DOCKET NO. 33672

COMMISSION STAFF'S PETITION FOR DESIGNATION OF COMPETITIVE RENEWABLE-ENERGY ZONES	§ § § §	**PUBLIC UTILITY COMMISSION OF TEXAS**

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ORDER ON REHEARING

I. Introduction

This Order addresses Commission Staff's petition for designation of competitive renewable-energy zones (CREZs), including conclusions regarding which zones should be designated as CREZs, the identification of the major transmission improvements necessary to deliver, in a manner that is most beneficial and cost-effective to customers, the energy generated by renewable resources in the CREZs, and updates of the Commission's estimate of the maximum generating capacity of renewable resources in the CREZs that the Commission expects the transmission ordered for the CREZs to accommodate.

Based on the evidence and testimony presented during hearing, the Commission concludes that the following areas from the AWS Truewind Study contained in Figure 3 of the *ERCOT Analysis of Transmission Alternatives for Competitive Renewable-energy Zones*[1] (ERCOT Study), with certain modifications as described in this order, should be designated as CREZs: zone 2A,[2] zone 4, zones 5 and 6, zone 9A,[3] and zone 19. The Commission finds that the major transmission improvements identified in the CREZ Transmission Optimization Study[4] (CTO Study) for Scenario 2 are necessary to deliver the energy generated by renewable

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[1] ERCOT Analysis of Transmission Alternatives for Competitive Renewable-energy Zones, ERCOT Ex. 1 at Ex. DW-1 at 10.

[2] Zone 2A is comprised of that area enclosed by the perimeter boundaries of zones 1 and 2, plus an additional area that includes all of Briscoe County.

[3] Zone 9A is comprised of zones 9 and 10, plus additional areas between and near the zones as requested by AES SeaWest, BNB Renewable Energy LLC, FPL Energy LLC, and RES America Developments, Inc.

[4] ERCOT's Competitive Renewable-energy Zones Transmission Optimization Study, ERCOT Ex. 4 at Ex. DW-1.

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resources in the CREZs, in a manner that is most beneficial and cost-effective to the customers. Additionally, the Commission's estimate of the maximum generating capacity of renewable resources in the CREZs that the Commission expects the transmission ordered for the CREZs to accommodate is 18,456 MW.

It is also noted, regarding the renewable-energy goals set for the state in PURA[5] § 39.904(a), that as of December 2006 there were 2,508 MW of wind generation in service in ERCOT and at least 4,850 MW of wind resources were likely to be in service by the end of 2007.[6] As of April 2007, the amount of wind generation in service in ERCOT had reportedly increased to 2,981 MW, with an additional 1,605 MW of wind generation having executed interconnection agreements with ERCOT.[7] The testimony at the hearing on the merits on June 12, 2008 credibly established that the amount of wind generation expected to be on the grid by the end of 2008 is approximately 10,000 MW.[8] The renewable-energy potential being developed thus far has allowed the State of Texas to meet and surpass the statutory renewable-energy goals.

II. Procedural History

P.U.C. SUBST. R. 25.174(a)(1) requires Commission Staff to initiate a contested case proceeding to designate CREZs upon receiving ERCOT's study of the wind energy production potential statewide and the transmission constraints that are most likely to limit the delivery of electricity from wind energy resources. ERCOT filed the ERCOT Study in Project No. 33577 on December 7, 2006, and Commission Staff filed a petition for the designation of CREZs on January 4, 2007.

The Commission's approach in the CREZ proceeding is two-phased. In the first phase, the Commission conducted a hearing from June 11 – 14, 2007, and designated areas of the state as CREZs in an interim order on reconsideration issued on November 6, 2007. The scope of the

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[5] Public Utility Regulatory Act (PURA), TEX. UTIL. CODE ANN. §§ 11.001-66.017 (Vernon 2007).

[6] ERCOT Study. ERCOT Ex.1 at Ex. DW-1 at ES-1.

[7] Direct Testimony of Jeffry Pollock, TIEC Exhibit 1 at 9-10 *citing to* ERCOT, *Wind Impact/Integration Analysis*, Regional Planning Group Meeting April 13, 2007.

[8] Tr. at p. 1865 (June 12, 2008).

interim order was limited to designating areas as CREZs and providing initial estimates of the maximum generating capacity that the Commission expected the transmission ordered for the CREZs to accommodate. Regarding transmission solutions, the Commission determined that it would be necessary for ERCOT to conduct studies on the four aggregate tiers of megawatt transfer capability identified by the Commission for the designated CREZs, and directed ERCOT to conduct the CTO study. The purpose of the study was to identify transmission proposals that would produce the most beneficial and cost-effective transmission solutions to deliver each scenario's estimated generating capacity from the designated CREZs. ERCOT conducted workgroups over a 6-month period with stakeholders to consider and test multiple alternative transmission solutions.

On April 2, 2008, ERCOT filed the CTO study, which presented 5 alternative plans that represent the least expensive transmission alternatives that will support each of the four scenarios on a $/kWh basis. Also on the same day, ERCOT filed the "Analysis of Wind Generation Impact on ERCOT Ancillary Services Requirements" study prepared by General Electric International, Inc. (the GE Ancillary Services study). The purpose of this study was to determine the level, type, and cost of additional ancillary services to maintain the reliability of the grid with increasing levels of wind generation. The GE Ancillary Services study began before the Commission's interim order in the CREZ proceeding, therefore the levels and geographic location of the wind generation studied are similar to, but do not exactly mirror, the four scenarios addressed in the CTO study. The GE Ancillary Services study covers four scenarios also: a 5,000 MW, two 10,000 MW, and a 15,000 MW scenario of wind generation.

After these filings by ERCOT, the second phase of the proceeding commenced, and a second hearing on the merits was held on June 11-12, 2008. In the second phase, the Commission identified the major transmission improvements necessary to deliver, in a manner that is most beneficial and cost-effective to customers, the energy generated by renewable resources in the CREZs designated in the first phase. This identification of improvements includes the new and upgraded lines, identified by voltage level; a general description of where any new lines will interconnect to the existing grid;[9] as well as the necessary improvements other

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[9] P.U.C. SUBST. R. 25.174(a)(5)(B).

than transmission lines. The Commission also updates the estimate of the maximum generating capacity that the Commission expects the transmission ordered for the CREZs to accommodate.

III. Discussion

PURA § 39.904(g) directs the Commission to designate competitive CREZs throughout Texas in areas in which renewable-energy resources and suitable land areas are sufficient to develop generating capacity from renewable-energy technologies. In determining whether to designate an area as a CREZ, the Commission must consider the level of financial commitment by generators for each CREZ[10] and may consider any other factors considered appropriate by the Commission, as provided by PURA.[11]

P.U.C. SUBST. R. 25.174(a)(5) provides that the Commission's final order in this proceeding shall specify: (1) the geographic extent of the CREZ; (2) major transmission improvements necessary to deliver to customers the energy generated by renewable resources in the CREZ, in a manner that is most beneficial and cost-effective to the customers, including new and upgraded lines identified by voltage level and a general description of where any new lines will interconnect with the existing grid; (3) an estimate of the maximum generating capacity that the Commission expects the transmission ordered for the CREZ to accommodate; and (4) any other requirement considered appropriate by the Commission as provided by PURA.

IV. CREZ Designations

A. Suitable Land Area and Renewable-energy Resources

The Commission finds that the methodology utilized in the AWS Truewind Study, as described in the ERCOT Study, in addition to the relevant testimony and evidence submitted by the parties, establishes that the statutory criteria related to suitable land areas and renewable-energy resources has been met for each of the zones designated by the Commission as a CREZ. As discussed in the ERCOT Study, AWS Truewind conducted its analysis of wind generation

[10] PURA § 39.904(g)(3), P.U.C. SUBST. R. 25.174(a)(4)(B).

[11] P.U.C. SUBST. R. 25.174(a)(4)(C).

potential by using a proprietary model called MesoMap, which is an integrated set of atmospheric models, computer systems, and meteorological and geophysical databases.[12] AWS Truewind also analyzed land use patterns to determine the amount of land available for wind development.[13] After reviewing the information contained in the ERCOT Study and testimony by the parties regarding the analysis conducted by AWS Truewind, the Commission finds that the methodology used by AWS Truewind is an adequate method for determining those areas within the state where sufficient renewable-energy resources and suitable land areas exist for wind-power development.

Using its modeling tools in addition to certain other data, AWS Truewind identified the 100-MW sites within Texas with the highest annual capacity factors[14] and clustered those sites into 25 areas.[15] A generation supply curve was developed for each of the 25 zones, based on "the amount of developable land in each zone, the existing wind resources, and the output power curve of a large generic wind turbine."[16] Figure 3 of the ERCOT Study shows the location of the areas with the best 4,000 MW with the highest annual capacity factors within each of the 25 areas studied by AWS Truewind.[17] AWS Truewind's modeling results were released to ERCOT stakeholders, who were given an opportunity to provide additional data to AWS Truewind that, in some instances, resulted in modifications to certain findings reached by AWS Truewind.[18]

Each of the zones designated by the Commission as a CREZ is shown within Figure 3 of the ERCOT Study, or an expansion of a zone or zones shown within Figure 3. The Commission finds that the methodology utilized by AWS Truewind was thorough and serves as an adequate method for identifying those areas of the state in which renewable-energy resources and suitable land areas are sufficient for wind-generation development. The Commission finds that

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[12] ERCOT Study, ERCOT Ex. 1 at Ex. DW-1 at 7.

[13] *Id.*

[14] "The term capacity factor means the amount of energy produced by a generator over the period of a year, as a percentage of the product of the generator's nameplate capacity multiplied by the number of hours in a year (8,760)." *Id.* at 8.

[15] *See* ERCOT Study, ERCOT Ex. 1 at Ex. DW-1 at 8.

[16] *Id.*

[17] *See* ERCOT Study, ERCOT Ex. 1 at Ex. DW-1 at 10.

[18] *Id.* at 12.

expanding certain zones, as described in this order, is warranted based upon the evidence in the record regarding parties' commitment to develop renewable-energy resources within the expanded areas, as well as the presence of renewable-energy resources and suitable land area within the expanded area. Accordingly, each of the Commission's designated CREZs fulfill the requirements of PURA § 39.904(g) and P.U.C. SUBST. R. 25.174(a)(4).

B. Evidence of Financial Commitment

PURA § 39.904(g)(3) and P.U.C. Subst. R. 25.174(a)(4)(B) require the Commission to consider the level of financial commitment by generators for each zone in determining whether to designate an area as a CREZ. Thus, aside from the presence of sufficient renewable-energy resources and suitable land areas, a zone must have a certain level of financial commitment by developers for the Commission to determine that the zone should be designated as a CREZ. P.U.C. SUBST. R. 25.174(b) sets forth examples of financial commitment by developers, including: (1) existing renewable-energy resources; (2) pending or signed interconnection agreements; (3) leasing agreements; (4) letters of credit; (5) interconnection studies by a TSP, ERCOT, or other ISO; (6) "any other factors;" (7) a non-utility entity's commitment to build and own transmission facilities; and (8) a deposit or payment to secure or fund the construction of such transmission facilities by an electric utility or a transmission facility.

In evaluating the level of financial commitment for the nominated zones, the Commission considered the number of developers, total resources committed by those developers, and the nature of the resources committed. Accordingly, because the record reflects that no financial commitment evidence was received for zones 3, 8, 15, 16, 17, 21, 22, 23, and 24, the Commission excluded these zones from further evaluation for CREZ designation. Further, the Commission did not select for CREZ designation those zones for which the record reflected relatively limited developer interest. Accordingly, zones 7, 11, 12, 13, 14, 18, 20, and 25 did not receive CREZ designation because those zones were supported by only one or two interested developers with relatively less significant financial commitment.

While both zones 1 and 19 reflect financial commitment filed by three developers, the Commission finds that the weight of this commitment is significant. Zone 1 possesses superlative wind resources, and the level of financial commitment for zone 2A (which combines zone 1 and 2) is sufficient for CREZ designation. The financial commitment for zone 19 reflects significant resources and the potential for upwards of 1,500 MW of wind development.[19] Thus, the zones chosen by the Commission for CREZ designation – zones 2A, 4, 5, 6, 9A, and 19 – were supported by testimony and evidence demonstrating significant levels of financial commitment. It should be noted that zones that did not receive CREZ designation in this docket are not precluded from receiving CREZ designation in a future CREZ proceeding.

C. Geographic Extent of the Designated CREZs

P.U.C. SUBST. R. 25.174(a)(5) requires the Commission to specify the geographic extent of the CREZs in its final order in this proceeding. Consistent with Commission Staff's recommendation, the Commission finds that, except as specifically modified by this order, the CREZ boundaries should be based on the lines drawn by AWS Truewind in Figure 3 of the ERCOT Study, which represent the areas with the best 4,000 MW in each of the wind resource zones.[20] For ease of reference, a copy of Figure 3 from the ERCOT Study has been attached to this order as Attachment A. Certain modifications to the boundaries set forth in Figure 3 of the ERCOT Study are warranted based upon the evidence of renewable-energy resources, suitable land areas, and financial commitment relating to the requested expanded areas. For those zones that have been expanded from the original boundaries in Figure 3 of the ERCOT Study for which a written description of the expanded area is not sufficiently precise, attached to this order as Attachments B, C, and D are copies of the maps submitted by the parties depicting those expansions. For all zones for which the Commission has not made a specific statement regarding the granting of an expansion, the Commission finds that expansion of such zones was not sufficiently supported by the record evidence.

The boundaries for the CREZs designated by the Commission are as follows:

[19] Although Wind Tex Energy prefiled the direct testimony of Steven DeWolf, which described Wind Tex Energy's financial commitment to zone 9A and 19, the Commission did not consider this testimony as it was not offered into evidence pursuant to the requirements of P.U.C. PROC. R. 22.225(b).

[20] The brown-line boundaries on ERCOT Exhibit – 3A also set forth the boundaries of the CREZs; however, because Exhibit – 3A was filed under seal, citation to Figure 3 from the ERCOT Study is made for ease of reference.

zone 2A: Comprised of that area enclosed by the perimeter boundaries of zones 1 and 2, plus an additional area that includes all of Briscoe County.

zone 4: Comprised of that area designated as zone 4 in Figure 3 of the ERCOT Study without modification.

zones 5 and 6: Expanded to include an extension of the eastern boundary of zone 5 ten miles further east into Tom Green and Schliecher counties, as depicted in Exhibit NRG-3 at Exhibit 1. (Attachment B)

zone 9A: Comprised of zones 9 and 10, plus an additional area between the zones as requested by FPL Energy and BNB Renewable Energy as set forth in Exhibit BNB-10. (Attachment C) Additionally, to the extent that this area differs from the expansion requested by AES Seawest, as set forth in AES SeaWest Exh. No. 2 at Exhibit RS-1, the differing area is also included in zone 9A. (Attachment D) Further, RES's projects located in Callahan and Shackelford counties in zone 12, as those projects were described in the record and depicted in RES EX. 2A at Exhibit C (filed under seal), are also included in zone 9A.

zone 19: Comprised of that area designated as zone 19 in Figure 3 of the ERCOT Study without modification.

Consistent with open access principles, developers are not deemed automatically ineligible to interconnect with a transmission line built to serve a CREZ simply because the location of their wind project may fall outside a delineated CREZ boundary. However, in any subsequent dispatch priority proceeding, developers within a CREZ that submitted evidence of financial commitment in this proceeding will likely fare better than other developers.

D. Transmission Solutions

P.U.C. SUBST. R. 25.174(a)(5)(B) requires the final order in this proceeding to specify the major transmission improvements necessary to deliver to customers the energy generated by renewable resources in the CREZ, in a manner that is most beneficial and cost-effective to customers, including new and upgraded lines identified by voltage level and a general description of where any new lines will interconnect to the existing grid. There appeared to be general consensus from ERCOT and the transmission service providers who participated in the hearing on the merits in the first phase that certain transmission lines, such as those involving the movement of power in the Texas Hill Country, should be built from a reliability standpoint. However, the Commission finds that it was difficult, and possibly counterproductive, to direct with detailed specificity at that phase all the transmission lines that should be built to serve a given CREZ. As testified to by ERCOT witness Dan Woodfin at the first phase hearing on the merits, in order for ERCOT to conduct the necessary studies to determine the transmission needed to serve the CREZs, ERCOT would need to know which CREZs will be served and how many megawatts are expected to be served.[21] Therefore, the Commission specified in the interim order those components to provide parameters for the necessary studies.

Pursuant to P.U.C. SUBST. R. 25.174(a)(5)(C), the Commission's final order should specify the estimated maximum generating capacity that the Commission expects the transmission ordered for the CREZ to accommodate. The Commission's directives to ERCOT, as set forth below, provided an initial estimate after the first phase hearing on the merits. The Commission requested that ERCOT study four aggregate tiers of megawatt transfer capability, based upon the number of megawatts parties in this proceeding have stated they intend to develop. Because the Commission had determined which zones should receive CREZ designation, ERCOT could estimate costs with greater precision than had been achievable during the ERCOT Study. ERCOT's CTO Study, along with stakeholder input, allowed ERCOT to present to the Commission transmission proposals that provide transfer capability for the estimated maximum generating capacity per CREZ in the most beneficial and cost-effective way to customers. In its CTO Study, ERCOT delineated which portions of the CREZ transmission lines would likely be required as part of ERCOT's long term system assessment absent the need to serve the additional renewable generation.[22]

The Commission found that it would be beneficial for ERCOT to consider, as part of its CTO Study, more than one interconnection point within certain CREZs, because certain CREZs, such as zones 2A and 9A, cover expansive territory where the cost of interconnection by

[21] Tr. at 1358-1359 (June 14, 2007).

[22] CTO study, ERCOT Ex. 4 at Ex. DW-1 at 35-36.

developer could vary greatly based upon the location of the ERCOT interconnection point. ERCOT retained discretion to determine the number and location of interconnection points within each CREZ to be studied as part of the CTO Study.

The transfer capability scenarios set forth below begin at a low for Scenario 1 of 5,150 MW, which is the shortfall between the 2007 ERCOT base case of 4,850 MW[23] and the 10,000 MW statutory target for renewable energy provided in PURA § 39.904(a), and a high for Scenario 3 of 17,956 MW, which is determined by adding the total megawatt capacity of development proposed for each designated CREZ.[24] Scenario 4 divides the sum of the total megawatt capacity proposed for the zones desired by Commissioner Parsley among all the zones designated by the Commission, with the exception of zone 4 and that portion of zone 2A that encompasses zone 1. Such a division reflects Commissioner Parsley's desire to have zones 1 and 4 deliver power to the Southwest Power Pool (SPP) and goal to maintain potential transmission infrastructure costs at close to $1.3 billion. Accordingly, the Commission requested that ERCOT study the following scenarios in its CTO Study:[25]

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[23] According to ERCOT, at least 4,850 MW of wind resources are likely to be in service by the end of 2007. *See* ERCOT Study, ERCOT Ex. 1 at Ex. DW-1 at 10.

[24] Each proposed project in excess of 1,000 MW was capped at 1,000 MW for purposes of Scenarios 1, 2, and 3 in the ERCOT CREZ Transmission Optimization Study.

[25] These MW transfer capability numbers are provided with the understanding that ERCOT may exercise discretion in determining the number of MW that could safely and reliably be served based upon limitations such as voltage control. Additionally, while the Commission used a base case figure of 4,850 MW in determining the scenarios above, ERCOT is to use best available data in determining the base case figure.

Table 1: MW Tiers for ERCOT CREZ Transmission Optimization Study

	Scenario 1 (MW)	Scenario 2 (MW)	Scenario 3 (MW)	Scenario 4 (MW)
Zone 2A	1422	3191	4960	6660
Zone 4	1067	2393	3720	0
Zones 5/6	829	1859	2890	3190+[26]
Zone 9A	1358	3047	4735	5615
Zone 19	474	1063	1651	2051
CREZ transfer capability	5150	11,553	17,956	17,516
Total transfer capability[27]	10,000	16,403	22,806	22,366

ERCOT was directed to pursue the completion of the CTO Study in the most expeditious manner possible, which could involve studying the lower tiers of megawatt transfer capability (*i.e.,* Scenarios 1, 2, and 4) before evaluating the higher tier (*i.e.*, Scenario 3). As directed, ERCOT filed the results of its CTO Study in this docket on April 2, 2008, along with the GE Ancillary Services study.

E. CREZ Transmission Capacity Plan

The Commission finds that the major transmission improvements identified in the CTO study for Scenario 2 are necessary to deliver the energy generated by renewable resources in the CREZs, in a manner that is most beneficial and cost-effective to the customers. A copy of ERCOT's Figure 5: Scenario 2 of the CTO Study, ERCOT Exhibit 8, which is a map depicting the major transmission improvements to deliver energy generated in the CREZs, is attached to this order as Attachment E. The Commission's updated estimate of the maximum generating capacity of renewable resources in the CREZs that the Commission expects the transmission ordered for the CREZs to accommodate is 18,456 MW.

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[26] ERCOT may increase the 3190 MW figure to include any additional MWs that are currently being curtailed from operating wind facilities in zones 5/6.

[27] CREZ transfer capability plus 4,850 MW (ERCOT base case wind generation figure). *See* ERCOT Study, ERCOT Ex. 1 at Ex. DW-1 at 10.

In addition, the Commission finds that certain line segments of the transmission plan identified as part of the CREZ transmission solution Scenario 2 are critical to relieve current congestion that is hampering the delivery of existing wind-powered energy to the grid.[28] These projects are of utmost priority, and will take precedence in the CREZ transmission implementation process, including planning, certification, and construction. The Commission designates these lines as part of the selected CREZ transmission solution, but directs that if it is more expedient to complete these projects by the incumbent transmission service providers or others through ERCOT's customary Resource Planning Group (RPG) process, that process may be utilized to achieve the stated goal of ensuring these facilities are in service as quickly as possible. The following projects[29] are identified as having first priority: the Central B to Central A double-circuit 345-kV line, the Central A to Central Bluff double-circuit 345-kV line, the Central Bluff to Bluff Creek double-circuit 345-kV line, the Bluff Creek to Brown double-circuit 345-kV line, the Brown to Newton/Salado double-circuit 345-kV line, the Newton to Killeen double-circuit 345-kV line, the Twin Butte to Brown additional 345-kV line on existing structures, the Twin Butte to McCamey D single-circuit, double-circuit-capable 345-kV line, the McCamey D to Kendall double-circuit 345-kV line, the Kendall to Gillespie single-circuit, double-circuit-capable 345-kV line, the Gillespie to Newton single-circuit, double-circuit-capable 345-kV line, and the Oklaunion to Bowman double-circuit 345-kV line.

In developing the capacity plan to construct the necessary transmission improvements, the Commission considered several factors pursuant to PURA § 39.904(g) and P.U.C. SUBST. R. 25.174(c)(3), including: 1) the cost-effectiveness and benefits to customers of each proposed scenario; 2) the estimated cost of constructing transmission capacity necessary to deliver to electric customers the electric output from renewable-energy resources in the CREZs; 3) the

[28] Tr. at 1633-34 (June 11, 2008); Direct Testimony of Sergio Garza, LCRA TSC Ex. 2 at 13-14.

[29] The projects were identified in shorthand terms in prefiled testimony as the Clear Crossing switch station, the Red Creek to Killeen line, the Twin Butte to Kendall line, the Panhandle south zone to Central zone line, and the Oklaunion to Bowman line. However, for purposes of the order, they are identified more specifically to reflect the lines' identification in the CTO study and the ERCOT 2007 Transmission Constraints Needs Report (Five-Year Transmission Plan). *See,* Direct Testimony of Brian Almon, Staff Ex. 6 at 7 and Direct Testimony of Bradley C. Jones, Luminant Ex. 1 at 34. It is noted that the Clear Crossing 345-KV switching station was in Scenario 1A, but not in Scenario 1B or 2. The PanOakMid to Center C line passes the location identified for the siting of the Clear Crossing station, which is where that line criss-crosses with the line from Central B to Willow Creek. Accordingly, the Commission is not including it in the prioritized projects. If this project continues to be, or later becomes necessary, it can be addressed through the usual RPG process.

estimated cost of additional ancillary services; and 4) other appropriate factors such as the integration of each scenario's wind generation in a reliable manner, the intent of the Legislature in directing the Commission to construct transmission capacity to deliver electricity from the CREZs, the environmental benefits, and the future expansion capability and other benefits of the plan.

1. Identification of Major Transmission Improvements

Appendix B to the CTO study provides sufficient detail in the cost calculations of the major transmission improvements in Scenario 2 to identify the lines to be constructed, by voltage level and a general description of where new lines will interconnect to the existing grid. In addition to the voltage levels and general descriptions of where new lines will interconnect, the cost breakdown for Scenario 2 also identifies other major transmission improvements necessary for the plan.

2. General Description of New Lines by Voltage Level and Interconnection Points

The new lines identified for Scenario 2 are visually depicted on the map in Attachment E to this order. The lines are identified by voltage levels and general descriptions of where new lines will interconnect in the CTO study cost breakdown for Scenario 2, and include the following:

McCamey, Central, and Central West: Gillespie to Newton single-circuit, double-circuit - capable 345-kV line; Kendall to Gillespie single-circuit, double-circuit-capable 345-kV line; West C to Odessa single-circuit, double-circuit-capable 345-kV line; West B to Moss single-circuit 138-kV line; West A to West C single-circuit, double-circuit-capable 345-kV line; West A to Central D single-circuit, double-circuit-capable 345-kV line; Twin Butte to Brown new 345-kV line on existing structures; Tonkawas to Sweetwater double-circuit 345-kV line; Sweetwater to Central Bluff double-circuit 345-kV line; McCamey D to Twin Butte single-circuit, double- circuit-capable 345-kV line; McCamey D to Kendall double-circuit 345-kV line; McCamey C to McCamey A single-circuit, double-circuit-capable 345-kV line; McCamey B to North McCamey 138-kV line on existing structures; McCamey A to Odessa single-circuit, double-circuit-capable 345-kV line; McCamey C to McCamey D single-circuit, double-circuit-capable 345-kV line; Mason to Pittsburgh 138-kV line; Divide to Twin Butte adding a second circuit to existing structures; Central E to Central D single-circuit, double-circuit-capable 345-kV line; Central D to Divide single-circuit, double-circuit-capable 345-kV line; Central C to Navarro/Sam Switch double-circuit 345-kV line; Central B to Willow Creek double-circuit 345-kV line; Central B to Central A double-circuit 345-kV line; Central A to West A double-circuit 345-kV line; Central A to Tonkawas double-circuit 345-kV line; Central A to Central C double-circuit 345-kV line; Newton to Killeen 345-kV line; Brown to Newton/Salado double-circuit 345-kV line; Bluff Creek to Brown double-circuit 345-kV line; and Central Bluff to Bluff Creek double-circuit 345-kV line.

Panhandle: West Krum to Anna double-circuit 345-kV line; Willow Creek to Hicks double-circuit 345-kV line; West Krum to Carrolton NW adding a new 345-kV line to existing structures; PanOakMid to Central C double-circuit 345-kV line; Panhandle AC to PanOakMid (with one circuit looping into Tesla 345-kV bus); Panhandle BB to Panhandle BA double-circuit 345-kV line; Panhandle BB to Oklaunion (with one circuit looping into Tesla 345-kV bus) double- circuit 345-kV line; Panhandle BA to Panhandle AC double-circuit 345-kV line; Panhandle AD to PanOakMid double-circuit 345-kV line; Panhandle AD to Central B double-circuit 345-kV line, Panhandle AC to Panhandle AD double-circuit 345-kV line; Panhandle AB to Panhandle BA single-circuit, double-circuit-capable 345-kV line; Panhandle AA to Panhandle AB single-circuit, double-circuit-capable 345-kV line; Panhandle AA to Panhandle AC single-circuit, double-circuit-capable 345-kV line; Parker to Everman new 345-kV line on existing structures; Oklaunion to West Krum double-circuit 345-kV line; Oklaunion to PanOakMid double-circuit 345-kV line; and Bowman to Oklaunion double-circuit 345-kV line.

3. Major Transmission Improvements Other Than New Lines

Transmission improvements other than new lines are also identified in the CTO study cost breakdown for Scenario 2, and include the following:

Stations: new 345-kV stations at Sam Switch, Gillespie, Newton, Brown, Navarro, Tesla, Hicks, West Krum, and PanOakMid;

Auto Transformers: addition of a 345-kV auto at Whitney, a 138-kV auto at Bandera, a 345-kV auto at Gillespie, two 345-kV autos at North McCamey, a 345-kV auto at Eagle Mountain, and the replacement of a 345-kV auto at Kendall;

50% Series Compensation: on McCamey D to Kendall; on Central C to Navarro/Sam Switch, on PanOakMid to Central C, on Panhandle AC to Tesla, and on Central B to Willow Creek;

Mega volt-ampere-reactive (MVAR) reactive compensation: 200 MVAR on PanOakMid; 150 MVAR on Central C, Central B, and Brown, 100 MVAR on Tesla, Gillespie, Central A, and McCamey D, 50 MVAR on Panhandle AC, Panhandle AD, Panhandle BB, and Panhandle AB;

MVAR capacitor bank: 300-MVAR bank on Oklaunion, 200-MVAR bank on PanOakMid, 150-MVAR bank on Tesla, 100-MVAR bank on Panhandle AC, and 50-MVAR bank on Panhandle AD;

Open and close lines: open Seymour to Bomarton 69-kV line, open Saps to Yellowjacket 138-kV line, open Rocksprings to Friess Ranch 69-kV line, open Fort Stockton to Barilla 69-kV line, open Bradshaw to Winters 69-kV line, and close bus ties at North McCamey bus;

Rebuilds: Sonora to Hamilton 138-kV line, Goldthwaite to Evant 138-kV line, Raymond Barker to Verde Creek 138-kV line, Kendct to Kendal 138-kV line, Verde Creek to Bandera, Willow Creek to Parker 345-kV as double circuit, and Jacksboro to Willow Creek 345-kV as double circuit;

Upgrade terminal equipment: on Eagle Mountain-Hicks-Alliance-Roanoke 345-kV line, on Abilene to Mulberry 138-kV line, on Abilene South to Leon 138-kV line, on Bowman to Graham 345-kV line, on Bowman to Fisher Road 345-kV line, on both Singleton to Gibbons Creek 345-kV lines, on Roanoke to Alliance 345-kV line, and on Morgan Creek to Twin Butte 345-kV line; and

Reconductor: on Bowman to Jacksboro 345-kV line.

4. Estimated Construction Costs of Transmission Capacity

P.U.C. SUBST. R. 25.174(c)(3)(A) allows the Commission to consider the estimated cost of constructing transmission capacity necessary to deliver to electric customers the electric output from renewable-energy resources in the CREZs in developing the transmission capacity plan. Because of the increases in materials costs, the cost estimates provided in the CTO study were significantly higher than those used in the initial ERCOT CREZ report referenced in the interim order on reconsideration.[30] The CTO study also contains general assumptions regarding costs per mile for new transmission, understanding that the lines would cross varying terrain, would likely not be routed as straight lines, and would have variations in right-of-way costs.[31] Additionally, the cost estimates include the equipment to connect the wind generation to the new transmission, assuming 10 miles as the average length of transmission lines from the wind facilities to the collection substation, an average of 400-500 MW of wind generation on each new circuit, and 138-kV or 345-kV voltage level for lines connecting the wind farms to the collection substations.[32] Scenario 2 contains 2,334 miles of new 345-kV right-of-way, and 42 miles of new 138-kV right-of-way.[33] The estimated collection costs for Scenario 2 range from \$580 to \$820 million.[34] The estimated cost of the transmission improvements identified in Scenario 2 is \$4.93 billion.[35]

Scenario 2 will prove less expensive than Scenario 1 (plans A or B) over the long term, because the transmission cost will be less per unit of capacity with higher levels of wind generation.[36] Additional wind generation will provide lower production costs.[37] While Scenario 1B has a lower overall cost than Scenario 2, its cost per MW of capacity is actually greater.[38]

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[30] CTO Study, ERCOT Ex. 4 at Ex. DW-1 at 4.

[31] *Id.*

[32] CTO Study, ERCOT Ex. 4 at Ex. DW-1 at 19.

[33] *Id.* at 24.

[34] *Id.*

[35] CTO Study, ERCOT Ex. 4 at Ex. DW-1 at Appendix B.

[36] Direct Testimony of Jan Bagnall, FPLE Ex. 15 at 711-13.

[37] Direct Testimony of Jess Totten, Staff Ex. 5 at 6.

[38] CTO Study, ERCOT Ex. 4 at Ex. DW-1 at 24; Direct Testimony of Jan Bagnall, FPLE Ex. 15 at 6-7.

This leaves Scenario 1B less cost-effective than Scenario 2, which is counter to the requirement in PURA § 39.904(g)(2) calling for the most cost-effective and beneficial plan. Additionally, although Scenario 1B is less expensive, it leaves little (if any) room for expansion of wind generation after 2008. While Scenario 1B has cost estimates of $733,981 per MW of new capacity and barely catches up with current development, Scenario 2 has cost estimates of $426,729 per MW of new capacity and leaves room for expansion.[39] ERCOT did not evaluate production cost savings for Scenarios 3 or 4, so there is no basis for making a determination on their cost-effectiveness. ERCOT did conclude that it was unlikely that the higher level of wind generation in those two scenarios could be placed in service by 2012. Because information on ERCOT generation levels, loads, and transmission additions needed to make accurate forecasts of ERCOT operation and production costs after 2012, it would be risky and premature for the Commission to implement Scenario 3 or 4.[40] In order to calculate fuel cost savings for 3 or 4, ERCOT would need to develop a transmission plan for the transmission overloads that result from the load growth between 2012 and 2018, or would need to develop a different modeling approach.[41]

5. Estimated Costs of Additional Ancillary Services

P.U.C. SUBST. R. 25.174(c)(3)(B) allows the Commission to consider the estimated cost of additional ancillary services in developing the transmission capacity plan. The analysis of cost-effectiveness of the plan includes consideration of the costs of reliably integrating the additional energy. The Commission acknowledges the GE study's finding that increased wind capacity requires traditional thermal units to provide ancillary services more frequently, and that ramping thermal units up and down will have cost impacts on the maintenance and operations of the units. However, the Commission finds compelling the GE study's conclusion that this displacement of thermal units with wind generation reduces the overall spot price of energy.[42]

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[39] CTO Study, ERCOT Ex. 4 at Ex. DW-1 at 22-23.

[40] Direct Testimony of Scott Norwood, Cities Ex. 1 at 19-20.

[41] Direct Testimony of Brian Almon, Staff Ex. 6 at 14.

[42] GE's Analysis of Wind Generation Impact on ERCOT Ancillary Services Requirements, ERCOT Resource 3 at RW-2, Executive Summary at 8, and at 5-9.

The Commission also notes the GE study's finding that although the total regulation service procured in a year will increase with increased wind generation capacity, increased wind capacity tends to reduce the per-MWh price, resulting in a small cost of regulation per MWh of wind generation, with the high end of the range at $0.27/MWh.[43] In addition, the study addressed responsive and non-spinning reserves service and replacement reserves, and made the analogy that fast drops in wind generation output are much like a fast load rise. Responsive reserve service would only need to be procured to the degree that they are not covered by non-spinning reserve service. The study suggested ways to influence and manage the relative costs of increased wind penetration on these services, such as the development of an additional "quick-start non-spinning reserve" (15 minute start-up time rather than 30 minutes), more certain wind forecasting, and higher confidence levels for commitment schedules.[44] Also, as a point related to ancillary services costs, the Commission notes that ERCOT estimated that Scenario 2 brings lower congestion costs ($2,926,117) compared to those costs of Scenario 1B ($3,271,508).[45] Another factor of the costs of ancillary services is balancing the potential increase in ancillary services and costs against the average system fuel savings of wind energy. ERCOT estimated that Scenario 2 provides an average savings of $38/MWh for each MWh of wind.[46]

It is understood that the costs of maintaining reliability and stability will vary depending on market structure and system conditions. The Commission is confident in ERCOT's assurances that system reliability can be maintained at Scenario 2 levels of wind generation by the lowest-cost alternatives, and can rely on scheduling additional thermal units and curtailing wind generation when there is no lower-cost alternative. Although there were benefits regarding ancillary services costs being lower and more predictable with lower levels of wind-energy integration at Scenario 1B, and the potential for greater fuel savings with higher levels of wind-energy at Scenario 3 or 4, the trade-offs for getting the best value for the transmission dollars while limiting the risks associated with maintaining reliability lead the Commission to the selection of Scenario 2.

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[43] GE Ancillary Services study, ERCOT Resource 3 at RW-2 at 9-7 to 9-8.

[44] *Id.* at Executive Summary at 15.

[45] Work Papers of Jess Totten, Staff Exhibit 7 at 15.

[46] CTO study, ERCOT Ex. 4 at Ex. DW- 1 at 24; Direct Testimony of Brendan Kirby, Wind Coalition Ex. 1 – Phase 2 at 7-8.

6. Other Factors Regarding Benefits and Cost-effectiveness of the Plan

P.U.C. Subst. R. 25.174(c)(3)(C) allows any other factors the Commission finds appropriate to be considered as provided by PURA. The Commission considered factors such as the integration of each scenario's wind generation in a reliable manner, the intent of the Legislature in directing the Commission to construct transmission capacity to deliver electricity from the CREZs, the environmental benefits, and the future expansion capability and other benefits of the plans.

i. Reliable Integration

The implementation of Scenario 2, with the specific lines prioritized as described, will provide ERCOT the benefit of experience in the process of integrating increasingly more wind energy. Reliability issues that were discussed at length in the direct testimony and evidence presented and during cross examination of witnesses at the hearing should be resolved through this experience.

The record is replete with examples of the efforts currently underway at ERCOT to address maintaining reliability with higher levels of wind generation.[47] There have been recent operational rule changes and there are several revisions under consideration, specifically in the Wind Operations Task Force. One notable example is the replacement of unit-specific energy schedules with schedules based on an objective wind forecast. Another example is ERCOT's use of an 80% confidence factor to mitigate the risk that wind will not deliver scheduled energy in real time. There are rule changes addressing wind generation interconnection standards, performance measures, and ancillary service requirements, such as voltage control, training, and grid maintenance and congestion. ERCOT is considering ramp rate limitations on wind resources, to mitigate impacts to system frequency (system frequency requires balancing supply and load on an instantaneous basis and is negatively impacted by rapid ramp rates). Also, requirements are being implemented that wind generation provide real-time hourly production

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[47] *See e.g.* Rebuttal Testimony of Mark Bruce, FPLE Ex. 15 at 3-7; Tr. at 1922-24 (June 12, 2008).

updates, and the implementation of nodal operations will provide more transparency than QSE portfolio-based dispatch and will better enable ERCOT to manage wind generation.[48]

A more conservative approach would be to select Scenario 1B, which would bring into ERCOT 12,053 MW of wind-generated electricity, once the transmission facilities can be constructed and placed into service. This amount is well within the actual tiers of MW analyzed, as applied to 2008 peak system load, in the GE Ancillary Services study. However, the Commission is confident that ERCOT is capable of integrating 18,456 MW of wind-generated electricity without sacrificing system stability and reliability. The Commission notes that the GE Ancillary Services study pointed out that the 15,000 actual MW analyzed is the equivalent in terms of wind penetration to 18,456 MW of wind generation applied to the forecast 2017 peak system load.[49] In other words, 15,000 MW is 23% wind penetration as applied to the 2008 peak system load, which is equivalent to the wind penetration of 18,456 MW as applied to the 2017 forecasted peak system load. The GE study found that, although the impacts of wind generation will become a significant focus in ERCOT system operation, this percentage of wind penetration could be reliably integrated with existing technology and operational attention, without any radical alteration of operations.[50] The aforementioned efforts being undertaken at ERCOT further buttress the decision to proceed directly to Scenario 2. It is also clear that from a reliability standpoint, the selection of Scenario 3, with almost 25,000 MW of wind generation, is not supported by the record evidence. Gaining experience in reliably integrating wind, at levels of penetration as related to system load projections that have been vetted by the GE Ancillary Services study, is the most reasonable approach.

ii. Legislative Intent

The intent of the Legislature in passing the amendments to PURA §§ 36.053, 39.203, and 39.904 in 2005 was to further encourage the development of renewable-energy resources by establishing a process to provide reliable and economical transmission resources ahead of renewable generation. In addition to raising the bar on renewable-energy goals and requiring the

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[48] Tr. at 1860-62 (June 12, 2008).

[49] GE Ancillary Services study, ERCOT Resource 3 at RW-2, Executive Summary at 2.

[50] *Id.* at 9-4.

Commission to develop a CREZ transmission plan, the amendments waive requirements and shorten timeframes applicable to other CCN applications and deem CREZ transmission facilities used, useful, and prudent for rate-setting purposes. The statements made by Texas legislators in the house and senate also support the conclusion that the Legislature's intent is clear.[51] Scenario 2 best satisfies this intent. Selection of a smaller plan than Scenario 2 would not only leave little room for expansion, thereby not providing transmission resources *ahead* of renewable generation, it would also have a chilling effect on capital investment in the Texas renewable energy industry, most notably wind. Although Scenario 3 arguably would go further in satisfying the intent of the Legislature, the noted discussions and filed statements of the legislators make it clear that maintaining reliability of the system is paramount. Because there was insufficient assurance that levels of wind energy associated with Scenario 3 could be reliably integrated, the Commission does not consider it the best plan from the standpoint of satisfying the Legislature's intent.

iii. Environmental Benefits

Environmental benefits were not specifically quantified in the CTO study, but the Commission notes that, logically, transmission plans providing for greater amounts of wind-generated energy also bring greater air quality and water conservation benefits as they reduce the reliance on other generation sources. FPL witness Jan Bagnall testified regarding the modeling of energy projects that credibly confirmed water savings of electricity produced through wind generation compared to combined cycle gas-fired and coal generation plants. It was estimated that 350 gallons of water are consumed per MWh from a gas plant and 800 gallons of water per MWh from a coal plant.[52] After construction of wind facilities, there is very little water consumed in the process of generating electricity.[53] Similar analysis was conducted regarding

[51] Senator Fraser, author of SB 20, described the increase in the goals for renewable energy as being conservative in a discussion on July 12, 2005 with Senator Lucio on the floor during the passage of the bill. He stated that the expectation was to get to a higher number as quickly as reliability issues can be addressed in ERCOT, and mentioned cost of transmission development as a secondary factor. In the House, Representatives Swinford and Baxter filed a statement of legislative intent regarding SB 20. The statement provided that the new goals were set in a measured step while instructing the Commission and ERCOT to carefully study transmission and capacity adequacy. It also stated that they want Texas to reach its renewable-energy goals ahead of time.

[52] Direct Testimony of Jan Bagnall, FPLE Ex. 15 at JB-2 at 10.

[53] United States Department of Energy's 20% Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply, Commissioners Ex. 7 at 1.3.2.

the reduction of emissions of NO_x, SO_2, and CO_2 that result from increased levels of wind-generated electricity. Thus, each transmission plan that brings increasing amounts of wind-generated electricity also brings increasing environmental benefits. Although Scenario 3 was even more attractive than Scenario 2 in this regard, the reliability concerns associated with Scenario 3 outweighed these benefits.

iv. Future Expansion Capability and Other Benefits

The ability to cost-effectively expand the transmission capacity is a very important consideration. Scenarios 1B, 2, and 3 were designed by ERCOT with expandability in mind.[54] Each of these plans is essentially a subset of the next larger plan. Scenario 1A was designed by ERCOT to be the least expensive way to reach the minimum tier of wind generation identified by the Commission at the first phase of the case, without any focus on expansion capability. Scenario 1A was dismissed as a non-viable option primarily for this reason. Expansion capability was a very attractive component of Scenario 1B, but because wind generation has already outgrown Scenario 1B's capacity, it too was rejected in favor of Scenario 2.

In addition to Scenario 2 leaving room for growth while still maintaining expansion capability to Scenario 3 if necessary, Scenario 2 also provides non-CREZ benefits that Scenario 1A or 1B do not. These were noted by LCRA TSC witness, Sergio Garza, who points out that Scenario 2 also benefits the system by meeting critical needs of non-CREZ wind development, economic long-term system solutions, and Hill Country load growth.[55]

Finally, Scenario 2 provides transmission capacity for 18,456 MW of wind-generated energy from the CREZs, which serves to better diversify Texas's energy mix by making renewable energy a larger slice of the Texas energy pie. Greater energy diversification is important to the goal of energy security. Wind as a cost-free fuel is not subject to price volatility like natural gas, or the regulatory uncertainties associated with the emission of greenhouse gases. Scenario 2 provides for the integration of levels of renewable energy that contribute to a robust and diverse portfolio of energy sources without sacrificing reliability. Similarly to the

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[54] CTO Study, ERCOT Ex. 4 at Ex. DW-1 at 6, 16.

[55] Direct Testimony of Sergio Garza, LCRA TSC Ex. 2 at 17-18.

environmental benefits discussed previously, Scenario 3 was an even more attractive plan for bringing diversity to the state's energy mix, but this gain was outweighed by reliability concerns.

F. Future Actions

After the issuance of a final order in this docket, the Commission will proceed, pursuant in part to P.U.C. SUBST. R. 25.174(c), to select the entity or entities responsible for constructing the transmission improvements to the CREZs. The Commission anticipates that the selection of the entity or entities responsible for constructing the transmission improvements to the CREZs will be completed by the end of 2008, and that those selected entities will move diligently towards the development and submission of applications for certificates of convenience and necessity (CCN) by the end of 2009. The Commission intends to address the applications by mid-2010 and expects the selected entities to expeditiously begin and complete construction of their transmission projects following approval of their respective applications for CCNs.

Also as discussed in more detail above, the Commission has the expectation that the lines identified as having the utmost priority will be addressed, planned, certificated, constructed, and placed into service first. This prioritization may be accomplished in the manner determined to be the most expedient, either in the CREZ transmission process or via the RPG process.

Although the Commission determines that the designated CREZs be interconnected with ERCOT via the major transmission improvements identified in this order, the parties have raised concerns regarding jurisdictional issues attendant to the interconnection of generation in the northern area of the Panhandle. Should generators located in Zones 2A and 4 desire to pursue interconnection with the Southwest Power Pool (SPP), the Commission would not discourage such interconnection provided those generators do not interconnect simultaneously with ERCOT. For those generators located in zones 4 and the northern portion of zone 2A[56] who desire to interconnect with ERCOT, the Commission strongly suggests a determination by the Federal Energy Regulatory Commission (FERC) disclaiming jurisdiction. Accordingly, either the generator wishing to be served or the transmission service provider that would provide such

[56] Defined as the portion of zone 2A that is included in zone 1 in Figure 3 of the ERCOT Study.

interconnection should first obtain FERC statement disclaiming jurisdiction before the Commission will approve a CCN application. Similar to the approval granted in the *Cottonwood*[57] case, such FERC approval should be in the form of an Order Granting Petition for Declaratory Order or any other mechanism by which the FERC disclaims jurisdiction over the proposed transmission lines to ERCOT, transmission service over the proposed transmission lines, and the utilities in ERCOT that are not currently public utilities under the Federal Power Act.[58]

Although the Commission is not addressing curtailments and dispatch priority issues in this docket, the Commission does state that, as a matter of policy, there is an expectation that no nuclear facilities will be curtailed during periods of high wind generation. The GE study included the determination that increased wind energy production is primarily offset by a decrease in the production of combined-cycle gas turbine plants.[59] However, during periods of light load and high wind levels, plants utilizing other sources of generation may see significant turndowns, as well.[60] Given the unique characteristics of nuclear energy production, during periods of light load and high wind levels, it is sound policy to prohibit the back-down of nuclear power plants. The Commission also has the expectation that staff, ERCOT, and system participants will address the effects of light load and high wind levels on other forms of generation, in particular, recognizing the future critical role that coal generators utilizing "clean" coal and carbon capture and sequestration technologies may occupy in ERCOT. This issue is most appropriately resolved in a currently ongoing Commission project addressing dispatch prioritization in the CREZ zones.[61]

Finally, the Commission expects that reliability issues will be further explored through either an implementation docket or the Wind Operations Task Force, or some combination of

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[57] *Cottonwood Energy Company, L.P.*, Order Granting Petition for Declaratory Order, 118 FERC ¶ 61,198 (2007).

[58] *See id.*

[59] GE Ancillary Services study, ERCOT Resource 3 at RW-2 at 5-2.

[60] *Id.*

[61] *See Proceeding to Establish Policy Relating to Excess Development in Competitive Renewable-energy Zones*, Project No. 34577 (pending).

both. It is necessary that the Commission maintain a strong feedback loop with a centralized process to assure that necessary reporting needs are met and that various reliability issues are being worked in a unified, not fragmented, manner. Toward that goal, the Commission directs ERCOT, through any committee or task force as designated by ERCOT, to report to the Commission on a quarterly basis regarding reliability issues being studied. Unless staff designates a different project, Project No. 34577 can also be utilized for this purpose.

V. Findings of Fact

Procedural History

1. On December 15, 2006, in Project No. 31852, the Commission adopted P.U.C. SUBST. R. 25.174 to effectuate the requirements of PURA § 39.904(g).

2. P.U.C. SUBST. R. 25.174(a)(1) required Commission Staff to initiate a contested-case proceeding to designate competitive renewable-energy zones (CREZs) upon receiving the Electric Reliability Council of Texas's (ERCOT's) study of the statewide wind-energy-production potential and the transmission constraints that are most likely to limit the deliverability of electricity from wind-energy resources.

3. On December 7, 2006, ERCOT filed its study, entitled "Analysis of Transmission Alternatives for Competitive Renewable-energy Zones in Texas," (ERCOT Study) in *Reports to the Legislature on Renewable Energy and the Need for Generation and Transmission Facilities*, Project No. 33577.

4. On January 4, 2007, Commission Staff filed its petition in this docket for CREZ designation.

5. On January 8, 2007, the Commission issued Order No. 2, setting the intervention deadline as January 22, 2007.

6. On January 25, 2007, the Commission issued Order No. 3, granting the following parties' motions to intervene: AEP Texas Companies (AEP Texas Central Company, AEP Texas North Company, and Southwestern Electric Power Company); AES SeaWest Inc.; Airtricity Inc.; Babcock & Brown Renewable Holdings Inc.; BNB Renewable Energy LLC; Briscoe County; Celanese Ltd.; CenterPoint Energy Houston Electric LLC; City

of Abilene; City of Austin d/b/a Austin Energy; City of Garland; CMS Enterprises Company; CPS Energy; Denton Municipal Electric; Direct Energy LP, CPL Retail Energy LP, and WTU Retail Energy (the Direct Companies); East Texas Cooperatives (Sam Rayburn G&T Electric Cooperative Inc, Tex-La Electric Cooperative Inc., and East Texas Electric Cooperative Inc.); Electric Transmission Texas LLC (ETT); ERCOT; Eurus Energy America Corporation; Floyd County; Floydada Economic Development Corporation; FPL Energy LLC; Fremantle Energy LLC; Golden Spread Electric Cooperative Inc.; Great Plains Windpower LLC; Guadalupe Valley Electric Cooperative Inc.; Homestead Wind LLC.; Horizon Wind Energy LLC; Invenergy Wind North America LLC; ITC Grid Development; LCRA Transmission Services Corporation; Lockney Economic Development Corporation d/b/a Opportunity Lockney; Mesa Water Inc. (subsequently identified as Mesa Power LLC); Noble Environmental Power LLC; NRG Texas LLC; Occidental Energy Ventures Corp.; Penn Real Estate Group Ltd.; PPM Energy Inc.; Public Werks Inc.; Reliant Energy Retail Services LLC; RES America Developments Inc.; Sharyland Utilities LP; Shell WindEnergy Inc.; South Texas Electric Cooperative Inc.; Southwest Power Pool Inc. (SPP); Southwestern Public Service Company (SPS); Steering Committee of Cities Served by TXU (Cities); Texas Industrial Energy Consumers (TIEC); Texas-New Mexico Power Company; The Wind Coalition; Tierra Energy LLC; TXU Electric Delivery Company; TXU Energy, Wholesale, and Power Companies; West Texas Wind Energy Consortium; and White-Wind Power Co.

7. On February 14, 2007, the Commission issued Order No. 6, granting the following parties' late-filed motions to intervene: BPWENA; Chermac Energy Corporation; Clipper Windpower Development Company Inc.; King Ranch Minerals Inc. (subsequently identified as King Ranch Inc.); and Office of Public Utility Counsel (OPC).

8. On February 15, 2007, the Commission issued an order requesting each interested party to file a list of issues to be addressed by the Commission in this docket.

9. On February 15, 2007, the following parties timely filed CREZ nominations: AES Seawest Inc.; BPWENA; Eurus Energy America Corporation, Clipper Windpower

Development Company Inc., and Floydada Economic Development Corp.; FPL Energy LLC; Fremantle Energy LLC; Horizon Wind Energy LLC; Invenergy; ITC Grid Development LLC; LCRA Transmission Services Corp.; Mesa Power LLC; NRG Texas LLC; Panhandle Loop Intervenors (Airtricity Inc., Babcock & Brown Renewable Holdings Inc., Celanese Ltd., Occidental Energy Ventures Corp., and Sharyland Utilities LP); Penn Real Estate Group Ltd.; PPM Energy Inc.; RES America Developments Inc.; and Shell WindEnergy Inc. BNB Renewable Energy LLC and Chermac Energy Corporation submitted nominations on February 16, 2007. McDowell Ranch submitted a motion to intervene that also indicated a CREZ nomination on March 8, 2007.

10. On February 26, 2007, each of the following entities filed a list of issues: AES SeaWest Inc.; BPWENA; Commission Staff; Electric Transmission Texas LLC, AEP Texas Central Company, AEP Texas North Company, and Southwestern Electric Power Company; ERCOT; FPL Energy LLC; Fremantle Energy LLC; Golden Spread Electric Cooperative Inc.; Horizon Wind Energy LLC; ITC Grid Development; King Ranch Inc.; Panhandle Loop Intervenors (Airtricity Inc., Babcock & Brown Renewable Holdings Inc., Celanese Ltd., Occidental Energy Ventures Corp. and Sharyland Utilities LP); PPM Energy Inc.; Public Werks Partners; RES America Developments Inc.; Shell WindEnergy Inc.; SPP; the Steering Committee of Cities Served by TXU; TIEC; and TXU Electric Delivery Company.

11. On March 8, 2007, King Ranch Inc. and ITC Grid Development LLC filed motions to sever, which were both subsequently denied.

12. On March 21, 2007, parties filed testimony regarding their financial commitment for CREZs.

13. On March 23, 2007, the Commission filed its preliminary order, identifying issues to be addressed and an issue not to be addressed in this case.

14. On March 26, 2007, the Commission issued Order No. 11, granting the following parties' late filed motions to intervene: McDowell Ranch and Wagner & Brown Ltd., and on March 27, 2007, the Commission issued Order No. 12 correcting the names of the intervenors listed in Order. No. 11.

15. On March 30, 2007, the Commission issued Order No. 13, granting the following parties' late filed motions to intervene: Salt Fork Wind LP & Cielo Wind Power LLC, Noelke Hill GP LLC & Cielo Wind Power LLC (subsequently corrected to Cielo Noelke GP, LLC & Cielo Wind Power, LLC), and Tenaska Transmission Development Partners LLC.

16. On April 24, 2007, parties filed direct testimony on issues other than financial commitment.

17. On April 26, 2007, the Commission issued Order No. 21, granting Wind Tex Energy LP's late-filed motion to intervene.

18. On May 4, 2007, the Commission issued Order No. 22, granting the following parties' motions to withdraw from this docket: Public Werks Inc. on behalf of Public Werks Partners and Homestead Wind LLC; and Tenaska Transmission Development Partners LLC.

19. On May 21, 2007, parties filed rebuttal testimony.

20. The Commission conducted a hearing on the merits for this docket on June 11-14, 2007.

21. On June 15, 2007, the Commission issued an order extending time for issuance of the final order and requesting briefing on certain threshold legal and policy issues.

22. Post-hearing briefs filed by the parties by June 29, 2007 were timely received.

23. At its July 20, 2007 open meeting, the Commission discussed and rendered its decision in this docket, as set forth in the Interim Order.

24. On August 6, 2007, the Commission issued Order No. 34, seeking clarification from Wind Tex Energy, L.P. regarding that entity's participation in the hearing. On August 13, 2007, Wind Tex Energy responded requesting that its prefiled testimony be considered part of the record.

25. At its August 16, 2007 open meeting, the Commission clarified certain determinations made at its July 20, 2007 open meeting, which were incorporated into the Interim Order issued on October 2, 2007.

26. Motions for reconsideration, responses and other pleadings regarding the interim order were filed by FPL Energy, Airtricity, Penn Real Estate Group, Commission Staff, Cielo Noelke, BP Wind Energy North America, Chermac Energy Corporation, LCRA TSC, AES Seawest, and Shell Windenergy.

27. On November 6, 2007, the Commission issued the Interim Order on Reconsideration.

28. On February 21, 2008, the Commission issued Order No. 35, granting the following parties' motions to intervene: CPV Renewable Energy Company, LLC and CPV Rattlesnake Den Renewable Energy Company, LLC.

29. On March 18, 2008, the Commission issued the Order Requiring Settlement Conference regarding the selection of transmission providers in Project No. 34560.

30. On April 2, 2008, ERCOT filed the GE Ancillary Services study and the CREZ Transmission Optimization study.

31. On April 9, 2008, the Commission issued Order No. 36, granting the following parties' motions to intervene: Lone Star Transmission, LLC, Trans-Elect Texas, LLC, and Tejas Transmission, LLC.

32. On April 15, 2008, the Commission issued Order No. 38, setting the prehearing and hearing schedule.

33. Appeals, responses to appeals, and other pleadings regarding Order No. 38 were filed by FPL Energy, Lone Star Transmission, CPS Energy, STEC, Golden Spread Electric Cooperative, Inc., the City of Garland, Denton Municipal Electric, Trans-Elect Texas, Luminant Energy and Luminant Generation, E.On Climate and Renewables, AES Seawest, Horizon Wind Energy, Sharyland Utilities, Invenergy, and Oncor.

34. On April 28, 2008, the Commission issued Order No. 39, approving ERCOT's proposal to utilize Mr. Reigh Walling of GE and Mr. Michael Brower of AWS as sponsoring witnesses for the GE study.

35. On May 2, 2008, the Commission issued Order No. 40, granting the following parties' motions to intervene: Cross Texas Transmission, LLC, Brazos Electric Power Cooperative, Inc., Longfellow Ranch Partners, Edison Mission Energy, Public Citizen of Texas, Texas Impact, Environment Texas, and the Sustainable Energy and Environmental

Development Coalition, Environmental Defense Fund, AEP Energy Partners, Inc., Desert Sky Wind Farm, LP, and Trent Wind Farm, LP.

36. On May 5, 2008, the Commission issued Order on Appeal of Order No. 38, granting in part and denying in part the relief requested in the appeals. The Commission determined that it is appropriate to include the GE Ancillary Services study in the record of this proceeding, and that the parties would be allowed the opportunity in this docket to present relevant, non-cumulative evidence and rebut evidence presented, regarding issues in dispute arising from the CREZ Transmission Optimization Study and the GE Ancillary Services study.

37. On May 7, 2008, the Commission issued Order No. 41 to set a revised procedural schedule, and issued Order No. 42 to provide additional clarification regarding the hearing and prehearing procedures.

38. On May 23, 2008, direct testimony was filed by the parties, and on June 3, 2008, rebuttal testimony was filed by the parties.

39. The Commission conducted a hearing on the merits in this second phase of this docket on June 11-12, 2008.

40. On June 26, 2008, post-hearing briefs from the parties were timely filed.

41. The Commission issued its initial order in this docket on August 15, 2008.

42. Motions for rehearing, responses, and other pleadings regarding the order were filed by Cities, City of Austin, TIEC, LCRA TSC, Commission Staff, FPL Energy, several wind developers, and the Direct Companies.

<u>CREZ Designations</u>

Renewable-energy Resources and Suitable Land Areas

43. The ERCOT Study was completed to support the Commission's evaluation of potential areas to be designated as CREZs.

44. The ERCOT Study represents ERCOT's independent evaluation, with input from ERCOT stakeholders and the SPP, of the potential for wind-generation development in Texas.

45. ERCOT solicited information from stakeholders regarding areas in which there was market interest in developing wind resources; these areas, as depicted in Figure 1 in the ERCOT Study, were considered in ERCOT's analysis of the potential for wind-generation development in the state.

46. ERCOT solicited proposals from outside consultants who specialized in meteorological modeling and wind generation analysis to conduct an independent analysis of wind resources throughout the state.

47. ERCOT selected AWS Truewind as its outside consultant to identify areas throughout the state with the best wind-resource potential.

48. AWS Truewind used a complex meteorological and geophysical model, called MesoMap, to provide localized prediction of wind patterns and resulting wind power output across the state to identify those areas with the best wind resources.

49. AWS Truewind identified areas where sufficient land was available to support 100 MW of installed wind generation with the highest annual capacity factors and clustered those sites into 25 areas based on similarity of wind resources.

50. Using the results of the MesoMap model, AWS Truewind selected the 40 best 100-MW sites in each of the 25 zones, for a total of 4,000 MW in each zone.

51. AWS Truewind provided one year of typical hourly wind output for each of the 100-MW sites within the 25 zones.

52. Figure 3 from the ERCOT Study shows the location of the areas, identified by AWS Truewind, with the best 4,000 MW with the highest annual capacity factors within each of the 25 zones.

53. The zones in Figure 3 of the ERCOT Study generally are ordered by the quality and quantity of wind generation, with zone 1 having the strongest and zone 25 the weakest overall wind resources.

54. The methodology utilized by AWS Truewind is adequate for identifying those areas in the state with renewable-energy resources, in the form of wind-energy potential, and land areas suitable for the development of those resources.

55. The AWS Truewind Study, as incorporated into the ERCOT Study, in addition to the relevant testimony and evidence submitted by the parties, establishes that the criteria relating to suitable land areas and renewable-energy resources has been met for each of the zones designated by the Commission as CREZs.

Financial Commitment by Generators

56. In evaluating the level of financial commitment for the nominated zones, among other factors, the Commission considered the number of developers and total resources committed by those developers.

57. No financial commitment evidence was received for zones 3, 8, 15, 16, 17, 21, 22, 23, and 24; thus, these zones were excluded from further evaluation for CREZ designation.

58. Zones 7, 11, 12, 13, 14, 18, 20, and 25 were supported by only one or two interested developers with relatively less financial commitment than those zones chosen by the Commission for CREZ designation.

59. The following developers presented financial commitment evidence and testimony with respect to zone 2A: BPWENA; Chermac Energy Corporation; Clipper Windpower Development Company Inc.; Eurus Energy America Corporation; Horizon Wind Energy LLC; Invenergy Wind North America LLC; PPM Energy Inc.; RES America Developments Inc.; and Shell WindEnergy Inc.

60. BPWENA's financial commitment to zone 2A is comprised of, but not limited to: approximately 50,000 acres either in final negotiations or under agreement; millions of dollars expended for development; and possession of a multi-year turbine supply agreement.

61. Chermac Energy Corporation's financial commitment to zone 2A is comprised of, but not limited to: approximately 20,000 acres leased; filed requests for interconnection studies with SPP; and upward of $1.5 million spent and projected to be spent for development.

62. Clipper Windpower Development Company Inc.'s financial commitment to zone 2A is comprised of, but not limited to: filed requests for interconnection studies with SPP; approximately 16,980 acres leased; and a projection of $750,000,000 to be spent for development.

63. Eurus Energy America Corporation's financial commitment to zone 2A is comprised of, but not limited to: financing facility letter for $400,000,000 from Mizuho Corporate Bank, Ltd.; 24,311 acres leased; and completed interconnection screening study and feasibility study.

64. Horizon Wind Energy LLC's financial commitment to zone 2A is comprised of, but not limited to: 45,816.93 acres under lease agreements; millions of dollars expended for development; and existing long-term wind turbine supply contracts.

65. Invenergy Wind North America LLC's financial commitment to zone 2A is comprised of, but not limited to: over $500,000 expended for development with over $1 billion projected to be expended; approximately 51,000 acres leased; and two initiated interconnection requests with ERCOT.

66. PPM Energy Inc.'s financial commitment to zone 2A is comprised of, but not limited to, approximately 10,000 acres leased for which over $50,000 has been expended.

67. RES America Developments Inc.'s financial commitment to zone 2A, which was filed under seal, represents a significant commitment to development in the form of funds expended, funds projected to be expended, and acres under lease.

68. Shell WindEnergy Inc.'s financial commitment to zone 2A, which was filed under seal, represents a significant commitment to development in the form of funds expended and acres under lease.

69. The following developers presented financial commitment evidence and testimony with respect to zone 4: Airtricity Inc.; Babcock & Brown Renewable Holdings Inc.; Chermac Energy Corporation; Mesa Power LLC; and PPM Energy Inc.

70. Airtricity Inc.'s financial commitment to zone 4 is comprised of, but not limited to: upwards of $8 million expended for development; over $2 billion projected to be expended under certain conditions; approximately 70,000 acres leased; filed interconnection request with ERCOT; and completed interconnection agreement with SPP.

71. Babcock & Brown Renewable Holdings Inc.'s financial commitment to zone 4, which was filed under seal, represents a significant commitment to development in the form of credit secured for development, funds projected to be expended, and acres under lease.

72. Chermac Energy Corporation's financial commitment to zone 4 is comprised of $20,000 expended for wind development prospect evaluation with $1,200,000-$1,500,000 allocated for development costs.

73. Mesa Power LLC's financial commitment to zone 4 is comprised of, but not limited to: in excess of $200,000 expended for development; $4-6 million projected to be spent; and negotiations with landowners regarding leasing rights to 200,000 acres.

74. PPM Energy Inc.'s commitment to zone 4 is comprised of, but not limited to: interconnection requests filed with both ERCOT and SPP; approximately $40,000 invested to install and operate 2 meteorological towers onsite; and commitments to obtain options to lease acreage sufficient to support a 300 MW project.

75. The following developers presented financial commitment evidence and testimony with respect to zones 5 and 6: BPWENA; Fremantle Energy LLC; Horizon Wind Energy LLC; NRG Texas LLC, and RES America Developments Inc.

76. BPWENA's financial commitment to zones 5 and 6 is comprised of, but not limited to: millions of dollars expended for development; approximately 60,000 acres either in final negotiations or under agreement; and possession of a multi-year turbine supply agreement.

77. Fremantle Energy LLC's financial commitment to zones 5 and 6 is comprised of, but not limited to: approximately 10,000 acres in final lease negotiations; $5.2 million projected to be spent; and funded ERCOT interconnection study.

78. Horizon Wind Energy LLC's financial commitment to zones 5 and 6 is comprised of, but not limited to: more than $110,000 spent for development; commitments for a minimum of 15,600 acres; and existing long-term wind turbine supply contracts.

79. NRG Texas LLC's financial commitment to zones 5 and 6, which was filed under seal, represents a substantial commitment to development in the form of funds expended and projected to be expended.

80. RES America Developments Inc.'s financial commitment to zones 5 and 6, which was filed under seal, represents a substantial commitment to development in the form of funds expended and acres under lease.

81. The following developers presented financial commitment evidence and testimony with respect to zone 9A: AES SeaWest Inc.; BNB Renewable Energy LLC; BPWENA; FPL Energy LLC; Invenergy Wind North America LLC; NRG Texas LLC; RES America Developments Inc.; and Tierra Energy LLC.

82. AES SeaWest Inc.'s financial commitment to zone 9A is comprised of, but not limited to: upwards of $1 billion dollars expended for existing and planned projects; tens of thousands of acres under lease for existing and planned projects; multiple interconnection studies in progress; and commitments to wind turbine vendors for future delivery.

83. BNB Renewable Energy LLC's financial commitment to zone 9A is comprised of, but not limited to: approximately $859,000 spent for development; approximately 60,000 acres leased and optioned; and an interconnection application filed with ERCOT.

84. BPWENA's financial commitment to zone 9A is comprised of, but not limited to: millions of dollars expended for development; approximately 20,000 acres either in final negotiations or under agreement; and possession of a multi-year turbine supply agreement.

85. FPL Energy LLC's financial commitment to zone 9A is comprised of, but not limited to: $1.05 billion expended for existing renewable facilities, with nearly $500 million projected to be spent for a new project; leasing agreements; and completed screening and interconnection studies.

86. Invenergy Wind North America LLC's financial commitment to zone 9A is comprised of, but not limited to: over $165 million expended for development; approximately 85,000 acres of surface rights obtained; interconnection requests initiated; and one signed interconnection agreement.

87. NRG Texas LLC's financial commitment to financial commitment to zone 9A, which was filed under seal, represents a significant commitment to development in the form of funds expended, funds projected to be expended, and acres under lease.

88. RES America Developments Inc.'s financial commitment to zone 9A, which was filed under seal, represents a substantial commitment to development in the form of funds expended, funds projected to be expended, and acres under lease.

89. Tierra Energy LLC's financial commitment to zone 9A, which was filed under seal, represents a significant commitment to development in the form of funds expended, funds projected to be expended, and acres under lease.

90. The following developers presented financial commitment evidence and testimony with respect to zone 19: Invenergy Wind North America LLC; Penn Real Estate Group Ltd.; and Tierra Energy LLC.

91. Invenergy Wind North America LLC's financial commitment to zone 19 is comprised of, but not limited to: approximately $322,000 expended for development; $1.8 billion projected to be spent; approximately 70,000 acres of surface rights obtained; interconnection requests initiated; and one signed interconnection agreement.

92. Penn Real Estate Group Ltd.'s financial commitment to zone 19 is comprised of, but not limited to: approximately $2,650,000 expended for development; approximately 9,000 acres purchased; and an interconnection screening study prepared by ERCOT.

93. Tierra Energy LLC's financial commitment to zone 19, which was filed under seal, represents a significant commitment to development in the form of funds expended, funds projected to be expended, and acres under lease.

94. Those zones chosen by the Commission for CREZ designation – zones 2A, 4, 5, 6, 9A, and 19 – were supported by testimony and evidence demonstrating significant levels of financial commitment.

Geographic Extent of CREZs

95. Based on the sufficiency of suitable land areas and renewable-energy resources, as well as the relatively significant level of financial commitment, zones 2A, 4, 5, 6, 9A, and 19 should receive CREZ designation.

96. Except as specifically modified by this Interim Order, the CREZ boundaries should be based on the lines drawn by AWS Truewind in Figure 3 of the ERCOT Study, which

represent the areas with the best 4,000 MW in each of the wind resource zones. (Attachment A).

97. The boundary of zone 4 is identical to the boundary of zone 4 as set forth in Figure 3 of the ERCOT Study.

98. The boundary of zone 19 is identical to the boundary of zone 19 as set forth in Figure 3 of the ERCOT Study.

99. The boundary of zone 2A is comprised of that area enclosed by the perimeter boundaries of zones 1 and 2 from Figure 3 of the ERCOT Study, plus an additional area that includes all of Briscoe County.

100. The evidence presented by Shell WindEnergy Inc.'s witness Chris Ziesler justifies the inclusion of the entirety of Briscoe County in zone 2A because of the presence of high capacity factors throughout the county and Shell WindEnergy Inc.'s financial commitment to develop resources in Briscoe County.

101. Zone 1's ranking in the ERCOT Study as the area possessing the best overall wind resource in Texas warrants combining this zone in zone 2A because the combined area would possess sufficient renewable-energy resources, suitable land areas, and an adequate level of financial commitment by developers.

102. The boundary of zones 5 and 6 is expanded to include an extension of the eastern boundary of zone 5 from Figure 3 of the ERCOT Study ten miles further east into Tom Green and Schliecher counties, as depicted in Exhibit NRG-3 at Exhibit 1. (Attachment B).

103. As proposed by NRG Texas LLC, zone 5 is also expanded to include an area that falls completely within zone 11, as zone 11 is depicted in Figure 3 of the ERCOT Study; thus, the expanded area contains sufficient suitable land areas and renewable-energy resources, as well as the financial commitment by NRG Texas LLC for development.

104. The boundary of zone 9A is comprised of zones 9 and 10 from Figure 3 of the ERCOT Study, plus an additional area between the zones as requested by FPL Energy LLC and BNB Renewable Energy LLC, as set forth in Exhibit BNB-10 (Attachment C), and as requested by AES SeaWest Inc., as set forth in AES SeaWest Exh. No. 2 at Exhibit RS-1.

(Attachment D). Zone 9A also includes RES America Developments Inc.'s projects located in Callahan and Shackelford County in zone 12, as those projects were described in the record and depicted in RES EX. 2A at Exhibit C (filed under seal).

105. The area advocated for CREZ designation by FPL Energy LLC and BNB Renewable Energy LLC, as set forth in BNB-10, contains Horse Hollow (the world's largest operational wind farm, which FPL Energy LLC has expressed plans to expand) as well as Bull Creek (BNB Renewable Energy LLC's planned wind project); thus, the expanded area possesses significant financial commitment. Such financial commitment is indicative of the presence of the sufficiency of suitable land areas and renewable-energy resources.

106. The expansion to zone 9A advocated by AES SeaWest Inc. to include the areas just east of zone 9 located in Coke and Tom Green counties captures the financial commitment advanced by AES SeaWest Inc. for wind-resource development in the expanded area. Such financial commitment is indicative of the presence of the sufficiency of suitable land areas and renewable-energy resources.

107. The area for which RES America Developments Inc. proposes to expand zone 9A to include falls completely within zone 12, as zone 12 is depicted in Figure 3 of the ERCOT Study; thus, the expanded area contains sufficient suitable land areas and renewable-energy resources, as well as the financial commitment by RES America Developments Inc. for development.

108. For all zones for which the Commission has not made a specific statement regarding the granting of an expansion, the Commission finds that expansion of such zones was not sufficiently supported by the record evidence.

Transmission Solutions

109. Although several transmission proposals were presented in phase 1 of this docket, further study was needed to evaluate the major transmission improvements needed to serve the CREZs to determine which improvements have the potential to be the most beneficial and cost-effective to customers.

110. ERCOT conducted the necessary studies to determine the transmission needed to serve the CREZs designated by the Commission in this proceeding and produced the "CREZ Transmission Optimization Study" (the CTO study).

111. The CTO study represents ERCOT's independent evaluation, with input from ERCOT stakeholders, of optimized transmission plans to provide transfer capacity for wind generation as specified in the four scenarios previously identified by the Commission.

112. In providing megawatt tiers of transfer capability for ERCOT to study during its CTO study, the Commission provided an estimate of the maximum generating capacity that the Commission expected the transmission ordered for each CREZ to accommodate.

113. ERCOT selected General Electric International, Inc. (GE) as its outside consultant to analyze and prepare a study regarding the level, type, and cost of additional ancillary services that might be required to maintain the reliability of the ERCOT system with increasing levels of wind generation.

114. GE produced the "Analysis of Wind Generation Impact on ERCOT Ancillary Services Requirements" study (the GE Ancillary Services study) to support the Commission's evaluation of which transmission scenario is most cost-effective and beneficial to the customers.

115. In the GE Ancillary Services study, GE concluded that it is possible to integrate any of the levels of wind studied in the report without compromising reliability.

116. Through completion of the CTO study and the GE Ancillary Services study, ERCOT provided the Commission with a means to select the major transmission improvements necessary to deliver to customers the energy generated by renewable resources in the CREZs, in a manner that is most beneficial and cost-effective to customers.

Selection of Scenario 2 Transmission Solution

117. Transmission improvements and upgrades identified in Scenario 2 of the CTO study have capacity to deliver to customers the electric output from renewable-energy technologies in the CREZ in the most beneficial and cost-effective manner.

118. Scenario 2 consists of the following new and upgraded lines, identified by voltage level and a general description of where the new lines interconnect to the existing grid:

McCamey, Central, and Central West: Gillespie to Newton single-circuit, double-circuit capable 345-kV line; Kendall to Gillespie single-circuit, double-circuit-capable 345-kV line; West C to Odessa single-circuit, double-circuit-capable 345-kV line; West B to Moss single circuit 138-kV line; West A to West C single-circuit, double-circuit-capable 345-kV line; West A to Central D single-circuit, double-circuit-capable 345-kV line; Twin Butte to Brown new 345-kV line on existing structures; Tonkawas to Sweetwater double-circuit 345-kV line; Sweetwater to Central Bluff double-circuit 345-kV line; McCamey D to Twin Butte single-circuit, double-circuit-capable 345-kV line; McCamey D to Kendall double-circuit 345-kV line; McCamey C to McCamey A single-circuit, double-circuit-capable 345-kV line; McCamey B to North McCamey 138-kV line on existing structures; McCamey A to Odessa single-circuit, double-circuit-capable 345-kV line; McCamey C to McCamey D single-circuit, double-circuit-capable 345-kV line; Mason to Pittsburgh138-kV line; Divide to Twin Butte adding a second circuit to existing structures; Central E to Central D single-circuit, double-circuit-capable 345-kV line; Central D to Divide single-circuit, double-circuit-capable 345-kV line; Central C to Navarro/Sam Switch double-circuit 345-kV line; Central B to Willow Creek double-circuit 345-kV line; Central B to Central A double-circuit 345-kV line; Central A to West A double-circuit 345-kV line; Central A to Tonkawas double-circuit 345-kV line; Central A to Central C double-circuit 345-kV line; Newton to Killeen 345-kV line; Brown to Newton/Salado double-circuit 345-kV line; Bluff Creek to Brown double-circuit 345-kV line; and Central Bluff to Bluff Creek double-circuit 345-kV line.

Panhandle: West Krum to Anna double-circuit 345-kV line; Willow Creek to Hicks double-circuit 345-kV line; West Krum to Carrolton NW adding a new 345-kV line to existing structures; PanOakMid to Central C double-circuit 345-kV line; Panhandle AC to PanOakMid (with one circuit looping into Tesla 345-kV bus); Panhandle BB to Panhandle BA double-circuit 345-kV line; Panhandle BB to Oklaunion (with one circuit looping into Tesla 345-kV bus) double-circuit 345-kV line; Panhandle BA to Panhandle AC double-circuit 345-kV line; Panhandle AD to PanOakMid double-circuit 345-kV line; Panhandle AD to Central B double-circuit 345-kV line, Panhandle AC to Panhandle AD double-circuit 345-kV line; Panhandle AB to Panhandle BA single-circuit, double-circuit- capable 345-kV line; Panhandle AA to Panhandle AB single-circuit, double-circuit-capable 345-kV line; Panhandle AA to Panhandle AC single-circuit, double-circuit-capable 345-kV line; Parker to Everman new 345-kV line on existing structures; Oklaunion to West Krum double-circuit 345-kV line; Oklaunion to PanOakMid double-circuit 345-kV line; and Bowman to Oklaunion double-circuit 345-kV line.

119. Scenario 2 also includes transmission improvements other than new lines, as identified in the CTO study cost breakdown for Scenario 2 as follows:

A. *Stations:* new 345-kV stations at Sam Switch, Gillespie, Newton, Brown, Navarro, Tesla, Hicks, West Krum, and PanOakMid;

B. *Auto transformers:* addition of a 345-kV auto at Whitney, a 138-kV auto at Bandera, a 345-kV auto at Gillespie, two 345-kV autos at North McCamey, a 345-kV auto at Eagle Mountain, and the replacement of a 345-kV auto at Kendall;

C. *50% series compensation:* 50% compensation on McCamey D to Kendall; on Central C to Navarro/Sam Switch, on PanOakMid to Central C, on Panhandle AC to Tesla, and on Central B to Willow Creek;

D. *Mega volt-ampere reactive (MVAR) Reactive Compensation:* 200 MVAR on PanOakMid; 150 MVAR on Central C, Central B, and Brown, 100 MVAR on Tesla, Gillespie, Central A, and McCamey D, 50 MVAR on Panhandle AC, Panhandle AD, Panhandle BB, and Panhandle AB;

E. *MVAR Capacitor bank:* 300-MVAR bank on Oklaunion, 200-MVAR bank on PanOakMid, 150-MVAR bank on Tesla, 100-MVAR bank on Panhandle AC, and 50-MVAR bank on Panhandle AD;

F. *Open and close lines:* open Seymour to Bomarton 69-kV line, open Saps to Yellowjacket 138-kV line, open Rocksprings to Friess Ranch 69-kV line, open Fort Stockton to Barilla 69-kV line, open Bradshaw to Winters 69-kV line, and close bus ties at North McCamey bus;

G. *Rebuilds:* Sonora to Hamilton 138-kV line, Goldthwaite to Evant 138-kV line, Raymond Barker to Verde Creek 138-kV line, Kendct to Kendal 138-kV line, Verde Creek to Bandera, Willow Creek to Parker 345-kV as double circuit, and Jacksboro to Willow Creek 345-kV as double circuit;

H. *Upgrade terminal equipment:* on Eagle Mountain-Hicks-Alliance-Roanoke 345-kV line, on Abilene to Mulberry 138-kV line, on Abilene South to Leon 138-kV line, on Bowman to Graham 345-kV line, on Bowman to Fisher Road 345-kV line, on both Singleton to Gibbons Creek 345-kV lines, on Roanoke to Alliance 345-kV line, and on Morgan Creek to Twin Butte 345-kV line; and

I. *Reconductor:* on Bowman to Jacksboro 345-kV line.

120. Scenario 2 contains 2,334 miles of new 345-kV right-of-way, and 42 miles of new 138-kV right-of-way.

121. ERCOT estimates that Scenario 2 provides an average savings of $38/MWh for each MWh of wind.

122. These improvements identified as Scenario 2 are necessary to deliver to customers the energy generated by renewable resources in the CREZs.

123. The estimated cost of the plan for Scenario 2 at the time of the CTO study was $4.93 billion.

124. Based on production-costs modeling, the expected average annual wind curtailment is 2.31%, with a total annual wind generation of 64,031 GWh.

125. The updated estimate of the maximum generating capacity that the Commission expects this transmission to accommodate is 18,456 MW.

126. Scenarios 3 and 4 were significantly more expensive than Scenario 2.

127. Average system fuel cost savings was not analyzed for Scenarios 3 or 4, and the GE Ancillary Services study addressed an amount of wind energy significantly less than what Scenarios 3 or 4 would support.

128. Scenario 1B has significant limitations compared to Scenario 2 in that the amount of wind generation expected to be on the grid by the end of 2008 is approximately 10,000 MW, which would leave very little room for further wind expansion.

129. The lack of expansion capability for Scenario 1B would have a dampening effect on wind related capital investment in ERCOT.

130. Scenario 2 is less expensive than Scenario 1B on an incremental per MW of wind generation basis.

131. Scenario 2 has more environmental benefits than scenario 1B.

132. Scenario 2 addresses current chronic and severe congestion issues.

133. Scenario 2 addresses present and future needs for transmission development.

134. There is a need for more transmission generally from West Texas to the east and southeast, rather than northeast towards Fort Worth.

135. The central objective of the statutory change contemplated by SB 20 was to plan ahead of transmission capacity needs.

136. The rapid completion of certain lines identified in Scenario 2 is imperative to resolve existing congestion and address current voltage issues. These projects are designated as part of the CREZ transmission solution and are the first priority for planning and construction: the Central B to Central A double-circuit 345-kV line, the Central A to Central Bluff double-circuit 345-kV line, the Central Bluff to Bluff Creek double-circuit 345-kV line, the Bluff Creek to Brown double-circuit 345-kV line, the Brown to Newton/Salado double-circuit 345-kV line, the Newton to Killeen double-circuit 345-kV line, the Twin Butte to Brown additional 345-kV line on existing structures, the Twin Butte to McCamey D single-circuit, double-circuit-capable 345-kV line, the McCamey D to Kendall double-circuit 345-kV line, the Kendall to Gillespie single-circuit, double-circuit-capable 345-kV line, the Gillespie to Newton single-circuit, double-circuit-capable 345-kV line, and the Oklaunion to Bowman double-circuit 345-kV line.

137. Without storage capacity at scale, increased wind capacity requires traditional thermal units to provide ancillary services more frequently, and ramping thermal units up and down will have cost impacts on the maintenance and operations of the units.

138. Displacement of thermal units with wind generation will reduce the overall spot price of energy.

139. The total regulation service procured in a year will increase with increased wind generation capacity. However, increased wind capacity tends to reduce the per-MWh

price, resulting in a small cost of regulation per MWh of wind generation, with the high end of the range at $0.27/MWh.

140. Fast drops in wind generation output are much like a fast load rise. Responsive reserve service would only need to be procured to the degree that fast drops in wind generation are not covered by non-spinning reserve service.

141. ERCOT estimates that Scenario 2 brings lower congestion costs (estimated to be $2,926,117) compared to those costs of Scenario 1B (estimated to be $3,271,508).

142. Maintaining reliability and stability will vary depending on market structure and system conditions.

143. The GE Ancillary Services study was limited to a maximum integration of 15,000 MW of wind generation, which equals 23% wind penetration as applied to 2008 peak system load.

144. As applied to the forecast 2017 peak system load, 23% wind penetration equals 18,456 MW.

145. ERCOT reports that system reliability can be maintained at Scenario 2 levels of wind generation.

146. Scheduling additional thermal units and curtailing wind generation could occur when there is no lower-cost alternative.

147. P.U.C. SUBST. R. 25.174(c)(3)(C) allows the Commission to consider any other factors the Commission considers appropriate as provided by PURA.

148. Although there were benefits regarding ancillary services costs being lower and more predicable with lower levels of wind-energy at Scenario 1B, and the potential for greater fuel savings with higher levels of wind-energy at Scenario 3 or 4, the trade-offs for getting the best value for the transmission dollars while limiting the risks associated with maintaining reliability renders Scenario 2 the best CREZ transmission plan.

149. The implementation of Scenario 2, with the specific lines prioritized as described, will provide ERCOT the benefit of experience in the process of integrating more and more wind energy. Reliability issues that were discussed at length in the direct testimony and

evidence presented and during cross examination of witnesses at the hearing will be resolved through this experience.

150. The Commission considered factors such as the integration of each scenario's wind generation in a reliable manner, the intent of the Legislature in directing the Commission to construct transmission capacity to deliver electricity from the CREZs, the environmental benefits, and the future expansion capability and other benefits of the plans.

151. Efforts are underway at ERCOT to address maintaining reliability with higher levels of wind generation. These include operational rule changes and revisions under consideration such as the replacement of unit-specific energy schedules with schedules based on an objective wind forecast and the use of an 80% confidence factor to mitigate the risk that wind will not deliver scheduled energy in real time.

152. Wind generation interconnection standards, performance measures, and ancillary service requirements such as voltage control, training, and grid maintenance and congestion are being addressed.

153. ERCOT is considering ramp rate limitations on wind resources, to mitigate impacts to system frequency (system frequency requires balancing supply and load on an instantaneous basis and is negatively impacted by rapid ramp rates).

154. Requirements are being implemented that wind generation provide real-time hourly production updates.

155. The implementation of nodal operations will provide more transparency than QSE portfolio-based dispatch and will better enable ERCOT to manage wind generation.

156. ERCOT is capable of integrating 18,456 MW of wind-generated electricity without sacrificing system stability and reliability.

157. Gaining experience in reliably integrating wind energy by integrating the lines prioritized in this order first is the most reasonable approach to establishing CREZ transmission.

158. The integration of almost 25,000 MW of wind generation contemplated in Scenario 3 or 4 is not supported by the evidentiary record from a reliability standpoint.

159. The intent of the Legislature in passing the amendments to PURA §§ 36.053, 39.203, and 39.904 in 2005 was to further encourage the development of renewable-energy resources by establishing a process to provide reliable and economical transmission resources ahead of renewable generation.

160. The amendments raised the state's renewable-energy goals, required the Commission to develop a CREZ transmission plan, waived requirements and shortened timeframes applicable to CCN applications, and deemed CREZ transmission facilities used, useful, and prudent for rate-setting purposes.

161. Scenario 2 best satisfies the Legislative intent.

162. Transmission plans with lesser transfer capacity than Scenario 2 would leave little room for expansion, thereby not providing transmission resources ahead of renewable generation as directed by the legislation.

163. There was insufficient evidence to assure that levels of wind energy that would be associated with Scenario 3 or 4 could be reliably integrated, therefore the Commission finds that the larger plans do not satisfy the Legislature's intent.

164. Because of Scenario 2's greater wind-energy capacity, it provides more environmental benefits than Scenario 1B, because Scenario 2 displaces more gas-fired and coal-fired electricity.

165. It is estimated that 350 gallons of water are consumed per MWh from a gas plant and 800 gallons of water per MWh from a coal plant. After construction of wind facilities, there is very little water consumed in the process of generating electricity.

166. Because wind-generated electricity burns no fuel with resulting air emissions, each MWh of electricity generated by wind that displaces electricity generated by burning coal or gas results in a reduction of emissions of NO_x, SO_2, and CO_2.

167. Although Scenario 3 was more attractive than Scenario 2 regarding environmental factors, the reliability concerns associated with Scenario 3 outweighed these benefits.

168. The ability to cost-effectively expand the transmission capacity is a very important consideration.

169. Scenarios 1B, 2, and 3 were designed by ERCOT to be essentially a subset of the next larger plan.

170. The selection of a plan smaller than Scenario 2 would leave little room for expansion, thereby not providing transmission resources *ahead* of renewable generation.

171. Scenario 1A was dismissed as a non-viable option primarily because it lacked expansion capability.

172. Expansion capability was a very attractive component of Scenario 1B, but because wind generation has already outgrown Scenario 1B's capacity, it was rejected in favor of Scenario 2.

173. Scenario 2 provides many non-CREZ benefits, such as meeting critical needs of non-CREZ wind development, economic long-term system solutions, and Hill Country load growth, that Scenario 1A and 1B do not.

174. Scenario 2 better diversifies Texas's energy mix by increasing the share of renewable energy as related to other energy resources.

175. Greater energy diversification leads to other benefits, such as energy security.

176. Wind is not subject to fuel-cost volatility like natural gas, or the uncertainties of the costs of future regulations on greenhouse gases.

177. Although Scenario 3 was attractive from the standpoint of enhancing a robust and diverse portfolio of energy sources, this aspect was outweighed by reliability concerns.

178. Scenario 2 provides for the integration of levels of renewable energy that contribute to a robust and diverse portfolio of energy sources necessary to meet the state's projected increasing load, without sacrificing reliability.

VI. Conclusions of Law

1. The Commission has jurisdiction over the parties and the subject matter of the application pursuant to PURA §§ 14.001 and 39.904(g).

2. PURA § 39.904(g) sets forth the following criteria for the Commission to evaluate in designating a CREZ: (1) sufficient renewable-energy resources; (2) suitable land areas; and (3) level of financial commitment by generators.

3. P.U.C. SUBST. R. 25.174(a)(4) mirrors the requirements of PURA § 39.904(g) but adds that the Commission shall consider any other factors considered appropriate by the Commission as provided by PURA.

4. P.U.C. SUBST. R. 25.174(a)(5) provides that the Commission's final order in this proceeding shall specify: (1) the geographic extent of the CREZ; (2) major transmission improvements necessary to deliver to customers the energy generated by renewable resources in the CREZ, in a manner that is most beneficial and cost-effective to the customers, including new and upgraded lines identified by voltage level and a general description of where any new lines will interconnect with the existing grid; (3) an estimate of the maximum generating capacity that the Commission expects the transmission ordered for the CREZ to accommodate; and (4) any other requirement considered appropriate by the Commission as provided by PURA.

5. Zones 2A, 4, 5, 6, 9A, and 19, as described in this order and the interim order on reconsideration, best meet the criteria set forth in PURA § 39.904(g) and P.U.C. SUBST. R. 25.174(a)(4).

6. The transmission improvements as described in this order are necessary to deliver to customers the energy generated by renewable resources in the CREZ, in a manner that is most beneficial and cost-effective to the customers.

7. Certain transmission improvements identified in this order as being most critical to be constructed and placed in service first to address current congestion are properly prioritized in this order.

8. Consistent with open-access principles, developers are not deemed automatically ineligible to interconnect with a transmission line built to serve a CREZ designated by the Commission in this proceeding due to the fact that the location of their wind project may fall outside a CREZ boundary.

9. Pursuant to P.U.C. SUBST. R. 25.174(e), the Commission may consider evidence of financial commitment shown in this docket in any subsequent proceeding to limit interconnection and/or establish dispatch priorities regarding the transmission system in the CREZ.

10. The Federal Power Act provides jurisdiction to the Federal Energy Regulatory Commission (FERC) over the "transmission of electric energy in interstate commerce and the sale of such energy in interstate commerce." 16 U.S.C. § 824(a).

11. Electricity is held to be in interstate commerce if it is "transmitted from a State and consumed at any point outside thereof; but only insofar as such transmission takes place within the United States." 16 U.S.C. § 824(c).

12. No interstate commerce issues are implicated by the Commission's designation of CREZ in this proceeding because each CREZ designated by the Commission is located wholly within the State of Texas, transmission improvements built to serve the CREZs will be interconnected solely with ERCOT facilities, and generation within the CREZs will not be authorized to interconnect simultaneously with ERCOT and electrical grids outside of ERCOT.

VII. Ordering Paragraphs

In accordance with these findings of fact and conclusions of law, the Commission issues the following order:

1. The Commission designates zones 2A, 4, 5, 6, 9A, and 19, as those zones are described in Figure 3 of the ERCOT Study, the interim order on reconsideration, and this order, as CREZs.

2. The Commission specifies the major transmission improvements identified in this order as necessary to deliver to customers the energy generated by renewable resources in the CREZ, in a manner that is most beneficial and cost-effective to the customers, including new and upgraded lines identified by voltage level and a general description of where any new lines will interconnect with the existing grid.

3. The Commission estimates that the maximum generating capacity that the Commission expects the transmission ordered for the CREZ to accommodate is 18,456 MW.

4. The lines identified in this order as having the utmost priority will be addressed, planned, certificated, constructed, and placed into service first. This may be accomplished in the manner determined to be the most expedient, either in the CREZ transmission process or via the RPG process.

5. After issuance of its final order, the Commission will proceed, pursuant in part to P.U.C. SUBST. R. 25.174(c), to select the entity or entities responsible for constructing the transmission improvements to the CREZs.

6. For those generators located in zones 4 and the northern portion of zone 2A who desire to interconnect with ERCOT, the Commission strongly suggests a determination by the Federal Energy Regulatory Commission (FERC) disclaiming jurisdiction. Accordingly, either the generator wishing to be served or the transmission service provider that would provide such interconnection should first obtain FERC statement disclaiming jurisdiction before the Commission will approve a CCN application. Similar to the approval granted in the *Cottonwood* case, such FERC approval should be in the form of an Order Granting Petition for Declaratory Order or any other mechanism by which the FERC disclaims jurisdiction over the proposed transmission lines to ERCOT, transmission service over the proposed transmission lines, and the utilities in ERCOT that are not currently public utilities under the Federal Power Act.

7. ERCOT is directed to study, in association with market participants, the system reliability and stability issues implicated by increased wind generation, particularly wind generation that is geographically concentrated, and report the status of these studies to the Commission at least quarterly through a committee or task force as designated by ERCOT. Unless staff designates a different project, Project No. 34577 can also be utilized for this purpose.

8. ERCOT is directed to file periodic updates on the progress of the CREZ transmission development, the estimated costs, the effects on system reliability, the need for additional transmission and generation capacity throughout the state, and the status of the generation

market, in order to facilitate the process for complying with PURA § 39.904(j) and (k), which require reports to the Legislature by December 1 of each even-numbered year.

9. All other motions, requests for entry of specific findings of fact and conclusions of law, and any other requests for general or specific relief, if not expressly granted, are denied.

SIGNED AT AUSTIN, TEXAS the 6th **day of** October ~~**September**~~ **2008.**

PUBLIC UTILITY COMMISSION OF TEXAS

Barry T. Smith

BARRY T. SMITHERMAN, CHAIRMAN

KENNETH W. ANDERSON, JR. COMMISSIONER

Commissioner Nelson recused herself and did not participate in this decision.

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DOCKET NO. 33672

ATTACHMENT A

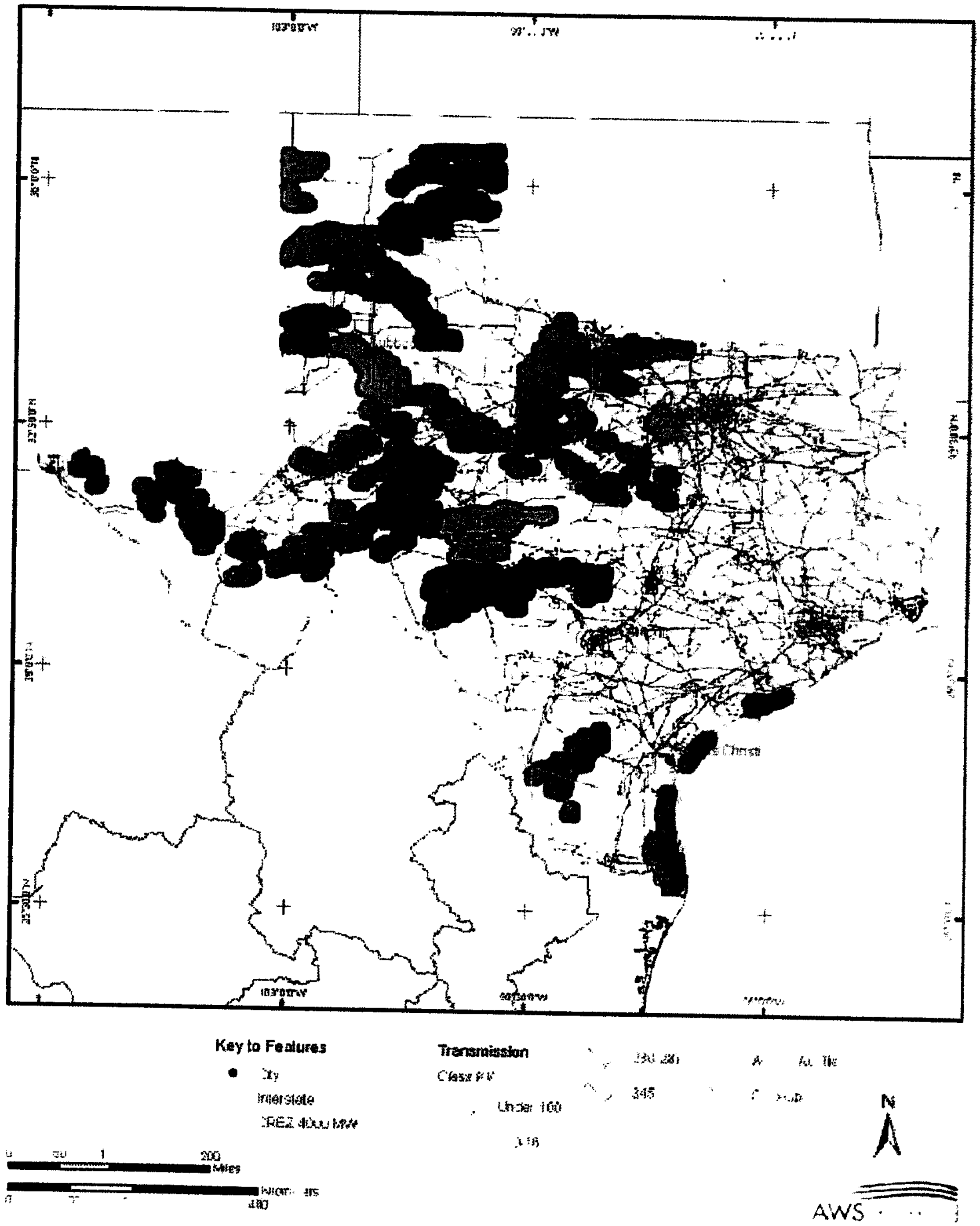
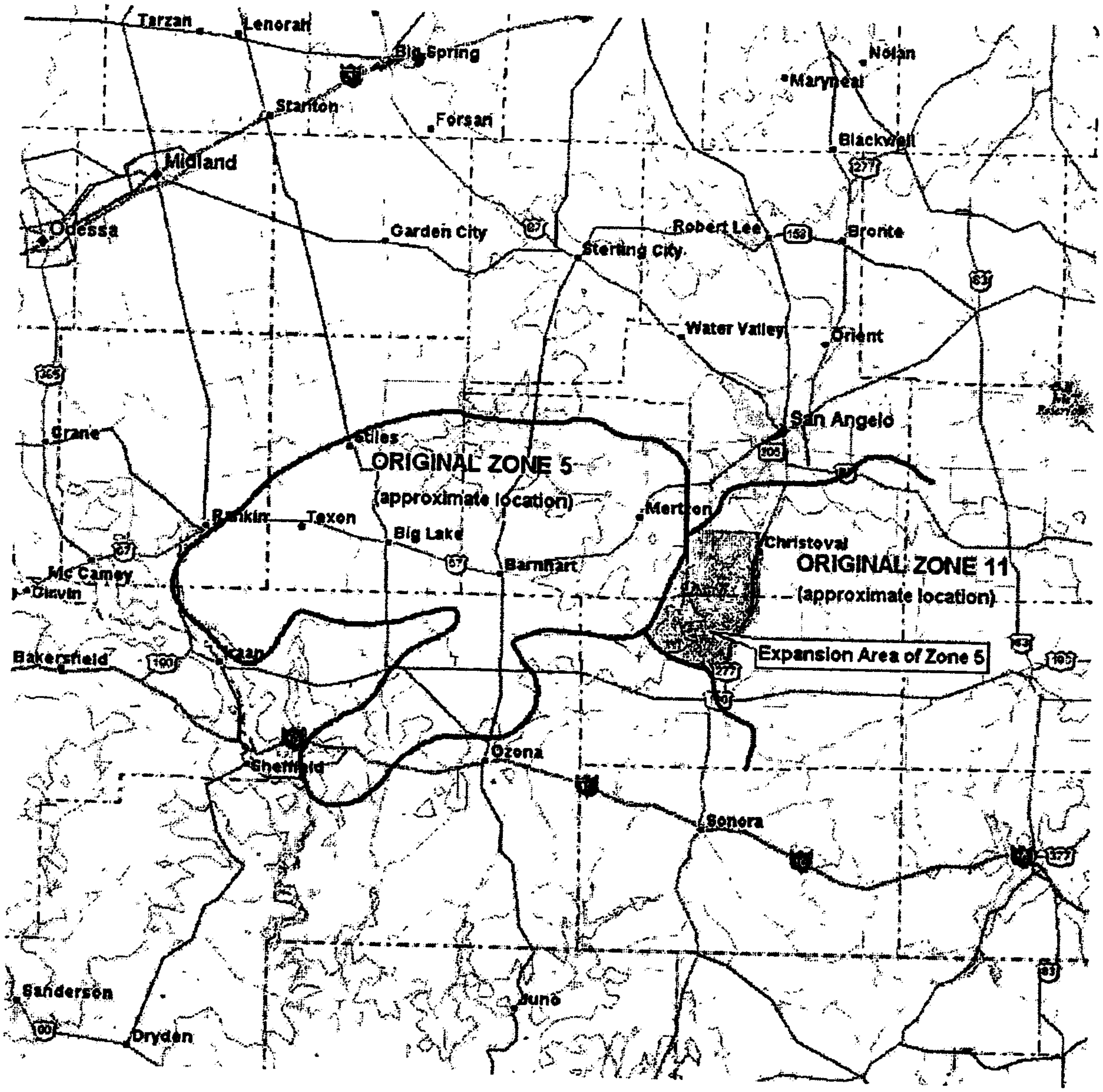


Figure 3: Areas Enclosing the Best 4,000 MW in Each of the Wind Resource Zones

DOCKET NO. 33672

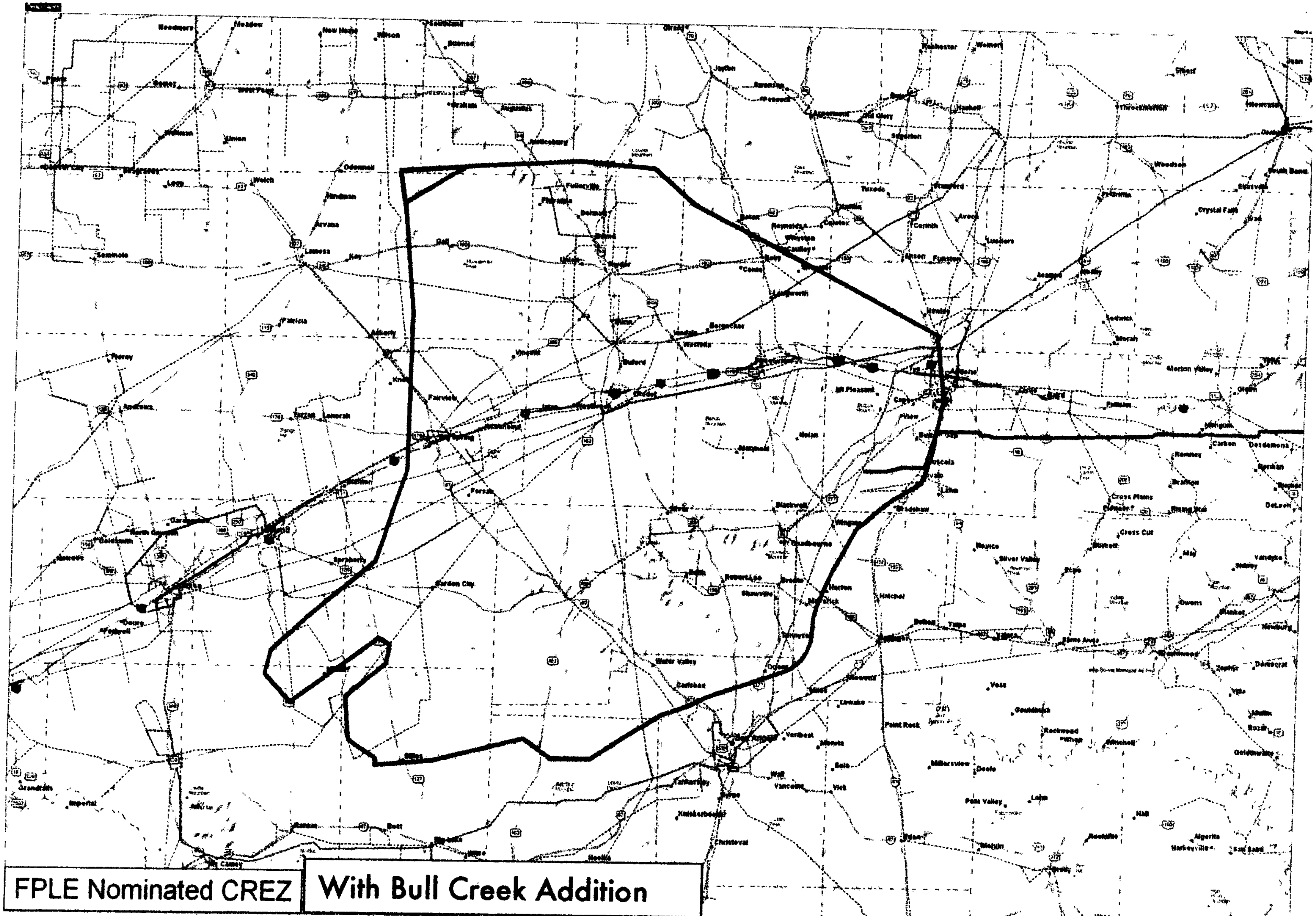
ATTACHMENT B

Exhibit 1 – Map of Modified Zone 5



DOCKET NO. 33672

ATTACHMENT C



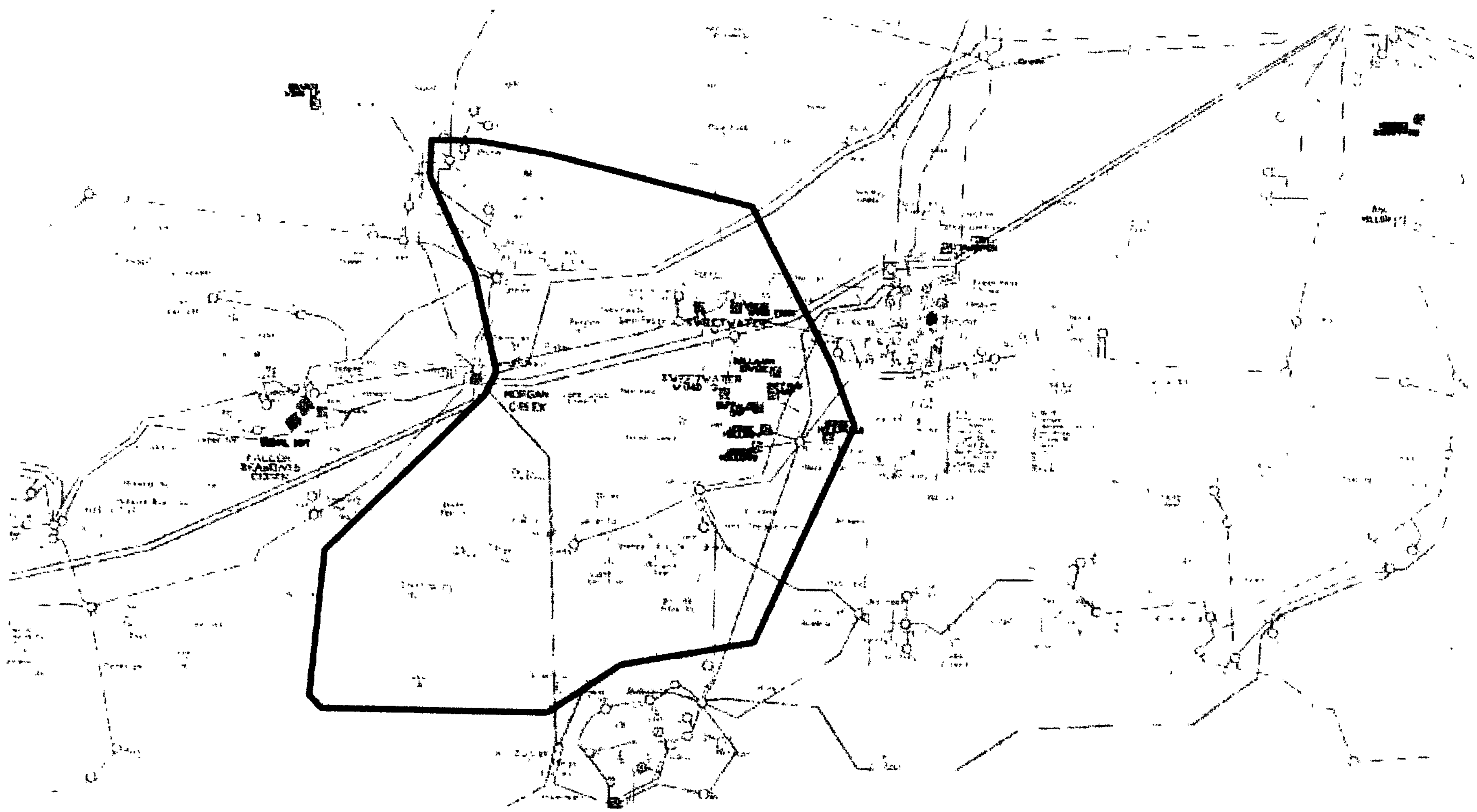
FPLE Nominated CREZ | With Bull Creek Addition

BNB -10

DOCKET NO. 33672

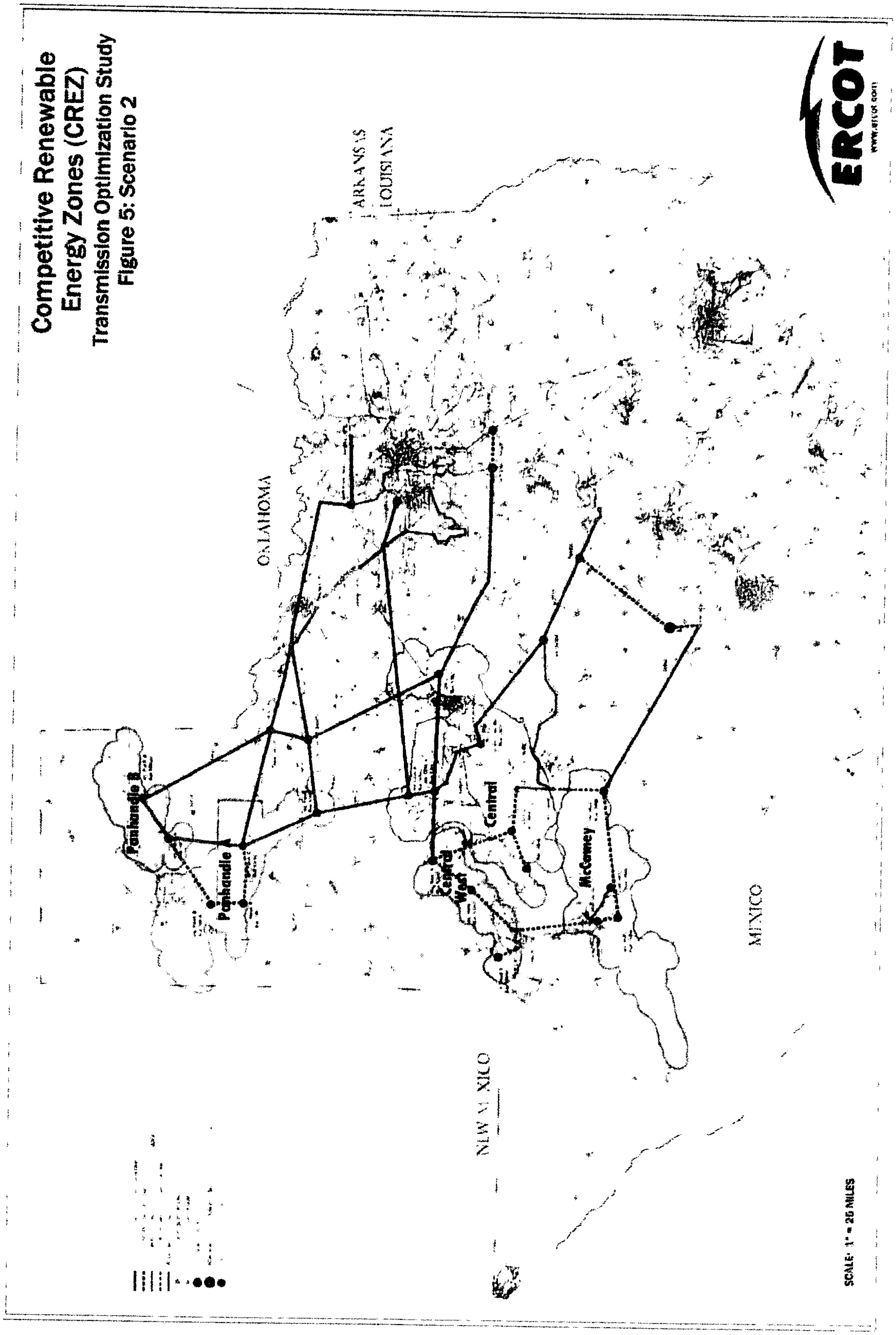
ATTACHMENT D

Exhibit RS-1: The Central CREZ



DOCKET NO. 33672

ATTACHMENT E


Competitive Renewable
Energy Zones (CREZ)
Transmission Optimization Study
Figure 5: Scenario 2
ARKANSAS
LOUISIANA
OKLAHOMA
Panhandle B
Panhandle A
Central
Central West
McCamey
MEXICO
NEW MEXICO
SCALE: 1" = 25 MILES
ERCOT
www.ercot.com