ANALYSIS GROUP
ECONOMIC, FINANCIAL and STRATEGY CONSULTANTS

# Identifying Resilience Market Failures and Services

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Workshop on Economic Approaches to Understanding and Addressing Resilience in the Bulk Power System

**Resources for the Future & R Street Institute**

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# My point of view (biases)

## Resilience =

- A combination of activities
- Not the same as “reliability”
- More than just generation or bulk power system
- Bigger than FERC’s jurisdiction

# re·sil·ience

rəˈzilyəns/

*noun*

**"the power or ability to return to the original form, position, etc. after being bent, compressed, or stretched . . .. . . [to] spring back, rebound."**

Random House

**"…bent, compressed, or stretched…." as a result of:**

- **human-induced actions or events (cyber, terror, sabotage, human error)**
- **natural events (e.g., extreme weather or other climate-related occurrences (fires, floods, droughts), earthquakes, volcanoes, tsunami)**

# re·sil·ience

rəˈzilyəns/

*noun*

**A resilient system is one that:**

- **acknowledges that outages can occur**
- **prepares to deal with them**
- **minimizes their impact when they occur**
- **is able to restore service quickly**
- **draws lessons from the experience to improve performance in the future.**

**Incident-Focused**

√ **PRIOR**

√ **PRIOR**

√ **DURING**

√ **AFTER**

**Post Incident Learning**

## Electric system resilience is more than:

- Generation assets and attributes
- Bulk power system
- FERC jurisdiction
- The electric system alone
- Commodity products or services

# Electric system resilience = a combination of….

- **Products and services – e.g., commodities**
  - **Energy**
  - **Capacity (resource adequacy and more)**
    - MW sufficient to meet peak and installed reserves
    - MW sufficient to provide energy when called upon (e.g., fuel assurance)
    - MW capable to perform particular services (e.g., black start)
  - **Ancillary services (operational security)**

**Principles for provisions of these products & services:**
- **Rely on markets or market-based approaches wherever possible, practical**

# Electric system resilience = a combination of….

- **Systems and processes - i.e., not commodities**
  - **Planning**
    - e.g., risk identification, modeling and analysis, drills and exercises, mutual assistance agreements in place, location of critical services, inventory of equipment, spare parts, inter-sectoral coordination
  - **Event-management services and capabilities**
    - e.g., communications, graceful degradation, mutual aid
  - **Restoration process and protocols**
    - e.g., sequencing of system elements, logistics/staging
  - **Evaluation**
    - e.g., metrics, assessments, standard-setting, willingness to pay

**These are more like monopoly services, public goods, establishment of the rules of engagement, avoidance of negative externalities**

# Electric system resilience = a combination of

- **Products and services:**
  - **Regulators and agents (RTO, utility) should:**
    - **Define the product/service, then rely on markets to provide them efficiently and effectively**
    - **Markets may include bid-based/auctions as well as centralized/decentralized competitive procurements**
- **Systems and processes:**
  - **Regulators should:**
    - **Define elements (e.g., planning) and set standards of performance (e.g., metrics, check list)**
    - **Provide financial incentives and standard ratemaking elements for provision of these system elements and processes**

# A few other thoughts

## New policy (legislative and/or regulatory)?

- To characterize resilience and establish expectations for performance (who, what, when, where, why, how)
- To fill the gaps in jurisdiction
  - e.g., FERC vis-à-vis some issues and some system: gas-system reliability rules and standards, coordination across bulk-power and distribution networks
- To address public policy considerations
  - e.g., due discrimination in restoration priorities, such as providing service first to critical infrastructure and services; information requirements for distributed energy systems capable of supporting resilience

# A few other thoughts (continued)

## New product/service definitions needed?

- Redefine "resource adequacy" to make it more robust
  - e.g., locational, temporal, operational attributes

## Metrics and standards?

- e.g., planning standards (N-2; multi-system failure; fuel-assurance); performance standards; ratemaking best practices and incentives

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