Reliability, Decarbonization, and Markets

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Highlights

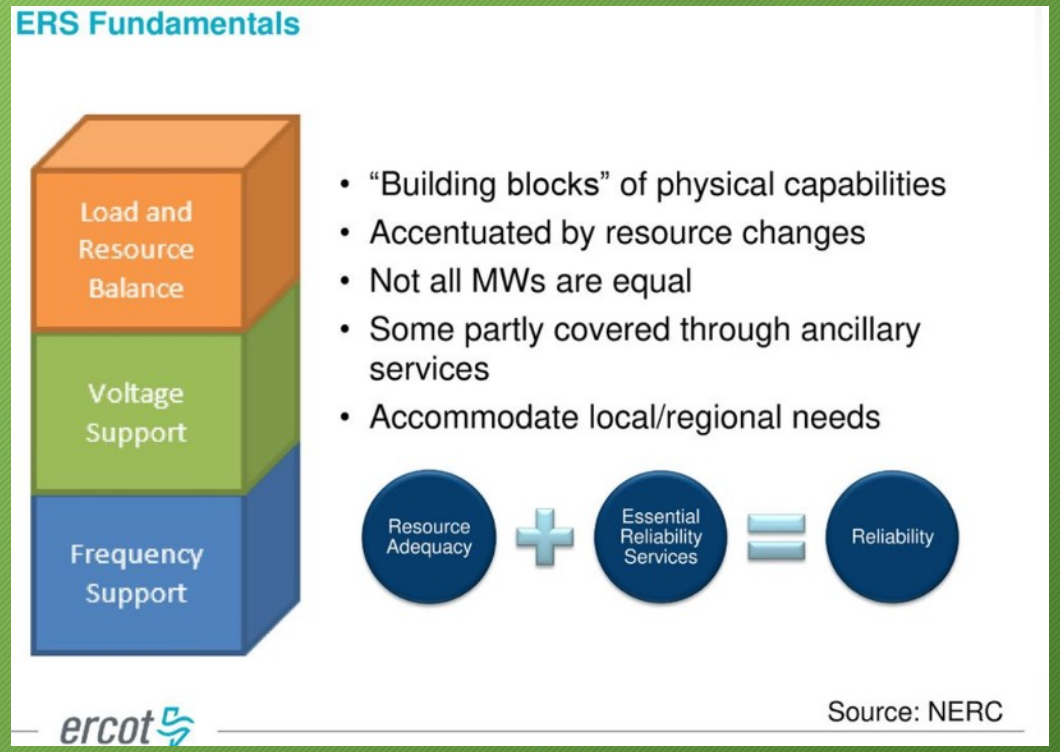
- What is Reliability?
- What are markets for Resource Adequacy? Why do they need “fixes”?
- Bulk Electric System Reliability is a Public Good
- What if I told that no one was in charge of reliable decarbonization?
- Possible market design solutions
- Possible regional planning solutions

Electric System Reliability has TWO parts

1) Resource Adequacy = LOLP Risk Assessments

2) Operating Reliability = To withstand sudden disturbances

- A reliable electric sector needs operating reserves and balancing resources



Why Markets for Resource Adequacy?

- “Deregulating” the electricity sector
- The LMP that enables short-term market operation efficiency would also be the only entry/exit signal. **Scarcity pricing especially important**.
- Symbiotic investment: Generators and Consumers
- Electricity is a commodity, and markets for electricity are just about delivery and hedging delivery and price risk
  - It doesn’t matter which resource delivers energy, only that energy is delivered (Hogan and Harvey 2022)

The reality…
Scarcity Price/LMP Alone Challenges

Missing Money	Missing Markets
Price Caps/Market Power	Insufficient markets for risk
Operator Actions	Insufficient incentives for hedging
Inelastic Demand and "can't target deficient LSEs" (Also raises serious equity concerns)	Always have default/bankruptcy option
Non-Convexity	Hard to forecast scarcity/discount these hours
Reliability Standards > CBA Economic Investment	

Scarcity pricing has never been a sufficient investment signal to meet reliability targets.

An LMP is important, helpful, useful, and necessary for efficient ST operations, but relying on an LMP alone for sufficient investment in the resources that enable reliable system operations has always been a challenge.

Bulk Electric System Reliability is a Public Good

- RTOs = The **supplier of last resort** for the **essential reliability services** needed to maintain reliability and prevent network system collapse. (Order 2000)

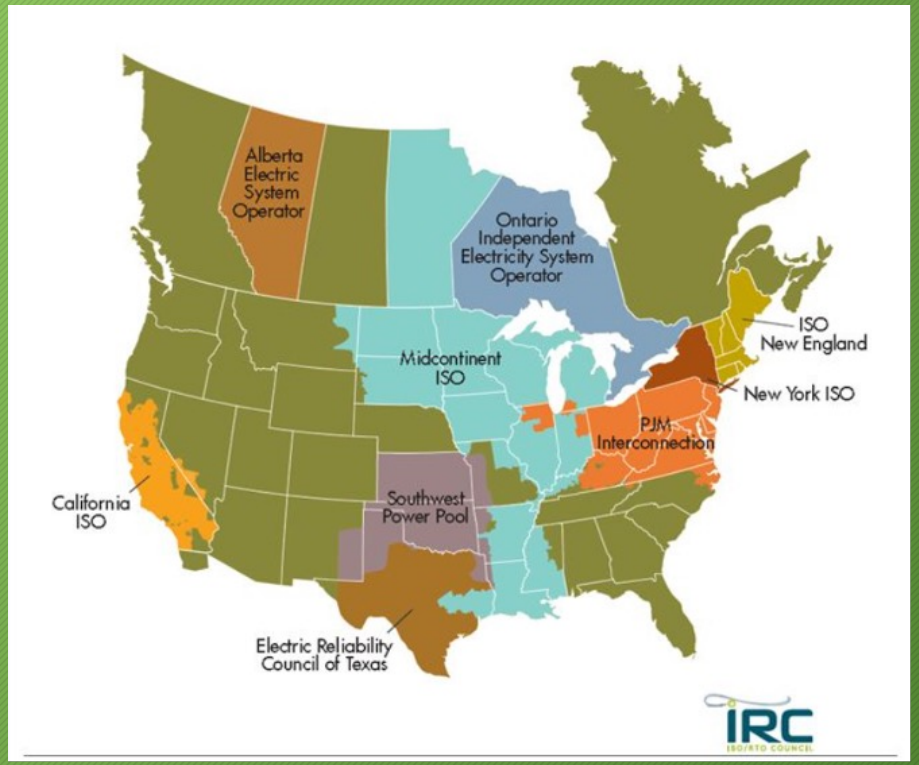
- What grid operators do to prevent network collapse is both non-exclusive and non-rivalrous. (Report to Congress on Electricity Market Competition 2007)

Electricity is key to reaching any decarbonization targets.

- Reliability throughout the transition depends on having a SPECIFIC MIX of resources that meet:
  - Policy targets + Balancing needs (load following, ramping, quick-start) + Operating reserve requirements.

What if I told there was no one in charge?

- The challenge is that there is no one in charge of meeting BOTH reliability needs and decarbonization targets
- RTOs do not set policy
- States set policy



Possible market design solutions?

- Hybrid Markets?
  - Competition “for” the market instead of “in” the market
  - Policy as driver of new entry. Informed by system planning.
  - Auction designs that avoid lock-in when no longer needed?
- Strategic Reserves?
  - All pay the cost of resources needed to maintain reliable grid operations.
  - Could still have competitive solicitation…which could enable new assets types that can fully replace fossil when commercially available?
- Regional IRP?
- Other?

Possible Planning Solutions

- Coordinated, reliability-informed, regional planning
- Resources that provide specific grid reliability services are needed now and as the grid decarbonizes.
- Reimagine the role of the RTOs
  - Provide system planning studies on various policy pathways
  - To inform state policy
  - To enable regional coordination for needed resources throughout the transition