



## Coal Outlook 2014

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Rail Energy Transportation Advisory Committee Meeting

March 6, 2014





## Session Overview

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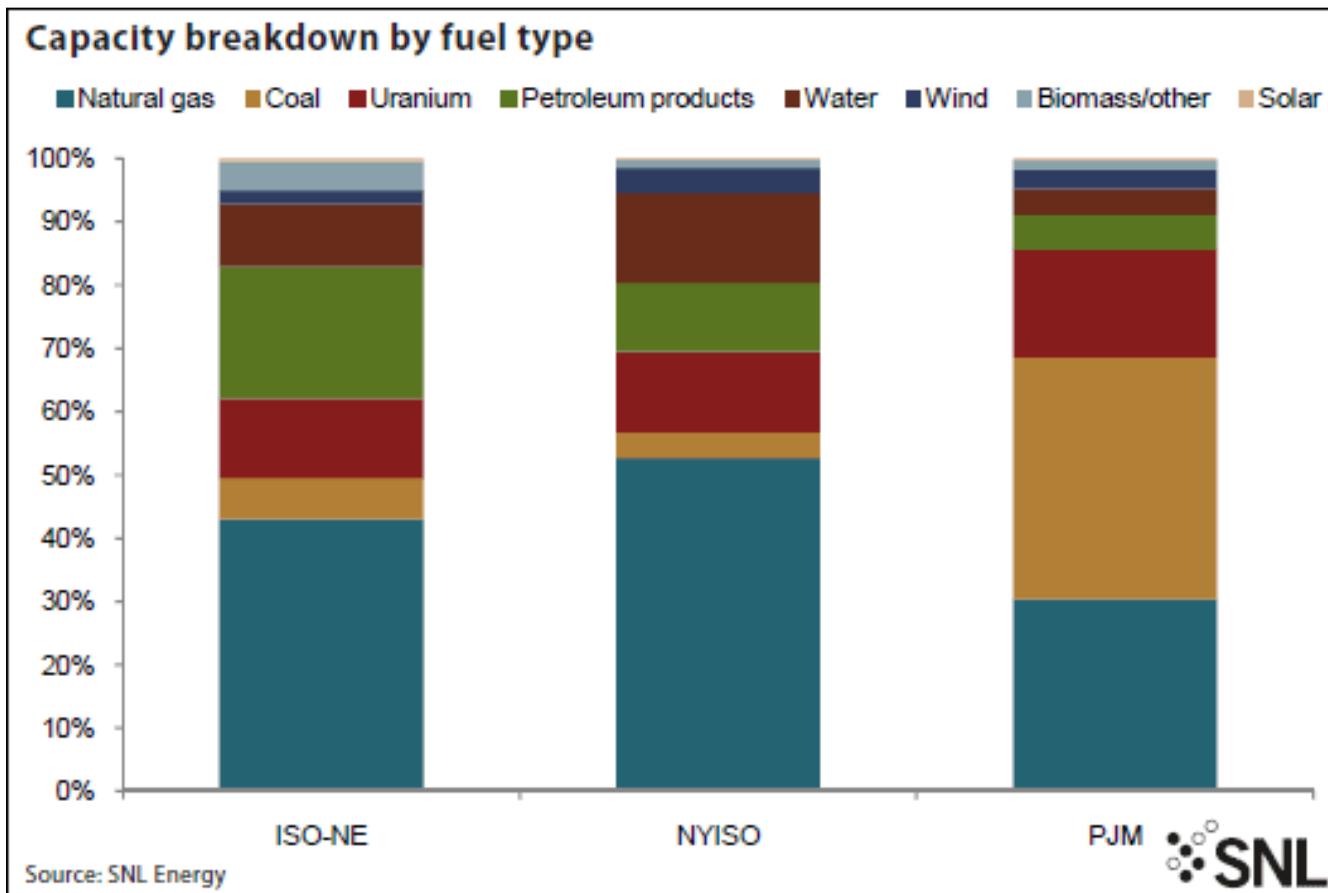
- ❖ A frosty winter – impacts to the market
- ❖ Domestic outlook 2014 – drivers of production and price
- ❖ Coal plant retirements – the real impact of 2015
- ❖ Export opportunities – where does coal have headroom?
- ❖ Pacific Northwest coal terminals – the latest
- ❖ Questions



## Coal and Natural Gas Markets – Recent Developments



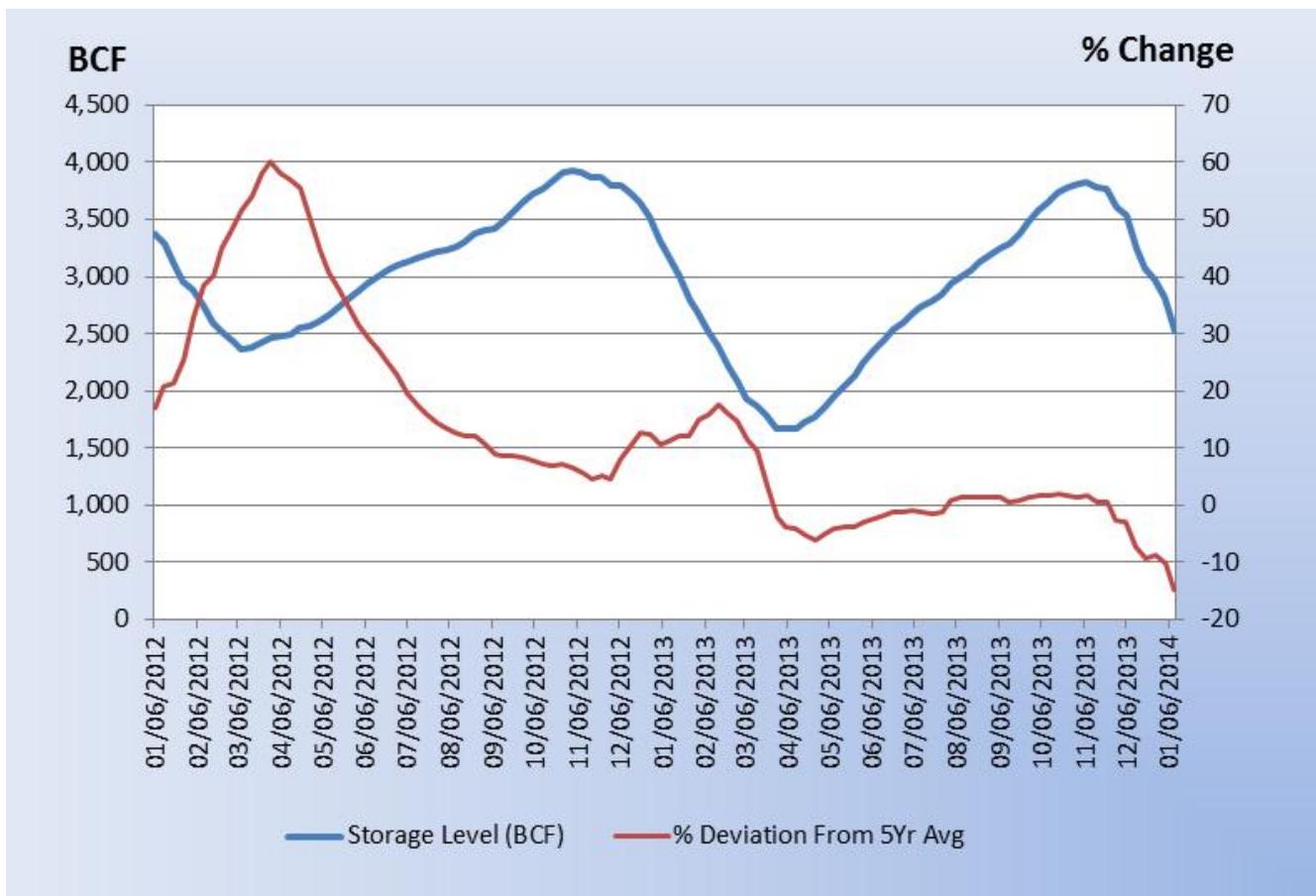
## Natural gas as a fuel for power generation taking on increased importance



- ❖ In New England, natural gas-fired generation accounts for 43% of the region's winter capacity. In New York, the total is 53%
- ❖ In PJM, gas accounts for about 30% of the region's total winter capacity, compared to 38% held by coal



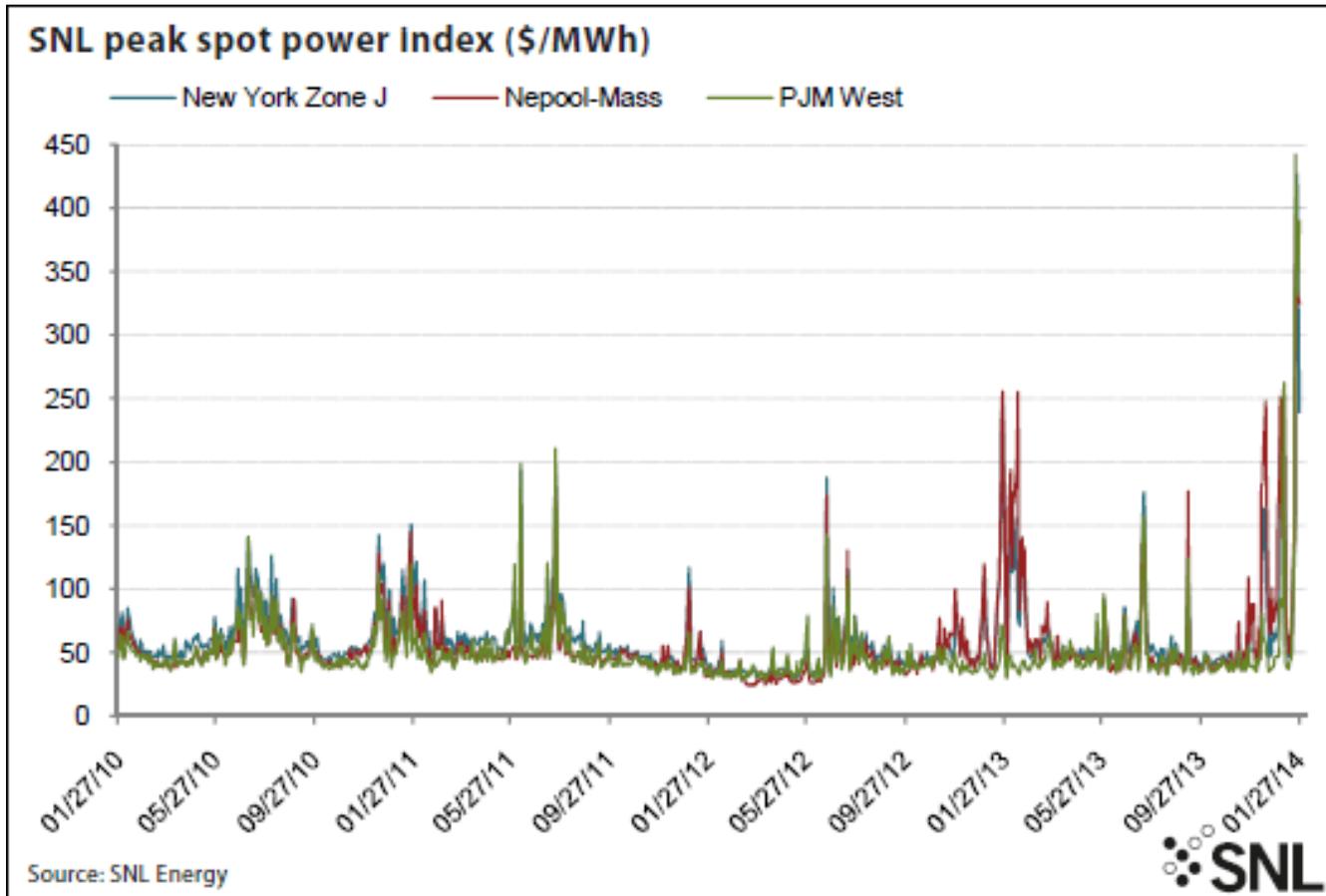
## Historic storage deficits lend momentum to coal demand



- ❖ After historic surpluses of Winter '11-12, producer cutbacks in dry gas and a strong Winter '12-13 close balanced markets this past year
- ❖ Early arriving winter this year has tested the shale supply paradigm



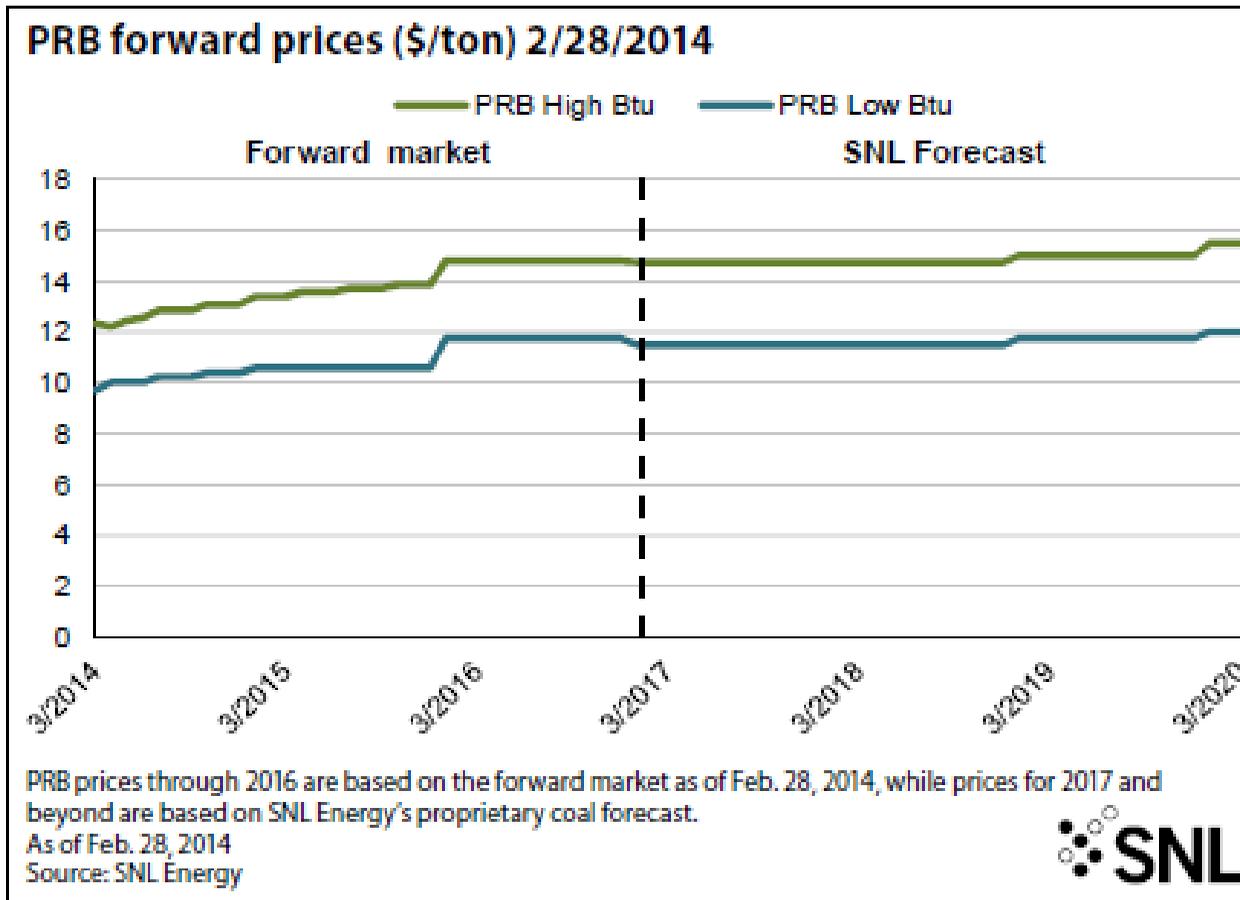
## Gas reliance under renewed scrutiny after epic power price spikes



- ❖ In New England, spot power prices at the Mass hub for Jan. 23 reached \$395/MWh. New York Zone J spot prices for Jan. 24 reached \$426.75/MWh
- ❖ In PJM, Western hub prices for Jan. 22 were pegged as high as \$442/MWh



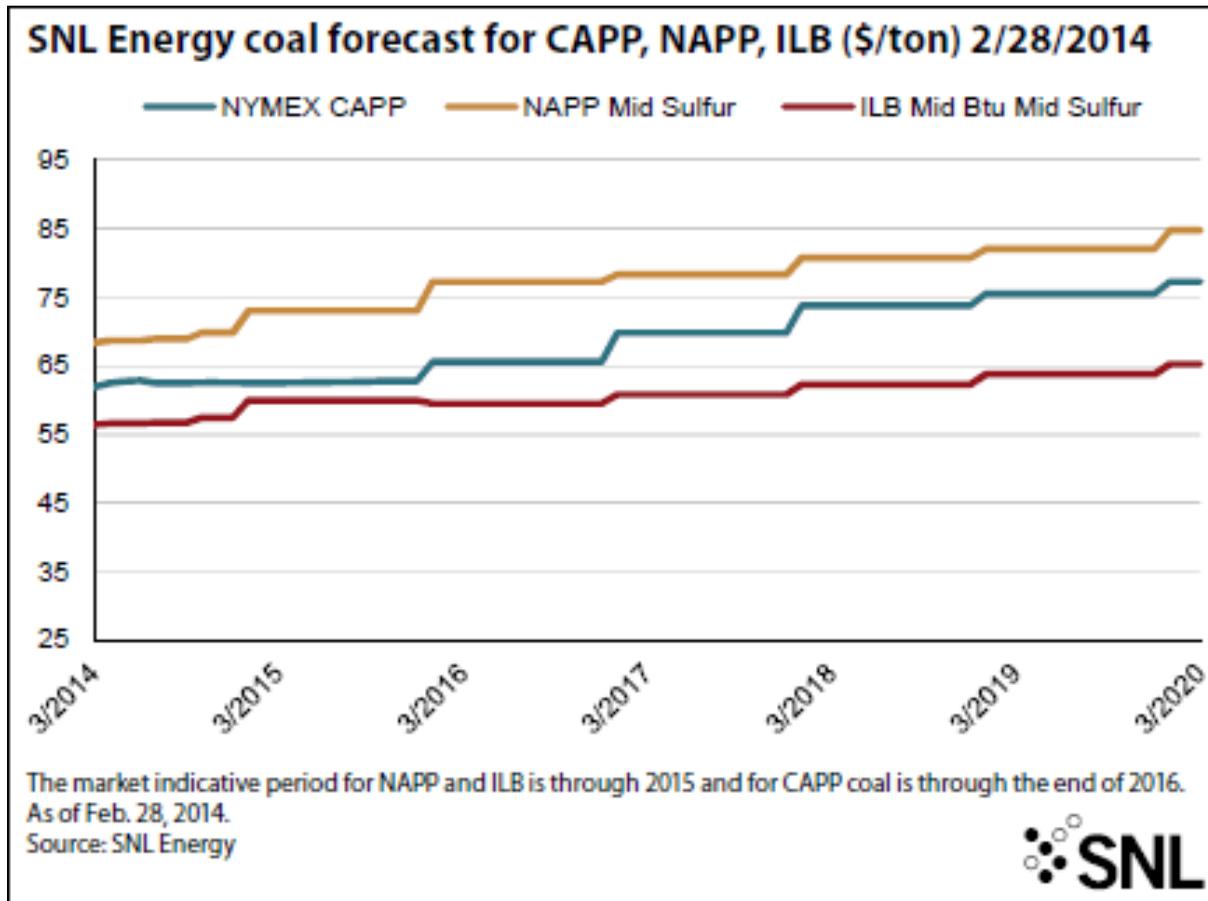
## March coal forecast



- ❖ Pricing picture looks better for producers than it has in nearly two years
- ❖ PRB 8,800 Btu/lb firming above \$13/ton over the next two years as supply constraints and competitiveness against natural gas boost demand compared to recent history



## March coal forecast



- ❖ Ongoing improved economics vs. natural gas has allowed price growth in spot CAPP coal and has supported improved coal generation levels
- ❖ International growth opportunities limited



## Estimated price floors for coal/gas switching

	Northern App	Central App	Ill. Basin	Rockies	PRB
Avg. Btu/lb	13,000	12,000	11,500	11,500	8,800
Sulfur (%)	2.00%	1.67%	2.50%	0.60%	0.33%
SO <sub>2</sub> (Lb/MMBtu)	3.1	2.8	4.3	1.0	0.8
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Coal Market Price*	68.25	51.00	56.28	35.50	11.79
Estimated shipping costs (\$/Ton)**	18.00	25.00	10.00	22.50	22.50
Cost of Coal Delivered	86.25	76.00	66.28	58.00	34.29
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<b>Sulfur Dioxide (SO<sub>2</sub>)</b>					
Allowance Price per Ton of SO <sub>2</sub>	10.00	10.00	10.00	10.00	10.00
Cost of SO <sub>2</sub> per Ton of Coal	0.40	0.33	0.50	0.12	0.07
Cost of SO <sub>2</sub> per MMBTU	0.015	0.014	0.022	0.005	0.004
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MMBtu per Ton of Coal	26.00	24.00	23.00	23.00	17.60
MWh @ selected Heat Rate	2.60	2.40	2.30	2.30	1.76
Total Coal Cost per MMBtu Before Nox	3.33	3.18	2.90	2.53	1.95
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<b>Nitrogen Oxide (NO<sub>x</sub>)</b>					
NO <sub>x</sub> Rate of marginal coal generation (Lb/MMBTU)	0.15	0.15	0.15	0.15	0.15
NO <sub>x</sub> allowance price (\$/Ton)	50.00	50.00	50.00	50.00	50.00
Cost of NO <sub>x</sub> per Ton of Coal (\$/Ton)	0.05	0.05	0.04	0.04	0.03
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Cost of NO <sub>x</sub> per MMBTU	0.004	0.004	0.004	0.004	0.004
Total/all-in cost of coal (\$/ton)	86.70	76.38	66.82	58.16	34.38
Estimated Additional Plant O&M (\$/MWh)	1.50	1.50	1.50	1.50	1.50
Total marginal cost per MWh from Coal (\$/MWh)	34.85	33.32	30.55	26.79	21.04
Total Coal Cost per MMBtu (\$/MMBtu)	3.34	3.18	2.91	2.53	1.96
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Efficiency adjustment vs. CCGT power plant (%)	33%	33%	33%	33%	33%
<b>Floor on natural gas (\$/MMBtu) - efficiency adjusted</b>	<b>4.60</b>	<b>4.40</b>	<b>4.03</b>	<b>3.52</b>	<b>2.76</b>

Source: SNL Energy

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## Coal Fleet – Demand Impacts of Environmental Regulations

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## Coal Fleet Retirements -- has the storm passed yet?

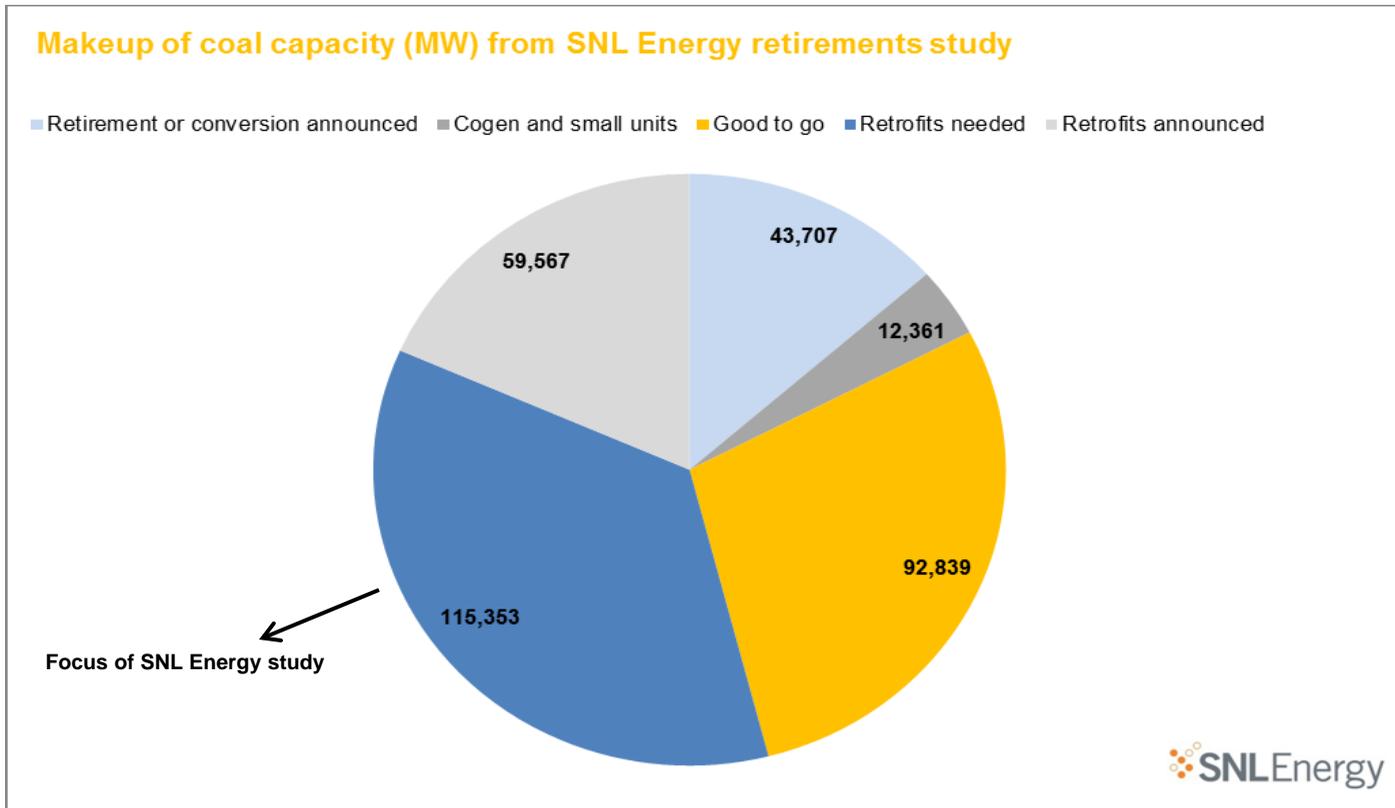
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- ❖ Fleet overview and regulatory constraints
- ❖ Market drivers of coal generating fleet
- ❖ Current and incremental retirement estimates
- ❖ Market impacts – reserve margins and coal demand



# Makeup of coal fleet

- ❖ Of ~320 GW fleet, 93 GW appear fully MATS compliant
- ❖ 60 GW have announced retrofit plans, 44 GW announced to retire/convert
- ❖ 115 GW need some retrofits and have no announced compliance plans





## Makeup of announced retirements

- ❖ 44 GW announced to retire/convert in 2012-2021
- ❖ Units are smaller in size with lower average utilization
- ❖ Generated ~4% of the nation's electricity in 2011

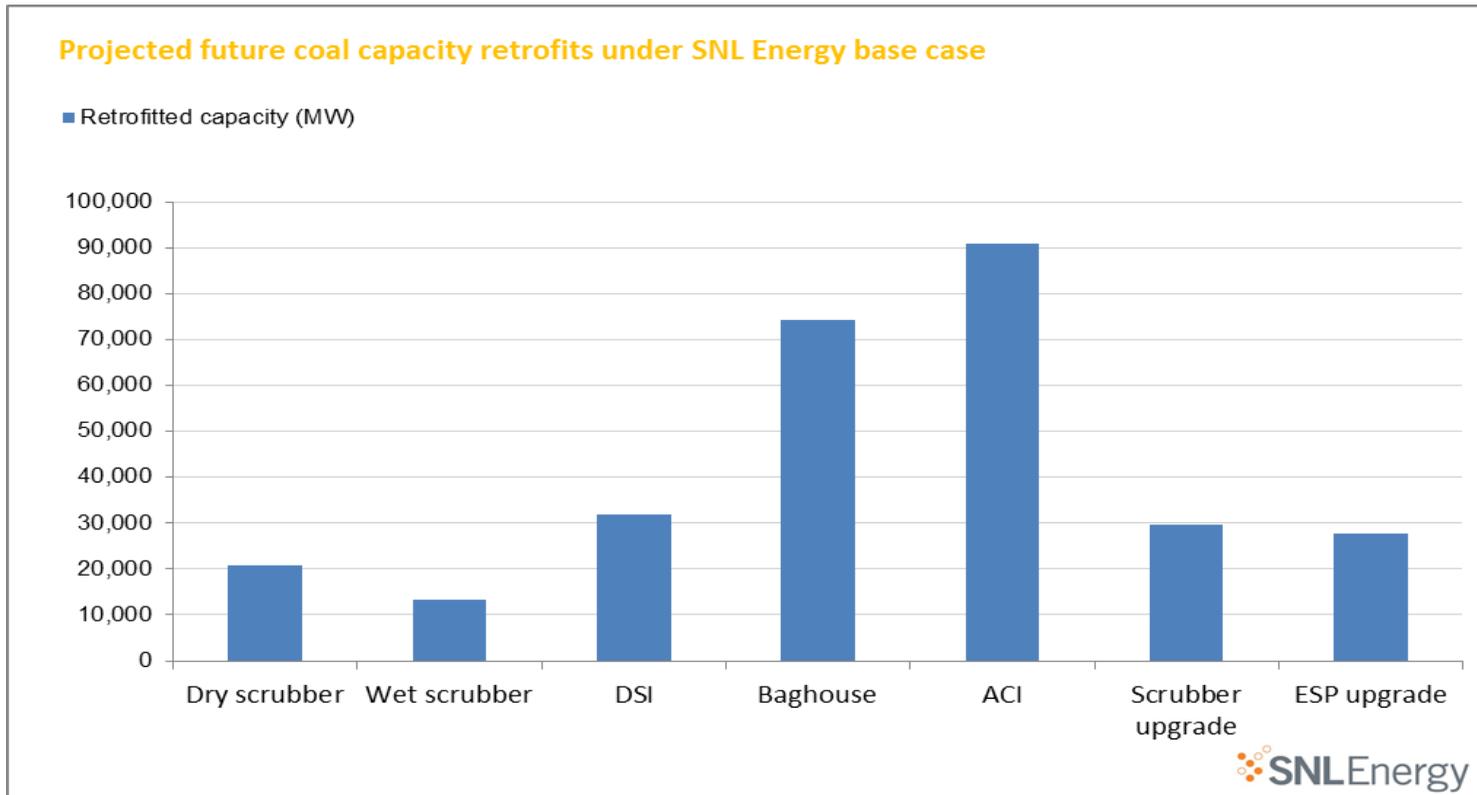
### Vital stats for announced coal retirements/conversions (2012-2021) in select regions

Region	2011 capacity factor (%)	2011 net gen (MWh)	2011 avg. heat rate (Btu/kWh)	Avg. age at retirement	Average size (MW)	Capacity retiring (MW)
MISO	38.00	6,775,252	11,458	56	61	2,069
PJM	39.25	73,175,560	10,488	53	175	21,380
SOU	43.79	17,689,676	10,285	50	210	4,612
AZNMSN	80.73	5,765,347	10,940	40	408	815
SPP	80.42	7,086,773	10,330	35	335	1,006
VACAR	30.06	10,814,426	10,865	54	111	4,116
CENTRL	37.20	10,086,700	11,419	58	129	3,095
<b>All regions</b>	<b>42.98</b>	<b>163,854,731</b>	<b>10,636</b>	<b>52</b>	<b>150</b>	<b>43,707</b>



# Projected retrofits under SNL Energy base case

- ❖ 97 GW appear economic to retrofit
- ❖ 32 GW of DSI, 13 GW wet scrubbers, 21 GW of dry scrubbers
- ❖ ~90 GW install activated carbon injection for mercury control
- ❖ 75 GW of fabric filters installed + 28 GW upgrade ESP





## Regulations facing coal plants

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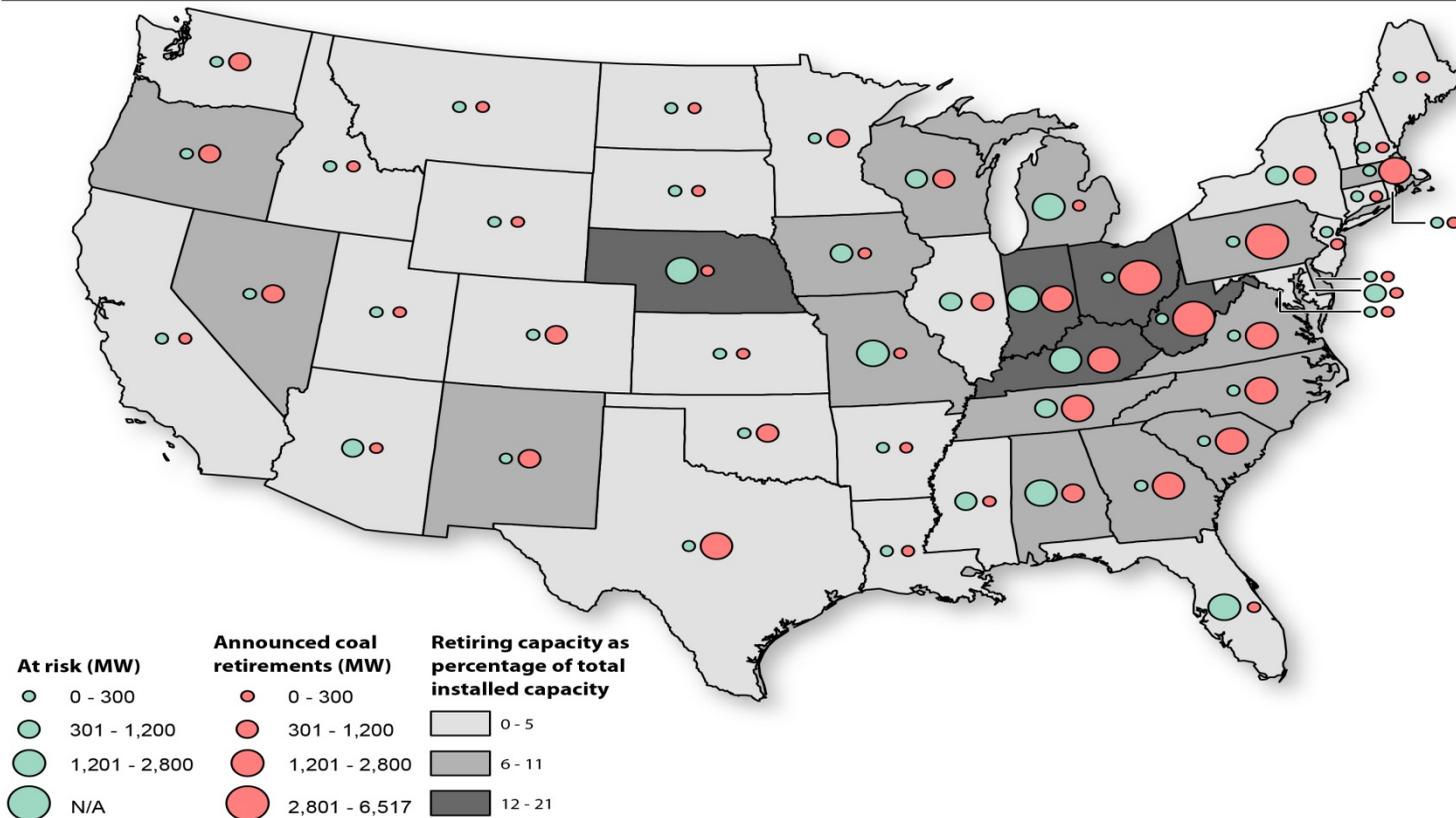
- ❖ **EPA MATS-** Control of acid gases, particulate and mercury aerosols (2015 compliance)
- ❖ **CAIR/CSAPR-** Control of NO<sub>x</sub> and SO<sub>2</sub>, CAIR currently in place and CSAPR return uncertain
- ❖ **Regional haze rule-** Uncertain outcome after CSAPR stay
- ❖ **Coal ash and water “effluent guidelines”-** Update to wastewater guidelines and coal ash disposal rules (final rules likely in 2014)
- ❖ **316(b)-**Cooling water intake structures rule (not finalized, expected in 2014)
- ❖ **Carbon regulation-** Becoming a bigger issue, but mostly in regions where coal is not prominent (California, Northeast)





# Map of at-risk coal retirements vs. announced retirements

## U.S. summary of announced coal retirements and capacity at risk of retiring



States are shaded by total at-risk and announced coal retirements (2012-2021) as a percentage of the state's total 2012 installed capacity (adjusted for availability)  
As of Sep. 30, 2013  
Source: SNL Energy  
Map credit: Whit Varner



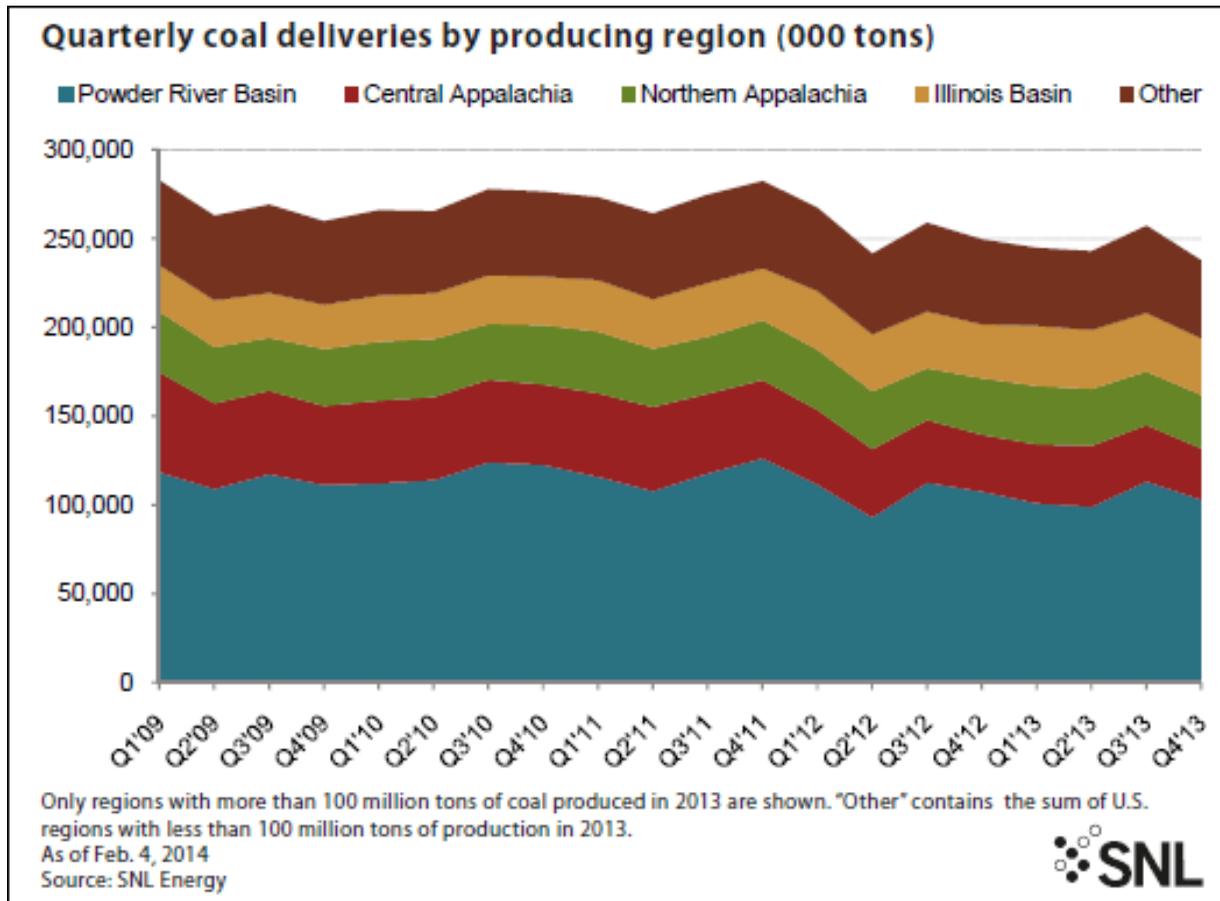
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## Coal Production and Price – Basin Overview

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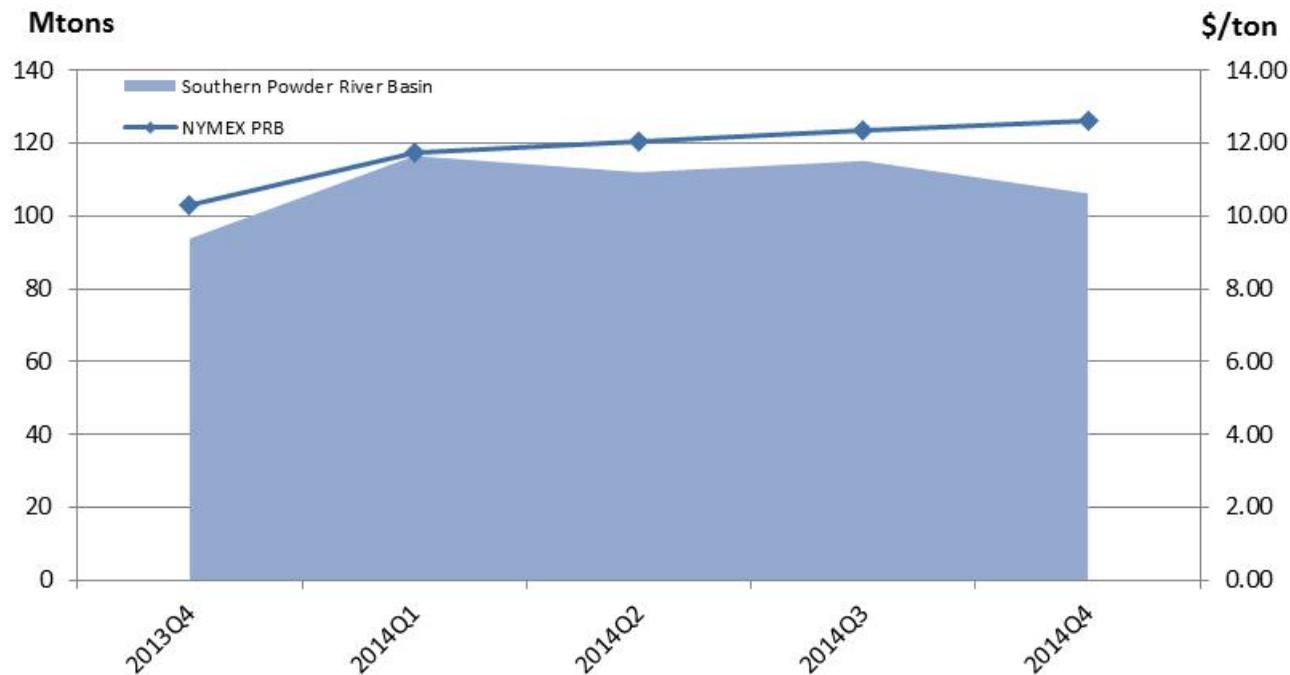
## Illinois Basin growth not enough to stop US coal production slide



- ❖ Total U.S. coal output in 2013 was down more than 3% compared to 2012 and nearly 9% below 2009 levels
- ❖ Illinois Basin production surpasses Central App; Northern App is closing quickly on Central App



## 2014 Production & Price Outlook – Southern Powder River Basin

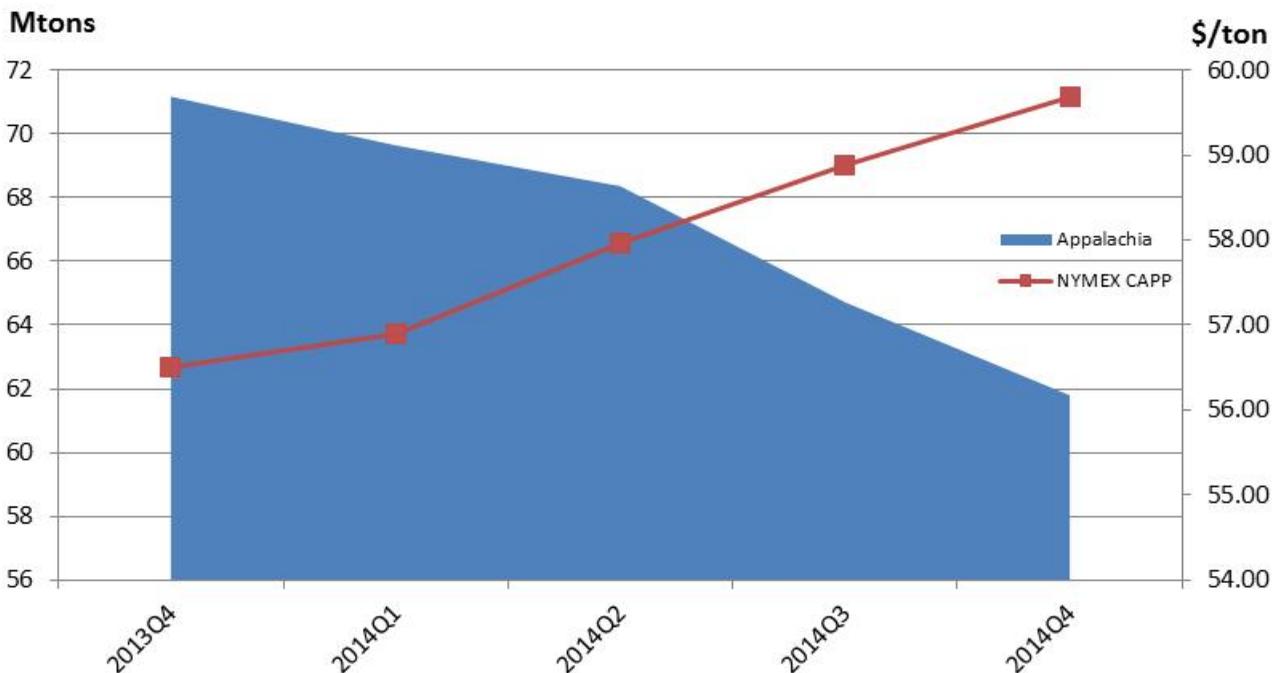


Source: SNL Energy

- ❖ Production growth driven by tight inventories and reverse switching, but limited by transportation issues
- ❖ Some market share growth versus Appalachia
- ❖ No expected contribution from export growth



## 2014 Production & Price Outlook – Appalachian Basin

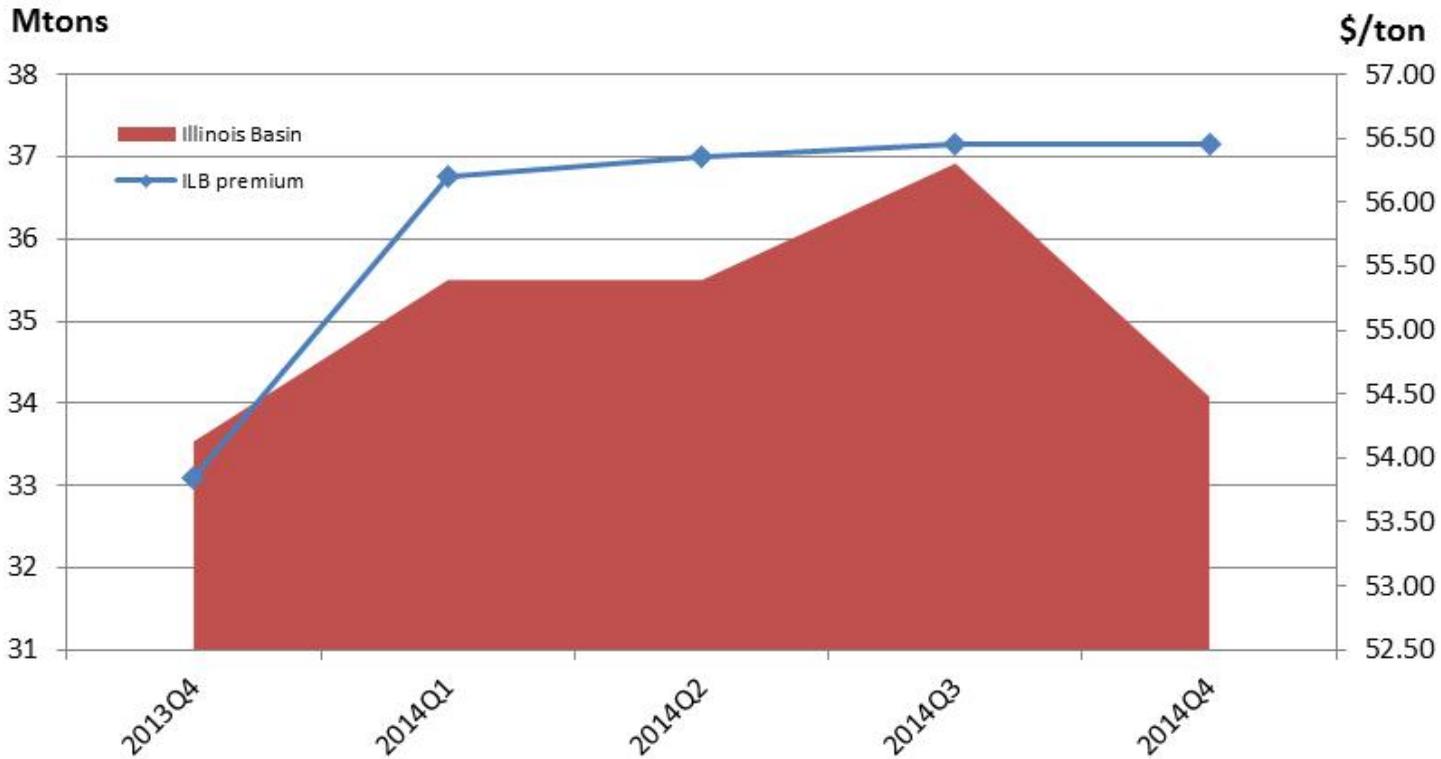


Source: SNL Energy

- ❖ Northern App holding steady, but Central and Southern App are in decline
- ❖ 2013 decline of 5% expected to increase to 6%, but 1H volumes expected reasonably healthy
- ❖ Price growth expected behind firmer natural gas and export opportunities



## 2014 Production & Price Outlook – Illinois Basin

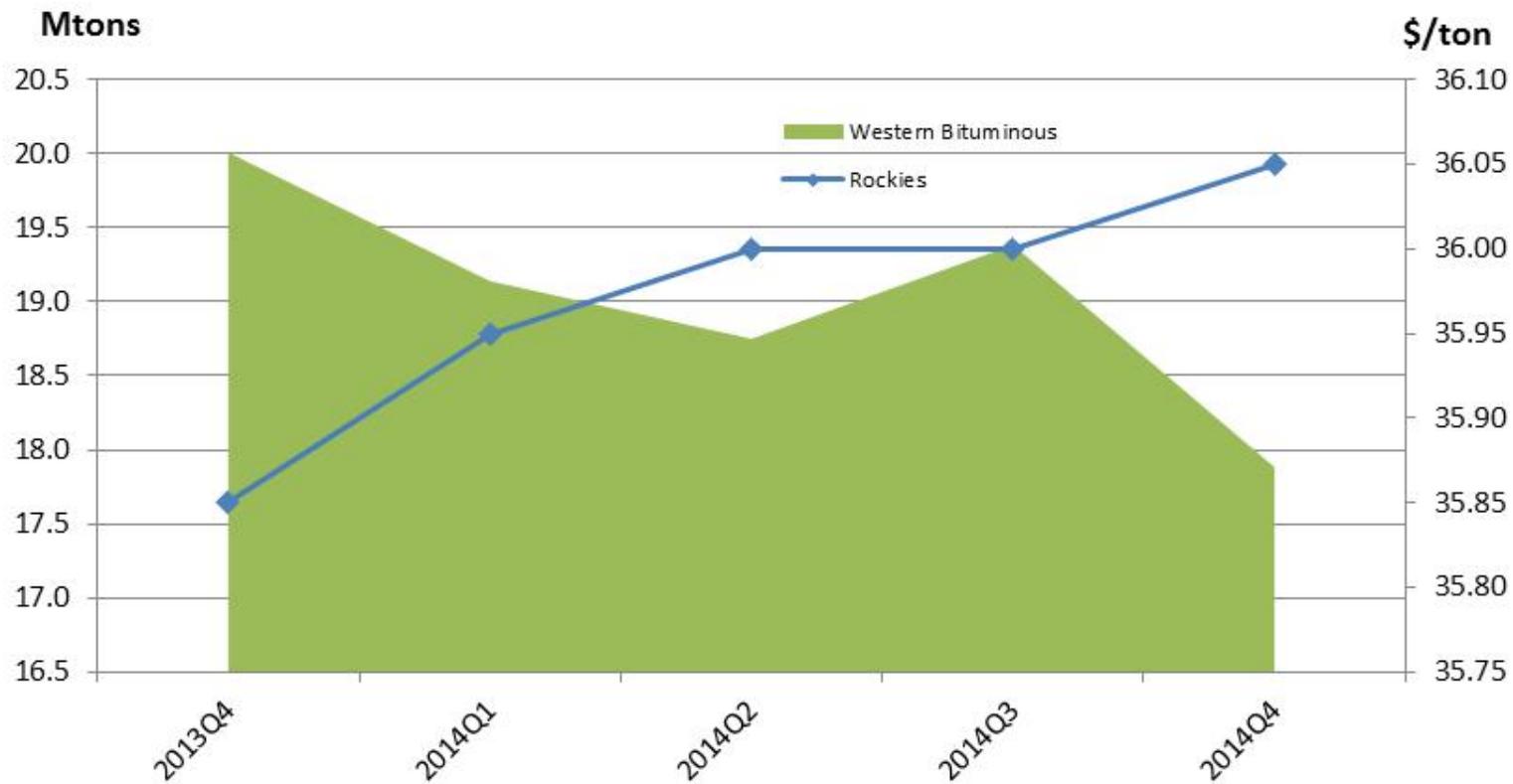


Source: SNL Energy

- ❖ Production growth of 6% expected for 2014 behind reverse switching and capture of Appalachian market share
- ❖ 2013 Q4 price rally may indicate broader integration of Illinois Basin coal trade into bituminous markets
- ❖ May be able to sustain production growth in the face of coal plant retirements



## 2014 Production & Price Outlook – Western Bituminous

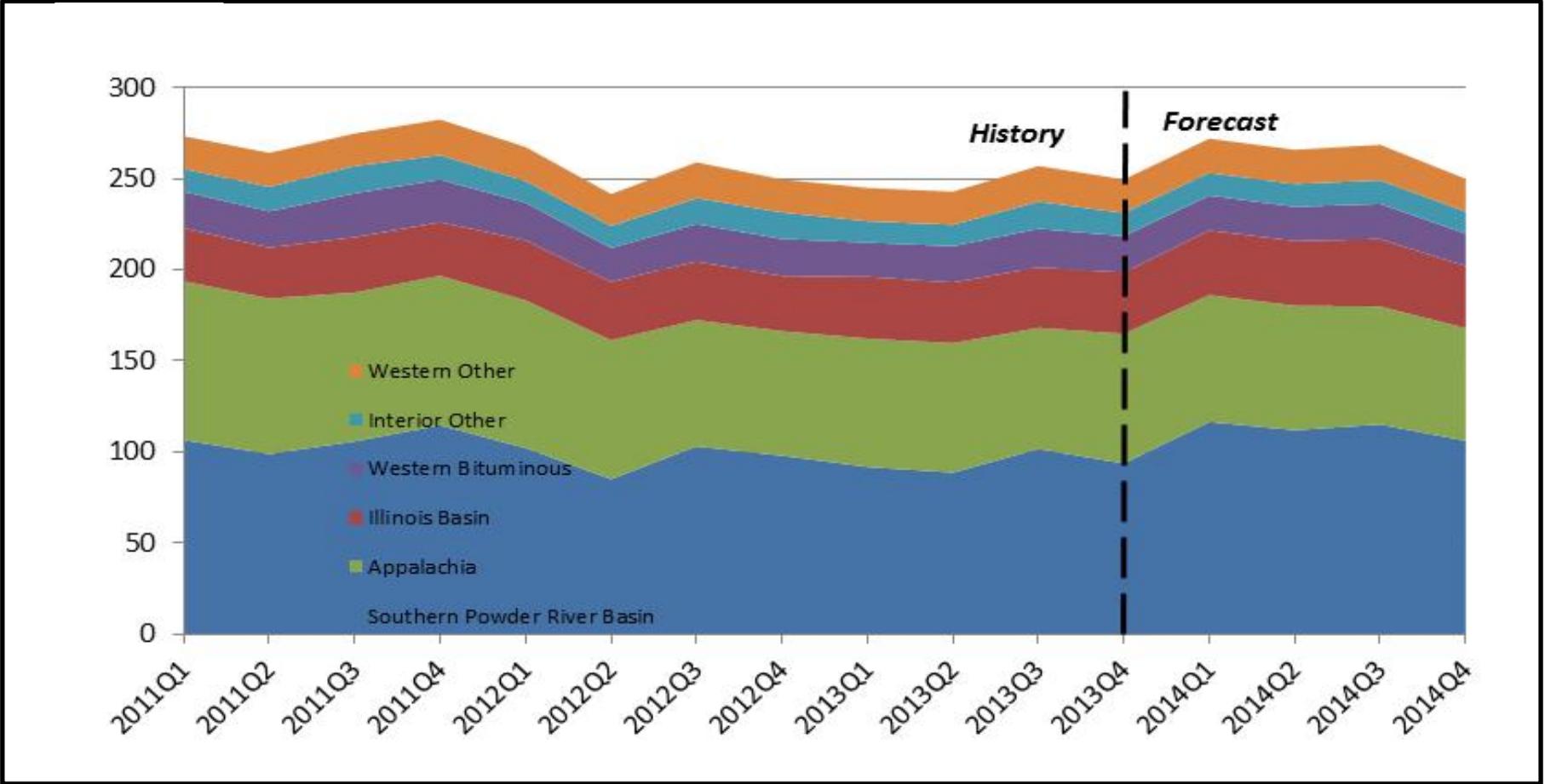


Source: SNL Energy

- ❖ Currently constrained by weak export market, tepid demand for Colorado coal
- ❖ Longwall sealed at large Elk Creek mine



# Recent coal production history and 2014 production forecast



Source: SNL Energy

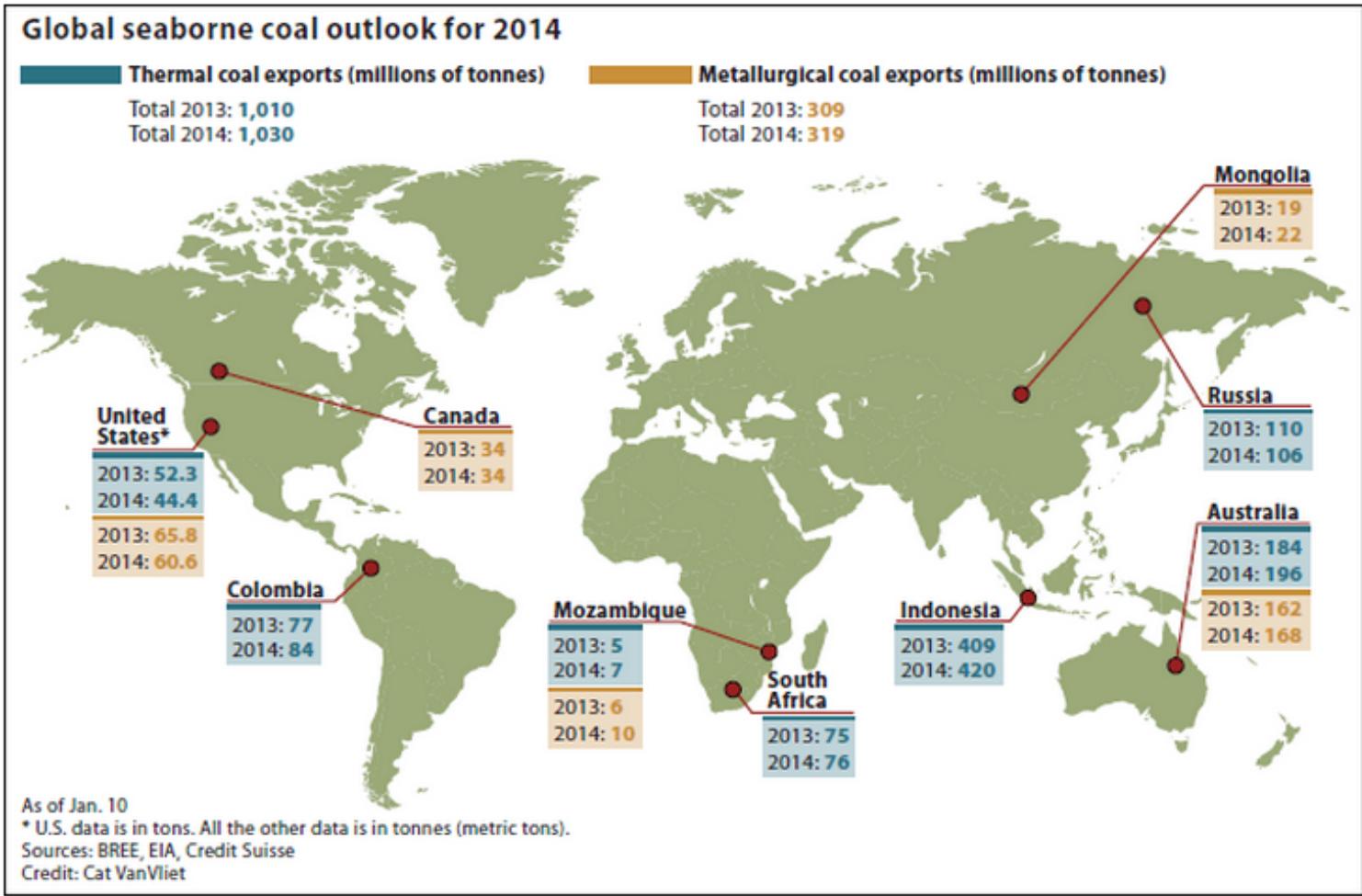
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## Incremental Export Opportunities for 2014

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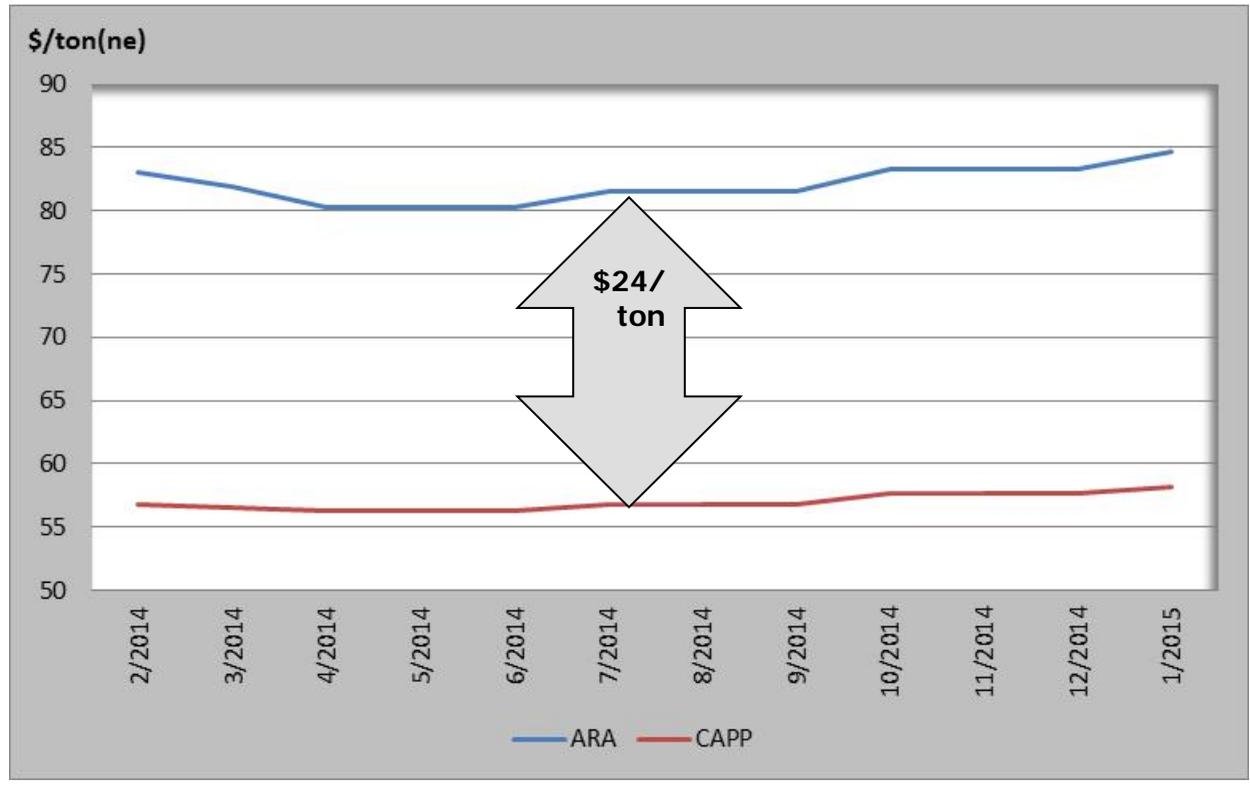
# Seaborne coal – U.S. outlook seen flat to declining



Source: SNL Energy



# Spreads to Europe – 2014

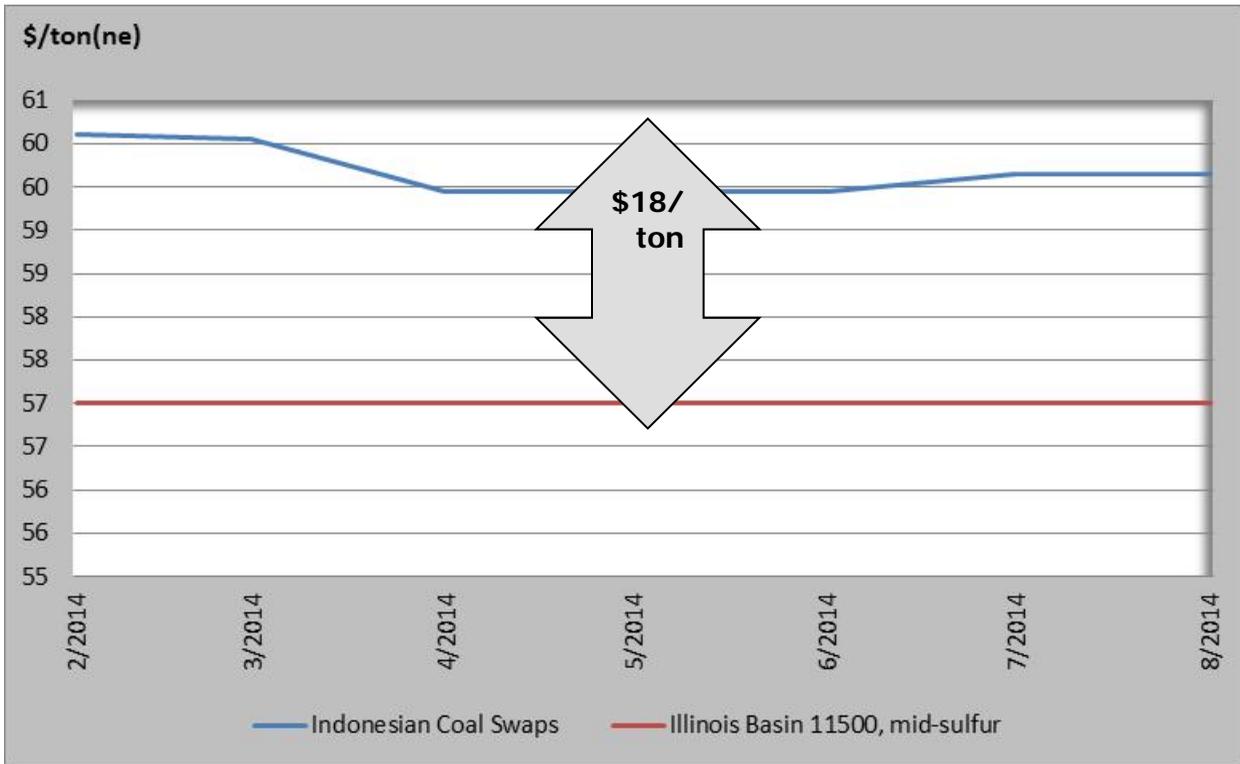


Source: SNL Energy

- ❖ Baltimore to ARA runs \$16/ton after recent rally in seaborne dry freight
- ❖ Despite rate concessions from rail carriers, prospects of incremental export growth to Europe appear slim
- ❖ Illinois Basin prospects out of New Orleans marginally better -- \$20/ton btu-equivalent spread against 21.50 in freight. Discounted grades may find headroom @ barge rates of \$15/ton



## Spreads to Asia – Illinois Basin via New Orleans



Source: SNL Energy

- ❖ New Orleans to Kalimantan runs \$44/ton, leaving Illinois Basin producers to compete with higher grade seaborne coal (Newcastle, Richard's Bay)



# Push for terminal capacity along West Coast hitting massive opposition



Source: SNL Energy



## Pacific Northwest terminal update

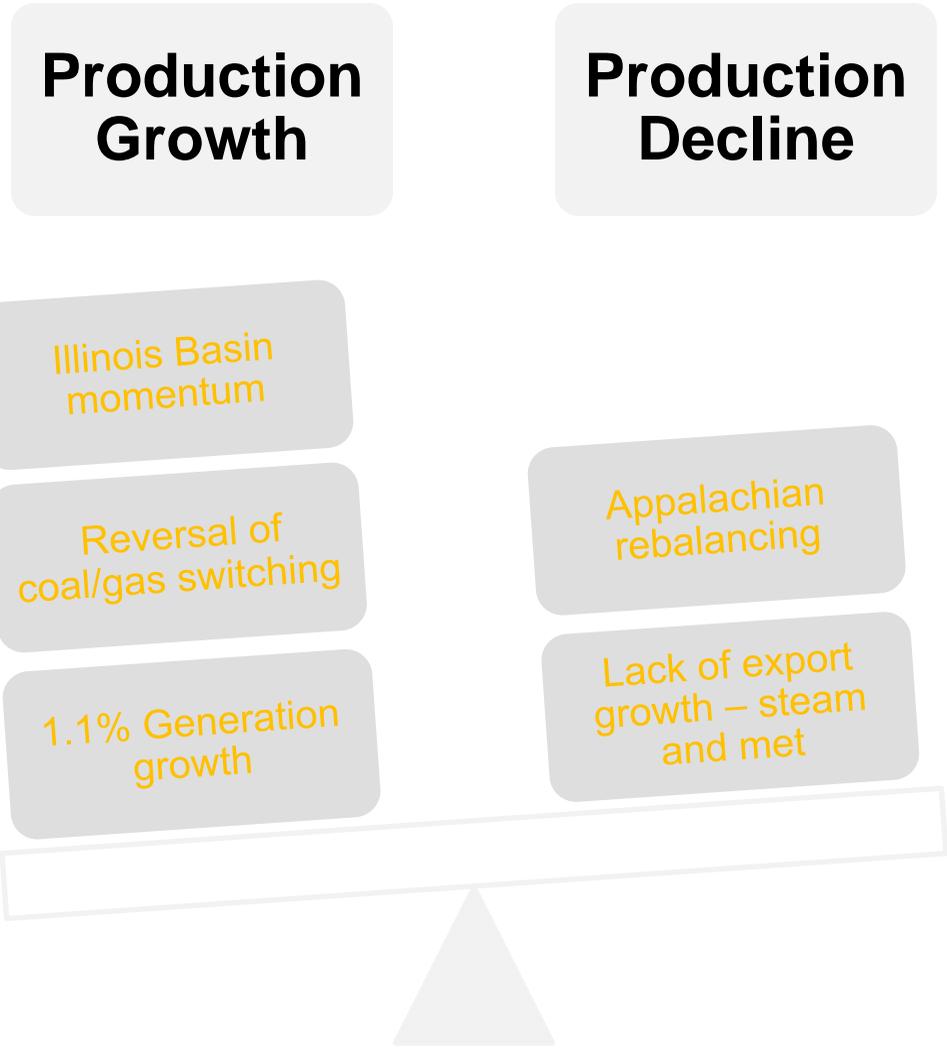
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- ❖ Gateway Pacific Terminal: Broad scope announced in July 2013
- ❖ Millennium Bulk Terminals: Broad scope announced in February 2014
- ❖ Morrow Pacific: Decision likely in 2014
- ❖ Fraser Surrey Docks: Under Port Metro Vancouver review



# Key Takeaways – 2014 Coal Volumes

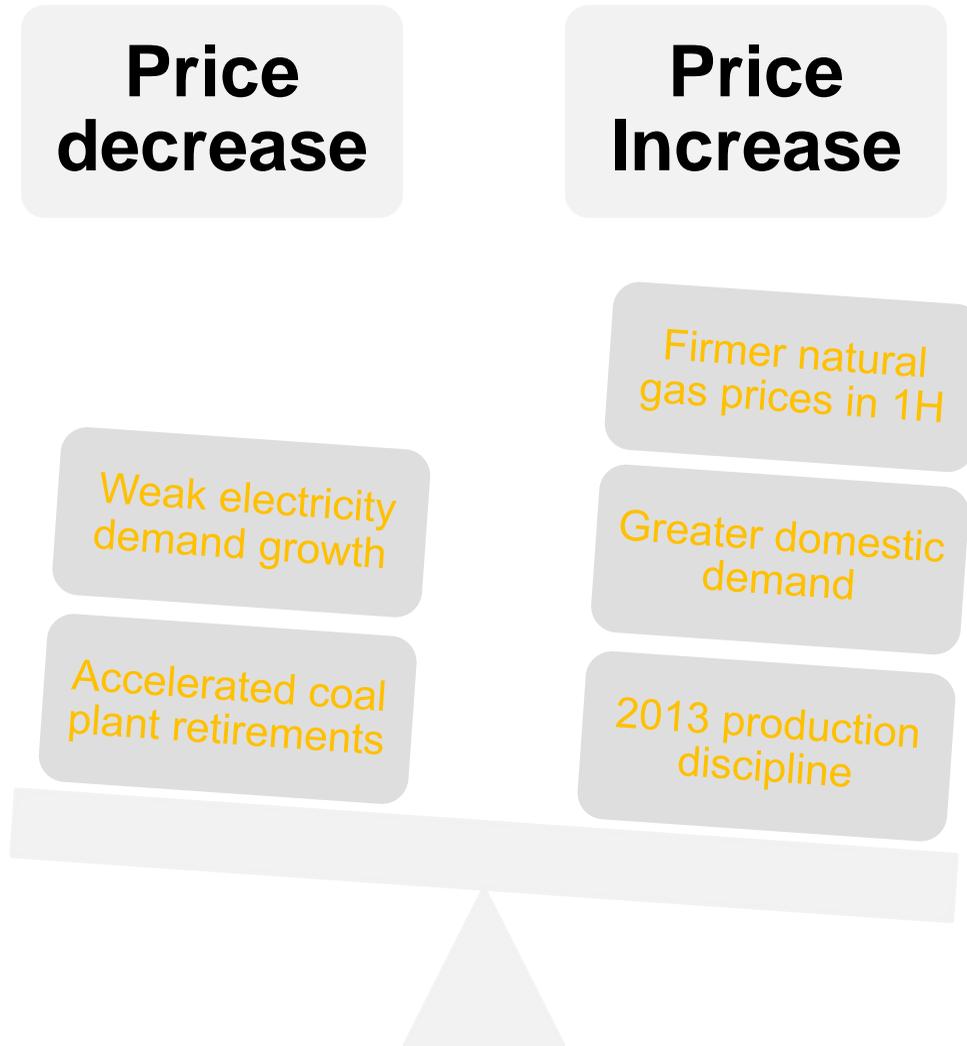
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## Key Takeaways – 2014 Coal Prices

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# Thank You!

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## Rail Energy Transportation Advisory Committee Meeting

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