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Coal Supply and Demand Fundamentals

Carnegie Mellon University, Electricity Industry Center
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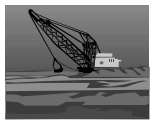
Platts Research & Consulting/RDI

Presentation Outline

- Background: Coal 101
- Current state of the industry
- Major market drivers for coal

Basic Coal Information



- Supply
  - Supply Regions
  - Companies
  - Mines and Mining Methods
  - Production
  - Productivity and Employment
  - Costs
  - Supply-Side Regulatory Issues

- Demand
  - Demand and Consumption by Market Sector
  - As-Received Quality
  - Consuming Companies and Facilities
  - Current and Future Technologies for Coal Utilization
  - Demand-Side Regulatory Issues

- Prices

- Transportation
  - Type
    - Rail
    - Barge
    - Truck
    - Belt/other
  - Distance
  - Cost

- Environmental
  - Emissions
  - Allowances
  - Emission Control Technology

- Forecasts

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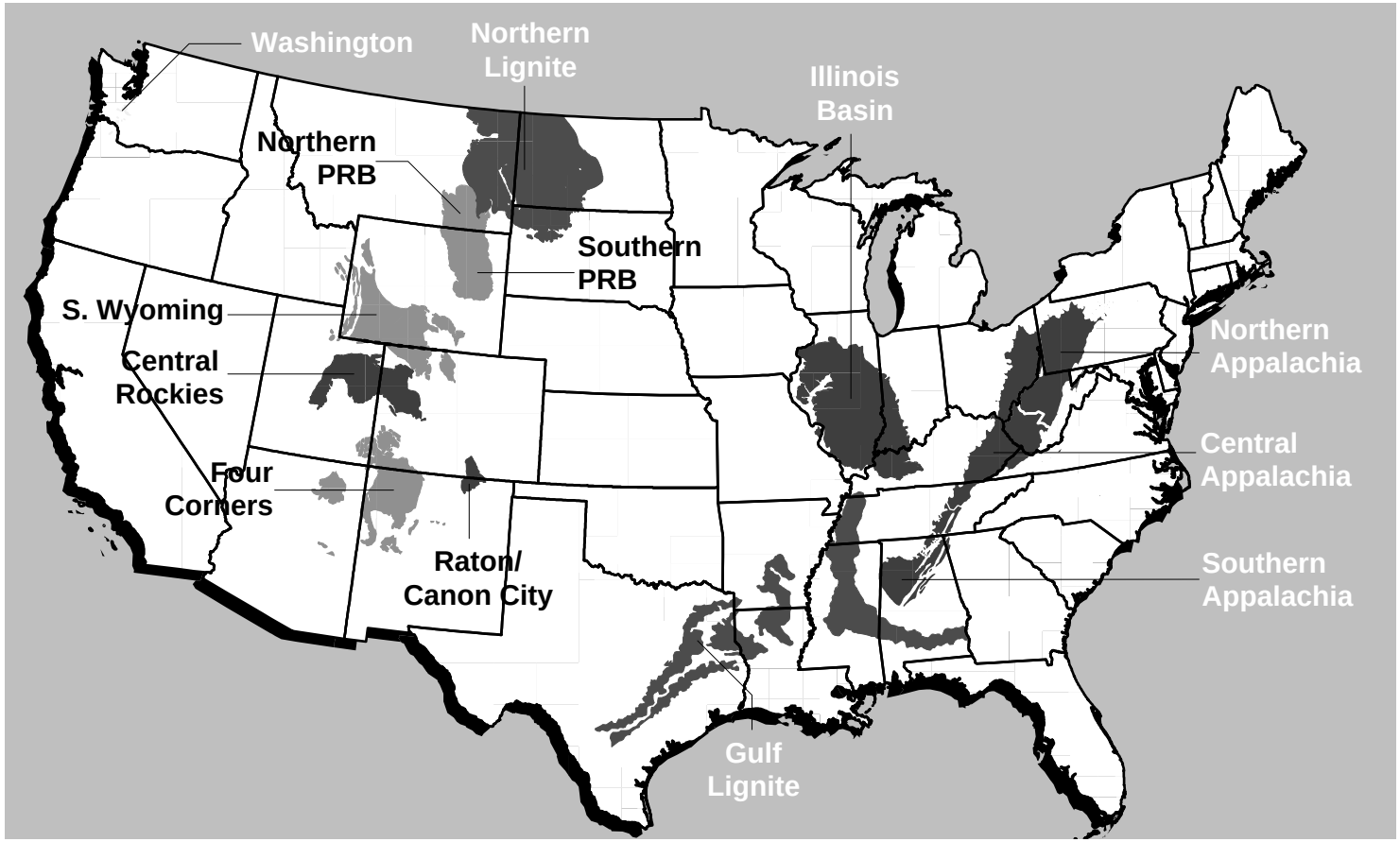
U.S. Coal Supply Regions



Source: PowerMAP

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Coal Quality is Highly Variable

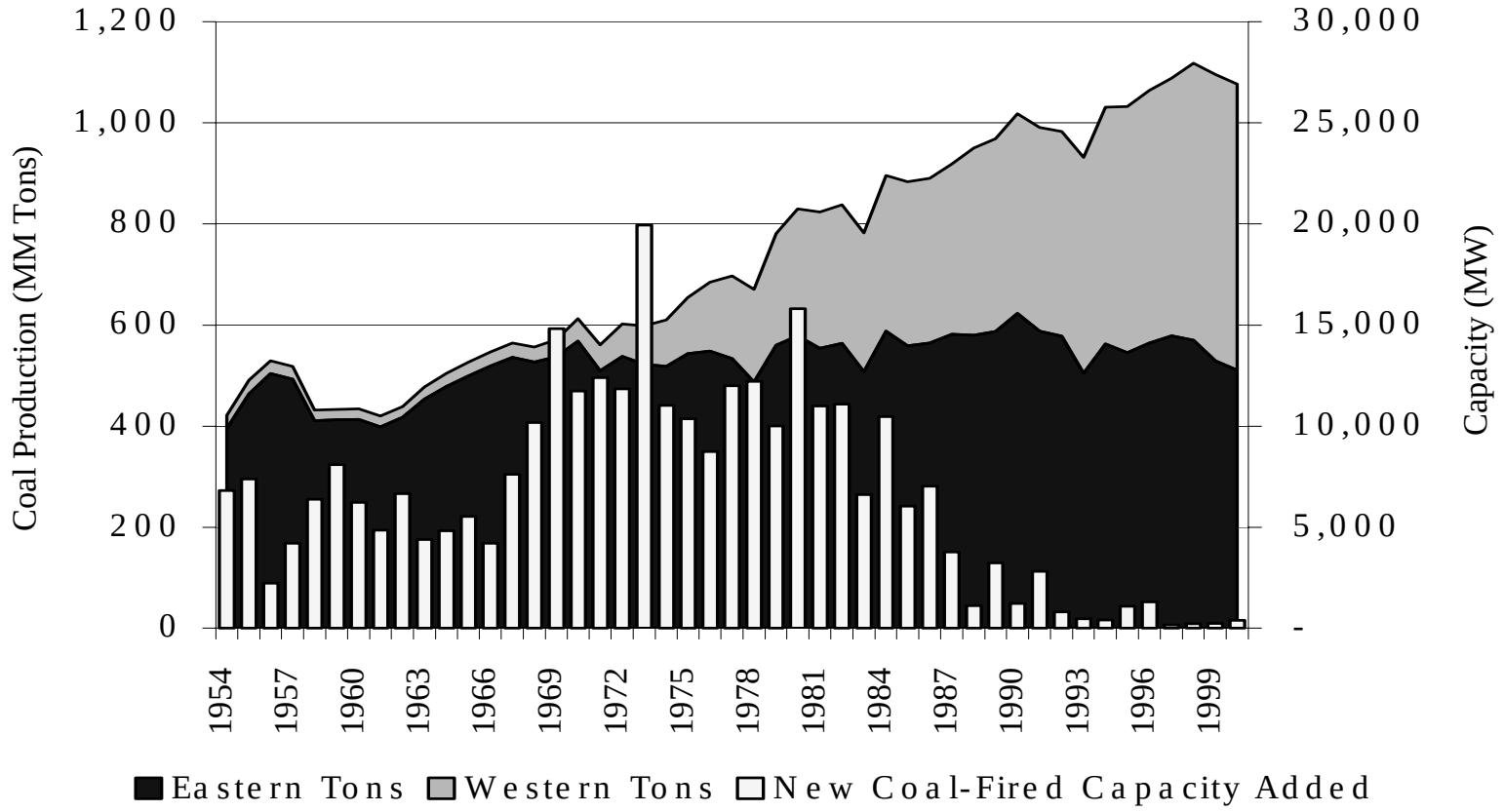
Average Coal Quality (As-Received), 2000-02

Coal Supply Region	Btu/lb.	Lb. SO_2/MMBtu	% Ash
East			
Northern Appalachia	12,423	3.84	10.88
Central Appalachia	12,405	1.48	10.77
Southern Appalachia	12,104	1.89	12.86
Illinois Basin	11,316	4.37	10.08
West			
Northern Powder River Basin	9,068	1.13	6.56
Southern Powder River Basin	8,655	0.70	5.09
Central Rockies	11,426	0.84	8.73
Four Corners	9,971	1.29	15.92
Gulf Lignite	6,438	3.35	16.58
Northern Lignite	6,532	2.25	9.52

Source: COALdat

U.S. Coal Industry Expansion

U.S. Coal Production and Generating Capacity Additions, 1954 - 2000



Source: U.S. Energy Information Administration

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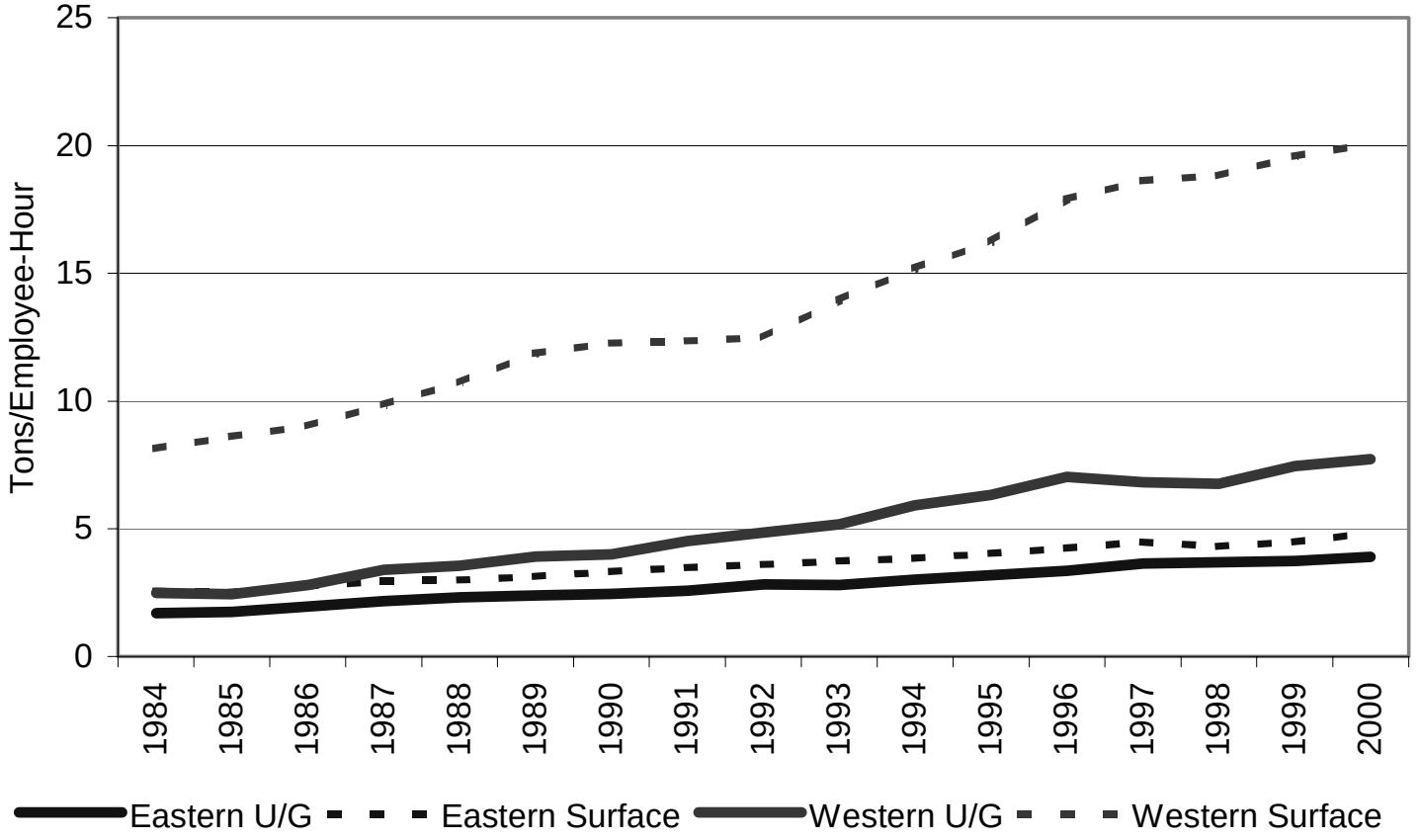
Rapid Productivity Growth

U.S. Coal Mine Productivity, 1984 - 2000



Source: U.S. Energy Information Administration

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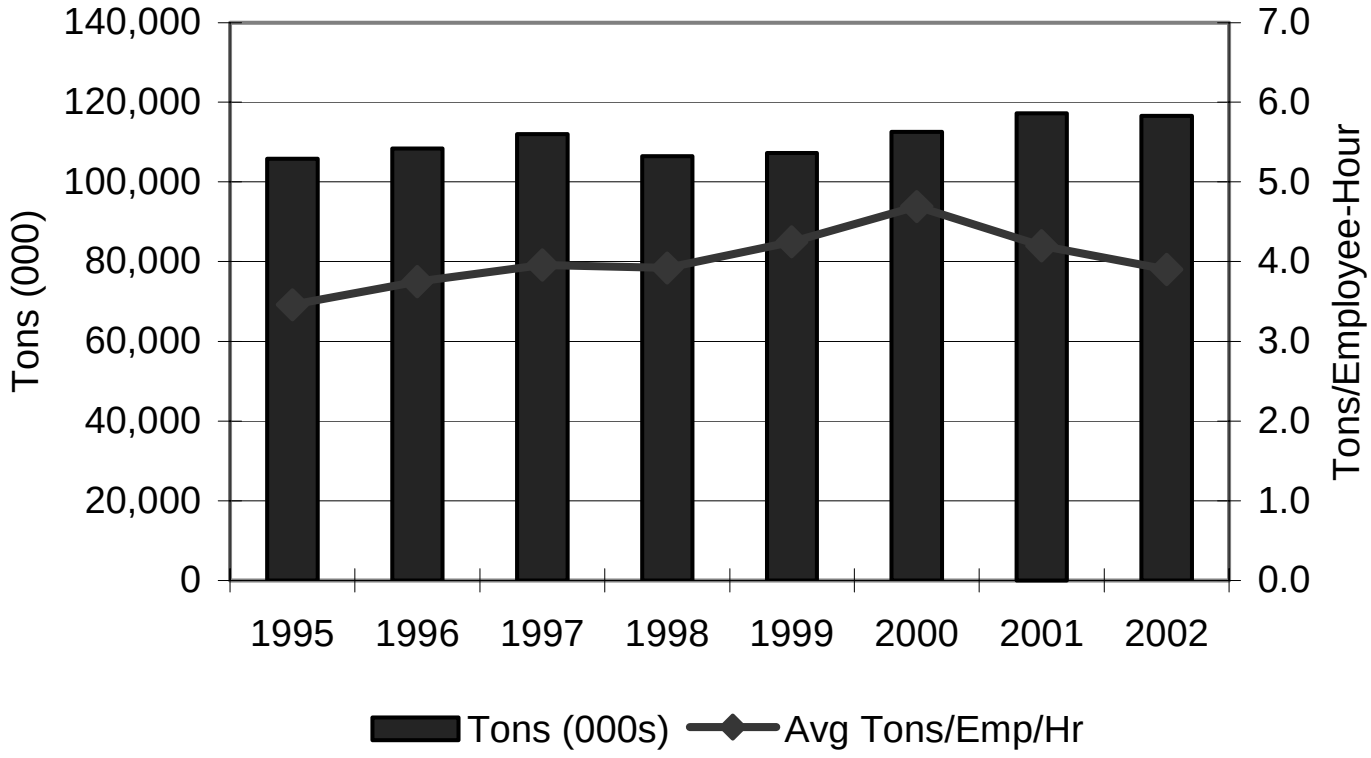
Factors Influencing Productivity

- Technological
  - Underground
    - Longwalls
    - Advancements in continuous miners
    - Computerization and automation
  - Surface
    - Larger haul trucks
    - Draglines
    - Mountaintop mining
    - Computerization and automation
  - Other
    - On-line analyzers
    - Improvements in coal handling systems
- Labor
  - Training
  - Declining influence of the union
- Regulation

CAPP Surface Mines

CAPP Surface Mine Production and Productivity, 1995 – 2002 (Est.)



Source: COALdat

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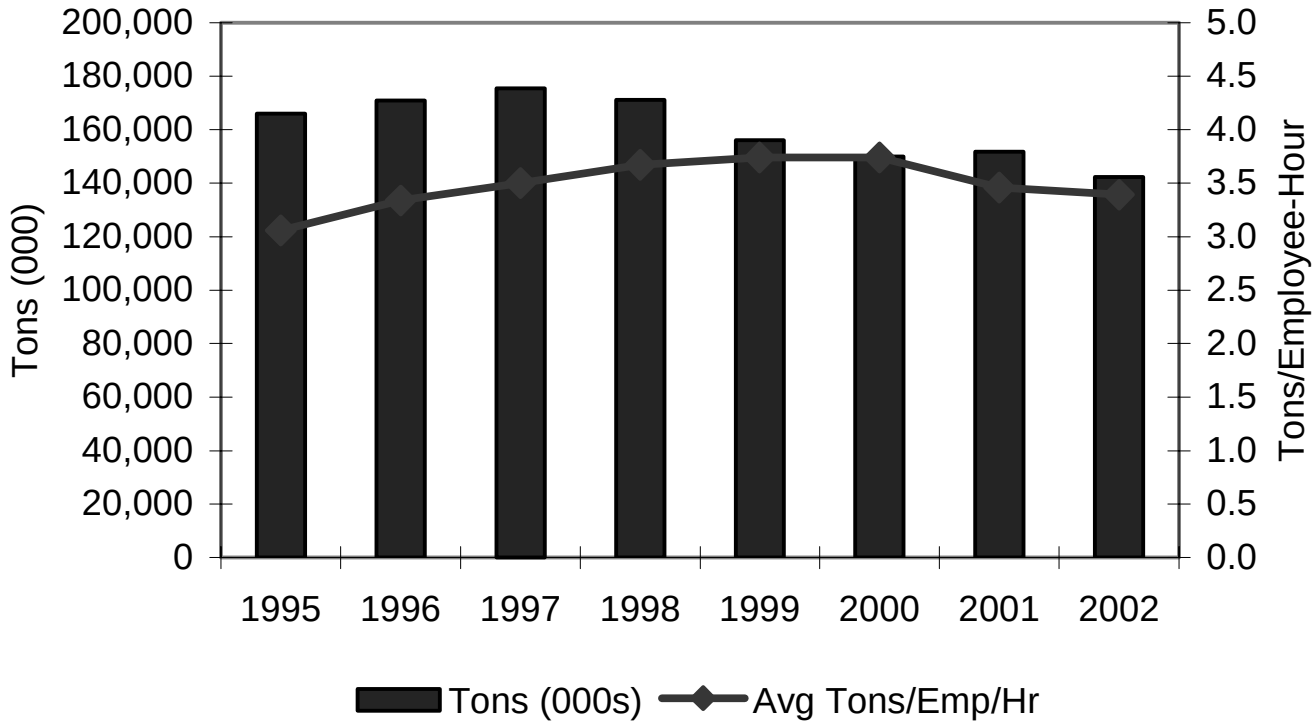
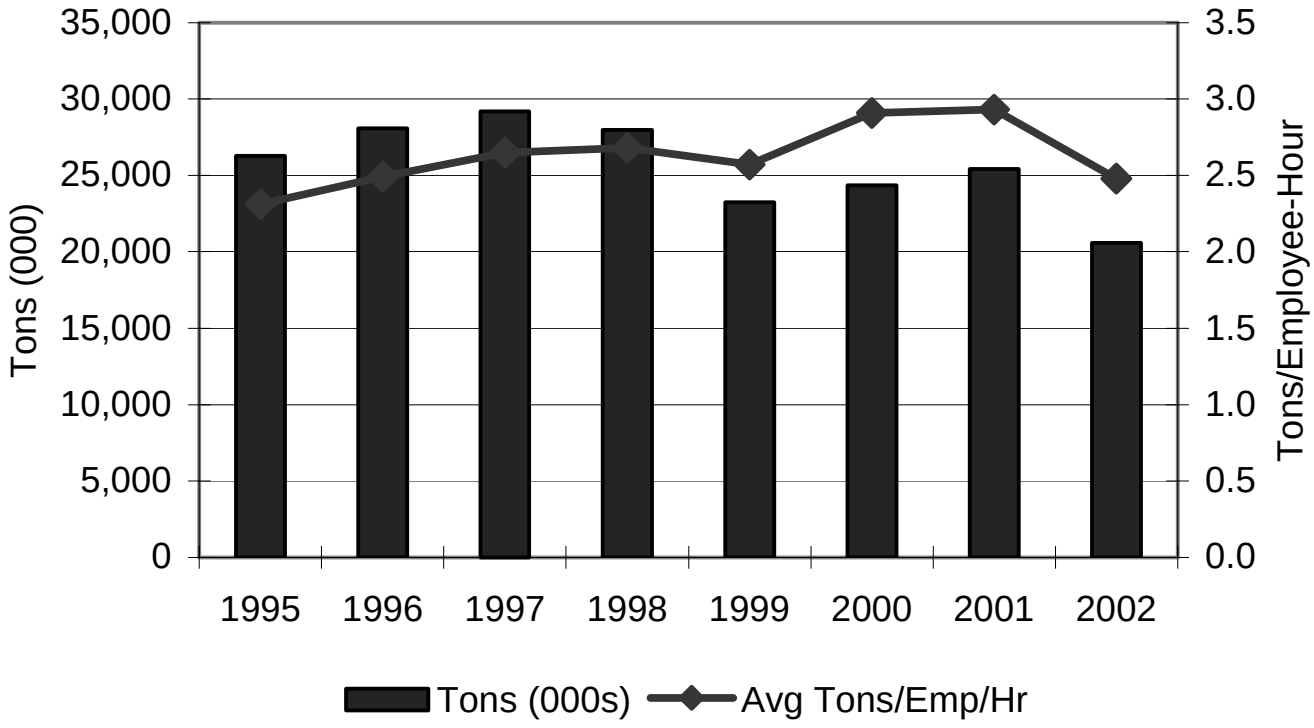
CAPP Underground Mine Production and Productivity, 1995 – 2002 (Est.)



Source: COALdat

NAPP Surface Mines

NAPP Surface Mine Production and Productivity, 1995 – 2002 (Est.)



Source: COALdat

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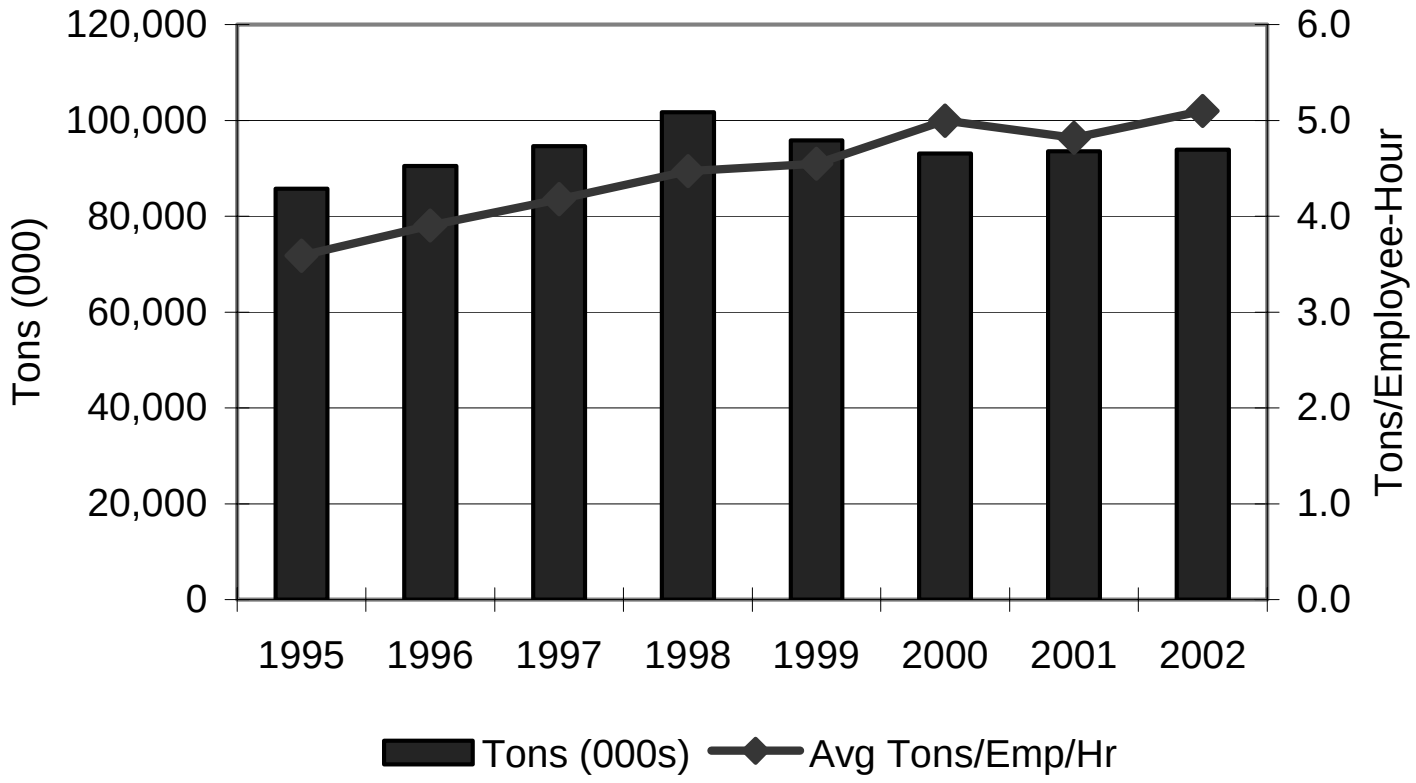

Source: COALdat

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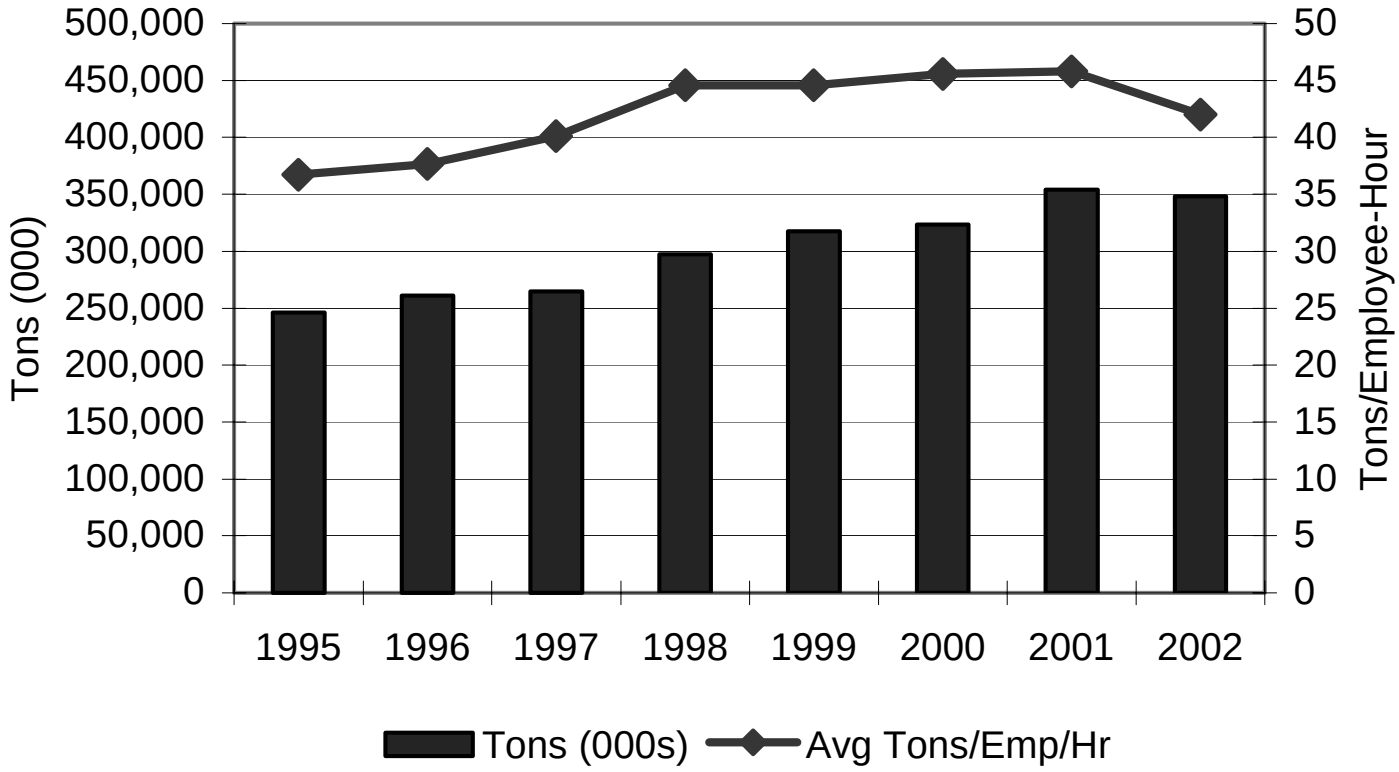
SPRB Surface Mines

SPRB Surface Mine Production and Productivity, 1995 – 2002 (Est.)



Source: COALdat

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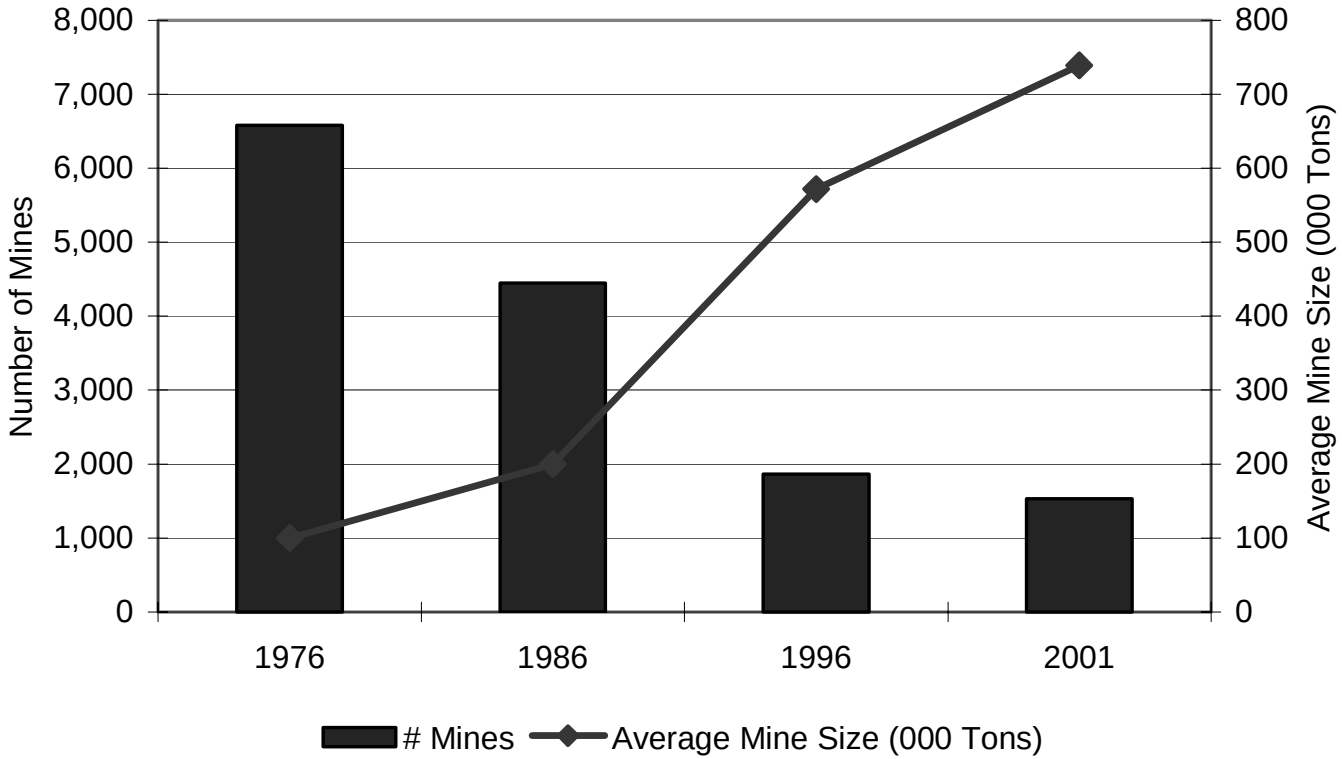
Trend Toward Fewer, Larger Mines

Number and Size of U.S. Coal Mines



Source: COALdat

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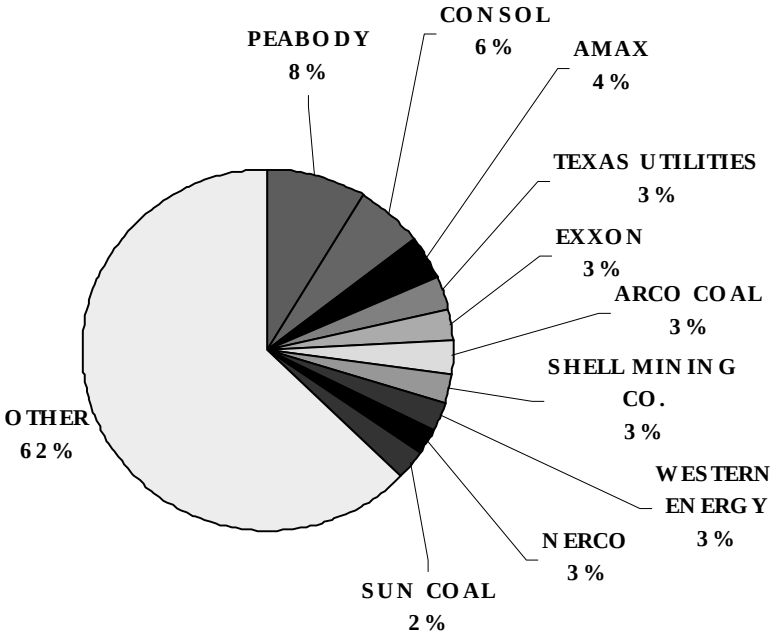
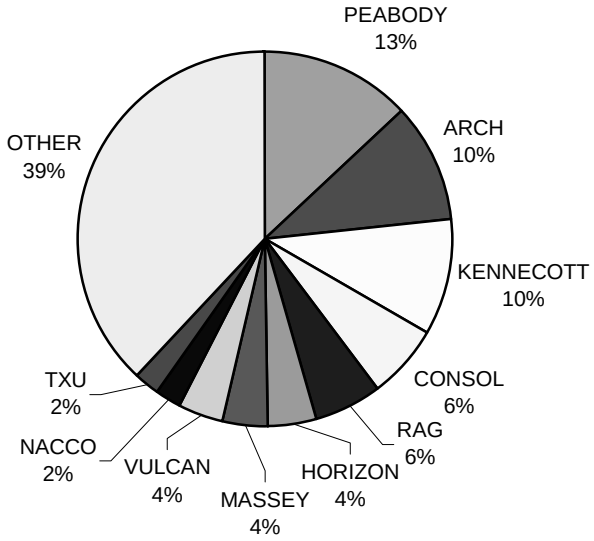
Industry Concentration and Consolidation

Ownership Share of Production, 1988 vs. 2001



1988 (963 Million Tons)



2001 (1,128 Million Tons)

Sources: Keystone Coal Industry Manual, COALdat

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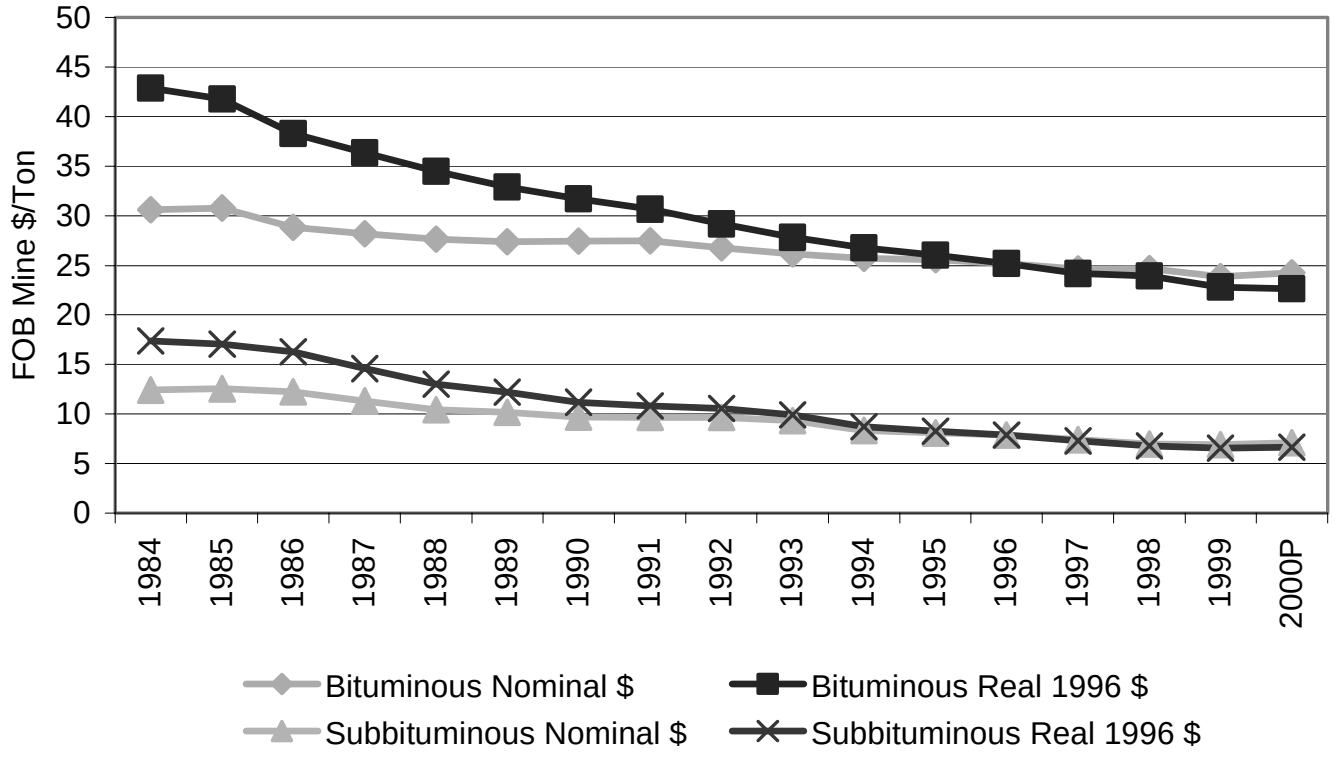
Price History

Productivity gains have been critical to profitability of coal industry in the face of declining prices.



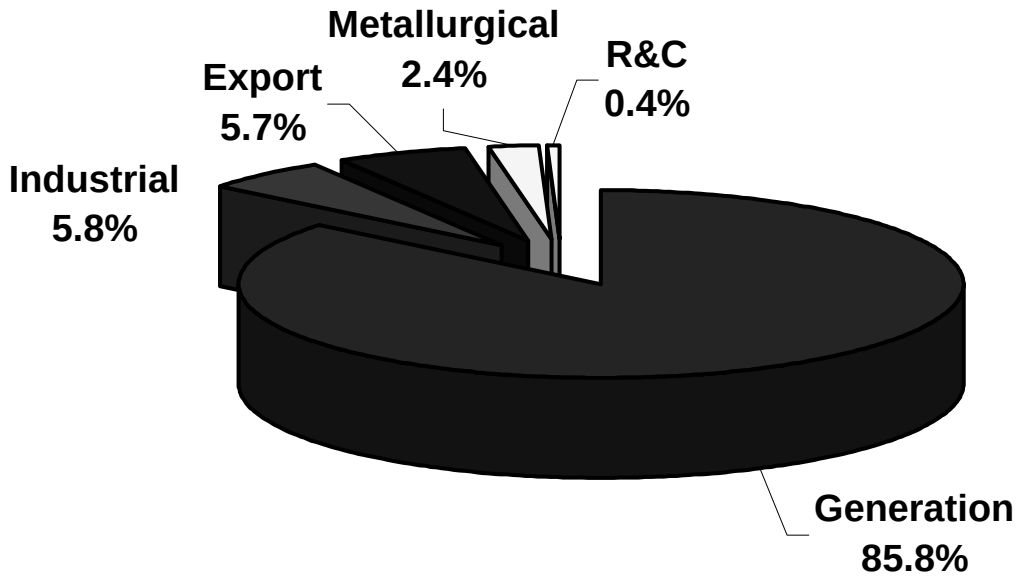
Source: U.S. Energy Information Administration

Financial State of the Industry

- Declining prices, decreasing margins are taking their toll on the coal industry.
- At least three major producing companies (including one in the top ten), accounting for nearly 60 million annual tons, are currently under Chapter 11 bankruptcy protection.
- Many more are on the brink, and a number of others have already disappeared.
- Poor finances, coupled with increasing regulatory uncertainty, have strangled capital investment in new mines and supporting infrastructure.

The Generation Sector is the Largest Coal Consumer…

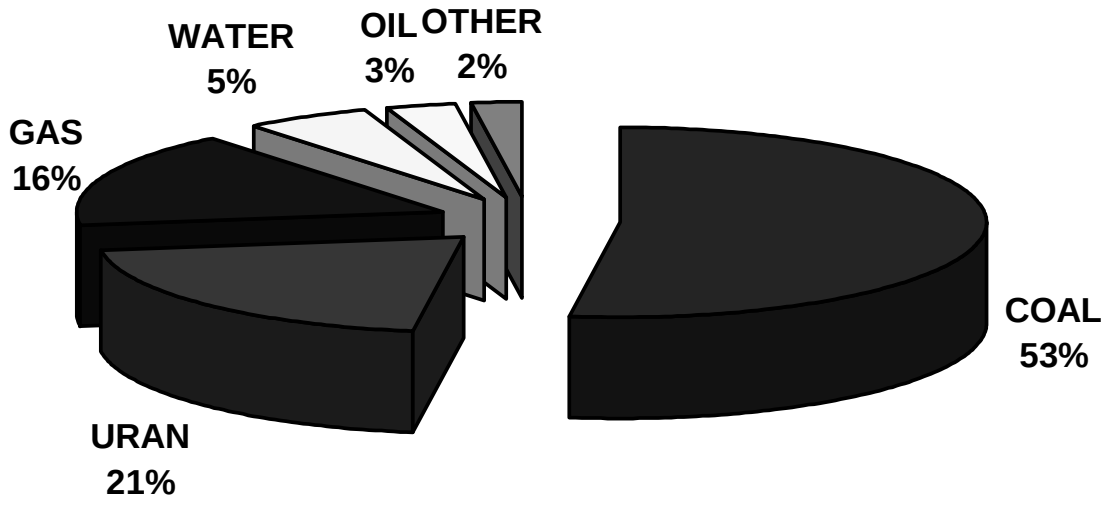
Distribution of U.S. Coal by Sector, 2001



Source: RDI Coal Market Research Service

…and Coal is the Dominant Fuel for Electric Generation

U.S. Electric Generation by Fuel Type, 2001



Source: COALdat

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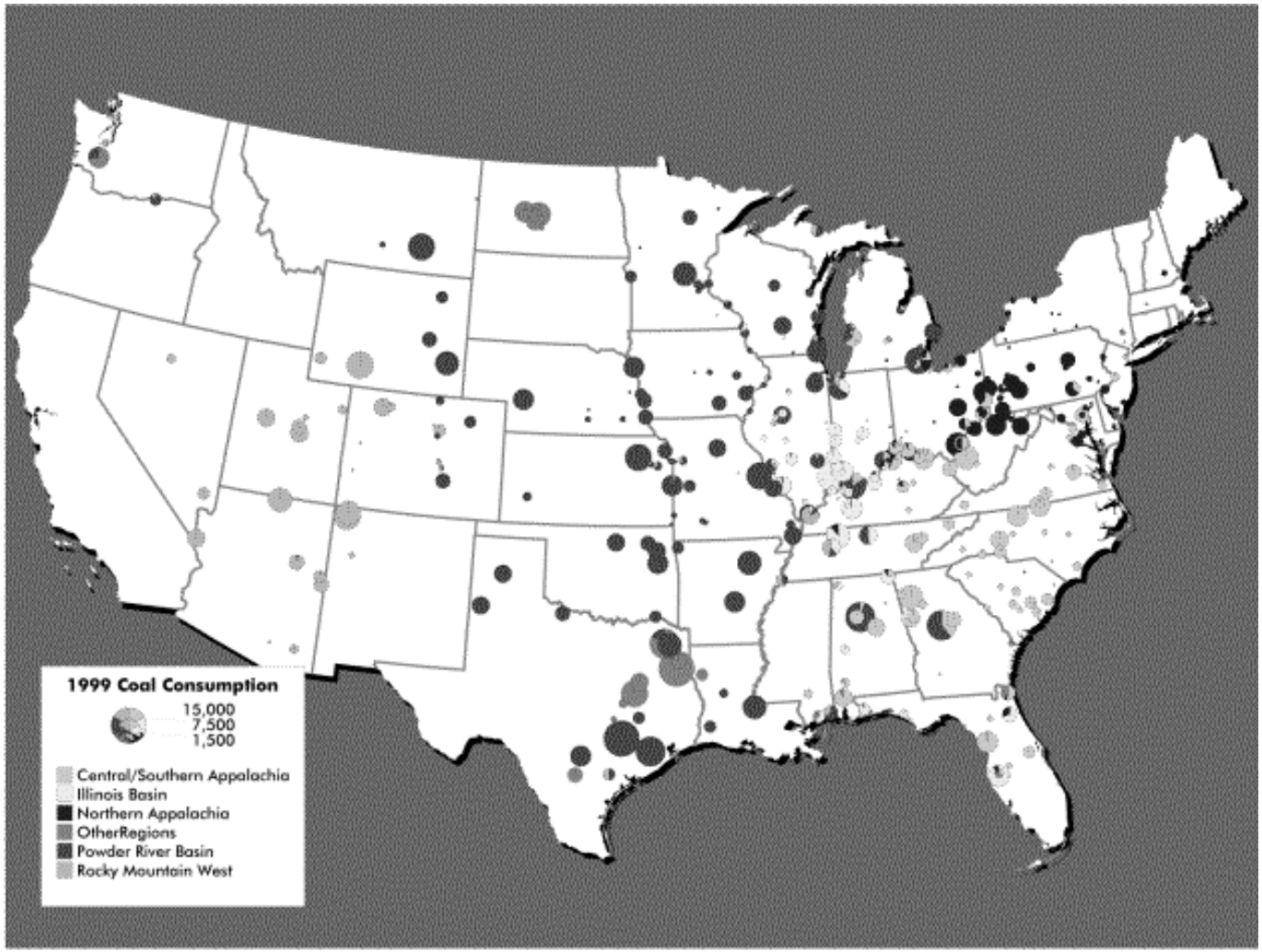
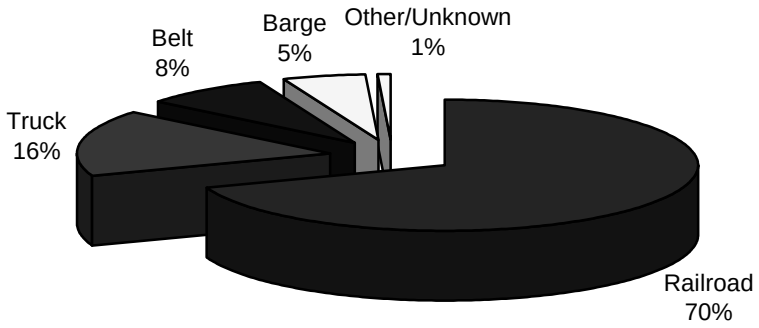
Coal Distribution to the Generating Sector by Supply Region

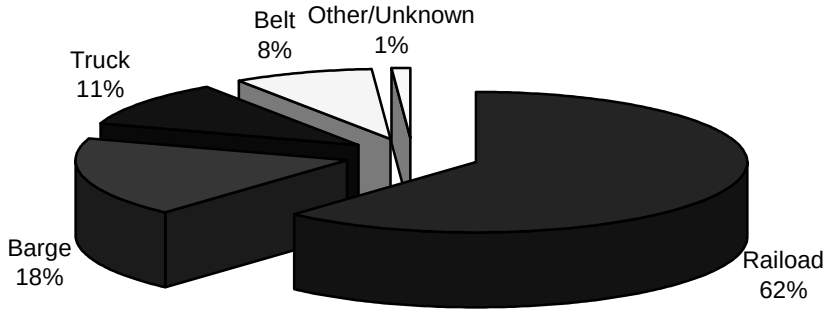


Transportation of Coal to the Generation Sector

Origin Type, 2001

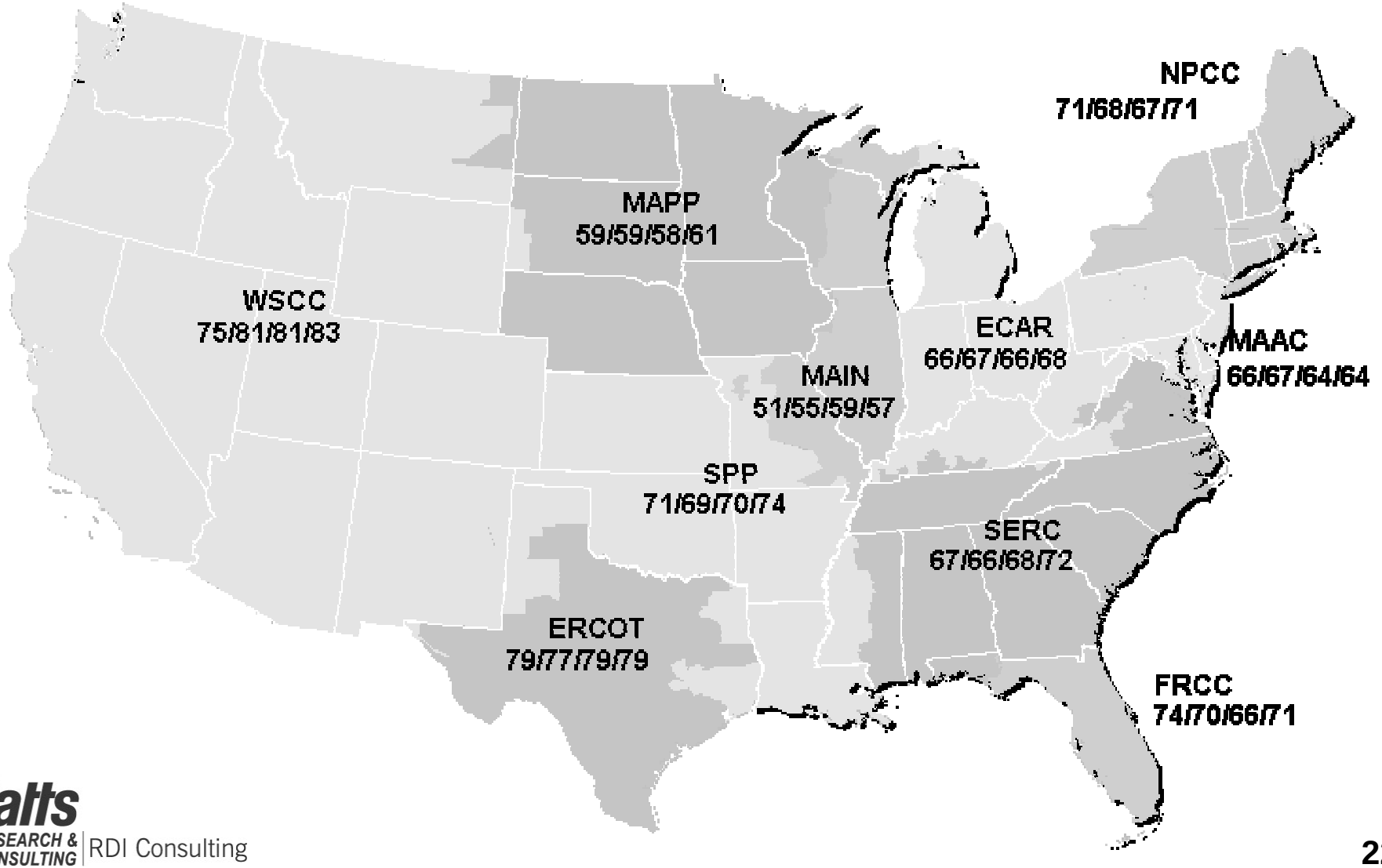


Destination Type, 2001



Source: COALdat

Average Capacity Utilization at Coal-Fired Power Plants, 1997 - 2000



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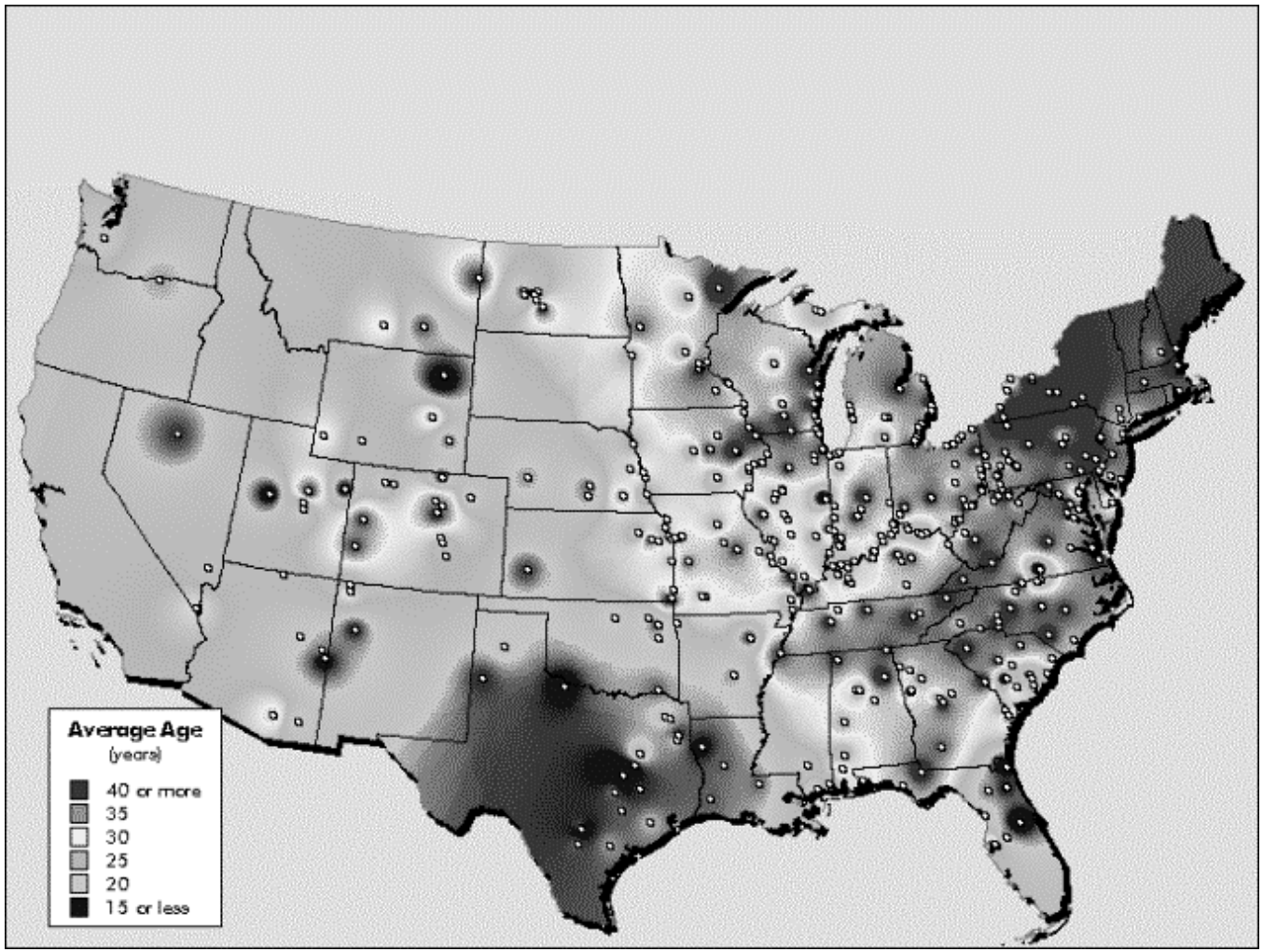
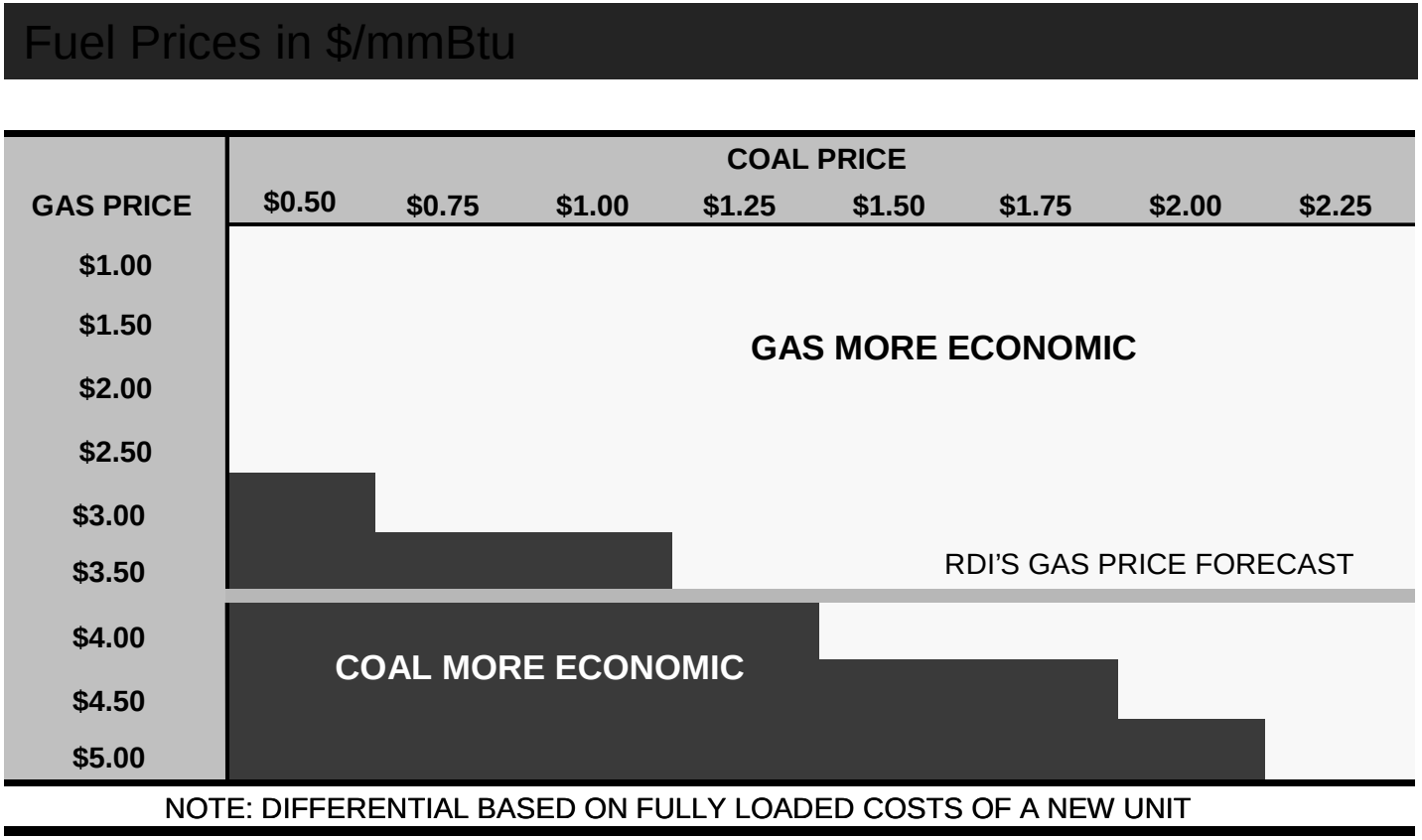
Average Age of Coal-Fired Power Plants



Will New Coal-Fired Generation Play a Role?

- Current economics and regulatory framework have not favored coal for new generation in most regions.
- Projects that go forward generally will have the advantages of:
  - Extremely low-cost fuel (mine-mouth, waste coal, pet coke)
  - Favorable political climate (including state-level tax incentives, financial assistance, “fast-track” permitting, etc.)
  - No transmission constraints
  - Environmental compatibility (PSD, Class I areas)
- All new plants will be equipped with state-of-the art pollution control technology.
- Over longer term, new clean coal technologies will be emphasized.
- Projects must “time the market” correctly.

The Economics of Coal vs. Gas for New Generation



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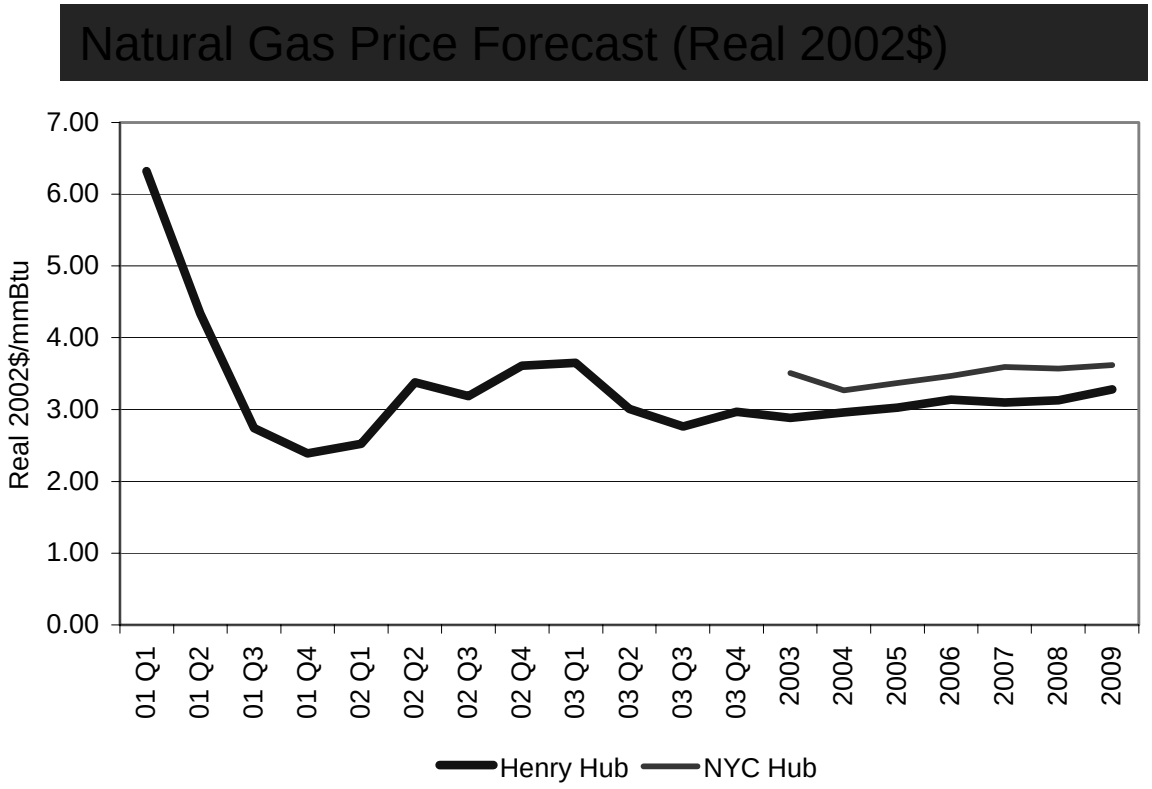
RDI's Gas Price Forecast

Delivered prices into the northeast are slightly higher than Henry Hub but reflect generally the same longer term trend



Source: RDI Power Outlook, Q3 2002

- In the near-term, high levels of storage will put downward pressure on gas prices through Q302.
- Longer term, supplies should tighten.
- Key assumption is that greenfield LNG development will provide incremental supply.

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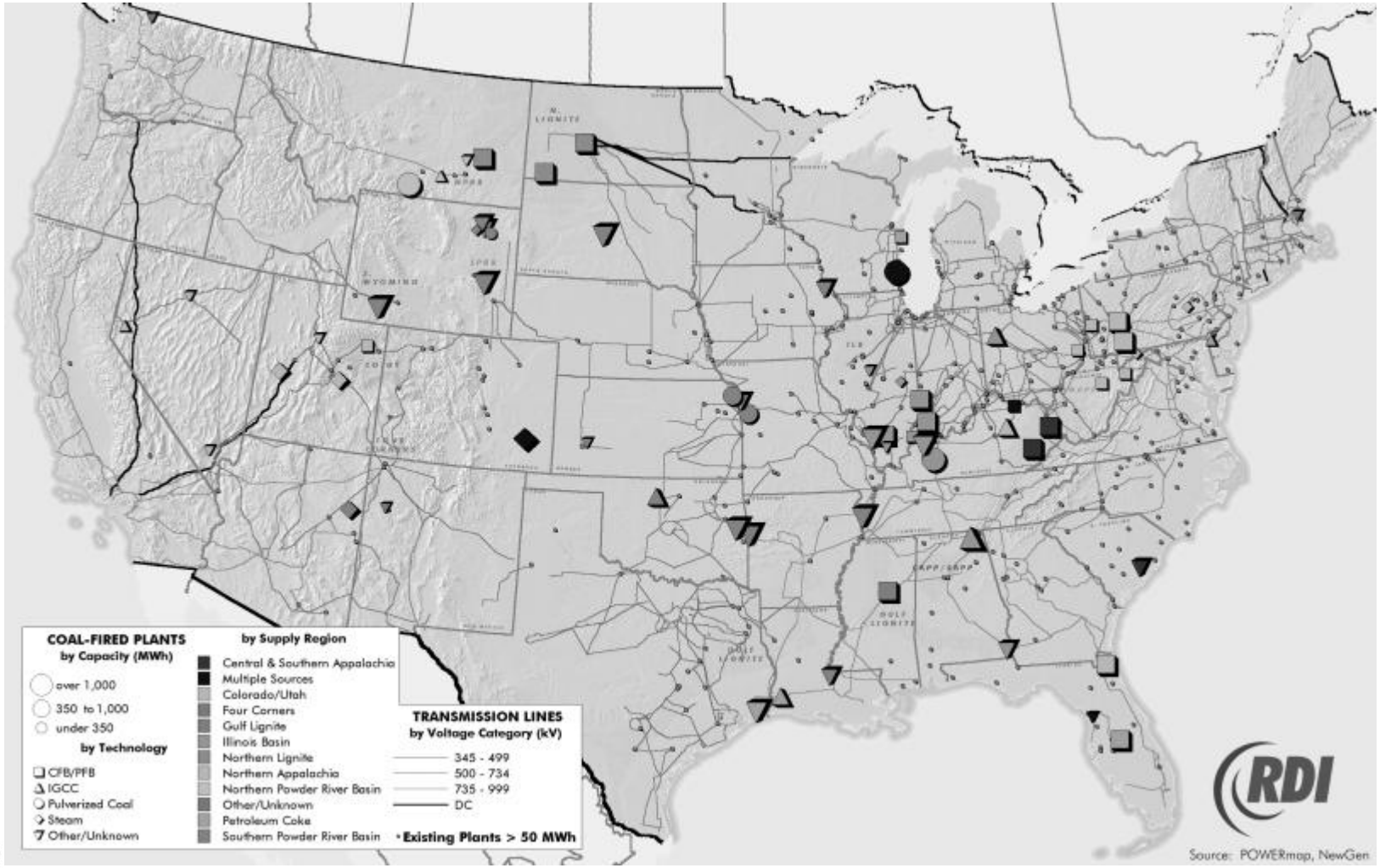
Proposed New Coal-Fired Plants



Major Market Drivers

- Supply
  - Reserve depletion
  - Regulation
    - Hayden ruling
    - Subsidence issues
    - Trucking restrictions
  - Availability of skilled labor
  - Financial condition of coal producers
- Demand
  - Pace of economic recovery
  - Inter-fuel competition
    - Gas prices
    - Capacity glut
  - Regulation
    - Environmental
    - Electric industry restructuring