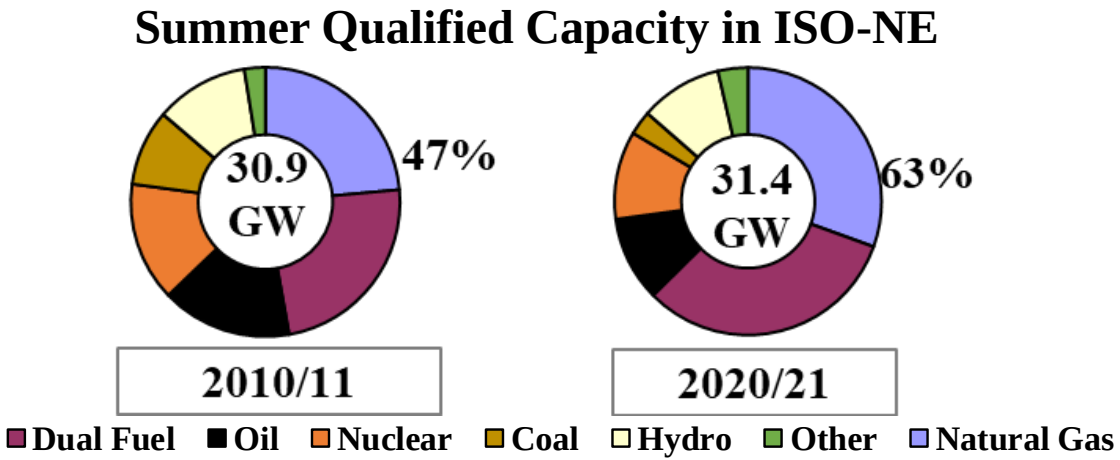
Outlook for Fuel Security and Market Design Enhancements in New England

Raghu Palavadi Naga
Pallas LeeVanSchaick

Potomac Economics

I. Background - New England Resource Mix

- Share of gas-fired generation has steadily increased in New England over the last decade.
- From 2010 to 2020, 4 GW of oil and coal-fired capacity has/will retire, and other such capacity is economically challenged.



I. Background - Fuel Supply Concerns in New England

- New England faces a constrained natural gas pipeline and LNG infrastructure.
  - Increased core gas demand in cold weather limits access of gas for power.
  - New pipeline and expansion projects typically encounter several challenges.
- ISO studied the region's vulnerability to fuel security issues in its Operational Fuel Security Analysis ("OFSA").
  - Considered a range of scenarios to evaluate fuel risk over 90 days of winter.
  - Results suggested significant hours of load shedding.
  - Heightened concerns with proposal to retire Mystic plants and Distrigas LNG.

I. Background - Efforts to Address Fuel Security Issues

- In light of the OFSA findings, ISO-NE:
  - entered into out-of-market contracts to retain the Mystic units and Distrigas LNG facility,
  - created a short-term compensation mechanism for units that maintain firm fuel inventories, and
  - is working with its stakeholders to design market-based solutions.

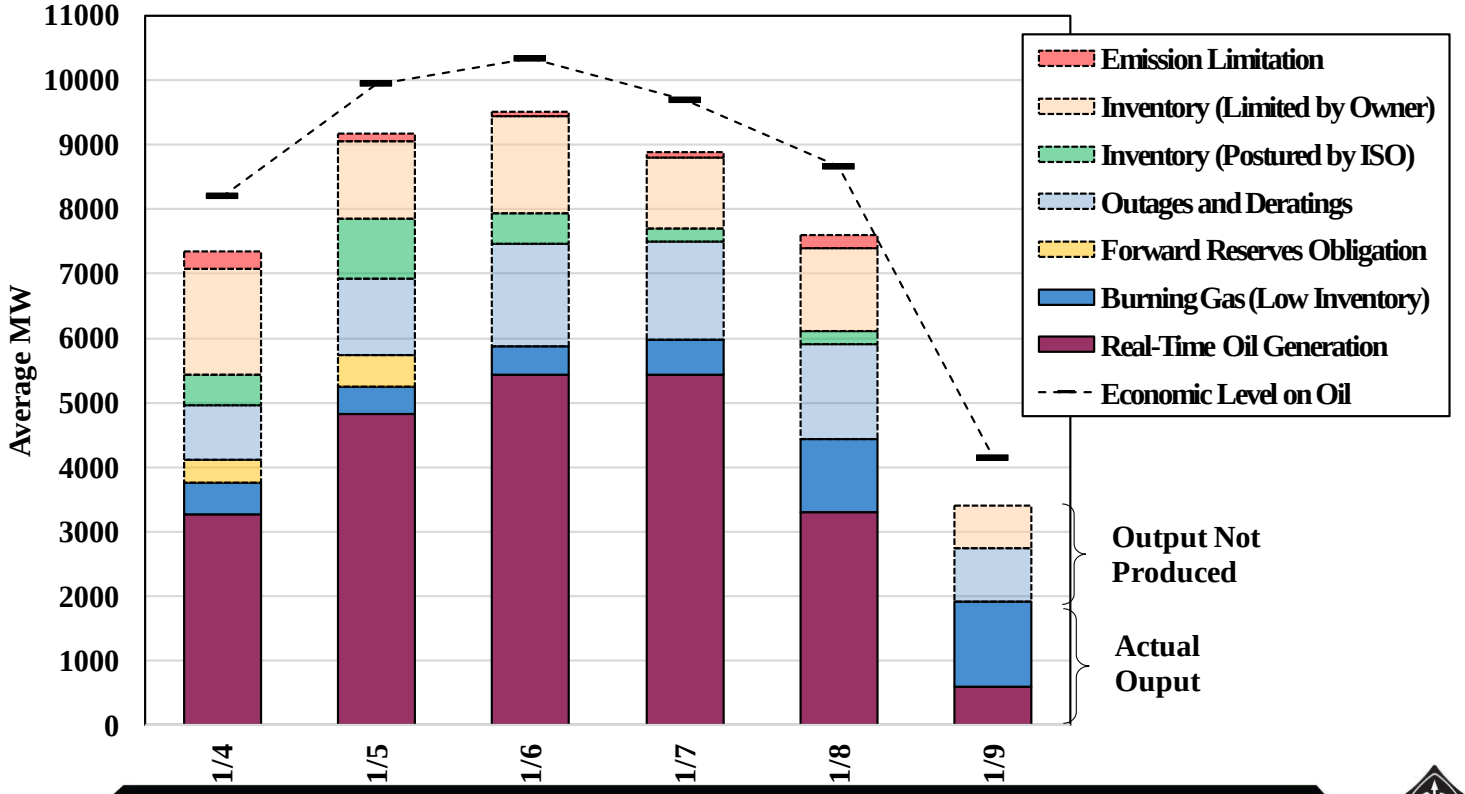
Potomac Economics Studies

- **Background**
- Assessed utilization of oil-fired and dual-fuel resources to identify factors that limited their availability in a recent cold snap.
- Assessed potential effects of efficient incentives to existing resources on risks identified in OFSA.

II. Cold Snap of December 28, 2017 – January 8, 2018

- Late December 2017 to early January 2018 saw a severe cold spell in New England – daily average temperatures were up to 24 degrees below normal.
- Severe weather conditions resulted in an extended period of natural gas scarcity.
  - Gas prices exceeded $100/MMbtu at times.
- Oil-fired generation was significantly higher relative to the historical levels, and fuel inventories depleted significantly.
  - Several units experienced limitations on continued oil usage for various reasons.

II. Utilization of Oil-Fired and Dual-Fuel Capacity



III. Fuel Security Outlook for Winter 2022/23 and Winter 2024/25

- ISO currently designing additional incentives for suppliers to acquire fuel needed to maintain reliability.
- Reran the OFSA model with two modifications to default assumptions.
  - Dispatch order
  - Oil tank replenishment rates
- ISO's OFSA assumptions are based on past experience – but past behavior is not a fully predictive of future actions in this context.

III. Fuel Security Outlook for Winter 2022/23 and Winter

Scenario	Results (Hrs)		
	30 Min Res Depletion	10 Min Res Depletion (< 700MW)	Load Shedding
Winter 2022/23			
ISO Reference	138	12	2
Modified Dispatch	24	0	0
Modified Dispatch and Replenishment	0	0	0
Winter 2024/25			
Modified Dispatch and Replenishment	0	0	0
Winter 2024/25 - Mystic 8 and 9 and Distrigas LNG			
Low LNG Injection	216	2	0
High LNG Injection	23	0	0

Conclusions

- Total oil inventory and LNG import capability are likely high enough to satisfy the demand during a severe winter event.
  - Require utilization rates far above any observed in the past.
- Market design that incentivizes suppliers can address fuel security concerns.