EDISON ELECTRIC INSTITUTE

Addressing Reliability Concerns:

Why Utilities and the Federal/DoD Must Stay VERY Engaged with One Another

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Edison Electric Institute

- U.S. Trade Association representing investor-owned electric utility companies
- International affiliates and industry associate members worldwide
- U.S. members serve 95% of the ultimate customers in the IOU segment of the industry
- And represent 70% of the U.S. electric power industry
- What do we do?
  - Serve of the advocacy arm for the industry
  - Work with federal agencies to implement laws and rulings
  - Work with our members (through various committees) to develop industry leadership and develop/share best practices on operational issues.
  - Work with our members and their customers

Changing Landscape

- Blackout of 2003: a game changer
  - Changing use of grid: local to a superhighway
    - Wholesale competition
    - Increasing congestion
    - Lower levels of investment in grid
      - Uncertainties about ownership, state-federal roles, pricing policy, siting issues
  - A voluntary approach to assuring grid reliability no longer viable
    - Enforceable Reliability Standards now the law
    - $1 Million a day for non-compliance

Changing Landscape (2)

- The recession has resulted in dampened demand, but demand is forecast to rebound and grow into the future – 25% by 2030 EIA
- The utility industry is at the beginning of a major investment cycle
  - Driven by new technology, demand growth, efficiency and environmental
- Increased attention to global warming and energy policy
- U.S. is no longer only significant influence in energy consumption
- Policymakers are calling for the industry to look at new technologies (i.e., renewables)
  - However, many of these new technologies are not possible without a robust transmission grid

Overview

- The increasing importance of understanding each others missions
- Overview of Our Business and its Concerns
- Engagement

Why Engagement is So Important
Plans/Procedures/Concerns

- DSB and changing energy security climate
  - An obvious alignment of goals/concerns that must be exploited
- SecureGrid '09 War Game (July 2009) hosted by DoD, DoE, DHS
  - Feedback from utility participants – "very worthwhile exercise"
- Takeaways:
  - DoD and utilities need to better understand each other's plans/procedures
  - Need to have relationships in place - don't wait until an emergency happens to figure out what to do, who to call, etc.
  - Top-down, one-size-fits-all solutions don't work well for either the utility industry or the diversity of DoD/Federal facilities
  - Exercises like SecureGrid should be repeated annually or some regular interval
  - What was the case 1-5 years ago, isn't necessarily today

An Alignment of Goals/Concerns

DoD Energy Priorities

- Cyber/physical security
- Aggressive EE policies and targets
- Energy Security: island critical assets
- Carbon reduction
- Smart meter/grid
- Renewables
- Demand Response
- Electrification of fleet and SG integration

Utility Priorities

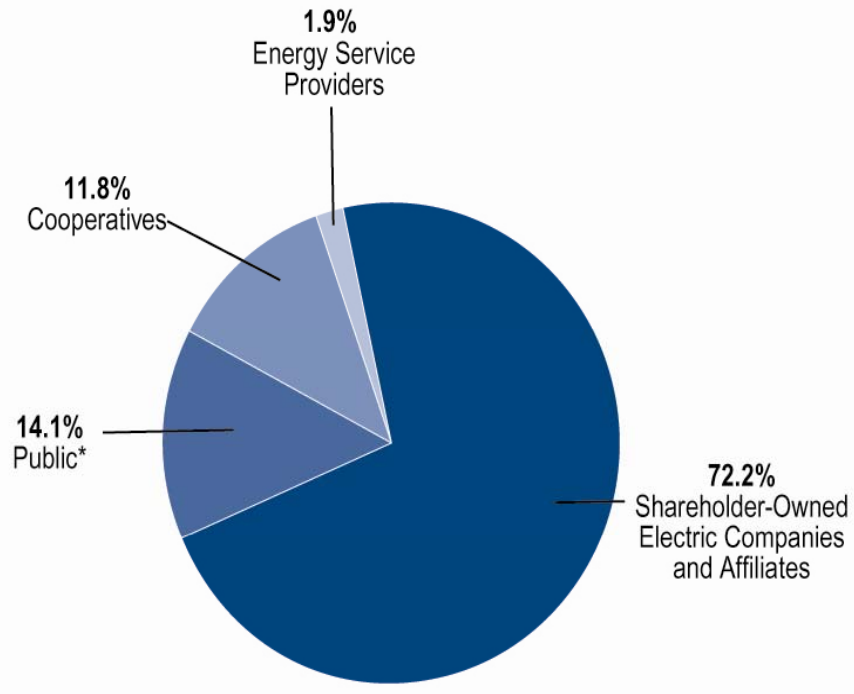
- Cyber/physical security
- Significant EE investments and targets
- Solutions to siting plants/ transmission
- Federal and state mandates
- Significant SG investments
- RPS mandates
- Demand Response
- PHEV

EEI

Our Industry's DNA

Types of Electric Utilities

- Shareholder-Owned Utilities
- Cooperatively Owned Utilities
- Government-Owned Utilities
  - *Federally Owned Utilities*
  - *State-Owned*
  - *Municipally Owned*
  - *Political Subdivisions*



* Includes state projects, political subdivisions, and municipal systems.
Note: Federal Utilities serve <0.1% of customers.

Source: U.S. Department of Energy, Energy Information Administration (EIA), *Monthly Electric Utility Sales and Revenues Report with State Distributions (EIA-826)*.

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Regulation of Investor-Owned Electric Utilities

STATE AND FEDERAL

What Does it Mean to be Regulated?

Rights

- Protected service territory
- Recovery of legitimate costs
- Fair return on investment
- Allowed to charge "non-competitive" rates

Responsibilities

- Obligation to serve
- Expenditures must be prudent
- Investments must be "used and useful"
- All rate increases must be justified and approved

Regulation of IOUs: States

- Generally, state governments regulate:
  - *adequacy of retail electric service;*
  - *mergers;*
  - *facility planning and siting on generation, transmission, distribution*
- In the 31 states without competition:
  - Rates are still determined by PUCs who look at the utilities entire cost of generating and delivering electricity to customers, and then set a rate that will reimburse the company for those costs plus a fixed rate of return
  - The PUCs' goal is to keep rates as low as possible while allowing the utility to remain financially healthy and meet their obligations to serve
- In 19 deregulated states and D.C., the generation portion is unregulated – transmission and distribution is regulated.

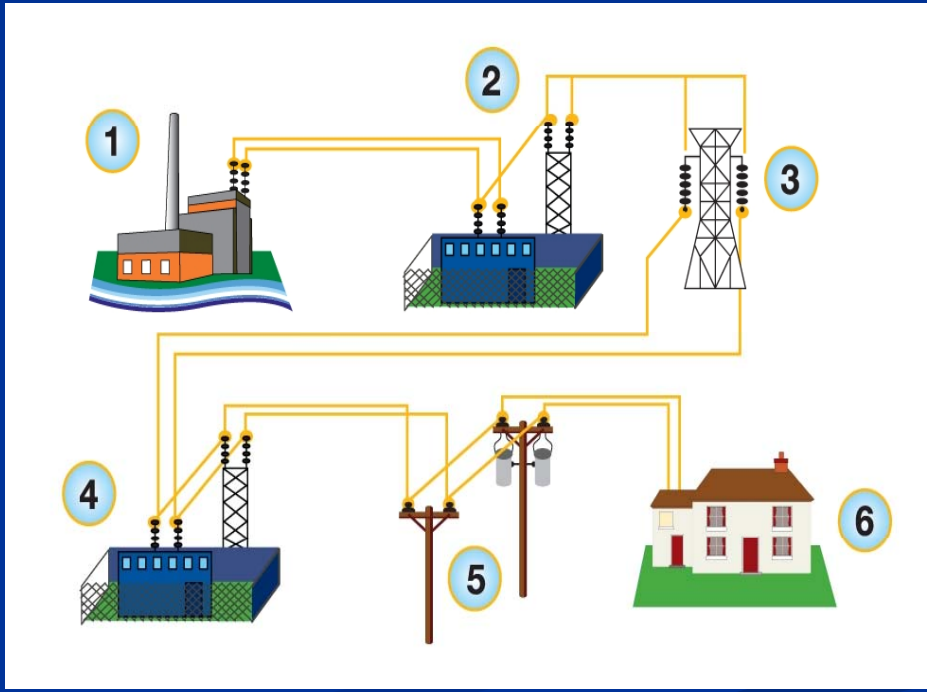
Regulation of IOUs: Federal

- *The federal government regulates interstate power sales and services (including reliability of grid), mergers; corporate structure*
- EPAct of 2005 created the Electric Reliability Organization (ERO).
  - In 2006, FERC selected NERC, an independent entity, to develop and enforce mandatory electric reliability rules on all users, owners, and operators of transmission system as the ERO.
- Other federal and state laws, rules, and regulations also apply to the electric utility industry, including, but not limited to:
  - *Anti-trust laws / Dept. of Justice / FTC*
  - *SEC requirements, including Sarbanes-Oxley*
  - *Environmental regulations/EPA*

HOW DOES THE SYSTEM WORK?

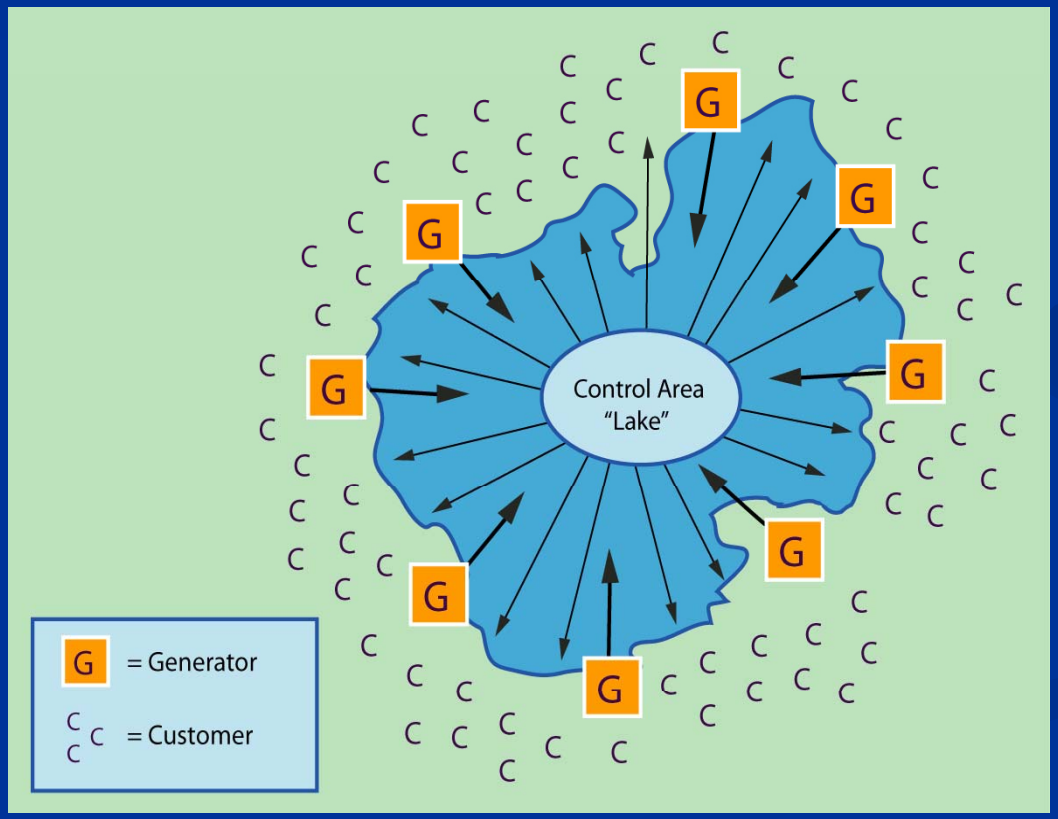
How the System Works

1. Electricity is generated and leaves the power plant
2. Its voltage is increased at a “step-up” substation
3. The energy travels along a transmission line to the area where the power is needed
4. Once there, the voltage is decreased or “stepped-down,” at another substation
5. A distribution power line carries the electricity
6. Electricity reaches your facility/base



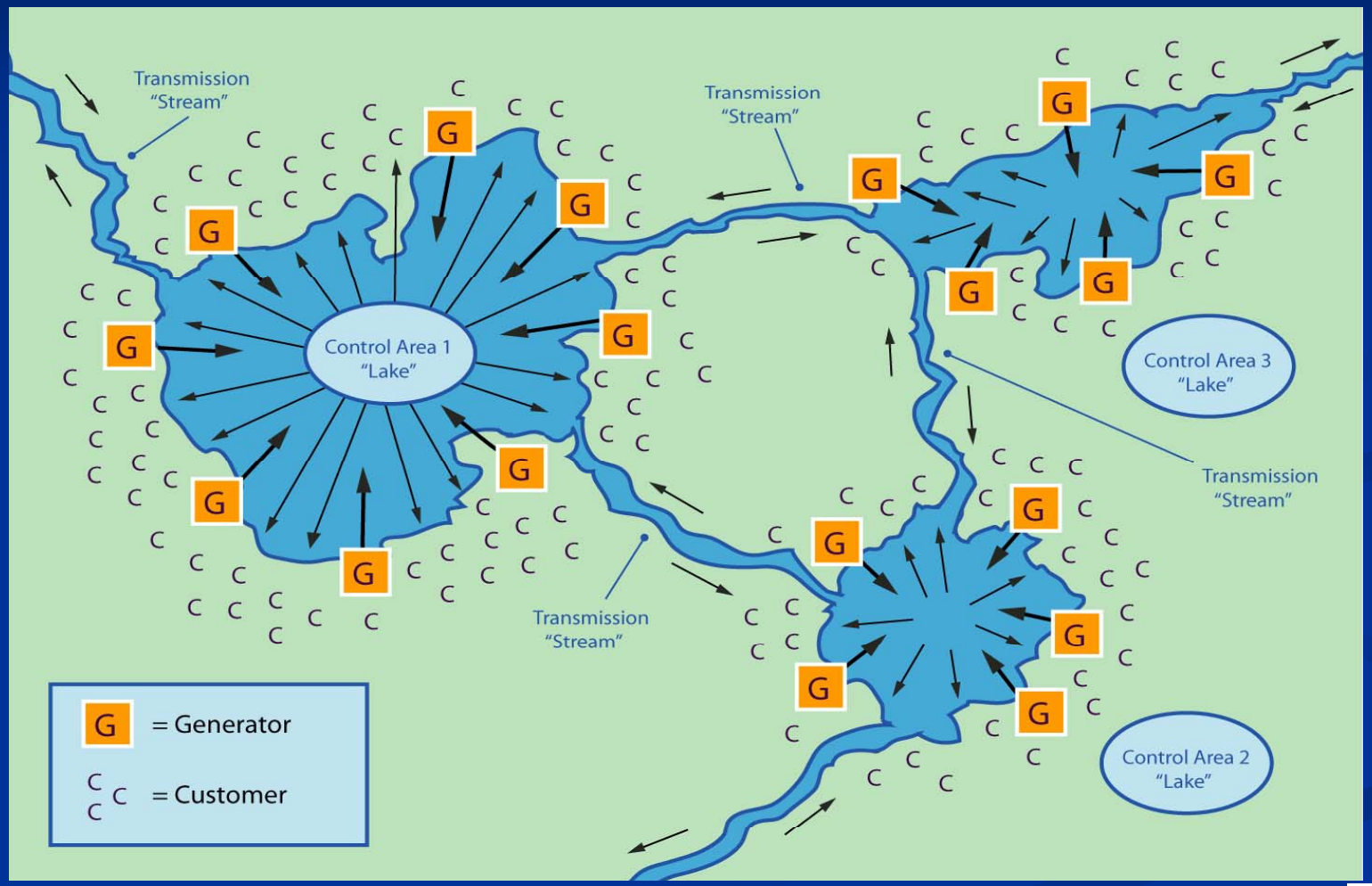
Operating Grid
What's the Catch?

Electricity cannot be stored, so supply (generation) must be produced exactly when needed to meet customer demand and to avoid system failure



- Level in electricity "lake" must be kept constant at all times
- Laws of physics dictate that power flows along path of least resistance; we cannot direct it along specific route

What's the Catch?



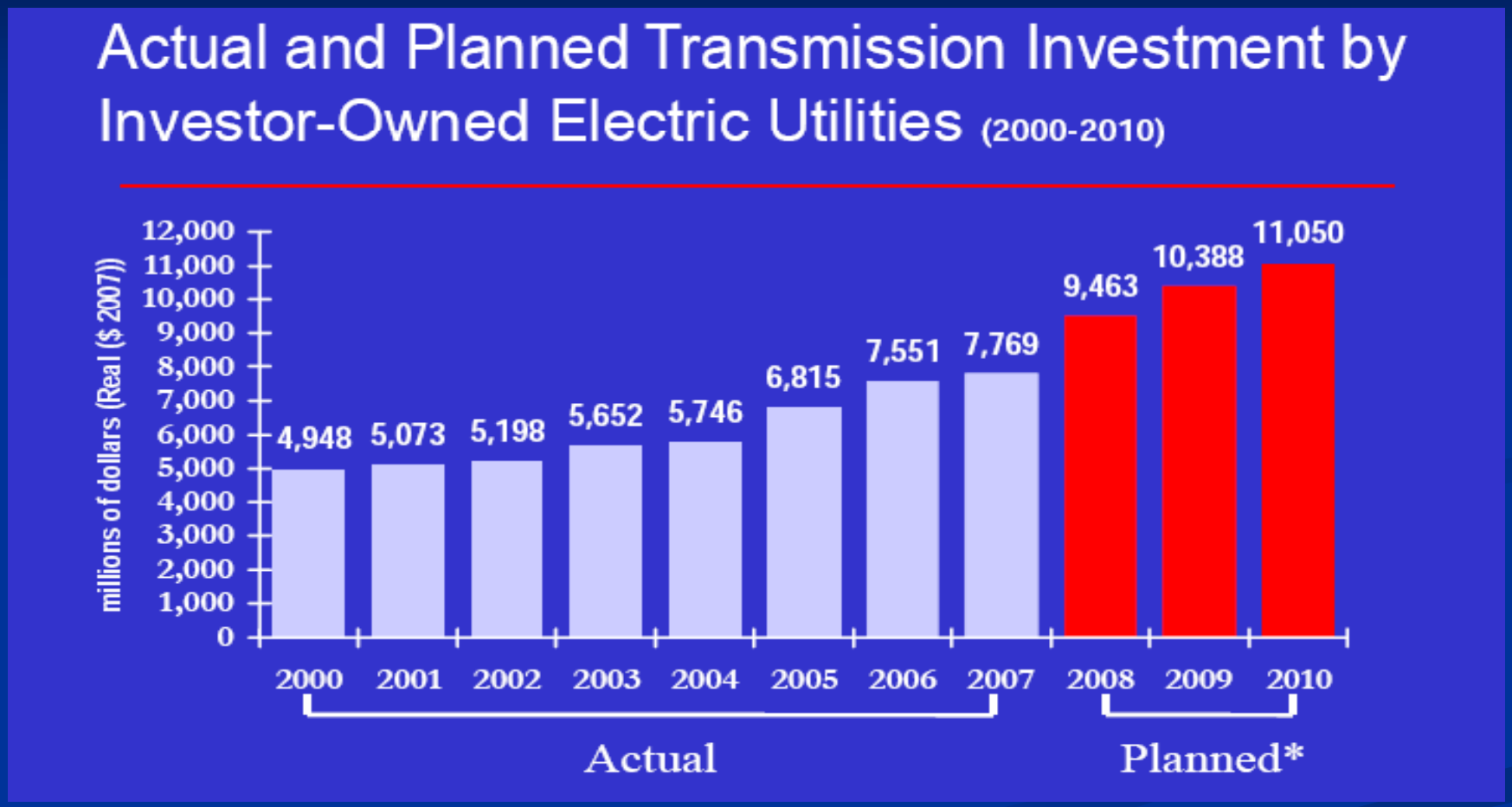
US Transmission Lines & Grid

Source: Produced by Edison Electric Institute. Data Source: Ventyx,Inc., The Velocity Suite 2009.

Increased Investment in Transmission

- From 2001-2007: $37 billion
- Response to providing congestion relief, enhance regional reliability, generator interconnection, load growth
- New federal and state developments affecting transmission infrastructure
  - EPAct 2005: *enforceable* reliable standards
  - State Renewable Portfolio Standards
  - Federal transmission pricing policies

Actual and Planned Transmission Investment



Note: Handy-Whitman Index of Public Utility Construction Costs used to adjust actual investment for inflation from year to year. Data represents both vertically integrated and stand-alone transmission companies. *Planned total industry expenditures are preliminary and estimated from 85% response rate to EEI's Electric Transmission Capital Budget & Forecast Survey. Actual expenditures from EEI's Annual Property & Plant Capital Investment Survey & Form 1s.

Operational Challenges For Integrating Renewables

- *Note: This doesn't just apply to utilities. A government distribution system is a microcosm of the utility system.*
- New renewable levels can create significant surplus energy at times
  - Can't always be used on grid or sold to others
  - Energy storage / off-peak electric vehicle charging can mitigate problem
  - At present these technologies can not significantly contribute to resource plans - smart grid will help enable these new technologies
- Renewable levels will require higher planning reserve margins for system backup to maintain reliability
  - More ancillary services req'd to maintain frequency and voltage levels
  - Generation and storage technologies required to meet system regulation, load following, and ramping requirements
  - Quick start and fast ramping technologies (peaking / storage) to manage generation variability and maintain reliability

Working With Utilities on Energy Security

Key EEI Security Objectives

- Develop next generation of security leadership to address changing security needs (e.g., cyber security, physical attacks, pandemic planning)
- Under CEO leadership, we coordinate the entire suite of EEI activities to ensure that the industry takes a comprehensive approach to business continuity
- Provide trusted forum for sharing and developing effective security best practices.

Energy Security

- We manage EEI programs to work with members on security and business continuity issues
  - EEI Security Committee
  - EEI CEO Business Continuity Task Force and supporting working groups
  - EEI CEOs Electric Sector Steering Group

Before Developing Plans, RFP's, etc., Develop Relationship with Your Utility

- Account executives, senior management
- They know their system, options, and pathways
  - Distribution
  - Transmission
  - Potential vulnerabilities
  - It's in their interest to help you make the most appropriate energy decisions
- They are positioned to work with you on Integrated Resource Plan
  - Take the guess work or assumptions out of plans, ideas
  - Align needs, goals with those of utilities and neighboring communities
    - ID opportunities – UESCs, tariffs, etc.

Developing an Integrated Plan

- Develop a vulnerability check-list
- Conduct a sanity check with your utilities
  - What are the utility physical, regulatory, and business particulars?

- What exactly are you trying to do?
  - What are the options?
  - Barriers and Resolution?

Max out efficiency, before tackling more costly ventures!!!

Resources

- Directory of Federal Account Executives (www.eei.org/nka)
- Energy Security Partnership Group
  - DoD-EEI group formed to identify and work to find solutions for facility energy security matters
- FEMP

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Thank You

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