Throwing Big Coal Under the Busbar
by Protecting Clean Water, Clean Air and Public Health

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Powder River Basin Coal Mine
Virginia Coal Mine

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70% of Coal Plants Scheduled to Retire between 2010 and 2020 Consume Appalachian Coal

Plants Scheduled to Retire Between 2010 and 2020

- Plants Consuming 75-100% CAPP Coal
- Plants Consuming 25-75% CAPP Coal
- Plants Consuming 1-25% CAPP Coal
- Plants NOT Consuming CAPP Coal

50 MW → 1,500 MW Capacity (MW) Scheduled to Retire

Sources: Retirement Data from CoalSwarm; coal consumption and location data from 2008-2010 EIA Forms 923 & 860; Mapping and processing by OpenSourceCoal.org; Analysis by Appalachian Voices, March, 2013
Brattle coal plant retirement screening tool – details

Hourly Energy Prices
- Historical hourly shapes for each NERC subregion (LMPs and system lambdas)
- Recent forward price and annual growth rates from AEO generation costs

Hourly Dispatch of Coal Units
- 24-hour commitment horizon
- 3 modes: off, min load, max load

Variable Costs for Coal Units
- AEO regional coal prices
- Unit-specific VOM and start-up costs
- Additional VOM for operating control equipment

Flexible Revenues

Energy Revenues

Variable Costs (fuel, VOM)

Capacity Revenues

All-in cost of replacement power from gas CC/CT

Merchant Unit
Retire when PV(revenues) < PV(costs)

Regulated Unit
Retire when PV(coal costs) >> PV(gas CC/CT costs)

Output by Region
- Retired coal capacity
- Reduction in coal generation

CO₂ prices

CapEx for required controls (FGD/SCR/BH)

FOM Costs (as-is and for control equipment)

Note: Dashed lines and boxes represent factors and feedback effects that are planned to be incorporated into the model.
Delivered Cost of Coal to Regulated Utilities from 3 Major Coal-Producing Regions over the Last 25 Years

Sources: EIA Form 923 (and predecessor forms); Conversion to 2011 dollars from US Budget Section 10 - Gross Domestic Product and Implicit Outlay Deflators Analysis by Appalachian Voices, March, 2013
Cost of Coal Sales Reported by Arch Coal, 2001-2012

Displacement of Coal by Gas for Electricity Generation between 2008 and 2012 (Jan-Jun only)

2008 Average Dispatch Order for Southern Co. Plants

Variable Operating Cost ($/MWh)

Daily Peak Load:

Cumulative Capacity (MW)

Sources: data from SNL Briefing Book; Graphics and analysis generated by the SimpleDispatch model produced by Appalachian Voices.
2009 Average Dispatch Order for Southern Co. Plants

Daily Peak Load:
Average

10%  90%

Sources: data from SNL Briefing Book; Graphics and analysis generated by the SimpleDispatch model produced by Appalachian Voices.
Simplified Appalachian Coal Mine Cost Curve

Cost of Production ($/ton)

Surface Mines

Underground Mines

Profit

Demand

Marginal Producer

Price

Cost

Demand

Surface Mines

Underground Mines

Profit

Marginal Producer

Price

Surface Mines

Underground Mines
Simplified Appalachian Coal Mine Cost Curve

Cost of Production ($/ton)

Million tons/yr productive capacity

Surface Mines

Underground Mines

Demand

Price

$25 $50 $75 $100 $125

50 100 150 200 250

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Cost of Production ($/ton)

Surface Mines
Underground Mines

Demand
Price

Million tons/yr productive capacity

$25 $50 $75 $100 $125

50 100 150 200 250

Surface Mines
Underground Mines
Impending Rules that Could Impact the Life-Cycle ("Busbar") Cost of Coal

Mining

EPA: Standards for Conductivity & Selenium (No schedule)

OSM: Stream Protection Rule (2013-2014)

Processing

OSM: Minefill Rule (2014?)

+ Lawsuits!!!
GOP Gained in 95% of Coal Counties From 2008 to 2012

United States Average: R+ 4.6%
Coal County Average: R+ 9.8%

Increase in Republican Presidential Vote Margin between 2008 and 2012
- R + 25% or more
- R + 20 - 25%
- R + 15 - 20%
- R + 10 - 15%
- R + 5 - 10%
- R + 0 - 5%
- Democratic Increase

Coal Mines Employing an Average of 5 or More Miners Between 2007 and 2012 (size proportional to employment)


Produced by Appalachian Voices, Nov, 2012.