Lower Rio Grande Valley Project - Status Updates of ERCOT Independent Review

September 18, 2019 – RPG Meeting

Current Status

- ERCOT provided an update on Lower Rio Grande Valley (LRGV) Transmission Expansion Project on July 16, 2019. http://www.ercot.com/content/wcm/key_documents_lists/165294/Lower_Rio_Grande_Valley_Transmission_Expansion_-_July_16_RPG_Updated.pdf

- Reliability issues are identified from both steady-state and dynamic perspectives with the potential 405 MW LNG load in Valley.

- Further steady-state analysis is performed to identify any reliability impact of import path options and also to find out transmission upgrades in the Valley area with the potential 405 MW LNG load.

Current Status

1. **Base Case (3,005 MW Valley Load + 405 MW LNG) Update**

2. Case Study Scenarios

   a) Base Case + Import Options

   b) Base Case + Import Options + Valley Area Upgrade Options

3. Observation and Next Steps

Base Case Update

❑ Generation Update

- Following additional generators in South WZ that met Planning Guide Section 6.9(1) for inclusion in the planning models at the time of the study are added to the case based on GIS published in June, 2019 as http://mis.ercot.com/misapp/GetReports.do?reportTypeId=15933&reportTitle=GIS%20Report&showHTMLView=&mimicKey

GINR	Project Name	Fuel	COD	MW Capacity
11INR0054	Midway Wind	WIND	06/29/2019	162.9
11INR0062	Shaffer Wind	WIND	07/01/2019	226
16INR0111	Las Lomas Wind	WIND	12/01/2020	200
17INR0025	Reloj Del Sol Wind	WIND	10/31/2020	202
18INR0059	East Raymond Wind	WIND	09/15/2020	201.6
19INR0045	Rayos Del Sol	SOLAR	12/31/2020	150
19INR0073	Shakes Solar	SOLAR	06/24/2020	206
20INR0088	West Raymond Wind	WIND	12/31/2020	239.8
			TOTAL	**= 1588.3 MW**

- These new generators are dispatched consistent with the 2019 RTP methodology
- 2,800 MW reserve is maintained in the study case.

Base Case Update

- Transmission Lines to Connect 405 MW LNG Load
  - Based on the input from STEC, following new transmission lines are added to connect the 405 MW LNG load.
    - Tap the existing WATERPORT - SOUTHMOST 138 kV line and HIWAY511 - S. CARBIDE 138 kV line into a new PORTSOUTH 138 kV substation
    - A new PORTSOUTH - ANNONVA_LNG 138 kV double circuit (11 miles each)
- DC Tie
  - Railroad DC tie (300 MW export) is turned off in the study case
  - Laredo and Eagle Pass DC tie dispatches remain same as in the 2018 RTP case.
    - Laredo DC tie: 100 MW export
    - Eagle Pass DC tie: 33 MW export

Current Status

1. Base Case (3,005 MW Valley Load + 405 MW LNG) Update

2. **Case Study Scenarios**

   a) **Base Case + Import Options**

   b) Base Case + Import Options + Valley Area Upgrade Options

3. Observation and Next Steps

Case Studies

- The following case studies were performed with and without the import path option(s) in order to identify local upgrades and to check any impact due to import path options.

Base Case	Import Opt 1 (AEP)	Import Opt 2 (STEC)
Base Case (3,005 MW Valley + 405 MW LNG)	**Base Case (3,005 MW Valley + 405 MW LNG)** + **DELSOL to FRONTERA 345 kV Line*** + **BONILLA – AJO – GODDARD 345 kV Single Circuit Import Path**	**Base Case (3,005 MW Valley + 405 MW LNG)** + **DELSOL to FRONTERA 345 kV Line** + **BONILLA – MIGUEL 345 kV Single Circuit Import Path**

***A new DELSOL to FRONTERA 345 kV line is assumed in the study base case as it is identified as the upgrade to address dynamic stability issue in Valley.**

Study Methodology

- Contingencies
  - NERC TPL-001-4 and ERCOT Planning Criteria (http://www.ercot.com/content/wcm/current_guides/53526/04-070118.doc):
    - Normal system condition (P0)
    - N-1 conditions (P1, P2-1, P7)
    - P2-2 to 2-4, P4, and P5 (EHV only)
    - X-1 + N-1
    - G-1 + N-1
- Criteria
  - Thermal: Monitor all transmission lines and transformers in the study region
    - Use Rate A for normal conditions
    - Use Rate B for emergency conditions
  - Voltage: Monitor all buses 69 kV and above in the study region
    - Voltages exceeding their pre-contingency and post-contingency limits
    - Voltage deviations exceeding 8% on non-radial load buses

Thermal Overloads – Base Case + Import Options

Valley Area							
From Bus	**From (kV)**	**To Bus**	**To (kV)**	**Length (mi)**	**Base Case**	**Import Opt 1**	**Import Opt 2**
LA_PALMA4A	138	CAVAZOS4A	138	12.22	YES	YES	YES
MILITARY4A	138	CAVAZOS4A	138	10	YES	YES	YES
HARLINSW4A	138	OLEANDER4A	138	3.26	YES	YES	YES
WESLACOU4A	138	STEWART4A	138	14.66	YES	YES	YES
CNTRLAVESUB8	138	COFFPORT4A	138	2.40	YES	YES	YES
RIOHONDO7A	345	RIOHOSTR	138 (T1)	N/A	YES	YES	YES
HIWAY511SUB8	138	COFFPORT4A	138	1.10	YES	YES	YES
LA_PALMA4A	138	L_FRESNO4A	138	10.22	YES	YES	YES
STILLMAN	138	L_FRESNO4A	138	12.14	YES	YES	YES
STILLMAN	138	WATERPRT	138	4.29	YES	YES	YES
STILLMAN	138	SCARBIDE4A	138	1.14	YES	YES	YES
PORTSOUTH	138	SCARBIDE4A	138	4.50	YES	YES	YES
AZTECA4	138	HEC4A	138	2.30	YES	NO	NO
NEDIN4A	138	MCOLL_RD4A	138	2.64	YES	NO	NO
Outside of Valley Area in South WZ							
From Bus	**From (kV)**	**To Bus**	**To (kV)**	**Length (mi)**	**Base Case**	**Import Opt 1**	**Import Opt 2**
BESSEL4A	138	LON_HILL4A	138	17.90	YES	NO	NO
CELANEBI4A	138	N_SHARPE4C	138	10.11	YES	NO	NO
CELANEBI4A	138	KLEBERG4A	138	6.09	YES	NO	NO

- **Regardless of import options, similar local transmission overloads inside Valley appear due to 405 MW LNG load.**

Steady State Assessment – Base Case + Import Options

- Thermal violations are observed in the Valley area.
- No voltage violations are observed in the Valley area.

Current Status

1. Base Case (3,005 MW Valley Load + 405 MW LNG)

   Update

2. **Case Study Scenarios**

   a) Base Case + Import Options

   b) Base Case + Import Options + Valley Area Upgrade Options

3. Observation and Next Steps

Case Studies – BC + Import Options + Local Upgrades

- Five transmission upgrade options were tested to address the thermal overloads identified in both import options.
- All five Valley area upgrade options resolve the thermal violations.
- No voltage violations in the Valley area.

Local Upgrades – Option 1

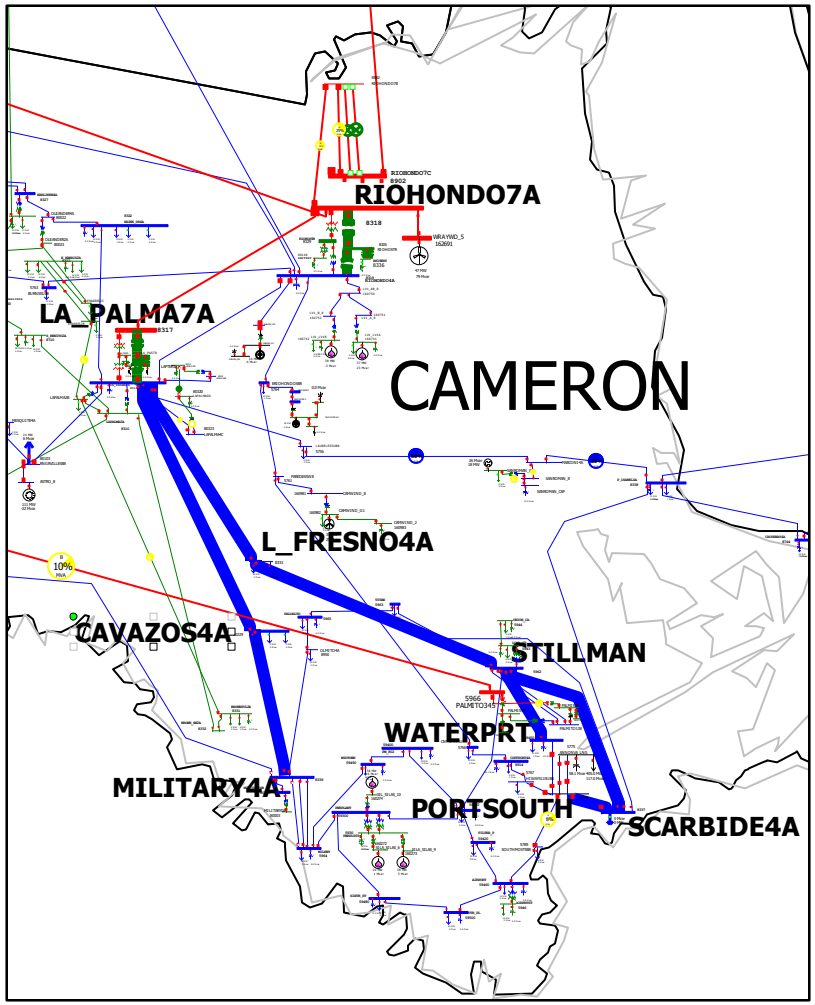
Option 1

Add

- A Second 345/138 kV T2 at LA PALMA

Upgrade

- 345/138 kV T1 at RIO HONDO
- LA PALMA to CAVAZOS 138 kV Line - 12.22 miles
- CAVAZOS to MILITARY 138 kV line - 10.03 miles
- LA PALMA to LOS FRESNOS 138 kV line - 10.22 miles
- STILLMAN to LOS FRESNOS 138 kV line - 12.14 miles
- STILLMAN to WATERPRT 138 kV line - 4.29 miles
- STILLMAN to S. CARBIDE 138 kV line - 1.14 miles
- PORT SOUTH to S. CARBIDE 138 kV line - 4.50 miles



Local Upgrades – Option 2

Option 2

Build

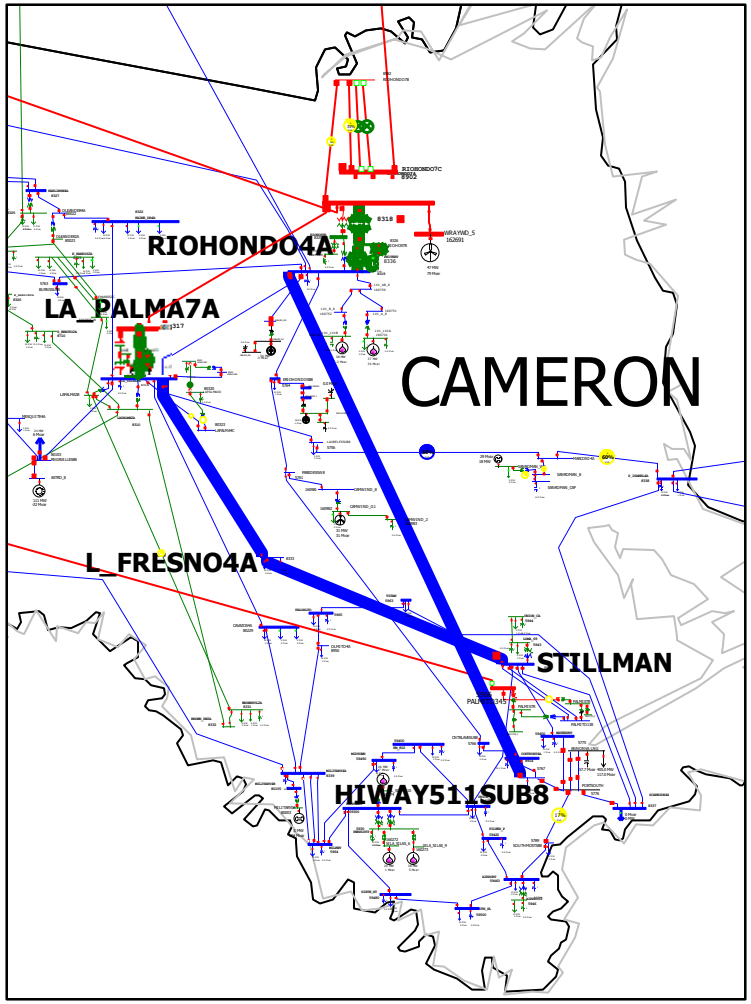
- A New RIO HONDO - HIWAY511 138 kV Line - 32 miles

Add

- A Second 345/138 kV T2 at LA PALMA

Upgrade

- 345/138 kV T1 at RIO HONDO
- LA PALMA to LOS FRESNOS 138 kV line - 10.22 miles
- STILLMAN to LOS FRESNOS 138 kV line - 12.14 miles



Local Upgrades – Option 3

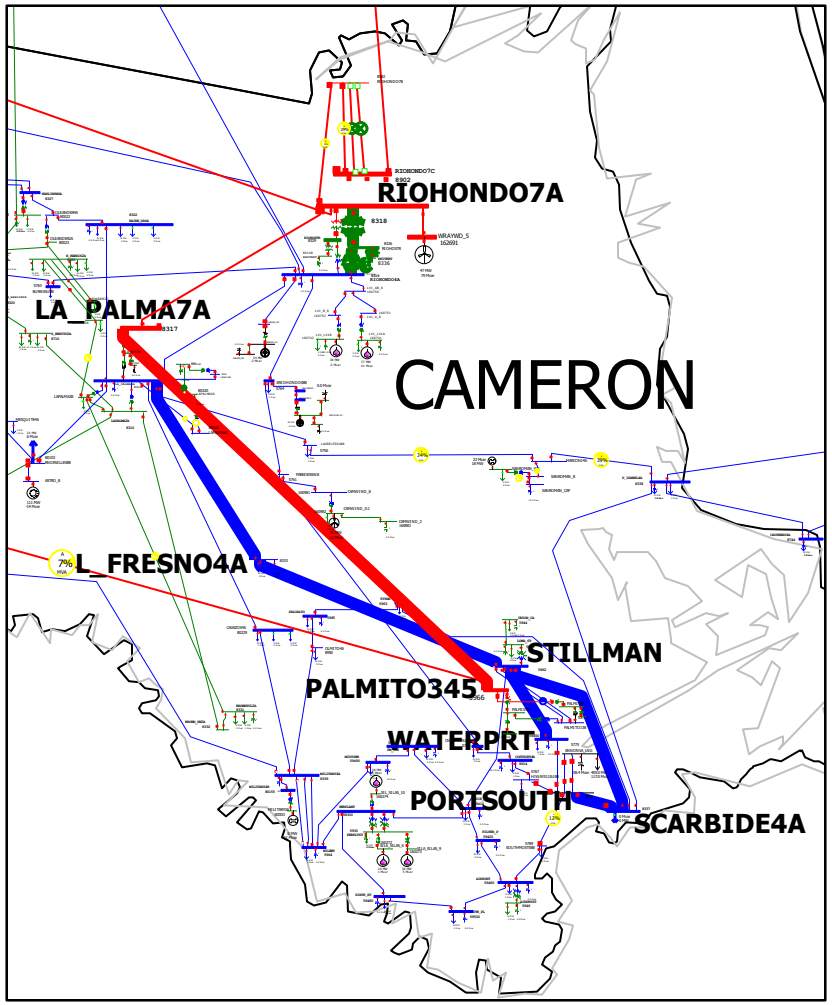
Option 3

Build

- LA PALMA to PALMITO 345 kV Line – 24 miles

Upgrade

- 345/138 kV T1 at RIO HONDO
- LA PALMA to LOS FRESNOS 138 kV line - 10.22 miles
- STILLMAN to LOS FRESNOS 138 kV line - 12.14 miles
- STILLMAN to WATERPRT 138 kV line - 4.29 miles
- STILLMAN to S. CARBIDE 138 kV line - 1.14 miles
- PORTSOUTH to S. CARBIDE 138 kV line - 4.50 miles



Local Upgrades - Option 4

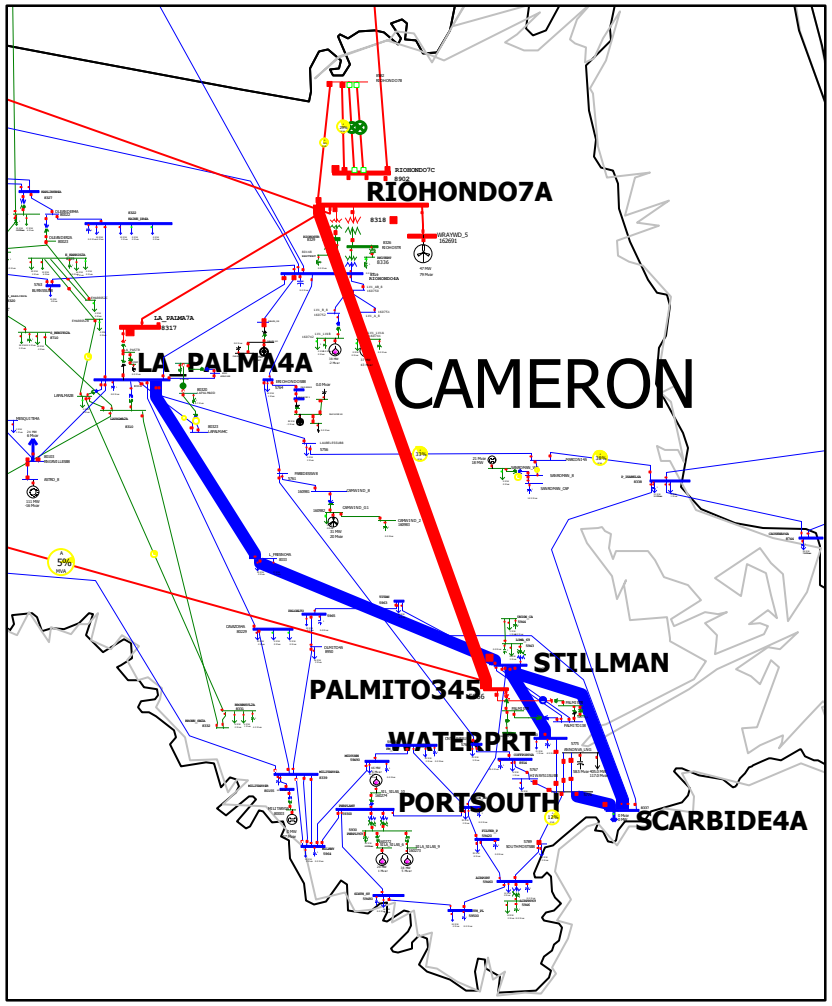
Option 4

Build

- RIO HONDO to PALMITO 345 kV Line – 30 miles

Upgrade

- LA PALMA to LOS FRESNOS 138 kV line - 10.22 miles
- STILLMAN to LOS FRESNOS 138 kV line - 12.14 miles
- STILLMAN to WATERPRT 138 kV line - 4.29 miles
- STILLMAN to S. CARBIDE 138 kV line - 1.14 miles
- PORTSOUTH to S. CARBIDE 138 kV line - 4.50 miles



Local Upgrades – Option 5

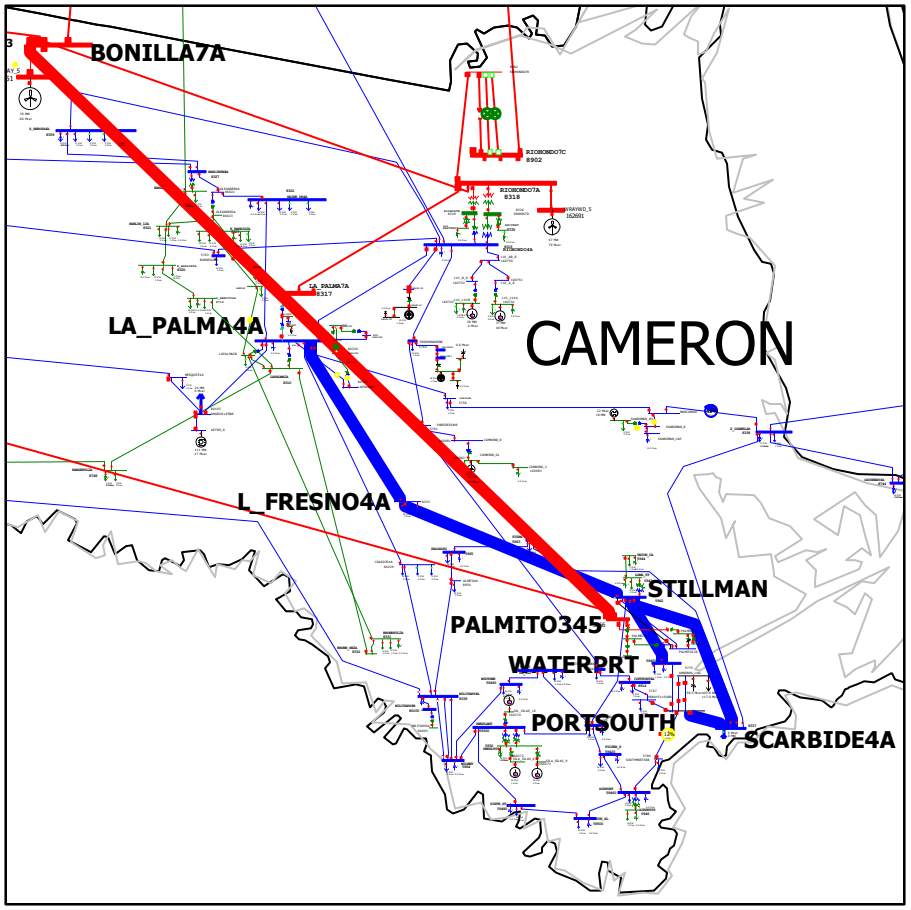
Option 5

Build

- BONILLA to PALMITO 345 kV Line – 47 miles

Upgrade

- LA PALMA to LOS FRESNOS 138 kV line - 10.22 miles
- STILLMAN to LOS FRESNOS 138 kV line - 12.14 miles
- STILLMAN to WATERPRT 138 kV line - 4.29 miles
- STILLMAN to S. CARBIDE 138 kV line - 1.14 miles
- PORTSOUTH to S. CARBIDE 138 kV line - 4.50 miles



Thermal Overloads – BC + Import Options + Local Upgrades

Valley Area						
From Bus	**From (kV)**	**To Bus**	**To (kV)**	**Length (mi)**	**Import Opt 1**	**Import Opt 2**
LA_PALMA4A	138	CAVAZOS4A	138	12.22	NO	NO
MILITARY4A	138	CAVAZOS4A	138	10	NO	NO
HARLINSW4A	138	OLEANDER4A	138	3.26	NO	NO
WESLACOU4A	138	STEWART4A	138	14.66	NO	NO
CNTRLAVESUB8	138	COFFPORT4A	138	2.40	NO	NO
RIOHONDO7A	345	RIOHOSTR	138 (T1)	N/A	NO	NO
HIWAY511SUB8	138	COFFPORT4A	138	1.10	NO	NO
LA_PALMA4A	138	L_FRESNO4A	138	10.22	NO	NO
STILLMAN	138	L_FRESNO4A	138	12.14	NO	NO
STILLMAN	138	WATERPRT	138	4.29	NO	NO
STILLMAN	138	SCARBIDE4A	138	1.14	NO	NO
PORTSOUTH	138	SCARBIDE4A	138	4.50	NO	NO
AZTECA4	138	HEC4A	138	2.30	NO	NO
NEDIN4A	138	MCOLL_RD4A	138	2.64	NO	NO
Outside of Valley Area in South WZ						
From Bus	**From (kV)**	**To Bus**	**To (kV)**	**Length (mi)**	**Import Opt 1**	**Import Opt 2**
BESSEL4A	138	LON_HILL4A	138	17.90	NO	NO
CELANEBI4A	138	N_SHARPE4C	138	10.11	NO	NO
CELANEBI4A	138	KLEBERG4A	138	6.09	NO	NO

- All five local upgrade options alleviate the thermal overloads in the Valley area.

Current Status

1. Base Case (3,005 MW Load + 405 MW LNG) Update

2. Case Study Scenarios

   a) Base Case + Import Options

   b) Base Case + Import Options + Local Upgrade Options

3. Observation and Next Steps

Observations

- ERCOT performed a steady-state analysis with the 405 MW LNG load and with each import option to identify reliability needs in the Valley area. Similar thermal overload issues were observed in the Valley area with each import option. No voltage violations were observed.

- Five local upgrade options along with two import options were evaluated to address the thermal and stability issues in the Valley area with the potential 405 MW LNG load. All options address the reliability issues.

Next Steps and Tentative Timeline

- ERCOT will also conduct certain N-1-1 contingency analysis (steady-state) near LNG load to evaluate the performance of each local upgrade option.

- ERCOT will continue to work on sensitivity analysis (steady-state) for the additional potential 840 MW LNG load.

- ERCOT expects to complete the independent review by 4Q, 2019.

Stakeholder Comments Also Welcomed Through:

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