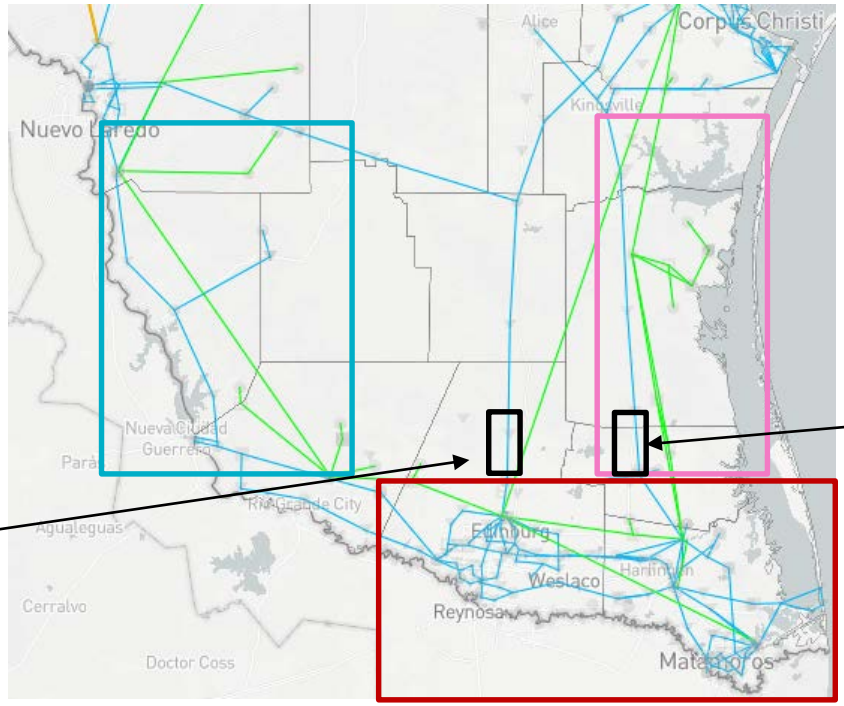
Recent Valley GTC Updates

Transmission Operations Planning

ROS Meeting
12/03/2020

GTCs in the Valley Region prior to the GTC Updates

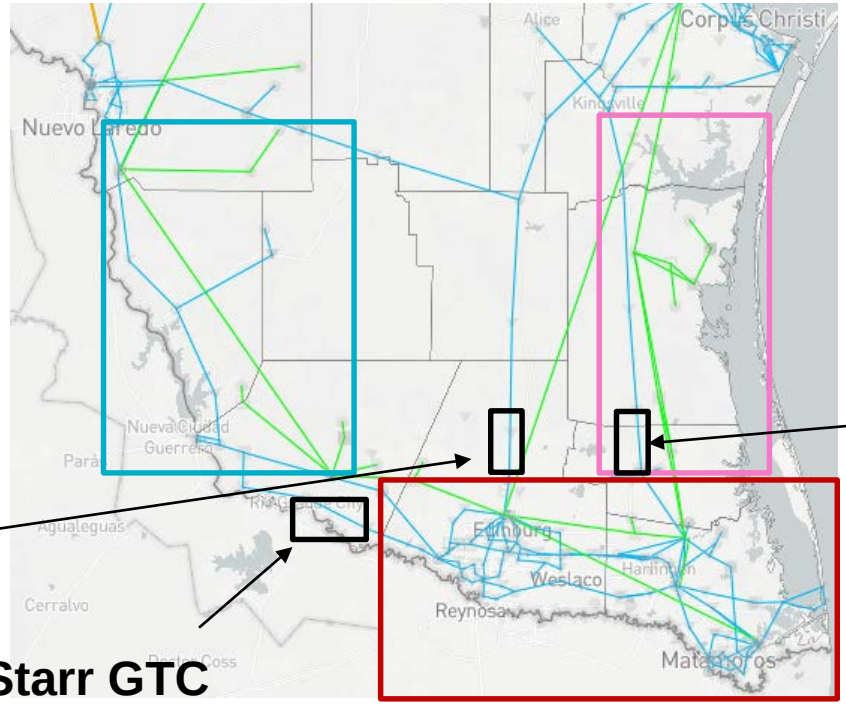
- 5 GTCs in the Valley region: 4 Export + 1 Import



For visualization purposes only. Does not represent exact study area boundaries or GTC interface.

Recent GTC Updates in the Valley Region (Nov. 2020)

- Update Lobo & Ajo GTL table with the same GTC interface
- Add Valley Export GTC (the same interface as Valley Import)
- Add Zapata – Starr GTC



Lobo GTC (345kV)

Ajo GTC (345kV)

Raymondville – Rio Hondo GTC (138kV)

RedTap GTC (138kV)

Zapta-Starr GTC (138kV)

Valley Import & **Export** GTC (345kV & 138kV)

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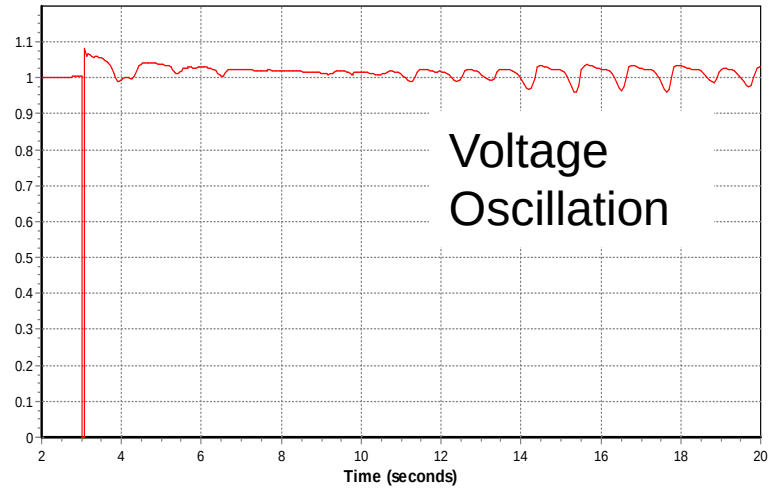
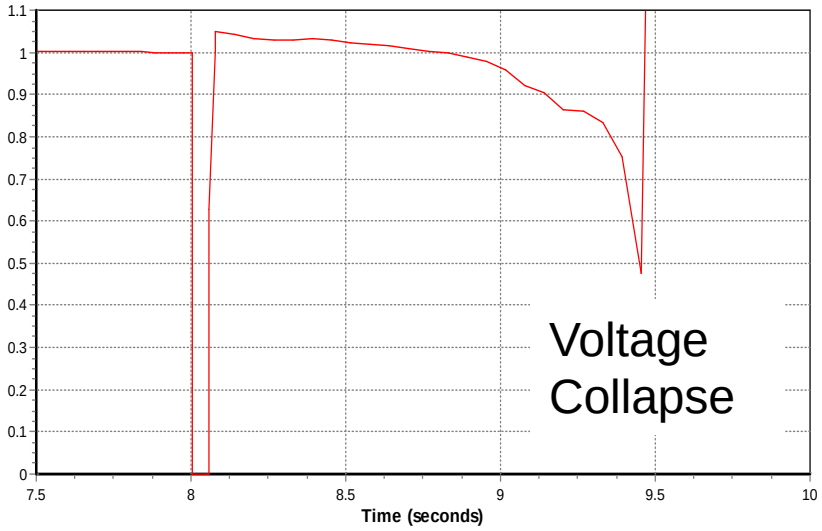
Why to update Valley GTCs

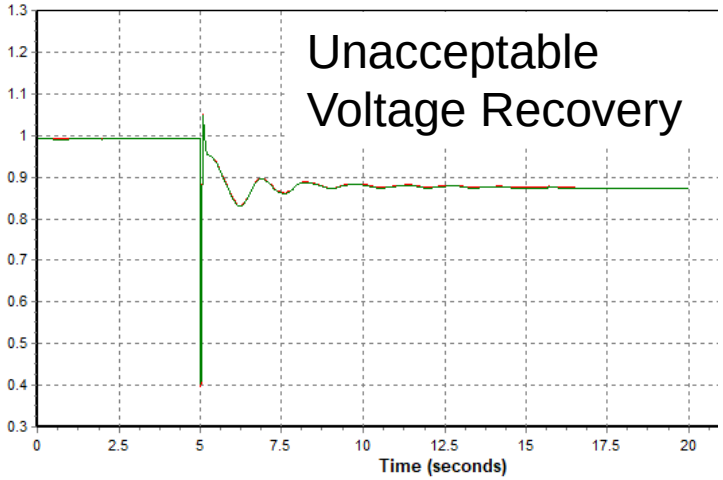
- Many new GRs (all WGRs) are connecting to the Valley region and most of them are outside Ajo and Lobo GTCs
  - 2020 Q2 QSA: 376MW
  - 2020 Q3 QSA: 538MW
  - 2020 Q4 QSA: 410MW (210MW inside Lobo GTC)
  - Total: ~1300MW
- The Stability issue (dynamic voltage stability) has shifted from local stability to regional stability in most of the operational conditions
- Existing Ajo and Lobo GTCs are insufficient to manage the regional stability
- There is a need of GTC updates to manage the regional stability

Dynamic Voltage Stability Issues

- Oscillatory response, voltage collapse and unacceptable voltage recovery



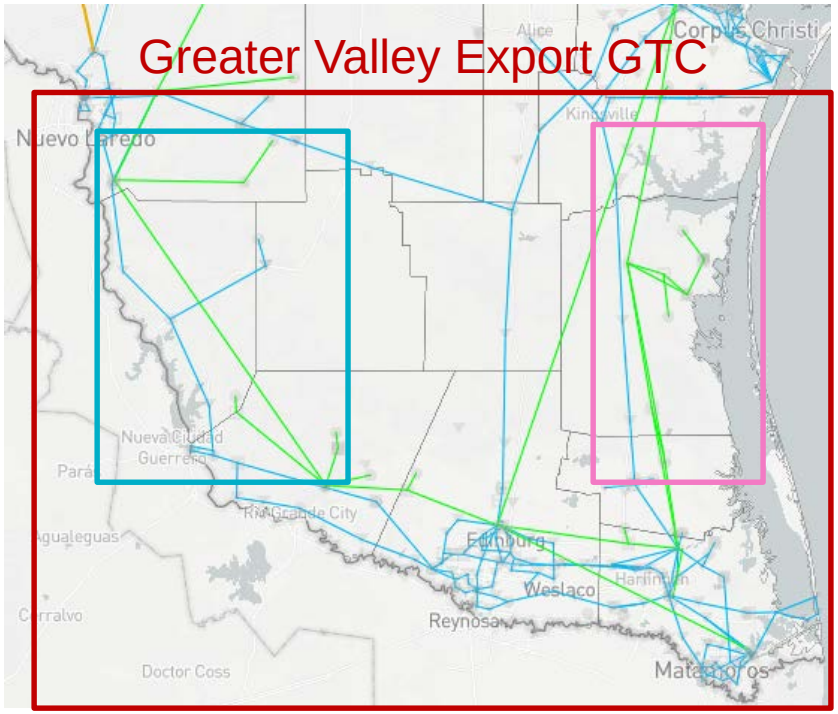




GTC Option #1 Greater Valley Export GTC

- Works well under no-prior outage and prior outages that Valley still remains intact
  - Challenging to deal with non-uniform dispatch
- Challenging to deal with prior outages with Valley divided into two parts
- Nested GTC may be needed

Lobo GTC



Ajo GTC

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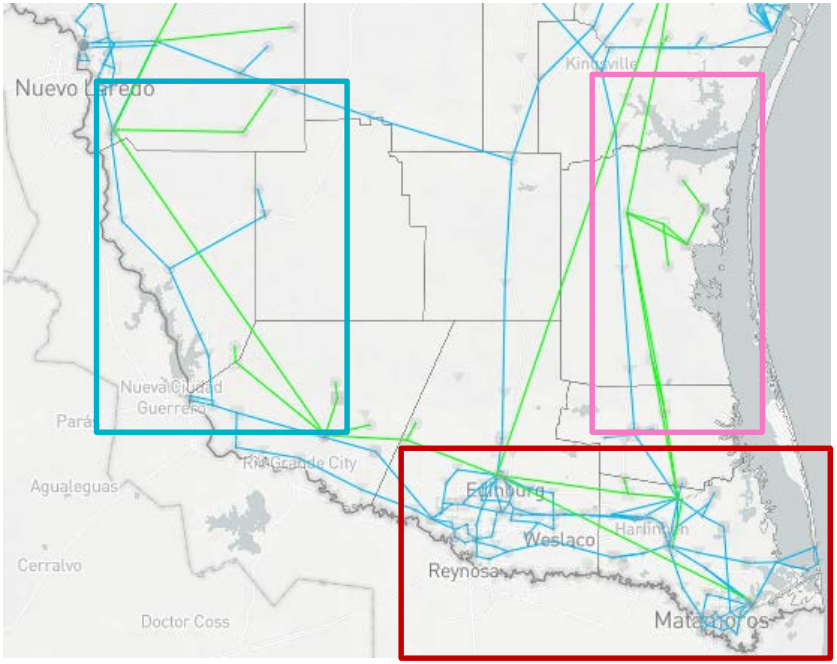
GTC Option #2 Lower Valley Export GTC

- A new Valley Export GTC (the same interface as Valley Import GTC) was proposed to work with Ajo and Lobo GTCs to deal with the regional stability
  - Properly manage non-uniform dispatch
  - Properly manage the situation when Valley is divided into two parts

Lobo GTC



Ajo GTC

Valley Export GTC

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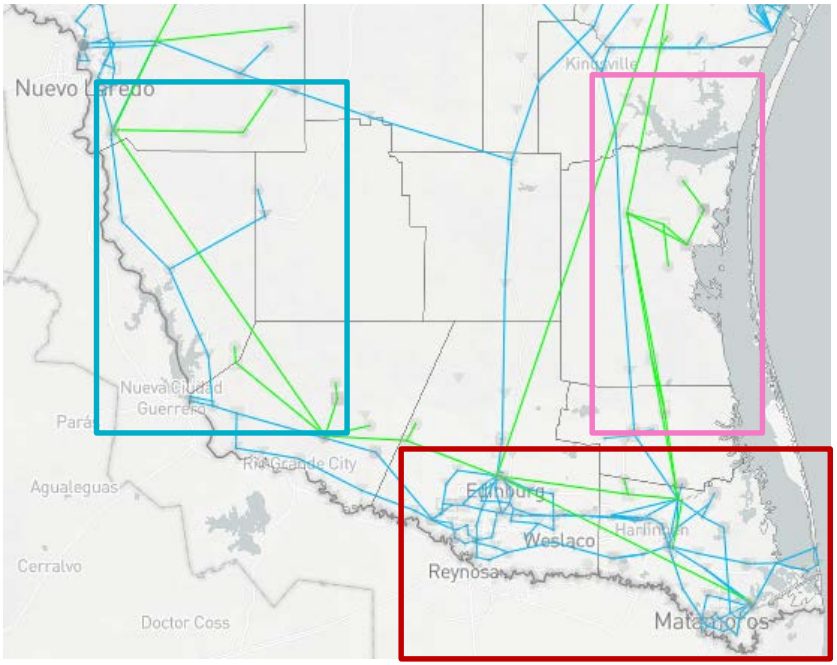
GTC Option #2 Lower Valley Export GTC

- GTC Methodology:
  - For no-prior outage and prior outages related to regional stability, limit 3 GTCs output all together (assume uniform dispatch for all the renewables in 3 GTC areas)

Lobo GTC



Ajo GTC

Valley Export GTC

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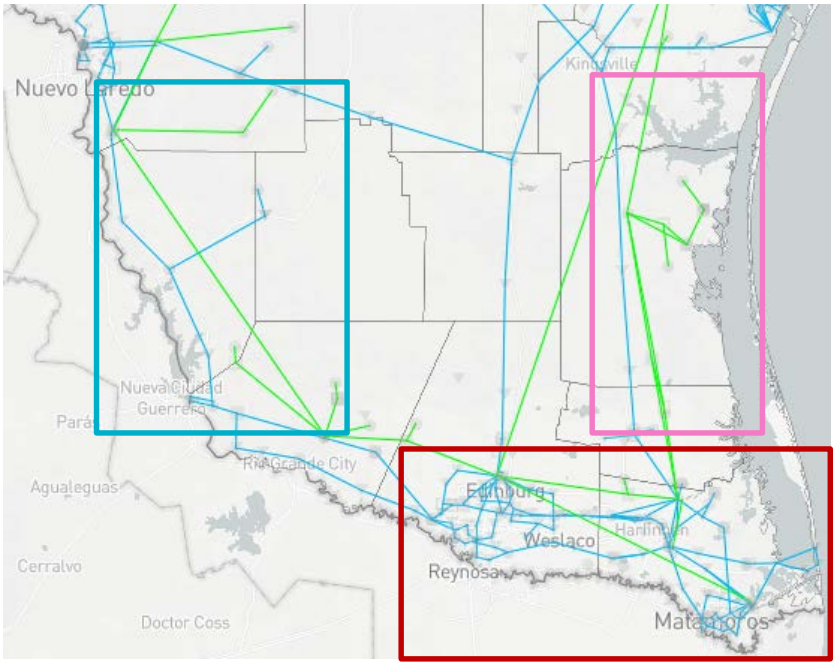
GTC Option #2 Lower Valley Export GTC

- GTC Methodology:
  - For prior outages related to local stability, limit the local GTC output; the other GTC areas are still subject to the no prior outage GTLs

Lobo GTC



Ajo GTC

Valley Export GTC

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GTC Study Case and Results

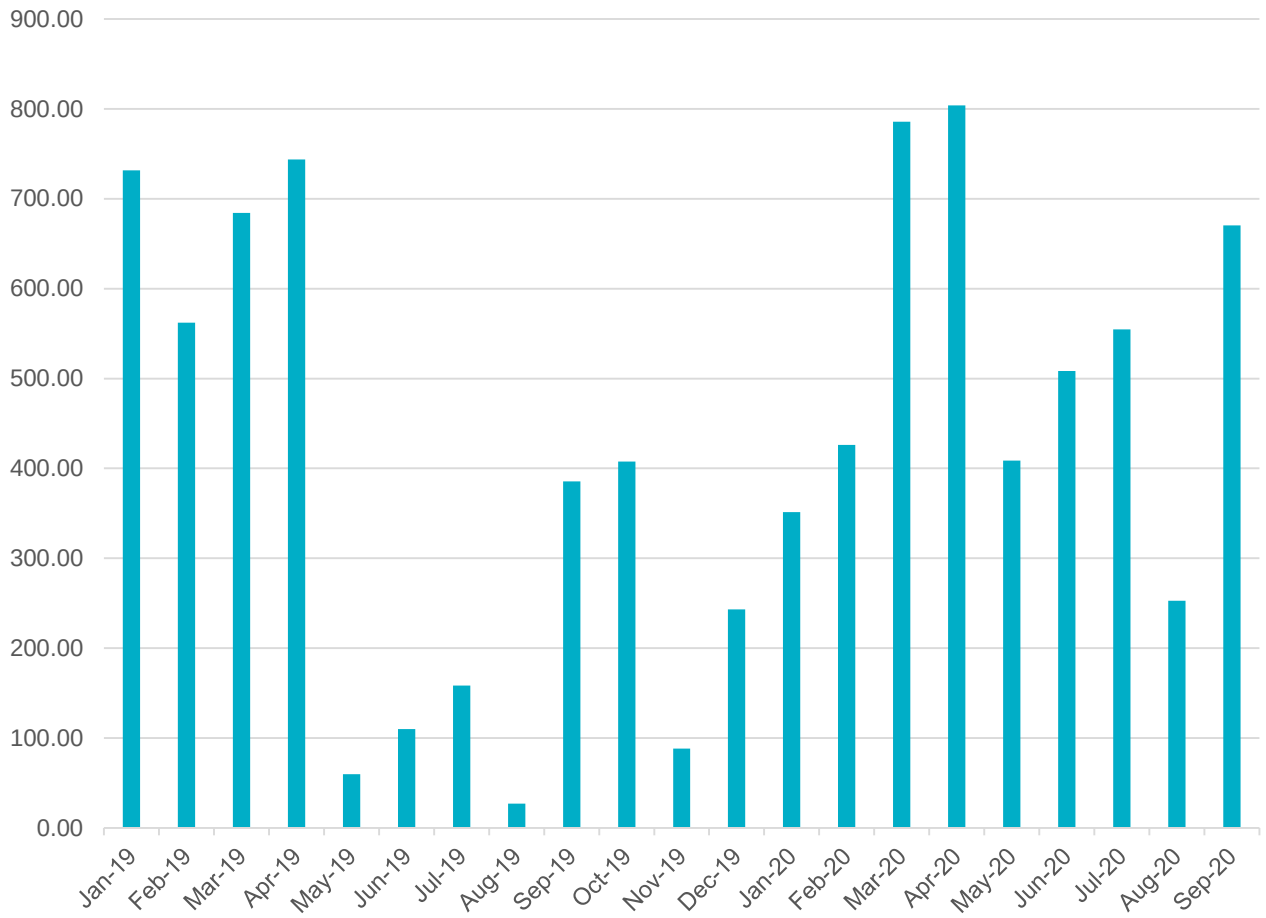
- Based on 2020 Q4 QSA study case (HWLL)
  - Valley thermal units dispatched at ~200MW
  - Valley load: ~900MW
- No prior outage GTLs (GTC interface flow limits)
  - Ajo: 906MW
  - Lobo:1426MW
  - Valley Export: 652MW
  - Sum of 3 GTLs: ~3000MW
- Prior outage GTLs available in the GTC methodology documents at ERCOT MIS

Comparison with Previous GTLs

- Total GTL of Ajo and Lobo remains almost the same for no-prior outage condition as the previous GTL:
  - Ajo: 906MW (current) vs 1098MW(previous)
  - Lobo: 1426MW (current) vs 1283 (previous)
  - Ajo and Lobo GTLs (no-prior outage) are proportional to the WGR installed capacity
- Significant increase for both Ajo and Lobo GTLs under many prior outage conditions, for example:
  - Ajo GTL (Ajo – Nelson Sharpe 345 kV prior outage)
    - 583MW (current) vs 128MW(previous)
  - Lobo GTL (N. Edinburg – Lon Hill 345 kV prior outage)
    - 1023MW (current) vs 550MW(previous)
  - It is because of the proposed GTC methodology

Historical Flow on Valley Export GTC Interface

- Highest monthly flow on the Valley Export GTC interface
  - 12 hours of flow exceeding 652MW (2019/1 – 2020/10)



Moving Forward

- The Valley GTCs (Ajo, Lobo and Valley Export) definitions are subject to future change with additional generation capacity and transmission upgrade.
- The Valley GTCs (Ajo, Lobo and Valley Export) interfaces may be more efficient once online TSAT is available and will be revisited at that time.