National Security Considerations in Distribution System Planning

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Key concerns:

• Critical infrastructure protection (both civilian and defense) from all hazards
  o Pre- and post-disaster capabilities
  o Defense Critical Energy Infrastructure (DCEI)

• Vulnerabilities associated with infrastructure interdependencies
  o North American Energy Resilience Model (NAERM)

• Cybersecurity
US Critical Infrastructure Depends on Electricity

Critical Infrastructure Interdependencies

Energy (Oil)
- Fuel Transport and Shipping
- Power for Pumping Stations, Storage, and Control Systems
- Fuel for Generators, Lubricants
- SCADA Communications
- Shipping

Transportation
- Fuel Transport and Shipping
- Power for Pumping, Signaling, and Switching

Electricity
- Power for Switches
- Water for Production, Cooling, and Emissions Reduction
- Power for Compressors, Storage, and Control Systems
- Water for Cooling Emissions Reductions

Water
- Water for Pump/Lift Stations and Control Systems
- Water for Cooling Emissions Reductions

Energy (Natural Gas)
- Fuel for Generators
- SCADA Communications

Communications and IT
- SCADA Communications
- Fuel for Generators
- Heat

Source: Finster, 2016
Defense Facility Considerations

There is a dependence between the defense facility and surrounding community

To ensure operation of mission-critical defense functions:
- Supporting critical infrastructure within the surrounding community should be adequately protected from all threats, and
- The civilian and military populations supporting defense-critical functions should operate effectively through emergencies

Is some level of co-planning needed?
Vision

Rapidly predict consequences of known and emerging threats to national energy infrastructure.

Prioritize investments in resilience to include hardening, research development, and fuel supply.

Support accurate and holistic analyses for decision makers to prepare, respond, and mitigate threats.

Mission: Modeling of interdependent infrastructure at National scale
North American Energy Resilience Model

Components

- Modeling and simulation tools (elect, gas, coms, econ/metrics)
- Databases to store model inputs and data streams
- Secure computer and storage systems
- User environments to enable analyses
- Processes used to obtain & feed data and model inputs into system

Conceptual NAERM Workflow Concept

- North American Model
  - Electricity Model
    - Eastern Interconnection
    - Western Interconnection
    - ERCOT
    - Canada + Mexico
- Infrastructure Models
  - Energy Model
  - Water Model
  - Transportation Model
  - Telecommunication Model
- System Protection
  - Planning (Off-Line)
    - Static Model
    - Transmission
  - Planning (Off-Line)
    - Dynamic Model
    - Transmission Distribution
  - Near Real-Time (On-Line)
    - + Probabilistic, HPC, ...

ELEMENTS OF THREATS

Study the impact on the Reliability, Resiliency, & Security

Develop Plans
Resilience Decision Framework

**Logical Consistency**

**State Policy Makers**

Legislatures and Governors
- Develop policy goals and objectives (e.g., wildfire mitigation)
- Require plans (ex: CA utility wildfire mitigation plans)
- Fund improvements (ex: CA utility cost recovery standards & practices)
- Require utility coordination and oversight (ex: coordination & data-sharing among state agencies, eg, sharing cybersecurity information and practices, and conducting independent evaluations)
- Facilitate specific risk mitigation strategies (ex: microgrid development and application of NAERM findings)
- Develop further recommendations (ex: establishing commissions, boards and state offices with specific charges)

**State Policy Implementers**

Utility Commissions
- Set substantive and procedural requirements for plans, including
  - Setting objectives, based on state policy goals and customer expectations
  - Establishing scope and timing requirements based on priorities
  - Establishing metrics to measure performance
  - Determining cost recovery mechanisms
- Approve or accept plans
- Fund improvements (cost recovery approval through and/or outside General Rate Case)

**Distribution System Owners & Operators**

Utilities
- Develop plans
  - Align objectives
  - Develop long-term strategy and short-term implementation plans integrated with current planning processes
  - Prioritize short-term vs long-term needs through risk assessments
  - Coordinate planning and operations
  - Re-design business practices
  - Establish staged, technology deployment plans and cost estimates
- Implement approved plans

**Stakeholder Input Processes**
Sources of Federal Funding for Mitigation

FEMA:

1. **Hazard Mitigation Grant Program (HMGP)** — funding provided after a disaster to protect public and private property through hazard mitigation efforts, $785M provided in FY2018, 75/25 fed/non-fed match. [www.fema.gov/hazard-mitigation-grant-program](http://www.fema.gov/hazard-mitigation-grant-program)

2. **Pre-Disaster Mitigation Grant Program (PDM)** — requires a community-adopted hazard mitigation plan and determination of efforts to mitigate the impact of identified, potential natural disasters, $250M available in FY2019. [www.fema.gov/pre-disaster-mitigation-grant-program](http://www.fema.gov/pre-disaster-mitigation-grant-program)

3. **Flood Mitigation Assistance (FMA) Program** — funding for projects to reduce or eliminate risk of repetitive flood damage to buildings insured by the National Flood Insurance Program (NFIP), $210M available in FY2029. [www.fema.gov/flood-mitigation-assistance-grant-program](http://www.fema.gov/flood-mitigation-assistance-grant-program)

4. **Building Resilience Infrastructure and Communities (BRIC) Program** — the Disaster Recovery Reform Act (DRRA) will reserve 6% of total funding obligated yearly to the Disaster Relief Fund to support new, innovative large infrastructure projects, $300-500M annually, 75/25 fed/non-fed match. [www.fema.gov/drra-bric](http://www.fema.gov/drra-bric)

HUD:

Questions for Consideration

How should national security concerns be addressed in grid planning processes?

1. Are current mitigation* processes sufficient?
   a. For critical infrastructure protection?
   b. Cybersecurity?

2. If not, what processes are needed?
   a. Are they threat dependent?
   b. What is the role of federal authorities and with whom should they interact?
   c. What are the specific processes or approaches that are needed?

3. Is funding a consideration?
   a. Who is responsible? (Depends…?)
   b. Preferred mechanisms?

* Mitigation is a type of long-term, pre-disaster planning which involves sustained expenditures on structural and non-structural efforts to reduce or eliminate future risks and is distinguished from emergency preparedness, restoration, and recovery.
Thank You

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