



# **ERCOT Overview (Emphasis on Real-Time Market and RT Operations) for Austin Electric Utility Commission**

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**Kenneth Ragsdale  
Principal, Market Design  
ERCOT**

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  - TSA (Transmission Security Analysis)
  - SCED (Security Constrained Economic Dispatch) [5 minute]
  - LFC (Load Frequency Control) [4 seconds]
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# ERCOT Region Quick Facts

**75% of Texas land area**  
**200,000 square miles**

**85% of Texas load**

**68,379 MW peak demand**  
**Set Aug. 3, 2011**

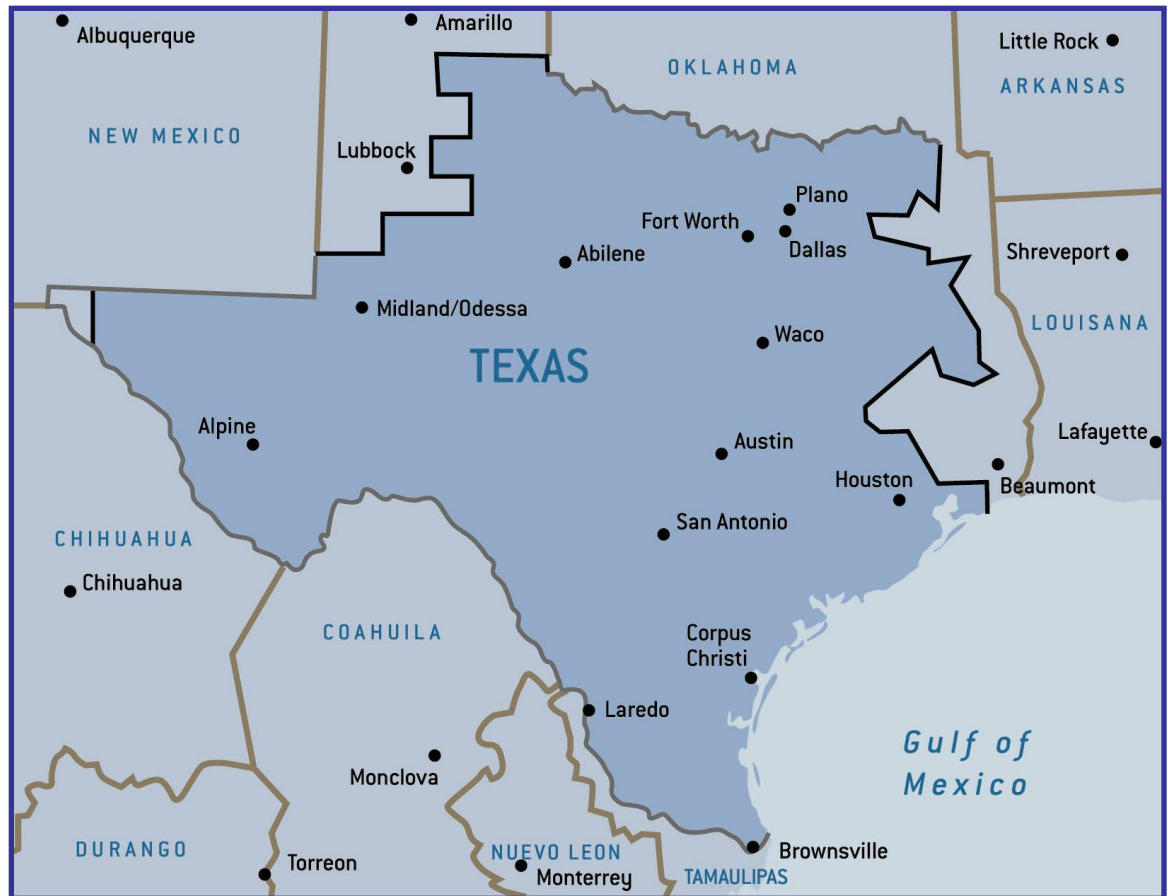
**335 billion kilowatt-hours**  
**energy produced, 2011**

**\$34 billion market**

**23 million Texans served**  
**6.7 million premises in**  
**competitive choice areas**  
**(73 % of load)**

## **ERCOT does not include:**

- El Paso area
- Texas Panhandle
- Northeast Texas
  - Longview, Marshall and Texarkana
- Southeast Texas
  - Beaumont, Port Arthur, and the Woodlands

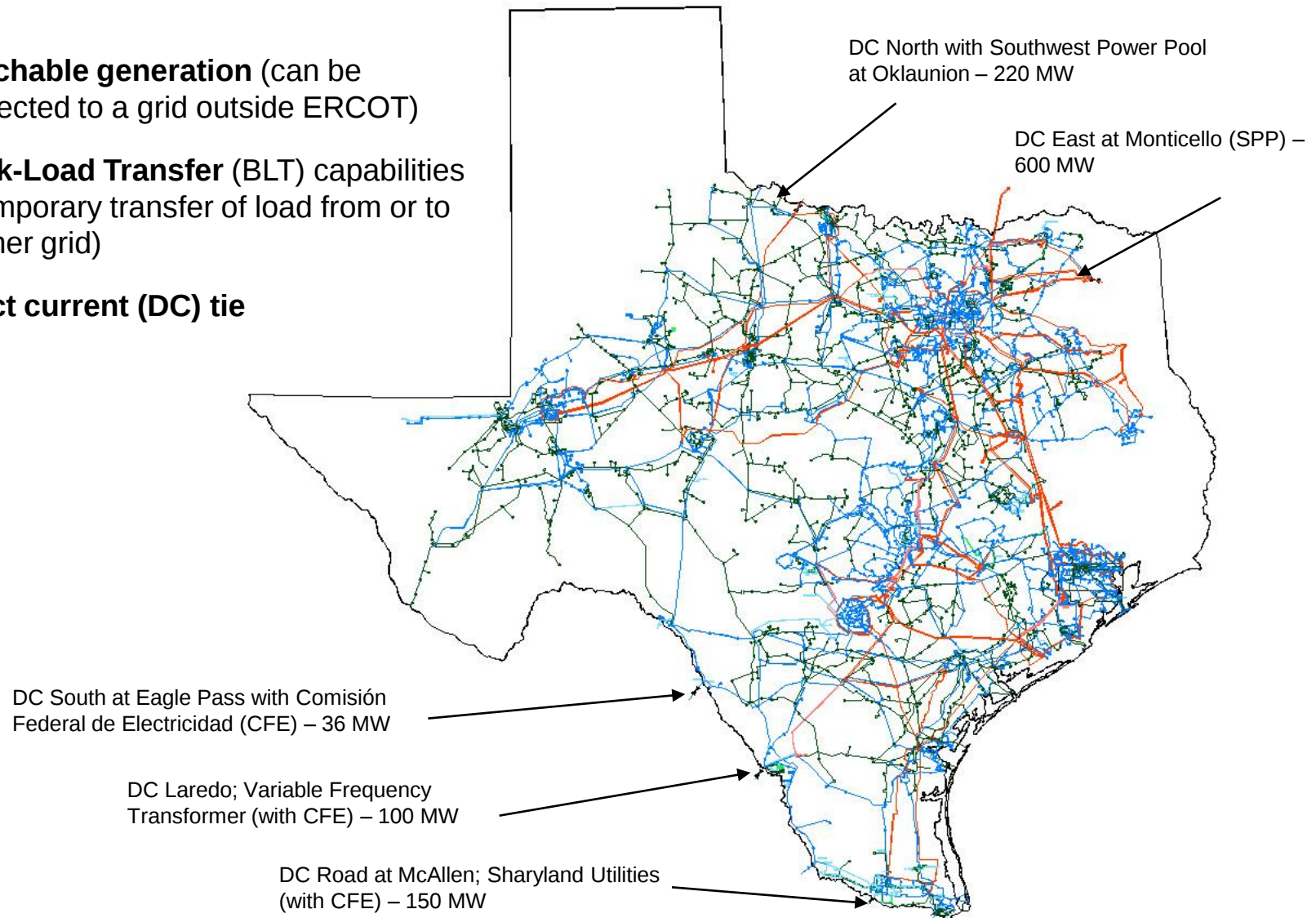


# ERCOT Grid: Connections to Neighboring Grids

**Switchable generation** (can be connected to a grid outside ERCOT)

**Block-Load Transfer (BLT)** capabilities (a temporary transfer of load from or to another grid)

**Direct current (DC) tie**



# ERCOT Grid Bulk Electricity Transmission Grid

~41,500 miles of high-voltage transmission lines

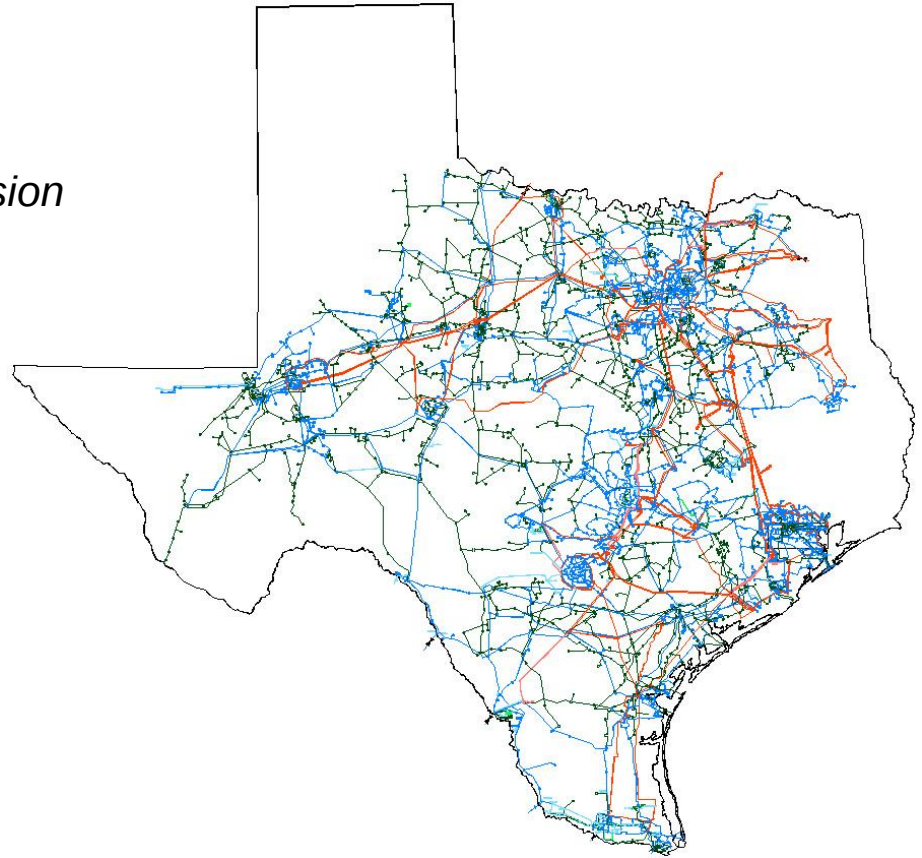
- ~9,500 miles of 345 kV

- ~20,000 miles of 138 kV

- ~12,000 miles of 69 kV

Connecting 550+ generation units

*Physical assets are owned by transmission providers and generators*



# ERCOT Records

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## Summer Peak Demand Records:

68,379 MW (August 3, 2011)

67,929 MW (August 2, 2011)

66,867 MW (August 1, 2011)

66,583 MW (June 26, 2012)

65,776 MW (August 23, 2010)

## Winter Peak Demand Records:

57,315 MW (February 10, 2011)

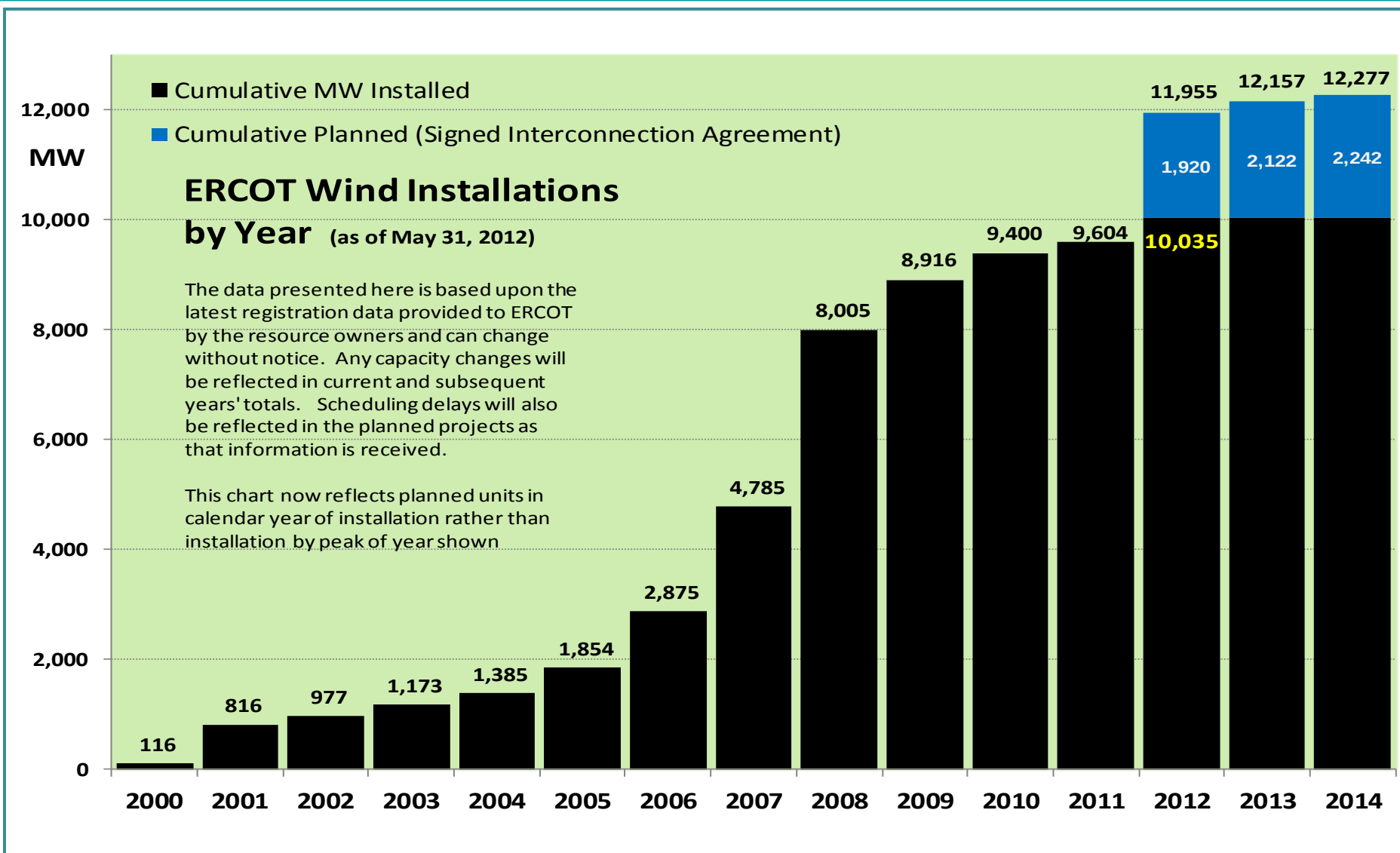
55,878 MW (2010)

## Wind Record:

A new wind record of 8,368 MW occurred on June 19, 2012 at 19:25

- Non-Coastal Wind = 7,381 MW
- Coastal Wind = 987 MW
- Wind was supplying 17.64 % of the 47,452 MW load

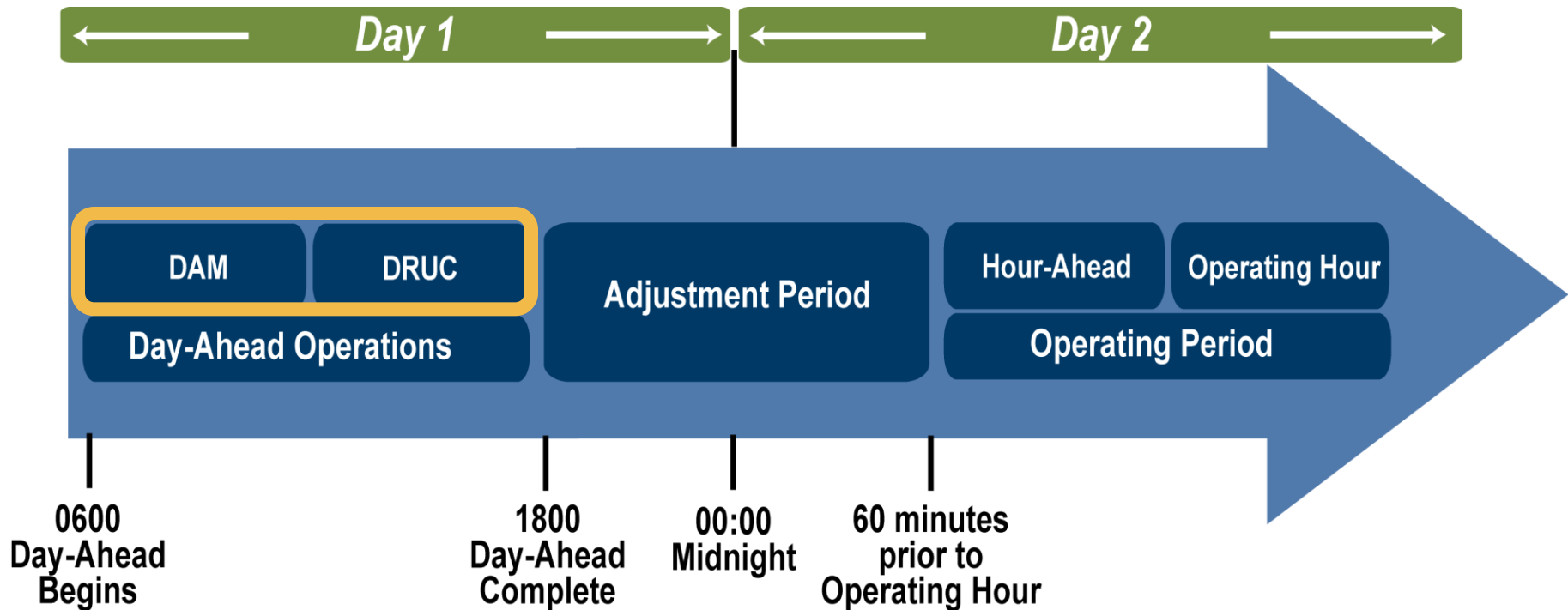
# Wind Generation (as of May 2012)



# Day-Ahead Operations

## Two Major Functions of Day-Ahead Operations

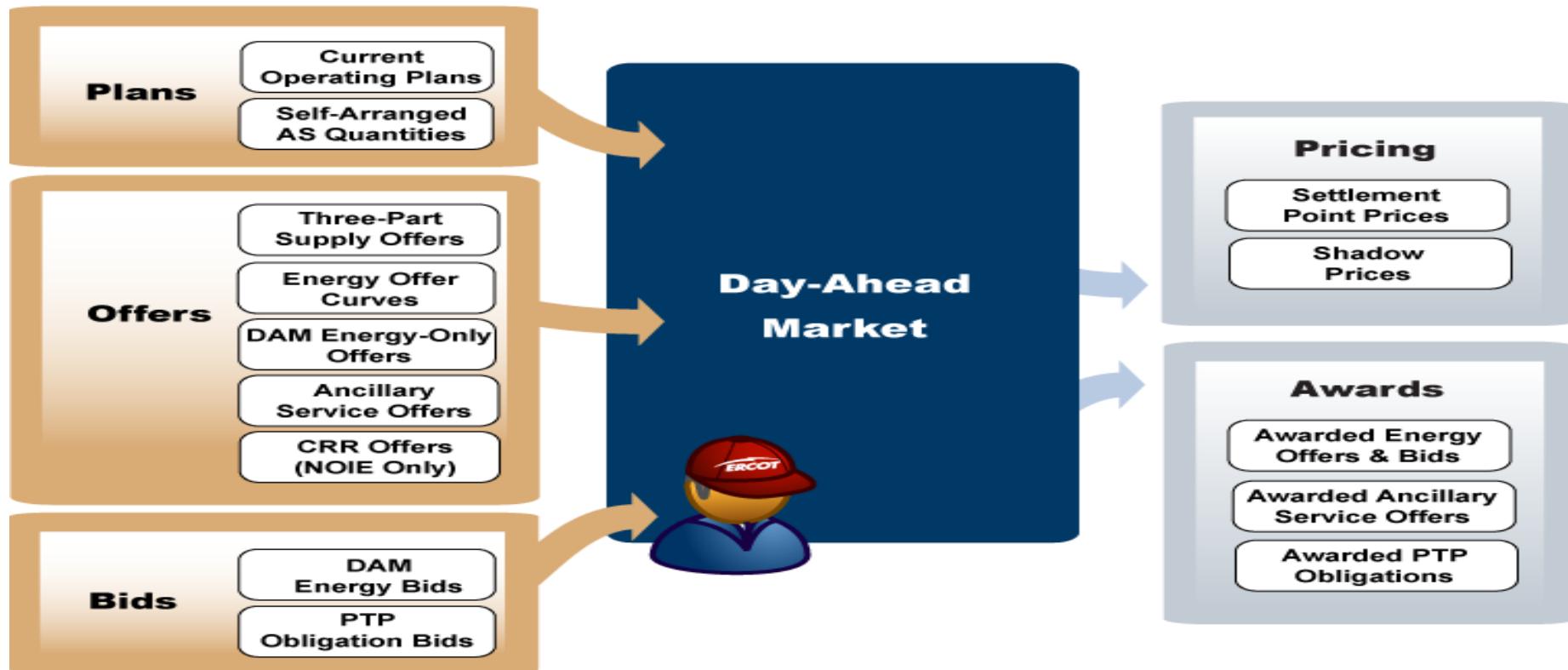
- Day-Ahead Market (DAM)
- Day-Ahead Reliability Unit Commitment (DRUC)



# Day-Ahead Market (Voluntary, Financial Market)

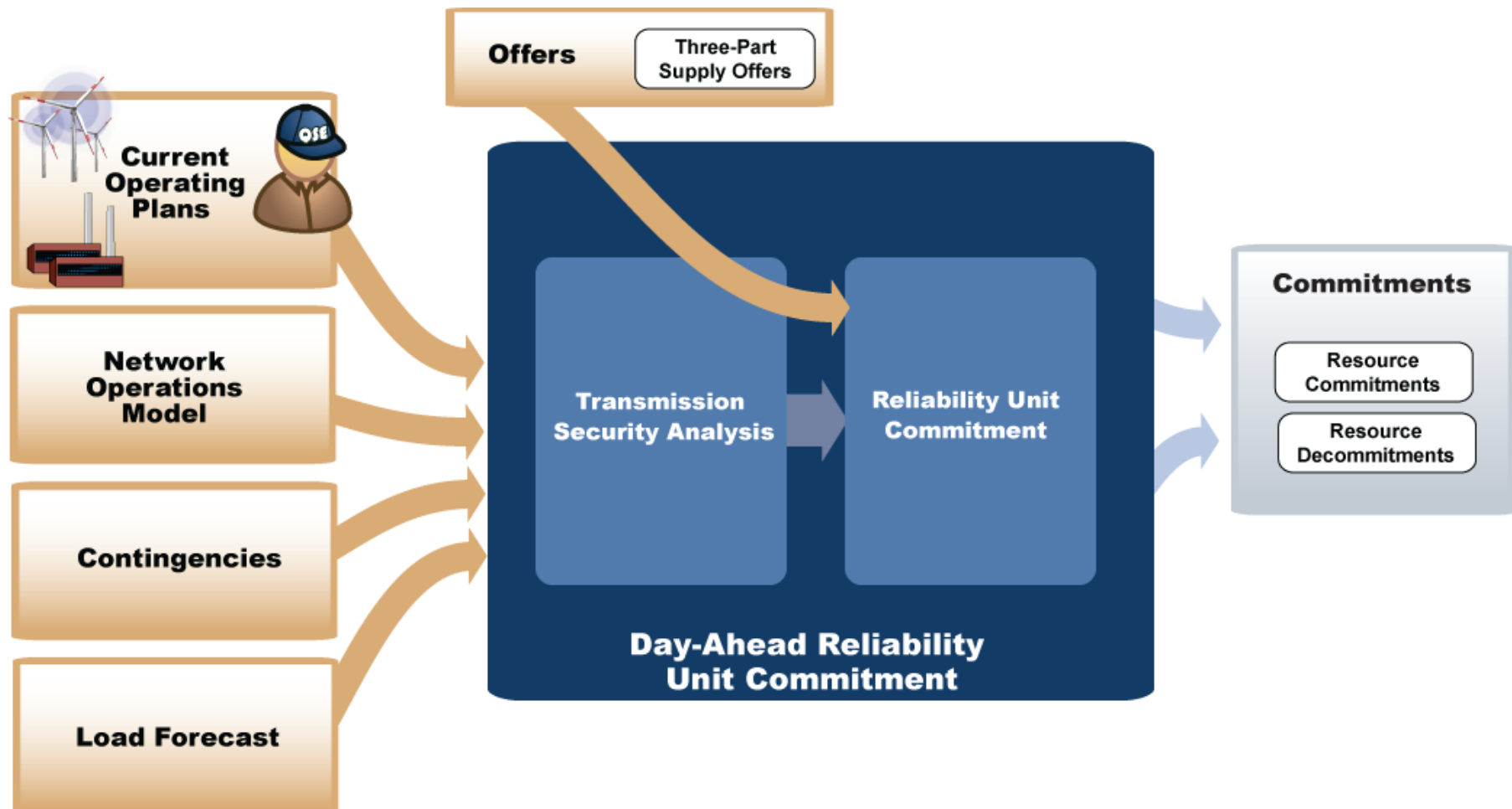
## DAM Clearing Process

- Co-optimized solution for Energy and Ancillary Services
- Simultaneously evaluates & clears bids and offers
- Covers all 24 hrs of next Operating Day



# Reliability Unit Commitment [DRUC and HRUC]

Process that ensures adequate capacity is committed to serve forecasted Load and the committed capacity is in the right location



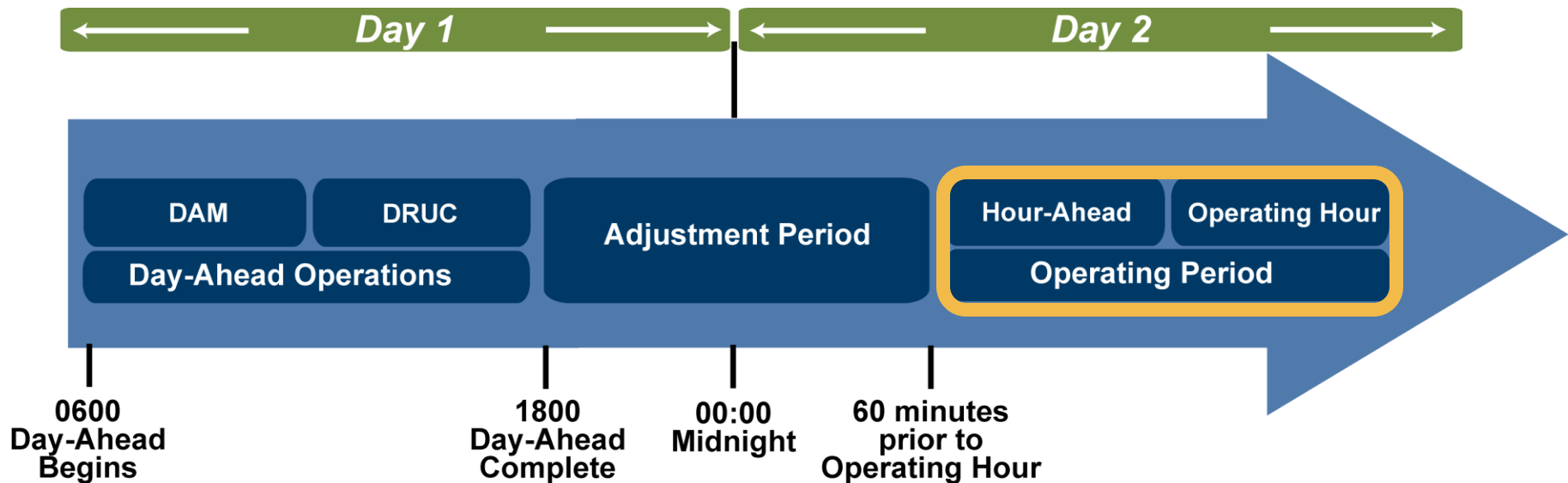
## Purpose of Real-Time Operations

- Manage reliability while operating at least cost
  - Balance Generation with system Load, while respecting constraints
  - Evaluate economics of on-line Resources
- Minimize use of Regulation Service
- Issue Dispatch Instructions and calculate prices

# Real-Time Operations Overview

## The Operating Period includes:

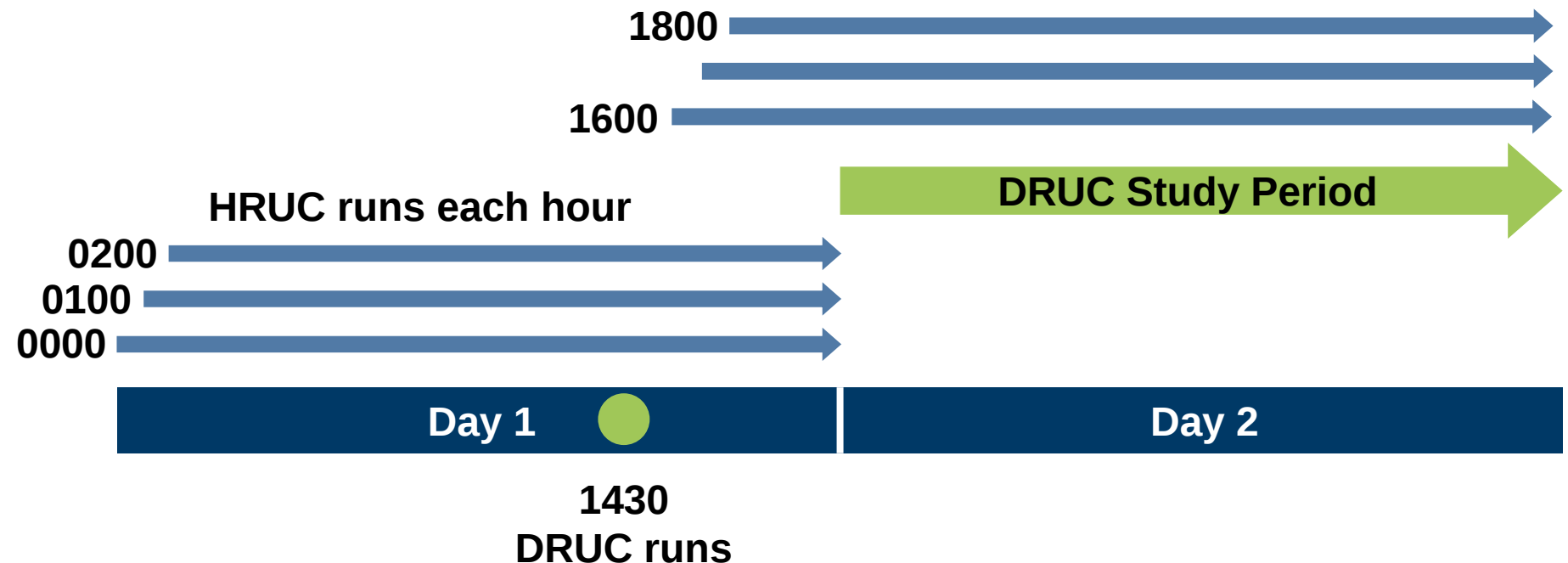
- Hour-Ahead – Hourly Reliability Unit Commitment
- Operating Hour - Real-Time dispatch of energy



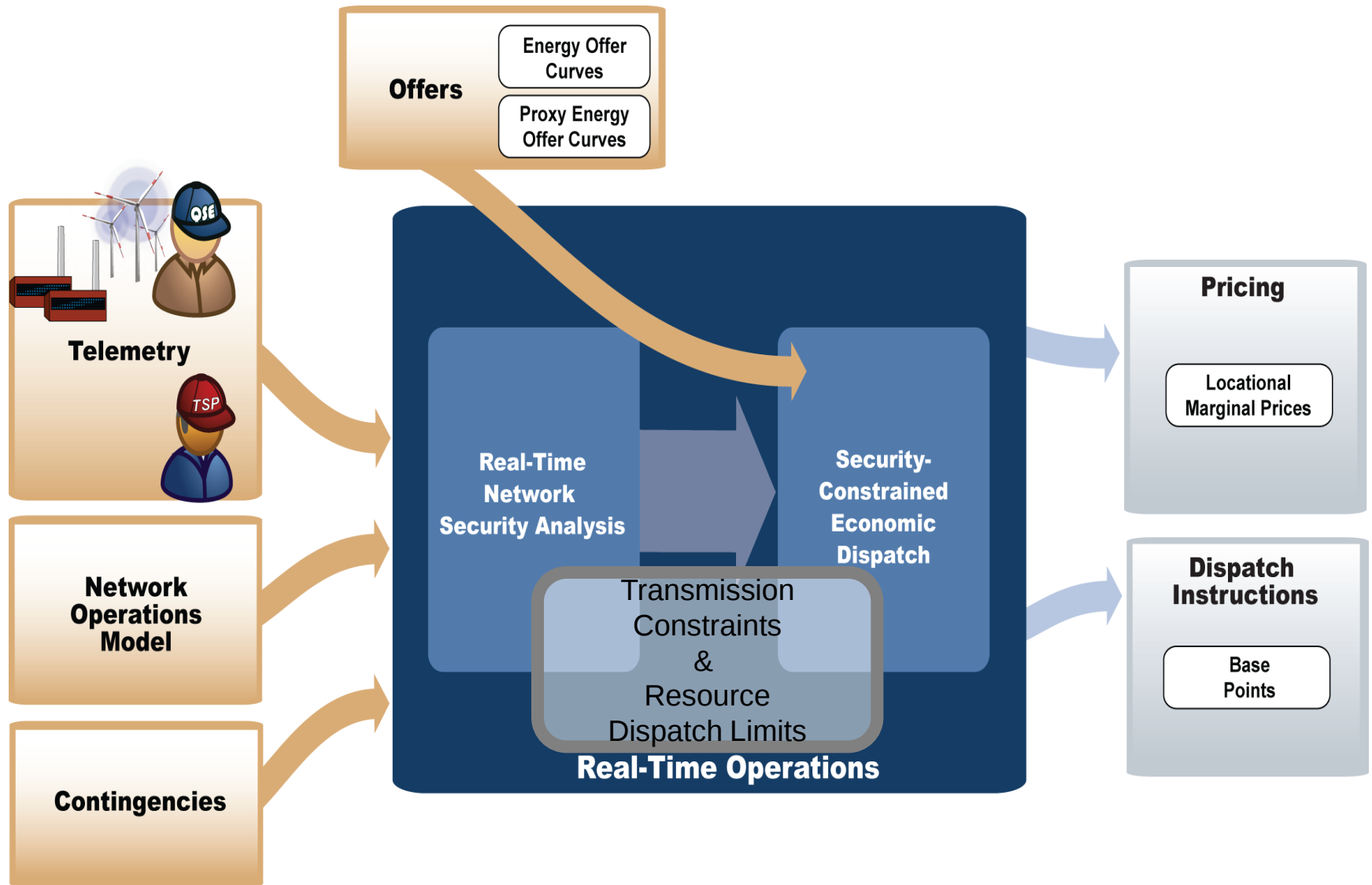
# HRUC (Hourly Reliability Unit Commitment)

## Hourly Reliability Unit Commitment (HRUC)

- Executed hourly
- Evaluates hours already considered by a DRUC

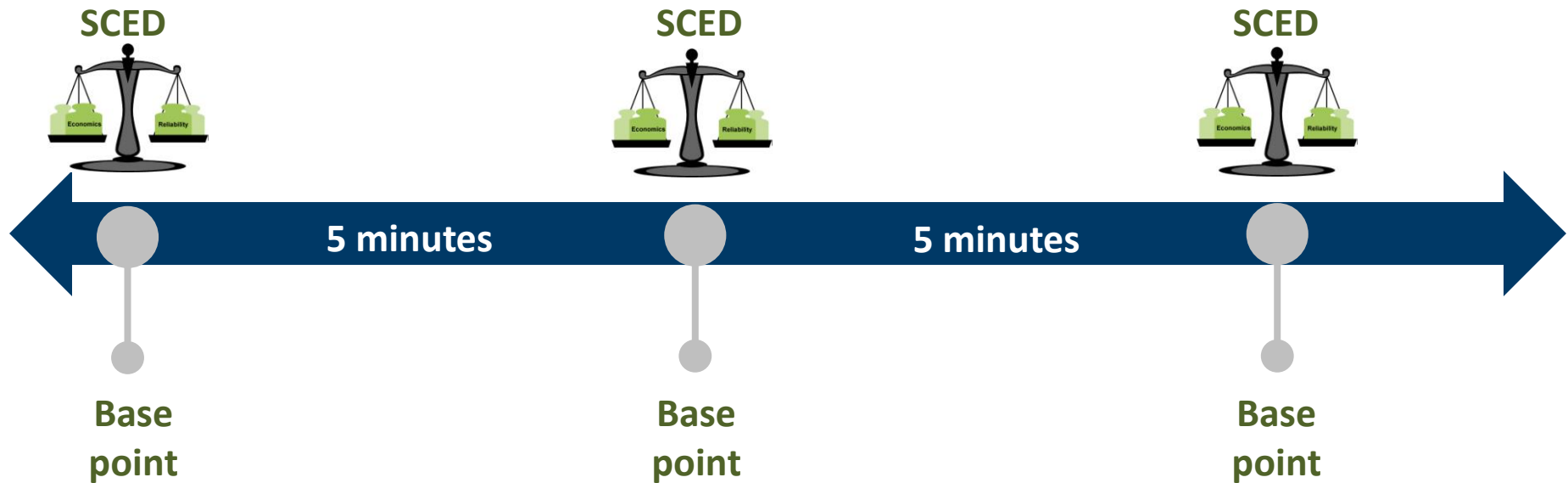


# Real-Time Operations --- SCED (at least every 5 Minutes)



## SCED Dispatch Instructions

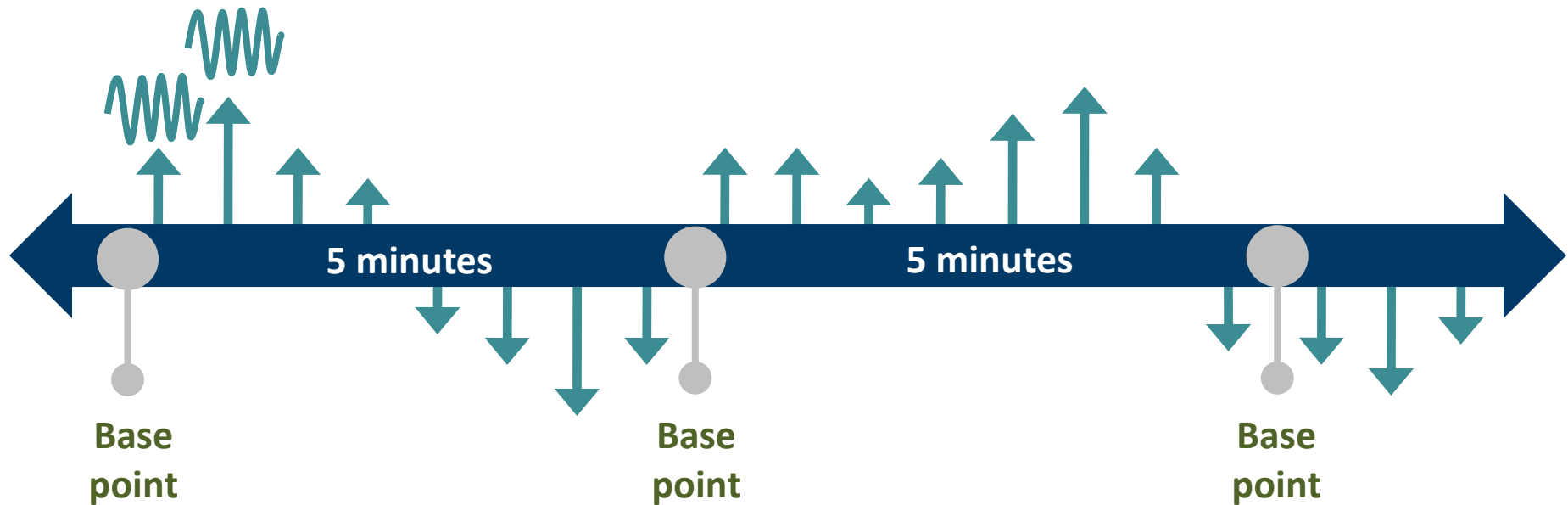
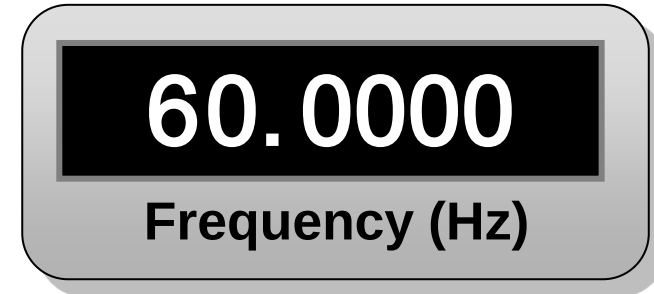
- At least every 5 minutes
- Based on economics



## LFC (every 4 seconds)

### Load Frequency Control (LFC)

- Matches generation with demand
- Responds to frequency deviations
- Deploys Regulation Reserve Service



# Enhancements Under Discussion and RT Links

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- Indicative 5 minute Prices for the next 55 minutes
- Discussion on RTC and RTD (Look-Ahead SCED)
- Fast Responding Regulation Service Pilot
- <http://www.ercot.com/content/cdr/contours/rtmLmpHg.html>
- [http://www.ercot.com/content/cdr/html/as\\_capacity\\_monitor.html](http://www.ercot.com/content/cdr/html/as_capacity_monitor.html)

# Questions?