 100 MW Load

| ID | Substation | Load Served (MW) | | | | | | | | | | Potential Mitigation Solutions |
|--------|------------|------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|--------------------------------|
| | | Select.. | Select.. | Select.. | Select.. | Select.. | Select.. | Select.. | Select.. | Select.. | Select.. | |
| X-SS-1 | | | | | | | | | | | | |

No single source substation with more than 100 MW Load