

Coal price volatility is here to stay

**Ninth Annual Washington Energy Policy Conference**

**Higher Energy Prices: New Paradigms and Policy Responses**

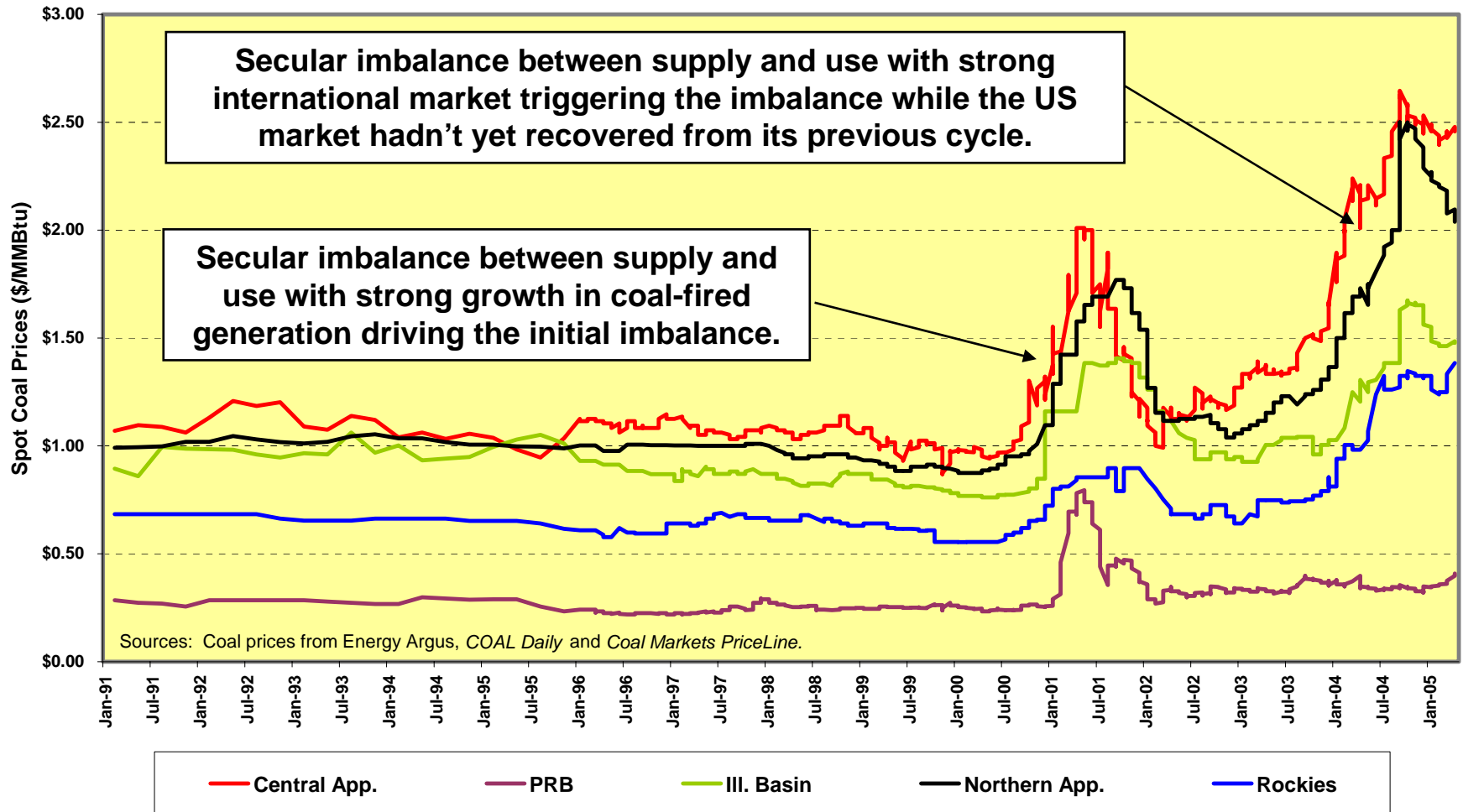
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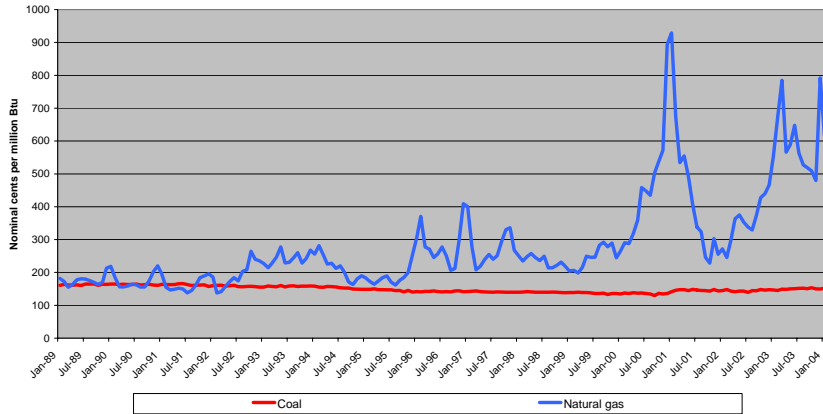
**April 26, 2005**

# Spikes in coal spot prices have become an inherent characteristic of the coal market

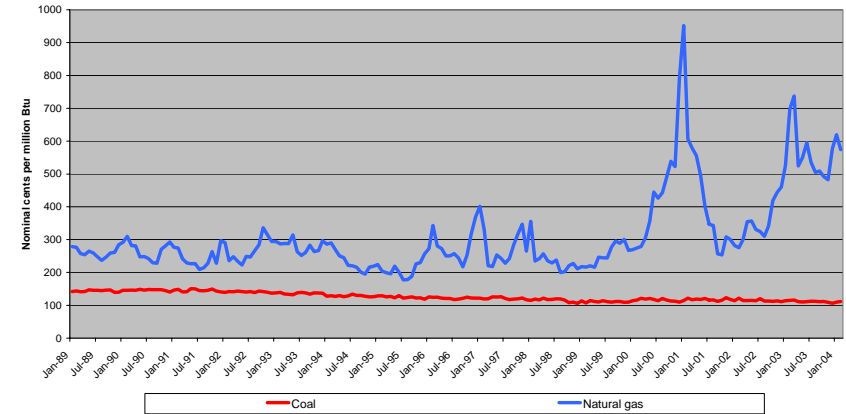


# Delivered coal prices have remained stable compared with delivered natural gas prices to generators

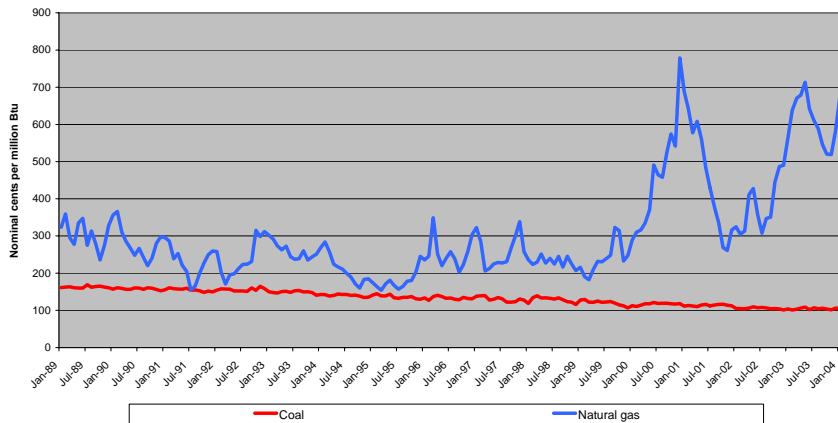
Delivered Coal and Natural Gas Costs to Electric Utilities in SERC From January 1989 Through February 2004 (in nominal dollars)



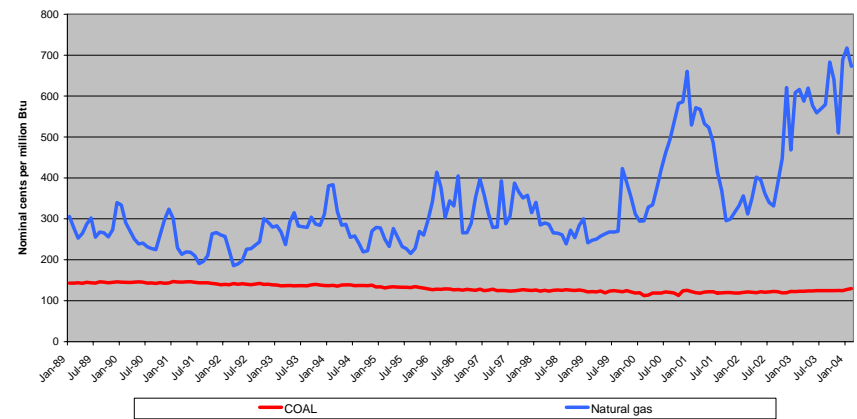
Delivered Coal and Natural Gas Costs to Electric Utilities in SPP From January 1989 Through February 2004 (in nominal dollars)



Delivered Coal and Natural Gas Costs to Electric Utilities in MAIN From January 1989 Through February 2004 (in nominal dollars)



Delivered Coal and Natural Costs to Electric Utilities in ECAR From January 1989 Through February 2004 (in nominal dollars)



Sources: Coaldat and Bloomberg.



## U.S. coal supply became less flexible during the last decade

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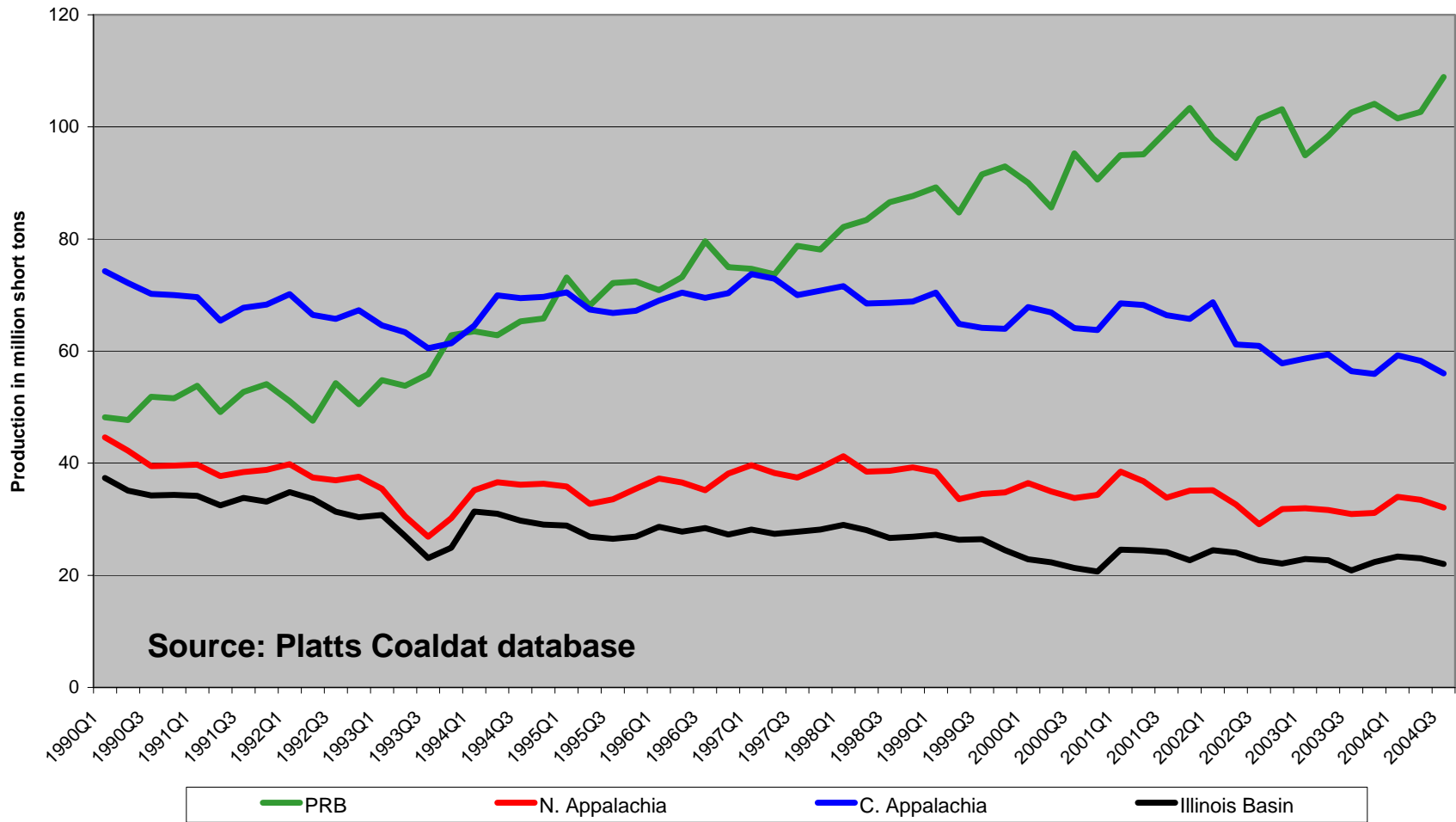
- **Coal supply is becoming increasingly inelastic in the short term.**
  - Operations are in production nearly all available hours.
  - Management is unwilling to add additional sections or shifts for short periods. Some weekend work already in most schedules.
  - Highly productive mining technologies are not flexible and create significant variations in production when they have problems.
  - Closing of high cost mining operations.
  - Less idle capacity is available to meet surges of demand or to replace production from other mines.
- **The number of small mines has decreased dramatically.**
  - In Central Appalachia, there were 1,162 small mines producing a total of 80.2 million tons of coal in 1989; today there are only 367 small mines producing 26.8 million tons.
- **Physical shock absorbers have been taken out of the supply system.**

## Higher concentration and more publicly-traded companies in US coal industry changed focus

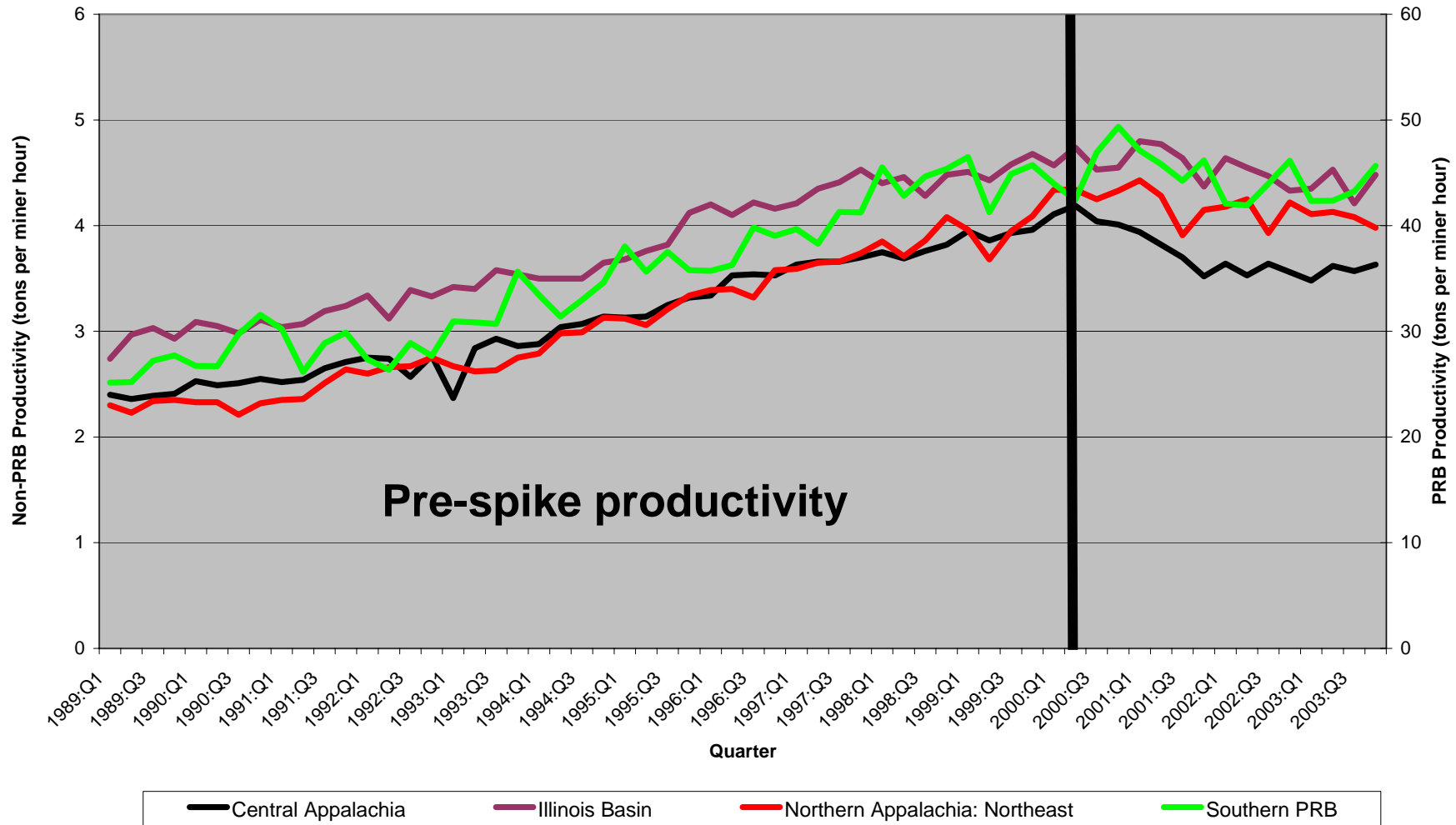
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- **Nationwide, the top 10 coal producers controlled 33% of total US coal production in 1989, 41% in 1994, 60% in 1999 and 64% in 2003.**
- **Publicly traded coal companies now account for more than half of the nation's coal supply.**
  - More publicly traded coal companies are on the way.
- **Effects of these changes on coal markets:**
  - Coal companies have become more focused on profitability rather than incremental production for its own sake.
  - Coal companies are faced with greater focus on (and accountability for) short-term earnings.
  - Coal companies must be more sensitive to Wall Street sentiment.
    - Shutting in capacity has boosted coal companies' stock prices even though it increases fixed costs per ton in the short term, and makes it more difficult/costly to attract new workers to the coal industry over the long term.

# PRB production growing while other regions decline



# Regional coal miner productivity declined and mining costs increased with initial spot price spike in 2000



# Public coal companies have not performed well financially as costs have increased faster than revenue

## Operating Margin\*

| <b>Company</b> | <b>2000</b> | <b>2001</b> | <b>2002</b> | <b>2003</b> |
|----------------|-------------|-------------|-------------|-------------|
| Arch Coal      | 5.30%       | 4.20%       | 1.90%       | 2.70%       |
| CONSOL Energy  | 4.60%       | 7.80%       | -1.90%      | -1.40%      |
| Massey Energy  | 8.50%       | 0.70%       | -1.60%      | -1.10%      |
| Peabody Energy | 5.30%       | 5.50%       | 6.40%       | 5.10%       |

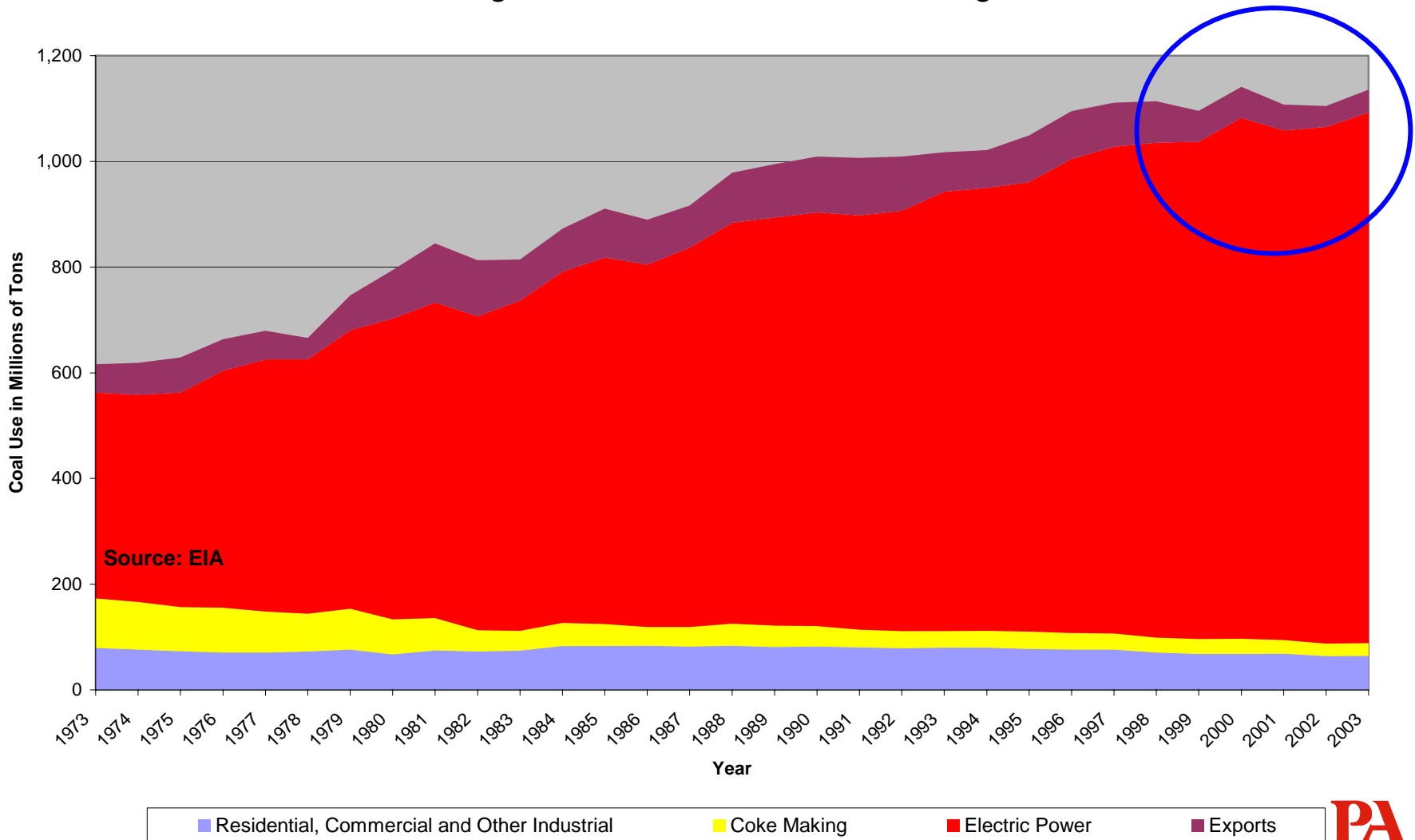
\* operating income / total revenue

Source: Daniel Roling "Coal-Burning Issues" Merrill Lynch (April 13, 2004)



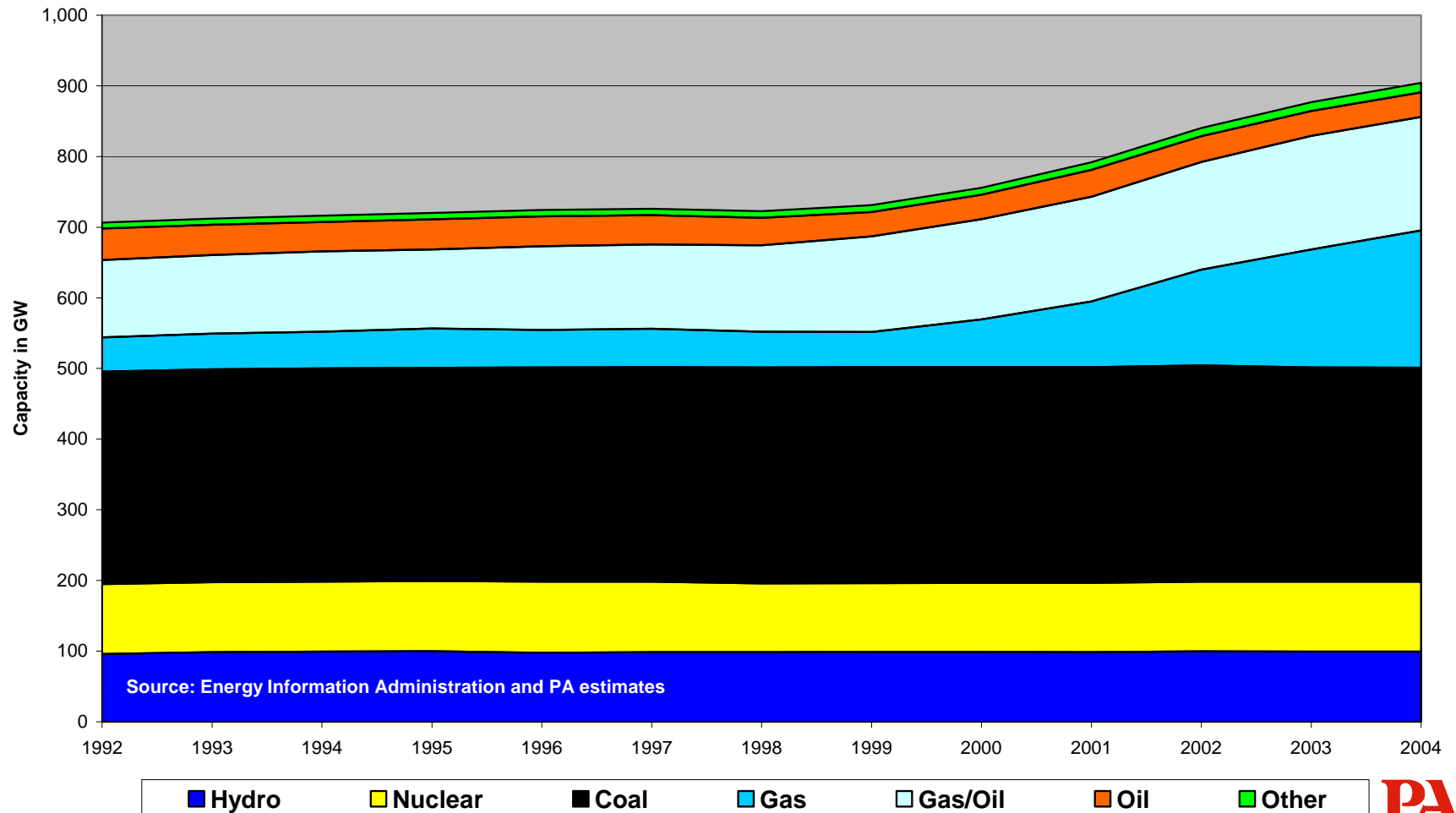
# Coal's primary market in U.S. is electric power

Growth in electric power generation stagnated from 1998 through 2002. Growth resumed in 2003 reaching 1.004 billion tons and achieving a further increase in 2004.



# Only significant growth in US electric generating capacity since 1992 was gas combined cycle units

The electric power sector started the 1990s with excess generating capacity and spent most of the decade working off the excess. It then began the next decade by building an excess of gas CC units.



# Coal-fired generation not growing as fast as total generation – gas-fired generation growing faster

| Generation Source        | Monthly Generation<br>(Billion kWh) |                | Percent<br>Change | Average Daily<br>Generation (Billion<br>kWh) |               | Percent<br>Change |
|--------------------------|-------------------------------------|----------------|-------------------|--|---------------|-------------------|
|                          | 2003                                | 2004           |                   | 2003   | 2004          |                   |
| Coal                     | 1,973.7                             | 1,976.3        | 0.13%             | 5.407  | 5.400         | -0.14%            |
| Natural Gas              | 649.9                               | 699.6          | 7.65%             | 1.781  | 1.912         | 7.35%             |
| Petroleum Liquids        | 102.7                               | 99.0           | -3.61%            | 0.281  | 0.271         | -3.87%            |
| Petroleum Coke           | 16.7                                | 18.6           | 11.34%            | 0.046  | 0.051         | 11.04%            |
| Nuclear                  | 763.7                               | 788.6          | 3.25%             | 2.092  | 2.155         | 2.97%             |
| Conventional Hydro       | 275.8                               | 269.6          | -2.24%            | 0.756  | 0.737         | -2.50%            |
| Other                    | 100.6                               | 101.7          | 1.08%             | 0.276  | 0.278         | 0.80%             |
| <b>Total</b>             | <b>3,883.2</b>                      | <b>3,953.4</b> | <b>1.81%</b>      | <b>10.639</b>                                | <b>10.802</b> | <b>1.53%</b>      |
| <b>Fuel Use</b>          |                                     |                |                   |  |               |                   |
| Coal (million tons)      | 1,014.1                             | 1,029.6        | 1.53%             | 2.778  | 2.813         | 1.25%             |
| Natural Gas (billion cf) | 5,616                               | 6,020          | 7.20%             | 15.387                                       | 16.449        | 6.90%             |
| Pet Coke (million tons)  | 6.303                               | 7.497          | 18.94%            | 0.017  | 0.020         | 18.62%            |

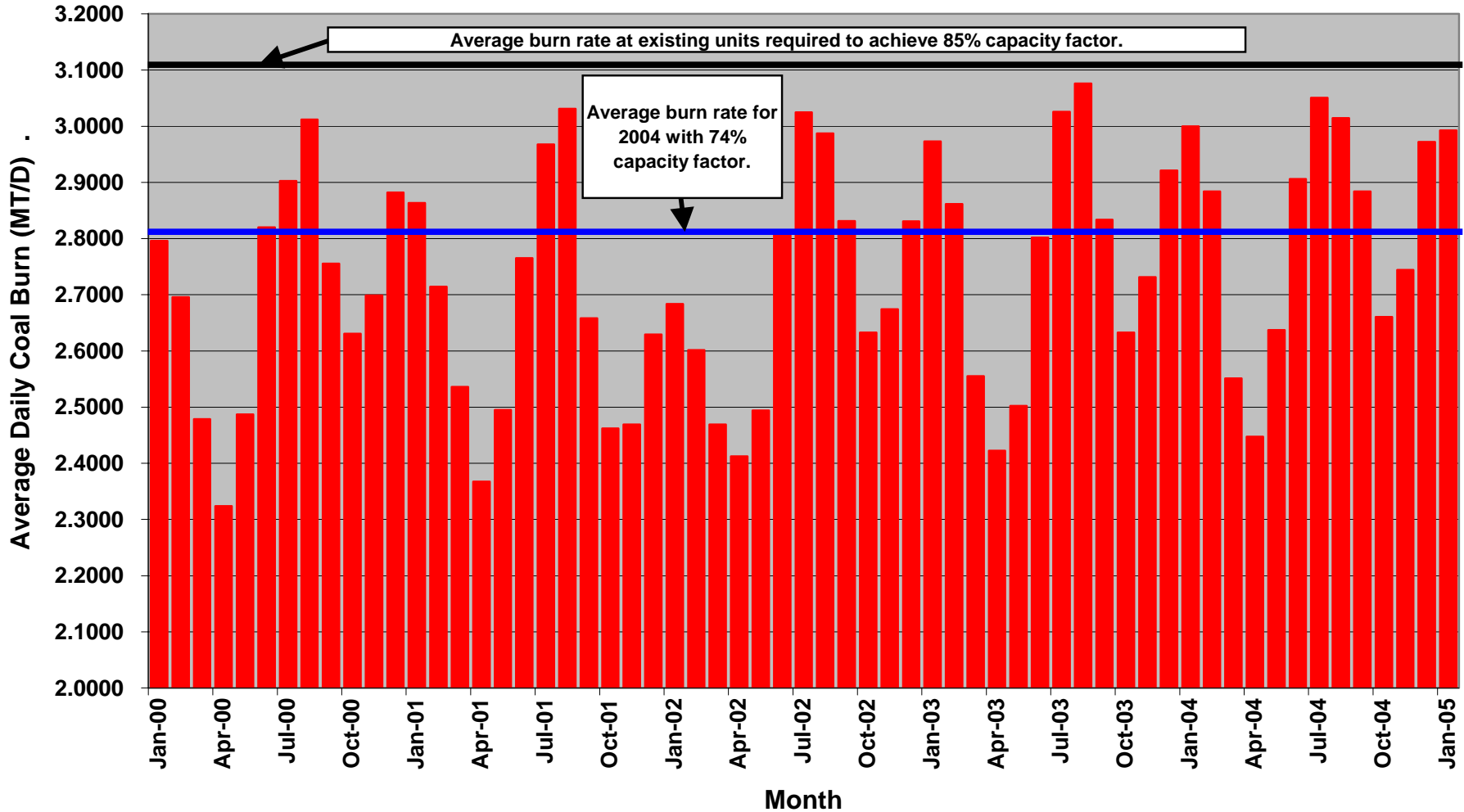
Source: EIA Electric Power Monthly

# Coal-fired generation declined in South Atlantic in 2004 with gas-fired generation growing by 18%

| <u>Generation Source</u> | <u>Monthly Generation (Billion kWh)</u> |              | <u>Percent Change</u> | <u>Average Daily Generation (Billion kWh)</u> |              | <u>Percent Change</u> |
|--------------------------|---|--------------|-----------------------|---|--------------|-----------------------|
|                          | <u>2003</u>                             | <u>2004</u>  |                       | <u>2003</u>                                   | <u>2004</u>  |                       |
| Coal                     | 422.0                                   | 411.4        | -2.53%                | 1.156   | 1.124        | -2.80%                |
| Natural Gas              | 83.4                                    | 98.6         | 18.27%                | 0.228   | 0.269        | 17.95%                |
| Petroleum Liquids        | 44.5                                    | 42.3         | -4.88%                | 0.122   | 0.116        | -5.14%                |
| Petroleum Coke           | 6.6                                     | 7.2          | 10.17%                | 0.018   | 0.020        | 9.87%                 |
| Nuclear                  | 194.1                                   | 199.2        | 2.62%                 | 0.532   | 0.544        | 2.34%                 |
| Conventional Hydro       | 21.1                                    | 15.9         | -24.70%               | 0.058   | 0.043        | -24.90%               |
| Other                    | 16.2                                    | 15.7         | -2.89%                | 0.044   | 0.043        | -3.16%                |
| <b>Total</b>             | <b>787.8</b>                            | <b>790.2</b> | <b>0.31%</b>          | <b>2.158</b>                                  | <b>2.159</b> | <b>0.04%</b>          |
| <u>Fuel Use</u>          |   |              |                       |   |              |                       |
| Coal (million tons)      | 173.1                                   | 174.0        | 0.50%                 | 0.474   | 0.475        | 0.22%                 |
| Natural Gas (billion cf) | 671                                     | 777          | 15.90%                | 1.838   | 2.124        | 15.58%                |
| Pet Coke (million tons)  | 2.236                                   | 2.585        | 15.61%                | 0.006   | 0.007        | 15.29%                |

Source: EIA Electric Power Monthly

# Average daily coal burn by month: peak generation near maximum; off-peak months are rising some



Source: Energy Information Administration



The coal industry is facing a dilemma --  
short-term profitability versus long-term stability

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**Current high spot coal prices are a result of a short-term cyclical imbalance that results from:**

- low profitability for Appalachian coal producers and declining coal production,
- limited availability of bituminous coals from other regions and countries to replace Appalachian supply, and
- an extremely tight international metallurgical coal market bidding up the price for high quality, bituminous steam coals for use as coking coals.

**Spot coal prices are likely to continue to be volatile because of changes in coal industry structure.**

**Extensive coal reserves are available for development at costs close to current marginal mine development costs in the Illinois Basin, the Powder River Basin (PRB) and, to a lesser extent, Northern Appalachia.**

- Coal-on-coal competition should keep long-term coal prices from rising significantly from cost-based levels, but will s-t profitability slow development?
- Environmental requirements could boost the cost to the consumer, particularly if mandatory CO<sub>2</sub> limits are enacted.
- If long-term coal prices rise substantially, growth in coal use could be greatly dampened.



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