

# The Coal Institute Spring Conference

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## Coal Markets and the Five Stages of Grief



Charlotte, NC

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# The Finer Things

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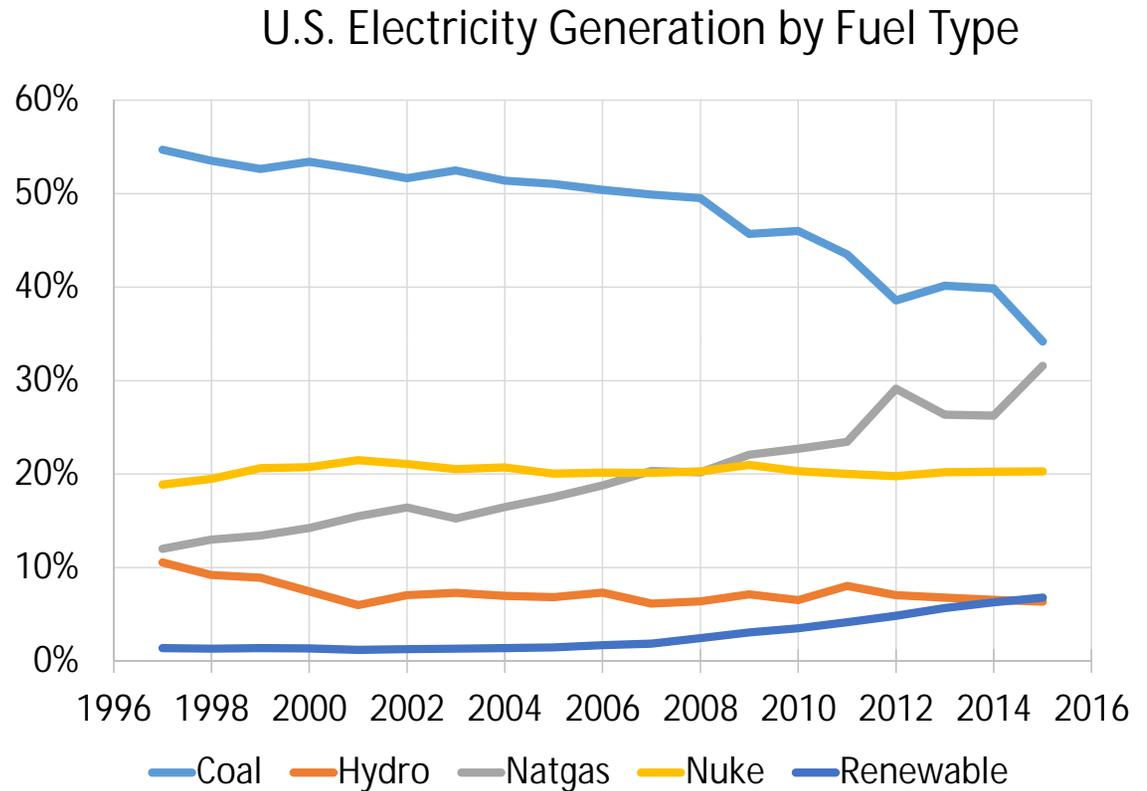
# US Coal Supply and Demand

- Utility demand expected to drop 75 mm tons this year
- Massive production cuts underway and must continue to bring balance to markets
- Utility inventories at all-time high, but falling slightly
- Cheap natgas and mild weather destroyed coal demand in winter
- Low cost coal will survive

Supply (million short tons)	2012 Actual	2013 Actual	2014 Actual	2015	2016	2017
Central App	146.2	126.7	116.0	90.9	71.0	70.0
Colorado/Utah	45.0	40.4	41.9	33.3	27.0	27.0
Illinois Basin	126.9	132.1	137.3	124.0	102.0	104.0
Northern App	124.6	123.1	132.1	118.2	92.0	91.0
Powder River	438.1	430.6	440.2	417.6	345.0	350.0
Other Regions	135.6	131.1	129.3	112.9	91.0	92.0
<b>Total US Production</b>	<b>1,016.4</b>	<b>984.0</b>	<b>996.7</b>	<b>896.9</b>	<b>728.0</b>	<b>734.0</b>
Waste Coal	11.2	11.3	11.2	9.6	8.0	8.0
Imports	9.2	8.9	11.4	11.3	10.0	10.0
<b>Total Supply</b>	<b>1,036.8</b>	<b>1,003.1</b>	<b>1,019.3</b>	<b>917.8</b>	<b>746.0</b>	<b>752.0</b>
Demand (million short tons)	2012 Actual	2013 Actual	2014 Actual	2015	2016	2017
Utilities	825.7	860.7	853.6	740.9	665.0	675.0
Coking Coal-Domestic	20.8	21.5	20.4	20.0	19.0	20.0
Industrial	42.8	43.1	42.8	41.0	38.0	37.0
Residential/Comm.	2.1	2.0	2.0	2.0	2.0	2.0
Exports/CC	70.5	67.0	58.6	46.3	30.0	28.0
Exports/Steam	55.3	51.1	38.7	27.6	21.0	19.0
Total Exports	125.8	118.1	97.3	74.0	51.0	47.0
<b>Total Demand</b>	<b>1,018.2</b>	<b>1,045.4</b>	<b>1,016.2</b>	<b>877.8</b>	<b>775.0</b>	<b>781.0</b>

# Competing Power

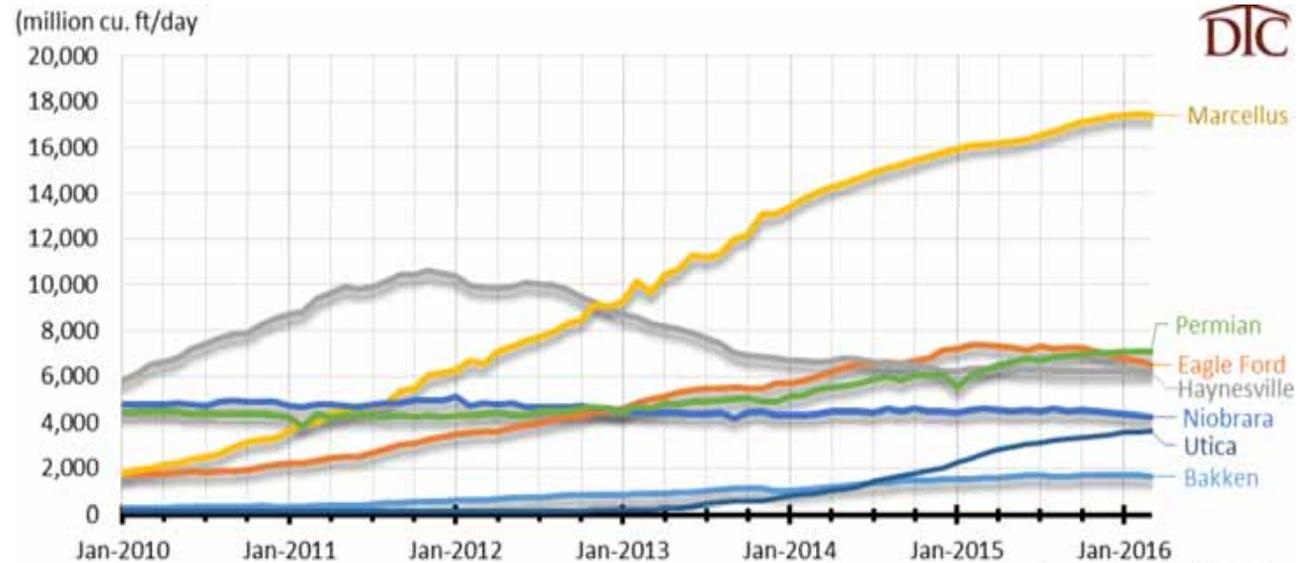
- From 1950 – 2007, power demand fell 3 times; from 2008 – 2015, power demand fell five times
- Natgas and wind eat into coal's market share
  - For the first time ever, natgas market share exceeded coal (7 months last year!)
- Renewables only account for 7% of US generation, but are growing steadily
- Coal accounts for 33% of power, down from 50% ten years ago



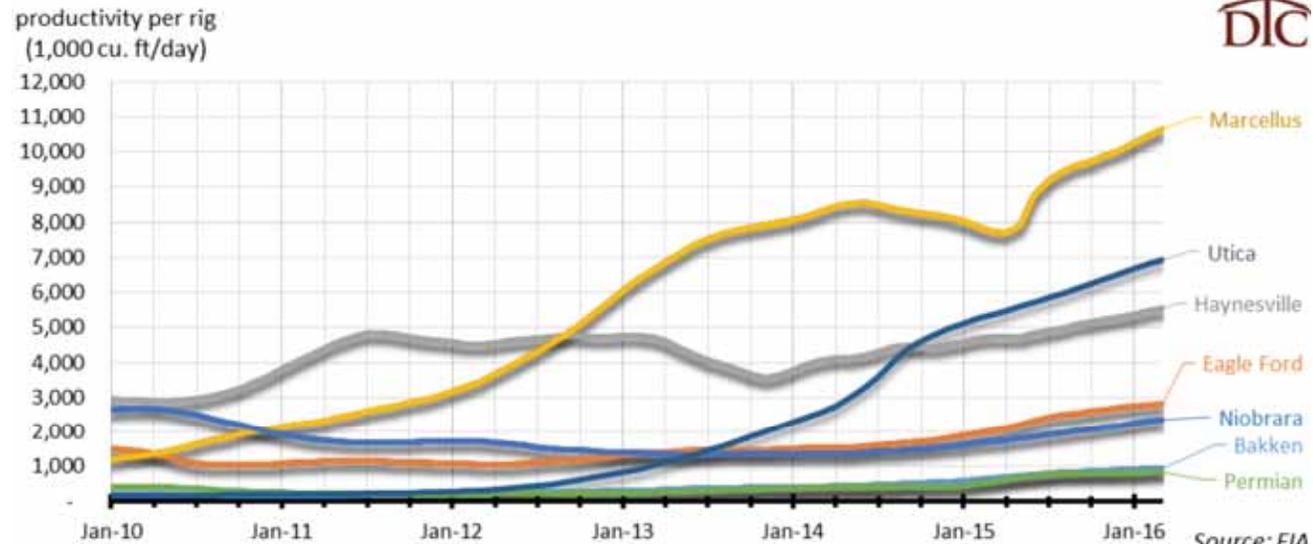
Source: EIA, DTC Research

# Natgas production and productivity

- Production is finally beginning to taper off in major basins
- Production can ramp up easily; over 2000 untapped wells in Marcellus
- Productivity continues to rise which does not bode well for future coal demand and coal prices

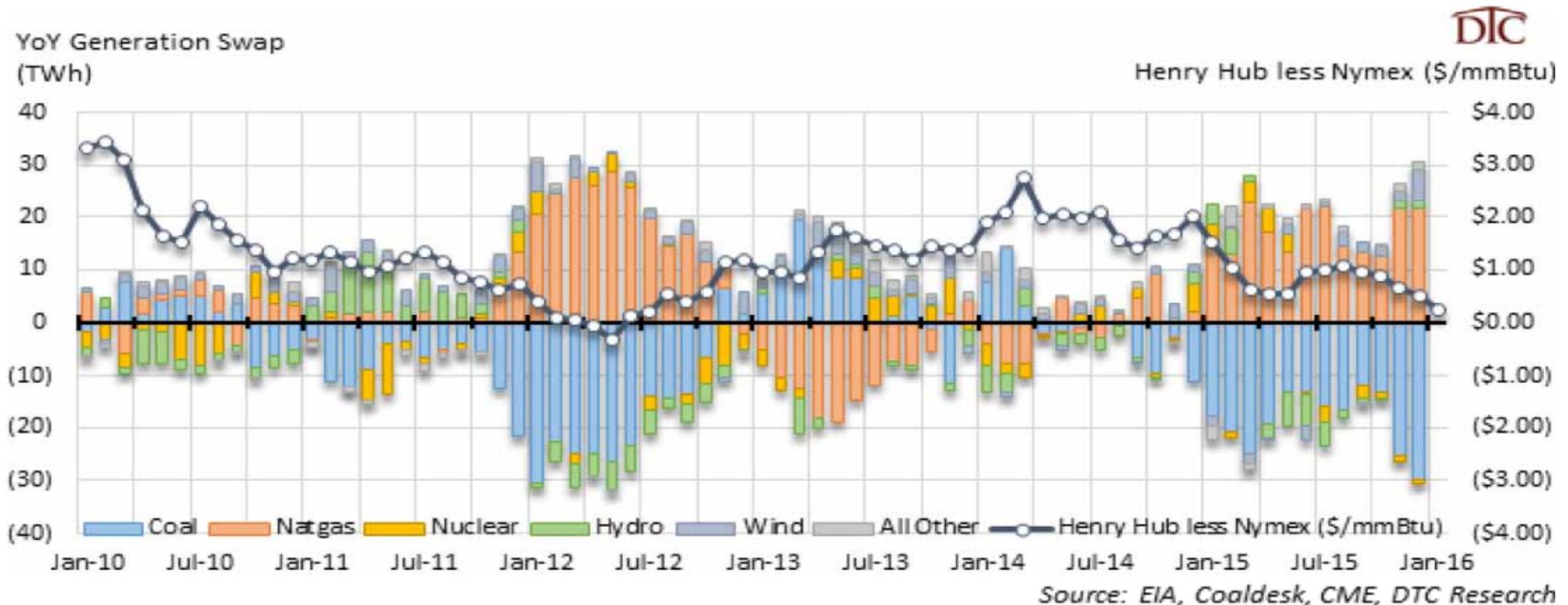


Source: US Energy Information Administration



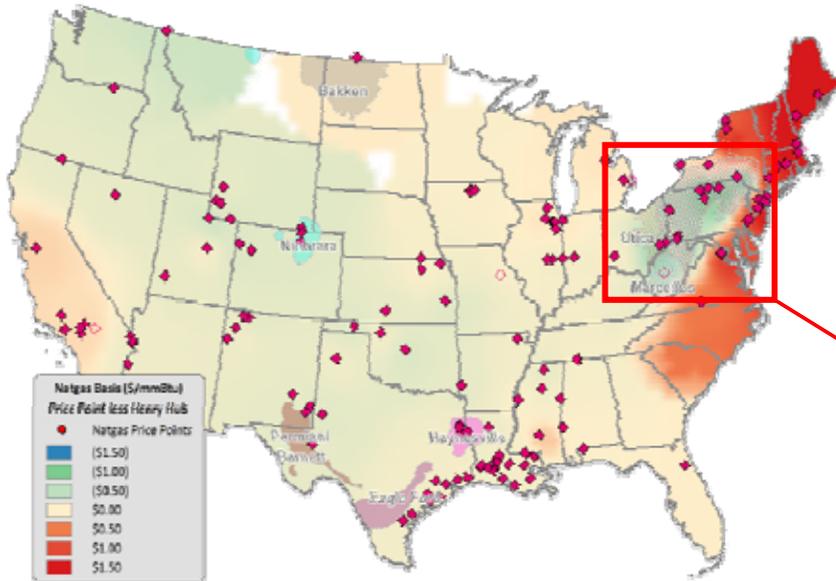
Source: EIA

# Monthly Coal and Natgas Switching

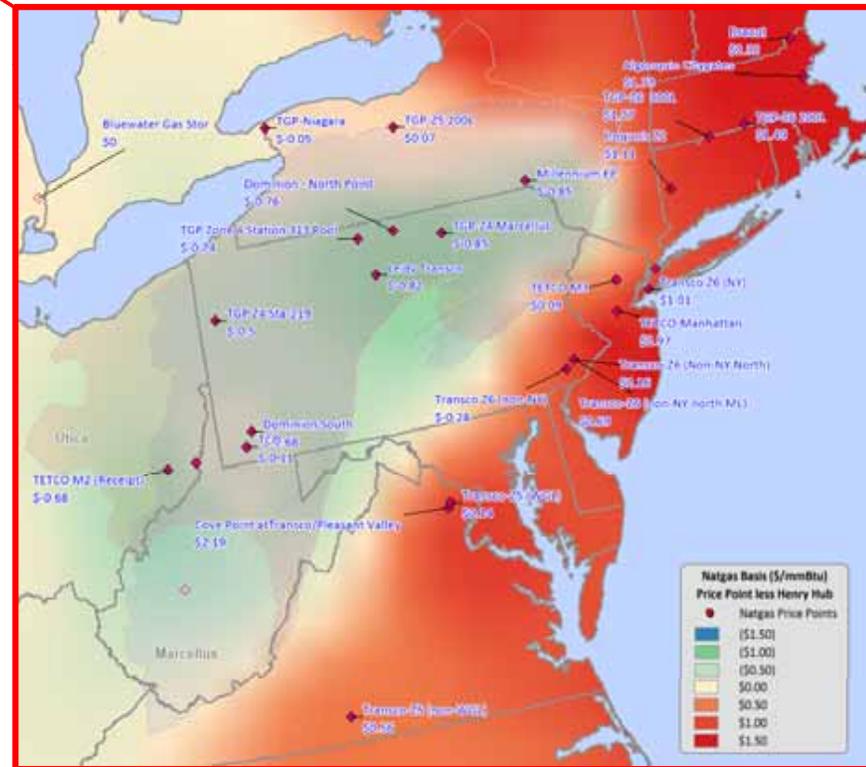


- In 2015, 111 mm tons of coal displaced
  - PRB – 54 mm tons
  - CAPP – 8 mm tons
  - NAPP – 13 mm tons
  - ILB – 20 mm tons
- Displacement accelerated last year due to falling natgas prices, especially in PRB
- Jan 2016 switching slowed to 7 mm tons due to fewer switching options

# Natgas Basis Differentials



Basis Differentials – February 2016



- Natgas price <\$3.00/mmBtu through 2019
  - Price has fallen ~16% YoY
- Dominion South and TETCO M3 at <\$1.00/mmBtu
  - Harms NAPP demand
- Virginia Southside Expansion and Constitution Pipeline will help deflate bubble

# Coal vs. Natgas model at varying price scenarios

DTC's Coal vs. Natgas Model© Spread (\$/MWh)**				Henry Hub Price			
Region	Coal Type/ Transport (\$/ton)	Natgas Basis Point / Differential	Coal Price	\$2.00	\$2.50	\$3.00	\$3.50
PJM East	Napp 13,000 4.5# Rail \$13.08	TETCO M3 / (\$0.51)	\$34.25	(\$8.24)	(\$4.74)	(\$1.24)	\$2.26
			\$37.70	(\$9.53)	(\$6.03)	(\$2.53)	\$0.97
			\$41.10	(\$10.80)	(\$7.30)	(\$3.80)	(\$0.30)
PJM West	Napp 13,000 4.5# Rail \$13.03	TCO / (\$0.12)	\$34.25	(\$5.29)	(\$1.79)	\$1.71	\$5.21
			\$37.70	(\$6.56)	(\$3.06)	\$0.44	\$3.94
			\$41.10	(\$7.82)	(\$4.32)	(\$0.82)	\$2.68
NYISO West	Napp 13,000 4.5# Rail \$15.05	Transco Z6 (NY) / \$0.06	\$34.25	(\$7.87)	(\$4.37)	(\$0.87)	\$2.63
			\$37.70	(\$9.14)	(\$5.64)	(\$2.14)	\$1.36
			\$41.10	(\$10.39)	(\$6.89)	(\$3.39)	\$0.11
Ill (Midwest)	ILB 11,500 5.2# Barge \$7.00	Chicago Citygates / \$0.04	\$29.50	(\$1.93)	\$1.57	\$5.07	\$8.57
			\$32.45	(\$3.16)	\$0.34	\$3.84	\$7.34
			\$35.40	(\$4.39)	(\$0.89)	\$2.61	\$6.11
Ill (Midwest)	PRB 8,800 \$22.94	Chicago Citygates / \$0.04	\$9.30	(\$4.21)	(\$0.71)	\$2.79	\$6.29
			\$10.25	(\$4.73)	(\$1.23)	\$2.27	\$5.77
			\$11.15	(\$5.22)	(\$1.72)	\$1.78	\$5.28
ERCOT	PRB 8,800 \$24.49	Henry Hub / (\$0.02)	\$9.30	(\$5.66)	(\$2.16)	\$1.34	\$4.84
			\$10.25	(\$6.18)	(\$2.68)	\$0.82	\$4.32
			\$11.15	(\$6.68)	(\$3.18)	\$0.32	\$3.82
SERC	Capp 12,500 <1% Rail \$22.16	FGT Z3 / (\$0.02)	\$38.00	(\$11.16)	(\$7.66)	(\$4.16)	(\$0.66)
			\$41.80	(\$12.68)	(\$9.18)	(\$5.68)	(\$2.18)
			\$45.60	(\$14.20)	(\$10.70)	(\$7.20)	(\$3.70)
SERC	ILB 11,800 4.5# Rail \$25.00	FGT Z3 / (\$0.02)	\$27.50	(\$9.41)	(\$5.91)	(\$2.41)	\$1.09
			\$30.25	(\$10.57)	(\$7.07)	(\$3.57)	(\$0.07)
			\$33.00	(\$11.74)	(\$8.24)	(\$4.74)	(\$1.24)
SERC	PRB 8,800 \$30.29	FGT Z3 / (\$0.02)	\$9.30	(\$9.56)	(\$6.06)	(\$2.56)	\$0.94
			\$10.25	(\$10.10)	(\$6.60)	(\$3.10)	\$0.40
			\$11.15	(\$10.61)	(\$7.11)	(\$3.61)	(\$0.11)

Representative Regional Coal Plant (w/o SCR or Scrubber) vs. 7,000 Btu/KWh Heat Rate Natgas Plant

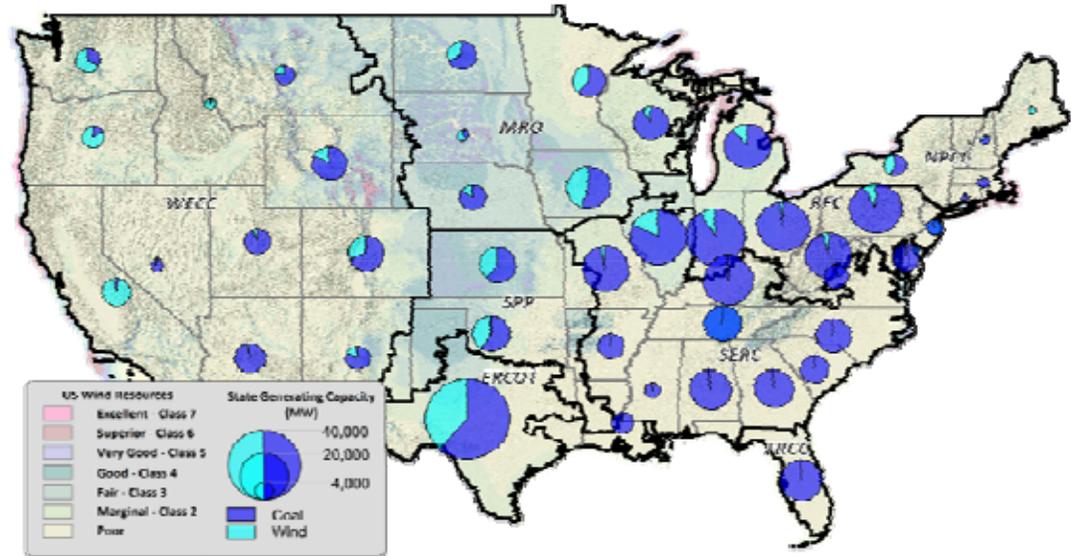
\*RGGI prices included in NYISO West; Group 2 SO<sub>2</sub> applied to ERCOT and SERC, Group 1 SO<sub>2</sub> applied to all others; Annual NO<sub>x</sub> allowar

\*\*Negative spread signifies the natgas gen costs are theoretically cheaper than coal gen costs.

# Wind

- Wind generation has increased its 2015 market share to 4.9%, up from 4.1% in 2014
- Wind capacity factor was 32% in 2015
  - Higher in winter than summer

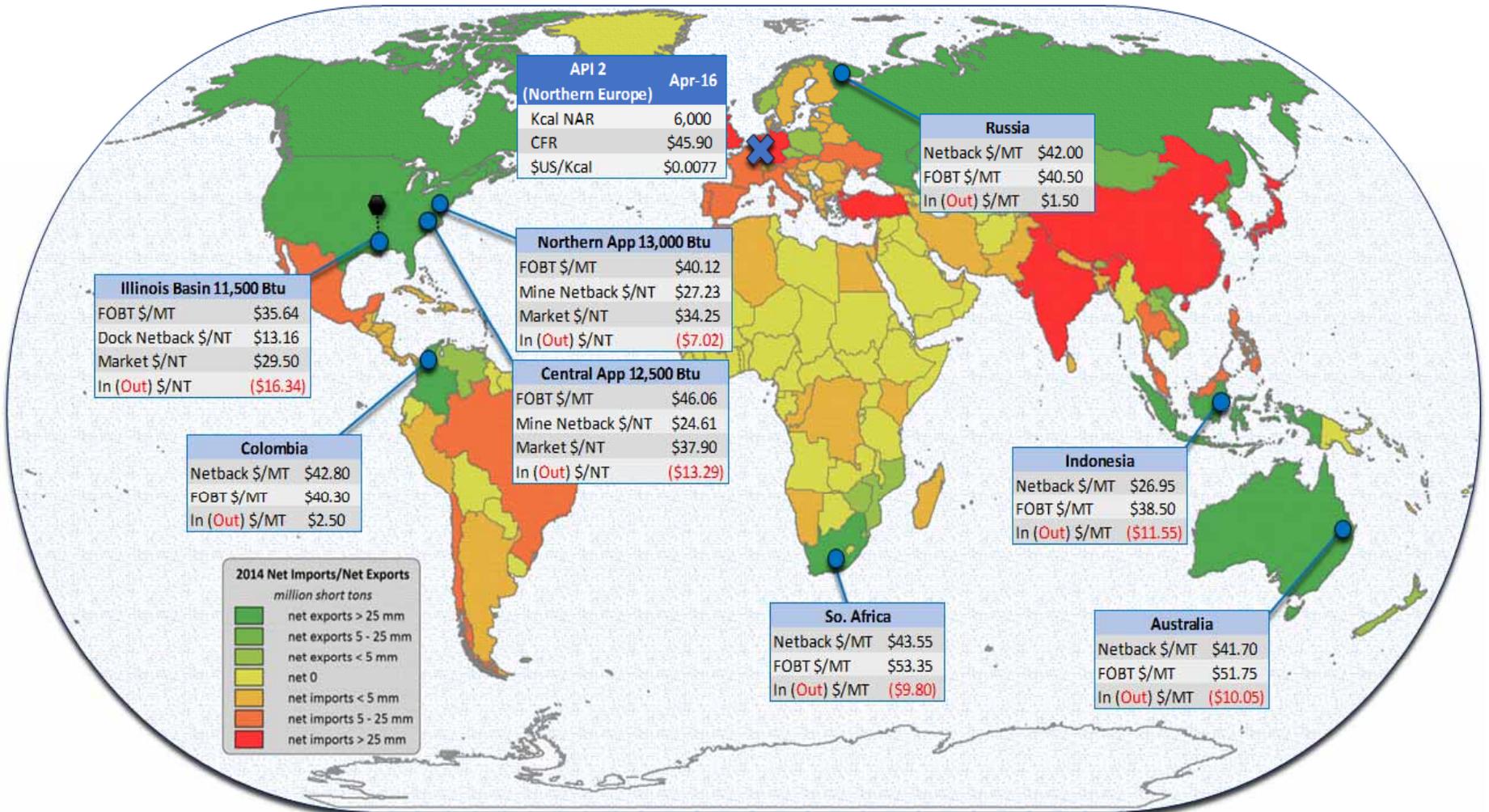
Wind and Coal Capacity by State



Potential Displacement of Coal by Wind at Normal Capacity Factor (000 tons)

NERC	Capp	ILB	<u>Napp</u>	PRB	Rockies	Gulf Lignite	Northern Lignite	Other	Total
MRO	0	97	28	14,422	28	0	6,941	981	22,497
NPCC	585	278	664	847	0	0	0	110	2,484
RFC	743	1,991	3,839	3,043	11	0	0	202	9,829
SERC	231	293	44	915	41	31	0	64	1,620
SPP	0	61	8	13,197	2	1,835	0	188	15,291
TRE	0	0	0	10,574	0	12,464	0	120	23,157
WECC	0	0	0	8,027	4,134	0	0	9,510	21,671
<b>Total</b>	<b>1,559</b>	<b>2,720</b>	<b>4,583</b>	<b>51,024</b>	<b>4,215</b>	<b>14,331</b>	<b>6,941</b>	<b>11,176</b>	<b>96,550</b>

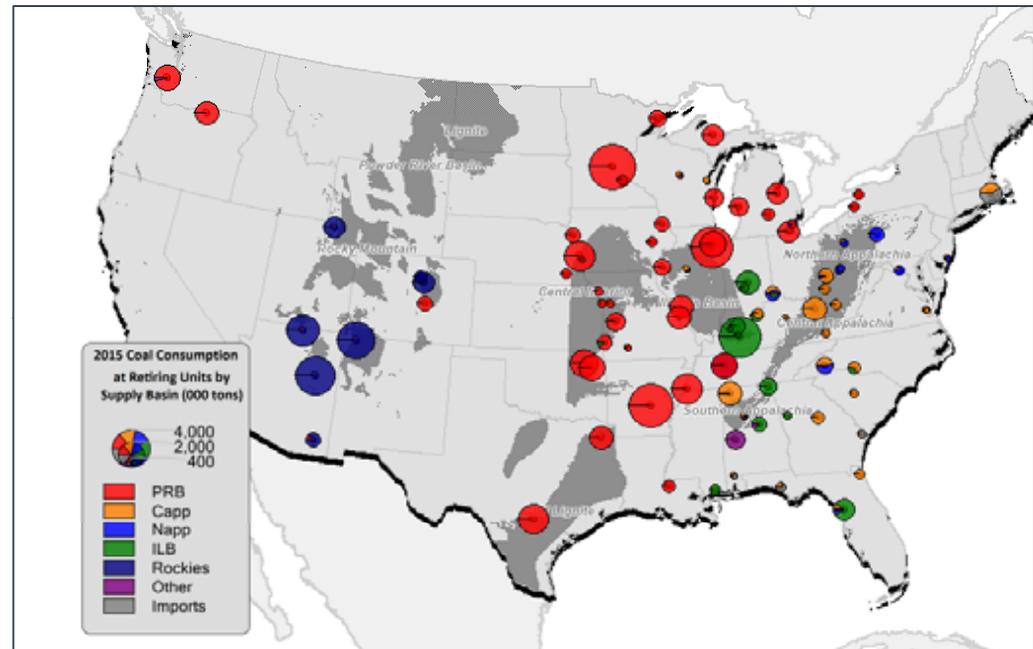
# Global Netbacks – U.S. ‘Out of the Money’



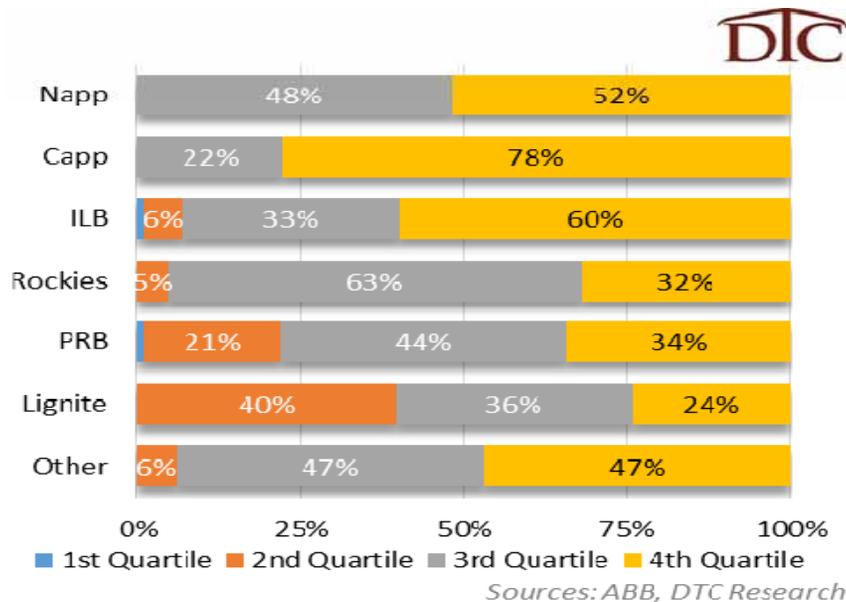
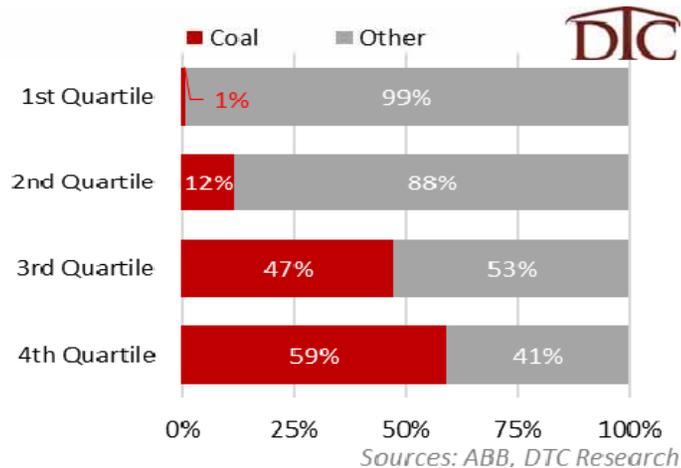
Sources: DTC data, Evolution Markets, FIS, CME, GlobalCoal, McCloskey, Lloyd's List, Tullett Prebon, Coaldesk, AxSMarine, SSY

# Coal consumption by retiring unit

- 22.0 GW shut down or refueled in 2015
- 12.8 GW set to retire or refuel in 2016 – 31 mm tons
- Between 2016 and 2025, 31.5 GW will disappear
- 61 mm tons consumed at units retiring between 2016 and 2020
  - PRB – 30 mm tons
  - Capp – 6 mm tons
  - Napp – 1.5 mm tons
  - ILB – 9 mm tons
- Peabody and Arch have 19 mm tons and 9 mm tons at risk, respectively

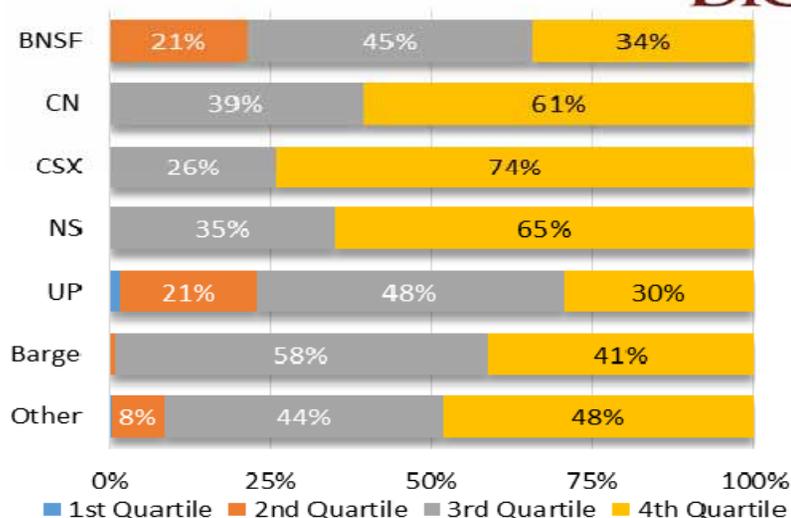


# Coal basin supply risk by quartile



- Analysis to quantify risk associated with coal units
- Generating units (all fuel types) were segregated by sub-NERC region
- Dispatch costs at each unit based on latest delivered fuel prices and basis differentials
- Units assigned a quartile ranking based on their order in the dispatch curve
  - 1<sup>st</sup> Quartile is best
  - 4<sup>th</sup> Quartile is worst
- We identified exposure to high dispatch cost units for basin, transport mode, coal supplier and consumer

# Coal basin supply risk by quartile (cont.)



- Risk exposure for transportation companies is least for PRB and ILB carriers
- NS is best positioned among eastern carriers
- Risk rating is on scale of 1 to 4

Sources: ABB, DTC Research

Transport	
Entity	Risk Rating
UP	3.05
BNSF	3.13
Other	3.39
Barge	3.40
CN	3.61
NS	3.65
CSX	3.74

Coal Supplier	
Entity	Risk Rating
ANR	3.02
ACI	3.04
BTU	3.16
CLD	3.24
WLB	3.38
Others	3.40
FELP	3.54
ARLP	3.65
CNX	3.99

Coal Basin	
Entity	Risk Rating
Lignite	2.85
PRB	3.11
Rockies	3.27
Other	3.41
Napp	3.52
ILB	3.52
Capp	3.78

Coal Consumers	
Entity	Risk Rating
Xcel	2.54
Berkshire	2.90
AEP	3.12
EnergyFuture	3.14
Dynegy	3.25
Southern	3.26
PPL	3.28
TVA	3.64
Duke	3.73
NRG	3.84

# Five Stages of Grief

- Denial
  - Trying to avoid the inevitable
    - Capital spending continued to occur
    - M&A activity accelerated for “bargain” hunters
    - Participants waited for natgas prices to rise again
- Anger
  - Frustrated outpouring of bottled-up emotion
    - Anger at Administration, EPA, environmentalists, other producers
- Bargaining
  - Seeking in vain for a way out
    - Cost cutting, production increases, deferments, high-grading, bankruptcy
- Depression
  - Final realization of the inevitable
    - Mood at industry events was at low point last year
- Acceptance and Hope
  - Finally finding the way forward
    - Production cuts, mine closures, consolidation

We are here.



# Summary

- Thermal markets reeling due to two primary factors: oversupply and competition from non-coal sources
  - Massive supply correction is underway
    - It's painful, but necessary
  - Non-coal sources are taking market share in an overall market that is flat
    - Natgas productivity rising, but production finally coming down
    - Wind is now 4.9% of power generation
  - Miners with low delivered cost will survive
  - Coal is at risk but association with low-quartile units minimizes risk exposure
  - Market sentiment appears to be somewhere between Depression and Acceptance stages

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