

2007 BACKGROUND OF U.S. COAL INDUSTRY

Industry Definitions:

The industry is categorized by four specifications, or grades, of coal: 1) anthracite, 2) bituminous, 3) subbituminous, and 4) lignite:

- **Anthracite (Hard Coal):** With a carbon content from 86 to 97 percent, low sulfur, and high BTU content, anthracite is the highest grade of coal. The reserves are found primarily in Pennsylvania. Anthracite is used primarily for space heating and electricity generation.
- **Bituminous (Soft Coal):** The most common grade in the United States, bituminous coal contains from 45 to 86 percent carbon. It has variable sulfur contents, a high heating value, and is found across wide sections of the United States. Bituminous coal is mined chiefly in the Appalachian and Interior coalfields and in the Rocky Mountains. It is used to generate electricity, make coke, and provide heat for industrial processing.
- **Subbituminous:** With a carbon content between 35 to 45 percent and relatively high moisture content, subbituminous coal has a moderate heating value. It is found in the West (Powder River Basin) and Alaska and is used for electricity generation.
- **Lignite:** With high moisture content and a low heat value, lignite is the lowest grade of coal. Lignite is mined in Montana, North Dakota, and Texas. As it is difficult and expensive to transport, it is used only domestically in electric generating plants.

Key Products and Services of Industry:

The four grades of coal (anthracite, bituminous, subbituminous, and lignite) form the basis of the U.S. coal industry and are the subject of this Industry Assessment.

In addition to coal, peripheral products and services include 1) coal mining equipment; 2) coal preparation equipment; 3) and equipment and engineering/construction services required for coal-fired power plants, including, but not limited to, boilers, turbines, and generators, and clean coal technology (CCT) equipment, most notably sorbent handling systems, flue gas desulfurization units, and ash/particle reduction equipment. These peripheral products and services are noted for their important links to the U.S. coal industry, though they are not the focal point of this analysis.

NAICS Codes:

- 212111: Bituminous Coal and Lignite Surface Mining
- 212112: Bituminous Coal Underground Mining
- 212113: Anthracite Mining

INDUSTRY OVERVIEW AND GLOBAL COMPETITIVENESS:

Industry Characteristics:

Output: In 2005, the U.S. coal industry experienced a record year, as production increased by 21.2 million short tons (MST), or 1.9% from 2004, to 1,133.3 MST. The 2005 figure was 5.6 MST higher than the 2001 production record of 1,127.7 MST. In

2005, eastern coal (coal east of the Mississippi River) accounted for 43.5% (493.5 million tons including refuse recovery) of production. Production in the west reached 56.5% (639.7 MST). The greatest increase from eastern coal producing states came from West Virginia, Kentucky, Ohio, Illinois, and Pennsylvania. Total production in the east was up by 1.9% overall. Production in the west, led by Wyoming, was up 2%. In addition to Wyoming, production from New Mexico, Utah, Montana, and Texas increased over 2004. Production in 2006 is expected to be another record year. (See Appendix, Figure 1, 2005 Coal Production by Coal-Producing Region).

Consumption: Total 2005 U.S. coal consumption of 1,128.3 MST set another record, increasing 1.9% over 2004. The majority of coal production, more than 92%, continued to go towards electricity generation and contributed to the rise in coal use in 2005. Power producers used an estimated 1,039.0 MST of coal, nearly 23 million tons more than in 2004. Coal-fueled power generation increased 1.8% to a record 214.2 billion kilowatt hours (KWh) in 2005, with coal continuing to provide about 50% of total electricity net generation. (See Appendix, Figure 2, 2005 Electric Power Sector Consumption of Coal by Census Region).

The other coal-consuming sectors (coking coal, other industrial uses, and residential and commercial sectors) only had minor changes in their consumption totals. Specifically, the other industrial uses sector had a decline in coal consumption in 2005 of 2.3%, while the coking coal sector had a decrease of 1.0%. The residential and commercial sector, the smallest of all coal-consuming sectors, remained at about the same level as in 2004.

Exports: U.S. coal exports increased nearly 2 million tons in 2005 to almost 50 million tons, a 4% increase over the 2004 level of 48 million tons. Gains in metallurgical coal exports were significant again in 2005, up 6.8% from 2004, as demand for coking coal exports for international markets was high and supplies limited. Metallurgical coal exports were 28.7 million tons in 2005. Prices for metallurgical coal were up to \$81.56 per short ton in 2005, compared to \$63.63 per short ton in 2004, an increase of 28.2%. Demand increases for met coal from Europe more than made up for the decline in demand from Asia. U.S. steam coal exports increased 0.6% to 21.3 million tons, driven by stronger demand from Europe. Canada, the United States' largest customer, took more steam coal in 2005, despite the closure of the Lakeview coal generation plant in Toronto. Steam coal exports to Asia declined by 45%, with Japan accounting for almost the entire decline, as Japan expanded its importation of steam coal from neighboring Asian countries.

Imports: Coal imports reached record levels for the third consecutive year, totaling 30.5 million tons in 2005. The majority of imported coal came from Colombia (approximately 70%). Additional major coal import suppliers were Venezuela, Canada, and Indonesia. The coal was imported by east coast power generators located near port terminals. As U.S. import capacity is nearing its limits, terminal expansions are planned for the southern Gulf and Atlantic coastal regions, and must be completed before imports can increase.

Market Share of Major U.S. Coal Companies: In 2005, Peabody Energy Corporation was the largest coal producer in the U.S. with output (including sales) of 206.8 million tons, representing 18.2% of total U.S. coal production. The second largest was Arch Coal, Inc.

with 129.7 million tons, representing 11.4% of total U.S. coal production. Ranking third was Kennecott Energy Company (Rio Tinto Energy America) with 128.6 million tons, or 11.3% of U.S. production. The fourth largest producer, CONSOL Energy, Inc., had output of 69.1 million tons, or 6.1% of U.S. production. The fifth largest producer was Foundation Coal Corporation, with 66.3 million tons, and 5.9% of production. The top five coal producing companies accounted for 53% of total U.S. production, with the top twelve accounting for 71%. (See Appendix, Figure 3, Major U.S. Coal Producers).

The market share among the largest five firms has been consistent over the past five years, as the five major coal producers have maintained their ranking in market share. In 2000, Peabody Energy Corporation held 16.9% of the U.S. market share, followed by Arch Coal, Inc. (10.5%), Kennecott Energy Company (9.9%), CONSOL Energy, Inc. (6.3%), and RAG American Coal Holding, Inc. (5.9%), which was the predecessor company of Foundation Coal Corporation.

Competitiveness in the Domestic (U.S.) Market:

The primary competitive element of the U.S. coal industry is the expansive availability of coal throughout the country: The coal reserves of the United States are the largest of any country in the world. Moreover, the recoverable coal reserves that are found within the 32 coal-producing states can provide an estimated 250 years worth U.S. coal supply at current usage rates. The top five states with the largest recoverable coal reserves contain more than 70% of the total coal in the United States, and the top ten states contain approximately 89% of total coal in the United States. (See Appendix, Figure 4, 2005: Top 10 U.S. Coal Producing States). Moreover, coal plays a unique role in U.S. energy security, as it is the only major domestically-sourced energy commodity for which the United States has a comparative advantage.

Coal imports do not substantially affect the U.S. domestic coal industry, as imports represent less than 3% of total U.S. coal consumption. Beginning in 2002, U.S. coal imports have risen, totaling 30.5 MST in 2005, an increase of 11.7% from 2004. The majority of the increase in imports is attributable to the U.S. coal transportation problems experienced in 2005, which impacted coastal electric power producers. In 2005, the average price of U.S. coal imports increased by 24.5% to \$46.71 per short ton. Columbia, Venezuela, Indonesia, and Canada account for 97% of U.S. coal imports. Though coal imports to the U.S. have increased over the past three years, record U.S. production has benefited the coal industry, as economic expansion and increased coal consumption in the United States have contributed to the increase in domestic coal prices and export coal prices.

Competitiveness in the International Market:

U.S. metallurgical coal exports in 2005 continue to be a strong element of overall U.S. coal exports, as exports in metallurgical coal increased 6.8% (totaling 28.7 MST) over the 2004 level, and accounted for 94% of the total increase in U.S. coal exports. U.S. coke exports have also contributed to increases in overall U.S. coal exports, as worldwide demand for steel promoted an increase of 32.5% (totaling 1.7 MST) in U.S. coke exports in 2005 when compared to 2004. Total U.S. steam coal exports increased by only 0.6% to a level of 21.3 MST in 2005. The United States has been among the top seven countries in the share of international coal market exports since 2000. Though U.S. coal exports declined from 53 to 37.3 MST between 2000 and 2001, U.S. coal exports

increased from 38.9 to 43.0 MST between 2003 and 2004. (See Appendix, Figure 5, Top Coal Exporters). Continuing with current trends of worldwide increased exports and heightened international energy demand, the U.S. coal industry is competitively engaged in the international coal market, as over fifty percent of U.S. coal companies surveyed foresee greater production in 2006.

Major Factors that have Affected Global Competitiveness for the U.S. Coal Industry:

Transportation issues have hampered potential increases in global competitiveness for the U.S. coal industry over the past five years. Growth in coal production was constrained by transportation capacity in 2005, as strong rail demand, two derailments, prolonged maintenance in the Power River Basin (Wyoming), and inclement weather in the southern region of the U.S. caused bottlenecks and shipping delays. Rail delays in 2005 occurred primarily in the west, as opposed to previous years when delays occurred in the east. Additional factors that affected global competitiveness for the U.S. coal industry in 2005 include the following:

1. The Army Corp of Engineers continued to experience delays in permit application processing for new and expanding mines in some U.S. districts;
2. The industry's new and expanding mines in the east and increased production capacity at mines in the west contributed to record production;
3. Increases in operating costs relating to a shortage of skilled miners, rising fuels costs, and geological problems constrained coal supply in the east;
4. Continued increases in U.S. coal exports due to a weak dollar and higher overseas transportation costs made U.S. coal attractive in international markets; and
5. Industrial growth in China led to a shortage of rubber and steel, and constrained mining equipment supply. The huge truck tires used on mining trucks and some equipment parts were in short supply in 2005.

In terms of the industrial outlook in the coming years for foreign and domestic demand of coal, U.S. coal companies were asked for their views on the outlook for 2006 U.S. coal production. Of the 43 companies responding, 53% expected stronger production in 2006 and 28% of the companies surveyed anticipated 2006 production to be at the same level as 2005. No companies anticipate a decrease in production. Nineteen percent of the companies did not respond to the survey. The markets which offer the greatest potential for expanding coal exports are China and India (where U.S. metallurgical coal exports are anticipated to increase) and Europe and South America (where steam coal shipments are projected to increase).

Major Competitors:

The countries that are seen to rival the U.S. as major coal exporters include Australia, Indonesia, China, South Africa, Russia, and Columbia. Of note, Japan, the world's largest coal importer, is sourcing more of its coal from China and Australia due to proximity and lower transportation costs.

Foreign Standards/Technical Regulations/Conformity Assessment Procedures That Affect the U.S. Coal Industry:

There are no foreign standards, technical regulations, or conformity assessment procedures that affect the U.S. coal industry, though the high quality of U.S. coal is attractive to countries, such as India, that have lower quality/lower BTU coals. It is

noteworthy that while the USG requires export permits for oil, gas, LNG, and electricity, there are no such permit requirements for U.S. exports of coal.

DOMESTIC ENVIRONMENT:

REGULATORY POLICIES:

The most influential and costly regulations to the U.S. coal industry are 1) the national Surface Mining Control and Reclamation Act of 1977, and 2) the Mine Improvement and New Emergency Response Act (MINER) of 2006, and 3) regulations for noise control and personal protective equipment.

1. The Surface Mining Control and Reclamation Act of 1977:
This act completely restructured the way coal mining is regulated nation wide and greatly increased environmental insight. The federal act allowed individual states to develop coal regulatory programs consistent with the federal legislation. Specifically, this act 1) establishes a nationwide program to protect society and the environment from the adverse effects of surface coal mining operations, and 2) promotes the reclamation of mined areas left without adequate reclamation. Coal company operators are required to deposit into a general fund a reclamation fee of 35 cents per ton of coal produced by surface mining, with funds being used to reclaim abandoned lands. As annual coal production from surface mines totals 743,552 thousand short tons (or 674,550 metric tons, as of 2004), and at 35 cents per ton, coal company operators pay, on average, \$236,092 per year to comply with the reclamation fee.
2. The Mine Improvement and New Emergency Response (MINER) Act of 2006:
As a result of increased fatal mine accidents in 2006, which have totaled 36 as of July 2006, President Bush signed the MINER Act on June 15, 2006. This legislation, the most significant mine safety act in 30 years, amends the Mine Safety and Health Act of 1977 and contains a number of provisions to improve safety and health in America's mines. The Congressional Budget Office has estimated the cost of private sector mandates, as stipulated by the MINER Act, to exceed \$128 million per year. As underground mine production totals approximately 367,557 thousand short tons (or 333,447 metric tons, as of 2004), coal companies with underground mining operations will pay \$383.87 per ton to comply with the MINER Act regulations.
3. Regulations for Noise Control and Personal Protective Equipment:
In 1985, the Mine Safety and Health Administration began permitting the coal mining industry to use hearing protectors in lieu of engineering controls. A Department of Labor Analysis in 1992 estimated that the cost of a hearing protection program is \$87 per worker. As there are 73,912 coal mine workers, both in underground and surface operations, the total estimate for compliance to this regulation is \$6,430,344 in 1992 dollars.

Engineering Controls and Personal Protective Equipment as a Share of Compliance

Costs:

The majority of coal mining regulations have been implemented for the protection of workers' lives and the improvement of the surrounding environment. As such, coal companies are estimated to pay a total of \$128 million per year (in 2006 dollars) for emergency response/personal protective equipment, as well as \$6.4 million per year (in 1992 dollars) for hearing protection compliance programs, thus totaling approximately \$134.4 million per year in regulatory compliance costs for engineering controls and personal protective equipment.

Proposed New Regulations for the Coal Industry:

As the U.S. coal industry is currently in the process of properly implementing the MINER Act of 2006, as well as addressing tax provisions to assist coal companies as they comply with this new regulation, there have not been any additional proposed regulations for the U.S. coal industry.

Regulations in Competing Markets:

The United States leads in the implementation of high standard coal mine safety regulations, and with the enactment of the MINER Act, these regulations will provide for a safer working environment. China is a top contending coal-producing market, with production expansion foreseen as China's domestic energy demand increases. However, China lacks high standard environmental and worker safety regulations and, as such, will be encouraged by neighboring countries to adopt more stringent standards in the upcoming years. Australia, as a competing coal-producing country, has placed responsibility for enacting and enforcing laws relating to mine health and safety to its six states and two territories. The Australian Coal Association has estimated that land rehabilitation projects for the mining industry total \$40,000 per hectare, whereas land rehabilitation costs in the U.S. are based on ton of coal produced. Thus, in the Australian and U.S. comparison, environmental regulation costs are not comparable, as Australia's environmental regulations are based on land size, while environmental regulations in the United States are based on the amount of coal produced.

State Regulations:

Miner safety and environmental regulations are based on federal legislation, and thus state-level regulations are not at issue in the U.S. coal industry.

Social Costs and Benefits of U.S. Coal Mine Regulations:

The benefits reaped by the environment and coal mine workers are the driving forces behind U.S. coal mine regulations. The 1977 Surface Mining Control and Reclamation Act identified and addressed the environmental impacts of coal mine operations in the U.S., with emphasis on remediating the environmental affects of U.S. mountain top removal operations, in which mountains and hills are moved by equipment to neighboring locations (oftentimes near rives and lakes) so as to gain access to coal seams. The Surface Mining Control Reclamation Act addressed the release of the particles, metals, and pollutants that went into the atmosphere and waterways by taxing the coal companies that engage in mountain top removal mining. This Act also required underground coal mine operators to pay a per ton fee for the reclamation of surrounding areas that would be affected once the underground mine operations cease. The 2006 MINER Act addressed worker safety issues as a result of the increased number of fatal

mining accidents in 2006. With the overarching goal of improving the safety and health of America's miners, this Act makes coal companies more accountable for their operations (through increased mine safety checks and higher penalties) and ensures that mines are properly equipped with ample and efficient safety devices.

NON-REGULATORY POLICIES:

Domestic Policies that Impact the Coal Industry's Competitiveness:

The U.S. coal industry received a substantial boost from the Energy Policy Act of 2005 and the Advanced Energy Initiative of 2006. While both of these programs focus on advanced coal-fired power generation technologies, the overall coal industry will benefit, as coal will serve as a greater source of electricity generation through these two programs.

Under the Energy Policy Act of 2005, the value of authorizations targeted for the U.S. coal and mining industry totaled \$6.177 billion, and the coal-related provisions of the tax portion of the bill amounted to \$2.805 billion. Specifically, the industry received support for the following:

- \$1.8 billion for Clean Coal Power Initiative that will demonstrate coal gasification technologies and advanced coal pulverized technologies;
- \$1.137 billion for Basic Coal Research and Development;
- \$3 billion for Clean Air Coal Program to establish advanced pollution control technologies for emissions reductions; \$2.5 billion to reduce emissions; and \$2.5 billion to fund the installation of clean coal technologies in electric generators;
- \$50 million for Carbon Capture and Sequestration Research and Development to develop carbon capture technologies for existing and new coal fired electric generating units; and
- Tax incentives for investments in gasification projects at industrial facilities, as well as tax credits for investments in IGCC technologies.

Under the 2006 Advanced Energy Initiative, President Bush outlined a program to reduce America's dependence on foreign sources of energy. The President set a national goal of replacing more than 75% of U.S. oil imports from the Middle East by 2025. The most effective means by which the U.S. can reduce its reliance on foreign oil is through the implementation of new energy technologies. The Advanced Energy Initiative provides for a 22% increase in clean-energy research at the Department of Energy to accelerate U.S. energy developments. As part of the Advanced Energy Initiative, President Bush put forward the Coal Research Initiative which includes \$281 million in the 2007 Budget for the development of clean coal technologies as well as \$54 million for the FutureGen Initiative, a partnership between the government and the private sector to develop innovative technologies for an emissions-free coal plant that captures carbon dioxide and stores it in deep geological formations.

Domestic Policies that Impact the Coal Industry's Ability to Innovate:

The coal industry has benefited from recent coal mining regulations and energy policies, as both have prompted coal industry leaders to advance coal mine safety programs, which serve as an international model, and coal-fired energy programs, which further encourage the advancement of clean coal technologies. As a result of these domestic policies,

competing coal-producing countries have joined in U.S.-led partnerships pertaining to the coal industry. Examples include the FutureGen Initiative, which incorporated participation from India, China, and South Korea in 2006, and the Carbon Sequestration Leadership Forum (CSLF) which is led by the U.S. and includes membership from twenty-two countries/regions.

Impact of Adverse Policies on the U.S. Coal Industry and Industry's Response:

With growing energy demand, expansive coal reserves, and rising domestic energy security concerns, the recent coal and energy policies implemented by USG have had positive impacts on the industry as a whole, as noted by the record coal production in 2005 of 1,133.3 MST, an increase of 1.9% from 2004. Moreover, coal-fired power generation increased to a record 2,014.2 billion kilowatt hours in 2005, up 1.8% from 2004. As coal provides over 50% of domestic electricity generation and U.S. reserves of coal will fuel 250 years' worth of domestic power, recent U.S. policies have encouraged the role of coal in the U.S. energy landscape.

Price Elasticities of Coal:

As energy demand and coal use is projected to increase, the coal industry is able to pass along higher coal prices to energy consumers. In 2005 and for the second year in a row, U.S. overall coal prices rose across the board for all forms of coal, and the average delivered coal price at electric utilities rose for the fifth consecutive year, up 13.2% from 2004. The largest increases in coal prices were found in the coking coal sector, as stringent specifications for coking coal limit availability. Consequently, coke plants have seen prices rise from \$50 per short ton in 2003 to \$85 per short ton in 2005. The cost increases incurred by electricity producers and steel manufacturers are passed on to consumers and end-users.

Domestic Labor Environment for the U.S. Coal Industry:

In 2005, forty-seven percent of U.S. coal companies estimated that the average age of their workforce is in the 40-45 year range, an increase of 45% from 2004. Forty-one percent of the coal companies surveyed indicated that their workforce is in the 45-50 year range, and 6% indicated that the workforce age fell in another category (generally older than 50 years). The results of the survey mirror the coal industry's concern that the majority of its workforce is reaching retirement age and must be replaced. The industry has been actively recruiting high school and college graduates to enter into apprenticeship programs. The industry has been working with universities to develop and expand their programs and degrees in coal science and mine engineering.

Coal Industry Expenditures:

An analysis of the top two U.S. coal producing companies, Peabody Energy and Arch Coal, indicate that the average depreciation, depletion, and amortization cost for 2005 totaled \$264,208,000, the average selling and administrative expenses came to \$140,685,000, and the average operating costs and expenses were \$2,944,922,000. The third largest U.S. coal producer, Kennecott Energy, is a subsidiary of the Australian firm, Rio Tinto, and thus was not factored in the financial analysis. Detailed financial information on costs and expenses and cash flows from investing activities for Peabody Energy and Arch Coal is noted in the Appendix, Figure 6.

New Coal Technologies:

Though not expected to lower the cost of coal production, the development of coal synfuel is worth noting, as it is a recent addition to the U.S. marketplace, with an increased presence in 2005. Fifty-seven coal synfuel plants were in operation in the U.S. at the end of 2005. The amount of coal processed by all the U.S. coal synfuel plants was 139.7 MST, an increase of 13.9 MST over 2004. The average price of coal delivered to the coal synfuel plants increased in 2005 by 17.7 percent to \$42.78 per short ton.

Raw/Intermediate Inputs for which Substitution is Difficult:

This is not applicable, as coal is the only input.

Production Operations for U.S. Coal Companies with Overseas Base:

The majority of operations and headquarters for U.S. coal companies are located in the United States. Of the top six U.S. coal producers, only one is a subsidiary operation: Kennecott Energy is a part of Australia's Rio Tinto Group, though its U.S. headquarters are in Gillette, Wyoming.

- Peabody Energy: St. Louis
- Arch Coal: St. Louis
- Kennecott Energy/Rio Tinto Energy America: Gillette, WY
- CONSOL Energy: Pittsburgh
- Foundation Coal: Linthicum Heights, MD
- Massey Energy: Richmond, VA

Back Office Operations:

No back office operations are leaving the United States.

Global Supply Lines:

As coal is a commodity and the only input, the impacts of global supply lines are not applicable. However, rail and transportation backlogs do affect the coal industry.

Foreign Company Investment in U.S. Coal Industry:

Foreign companies are not investing in the U.S. coal industry, as the majority of the top U.S. coal producers were established back in the late 1800s and early 1900s. A series of consolidations merged coal producers in the latter part of the 1900s. One exception is the Rio Tinto (Australia) investment in Kennecott Energy, now known as Rio Tinto Energy America.

Domestic Trends of U.S. Coal Industry

Over the past ten years, the top five U.S. coal producers have maintained their standing in terms of U.S. coal production, and this trend is foreseen to continue in the upcoming years. The era of consolidations and takeovers, witnessed in the latter part of the 1970s and early 1980s, is over. Domestic coal production will increase as energy demand expands, with financial benefits for the coal industry overall. U.S. met coal and coking coal producers will continue to experience higher profits, as worldwide supplies are limited and the demand for steel is increasing.

Venture Capital:

Venture capital does not play a role in the U.S. coal industry.

Financial Indicators:

The average revenue for the top two U.S. coal producers in 2005 was \$3,527,048,000. The average for operating margins was \$323,163,000, net profit averaged \$230,388,000, and long-term debt was \$1,177,338,000. Details of the financial analysis are noted in the Appendix, Figure 6.

TRADING ENVIRONMENT:

Key Opportunities for Expanding U.S. Coal Exports:

Domestic U.S. coal production provides for a secure energy supply, as coal is the most abundant energy source within the U.S. To maintain U.S. security of supply, U.S. exports of coal have been shadowed by the exportation of clean coal technology, coal preparation equipment, and emissions abatement equipment, all of which can remedy environmental degradation in countries where coal is used as a primary energy source, most notably China, India, Australia, Russia, and Poland. The United States has an unmarked advantage in developing and commercializing these technologies, as the Department of Energy has funded coal-fired demonstration plants and small-scale testing facilities to encourage the deployment of advanced coal-fired systems. Industry has indicated that increased DOE funding for coal-fired demonstration plants would be most beneficial for the development of cleaner burning coal systems. Once these systems prove to be efficient and commercially-viable, industry looks to DOC to promote the exportation of clean coal technologies in countries where coal is the greatest energy resource.

Obstacles Facing Industry in Expanding Exports:

In terms of U.S. exports of energy sources, coal is unique in that there are no U.S. export permit requirements for the U.S. sale of coal, unlike U.S. exports for oil, gas, LNG, and electricity. Moreover, there are few foreign barriers that obstruct or impede U.S. coal exports. The only major impediment to U.S. coal exports is the required infrastructure of coal-fired power plants in the importing countries: Only countries that burn coal in power plants or industrial facilities will import U.S. coal. Those countries with few or declining numbers of coal plants will not import U.S. coal. This scenario is most evident in Canada, where coal-fired power plants are being phased out in Ontario.

It is worth noting that exports of coal-fired power plant equipment provide greater opportunities in comparison to coal itself. The most important obstacles and impediments to the exportation of U.S. clean coal power production equipment involve licenses and IPR issues, both of which are a concern for large U.S. manufacturers and SMEs. The majority of plant equipment is sold under licensing arrangements, and thus IPR issues are of major concern to U.S. coal plant equipment companies that aim to enter the Chinese market, for fear that their technology may be replicated throughout China. This has proved to be a precarious situation for U.S. coal power equipment companies, in that they recognize the potential for increased market share in China, though fear that their technology may be replicated without benefiting from licensing royalties and fees.

Impacts of Coal's International Trade Through U.S. National Priorities:

International trade for the U.S. coal industry is partly influenced by U.S. energy and environmental policies, which reverberate to countries that are adopting cleaner energy technologies. Of note, the Energy Policy Act of 2005 puts emphasis on domestic

development of clean coal technologies that can be replicated in countries that also are adopting clean energy practices, most notably Europe. In future years, China and India will be encouraged to adopt cleaner energy practices, to which the U.S. can supply the most advanced technology.

Capacity Trends Over Time for the U.S. Coal Industry:

A comparison of global coal reserves from 1997 to 2004 indicate that coal capacity trends have remained at the same levels over the seven year time frame. In 1997, the United States held 25% of global coal reserves, followed by FSU countries at 23% and China at 12%. In 2004, the United States held 27% of global coal reserves, followed by FSU countries at 24%, and China at 13%. These three countries account for over 60% of all global coal reserves, and their capacity has gone virtually unchanged in the past decade. Additional countries that provide for global coal capacity are India, which holds approximately 10% of global coal reserves, followed by Australia at 9% and South Africa at 5%.

PERSPECTIVES AND STRATEGIC PLANNING CONSIDERATIONS

While coal's share of world energy consumption will continue to hover at the 40% range from 2006 to 2030, the international industrial sector will see small increases in coal consumption from 2006. The industrial sector currently sources 19% of its energy from coal, with an anticipated increase to 23% in 2030. While the industrial sector includes manufacturing, agriculture, and construction, the main drivers for the coal industry will be steel production and chemical manufacturing. The links between coking coal and steel as well as coal and chemicals will rise as a result of 1) growing international demand for steel, and 2) greater reliance on coal-fired power sources at chemical factories, as coal gasification technologies evolve.

Consequently, as coal is a readily-available, domestically-sourced, and inexpensive energy commodity, increased synergies between U.S. coal producers and international steel manufacturers, as well as U.S. coal producers and international chemical companies should be further explored. While the U.S and China are leaders in steel manufacturing, the U.S., Europe, and China reign in chemical technologies and production. In light of this scenario, greater rapport should be enhanced between the U.S. coal industry and the domestic/international sectors of steel production and chemical manufacturers

An analysis of the coal-fired electricity generation sector indicates that coal-fired power will further develop in China, India, South Africa, Australia, and Eastern Europe. As worldwide emissions and greenhouse gas concerns come to the forefront of energy and environmental issues, the U.S. stands ready to export existing commercially-viable clean coal technologies while simultaneously developing advanced clean burning coal-fired systems. Consequently closer collaboration between coal-fired power plants and emissions abatement manufacturers should be promoted, on both a domestic and international scale. With the looming increase in clean coal technology in China and India, IPR, patent, and licensing issues arise, thus prompting legal involvement to ensure that the U.S. companies which export clean coal equipment receive just and fair compensation and profit from the development of advanced clean coal technologies.

Sources:

Department of Energy, International Energy Outlook; Department of Energy, Annual Energy Outlook; Platt's International Coal Report; National Mining Association; National Coal Council; World Coal Institute; Coal Age Magazine; Coal People Magazine; Peabody Energy Website; Arch Coal Website; Kennecott Energy Website

Prepared by: Shannon Fraser (ITA/MAS/MFG/OEEI, x23609)

APPENDIX

Figure 1:

2005: Coal Production by Coal-Producing Region
(Million Short Tons and Percentage Changes from 2004)
U.S. 2005 Total: 1,133.3 Million Short Tons (+1.9% from 2004)
Source: Energy Information Administration, Annual Coal Report

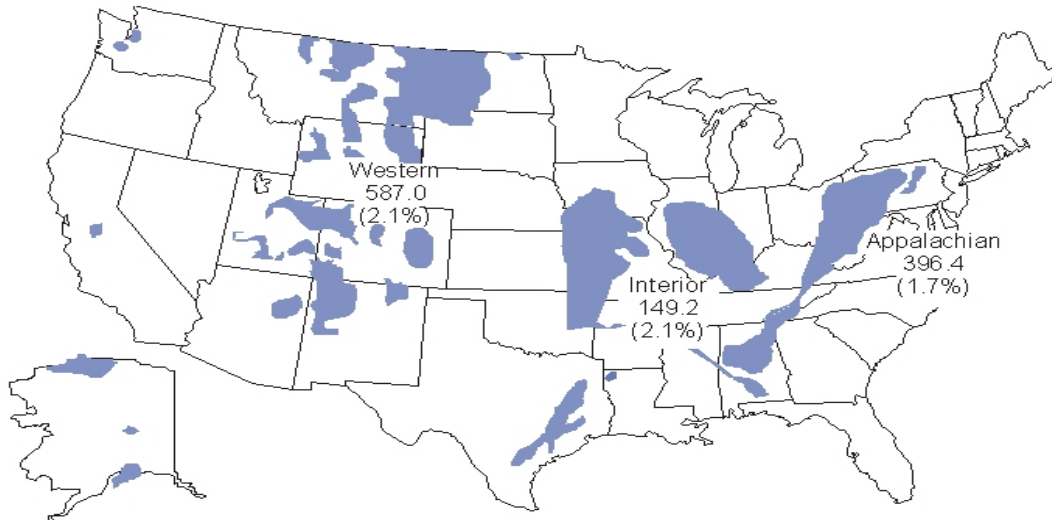


Figure 2:

2005: Electric Power Sector Consumption of Coal by Census Region
(Million Short Tons and Percentage Changes from 2004)
U.S. 2005 Total: 1,039.0 Million Short Tons (+2.2% from 2004)
Source: Energy Information Administration, Annual Coal Report

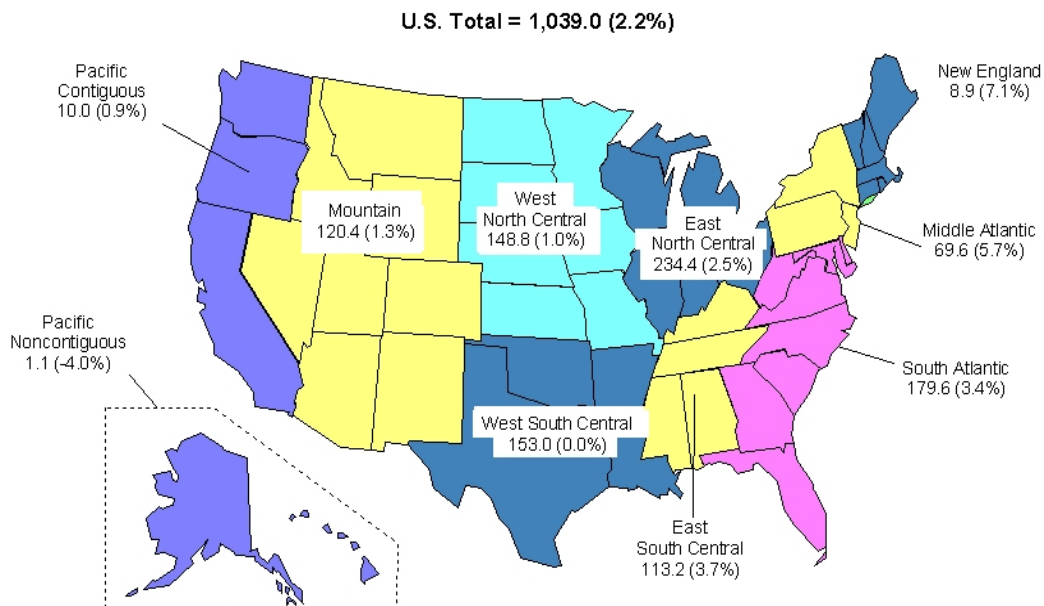


Figure 3:
Major U.S. Coal Producers
Source: National Mining Association

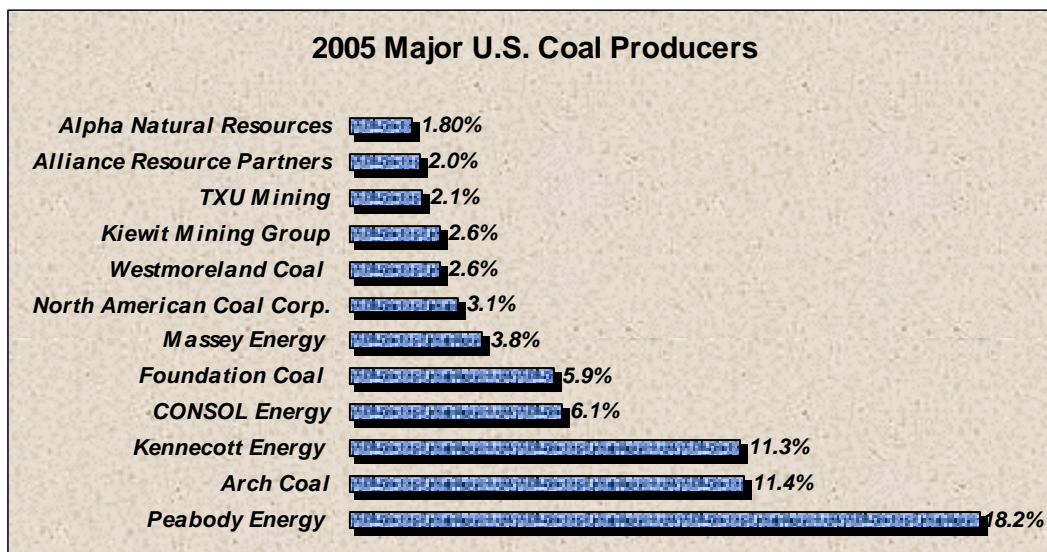


Figure 4:
2005: Top 10 Coal Producing States
Source: Coal Age, January 2006

2005: Top 10 U.S. Coal Producing States	Million Short Tons
Wyoming	407.3
West Virginia	151
Kentucky	116.5
Pennsylvania	65.3
Texas	43.7
Colorado	39.9
Montana	37.9
Indiana	33.6
Illinois	31.6
North Dakota	29.4

Figure 5:
Top Coal Exporters
(Figures in million tons)
Source: World Coal Council

Top Coal Exporters	2004 Total	2003 Total	2002 Total	2001 Total	2000 Total
Australia	219	207.8	197.8	192.8	186.8
Indonesia	107	90.1	73	90.9	56.8
PR China	86	95.8	85.8	69.3	55.1
South Africa	67	71.4	68.6	66.4	70
Russia	65	59.7	45.1	44.1	34.3
Columbia	52	46.1	34.4	41	34.5
USA	43	38.9	34.5	37.3	53
Canada	27	26	26.8	30.2	31.8

*Totals include coking coal and steam coal

Figure 6:

Select 2005 Financials for Peabody Energy and Arch Coal
 Source: Peabody Energy and Arch Coal 2005 Annual Report

Select Financials: 2005

	Peabody Energy	Arch Coal	Average:
Select Financials: 2005	(dollars in thousands)	(dollars in thousands)	
COST AND EXPENSES:			
Operating cost and expenses	3,715,836	2,174,007	2,944,922
Depreciation, depletion, and amortization	316,114	212,301	264,208
Asset retirement obligation expenses	35,901	n/a	n/a
Selling and administrative expenses	189,802	91,568	140,685
Other operating income:			n/a
Net gain on disposal or exchange of assets	-101,487	-54,075	(77,781)
Income from equity affiliates	-30,096	n/a	n/a
CASH FLOWS FROM INVESTING ACTIVITIES:			
Additions to property, plant, equipment, and mine development	-384,304	-357,142	(370,723)
Federal coal lease expenditures	-118,364	n/a	n/a
Purchase of mining and related assets	-141,195	117,048	(12,074)
Additions to advance mining royalties	-14,566	-28,164	(21,365)
Acquisitions, net	n/a	-23,285	n/a
Investments in joint ventures	-2,000	n/a	n/a
Proceeds from disposal of assets	76,227	n/a	n/a
Revenues	4,545,323	2,508,773	3,527,048
Operating Margins	518,383	127,943	323,163
Net Profit	422,653	38,123	230,388
Long-term debt	138,292	971,755	1,177,338