Upcoming CPES Meetings

December 10, 2014: **Meet the Regulators**

January 14, 2015: **Legislative Preview**

February 11, 2015: **Connecticut Green Bank with Bryan Garcia**

March 11, 2015: **Connecticut Energy, Environment and Economic Development Conference**, 8:00 AM to 3:00 PM, Courtyard by Marriott, Cromwell, CT.

April 8, 2015: **Regulatory Structures 2.0**

May 11-13, 2015: **New England Energy Conference and Expo**, Mystic Marriott, Mystic, CT.

June 10, 2015: **Energy Project Development and Delivery**

NOVEMBER 12, 2014 | CROMWELL, CT

Transformation of the Electric Grid in New England: Winter Challenges and Price Impacts

Connecticut Power and Energy Society

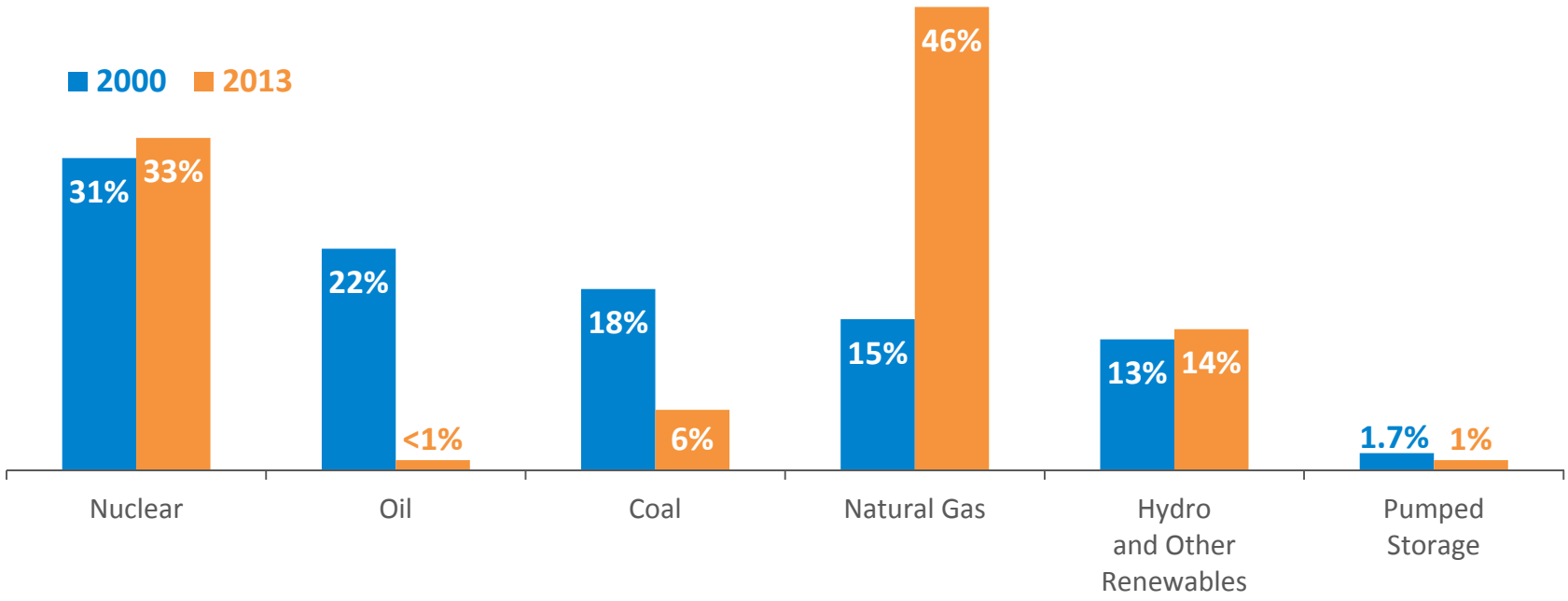
Anne George

VICE PRESIDENT, EXTERNAL AFFAIRS & CORPORATE COMMUNICATIONS

Dramatic Changes in the Energy Mix

The fuels used to produce New England's electric energy have shifted as a result of economic and environmental factors

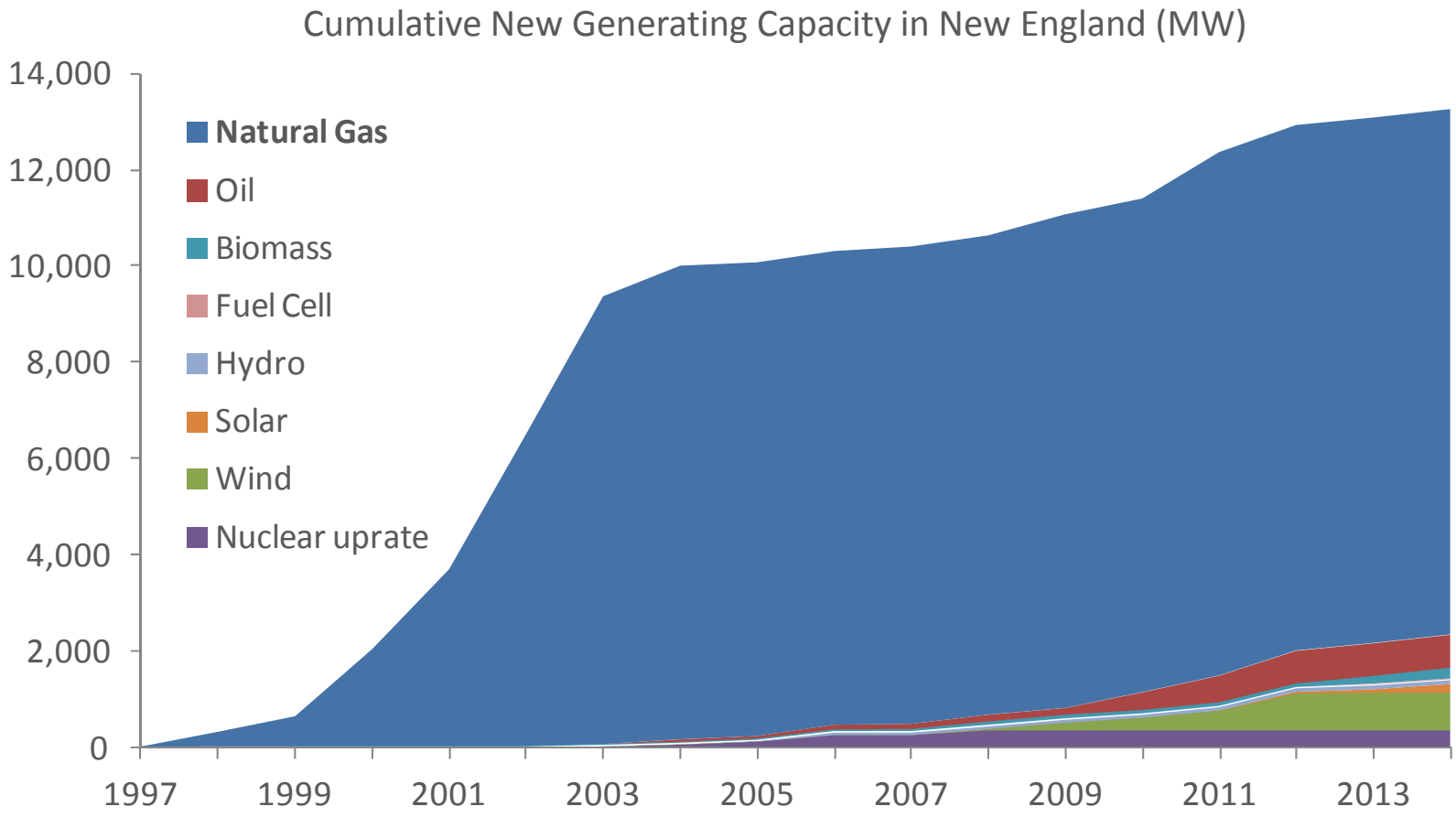
Percent of Total **Electric Energy** Production by Fuel Type
(2000 vs. 2013)



Source: ISO New England Net Energy and Peak Load by Source
Other renewables include landfill gas, biomass, other biomass gas, wind, solar, municipal solid waste, and miscellaneous fuels

Cumulative New Generating Capacity

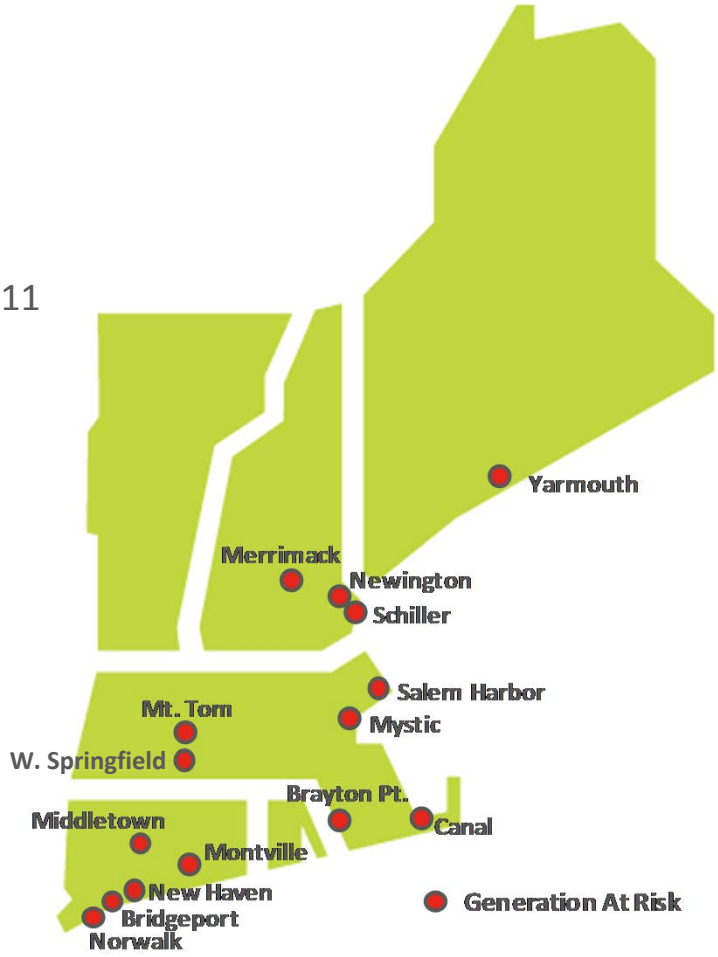
New England has not developed natural gas infrastructure to keep pace with growth of gas-fired generation



Region Is Losing Non-Gas Resources

Major Retirements Underway:

- Salem Harbor Station (749 MW)
  - Unit 1 (coal) and Unit 2 (coal) retired December 2011
  - Unit 3 (coal) and Unit 4 (oil) retired May 2014
- Vermont Yankee Station (604 MW)
  - Unit 1 (nuclear) must retire by May 2017
  - *Station plans to cease operations December 2014*
- Norwalk Harbor Station (342 MW)
  - Units 1, 2 and 10 (oil) must retire by May 2017
  - *Station has already ceased operations*
- Brayton Point Station (1,535 MW)
  - Units 1-4 (coal & oil) must retire by May 2017
- *Additional retirements are looming*



Source: *Generator Retirement Study*, ISO New England, 2012.

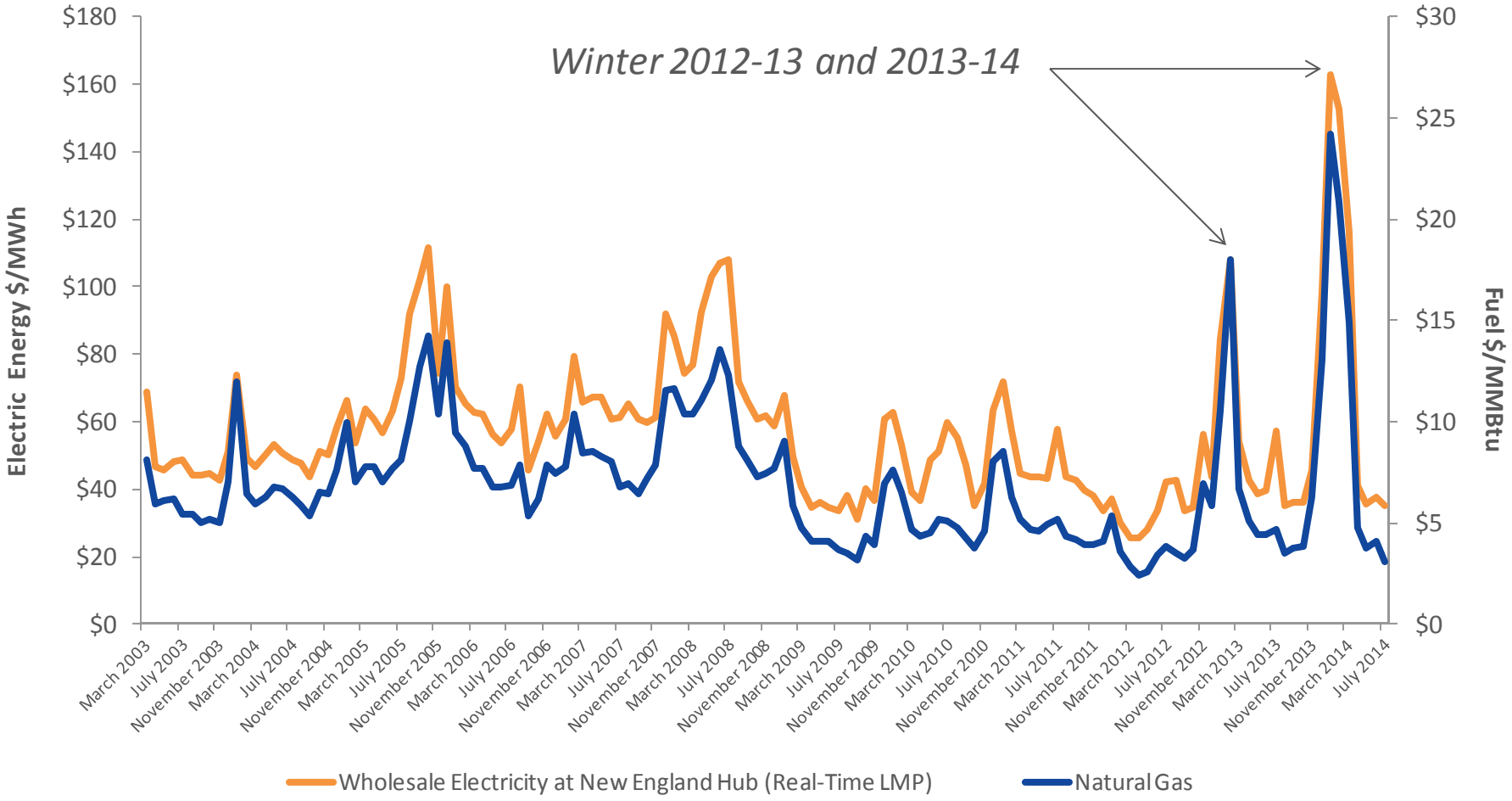
Operating Experience Last Winter

- Started early with colder-than-normal weather in December
- January ranked among the coldest months in recent history
  - 9 days were in the coldest 5% of days over the past 20 years
- New England experienced *sustained* high natural gas prices
  - ISO frequently operated with little or no gas-fired generation
  - High natural gas prices made many oil-fired generators economic
- Gas pipelines were constrained even without significant use by gas-fired generators
- Oil supply chain was fragile and increasingly constrained

Operating Experience Last Winter, *continued*

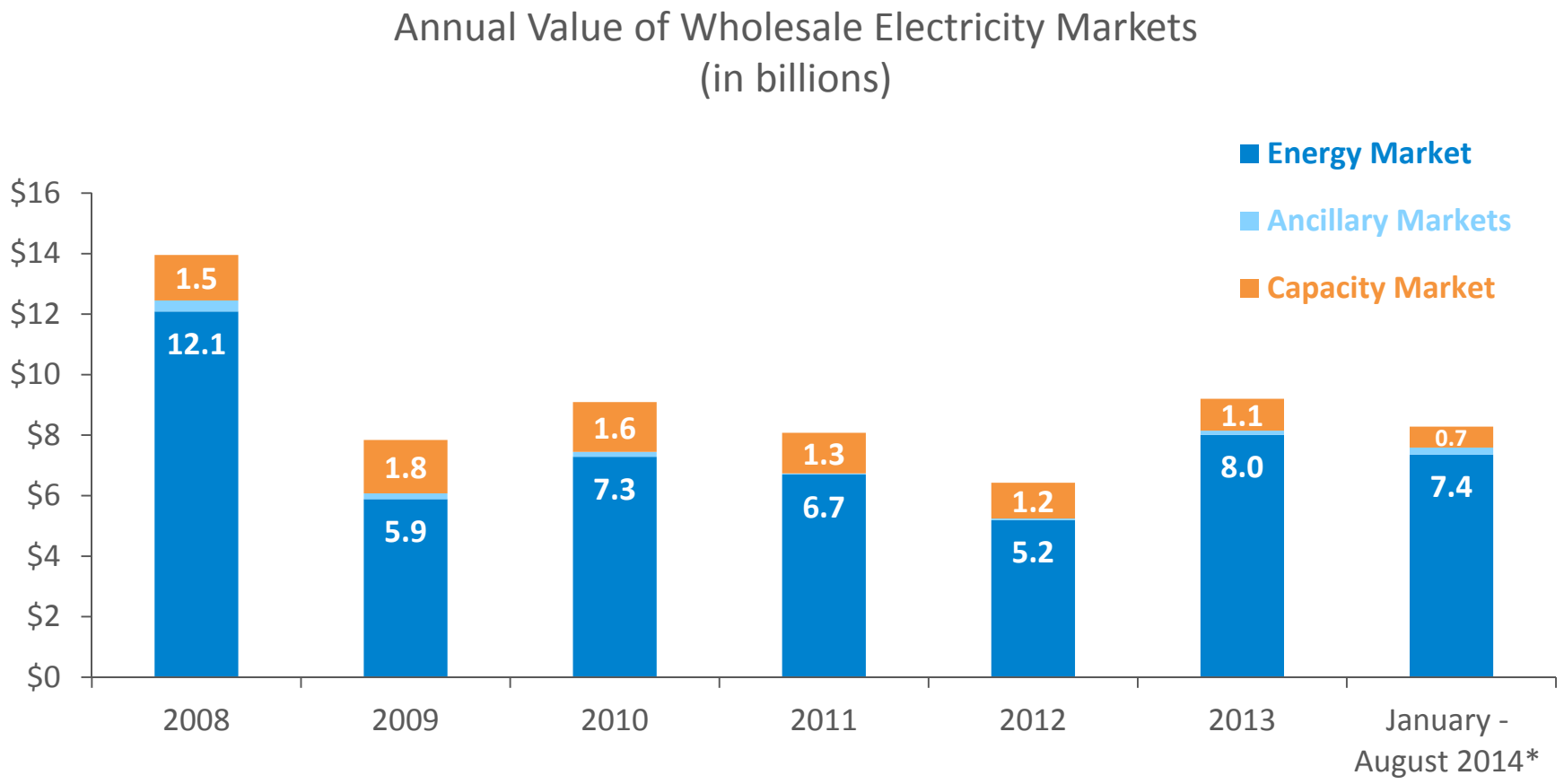
- New England generation fleet is operating with limited fuel inventories (other than nuclear and coal resources)
  - It becomes very difficult for the ISO to operate the grid reliably when fuel supply is so uncertain
- Oil-fired generators were vitally important to reliability last winter
  - Given difficulties securing mid-winter replenishment, it was critical that units had significant inventory at the beginning of the winter
  - This winter will be more challenging given retirements of non-gas generators in 2014 whose lost capability (2.6 million megawatt-hours) will be greater than what the ISO procured through the 2013-2014 Winter Reliability Program (1.9 million MWh)
- The region is highly vulnerable to the loss of large non-gas generators during cold weather (e.g., nuclear units)

High Gas Prices Drove Wholesale Electricity Prices to Record Levels Last Winter



Total Value of Markets Varies with Fuel Costs

Annual wholesale market costs have ranged from $6 billion to $14 billion



Source: 2013 Report of the Consumer Liaison Group, Appendix C

* 2014 data reflects January through August preliminary values and are subject to reconciliation

ISO Has Developed a New Reliability Program for this Winter (2014–2015); Approved by FERC

- **Objectives**:
  - Augment scarce pipeline gas for power generation to improve the region's overall fuel security and power system reliability
  - Create an incentive for generators to secure fuel arrangements going into the winter, while offsetting their risk of having unused fuel at the end of the winter
- **Solutions**:
  - Offset costs for generators to commission **dual-fuel capability**
  - Offset the carrying costs of firm fuel purchased by generators (**fuel oil and LNG**) that is unused at the end of the winter season, and
  - Compensation for **demand response** services
- **Key drivers**:
  - Generators' difficulty in replenishing oil supplies mid-winter
  - Greater gas pipeline constraints than anticipated, and
  - Retirements of significant non-gas generators and the resulting loss of fuel diversity
- **Differences from last year**:
  - Modified to be more fuel-neutral (expanded to include LNG)
  - Accounts for new market improvements and FERC clarity of generator obligations

Other Market Enhancements To Be Implemented in Time for this Winter

- Implementation of the **"Hourly Offer Flexibility"** project
  - Allows participants to update their offers in real-time to reflect changing fuel costs
  - Allows participants to submit certain supply offer parameters with hourly granularity to better reflect operational limits and costs that vary intra-day
  - Improves market pricing and incentives to perform
- Increased **Reserve Constraint Penalty Factors** (RCPFs) in the real-time energy market, ordered by FERC in Pay-for-Performance proceeding
  - Increases 10-Minute Non-Spinning Reserves, from $850/MWh to $1,500/MWh
  - Increases 30-Minute Operating Reserves, from $500/MWh to $1,000/MWh
  - Improves price signals and incentives to perform when resources are scarce

Conclusions

- We are in a precarious operating position for several winters due to inadequate gas pipeline infrastructure and retirements that have already taken place
- Further non-gas generator retirements and/or outages will exacerbate reliability concerns
- Recent market enhancements will improve long-term resource adequacy and performance, but this alone may not result in timely investments in additional gas infrastructure

Questions

Winter Power Prices and Natural Gas Constraints

An LDC & EDC's Perspective

UIL HOLDINGS CORPORATION | berkshire gas — Energy You Can Count On. People You Can Trust. | CNG | Southern Connecticut Gas — Service First | UI The United Illuminating Company

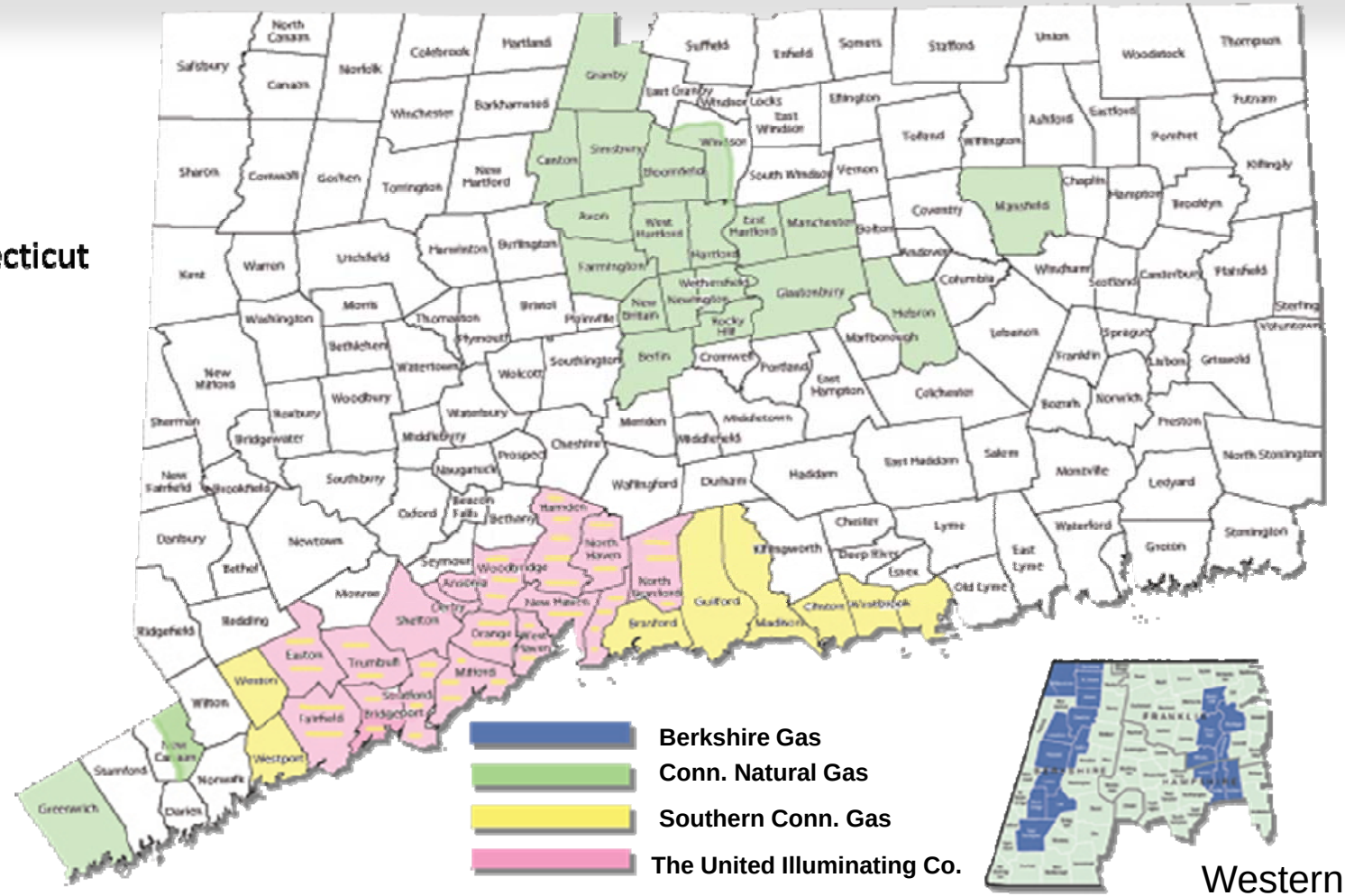
November 12, 2014

Topics

- Who Are We
- A Gas LDC perspective
- An Electric EDC's perspective
  - Power Procurement process
  - Impacts of Winter Natural Gas constraints

Who Are We

Connecticut



Western Massachusetts

A Natural Gas LDC Perspective

- Procure sufficient capacity to meet peak load of "design day", which is the coldest day in a rolling 30-year period.
- For CNG, that day is January 15, 2004, which had 75 EDD (Effective Degree Days) in Hartford and 68 EDD in Greenwich.
- For SCG, that day is January 15, 2004, which had 68 EDD in Bridgeport.

A Natural Gas LDC Perspective

- Peak Day needs are met through Primary firm pipeline capacity and on-site peaking (LNG) resources.

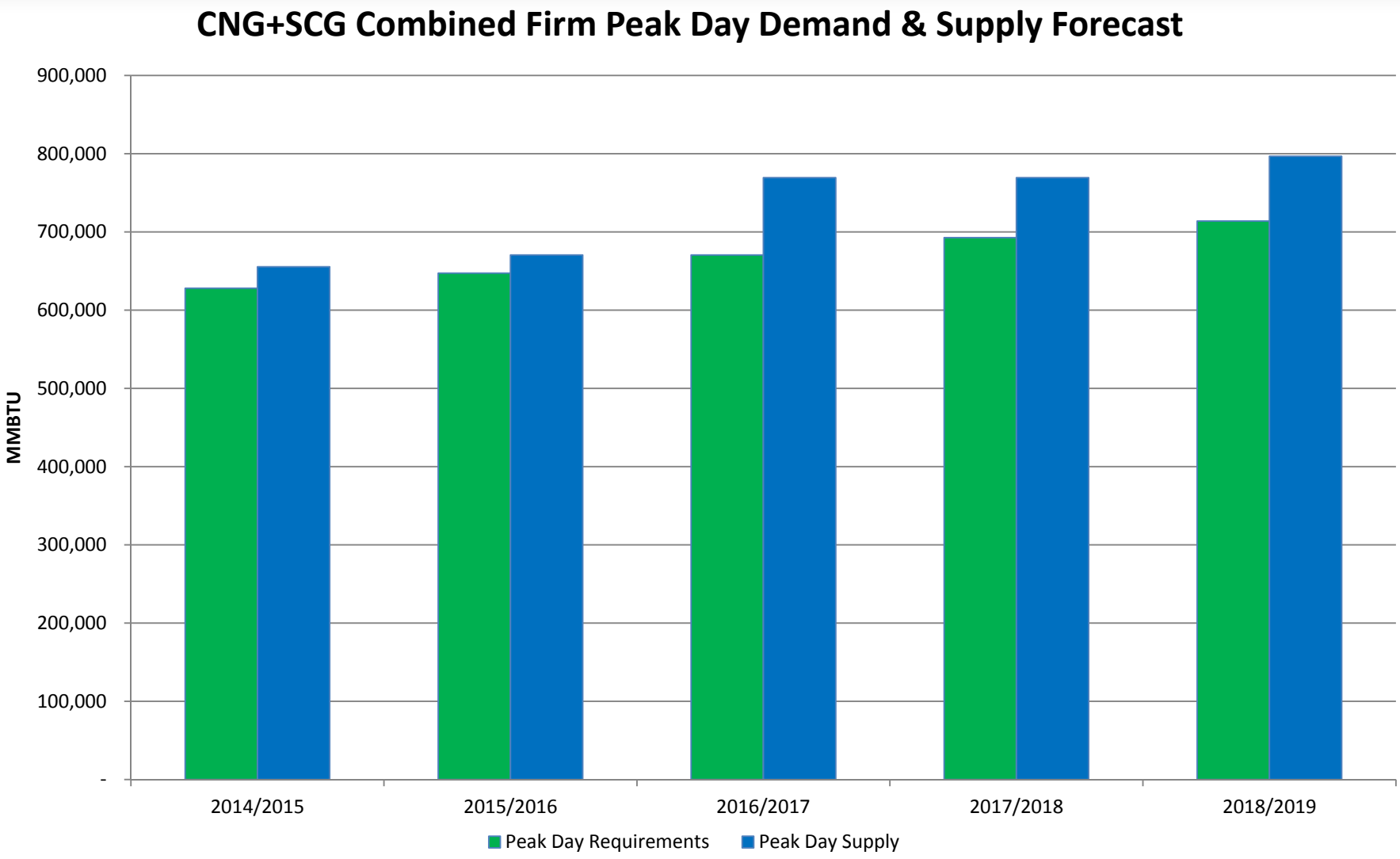
- On October 1, 2014, both CNG and SCG filed their biennial 5 year forecast of Natural Gas Demand and Supply with PURA.

- **Bottom line:**

A Natural Gas LDC Perspective

- ***Both CNG and SCG forecast that given the projected demand and supply forecast, there will be no deficiencies in meeting peak day requirements throughout the forecast horizon.***

A Natural Gas LDC Perspective



A Natural Gas LDC Perspective

- ***What do the Gas LDC's do with their capacity on non-peak days?***

- Sell it in the secondary market, primarily to electric generators.
- Very robust market, since, by definition, most days are not peak days.
- Those revenues flow back to firm retail gas customers & to support the Connecticut Comprehensive Energy Strategy.

An Electric EDC Perspective

- *Procurement of Standard Service* (for those customers who do not choose to receive their generation services from a licensed retail supplier).

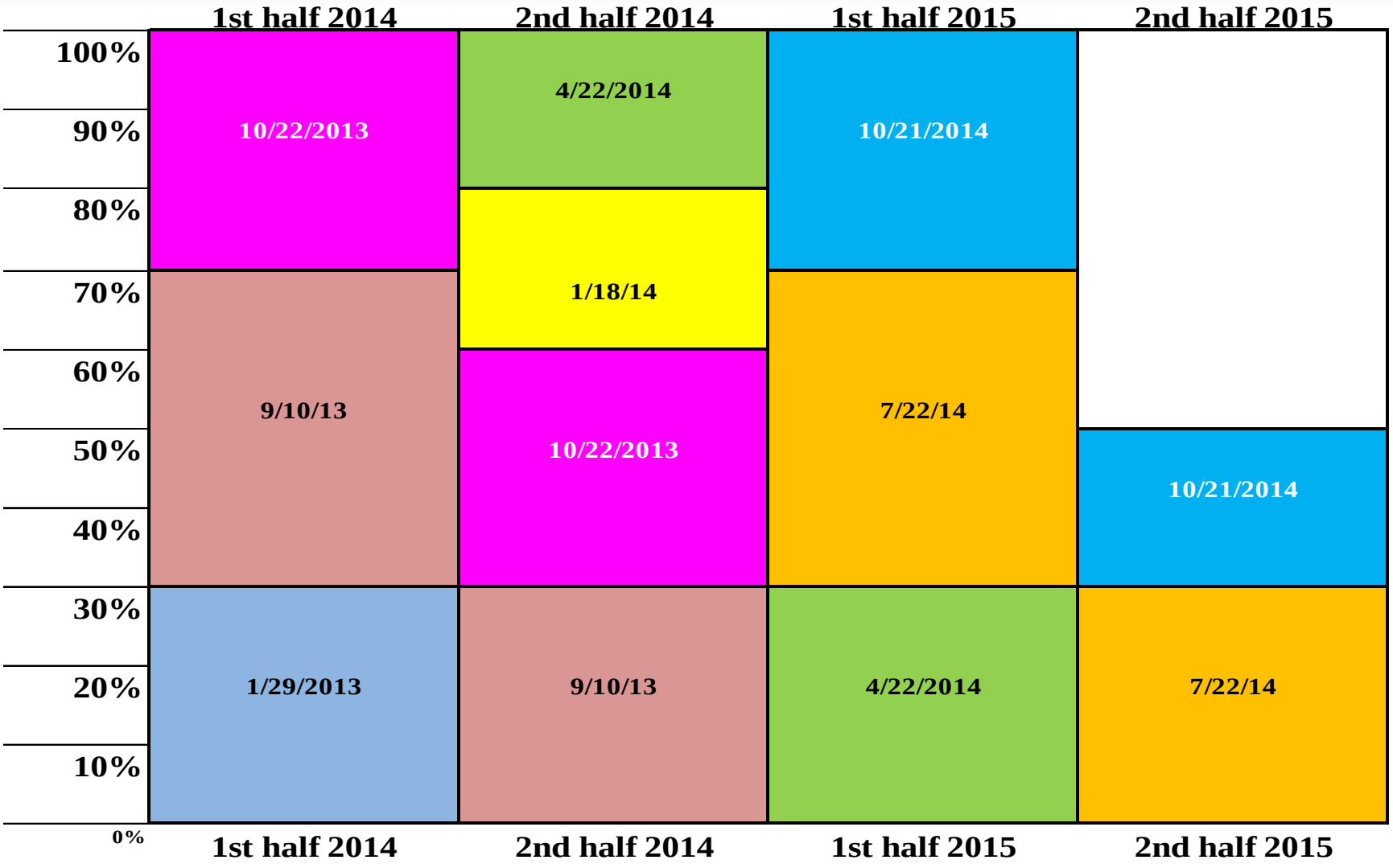
- Process is fairly prescriptive and is contained in the PURA-approved Procurement Plan.

An Electric EDC Perspective

- Overarching principle is **laddering.**

- Multiple procurements for a given delivery period, done at various times.
- Similar to “dollar-cost-averaging” in the investment world.

Laddering of Standard Service Procurement

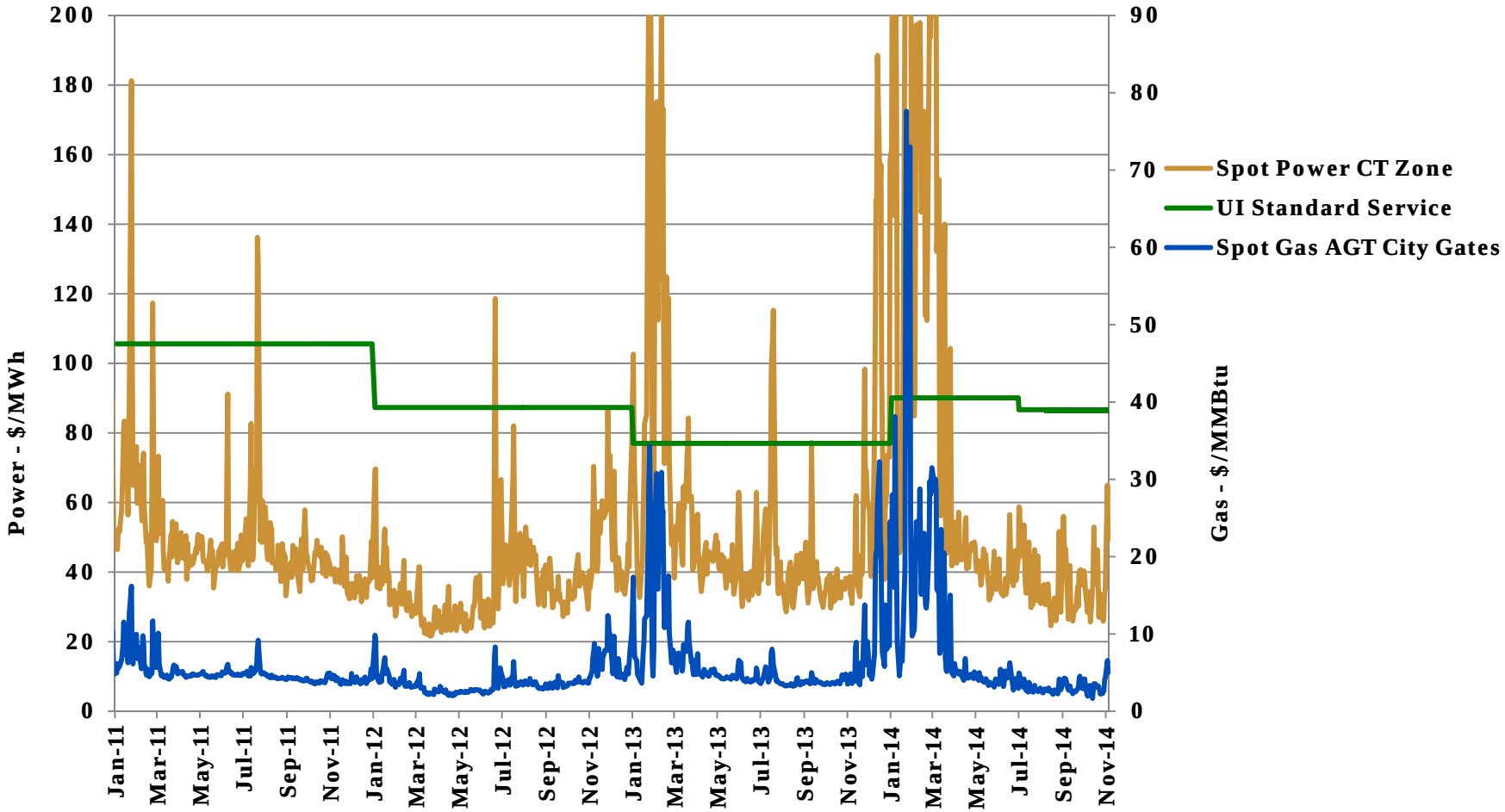


An Electric EDC Perspective
Procurement of Standard Service

- Resulting prices have followed the overall ISO market prices, although laddering dampens the immediate impacts of increasing or decreasing market prices.

- Also, the ISO market prices track natural gas prices.
- Therefore, the EDC's Standard Service prices will generally follow the natural gas futures prices.

Laddering helps to reduce Standard Service volatility…



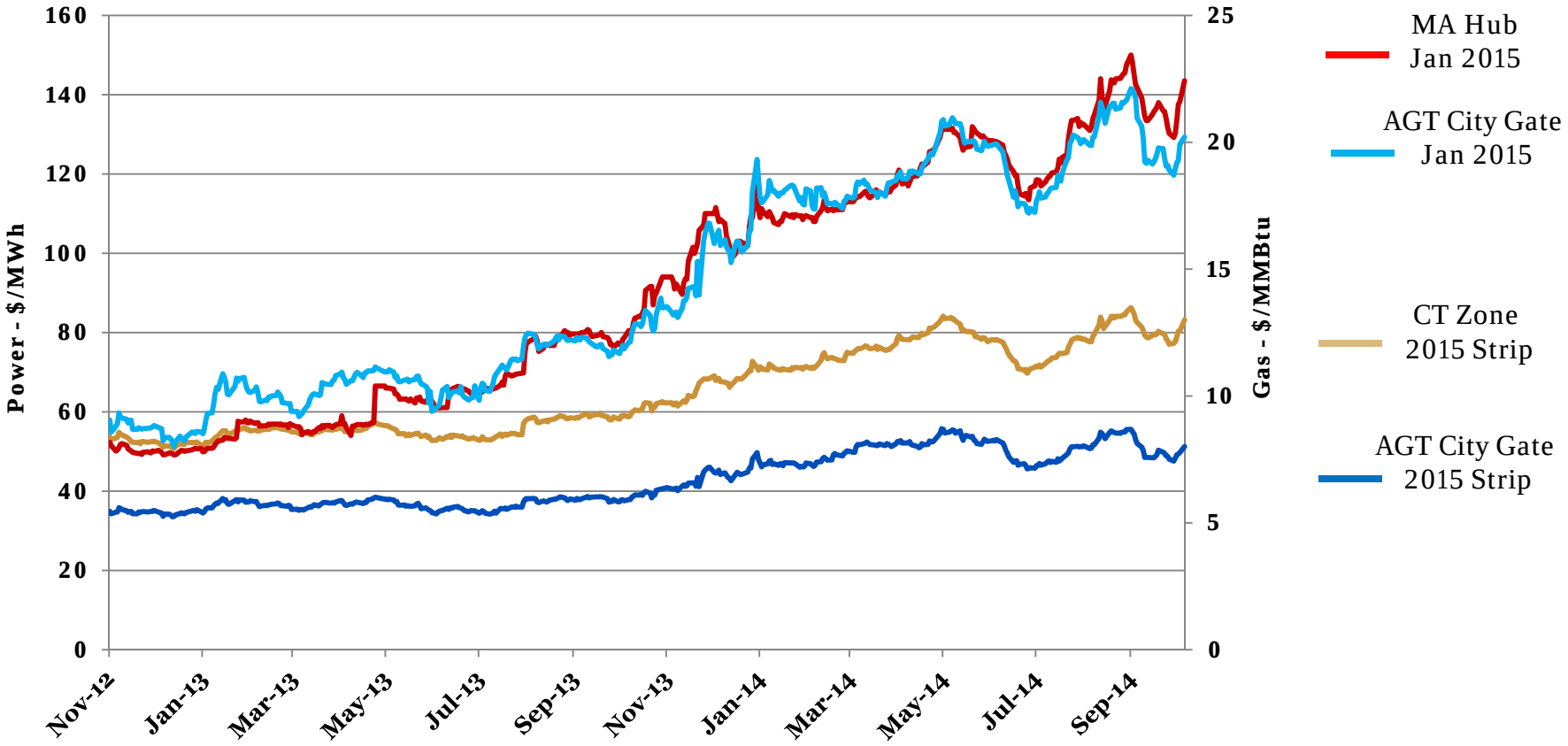
An Electric EDC Perspective
Procurement of Standard Service

- Recent experience
- Due to laddering, SS prices for winter 2013/2014 were established based on procurements done well prior to the price spikes.
- SS prices for Jan-Feb 2014 were unaffected by the “polar vortex”.
- However, such is not the case for 2014/2015.

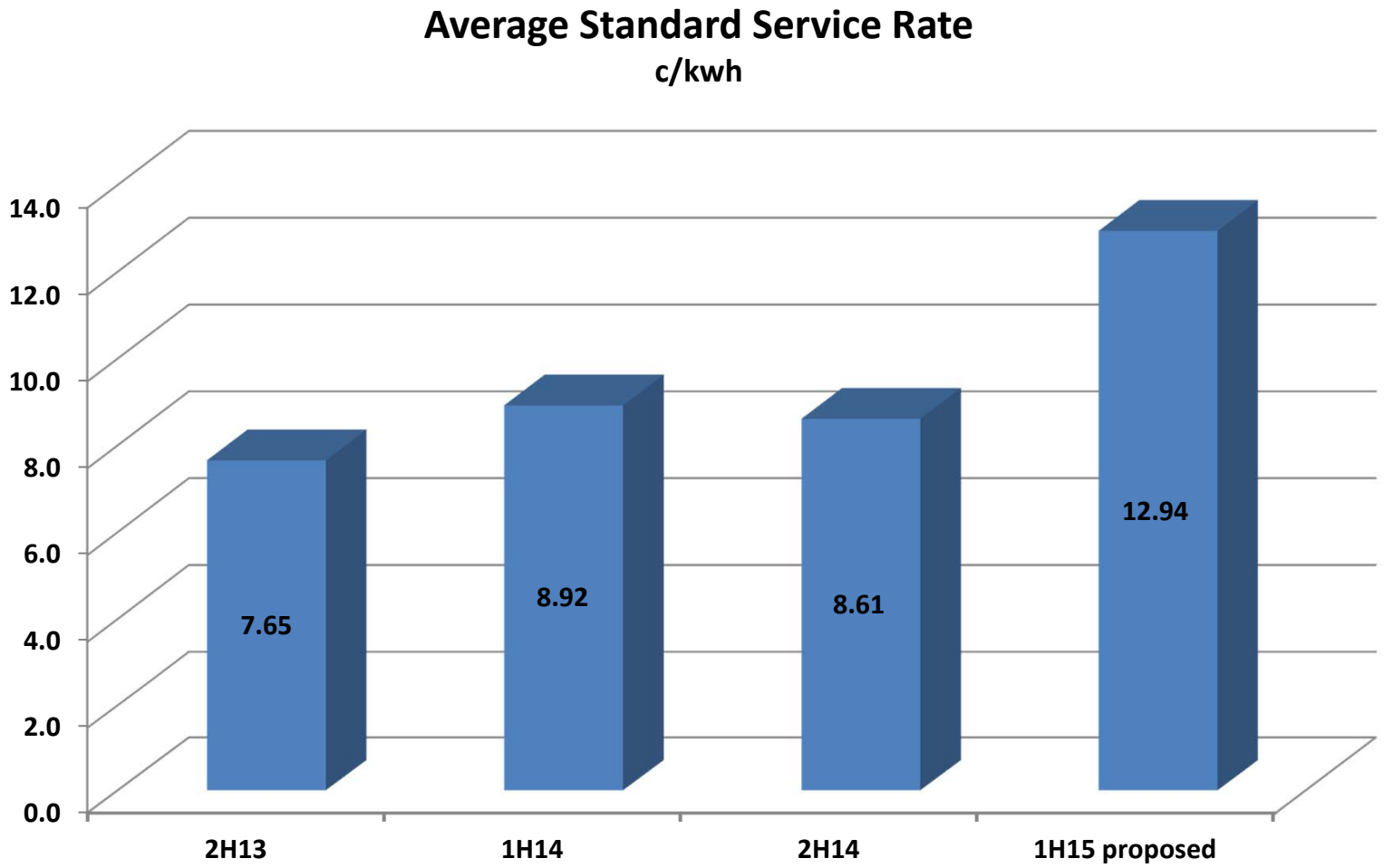
An Electric EDC Perspective
Procurement of Standard Service

- Expectations of another cold winter, or vivid memories of 2013/14 winter, have resulted in much higher expected prices for the first half of 2015.

Winter natural gas constraints drive power prices higher

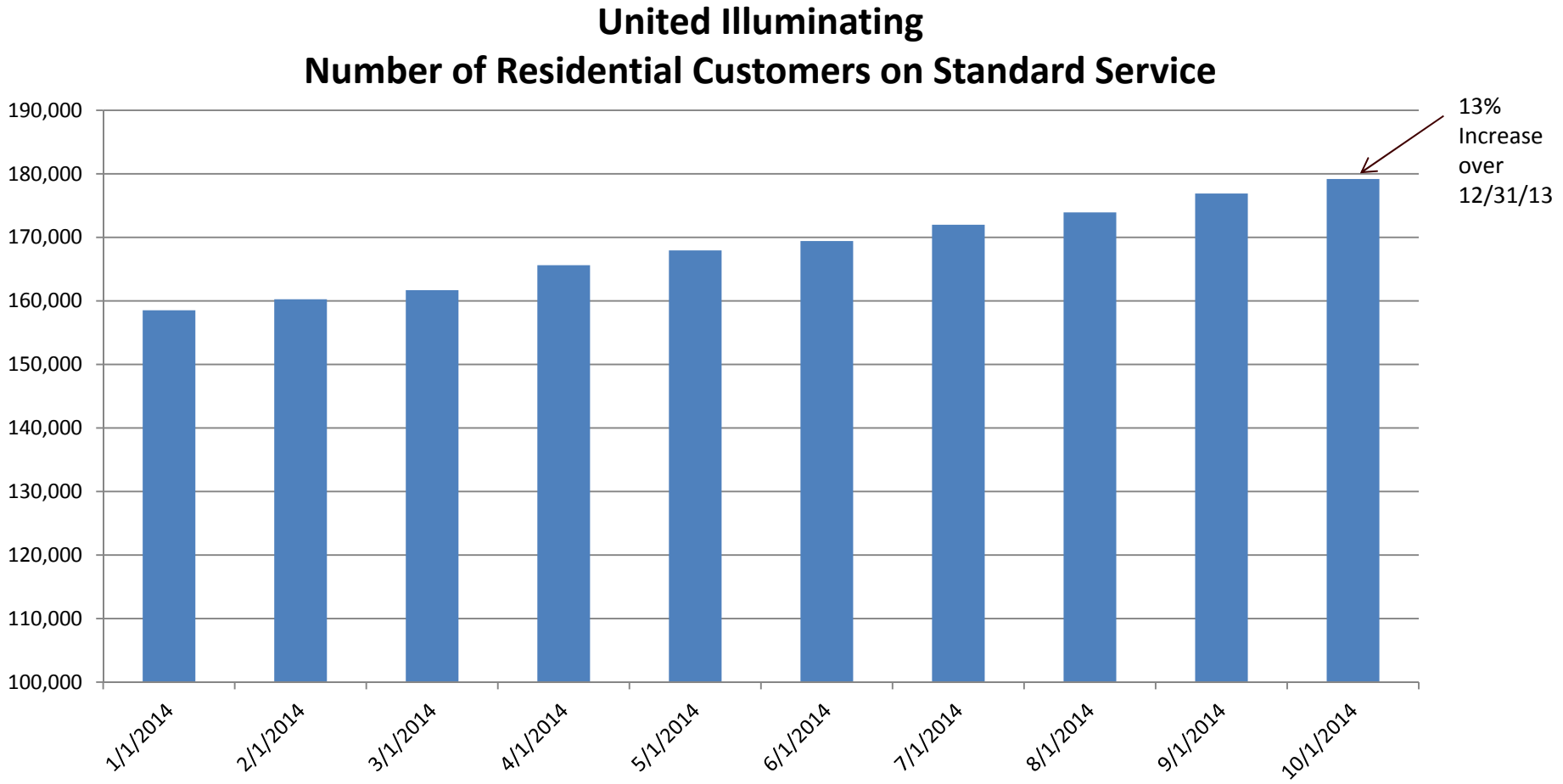


An Electric EDC Perspective
Procurement of Standard Service



An Electric EDC Perspective
Procurement of Standard Service

- One other impact of last winter's price spikes has been a noticeable increase in the number of SS customers.



An Electric EDC Perspective
Procurement of Standard Service

- Our experience is not unique in the region.
- *…..based on an announcement this week from one of the state's two dominant utilities, National Grid. It said its rates will increase by a whopping 37 percent over last winter's, solely because the cost of buying electricity from power plants has soared to the highest level in decades….. (Boston Globe, 9/25/14)*
- *…Business customers served by Central Maine Power Co. will see their standard-offer electricity rates jump from 6 cents per kilowatt hour in October to 15 cents in January, the release said… (Portland Press Herald, 10/6/14)*

Thank You !

WINTER CHALLENGES AND PRICE IMPACTS

CONNECTICUT POWER AND ENERGY SOCIETY

Taff Tschamler
Chief Operating Officer
November 12, 2014

Power for change.
North American Power

North American Power

- Founded in 2009 and located in Norwalk, Connecticut
- 120 employees
- Serve mass market customers with fixed and variable rate plans
- 300,000 power & gas customers at 60 utilities in 12 states
- Over $250MM of wholesale energy costs in 2014
- Purchase multiple products to hedge supply obligations from a large number of counterparties

Power for change.
North American Power

3 Observations on Winter Prices

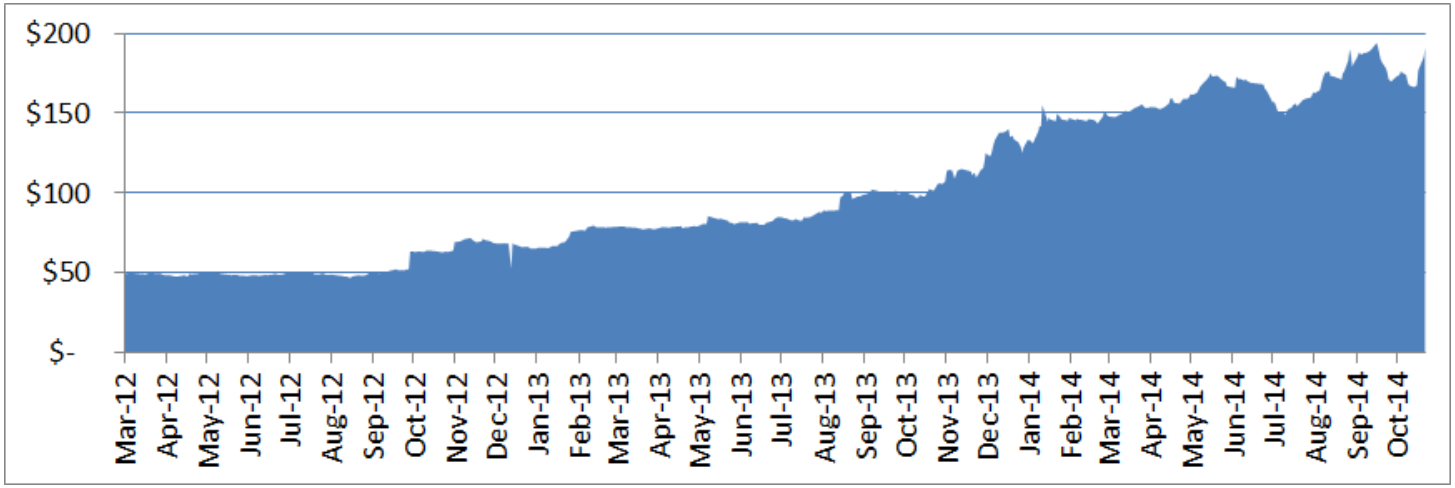
1. For those without pipeline capacity, New England natural gas prices this winter are 4x to 5x higher than most areas of the US.

2. Retail electric suppliers are especially challenged by New England winter wholesale prices.

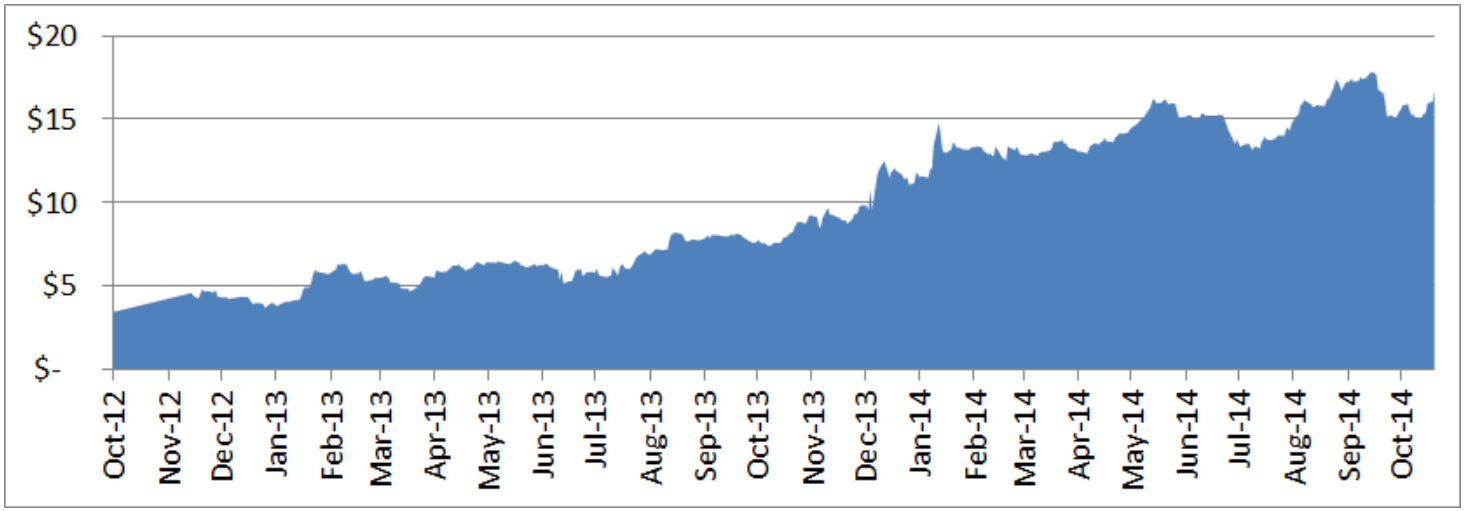
3. The causes of the problem are complex, but it is not because of deregulation.

January 2015 Wholesale Prices in New England

January 2015 Mass Hub On Peak Electric Price ($/MWh)



January 2015 Algonquin Basis Natural Gas Price ($/MMBtu)



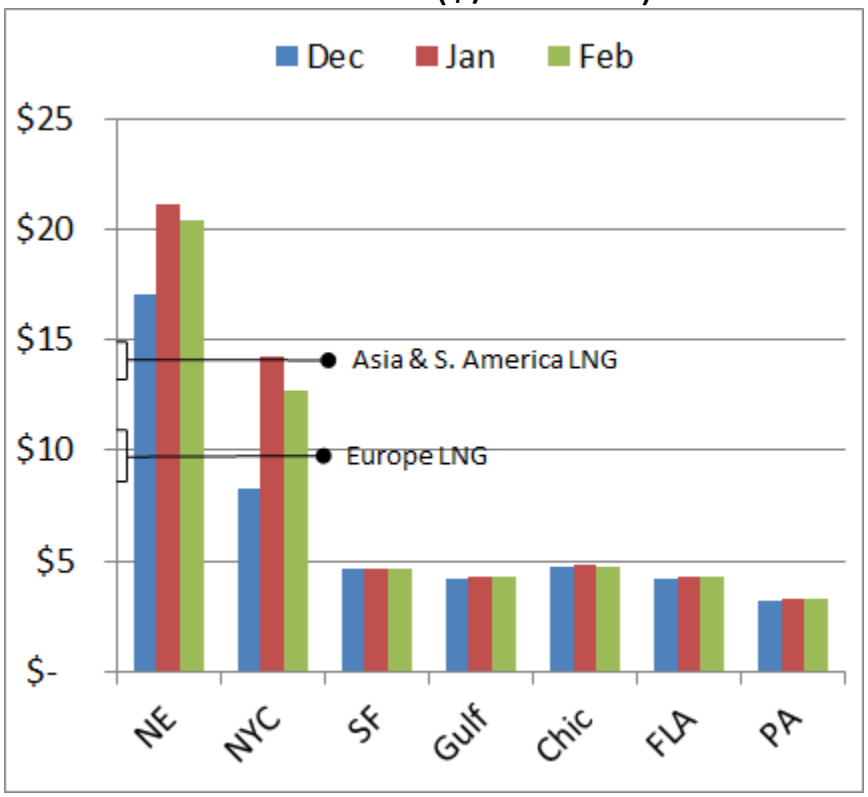
Source: CME

Wholesale Price Comparison (as of November 5, 2014)

New England winter gas prices are 4 to 5x higher than most parts of the US…

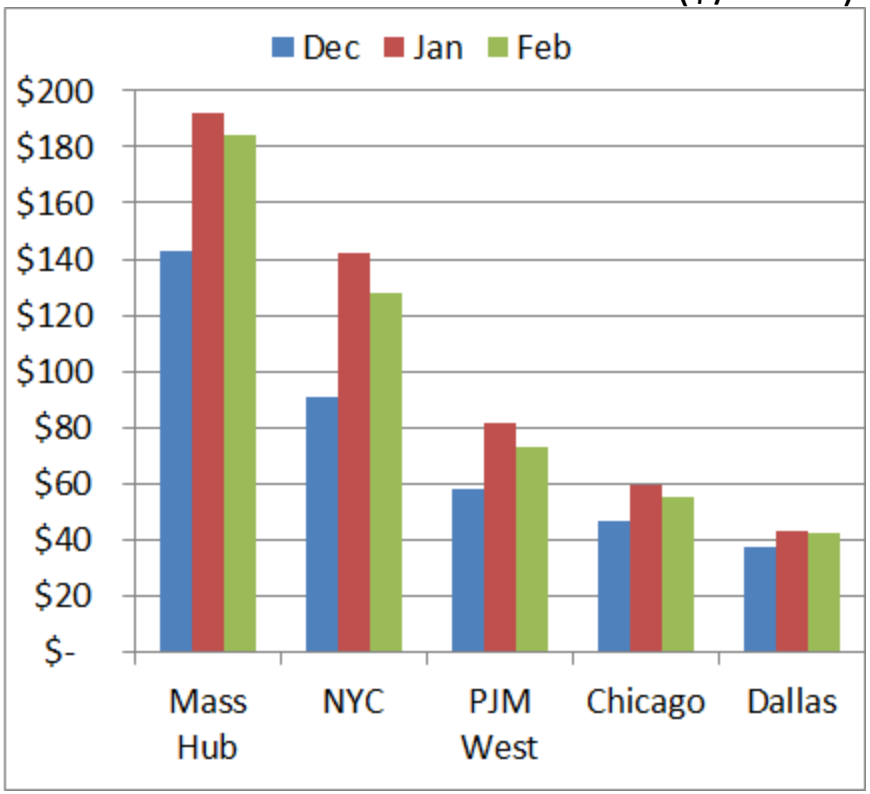
… causing a large premium in power prices compared to other regions.

Wholesale Gas Prices ($/MMBtu)



Source: CME, FERC

Wholesale On Peak Power Prices ($/MWh)



Power for change.
North American Power

A Retailer's Perspective on the Winter Challenge

The Impact on Retailers

- High prices, high attrition
- Financial losses
- Exits from the business
- Policy changes
- Reputational damage

In NAP's case, the response comprises many initiatives

- Adjust our products and plans
- Adjust how we hedge
- Educate customers
- Diversify our business outside of New England

New England v. Texas: A Restructuring Comparison

Deregulation is not the cause of New England's energy challenges.

	New England	ERCOT
Choice Customers	~4MM	~6MM
ISO Peak Load	~26 GW	~70 GW
Retail Market Design	Partial	Full
Retail Market Participants	20+	50+
Retail Supply Prices (¢/kWh)	8 to 15¢	4 to 7¢
Product Innovation/Diversity	Minimal	Robust
Customer Satisfaction	Low	High
Capacity Market	Yes	No
Price Cap ($/MWh)	$1,000	$9,000
New Generation	Limited	Robust
Energy Efficiency	Strong	Weak
Renewable Energy	Mixed	Strong

Texas has the most competitive retail market in the US. It does not have default service, a capacity market nor significant resource adequacy problems. Their rates are lower, customer satisfaction higher and innovation more robust than New England.