Brownsville Area Improvements Transmission Project – ERCOT Independent Review Status Update

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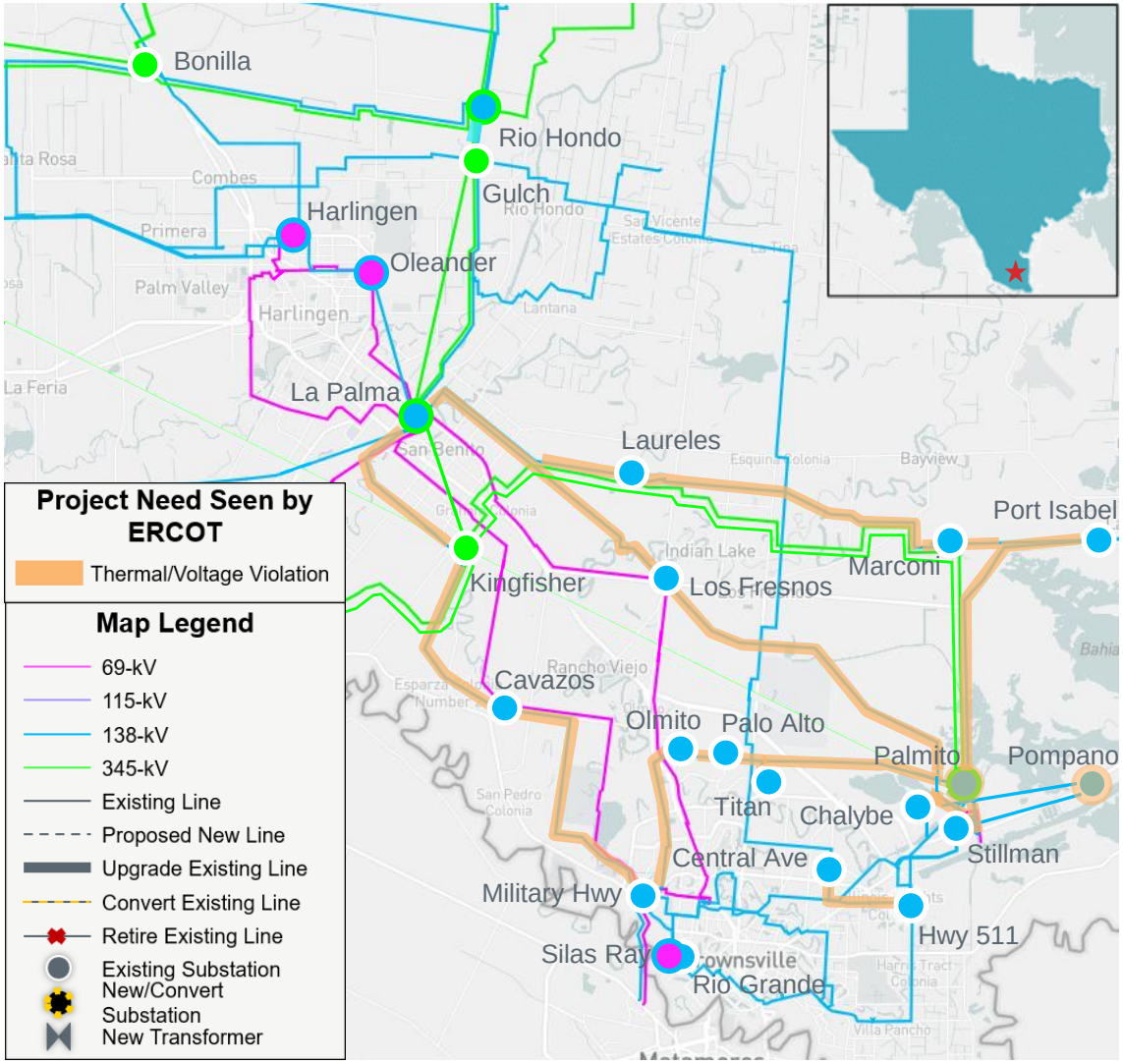
RPG Meeting
August 13, 2024

Recap

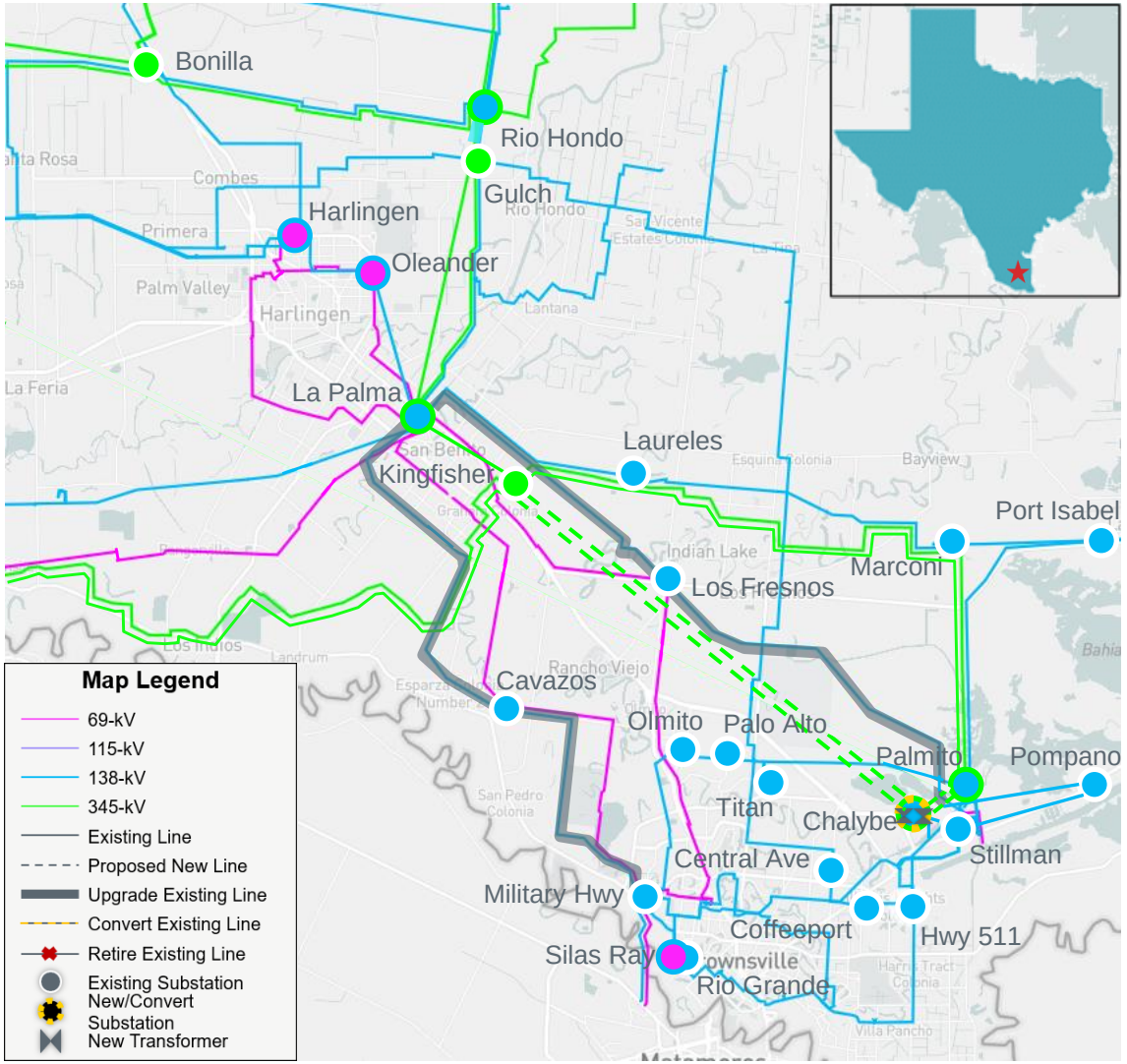
- American Electric Power Service Corporation (AEPSC) submitted the Brownsville Area Improvements Transmission Project for Regional Planning Group (RPG) review in March 2024
  - This Tier 1 project is estimated to cost $387.7 million and will require a Certificate of Convenience and Necessity (CCN)
  - Estimated in-service date is May 2027
  - Addresses both thermal overloads and voltage violations in the Brownsville area upon addition of new large load
- AEPSC presented project overview and ERCOT provided the study scope for this ERCOT Independent Review (EIR) at the June RPG meeting
  - https://www.ercot.com/calendar/06112024-RPG-Meeting
- ERCOT provided status update at the July RPG meeting
  - https://www.ercot.com/calendar/07162024-RPG-Meeting
- This project is currently under ERCOT Independent Review (EIR)

Recap: Project Need as Seen by ERCOT



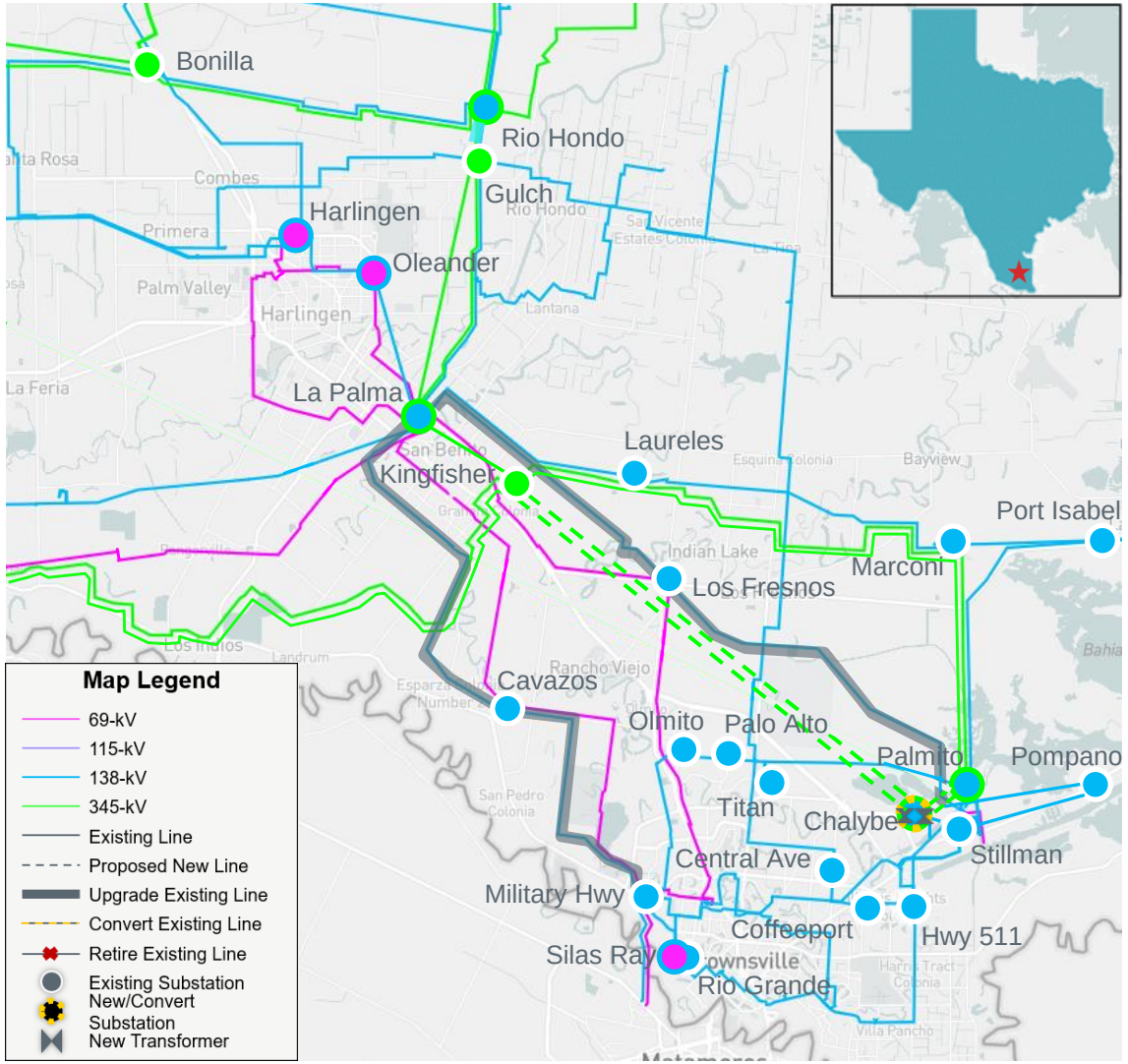
Option 2 – Preferred Option Proposed by AEPSC

- Install two 345/138-kV autotransformers at Chalybe rated 675 MVA
- Construct a new 22.0-mile 345-kV double circuit transmission line from Chalybe to Kingfisher rated 2668 MVA
- Construct a new 2.0-mile 345-kV double circuit transmission line from Chalybe to Palmito rated 2668 MVA
- Construct a new 1.0-mile 138-kV single circuit transmission line from Chalybe to Stillman rated 987 MVA
- Rebuild the 10.3-mile 138-kV single circuit transmission line from La Palma to Fresno rated 535 MVA
- Rebuild the 12.0-mile 138-kV single circuit transmission line from Fresno to Stillman rated 717 MVA
- Install two +/-150 MVAR STATCOMs at Chalybe



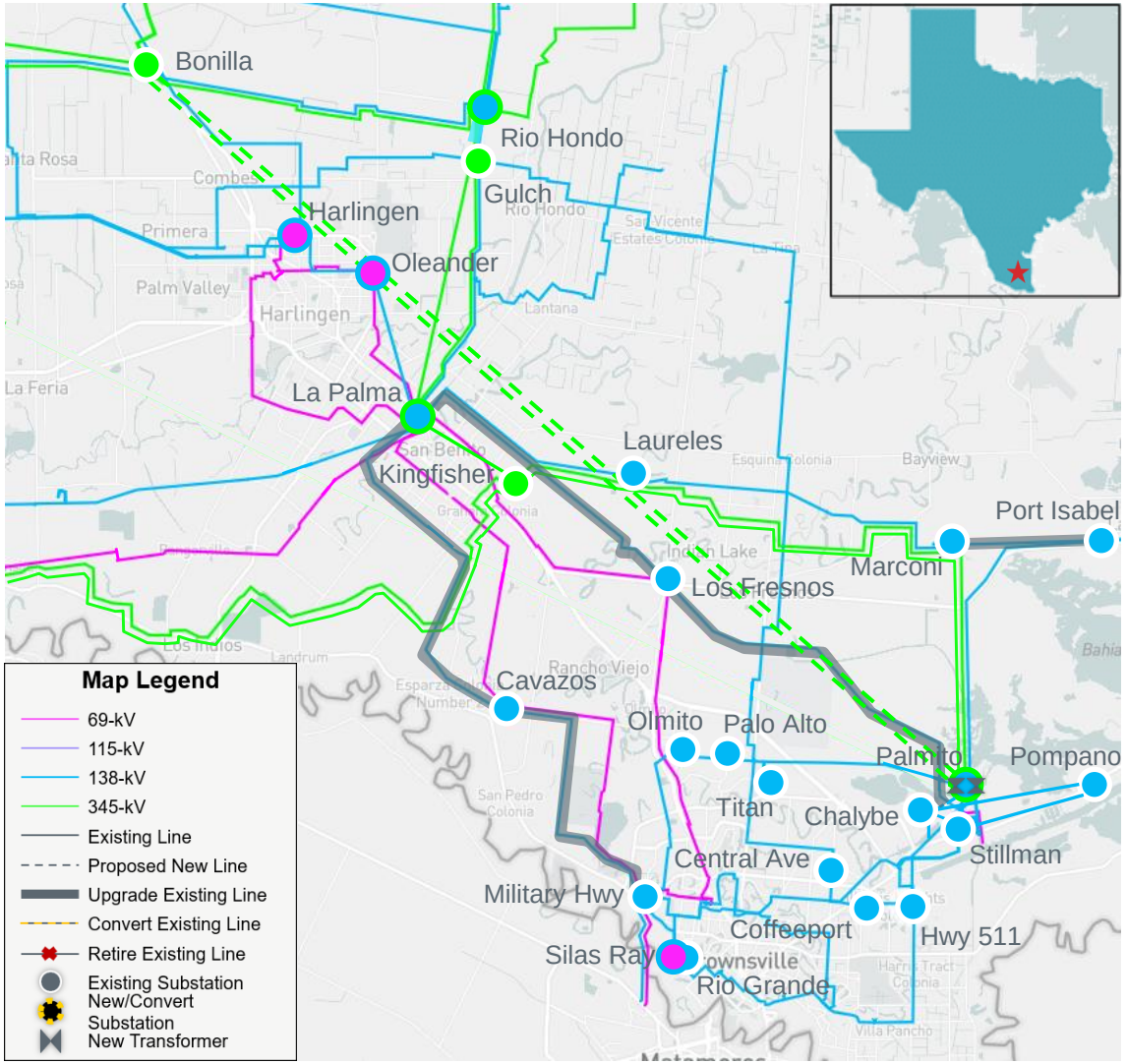
Option 2A – Modified Preferred Option Proposed by AEPSC

- Install two 345/138-kV autotransformers at Chalybe rated 675 MVA
- Construct a new 22.0-mile 345-kV double circuit transmission line from Chalybe to Kingfisher rated 2668 MVA
- Construct a new 2.0-mile 345-kV double circuit transmission line from Chalybe to Palmito rated 2668 MVA
- Construct a new 1.0-mile 138-kV single circuit transmission line from Chalybe to Stillman rated 987 MVA
- Rebuild the 10.3-mile 138-kV single circuit transmission line from La Palma to Fresno rated 535 MVA
- Rebuild the 12.0-mile 138-kV single circuit transmission line from Fresno to Stillman rated 717 MVA
- Rebuild the 10.0-mile 138-kV single circuit transmission line from Military to Villa Cavazos rated 717 MVA
- Rebuild the 12.2-mile 138-kV single circuit transmission line from La Palma to Villa Cavazos rated 535 MVA
- Install two +/-150 MVAR STATCOMs at Chalybe



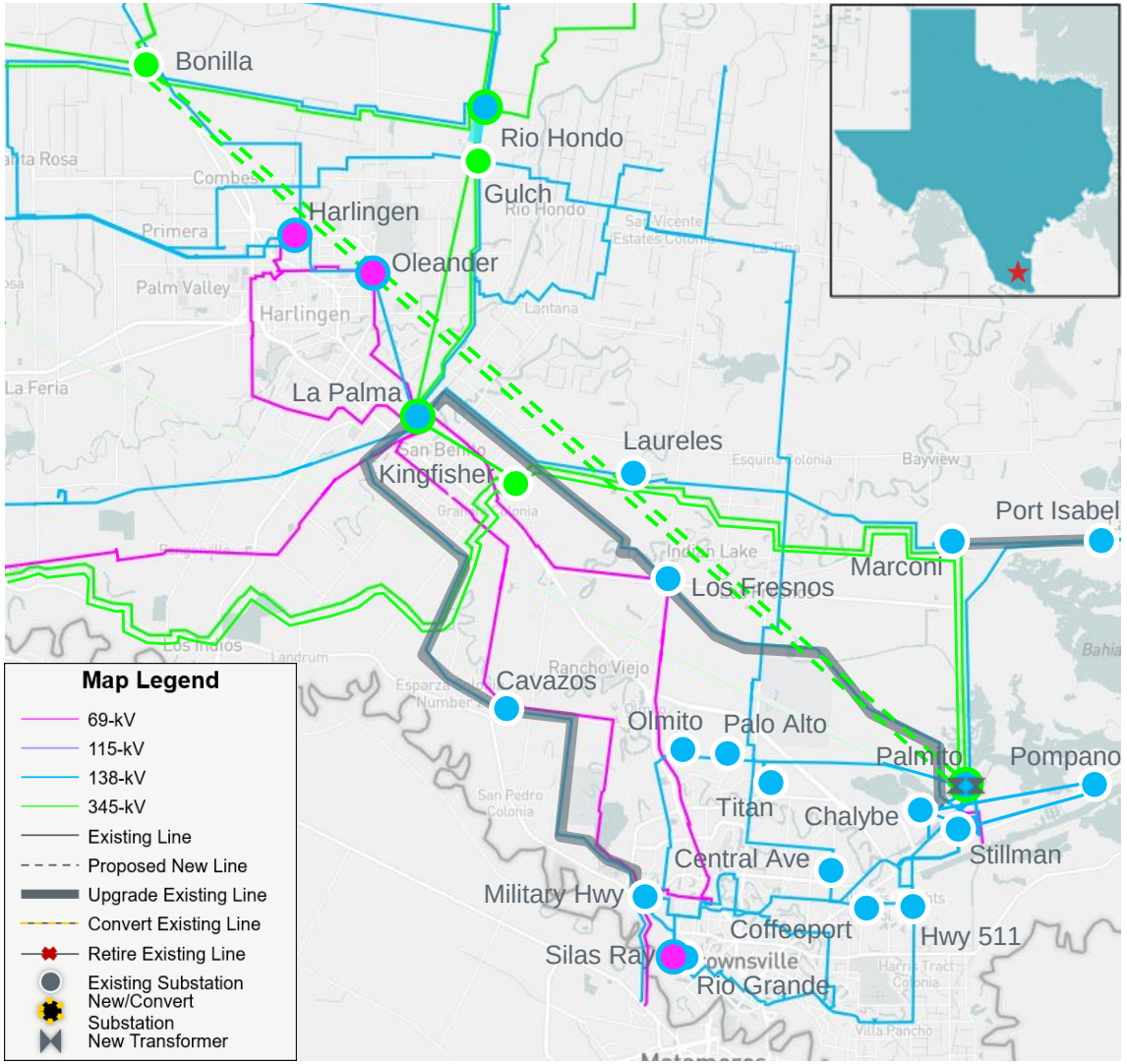
Option 5 – ERCOT Option

- Install two additional 345/138-kV 3-winding autotransformers at Palmito rated 450 MVA
- Construct a new 39.0-mile 345-kV double circuit transmission line from Palmito to Bonilla rated 2668 MVA
- Construct a new 2.0-mile 138-kV single circuit transmission line from Chalybe to Palmito rated 956 MVA
- Construct a new 0.4-mile 138-kV single circuit transmission line from Palmito to Stillman rated 516 MVA
- Construct a new 1.0-mile 138-kV single circuit transmission line from Chalybe to Stillman rated 987 MVA
- Install two +/-150 MVAR STATCOMs at Chalybe



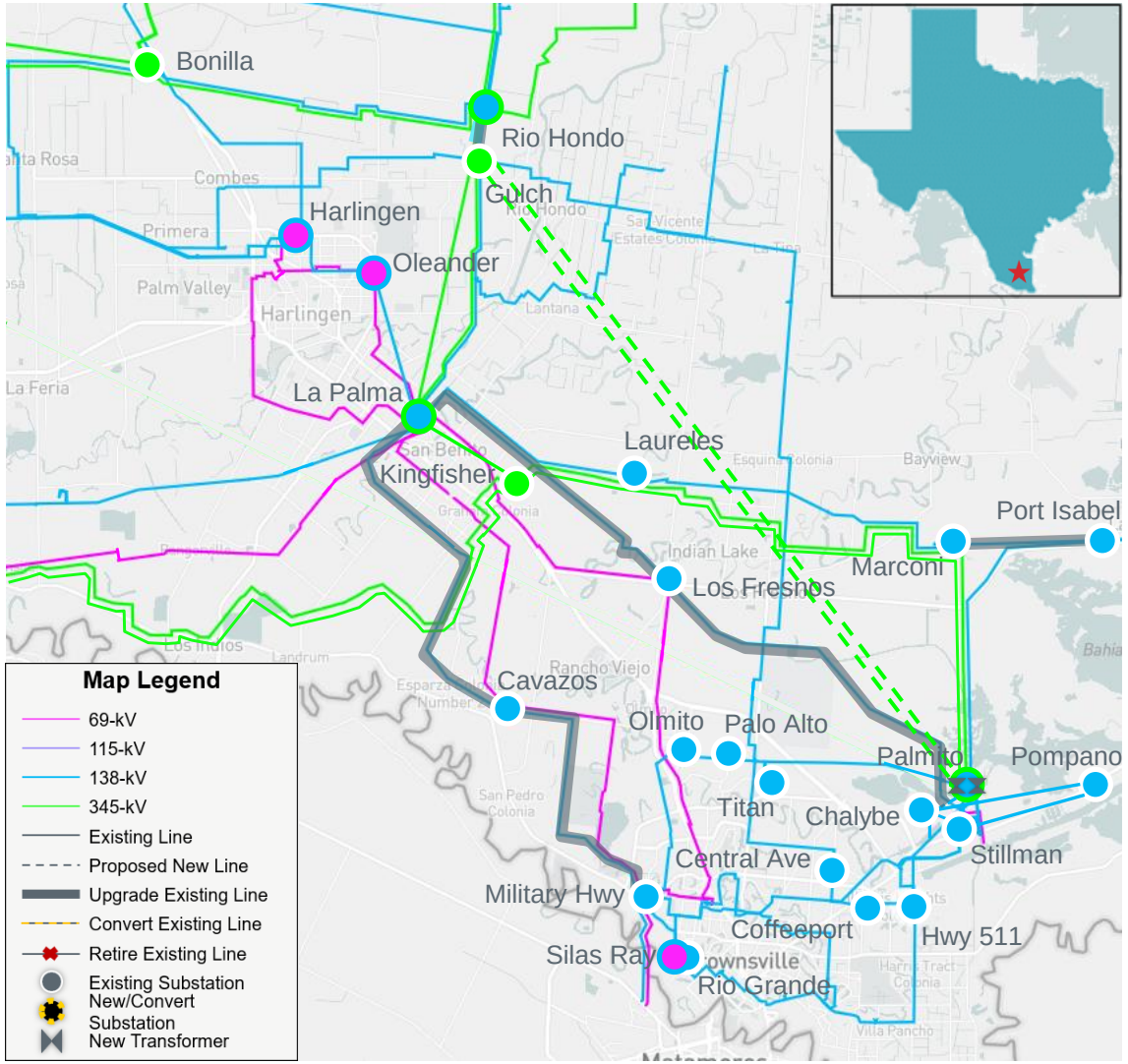
Option 5A – Modified ERCOT Option

- Install two additional 345/138-kV 3-winding autotransformers at Palmito rated 450 MVA
- Construct a new 39.0-mile 345-kV double circuit transmission line from Palmito to Bonilla rated 2668 MVA
- Construct a new 2.0-mile 138-kV single circuit transmission line from Chalybe to Palmito rated 956 MVA
- Construct a new 0.4-mile 138-kV single circuit transmission line from Palmito to Stillman rated 516 MVA
- Rebuild the 10.0-mile 138-kV single circuit transmission line from Military to Villa Cavazos rated 717 MVA
- Rebuild the 12.0-mile 138-kV single circuit transmission line from Fresno to Stillman rated 717 MVA
- Rebuild the 10.3-mile 138-kV single circuit transmission line from La Palma to Fresno rated 535 MVA
- Rebuild the 12.2-mile 138-kV single circuit transmission line from La Palma to Villa Cavazos rated 535 MVA
- Rebuild the 6.2-mile 138-kV single circuit transmission line from Marconi to Port Isabel rated 717 MVA
- Construct a new 1.0-mile 138-kV single circuit transmission line from Chalybe to Stillman rated 987 MVA
- Install two +/-150 MVAR STATCOMs at Chalybe



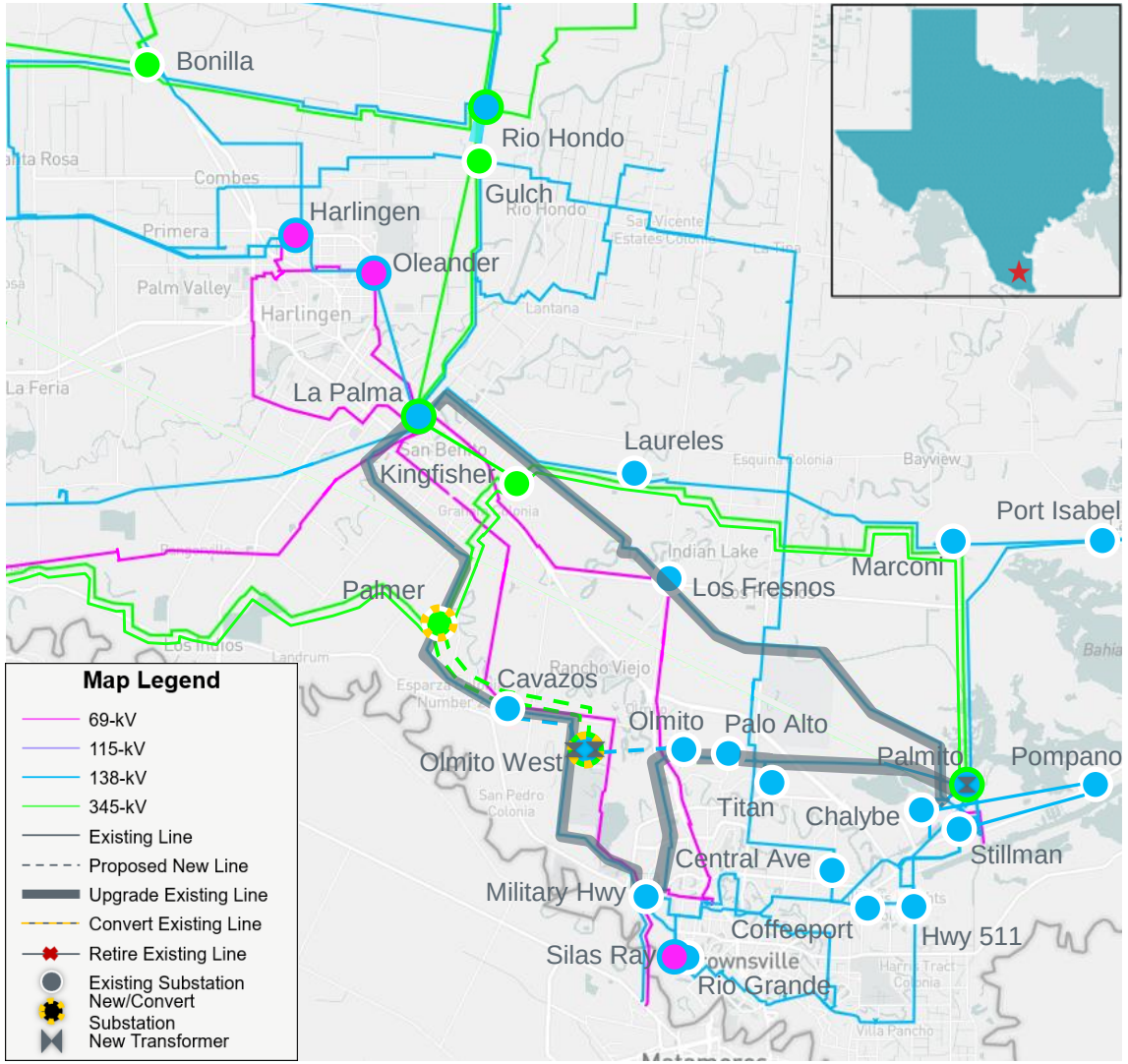
Option 7 – ERCOT Option

- Install two additional 345/138-kV 3-winding autotransformers at Palmito rated 450 MVA
- Construct a new 28.9-mile 345-kV double circuit transmission line from Palmito to Gulch rated 2668 MVA
- Rebuild the 1.0-mile 345-kV single circuit transmission line from Rio Hondo to Gulch rated 2668 MVA
- Construct a new 2.0-mile 138-kV single circuit transmission line from Chalybe to Palmito rated 956 MVA
- Construct a new 0.4-mile 138-kV single circuit transmission line from Palmito to Stillman rated 516 MVA
- Rebuild the 10.0-mile 138-kV single circuit transmission line from Military to Villa Cavazos rated 717 MVA
- Rebuild the 12.0-mile 138-kV single circuit transmission line from Fresno to Stillman rated 717 MVA
- Rebuild the 10.3-mile 138-kV single circuit transmission line from La Palma to Fresno rated 535 MVA
- Rebuild the 12.2-mile 138-kV single circuit transmission line from La Palma to Villa Cavazos rated 535 MVA
- Rebuild the 6.2-mile 138-kV single circuit transmission line from Marconi to Port Isabel rated 717 MVA
- Construct a new 1.0-mile 138-kV single circuit transmission line from Chalybe to Stillman rated 987 MVA
- Install two +/-150 MVAR STATCOMs at Chalybe



Option 8 – ERCOT Option

- Install one additional 345/138-kV 3-winding autotransformer at Palmito rated 450 MVA
- Add a 345-kV substation on the 345-kV double circuit transmission line from North Edinburg to Kingfisher named Palmer
- Add a 345-kV and 138-kV substation between Cavazos and Olmito named Olmito West and install two 345/138-kV autotransformers rated 675 MVA
- Construct a new 8.1-mile 345-kV double circuit transmission line from Palmer to Olmito West rated 2668 MVA
- Construct a new 2.7-mile 138-kV single circuit transmission line from Olmito West to Olmito rated 956 MVA
- Construct a new 4.0-mile 138-kV single circuit transmission line from Olmito West to Cavazos rated 956 MVA
- Construct a new 2.0-mile 138-kV single circuit transmission line from Chalybe to Palmito rated 956 MVA
- Construct a new 1.0-mile 138-kV single circuit transmission line from Chalybe to Stillman rated 987 MVA
- Rebuild the 5.5-mile 138-kV single circuit transmission line from Military to Olmito rated 717 MVA
- Rebuild the 0.4-mile 138-kV single circuit transmission line from Palo Alto to Olmito rated 717 MVA
- Rebuild the 2.5-mile 138-kV single circuit transmission line from Titan to Palo Alto rated 717 MVA
- Rebuild the 7.3-mile 138-kV single circuit transmission line from Titan to Chalybe rated 717 MVA
- Rebuild the 10.0-mile 138-kV single circuit transmission line from Military to Villa Cavazos rated 717 MVA
- Rebuild the 12.0-mile 138-kV single circuit transmission line from Fresno to Stillman rated 717 MVA
- Rebuild the 10.3-mile 138-kV single circuit transmission line from La Palma to Fresno rated 535 MVA
- Rebuild the 12.2-mile 138-kV single circuit transmission line from La Palma to Villa Cavazos rated 535 MVA
- Install two +/-150 MVAR STATCOMs at Chalybe



Preliminary Results of Planned Maintenance Outage Evaluation – Options

- ERCOT conducted planned maintenance outage evaluation on the base case to identify project need
  - Load level in the South Weather Zone was scaled down to 90.1% of the summer peak load in the study base case based on ERCOT load forecast, historical load, and ratio of residential/commercial load from TSP, to mimic the non-summer peak load condition
  - Based on a review of system topology of the Cameron County area, ERCOT tested N-2 contingency combinations, and then tested all applicable contingency violations with system adjustments (N-1-1)
- Planned maintenance outage analysis results

Option	Voltage Violations	Thermal Overloads	Unsolved Power Flow
2	0	2	0
2A	0	0	0
5	0	5	0
5A	0	0	0
7	0	0	0
8	0	0	0

Preliminary Results of Reliability Assessment – Short-listed Options Update

	N-1		G-1 + N-1		X-1 + N-1	
Option	Thermal Violations	Voltage Violations	Thermal Violations	Voltage Violations	Thermal Violations	Voltage Violations
2A	None	None	None	None	None	None
5A	None	None	None	None	None	None
7	None	None	None	None	None	None
8	None	None	None	None	None	None

- Options 2A, 5A, 7, and 8 are short-listed

Long-Term Load-Serving Capability Assessment

- Methodology
  - Adjusted load up in substations in the Study Area (Cameron County)
  - Adjusted conforming load down outside of the South weather zone to balance power
- Based on N-1 contingency

Option	Incremental Load Serving Capability (MW)
2A	528
5A	586
7	528
8	544

Next Steps and Tentative Timeline

- ERCOT will continue to evaluate options and provide status updates at future RPG meetings
  - Cost estimates and feasibility assessments have been requested from the Transmission Service Providers
  - Congestion analysis may be performed based on the recommended transmission upgrades to ensure that the identified transmission upgrades do not result in new congestion within the study area
  - Generation and Load Scaling Sensitivity Analyses
    - Planning Guide Section 3.1.3(4)
  - Subsynchronous Resonance (SSR) Assessment
    - Nodal Protocol Section 3.22.1.3(2)
- Tentative timeline
  - Final recommendation – Q3 2024

Thank you!

Stakeholder comments also welcomed through:

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Appendix A – Transmission Projects Added to Study Case

TPIT No	Project Name	Tier	Project ISD	TSP	County
69463	AEP_TCC_ArroyoInterconnection	Tier 4	Nov-24	AEP TCC	Cameron
73061	Falfurrias to King Ranch: 138 kV Line Rebuild	Tier 4	Nov-26	AEP TCC	Brooks
73359	Vertrees: Construct New Distribution Station	Tier 4	Feb-25	AEP TCC	Hidalgo
73661	New transformer (T2) at BPUB Palo Alto Substation	Tier 4	Mar-24	BPUB	Cameron
76082	Union Carbide: Rebuild 138 kV Station	Tier 4	Jun-26	AEP TCC	Cameron
76214	North Edinburg: 345 kV Reconfigure	Tier 4	Oct-24	AEP TCC	Hidalgo
76574	TexasAg Wind Interconnection	Tier 4	May-25	AEP TCC	Hidalgo
77144	Pompano: New 138 kV Station	Tier 4	Jul-24	AEP TCC	Cameron

Appendix B – Generation Added to Study Case

GINR	Project Name	Fuel	Project COD	Capacity (MW)	County
19INR0054	Monte Cristo 1 Wind	WIN	08/20/2025	234.5	Hidalgo
24INR0436	Carambola BESS	OTH	05/31/2026	97.43	Hidalgo

Appendix C – G-1 Generators and X-1 Transformers

G-1 Generators	X-1 Transformers
Silas Ray Unit C9	Palmito – Ckt 1 345/138-kV
Cameron Wind Unit 1	La Palma – Ckt 1 345/138-kV
San Roman Wind Unit 1	Rio Hondo – Ckt 1 345/138-kV
North Edinburg Unit 1 – Partial Steam	