

# US Electric Utilities & IPPs

## Coal's Gritty Outlook

### Equities

Americas  
Electric Utilities

#### Switching remains concentrated to the Mid-Atlantic Marcellus basin

Our latest market synopsis attempts to compile views from our UBS Coal, Power, and Rail teams. We believe the combination of low gas prices and coal plant retirements will result in considerably lower coal demand in 2015. Our state-by-state coal-to-gas switching model suggest demand could fall by 62Mt in 2015 at spot prices, with another ~23Mt from retirements, leading to a 75Mt or 9% drop in coal demand in 2015. This is at the upper end of industry estimates, but entirely reasonable seeing prices in the Mid-Atlantic *below* those levels last seen in 2012. We suspect the theme was not as prevalent yet with 4Q results, seeing higher gas prices during the Jan-Feb winter months as delaying the extent of the impact. We expect CAPP and NAPP to bear the brunt of the cuts, with ILB, PRB and Western operations sharing a smaller slice of cuts. We see ACI and ANR as least favourably positioned among coal producers. As for coal generators, we see FE, PPL's Talen, and NRG's GenOn as least favourably positioned amidst the sharpest pressure in the Marcellus and Utica basins.

#### But coal cost support is becoming important- recovery is a question of timing

Conditions appear ripe for continued coal supply reductions, although it's not clear it will come in time for the seasonally weak spring and even summer periods. However beyond this reduction, we view pricing as generally insufficient to fund costs and maintenance capex at a minimum for the remaining critical coal supply. As a result, we believe further downside to coal prices is possible in 2015.

#### Coal prices are on their backs, but so are rail fuel surcharges

We estimate rail rates are down to the tune of \$3-4/t YoY, assuming a ~50% reduction in '15 rail rates. This translates to a tailwind of ~\$2/MWh for PRB, and ~\$1.5/MWh for Appalachian deliveries. While there are a litany of specific tariffs used, we suspect this could buffer the downside for many coal IPPs as switching proves a headwind in 2015. We also flag rails have been among the leading datapoints to illustrate the sharp pullback in Southeastern coal dispatch in recent weeks; see corresponding commentary with CSX. Lower fuel surcharges are a greater boon to Western PRB coals, which see nominally lower coal dispatch costs overall (roughly ~10% declines).

#### But lower coal and rail fuel rates just mean lower power prices too

With power prices off significantly due to weaker gas, we see power as largely 'held up' by coal dispatch at this point in many regions of PJM. This point will become clearer as we move into the seasonal shoulder season, with gas basis becoming quite soft again; Dominion-South prices in Marcellus and Utica remain below their 2012 levels, when the last wave of coal to gas conversions was made. While reductions in coal and fuel surcharges should accrue to generators, the savings could yet reset these 'floor' power prices lower (total savings of \$3-4/t from fuel surcharges and continued softness in CAPP to the tune of further \$5-10/t, as well as PRB to the tune of ~\$2-3/t); this in total translates to a ~\$5/MWh reduction in dispatch costs for Eastern generators (App), and ~\$4/MWh to Western (PRB) generators. While improving their competitiveness, absolute power prices could remain pressured.

#### Who will benefit among power? CPN on coal to gas; DYN on rail negotiations

Capitalizing on coal to gas, we suspect sentiment into 1Q could prove more supportive for CPN. We suspect DYN could yet benefit from further incremental rail savings on its latest portfolio renegotiations (particularly its IPH portfolio), albeit won't escape unscathed from switching (its gasier orientation should help). We suspect NRG could be pressured primarily in the Northeast, as well as even Texas following recent comments of anticipated PRB switching.

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Please click on the links below for relevant reports:

[It's Not Just the Ball That's Dropping...](#) (Dec 31<sup>st</sup>)

[The Coal-to-Gas Debate: Worse than 2012 for PJM?](#) (Jan 28)

## Winter Hides Forthcoming Switching Pain

Despite the cold weather and increased electric demand from December-March this year, we continue to see increased pressure on both natural gas and coal pricing through the balance of 2015. Combined with environmentally driven (MATS) coal plant retirements this year (~5 GW of remaining in PJM alone), coal-to-gas switching is poised to ramp up significantly in 2015, especially with natural gas forward swaps prices nearing a third lower than 2012 levels, the last great period of switching. Eastern coal fleets dependent on relatively expensive and higher mercury-content Appalachian coal are most risk; these include those of FE, PPL's Talen, and NRG's GenOn. Western fleets burning PRB are not presently as vulnerable although we suspect the majority of incremental near-term retirements are likely oriented towards PRB operators faced with scrub-or-retrofit decisions. Switching will become the topic in Power by mid-year, in our view, particularly with the PJM auction in the rear view mirror, and with summertime gas basis allowing for wide discrepancies to emerge. Buckle up.

## Is 2015 another period of strong coal-to-gas switching?

We include several figures below to put switching in 2015 in historic context. We suspect 2015 could see a step-change shift, although environmental (MATS) driven coal-plant retirements will skew the data, making historic comparisons a bit more challenged (arguably the same could be said of 2014, albeit to a lesser extent). In the table below, note that Tetco M3, Transco Zone 6m and Dominion South Pt all show gas pricing for 2015 (forward) far below the historical spot for 2012, which was the last period of substantial coal-to-gas switching; last we showed this same table at the near year, prices were substantially higher – and only showed slightly YoY declines for the mid-Atlantic.

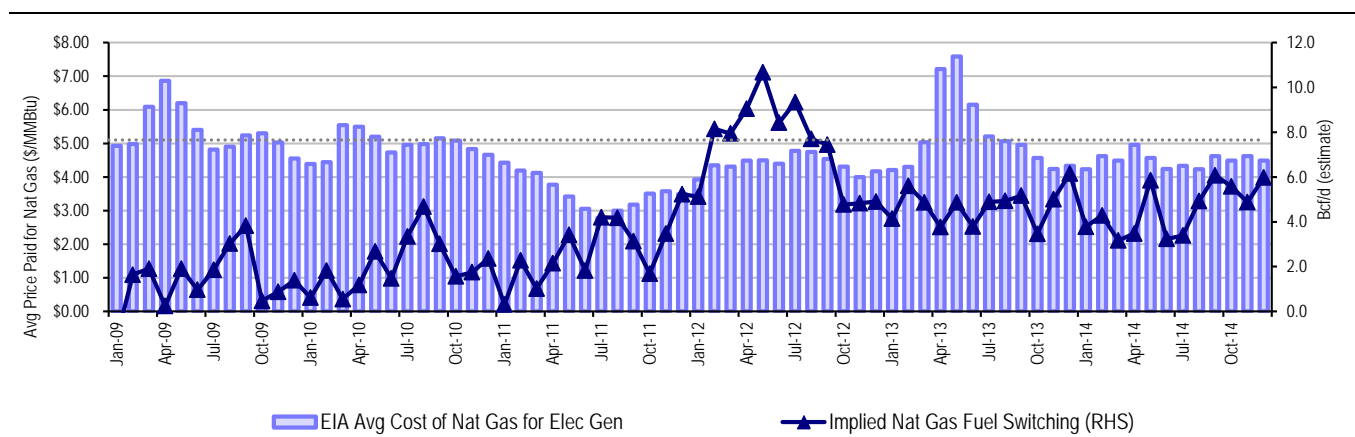
**Tetco M3, Transco Zone 6m and Dominion South Pt all show gas pricing for 2015 (forward) far below the historical spot for 2012, which was the last period of substantial coal-to-gas switching.**

**Figure 1: Comparison of 2008-2014 Average Daily Natural Gas Prices to the latest 2015 Forward Swap (3/23/15)**

	Henry Hub Spot	Leidy Hub Natural Gas Spot Px	Algonquin City Gates	Tetco M3	Transco Zone 6 NY	Transco Z6 non-NY	Chicago City Gate	Houston Ship Chnl	Dominion South Pt	SOCAL CITY GATE SPOT	PG&E City Gate	RUBY MALIN WEST COAST
2015 Fwd	2.86		3.97	2.07	2.85	2.68	2.84	2.81	1.75	2.99	3.15	2.67
2014	4.32	2.74	7.95	5.03	6.39	6.44	5.61	4.30	3.25	4.71	4.85	4.67
2013	3.72	3.07	6.95	3.93	5.07	4.08	3.86	3.70	3.51	3.95	3.97	3.58
2012	2.75	2.83	3.95	2.98	3.27	2.99	2.85	2.71	2.77	3.02	3.11	2.89
2011	3.98	4.33	5.02	4.61	5.01	4.68	4.12	3.93	4.11	4.09	4.23	
2010	4.37	4.89	5.28	5.10	5.39	5.25	4.45	4.33	4.57	4.27	4.53	
2009	3.92	5.00	4.80	4.63	4.89	4.64	3.93	3.75	4.23	3.67	4.12	
2008	8.84		10.06	9.82	10.12	9.82	8.79	8.48	9.28	4.86	8.58	
2015 Fwd vs 2012	0.11		0.02	(0.91)	(0.42)	(0.30)	(0.01)	0.10	(1.02)	(0.03)	0.04	(0.22)
2015 Fwd vs 2012	4%		0%	-31%	-13%	-10%	0%	4%	-37%	-1%	1%	-8%

Source: Bloomberg

**Figure 2: Coal to Gas Switching (relative to 2008) (Bcf/d) vs Avg cost of Natural Gas (\$/MMBtu) for Elec Generation**



Source: EIA and UBS estimates

We see gas generation averaging ~26 bcf/d in 2015, with potential for a disproportionate uptick from retirements mandated in April 2015 for MATS, as well as substantially cheaper mid-Atlantic gas; ~+3 bcf/d YoY is achievable.

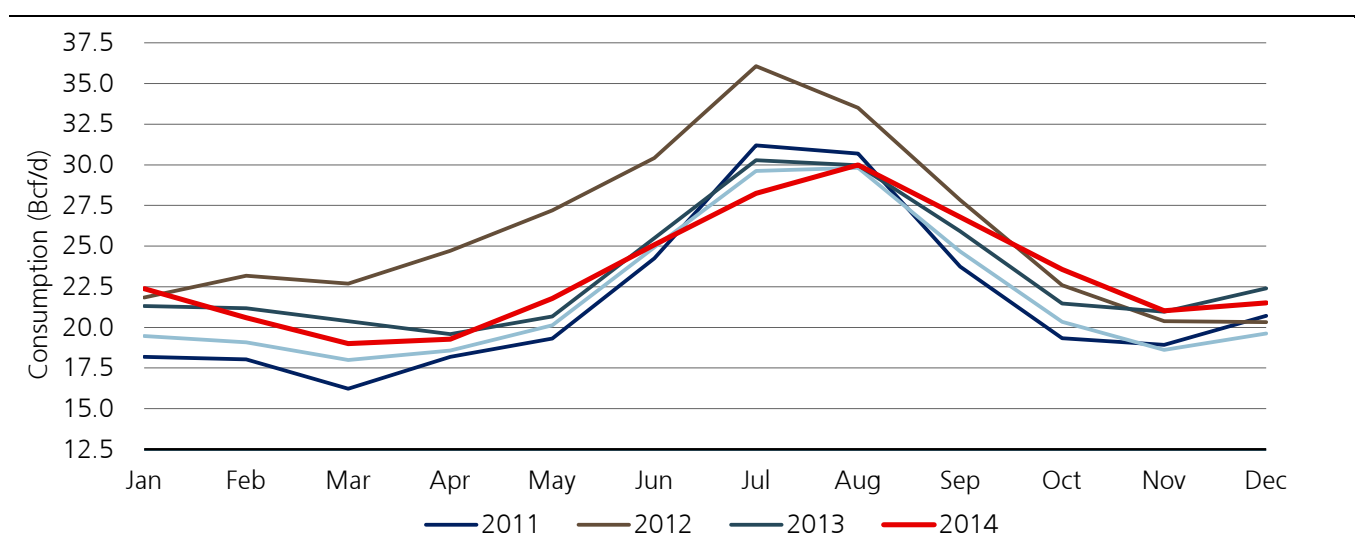
**Figure 3: Gas Burn (bcf/d) in the Generation Stack – How do recent years compare?**

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2007	20.2	16.7	16.7	18.5	14.8	16.0	15.7	16.0	22.7	26.0	26.2	19.9	19.1
2008	17.9	15.8	15.5	16.2	16.0	22.7	26.0	25.4	20.6	18.2	15.8	15.9	18.8
2009	16.3	16.8	16.7	15.6	17.2	22.2	25.9	27.9	23.8	18.0	16.0	17.5	19.5
2010	18.4	17.9	15.4	16.5	18.8	24.4	29.8	31.4	24.1	19.2	17.3	19.1	21.0
2011	18.2	18.0	16.2	18.2	19.3	24.2	31.2	30.7	23.7	19.3	18.9	20.7	21.6
2012	21.8	23.2	22.7	24.7	27.2	30.4	36.1	33.5	27.8	22.6	20.4	20.3	25.9
2013	21.3	21.2	20.4	19.6	20.7	25.5	30.3	30.0	25.9	21.5	21.0	22.4	23.3
2014	22.4	20.6	19.0	19.3	21.8	25.1	28.2	30.0	26.8	23.6	21.0	21.5	23.3

Source: EIA and UBS estimates

Comparing graphically, 2012 remains a clear stand out; we suspect 2015 could approach these levels. Particularly should positive load trends continue (ERCOT has proven resilient amidst lower oil prices, as has NYISO, with positive revisions).

**Figure 4: Natural Gas Burn in the Power Stack (Bcf/d)**



Source: EIA

## Coal Transport Savings from Fuel Surcharges

Alongside the latest slide in coal prices, we believe the utilities are likely to see a reduction in delivered coal cost per ton owing to lower fuel surcharge rates charged by the railroads. Based on UNP's 23% fuel surcharge rate for coal carloads in February 2015 (note: the most recent available, though this could move down further owing to a further reduction in fuel prices), compared to 39.5% in February 2014; as well as CSX's \$0.22/mile fuel surcharge rate in April 2015, compared to \$0.50/mile in April 2014, and NSC's 10% rate in May 2015, compared to 31.2% in May 2014: we believe the rails will charge a fuel surcharge rate at a reduced level consistent with the y/y change in crude/fuel prices. So, for **UNP, for example, assuming crude/fuel prices are down roughly about 50% y/y this would equate to a roughly \$4.12/ton reduction in delivered coal price** (note: \$2,369/coal-carload in 2Q14 x 20%-points reduction / 115 tons/coal-carloads). On the same basis, **coal delivered by CSX could fall by about \$3.92/t while coal delivered by NSC could fall by about \$3.33/t.**

~\$3-4/t tailwind on lower fuel surcharges from the rails

Translates to ~\$2/MWh tailwind to fuel costs

In the Figure, below, we frame the potential y/y fuel surcharge accruing to the generators in 1Q15 by examining three different surcharges - UNP's HDF, rate-based carload surcharge, CSX's HDF, rate-based intermodal surcharge, and NSC's WTI, rate-based carload surcharge. This is a function of the 2-month lag in setting the surcharge rate and the rate being tied to HDF, which has declined at a slower rate than WTI. The y/y change in CSX's surcharge rate results in the greatest impact to ARC mainly because the 1-month lag accelerates the effect of lower fuel prices on surcharge revenue and also because the gearing of the surcharge mechanism is higher.

We note the complexity in trying to forecast the y/y revenue impact from lower fuel surcharges, as the rails employ several surcharge programs and negotiated surcharge rates. Nonetheless, looking at individual surcharge mechanisms does help assess the relative headwinds faced by the rails in 1Q15. We believe CSX's intermodal surcharge is similar to the intermodal surcharges used by the other rails, so our modeling suggests widespread weakness in 1Q15 intermodal yields for the U.S. rails. Where the 1Q15 fuel surcharge impact diverges a bit among the rails, in our view, is on the carload side. Rails that are levered to HDF-based surcharges will likely experience less of an impact on surcharge revenue in 1Q15 than rails levered to WTI-based surcharges.

**Figure 5: Comparing the Potential Fuel Surcharge Headwind Among the Rails**

	<u>Lag in Setting</u> <u>Rate</u>	<u>1Q14 Average</u> <u>Rate</u>	<u>1Q15 Average</u> <u>Rate</u>	<u>Estimated Impact on</u> <u>ARC</u>
UNP HDF-Based Carload Surcharge	2 months	26.3%	21.2%	-4.1%
CSX HDF-Based Intermodal Surcharge	1 month	34.5%	22.7%	-8.8%
NSC WTI-Based Carload Surcharge	2 months	9.5%	1.2%	-7.6%

Source: Company Reports and UBS Estimates

## Other Datapoints Issues on the Rail Side

- **Rails can't run with the cold snap:** Recent cold weather not only has increased the demand for electricity and coal, but has also reduced the availability of rail service, with coal deliveries competing for space with other cargo during the snap.
- **Crude-by-rail:** Drove both deliverability issues last year as well as competed for volumes. With oil prices off so materially, the question is whether these issues will prove problematic next winter, as well. Also, to what extent will this enable wider latitude in price negotiations following a tighter 2014.

## Industry Commentary around Rail Rates:

- **Dynegy Rail Renegotiation:** We flag DYN is among the only large coal burners to see a major contract up for renegotiation. We flag not just are the bulk of the \$40 mn initial synergies disclosed from its pending acquisition of plants from Duke and ECP tied to the Kincaid (~6TWh/yr).

**With (3) other plants in the IPH under re-negotiation as well**, we estimate the total savings could be \$3-4/t (separate and incremental to fuel savings), driving \$2-3/MWh improvement on conservatively 10-15TWh. That said, seeing the tight market experienced in 2014, it's unclear if the full savings can be achieved vs. the \$21-22/t seemingly achieved in the prior DYN negotiation for the last reset. All-in fuel savings from new rail contract could well be north of \$50 Mn/yr. We see the current environment as favourable for procurement.

- **DYN on Fuel Surcharges:** Management commented that the benefits from lower fuel were largely offset by inflation in underlying contracts. We were generally surprised to hear this.
- **NRG:** Indicated at its Analyst Day it was working with its Transportation provider (BN) around the weak gas environment. The company has readily admitted it expected to see coal-to-gas switching impact the PRB markets in Texas again this year.

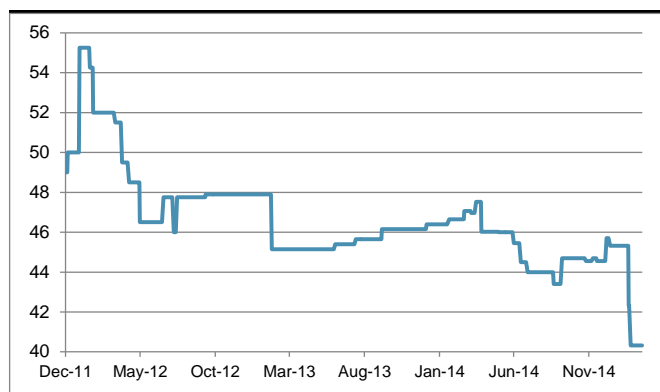
## The Rise (and Fall?) of Illinois Basin

We include the latest price trend for this coal segment in the Figure below. We suspect prices here could continue to see pressure as negative gas basis continues to shift Westwards given continued production from the Utica.

We have yet to see companies noting the decline in ILB prices, but suspect this could gain some attention for the like of AEP, DYN (DUK), and FE. This particular segment of the coal market appears able to sustain the lower coal price environment.

We believe ILB will continue to be a beneficiary of lower Appalachian volumes, although lower rail rates could increase competition from the PRB. However in the near-term, coal oversupply means pricing and tons could suffer despite ILB gaining market share. This soft outlook was reflected in Murray Energy's \$1.395B purchase of an 80% voting interest in Foresight Energy GP and 50% of the LP at a level below the IPO price.

**Figure 6: Illinois Basin Coal (\$/t) Price History**



Source: Bloomberg

**Figure 7: PJM ILB Dark Spread (\$/MWh)**



Source: Bloomberg, Platts, and UBS Estimates

## Paying for the Scrubber Upgrades

In a unique situation, it appears Foresight is pursuing discussions with Dynegy to partially fund the construction of the Newton scrubber under the IPH portfolio. While we look for details in future calls, we suspect this amounts to \$100-200 Mn, with the bulk to occur in the 2018-19 period. The quid pro quo would appear to be that the plant would blend a substantial quantity.

**Foresight appears to be buying market share from DYN**

### PRB economics remain superior

The plant would otherwise *not* have switched to higher cost Illinois basin, despite being located in the state even if it had funded a scrubber on its own, still seeing the cost of delivered PRB as cheaper. The question is if there is a further market for Illinois Basin to penetrate westwards (we suspect not).

Please click on the links below to read our reports on ILB Basin Opportunity:

[The Illinois Basin Opportunity: Positive IPPs, DYN Consolidation, FE, AEP \(June 27, 2014\)](#)

## The Economics for App and PRB Coal

We see the latest dip in Appalachian prices as well as PRB as also being passed through back to generators in order to maintain market share.

CAPP prices remain low below \$55/ton given continued gas pressure from Marcellus gas prices; we expect further NAPP coal plant retirements in months ahead to maintain this pressure; meanwhile PRB appears hit ~\$13, albeit just recently corrected off that high.

We expect a significant trend in coal to gas switching to pressure statistics and prices once more this spring, disproportionately impacting the Eastern Appalachian products given the sharp declines in Marcellus and Utica prices.

**Figure 8: Average Weekly Bituminous Coal (CAPP) NYMEX Front Month Prices (\$/Short Ton)**



Source: FactSet

**Figure 9: Average Weekly Sub-Bituminous Coal (PRB) NYMEX Front Month Prices (\$/Short Ton)**



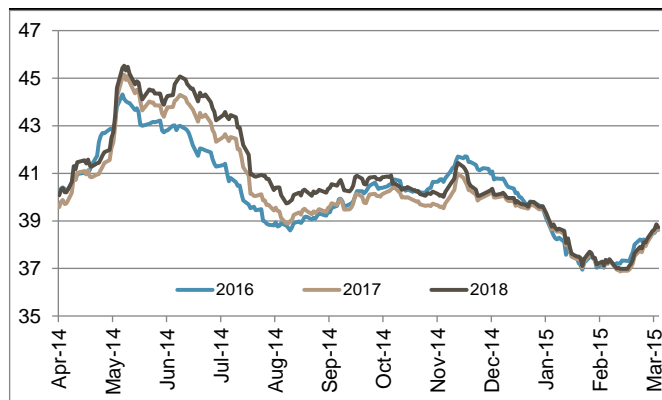
Source: FactSet

## Digging into Power Prices

### Looking first at recent power price trends: weak.

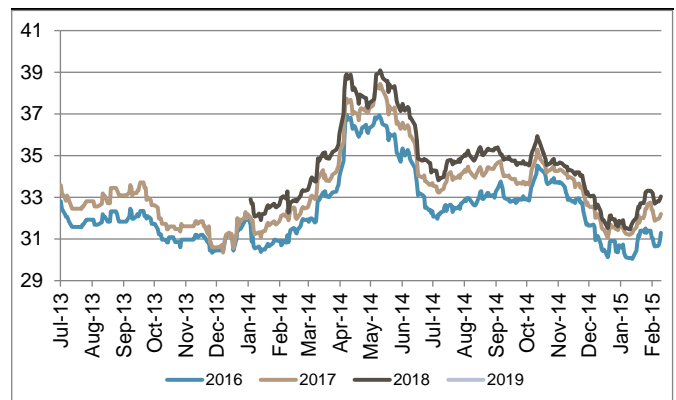
PJM power prices remain depressed both for West Hub (Mid-Atlantic) as well as NI Hub (ComEd/Chicago) delivery seeing the effects of cheap gas and coal.

**Figure 10: PJM West ATC Power Prices (\$/MWh)**



Source: Platts and UBS estimates

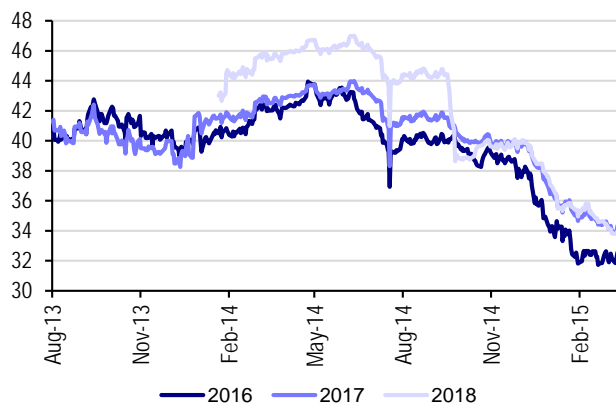
**Figure 11: NI Hub ATC Power Prices (\$/MWh)**



Source: Platts and UBS estimates

Meanwhile Texas remains quite weak as new supply and continued weakness in gas prices have pushed down prices to multi-year lows on the forward curve. We suspect upcoming datapoints won't prove all that supportive either.

**Figure 12: ERCOT-Houston ATC Forwards (\$/MWh)**



Source: Platts

## Putting it all together: PJM and ERCOT-PRB Dark Spreads

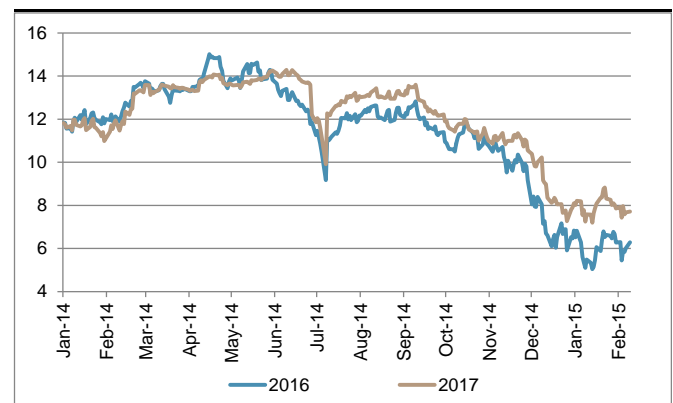
We have included dark spreads for both Eastern and Western regions. We use CAPP coal in our calculation of dark spreads for PJM West as this is the predominant fuel source for coal plants in the Northeast. We use the ERCOT South pricing hub to represent economics for coal plants in Texas, which predominantly are fuelled by PRB (8,800btu/lb) coal. CAPP coal continues to suffer from coal-to-gas switching given its disproportionate cost on a \$/MMBtu basis. We include transportation assumptions of \$25/ton for CAPP coal and \$32/ton for PRB coal to Texas.

**Figure 13: PJM ATC Dark Spreads vs. CAPP Spot Futures (\$/MWh)**



Source: Platts, Bloomberg, and UBS estimates

**Figure 14: ERCOT-Houston (ATC) – PRB 8,800 Dark Spread (\$/MWh)**



Source: Platts, Bloomberg, and UBS estimates

In Figure 15, we lay out a few simple rules of thumb for the switching discussion. As an approximate range, it takes 0.4-0.7Mt of coal to make a TWh (US average is 0.54 Mt/TWh). It takes around 7.6Bcf of natural gas to make a TWh. On average therefore each 1Mt of coal displaced by natural gas is equivalent to 14Bcf.

Industry estimates for switching in 2015 have generally ranged between 20 and 80Mt, which translates to 1-4% of US net generation, and in gas terms that is a range of 0.8-3.1 bcf/d.



**Figure 15: Coal to gas switching cheat sheet – estimates could be conservative, particularly for NAPP**

<b>US net generation (TWh)</b>						
Net generation, US, all sectors (2014)	4093					
Amount from coal (2014)	1586					
Amount from gas (2014)	1122					
<b>Coal assumptions</b>	<b>PRB</b>	<b>PRB</b>	<b>Average</b>	<b>ILB</b>	<b>CAPP</b>	<b>NAPP</b>
Coal energy density (BTU/lb)	8,000	8,800	9,800	11,700	12,500	13,000
Coal heat rate (BTU/kWh)	10,500	10,500	10,500	10,500	10,500	10,500
Specific coal burn (Mt/TWh)	0.66	0.60	0.54	0.45	0.42	0.40
<b>Gas assumptions</b>						
Gas energy density (BTU/cf)	1010					
Gas heat rate (BTU/kWh)	7700					
Specific gas burn (Bcf/TWh)	7.6					
Bcf per Mt	12	13	14	17	18	19
<b>Scenarios</b>						
<b>Coal switched (Mt)</b>	<b>20</b>	<b>40</b>	<b>60</b>	<b>80</b>	<b>100</b>	<b>120</b>
Power switched (TWh)	37	75	112	149	187	224
Power (% of total)	0.9%	1.8%	2.7%	3.6%	4.6%	5.5%
Equivalent natural gas (bcf)	285	569	854	1,138	1,423	1,708
<b>Natural gas (bcf/d)</b>	<b>0.8</b>	<b>1.6</b>	<b>2.3</b>	<b>3.1</b>	<b>3.9</b>	<b>4.7</b>

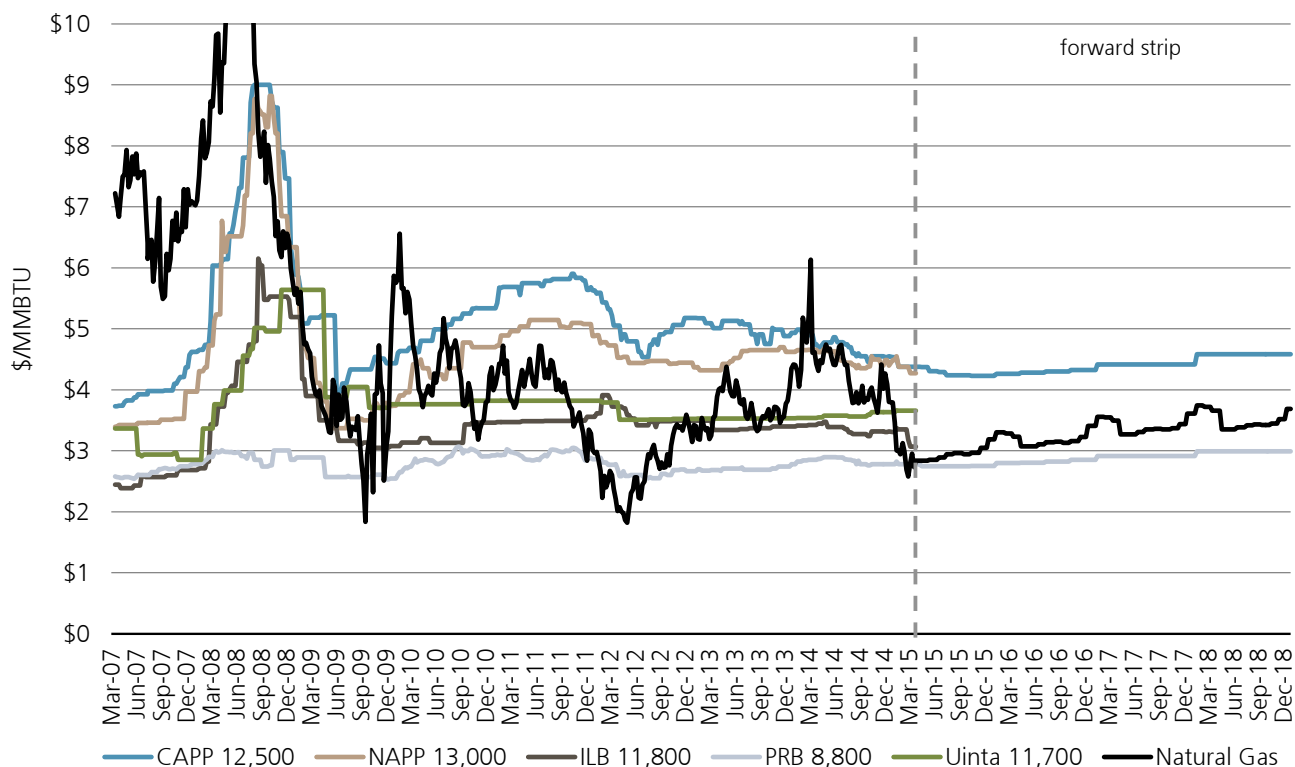
Source: UBS estimates, EIA

## Coal to gas switching and the impact on the coal market

Gas prices remain under pressure as we move from withdrawal season to injection season. While gas inventories exit the winter at 1.5Tcf, below the five year average of 1.65Tcf, our energy team sees the market as well oversupplied with the weather-adjusted supply-demand balance on track to exceed 4Tcf (above the 5yr average of 3.8Tcf) by the November 1<sup>st</sup> start of winter. As a result, natural gas prices are likely to remain weak over the summer.

Current gas prices are already below the switching level for most coal basins, as shown in Figure 16, which shows the coal prices in gas equivalent terms (assuming a 33% efficiency adjustment). Only the Powder River Basin (PRB) remains in the money, however further weakening in gas prices could threaten that as well.

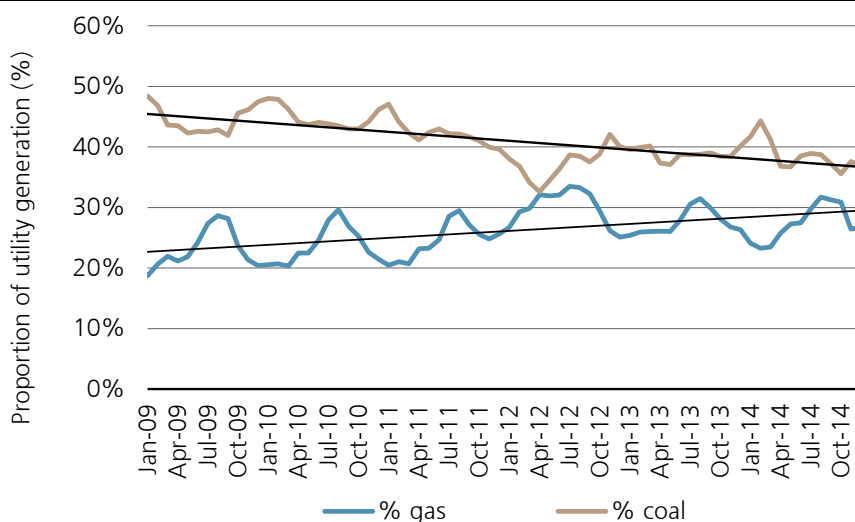
**Figure 16: US thermal coal prices by basin on Heat-Rate Adjusted Basis– only PRB technically in the money**



Source: EIA, Bloomberg, SNL Financial, UBS estimates

Coal to gas switching has been part of an ongoing trend, as shown in Figure 17, with coal losing around 10% of the generation market since the beginning of 2009.

**Figure 17: Coal versus gas utility generation market share**

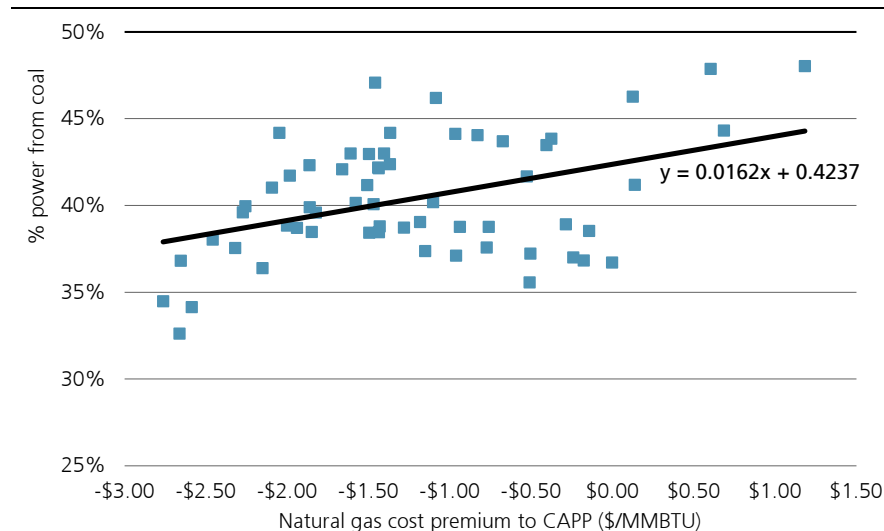


Source: EIA

The last meaningful dip occurred in 2012; 2014 saw coal burn relatively flat YOY. However, we believe the combination of low gas prices and coal plant retirements will result in considerably lower coal demand in 2015.

A simple linear switching model (Figure 18) using the highest cost CAPP basin, shows that for every \$1/MMBTU CAPP coal premium to Henry Hub, coal loses 1.62% market share to gas, or ~36Mt worth of coal demand (gas picks up ~1.38bcf/d). Spot natural gas is at a \$1.54/MMBTU discount to CAPP, versus an average of \$0.40/MMBTU discount in 2014. This \$1.14/MMBTU delta would suggest the loss of ~41Mt, before considering the impact of any coal plant retirements.

**Figure 18: Sensitivity of coal-gas price delta to utility market share**



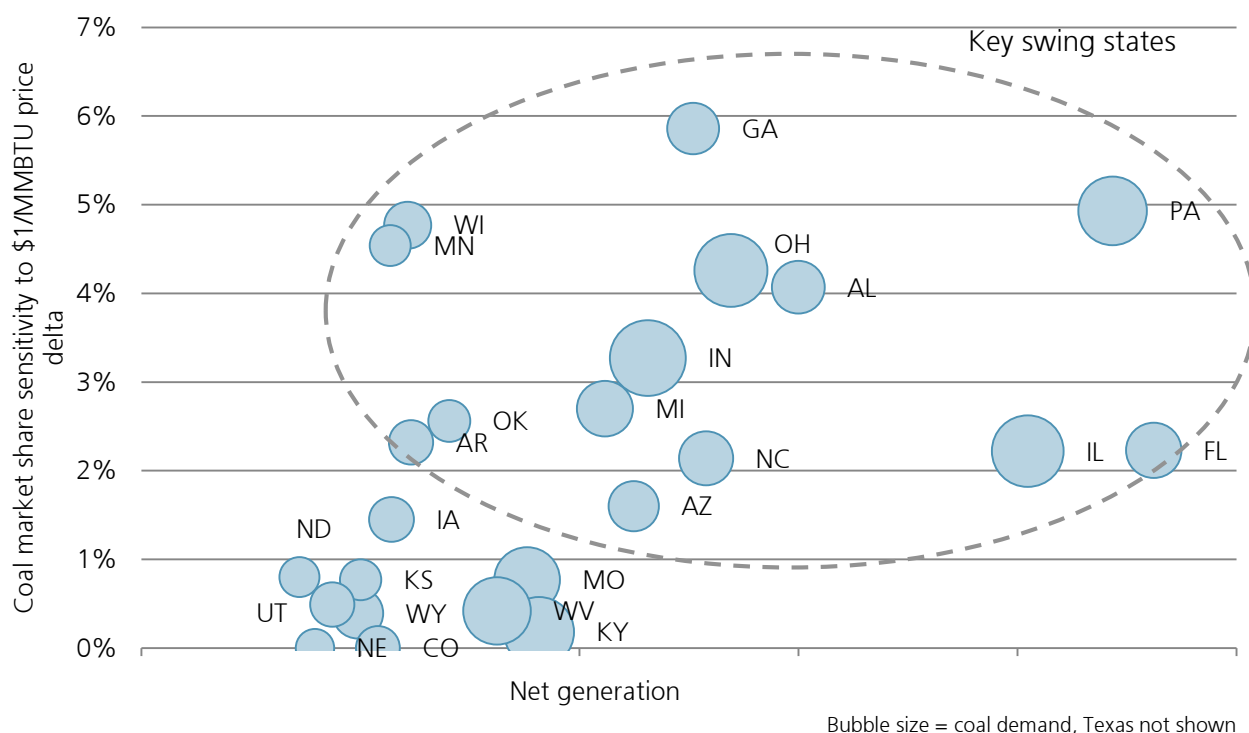
Source: UBS estimates, EIA

## What are the marginal states?

This analysis is oversimplified however. Due to the structure of the power market the relationship is actually non-linear. It also varies by region, coal type, gas basis and power dispatch needs.

To get a more granular view, we looked at historical switching by state. There is a fairly wide range, which is summarized in Figure 19.

**Figure 19: Sensitivity by state**



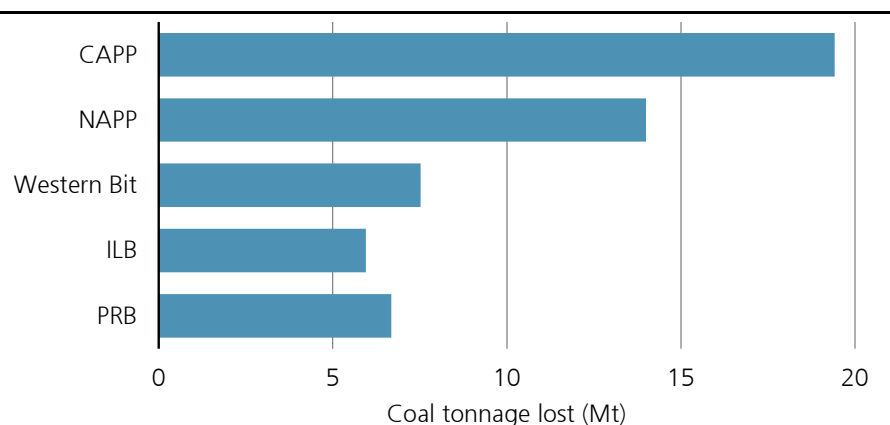
Source: UBS estimates, EIA

Note: The chart shows only the top 25 coal burning states, and Texas is not shown due to its size

This model suggests the loss of some 52Mt of coal burn from switching in 2015 at spot prices. The model uses local gas basis pricing and coal pricing from the marginal basin. We suspect this could understate the amount of NAPP lost, seeing this region as the most directly in competition with cheaper Marcellus and Utica gas (this is only region with potential for

If we look at the coal burn in each region and simply assume the marginal tons in each state are reduced, our reduction by region looks as follows.

**Figure 20: Potential switching losses by region – very weighted towards Northeast, with further downside to NAPP in our view**

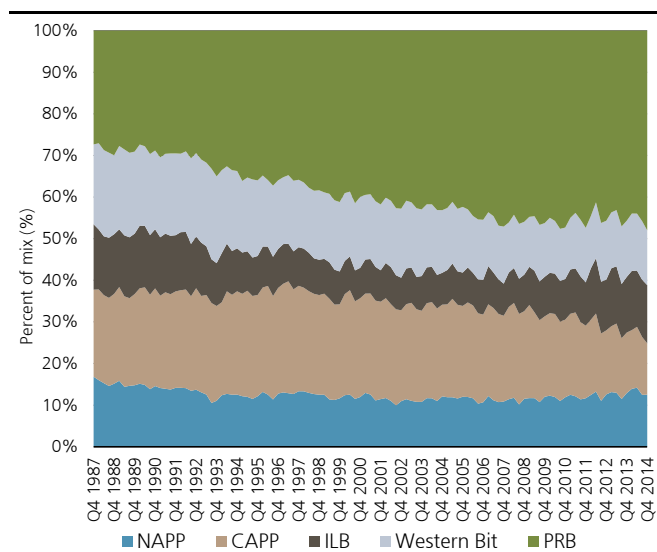


Source: UBS estimates

This model may exaggerate the CAPP tonnage loss by placing cuts squarely on that region rather than sharing cuts across different basins for each state, however it is

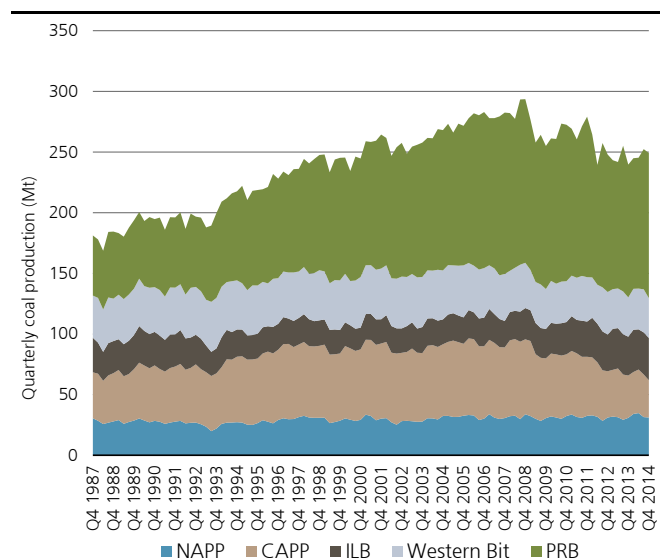
a continuance of the trend that sees CAPP losing market share to PRB and ILB, as shown in Figure 21.

**Figure 21: Coal share by basin (thermal and met)**



Source: MSHA

**Figure 22: Quarterly coal tonnage (thermal and met)**



Source: MSHA

### Northeast switching could be big: PJM is the focus.

Our call with FEP Advisors in January discussed the outlook for both the PJM and Eastern Interconnection market (a bit interchangeable at time), but the most significant takeaway is FEP's modelling suggests gas at a \$2/MMBtu level would produce expected generation to the tune of 1.5Bn MMBtu, up ~50% YoY from the 950Mn MMBtu consumed in 2014, despite the effects of the polar vortex, translating to +1.4Bcf/d YoY gas demand. Meanwhile coal appears poised to decline to ~3.5 Bn MMBtu from just under ~4Bn MMBtu last year, a ~13% YoY decline. Our initial estimates had pinned this decline, particularly for the Eastern NAPP and CAPP markets at closer to -20%, with ILB and PRB proving more resilient.

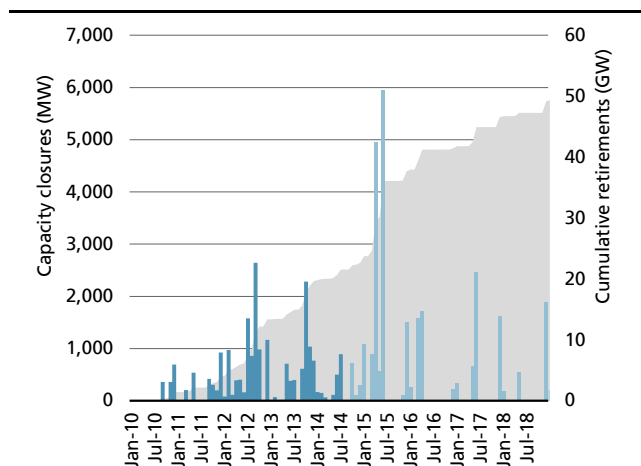
A key consideration in the PRB in particular, and ILB tons to the southeast are rail rates. We emphasize that PRB rail rates have seemingly remained moderate since 2012 – and would suspect BN (and even UP) could be positioned to offer spot discounts to enable continued volumes. Focusing on nationally-quoted Henry Hub gas prices, the key question remains at what price PRB will 'kick-in' switching (which is likely to be at prices between \$2-3/MMBtu), mostly in Texas and the Southeast markets, where the highest delivered rail costs are experienced (high 20's/ton+).

### Don't forget the retirements

All of the foregoing discussion excludes consideration of coal plant closures, which are accelerating significantly in 2015.

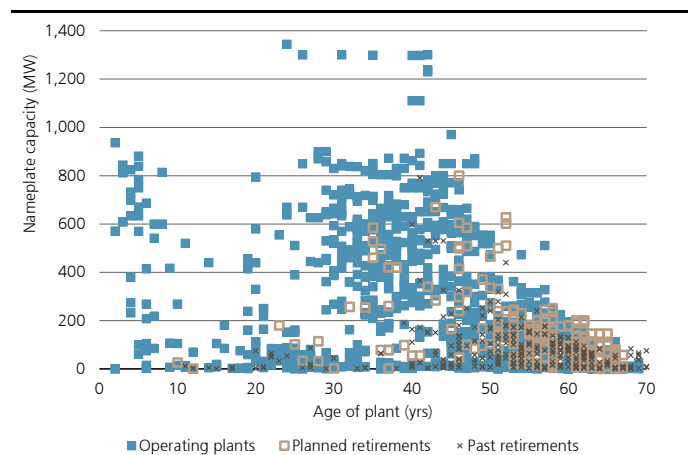
Most closures in the past have been the smallest and oldest plants, however 2015 is a big year for retirements with more than 20Mt worth of coal demand permanently shutting.

**Figure 23: Coal plant closures**



Source: EIA, UBS estimates

**Figure 24: Coal plant size and age**



Source: EIA, UBS estimates

We suspect coal-to-gas switching stats will only be further skewed upwards by the permanent retirement of coal plants impacted by the EPA's forthcoming MATS regulations in May. While the Supreme Court has recently agreed to review the issue, opening a window for the stay of specific unit retirements, we know of no utilities or IPPs moving forward with such a request. We estimate the impact of 2015 MATS retirements in PJM alone at ~0.5-1.0 bcf/d.

We expect 2015 will continue to see modest coal plant retirements, potentially even on the back of the latest coal ash regulations as waste water handling systems and other requirements from Regional Haze programs gain clarity. We still see the next major wave of coal plant retirements as being focused around the 2020 timeframe, mostly in the West.

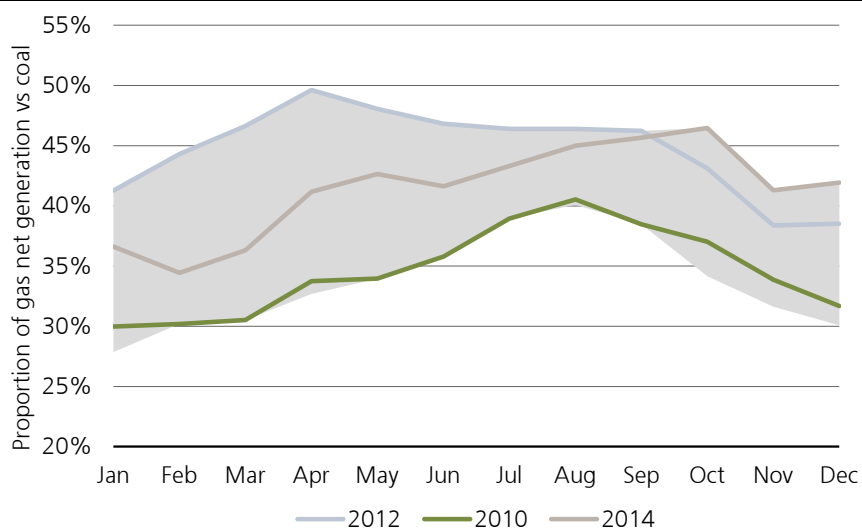
Back East, we suspect 2015 will see a continued trend towards conversion of coal plants to gas, leveraging existing steam boilers to use gas feedstocks to operate – and meet compliance with forthcoming air regulations. While GenOn has already announced much of its portfolio will convert to gas – and could yet announce incremental units, we also suspect PPL's Talen will convert units at several of its own plants to gas, too.

As abundantly illustrated by the poor performance of the coal portfolio's reliability during the polar vortex, we suspect continued limited investment in the asset class, particularly for those units closing, will only see average unit performance continue to trend down in 2015. We think ongoing reforms of winter performance metrics among other efforts will improve availability statistics of the portfolio.

Summing up the estimated closures of 20Mt and switching of 62Mt, we come close to 80Mt of thermal coal loss in 2015. This is at the high end of estimates from Peabody Energy for 60-80Mt to be lost this year.

The bigger picture of this trend is that coal is losing its role of base load provider with utilities appearing to prefer running gas as base load and buying coal as top-up. Gas finished the year with a very high share of net generation, as shown in Figure 25.

**Figure 25: Gas burn high relative to coal in late 2014**

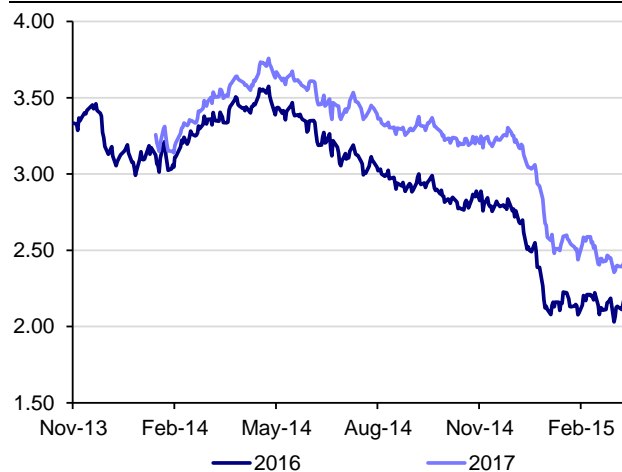


Source: EIA

### Gas switching is really a story of Northeast

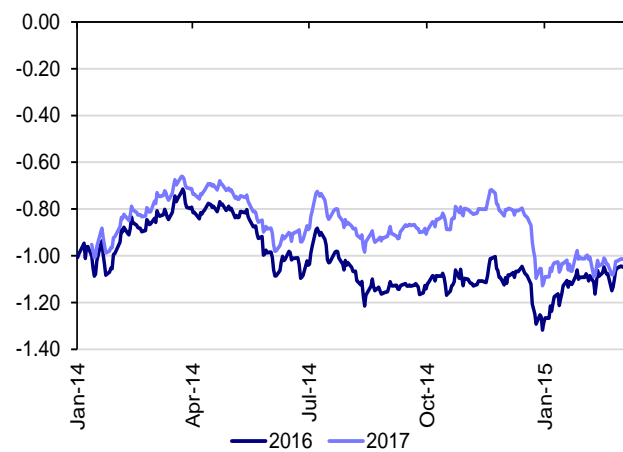
As a result, we could see more volatility in switching than we've seen in the past. Predictably, the forward curve for both Dominion-South and TETCo suggest switching will be most pronounced during the seasonal shoulders as well as summer 2015. That said, the curve is quite flat for winter 2014/2015 deliver for Dominion-South, suggesting even 1Q switching stats could be pronounced.

**Figure 26: Dominion South Forwards (\$/MMBTU)**



Source: Platts

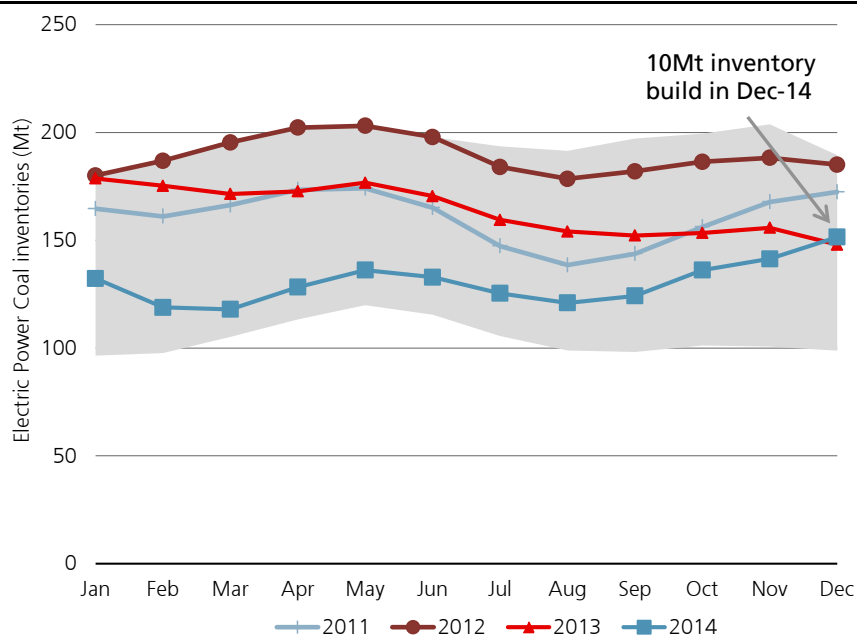
**Figure 27: Dominion South Basis (\$/MMBTU)**



Source: Platts

Two things we are paying attention to of late include utility inventories which grew at a surprising rate in December, and rail shipping rates, which have fallen considerably in February/March.

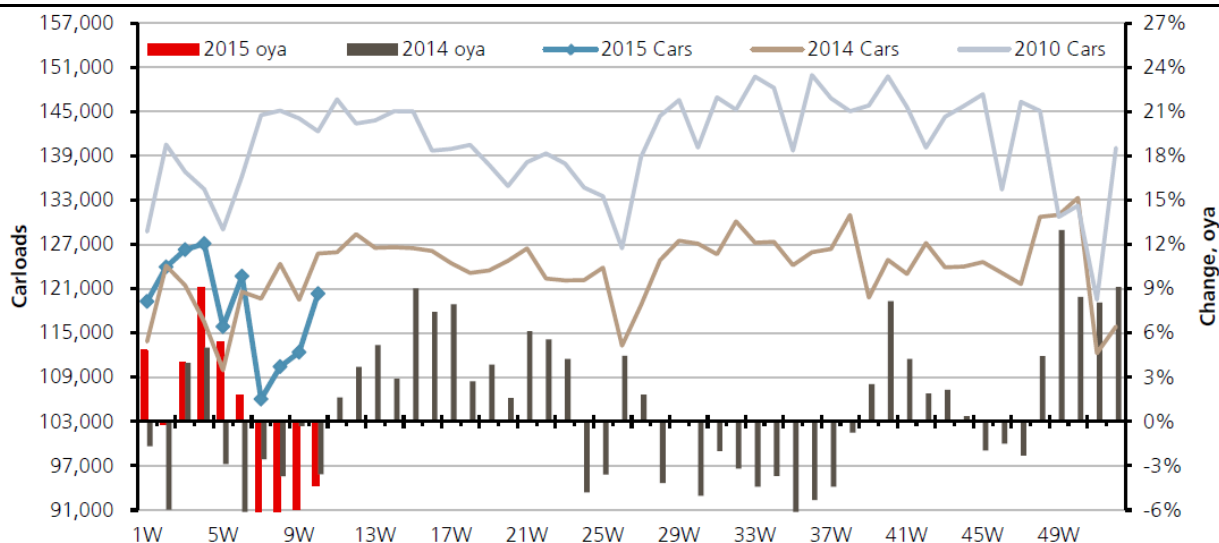
**Figure 28: Surprisingly large December inventory build**



Source: EIA, UBS estimates

Our US coal analyst recently reduced Q1/15 rail EPS estimates due to the drop in coal volumes.

**Figure 29: Rail industry traffic - coal**



Source: Association of American Railroads (AAR), UBS analysis

Note: Given 53 weeks in 2014, "2014 cars" is accelerated by one week for calendar date comparison (ie. 2W14 to 1W15)

If rail coal volumes remain weak, it could be indicative of a higher degree of switching than previously expected.

The last big drop in utility coal burn occurred in 2012 when volumes were down by over 100Mt YOY. We think this would be hard to beat but if we saw gas pricing fall to sub \$2/MMBTU, we could come close. In 2012 the coal market was offered some relief through export markets, which surged by 20Mt. However, we think this will be hard to achieve in 2015 with current seaborne pricing much weaker, netbacks are unattractive for this option.



In an upside case, we might see utility coal burn down by only ~10Mt YOY as a higher gas price drives improved coal burn over 2014, offset slightly by coal plant retirements.

## Coal prices could be close to offering a floor

Even allowing for meaningful switching, coal still provides around a third of net power production and therefore the miners need sufficient cash flow to fund costs and maintenance capex at a minimum. These conditions have not been in place for some time. Even in the low cost PRB over the past 5 years margins had already been contracting as haul distances continue to grow and strip ratios increase as mining moves west. Miners are scaling back capex and reducing contract levels at the prices. We believe prolonged distressed coal prices could put future coal production in jeopardy.

While coal prices could get worse before they get better, we feel we are nearing the bottom.

Our price forecast is shown in Figure 30. We note our energy team's gas forecast is predicated on only a +1.4 bcf/d increase in electric consumption up to ~24 bcf/d (readily achievable at current prices); this would be equivalent to overall coal switching of only 40Mt.

**Figure 30: UBS coal price forecast**

	2013	2014	Q1 2015	Q2 2015	Q3 2015	Q4 2015	2015	2016	2017	2018
Henry Hub natural gas (\$/MMBTU)	\$3.73	\$4.35	\$3.00	\$3.15	\$3.25	\$3.50	\$3.23	\$3.75	\$4.00	\$4.50
WTI (\$/bbl)	\$98	\$93	\$48	\$48	\$50	\$50	\$49	\$63	\$75	\$85
Newcastle thermal (6300 GAR) (\$/mt)	\$85	\$70	\$65	\$64	\$63	\$64	\$64	\$66	\$75	\$84
Richards Bay thermal (6000 NAR) (\$/mt)	\$80	\$73	\$65	\$64	\$63	\$64	\$64	\$66	\$75	\$84
API2 thermal (\$/mt)	\$82	\$73	\$65	\$64	\$63	\$64	\$64	\$66	\$75	\$84
Hard Coking Coal (\$/mt)	\$159	\$126	\$117	\$117	\$120	\$120	\$119	\$128	\$136	\$143
CAPP 12000	\$56	\$58	\$48	\$49	\$48	\$49	\$49	\$51	\$58	\$65
CAPP 12500 1.2lb SO2	\$66	\$60	\$54	\$54	\$53	\$54	\$54	\$56	\$64	\$71
PRB 8800	\$10.44	\$11.80	\$11.14	\$11.00	\$11.00	\$11.00	\$11.03	\$11.50	\$12.85	\$13.85
PRB 8400	\$9.53	\$10.02	\$8.75	\$9.35	\$9.35	\$9.35	\$9.20	\$9.78	\$10.92	\$11.77
NAPP - 13000 <3lb SO2	\$66	\$67	\$64	\$59	\$58	\$59	\$60	\$61	\$69	\$78
CoAJT 11,700 0.8lb SO2	\$36	\$37	\$38	\$39	\$38	\$39	\$38	\$40	\$45	\$51
ILB 11,500	\$46	\$46	\$45	\$43	\$42	\$43	\$43	\$44	\$50	\$56

Source: UBS estimates

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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 for 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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Neutral	FSR is between -6% and 6% of the MRA.	42%	32%
Sell	FSR is > 6% below the MRA.	11%	21%
Short-Term Rating	Definition	Coverage <sup>3</sup>	IB Services <sup>4</sup>
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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 December 2014.

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<b>American Electric Power, Inc.</b> <sup>6b, 7, 16</sup>	AEP.N	Neutral	N/A	US\$57.70	20 Mar 2015
<b>Arch Coal, Inc.</b> <sup>6a, 16, 20</sup>	ACI.N	Sell (CBE)	N/A	US\$0.90	20 Mar 2015
<b>Calpine Corporation</b> <sup>2, 4, 5, 6a, 16</sup>	CPN.N	Neutral	N/A	US\$22.03	20 Mar 2015
<b>CSX Corporation</b> <sup>2, 4, 6a, 16</sup>	CSX.N	Neutral	N/A	US\$35.16	20 Mar 2015
<b>Dominion Resources</b> <sup>2, 4, 6a, 6b, 6c, 7, 16</sup>	D.N	Buy	N/A	US\$72.19	20 Mar 2015
<b>Duke Energy</b> <sup>2, 4, 5, 6a, 6c, 7, 16</sup>	DUK.N	Neutral	N/A	US\$76.67	20 Mar 2015
<b>Dynegy, Inc.</b> <sup>2, 4, 5, 6a, 16</sup>	DYN.N	Buy	N/A	US\$28.08	20 Mar 2015
<b>FirstEnergy Corp.</b> <sup>16</sup>	FE.N	Sell	N/A	US\$36.38	20 Mar 2015
<b>Norfolk Southern Corporation</b> <sup>16</sup>	NSC.N	Neutral	N/A	US\$110.43	20 Mar 2015
<b>NRG Energy Inc.</b> <sup>16</sup>	NRG.N	Buy	N/A	US\$25.45	20 Mar 2015
<b>PG&amp;E Corporation</b> <sup>16</sup>	PCG.N	Neutral	N/A	US\$53.96	20 Mar 2015
<b>PPL Corporation</b> <sup>2, 4, 5, 6a, 6c, 7, 16</sup>	PPL.N	Neutral	N/A	US\$34.36	20 Mar 2015
<b>Union Pacific Corporation</b> <sup>16</sup>	UNP.N	Buy	N/A	US\$117.45	20 Mar 2015

Source: UBS. All prices as of local market close.

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