WETT Bearkat Area Transmission Improvements Project-ERCOT Independent Review Update

ERCOT Transmission Planning

Regional Planning Group
May 22, 2018

Bearkat Status Update

- **Wind Energy Transmission Texas (WETT) submitted Bearkat Area Transmission Improvements project for Regional Planning Group review. This is a Tier 1 project that is estimated to cost $ 69.87 million.**

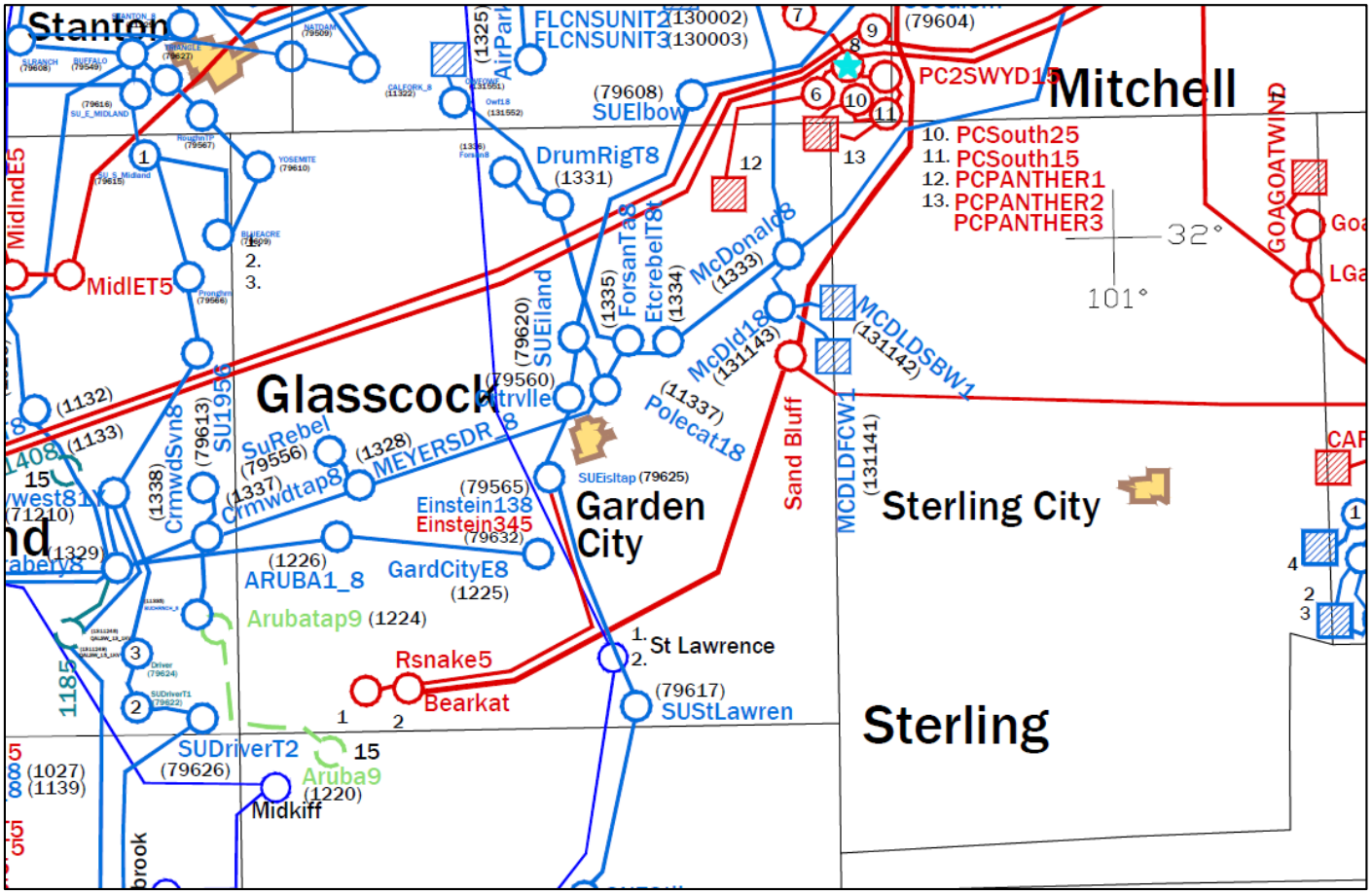
  http://www.ercot.com/calendar/2017/10/19/108887-RPG

- **ERCOT provided scope updates and study assumptions at the February RPG**

  http://www.ercot.com/calendar/2018/2/27/138675-RPG

- **ERCOT presented preliminary results and future steps at the April RPG**
  http://www.ercot.com/content/wcm/key_documents_lists/138684/Bearkat_Update_04_24_2018_RPG.pdf

Bearkat - Topology



Economic Evaluation of Alternatives

Please refer to the Appendix for project option descriptions

Project	Annual PC Savings (M$)	Total Capital Cost for Option (M$)	Benefit/Cost Ratio	Meets Benefit/Cost Ratio of 15%
Opt 1	5.76	54.95	0.11	NO
Opt 2	8.12	55.61	0.14	NO
Opt 3	7.82	58.06	0.14	NO
Opt 4	8.13	69.87	0.12	NO
Opt 5	7.74	80.54	0.10	NO
Opt 6	7.12	93.47	0.08	NO
Opt 7	4.93	102.15	0.05	NO
Opt 8	6.43	106.50	0.06	NO

Economic Evaluation of Alternatives
Weather Scenario Analysis

For options with B/C ratio between 10 and 20%, PC savings were determined under two other weather scenarios (2007 and 2010)

http://www.ercot.com/content/wcm/key_documents_lists/108892/Whitepaper_Economic_Planning.pdf

Project	PC Savings - 2007 Weather Year (M$)	PC Savings - 2010 Weather Year (M$)	Total Capital Cost for Option (M$)	Benefit/Cost Ratio - 2007 Weather Year	Benefit/Cost Ratio - 2010 Weather Year	Benefit/Cost Ratio using Weather-Averaged Savings	Meets Benefit/ Cost Ratio of 15%
Opt 1	6.99	6.32	54.95	0.13	0.12	0.12	NO
Opt 2	7.50	6.93	55.61	0.14	0.12	0.14	NO
Opt 3	7.18	5.75	58.06	0.12	0.10	0.12	NO
Opt 4	7.27	6.07	69.87	0.10	0.09	0.10	NO

Transmission Outage Probability Analysis

- Transmission outage probability analysis was performed consistent with 2017 RTP, based on ERCOT system-wide 345-kV line outage statistics for each season.

Equipment type	Fall	Spring	Summer	Winter	Annual
Single Circuit (345-kV)	0.018	0.019	0.006	0.016	0.015

- Transmission outage probability analysis was performed for Options 1, 2, 3, and 4

- The additional production cost (PC) savings under outages was determined using base weather year 2009

Transmission Outage Probability Analysis-Results

- PC savings with Bearkat – Sandbluff single 345-kV transmission circuit outage

Project	Annual Expected PC Savings with Outage (M$)	Probability-weighted Annual PC Savings (M$)	Total PC Savings with Outage (M$)	Total Capital cost for option (M$)	Benefit/ Cost Ratio	Meets Benefit/ Cost Ratio of 15%
Option 1	0.50	5.67	6.17	54.95	0.112	NO
Option 2	0.57	8.00	8.57	55.61	0.154	YES
Option 3	0.48	7.70	8.18	58.06	0.141	NO
Option 4	0.59	8.01	8.60	69.87	0.123	NO

Next Steps

- ERCOT will perform further analyses to assess the performance of the project options with Kontiki wind modeled in the base case

Project Name	Projected COD	Fuel	Capacity	County
Kontiki Wind A	09/2019	Wind	255	Glasscock
Kontiki Wind B	09/2020	Wind	255	Glasscock

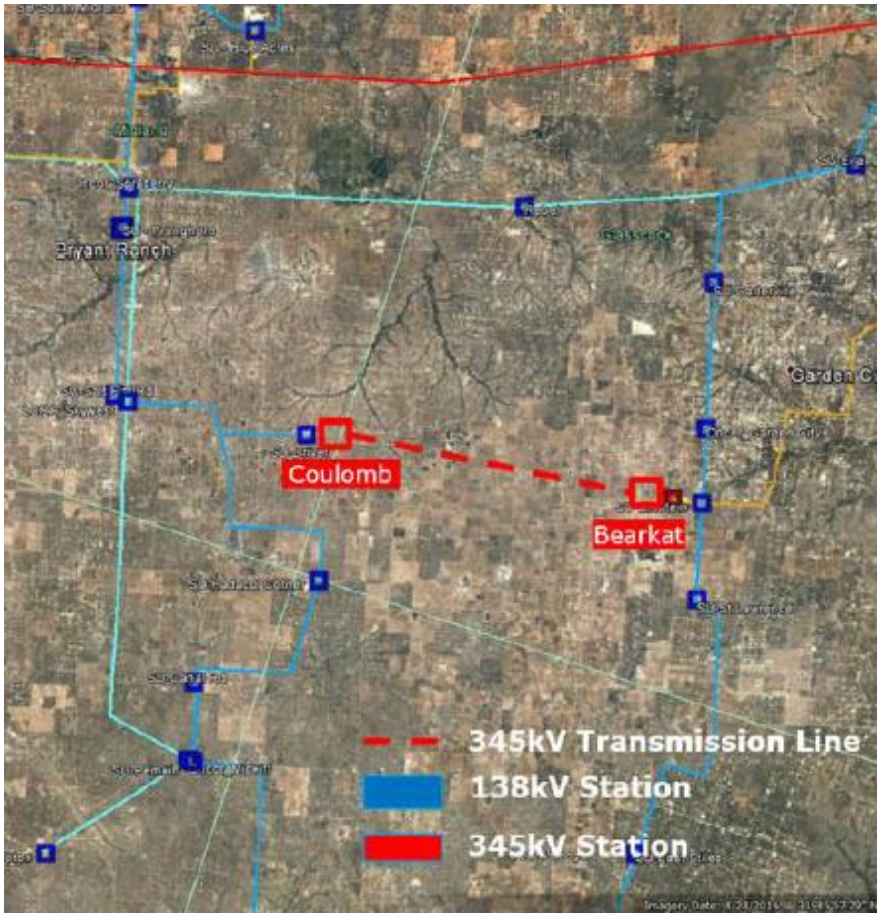
Deliverables

- **Timeline**
  - EIR recommendation to TAC – July, 2018
  - BOD Endorsement – August, 2018

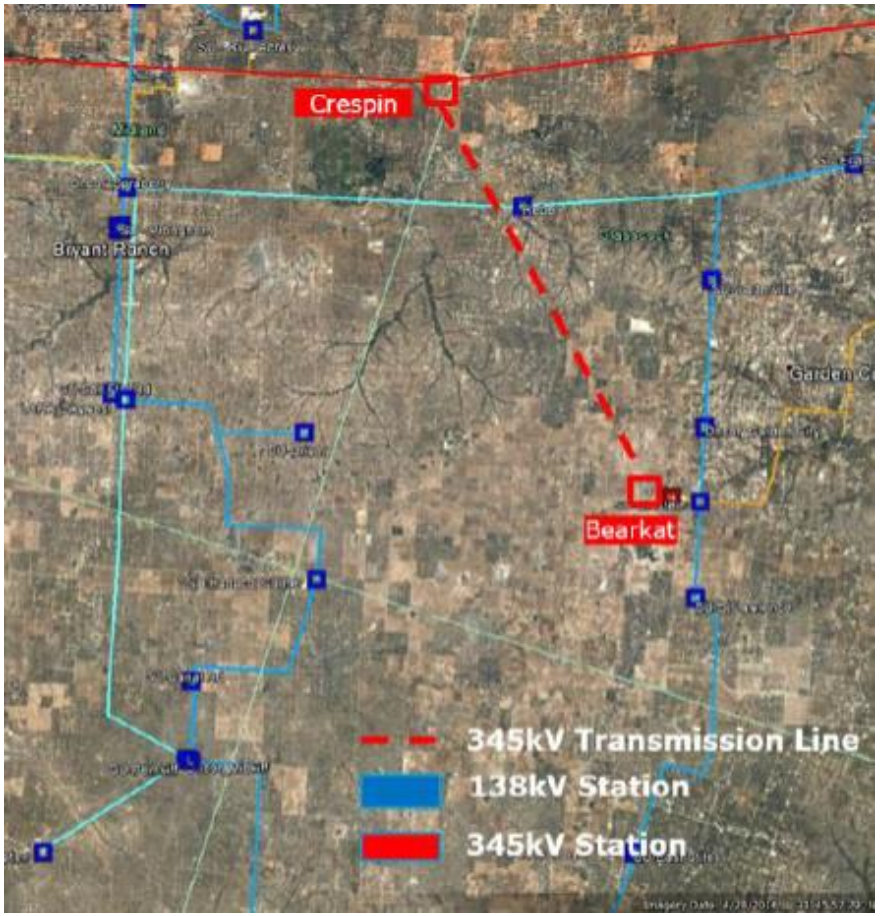
Stakeholder Comments Also Welcomed to Prabhu Gnanam:

ggnanam@ercot.com

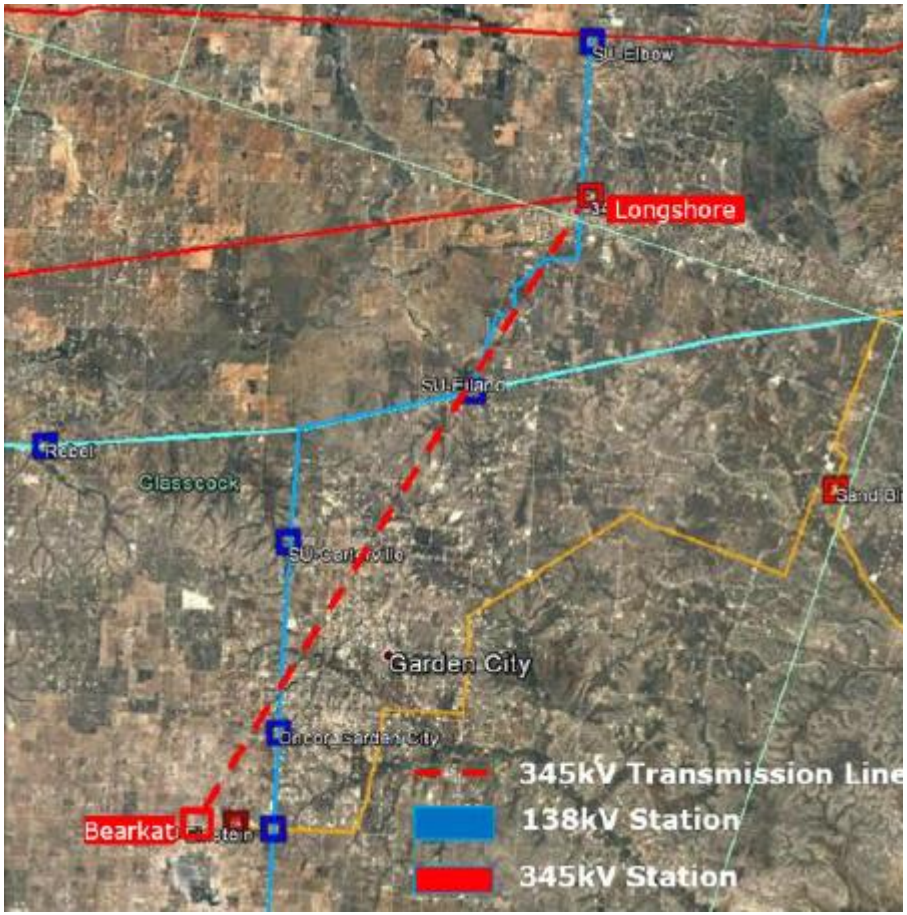
Appendix – Transmission Option 1 (Presented by WETT at 08/22/2017 RPG)



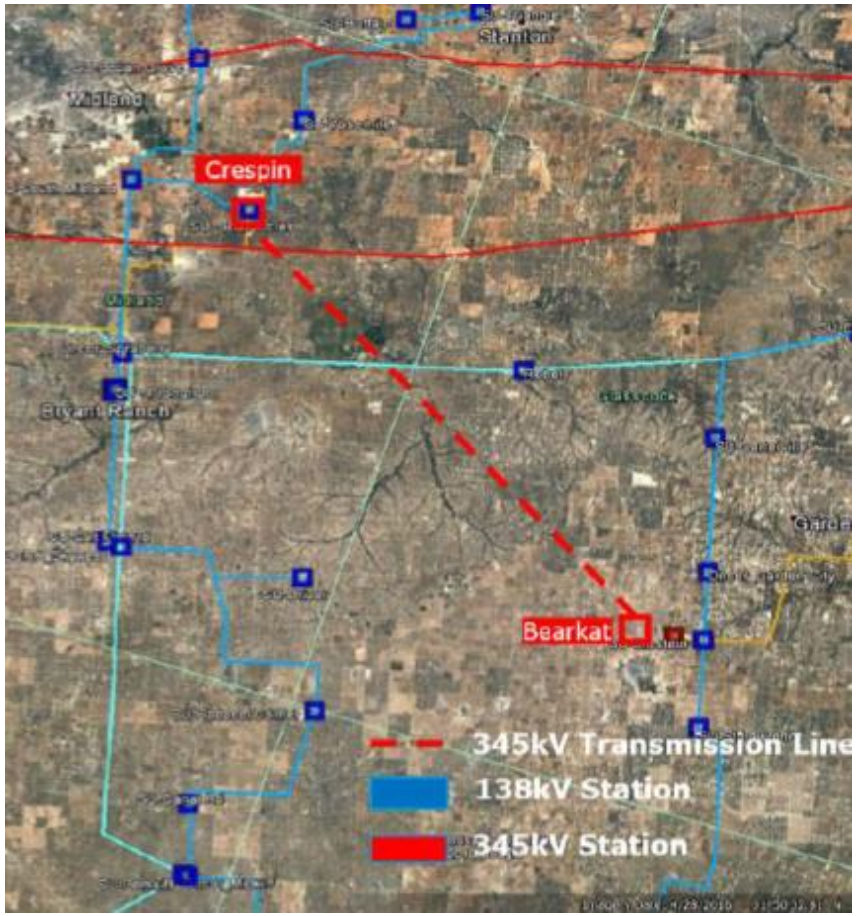
Appendix – Transmission Option 2 (Presented by WETT at 08/22/2017 RPG)



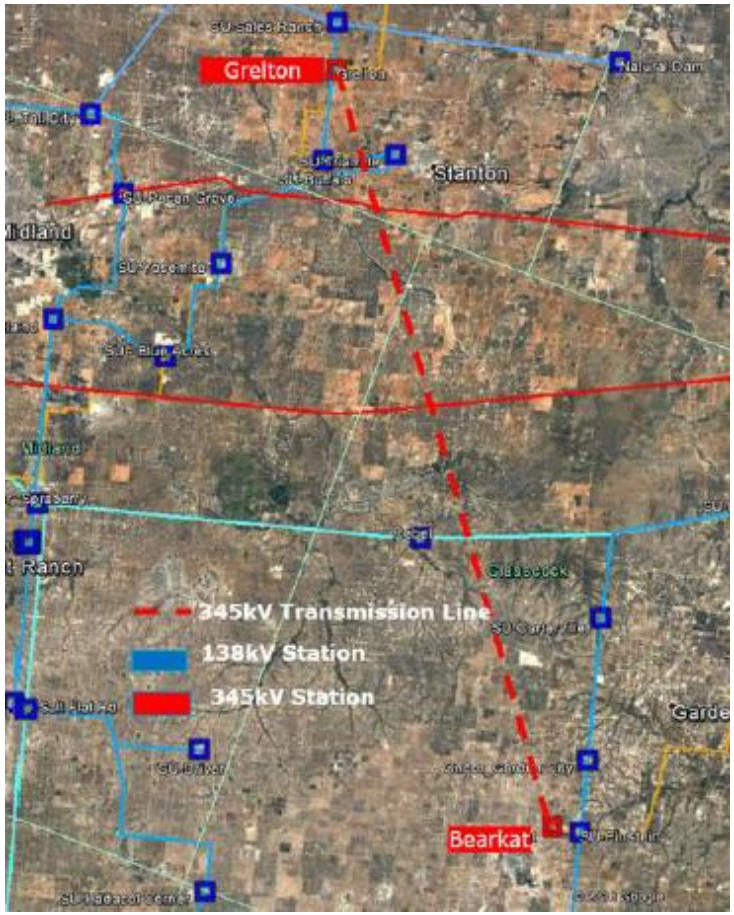
Appendix – Transmission Option 3 (Presented by WETT at 08/22/2017 RPG)



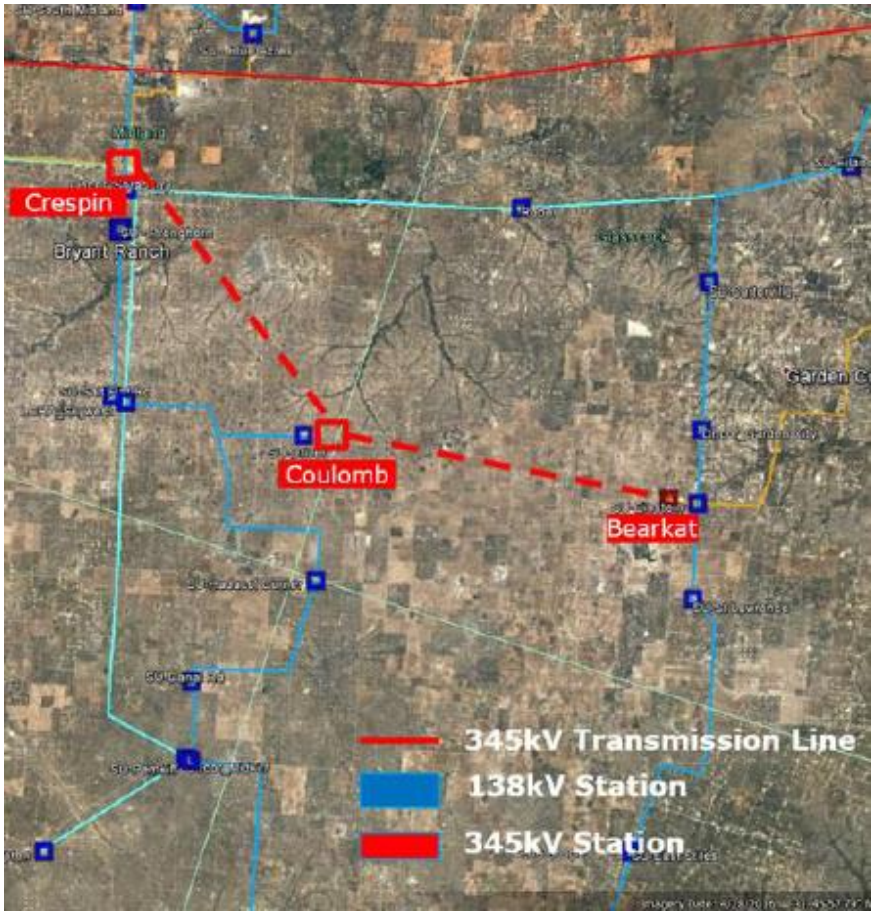
Appendix – Transmission Option 4 (Presented by WETT at 08/22/2017 RPG)



Appendix – Transmission Option 5 (Presented by WETT at 08/22/2017 RPG)

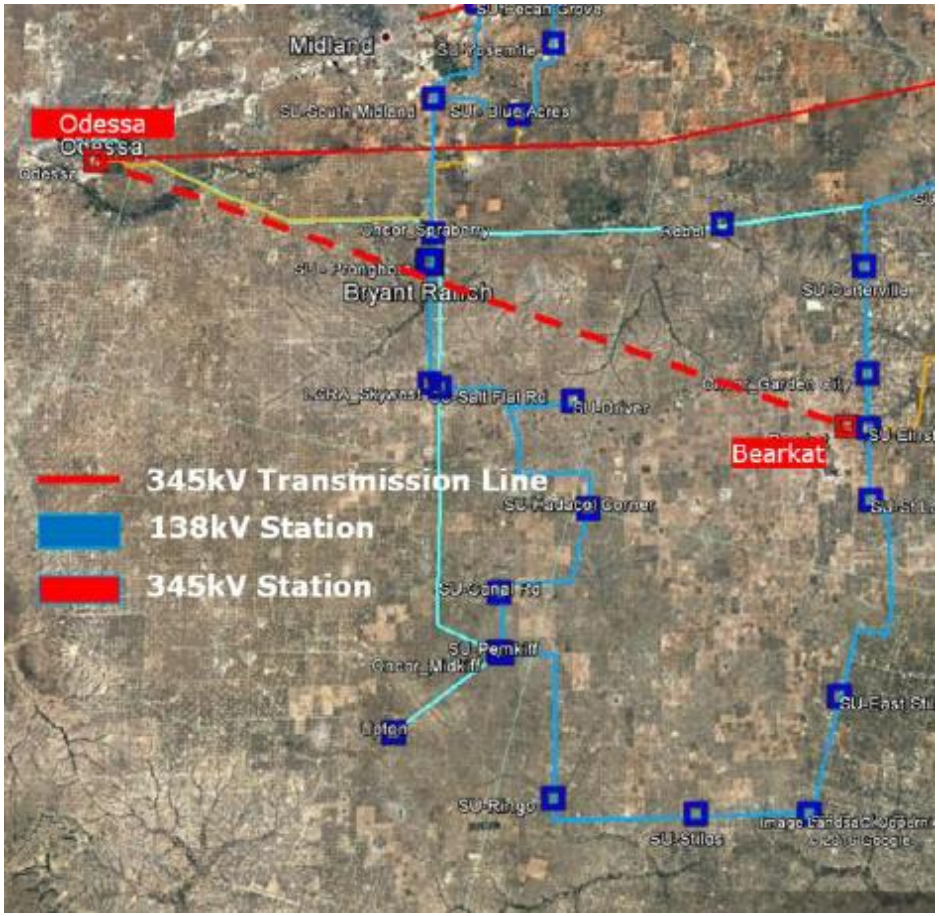


Appendix – Transmission Option 6 (Presented by WETT at 08/22/2017 RPG)



Appendix – Transmission Option 7 (Presented by WETT at 08/22/2017 RPG)

Appendix – Transmission Option 8 (Presented by WETT at 08/22/2017 RPG)



Appendix – Calculation of PC Savings under outage conditions

$$PC\ Savings_{base\ year\ with\ outages} = Annual\ PC\ Savings_{base\ year} \times \left[1 - \sum_{out=i}^{n} pr(out)_{annual}\right] + Annual\ Expected\ PC\ Savings_{Out}$$

Where,

$$Annual\ Expected\ PC\ Savings_{out} = \sum_{Out=i}^{n} \sum_{Season=1}^{4} PC\ Savings_{Season-outage} \times pr(out)_{Season}$$

$$and\ n = \#\ of\ outages$$

Where,

$$pr(out) = \frac{\#\ of\ occurences\ per\ period\ \times average\ duration\ per\ occurence}{\#\ of\ circuits \times \#\ of\ hours\ in\ the\ period}$$

http://www.ercot.com/content/wcm/key_documents_lists/108892/Whitepaper_Economic_Planning.pdf