

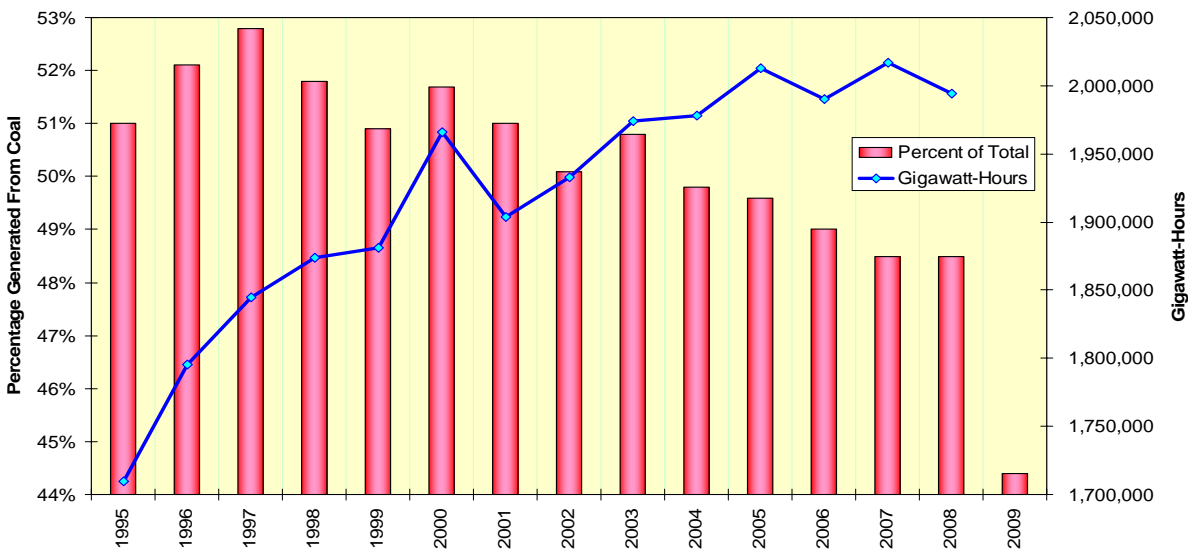
## Coal Has A Strong Steel Linkage

Coal is really hard to love. Nowhere in the world is it mined without either major disruption to the surface for open-pit processes or dangerous conditions for the underground miners in shaft processes. Its transportation either by barge or railcar is by its very nature fuel-intensive, and every idea to turn it into slurry for pipeline transport runs into water-related issues. Coal gasification and liquefaction, by either direct or indirect (Fischer-Tropsch) methods run into the tyranny of thermodynamics: It is much more efficient to simply burn the raw coal.

Once coal is burned, you have solid, or slag issues; while firms such as Headwaters have turned the silicate fly ash into a substitute for Portland cement, fly ash is a high-bulk and low-value commodity. Finally, there is the great issue of gaseous pollution; scrubbing of sulfur dioxide has been going on for decades as the science truly was settled. Nitrous oxides and other waste gases have received less attention, and then there is carbon dioxide. Let's just say it would be nice to examine this issue through an impartial scientific lens as opposed to a political lens for a change. For the record, I think (and thought prior to the present scandal involving suppression of dissenting research) the jury is still out on this issue, an agnostic stance that seems to anger everyone.

But we cannot live without coal unless we are willing to live without electricity. According to the Energy Information Administration, coal is responsible for 44.4% of electricity generated year-to-date. While this is down from levels of recent years, some of this may be recession-related. More important, though, is the overall trend in total gigawatt-hours of electricity generated from coal: It is rising here and worldwide. As the EIA projects an average annual growth rate in coal consumption of 0.8% until 2030, total coal use here and worldwide will continue to rise.

Coal's Shrinking Piece Of An Expanding Pie



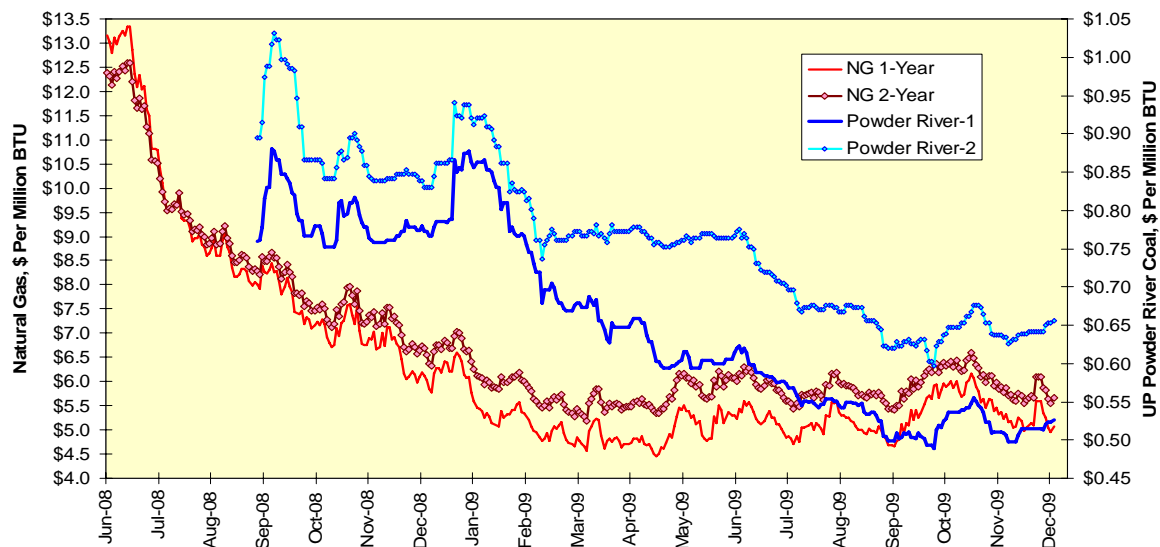
### Comparison To Natural Gas

The question should arise whether the present supply glut of natural gas will affect coal prices. The Clintonesque answer must be, "Depends on what you mean by coal prices." While both the petroleum and natural gas markets are linked with a maze of pipelines, most of which only move in one direction, coal is a series of separate production markets, the largest two of which are the Powder River Basin in Wyoming and Montana and the Central Appalachian market, primarily in West Virginia and Kentucky (the Big Sandy River defines part of the border between the two states). The two regions' prices behave differently.

As I discussed in [August](#), it is critical we look at natural gas prices not in terms of the front-month but rather as a strip of prices. Not only does this smooth out the seasonality in the market, but it allows us to match a forward price in a commodity with the forward-looking equity market. In addition, we should remain mindful that while natural gas trades daily rather actively, most coal is bought and sold on long-term contracts. The two markets have a bit of a tortoise-and-hare relationship.

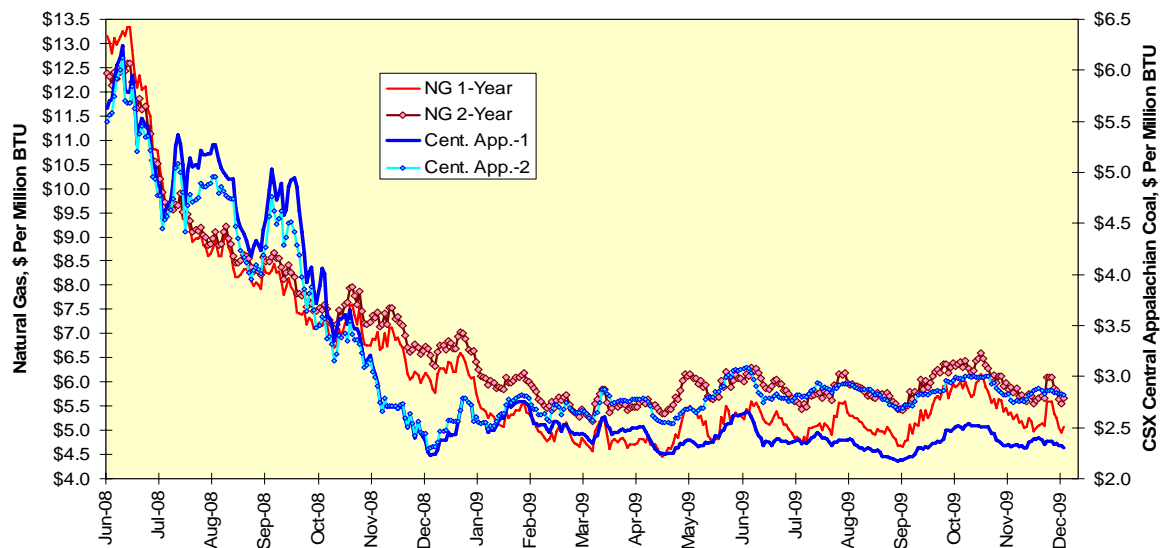
If we compare the one- and two-year Union Pacific strip prices against similar prices for natural gas, we do not see a significant correlation between the two over the short period of time when the coal strip prices have been available. Second-year Powder River coal has been particularly slow in converging downward in competition with second-year natural gas strips.

**Comparative Forward Prices: Natural Gas Vs. Powder River Coal**



Now let's shift the analysis to CSX' Central Appalachian strips; here the correlation is tight and is available for one and all to see. This tells us the Central Appalachian market is more spot-price oriented and production from the many deep-shaft mines in the region can be turned on and off relatively quickly.

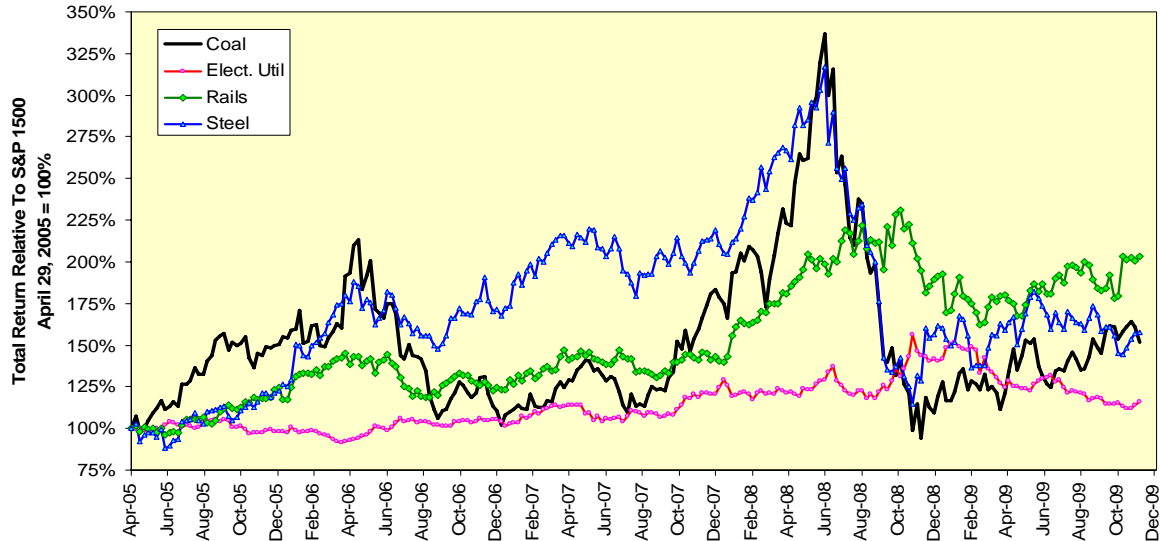
**Comparative Forward Prices: Natural Gas Vs. Central Appalachian Coal**



**The Equity Link**

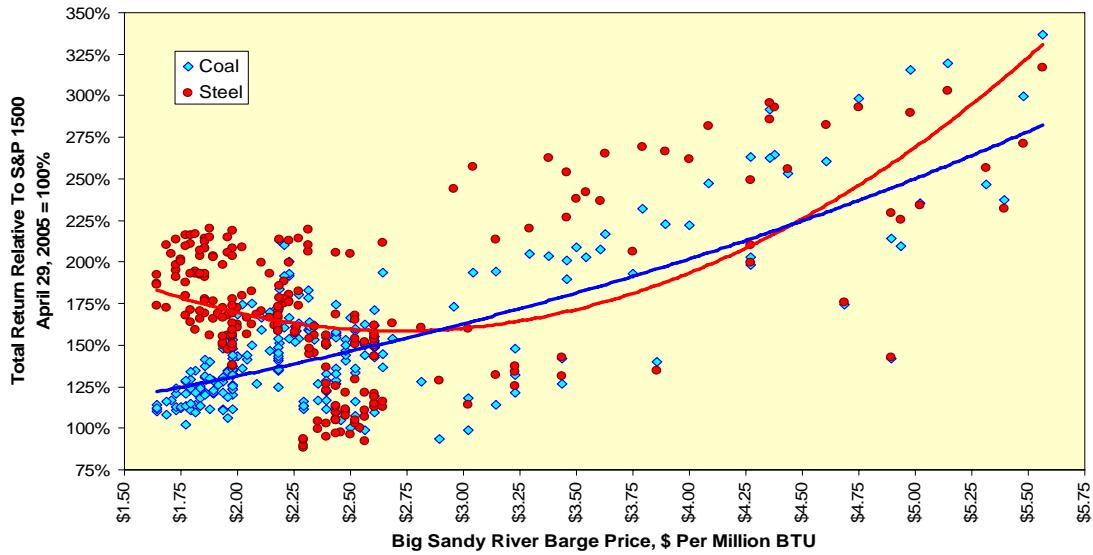
Now let's take a look at four industries with strong links to coal, coal itself, electric utilities, railroads and steel and track their total returns relative to the S&P 1500 Supercomposite back to the end of April 2005. The coal and steel groups both jumped higher going into coal's 2008 peak and both fell together as the market broke. Neither the rail nor electric utility groups were as linked to coal prices over time. For the record, the coal group consists of Arch Coal, Consol Energy, Massey Energy, Patriot Coal and Peabody Energy. The steel group consists of AK Steel, Allegheny Technologies, AM Castle, Carpenter Technology, Cliffs Natural Resources, Commercial Metals, Nucor, Olympic Steel, Reliance Steel, Steel Dynamics, U.S. Steel and Worthington Industries.

### Relative Performance Of Coal-Linked Industries



Now if we map the relative total returns for the coal and steel groups against the Big Sandy River barge price, we see a quadratic relationship for the steel group as opposed to a linear one for the coal group. The global steel boom created a demand for the more expensive grades of metallurgical coal; we can state the strong performance for the steel group came as its demand growth allowed it to absorb higher metallurgical coal prices. The coal group had no such value-added proposition to the price of coal itself.

Relative Industry Performance As Function Of Coal Price:  
Big Sandy River



This link to steel is rather like natural gas' link to the petrochemical and fertilizer industries; both are beyond reasonable substitution (petroleum coke is a viable substitute for coal coke in areas where refineries are near steel mills, however). While the world has excess steel-making capacity and well as excess natural gas for now, both are factored into the price of coal already. Barring a crash in global steel demand and an accelerated shift away from coal in electricity generation, we should see coal stocks continue to outperform.