

## **6. ECONOMIC IMPACT ON THE REGION**

**SB 257 Section 4(2)(j)**

## **6. Economic Impact - SB257 4(2)(i)**

The proposed Thoroughbred Generating Company will have a tremendous positive economic impact on the Central City/Muhlenberg County area as well as a seventeen county region of western Kentucky. It has been estimated that the Thoroughbred project is expected to create an annual average of more than \$98 million in new spending.

Construction of the Thoroughbred Generating Station will occur over a four and one half year period. The average number of workers will be approximately 1,500 with the maximum at peak of 2,900. These workers will most likely be residents of the western Kentucky area. Some workers will temporarily relocate to the area during the construction.

When operational, the power plant and mine together will employ approximately 450 full time workers. It is anticipated that approximately 400 of those workers will reside in Kentucky. An estimate of indirect and induced jobs adds another 633 job years annually for the region.

In addition to the jobs created, Thoroughbred, its contractors, and employees will purchase many goods and services from the surrounding area and Kentucky. It is estimated that there will be \$3.345 billion in cumulative new spending over the 30 plus years of construction and operation.

Attached is an analysis prepared by KPMG LLP Economic Consulting Services which details the economic impacts for Kentucky which would likely result from construction and operation of the Thoroughbred Energy Campus. In addition an analysis by Hill & Associates is also attached. The Hill report outlines the long-term economic advantages of coal fueled power plants over gas fueled plants.

## **6.1 KPMG Economic Impact Study**

**Thoroughbred Energy Campus:  
An Analysis of Economic Impacts for Kentucky**

**Prepared for  
Peabody Energy**

**KPMG LLP  
Economic Consulting Services  
Washington, DC  
February 2002**

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## **1.0 Executive Summary**

### **1.1 KPMG Disclosures**

This report was prepared by KPMG LLP's Economic Consulting Services ("KPMG") at the request of Peabody Energy for the exclusive benefit of Peabody Energy and is subject to limitations described herein. KPMG relied upon Thoroughbred Energy Campus estimates provided by Peabody Energy regarding local job creation, operational employee wages and benefits, and anticipated business spending. These estimates and assumptions provide the basis for portions of this analysis; however, they have not been independently verified by KPMG. Accordingly KPMG expresses no opinion and gives no warranty as to the accuracy of such information. Furthermore, there are usually differences between estimates and actual results because events and circumstances do not occur as expected, and those differences might be material. This report is intended to be read in its entirety, including the associated description of the IMPLAN model and appendices.

It is KPMG's understanding that this report may be used during discussions with third parties concerning public sector licensing and certification and may be filed by Peabody Energy with appropriate governmental agencies as required.

### **1.2 Introduction**

This report describes KPMG's assessment of the economic impacts of the proposed Thoroughbred Energy Campus ("the Project"), a planned 1,500 megawatt coal-fueled power plant and adjacent coal mine to be located in Muhlenburg County, Kentucky with more than 450 permanent jobs expected at full production. This analysis provides an overview of the estimated value generated by the Project in the form of increased economic activity as a result of continual investment in materials and services, and the impacts to employment and income.

This report estimates the economic impacts for the Commonwealth of Kentucky, the 17-county region surrounding the Project ("the Thoroughbred Community"), and the County of Muhlenburg where the Project will reside. The Thoroughbred Community consists of the following Kentucky Counties: Butler, Caldwell, Christian, Crittenden, Daviess, Hancock, Henderson, Hopkins, Logan, Lyon, McLean, Muhlenburg, Ohio, Todd, Trigg, Union, and Webster.

Total economic impacts are comprised of three sub-categories: direct, indirect and induced. Direct impacts are created by the first round of spending by the Project, its contractors and employees. Indirect impacts are created by the second and later rounds of spending that are

incurred by the suppliers to the Project and its contractors. Induced impacts are created by subsequent rounds of spending generated by the personal consumption expenditures of employees of the suppliers to the Project. Indirect and induced impacts combine to form the ripple effects of spending throughout the area under analysis.

Taxes paid by the Project could be thought of as direct spending, but because it cannot be determined how or if the Government entities will spend those funds, this analysis has conservatively excluded the effects of taxes in calculating any direct, indirect, or induced impacts. It could reasonably be inferred that additional economic activity would result from the indirect and induced impacts of tax revenue spending and corresponding employment.

This report presents results for three different measures of economic activity: spending, job-years, and income. Spending represents total transactions between unrelated parties. A job-year is the employment of one person full time for one year. Income is personal income earned by workers, and includes fringe benefits. The three measures are separate indicators of economic activity, and should not be added together.

For purposes of the economic benefit analysis, the construction period and 30-years of operations for both the power plant and the mine were considered. The construction periods are identified as 2002-2006 for the power plant and 2003-2006 for the mine. Operations overlap the construction period to accommodate ramp-up to full operations in 2007. Subsequently the operations period is identified as 2005-2035 for the power plant and mine. The entire period covered by this analysis is 34 years beginning in 2002 and ending in 2035. It should be noted that the useful life of the Project is expected to extend well beyond 2035, however, this analysis ends at 2035 for the sake of modeling convenience.

All estimates in this report are stated in 2001 dollars (constant dollars) unless noted otherwise.

### 1.3 Summary of Results

#### Major Economic Benefits for the Commonwealth of Kentucky:

<b>Total Economic Impacts on the Commonwealth of Kentucky, 2002 – 2035</b>					
<b>(Millions, except Job-years)</b>					
	<b>Power Plant Construction</b>	<b>Mine Construction</b>	<b>Power Plant Operations</b>	<b>Mine Operations</b>	<b>Total</b>
Spending	\$ 1,306	\$ 88	\$ 886	\$ 1,064	<b>\$ 3,345</b>
Job-years	12,907	964	12,435	19,340	<b>45,646</b>
Income	\$ 384	\$ 40	\$ 623	\$ 919	<b>\$ 1,966</b>

Detail may not add to total due to rounding

The estimated impacts for the Commonwealth of Kentucky over the 2002-2035 construction and operating periods are as follows:

- \$3.345 billion in cumulative new spending (excluding power plant revenues) from direct, indirect, and induced impacts;
- An average of more than \$98 million per year of new spending;
- \$1.966 billion in cumulative personal income from direct, indirect, and induced impacts;
- Construction Activities:
  - Approximately 924 average direct job-years are expected to result from the construction of the power plant (842 average job-years annually) and the mine (82 average job-years annually);
  - As a result of the entire construction activity, another 1,866 average indirect and induced job-years annually are estimated to be generated with average annual wages and benefits of about \$27,300 per job-year;
- Operation Activities:
  - Approximately 392 average direct job-years annually are expected to result from the operations of the power plant (111 job-years) and the mine (281 job-years) with average annual compensation including benefits of \$79,400 per job-year. This includes the ramp up to full operations;
  - Of the more than 450 permanent jobs created by the Project, approximately 402 of those workers will reside within the Commonwealth. (The analysis conservatively assumed that not all Project employees will be Commonwealth residents.) The 402 permanent positions are comprised of 112 jobs at the power plant and 290 jobs at the mine;
  - As a result of the power plant and the mine operations activity, an additional 633 indirect and induced job-years annually are estimated to be generated with average annual wages and benefits of about \$29,400 per job-year.



**Major Economic Benefits for the 17-county Thoroughbred Community:**

<b>Total Economic Impacts on the 17-county Thoroughbred Community, 2002 – 2035</b>					
<b>(Millions, except Job-years)</b>					
	<b>Power Plant Construction</b>	<b>Mine Construction</b>	<b>Power Plant Operations</b>	<b>Mine Operations</b>	<b>Total</b>
Spending	\$ 1,100	\$ 51	\$ 785	\$ 688	<b>\$ 2,624</b>
Job-years	10,878	674	11,432	15,074	<b>38,057</b>
Income	\$ 305	\$ 28	\$ 580	\$ 713	<b>\$ 1,627</b>

Detail may not add to total due to rounding

The estimated impacts for the 17-county Thoroughbred Community over the 2002-2035 construction and operating periods are as follows:

- \$2.624 billion in cumulative new spending (excluding power plant revenues) from direct, indirect, and induced impacts;
- An average of more than \$77 million per year of new spending;
- \$1.627 billion in cumulative personal income from direct, indirect, and induced impacts;
- Construction Activities:
  - Approximately 914 average direct job-years are expected to result from the construction of the power plant (842 average job-years annually) and the mine (72 average job-years annually);
  - As a result of the entire construction activity, another 1,411 average indirect and induced job-years annually are estimated to be generated with average annual wages and benefits of about \$24,100 per job-year;
- Operation Activities:
  - Approximately 357 average direct job-years annually are expected to result from the operations of the power plant (111 job-years) and the mine (246 job-years) with average annual compensation including benefits of \$80,300 per job-year. This includes the ramp up to full operations;
  - Approximately 365 of the 450 permanent positions are individuals residing within the Thoroughbred Community. The 365 positions are comprised of 112 jobs at the power plant and 253 jobs at the mine;
  - As a result of the power plant and the mine operations activity, an additional 498 indirect and induced job-years annually are estimated to be generated with average annual wages and benefits of about \$26,300 per job-year.

## 1.4 Methodology

To conduct this analysis, KPMG has employed the IMPLAN<sup>1</sup> model, a state-of-the-art Input-Output modeling and database system. IMPLAN, which stands for “Impact Analysis for Planning,” is used by numerous analysts in industry, academia, and state and local government. KPMG calculated all impacts using current IMPLAN models<sup>2</sup>. The results show that the construction and operation of the proposed Project are estimated to result in substantial economic benefits.

The separate IMPLAN models for the Commonwealth of Kentucky, the 17-county Thoroughbred Community, and Muhlenburg County, capture the Input-Output relationships among the economic sectors within each sector. A more detailed explanation of the IMPLAN methodology can be found just prior to the appendices in this report. KPMG used the models to calculate the multiplier effects of the Project on each sector and in total. Prior to performing the calculations, KPMG assigned the various expenditures estimated for the Project to their respective economic sectors. The model produced values for the direct, indirect, and induced impacts of the expenditures in each year of construction and operation. An explanation of this economic impact terminology is given below.

### Direct Impacts

The direct impacts of spending associated with the Project include the purchases of capital goods and construction services by the Project, and the payment of salaries and wages to its contractors (excluding benefits) during the construction period. This analysis also classifies the Project’s operating expenditures and payments of wages and salaries to its employees during the operating period as direct impacts.

### Indirect Impacts

As money is spent on the Project, new economic activity is generated. The Project’s purchases of goods and services from the sector’s businesses result in new spending by those businesses, who then make purchases from other local businesses, and so on. The indirect impacts generated by the Project’s spending are the associated spending, jobs, and personal income generated by the subsequent rounds of this re-spending.

### Induced Impacts

The construction workers and the Project’s operating employees, as well as the employees of the businesses impacted by construction and operating expenditures each year also create additional economic activity by spending the money they earn. The spending, jobs, and personal income produced by this “household spending” are the induced impacts.

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<sup>1</sup> IMPLAN is a registered trademark of the Minnesota IMPLAN Group, Inc., located in Stillwater, MN.

<sup>2</sup> Based on Thoroughbred Energy Campus expenditure and employment projections provided by Peabody Energy.

## Power Plant Operations

Operations for the power plant are expected to begin in 2005 with ramp-up to full operations during 2007. This analysis examines an operation period of 31 years for the power plant, which extends to the end of 2035. Total expenditures on non-labor goods and services related to operations of the power plant are expected to be valued at an average \$179 million per year during the period. Of this amount, an estimated \$11 million will be spent annually on locally provided goods and services within the Commonwealth, \$10 million annually within the 17-county Thoroughbred Community, and an estimated \$426,000 within Muhlenburg County. (See Appendix Table A-3.)

The Project estimates that during the operating period, the average operating payroll will be approximately \$11 million per year. It is expected that all of this income will go to employees residing in the 17-county Thoroughbred Community including \$4 million to employees residing in Muhlenburg County.<sup>3</sup> The Project estimates that after the ramp-up period, 112 full time employees will be required to operate power plant. Of this number, it is estimated that all will reside within the 17-county Thoroughbred Community and 35 percent, or 39 individuals will reside in Muhlenburg County.

## Mine Operations

Operations for the mine are expected to begin in 2005 with ramp-up to full operations during 2007. For the purposes of this analysis, an operation period of 31 years is considered for the mine, which extends through the year 2035. Mine operations consist of spending on goods and services, payroll and the associated jobs at the mine. Total expenditures related to operations of the mine are expected to amount to an average \$56 million per year. These expenditures are expected to result in an estimated \$31 million within the Commonwealth, \$24 million in the 17-county Thoroughbred Community and \$9 million in Muhlenburg County. Of the \$31 million spent within the Commonwealth, approximately \$11 million annually will be spent on locally provided goods and services within Kentucky including an estimated \$6 million annually to be spent within the 17-county Thoroughbred Community and \$4 million within Muhlenburg County. (See Appendix Table A-4.)

The Project expects that about \$25 million of the \$56 million per year total mine operating cost will be for operating payroll (including benefits). Of this amount, \$20 million is expected to go to employees residing in Kentucky for wages and benefits including \$17 million to employees in the 17-county Thoroughbred Community and \$5 million within Muhlenburg County.<sup>4</sup> The analysis assumes that once operations are fully ramped up, an average of 362 full-time employees will be required to operate the mine. This analysis assumes that 290 of these 362 employees will reside within Kentucky including 253 within the 17-county Thoroughbred Community and 72 within Muhlenburg County.

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<sup>3</sup> Local spending by the Project's power plant employees on goods and services is estimated to be \$9 million for employees residing within the 17-county Thoroughbred Community (same for Kentucky) and \$3 million for employees residing within Muhlenburg County, per KPMG's use of the IMPLAN model.

<sup>4</sup> Local spending by the Project's mine employees on goods and services is estimated to be \$12 million for employees residing within Kentucky including \$11 million for employees within the 17-county Thoroughbred Community and \$3 million within Muhlenburg County, per KPMG's use of the IMPLAN model.

## 2.0 Economic Impacts

The estimated spending total of \$3.345 billion for labor and materials within the Commonwealth of Kentucky consists of \$2.177 billion in direct spending on construction and operations and \$1.168 billion in indirect and induced expenditures. The estimated spending total of \$2.624 billion for labor and materials within the surrounding 17-county Thoroughbred Community consists of \$1.917 billion in direct spending on construction and operations and \$707 million in indirect and induced expenditures. The estimated spending total of \$704 million for labor and materials within Muhlenburg County consists of \$575 million in direct spending on construction and operations and \$129 million in indirect and induced expenditures. The estimated spending impact for the 17-county Thoroughbred Community is 78 percent of that for the Commonwealth of Kentucky as a whole, while the estimated spending impact in Muhlenburg County is about 21 percent of that of the entire Commonwealth.

For the Commonwealth of Kentucky, the estimated 45,646 total job-years consist of 16,686 direct job-years and 28,960 indirect and induced job-years. For the 17-county Thoroughbred Community, the estimated 38,057 total job-years consist of 15,558 direct job-years and 22,499 indirect and induced job-years. For Muhlenburg County, the estimated 9,914 total job-years consist of 4,927 direct job-years and 4,986 indirect and induced job-years.

The estimated total personal income for the Commonwealth of Kentucky of \$1.97 billion consists of \$1.13 billion in direct personal income and \$833 million in indirect and induced personal income. The estimated total personal income for the 17-county Thoroughbred Community of \$1.63 billion consists of \$1.05 billion in direct personal income and \$577 million in indirect and induced personal income. The estimated total personal income for Muhlenburg County of \$460 million consists of \$349 million in direct personal income and \$110 million in indirect and induced personal income.

Tables 2-A through 2-C below detail the totals above into direct impacts and other impacts (combination of indirect and induced impacts). Also included are the multipliers for job-years and income, which are determined by calculating the ratio of total job-years and income (direct, indirect, and induced) to direct job-years and income.

**Table 2-A**

<b>Direct and Indirect Economic Impacts on the Commonwealth of Kentucky, 2002 – 2035</b>				
<b>(Millions, except Job-years)</b>				
	<b>Direct (A)</b>	<b>Indirect &amp; Induced</b>	<b>Total (B)</b>	<b>Multiplier (B)/(A)</b>
Spending	\$2,177	\$1,168	\$3,345	1.54
Job-years	16,686	28,960	45,646	2.74
Income	\$1,133	\$ 833	\$1,966	1.74

Detail may not add to total due to rounding

**Table 2-B**

<b>Direct and Indirect Economic Impacts on the 17-county Thoroughbred Community, 2002 – 2035</b> (Millions, except Job-years)				
	<b>Direct (A)</b>	<b>Indirect &amp; Induced</b>	<b>Total (B)</b>	<b>Multiplier (B)/(A)</b>
Spending	\$1,917	\$ 707	\$2,624	1.37
Job-years	15,558	22,499	38,057	2.45
Income	\$1,049	\$ 577	\$1,627	1.55

Detail may not add to total due to rounding

**Table 2-C**

<b>Direct and Indirect Economic Impacts on Muhlenburg County, 2002 – 2035</b> (Millions, except Job-years)				
	<b>Direct (A)</b>	<b>Indirect &amp; Induced</b>	<b>Total (B)</b>	<b>Multiplier (B)/(A)</b>
Spending	\$ 575	\$ 129	\$ 704	1.22
Jobs-years	4,927	4,986	9,914	2.01
Income	\$ 349	\$ 110	\$ 460	1.32

Detail may not add to total due to rounding

These results show that for every dollar that the Project spends in connection with the construction and operation of its energy Project, it will generate an estimated 54 cents of additional spending in the Commonwealth of Kentucky including 37 cents in the 17-county Thoroughbred Community and 22 cents in Muhlenburg County. Likewise, for every worker the Project hires, it is estimated that approximately 1.7 additional jobs will be created in the Commonwealth of Kentucky including 1.5 jobs in the 17-county Thoroughbred Community and 1 in Muhlenburg County. Every dollar the Project pays in wages will produce an estimated additional 74 cents of income in the Commonwealth of Kentucky including 55 cents in the 17-county Thoroughbred Community and 32 cents in Muhlenburg County.

The Thoroughbred Energy Campus will likely generate additional fiscal benefits that are not quantified in this report. As discussed above, the direct taxes that will be paid in connection with this Project, and their impacts are not included in this analysis. In addition, the indirect and induced effects estimated in this report will generate income and expenditures within Kentucky, which will be part of Kentucky's tax base. Therefore, the indirect and induced income generated by the Project would likely result in additional personal and corporate income tax revenue, and sales tax revenue for the Commonwealth of Kentucky.

## IMPLAN Model Description

The Impact Analysis for Planning (IMPLAN) model is a microcomputer-based program that allows construction of regional Input-Output models for areas as small as a county and aggregation of individual county databases for multi-county analysis. IMPLAN was originally developed for the U.S. Department of Agriculture and is maintained and supported by the Minnesota IMPLAN Group, Inc., Stillwater, Minnesota.

The components of the IMPLAN database form the economic accounts of an individual county, several counties, or an entire state. These accounts show the flow of commodities to industries and institutional consumers in 528 separate industries in agriculture, mining, construction, manufacturing, wholesale and retail trade, utilities, finance, insurance and real estate, and consumer and business services. Each industry is described in terms of its purchases from and sales to all other industries in the local economy. Values for all activities are in producers' prices and do not include transportation costs or other additional transaction costs associated with delivering outputs from each industry to other intermediate users.

The accounts also provide information on value added by each industry and sales by each industry to final demand. Value added has four main components: employee compensation (wages, salaries, benefits, life insurance, retirement, etc.), proprietary income (payments received by self-employed individuals as income), other property-type income (payments received from royalties and dividends), and indirect business taxes (primarily excise and sales taxes individuals pay to businesses).

Final demands are goods and services purchased for their ultimate use by an end user. They include personal consumption expenditures (payments by individuals or households to industries for goods and services for personal consumption); federal government purchases (military and nonmilitary) and sales; state and local government purchases (public education and noneducation) and sales; inventory purchases (unsold annual output) and sales (where inventory reduction exceeds additions from production); capital formation (expenditures to obtain capital equipment); and foreign exports. Final demands are allocated to producing industries, and margins are allocated to the service sectors (transportation, wholesale and retail trade, insurance, etc.) associated with providing that good to the final user.

The IMPLAN model provides the necessary information to estimate a complete set of regional economic accounts for a local area. The economic accounts are then converted to industry through the use of Input-Output accounts and a set of Leontief multipliers. The initial data set is the "use" of commodities by industry and the "make" of commodities by industry. These flows are derived for the local area from the national Input-Output accounts. Final demands, value added, output, and employment are derived for each data set. Employment numbers are also derived for each industry in the local area.

To create a regional Input-Output model for the local area, the regional data are combined with the 1992 national structural matrices produced by the U.S. Bureau of Economic Analysis. This operation produces regional structural matrices and eliminates industries that do not exist in the

region. Imports are then estimated via the calculation of regional purchase coefficients (RPCs). An RPC represents the proportion of the total locally produced supply of a good or service required to meet a particular industry's intermediate and final demands; RPCs range between 0 and 1. In the IMPLAN model, RPCs are derived from the 1977 Multi-Regional Input-Output Accounts, a cross-sectional database of Input-Output regional accounts linked with consistent interstate trade flows. Imports are calculated by using the minimum of the RPC or the supply/demand pool. The regional final demands and the use matrix are then multiplied by the resulting RPC coefficients, which creates a set of matrices and final demands that are free of imports. Domestic exports are the residual of regional production not locally consumed. The result is a balanced set of regional economic accounts.

The Input-Output accounts are then developed. The regional use matrix and final demands are converted from a commodity basis to an industry basis by using the market share hypothesis. The subsequent inversion of the Input-Output accounts provides an import-free Leontief matrix of multipliers.

The notion of a multiplier or ripple effect rests on the difference between the initial effect of a change in demand and the total effect of that change. Total effects can be calculated either as direct and indirect effects or as direct, indirect, and induced effects. Direct effects are production changes associated with the immediate effects or final demand changes. Indirect effects are production changes in backward-linked industries caused by the changing input needs of directly affected industries (i.e., additional purchases to produce additional output). Induced effects are changes in regional household spending patterns caused by changes in household income generated by the direct and indirect effects.

IMPLAN estimates five sets of multipliers, corresponding to five measures of regional economic activity: total industry output, personal income, total income, value added, and employment. These multipliers are used to estimate the impact of changes in expenditures in an industry that provides inputs to a particular existing or new activity.

## **Appendix – Detailed Calculations**



**Table A-1 – Local Purchase Components for the Power Plant Construction Period**

2002 – 2006				
<b>Table A-1 Power Plant Construction Items</b>	<b>Total</b>	<b>Amount Spent Within Kentucky</b>	<b>Amount Spent Within the 17-county Community</b>	<b>Amount Spent Within Muhlenburg County</b>
Capital Expenditure	\$1,217,970,428	\$ 24,359,409	\$ 6,089,852	\$ 365,391
TOTAL EPC VENDOR and Transmission line	\$ 823,074,995	\$749,029,575	\$737,529,574	\$252,960,351
<b>Power Plant Capital Expenditure and EPC Vendor Total*</b>	<b>\$2,041,045,424</b>	<b>\$773,388,983</b>	<b>\$743,619,426</b>	<b>\$253,325,742</b>
<b>TOTAL Owners oversight</b>	<b>\$ 12,574,965</b>	<b>\$ 8,525,090</b>	<b>\$ 8,525,090</b>	<b>\$ 2,967,736</b>
<b>GRAND TOTAL</b>	<b>\$2,053,620,389</b>	<b>\$781,914,073</b>	<b>\$752,144,516</b>	<b>\$256,293,478</b>

\*Impact of taxes to be paid in connection with the Project have been excluded from the analysis.

All figures in 2001 dollars.

Detail may not add due to rounding.



**Table A-2 – Local Purchase Components for the Mine Construction Period**

2003 – 2006				
<b>Table A-2 Mine Construction – Items</b>	<b>Total</b>	<b>Amount Spent Within Kentucky</b>	<b>Amount Spent Within the 17- county Community</b>	<b>Amount Spent Within Muhlenburg County</b>
<b>Capital</b>				
Total Mine Development	\$ 1,836,000	\$ 1,468,800	\$ 1,285,200	\$ 367,200
Total Facilities	\$ 35,011,750	\$ 28,009,400	\$ 24,508,225	\$ 6,904,850
Total Power Distribution	\$ 2,896,000	\$ 2,316,800	\$ 2,027,200	\$ 14,480
Total Mining & Support Equipment	\$ 50,114,000	\$ 10,183,000	\$ 700,000	\$ -
<b>Total Capital</b>	<b>\$ 89,857,750</b>	<b>\$ 41,978,000</b>	<b>\$ 28,520,625</b>	<b>\$ 7,286,530</b>
<b>Other Expenses</b>				
Total Labor and Benefits	\$ 19,877,245	\$ 15,901,796	\$ 13,914,072	\$ 3,975,449
Total Materials and Supplies	\$ 10,488,341	\$ 3,223,032	\$ 1,747,130	\$ 868,671
Total Outside Services	\$ 1,404,222	\$ 381,680	\$ 313,678	\$ 150,471
Total Power	\$ 1,493,158	\$ 1,493,158	\$ -	\$ -
Total Taxes and Insurance*	\$ 846,350	\$ 47,459	\$ -	\$ -
Total Leases	\$ 213,565	\$ 99,664	\$ 92,070	\$ 61,981
Total Other Income/Expenses	\$ 44,494	\$ 38,005	\$ 30,404	\$ 12,162
<b>Total Other Expenses</b>	<b>\$ 34,367,375</b>	<b>\$ 21,184,794</b>	<b>\$ 16,097,354</b>	<b>\$ 5,068,734</b>
<b>Royalties</b>	<b>\$ 756,000</b>	<b>\$ 756,000</b>	<b>\$ 756,000</b>	<b>\$ 756,000</b>
<b>GRAND TOTAL</b>	<b>\$ 124,981,124</b>	<b>\$ 63,918,794</b>	<b>\$ 45,373,978</b>	<b>\$ 13,111,263</b>

\*Impact of taxes to be paid in connection with the Project have been excluded from the analysis.

All figures in 2001 dollars.

Detail may not add due to rounding.

**Table A-3 - Local Purchase Components for the Power Plant Operation Period**

2005 – 2035 Total				
<b>Table A-3 Power Plant Operations -- Items</b>	Total	Amount Spent Within the State of Kentucky	Amount Spent Within the 17 County Community	Amount Spent Within Muhlenburg County
Total Labor and Benefits	\$ 342,926,416	\$ 342,926,416	\$ 342,926,416	\$ 120,024,246
Total Taxes and Insurance*	\$ 1,310,762,996	\$ -	\$ -	\$ -
Total Other	\$ 572,491,884	\$ 70,686,891	\$ 70,686,891	\$ 13,212,459
Total Materials and Supplies	\$ 3,660,968,732	\$ 261,074,862	\$ 253,082,774	\$ -
<b>GRAND TOTAL</b>	<b>\$ 5,887,150,029</b>	<b>\$ 674,688,169</b>	<b>\$ 666,696,081</b>	<b>\$ 133,236,705</b>

\*Impact of taxes to be paid in connection with the Project have been excluded from the analysis.

All figures in 2001 dollars.

Detail may not add due to rounding.

**Table A-4 – Local Purchase Components for the Mine Operation Period**

2005 - 2035 Total				
<b>Table A-4 Mine Operations – Items</b>	<b>Total</b>	<b>Amount Spent Within Kentucky</b>	<b>Amount Spent Within the 17-county Community</b>	<b>Amount Spent Within Muhlenburg County</b>
<b>Operations Spending</b>				
Total Labor and Benefits	\$ 771,847,470	\$ 617,477,976	\$ 540,293,229	\$ 154,369,494
Total Materials and Supplies	\$ 481,696,639	\$ 148,023,758	\$ 80,240,201	\$ 39,895,319
Total Outside Services	\$ 139,512,227	\$ 35,317,832	\$ 28,373,932	\$ 11,708,573
Total Power	\$ 57,837,617	\$ 57,837,617	\$ -	\$ -
Total Taxes and Insurance*	\$ 16,005,417	\$ 897,500	\$ -	\$ -
Total Leases	\$ 4,038,750	\$ 1,884,750	\$ 1,741,150	\$ 1,172,135
Total Income/Expenses	\$ 2,043,469	\$ 1,745,463	\$ 1,396,370	\$ 558,548
Royalties	\$ 76,967,863	\$ 76,967,863	\$ 76,967,863	\$ 76,967,863
<b>TOTAL FOR OPERATIONS SPENDING</b>	<b>\$ 1,549,949,452</b>	<b>\$ 940,152,759</b>	<b>\$ 729,012,746</b>	<b>\$ 284,671,932</b>
<b>Replacement and Maintenance Spending</b>				
Total Facilities	\$ 62,642,800	\$ 10,474,240	\$ 9,164,960	\$ 1,658,770
Total Power Distribution	\$ 965,000	\$ 772,000	\$ 675,500	\$ 4,825
Total Mining/Support Equip.	\$ 114,896,000	\$ 11,283,000	\$ 700,000	\$ -
Total Land	\$ 500,000	\$ 400,000	\$ 350,000	\$ 2,500
<b>Total Capital</b>	<b>\$ 179,003,800</b>	<b>\$ 22,929,240</b>	<b>\$ 10,890,460</b>	<b>\$ 1,666,095</b>
<b>GRAND TOTAL</b>	<b>\$ 1,728,953,252</b>	<b>\$ 963,081,999</b>	<b>\$ 739,903,206</b>	<b>\$ 286,338,027</b>

\*Impact of taxes to be paid in connection with the Project have been excluded from the analysis.

All figures in 2001 dollars.

Detail may not add due to rounding.

## Table A-5 – Detailed Economic Impact Results

All figures are in millions of 2001 dollars.  
Detail may not add due to rounding.

### KENTUCKY

#### Power Plant Construction

2002-2006	TOTAL			
	Direct	Indirect	Induced	Total
Spending	\$778	\$237	\$290	\$1,306
Job-years	4,212	4,507	4,188	12,907
Personal Income	\$147	\$134	\$103	\$384

#### Mine Construction

2003-2006	TOTAL			
	Direct	Indirect	Induced	Total
Spending	\$56	\$11	\$21	\$88
Job-years	327	336	301	964
Personal Income	\$22	\$11	\$7	\$40

#### Power Plant Operations

2005-2035	TOTAL			
	Direct	Indirect	Induced	Total
Spending	\$606	\$116	\$164	\$886
Job-years	3,438	6,638	2,359	12,435
Personal Income	\$343	\$222	\$58	\$623

#### Mine Operations

2005-2035	TOTAL			
	Direct	Indirect	Induced	Total
Spending	\$737	\$151	\$177	\$1,064
Job-years	8,709	8,083	2,548	19,340
Personal Income	\$621	\$235	\$63	\$919

#### TOTAL

2002-2035	TOTAL			
	Direct	Indirect	Induced	Total
Spending	\$2,177	\$516	\$652	\$3,345
Job-years	16,686	19,565	9,395	45,646
Personal Income	\$1,133	\$602	\$231	\$1,966

All figures are in millions of 2001 dollars.  
 Detail may not add due to rounding.

### 17-COUNTY THOROUGHBRED COMMUNITY

#### Power Plant Construction

2002-2006	TOTAL			
	Direct	Indirect	Induced	Total
Spending	\$747	\$158	\$195	\$1,100
Job-years	4,212	3,364	3,302	10,878
Personal Income	\$144	\$90	\$71	\$305

#### Mine Construction

2003-2006	TOTAL			
	Direct	Indirect	Induced	Total
Spending	\$35	\$5	\$11	\$51
Job-years	286	196	191	674
Personal Income	\$19	\$5	\$4	\$28

#### Power Plant Operations

2005-2035	TOTAL			
	Direct	Indirect	Induced	Total
Spending	\$597	\$77	\$110	\$785
Job-years	3,438	6,123	1,870	11,432
Personal Income	\$343	\$197	\$40	\$580

#### Mine Operations

2005-2035	TOTAL			
	Direct	Indirect	Induced	Total
Spending	\$538	\$69	\$81	\$688
Job-years	7,622	6,085	1,367	15,074
Personal Income	\$544	\$140	\$29	\$713

#### TOTAL

2002-2035	TOTAL			
	Direct	Indirect	Induced	Total
Spending	\$1,917	\$309	\$398	\$2,624
Job-years	15,558	15,768	6,731	38,057
Personal Income	\$1,049	\$432	\$145	\$1,627

All figures are in millions of 2001 dollars.  
Detail may not add due to rounding.

### MUHLENBURG COUNTY

#### Power Plant Construction

2002-2006	TOTAL			
	Direct	Indirect	Induced	Total
Spending	\$255	\$31	\$50	\$336
Job-years	1,474	711	908	3,093
Personal Income	\$68	\$22	\$18	\$108

#### Mine Construction

2003-2006	TOTAL			
	Direct	Indirect	Induced	Total
Spending	\$12	\$1	\$2	\$15
Job-years	82	63	42	186
Personal Income	\$6	\$1	\$1	\$8

#### Power Plant Operations

2005-2035	TOTAL			
	Direct	Indirect	Induced	Total
Spending	\$108	\$6	\$9	\$123
Job-years	1,203	893	159	2,256
Personal Income	\$120	\$22	\$3	\$145

#### Mine Operations

2005-2035	TOTAL			
	Direct	Indirect	Induced	Total
Spending	\$201	\$15	\$15	\$231
Job-years	2,168	1,930	280	4,378
Personal Income	\$155	\$38	\$6	\$199

#### TOTAL

2002-2035	TOTAL			
	Direct	Indirect	Induced	Total
Spending	\$575	\$52	\$77	\$704
Job-years	4,927	3,597	1,389	9,914
Personal Income	\$349	\$82	\$28	\$460

## **6.2 Hill & Associates Economic Benefits of Coal Fueled Power Plants Compared to Natural Gas**



**ECONOMIC BENEFITS OF A  
COAL-FUELED POWER PLANT  
COMPARED TO NATURAL GAS**

**PREPARED FOR  
PEABODY ENERGY**

**August 2002**

# ECONOMIC BENEFITS OF A COAL-FUELED POWER PLANT COMPARED TO NATURAL GAS

## SUMMARY

Peabody Energy has requested Hill & Associates, Inc to evaluate the potential economic benefits of constructing and operating a large coal-fueled power plant in the Midwest, compared to developing and operating a plant of similar size fueled by natural gas. This report presents the results of our analysis, which shows that coal has a much more favorable economic impact. The numbers presented are representative of the state-wide economic impacts that would be associated with development of a new power plant in any of the several mid-western states that produce coal.

The construction and operation of a coal-fueled power plant in a coal-producing state will bring major economic benefits in terms of jobs created and sales for regional businesses. Constructing a coal-fueled power plant and the associated mine will increase business volume at the state level by \$4.5 billion dollars and result in over 20,000 job-years of new employment. Operating the mine and plant over the estimated 40 – 50 year life will lead to an additional \$702 million dollars of business volume in the state each year and create almost 4,000 permanent jobs. Much of the economic activity and many of the new jobs will be created indirectly as a result of the expenditures made directly at the power plant and mine.

By contrast, a new gas-fueled power plant of the same size would have only about one third of coal's favorable impact on the economy and regional employment during the construction phase. Gas would also have a less favorable impact during the operating life of the plant because most of the dollars spent for operating the gas plant would probably go out-of-state for purchases of the natural gas. New jobs created by operation of the gas plant would amount to only 22% of the jobs created by the new coal plant and mine.

In addition to the advantages coal offers in terms of project-related spending and employment, the use of coal for power generation also provides broader economic benefits. Because fuel is a major element in the cost of electricity and coal is so much cheaper than gas, the use of coal-fueled generation provides a secure base of low-cost generation for all of the consumers and businesses in the region. Furthermore, low electricity costs will help attract other new business. Appendix A shows the current cost of coal to a mine-mouth power plant in the Midwest is likely to be less than \$.85 per million Btu. Based upon the typical performance pattern of a longwall mine, these costs are expected to remain approximately constant over the life of the mine. Also, the annual forecast of U.S. steam coal prices prepared by Hill & Associates, Inc. predicts declining coal prices in the Midwest. In contrast, gas prices have recently been higher and are expected to remain far above coal. According to the 2002 edition of the Annual Energy Outlook of the U.S. Energy Information Agency (EIA), the average price for natural gas delivered to U.S. utilities during 2000 and 2001 was almost \$4.50 per million Btu. Because the

EIA and others forecast the price of gas will average around \$3.50 per million Btu (in constant dollars) over the next 20 years, it appears that coal will continue to be a much lower cost fuel than natural gas. These fuel price differences account for the fact that states generating power from gas have the highest electricity prices and states using coal have the lowest electricity prices.

There will also be non-economic benefits derived from a new coal plant. While gas generally offers environmental advantages over coal, it should be noted that a modern coal plant with a high thermal efficiency and equipped with state-of-the-art pollution control equipment will, because of its low operating costs, displace the output of old, small and less well-controlled coal plants that can be significant sources of pollution. The UFEM/NPM model used by Hill & Associates to model coal use and electricity dispatch across the U.S. consistently shows that modern coal plants in the Midwest will force some of the smaller/older plants to be shut down. Thus the environment will gain along with the economy.

## **BACKGROUND AND APPROACH TO THE STUDY**

This study was prepared by Hill & Associates, Inc., a consulting firm specializing in energy industry economics and markets, with the assistance of the University of West Virginia's Bureau of Business and Economic Research. The two options analyzed were:

1. A 1500 megawatt coal-fueled power plant equipped with the latest technology for emissions control. The coal for this plant would be supplied by a new mine using modern longwall technology
2. A plant of the same size burning natural gas and utilizing combined cycle technology. In all likelihood, a plant of this size would have to use gas produced outside the region and piped in via the interstate pipeline system.

The study team developed estimates of power plant construction and operating costs and employment from sources such as the Department of Energy, the International Energy Agency, the Electric Power Research Institute and internal company files of mine costs and staffing. These cost estimates were then fed into the IMPLAN model, a widely-used model that provides estimates of the full statewide impact of changes in economic inputs. The IMPLAN model calculates direct, indirect and induced economic activity. These measures capture the "ripple" effect that occurs when one element of new economic activity creates new employment and spending in related areas as well as additional employment and spending in economic sectors not directly related to the one where the initial new expenditures are made. The cost and staffing estimates used as inputs to the IMPLAN model are summarized in Appendix A.

## ESTIMATES OF ECONOMIC IMPACTS

The results of the IMPLAN model analysis are shown in Tables 1 - 6 below. Tables 1 and 2 show the economic impacts of a coal-fueled power plant and the mine needed to supply the coal. Tables 3 and 4 show a similar analysis for a gas-fueled plant of the same size. Tables 5 and 6 summarize the differences. In each case, the first table of a pair shows the total life-of-project numbers for the impact of the construction work and the second table shows the annual impacts (in millions of dollars per year and in equivalent jobs) of plant operations.

Before discussing the results as presented in the tables, it will be useful to review a few definitions of the major terms used in the study. These are:

- *Direct Economic Impacts* – The first round of spending on the project.
- *Indirect Impacts* – The second and later rounds of spending by the contractors and sub-contractors.
- *Induced Impacts* – Later rounds of business volume related to the consumption spending by the construction and operating employees of the project.
- *Business Volume* – Sales (or spending).
- *Employment* – Permanent jobs in the operation phase and "Job-years" during the construction phase (a job-year being one person employed for 12 months, two employed for 6 months, etc.)
- *Employee Compensation* – Wages and salaries plus employers' contributions for social security, unemployment insurance, workers' compensation, medical insurance, etc.

A review of the tables below shows the economic benefits of a coal-fueled plant are much greater than gas for the following three reasons:

1. The construction cost for a coal-fueled plant is almost three times that of a plant of the same size fueled by natural gas.
2. Employment at a coal plant and the mine that supplies it will be more than six times the employment at a gas plant.
3. Most of the money spent on fuel supply, which is a power plant's largest operating cost, stays in-state for a coal plant but goes out of the state for a gas plant.

**Table 1**  
**Economic Impact of a 1500 Mw Coal-Fueled Plant & Mine- Construction Phase**

Type of Impact	Direct Impact	Indirect and Induced Impacts	Total Impact
Business Volume (Sales in millions)	\$2,113	\$2411	\$4524
Employment (Job-Years)	6,240	14,060	20,300
Employee Compensation (millions)	\$624	\$391	\$1015
Assorted State Taxes (Based on Kentucky - in millions)	--	--	\$57.7

**Table 2**  
**Economic Impact of a 1500 Mw Coal-Fueled Plant & Mine - Operations Phase**

Type of Impact	Direct Impact	Indirect and Induced Impacts	Total Impact
Business Volume (Sales in million \$/year)	\$207.0	\$495.6	\$702.6
Employment (Jobs)	518	3,474	3,992
Employee Compensation (million \$/yr)	\$10.7	\$97.4	\$108.1
Assorted State Taxes (millions)	--	--	\$5.4

**Table 3**  
**Economic Impact of a 1500 Mw Gas-Fueled Plant - Construction Phase**

Type of Impact	Direct Impact	Indirect and Induced Impacts	Total Impact
Business Volume (Sales in millions)	\$750	\$855	\$1,605
Employment (Job-Years)	1,350	4,620	5,970
Employee Compensation (millions)	\$135	\$136	\$271
Assorted State Taxes (millions)	--	--	\$15.5

**Table 4**  
**Economic Impact of a 1500 Mw Gas-Fueled Plant – Operations Phase**

Type of Impact	Direct Impact	Indirect and Induced Impacts	Total Impact
Business Volume (Sales in million \$/year)	\$52.2 (1)	\$92.3	\$144.5
Employment (Jobs)	78	790	868
Employee Compensation (million \$/year)	\$5.8	\$23.3	\$29.1
Assorted State Taxes (millions)	--	--	\$1.7

Note 1. If the majority of expenditures on the natural gas plant were spent in-state, the direct economic impact of the gas plant would be \$327.4 million per year. However, an estimated \$275.2 million is likely to be spent out-of-state for natural gas, an expenditure that will have no impact within the state.

**Table 5**  
**Additional Impacts of Coal (Compared to Gas) – Construction Phase**

Type of Impact	Direct Impact	Indirect and Induced Impacts	Total Impact
Business Volume (Sales in millions)	\$1363	\$1556	\$2919
Employment (Job-Years)	4,890	9,440	14,330
Employee Compensation (millions)	\$489	\$255	\$744
Assorted State Taxes - millions	--	--	\$42.2

**Table 6**  
**Additional Impacts of Coal (Compared to Gas) – Operations Phase – Excluding Out-of-State Purchases of Natural Gas**

Type of Impact	Direct Impact	Indirect and Induced Impacts	Total Impact
Business Volume (Sales in million \$/year)	\$154.9	\$403.3	\$558.2
Employment (Jobs)	440	2684	3,124
Employee Compensation (million \$/year)	\$4.9	\$74.1	\$79.0
Assorted State Taxes -- million \$/year	--	--	\$3.7

In summary, these tables show that:

- The economic and employment benefits of a coal-fueled power plant far exceed the benefits of a plant fueled by gas.
- During the construction phase, coal will cause business activity to increase by \$2.9 billion more than gas would do.
- In that same phase, coal will create about 14,300 more job-years of work for construction personnel and a payroll that is higher by \$744 million.
- After the plant begins operation, coal will create 3,100 more permanent jobs with an extra payroll of \$79 million per year and more than \$550 million annually in increased business activity.

## APPENDIX A

### POWER PLANT and LOCAL COAL MINE COST SUMMARY

	COAL-FUELED PLANT (PC with wet scrubber)		GAS-FUELED PLANT (Combined Cycle)	
SIZE (MW)	1500		1500	
CAPACITY FACTOR	85.00%		85.00%	
ANNUAL GENERATION - MWHrs	11,169,000		11,169,000	
<b>TOTAL CAPITAL COST (Millions)</b>	<b>\$2,000.0</b>		<b>\$750.0</b>	
OF WHICH:				
Equipment Purchase	45.00%	\$900.0	60.00%	\$450.0
Labor	29.00%	\$580.0	18.00%	\$135.0
Material	5.00%	\$100.0	5.00%	\$37.5
Buildings	3.00%	\$60.0	2.00%	\$15.0
Engineering	11.00%	\$220.0	6.00%	\$45.0
Land	0.00%	\$0.0	0.00%	\$0.0
Sales Taxes	3.00%	\$60.0	4.00%	\$30.0
Interest During Const.	3.00%	\$60.0	3.00%	\$22.5
Other	1.00%	\$20.0	2.00%	\$15.0
Total	<u>100.00%</u>	<u>\$2,000.0</u>	<u>100.00%</u>	<u>\$750.0</u>

#### POWER PLANT OPERATING COSTS:

	\$/MWhr	\$/Year (Millions)		\$/MWhr	\$/Year (Millions)	
Fuel	@\$.840/mmBtu *	\$7.99	\$89.2	@\$3.50/mmBtu	\$24.64	\$275.2
Supv Labor		\$0.15	\$1.7		\$0.12	\$1.3
Hourly Labor		\$0.81	\$9.0		\$0.40	\$4.5
O&M Supplies/Services/Prop. Tax		\$9.58	\$107.0		\$4.15	\$46.4
		<u>\$18.53</u>	<u>\$207.0</u>		<u>\$29.31</u>	<u>\$327.4</u>

\*\$14.83 cost + \$5 Depreciation and return on capital = \$19.83/ton profitable price = \$.840/mmBtu



## APPENDIX A – (Continued)

### COAL REQUIREMENT

Assumed Btu/lb	11,800
Plant Heat Rate Btu/kwhr	9520
Tons/yr Required	4,505,461

### COAL MINE CAPITAL AND PRODUCTION COSTS

**TOTAL CAPITAL COST (Millions)** \$112.6  
**At \$25/annual ton**

OF WHICH:

Equipment Purchase	50.00%	\$56.3	50% in-state
Labor	39.00%	\$43.9	
Engineering	2.00%	\$2.3	
Land	0.00%	\$0.0	
Sales Taxes	3.00%	\$3.4	
Interest During Const.	5.00%	\$5.6	
Other	1.00%	\$1.1	
Total	100.00%	\$112.6	

**COAL MINE PRODUCTION COSTS (all coal supplied by local mine):**  
**(LW mine, 50 ton/manday)**

	\$/Ton	\$/Year (Millions)
Labor	\$4.16	\$18.7
Pension	\$0.21	\$0.9
Supplies & Parts	\$5.25	\$23.7
Royalty (to landowner)	\$1.04	\$4.7
State Severance Tax	\$1.17	\$5.3
State & Local Taxes	\$0.75	\$3.4
Bonding for Reclam.	\$0.50	\$2.3
Other Insurance	\$0.25	\$1.1
Office Wages/Salaries	\$0.20	\$0.9
Fed Reclam. Tax	\$0.15	\$0.7
Fed Black Lung Tax	\$1.15	\$5.2
	\$14.83	\$66.8

**EMPLOYMENT:**

	COAL:			GAS: PLANT
	PLANT	MINE	TOTAL	
Construction (Job-Years) (at \$100,000/const. Worker yr)	5800	439	6239	1350
Operations (No. Employees)	143	375	518	78

# **7. DISCLOSURE OF PAST ENVIRONMENTAL VIOLATIONS**

**SB 257 Section 4(2)(k)**

**7. Disclosure of Past Environmental Violations – SB 257 Section 4(2)(k)**

Thoroughbred Generating Company, LLC. (TGC) is a wholly owned subsidiary of Peabody Energy Corporation. TGC has no violations of federal or state environmental laws, rules, or administrative regulations, regardless of magnitude of the penalty. Further, there are no judicial or administrative actions pending for environmental violation.