



BALANCED ENERGY

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The Need for Transparency in Electricity Markets

*An Overview of the How Important Transparency is to
Ensure that Electricity Markets Function Rationally*

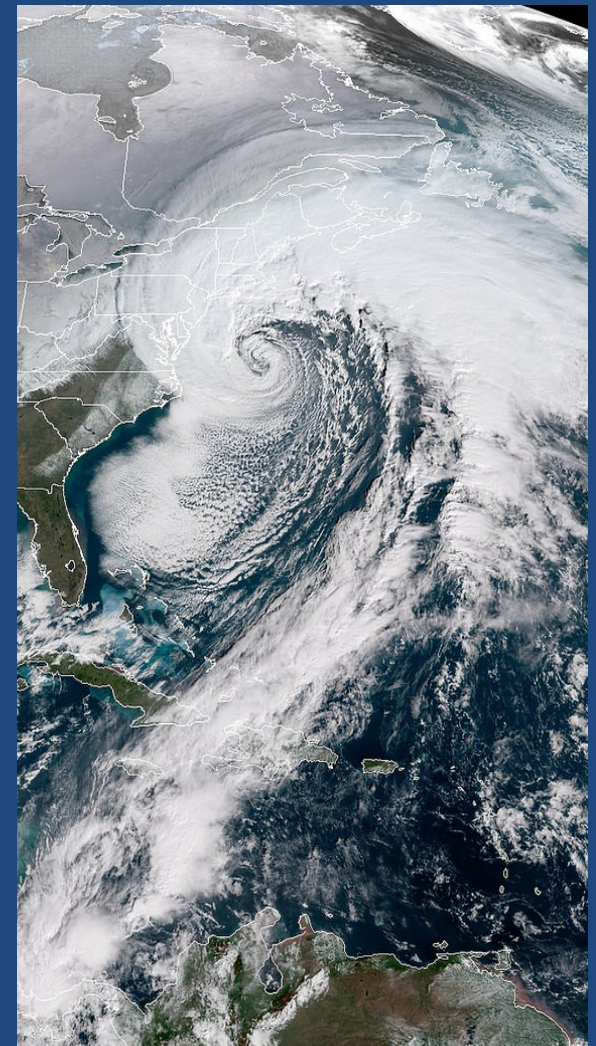
May 22, 2018

Kingsport, Tennessee



Outline

1. Recent Case Studies Documenting how Some Resources Impart Energy Resilience and Some Impart a Resilience Penalty to the Grid.
2. Overview of Factors Preventing Transparency to Customers in Electricity Markets.
3. How the Cautionary Tale of Organized Markets Informs how FERC, NERC, and DOE Need to Work Toward Energy Transparency

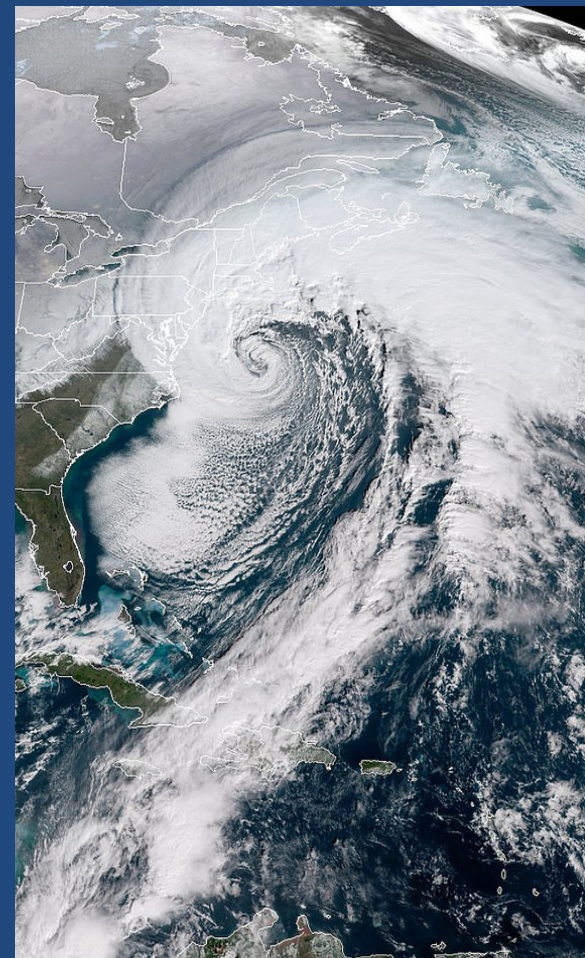




Part 1: Energy Resilience

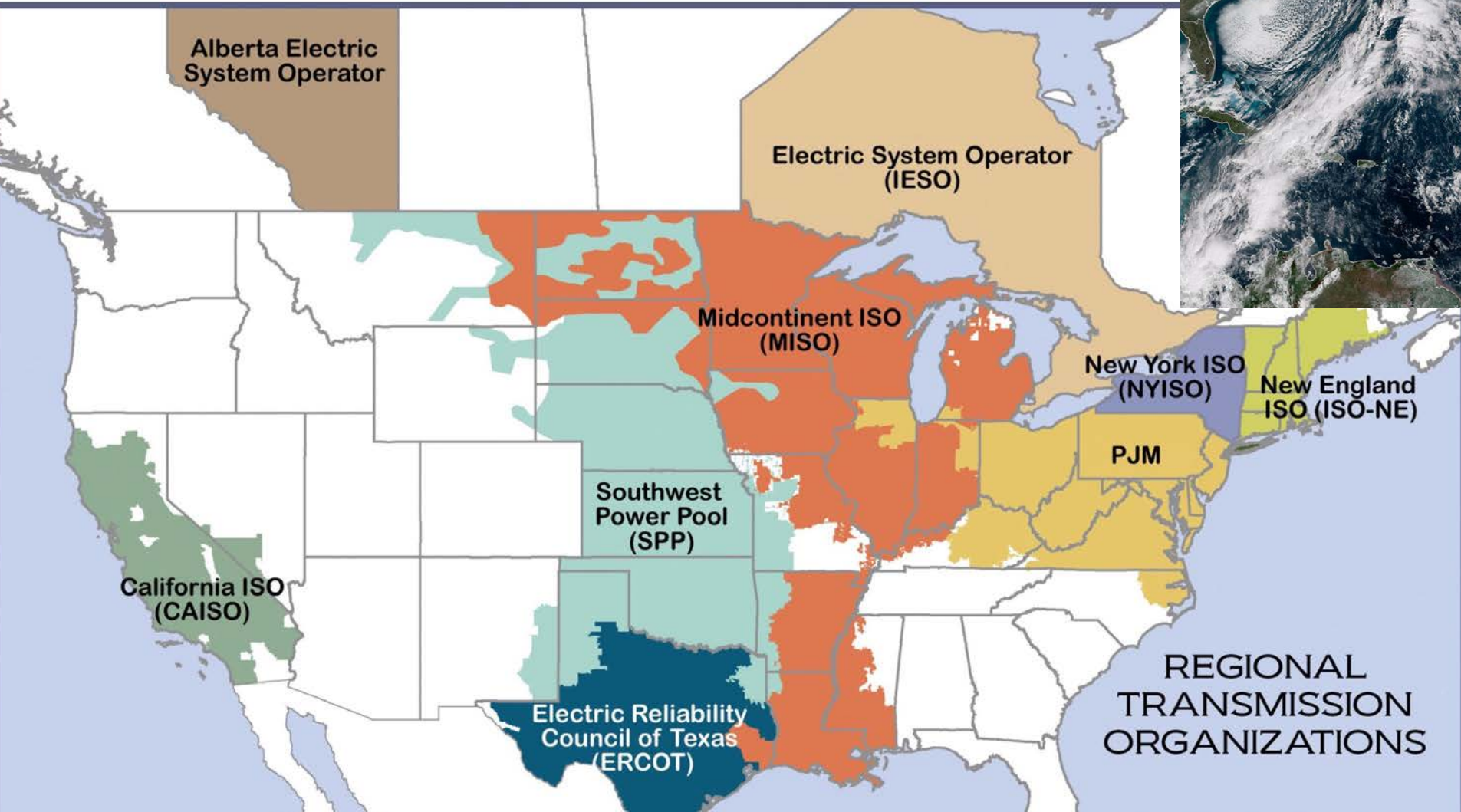
Recent Weather Events and Summer Projections Make it Clear that Grid Resilience is Enhanced by Coal & Impaired by Non-Dispatchables (Wind)

1. Data Shows Energy Resilience of Coal (and Penalty of Wind) across 6 RTOs Impacted by the January 2018 “Bomb Cyclone.”
2. Biggest renewable market experiment (Texas) now facing extremely thin reserve margins and risks of price escalation after a modest reduction in coal baseload capacity.



1.1 – Bomb Cyclone Case Study

6 Regional Transmission Operators (RTOs) Impacted



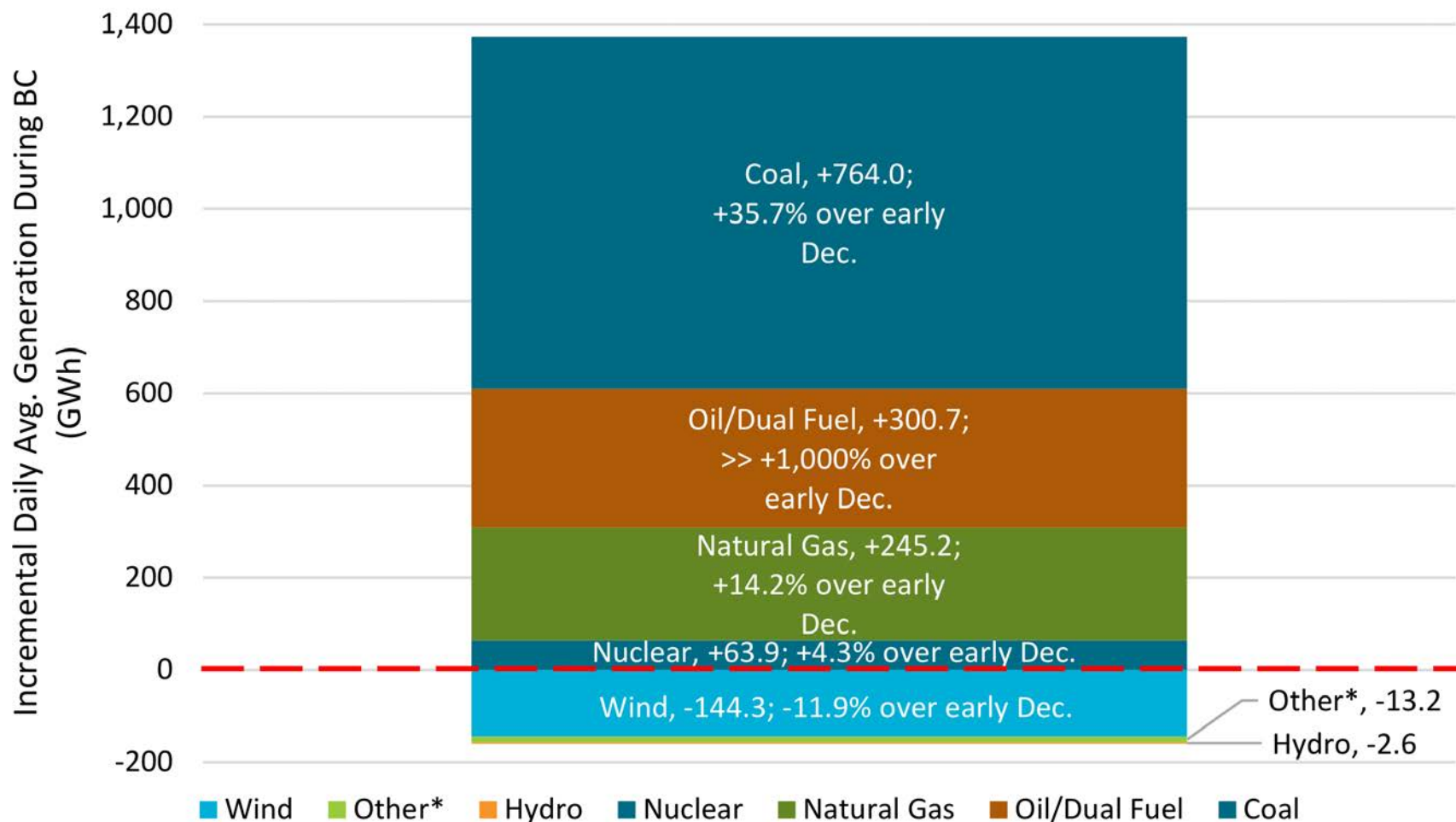


March 13, 2018

1.1 - DOE/NETL : “Without available capacity from partially utilized coal units, PJM would have experienced shortfalls leading to interconnect-wide blackouts”



Exhibit ES-1. Fuel based generation resilience during the Bomb Cyclone, six ISOs



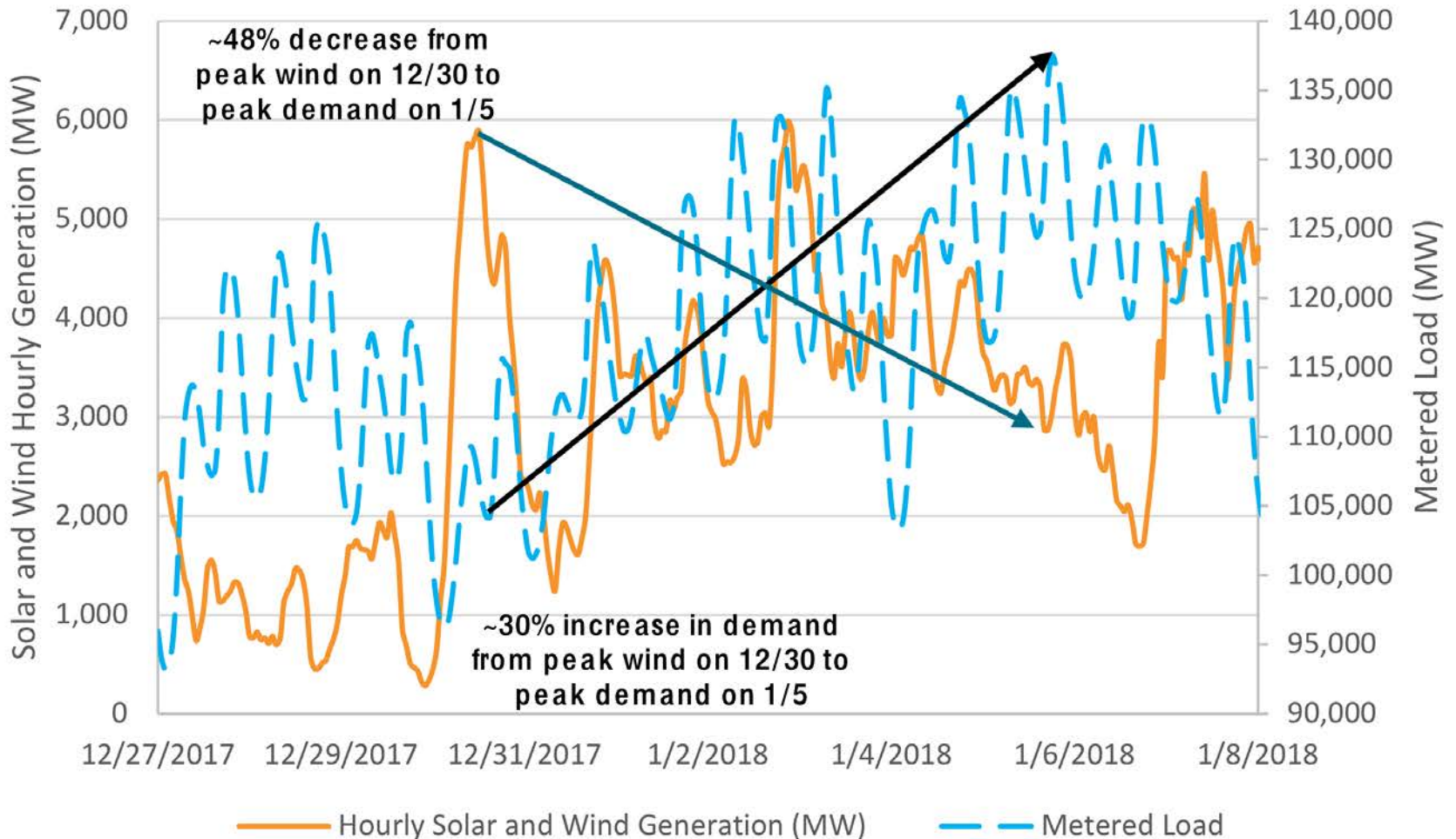
* 'Other' includes misc. categories, including other, refuse, solar, diesel, and multiple fuels



1.1 - DOE/NETL: "Intermittent generating sources experienced a significant decline nearly inverse to growth in demand. . . solar and wind resource [] essentially imparted a resilience penalty to the system."

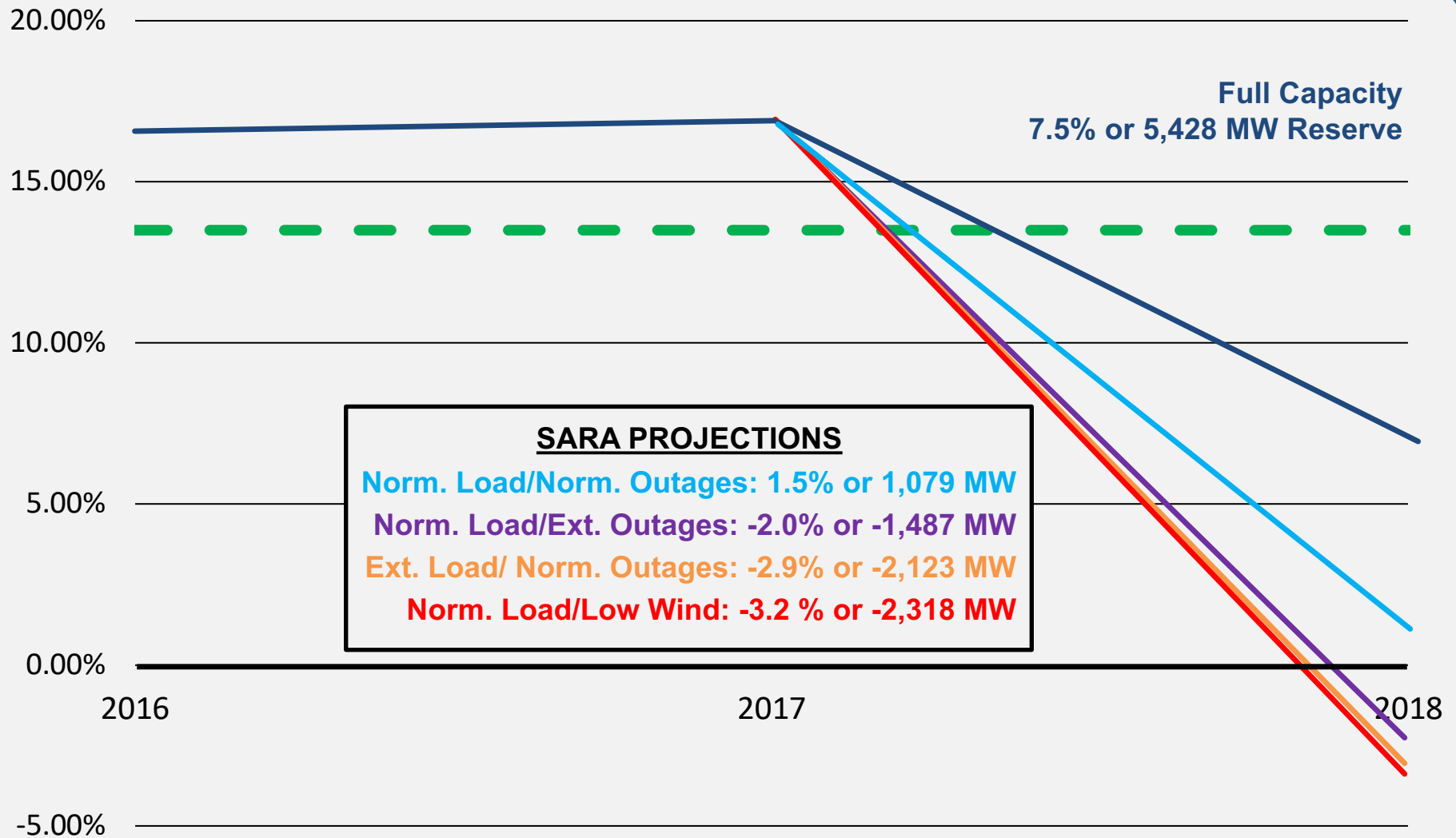


Exhibit 1-12. PJM solar and wind generation performance during the Bomb Cyclone



1.2 – Texas Case Study:

ERCOT Summer Projections for Reserves





Part 2: The Importance of Transparency in Electricity Markets

Markets depend on consumers knowing the true costs of what they are buying – that is NOT happening in electricity markets.

- 2.1 - Subsidies hidden from consumers in our ST/FED tax bills.
- 2.2 - All fuels receive subsidies but massive disparity in ROI (\$/MW).
- 2.3 – Direct/Indirect Subsidies Distorting Markets (hiding costs):
 - Multi-billion dollar transmission projects socialized across entire markets.
 - Growing costs for ancillary services (to balance wind & solar).
 - Stranded costs of prematurely retired units (driven by market distortions).

2.1 – Price of Renewables -Hidden in our Tax Bills (not shown on utility bills)

EIA (2018):

Indicators	FY 2010	FY 2013	FY 2016
Total Energy Subsidies and Support (million 2016 dollars)	37,992	29,335	14,983
U.S. Energy Consumer <small>trillion British thermal units or as specified</small>	96,850	98,655	96,788
U.S. Wind	863	1,557	2,038
U.S. Solar	88	205	533
U.S. Geothermal	207	215	209

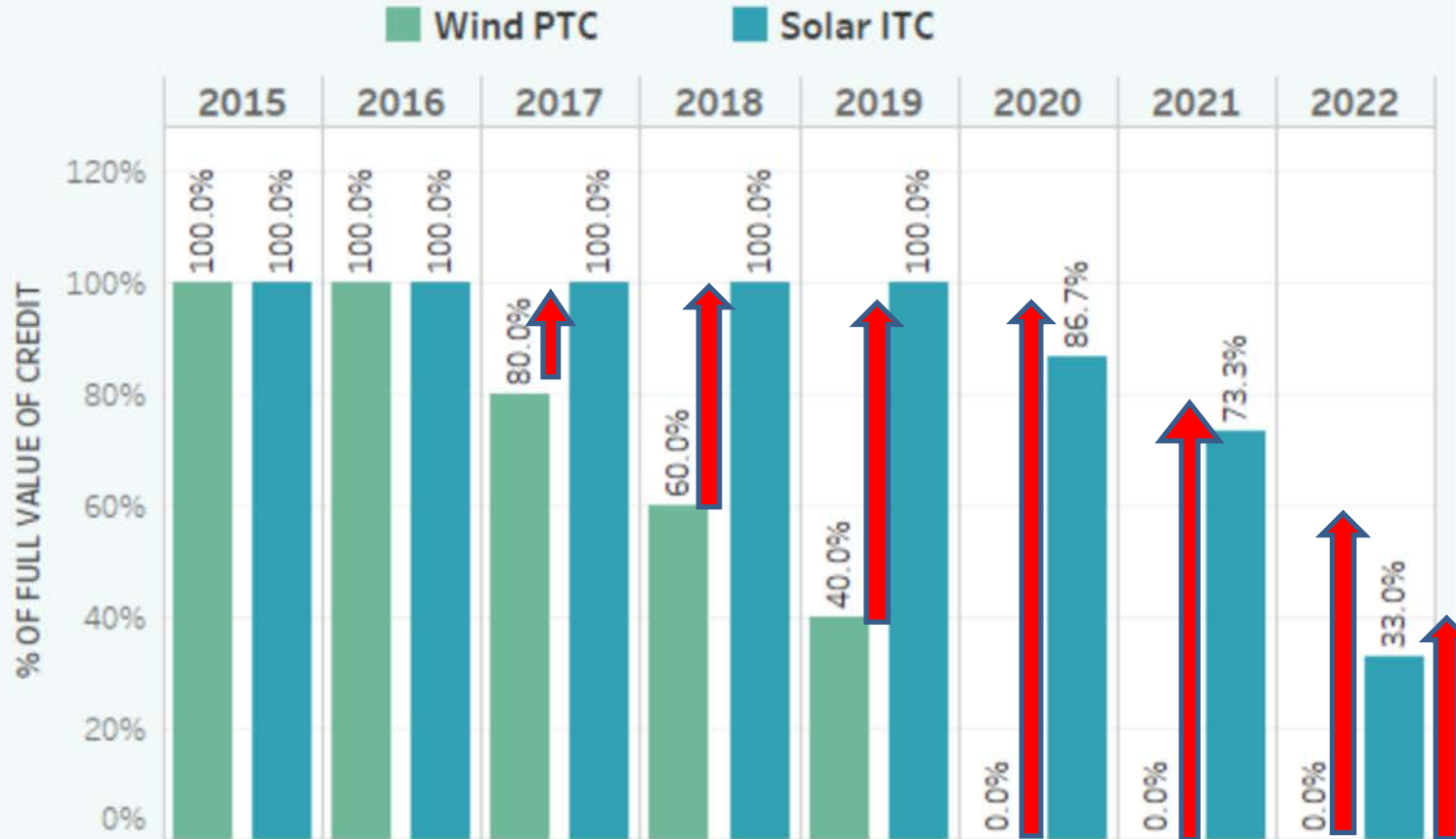
DOE (2018):

Table 3-5. Fiscal Year 2013 Electricity Production Subsidies and Support¹⁷⁷

Beneficiary	Direct Expenditures	Tax Expenditures	Research and Development	Federal and RUS Electricity	Total	Share of Total Subsidies and Support
Renewables	7,408	3,373	722	176	11678	72%
Biomass	62	9	47	-	118	1%
Geothermal	221	22	2	-	245	2%
Hydropower	194	17	10	171	392	2%
Solar	2,448	1,712	234	-	4393	27%
Wind	4,274	1,614	49	-	5936	37%

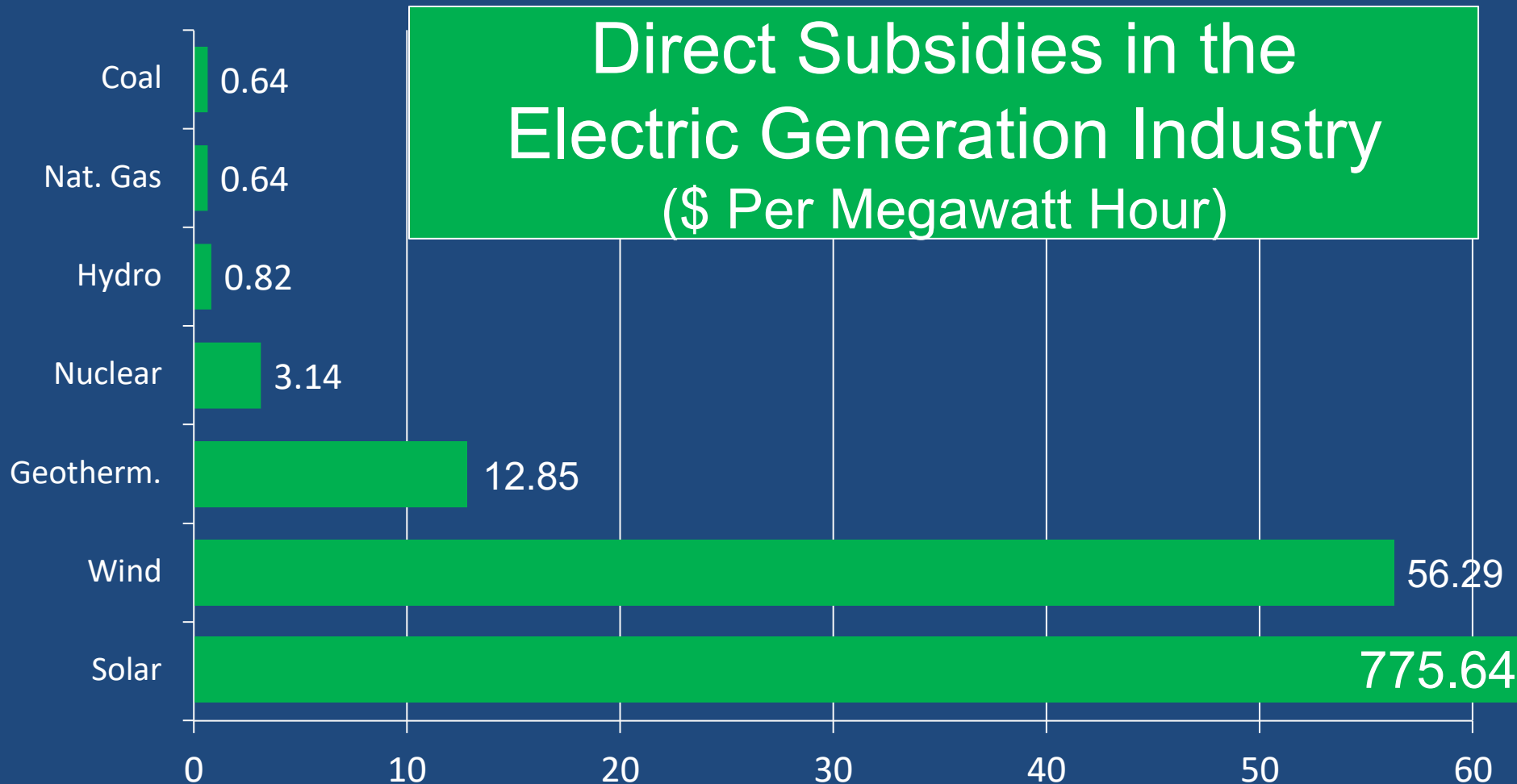
Sources: EIA Direct Federal Financial Interventions and Subsidies in Energy in Fiscal Year 2016 (Table 1) (April 2018); DOE Grid Study (Table 3-5)(2017).

PTC “Phase-Out” & “Safe Harbor” Creates Uncertainty



- PTC guidance with 4-year safe harbor will delay the impact of the wind phase-out.
- Extent to which wind companies will use reduced value PTC is unclear.
- Section 48 ITC continues permanently at 10%, while Section 25 (residential) phases out.
- Treasury is still working on the ITC guidance.

2.2 - All fuels receive subsidies but massive disparity in ROI (\$/MW).



Source: U.S. DOE, 2011; Institute for Energy Research, 2011 (an update of this information is critically needed).



2.3 - Indirect Subsidies Explored

Current Regulatory Frameworks Hiding Costs:

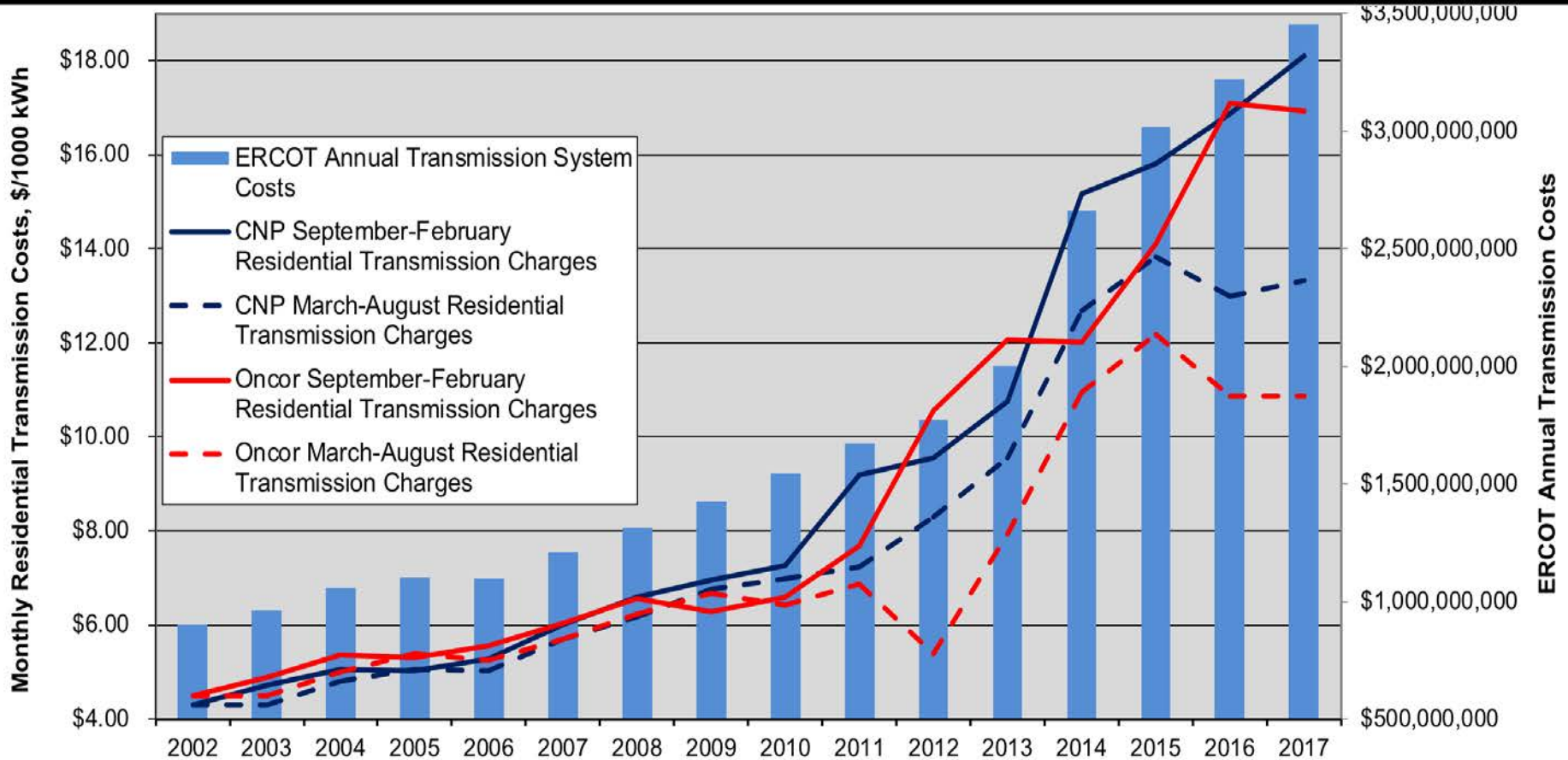
2.3.1: Multi-billion renewable-driven transmission projects socialized across entire markets.

2.3.2: Growing costs for ancillary services (to balance wind & solar) not factored into RE prices.

2.3.3.: Stranded costs of prematurely retired units (driven by market distortions) born by customers in regulated markets & utilities in deregulated markets

2.3.1 - Transmission Costs of Integrating Renewables

Case Study: ERCOT

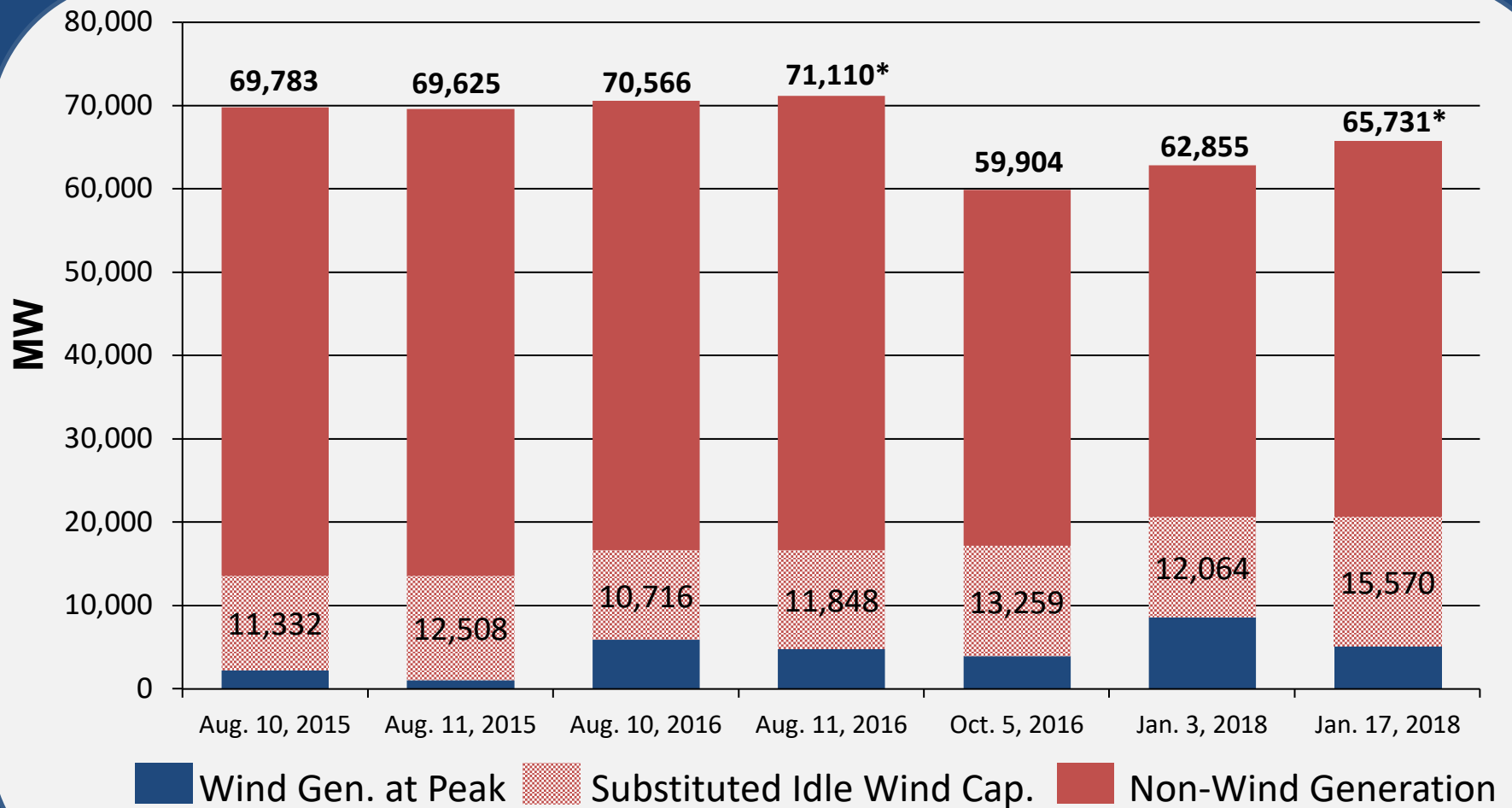


2002 to 2017

83% increase in regulated charges (T&D)
16% decrease in competitive charges (energy)

2.3.2 – The Price of Non-Dispatchability

CASE STUDY: ERCOT - Exposure to the Wind “Swing”



* ERCOT Peak Summer & Winter Days

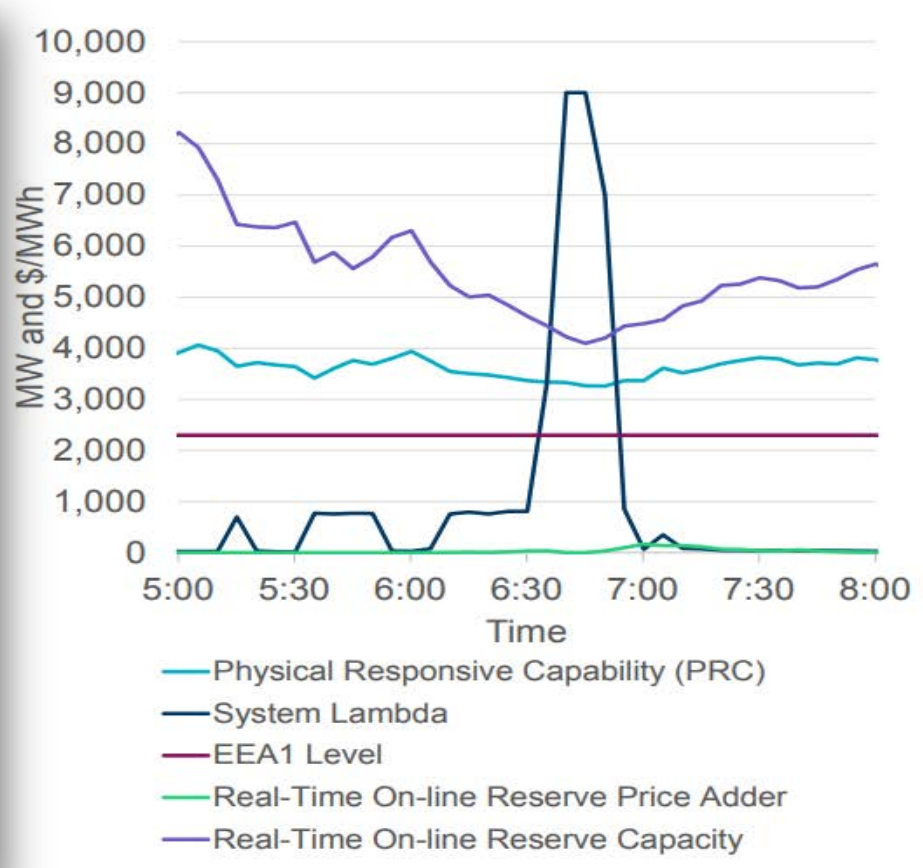
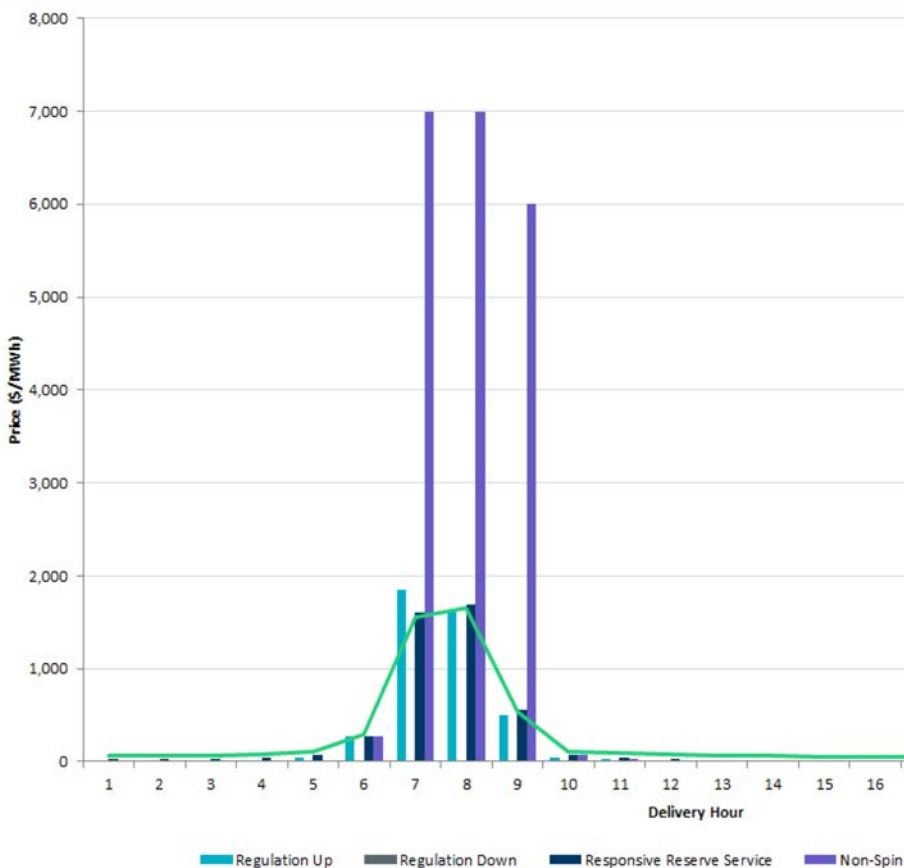
2.3.2-Price Impacts of Scarcity

January 17, 2018

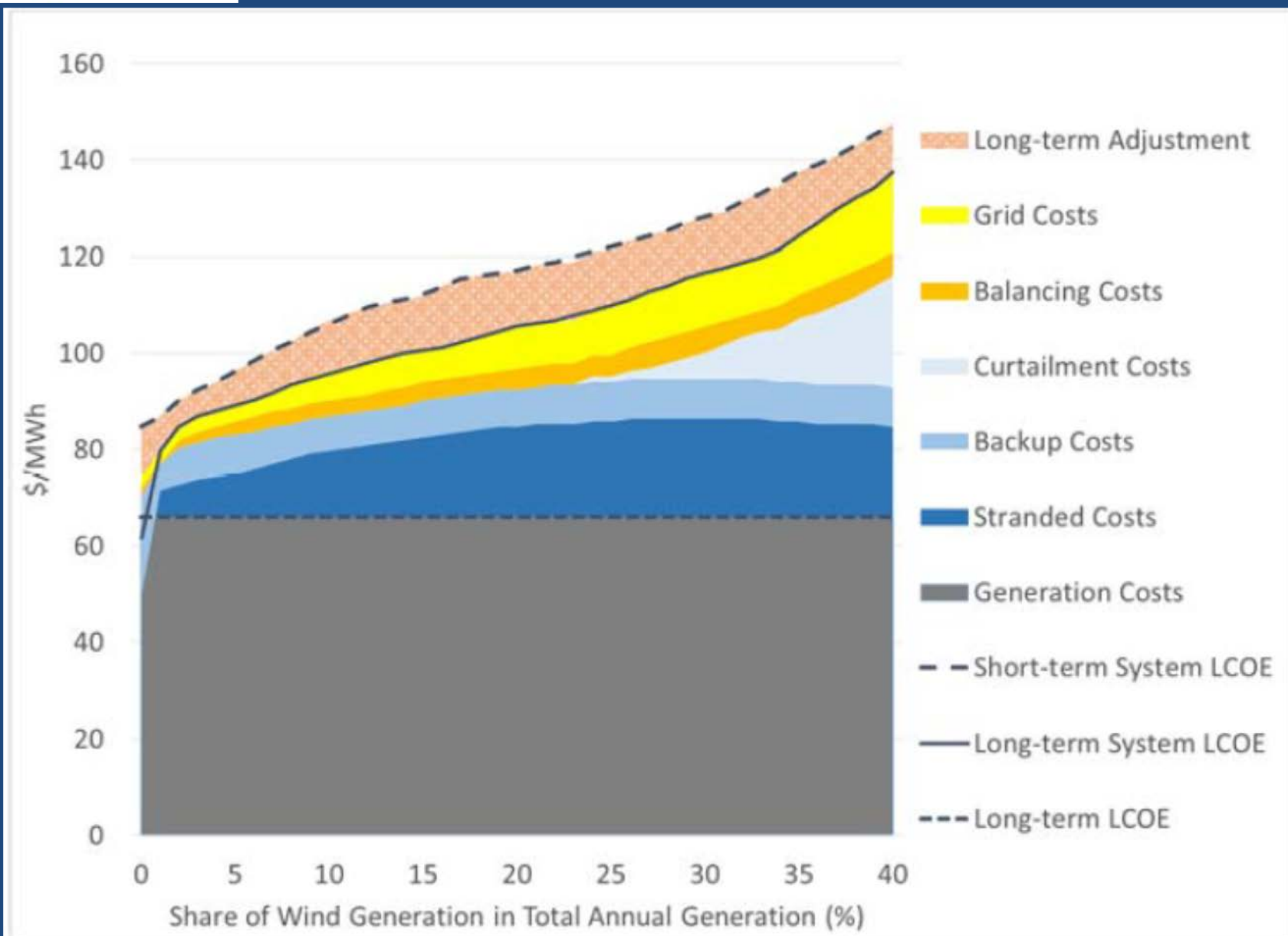
Day-Ahead Market (DAM)

January 23, 2018

Real-Time Market (RTM)



2.3.3 – Integration Cost of Renewables



Source: Adapted from Ueckerdt et al. (2013).

Source:
University of Texas, Bureau of Economic Geology, Center for Energy Economics, Competitiveness of U.S. Renewable-Generation Resources: A Multifaceted Assessment, 2017.



PART 3:

FERC, NERC, & DOE Must Return Transparency to Electricity Markets



- Not all Capacity Additions Are Created Equal
 - Resiliency Attributes & Resiliency Penalties Matter
 - Customers Need to Know the Total Cost of Resources
- Market Distortions Must be Mitigated to Preserve & Protect the Investments of Ratepayers & Utilities:
 - Econ 101: The Car You Own vs. “New Car Deal”
 - Investments of Consumers/Utilities Warrant Protection

BOTTOM LINE: Impose System-Wide “Needs Assessment” Requirement for Non-Dispatchable Capacity Additions