

The Competitive Renewable Energy Zones Process

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The ERCOT Region



Regional Import Capacity: 1,256 MW of Asynchronous Tie Capacity (820 MW with Eastern Interconnection)



Competitive Renewable Energy Zones

In 2005, the Texas Legislature passed SB 20, instructing the Public Utility Commission of Texas (PUCT) to designate transmission for Competitive Renewable Energy Zones (CREZs)





- The PUCT established contestedcase docket 33672 in January, 2007
- Parties nominated CREZs and demonstrated financial commitment
- Transmission service providers
 proposed transmission solutions
- First Hearing held in June 2007



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Designated Zones and Scenario Wind Levels



CREZ Ruling – 2,376 Miles of New ROW



Zone	New Wind Capacity (MW)
Panhandle A	3,200
Panhandle B	2,400
Central	3,000
Central West	1,100
McCamey	1,900

Red lines are new 345-kV double circuit ROW

Dotted red lines are new 345-kV single circuit ROW

Planning cost estimate: \$4.9 B (based on straight-line routing)

Plan development details available at: http://www.ercot.com/content/news/ presentations/2008/ ERCOT_Website_Posting.zip



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Next Step - Selecting Transmission Providers



assigned the proposed **CREZ** circuits to a set of incumbent and new entrant transmission service providers.

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The Hard Part: ROW Permitting and Construction



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CREZ Transmission Update – January 30, 2014

- As of January 30, 2014, the CREZ transmission projects were complete.
- The transmission plan is designed to serve approximately 18.5 GW:
 - ~3600 right-of-way miles of 345 kV
 - \$6.9 billion project cost
- Lines are open-٠ access; use not limited to wind

Gray Alibates 345 KV SUBSTATION / LINE Windmill 138 KV SUBSTATION / LINE Tule Canyon Tesla Ogallala CTT Jim Treece Rilev Edith Clarke Bowman Cottonwood Gauss Jacksboro W.Krum Anna W.Denton Clearcrossing Rocky Mound Henderson WillowCk Lewisville Carrolton Hicks Parker Dermott Everman East Kirchhef WShack Faraday Scurry Long Draw Tonkawas Romny Grelton. Sweetwater East Comanche Peak Navarro Central Bluff **Bluff** Creek Ector North Koppril Sam Switch Sand Bluff LDivide Odessa Moss Bearkat Brown Twin Butte NMcCAMEY Killeen Big Hill Tippet Salado Bakersfield Orsted Edison Kendal

Project details available at: http://www.texascrezprojects.com/guarterly reports.aspx



The Impact of CREZ on Wind Generation Development in ERCOT



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Why Has CREZ Been a Success

- The ERCOT region has both world-class wind resources and large population (load) centers
- There are few barriers to land development in west Texas
- The CREZ project combined economic development, development of in-state energy resources, and development of green energy
- Cost allocation formulas are settled
- The overall risk of the project was controlled by taking small steps, and by maintaining the ability to change course if needed
- The regulatory processes and technical planning analyses moved forward in tandem
- Wind integration is facilitated in ERCOT by a large fleet of flexible natural gas, combined-cycle generation, and by system-wide dispatch at 5-minute intervals
- The geographic scope of the ERCOT system lends itself well to regional planning



Takeaway Thoughts

- Infrastructure development can have unforeseen benefits
 - Some CREZ circuits are also being used to connect new shalegas load to the ERCOT system.
- The challenge of integrating new technologies continues
 - CREZ planning and development has required several industryleading technical studies
 - Reactive device plan optimization
 - Sub-synchronous interactions
 - Stability impacts of regions with high wind penetration and reduced system strength
 - Continued development and validation of models that accurately represent the behavior of power-electronics-based generation resources is essential
 - The changing nature of the resource fleet is affecting other areas of planning



Questions?







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