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North Dakota Lignite Energy Industry's Contribution to the State Economy for 2008 and Projected for 2009

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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 2008 and projected expenditures for 2009. 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. Expenditures were obtained from a survey of firms involved in lignite-related activities (mining or conversion) in North Dakota. 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 2007 and the resulting level of business activity were compared to 2007 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 $864.2 million in 2008 and were projected at $1,043.5 million for 2009 (Table 1), based on a survey of firms in the industry. Actual expenditures for 2008 were slightly lower than the level projected for that year--$995.4 million (Coon and Leistritz 2008). [Overall, expenditures during the 1987-2008 period were higher than those for earlier years. In fact, 2008 expenditures were 150 percent higher than those for 1986, which were $346.2 million (Coon and Leistritz 1987). It should be noted, however, that inflation was about 96 percent, nationwide, over this period.]

Actual 2008 outlays were slightly lower than previous projections resulting primarily because the retail trade sector and household expenditures were less than projected. Actual expenditures to purchase wholesale electric power, to satisfy customer demand in 2008, were greater than projected. Lignite energy industry firms are expecting their 2009 expenditures to grow by over $179 million from 2008 levels. This expansion is highlighted by $214.8 million more in contract construction projects. Rising oil prices worldwide since 2000 are a key reason for projected growth in the lignite energy industries. Oil prices have risen rather dramatically since mid-1999, and oil prices have currently moderated from all time highs exceeding $140 per barrel. Oil prices have been extremely volatile the past couple of years. At this time oil prices are in the $50 per barrel range, down considerably from the all-time highs during July 2008. This situation has led to increased demand for lignite

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energy products. In fact, electric energy shortages in the United States since 2000 have stimulated discussions for building coal conversion plants in western North Dakota. The construction sector could experience even larger increases in the future with an emphasis on more domestic energy production.

Table 1. Estimated North Dakota Direct Expenditures by Economic Sector for Companies Involved in Lignite-related Activities, 2008 and Preliminary 2009

Sector	2008	2009
	-million dollars-	
Construction	99.9	314.7
Transportation	24.5	27.8
Comm & public utilities	99.2	94.3
Wholesale trade & misc mfg	120.8	131.9
Retail trade	208.0	178.5
Fin, ins & real estate	52.4	53.4
Bus & personal serv	54.6	56.2
Prof & social serv	30.7	10.4
Households	174.1	176.3
Total	864.2	1,043.5

Expenditures from firms involved in lignite-related activities generated total business activity of over $2.5 billion in 2008 and projected to be $3.0 billion for 2009 (Table 2). Expenditures by lignite-related firms resulted in $646.2 million of retail sales activity in the state in 2008 and are projected at $692.7 million for 2009. Also, the industry's activities generated $742.2 million in personal income in 2008, with the 2009 level projected to be $853.1 million.

Lignite industry companies contribute substantially to state tax revenues. Total taxes attributable to the industry were estimated to be $93.3 million in 2008 and $98.9 million in 2009 (Table 3). Coal severance and energy conversion taxes constituted 16 percent and 29 percent of the total, respectively, in 2008. In addition to the 4,074 workers directly employed in 2008 and the projected 4,342 workers for 2009, the industry supported jobs for over 21,000 indirect workers (secondary employment) in 2008 and almost 24,000 in 2009 from business activity attributable to the lignite industry in each of these years (Table 4).

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, 2008 and Preliminary 2009

Item	2008	2009
	-million dollars-	
Personal income	742.2	853.1
Retail sales	646.2	692.7
Business activity for all business sectors[a]	1,571.0	1,890.0
Total business activity	2,548.8	3,003.3

[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, 2008 and Preliminary 2009

Tax Revenue	2008	2009
	-million dollars-	
Coal severance	14.7	15.0
Energy conversion	27.4	27.6
Sales and use	29.9	32.1
Personal and corporate income	16.0	18.7
Other	5.3	5.5
Total	93.3	98.9

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 2007 ($1,573.7 million) were compared with the total economic base (sales for final demand or exports) for North Dakota for 2007, the last year the data were available ($23,751.4 million), they comprised 6.6 percent of the state's total (Coon and Leistritz 2009). When petroleum exploration, extraction, and refining were included, the energy sectors accounted for 16.6 percent of the state's total economic base in 2007. Business activity generated by the lignite industry's sales for final demand ($3,555.4 million) was 4.9 percent of the 2007 state total gross business volume ($72,521.6 million). This has increased from 4.5 percent in 2004, reflecting the increased value of the lignite energy production.These measures show that the lignite energy industry plays an important role in the North Dakota economy.

Table 4. Estimated Direct and Secondary Employment for Companies Involved in Lignite-related Activities, 2008 and Preliminary 2009		
Employment	2008	2009
Direct	4,074	4,342
Secondary	21,654	23,969

Table 5. North Dakota Covered Annual Average Wages By Industry, 2004-2007				
Industry	2004	2005	2006	2007
Agriculture	27,029	27,353	27,909	29,715
Mining	52,998	57,054	64,642	70,004
Mining except oil & gas	57,620	59,559	62,160	65,333
Construction	34,284	35,704	37,923	40,532
Manufacturing	36,016	36,375	38,274	40,170
Trans, Comm, Util	39,701	41,130	42,587	44,580
Elec Prod	67,151	69,876	67,934	71,702
Gas Prod	68,496	70,100	71,393	75,563
Wholesale Trade	38,380	40,120	41,927	44,415
Retail Trade	19,802	20,204	20,672	21,700
FIRE	35,508	35,752	37,418	39,402
Services	27,362	28,607	29,846	31,313
Government	30,545	31,536	32,526	34,258
TOTAL	28,987	29,955	31,316	33,086

Source: Job Service North Dakota, 2005, 2006, 2007, and 2008.

Previous versions of this analysis have reported that the state's coal mining sector wages were the highest in the state. This could still be the case, but due to disclosure problems the coal mining industry is now reported as all mining, except oil and gas. The 2007 average annual wage for all mining, except oil and gas, is considerably lower than the last year coal mining salaries were available. However, the mining, except oil and gas, wages were near the highest in North Dakota, following gas production and electrical production. Mining, except oil and gas, salaries were nearly double that of all covered wages in North Dakota for the 2004 to 2007 period, the latest years data were available (Table 5). Mining, except oil and gas, average annual wages have increased each year from 2004 to 2007. The lignite energy industry (coal production and conversion) provides average wages above almost all other industries in North Dakota.

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 annual wages per employee in 2006 ($70,664), but State Region 1 had the highest wages in 2007 ($76,297). County mining and all industry wages are presented in Table 7 for those with mining activities. Data were not available for Adams, McLean, and Oliver Counties for 2006 and 2007 to avoid disclosure problems. McLean County had the highest mining wages of all counties in 2004, but due to data disclosure problems it was not possible to determine if it continued to have the highest mining wages in 2006 or 2007. Average mining wages for Mercer County was $76,403 in 2007, increasing from $73,235 in 2006. 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 2006 and 2007				
	2006		2007	
Region	Mining	Total	Mining	Total
	----------$----------			
Region 1	68,800	35,656	76,297	39,936
Region 2	55,140	27,530	59,131	29,034
Region 7	70,664	33,172	73,267	34,802
Region 8	60,018	27,878	64,329	30,012

Source: Job Service North Dakota, 2007 and 2008

The world energy situation has been changing rapidly in recent years. Demand for oil has increased significantly with more nations becoming industrialized. Demand for oil, turmoil in oil producing countries, and oil production quotas have resulted in price increases. These price increases (crude oil prices spiked over $140 per barrel) have resulted in our nation's industries looking for new sources of domestic energy. Along with the prospect of producing renewable energy (ethanol,biodiesel, wind energy, etc.), further development of domestic reserves now seems feasible. North Dakota has massive lignite coal reserves that could help supply our nation's energy needs.

This is an exciting time for North Dakota´s lignite energy industry. An ethanol plant in western North Dakota teams with an electrical generation plant to use waste water heat to form a very efficient facility. Great River Energy is currently building a 99 megawatt combined heat and power (CHP) plant near

Spiritwood. The plant will also provide steam to the Cargill malt plant on the site. A lignite mine in southwestern North Dakota is in the planning stages, with the potential of a synthetic gasification plant to follow. American Lignite Energy is considering building a plant in North Dakota that would convert lignite to liquid fuels, while also producing electric power. These examples provide an indication of what may be ahead for North Dakota's lignite energy industry. However, the continued growth in the lignite energy industry could be hampered by the policies of the current administration in Washington, D.C. The administration's rhetoric has not been friendly to coal and other carbon-based fuels. New tax proposals could add significantly to the cost of producing energy products that are in high demand. The legislative process will ultimately determine the fate of these proposals.

Table 7. Covered Annual Average Wages for Mining and All Industries, For Counties Involved in Mining 2006 and 2007

	2006		2007	
Region	Mining	Total	Mining	Total
	----------$----------			
Adams	N/A	24,834	N/A	26,269
Bowman	53,047	26,366	61,082	28,576
McLean	N/A	34,131	N/A	37,107
Mercer	73,235	45,167	76,403	46,776
Oliver	N/A	46,234	N/A	48,931
Williams	69,550	37,273	76,506	41,598
N. Dak	64,642	31,316	70,004	33,086

Source: Job Service North Dakota, 2007 and 2008

This study estimated the 2008 and projected 2009 economic contribution of the lignite energy industry to the North Dakota economy. The industry currently provides high-wage jobs for western North Dakota residents and generates levels of business activity that benefit the entire state. Each of the lignite energy related projects previously discussed would be a large-scale development for the state. Construction and operation of any, or all, of these projects would greatly increase the level of economic activity attributed to the lignite energy sector. North Dakota could realize significant economic benefits as a result of growth and development of the lignite energy industry. The role of North Dakota's lignite-energy industry in the state's economy will be increasingly important as the lignite coal reserves are utilized.

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 2007, see Coon et al. (1983) and Coon and Leistritz (annually 1985-2008).

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