The Challenge of Ensuring System Reliability Through Wholesale Markets as the Resource Mix Evolves
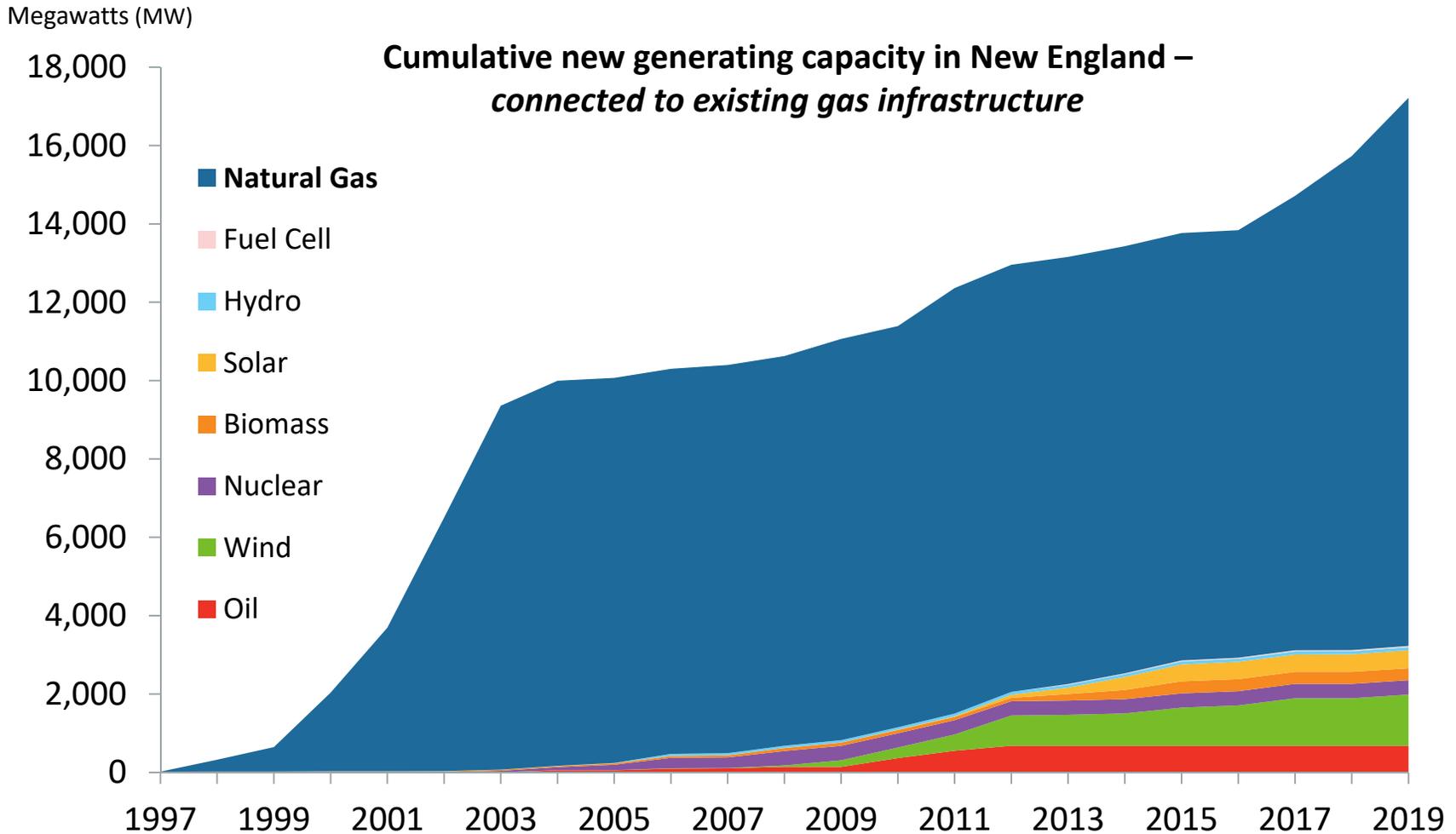
New England-Canada Business Council Annual Energy Conference
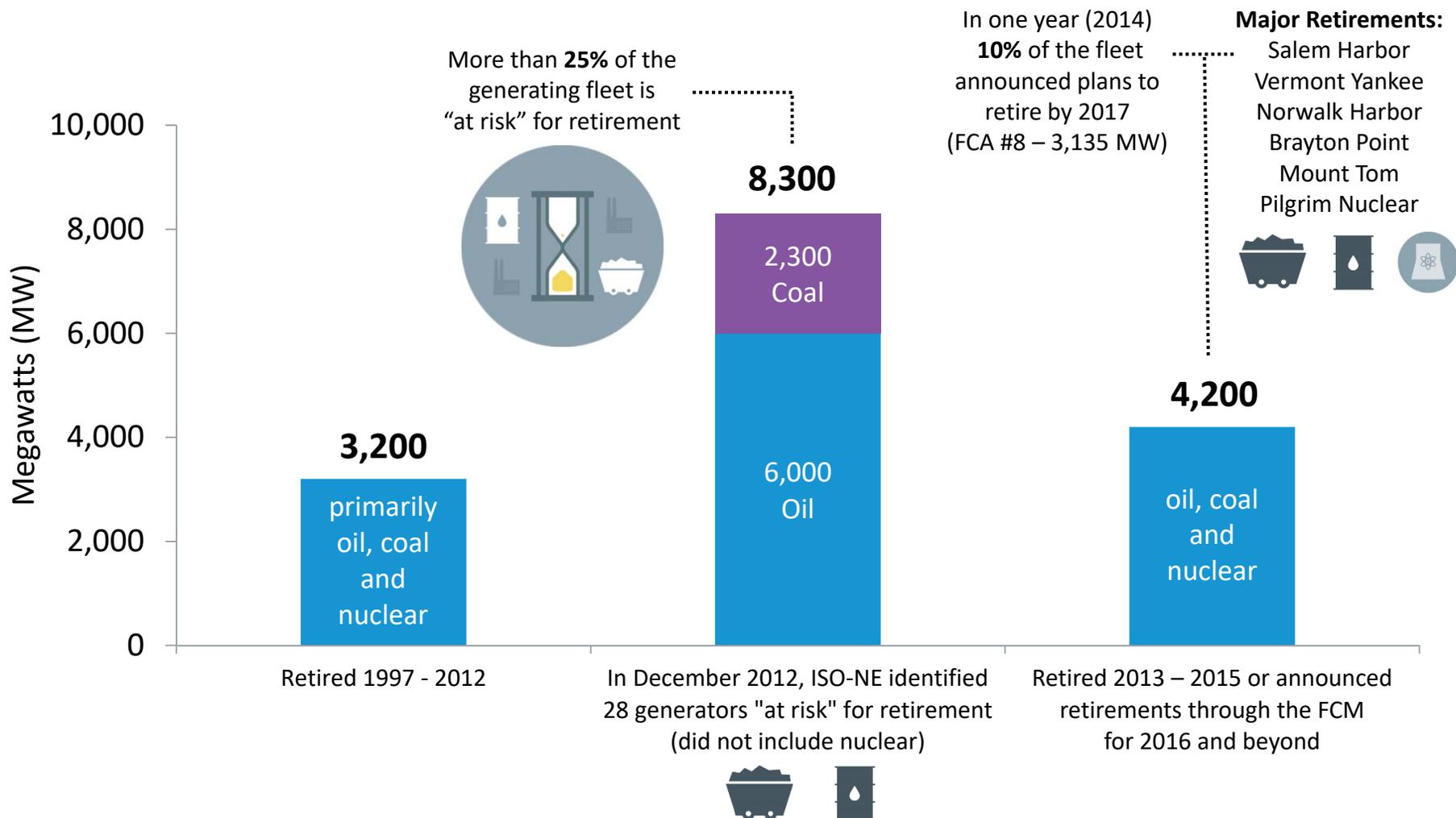
Gordon van Welie

PRESIDENT & CEO

ISO-NE Public

Natural Gas Is Currently the Dominant Fuel Source for New Generating Capacity in New England

Megawatts (MW)

Cumulative new generating capacity in New England – *connected to existing gas infrastructure*

Legend:
- Natural Gas
- Fuel Cell
- Hydro
- Solar
- Biomass
- Nuclear
- Wind
- Oil

Note: New generating capacity for years 2016 – 2019 includes resources clearing in recent Forward Capacity Auctions.

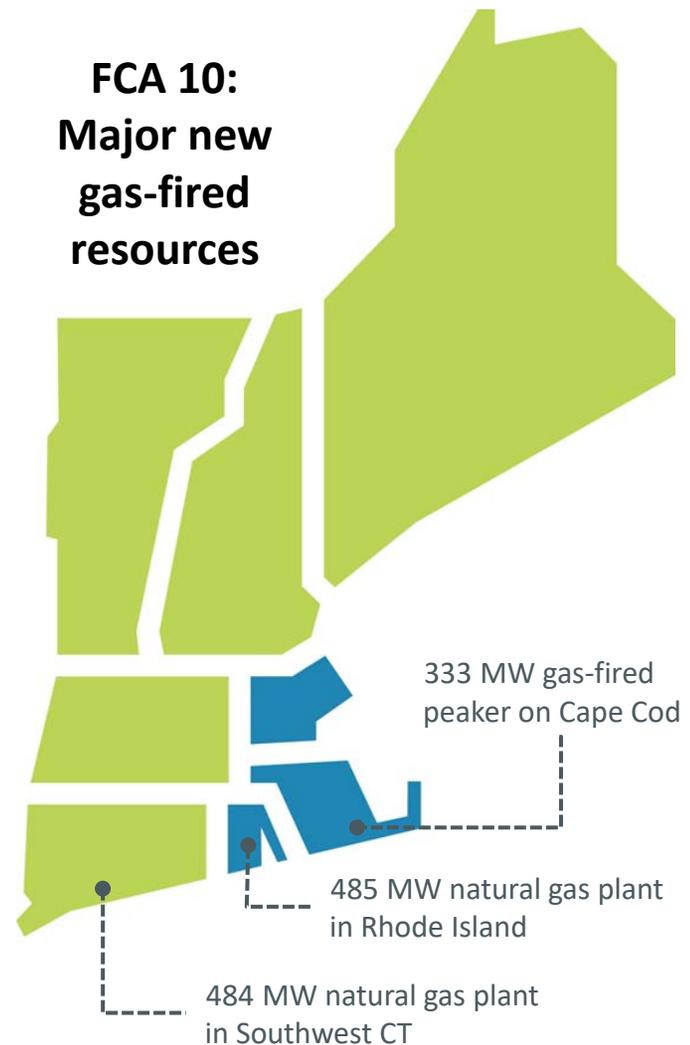# Large Non-Gas Generators Have Recently Retired or Announced Plans to Retire, and More Retirements Are Likely

More than **25%** of the generating fleet is "at risk" for retirement

In one year (2014) **10%** of the fleet announced plans to retire by 2017 (FCA #8 – 3,135 MW)

Major Retirements:
Salem Harbor
Vermont Yankee
Norwalk Harbor
Brayton Point
Mount Tom
Pilgrim Nuclear

Megawatts (MW)

10,000

8,000

6,000

4,000

2,000

0

3,200

primarily oil, coal and nuclear

Retired 1997 - 2012

8,300

2,300 Coal

6,000 Oil

In December 2012, ISO-NE identified 28 generators "at risk" for retirement (did not include nuclear)

4,200

oil, coal and nuclear

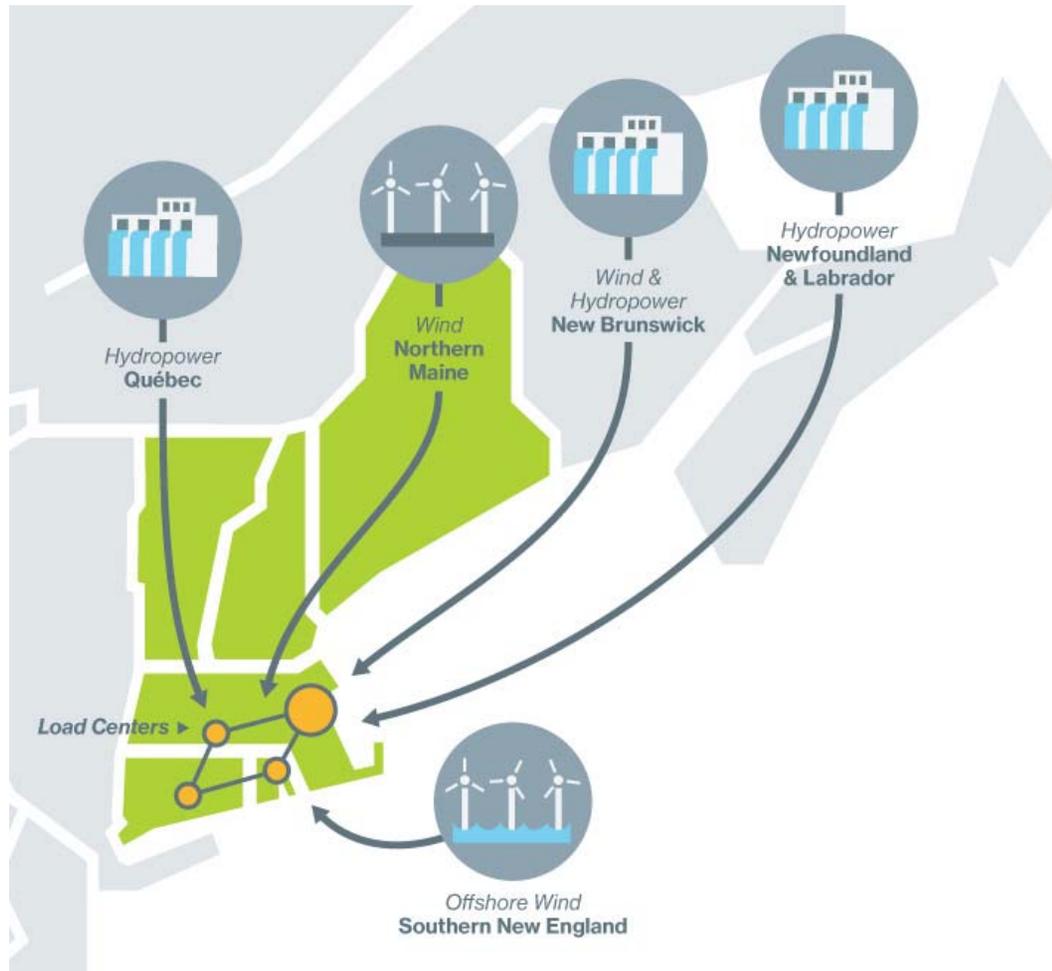Retired 2013 – 2015 or announced retirements through the FCM for 2016 and beyond

ISO-NE's Capacity Market Has Attracted New Peaking and Combined-Cycle Gas Generation to Load Centers

- **3,000 MW** of gas-fired generation have come forward in recent auctions (FCAs 7–10) with commitments to be available in 2017–2019

- A mix of existing and new resources cleared in FCA 10, including three new, gas-fired, dual-fuel power plants totaling **1,300 MW**

- FCA 10 also attracted new renewable resources, demand resources, and imports

FCA 10: Major new gas-fired resources

333 MW gas-fired peaker on Cape Cod

485 MW natural gas plant in Rhode Island

484 MW natural gas plant in Southwest CT

New England States and Developers Are Proposing to Add Significant Clean Energy to the Region

Hydropower Québec

Wind Northern Maine

Wind & Hydropower New Brunswick

Hydropower Newfoundland & Labrador

Load Centers ►

Offshore Wind Southern New England

- As of **November 2016**, 15 elective transmission projects are proposed in the ISO Interconnection Queue totaling more than **9,000 MW** of potential transfer capability
  - Primarily large-scale **hydro** from eastern Canada and **wind** from northern New England
  - Note: Recent CT/MA/RI RFP selected mostly in-region projects to move forward

- These projects seek to address policy goals, not reliability needs

- Contracting for clean energy outside of the wholesale markets may affect price formation and investor confidence

Map is representative of the types of projects announced for the region

ISO New England Is Focused on Developing Solutions to the Region's Top Reliability Risks

- **Ensuring resource adequacy through the wholesale market**
  - New England will need sufficient resources to replace retiring resources and these must be able to perform under adverse weather conditions
  - Appropriate price formation in the FCM is critical to investment and performance incentives

- **Resolving fuel-adequacy constraints**
  - New England is challenged to meet electricity demands with existing natural gas infrastructure, particularly during the winter
  - If the region cannot invest in new gas infrastructure or allow adequate use of dual-fuel capability, we will have to retain, and invest in, sufficient non-gas resources to ensure reliability

- **Integrating renewable resources**
  - Renewable resources provide variable energy production and are typically not reliable capacity resources
  - To assure reliability, the region needs fast-responding, flexible capacity resources that are not constrained in their operation

ISO-NE Will Continue to Work with Stakeholders to Manage the Transformation of the Power System

- **New England's wholesale markets provide a framework to ensure resource adequacy and reliability**
  - Competitive wholesale electricity markets have resulted in high levels of reliability, produced significant efficiencies and have driven billions of dollars of investment in New England's power system
  - However, the competitive market framework is vulnerable, and the transformation of the power system is presenting new risks

- **Addressing the realities imposed by a constrained fuel system**
  - Growing levels of renewable generation will require a fleet of flexible resources, with an equally flexible fuel system, to reliably balance the variability of renewable resources
  - The lack of investment in additional gas infrastructure will likely place additional constraints on the wholesale market and require the use of alternate fuels, particularly during the winter
  - This has implications for exit/entry in the FCM, emissions and price volatility

- ***How does the region balance the achievement of multiple policy goals?***
  - Reliable electricity supply and delivery
  - Environmental improvements (lower emissions)
  - Economics (efficiency/cost effectiveness)