System Planning Report

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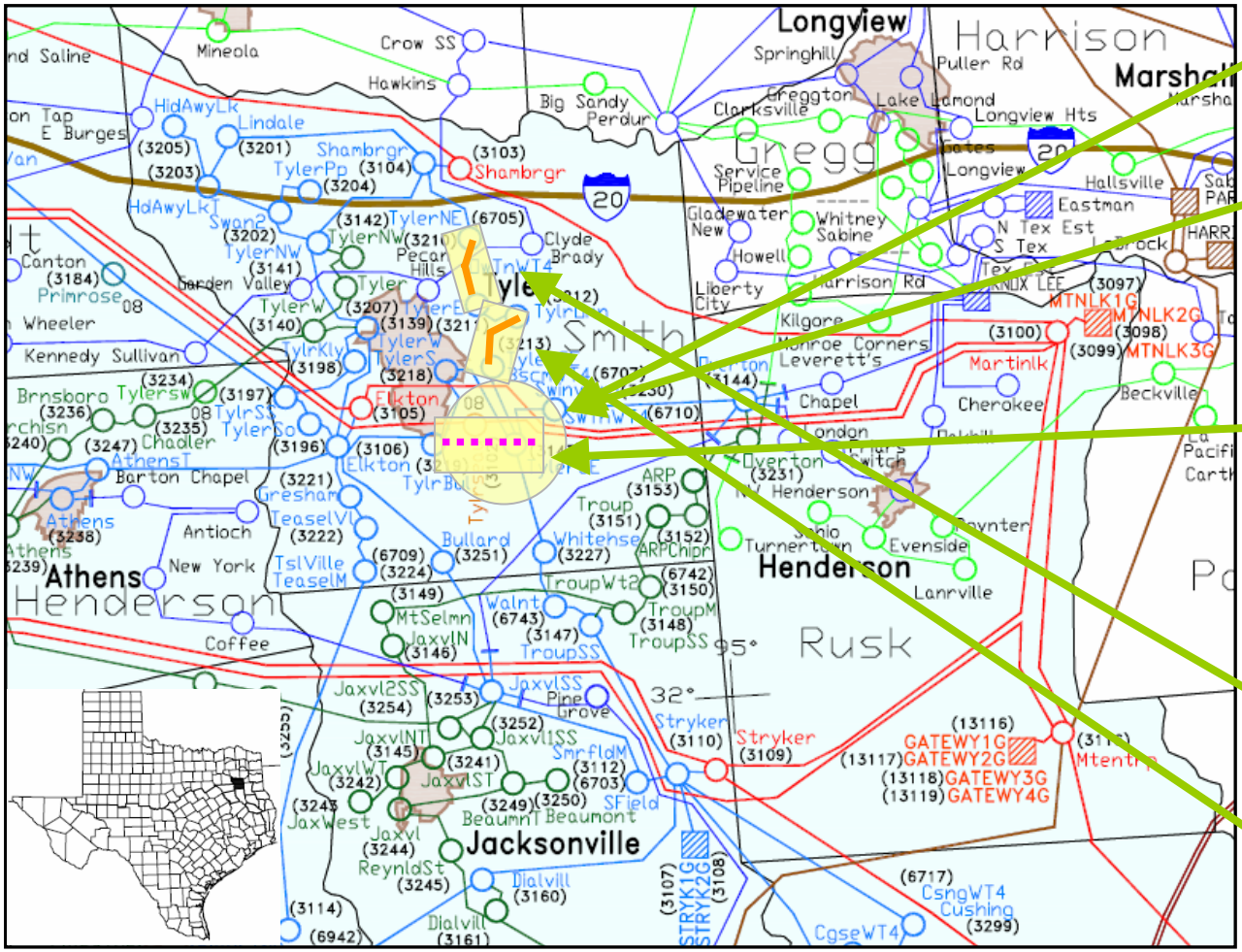
Planning Activities - Summary

- ERCOT is currently tracking 233 active generation interconnection requests totaling over 103,000 MW. This includes almost 46,000 MW of wind generation
- New Interconnect Agreements signed in February:
  - Sherbino Mesa Wind Farm (06INR0012) for 300 MW in Pecos County
  - Coyote Run Wind Farm (07INR0036) for 184 MW in Borden County
- Regional Planning Group is currently reviewing proposed transmission improvements with a total cost of $180 million
- Final Wind Impact Study presented to the ROS Wind Impact Task Force on Feb. 27 (discussed further in this report)
- CREZ Transmission Optimization (CTO) study is under way (discussed further in this report)

Tyler Grande Project

Description of Recommendation



- Use a spare 345/138 kV auto at the Tyler Grande Switching Station (Southeast)
  Cost: $3,665,000
- Install 4-ohm 138 kV switchable series reactors on the Tyler Grande autotransformer
  Cost: $1,500,000
- Rebuild the Tyler Grande – Tyler South 138 kV line so that the Rate B is 326 MVA. The circuit will be rebuilt for double circuit operation with one circuit being the circuit from Tyler Grande – Tyler Elkton and the other circuit being a radial feed to Tyler South.
  Cost: $2,750,000
- Upgrade the Tyler Northeast – Tyler East 138 kV line so that the Rate B is 326 MVA
  Cost: $1,900,000
- Upgrade the Tyler GE – Tyler Omen Road 138 kV line so that the Rate B is 326 MVA
  Cost: $1,300,000
- **TOTAL COST: $11,115,000**

Stakeholder Review

- The Stakeholder review period for this project was held in September 2007
- There were no dissenting comments on this package and Oncor & Luminant resolved all questions
- Scheduled in-service prior to Summer 2009

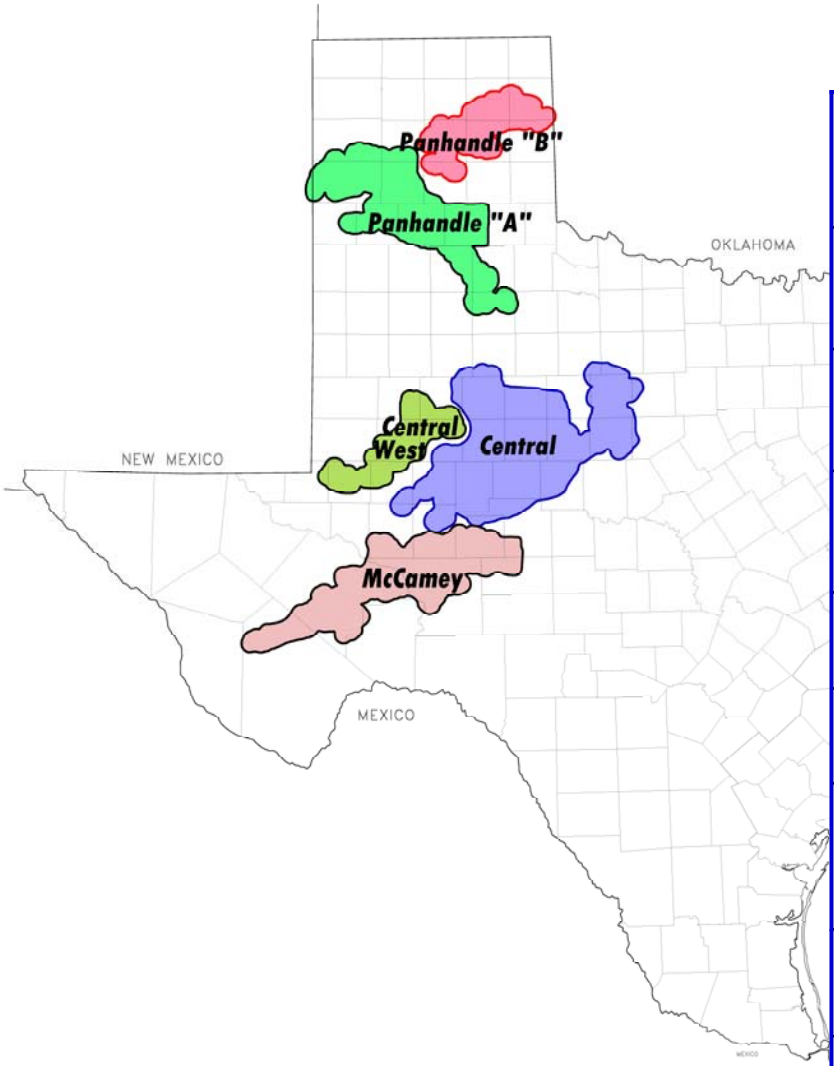
- **Reliability Justified Projects** – lowest cost solution to alleviate unserved energy caused by overloads on two 138 kV lines and the Elkton 345/138 kV autotransformer
  - Addition of the 345/138 kV autotransformer using a spare 493 MVA autotransformer
  - Rebuild of the Tyler Grande – Tyler South 138 kV line so that the Rate B is 326 MVA
- **Economically Justified Projects** – expected production cost savings over 2009-2012 period of ~$38 million for capital cost of $4.7 million
  - Upgrade the Tyler Northeast to Tyler East 138 kV line so that the Rate B is 326 MVA
  - Upgrade the Tyler GE to Tyler Omen Road 138 kV line so that the Rate B is 326 MVA
  - Addition of the 138 kV series reactors on the Tyler Grande autotransformer

ERCOT Support for the Project

- ERCOT recommends that the project be endorsed by the ERCOT Board Of Directors.

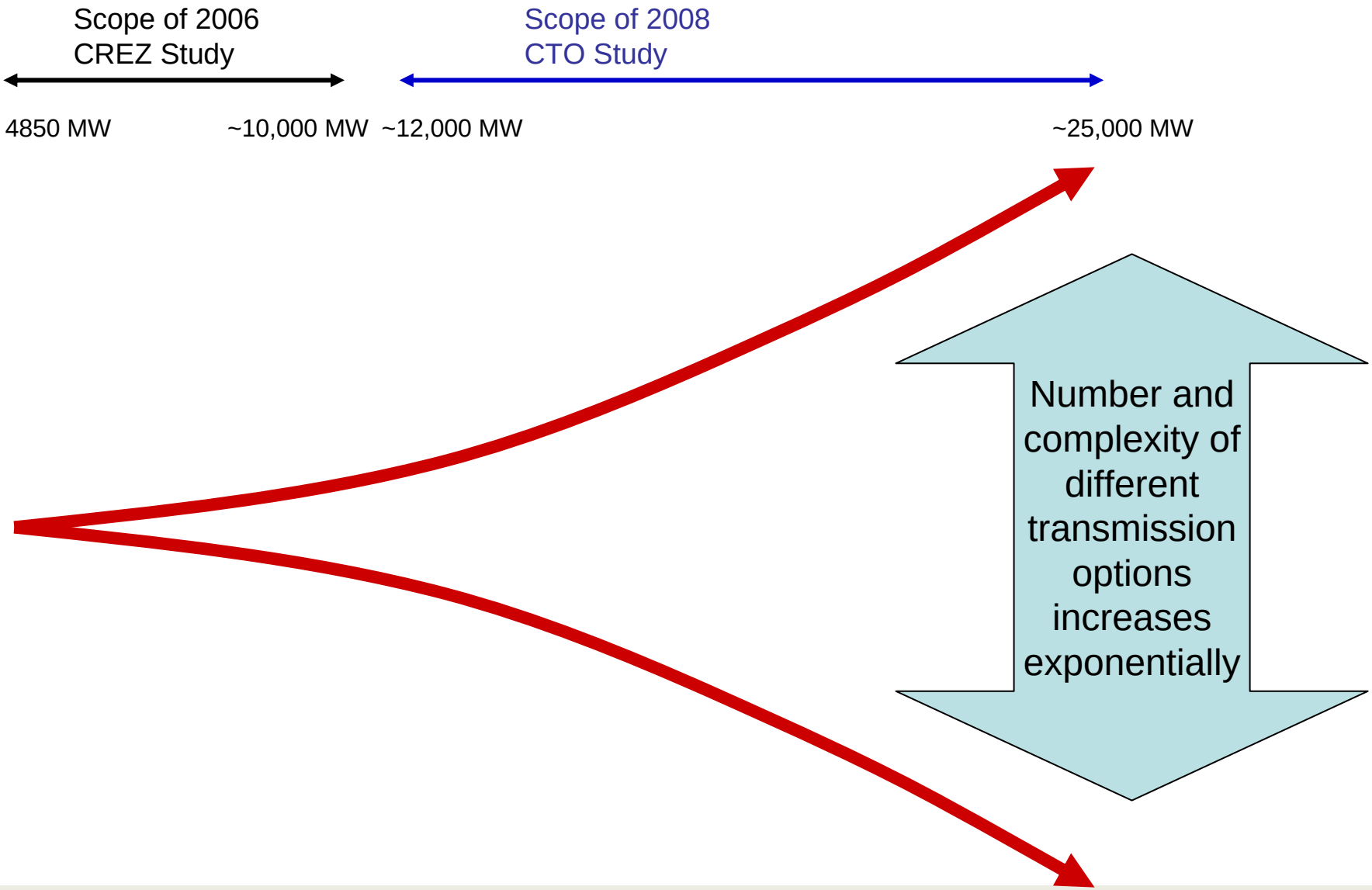
Competitive Renewable Energy Zone (CREZ) Transmission Optimization Study Update

Designated Zones and Scenario Wind Levels



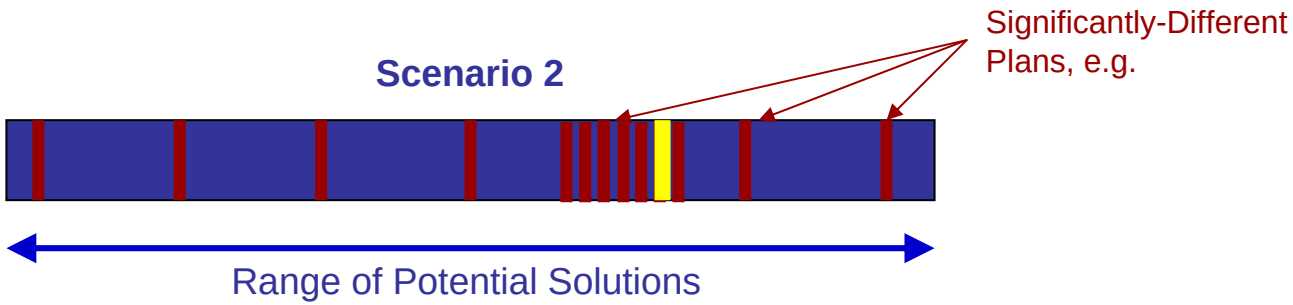
Capacity of New CREZ Wind by Scenario (MW)				
Wind Zone	**Scen. 1**	**Scen. 2**	**Scen. 3**	**Scen. 4**
Panhandle A	**1,422**	**3,191**	**4,960**	**6,660**
Panhandle B	**1,067**	**2,393**	**3,720**	**0**
McCamey	**829**	**1,859**	**2,890**	**3,190**
Central	**1,358**	**3,047**	**4,735**	**5,615**
Central West	**474**	**1,063**	**1,651**	**2,051**
Total*	**12,053**	**18,456**	**24,859**	**24,419**
* Assumes 6,903 MW of existing wind capacity				

Scope of Study



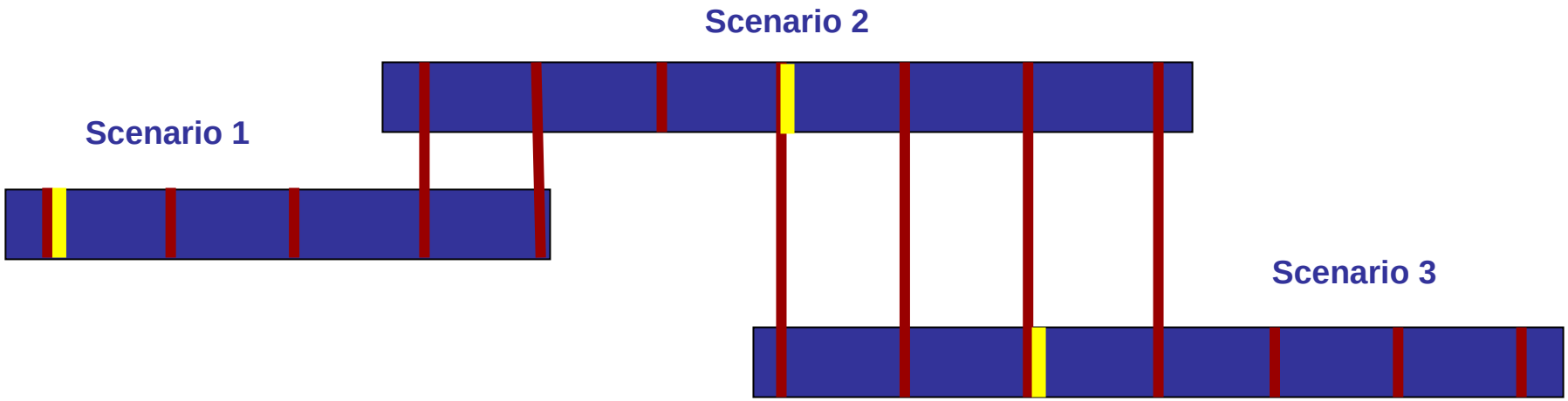
Study Approach

- Develop a number of significantly different core concepts and test their performance
- Variations on the concepts with best performance will be developed and tested
- The best performing plan will be selected for the scenario



Study Approach

- May use the same core concepts as bases for significantly different plans in different scenarios



- But a different core concept may provide the basis for the preferred plan for a different scenario

Staging and Expansion

- **Will develop a preferred plan that is optimized for each of the four scenarios**
- **Will provide expansion path of what elements in each of these plans should be built first if that Scenario is selected (except for Scenario 1)**
  - Use lower scenarios as basis
- **Will develop an expansion path from the preferred plan for the lower scenarios, so as to allow for consideration of future expandability of those plans**
  - Using next higher scenario as basis

Staging and Expandability

Current Status of CREZ Transmission Optimization Study

- **To be updated**

Wind Ancillary Services Study

- **Performed by General Electric consulting group with input from ERCOT Staff and a task force of stakeholders from the Reliability and Operations Subcommittee (ROS)**
- **Studied need for additional or modified ancillary services to meet reliability requirements, based on:**
  - 2008 load level and installed thermal generation
  - Four scenarios of installed wind generation, distributed among potential CREZ areas
    - 5,000 MW; 10,000 MW; 10,000 MW with different geographic distribution; and 15,000 MW
  - Used actual 2006 load pattern and used 2006 weather patterns to drive simulation of wind generation that would occur if these amounts of wind generation were installed

A/S Study Findings - Regulation

- **Need to implement state-of-the-art wind power production forecast**
  - Protects against under-commitment due to predictable changes in wind (reliability issue)
  - Protects against over-commitment (economic issue)
  - Acceleration of nodal project on wind forecasting
- **Present ERCOT methodology for determining regulation requirement remains effective if adjusted for increasing installed wind capacity (increase is linear)**
- **Regulation requirements (average, annual) increase linearly with increase in installed wind generation, up to 20-23% for 15,000MW**
  - Requirements vary by season and time of day

Additional A/S Study Findings

- **Daily swings in net load (load-wind) increase significantly with increasing wind**
- **Occasional down regulation exhaustion may occur with base load generation at bottom and all cycling units offline for >5000MW of wind generation**
  - Several alternatives to resolve this issue, including wind curtailment
  - Added volatility will demand faster response from offline units (i.e. startup) and more ramping capability in non-wind generation
- **Extreme wind power increases and decreases will occur infrequently (up to 20% within 30 mins), but are predictable with wind forecast**
  - Increase responsive and/or non-spin reserves during these periods
- **Localized convective events are less predictable; large concentrations of wind increases vulnerability but CREZ geographic diversity helps**

Questions?