

A Few Thoughts on the Empire State

New York Association for Energy Economics

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Analyst Certification and Required Disclosures Begin on Page 29

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May 22nd, 2014



Who Am I?

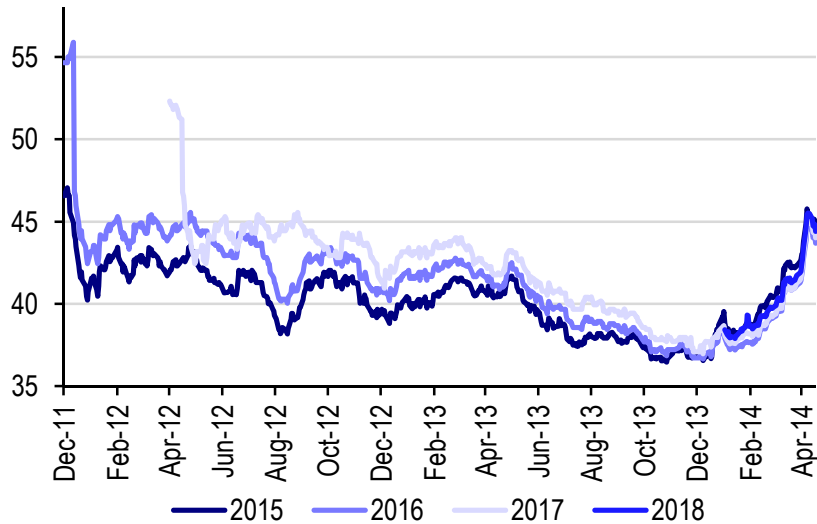
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Where are we today?

Power Prices (and Markets) Have Recovered Some..

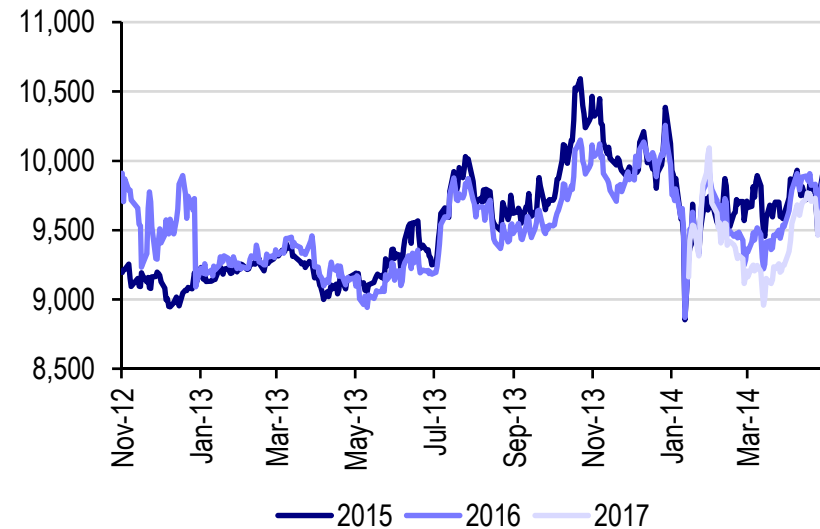
- Are we looking at some of the best years yet?
 - *Counterpoint: Staring down from the top of the market even?*

PJM West ATC Prices (\$/MWh)



Source: Platts

PJM West ATC Heat Rates (btu/KWh)

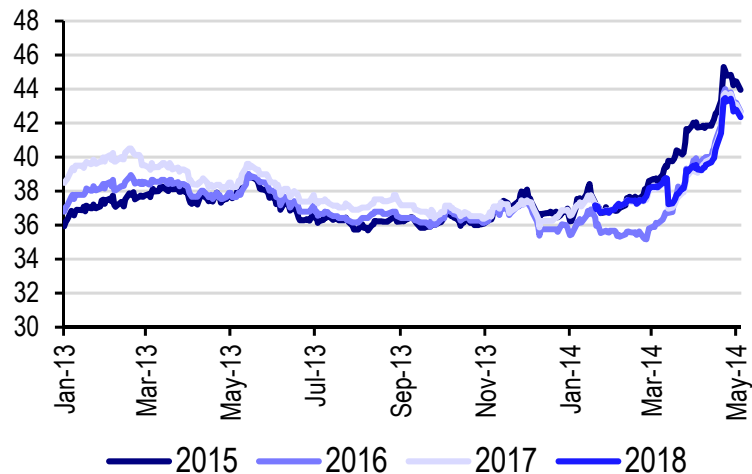


Source: Platts

... Even Upstate Has Recovered

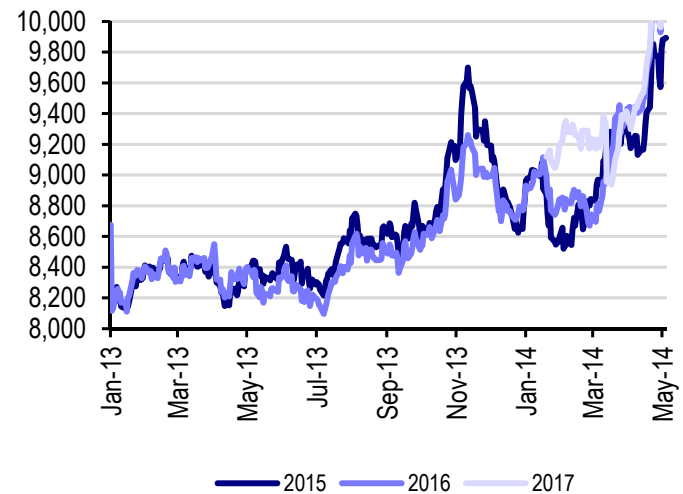
- It's not just been PJM, but New York too..
 - We're surprise by the recovery in upstate in particular
 - Nuclear retirement talk has enabled some talk, but it appears gas driven too...
That appears unlikely/unsustainable.

NYISO Zone A – ATC Power Prices (\$/MWh)



Source: Platts

NYISO Zone A – ATC Heat Rates (btu/KWh)

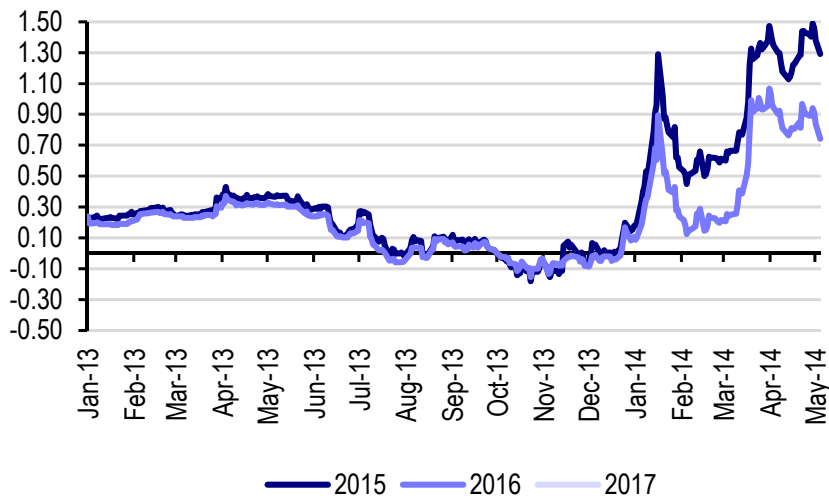


Source: Platts

Driven by Gas Price Recovery in the Region

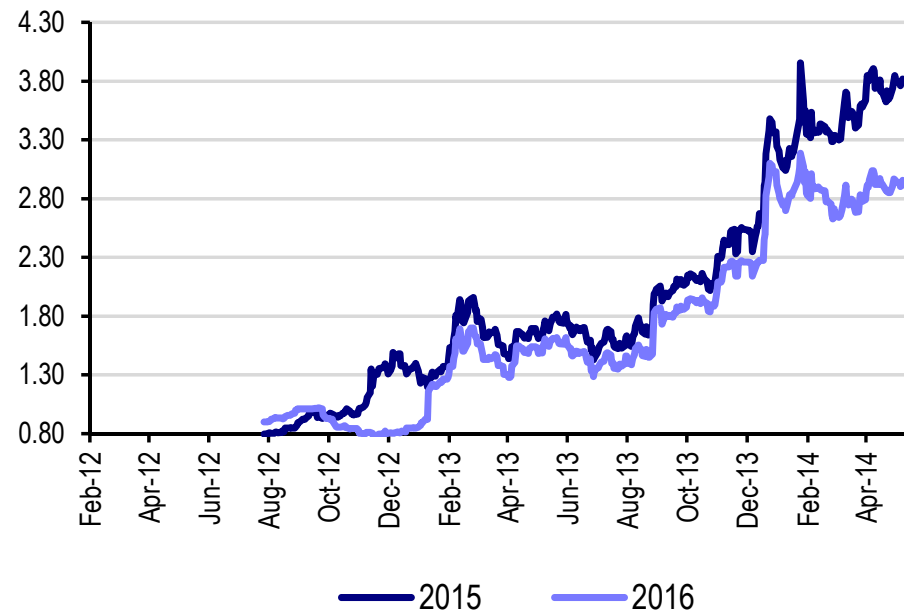
- Continued recovery in Algonquin prices since 2012.
 - Transco has been recovering nicely since early this year

TransCo – Zone 6 Basis (\$/MMBtu)



Source: Platts

Algonquin (\$/MMBtu)

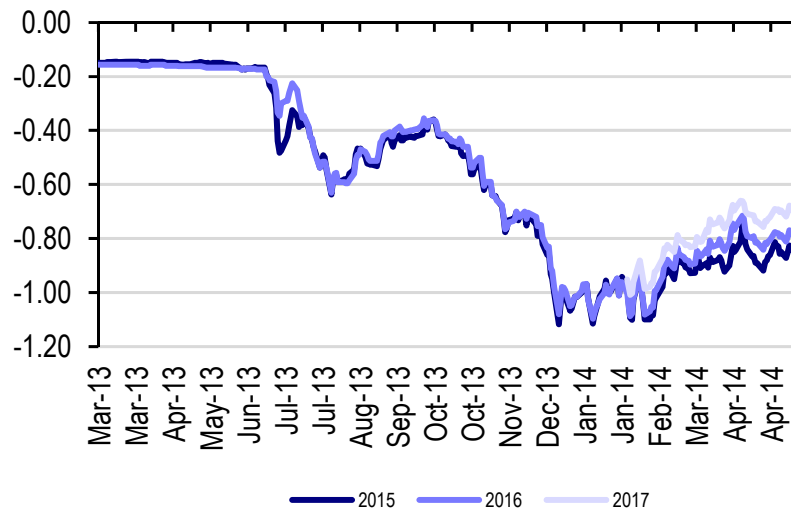


Source: Platts

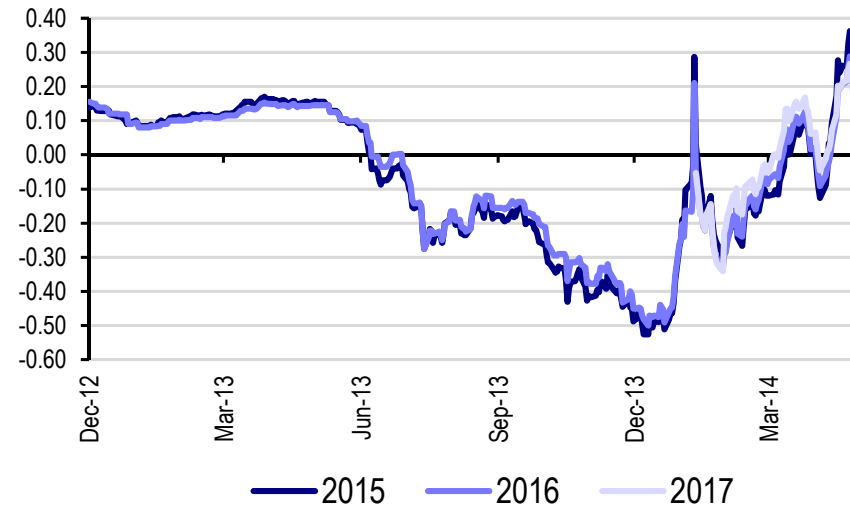
Structural or Cyclical Headwind in Gas Prices?

Dramatic fall in Delivered Cost of Gas

Dominion South Point Forwards
\$/MMBtu



TETCO M3 (NJ-PA) \$/MMBtu



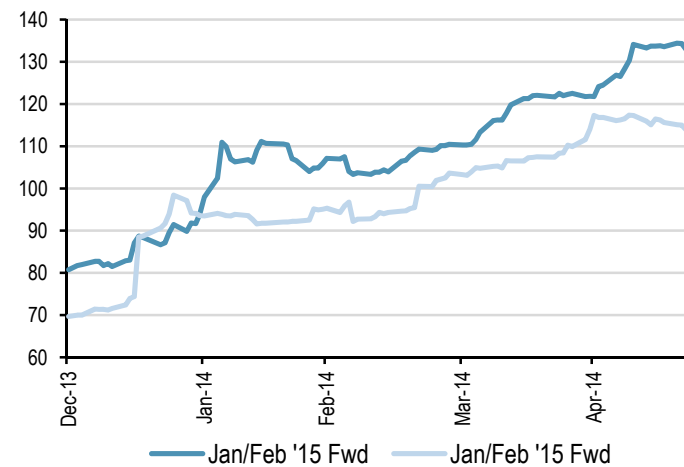
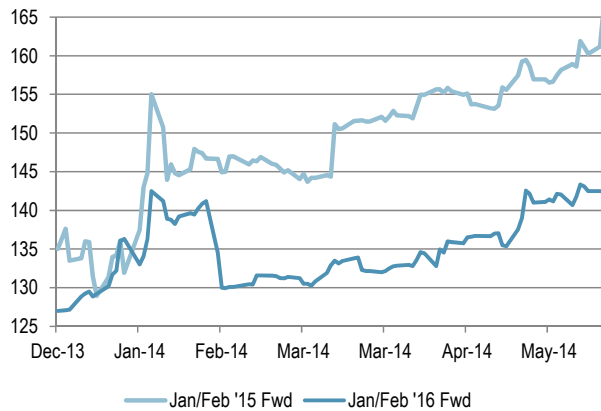
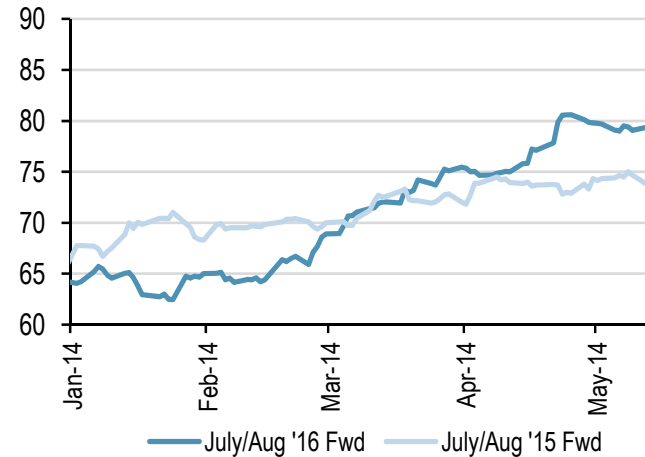
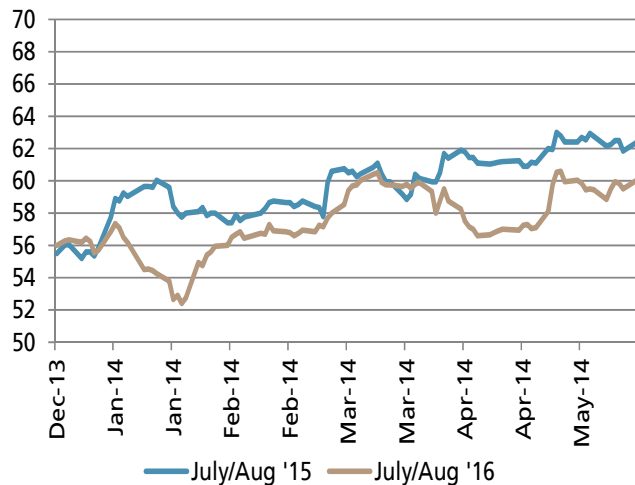
- When will the gas takeaway issues get resolved?

Gas Constraints to Save the Day?

Where are we today?

- Has been the case in NY and New England for Some Time... But Now PJM as well

MassHub and NYISO Zn J (NYC) Summer and Winter On-Peak Prices

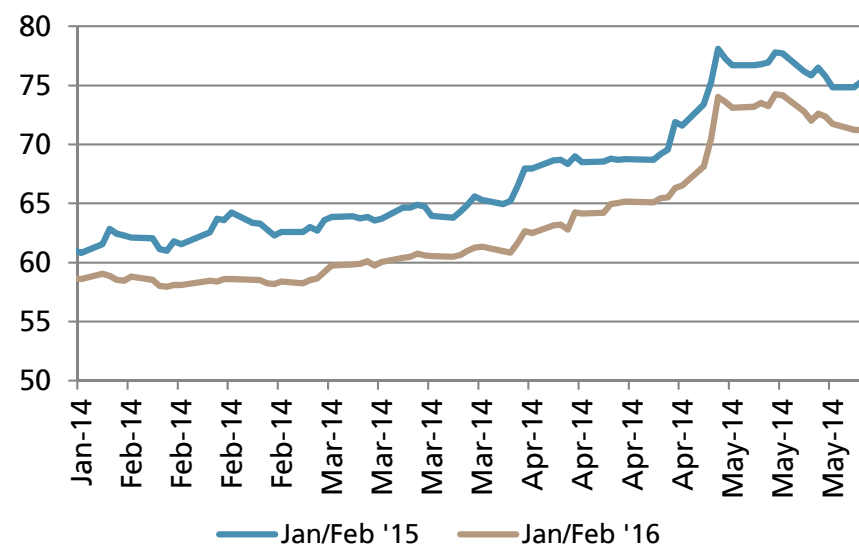
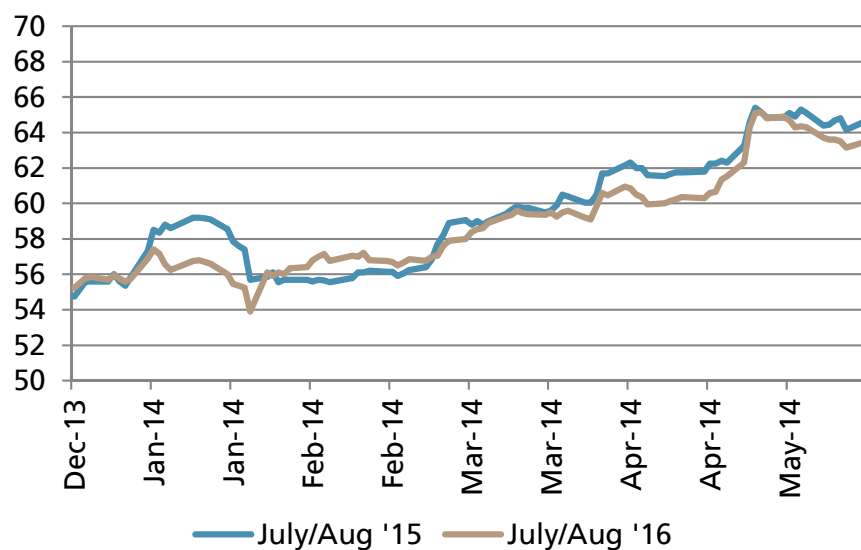


Adding PJM to that List

Winter Eclipses Summer for 'Value' Argument

- Commodity Recovery *Rather* Than Power Supply/Demand (Heat Rate) Recovery?

PJM West- Summer and Winter On-Peak Prices



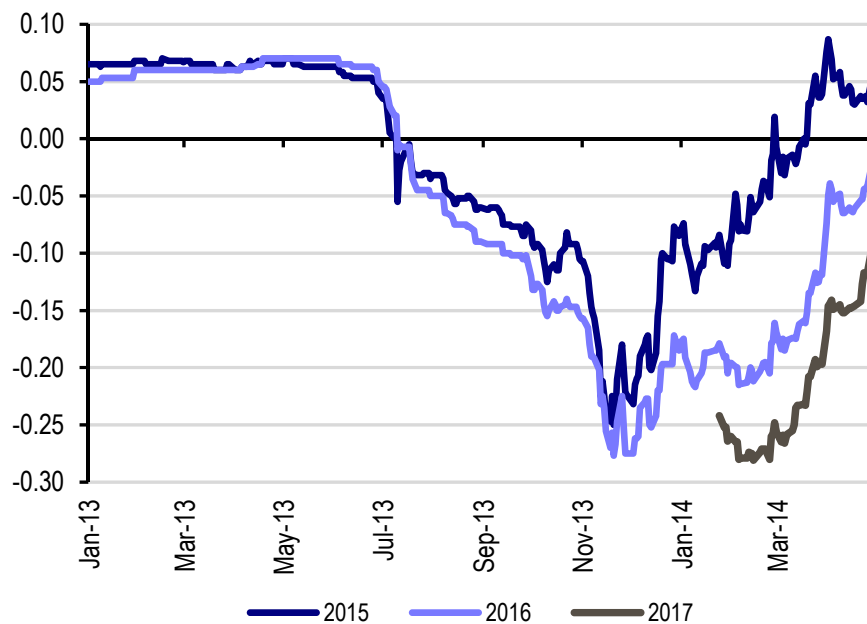
Source: Platts

Is PJM "West" Next?

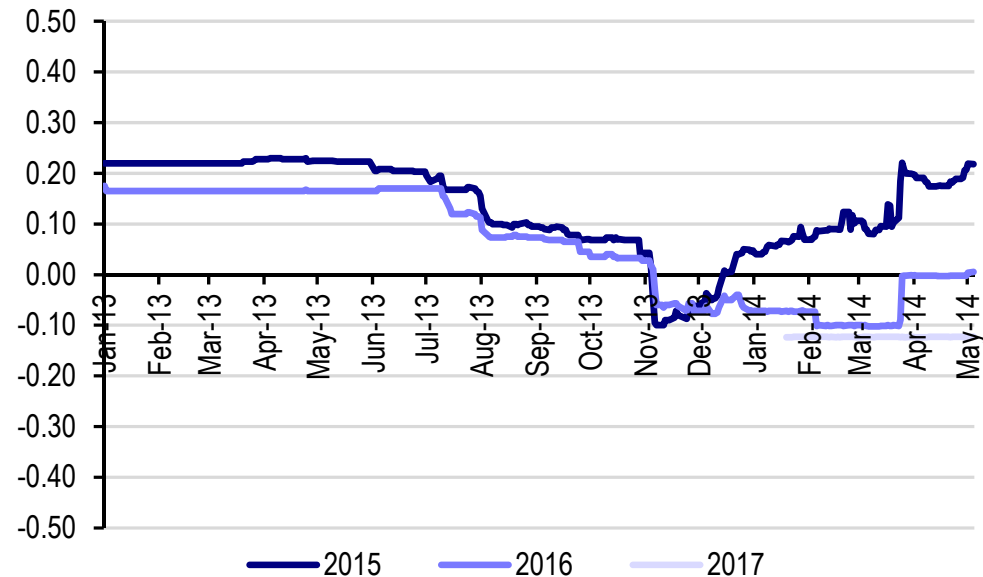
Gas development could yet spread to Utica (and beyond?)

- Utica production remains strong, but liquids-rich
 - 'Associated' gas is the key
- Repurposing of REX Pipeline to *reverse* flow? 2015 is the bifurcating year.
- Beware Ohio Coal Generators....New GAS generators on the come (*this Friday?*)

Chicago Citygate (\$/MMBtu)



Dawn Hub (\$/MMBtu)



The Debate: Will Supply Outstrip Demand?

Eventually, yes, but right now, not so sure

- What's the new pipeline sources?
 - New York: Constitution (0.6 bcf/d) and further expansion of Millennium Pipeline (0.2-0.5 bcf/d)
 - New Jersey: Expansion of TETCO of
- What's the new demand? Generation primarily.
 - New York: Additional gas capacity to eventually enable IP retirement, includes Danskammer and potentially another contracted CCGT (Cricket Valley?)
 - New Jersey: Hess' Newark Energy Center and LS Powers' West Deptford
- What else is at play?
 - Less Canadian production: How will continued decline in Western Canadian production factor into the Dawn Hub and New England prices?
 - Conversion of Gas to Oil pipelines could exacerbate decline.
- Litany of other moving pieces keep this math approximate– and limited to the winter peak days.

Add Capacity Market Improvement Too...

- NY Capacity Prices have continued to improve
 - *Here too, we think we could be looking at the top of the market*
 - *New Capacity (namely Hudson Transmission Partners, HTP) will limit any upside*
- What about new entrants?
 - We see limited merchant investment outside of contracted constructs
- Exports to New England?
 - Upside to New York prices: clear potential, but would be for 2018/19
 - Mis-match on auction timing

Capacity Market Forecast : New York Better than Most

- NY Capacity Prices are better than adjacent regions
 - More imports in very near term?

| NYISO ICAP Forecast | 2007 | 2008 | 2009 | 2010 | 2011E | 2012E | 2013E | 2014E | 2015E |
|-------------------------------------|--------|-------|-------|--------|--------|--------|--------|--------|--------|
| NYC Forecast | | | | | | | | | |
| Summer ICAP (\$/kW-month) | 12.37 | 6.50 | 6.75 | 12.90 | 13.54 | 11.70 | 14.80 | 16.24 | 14.00 |
| \$/kW-yr | 148.44 | 78.00 | 81.00 | 154.80 | 162.48 | 140.40 | 177.60 | 194.88 | 168.00 |
| \$/MW-day | 407 | 214 | 222 | 424 | 445 | 385 | 487 | 534 | 460 |
| Winter ICAP (\$/kW-month) | 5.67 | 1.91 | 2.79 | 4.65 | 4.60 | 2.70 | 4.50 | 7.54 | 8.54 |
| \$/kW-yr | 68.04 | 22.92 | 33.48 | 55.80 | 55.20 | 32.40 | 54.00 | 90.48 | 102.48 |
| \$/MW-day | 186 | 63 | 92 | 153 | 151 | 89 | 148 | 248 | 281 |
| Annualized (\$/kW-yr) | 100.72 | 52.22 | 60.96 | 105.20 | 105.04 | 90.00 | 121.88 | 142.68 | 129.24 |
| \$/MW-day | 276 | 143 | 167 | 288 | 288 | 247 | 334 | 391 | 354 |
| NY - Rest of State (RoS) | | | | | | | | | |
| Summer ICAP (\$/kW-month) | 2.25 | 2.67 | 3.01 | 2.47 | 0.55 | 1.25 | 4.20 | 5.15 | 4.00 |
| \$/kW-yr | 27.00 | 32.04 | 36.12 | 29.64 | 6.60 | 15.00 | 50.40 | 61.80 | 48.00 |
| \$/MW-day | 74 | 88 | 99 | 81 | 18 | 41 | 138 | 169 | 132 |
| Winter ICAP (\$/kW-month) | 2.50 | 1.91 | 1.77 | 1.75 | 0.39 | 0.15 | 0.82 | 2.58 | 3.58 |
| \$/kW-yr | 30.00 | 22.92 | 21.24 | 21.00 | 4.68 | 1.80 | 9.84 | 30.96 | 42.96 |
| \$/MW-day | 82 | 63 | 58 | 58 | 13 | 5 | 27 | 85 | 118 |
| Annualized (\$/kW-yr) | 27.32 | 27.20 | 28.64 | 22.60 | 5.16 | 9.74 | 33.64 | 46.38 | 39.68 |
| \$/MW-day | 75 | 75 | 78 | 62 | 14 | 27 | 92 | 127 | 109 |
| Lower Hudson Valley Estimate | | | | | | | | | |
| Summer ICAP (\$/kW-month) | | | | | | | | 9.96 | 8.00 |
| \$/kW-yr | | | | | | | | 119.52 | 96.00 |
| \$/MW-day | | | | | | | | 327 | 263 |

Our Forecast by Market...

Future uplift in New England could be favorable for New York?

ISO-NE Forecast: Updated to Reflect Initial View of Demand Curve

| ISO New England FCM Results | | | | | Actual | Forecasted |
|--|---------|---|---------|---|----------|-------------------------|
| FCA Auction # | 4 | 5 | 6 | 7 | 8 | 9 |
| Auction Date | | | | 4-Feb-13 | 4-Feb-13 | |
| Period (Years) | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 |
| CONE (Updated) | 4.918 | 5.349 | 5.723 | 6.05 | 6.39 | 11.08 |
| <i>Increase</i> | | 9% ▲ | 7% | 6% | | <i>New Demand Curve</i> |
| Clearing Price, \$/kW-month (Actual/Forecasted) | 2.95 | 3.21 | 3.43 | 3.15 ▼ | 7.025 | |
| Pro-Rated Price (Actual/Forecasted) | 2.52 | 2.86 | 3.13 | 2.88 | 7.025 | 11.08 |
| <i>\$/MW-day Equivalent</i> | 82.72 | 94.03 | 102.87 | 94.78 | 230.96 | 364.27 |
| NEMA (Boston Clearing Price), \$/kW-month [1x1 * Net CONE] | | | | 6.66 | 15.00 | 15.00 |
| <i>\$/MW-day Equivalent</i> | | | | 219 | 493 | |

Source: ISO-NE and UBS estimates

New England Dynamic Bodes well in Medium Term

Exporting from New York in the Medium to Long Term

- We read ISO-NE's proposed new demand curve will drive structurally higher prices
 - How much transmission will commit itself forward out of New York?
 - Could this drive new investment in New York too? Yes, in part.
- Expect new Dual-Fueled Capacity to enter the market in New England
- Focus on alleviating gas concerns/resource adequacy could have negative impact to NY
- Higher Net CONE in New England could drive more exports structurally given higher barriers to entry
 - 'Gas by Wire'

How about other nearby markets?

PJM likely to be disappointing this week too...

PJM Capacity Price Forecast

| | 2013/14 | 2014/15 | 2015/16 | 2016/17 | UBSe 2017/18 |
|---|--------------|--------------|--------------|--------------|--------------|
| Resource Clearing Prices (\$/MW-day) | | | | | |
| RTO | \$27.73 | \$125.99 | \$136.00 | \$59.37 | \$70.00 |
| EMAAC | \$245.00 | \$136.50 | \$167.46 | \$119.13 | \$70.00 |
| SWMAAC | \$226.15 | \$136.50 | \$167.46 | \$119.13 | \$70.00 |
| MAAC | \$226.15 | \$136.50 | \$167.46 | \$119.13 | \$70.00 |
| DPL-S | \$245.00 | \$136.50 | \$167.46 | \$119.13 | \$70.00 |
| PS-N | \$245.00 | \$225.00 | \$167.46 | \$219.00 | \$200.00 |
| PSEG | \$245.00 | \$136.50 | \$167.46 | \$219.00 | \$200.00 |
| PEPCO | \$247.14 | \$136.50 | \$167.46 | \$119.13 | \$70.00 |
| ATSI | | | \$357.00 | \$114.23 | \$70.00 |
| Reserve Margin | 20.2% | 19.6% | 20.2% | 21.1% | |

Source: PJM and UBS estimates

Major NY Theme #1: Lacking Faith in Markets?

Can New York be trusted?

- Continued bifurcation on contracting efforts between NEW and OLD is challenging
 - How can 'merchant' new build truly occur
 - Faith is in maintaining the capacity construct, and at the whim of regulators
- More value locked up in Spark Spreads, rather than capacity
 - Regulatory risk in these cash flows is limited
- Focus of late in LHV around restructured markets – and emergency order
 - What is the purpose of LHV?
 - Can there be new build in current context?

Major Theme #2: Can New York afford the retirements?

RGGI Math would suggest limited palatability of this

- We expect New York state to step in to save the units
 - Help out Ginna, and even Nine Mile / Fitzpatrick eventually?
- Energy Highway goal appears to be geared towards enabling IP shutdown? Precludes others?
- Question is whether state has adequate gas supply?
 - Dual fuel is clearly here to stay.

Figure 3: RGGI under New '14 Budget (in Short Tons)

| 2014 New York RGGI Carbon Allowances Budget (short tons) | | | |
|--|---------------------------------|------------------------------|-------------------------------------|
| CO ₂ Base Budget | CO ₂ Adjusted Budget | % of Total Adjusted RGGI Cap | Total RGGI Carbon Allowances Budget |
| 35,288,822 | 32,033,582 | 39% | 91,000,000 |

Emission Increases from 'At Risk' Nuclear Units in Northeast

| Plant Name | Owners | State | MW | Net Generation (MWh) | Emissions from Retirement (short tons) | % of NY Budget |
|---------------------------|-------------|-------|-------|----------------------|--|----------------|
| Indian Point 2 | Entergy | NY | 1,031 | 7,934,995 | 4,364,247 | 12% |
| Indian Point 3 | Entergy | NY | 1,044 | 9,002,057 | 4,951,131 | 14% |
| James A. FitzPatrick | Entergy | NY | 848 | 6,070,526 | 3,338,789 | 9% |
| R.E. Ginna | Exelon, etc | NY | 582 | 4,601,719 | 2,530,945 | 7% |
| Nine Mile | Exelon, etc | NY | 1,785 | 13,165,263 | 7,240,895 | 21% |
| Total for New York | | | | | 22,426,008 | 64% |
| Pilgrim | Entergy | MA | 683 | 5,859,540 | 3,222,747 | |
| Vermont Yankee | Entergy | VT | 604 | 4,989,338 | 2,744,136 | |

Source: RGGI and UBS estimates

Source: RGGI

Major NY Theme #3: Utility of the Future?

How much pain for the incumbents to come?

- More regulated investments
 - Subsidizing behind the meter investments
 - Enabling a rate-regulated construct again?
- Limiting demand growth
 - Expect a negative outlook for *metered* demand
- Accelerating and subsidizing new renewables
 - But that enables a growth investment for some?

Major NY Theme #4: ... and No Rate Inflation?

... Just this year. It matters more than most.

- Gubernatorial election year.. Despite any real challenger emerging?
- ConEd rate freeze illustrates this thesis
- Following this last winter, clear desire to avoid repeat of 'rate shock'
 - Numerous complaints to PSC exacerbate this policy directive
- Long-term: goals will drive inflation
 - Goal appears to be disproportionate

Major NY Theme #5: ... and What about Fuel Diversity?

Inability to develop gas pipelines could be leading edge of problem

- Do delays in pipeline development impede shutdown of Indian Point?
- What about ramifications for New England gas adequacy?
 - Limits ability for pipes to ease pressure on expansions
 - New England Governors' initiative is emphasizing midstream development whereas NY appears to be de-emphasizing
- Focus is on new pipeline
 - But what about expansion of existing?

The Renewables Are Coming

Watch Out!

- Robust outlook for new renewables
 - *Rush* to the door on PTC expiration
 - *Robust* capacity factor expectations... even low CF sites are now growing in Northeast!
- Effectively equivalent to new gas assets being added to market
 - Compare to Europe?
 - 1) No demand growth, but new supply based on subsidies
 - 2) PTCs drive negative prices
- Where is this relevant?
 - Particularly in California : duck chart
 - Midwest: Total MWhs added matter
 - Flexibility attributes will increasingly matter
- No fuel costs to renewables
 - Increasing penetration will driven prices down, *below* that of other fuel sources
 - Akin to nuclear assets, with limited marginal costs

-> *Subsidized Renewables.. Not Subsidized Gas?*

Renewables: Exceeding Demand?

Cumulative US build exceeds forecasted EIA demand growth through 2020

Table 9: Incremental Renewable Requirements vs. Projected Incremental Retail Sales (GWh)

| (GWh) | Incremental Renewable Generation Required (2020) | Total Incremental Retail Sales Projected (2020) | Discrepancy |
|-------------------------|--|---|-----------------|
| AZ | 3,784 | 9,283 | 5,499 |
| CA | 57,231 | 21,834 | (35,398) |
| CO | 5,715 | 7,193 | 1,478 |
| CT ¹ | | 1,456 | |
| DE | 1,162 | 373 | (789) |
| HI | 1,667 | 519 | (1,148) |
| IA | | | |
| IL | 17,077 | 7,229 | (9,848) |
| KS | 3,140 | 1,283 | (1,857) |
| MA ² | 5,944 | 2,709 | (3,235) |
| MD | 6,882 | 2,069 | (4,813) |
| ME | | 557 | |
| MN ³ | 11,218 | 3,624 | (7,594) |
| MO | 4,259 | 2,291 | (635) |
| MT | | 1,589 | |
| NC | 8,162 | 9,968 | (6,574) |
| NH | 1,850 | 530 | (1,320) |
| NJ ⁴ | | 2,500 | |
| NM | 2,850 | 2,854 | 4 |
| NV | 880 | 4,201 | 3,321 |
| OH | 10,695 | 7,829 | (2,866) |
| OR | 6,252 | 5,435 | (817) |
| PA ¹ | 6,404 | 4,838 | (1,566) |
| RI | | 377 | |
| TX ¹ | | | |
| WA ¹ | 4,713 | 10,799 | 6,087 |
| WI | | | |
| Total | 159,884 | 111,340 | (62,068) |
| Total without CA | 102,652 | 89,507 | (26,671) |

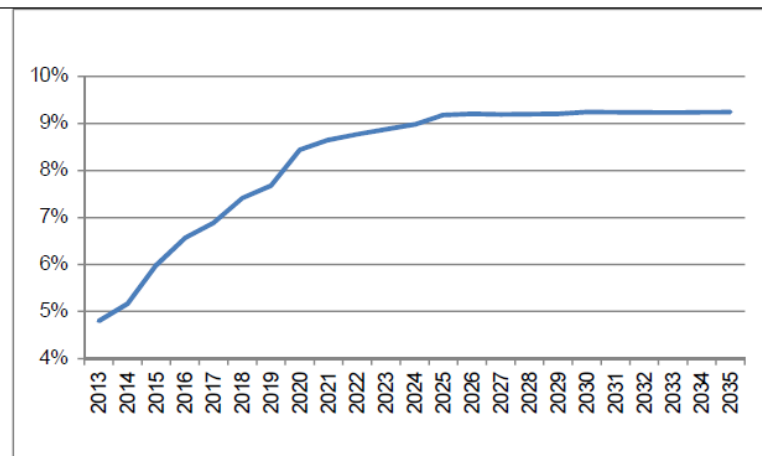
Notes:
(1) Utilized SNL data for the 2011 Compliance Data as there was no data reported from the states.

Source: LBNL, SNL, and UBS estimates



- Assumes Build out to Existing RPS Standards
 - Some states poised to increase?
 - Will likely be regionally concentrated

Mandatory RPS as a proportion of Total Electric Sales



Source: EIA, Berkeley National Laboratory

On the (Bleeding) Edge

Negative Hours of Pricing are *growing*

- Power Prices are even *negative* for growing portion of time due to Production Tax Credits (PTCs)
- Negative Pricing pushes intersection of renewable policy against de-carbonization policy
 - Offsetting subsidies to 'save the nukes' will be state-driven?

Quad Cities Day Ahead LMP Prices

| | # hours with negative pricing | average negative price (\$/MWh) | % of hours with negative prices |
|------|-------------------------------|---------------------------------|---------------------------------|
| 2006 | 0 | 0 | 0% |
| 2007 | 0 | 0 | 0% |
| 2008 | 20 | (2.57) | 0.23% |
| 2009 | 129 | (4.12) | 1.47% |
| 2010 | 213 | (6.11) | 2.43% |
| 2011 | 133 | (3.39) | 1.52% |
| 2012 | 337 | (7.77) | 3.85% |
| 2013 | 101 | (15.35) | 1.15% |

Source: PJM; **2013 is YTD

Quad Cities Average LMP Prices (\$/MWh)

| Average LMP (\$/MWh) | |
|----------------------|-------|
| 2006 | 41.02 |
| 2007 | 44.17 |
| 2008 | 48.07 |
| 2009 | 25.23 |
| 2010 | 27.87 |
| 2011 | 27.09 |
| 2012 | 20.71 |
| 2013 | 25.36 |

Source: SNL

2013 as of Oct, 2013

Zero Marginal Cost?

The Future of Power Markets

- Markets will need to respond to these signals
- Does the future look more like **energy** or **capacity markets**
 - Intermittency and operational metrics will matter more
 - How will 'merchant' renewables ever be incentivized? Not with Energy?
- Still does not bode well for steam generation based technologies
 - Nuclear and Coal remain fragile
- Capacity markets appropriately redirect compensation towards **fixed payments**
 - Infrastructure business naturally attempts to *match* duration of assets with cash flows

Permissible Bidding Strategies are Key

Focus on what retiring units are allowed to bid

- Trend in a market without load growth is *towards Free Cash Flow Breakeven*
 - The question is about asset rationalization to meet load forecast, NOT new entry
 - One capacity source is *cannibalizing another* with a lower fixed cost structure
- The key questions remains what are permissible bidding strategies by participants
 - What is *my appropriate variable cost?*
 - *Recovery ON and OF Capital:* That is to say:
 - 1) 'Return on Equity'
 - 2) Depreciation

What will the corporates do?

Bifurcation in the sector

- Seeing the gradual De-Integration of the Sector?
 - Many companies in PJM never required divestment
 - Investment profile increasingly bifurcated:
 - > Regulated Utility ideal is stable dividend
 - > Merchant Business Model emphasizes commodity leverage
 - Will see this continue to unfold in coming year:
 - PPL, AEP, DUK... eventually others to follow? What will EXC do?
- All about valuation arbitrage between metrics
 - EV/EBITDA vs. P/E Equity Valuations
 - What is a Business worth that :
 - a) generates no earnings?
 - B) generates no cash?
- Does current capitalization enable a **spin** or **sale**?

Is There a Bid for Yield?

Contracted Generation Model Vindicated

- Success of NRG Yield heralds new focus
 - Contracted IPP Business model, primarily for renewables
- Bifurcation in equity markets between those with dividend and those without
 - Increasing premium for dividend growth
- Is it sustainable?
 - Accretive to acquire.. Until it's not.
 - Depleting assets? Contracts are 'above-market' by design.
 - Contract tenor: what's the coverage

Risk Statement

- Risks for Utilities and Independent Power Producers (IPPs) primarily relate to volatile commodity prices for power, natural gas, and coal. Risks to IPPs also stem from load variability, and operational risk in running these facilities. Rising coal and, to a certain extent, uranium prices could pressure margins as the fuel hedges roll off Competitive Integrations. Further, IPPs face declining revenues as in the money power and gas hedges roll off. Other non-regulated risks include weather and for some, foreign currency risk, which again must be diligently accounted in the company's risk management operations. Major external factors, which affect our valuation, are environmental risks. Environmental capex could escalate if stricter emission standards are implemented. We believe a nuclear accident or a change in the Nuclear Regulatory Commission/Environment Protection Agency regulations could have a negative impact on our estimates.

Risks for regulated utilities include the uncertainty around the composition of state regulatory Commissions, adverse regulatory changes, unfavorable weather conditions, variance from normal population growth, and changes in customer mix. Changes in macroeconomic factors will affect customer additions/subtractions and usage patterns

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| UBS 12-Month Rating | Definition | Coverage ¹ | IB Services ² |
|-----------------------|---|-----------------------|--------------------------|
| Buy | FSR is > 6% above the MRA. | 47% | 33% |
| Neutral | FSR is between -6% and 6% of the MRA. | 42% | 34% |
| Sell | FSR is > 6% below the MRA. | 11% | 23% |
| UBS Short-Term Rating | Definition | Coverage ³ | IB Services ⁴ |
| Buy | Stock price expected to rise within three months from the time the rating was assigned because of a specific catalyst or event. | less than 1% | less than 1% |
| Sell | Stock price expected to fall within three months from the time the rating was assigned because of a specific catalyst or event. | less than 1% | less than 1% |

Source: UBS. Rating allocations are as of 31 March 2014.

1:Percentage of companies under coverage globally within the 12-month rating category. 2:Percentage of companies within the 12-month rating category for which investment banking (IB) services were provided within the past 12 months. 3:Percentage of companies under coverage globally within the Short-Term rating category. 4:Percentage of companies within the Short-Term rating category for which investment banking (IB) services were provided within the past 12 months.

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