



ERCOT MARKET

PNUCC

Larry Weis | June 2, 2017

AGENDA

- Overview
- Evolution
- ERCOT Wholesale Market/COUs Business Change
- Questions and Wrap-up

ELECTRIC RELIABILITY COUNCIL OF TEXAS (ERCOT)

- Manages the flow of power on the Texas Interconnection that supplies power to 24 million Texas customers – representing 85 percent of the state's electric load
- ERCOT Functions
 - Facilitates competitive wholesale market & transmission open access
 - Facilitates retail market for millions in competitive areas
- Texas Reliability Entity (TRE) formed for reliability and compliance
- Membership-based 501(c)(4) nonprofit corporation
 - Includes consumers, generators, power marketers, retail electric providers, IOUs and COUs

ERCOT - CONTINUED

- Rules set by Public Utility Commission of Texas (PUCT) which is controlled by the Texas Legislature
- Large, energy intensive use market - industry, weather
- Very small electric interconnection grid
- Over 71,000 MW peak, low load ~26,000 MW
- Wind over 19,000 MW connected
- Load served by wind - 50% March 31, 2016
- 2016 Fuel mix
 - Gas 44%, Coal 29%, Nuclear 12% and Wind 15%
- First ISO in the United States

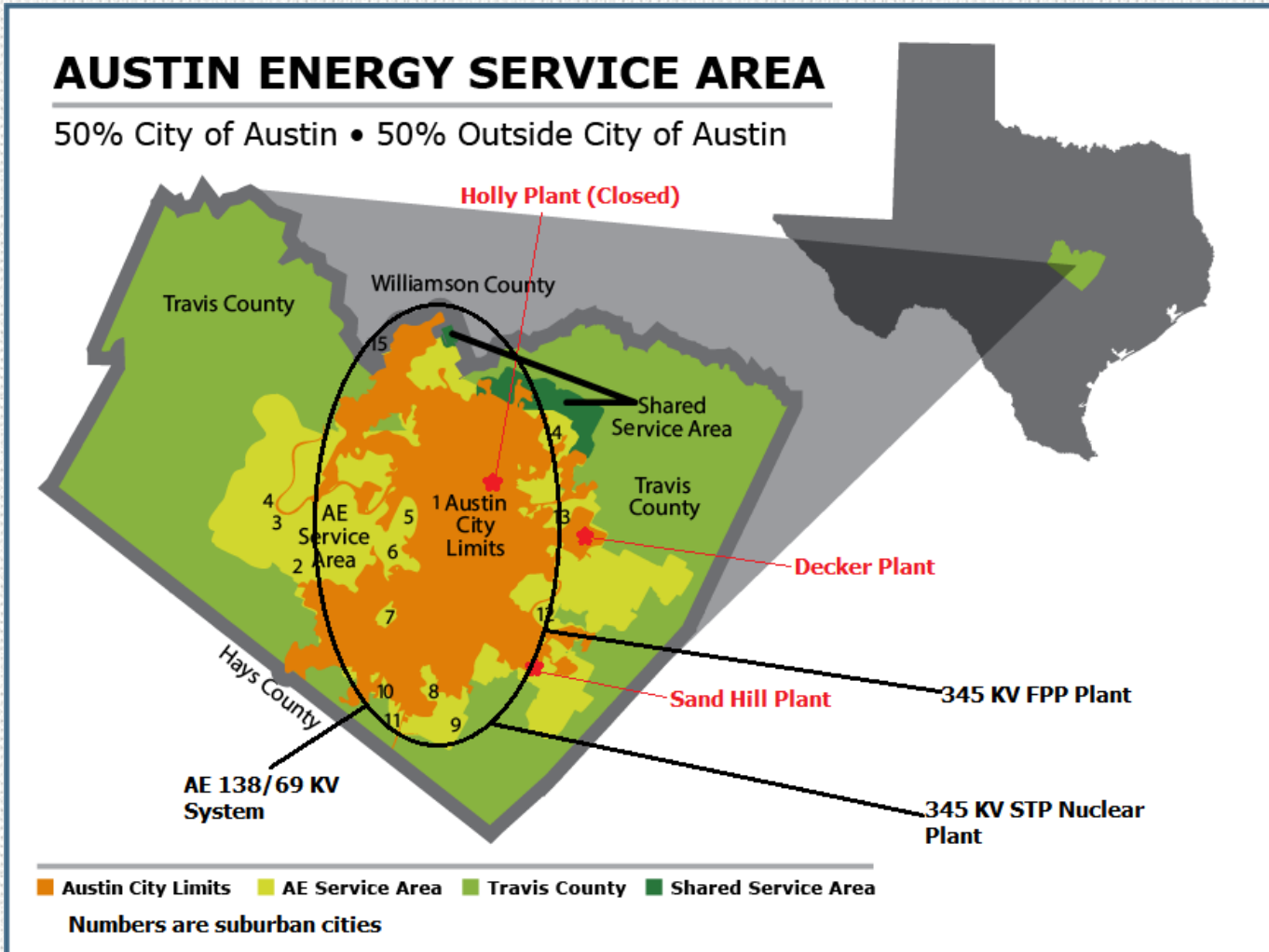
EVOLUTION

- WW II - Texas Interconnected System (TIS) formed
- ERCOT formed in 1970 to take over TIS
- 1995 - Legislature deregulated the wholesale market. The PUCT expanded ERCOT's responsibilities to enable wholesale competition and facilitate efficient use of the transmission system by all market participants.
- 1999 Legislature restructured market - merged 10 BAs
 - IOUs divest generation
 - Created retail customer choice
 - Created some protection for POUs - retail opt-in, grandfathered congestion rights & protection of competitive information

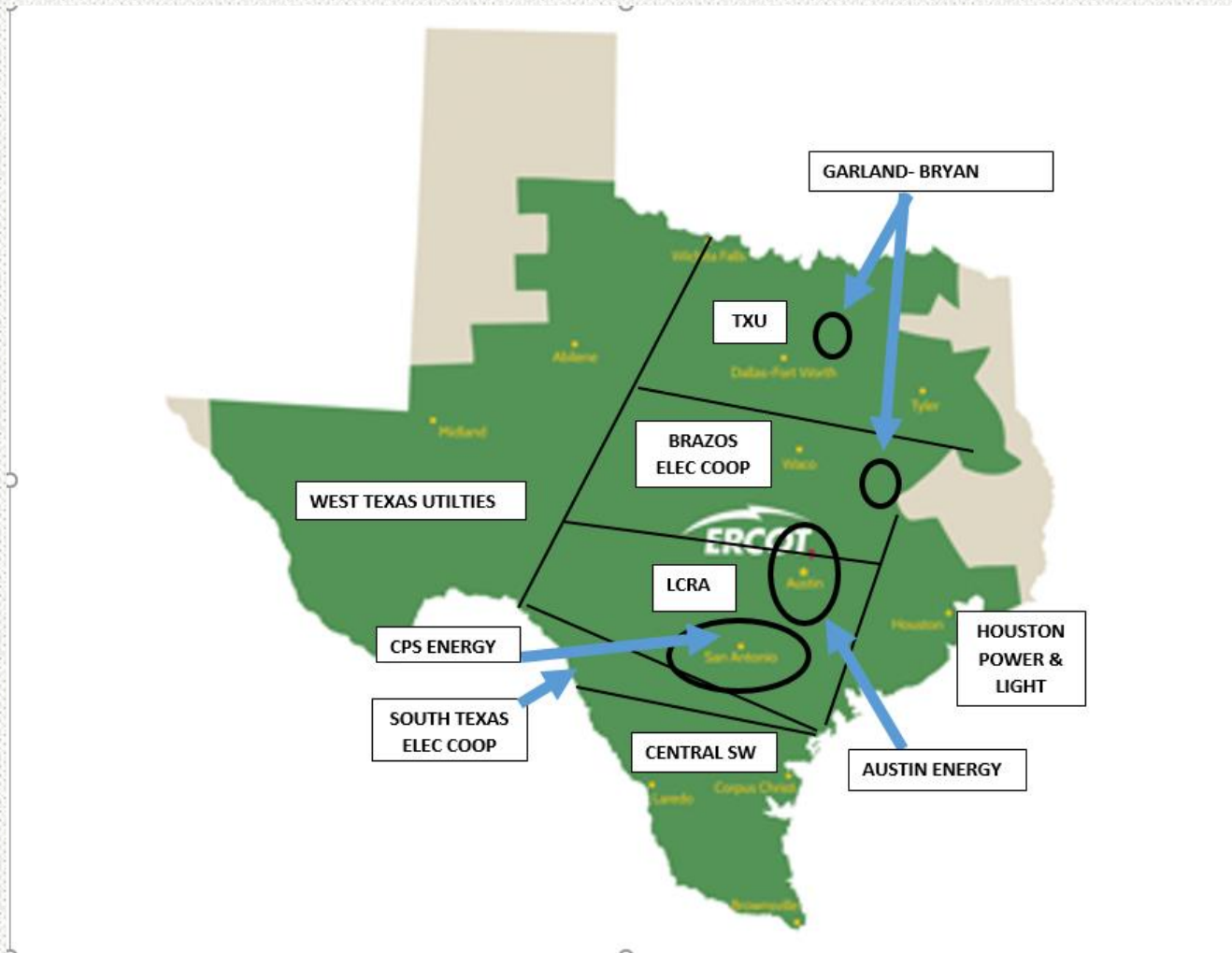
ERCOT REGION



AUSTIN ENERGY SYSTEM SCHEMATIC



ERCOT BALANCING AREAS- 1970 TO 2000



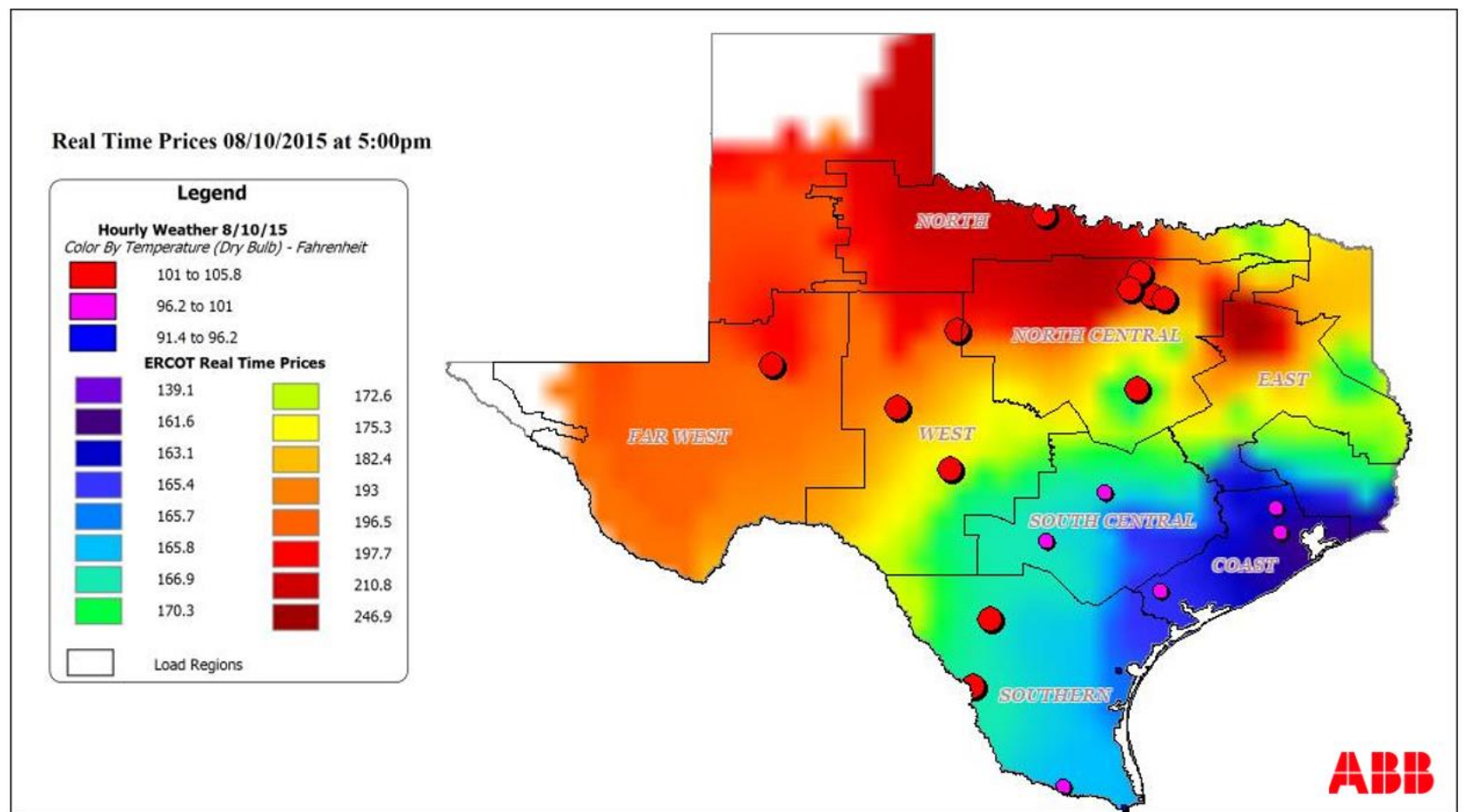
ERCOT ZONAL MAP - 2001 TO 2010



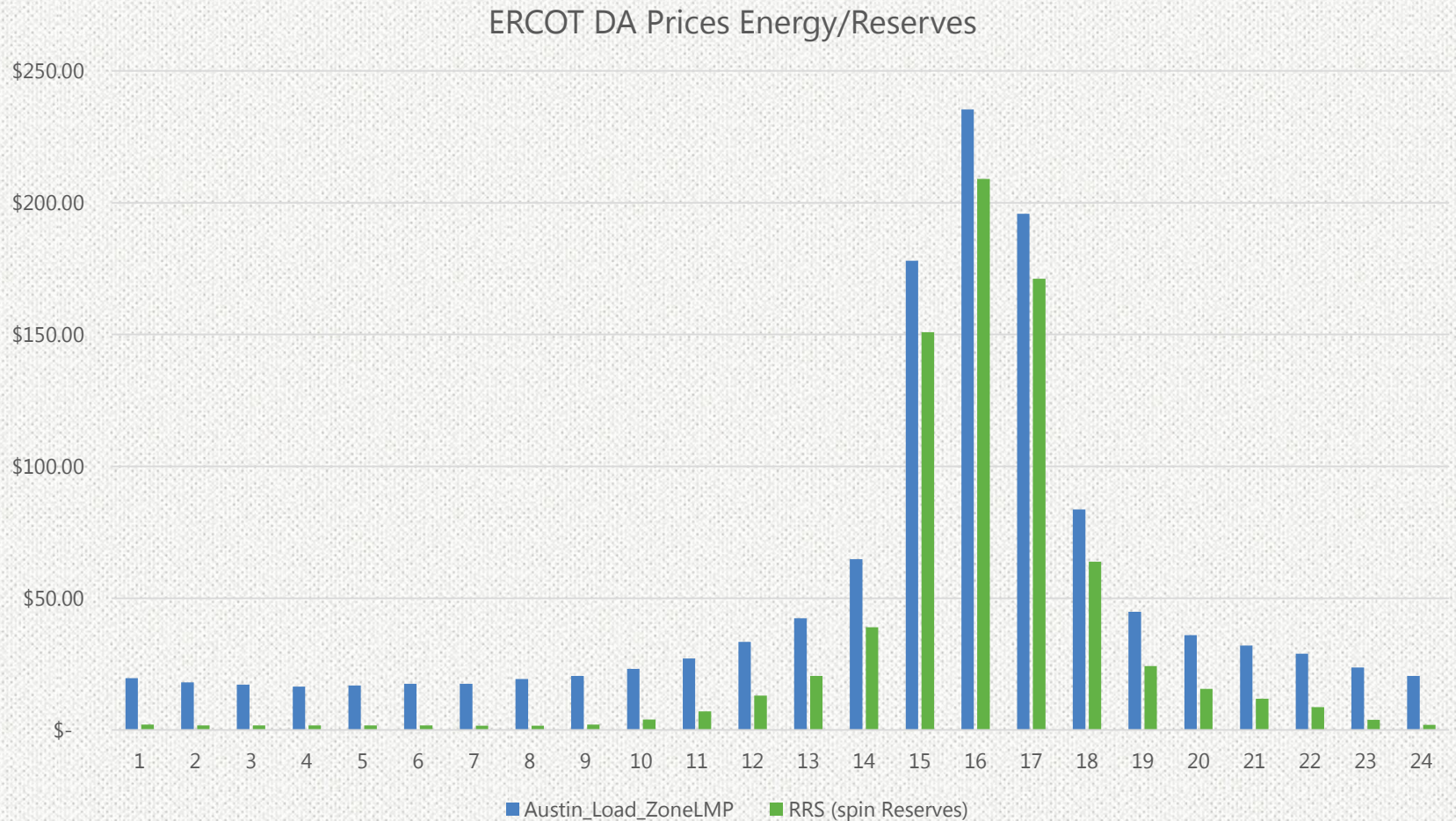
EVOLUTION - CONTINUED

- Zonal market had problems
 - Local congestion cost causation & general uplift cost
 - Integration of wind
 - Inefficient unit commitment
- 2005 Legislation created Competitive Renewable Energy Zones (CREZ) and \$7 B transmission build for wind that was uplifted to all loads
- Ordered by PUCT to form Nodal (LMP) and full DA market
- December 2010 Nodal market go-live

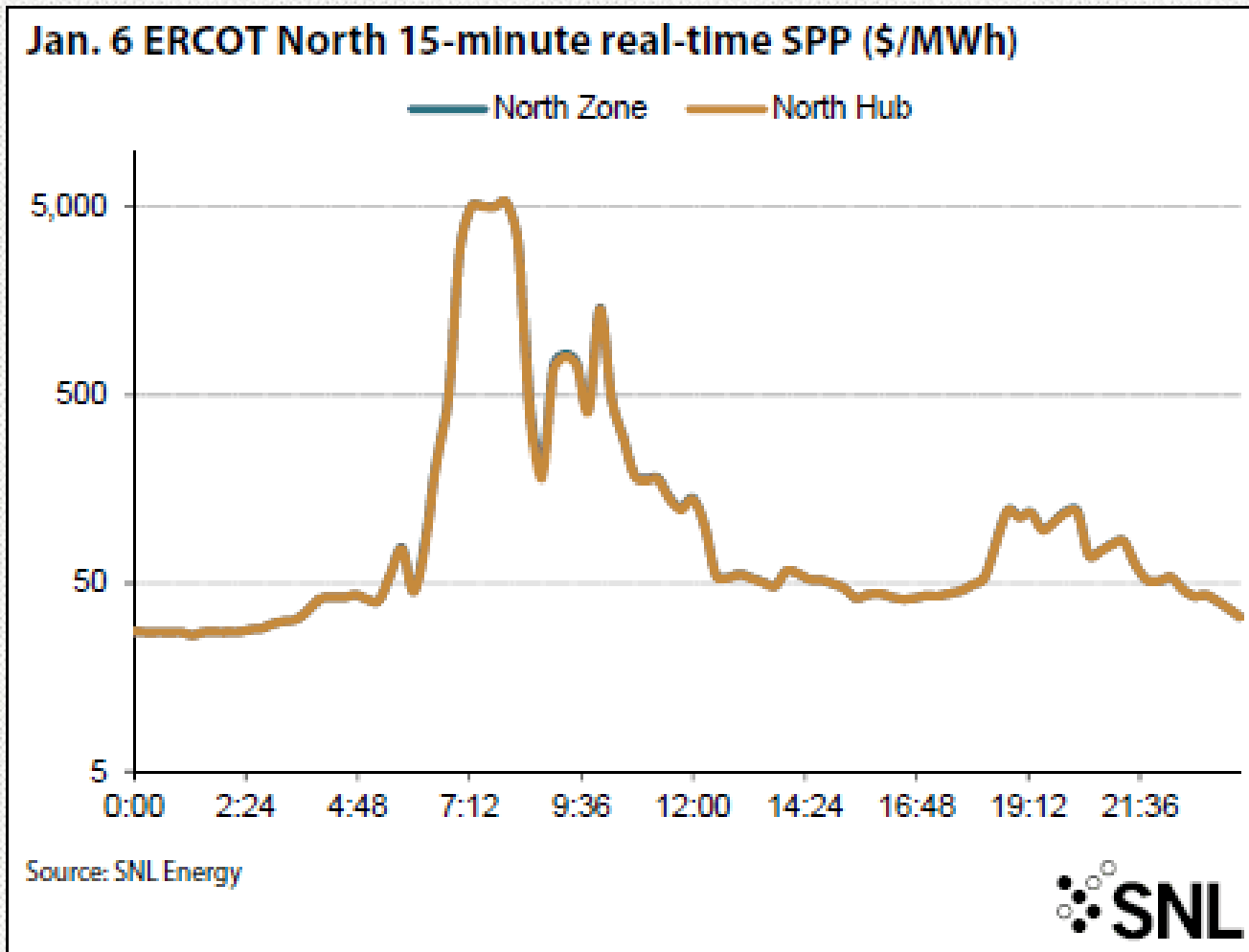
ERCOT LMP PRICES



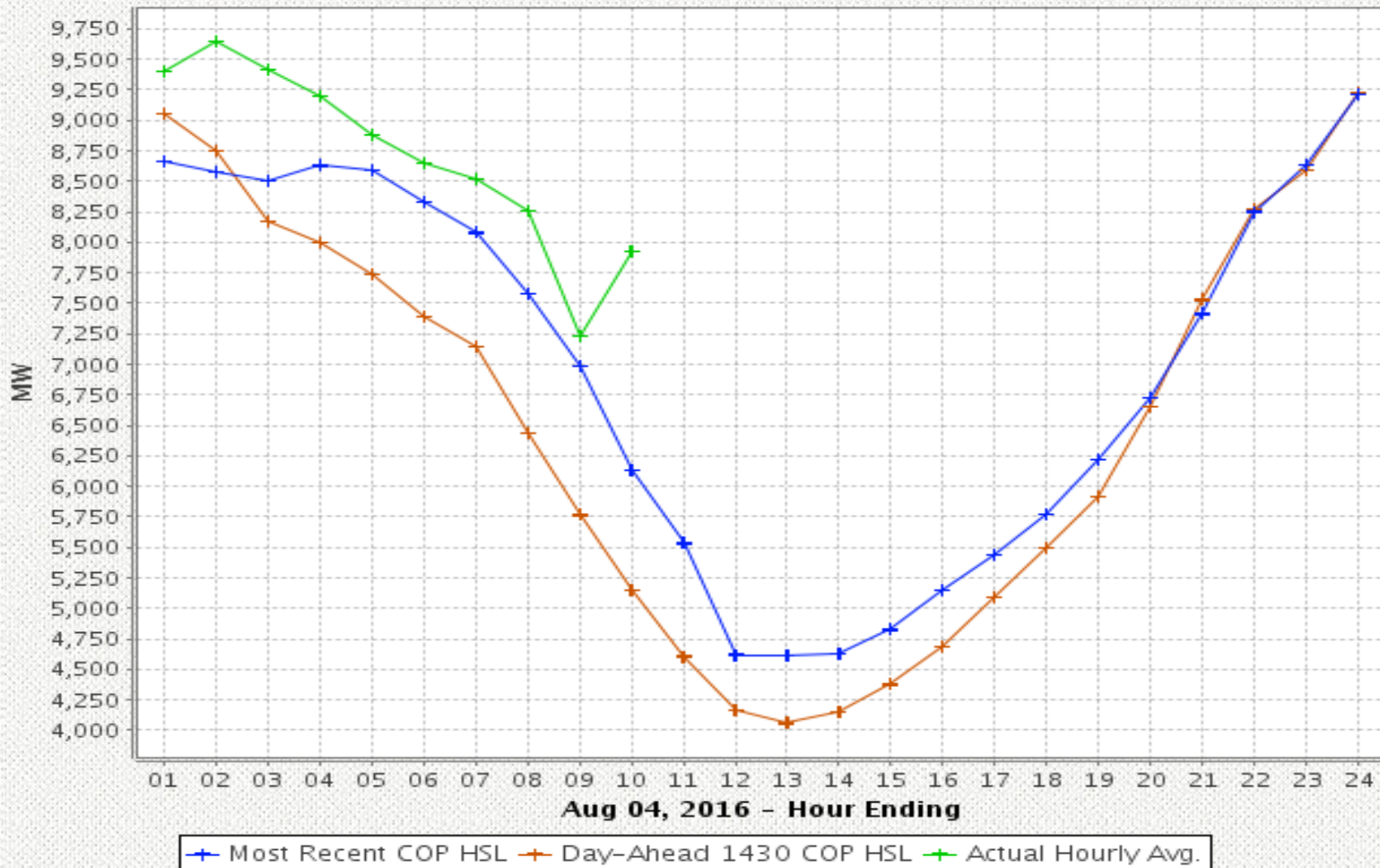
ERCOT DAY AHEAD MARKET CO-OPTIMIZES ENERGY AND CAPACITY



ERCOT - ENERGY MARKET ONLY



WIND (THERE IS TWICE THIS MUCH NOW)



ERCOT WHOLESALE MARKET/POU IMPACTS

- New way of thinking about loads/resources
- All load is bought from ERCOT
- All generation is sold to ERCOT
- Pre-1999 remote POU resources have discounted Congestion Revenue Rights
- Large POUs had to have their own load zones

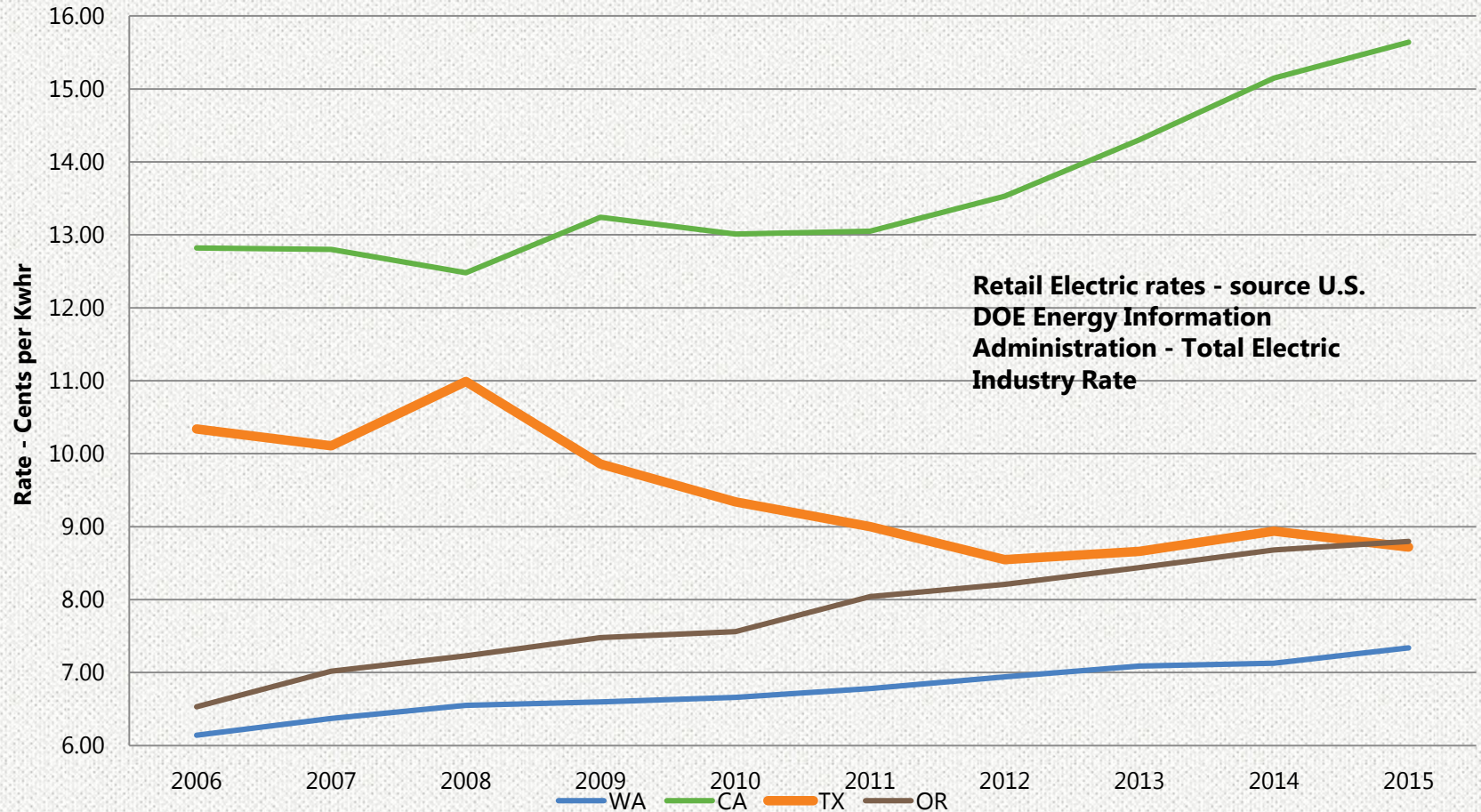
PUBLICLY OWNED UTILITIES CHALLENGES

- Many PPAs were not designed to handle Nodal operations and rules
- POUs by default do not have retail choice but can opt-in; however some pressure is being applied at the legislature over customer choice in POUs
- Much greater pressure on public power wholesale providers to be cost competitive with wholesale market that co-ops and small munis could buy from

PUBLICLY OWNED UTILITIES OPPORTUNITIES

- POUUs can obtain cost recovery for new transmission improvements for system improvements
 - Transmission cost is assigned based on share of peak load
 - 345 kv Auto-transformers: AE's Austrop & Dunlap substations
- Nodal market has allowed some POUUs to leave their previous provider and take renewable energy PPAs
 - Includes the financial risk on settlement with ERCOT but avoids operational risk of renewable integration, ERCOT manages that

RETAIL ELECTRIC RATES- IS IT WORKING?





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OUR MISSION

Seattle City Light is dedicated to exceeding our customers' expectations in producing and delivering environmentally responsible, safe, low-cost and reliable power.

OUR VALUES

Excellence, Accountability, Trust and Stewardship.

