

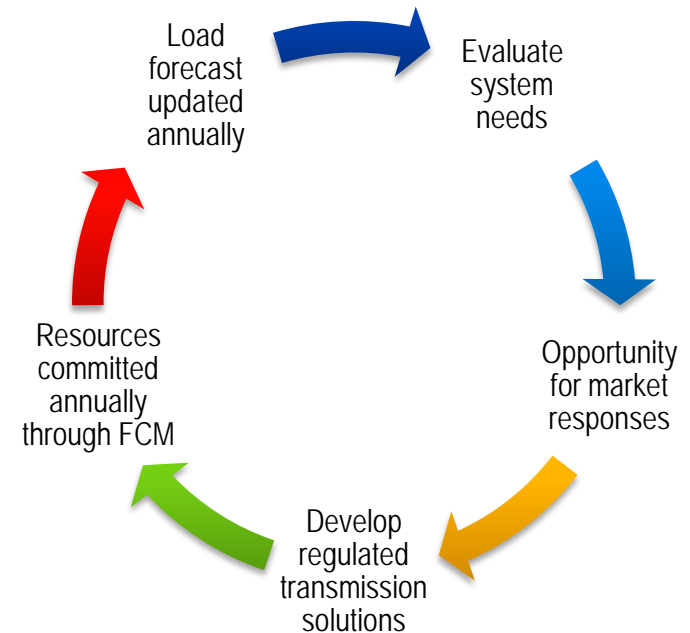
The Evolution and Expansion of System Planning

Gordon van Welie, President and CEO
ISO New England Inc.

NECPUC Symposium
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New England Planning Process is Continuous, Adaptive, Successful

- Transparent, 10-year annual needs assessment reflects:
 - Updated load forecasts
 - Market responses
 - Timing of future resource needs
- Preferred transmission solutions
- Results: reliability-based transmission investment across the region

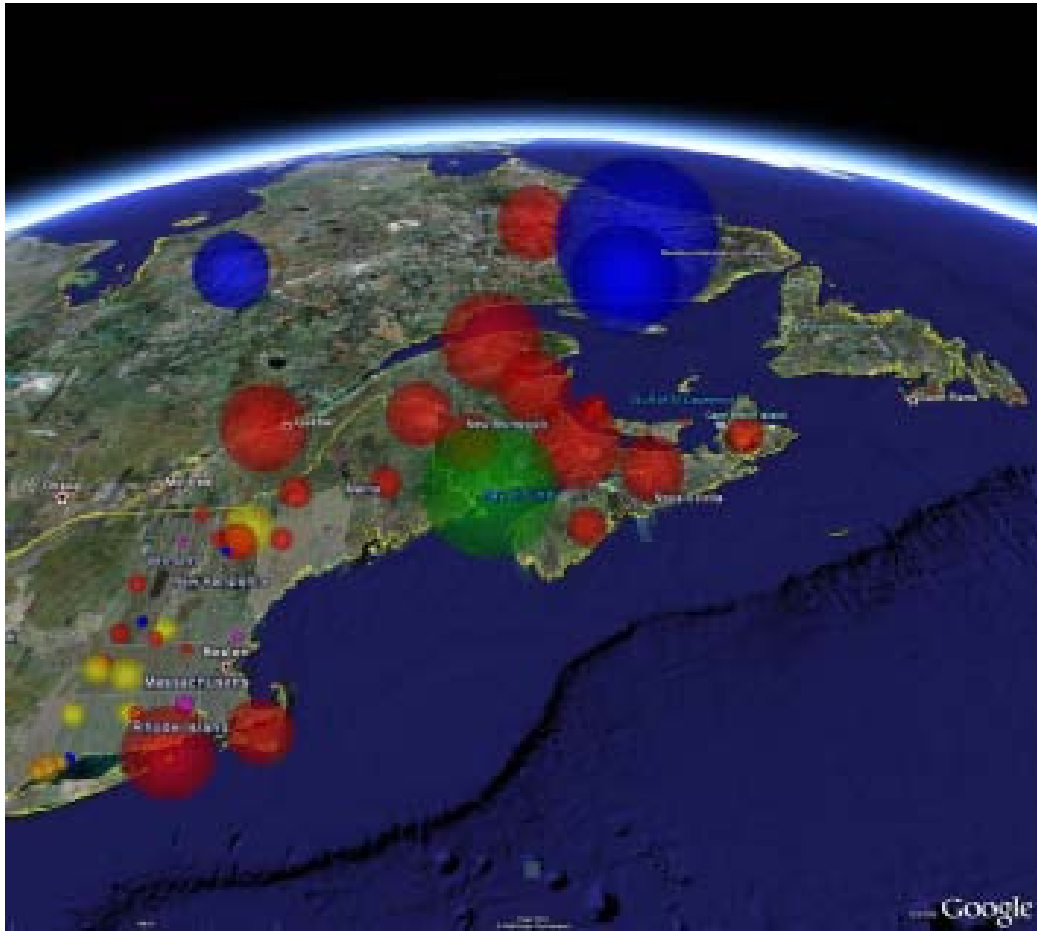


Planning Evolving Beyond Reliability Needs

Policymakers seek environmental, economic solutions

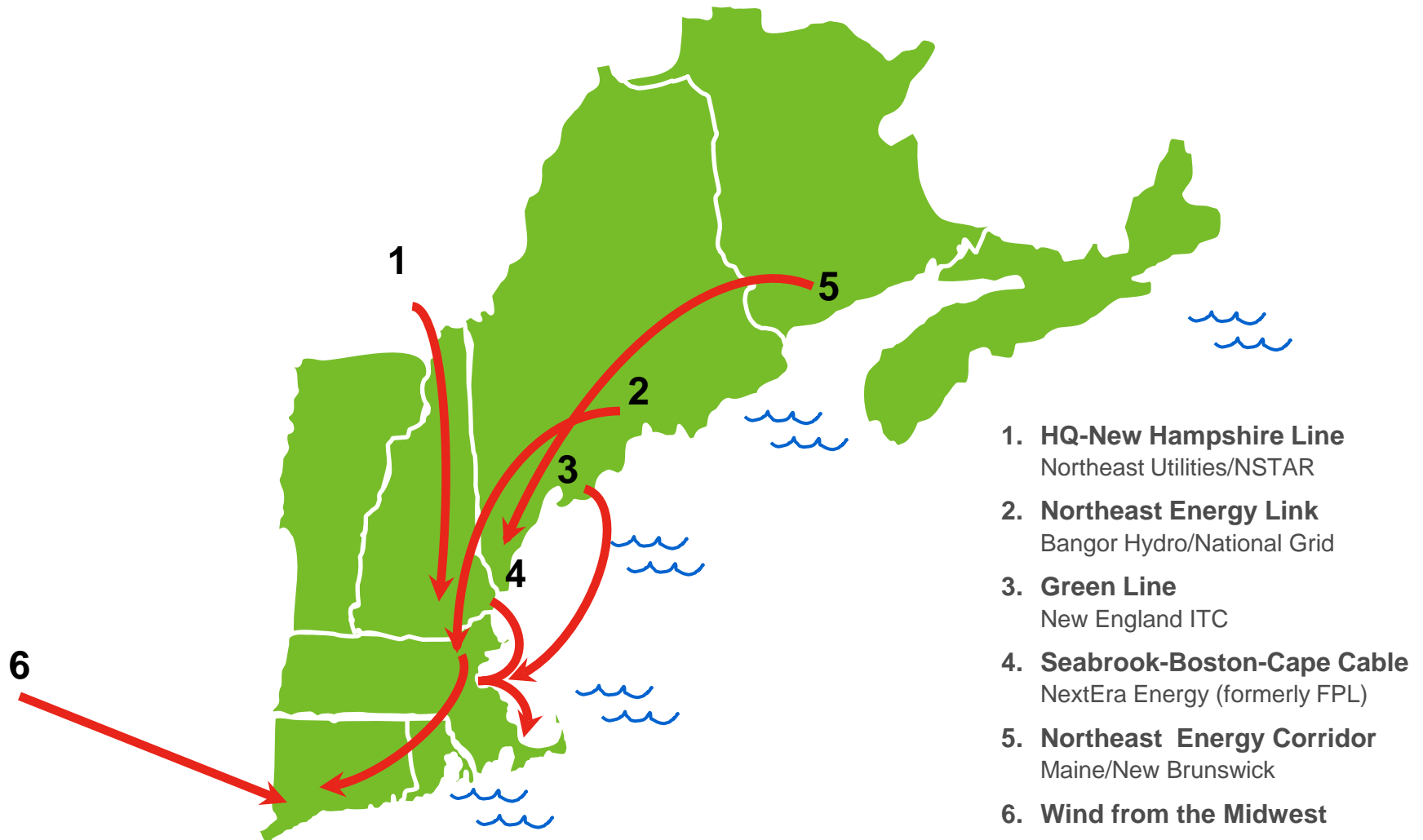
- **FERC** requires economic studies in 2008
 - Studies evaluating multiple long-range resource and transmission scenarios have been performed but cost allocation is undecided
- **Governors** pursue long-term vision for renewable integration
- **Congress** seeking legislation for:
 - Aggressive transmission development, broader planning, a smarter grid, national carbon cap and trade, national RPS

Developers Proposing Renewable, Low- and Non-Emitting Resources in New England, Eastern Canada



- Hydro
- Wind
- Biomass
- Landfill gas
- Fuel cell
- Nuclear

On- and Off-shore HVDC Projects Vying to Move Renewable Energy to New England Load Centers



Governors' Request ISO Technical Support for Regional "Blueprint"

- States seek to identify: *“significant sources of renewable energy available to New England, the most effective means to integrate them into our power grid, and the estimated costs.”*
 - New England States Committee on Electricity (NESCOE), March 2009
- Request economic study for 2009
- Transmission funding methodology uncertain



Blueprint: Approach

- Study is based on renewable resource scenarios
 - Combination of wind, demand resources, PHEV, energy storage and expanded imports
 - Range of resource penetrations (low / medium / high)
 - Long-term horizon: approximately 20 years into the future (around 2030)
- Evaluates generation retirement scenarios
 - Gas units added if needed to meet Installed Capacity Requirement
- States are developing study assumptions

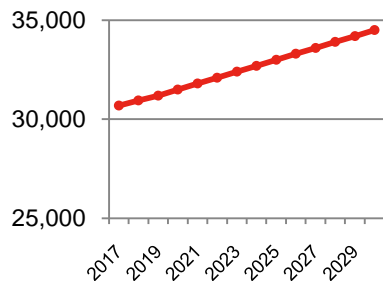
Blueprint: Preliminary Assumptions



Existing Resources

- Existing capacity plus resources selected in Forward Capacity Market

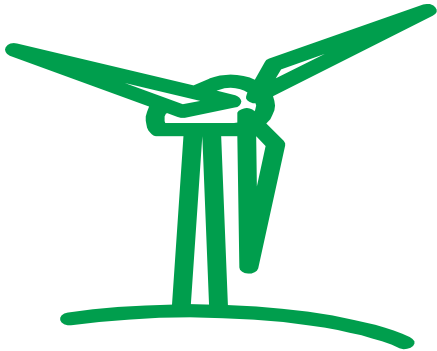
Forecast: 2017-2030



Demand Forecast

- Extrapolate *2009 Regional System Plan* forecast to 2030 (Approx. 34,500 MW peak demand)

Blueprint: Preliminary Assumptions



Wind

- Add up to 12,000 MW of on- and off-shore wind in New England
 - Off-shore wind distributed evenly between Maine, Massachusetts, and Rhode Island



New Demand Resources

- On-peak and seasonal peak energy efficiency (Passive)
- Real-time Demand Response (Active)
- Emergency Generation

Blueprint: Preliminary Assumptions



Energy Storage

- Add generic energy storage scenario as a proxy for new pumped storage hydro, batteries, compressed air, or other technologies

Plug-in Electric Vehicles

- Up to 2.5 million PHEVs in New England by 2030



Blueprint: Preliminary Assumptions



Repowering:

- Repower older fossil generators (oil and coal) with new state-of-the-art natural gas generators

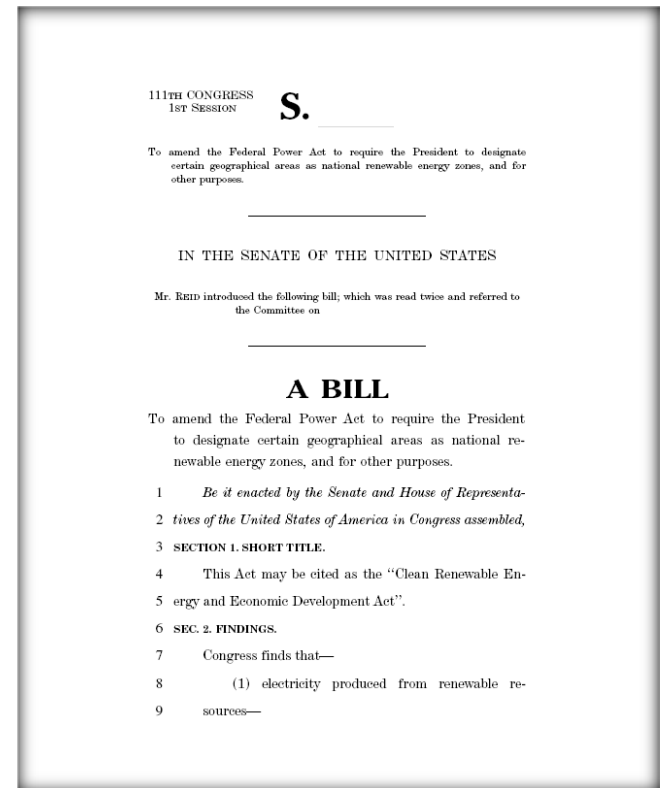


Imports:

- Expand interconnections with neighboring systems to increase imports of clean energy supplies

Congress to Require Broad-based Planning

- Stimulus calls for interconnection-wide planning, study of renewable integration
- Discussion of new planning entity to develop transmission for Eastern Interconnection
- National debate ongoing:
 - Should planning be top-down or bottom-up?
 - Scenarios or plans or combinations?
 - Appropriate role of ISOs/RTOs and states?



Making Broad Interconnection Planning Work for New England

- Planning authorities establishing collaborative for coordinated planning
- Create analysis of Eastern Interconnection using regional plans as foundation
- “Bottom-up” approach ensures New England characteristics, including Governors’ Blueprint, are considered
- FERC authority to modify regional plans



Moving New England Toward Smart Grid

- Drivers:
 - Improve capacity utilization, reduce consumer costs, promote integration of DR, renewables, energy storage technology
- Requirements:
 - Clear objectives from federal and state policy makers
 - National standards; communications, interoperability, cybersecurity
- Progress:
 - Multiple ISO initiatives to enhance communications, visibility of smart grid devices, and testing of new technologies

Challenges for ISO New England

- **Growing requirements in a period of significant cost control**
 - Existing initiatives stretching current resources
 - Accelerating state, regional and national regulatory requirements to integrate renewable resources and implement smart grid initiatives
 - Increasing stakeholder demand for complex and resource-intensive market improvements and planning services
- **Dilemma: Deciding priorities in a budget-constrained environment**

Conclusion

- Regional planning and cooperation is a solid foundation to meet new planning requirements
- New England to contribute to national energy goals
- ISO New England:
 - To support New England states in developing a regional blueprint for the future
 - Seeks input on five-year business plan and priorities