AEPSC Hidalgo-Starr Transmission Project – ERCOT Independent Review Update

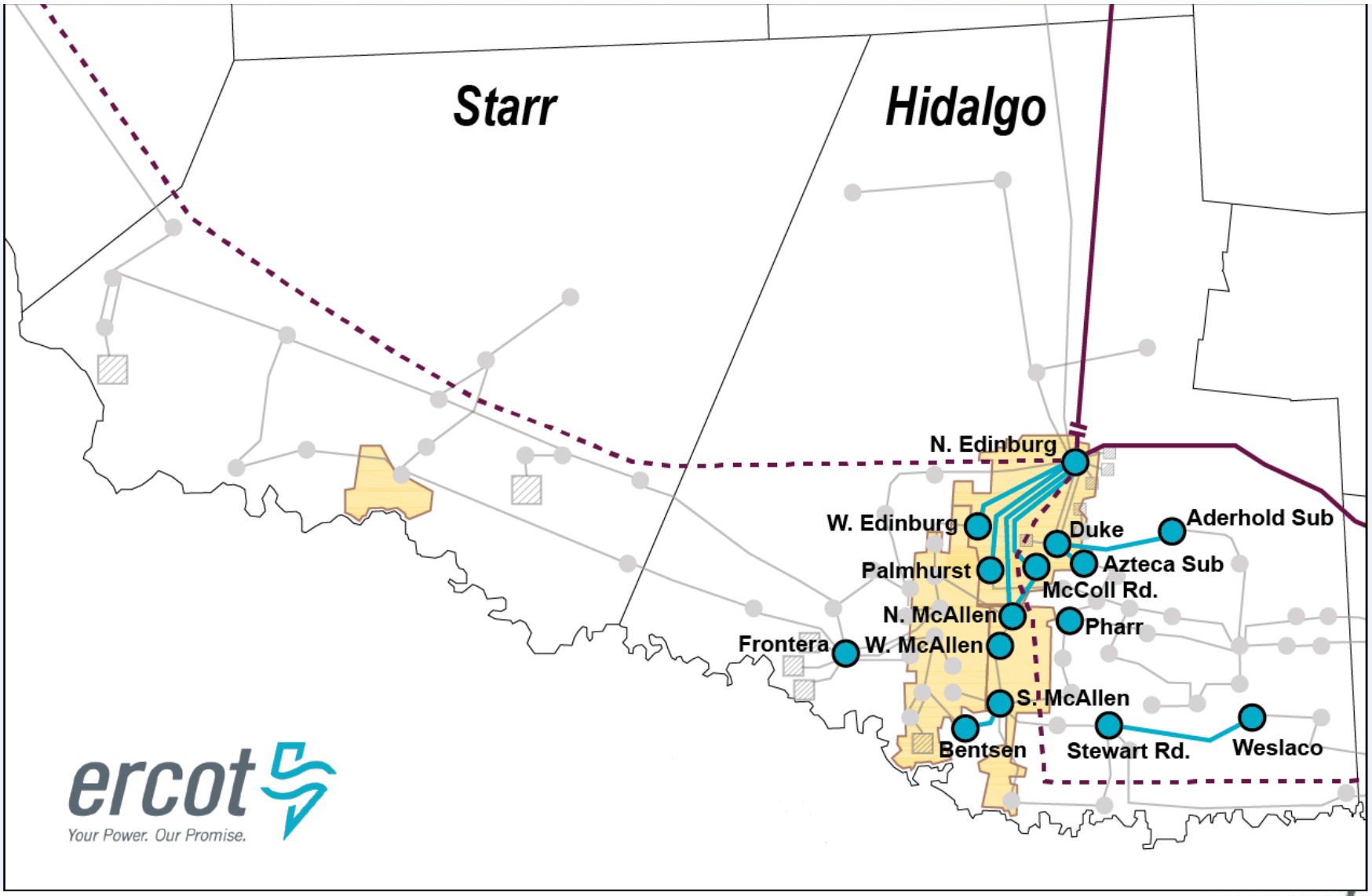
RPG Meeting
March 22, 2016

Status of AEPSC Hidalgo-Starr Transmission Project Review

- ERCOT is conducting an Independent Review of the need to address the reliability issues that are present in the West Lower Rio Grande Valley area.
  - Current status:
    - ERCOT presented the study assumptions and the results for the need analysis in the January RPG.

      http://www.ercot.com/content/wcm/key_documents_lists/77716/Draft_AEPSC_Hidalgo_Starr_Transmission_Project____ERCOT_Update.pdf

    - ERCOT tested options to address the reliability need.


Starr
Hidalgo
N. Edinburg
W. Edinburg
Duke
Aderhold Sub
Palmhurst
Azteca Sub
McColl Rd.
N. McAllen
Pharr
Frontera
W. McAllen
S. McAllen
Bentsen
Stewart Rd.
Weslaco
ercot
Your Power. Our Promise.

Options Evaluated

- Five options were evaluated, based on the TSP's RPG submittal and the reliability issues identified:
  - Option A: AEP option 1 with the following modification
    - Add second transformer at Frontera

    Estimated Cost: $94.3 million
  - Option B: AEP option 2

    Estimated Cost: $89.5 million
  - Option C: AEP option 2 with the following modification
    - Use one double circuit line instead of two single circuit lines to connect the South McAllen substation to the North Edinburg to Loma Alta 345 kV line

    Estimated Cost: $70 million *
  - Option D: AEP option 3 with the following modifications
    - Operate the Pharr – North McAllen 138 kV line segment normally closed except for certain N-1-1 conditions
    - Use one double circuit line instead of two single circuit lines to connect the Stewart Road substation to the North Edinburg to Loma Alta 345 kV line

    Estimated Cost: $51.5 million *
  - Option E: AEP option 3-1 (AEP's preferred option)

    Estimated cost: $143.4 million

* Cost estimates calculated by ERCOT (based on estimates provided for AEP option 2 / option 3)

Options Evaluated

- The following component which is common for all the options is a Tier 4 project listed in TPIT(Transmission Project Information Tracking) and it was included in the base case. The cost for this project was excluded from all the options.
  - Looping in the McColl Road – North McAllen 138 kV line into Pharr 138 kV substation and operate the Pharr – North McAllen 138 kV line segment normally open.

- The following system upgrades were included in all the options and these upgrades are not listed in the option details.
  - Expand the existing West Edinburg 138 kV substation to a new 5 breaker ring bus to accommodate the termination of two new 138 kV transmission lines.
  - Construct 1000 feet of new 138 kV transmission line to loop in the North Edinburg to Palmhurst 138 kV line into the West Edinburg 138 kV substation.

Options Evaluation

- The following analysis were completed to evaluate the five options.
  - N-1, G-1+N-1 and X-1+N-1 analysis using the 2021 South/South Central summer peak case from the 2015 Regional Transmission Plan.
  - N-1-1 analysis using the 2021 South/South Central spring peak case.
  - N-1, G-1+N-1 and X-1+N-1 sensitivity analysis using the 2021 South/South Central winter peak case, which was derived by scaling up the valley load to the AEP 2021 90/10 winter forecast value in the 2021 South/South Central summer peak case.

- All five options can resolve the reliability issues in the West Valley Study Area.

Options Evaluation Results

- N-1 Results (2021 summer peak case):

Branch	Length (miles)	Option A	Option B	Option C	Option D	Option E
N. McAllen to N. Edinburg 138 kV Ckt 2 (8368-8380)	9.2	94.0%	96.6%	96.6%	95.1%	82.8%
South McAllen to Bentsen 138 kV Ckt 2 (8371-8822)	3.3	97.3%	94.7%	94.7	95.2%	95.2%
N. Edinburg to McColl Road 138 kV Ckt 1 (8380-8908)	2.6	91.8%	87.2%	87.2%	96.0%	85.0%

- X-1+N-1 and G-1+N-1 contingency analysis results do not show any branch loaded above 95% in the study region.

Options Evaluation Results

- N-1-1 Results (2021 spring peak case):

Branch	Length (miles)	Option A	Option B	Option C	Option D	Option E
Aderhold Sub to Duke/HEC 138 kV Ckt 1 (5754-8963)*	7.6	98.5%	97.0%	98.5%	98.0%	98.1%
N. Edinburg to McColl Road 138 kV Ckt 1 (8380-8908)	2.6	95.6%	92.6%	92.6%	95.2%	90.1%
N. McAllen to N. Edinburg 138 kV Ckt 2 (8368-8380)	9.2	92.5%	97.2%	97.3%	92.6%	76.8%
W. Edinburg to N. Edinburg 138 kV Ckt 2 (5771-8380)	4.5	92.9%	93.2%	93.2%	96.4%	86.7%
Duke/HEC to Azteca Sub 138 kV Ckt 1 (8963-8708)*	2.3	97.4%	97.3%	97.3%	99.4%	97.2%
W. Edinburg to N. Edinburg 138 kV Ckt 1 (5771-8380)	4.6	91.2%	96.8%	96.9%	98.7%	93.0%

* dynamically rated line

Options Evaluation Results

- N-1 Results (2021 winter peak sensitivity case):

Branch	Length (miles)	Option A	Option B	Option C	Option D	Option E
N. McAllen to N. Edinburg 138 kV ckt 2 (8368-8380)	9.2	95.6%	97.6%	97.3%	96.0%	84.7%
South McAllen to Bentsen 138 kV ckt 1(8371-8822)*	3.3	98.1%	95.3%	95.3%	96.2%	96.3%
N. Edinburg to McColl Road 138 kV ckt 1 (8380-8908)	2.6	93.2%	88.3%	88.0%	97.3%	87.6%

* dynamically rated line

- X-1+N-1 Results:

Branch	Length (miles)	Option A	Option B	Option C	Option D	Option E
Weslaco unit to Stewart Road 138 kV ckt 1(8348-8951)	14.7	92.3%	92.5%	92.5%	94.1%	99.6%

- G-1+N-1 contingency analysis results do not show any branch loaded above 95% in the study region.

Next Steps

- ERCOT is currently studying the internal Valley upgrade options together with the Valley import upgrade options.

- ERCOT anticipates to complete this EIR and make a final recommendation by April RPG meeting

Questions?

Appendix: Details of the Options

- Option A (Frontera 345 kV Station)
  - Expand the existing Frontera 138 kV substation to include new breakers and protection equipment for a single new 345 kV transmission line and two 345/138 kV transformers.
  - Install two 345/138 kV autotransformers at Frontera 138 kV substation.
  - Construct a new 345 kV transmission line, approximately 23 miles from the Frontera 345 kV substation to the planned Pomelo station located on the existing North Edinburg to Del Sol 345 kV line.

  Estimated Cost: $94.3 million
- Option B (South McAllen 345 kV Station)
  - Expand the existing South McAllen 138 kV substation to include new breakers and protection equipment for two new 345 kV transmission lines and two 345/138 kV transformers.
  - Install two 345/138 kV autotransformers at South McAllen 138 kV substation.
  - Construct two new 345 kV transmission lines, approximately 12 miles each from South McAllen 138 kV substation to a tap location on the North Edinburg to Loma Alta 345 kV line, 30 miles from North Edinburg 345/138 kV substation.

  Estimated Cost: $89.5 million
- Option C (South McAllen 345 kV Station)
  - Expand the existing South McAllen 138 kV substation to include new breakers and protection equipment for two new 345 kV transmission lines and two 345/138 kV transformers.
  - Install two 345/138 kV autotransformers at South McAllen 138 kV substation.
  - Construct one new 345 kV double circuit transmission line, approximately 12 miles from South McAllen 138 kV substation to a tap location on the North Edinburg to Loma Alta 345 kV line, 30 miles from North Edinburg 345/138 kV substation.

  Estimated Cost: $70 million *

* Cost estimate calculated by ERCOT (based on estimate provided for AEP option 2)

❑ Option D (Stewart Road 345 kV Station)

- Expand the existing Stewart Road 138 kV substation to include new breakers and protection equipment for two new 345 kV transmission lines and two 345/138 kV transformers.
- Install two 345/138 kV autotransformers at Stewart Road 138 kV substation.
- Construct one new 345 kV double circuit transmission line, approximately 5 miles from Stewart Road 138 kV substation to a tap location on the North Edinburg to Loma Alta 345 kV line, 30 miles from North Edinburg 345/138 kV substation.
- Operate the Pharr – North McAllen 138 kV line segment normally closed except for certain N-1-1 conditions

Estimated Cost: $51.5 million *

- Cost estimate calculated by ERCOT (based on estimate provided for AEP option 3)

❑ Option E (Steward Road 345 kV Station plus Frontera 345 kV Station)

- Expand the existing Stewart Road 138 kV substation to include new breakers and protection equipment for two new 345 kV transmission lines and two 345/138 kV transformers.
- Install two 345/138 kV autotransformers at Stewart Road 138 kV substation.
- Construct two new 345 kV transmission lines, approximately 5 miles each from Stewart Road 138 kV substation to a tap location on the North Edinburg to Loma Alta 345 kV line, 30 miles from North Edinburg 345/138 kV substation.
- Expand the existing Frontera 138 kV substation to include new breakers and protection equipment for a single new 345 kV transmission line and single 345/138 kV transformer.
- Install a single 345/138 kV autotransformer at Frontera 138 kV substation.
- Construct a new 345 kV transmission line, approximately 23 miles from the Frontera 345 kV substation to the planned Pomelo station located on the existing North Edinburg to Del Sol 345 kV line.

Estimated cost: $143.4 million