AAE 05002 **March 2005**

North Dakota Lignite Energy Industry's Contribution to the State Economy for 2004 and Projected for 2005

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This report provides estimates of the lignite industry's contribution to the North Dakota economy, using key economic indicators such as retail trade activity, personal income, total business activity, employment, and tax revenues. The estimates are based on actual industry expenditures for 2004 and projected expenditures for 2005. Expenditures were obtained from a survey of firms involved in lignite-related activities (mining or conversion) in North Dakota. This analysis contains several measures of the relative importance of the lignite energy industry in North Dakota. First, the industry's share of the state's total sales to final demand (or exports) is evaluated. Second, the business volume generated by the industry is compared to the total gross business volume for the state. Third, annual wages paid by lignite energy related industries will be compared to all industry wages in the state.

The methods used for this analysis are similar to those described in Coon et al. (1983) and Coon and Leistritz (1986). Expenditures of companies involved in lignite-related activities in North Dakota constitute the basic data for the study. The North Dakota Input-Output Model was used to analyze these data. The model uses interdependence coefficients, or multipliers, that measure the level of total gross business volume generated in each sector from an additional dollar of sales to final demand in a given sector. The input-output model applies the industry's expenditures to these interdependence coefficients. For a complete description of the input-output model, a listing of the coefficients, and how the model can be used to perform an economic contribution study, see Coon et al. (1985 and 1989). Resulting levels of business activity were used to estimate tax revenues and indirect and induced employment, based on historic relationships (Coon et al. 1992). Lignite industry sales for final demand for 2003 and the resulting level of business activity were compared to 2003 state values (the most recent data available) to indicate the industry's role in the economy. All values in this analysis are expressed in current year dollars (i.e., nominal dollars).

The expenditures of firms involved in lignite-related activities are assumed to work their way through the local economy the same as expenditures of firms in other sectors of the North Dakota economy. The estimated ratio of secondary employment (jobs generated in other sectors of the North Dakota economy) to direct employment (jobs in the mines and plants using lignite in the state) is higher for the lignite industry than for some other sectors of the state's economy. Firms in the lignite industry have higher levels of expenditures per employee than do most other economic sectors in the state, making the indirect employment per worker in the lignite and lignite conversion industries higher.

Results

The North Dakota lignite industry's in-state expenditures totaled $597.3 million in 2004 and were projected at $603.5 million for 2005 (Table 1), based on a survey of firms in the industry. Actual expenditures for 2004 were slightly higher than the level projected for that year--$583.7 million (Coon and Leistritz 2004). [Overall, expenditures during the 1987-2004 period were higher than those for earlier years. In fact, 2004 expenditures were 73 percent higher than those for 1986, which were $346.2 million (Coon and Leistritz 1987). It should be noted, however, that inflation was about 72 percent, nationwide, over this period.]

Actual 2004 outlays were higher than previous projections resulting primarily because retail trade sector expenditures were larger than projected. Rising oil prices worldwide since 2000 may also have contributed to growth in the lignite energy industries. Since mid-1999, oil prices have risen rather dramatically and currently oil prices are at all time highs with the price exceeding $55 per barrel. This situation could lead to increased demand for lignite energy products. In fact, electric energy shortages in the United States in 2000 have stimulated discussions for building a new coal-fired plant in western North Dakota. Construction expenditures were lower than in

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Table 1. Estimated North Dakota Direct Expenditures by Economic Sector for Companies Involved in Lignite-related Activities, 2004 and Preliminary 2005

Sector	2004	2005
	-million dollars-	
Construction	42.9	41.0
Transportation	26.1	27.1
Communications and public utilities	44.4	45.9
Wholesale trade and misc. manufacturing	62.9	61.6
Retail trade	111.3	114.2
Finance, insurance, and real estate	46.6	50.0
Business and personal services	42.0	40.6
Professional and social services	35.8	35.0
Households	185.3	188.1
Total	597.3	603.5

Table 2. Estimated Direct Plus Indirect Personal Income, Retail Sales Activity, Business Activity for All Business Sectors, and Total Business Activity for Companies Involved in Lignite-related Activities, 2004 and Preliminary 2005

Item	2004	2005
	-million dollars-	
Personal income	587.4	595.0
Retail sales	443.6	450.1
Business activity for all business sectors [a]	1,057.5	1,066.8
Total business activity	1,798.6	1,816.0

[a] Includes all sectors except agriculture (livestock and crops), households, and government.

Table 3. Estimated State Tax Revenue Resulting from Activities of Companies Involved in Lignite-related Activities, 2004 and Preliminary 2005

Tax Revenue	2004	2005
	-million dollars-	
Coal severance	11.9	12.1
Energy conversion	26.9	28.1
Sales and use	20.5	20.8
Personal and corporate income	12.1	12.2
Other	5.1	5.3
Total	76.5	78.5

Table 4. Estimated Direct and Secondary Employment for Companies Involved in Lignite-related Activities, 2004 and Preliminary 2005

Employment	2004	2005
Direct	3,933	3,970
Secondary	18,293	18,297

1996, the principal construction year for an anhydrous ammonia plant and an ammonium sulfate plant at the Dakota Gasification facility near Beulah. Construction expenditures are projected to decrease only slightly in 2005, but this could be a sector with large increases in the future with the possible addition of a power plant.

Expenditures from firms involved in lignite-related activities generated total business activity of nearly $1.8 billion in 2004 and projected to be slightly over $1.8 billion for 2005 (Table 2). Expenditures by lignite-related firms resulted in $443.6 million of retail sales activity in the state in 2004 and are projected at $450.1 million for 2005. Also, the industry's activities generated $587.4 million in personal income in 2004, with the 2005 level projected to be $595.0 million.

Lignite industry companies contribute substantially to state tax revenues. Total taxes attributable to the industry were estimated to be $76.5 million in 2004 and $78.5 million in 2005 (Table 3). Coal severance and energy conversion taxes constituted 16 percent and 35 percent of the total, respectively, in 2004. In addition to the 3,933 workers directly employed in 2004 and the projected 3,970 workers for 2005, the industry supported jobs for over 18,000 indirect workers (secondary employment) from business activity attributable to the lignite industry in each of these years (Table 4).

Two additional measures can be used to show the importance of the lignite industry to the North Dakota economy: sales for final demand and business activity. When lignite energy industry sales for final demand for 2003 ($1,141.8 million) were compared with the total economic base (sales for final demand or exports) for North Dakota for 2003, the last year the data were available ($17,284.0 million), they comprised 6.6 percent of the state's total (Coon and Leistritz 2005). When petroleum exploration, extraction, and refining were included, the energy sectors accounted for 10.8 percent of the state's total

economic base in 2003. Business activity generated by the lignite industry's sales for final demand ($2,578.4 million) was 4.8 percent of the 2003 state total gross business volume ($54,024.0 million). These measures show that the lignite energy industry plays an important role in the North Dakota economy.

Wages paid annually in the state's coal mining sector were the highest of any in North Dakota ($65,037 in 2002 and $66,166 in 2003) (Table 5). These salaries were more than 2.4 times that of all covered wages in North Dakota in 2002 and 2003, the latest years data were available. Coal mining average annual wages increased from 2002 to 2003. This reverses the slight decline from 2001 to 2002 which may have been due in part to the data reporting switching from SIC codes to NAICS classifications. Following closely behind coal mining wages were gas production and electrical production salaries. The lignite energy industry (coal production and conversion) provides the highest average wages of any industry in North Dakota.

Table 5. North Dakota Covered Annual Average Wages By Industry, 2002 and 2003

Industry	2002	2003
Agriculture	25,829	25,212
Mining	49,153	50,970
Coal Mining	65,037	66,166
Construction	31,862	32,551
Manufacturing	32,474	34,082
Trans, Comm, Utilities	35,554	37,339
Electrical Production	58,572	62,879
Gas Production	59,112	62,733
Wholesale Trade	34,493	36,126
Retail Trade	18,776	19,268
FIRE	31,920	33,614
Services	25,265	26,232
Government	28,283	29,361
TOTAL	26,550	27,629

Source: Job Service North Dakota, 2003 and 2004.

Table 6 presents data that shows mining wages are much higher than all wages for state regions that have lignite energy activities. State Region 7 had the highest mining industry wages per employee in 2002 ($61,688) and 2003 ($62,162). County mining and all industry wages are presented in Table 7 for those with mining activities. These data were consolidated to avoid disclosure problems but still provide a good indication of the extent mining wages were above those for all industries. Mercer County had the highest mining wages of all counties in 2002 and McLean County had the highest in 2003. Wage data presented helps to show the benefits the lignite energy industry provides in North Dakota. It contributes to the state's economy through business activity, tax revenues, and employment. On a local and regional basis, the lignite energy industry provides good paying jobs that help keep people in North Dakota.

Table 6. Covered Annual Average Wages For Mining and All Industries, For State Planning Regions Involved in Mining, 2002 and 2003

	2002		2003	
Region	Mining	Total	Mining	Total
	----------$----------			
Region 1	45,733	24,302	49,009	26,008
Region 2	36,567	23,447	41,114	24,469
Region 7	61,688	28,408	62,162	29,834
Region 8	46,821	22,704	50,024	23,753

Source: Job Service North Dakota, 2003 and 2004.

Table 7. Covered Annual Average Wages For Mining and All Industries, For Counties Involved in Mining, 2001 and 2002

	2002		2003	
Region	Mining	Total	Mining	Total
	----------$----------			
Adams	N/A	21,655	N/A	22,204
Bowman	39,664[a]	20,840	44,181[a]	22,903
McLean	63,586[b]	28,172	65,995[b]	28,953
Mercer	64,493[c]	37,821	64,533[c]	39,297
Oliver	58,342[d]	42,154	56,105[d]	42,621
Williams	46,584	24,841	50,383	26,733
N. Dakota	49,153	26,550	50,970	27,629

[a]Includes mining and utilities industries to avoid disclosure.
[b]Includes mining, agriculture, and utilities industries to avoid disclosure.
[c]Includes mining and agriculture industries to avoid disclosure.
[d]Includes mining, agriculture, utilities, and construction industries to avoid disclosure.
Source: Job Service North Dakota, 2003 and 2004

The lignite energy industry's economic contribution to the North Dakota economy has been assessed annually since 1982. The North Dakota Lignite Council, the North Dakota Industrial Commission, and recently the Lignite Energy Council have funded these studies. For a discussion of the annual economic contributions the lignite energy industry (that is, those firms involved in the mining or conversion of the state's lignite) has made from 1982 through 2003, see Coon et al. (1983) and Coon and Leistritz (annually 1985-2004).

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