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North Dakota Lignite Energy Industry's Contribution to the State Economy for 2010 and Projected for 2011

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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 2010 and projected expenditures for 2011. 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 2009 and the resulting level of business activity were compared to 2009 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 \$971.0 million in 2010 and were projected at \$979.3 million for 2011 (Table 1), based on a survey of firms in the industry. Actual expenditures for 2010 were slightly less than the level projected for that year--\$983.8 million (Coon and Leistritz 2010). [Overall, expenditures during the 1987-2010 period were higher than those for earlier years. In fact, 2010 expenditures were 181 percent higher than those for 1986, which were \$346.2 million (Coon and Leistritz 1987). It should be noted, however, that inflation was about 99 percent, nationwide, over this period.]

Actual 2010 outlays were less than previous projections resulting primarily because the construction sector expenditures were less than projected. Actual expenditures to purchase wholesale electric power, to satisfy customer demand in 2010, was slightly less than projected. Lignite energy industry firms are expecting their 2011 expenditures to increase by \$8.3 million from 2010 levels. This increase is primarily the result of \$9.8 million additional expenditures to the household sector, primarily for wages and salaries. 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, reaching over \$140 per barrel in 2008. Oil prices have been extremely volatile the past couple of years and currently are in the \$110 per barrel range. This is less than the all-time highs during July 2008, but higher than oil prices have been in last couple of years. The

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current rise in oil prices is being driven by unrest in the Middle East and increasing demand as countries start to recover from a world-wide recession. This situation has led to increased demand for lignite energy products. In fact, electric energy shortages in the United States in 2000 have stimulated discussions for building coal conversion plants in western North Dakota. The construction sector could experience increases in the future with an emphasis on more domestic energy production.

Sector	2010	2011
-million dollars-		
Construction	156.0	138.3
Transportation	26.1	28.0
Comm & public utilities	87.9	96.0
Wholesale trade & misc mfg	116.2	121.0
Retail trade	151.4	154.3
Fin, ins & real estate	78.9	84.5
Bus & personal serv	60.3	52.5
Prof & social serv	42.8	43.5
Households	<u>251.4</u>	<u>261.2</u>
Total	971.0	979.3

Expenditures from firms involved in lignite-related activities generated total business activity of over \$2.9 billion in 2010 and projected to be nearly \$3.0 billion for 2011 (Table 2). Expenditures by lignite-related firms resulted in \$676.4 million of retail sales activity in the state in 2010 and are projected at \$688.4 million for 2011. Also, the industry's activities generated \$910.8 million in personal income in 2010, with the 2011 level projected to be \$930.0 million.

Lignite industry companies contribute substantially to state tax revenues. Total taxes attributable to the industry were estimated to be \$89.8 million in 2010 and \$91.3 million in 2011 (Table 3). Coal severance and energy conversion taxes constituted 12.5 percent and 25.8 percent of the total, respectively, in 2010. In addition to the 3,910 workers directly employed in 2010 and the projected 3,865 workers for 2011, the industry supported jobs for about 23,000 indirect workers (secondary employment) in 2009 and 2010

from business activity attributable to the lignite industry in each of these years (Table 4).

Item	2010	2011
-million dollars-		
Personal income	910.8	930.0
Retail sales	676.4	688.4
Business activity for all business sectors ^a	1,730.5	1,748.7
Total business activity	2,912.9	2,957.4

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

Tax Revenue	2010	2011
-million dollars-		
Coal severance	11.3	11.3
Energy conversion	23.2	23.1
Sales and use	31.3	31.9
Personal and corporate income	19.0	19.4
Other	<u>5.0</u>	<u>5.6</u>
Total	89.8	91.3

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 2009 (\$1,655.6 million) were compared with the total economic base (sales for final demand or exports) for North Dakota for 2009 (\$28,183.7 million), they comprised 5.9 percent of the state's total (Coon and Leistritz 2011). When petroleum exploration, extraction, and refining were included, the energy sectors accounted for 12.2 percent of the state's total economic base in 2009. Business activity generated by the lignite industry's sales for final demand (\$3,756.5 million) was 4.3 percent of the 2009 state total gross business volume (\$86,950.6 million). This is slightly less than the 4.6 percent in 2008, but has remained a consistent share of the state's economic base. These

measures show that the lignite energy industry plays an important role in the North Dakota economy.

Employment	2010	2011
Direct	3,910	3,865
Secondary	23,194	22,820

Industry	2006	2007	2008	2009
Agriculture	27,909	29,715	31,693	34,579
Mining	64,642	70,004	74,949	73,055
Mining, except oil & gas	62,160	65,333	68,417	72,318
Construction	37,923	40,532	44,099	45,406
Manufacturing	38,274	40,170	41,720	41,577
Trans, Comm, Util	42,587	44,580	47,470	48,599
Elec Prod	67,934	71,702	74,879	82,502
Gas Prod	71,393	75,563	75,814	72,318
Wholesale Trade	41,927	44,415	48,163	48,772
Retail Trade	20,672	21,700	22,863	23,233
FIRE	37,418	39,402	41,674	42,805
Services	29,846	31,313	32,871	34,171
Government	31,526	34,258	35,887	37,282
TOTAL	31,316	33,086	35,075	35,970

Source: Job Service North Dakota, 2007, 2008, 2009 and 2010.

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 2009 average annual wage for all mining, except oil and gas, for the first time exceeded 2005 coal mining salaries \$70,938, the last year data were available (Coon and Leistriz, 2007). Also, the mining, except oil and gas, wages were near the highest in North Dakota, following electrical production. Mining, except oil and gas, salaries were nearly double that of all covered wages in North Dakota for the 2006 to 2009 period, the latest years data were available (Table 5). Mining, except oil and gas, average annual wages have increased each year from 2006 to 2009. 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 1 had the highest mining industry annual wages per employee in 2008 (\$79,353) and Region 7 had the highest in 2009 (\$82,845). 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 2008 and 2009 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 2008 or 2009. Average mining wage for Mercer County was \$82,201 in 2009, increasing from \$80,949 in 2008. 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.

Region	2008		2009	
	Mining	Total	Mining	Total
-----\$-----				
Region 1	79,353	46,755	73,086	45,998
Region 2	65,163	30,956	62,115	32,516
Region 7	76,889	35,987	82,845	37,382
Region 8	73,585	33,554	80,868	34,834

Source: Job Service North Dakota, 2009 and 2010

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 highly efficient plant. A lignite mine in southwest North Dakota is in the process of testing coal beneficiation to convert lignite coal to a high efficiency fuel source for an electric generation plant. Several other projects are being discussed that would also use lignite coal. American Lignite Energy is considering building a plant that would use 6 million tons of lignite coal per year to produce liquid fuels. This plant would produce 25,000 barrels per day of refined fuel products including gasoline, diesel, and jet fuel. Also, an electrical generation plant in east-central North Dakota that will use lignite coal as a fuel source is nearing operational status. These examples provide an indication of what may be ahead for North Dakota's lignite energy industry.

New technologies and processes (i.e., coal beneficiation) have made North Dakota's lignite coal a more efficient and environmentally friendly energy source. With the state's vast lignite reserves, this points to continued strength in the lignite energy industries. However, the continued growth in the lignite energy industry could be hampered by the policies of the current administration in Washington, D.C. Projects that could benefit North Dakota and provide energy for the rest of the nation are currently being delayed. New tax proposals could also add significantly to the cost of producing energy products that are in high demand.

Table 7. Covered Annual Average Wages for Mining and All Industries, For Counties Involved in Mining 2008 and 2009

Region	2008		2009	
	Mining	Total	Mining	Total
	-----\$-----			
Adams	N/A	27,443	N/A	28,290
Bowman	61,915	30,124	67,327	31,441
McLean	N/A	36,963	N/A	42,027
Mercer	80,949	47,772	82,201	52,384
Oliver	N/A	50,403	N/A	60,202
Williams	80,944	48,632	73,395	47,027
N. Dakota	74,949	35,075	73,055	35,970

Source: Job Service North Dakota, 2009 and 2010

This study estimated the 2010 and projected 2011 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 2009, see Coon et al. (1983) and Coon and Leistriz (annually 1985-2010).

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