Meeting Connecticut's Energy Goals

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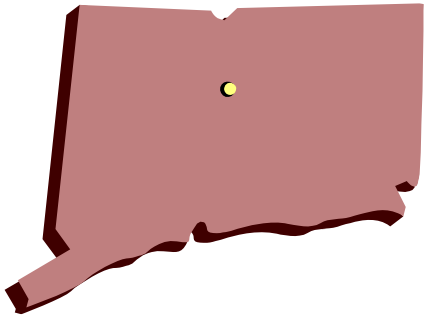
How the energy world looks to us

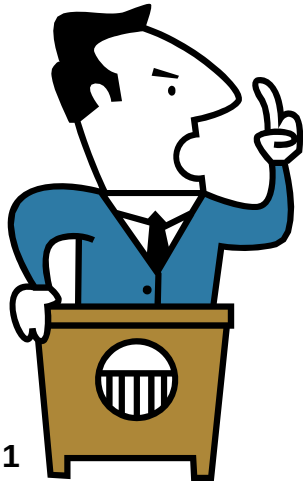
CUSTOMERS/DEMAND

- Slow growth; contraction possible
  - Slow economic recovery
  - Expanding energy efficiency investment
  - Changing relationship with power requiring rethink of reliability standards and distribution business

TECHNOLOGY DEVELOPMENT

- "Clean Tech" hype moderating
  - Google and Microsoft exiting
  - AMI deployments challenging
  - "Smart Grid" developing slowly
  - EV introductions successful
- Improving solar costs (China effect)
- Storage still a question mark





ENERGY POLICY MAKERS

- Ongoing frustration with high retail rates
- Storm preparedness and response "top of agenda"
- Continued Federal support for transmission development (including economic transmission)
- Federal Energy Policy in flux

FUEL SUPPLY

- Sustained low/moderate gas prices
  - Continued supply expansion
  - Demand not keeping pace with supply
  - Changing pricing mechanisms
- (Lack of) fuel diversity concerns growing

Our Priorities

- What Policy Makers Want:
  - Primary: Cleaner, Cheaper, and More Resilient
  - Secondary: Technological Innovation
- How NU will further those goals:
  - Expand customer access to natural gas for heating and industrial processing
  - Facilitate the development of alternative fuel transportation
  - Increase access to clean and cost effective generation sources
  - Improve the resiliency of the electricity grid and storm response to meet customer expectations, not “good utility practice”
  - Strategically smarten the grid with digital technology

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Natural Gas Plan Proposal

Summary of Plan

- **Expand customer access** to natural gas
  - Residential 35 -- > 50%
  - Commercial 35% -- >75%
  - Industrial 54% -- > 75%
- **Phased approach** with initial focus on customers proximate to existing mains followed by expansion of gas main to attractive loads
- **Focus on key loads** with broad state benefits (e.g., schools and key employers)
- Working to **get key enablers in place**
  - Customer conversion incentives/ financing options
  - Regulatory treatment of expansion capital
  - Transition options for fuel oil dealers

Benefits to Connecticut

- **54,000 job-years** of NET total employment
  - 8,000 craft labor jobs per year in the first 5 years
  - 3,100 jobs per year in years 6-10
- **$4.1 billion of increased net GDP**
  - $2.8 billion first 5 years
  - $1.3 billion in the later years
- **$0.4 billion of increased state revenue**
  - 86% in the first five years
- **$30-35 million of increased property taxes**
- **$12 million in additional natural gas energy efficiency funds** per year
- **1 million tons of CO2 emissions reduction**

Alternative Fuel Transportation

- Connecticut ideal for electric transportation
  - Short commute distances
  - Environmentally aware population
  - High percentage of hybrids in existing fleet
- "Away from home recharging" research project underway and evaluating expansion into a broader public infrastructure investment to cure "range anxiety"
- Developing a "home recharging" pilot with incentives to encourage off-peak recharging
- Natural Gas a better option for medium and heavy duty vehicles
- Developing proposal for 2-3 natural gas vehicle refueling stations for local fleets

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Developing New Sources of Clean Generation

THE NORTHERN PASS℠

> 1200 MW HVDC interconnection with Quebec; participant funded transmission project with potential to import up to 10 GWh of low carbon intensity power at market prices (no premium and no subsidy)

> Public Act 11-80 Section 127 renewable generation: examining several potential projects to develop 10 MW of utility scale renewables

> In discussions with multiple renewable developers and other Transmission owners to develop a renewable collector transmission project in Northern New England

> Launching first solicitation of the LREC-ZREC program for small scale renewable and low emission resources

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Improving the resiliency of the grid

- Implementing a comprehensive improvement program focused on storm response processes and practices
- Proposed an infrastructure hardening program focused on enhanced vegetation management, structural and electrical hardening
- Evaluating costs and benefits of alternative storm hardening approaches, including
  - Undergrounding key electric distribution assets
  - Expansion of back up generation for key municipal facilities (gas station, grocery, schools, shelters)
  - Deployment of micro grid approach with low emission generation
- Designing a micro grid pilot program with several partners to better understand the state of technology and costs
- Working with GM to explore the potential role Extended Range Electric Vehicles (like the Volt) could play in providing back up generation during a prolonged outage

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Smartening the grid

- Deployed over many years an already smart grid that can isolate faults and minimize outages to about 70% of the circuit miles
- Conducted a comprehensive dynamic pricing rate pilot using AMI technology; prospective roll out under consideration at DEEP
- Examined cost-benefit of multiple smart grid technologies and currently designing a pilot to understand the real benefits of
  - Optimizing voltage at the customer level
  - Improving outage detection and restoration
  - Integrating distributed generation resources to minimize power quality impacts
  - Sensing technology to improve asset management

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Things we are concerned about

- Natural gas pipeline capacity expansion needs
  - LDC contracting risk
  - Power Generators' reliance on non-firm capacity
- Natural gas dependence in generation sector, especially with potential solid fuel retirements
- Product life-cycle of digital technologies and "future-proofing" "smart-grid" investments
- Unintended rate payer impacts of various policies/ programs and how to rethink rate design to ensure equitable distribution of costs