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## **Overview of Energy Storage in ERCOT**

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# Contents

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## 1. ERCOT Overview

- Historical and Future Generation Mix
- Existing and Planned Energy Storage Resources (ESRs)
  - Batteries, CAES, Turbine Inlet Cooling with Thermal Storage, Pumped Hydro, Electric Vehicles, Residential Thermal Storage, Flywheels

## 2. Historical Load and Price Information (relevant to storage)

## 3. Current Market Design Issues

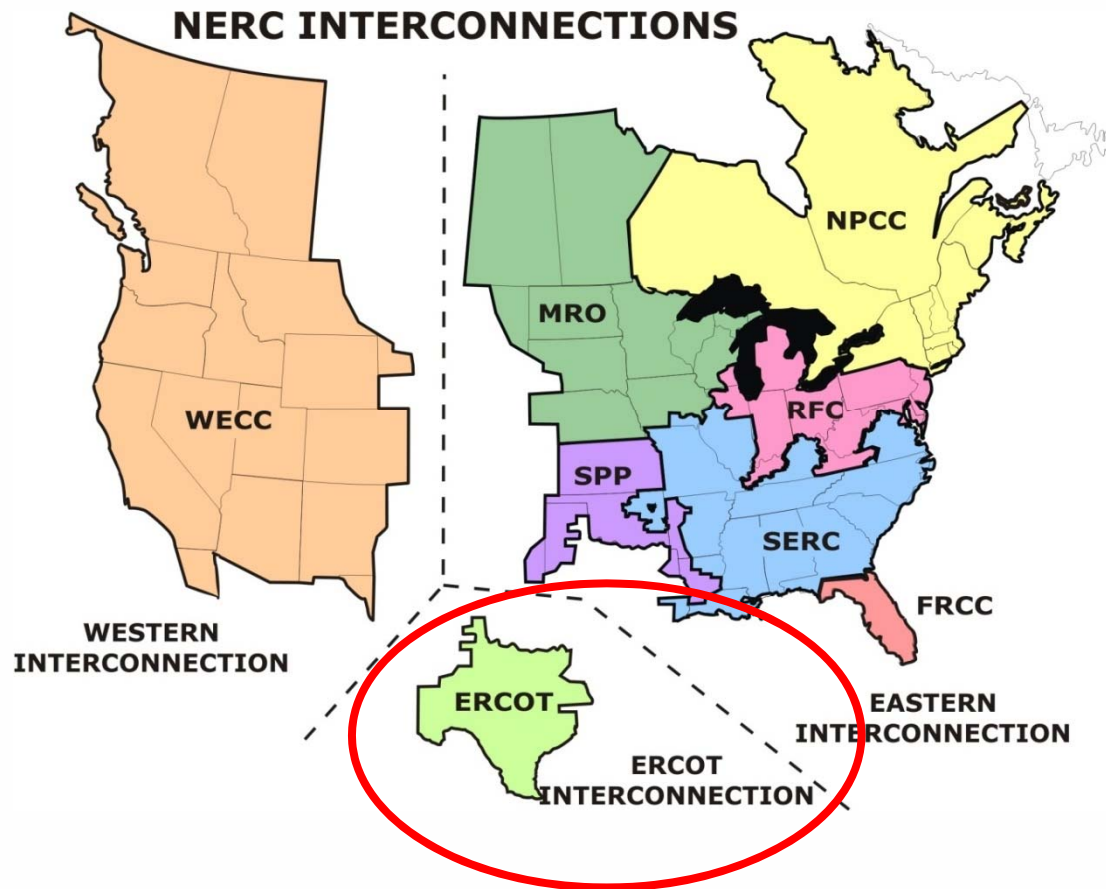
- Pricing and Settlement of Wholesale Storage Load (definition of ESR and eligibility for WSL treatment) [NPRR 461]
- State of Charge – who should maintain? (ERCOT RTC/RTD Proposal)
- Various Caps for Energy Storage Resources
- November 2014 white paper: The Value of Distributed Electricity Storage in Texas

## 4. Overview of Fast Responding Regulation Service (FRRS)

## 5. Future Ancillary Services



# North American Bulk Power Grids



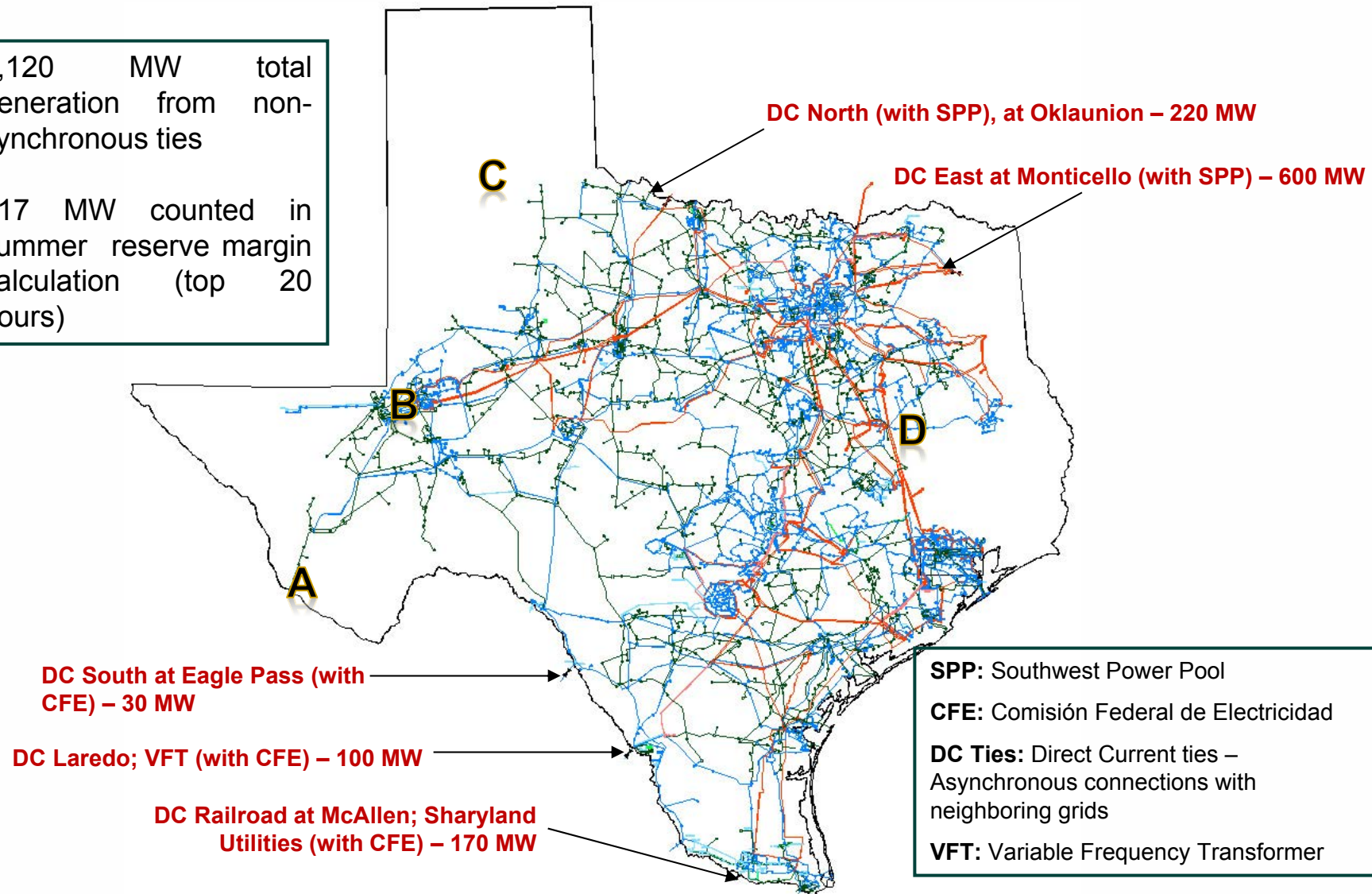
*ERCOT connections to other grids are limited to direct current (DC) ties, which allow control over flow of electricity*

- The ERCOT Region is one of 3 grid interconnections in USA-Canada
- The ERCOT grid:
  - Covers 75% of Texas land
  - Serves 90% of Texas load
  - >40,000 miles of transmission lines
  - >550 generation units
  - Physical assets are owned by transmission providers and generators, including municipal utilities and cooperatives

# DC-Ties

1,120 MW total generation from non-synchronous ties

517 MW counted in summer reserve margin calculation (top 20 hours)



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[Energy Storage: Where Are We Now?](#)

First appeared as part of the conference materials for the  
2015 Renewable Energy Law session

"Energy Storage: Where Are We Now?"