

Doyle Trading Consultants Presentation to The Coal Institute's 2017 Fall Education and Engineering Seminar

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US Coal: Domestic Market Perspective



Doyle Trading Consultants, LLC

Colorado:
P.O. Box 4390
Grand Junction, CO 81502

New York:
52 Vanderbilt Ave.
11th Floor
New York, NY 10017

Charles Dayton, Vice President of Market Analytics

www.doyletradingconsultants.com

The Finer Things

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Doyle Trading Consultants, LLC

P.O. Box 4390 Grand Junction,

Colorado 81502

Fax: 970 256 8933

About DTC

Since 2002, DTC has served the needs of the coal and energy industry. More than 1000 industry leaders from over 200 companies subscribe to our services. We give our clients an edge by providing the following:

- ✓ **Principal Service**
- ✓ **Quarterly Coal Outlook and Price Forecast Report**
- ✓ **Utility and Natural Gas Insights Report**
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Colorado Office:
751 Horizon Court
Suite 240
Grand Junction, CO 81506
USA



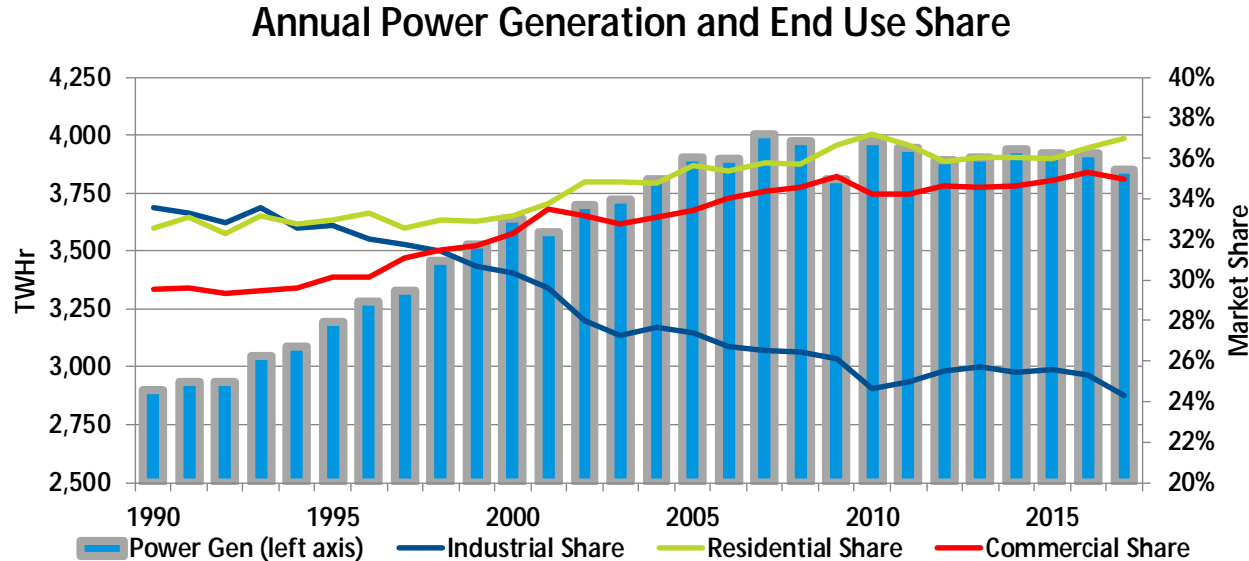
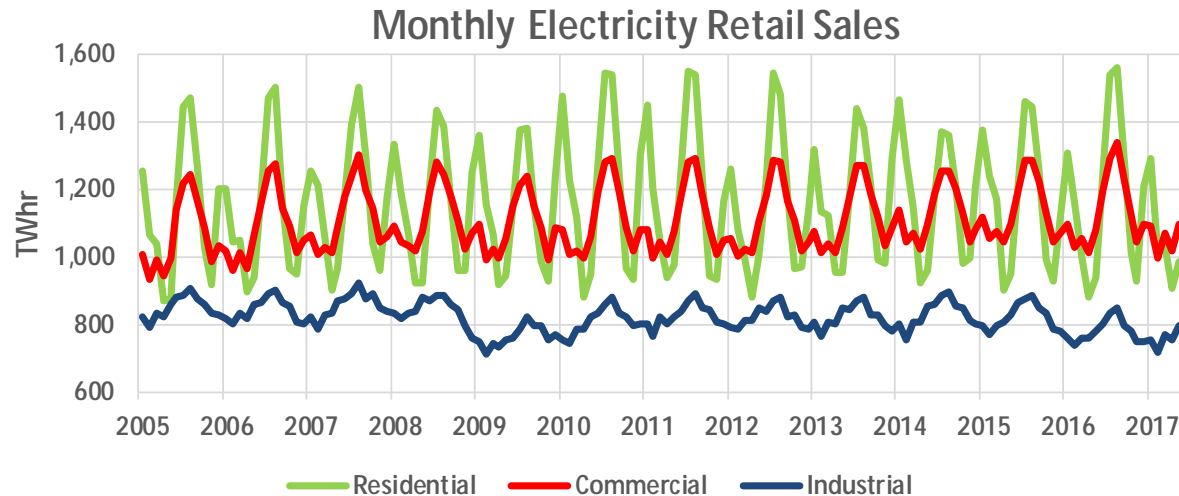
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52 Vanderbilt Avenue
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The Coal Markets – a 30,000 foot view

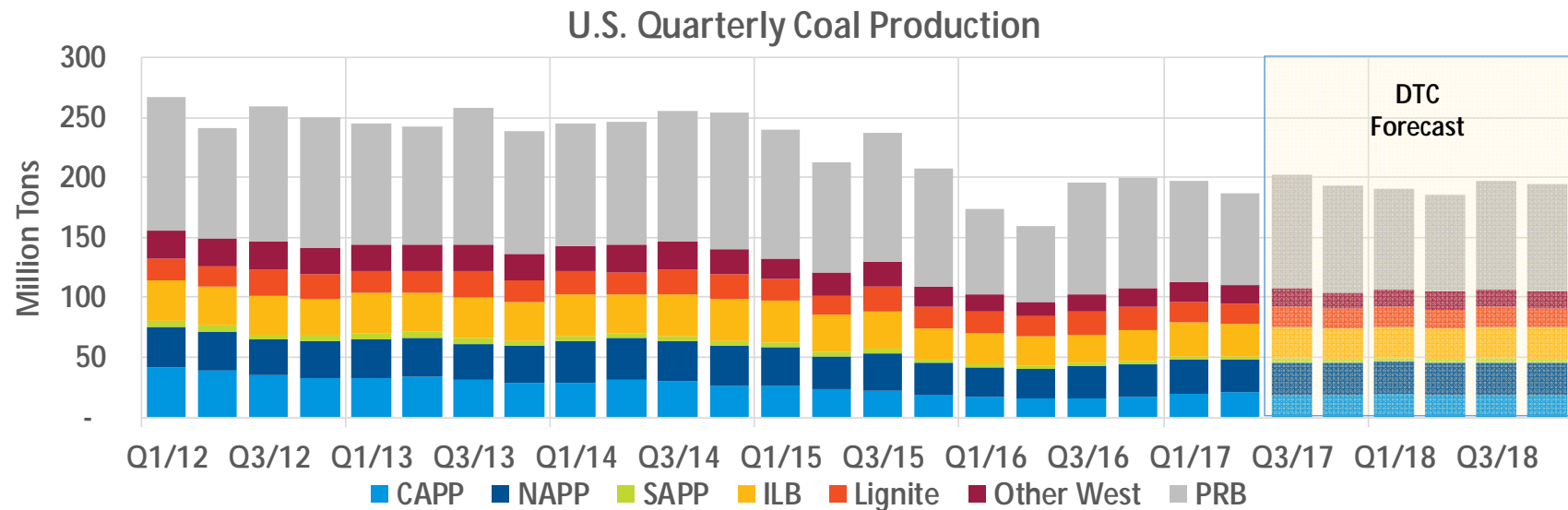
- US Demand for power is slowing
 - From 1949 – 2008, YoY power demand has fallen 3 times
 - Since 2008, YoY power demand has fallen 5 times
 - Annual power growth was as follows:
 - '50s: 9.4%, '60s: 7.4%, '70s: 4.6%, '80s: 2.4%, '90s: 2.2%, '00s: 1.1%, '10s: -1.3%
- Renewables and natgas taking market share
 - Natgas has taken biggest market share
 - Total wind capacity can reduce coal demand by up to 125 mm tons
- Price volatility likely once inventories drop
 - Will transportation system be able to handle volatility?
- Remaining power plants – what is the retirement risk?
 - Key is quantifying which ones survive and building strategies around those plants
- Global Coal Markets
 - GDP sluggish
 - China dominates supply and demand, but other countries play key roles
 - International thermal prices strong currently
- US Exports are picking up after weak 2016
 - Coking coal prices very volatile, dependent on outside factors
 - Domestic thermal coal prices more muted

Electricity Markets are Fundamentally Changing



- Res/Com power demand is seasonal
 - Industrial demand: comparatively even
- Yet total power gen has declined since 2007
 - Res/Com demand continues to grow
 - Industrial demand declining
- Volatility in power *sales* is increasing and that affects how power plants are dispatched

U.S. Coal Production – Where We Are



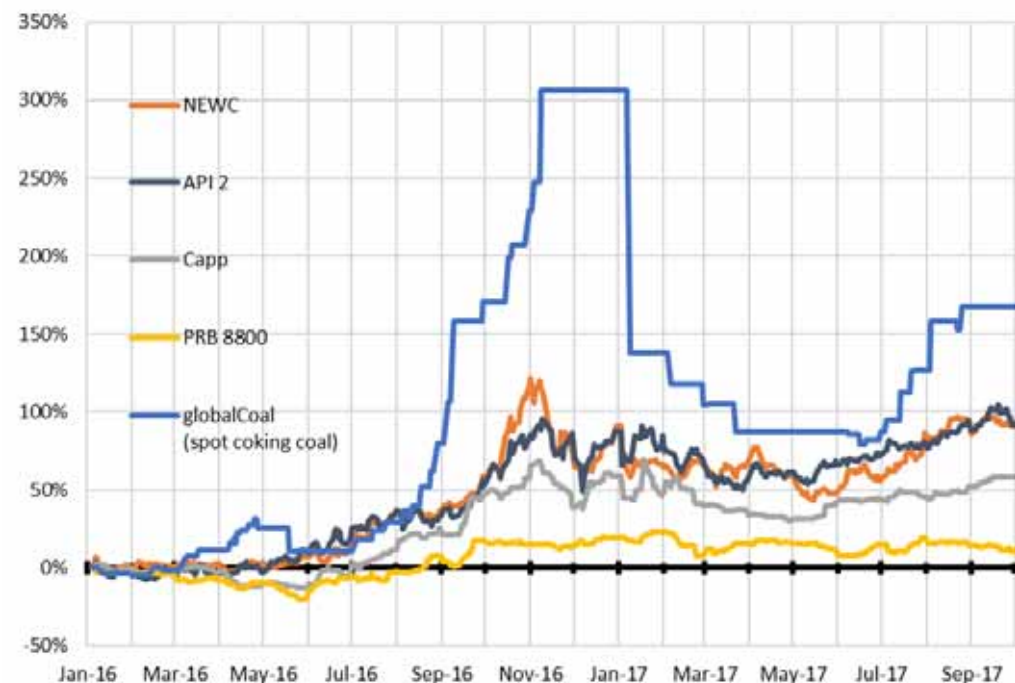
- First half 2017 coal production was 384 million tons
 - Up from 333 mm tons for H1-2016
 - PRB 2017 rebound was driven on higher natural gas prices compared to the first half of 2016
 - All other supply regions higher on improved domestic burn and export demand
 - Number of producing mines in the East is down by 51% from 5 years ago but average mine size is up 39% -- not because the mines are getting larger, just fewer small mines
 - PRB mine count remained constant over past 5 years but average mine size dropped 17% on fewer tons from existing mines
- For 2018, DTC assumes natural gas ~\$3/mmBtu and “normal” weather

Thermal Coal Price Rally Versus Coking Coal Rally

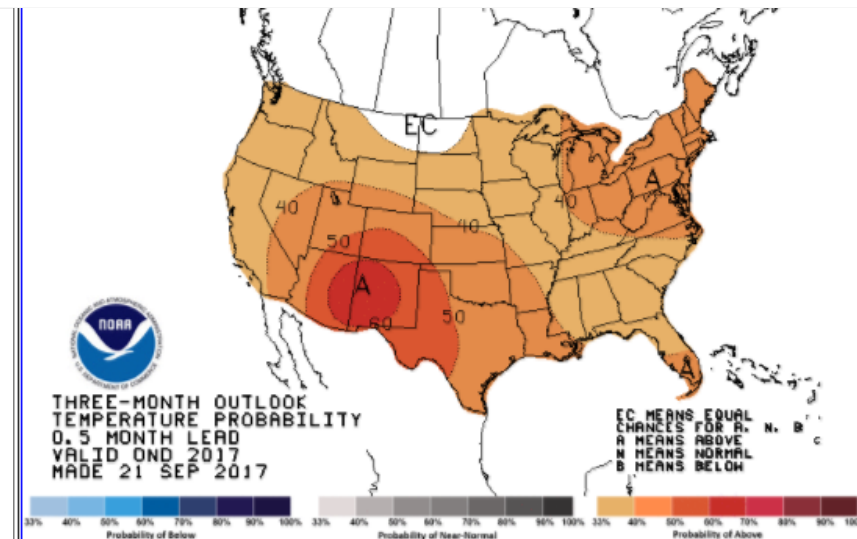
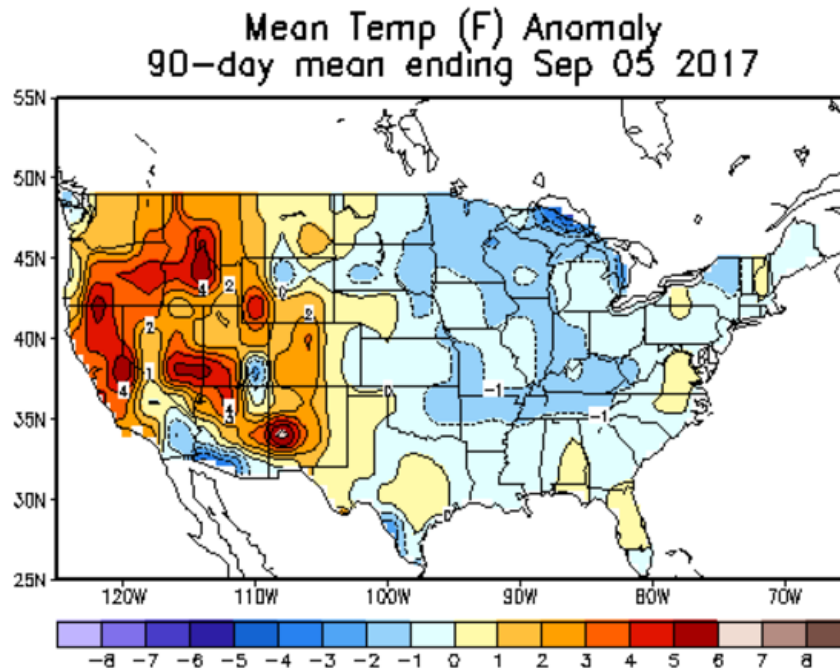
Despite being in shadow of coking coal, thermal coal prices had nice run in 2016

- Last coking coal benchmark settled at \$285/MT for JFY 4Q16 (Jan-Mar) in Dec-16.
- Newcastle prompt month has rebounded from its 2017 lows in May. Prompt year (2018) has risen to \$85/MT
 - NEWC above \$80 puts ILB and WBIT in the money; CAPP in the money above \$90 for export
- International thermal helping some U.S. thermal coal with the notable exception of the SPRB where the prompt month has fallen below \$11.25 (Nov '17). PY just over \$12

Percent change in value since Jan 2016



The Weather Slide



- The heat has been in the West
 - Temperatures in the Midwest and East have been below normal
- Summer power demand down
- Harvey & Irma and to a lesser extent Nate also taking a bite out of power demand
- Winter outlook – not looking promising

US Coal Supply and Demand

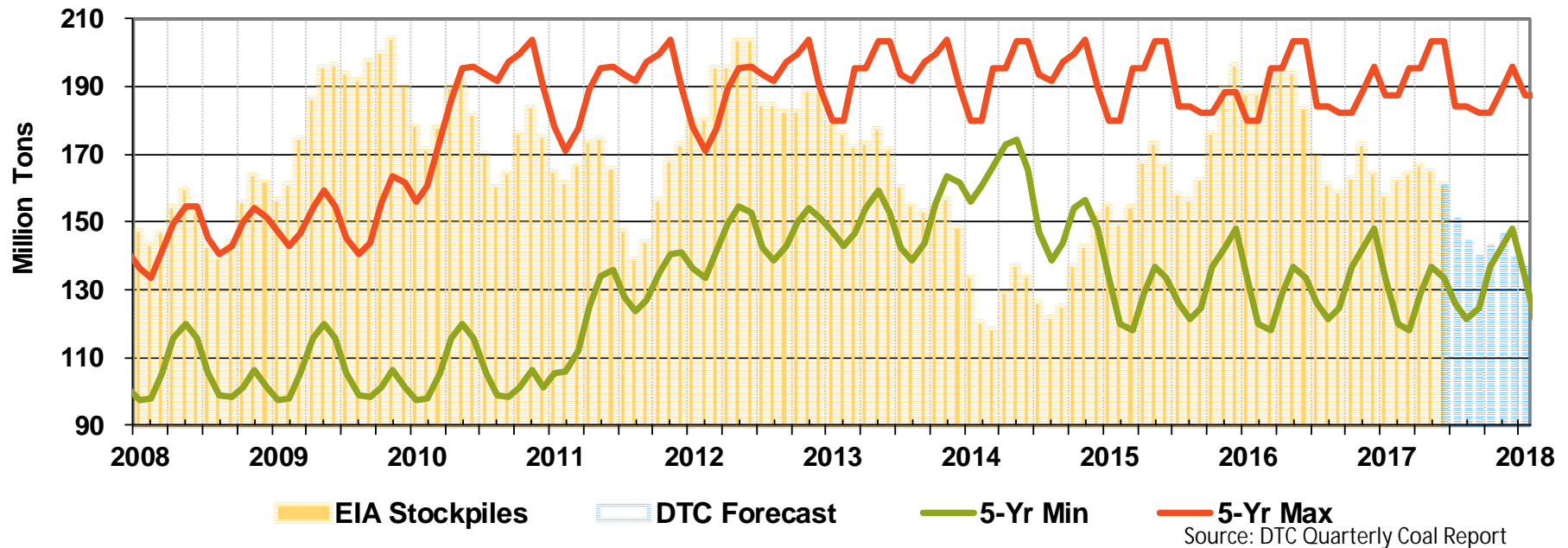
- Utility coal demand partial rebound from dismal 2016?
- Total U.S. coal production fell 169 mm tons in 2016
 - Expecting 2017 to recapture about 1/3rd of the 2016 losses
- Higher natgas prices during H1 helped coal, particularly ILB, NAPP and PRB
 - Concern: forward gas prices
- Exports slated to rise on back of higher int'l prices YoY
- Cooler than expected summer temperatures limited utility demand. 2H17 utility demand growth will not match gain seen in 1H17

Supply	2012 Actual	2013 Actual	2014 Actual	2015 Actual	2016 Actual	2017 DTC Est.	2018 DTC Est.	2019 DTC Est.
Capp	146.70	127.11	116.36	90.02	66.67	77.00	76.00	73.00
Colo/Utah	45.58	41.21	41.94	33.30	26.38	30.00	29.00	27.00
Ill. Basin	127.27	132.24	137.24	123.85	98.42	106.00	104.00	106.00
Napp	124.82	122.55	133.02	115.77	101.90	109.00	109.00	108.00
PRB (WY, MT)	438.14	430.16	440.23	417.64	329.83	354.00	356.00	355.00
Other Regions	133.95	131.58	131.26	116.40	105.04	102.00	98.00	97.00
Total US Prod	1,016.46	984.84	1,000.05	896.98	728.23	778.00	772.00	766.00
Waste Coal	11.20	11.28	12.09	9.94	9.20	9.00	8.00	8.00
Imports	9.16	8.91	11.35	11.32	9.85	8.00	8.00	8.00
Total Supply	1,036.81	1,005.03	1,023.49	918.24	747.28	795.00	788.00	782.00

Demand	2012 Actual	2013 Actual	2014 Actual	2015 Actual	2016 Actual	2017 DTC Est.	2018 DTC Est.	2019 DTC Est.
Utilities	823.55	857.96	851.60	738.44	677.27	676.00	671.00	660.00
Coking								
Coal/Domestic	20.75	21.47	21.30	19.71	16.48	18.00	19.00	19.00
Industrial	42.84	43.05	42.95	38.47	34.56	34.00	33.00	31.00
Rescom	2.04	1.95	1.89	1.50	1.18	1.00	1.00	1.00
Exports/CC (Incl. Can.)	69.88	65.70	60.10	46.34	41.33	52.00	48.00	46.00
Exports/Steam (ex. Can.)	53.49	48.58	34.81	26.28	17.87	35.00	32.00	26.00
Exports/Steam (Can.)	2.38	3.40	2.38	1.67	1.07	1.00	1.00	1.00
Total Exports	125.75	117.68	97.29	74.29	60.27	88.00	81.00	73.00
Total Demand	1,014.93	1,042.12	1,015.02	872.42	789.77	817.00	805.00	784.00

Source: DTC Monthly Update

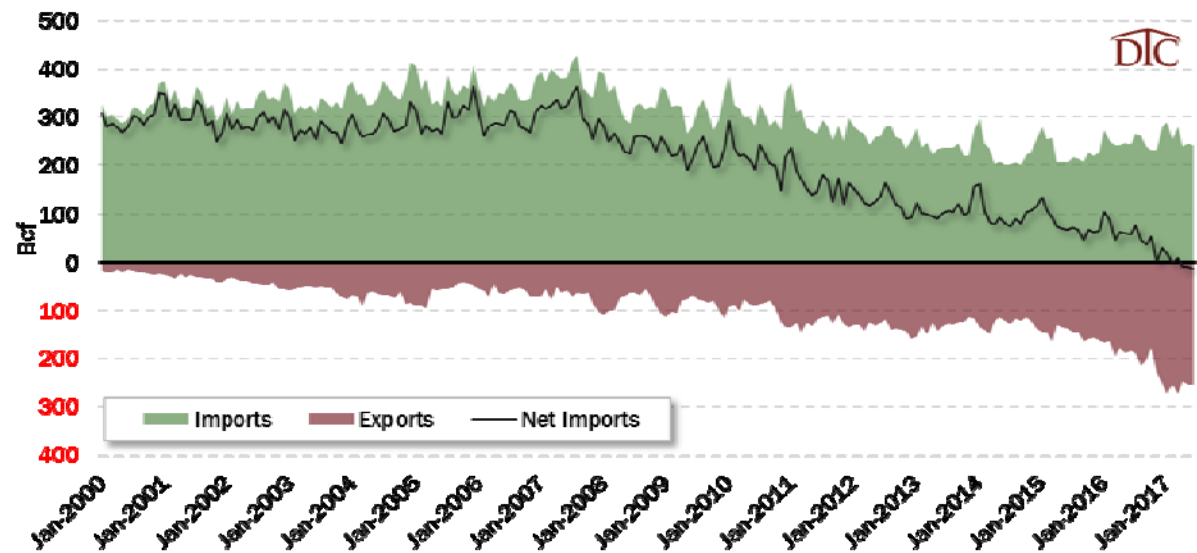
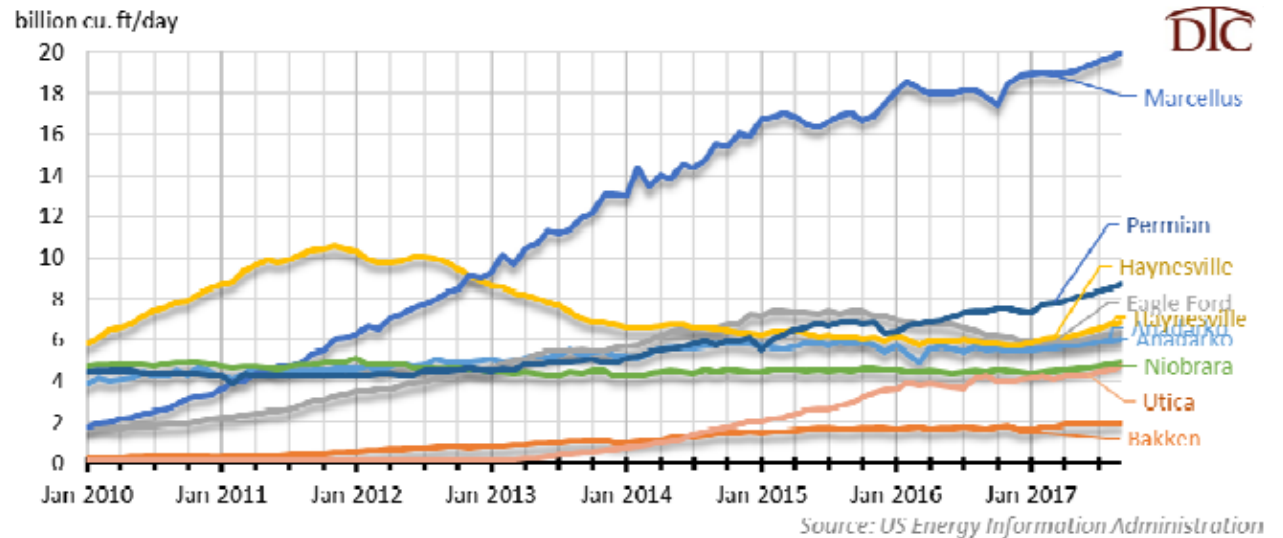
Utility Inventories Improving



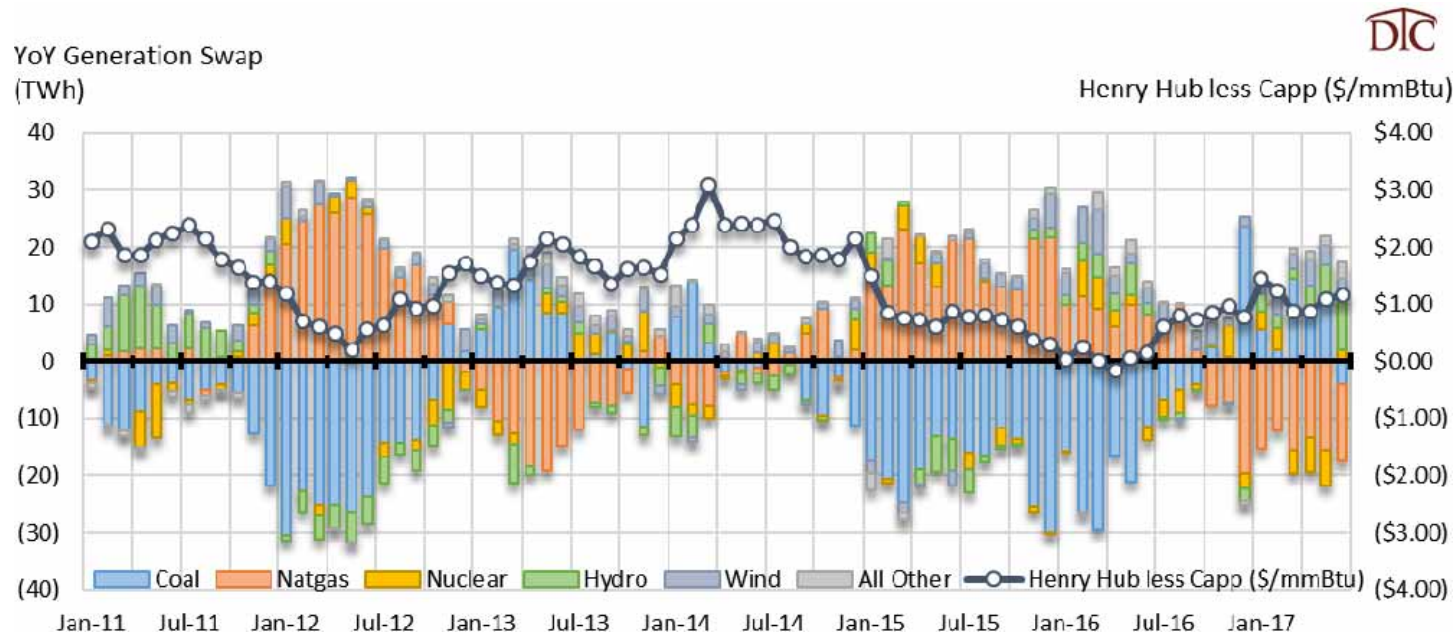
- Utility inventories have come down over the past year, down 21.4 mm tons YoY .
 - 148.1 mm tons at the end of July, down 12.6% YoY.
 - 80 days of burn at the end of July (at forward consumption rates).
 - Just under 200 mm tons at start of 2016 - 124 days of burn vs 5-yr avg 68 days.
 - Stocks should end 2017 at 140 mm tons, down 24 mm tons from the start of the year.
- Capp stocks down 25% YoY; Napp down 27%, PRB down 11%, and ILB stocks down 8% YoY at end of July.

Natgas Production and Productivity

- Production increasing in Marcellus/Utica and associated gas in Permian
 - Watching rig counts
- U.S. is now a net exporter of natural gas with additional LNG and cross-border pipeline capacity this year
- Expect injection season inventories to end near 5-yr average



Monthly Coal and Natgas Switching

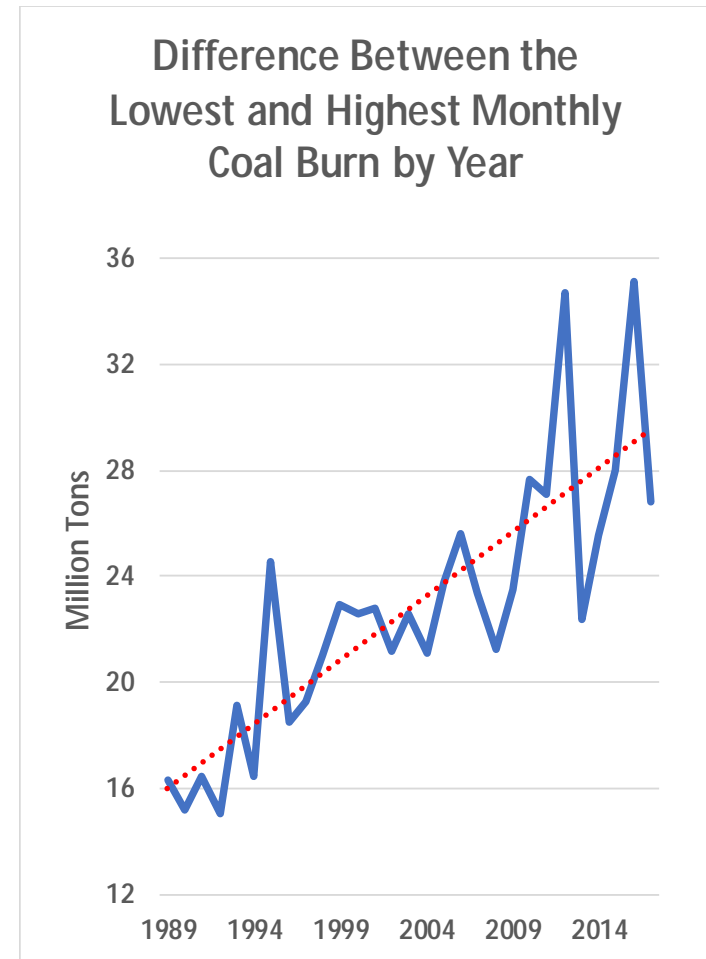


Source: DTC Quarterly Coal Report

- In 2016, 61.9 mm tons of coal displaced – mostly by natgas.
- From Oct '16 to May '17, coal regained 33.8 mm tons back from natgas and other fuels.
 - PRB – 26.9 mm tons lost in 2016, 17.7 mm tons gained Oct-May.
 - CAPP – 3.5 mm tons lost in 2016, 1.3 mm tons gained Oct-May.
 - NAPP – 7.9 mm tons lost in 2016, 2.7 mm tons gained Oct-May.
 - ILB – 9.7 mm tons lost in 2016, 4.9 mm tons gained Oct-May.
- Low cost basins were last to lose market share to falling natgas prices and were first to recover market share from rising natgas prices
- All coal basins lost market share in June 2017, not to natgas, but largely to hydro and less to nuclear and wind

Power Generation Industry in Transition

- Coal burn for power generation peaked in 2007 at 1,045 mm tons
 - Burn in 2016 was 677 mm tons
 - More natural gas, renewables
- Power generation also peaked in 2007 (thus far) but industrial demand has taken largest hit
- Long-term trend has been more seasonality in coal burn
 - Even more after shale-gas revolution
 - Increasing influence of subsidized renewable power
- The coal industry works better with constant demand but the primary market for coal is moving in another direction



CSX's "Precision Scheduled Railroading"

- Precision Scheduled Railroading (PSR)
 - Balanced the scheduled network
 - Customer service
 - Conversion of hump facilities to flat switching yards
 - Asset utilization enhancements
 - Updated metrics



"Since fundamental change cannot be implemented while working from two separate operating plans, the changes occurred over a short period of time to effectively realize the benefits of the new PSR plan" -- *E. Hunter Harrison*
8/14/2017

- Created service issues earlier this summer for both CSX shippers/receivers but also other connecting rail lines and export terminals

PSR – Waiting for Reviews

Pros:

- Balanced the scheduled network
 - “Consolidated inefficient unit trains into the merchandise network . . .”
Reading between-the-lines: ratable schedule.
- Removing daily obstacles and low-efficiency business improves overall fluidity
 - Converting hump yards is providing a nod toward larger blocks of cars and less sorting of loose cars. Could/Should be viewed as a net positive for unit trains.

Cons:

- A ratable schedule is difficult when the business consists of hundreds of load-points, is subject to volatile demand, must meet strict unloading windows (international) and throw on weather vagaries
 - Reminder -- utility industry has been moving toward seasonal buying and higher proportion of spot/short-term purchases – how does not mesh with this model?

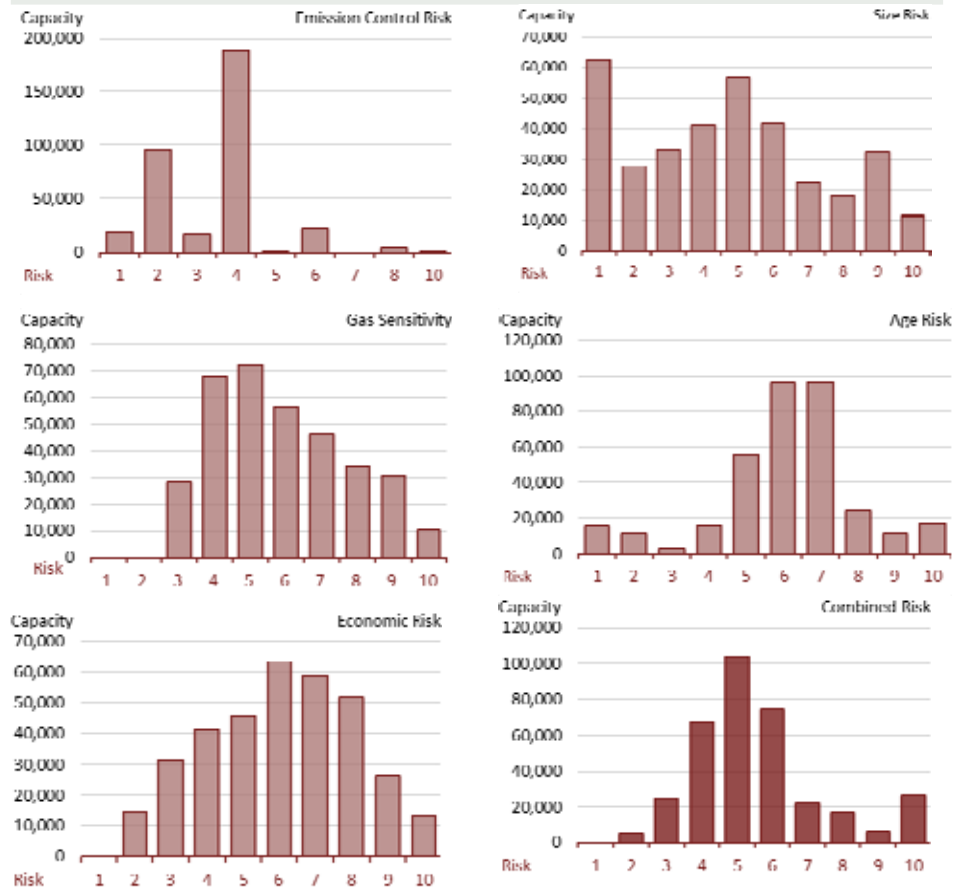
PSR Observations

- CSX retooling in effect shifts the business risk onto shippers/receivers
 - Less flexibility requires better planning and more inventory space on the receiving end
 - For power plants, more yard space and higher inventory carrying costs
 - For ports, new inventory space would be difficult therefore more lead-time in advance of inbound ships – or – more demurrage. Could reduce effective capacity of loading ports.
- We are not exactly sure what this means for our inventory calcs
- Bigger question is will this model be adopted by the other railroads?
 - On the positive side, unit train movement reliability should increase and is there a cost/benefit sharing aspect to this with the shippers?
- The winners will be the mines which can load larger trains faster and receivers who can also discharge trains at any time and have stockyard capacity
 - Requires more customer service and detailed coordination

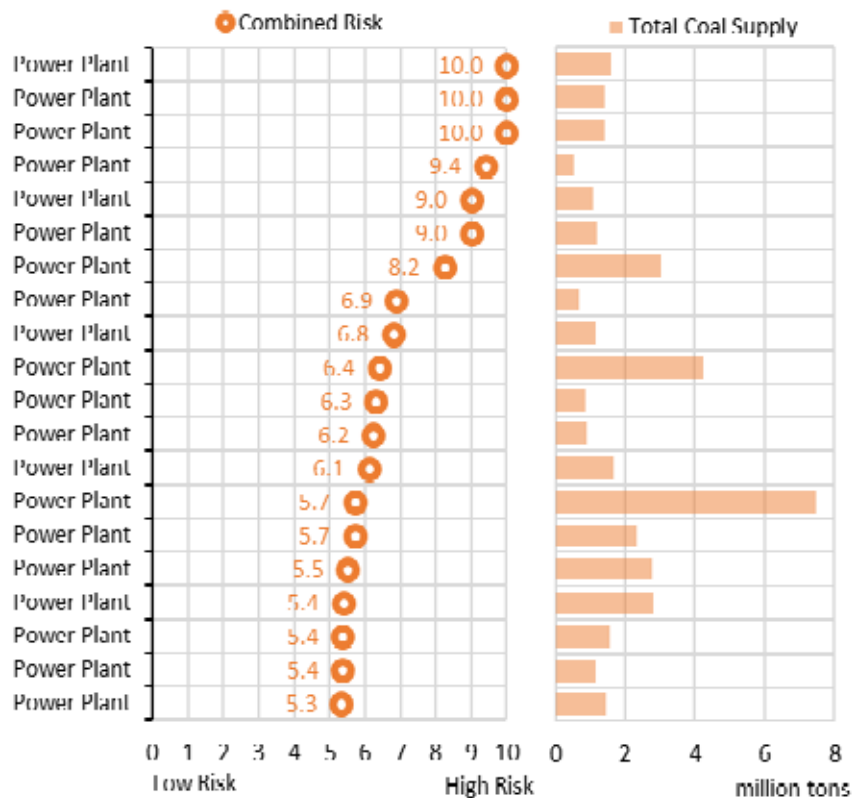
Coal Unit Retirement Risk Overview

- DTC analyzed 1,082 coal-fired generating units in the US to determine their risk of retirement based on 7 retirement risk factors
 - 1 = lowest risk, 10 = highest risk
- The risk factors :
 - Age of unit
 - Unit generating capacity
 - Emission controls
 - Competition from new non-coal capacity additions
 - Regional capacity reserve margin
 - Natgas price sensitivity, and
 - Variable operating costs
- The 1-10 risk value shows the relative risk among all units in the coal fleet

US Coal Fleet Risk Distribution of selected Risk Factors



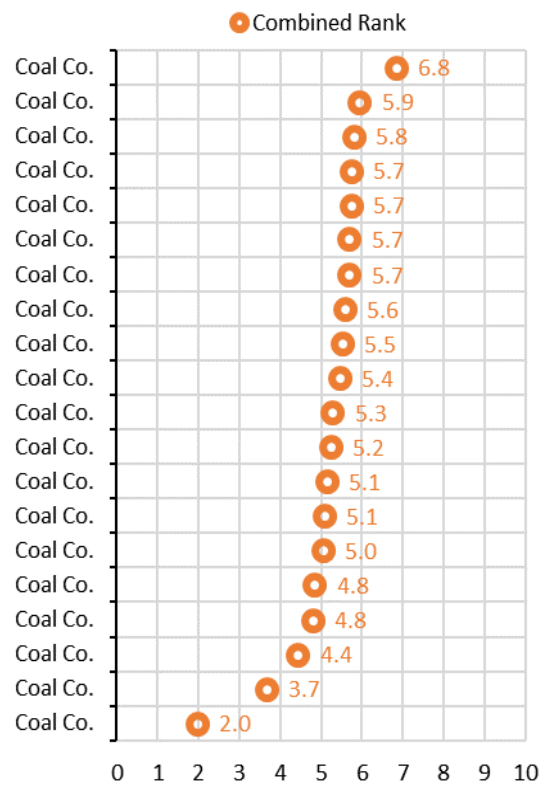
Retirement Risk by Power Plant



Holding Company	Combined Risk	Economic Risk	Gas Sensitivity Risk	Size Risk	Age Risk	Emission Control Risk	New Capacity Risk	Reserve Margin Risk
Power Plant	10.0	8.0	7.0	10.0	10.0	6.0	3.0	1.0
Power Plant	10.0	8.0	8.0	7.0	8.0	4.0	5.0	8.0
Power Plant	10.0	4.7	4.7	9.0	9.0	6.0	3.0	1.0
Power Plant	9.4	6.3	6.3	9.3	7.9	6.3	4.0	1.0
Power Plant	9.0	6.6	7.0	6.4	8.4	4.0	1.0	7.0
Power Plant	9.0	3.0	4.0	8.4	7.4	4.8	4.0	1.0
Power Plant	8.2	6.0	5.3	5.0	5.7	3.0	2.0	6.0
Power Plant	6.9	4.5	4.3	9.2	7.2	2.6	5.0	10.0
Power Plant	6.8	8.2	8.6	5.3	5.7	4.0	2.0	1.0
Power Plant	6.4	9.6	9.0	3.8	6.3	3.2	5.0	10.0
Power Plant	6.3	6.6	6.6	10.0	4.1	6.5	4.0	1.0
Power Plant	6.2	7.5	7.0	8.0	8.5	2.0	5.0	8.0
Power Plant	6.1	7.0	5.0	4.0	6.0	6.0	5.0	10.0
Power Plant	5.7	7.8	6.0	4.2	5.8	3.3	5.0	10.0
Power Plant	5.7	7.0	4.0	4.0	7.0	4.0	5.0	10.0
Power Plant	5.5	8.0	7.0	5.0	6.5	1.5	5.0	8.0
Power Plant	5.4	6.0	7.0	4.8	7.4	4.0	1.0	7.0
Power Plant	5.4	8.0	8.0	5.0	6.0	2.0	1.0	7.0
Power Plant	5.4	8.0	8.0	6.0	6.0	2.0	4.0	1.0
Power Plant	5.3	4.9	5.9	7.4	7.0	4.0	1.0	7.0

Retirement Risk by Coal Producer

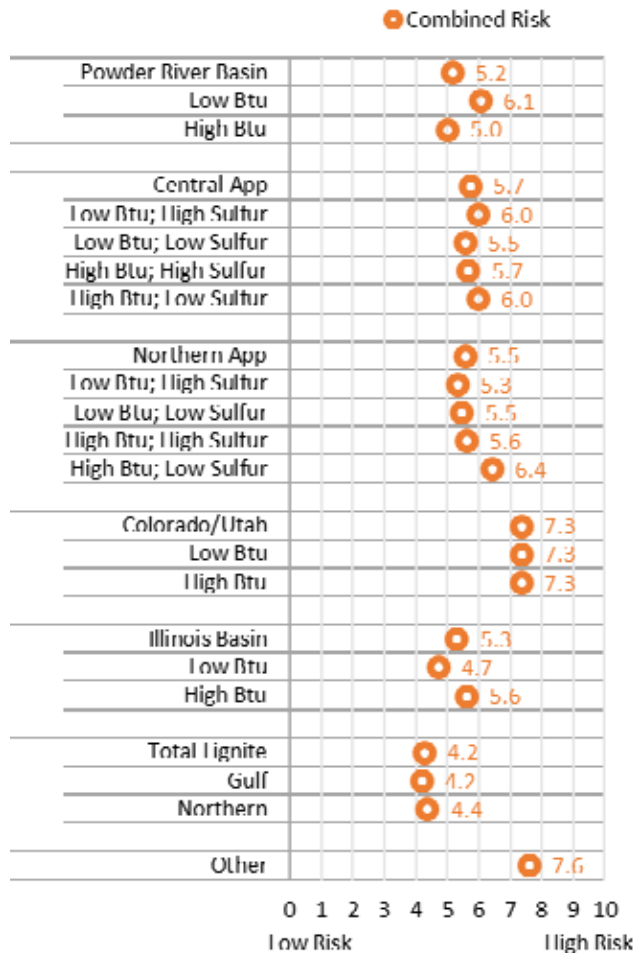
Combined Risk by Coal Producer



Plant Name	Combined Rank	Economic Rank	Gas Sensitivity Rank	Size Rank	Age Rank	Emission Control Rank	New Capacity Rank	Reserve Margin Rank
Coal Co.	6.8	6.2	6.3	3.9	5.7	2.6	5.0	5.7
Coal Co.	5.9	5.2	4.9	3.8	5.3	3.5	9.3	9.3
Coal Co.	5.8	7.3	6.4	5.5	5.4	2.5	4.9	9.4
Coal Co.	5.7	6.2	6.2	5.3	5.9	2.8	2.2	1.7
Coal Co.	5.7	6.3	6.5	4.8	6.3	2.9	5.5	4.7
Coal Co.	5.7	7.2	7.2	5.3	6.4	3.6	3.8	2.4
Coal Co.	5.7	6.7	6.5	4.5	5.8	3.4	3.1	3.7
Coal Co.	5.6	6.2	6.2	5.3	6.3	3.5	3.6	4.1
Coal Co.	5.5	7.2	7.2	4.5	6.2	3.5	3.9	4.0
Coal Co.	5.4	5.8	5.8	4.3	6.7	3.9	4.9	7.2
Coal Co.	5.3	6.5	6.4	4.1	6.2	3.7	4.6	5.3
Coal Co.	5.2	5.4	5.2	4.2	5.9	3.4	3.1	6.2
Coal Co.	5.1	5.3	5.2	4.1	5.8	3.3	3.1	5.1
Coal Co.	5.1	6.0	5.6	5.7	6.1	3.0	3.1	1.4
Coal Co.	5.0	6.3	5.5	4.7	5.2	3.4	3.6	6.6
Coal Co.	4.8	4.9	5.2	4.6	5.8	3.3	3.2	3.9
Coal Co.	4.8	5.4	5.3	3.4	5.6	3.1	3.6	6.5
Coal Co.	4.4	6.2	6.1	4.2	5.5	1.9	3.7	3.0
Coal Co.	3.7	4.1	3.4	2.7	3.8	2.1	5.0	10.0
Coal Co.	2.0	2.0	3.0	1.0	1.0	2.0	1.0	7.0

Retirement Risk by Coal Basin

Combined Risk by Basin and Quality



- CO/UT coal tends to have greatest risk exposure due to expensive dispatch costs, competing fuels, and at-risk plants
- When examining CO and UT separately, CO coal has far greater risk than UT coal which has considerable local demand
- Low-cost basins will usually have lowest risk due to competitive generation costs
- Risk also aggregated by utility and transportation mode

The Grid Resiliency Pricing Rule

- Proposed by DOE at the end of September, rule proposes a “special rate” for generators that have a 90-day fuel supply
 - Proposed on Sept 29th after Grid Study released on August 23rd
 - Coal/Nuclear at an advantage and Gas/Renewables at disadvantage
- Not as big a game changer as it seems
 - No ERCOT – no FERC jurisdiction
 - Really plants that don’t get rate recovery
 - Mostly Dynegy’s IL fleet in MISO
 - Most of PJM included
 - Really an attempt to support north central and northeastern markets hit hard by cheap Marcellus/Utica gas prices
- Questions that remain
 - How is 90 days burn defined?
 - Annual average, max burn, seasonal?
 - What will this actually do?
 - Delay or prevent plant closings? How many? How much of this will nuke get over coal?

Clean Power Plan Repeal

- Announced by EPA on October 10th
 - EPA stated it feels CPP “exceeds the EPA’s statutory authority”
- What does this mean? Not much
 - SCOTUS would probably have repealed it anyway
 - Most of the near-term damage has already been done
 - Does not do anything to restrict state-level efforts
 - A new administration’s EPA in the future can propose something similar in the future that doesn’t rely on as shaky of ground as section 111(d) of the CAA
 - 111(d) requires “best system of emission reduction”, not targets that are economically unfeasible for coal fired generation
 - Kemper shows economics for CCS not there yet

What's Ahead?

- Price volatility likely
 - Inventories falling (correcting)
 - Natural gas production expected to increase, but so is demand
 - CSX PSR (and others?)
- Production capacity constraints
 - Reduced CAPEX – equipment, high grading, maintenance, labor
 - New mine development – limited at this time
 - Current ownership more focused on returns and providing value to shareholders
 - M&A environment improving
- Overall inventories moving in right direction but stubborn stockpiles on top of weak weather and limited access to exports keep a lid on prices
- International thermal players also worried about geopolitical developments

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