

# Electricity and Natural Gas Price Risks: This Winter and Beyond

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**GDF SUEZ Road Show, Boston MA**  
**October 28, 2014**

**GDF SUEZ**

BY PEOPLE FOR PEOPLE

# Andy's Background

- **Andy Weissman**

- Chief Executive Officer of EBW Analytics Group
- Senior Energy Advisor to Haynes and Boone, LLP



- **Publisher of Energy Risk Report**

- Created specifically to help purchasing managers make well informed decisions for their companies
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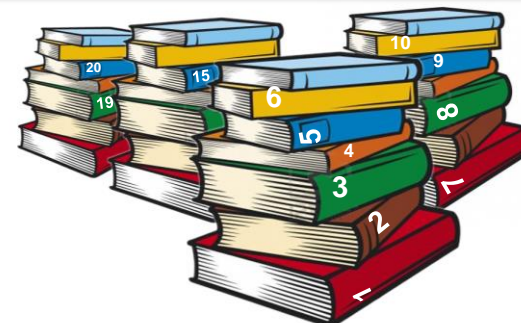
# Agenda and Core Message

- EBW AnalyticGroup's objective is to:
  - Provide electricity and natural gas purchasers with more rigorous, better supported basis for buying decisions
  - Assist buyers in minimizing exposure to upside price risks
- Focus on three regions:
  - New England ISO
  - New York ISO
  - PJM
- Four key issues:
  1. Lessons learned from last winter
  2. Electricity and natural gas prices during next twelve to eighteen months
  3. Longer-term price trends and risks
  4. Need for improved regulation - both RTOs and FERC
- Minimizing risk exposure critical

Fully Integrated Regulated Utilities



Rules After Restructuring



# Danger Signs in Every Direction



- Risk factors include:
  - Increasing frequency of extreme weather events
  - Flaws in conventional techniques for assessing resource adequacy
  - Massive wave of expected retirements of coal, nuclear and oil-fired steam units
  - Potential explosive growth in demand for natural gas later in decade
  - Lack of adequate incentives to build new generation
  - Failure to expand natural gas pipeline system in a timely manner
  - Lack of adequate incentives to inject natural gas in storage (either as conventional natural gas or as LNG)
  - Failure to develop a national strategy to avoid potential price volatility due to LNG exports and increased pipeline exports to Mexico
- Upside price risks likely to grow every year during remainder of decade
- Implications for energy purchases
  - Essential to manage exposure to upside price risks
  - Follow portfolio approach
  - Be quick to seize on windows of opportunities to cover future requirements at attractive prices – including RIGHT NOW

# Next Generation Approach to Market Analysis

- Optimizing procurement and minimizing exposure to upside price risks requires:
  1. Understanding the big picture
  2. Heavy emphasis on risk assessment
  3. Integrating weather and market analysis
  4. New, better analytical tools and methodology
    - More robust analysis of weather-related risks
    - Ability to analyze multiple scenarios and assess with greater precision how shifts in demand for electricity and natural gas affect prices
  5. Thorough understanding of regulatory requirements and how they affect prices

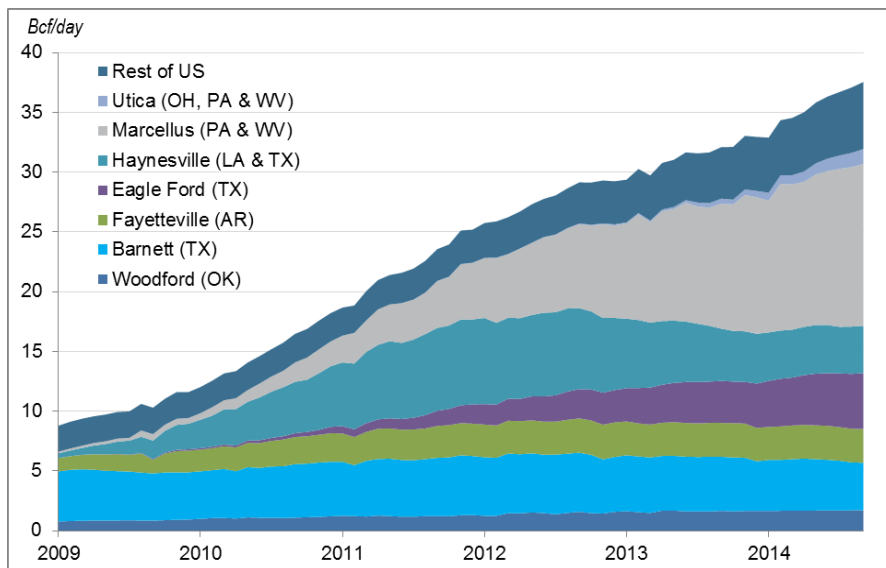


# LESSONS LEARNED FROM LAST WINTER

# Shale Revolution Created False Sense of Comfort

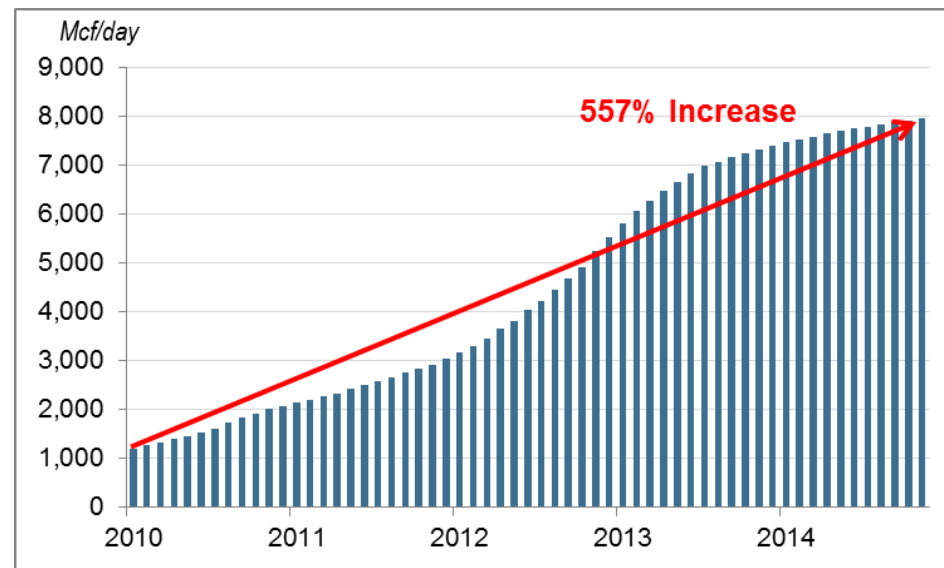
- U.S. natural gas production growing at rapid rate
  - Particularly in Marcellus Shale and Utica
- Production costs continued to plummet due to increased efficiency and productivity per rig
- Reserve margins appeared to be adequate in every region

US SHALE PRODUCTION BY PLAY, SINCE 2009



Source: EIA, EBW Analytics Group

MARCELLUS PRODUCTION BY WELL, SINCE 2010

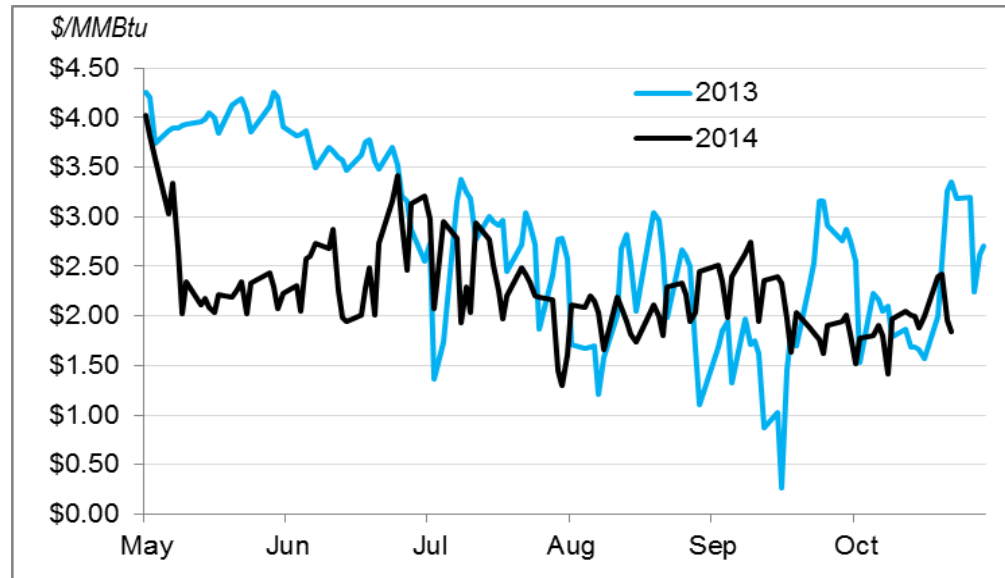


Source: EIA, EBW Analytics Group

## Fastest Growth in Northeast

- Production in Marcellus Shale has already reached 15.8 Bcf/day and could grow to 30 Bcf/day by end of decade
- Has resulted in increasing downward price pressure in non-weather months

NATURAL GAS PRICES AT LEIDY HUB,  
MAY – OCTOBER, 2013 VERSUS 2014



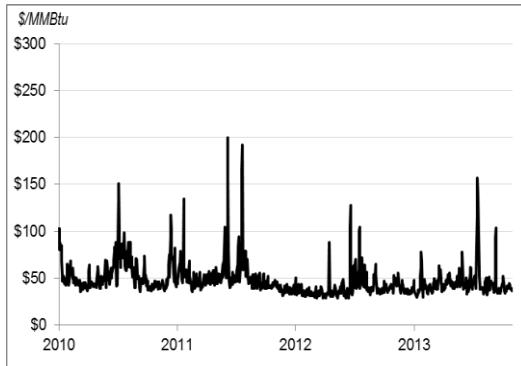
Source: EBW Analytics Group, Bloomberg



# Prices Generally Moderate

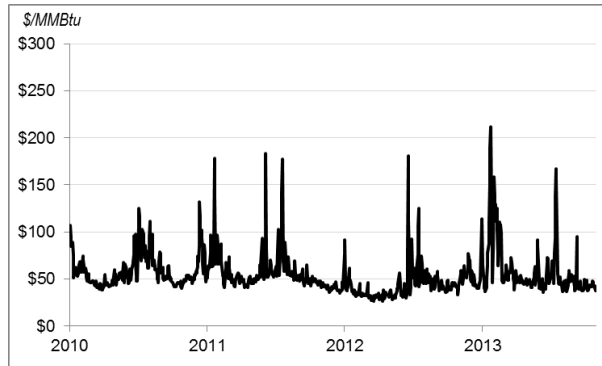
- Prior to last winter, most of U.S. believed no longer vulnerable to frequent, severe price spikes
  - New England primary exception

**PJM WESTERN PEAKDAY-AHEAD  
ELECTRICITY PRICES**



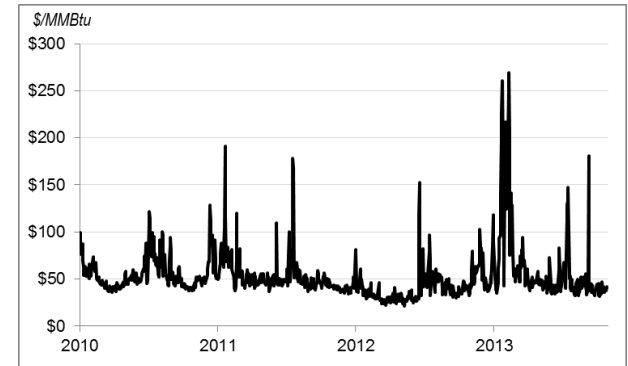
Source: Bloomberg, EBW Analytics Group

**NYISO ZONE G PEAK DAY-AHEAD  
ELECTRICITY PRICES**



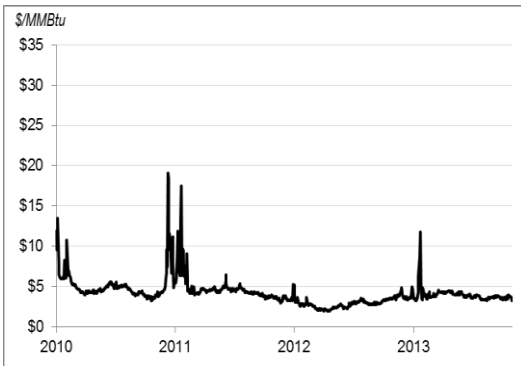
Source: Bloomberg, EBW Analytics Group

**ISO-NE INTERNAL HUB PEAK DAY-AHEAD  
ELECTRICITY PRICES**



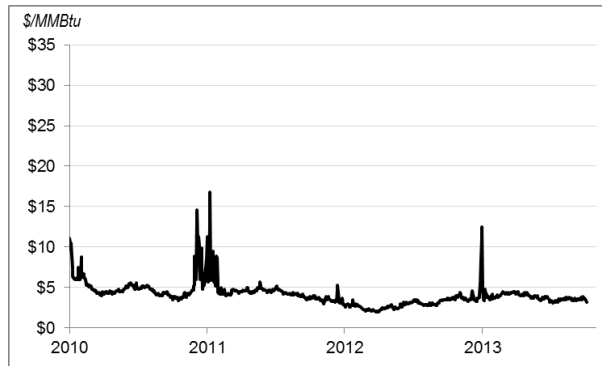
Source: Bloomberg, EBW Analytics Group

**NATURAL GAS SPOT PRICE AT  
TRANSCO ZONE 6 (NON-NYC)**



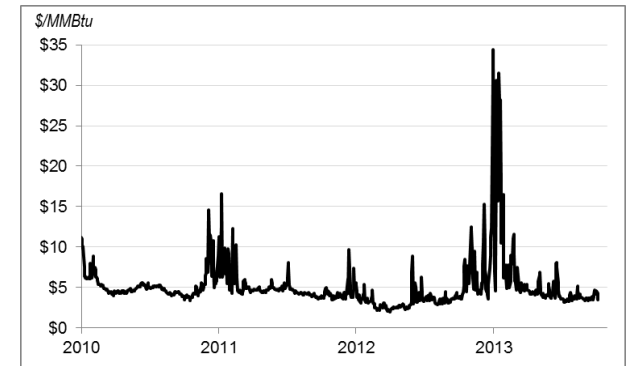
Source: Bloomberg, EBW Analytics Group

**NATURAL GAS SPOT PRICE AT  
TETCO M3 (NYC)**



Source: Bloomberg, EBW Analytics Group

**NATURAL GAS SPOT PRICE AT  
ALGONQUIN HUB**

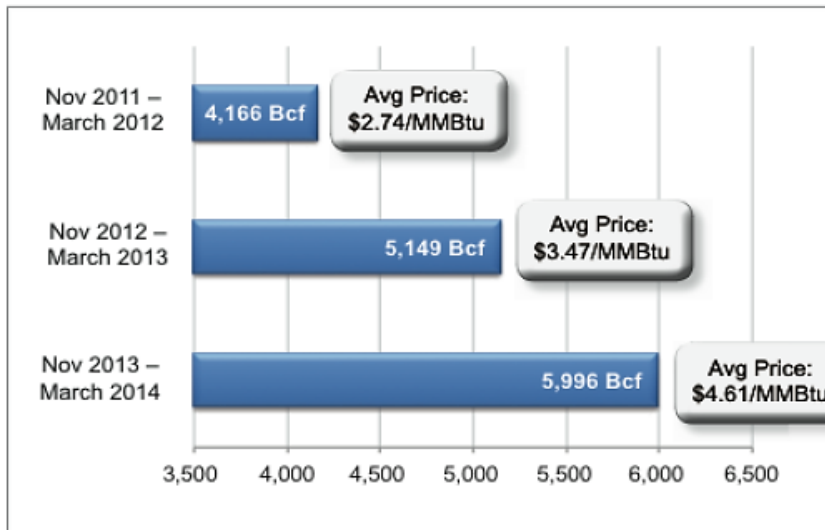


Source: Bloomberg, EBW Analytics Group

# Natural Gas Prices Exploded Last Winter

- Steep rise nationally
- Due to:
  - Extreme cold weather
  - Lack of adequate natural gas in storage
- Bottomed out at 822 Bcf on March 28<sup>th</sup>

WINTER SPACE HEATING DEMAND (BCF) AND NATURAL GAS PRICES (\$/MMBTU), 2011 TO 2014



Source: EBW Analytics Group

NYMEX FRONT-MONTH NATURAL GAS CONTRACT, SINCE 2011

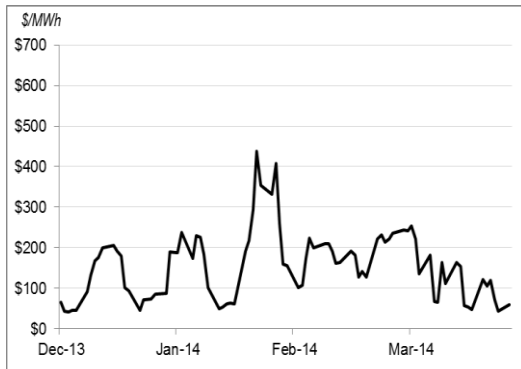


Source: EBW Analytics Group

# Impact on Northeast Far More Severe

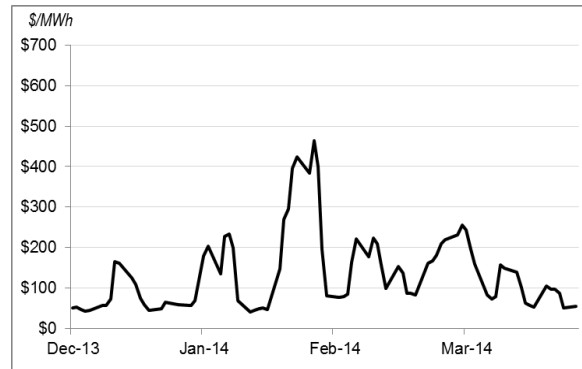
- Record winter-month electricity prices throughout the Northeast
  - Particularly severe in Northeast

**ISO-NE INTERNAL HUB DAY-AHEAD DAILY PRICES, LAST WINTER**



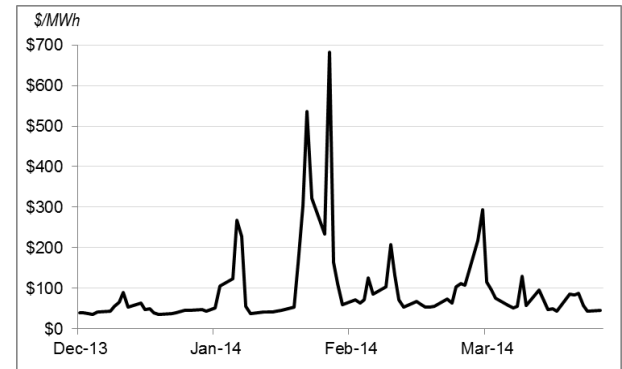
Source: Bloomberg, EBW Analytics Group

**NYISO ZONE G DAY-AHEAD DAILY PRICES, LAST WINTER**



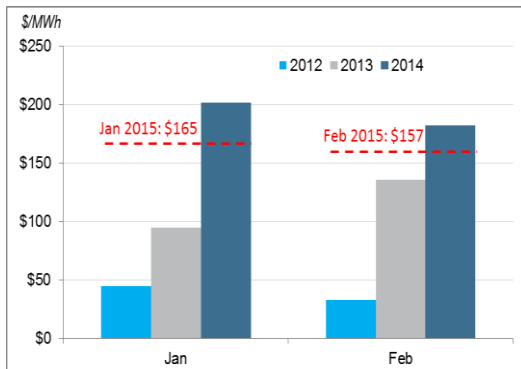
Source: Bloomberg, EBW Analytics Group

**NYISO ZONE G DAY-AHEAD DAILY PRICES, LAST WINTER**



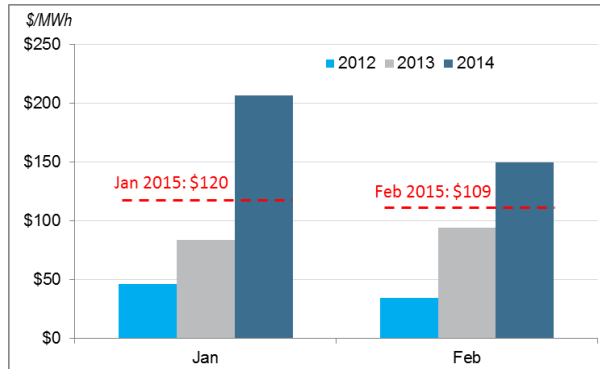
Source: Bloomberg, EBW Analytics Group

**ISO-NE INTERNAL HUB PEAK DAY-AHEAD PRICES, HISTORICAL AND FUTURES**



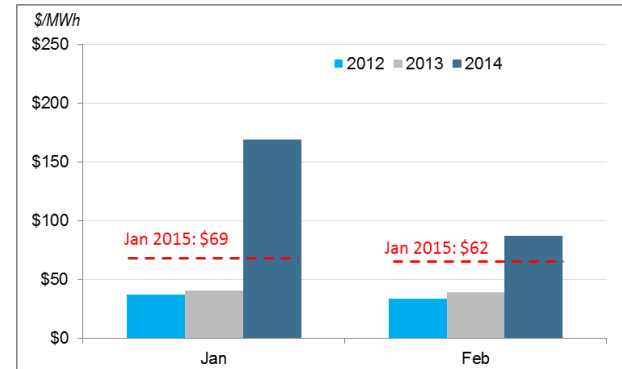
Source: Bloomberg, EBW Analytics Group

**NYISO ZONE G PEAK DAY-AHEAD PRICES, HISTORICAL AND FUTURES**



Source: Bloomberg, EBW Analytics Group

**PJM WESTERN PEAK DAY-AHEAD PRICES, HISTORICAL AND FUTURES**

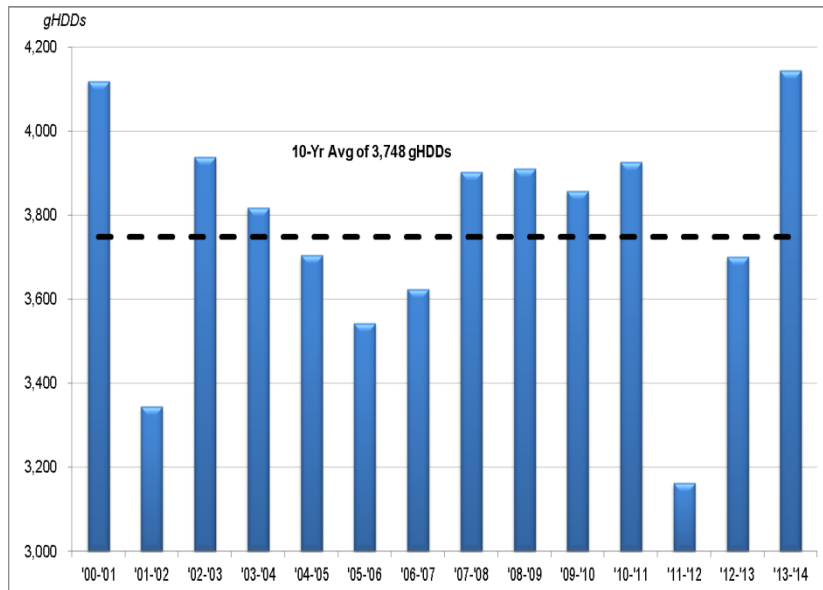


Source: Bloomberg, EBW Analytics Group

# Multiple Drivers

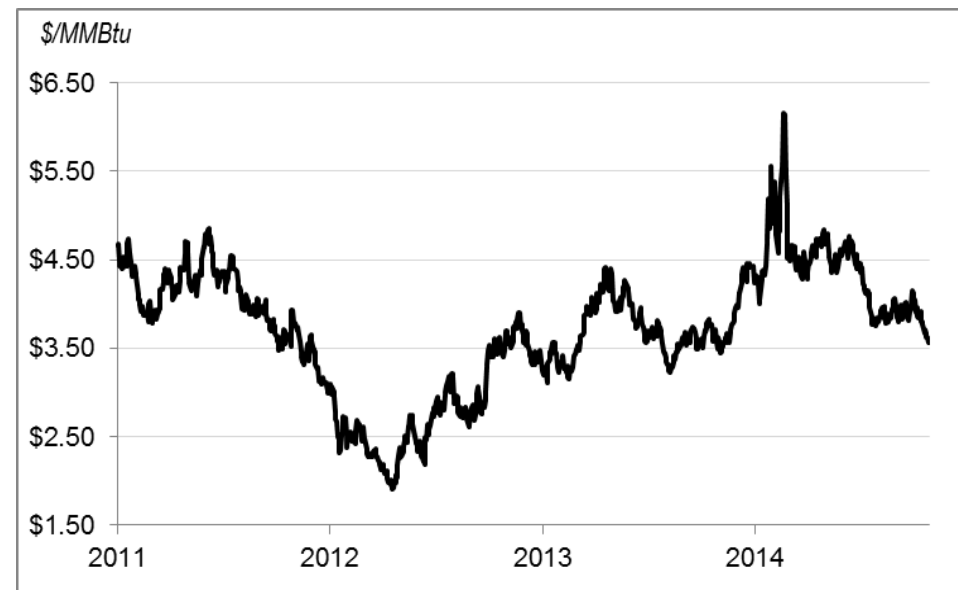
- Reflects combined effect of:
  - Exceptionally cold winter weather
  - Generation outages
  - Pipeline constraints

**NATIONAL GAS-WEIGHTED HEATING DEGREE DAYS, 2000-2014**



Source: National Oceanic and Atmospheric Administration, EBW Analytics Group

**NYMEX FRONT-MONTH NATURAL GAS CONTRACT, SINCE 2011**

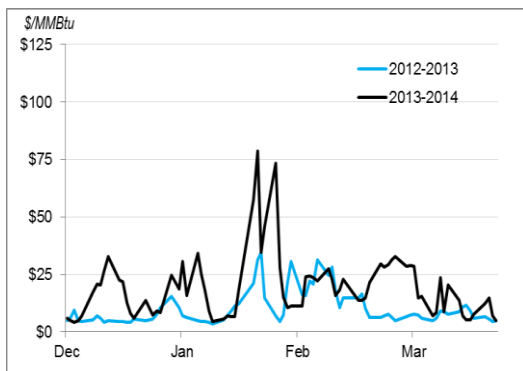


Source: EBW Analytics Group

# Multiple Impacts from Pipeline Constraints

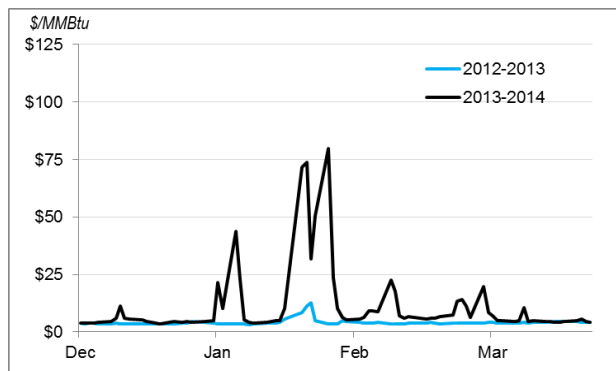
- Pipeline congestion and bitter cold throughout northeast simultaneously:
  - Drove up basis differentials and commodity prices sharply
  - Increased dependence upon ultra-expensive oil-fired units
  - Required use of least efficient generating units in fleet

**NATURAL GAS PRICES AT ALGONQUIN HUB, LAST TWO WINTERS**



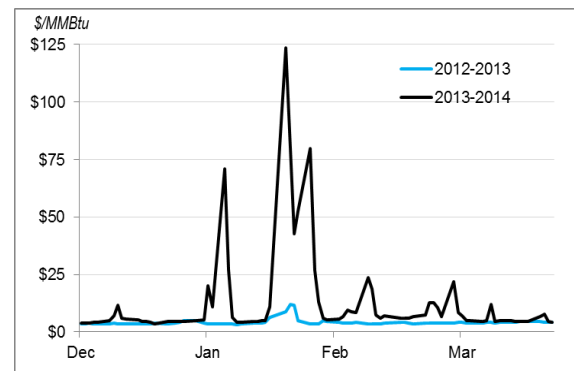
Source: Bloomberg, EBW Analytics Group

**NATURAL GAS PRICES AT TETCO M3 (NYC), LAST TWO WINTERS**



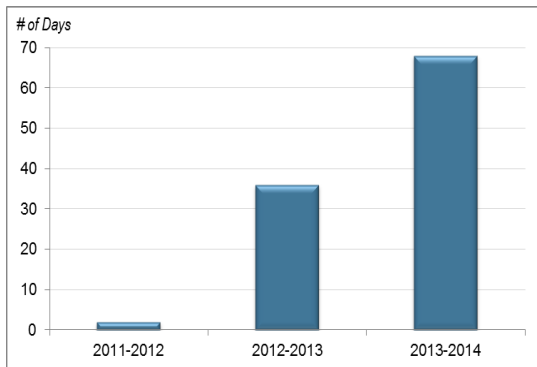
Source: Bloomberg, EBW Analytics Group

**NATURAL GAS PRICES AT TRANSCO ZONE 6 (NON-NYC), LAST TWO WINTERS**



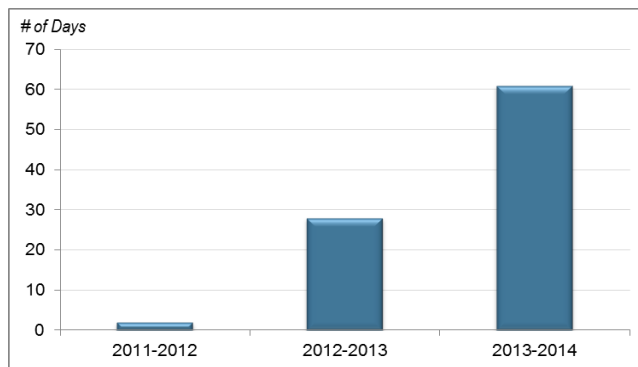
Source: Bloomberg, EBW Analytics Group

**SCARCITY PRICING INCIDENTS IN ISO-NE, DECEMBER TO MARCH**



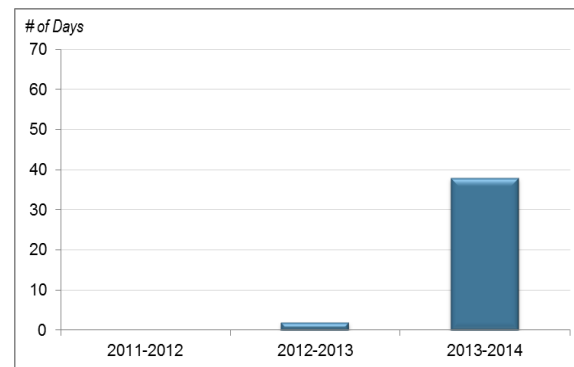
Source: Bloomberg, EBW Analytics Group

**SCARCITY PRICING INCIDENTS IN NYISO, DECEMBER TO MARCH**



Source: Bloomberg, EBW Analytics Group

**SCARCITY PRICING INCIDENTS IN PJM, DECEMBER TO MARCH**

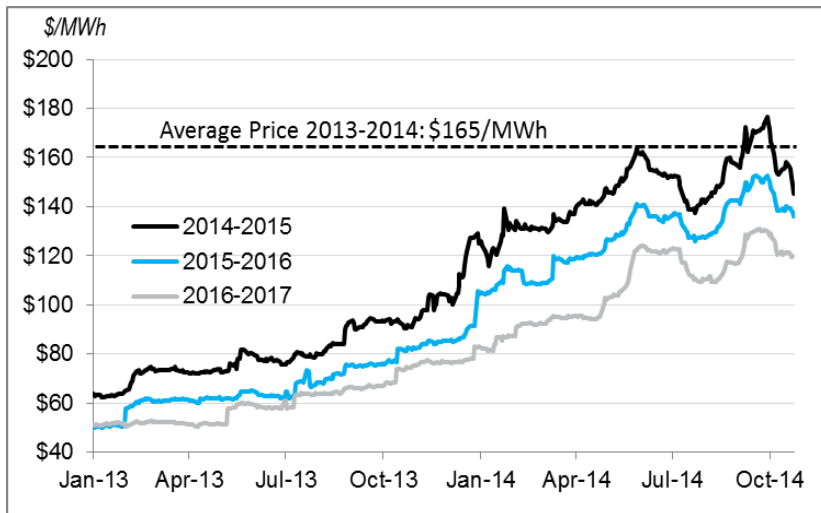


Source: Bloomberg, EBW Analytics Group

# Continued Impact on Winter-Month Prices

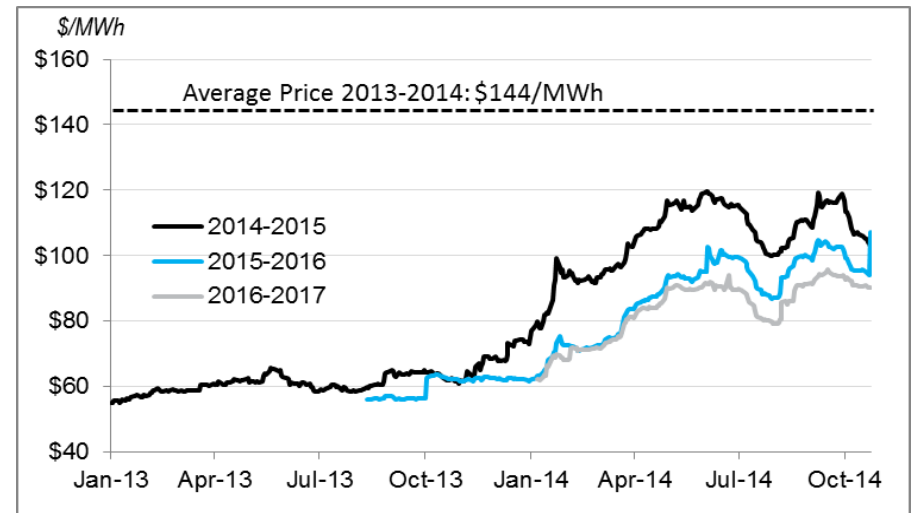
- Has driven up prices for winter month contracts sharply:
  - While prices have softened slightly this fall, likely to shoot up sharply if forecasts start calling for colder weather in late November or December

ISO-NE INTERNAL FUTURES FOR DEC-FEB STRIP NEXT THREE WINTERS, SINCE 2013



Source: EBW Analytics Group, Bloomberg

NYISO ZONE G FUTURES FOR DEC-FEB STRIP NEXT THREE WINTERS, SINCE 2013



Source: EBW Analytics Group, Bloomberg

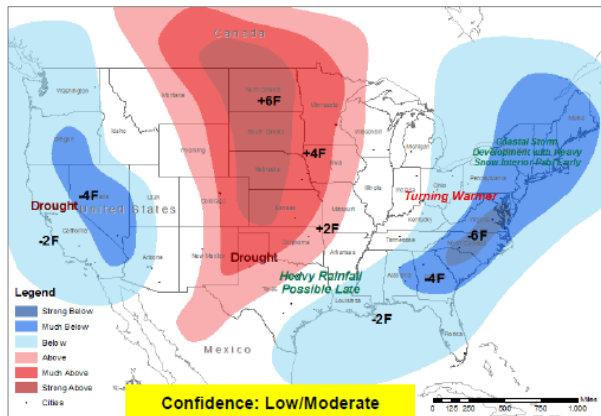
# Revealed Major Flaws in ISO Power Supply Planning and Risk Assessment

- Severe cold weather unmasked deep-seated flaws in ISO assessment of system requirements
  - Underestimated reserve margin requirements for generation
  - Failed to consider potential impact of cold weather on availability of generation
  - Failed to accurately assess potential demand of natural gas
  - Failed to adequately examine reliability of fuel supply
    - Particularly PJM
- Needlessly increases electricity buyer risks
- Likely to take considerable time to solve
- While future winters may not be as cold, risks could continue to increase due to:
  - Power plant retirements
  - Continued growth in residential and commercial demand for natural gas
  - Increased potential for nuclear outages as power plants age
- Requires granular assessment of each region looking at multiple weather scenarios

# Winter Weather Will Have Impact

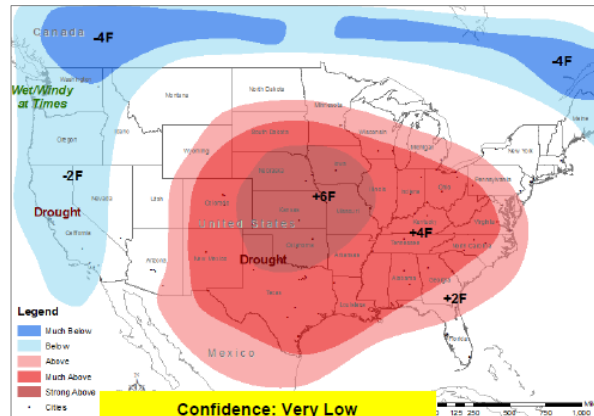
- Uncertainty still high

**DAY 6-10 TEMPERATURE ANOMALY FORECAST**



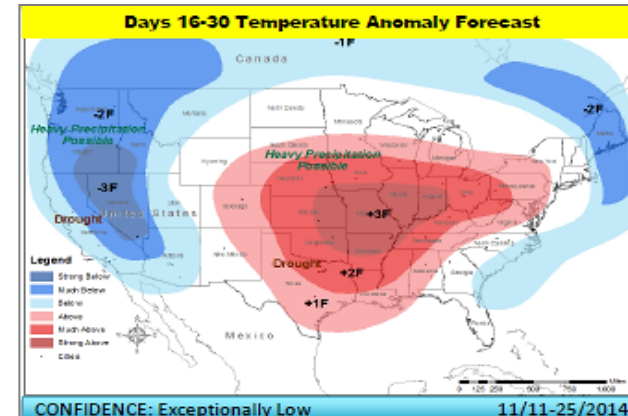
Source: Weather Decision Technologies

**DAY 11-15 TEMPERATURE ANOMALY FORECAST**



Source: Weather Decision Technologies

**DAY 16-30 TEMPERATURE ANOMALY FORECAST**



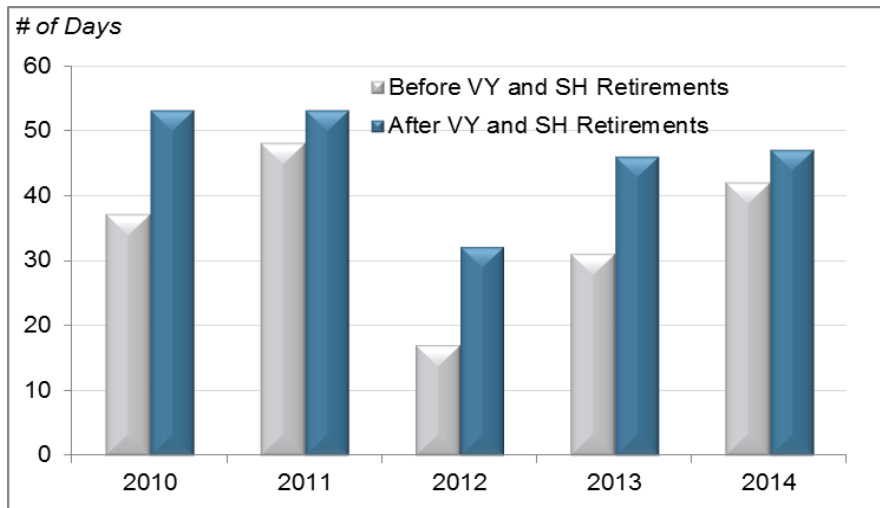
Source: Weather Decision Technologies



# But Scarcity Pricing Could Be High Even if Normal Weather Scenario

- Use of gas-fired generation could be constrained even if temperatures not as cold
- Other drivers include:
  - Continued increases in use of natural gas for space heating
  - Retirements of nuclear, coal and older steam-fired generating units
- Problems could become worse every year until late in decade
- ISO slow to act, confused and focused on reliability, not energy costs or total bill

IMPACT OF SALEM HARBOR AND VERMONT YANKEE RETIREMENTS ON JANUARY AND FEBRUARY CONSTRAINED DAYS



Source: EBW Analytics Group

IMPACT OF SALEM HARBOR, VERMONT YANKEE, AND BRAYTON POINT RETIREMENTS ON JANUARY AND FEBRUARY CONSTRAINED DAYS



Source: EBW Analytics Group

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# LONGER-TERM TRENDS

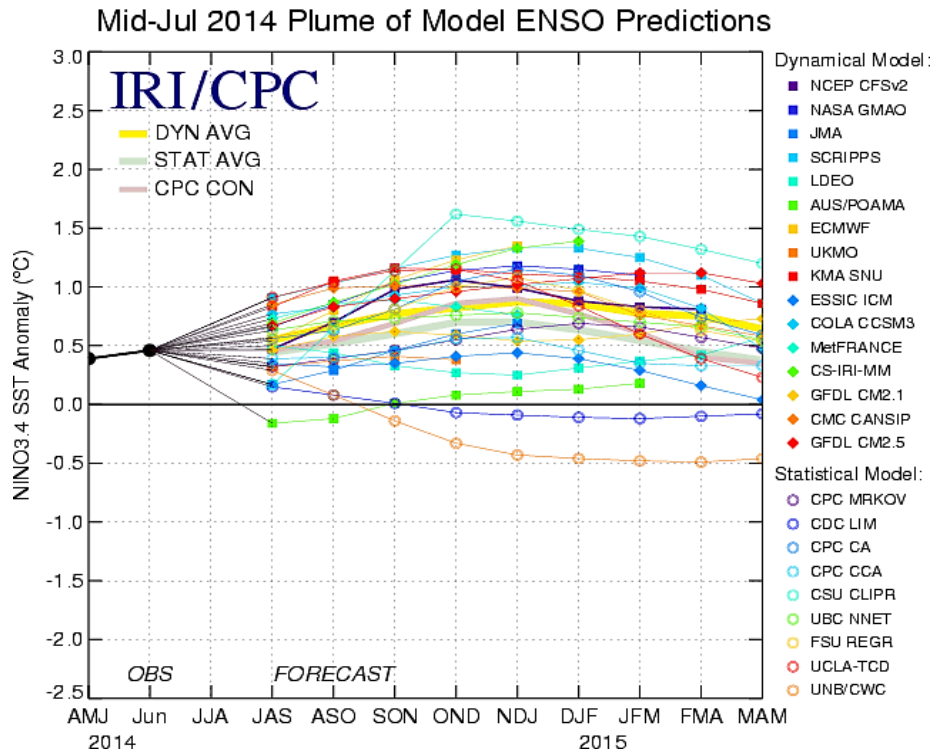
# Key Price Drivers

- Five key issues:
  1. Continuing winter price risk
  2. Future natural gas prices
  3. Impact of coal retirements and other Clean Air Act requirements on summer prices
  4. Potential disappearance of basis differential for Marcellus Shale
  5. Regulatory break-downs
    - Both RTOs and FERC
- Regulatory deficiencies (# 5 above) cross-cut and exacerbate # 1 through 4

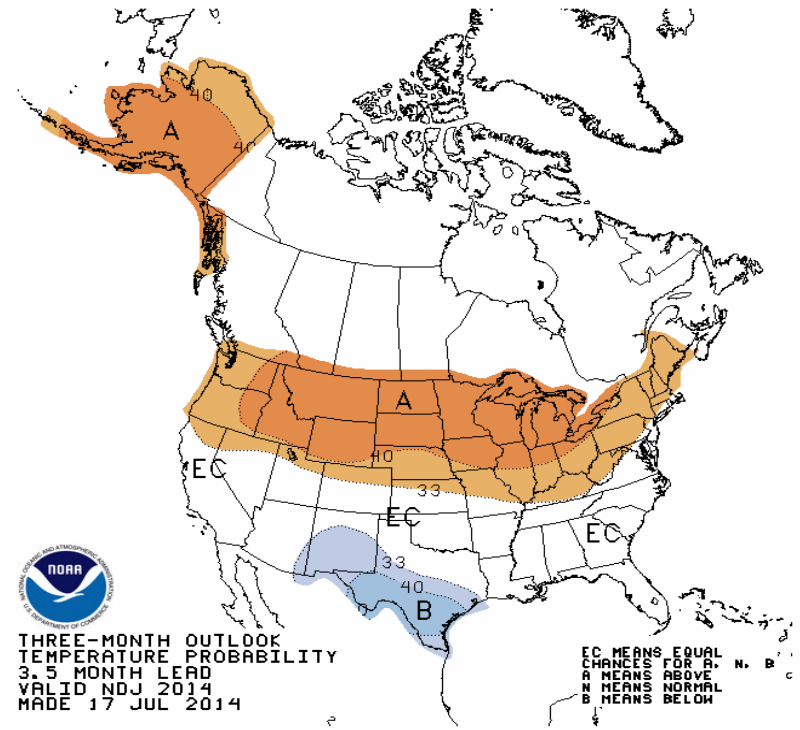
# Much Depends on Next Winter

- El Niño currently seen as main driver
- National Weather Service Predicts mild winter
  - Could lead to a significant further natural gas price decline
- But impact on forward curve in PJM likely to be modest

EL NIÑO STATUS AS OF MID-JULY



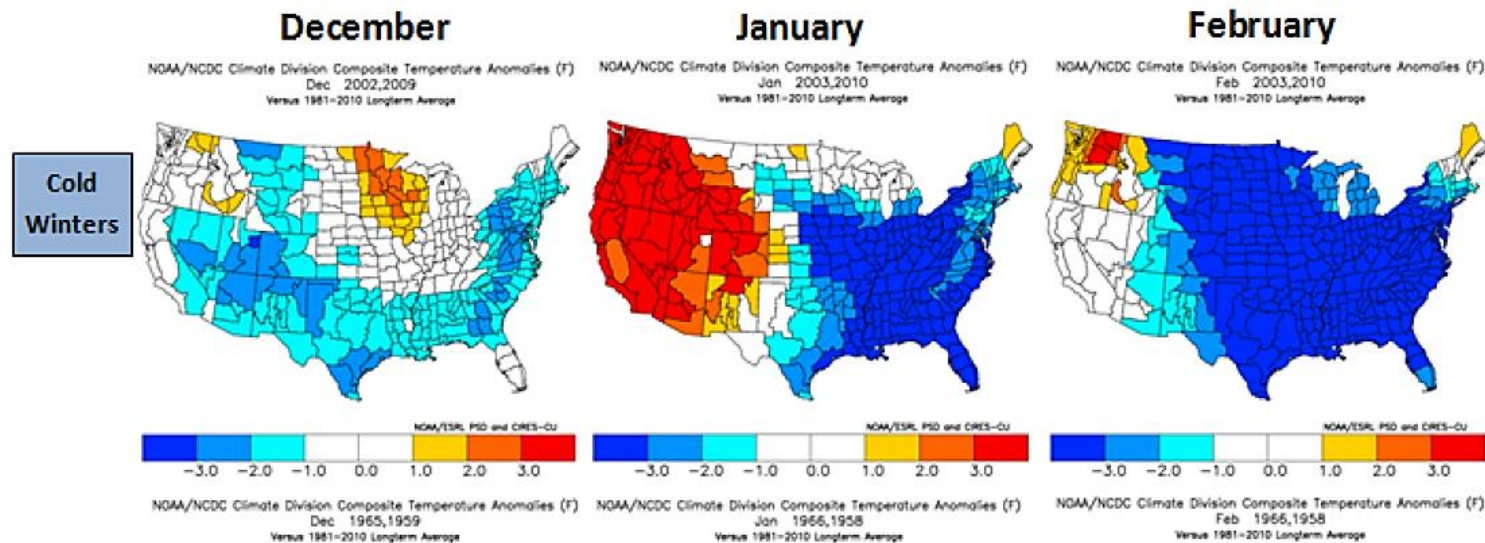
NATIONAL WEATHER SERVICE WINTER FORECAST



# Potential Major Forecast Bust

- Another very cold winter just as likely
- Risk of extreme weather events could intensify later in decade
  - Even more intense drought and/or even more severe winters

## COLD 2014-2015 WINTER WEATHER SCENARIO

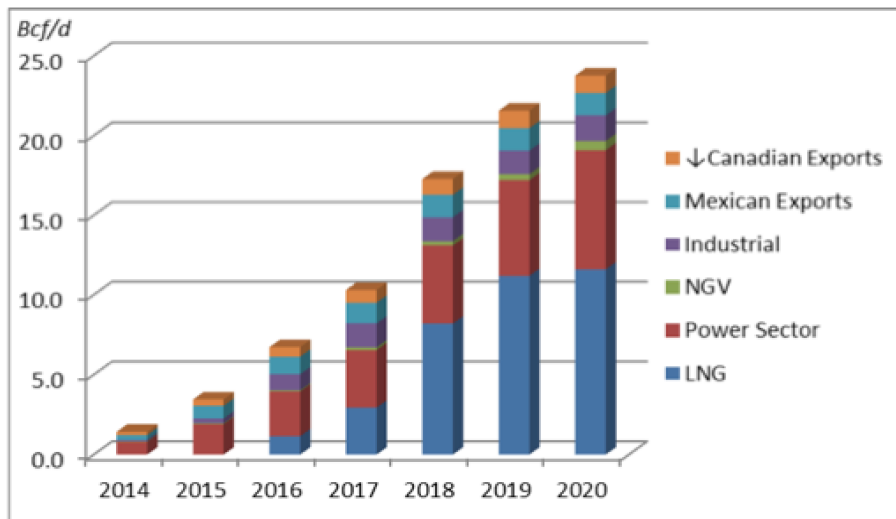


Source: CWG

# Profound Changes On Horizon for Natural Gas

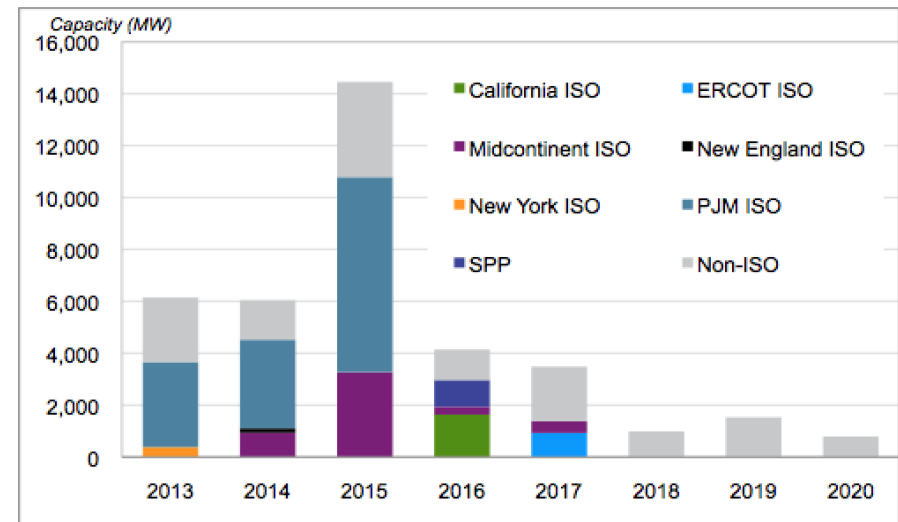
- Potential huge increases in U.S. demand
  - Massive coal plant retirements starting in spring of 2015
  - Huge growth in Mexican exports
  - Industrial boom
  - LNG exports starting in 2016
  - Use of LNG for heavy duty trucks and marine transport
- Potential increases not yet priced into market

**CUMULATIVE INCREASE IN DEMAND FOR US PRODUCTION  
2014-2020, BY SOURCE**



Source: EBW Analytics

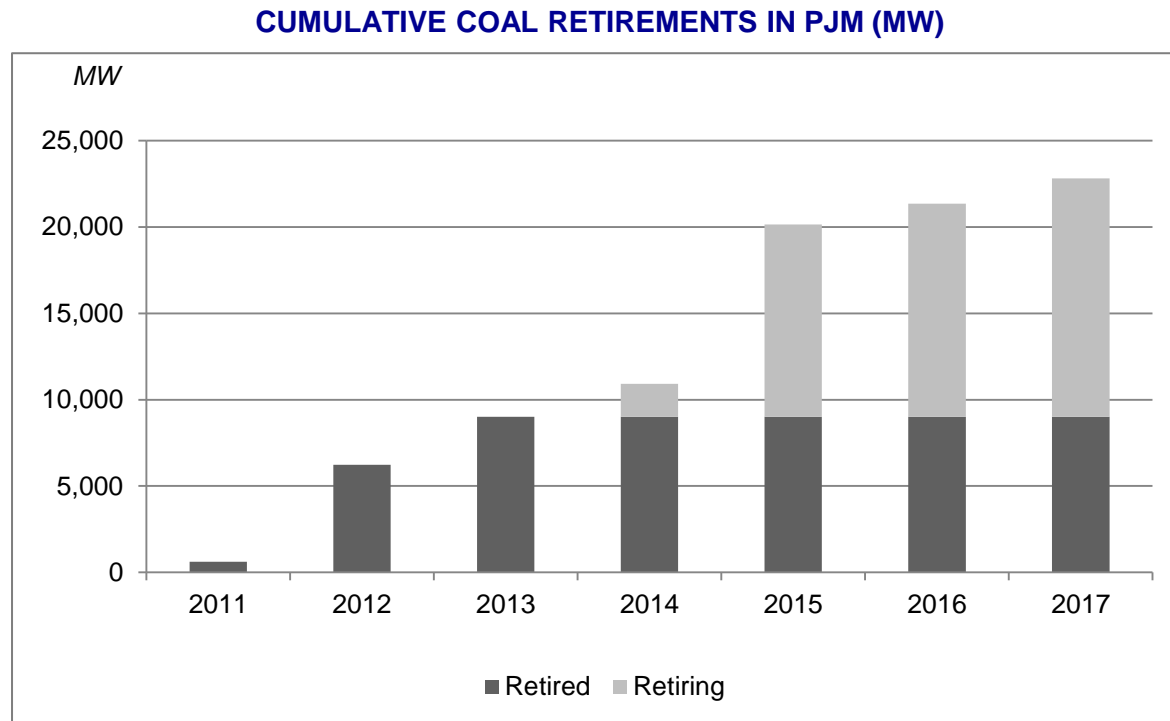
**SCHEDULED COAL RETIREMENTS BY YEAR AND REGION**



Source: EBW Analytics, Ventyx

# Coal Retirements Particularly Critical for PJM

- Could have major impact this coming summer and beyond

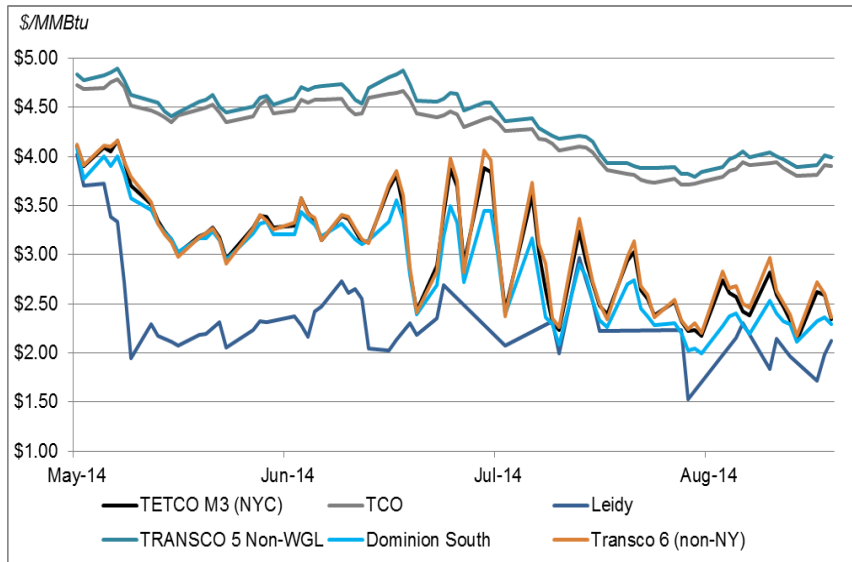


Source Ventyx

# Basis Differential Key Factor

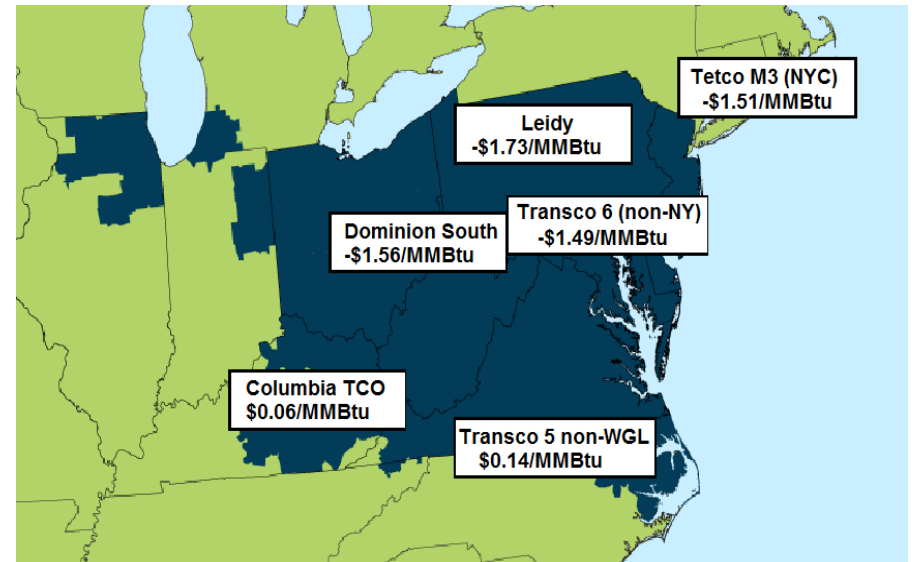
- May persist for another 18 to 24 months

**MARCELLUS NATURAL GAS PRICING HUBS (\$/MMBTU), SINCE MAY 1ST**



Source: Bloomberg

**NATURAL GAS BASIS DIFFERENTIALS TO HENRY HUB ON AUGUST 20<sup>TH</sup>, PJM**



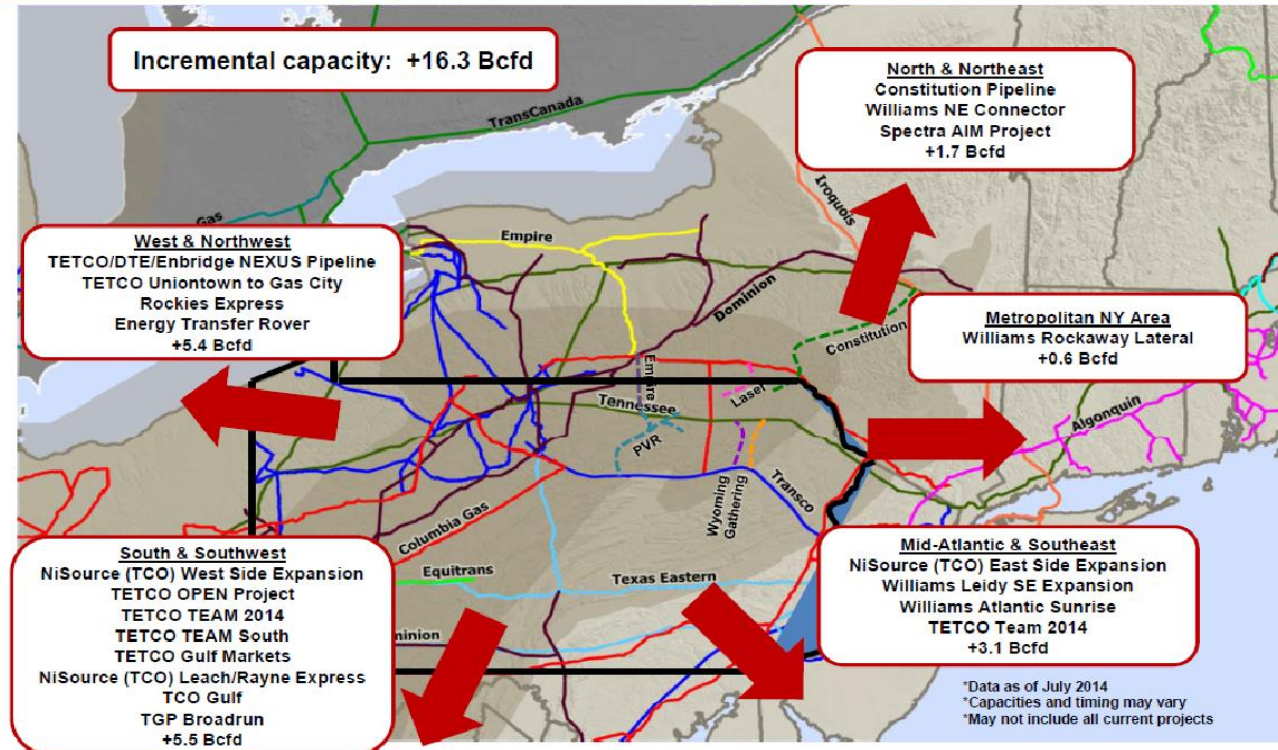
Source: EBW Analytics Group, Bloomberg, PJM



# But End is in Sight

- Gap between Marcellus Shale and Henry Hub may shrink sharply at same time prices rise nationally

## Marcellus – Planned and Proposed Infrastructure Projects through 2017



Source Range Resources

# Major Structural Challenges Becoming Apparent

- Lack of adequate incentives to build new generation or keep existing generation online
  - Questions regarding reliability of demand side management
- Huge planning void
  - Flawed methodology
  - Ignores natural gas side of the equation
- Structural deficiencies highlighted this winter
  - Potential impact of extreme weather/difficulty in adjusting to huge swings in weather-driven demand
  - Exacerbated by increased dependence upon natural gas
    - Lack of critically needed pipeline and transmission infrastructure
    - Inadequate incentives to fully utilize storage
    - Lack of adequate deliverability

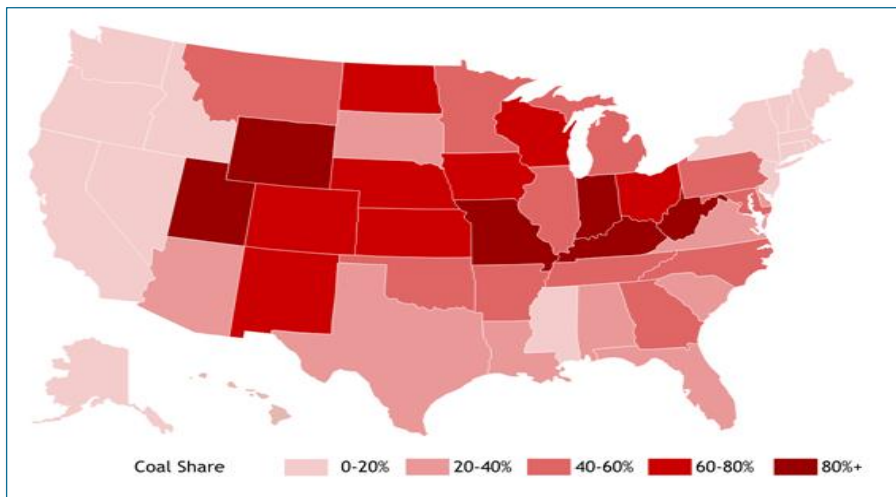
# Huge Upside Risks for Customers | Downside Risks for Producers

- Problems as much institutional as structural
  - No effective mechanism for planning – or even identifying risks
  - Dysfunctional regulatory system
- Creates huge upside risks for end users
  - Deters expanded use
- Paradoxically, natural gas producers remain highly vulnerable to downside risks
  - Prices likely to periodically crater whenever weather-driven demand slumps
  - Production growth likely to continue to exceed expectations
- Power producers exposed to huge regulatory risks without assured means of recovering capacity costs
- Cries out for:
  - Long-term supply agreements/partnership
  - Portfolio approach by energy users purchasing at market price

# Obama Climate Action Plan Could Have Significant Further Impact

- Far greater potential impact than generally recognized
  - First-time federal restrictions on emissions of greenhouse gases for existing coal-fired plants
  - Proposed U.S. EPA rules expected June 1, 2014
  - Implementation by states in 2016
- Could lead to:
  - Retirement of additional 60,000 MW of coal-fired generation by 2020
  - Up to 10 Bcf/day of additional demand for natural gas

**STATE-BY-STATE COAL SHARE OF ELECTRICITY GENERATION**  
 Most Vulnerable States Have High Coal Use



Source: EBW Analytics, EIA

**POTENTIAL GREENHOUSE GAS EMISSIONS REDUCTIONS REQUIRED UNDER UPCOMING GHG REGULATIONS, TOP FIVE EMITTERS**

State	2011 Fossil Fleet Carbon Emissions (million MtCO <sub>2</sub> )	Potential 2020 Emissions Reductions Under Climate Action Plan	Required Reduction from 2011 Emissions
Texas	267,445	41,434	15%
Pennsylvania	116,031	15,625	13%
Ohio	112,293	24,240	22%
Florida	111,918	-	0%
Indiana	109,284	23,169	21%

Source: EBW Analytics

# Energy Risk Report



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  - detailed price forecasts through 2017
  - risk alerts and buying recommendations
  - regional electricity report on every ISO, plus national electricity overview

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# How to Reach Andy

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# ISO-NE Update

**Joe Dalton**, Director Government & Regulatory Affairs, GDF SUEZ Energy Resources

### Overview of Major Milestones: 2012-Today

- Natural Gas Snapshot
- Proposed Gas and Electric Transmission Projects
- Stakeholder Analysis
- Concluding Thoughts



## Overview – Major Milestones

- **August 2012** – FERC Technical Conference on Gas/Electric Coordination held in Boston
- **October 2012 - May 2013** – New England Gas Electric Focus Group forms and meets
- **September 2013** – New England States Committee on Electricity (NESCOE) releases Phase III Black & Veatch Study, “Natural Gas Infrastructure and Electric Generation: Proposed Solutions for New England”
- **December 2013** – All Six New England Governors commit to regional cooperation to jointly procure:
  - **1200–3600 MW low carbon (read Canadian) hydro**
  - **600 mmcf/d–1Bcf/d of natural gas pipeline infrastructure**
- **January- July 2014** – NESCOE solicits stakeholder comments; shapes program
- **April 2014** – US DOE Quadrennial Energy Review meetings in RI, CT
- **July 31, 2014 – MA Legislature fails to enact Clean Energy Resources Act**
  - Up to 2,400 MW Canadian hydro
  - Enables MA participation on natural gas procurement
- **August 2014 – Present – MA “pauses” participation in regional initiative**
  - DOER commences study on low natural gas demand growth scenario (10/15, 10/30, 11/20)
  - Six state process slows, hasn’t completely stopped
- **September/October/November 2014 – Utilities announce large default service rate increases**
  - NGrid (MA), Unitil (NH), Liberty(NH), Central Maine Power (ME) up sharply;
  - NU/NSTAR; WMECO – announcements pending

## Overview – The story as portrayed in Press

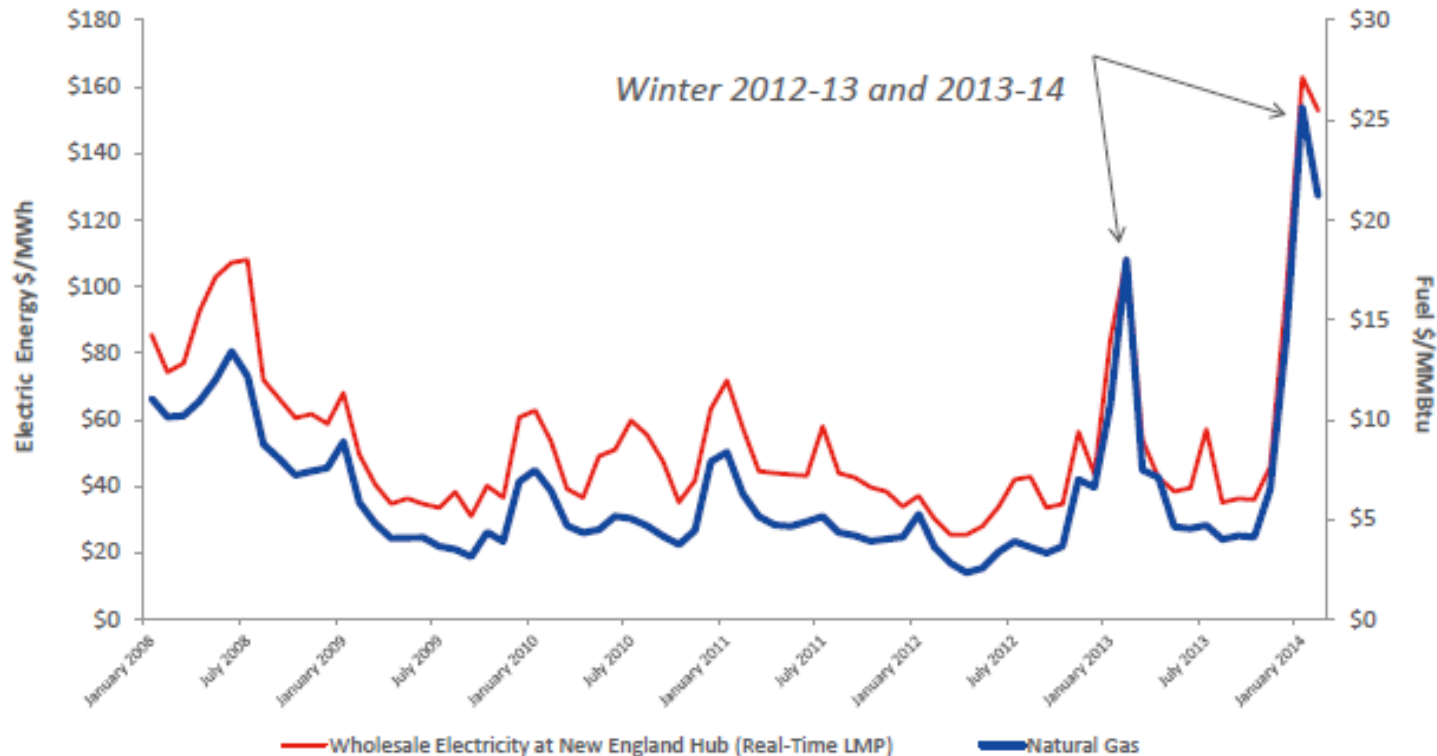


Source: The Hartford Courant, December 2013

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# Overview – The story as portrayed by ISO-NE

## High Gas Prices Drove Wholesale Electricity Prices to Record Levels over the Past Two Winters





## Topics

- Overview of Major Milestones: 2012-Today

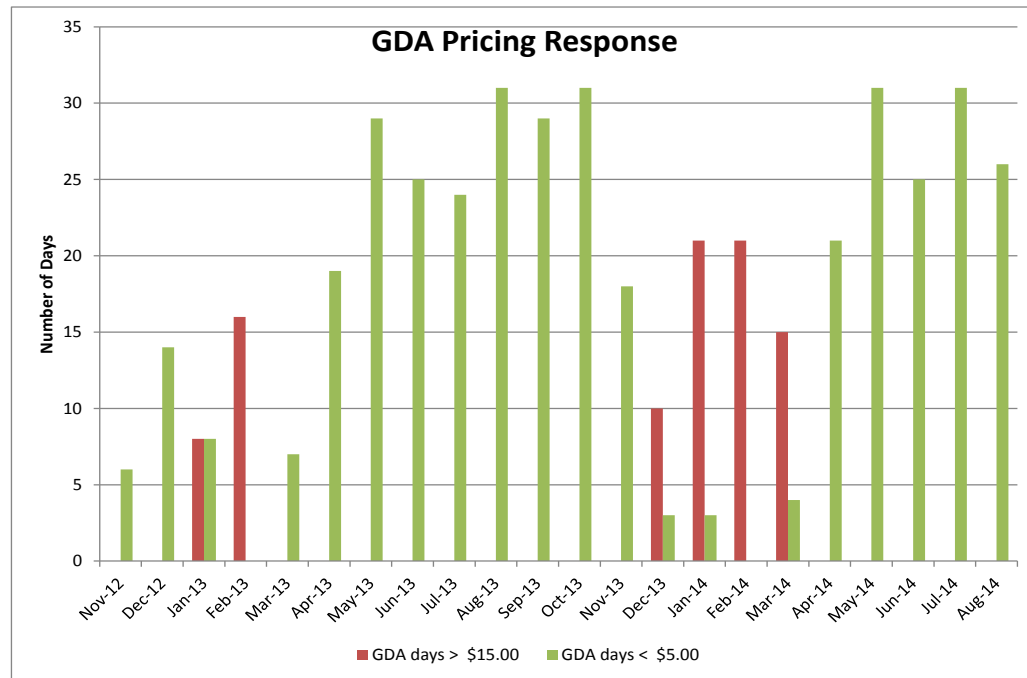
### Natural Gas Snapshot

- Proposed Gas and Electric Transmission Projects
- Stakeholder Analysis
- Concluding Thoughts

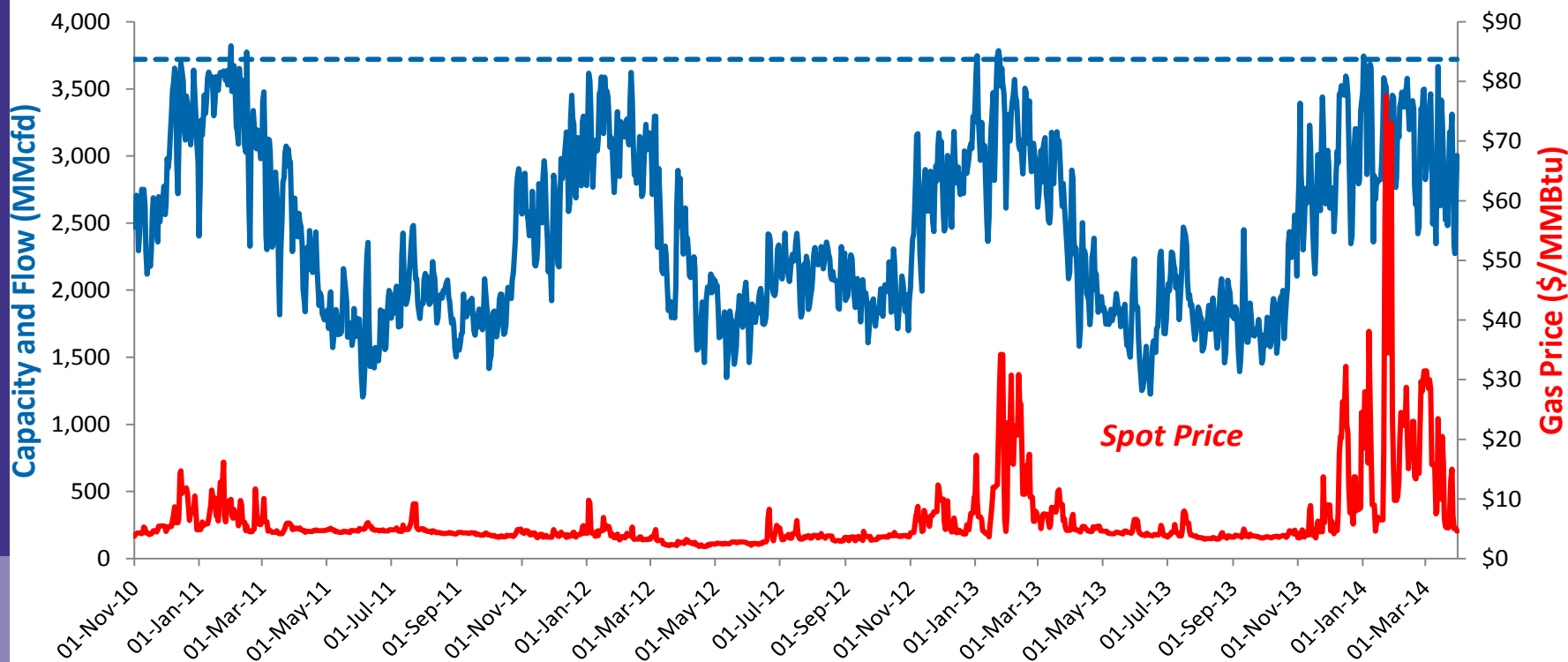
# Ironically, New England's Challenge is due to Low Priced Gas

- For most of the year, low priced gas has driven power prices lower, effectively “draining the pond” for non-gas fired generators
- Baseload LNG has left the market
- Competition for gas between power generation and heating demand during short periods in winter is growing as the generation mix becomes more gas weighted
  - Heating load maintains distinct advantage in this competition with firm capacity and full cost recovery
- Gas price behavior illustrates the challenge: additional supply is necessary only for several days per year but is plentiful and cheap most of the time

Proposals to build additional regional pipeline infrastructure can't be supported by the market given the short duration of the problem



# New England gas demand over the last 4 winters has been within existing capacity



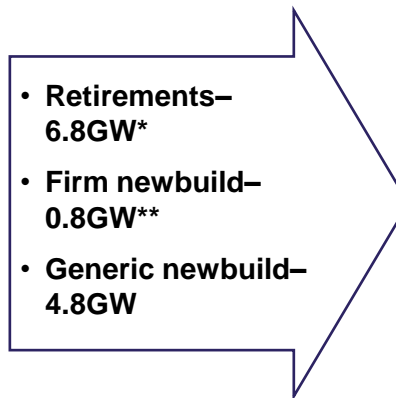
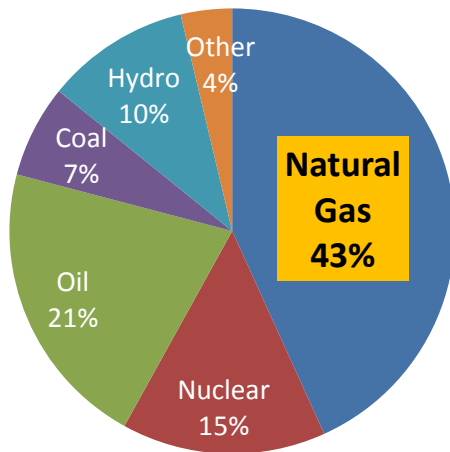
Source: ICF International\*

- During this winter's extended cold spells, gas demand increased such that **total pipeline utilization was above 90% on 42 days, and above 95% on 10 days.\***
- As pipelines reached their limits, the price of remaining spot supplies increased.\*
- Given the marginal need for gas, a relatively small amount of gas can have a disproportionate effect on relieving the stress on the system

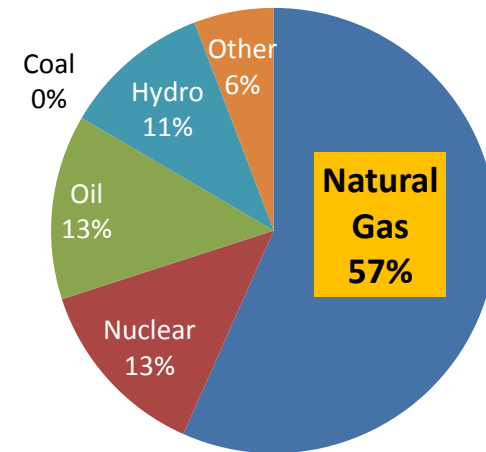
\* Defined as period when NE pipeline flow is greater than or equal to 90% of pipeline capacity; Source: ICF Study for GDFSuez

# New England power market expected to be more gas based

**2014 Capacity**  
100% = 31 GW



**2020 Capacity**  
100% = 30 GW



- Higher potential call on gas infrastructure during peak demand periods – increase from 2014 to 2020 could be as high as 0.8 bcf/d\*\*\*

\* Vermont Yankee nuclear (0.6GW), all coal capacity (Brayton Point, Mt. Tom, others, total 2.1GW)), and old oil and gas capacity (4.1GW)  
 \*\* Footprint CCGT (0.7GW), Cape Wind (0.4GW nameplate, or 72MW after intermittency deration)  
 \*\*\* Assumes 100% operation on incremental gas-fired capacity

## Economic Congestion of Pipelines Highlights Value of Alternatives

- Over 50% of proposed new generation is gas fired, followed closely by wind
- Extended periods of higher energy prices as pipes from the West experienced congestion and oil came in and out of economics
- Massive pipeline expansions may be the equivalent of “using a tank to kill a squirrel” as New England is challenged by peak gas supply, not base load gas supply
  - ISO-NE winter program will include up to 1.5 Bcf of incremental LNG supply commitment this winter.
  - New England has sufficient existing gas infrastructure to support reliable electric system operation though LNG has been significantly under-utilized.
  - New England States pipeline expansion initiative currently stalled.
- Options more consistent with the less than a 30 day need
  - Right-sized pipeline capacity increase from some of several strategic projects already announced
  - Reliance on LNG as peaking fuel as world price continues to drop
  - New market design for pumped storage plants
  - Simple Cycle Combustion Turbine Back Up for wind projects
  - Sloped Demand Curve and Pay for Performance Initiatives to reward existing fleet





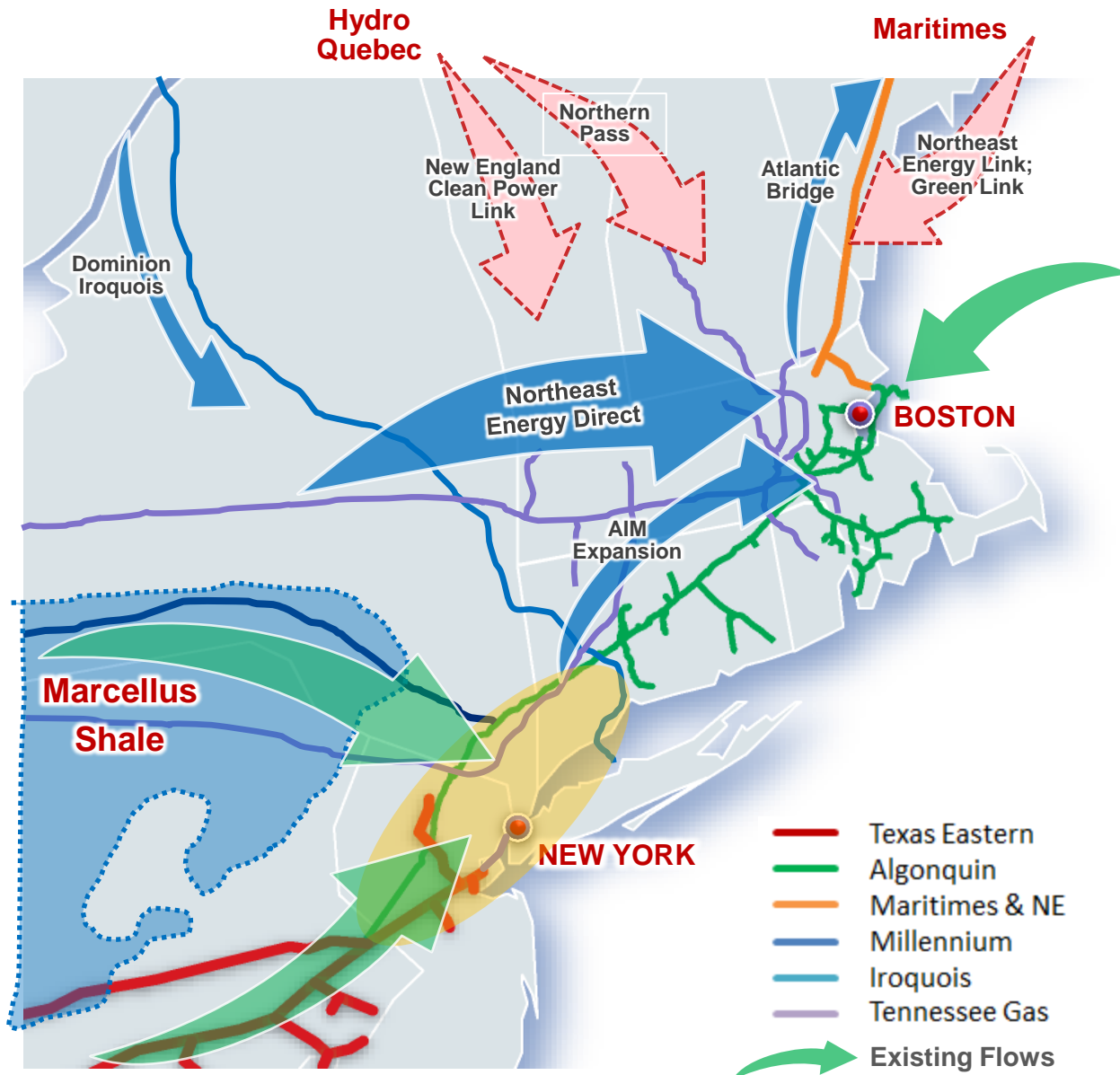
## Topics

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# Market Response – Proliferous projects proposed from all directions



## New Gas Pipelines:

Project	Bcf/d	COD
AIM	0.34	2016/17
Atlantic Bridge	0.175	2017/18
Access Northeast	up to 1.0	2018/19
NE Energy Direct	0.8-2.2	2018/19
Dominion Iroquois	0.082	2016/17
<b>Total</b>	<b>2-4 Bcf/d</b>	

## New Electric Transmission

Project	GW	COD
Northern Pass	1.2	2019+
New England Clean Power Link	1.0	2019+
Northeast Energy Link	1.1	2019+
Green Link	1.0-1.2	uncertain
<b>Total</b>	<b>4.0 GW</b>	

# Transmission Capacity Need for New Projects and Reliability

2015 - 2018 Forecast - Summary

- Slowed electricity demand growth from energy efficiency and DG is not slowing need for new transmission
- Generator retirements and delays to new generation projects add to challenges
- Regional interest in increased electric transmission import capability to the region, yet some shortfall in Canadian imports under existing transmission this past winter.
- Long-term transmission solutions are being installed and transmission rates steadily increasing – another \$5B of planned transmission has yet to reach rates

(A)		(B)	(C)	(D)	(E)
		2015	2016	2017	2018
(1)	Estimated Additions In-Service and CWIP (\$M)	880	834	843	738
(2)	Forecasted Revenue Requirement (\$M)	143	134	144	116
(3)	Estimated RNS Rate Impact (\$/kW-Yr)	7	6	7	5
(4)	Estimated RNS Rate Forecast (\$/kW-Yr)	97	103	110	115
(5)	Estimated RNS Rate Forecast (\$/kWh)	0.020	0.022	0.023	0.024
	Assumes a 53.9% Load Factor				



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### Stakeholder Analysis

- Concluding Thoughts

## Stakeholder analysis – competing interests and some unlikely alliances

Stakeholder Group	Primary motivations
Consumers & Ratepayers	Concerned about recent rate increases; BUT ALSO concerned and vocally opposed to infrastructure projects like Northern Pass and Kinder Morgan NE Energy Direct
New England Governors	<ul style="list-style-type: none"> <li>– Some want to crush natural gas basis – they think as gas price goes, so goes power price, but is all else constant?;</li> <li>– Others have global warming goals that require massive amount of Canadian hydro MW</li> </ul>
ISO-NE	<ul style="list-style-type: none"> <li>– Electric reliability should be primary concern: baseload retirements</li> <li>– Winter Reliability Programs 13/14 &amp; 14/15</li> <li>– Pay for Performance (PFP) rule changes; Demand Curve on horizon</li> </ul>
Electric Generators	Want gas available but do not want to pay for firm tariff because of lack of recovery mechanism; ISO-NE (PFP) rule changes should help
Pipeline Developers	<ul style="list-style-type: none"> <li>-- Won't build on spec; and tough to build in NE</li> <li>-- Welcome subsidized procurement proposal</li> </ul>
Electric Distribution Companies	<ul style="list-style-type: none"> <li>-- Winners either through potential contracting entity for pipe; or</li> <li>-- they have stake in many transmission projects</li> </ul>
LNG Suppliers (GDF SUEZ, Canaport)	Advocating Peak vs Pipe; urge full utilization of existing LNG infrastructure; especially in winter
Environmentalists	<ul style="list-style-type: none"> <li>-- View big hydro and fracked gas as not green;</li> <li>-- Nat Gas transition to greater renewables</li> </ul>



## Topics

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Concluding Thoughts

## The New England Energy Mix Is Changing

- Region is losing some of its base of conventional non-gas fired generation
  - VT Yankee, Brayton Point, Salem Harbor
- More renewable energy is connecting to the grid – increasingly behind the meter
- Need for responsive resources likely to increase with increased reliance on variable output resources and external region resources
- Market participants responding to new investment signals sent in recent auction;
  - States' interest in out-of-market transmission and pipeline could impede needed resource investments and their timing
- Subsidized pipeline and electric transmission projects present potential of financially significant, long term economic risks of higher rates/prices for retail customers
  - Better use of existing natural gas infrastructure and dual fuel generation more economic solutions to the short duration gas supply issues
  - This path preserves flexibility to adapt to changing market needs



# NYISO Update: New York – Changing Market

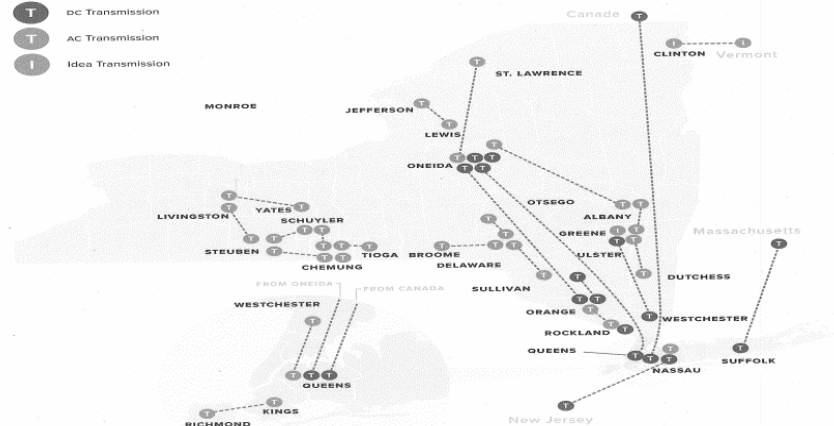
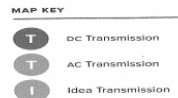
**Jeffrey Levine**, Director Government & Regulatory Affairs, GDF SUEZ Energy Resources



# Infrastructure Investment and Market Prices - Governor Cuomo's Energy Highway Plan 2012

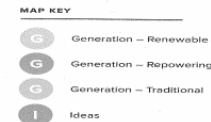
- 3,200 MWs of transmission and generation
- \$1B in new transmission, \$675M in renewable generation, \$2.5B to repower existing power plants and build new ones, \$250 million for Smart Grid applications and the acceleration of \$1.3 billion in bulk power and distribution network upgrades.

Map of Transmission Responses



Note: All RFI responses and locations (if given by county in RFI response) are conceptual and none have been endorsed by the Energy Highway Task Force.

Map of Generation Responses



Note: All RFI responses and locations (if given by county in RFI response) are conceptual and none have been endorsed by the Energy Highway Task Force.

## Infrastructure Investment and Market Prices – Capacity Market

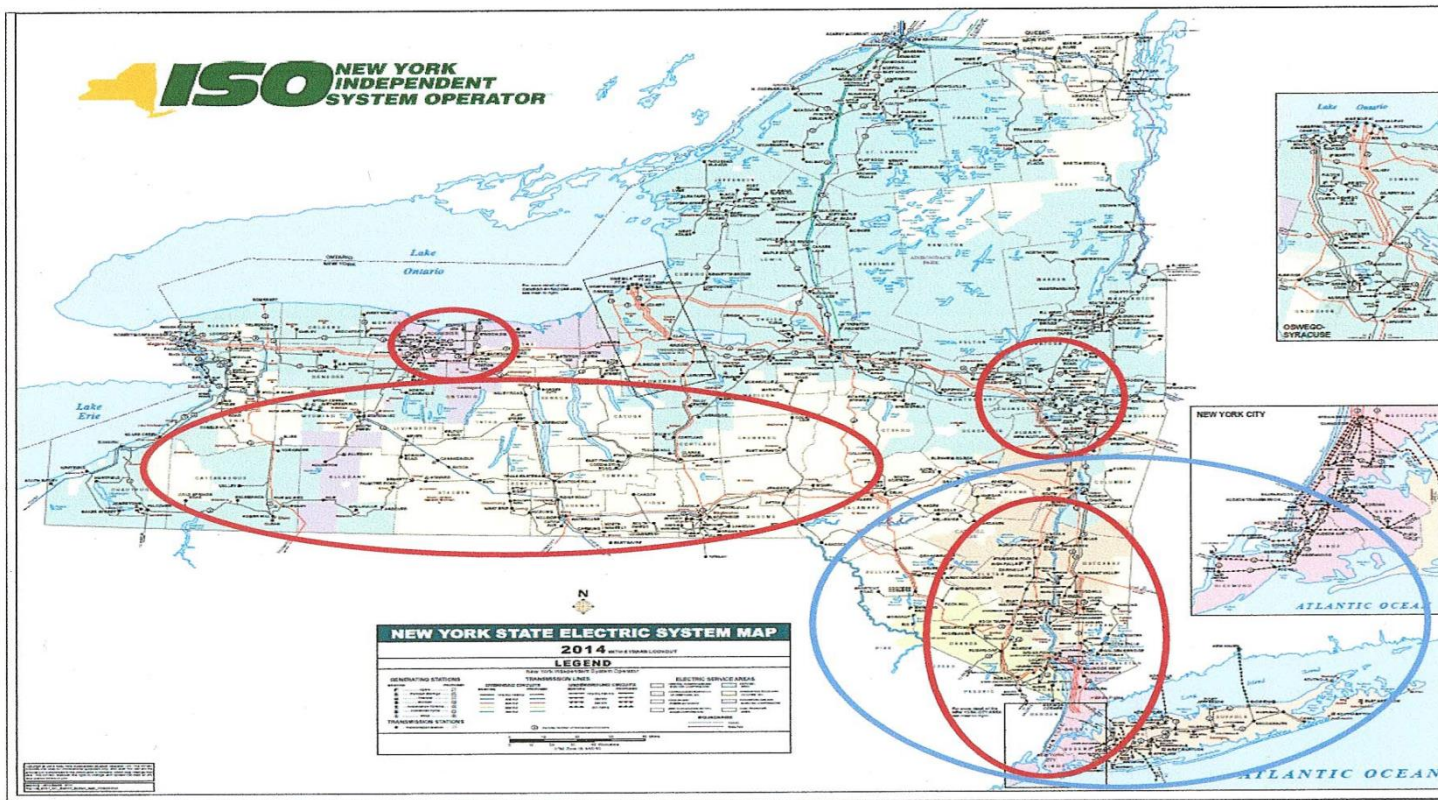
- Six month, monthly and spot v. Forward
- Adequacy of centralized market to attract investment
- Reliability Support Services Agreement
  - Contract between 540MW Danskammer and Central Hudson
    - Minimum Locational Capacity Requirement in NYC
  - Contract between National Grid and NRG to repower the retiring 425MW Dunkirk coal plant with natural gas
  - 581MW Ginna nuclear plant in Ontario, NY requested a Reliability Support Service Agreement with Rochester Gas & Electric by December 1, 2014

## Infrastructure Investment and Market Prices – Energy Market

- Reserve Shortage/Scarcity Pricing
  - Increased reserve requirements
  - Proposed \$750/MWh pricing – up from \$500
- Create a South East New York (SENY) reserve region (NYISO Zones G-K)
  - Current SENY constraints can prevent eastern operating reserves from being available in the southeast New York load centers

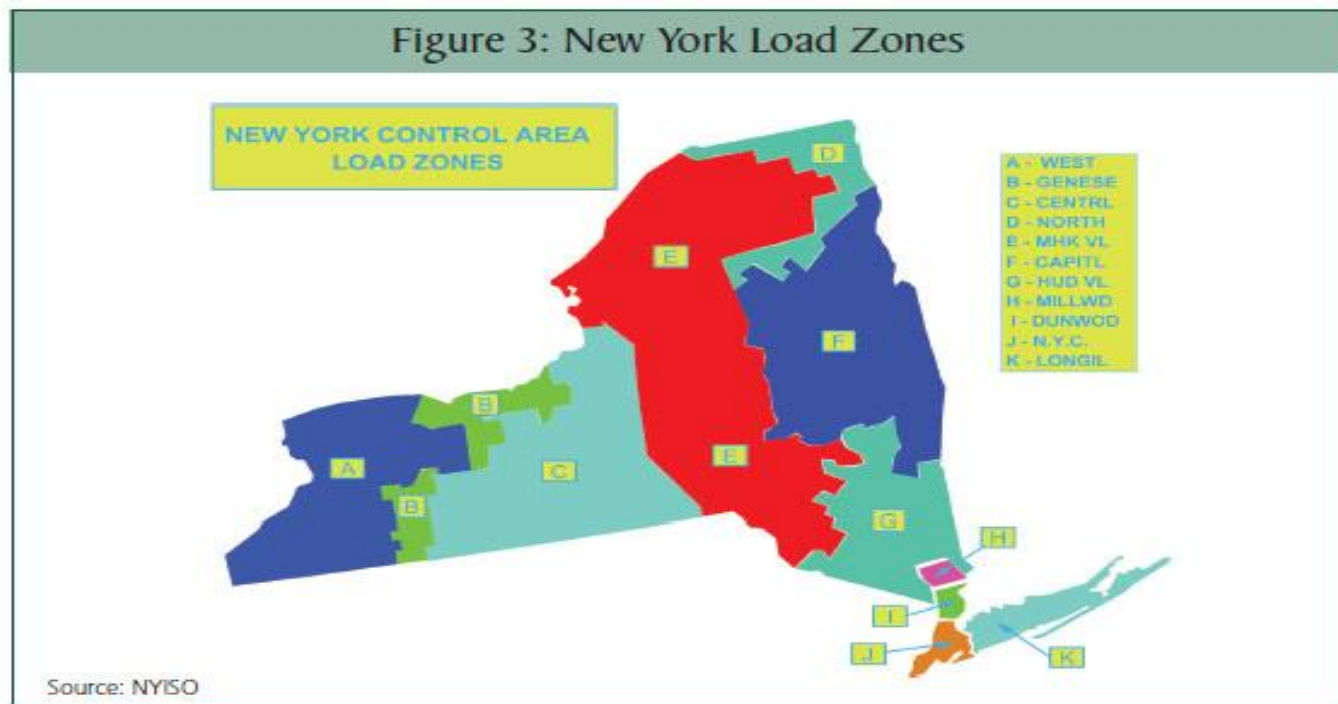
# NY ISO 2014 Reliability Needs Assessment

- While NY ISO continues to be long generation, forecasts show possible transmission constraints in 2015 and resource inadequacy in 2019 due to projected load growth and expected generator retirements
- Red circles indicate areas where load may be impacted by transmission constraints
- The blue circle indicates the South East NY region with resource adequacy violations



## NY ISO Lower Hudson Valley Capacity Zone

- The new Lower Hudson Valley capacity zone (NY ISO Zones G, H, I, J) better reflects the transmission constraint at the Upper New York/South East New York intertie.
- Investment signals - UCAP spot prices averaged significantly higher than the Rest of State



# Distributed Energy Resources/Micro-Grids

## **\$1B Green Bank Proposal**

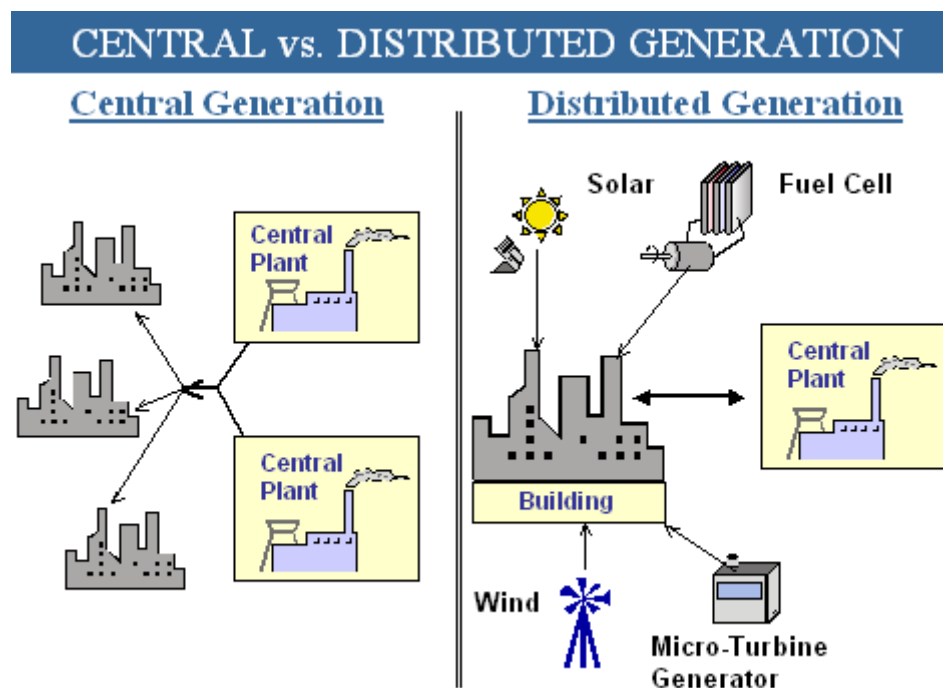
- Fund cleaner, more diverse, and less centralized generation
- Partner with private sector lenders to fund economically viable but not financeable projects.
- Funds collected from the System Benefit Charge and RGGI auction revenues

## **\$5B Clean Energy Fund**

- New York State Energy Research and Development Authority (NYSERDA)
- Replace Renewable Portfolio Standard, System Benefits Charge, and Energy Efficiency Portfolio Standard programs
- RPS RECs or energy and RECs
- Investment of public funds and the attraction of private capital
- Reduce greenhouse gas emissions from energy sector 40% by 2030 and 80% by 2050 - actions, which would require nearly \$150 billion of cumulative investment in energy efficiency and renewables by 2030

## Distributed Energy Resources/Micro-Grids

- NY Public Service Commission investigating policy, rates, technology and energy services to transform electricity market to be centered on resilient micro grids, demand response, energy efficiency, distributed generation, storage and advanced consumer load management/elasticity.



# Q&A