New England Pipeline and Transmission Infrastructure: Recent Studies

Energyzt Advisors, LLC

NE Electricity Restructuring Roundtable

20 November 2015

Contents

Objectives

- Review the findings of the Energyzt research and reports on winter reliability in New England in the context of a need for a new natural gas pipeline funded by electricity ratepayers

Contents

- Summary of Energyzt Reports
- Overview of Analysis
- Conclusions

New England has sufficient infrastructure -- Contracts not Construction

Summary of Reports

***ENERGYZT* issued two separate reports on winter reliability in New England:**

1) **REPORT: Winter Reliability Analysis of New England Energy Markets,** prepared for New England Power Generators Association, October 2014

Question: Is there enough existing energy infrastructure to meet winter reliability requirements?

Answer: Yes.
The only scenario that indicates potential issues is one where LNG import capacity is constrained

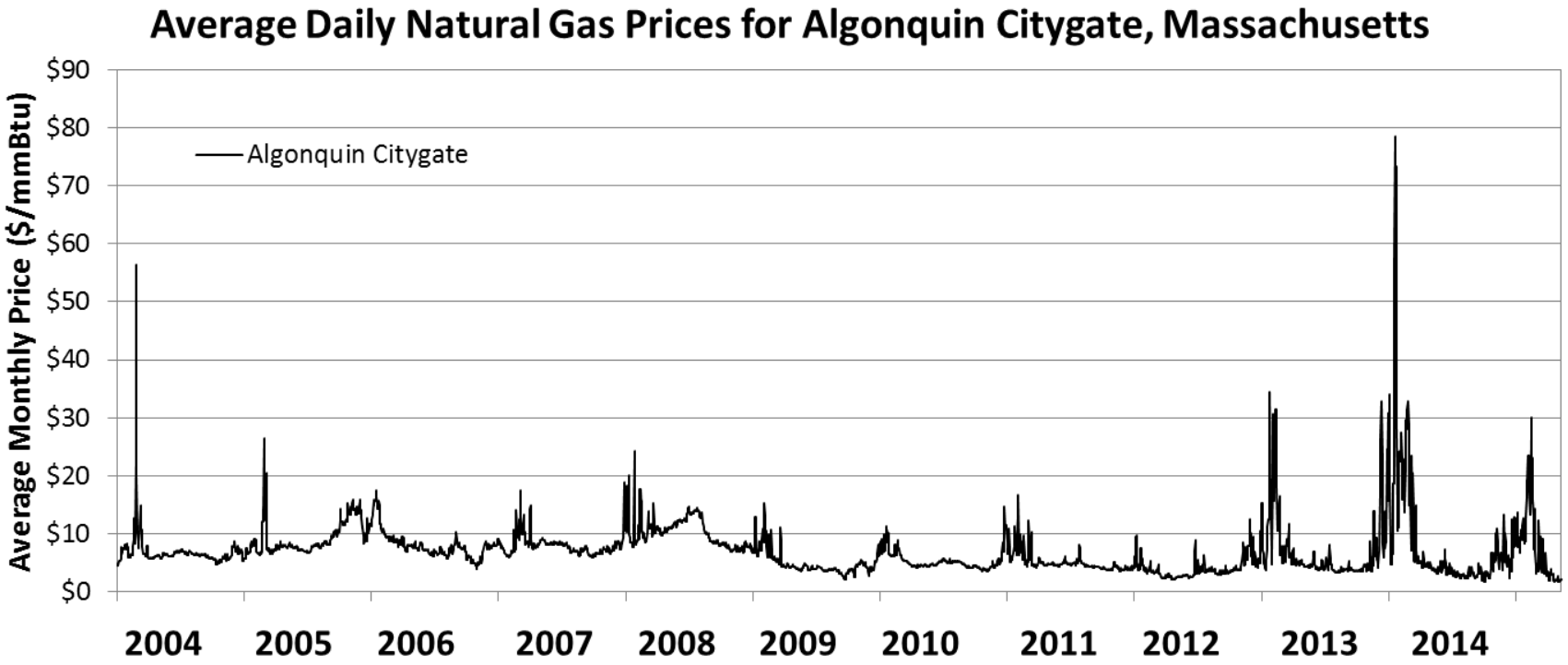
2) **REPORT: Analysis of Alternative Winter Reliability Solutions for New England Energy Markets,** prepared for GDF SUEZ Energy North America, August 2015

Question: What caused the winter price spikes and what are the most economic solutions to address potential reliability concerns?

Answer: Failure to utilize existing energy infrastructure caused winter issues
Engage in market-based approaches to contract with existing energy infrastructure (e.g., dual-fuel and LNG)

"An expert knows all the answers – if you ask the right questions" - Anonymous

Analysis | The past three winters, prices were abnormally high



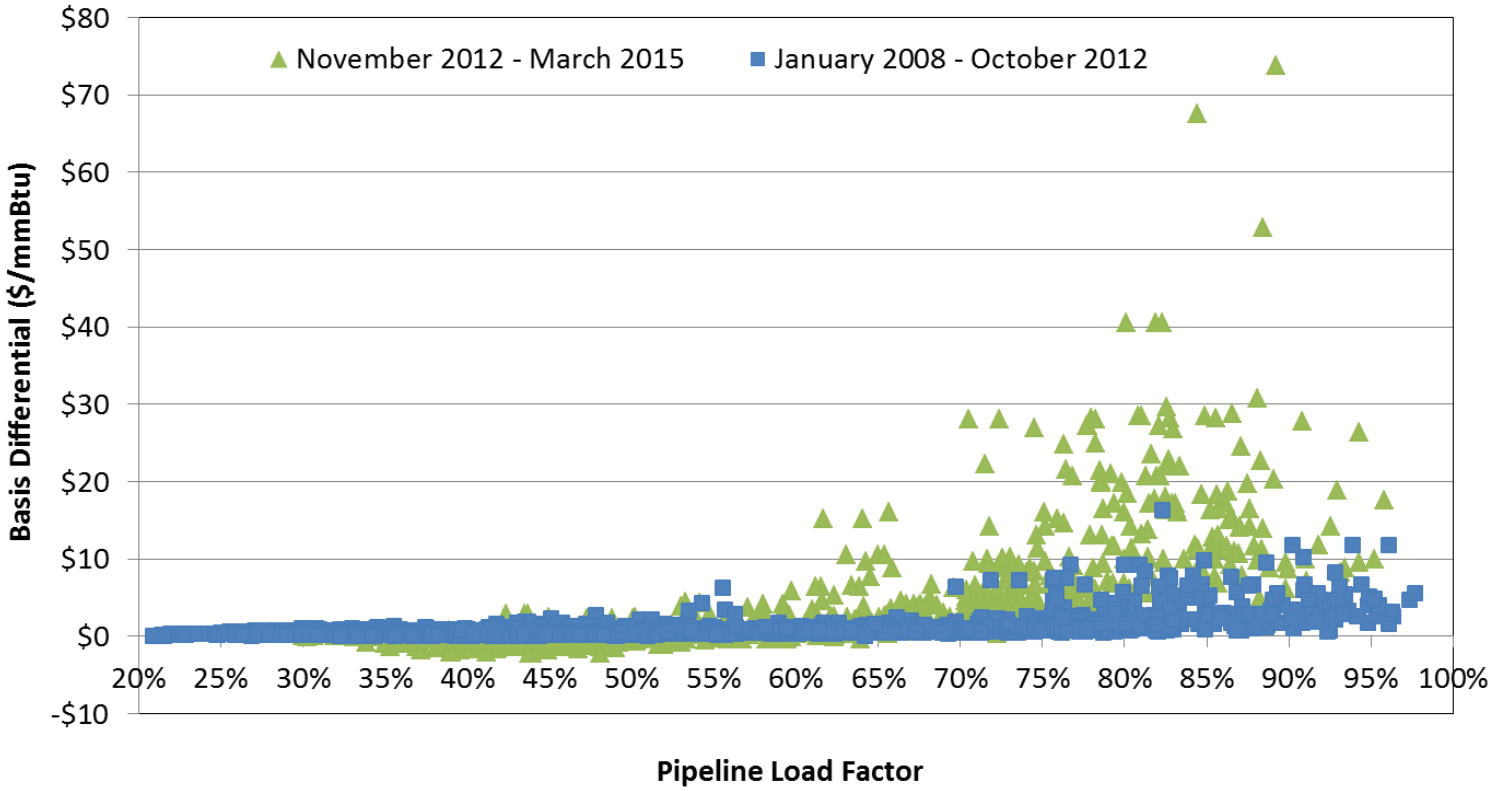
Sources: Energyzt analysis of Ventyx Energy Velocity Suite

Assumption: High prices during periods of high demand = inadequate supply

Initial response by the industry: Build more natural gas pipelines

Analysis | Higher basis differentials compared to Henry Hub

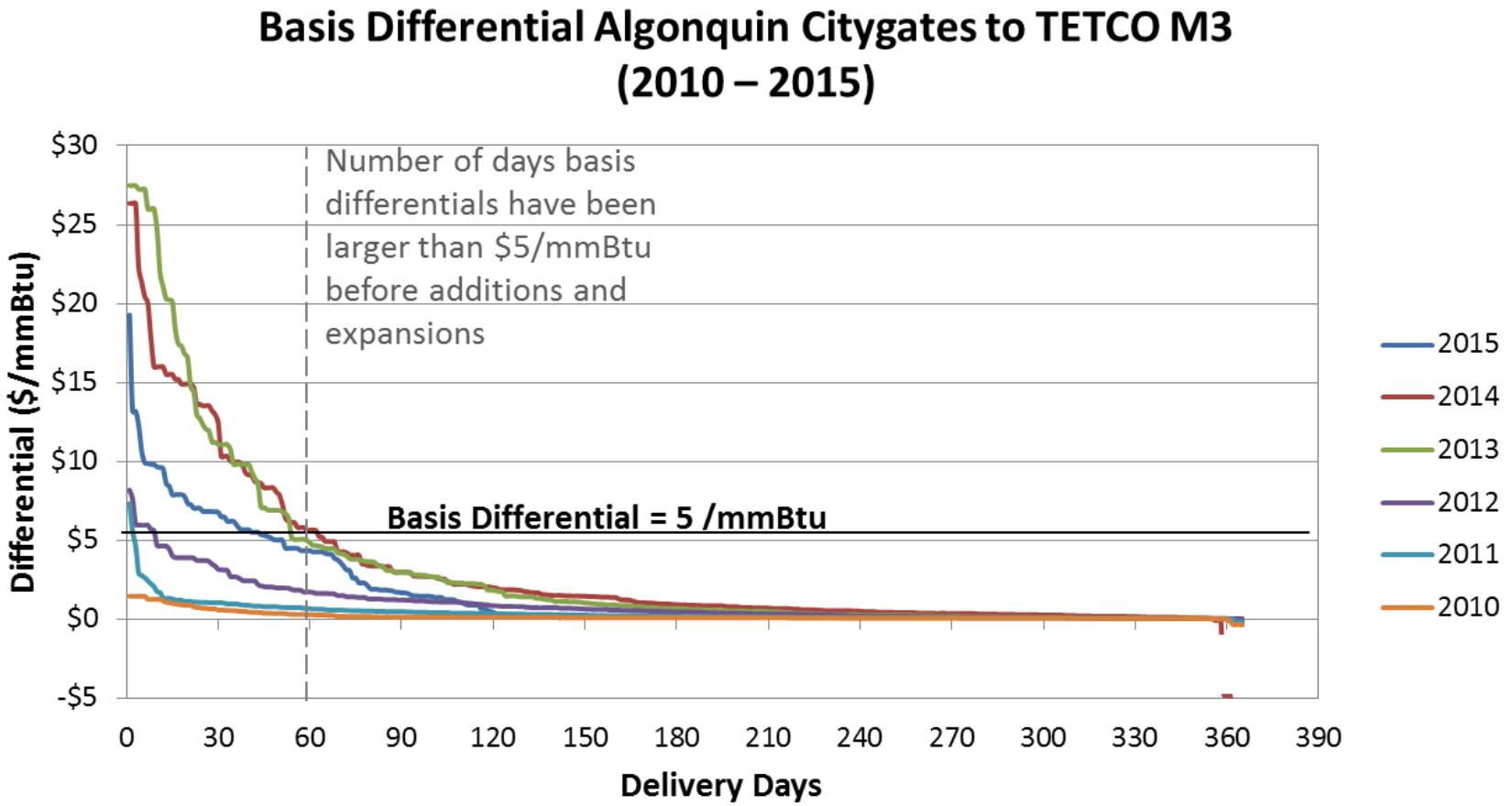
Natural Gas Basis Differentials in New England vs. Henry Hub



Source: Energyzt analysis of IEA AEO 2015, Ventyx

Basis differentials to Henry Hub started diverging in 2012 for summer and winter

Analysis | Basis differentials compared to PJM also higher

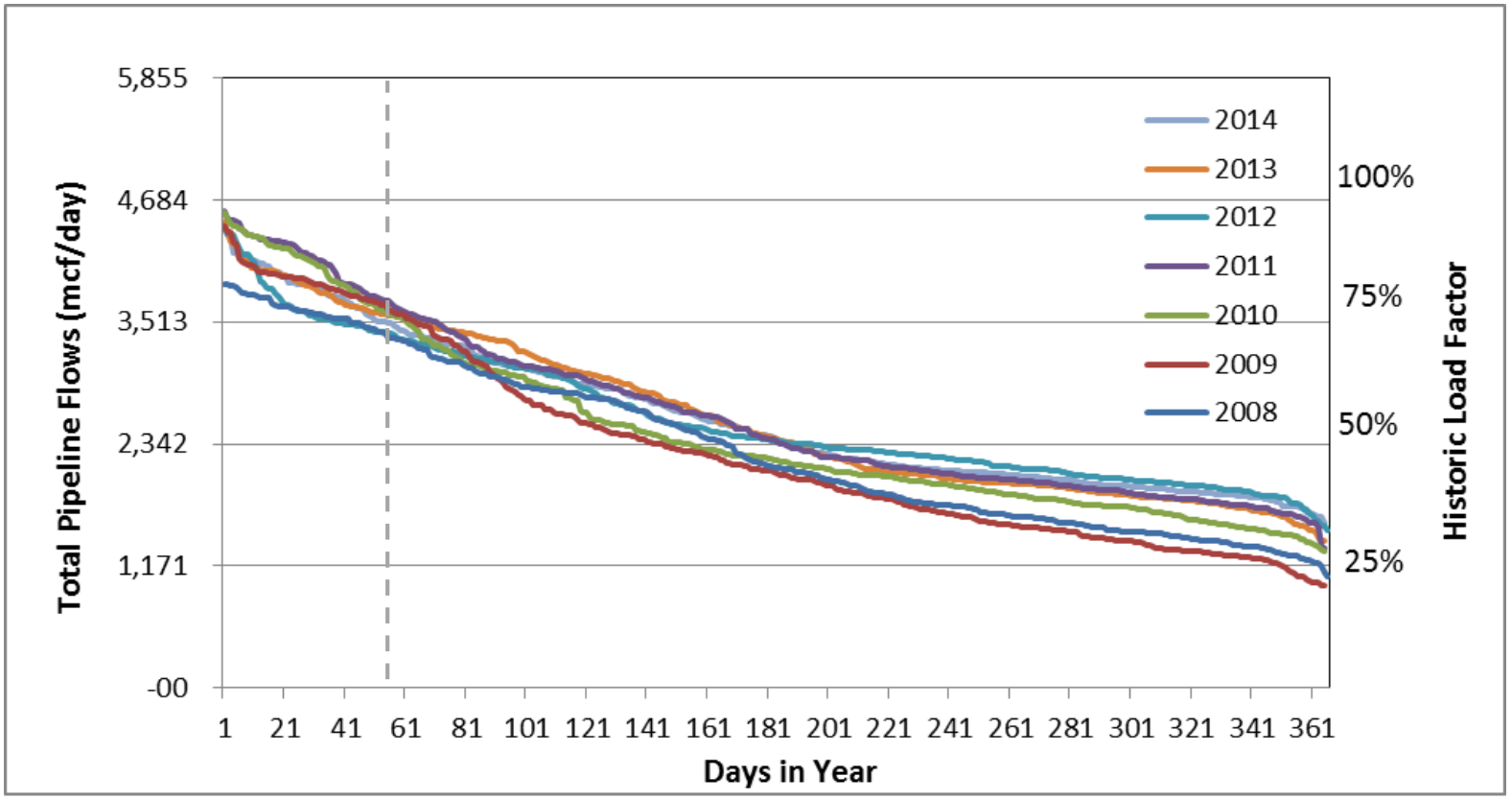


Sources: Interconnect Exchange data via Ventyx

PJM basis differential more than $5/mmBtu occurr less than 60 days of the year

Analysis | Pipeline deliveries were lower than 2010 and 2011

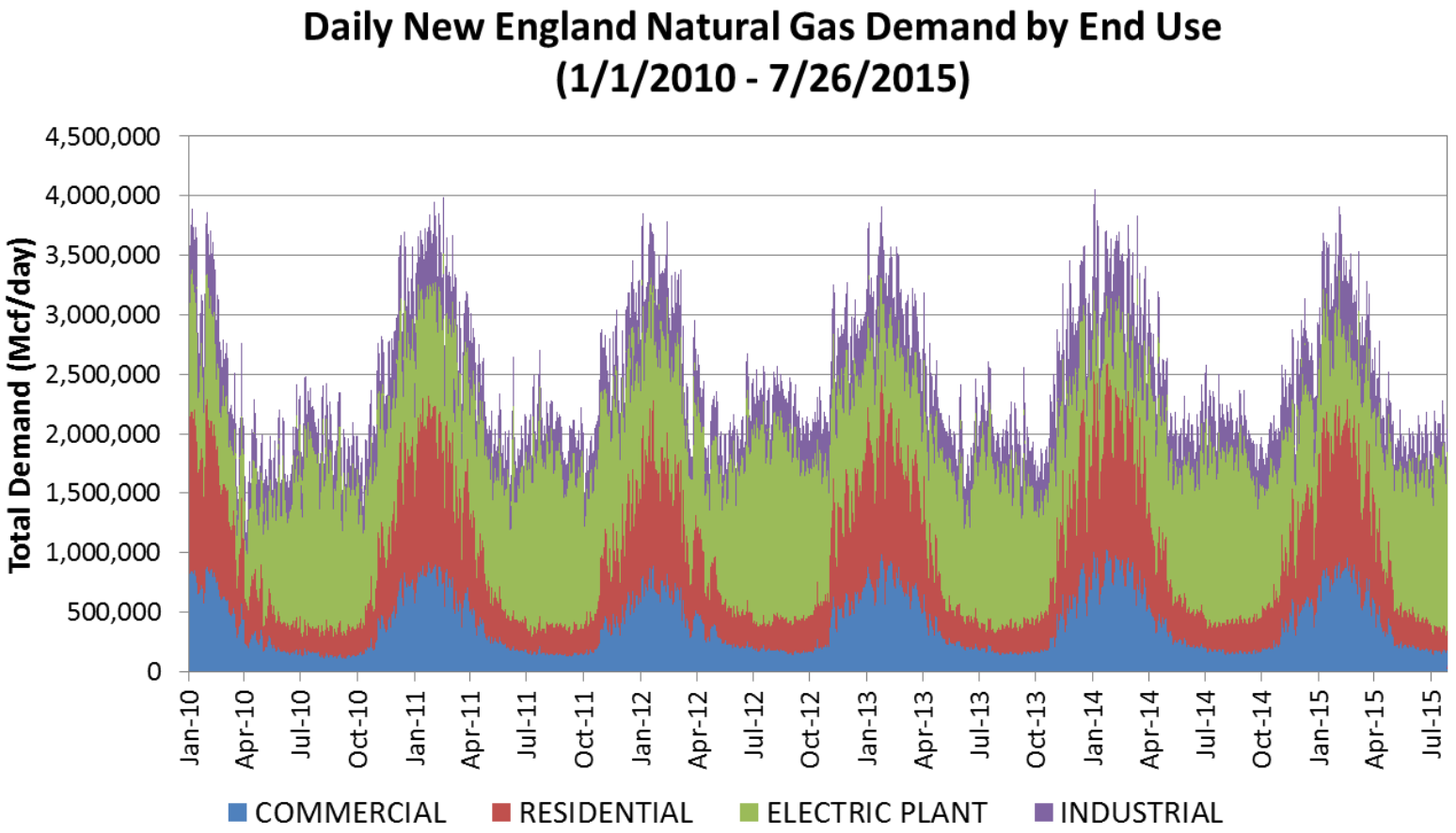
Pipeline Capacity Load Duration Curve



Source: Energyzt analysis of IEA AEO 2015, Ventyx

Pipeline capacity would appear to be adequate to meet peak days

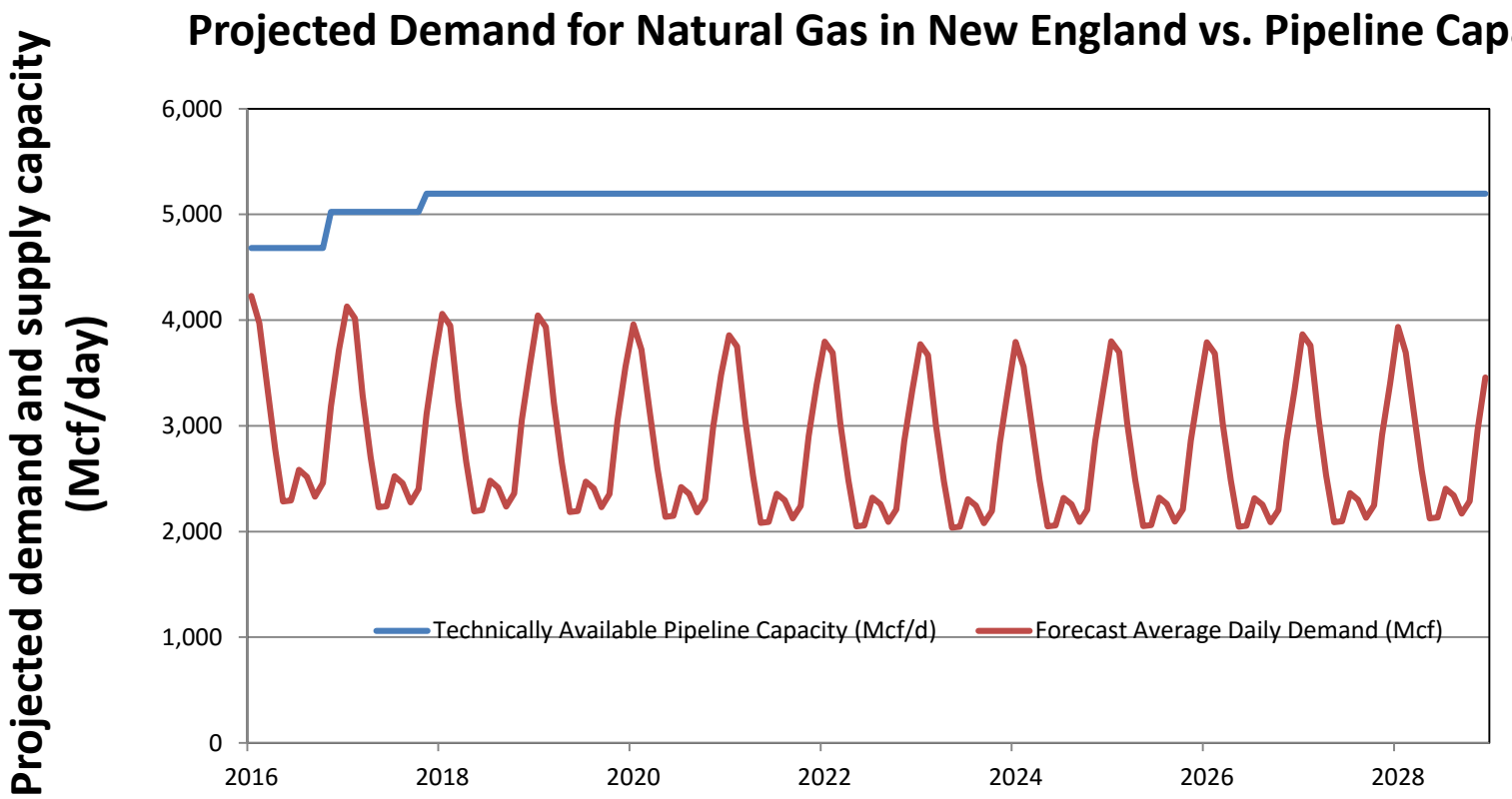
Analysis | Peak natural gas demand has been spiky, but flat



Source: Energyzt analysis of EIA Natural Gas Monthly Report

Plenty of excess pipeline capacity outside of the winter months

Analysis | New capacity more than meets average demand

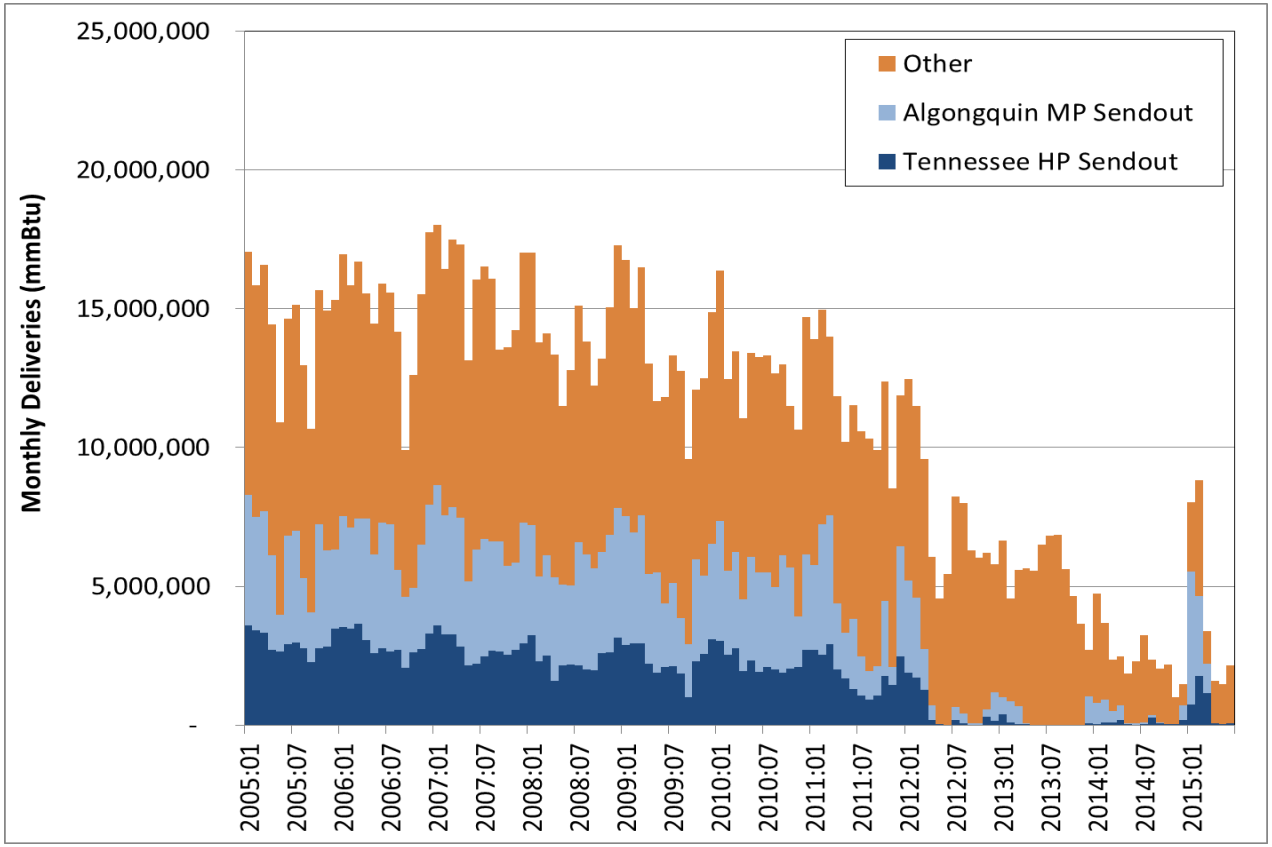


Source: Energyzt analysis of IEA AEO 2015, Ventyx

Projections also indicate that the underlying issue is a not baseload problem

Analysis | LNG inflows declined in 2012 as contracts expired

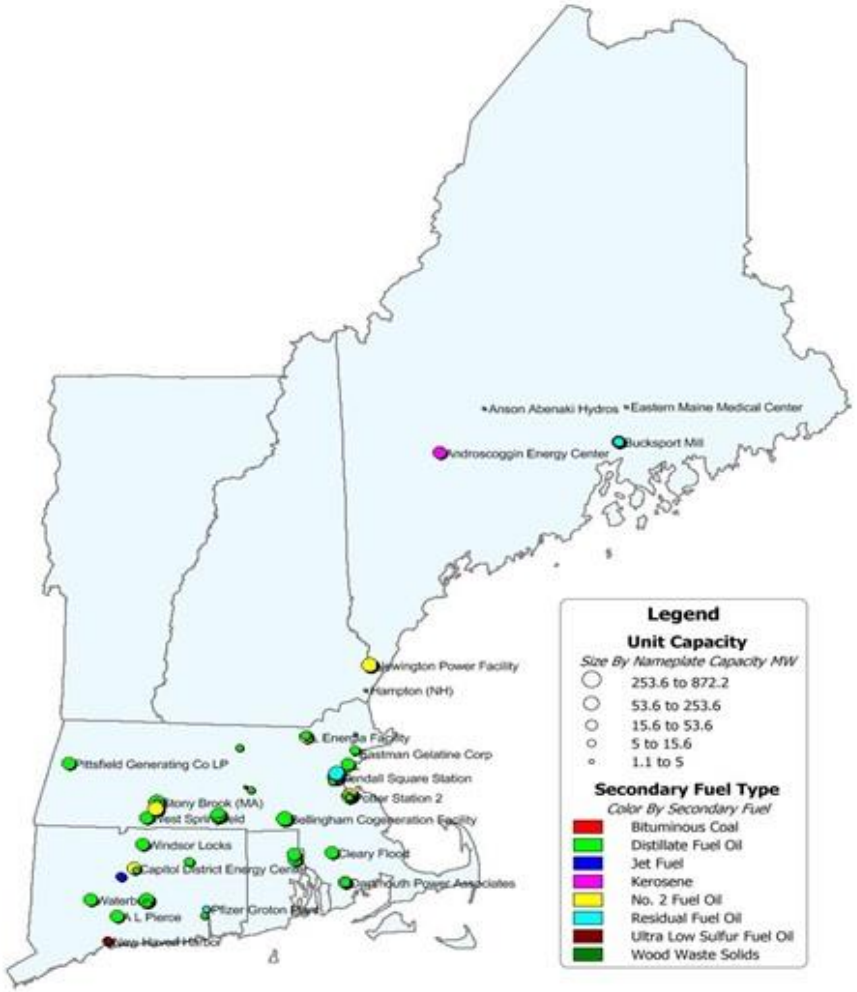
Monthly Scheduled Quantities by LNG Terminal



Source: Energyzt analysis of GDF Suez data underlying semi-annual reports to FERC

What would you do if you discovered 85% of a pipeline's capacity was unused?

Analysis | Dual-fuel units also provide peaking resources



Total Generating Plants with Dual fuel Capability and Natural Gas as Primary Fuel

Location	# of Plants	MW Capacity
Connecticut	11	1,258
Maine	4	469
Massachusetts	26	4,192
New Hampshire	2	609
Rhode Island	3	594
New England	46	7,121

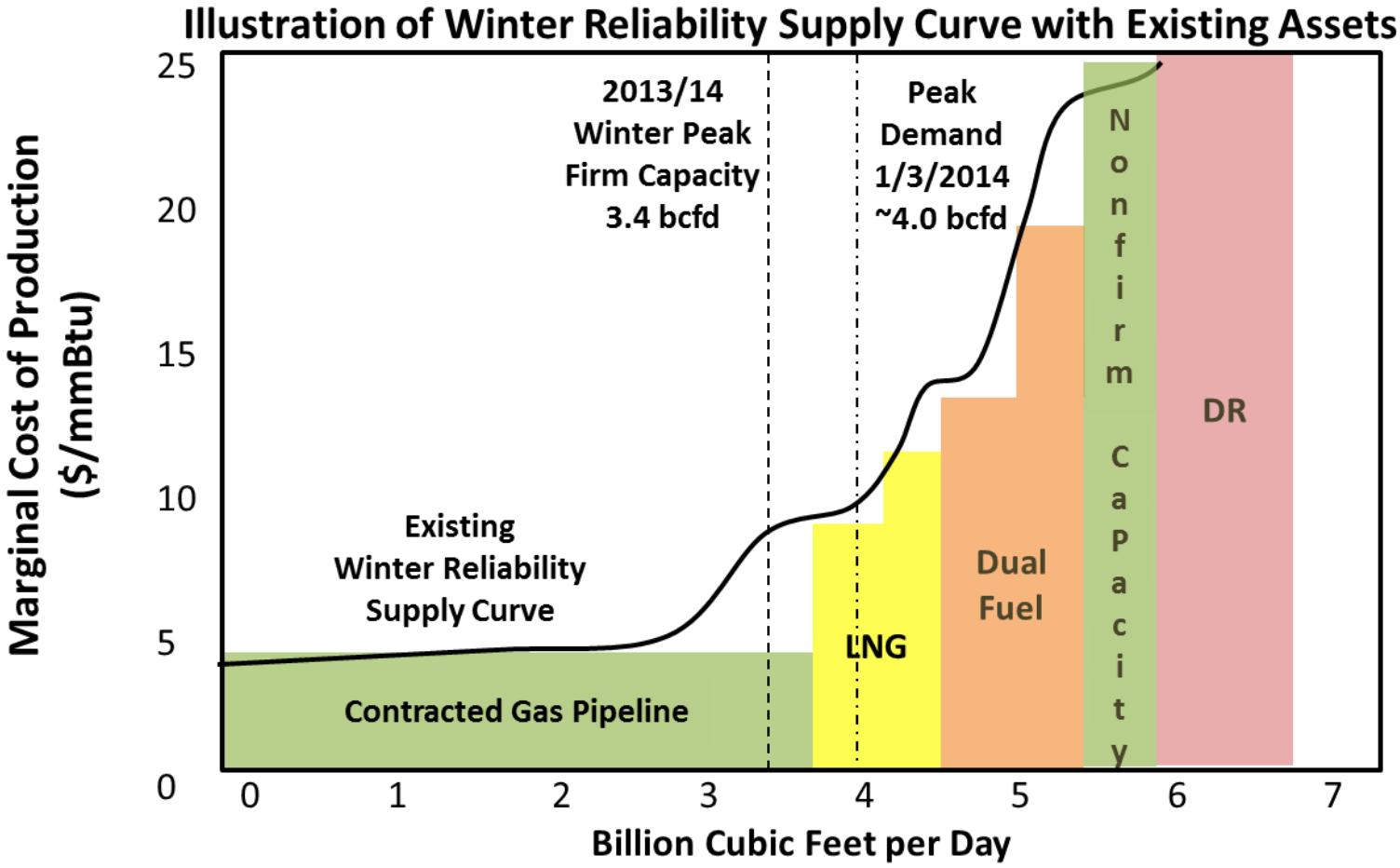
Secondary Fuel Type For NE States by Capacity (MW)

State	Distillate Fuel Oil	Other Fuel Oil	BIT Coal	Kerosene	Wood Waste
CT	990	268			
ME	187	31		164	88
MA	2,218	1,968	6		
NH	3	606			
RI	584	10			
TOTAL	**3,981**	**2,883**	**6**	**164**	**88**

Sources: EIA Form 816 via Ventyx, 2014 NERC Report on Polar Vortex

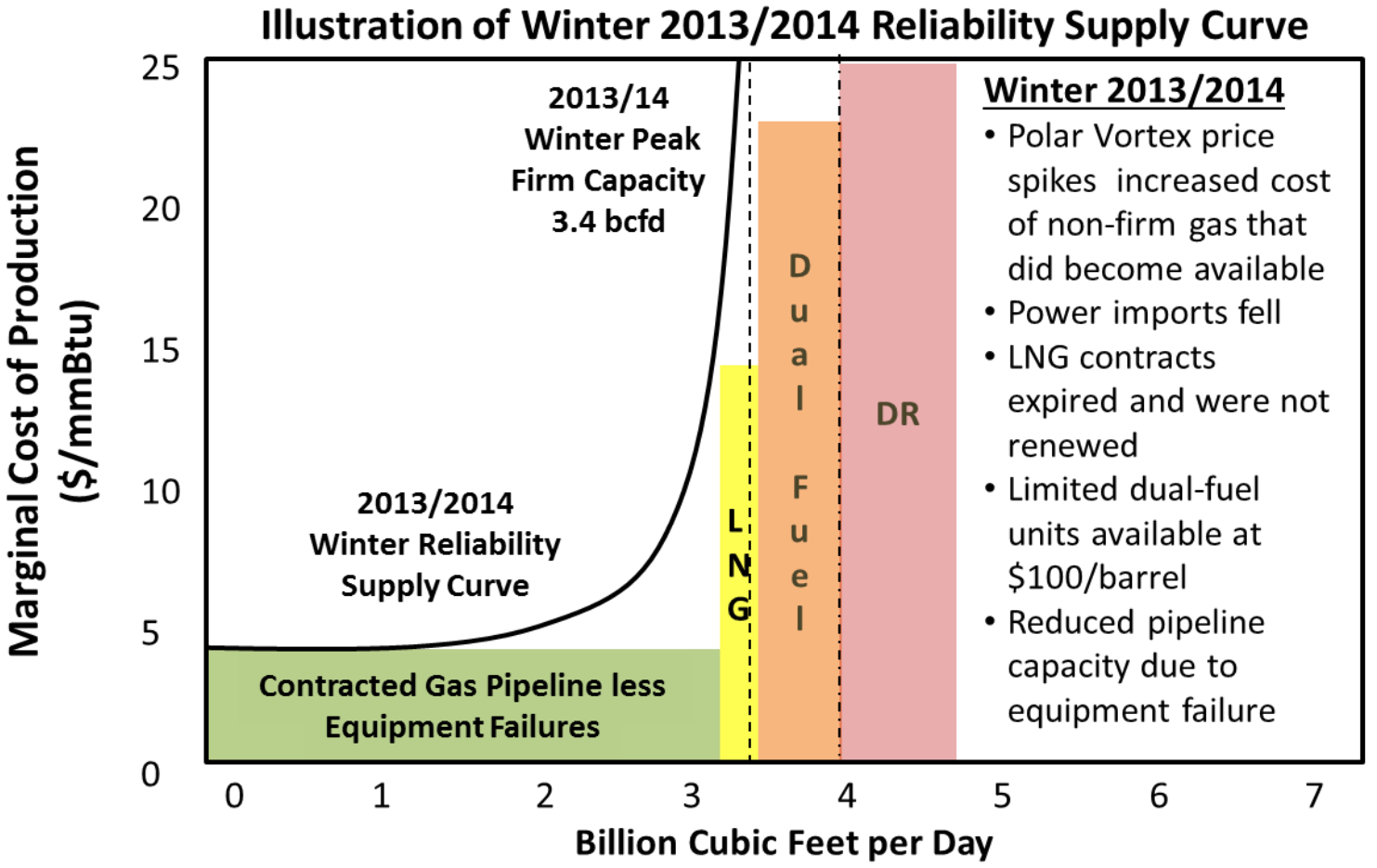
New England has around 7,000 MW of dual-fuel capability

Analysis | Existing infrastructure was adequate



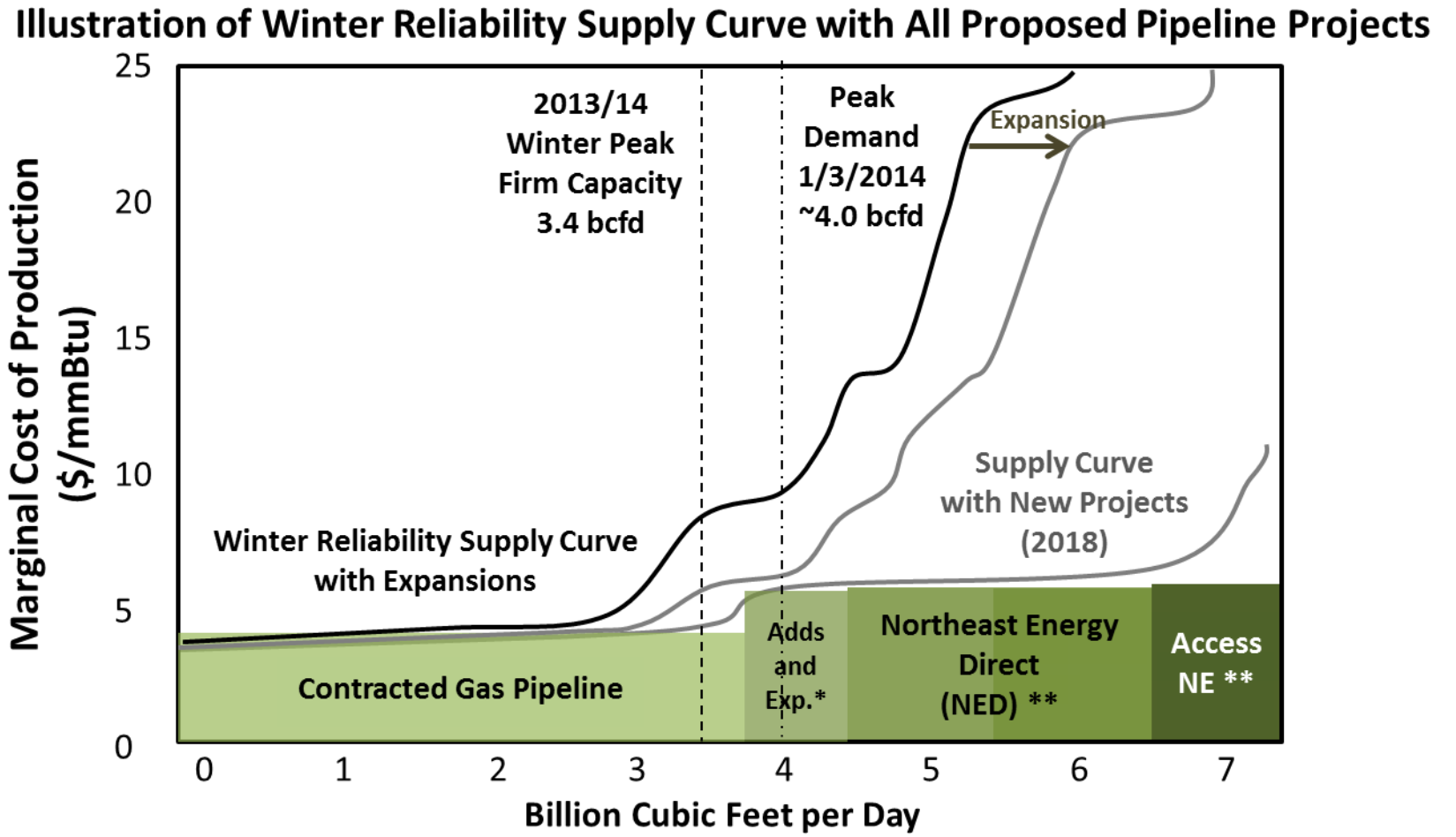
There is adequate energy infrastructure to meet winter requirements

Analysis | Existing infrastructure was not deployed



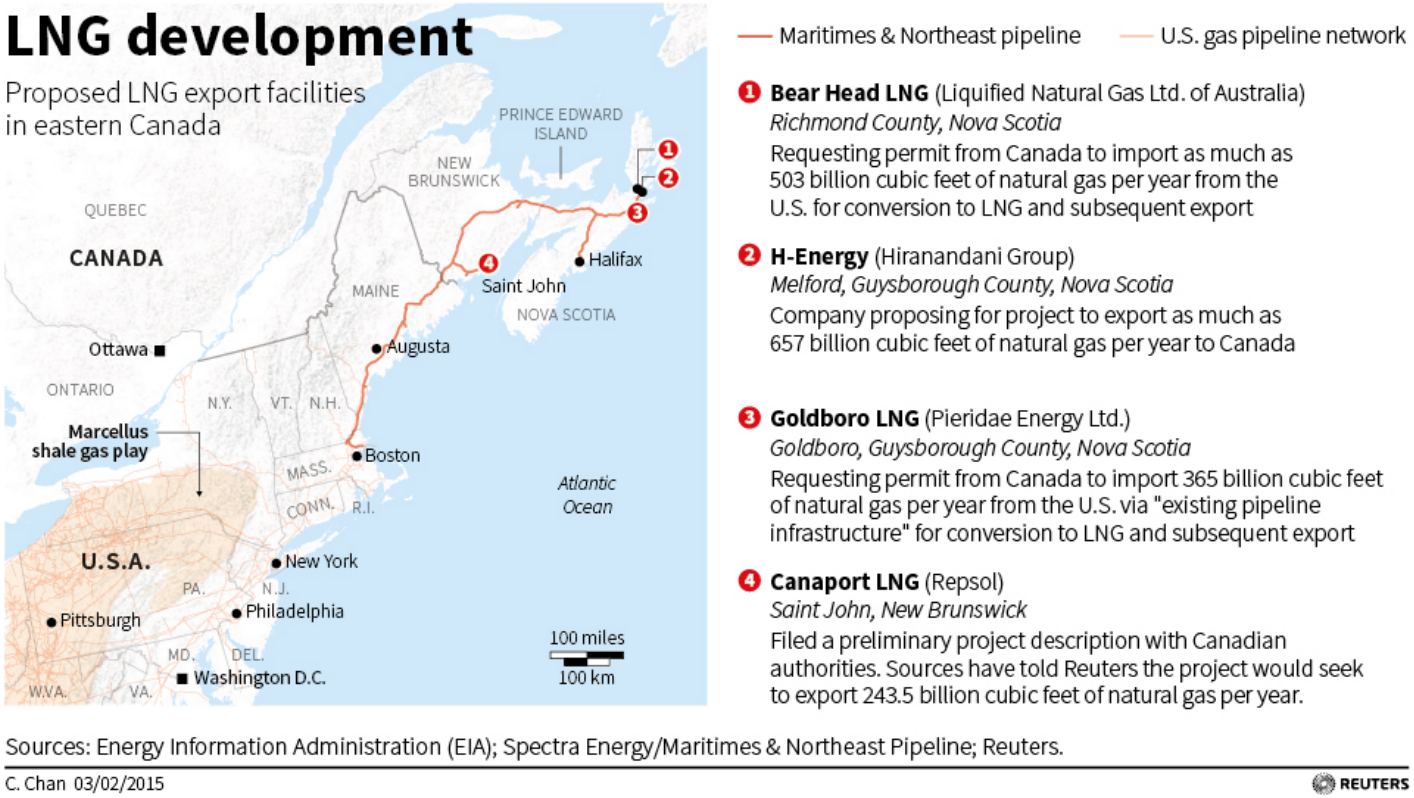
Existing infrastructure was not appropriately deployed

Analysis | Proposed pipelines would oversupply New England



Proposed pipelines would substantially oversupply the market

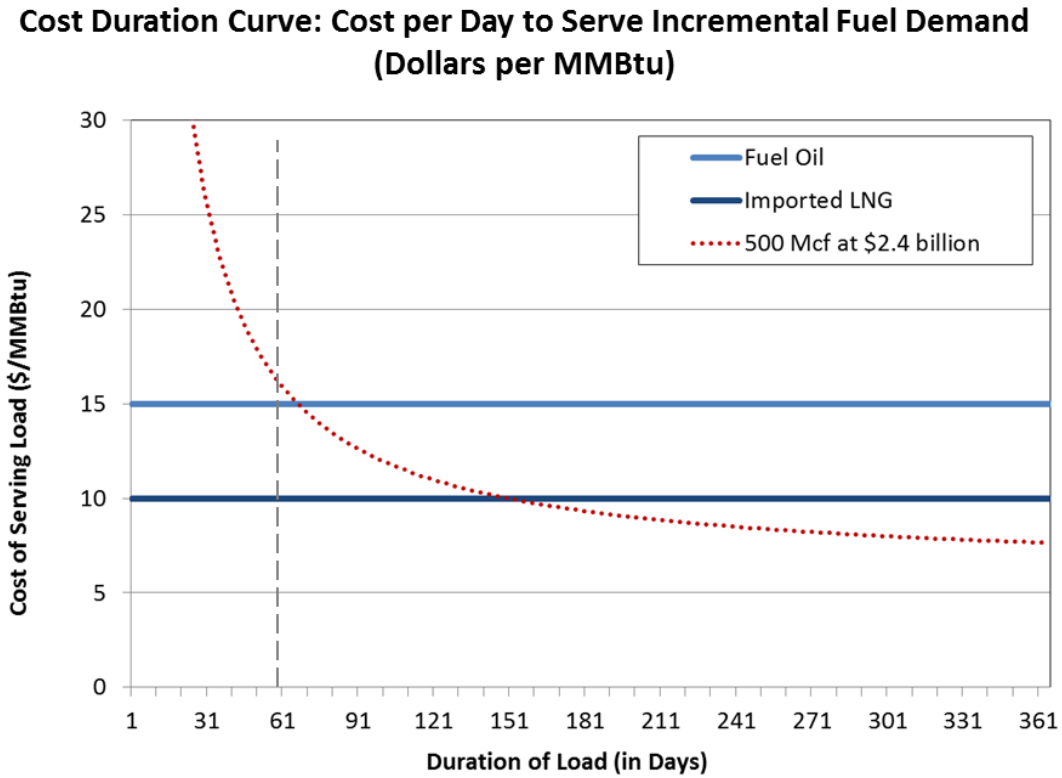
Analysis | Oversupply into New England would find demand



Source: Sherwood, D., Thomas Reuters Foundation, "Analysis- Eastern Canadian LNG export plans face supply quandary," February 4, 2015, http://www.trust.org/item/20150204055734-bxg59

Most likely candidates for pipeline capacity resales = Canadian exports

Analysis | Peaking solutions (dual-fuel and LNG) are least cost

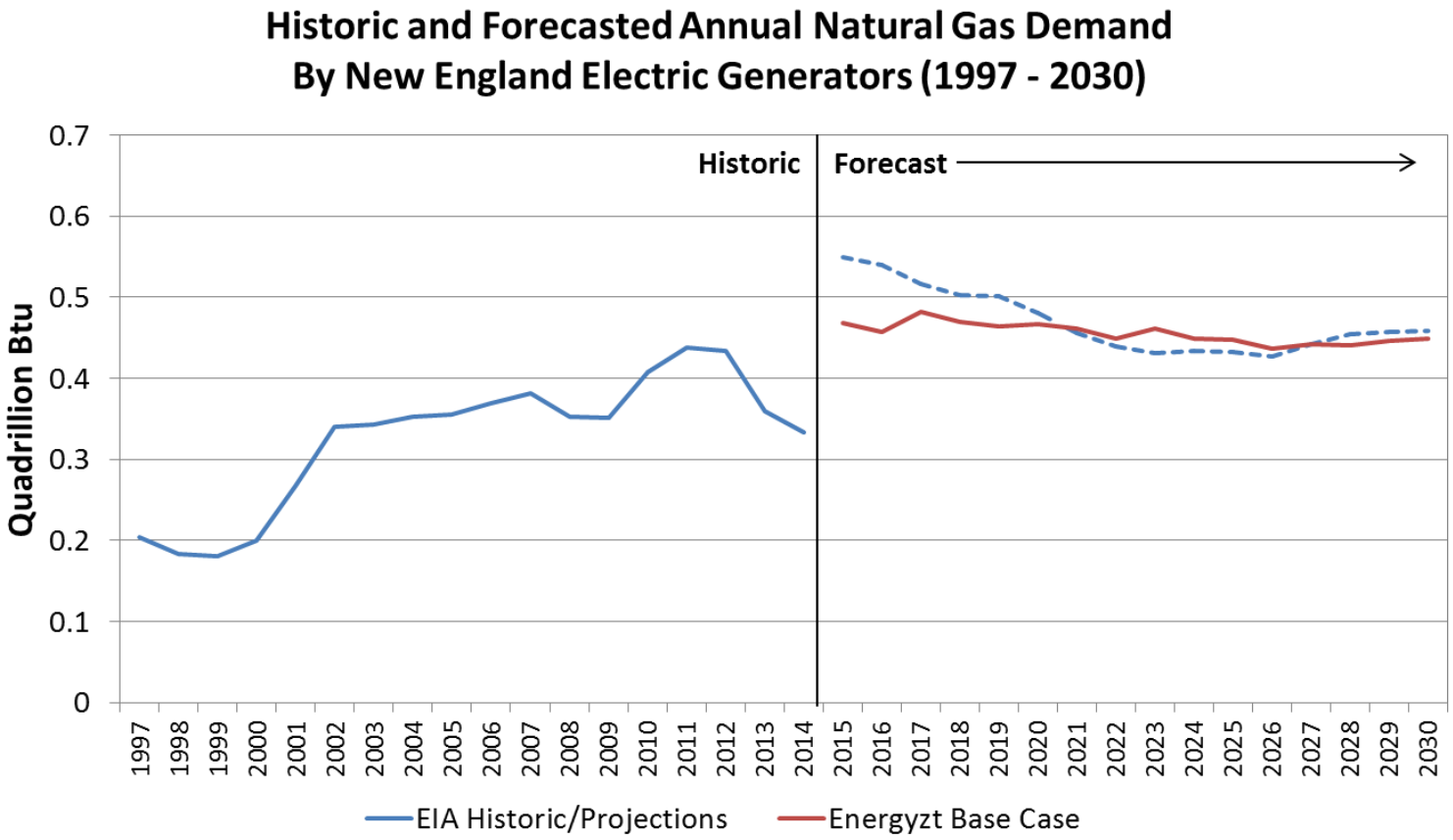


Sources: Energyzt analysis of average cost of incremental supply (variable and capital costs) and does not include price suppression due to excess natural gas supply into the market. Assumptions reflect current market conditions during winter peak periods

Key assumptions:
- Pipeline cost = $2.4 billion
- Cost Recovery Factor = 12.5%
- Variable Costs = $5 / mmBtu gas supplies and $1 / mmBtu other
- Cost of Fuel Oil = $15 / mmBtu
- Cost of LNG = $10 / mmBtu

In addition, dual-fuel and LNG are more focused, flexible and impose less risk

Analysis | The electricity sector is not adding to demand



Source: Energyzt analysis; Annual Energy Outlook 2015

Flat electricity demand and efficiency improvements limit electric demand

Conclusions | New England needs contracts, not construction

- **Winter price spikes reflected a transient peaking problem**
- **Existing infrastructure is more than adequate**
- **The market is responding by accessing existing infrastructure**
  - Dual-fuel capability
  - LNG contracts
  - Energy efficiency
  - ISO-NE performance programs

  Such peaking solutions are the least cost and least risk to ratepayers
- **New pipeline capacity already is being built under traditional financing mechanisms which will expand capacity**
- **A new natural gas pipeline funded by electricity ratepayers is not needed or justified**

The issue is not lack of infrastructure, but inadequate use of that infrastructure

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