Renewable Integration in ERCOT

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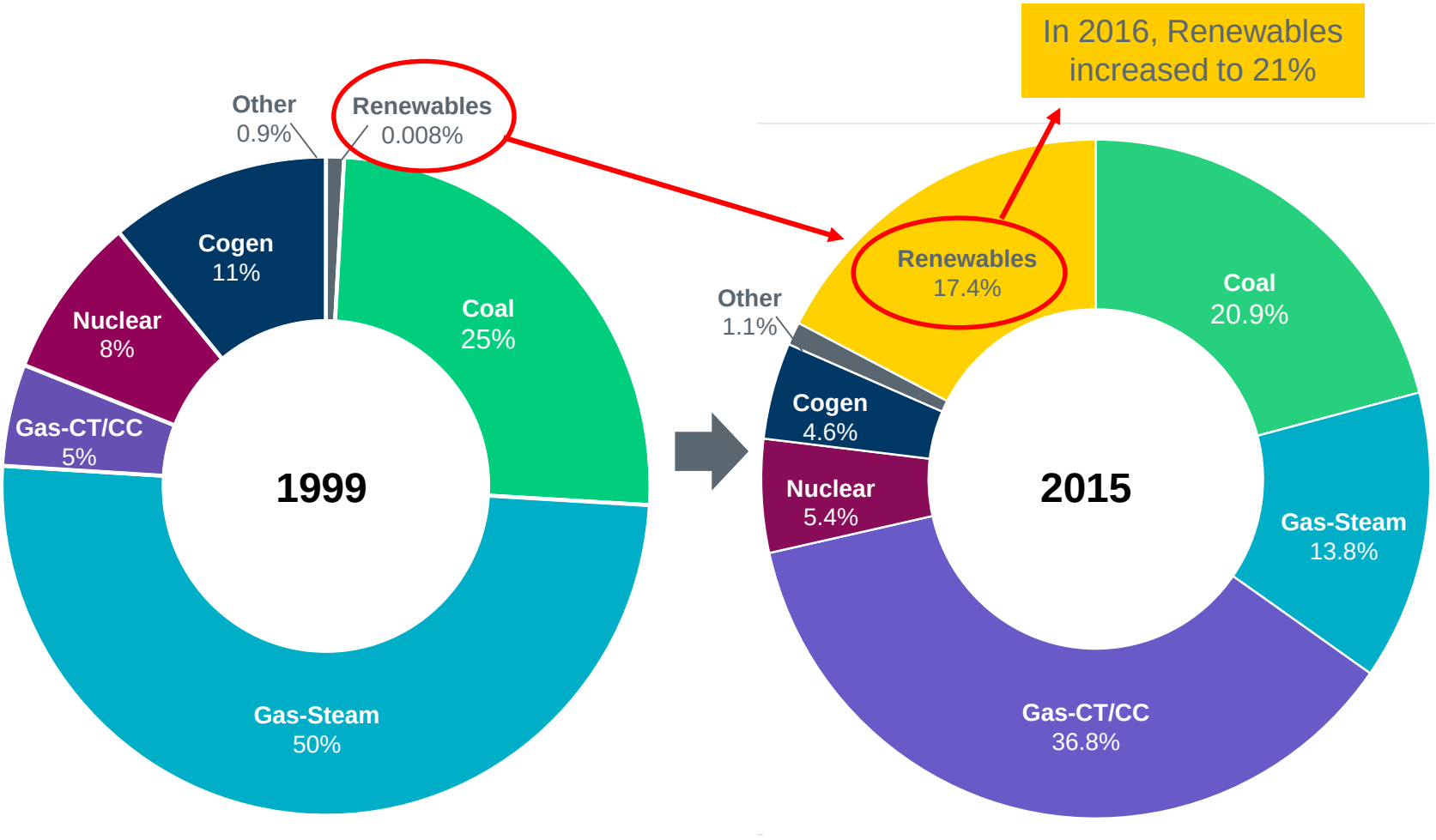
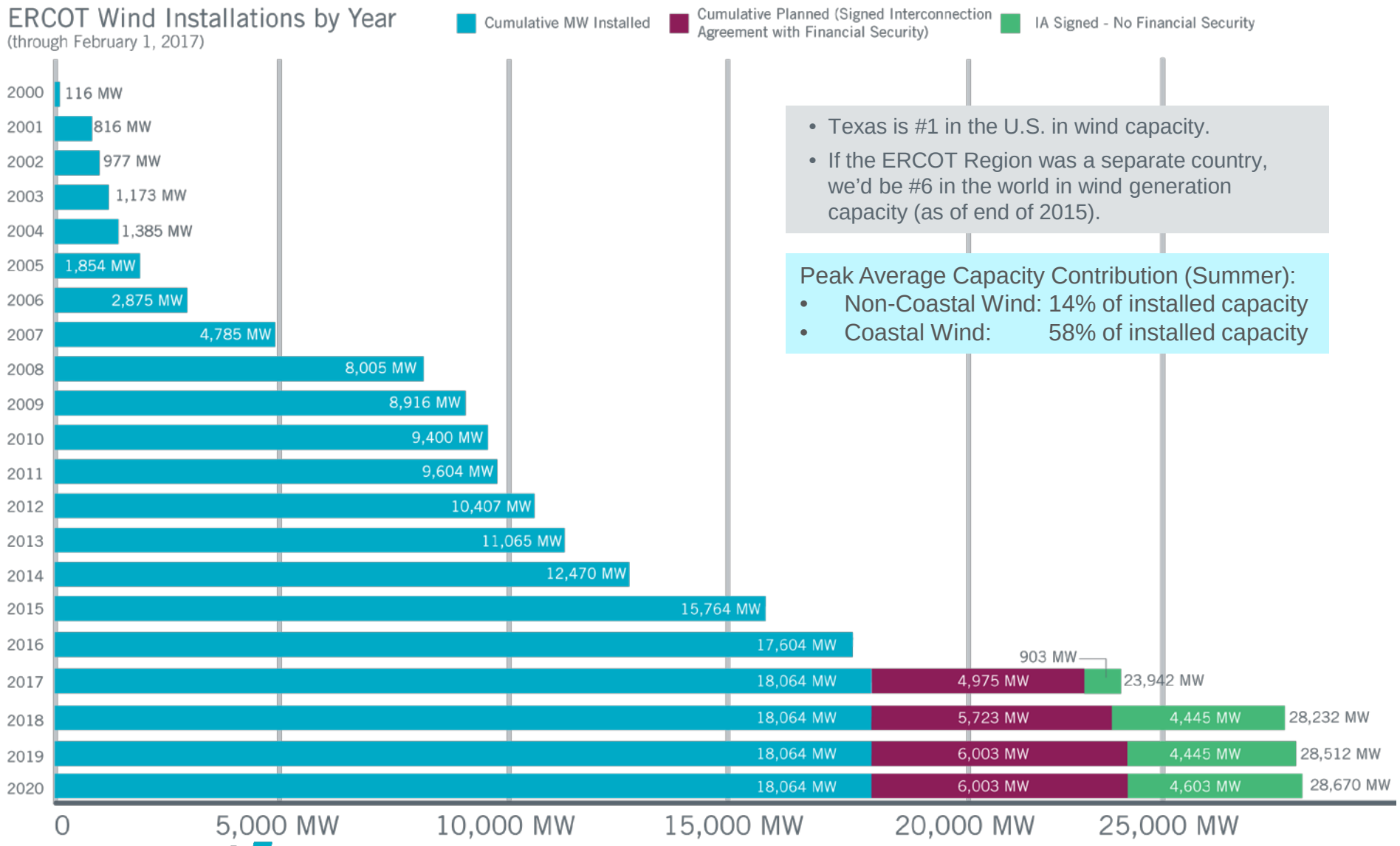
UT Energy Week
February 8, 2017

Changing Resource Capacity Mix



Wind Generation Queue

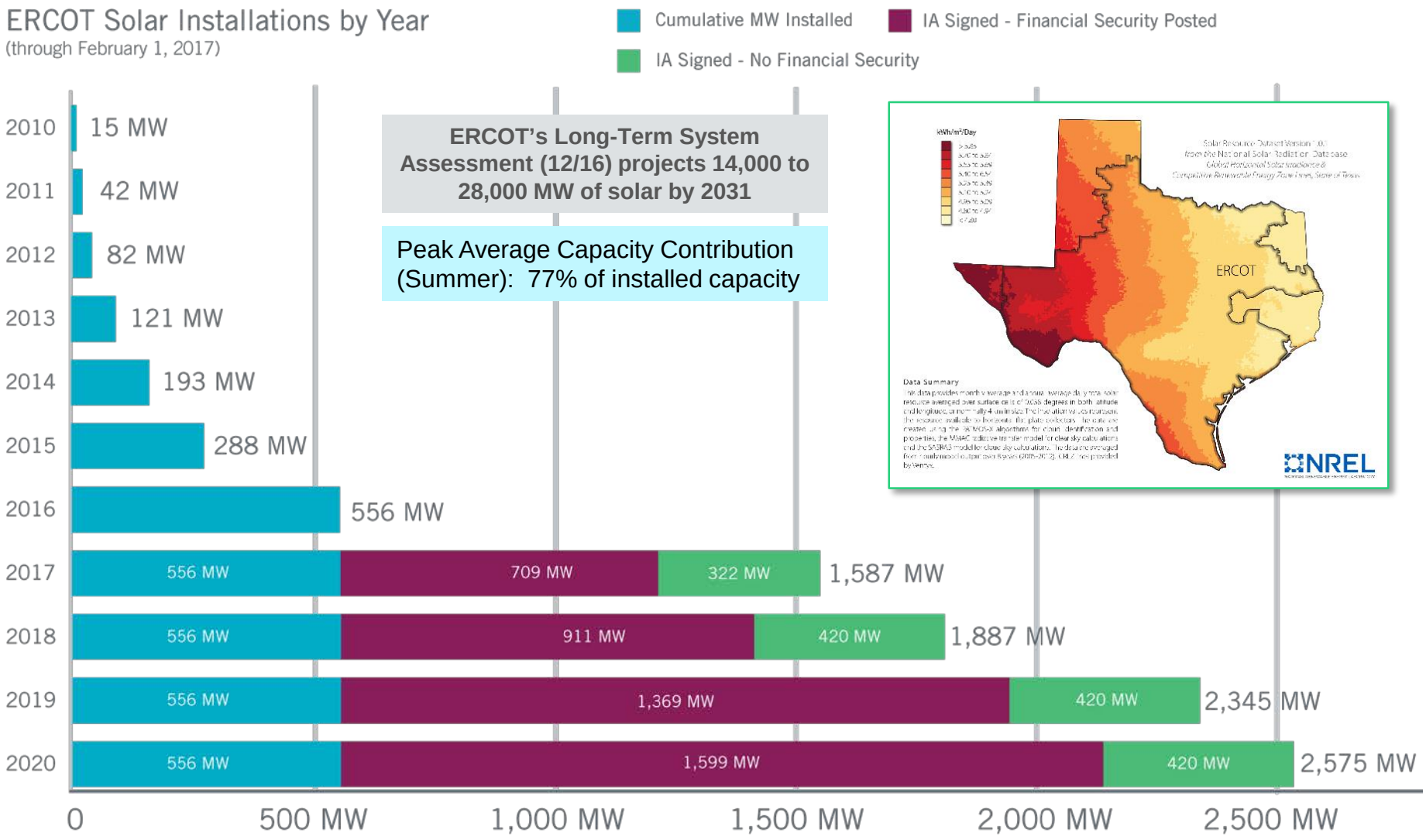


- Texas is #1 in the U.S. in wind capacity.
- If the ERCOT Region was a separate country, we'd be #6 in the world in wind generation capacity (as of end of 2015).

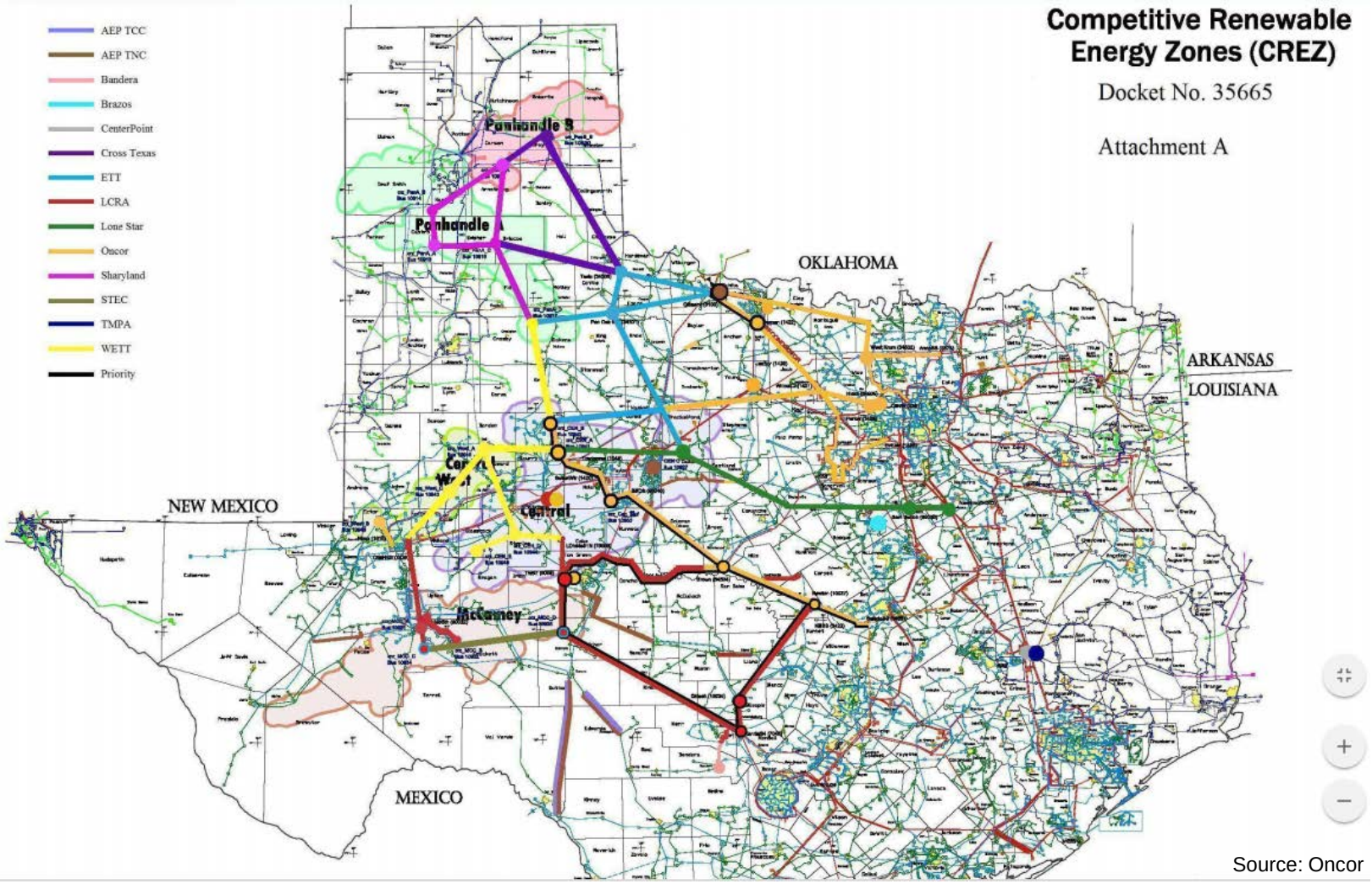
Peak Average Capacity Contribution (Summer):

- Non-Coastal Wind: 14% of installed capacity
- Coastal Wind: 58% of installed capacity

Utility Scale Solar Generation Queue



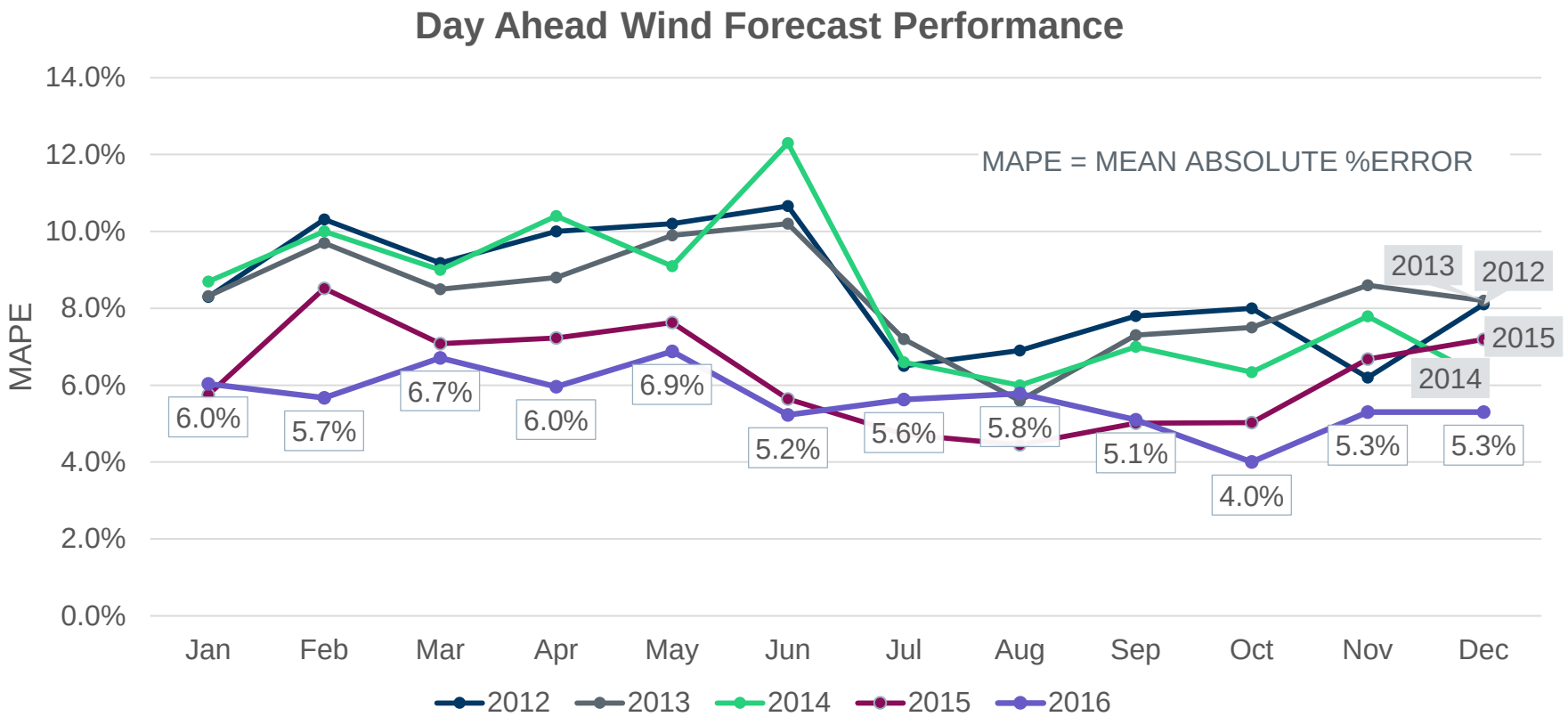
CREZ Transmission



Source: Oncor

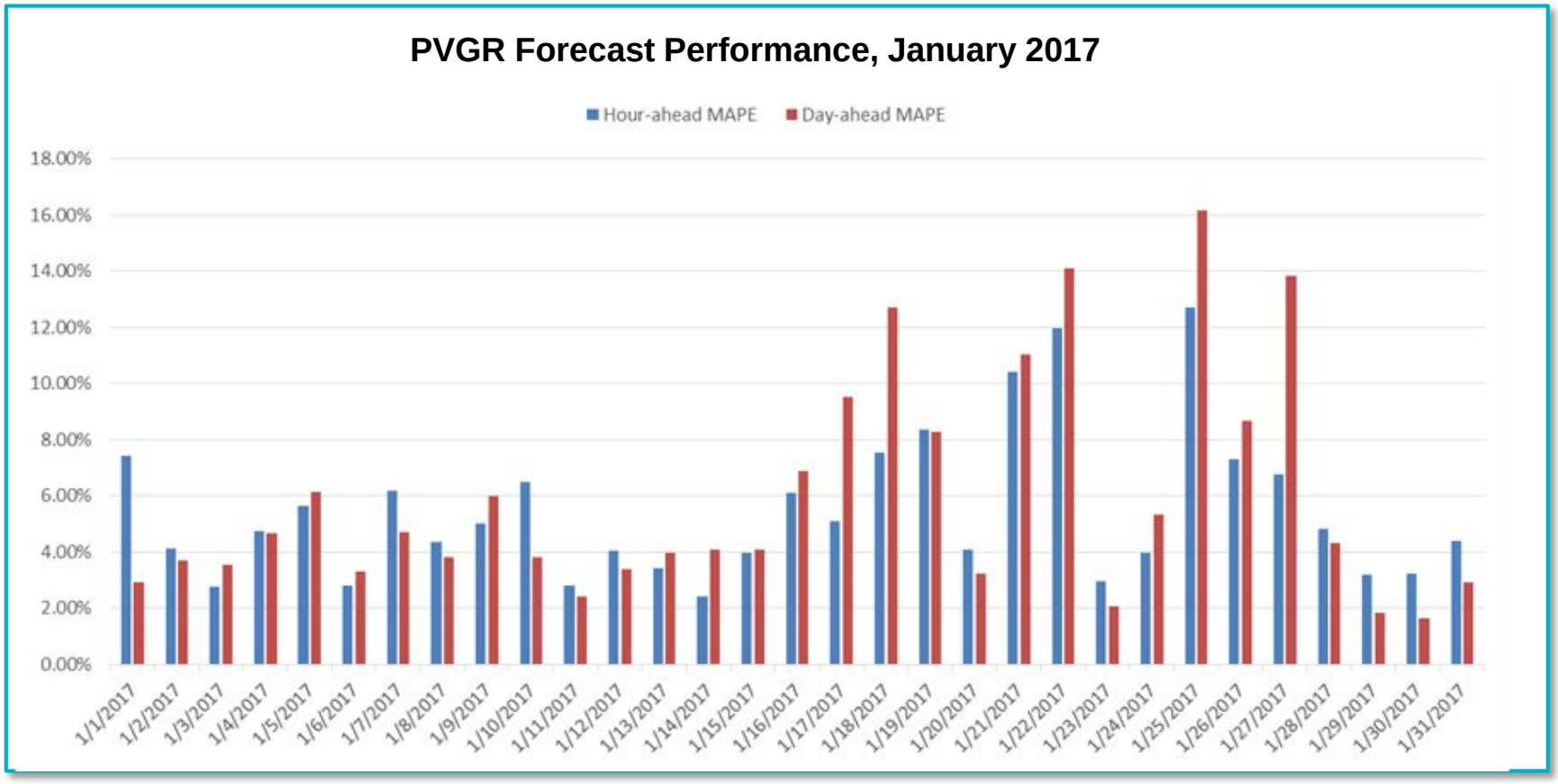
Integrating and Managing Renewables

- ERCOT's 7-day wind forecast overall performance has steadily improved
  - Inclement weather preparation, including capability to manually overwrite wind forecast for icing events



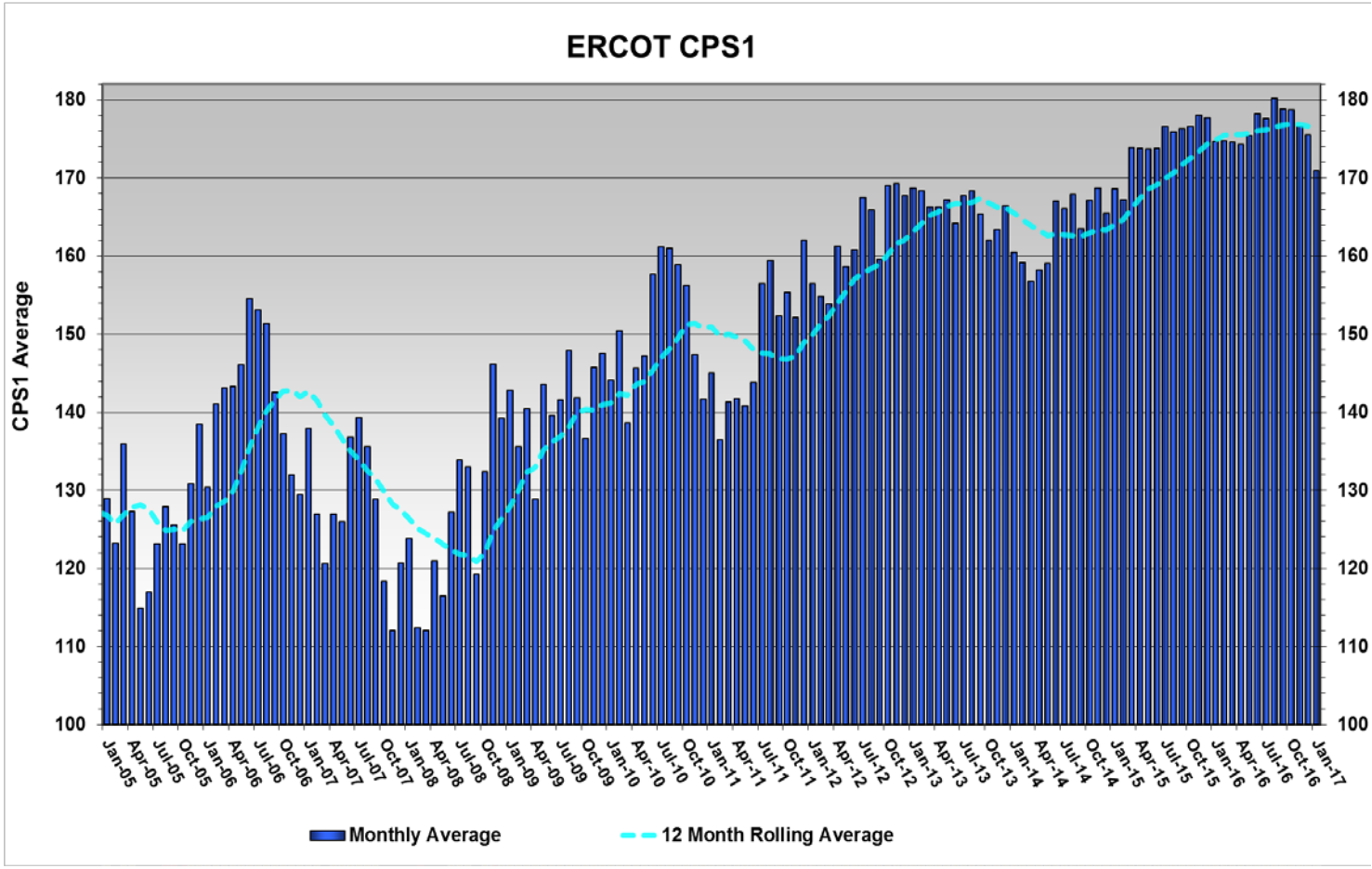
Integrating and Managing Renewables

- Grid-scale solar PV forecasting tool moved into production April 2016
- Performance has steadily improved



Grid Performance: CPS1 Scores 2005-2016

Control Performance Standard 1 is a measurement of how well a Balancing Authority (ERCOT) maintains grid frequency within acceptable parameters. It is a metric of the North American Electric Reliability Corporation (NERC).



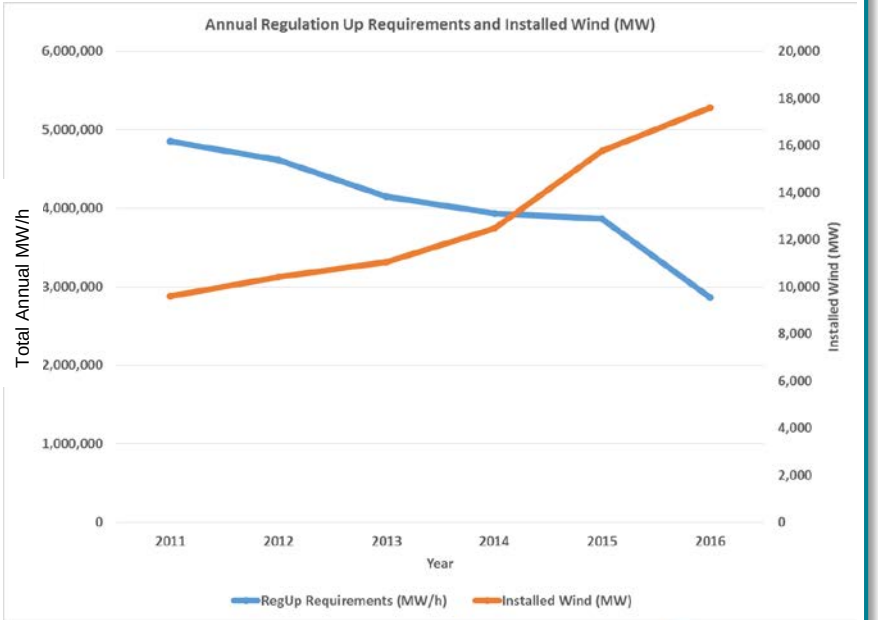
CPS1 12 Month Rolling Average = 176.31%

('Perfect' score is 200%)

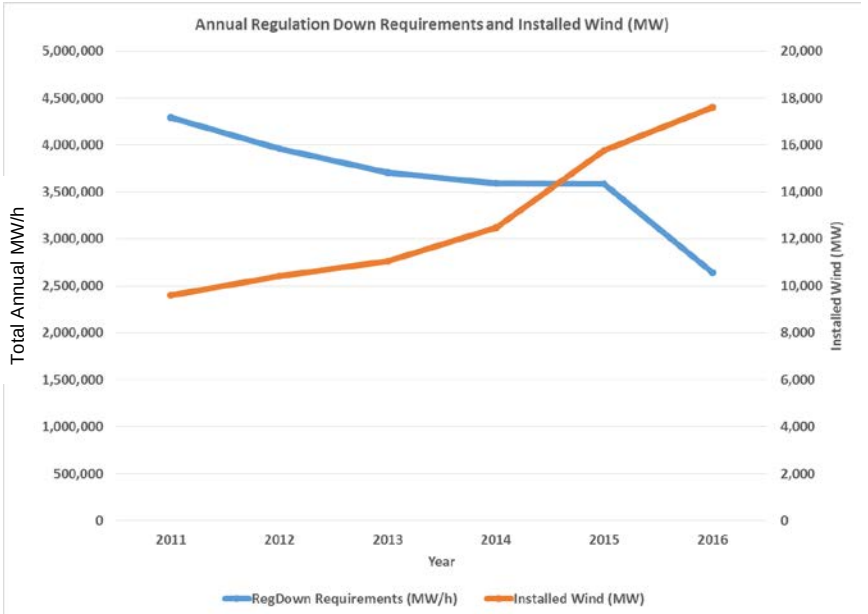
Regulation Service Requirements 2011-2016

- Annual procurements of Regulation Service (MW/h) and year-end Installed Wind Capacity (MW)
  - Reg. requirements have decreased even as wind integration has increased

Regulation-Up



Regulation-Down



Questions?