

2014 Regional System Plan (RSP14)

2014 Public Meeting



Stephen J. Rourke

VICE PRESIDENT, SYSTEM PLANNING



Revised Agenda: 2014 Regional System Plan Meeting

Seaport Hotel & Seaport World Trade Center, Boston, MA

11:00 a.m. Registration

11:30 a.m. Lunch

12:30 p.m. Welcoming remarks

12:40 p.m. ISO New England report on **2014 Regional System Plan** and Q&A

1:45 p.m. Break

2:00 p.m. **Panel:** How will New England get its energy in 2023: By pipe, by wire, or from local resources?

3:30 p.m. Closing remarks and adjourn

Panel Discussion: How will New England get its energy in 2023: By pipe, by wire, or from local resources?

- Moderator
 - **Roberta Brown**, ISO New England, Board of Directors
- Panelist
 - **Rob Bennett**, Executive Vice President and Chief Operating Officer, Emera Inc., Halifax, Nova Scotia
 - **Ron Edelstein**, Director, Government and Regulatory Relations, Gas Technology Institute
 - **Chris Recchia**, Commissioner, Vermont Department of Public Service; and, Manager, New England States Committee on Electricity
 - **Bill White**, Senior Director, Offshore Wind Sector Development, Massachusetts Clean Energy Center

2014 Regional System Plan (RSP14)

Process and Summary

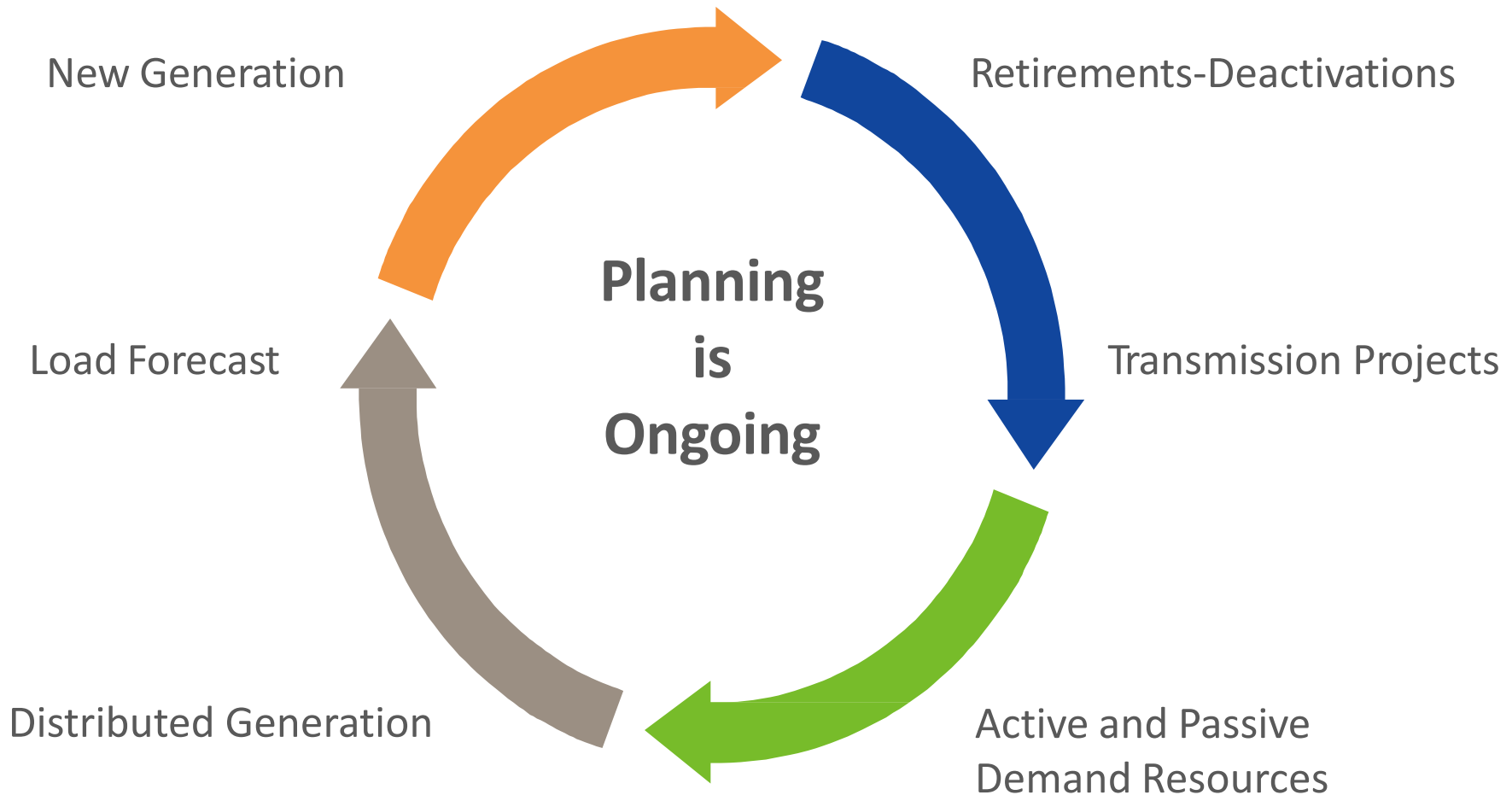


Michael I. Henderson

DIRECTOR, REGIONAL PLANNING AND COORDINATION



ISO New England System Planning Process



Planning Process: Objectives and Overview

Objectives

- Meet reliability criteria
- Provide opportunities for market solutions
 - e.g., generation, demand-side measures, and elective or merchant transmission
- Provide a regulated transmission plan as a backstop for identified reliability needs
 - Can be modified based on market solutions that develop

Overview

- Summarizes system planning activities and updates RSP13
- Presents system needs over a 10-year horizon
- Summarizes information on the amounts, types, and locations of resources required to meet future system needs
- Provides status of transmission projects in the plan throughout the year, consistent with national, regional, and ISO New England requirements
- Summarizes interregional planning activities

RSP14 Satisfies Tariff Requirements

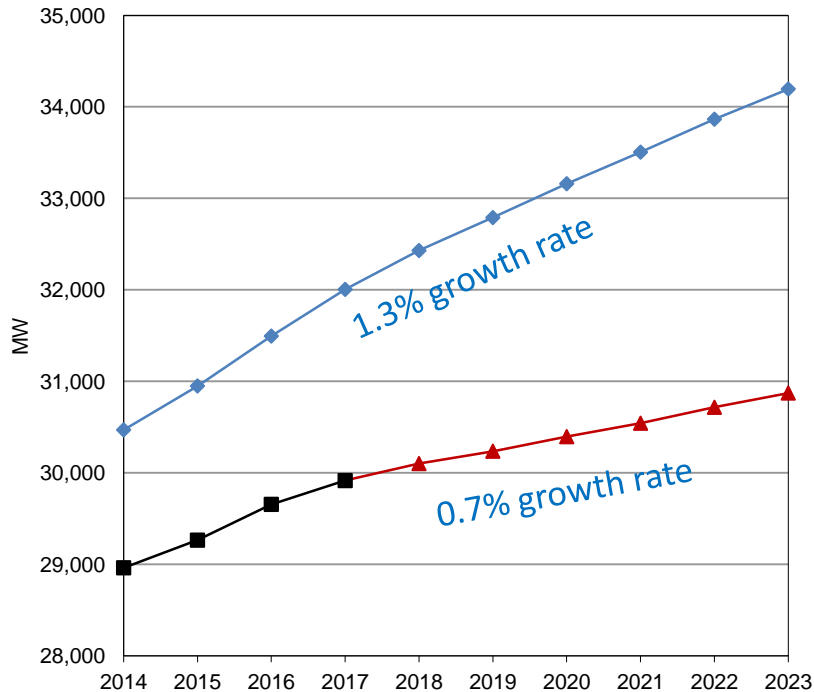
- The ISO carries out regional planning with the Planning Advisory Committee (PAC) as part of an open, transparent stakeholder process
- RSP14 reflects the results and findings of the ongoing ISO regional planning process for 2014
- RSP14 meets all required planning procedures and criteria
 - North American Electric Reliability Corporation
 - Northeast Power Coordinating Council
 - ISO New England



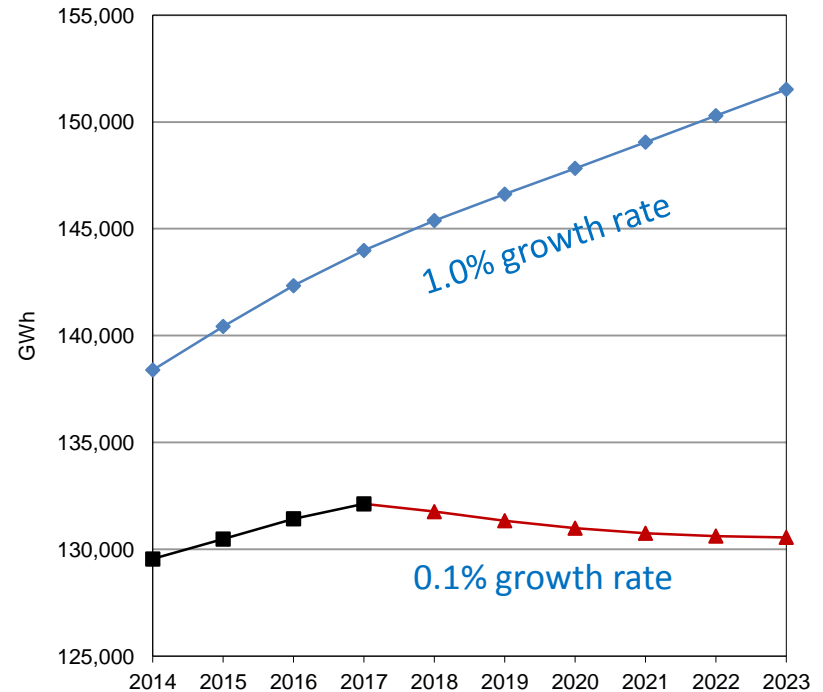
Energy-Efficiency Investments are Producing Results

Peak demand growth is lower; energy use is flat

New England: Summer 90/10 Peak (MW)



New England: Annual Energy Use (GWh)



—◆— RSP14 —▲— RSP14-FCM-EEF —■— RSP14-FCM

—◆— RSP14 —▲— RSP14-FCM-EEF —■— RSP14-FCM

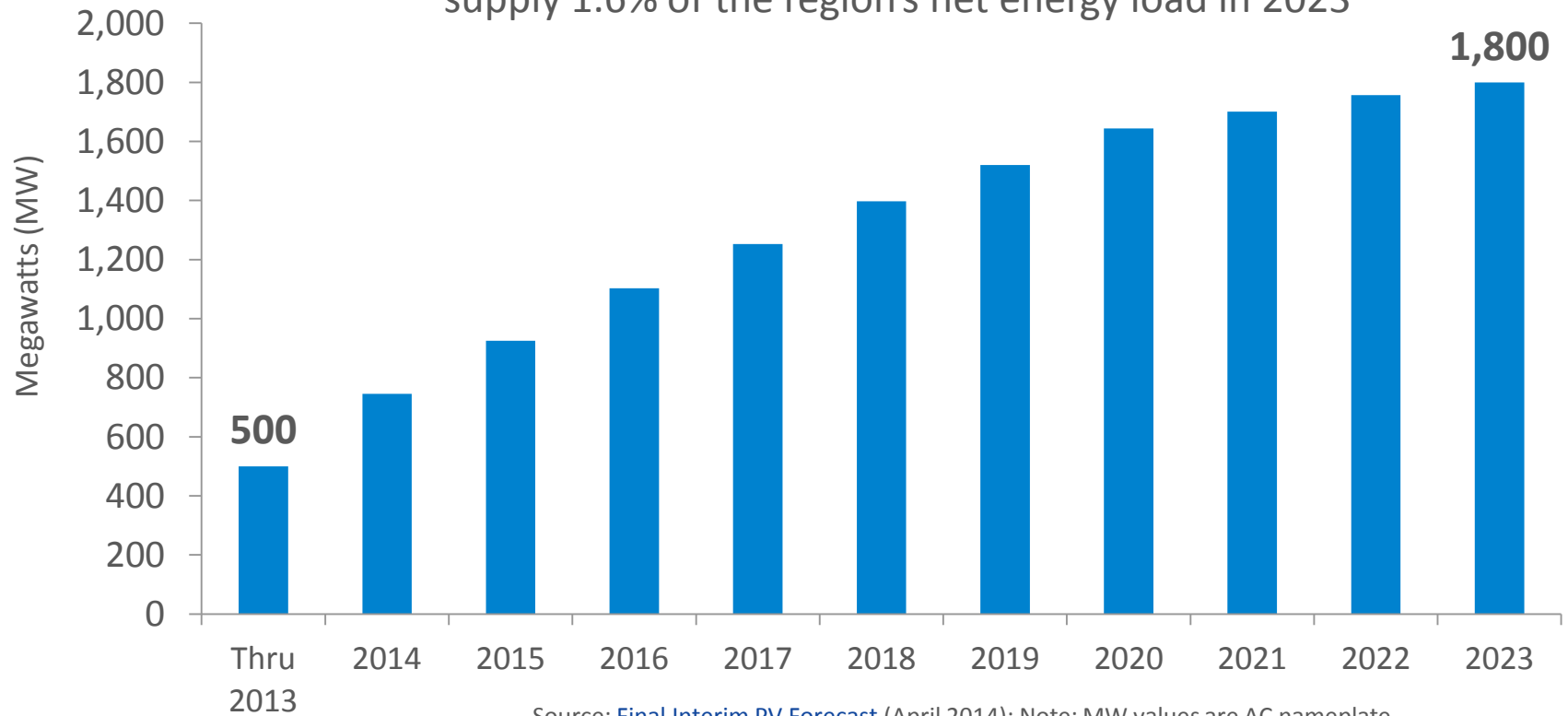
Source: [Final ISO New England EE Forecast for 2018-2023](#) (April 28, 2014)

Forecasts of Region's Annual and Peak Use

- System needs are driven in part by load forecast, which reflects:
 - Slow economic recovery
 - Historical energy efficiency (EE)
 - Federal EE standards for appliances and commercial equipment
 - Reduces forecasted energy use by 1.6% in 2023
- The 50/50 summer and winter peak forecasts and the annual energy use forecast are approximately the same as the RSP13 forecast
 - Annual growth rates are 1.3% for the summer peak, 0.6% for the winter peak, and 1.0% for annual energy use
 - The forecasted annual average savings from EE was 205 MW for peak load and 1,518 GWh for total energy use for 2018 through 2023
 - The net forecast rates are 0.7% for the summer peak, -0.1% for the winter peak, and 0.1% for annual energy use
- RSP studies account for load reductions due to:
 - Forward Capacity Market (FCM) passive and active demand resources
 - The EE forecast
 - Distributed Generation (DG) as either resources or embedded in historical load trends

ISO-NE's Interim Distributed Generation Forecast Predicts Steady Growth in Solar PV through 2023

Scenario analysis shows photovoltaic (PV) can supply 1.6% of the region's net energy load in 2023



Source: [Final Interim PV Forecast](#) (April 2014); Note: MW values are AC nameplate

ISO Initiatives to Integrate Distributed Generation

Solar PV resources make up most of the DG growth

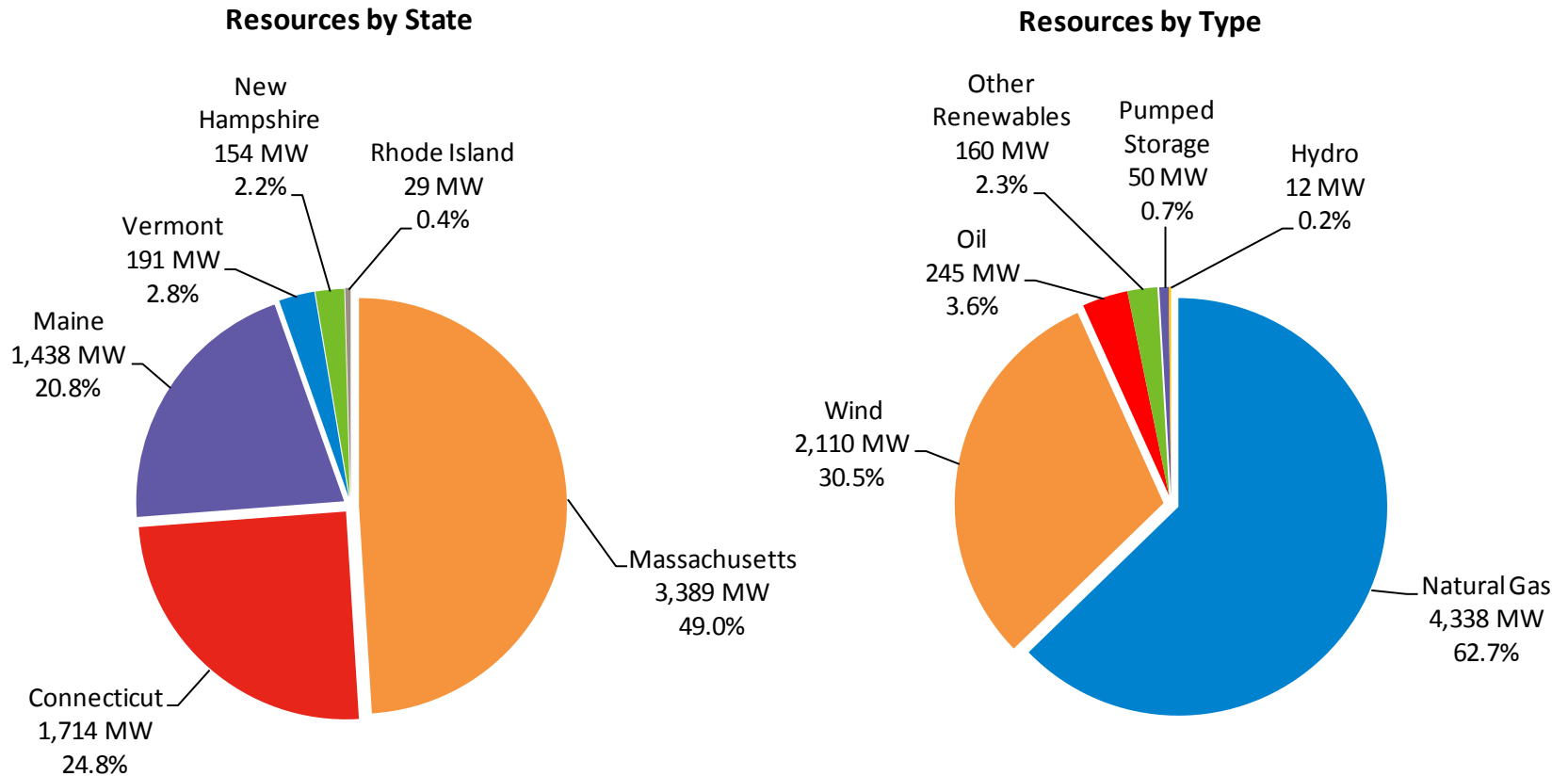
- Improve the load forecast used by system operations
 - Continuing to analyze the potential impacts of growing DG on system operations, including ramping, reserve, and regulation requirements
- Enhance the PV planning forecast and possibly expand the forecast to include other types of DG
- Address potential reliability impacts related to interconnection standards by working with IEEE and the states
- Forecast energy production of PV resources in the planning environment (RSP15)
- Use the PV forecast in:
 - New economic studies
 - New transmission planning studies
 - Resource adequacy studies, beginning with FCA10

Supply and Demand Options Help Meet Needs

Region requires sufficient quantities and types of supply and demand resources

- Additional FCM resources will be procured for 2017/2018 in the annual reconfiguration auctions, if needed
- Regional projections show the need for new resources totaling 424 MW in 2019/2020 and 1,155 MW in 2023/2024
- Additional retirements would accelerate resource needs
- NEMA/Boston marginally meets resource adequacy requirements
- Fast-start resources, in-merit generation, and transmission system improvements are satisfying the operating-reserve requirements of major load pockets, but further infrastructure development in these areas benefits system performance

Natural Gas and Wind Remain the Dominant Fuels in the ISO Generation Interconnection Queue

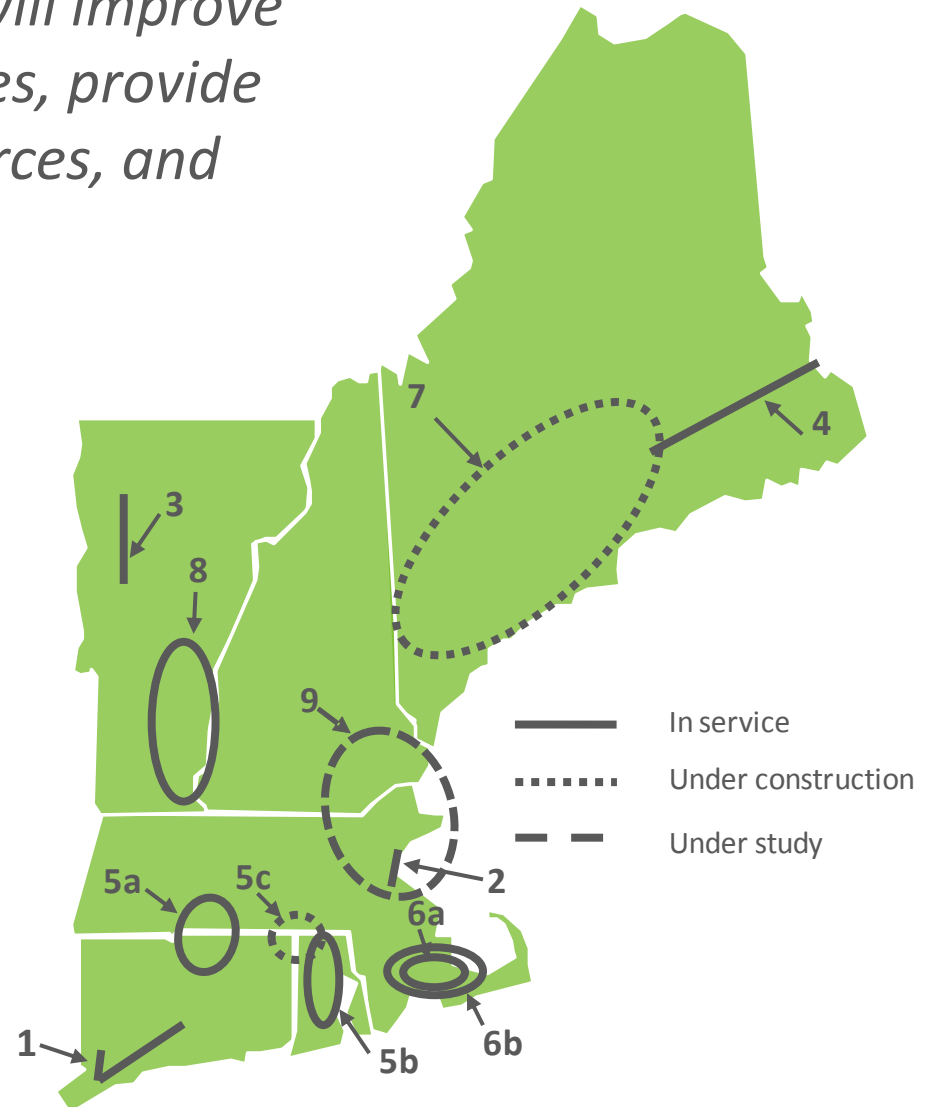


Resources in the ISO Generator Interconnection Queue, by state and fuel type, as of April 1, 2014 (MW and %). See the monthly COO report of the NEPOOL Participants Committee meetings for updates. Over 4,100 MW of wind projects appeared in the August 1, 2014 update on the interconnection queue

Transmission Development

Regional transmission projects will improve deliverability of existing resources, provide flexibility for locating new resources, and facilitate retirements

1. Southwest CT Reliability Project, Phases 1 & 2
2. Boston 345 kV Transmission Reliability Project, Phases 1 & 2
3. Northwest Vermont Reliability Project
4. Northeast Reliability Interconnection Project
5. New England East-West Solution
 - a. Greater Springfield components
 - b. Rhode Island Reliability components
 - c. Interstate Reliability Project
6. Southeast Massachusetts
 - a. Short-term Lower SEMA upgrades
 - b. Long-term Lower SEMA Project
7. Maine Power Reliability Program
8. Vermont Southern Loop
9. Greater Boston upgrades



ISO New England's Strategic Planning Initiative

Focused on developing solutions to the region's top reliability risks

Reliability requires a flexible, high-performance fleet to address strategic risks:

- Natural gas dependency
- Power plant retirements
- Renewable resource integration



New England is an Energy-Constrained System

Greater fuel certainty and diversity of supply are required

- The region has immediate and growing concerns about the availability of generating resources to produce electrical energy—particularly natural gas-fired and oil-fired resources
 - Natural gas pipelines, and supplies of liquefied natural gas (LNG), oil, and coal can be constrained, especially during high demand periods
 - Operation of the system proved challenging last winter due to limitations of both natural gas and oil fuel supplies
 - Studies show the fuel-reliability concerns, especially for natural gas, will grow increasingly severe without infrastructure additions



New England is an Energy-Constrained System

Greater fuel certainty and diversity of supply improve reliability

- Non-gas-fired generators are retiring, and further retirements are likely to increase the regional dependence on natural gas
 - Most new resources will likely be natural-gas-fired generators
- The region is evaluating multiple options
 - Natural gas pipeline expansion
 - LNG contracts and possible addition of facilities
 - Dual-fuel generator capability
 - Transmission additions to Canada that provide access to diversified resources
 - Wind, solar, and energy-efficiency resources that displace other fuels

Environmental Issues and Renewable Integration

- Existing and upcoming environmental regulations will continue to affect the region's generators
 - Over the past decade, average and marginal emissions rates have declined, in part due to the region's increased use of natural gas
 - Higher operating costs, reduced capacity or energy production
 - Additional capital improvements and resource retirements
 - Increased use of natural-gas-fired generation is likely
 - Relicensing of nuclear and hydro facilities could reduce output and flexibility
- Public policy and regulation are driving the development of renewable resources, energy efficiency, and distributed generation
- Wind projects that interconnect to weak portions of the system are at risk of curtailment unless the transmission system is expanded
- Expanded interconnections with Canada could provide access to hydro resources and diversify the supply

Performance Flexibility is Necessary as Wind and Solar Resources are Developing

- The system requires timely response to contingency outages
- Existing and planned variable energy resources (VERs), such as wind and solar, increase regulation and ramping requirements
- Many generators were not designed to provide flexible operation
- Attracting resources to address system flexibility needs will be encouraged by:
 - Increasing the operational reserve requirements
 - Enhancing market incentives



Strategic Transmission Analysis

Studies have assessed potential transmission issues with retirements and wind development in the region

At-Risk Unit Retirements



Integration of Variable Resources

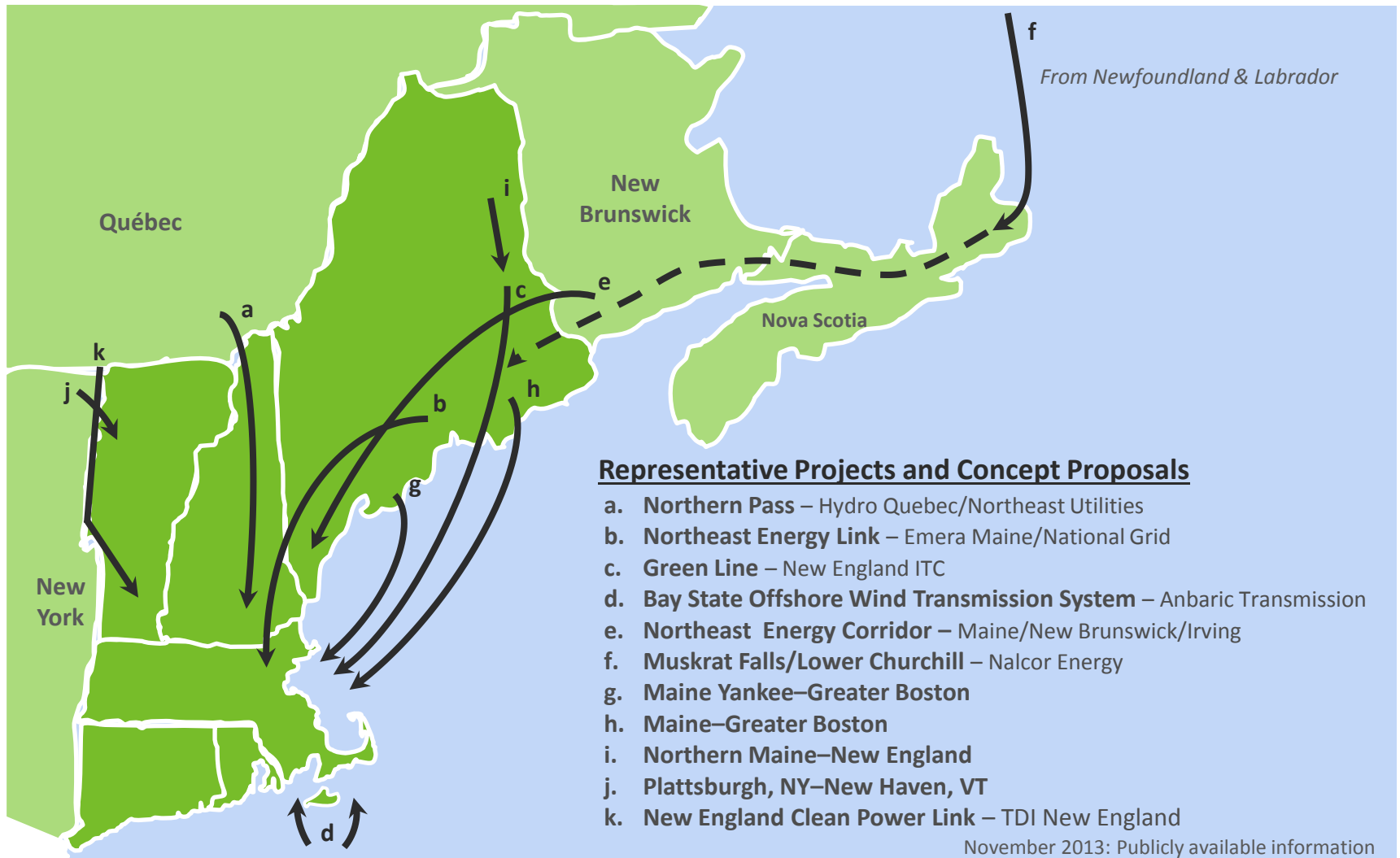


Economic Planning Studies and Market Resource Alternatives in Load Pockets

- New England studies have been focused on the economic and environmental impact of facilitating the delivery of northern New England wind energy and Canadian hydro and other renewable energy sources, such as:
 - 2011 - Economic study evaluation of transmission constraints that could restrict the development of renewable energy projects in New England, particularly wind
 - 2012 - Economic study showed the most-suitable locations for developing various types of resources without causing congestion and the least-suitable locations for unit retirements. The study also compared a “business-as-usual scenario” with the effects of increases and decreases in several resource types (work complete – report under preparation).
 - 2013 - Economic study request to show the effects of higher loss-of-source limits in New England, including higher imports on the Phase II interconnection with Hydro Québec
- The ISO has provided critical load levels and studies of market resource alternatives in load pockets
 - RSP14 summarizes analysis for the SEMA/RI area



Onshore and Offshore Transmission Proposals are Vying to Move Renewable Energy to New England Load Centers



Note: These projects are NOT reliability projects, but ISO New England’s role is to ensure the reliable interconnection of these types of projects.

Interregional Planning and Coordination Activities

U.S. Department
of Energy
Congestion Study

Eastern
Interconnection
Planning
Collaborative (EIPC)

Electric Reliability
Organization (ERO)

Northeast Power
Coordinating
Council (NPCC)

ISO/RTO Council
(IRC)

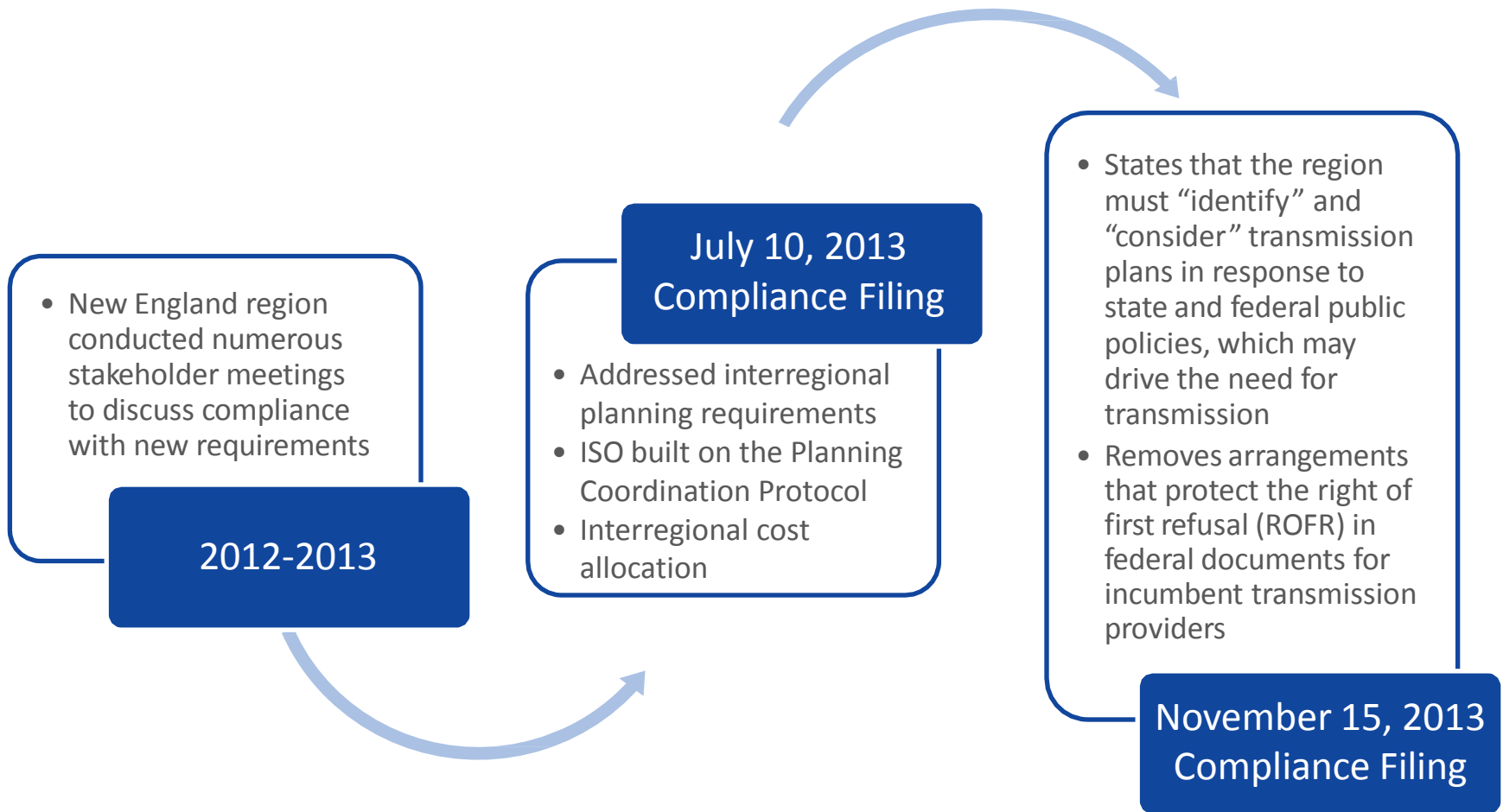
Northeastern
ISO/RTO Planning
Coordination
Protocol



Interregional Planning and Regional Initiatives

- Interregional planning has progressed
 - The comprehensive Northeast Coordinated System Plan was recently issued
 - The Eastern Interconnection Planning Collaborative is conducting scenario analyses and studying electric power system interactions with the natural gas system
- The New England states coordinate their planning activities
 - NESCOE, NECPUC, the Consumers Liaison Group, and other activities
 - Renewable Portfolio Standards
 - Imports from Canada and transmission to sources of wind generation are both being considered
- The region has successfully planned the New England power system
 - The region complies with all planning requirements
 - Order 1000 will change the planning processes

Order 1000 Process – Awaiting Final FERC Order



Summary: Meeting Regional Challenges

- RSP meets System Planning requirements
 - RSP addresses resource adequacy, transmission reliability, economic performance, environmental, regional, and interregional issues
- The region faces future challenges to maintaining a reliable and efficient operation of the power system
 - Resource performance and flexibility
 - Growing dependence on natural gas resources
 - Potential generator retirements
 - Integration of more variable resources
 - Alignment of wholesale market design and regional transmission planning

Summary: Meeting Regional Challenges, cont.

- The ISO continues to work with regional stakeholders to address emerging issues
 - Compliance with FERC Order 1000 requirements
 - Studies are being conducted in support of the Strategic Planning Initiative and various market rules and reliability procedures are under development
 - Other issues are being addressed, such as the integration and forecast of distributed resources

Special Thanks To:

**The Planning Advisory Committee
and all stakeholders involved in the
development of the
*2014 Regional System Plan***

Questions

