



Insights from RFF and R Street Institute Workshop on Economic Approaches to Understanding and Addressing Resilience

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High Level Insights

- Participants offered a variety of perspectives on the definition of resilience and the distinctions between reliability and resilience.
 - Inevitableness of outages and strategies for recovery are important aspects of the resilience concept.
- The existing electricity generation system is quite resilient.
- Market incentive to generators to deliver power in periods of shortage are strong.

Spot Price Signals are Strong

Market	Offer Cap ¹ (\$/MWh)	Max Shortage Adder ² (\$/MWh)	Capacity Performance (\$/MWh)	Max Signal in Severe Shortage (\$/MWh)
ISO-NE	\$2,000	\$3,050	\$3,500 ³	\$8,500
PJM	\$2,000	\$1,700	\$3,500 ⁴	\$7,200
MISO	\$2,000	\$1,500	N/A	\$3,500
NYISO	\$2,000	\$3,250	N/A	\$5,250
ERCOT	\$9,000	\$9,000	N/A	\$14,000 ⁵

Notes:

- 1 Offers up to \$1,000/MWh normally, or \$2,000/MWh w/case-specific review, except ERCOT.
- 2 Sum of Reserve Constraint Penalty Factors in ISO-NE, PJM, MISO, and NYISO.
- 3 In effect for 6/2021-5/2025.
- 4 In effect for the RTO in 2020-21; range is \$2,200 to \$4,000 across the LDAs.
- 5 ERCOT high offer cap is for "small fish." "Max signal" reflects marginal energy offers + ORDC adder but is capped at \$9,000, except to the extent transmission constraint penalty factors are binding (adds up to \$5,000).

High Level Insights (cont'd).

- The customer perspective is the one that matters most.
- Most disruptions in service are in the distribution system.
- Value of lost load (VOLL) is an important concept for setting targets and evaluating resilience enhancing measures.
 - Lots of uncertainty about VOLL and how it varies with location, length and scope of outage; No economic justification for 1 in 10 standard
 - Research is needed.
 - Introducing demand side into electricity markets (price responsive demand) could reveal how customers value reliable service.
- Addressing resilience generally falls outside of commodity markets and responses may be best arrived at in local or state settings.

Lessons for Policy Makers

- Avoid ad hoc, impulsive interventions in electricity markets.
- Establish performance expectations & provide incentives.
- Improve VOLL estimates and incorporate them in administrative demand curves used for scarcity pricing.
- Find ways to promote price-responsive demand in markets.
- Consider more robust resource adequacy measures but beware of unintended consequences.
- Use caution in making prescriptions with limited information/high uncertainty to avoid government failure > market failure.
- Focus on T&D systems as they are most vulnerable.

Thank you.

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