DOCKET NO. 38577

PROCEEDING TO DETERMINE WHETHER TO MODIFY THE CREZ TRANSMISSION PLAN	**§ § §**	**PUBLIC UTILITY COMMISSION OF TEXAS**

ERCOT'S RE-EVALUATION OF THE NEED FOR THE GILLESPIE TO NEWTON CREZ TRANSMISSION LINE AND ANALYSIS OF ALTERNATIVE SOLUTIONS

COMES NOW, Electric Reliability Council of Texas, Inc. (ERCOT) and pursuant to the Public Utility Commission's (Commission) Order Establishing Docket,[1] files this report on the review of the need for the Gillespie to Newton Competitive Renewable Energy Zone (CREZ) transmission circuit and analysis of alternative solutions[2] to limit curtailment of wind energy.

ERCOT's report on the review of the need for the Gillespie to Newton CREZ transmission circuit and analysis of alternative solutions is attached hereto as Attachment A.

Respectfully submitted,

By: _____

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[1] Order Establishing Docket, Docket No. 38577 (August 24, 2010).

[2] The Commission requested that ERCOT file the information it was provided for its analysis regarding the NextEra Energy Resources private generation-tie circuit. This information was previously submitted in two informational filings in this docket by Horse Hollow Generation Tie, LLC. *See* Docket No. 38577, Interchange Item Nos. 10 and 21.

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COUNCIL OF TEXAS, INC.

CERTIFICATE OF SERVICE

I certify that a copy of this document was served on all parties of record in this proceeding on September 23, 2010 in the following manner: by facsimile, hand-delivery, electronically mailed, sent by overnight delivery, or United States first-class mail.

Lori Cobos

ERCOT Review of the CREZ Gillespie to Newton Circuit

September 23, 2010

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ERCOT Review of the Gillespie to Newton Project

1. Introduction

On June 1, 2010, the Chairman of the Public Utility Commission of Texas (Commission, PUCT) requested that ERCOT re-evaluate the need for the Gillespie to Newton transmission circuit included in Scenario 2 of the CREZ Transmission Optimization (CTO) Study filed by ERCOT in PUCT Docket No. 33672. ERCOT completed its review and provided a letter-response to the Commission on August 17, 2010. Following a review of the results of the analysis in ERCOT's letter-response, the Commission requested in the Order Establishing Docket in PUCT Docket No. 38577,that ERCOT provide a summary and brief discussion of the re-evaluation of the need for the Gillespie to Newton circuit and analysis of alternative solutions needed to limit curtailment of wind energy. This report provides the requested information, including the methodology and detailed results of the analysis.

2. Methodology

As requested in the Commission Chairman's June 1, 2010 Letter, ERCOT's analysis of the need for the Gillespie to Newton circuit assumed the incorporation of all transmission projects, both planned and completed, in the ERCOT transmission system. In addition, all transmission projects designated as part of the CREZ Transmission Plan (CTP) were included in the model representations of the ERCOT transmission system for this study.

In the development of the CTP, transmission alternatives were considered to be acceptable if they provided sufficient transmission capacity, such that no more than approximately 2% of the expected wind generation in a year was undeliverable, i.e., curtailed. The amount of wind generation curtailed is determined using a program that simulates future system operations through security-constrained unit commitment and economic dispatch of all generation in ERCOT to serve hourly system load. This model simulates the operation of the generation units in ERCOT in a manner consistent with market conditions while adhering to the limitations of the ERCOT transmission system and applicable North American Electric Reliability Corporation (NERC) and ERCOT reliability requirements. Units are committed and dispatched based on variable costs – i.e., startup costs, fuel costs, variable operations and maintenance costs, and emissions costs across all hours of the year. Representative wind patterns (developed through meteorological modeling of typical hourly wind patterns throughout Texas), average weather year load patterns (by weather zone) and generation unit efficiencies and operational constraints (such as minimum up times, minimum down times, startup costs, etc.) are inputs into this model, which is designed to determine the lowest cost option to serve load while maintaining transmission grid reliability. Wind generation, modeled as having $0 variable cost, is utilized by the model to the extent possible, given transmission and system operational limitations.

Even with no transmission constraints, approximately 0.5% of the available wind energy is curtailed by the system operations simulation model due to other operational constraints. As a result, transmission alternatives in the CTO Study were considered

sufficient if the model results indicated no more than 2.5% of wind generation curtailment.

The continued need for the Gillespie to Newton circuit, or an adequate alternative, was determined by removing the respective circuit from the modeled transmission system and calculating the overall annual wind generation curtailment. With the Gillespie to Newton circuit removed, the curtailment increased from 2.5% to 3.4%, a reduction of approximately 598 GWh of wind generation per year. As this increased level of wind generation curtailment did not meet the criteria established in the CTO Study, alternative projects were evaluated to determine if there existed cost-effective alternatives to the Newton to Gillespie circuit.

Alternative solutions were submitted to ERCOT by various stakeholders through the Regional Planning Group (RPG) process, and additional options were developed by ERCOT staff. Proposed system upgrades were evaluated for effectiveness at reducing overall wind curtailment; planning-level cost estimates were developed for options that met the CTO Study criteria. Several of the alternative system upgrades resulted in wind generation curtailment that was at or below the level to which the CTP was originally designed. The lowest-cost alternative solution was analyzed for stability following transient events, using the latest dynamic stability databases developed as part of the CREZ Reactive Study being conducted concurrently by ABB, Inc. (ABB) Through this analysis, the lowest-cost acceptable alternative to the Gillespie to Newton circuit was identified and validated.

3. Alternatives

Potential alternative solutions evaluated as part of this study included upgrades of existing transmission infrastructure, new 345-kV circuits, and incorporation of privately owned and operated transmission investments. Some of the scenarios include upgrades to existing 138-kV circuits near the Killeen and Kendall substations. New circuits that were evaluated included single-circuit 345-kV connections from Newton to Hutto; Kendall to Lytton Springs; Kendall to Hays (this circuit could potentially utilize an open position on existing towers); and Big Hill (formerly known as McCamey D) to Cagnon. The new 345-kV circuits from Big Hill to Cagnon have been included in alternatives in place of the proposed 345-kV circuits from Big Hill to Kendall that were a part of the CTP. These circuits were evaluated as a means of quantifying any potential benefits from reducing transmission congestion in the vicinity of the Kendall substation by directing power flows south to Cagnon.

In several of the cases studied, the private generation-tie (gen-tie) circuit operated by NextEra Energy Resources (NextEra) was included as a network circuit. This private gen-tie circuit currently connects the NextEra wind generating units (Horse Hollow 1 – 4 and Callahan Divide) to the Kendall substation. In the cases so noted, a new substation is assumed to be constructed at the point where the gen-tie circuit intersects the Twin Butte to Brown circuit. The circuit from this substation to Kendall is assumed to be in service, with the remainder of the circuit (from this new substation back to the NextEra

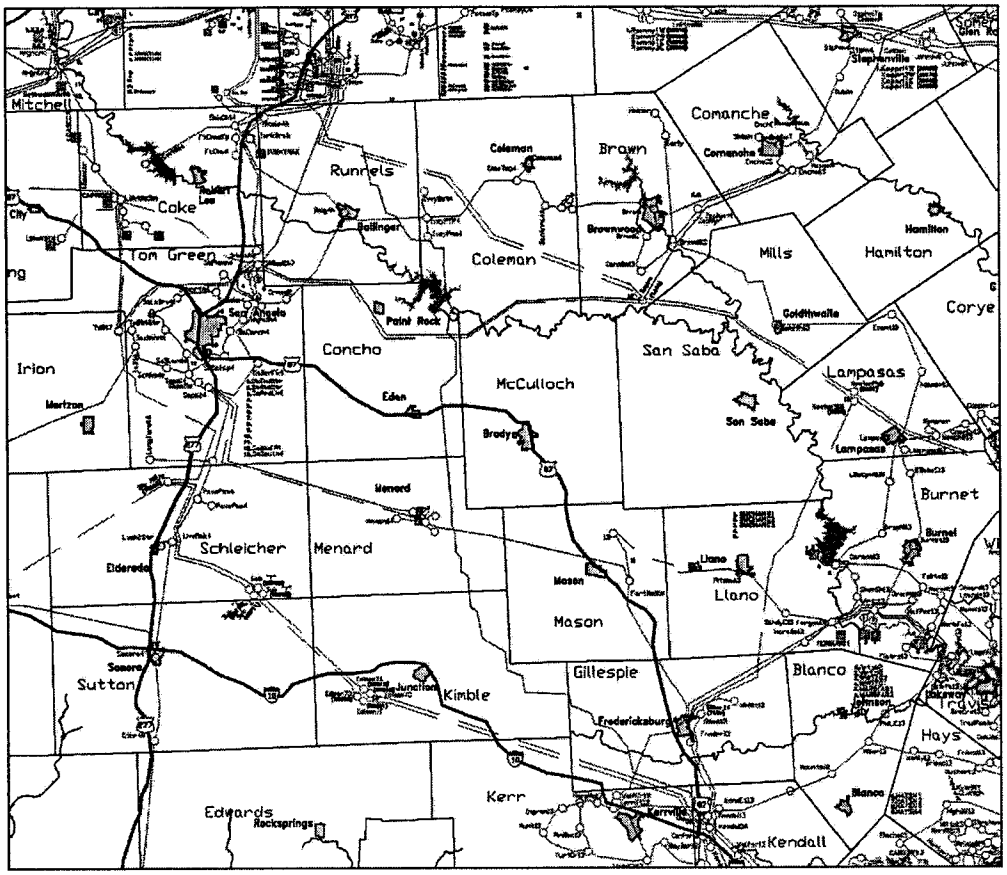

Figure 1: Transmission Map of the Study Area

wind generation facilities located south of Abilene) disconnected. In these cases, the NextEera wind generation units are connected to the Bluff Creek and NW Abilene substations. Technical specifications for the gen-tie circuit (ratings and impedances) were provided to ERCOT by NextEra. Based on this information, the gen-tie circuit was assumed to have a rating of 1,735 MVA. In cases where the notes specify that the NextEra wind generating units are connected to the gen-tie circuit, then the gen-tie circuit from these units to the new substation at the point of intersection of the gen-tie circuit and the Twin Butte to Brown circuit is assumed to be in-service.

In cases 27 and 29 – 31, the notation "private gen-tie with expanded connection" indicates that the new substation has been constructed to accommodate connections to both of the existing parallel 345-kV circuits that intersect the NextEra gen-tie circuit (these circuits are the Twin Butte to Brown circuit and the Red Creek to Brown circuit).

In cases 32 and 33, the entire length of the gen-tie circuit is modeled as a network connection. In these cases the gen-tie circuit is connected to the Bluff Creek substation in the north and the Kendall substation in the south. One additional connection is included in these two cases: a new circuit connects Big Hill to a point approximately two-thirds of the distance to Kendall along the gen-tie circuit.

4. Results

Table 1 provides a summary of the level of wind generation curtailment associated with selected alternative solutions that were reviewed as part of this study. For each alternative, the major circuits that were removed from the case are listed, as are the new circuits that were added (or in some cases upgraded). In each of the cases listed, except for the circuits listed as removed, all existing and planned transmission circuits, as well as the circuits designated as part of the CTP, are included in the model representation of the ERCOT system.

Table 1: Selected Alternative Solutions and Simulation Results

Case	Circuits Removed	Circuits Added	Wind Curtailment
1	None – Reference Case	None	2.5%
2	Gillespie – Newton	None	3.4%
3	Gillespie – Newton	138-kV Upgrades to Killeen – Killeen Elm and Kendall - Paleface	2.59%
4	Gillespie – Newton	Same as Case 3 with Series Reactor on Ft. Lancaster to Hamilton circuit	2.53%
5	Gillespie – Newton	private gen-tie	3.01%
6	Gillespie – Newton	private gen-tie; NextEra wind connected to private gen-tie	3.12%
7	Gillespie – Newton; Kendall – Gillespie	Newton - Hutto	3.60%
8	Gillespie – Newton; Kendall – Gillespie	Newton – Hutto; Kendall to Lytton Springs	2.65%
9	Gillespie – Newton	private gen-tie; Kendall – Hays; Hays – Zorn	2.46%
10	Gillespie – Newton	private gen-tie; Kendall - Hays	2.47%
11	Gillespie – Newton; Big Hill – Kendall (2 circuits)	Big Hill – Cagnon (2 circuits)	3.22%
12	Gillespie – Newton	Kendall – Hays; 138-kV upgrades on Killeen – Killeen Elm	2.46%
13	Gillespie – Newton; Big Hill - Kendall (2 circuits)	Private gen-tie; Big Hill – Cagnon (1 circuit)	2.77%
14	Gillespie – Newton; Big Hill- Kendall (2 circuits); Kendall – Gillespie	Private gen-tie; Big Hill – Cagnon (2 circuits)	2.10%
15	Gillespie – Newton; Kendall - Gillespie	Kendall – Hays; Upgrade Killeen – Killeen Elm	2.82%
16	Gillespie – Newton; Kendall - Gillespie	Kendall – Hays; Upgrade Killeen – Killeen Elm; Additional 478 MVA autotransformer at Kendall	2.50%
17	Gillespie – Newton; Kendall – Gillespie; Big Hill – Kendall (2 circuits)	Private gen-tie; Big Hill – Cagnon (1 circuit)	2.77%

Case	Circuits Removed	Circuits Added	Wind Curtailment
18	Gillespie – Newton; Kendall – Gillespie; Big Hill – Kendall (2 circuits)	Private gen-tie; Big Hill – Cagnon (2 circuits)	2.03%
19	Gillespie – Newton; Kendall - Gillespie	138-kV Upgrades to Killeen – Killeen Elm and Kendall - Paleface	4.32%
20	Gillespie – Newton; Kendall - Gillespie	138-kV Upgrades to Killeen – Killeen Elm and Kendall – Paleface; Additional 478 MVA autotransformer at Kendall	2.58%
21	Gillespie – Newton; Kendall - Gillespie	138-kV Upgrades to Killeen – Killeen Elm and Kendall – Paleface; Two additional autotransformers at Kendall	2.64%
22	Gillespie – Newton	Newton - Hutto	2.29%
23	Gillespie – Newton	Newton – Hutto; Kendall – Lytton Springs	2.25%
24	Gillespie – Newton	Kendall – Lytton Springs	3.28%
25	Gillespie – Newton; Big Hill – Kendall (2 circuits)	Private gen-tie; Big Hill – Cagnon (1 circuit); Big Hill– gen-tie substation (1 circuit)	2.71%
26	Gillespie – Newton	Kendall – Lytton Spings; Upgrade Killeen – Killeen Elm	2.46%
27	Gillespie – Newton	Private gen-tie (expanded connection); Kendall – Hays	2.47%
28	Gillespie – Newton	Upgrades to Killeen – Killeen Elm, Kendall – Paleface, and Hamilton – Maverick	2.46%
29	Gillespie – Newton; Big Hill – Kendall (2 circuits)	Private gen-tie (expanded connection); Big Hill – gen-tie substation	5.34%
30	Gillespie – Newton; Big Hill – Kendall (1 circuit)	Private gen-tie (expanded connection); Big Hill – gen-tie substation (1 circuit)	3.14%
31	Gillespie – Newton; Big Hill - Kendall	Private gen-tie (expanded connection); Big Hill – Cagnon (1 circuit); Big Hill – gen-tie substation (1 circuit)	2.60%
32	Gillespie – Newton; Big Hill – Kendall; Kendall – Gillespie	Private gen-tie (connected from Bluff Creek to Kendall) with series compensation; Big Hill – Cagnon (1 circuit); Big Hill – southern gen-tie substation (1 circuit)	13.26%
33	Gillespie – Newton; Big Hill – Kendall; Kendall – Gillespie	Private gen-tie (connected from Bluff Creek to Kendall) without series compensation; Big Hill – Cagnon (1 circuit); Big Hill – southern gen-tie substation (1 circuit)	6.69%

The results of each of these options were compared, and ten options were selected for cost analysis. Costs were estimated using planning–level cost assumptions, consistent with the costs listed in Table 3 of the CTO Study. The ten options selected, and the estimated costs, are listed in Table 2, below. As the cost of the NextEra gen-tie circuit is unknown, along with the costs of any required upgrades to this circuit, these aggregate costs are indicated using the variable α.

Table 2: Cost Analysis

Case	Circuits Removed	Circuits Added	Wind Curtailment	Cost of Upgrades ($M)	Deferred Costs ($M)
3	Gillespie – Newton	Upgrade Killeen – Killeen Elm; Kendall – Paleface	2.59%	39	136
10	Gillespie – Newton	Private gen-tie; Kendall - Hays	2.47%	88 + α	136
12	Gillespie – Newton	Kendall – Lytton Springs; Upgrade Killeen – Killeen Elm	2.46%	78	136
16	Gillespie – Newton; Kendall – Gillespie	Kendall – Hays; Upgrade Killeen – Killeen Elm; Additional 478 MVA autotransformer at Kendall	2.50%	86	190
18	Gillespie – Newton; Kendall – Gillespie; Big Hill – Kendall (2 circuits)	Private gen-tie; Big Hill – Cagnon (2 circuits)	2.03%	81 + α	190
20	Gillespie – Newton; Kendall – Gillespie	138-kV Upgrades to Killeen – Killeen Elm and Kendall – Paleface; Additional 478 MVA autotransformer at Kendall	2.58%	47	190
22	Gillespie – Newton	Newton - Hutto	2.29%	98	136
26	Gillespie – Newton	Kendall – Lytton Springs; Upgrade Killeen – Killeen Elm	2.46%	125	136
28	Gillespie – Newton	Upgrades to Killeen – Killeen Elm, Kendall – Paleface, and Hamilton - Maverick	2.46%	71	136
31	Gillespie – Newton; Big Hill – Kendall (2 circuit)	Private gen-tie (expanded connection); Big Hill – gen-tie substation (1 circuit), Big Hill – Cagnon (1 circuit)	2.60%	161 + α	251

Option 3 is the lowest cost alternative to the Gillespie to Newton circuit. This option includes the reconductoring or reconstruction of the existing 138-kV circuits listed below:

- The circuits from Killeen (bus 3423) to Killeen Elm (bus 3618), approximately 7 miles of circuits, to achieve a rate B of 400 MVA. These circuits are owned and operated by Oncor Electric Delivery; and,
- The circuits from Kendall (bus 7152) to Miller Creek (bus 7479), approximately 40 miles of circuits, to achieve a rate B of 440 MVA, and the circuits from Miller Creek (bus 7479) to Paleface (bus 7476), approximately 17 miles of circuits, to achieve a rate B of 220 MVA. These circuits are owned and operated by the Lower Colorado River Authority (LCRA).

Based on available information, ERCOT does not believe that upgrading the 138-kV circuits listed above will require modification of the respective Transmission Owner's Certificate of Convenience and Necessity (CCN).

Option 20 may be a more cost-effective alternative, due to the removal of not only the Gillespie to Newton circuit, but also the Kendall to Gillespie circuit. However, this option eliminates a significant new load-serving path into the Hill Country, and the additional reliability implications of removing this circuit are being analyzed in a concurrent study being conducted by ERCOT, at the Commission's request, of the Bill Hill (McCamey D) to Kendall to Gillespie circuit. The results of this study will be provided to the Commission when it is completed. The selection of option 3 at this time does not preclude use of option 20 if further analysis indicates that it is acceptable.

5. Stability Analysis

Stability analysis was performed on Option 3 using transient stability cases provided by ABB, Inc. as part of their work analyzing the reactive requirements for the CTP. The Gillespie to Newton circuit was removed from these cases and the upgrades associated with Option 3 were added. The system response following simulated 6-cycle three-phase faults was analyzed for 12 significant contingencies located near the Gillespie and Newton substations. Contingencies were selected based the results of steady-state Power/Voltage analysis. Model results were considered acceptable if the overall system response was well-damped and if voltages recovered to post-contingency levels before the end of a ten-second simulation period. Post-contingency voltage criteria vary by TSP but are typically around 0.9 pu.

For the scenario with the Gillespie to Newton circuit removed and the upgrades described in Option 3 added, this analysis indicates that the system was stable for the contingencies evaluated.

6. Discussion

As noted on page 36 of the CTO Study, several options were considered as part of the original CTO Study to relieve transmission congestion in the vicinity of the Kendall substation. The circuit connecting this substation with the Killeen substation, through the Newton switching station, was selected because similar projects had been shown to have system reliability benefits in long-range studies completed by both ERCOT and LCRA. Modeling analysis conducted by ERCOT as part of this reassessment of the Gillespie to Newton circuit confirms that as loads grow in the Hill Country and nearby areas, the Gillespie to Newton circuit would provide more system operational flexibility and greater support for long-term system reliability compared to the 138-kV improvements identified as part of this reassessment.

The Kendall to Newton circuits were included in the CTP because they relieved congestion due to wind generation near the Kendall and Killeen substations in a way that supported the long-range need for reliable electric service to the Hill Country area. No other circuits in the CTP were justified in part based on long-range system needs. As such, the modification to the CTP identified in this reassessment represents a unique opportunity to reduce the overall cost of the CTP transmission improvements. The potential savings noted in this reassessment (comparing the identified 138-kV upgrades

to the Gillespie to Newton circuit) are a direct result of foregoing long-range system benefits for a near-term solution.

If the Commission chooses to alter the CTP to include these 138-kV improvements in lieu of the Gillespie to Newton circuit, ERCOT believes that the decision to implement these improvements could be delayed until the upgrades are actually needed, since these upgrades may not require CCN modifications and could, therefore, be completed relatively quickly. By delaying the decision to implement these projects, the Commission would allow ERCOT to re-evaluate the cost-effectiveness of these solutions annually through the five-year planning process, taking into account future changes in the overall ERCOT transmission system. As wind generation capacity increases on the transmission system and the expected congestion at the Kendall and Killeen substations noted in the CTO study and in this reassessment becomes evident in the modeling analysis conducted as part of the ERCOT five-year transmission planning process, the most cost-effective upgrades can be endorsed by ERCOT and implemented by Transmission Owners. ERCOT will coordinate with the respective Transmission Owners to determine the required construction time for these projects and to ensure that the expected congestion can be mitigated in a timely manner.

7. Conclusion

Based on the results of this study, ERCOT has found a cost-effective alternative to the Gillespie to Newton circuit specified in the CTP. Analytical results based on planning information available at this time indicate that the following upgrades of existing 138-kV circuits will provide sufficient transmission capacity to allow the overall CTP to function in a manner that meets the criteria established as part of the CTO Study:

- Reconductoring or reconstruction of the circuits from Killeen (bus 3423) to Killeen Elm (bus 3618), approximately 7 miles of circuits, to achieve a rate B of 400 MVA. These circuits are owned and operated by Oncor Electric Delivery; and,
- Reconductoring or reconstruction of the circuits from Kendall (bus 7152) to Miller Creek (bus 7479), approximately 40 miles of circuits, to achieve a rate B of 440 MVA, and the circuits from Miller Creek (bus 7479) to Paleface (bus 7476), approximately 17 miles of circuits, to achieve a rate B of 220 MVA. These circuits are owned and operated by the Lower Colorado River Authority (LCRA).

If the Commission chooses to alter the CTP to include these 138-kV improvements in lieu of the Gillespie to Newton circuit, ERCOT believes that the decision to implement these improvements could be delayed until the upgrades are shown to be needed through the existing ERCOT five-year transmission planning process. Information from Oncor and LCRA indicates that these upgrades will likely not require CCN modifications and therefore, could be completed relatively quickly. The actual construction time will depend on what proportion of the length of these circuits can be reconductored (using the same towers), and what proportion will need to be reconstructed (using new towers).

Delaying a decision to implement these projects would allow ERCOT to re-evaluate the cost-effectiveness of these solutions annually through the five-year planning process,

taking into account future changes in the overall ERCOT transmission system. As wind generation capacity increases on the transmission system and the expected congestion at the Kendall and Killeen substations noted in the CTO study and in this reassessment becomes evident in planning studies, the most cost-effective upgrades can be endorsed by ERCOT and implemented by Transmission Owners. ERCOT can coordinate with the respective Transmission Owners to determine the required construction time for these projects and to ensure that the expected congestion is mitigated in a timely manner.