AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

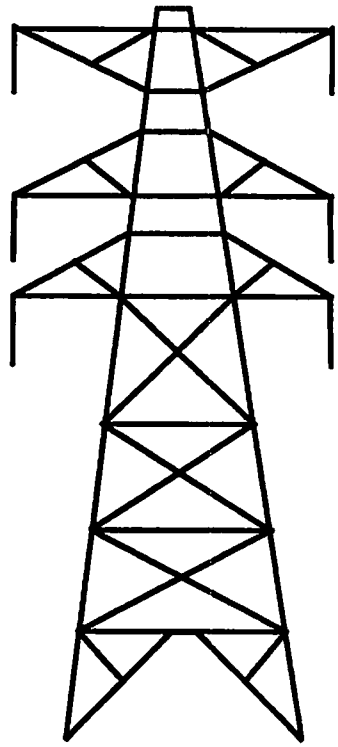
*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

AE 91002 April 1991

A Statistical Analysis of the North Dakota Lignite Industry's Contribution to the State Economy for 1990 and Projected 1991

Randal C. Coon and F. Larry Leistritz

The economic contribution the lignite industry makes to the North Dakota economy has been assessed on an annual basis since 1982. Funding for these studies has been provided by the North Dakota Lignite Council and in recent years by the North Dakota Industrial Commission. For a discussion of the economic contributions the lignite industry (i.e., those firms involved in the mining or conversion of the state's lignite) has made on an annual basis for the period 1982 to 1989, see Coon et al. 1983; Coon and Leistritz 1985, 1986, 1987, 1988, 1989, and 1990.



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. These items will be estimated for 1990 based on actual industry expenditures and for 1991 using projected levels of spending. Expenditures were obtained from a survey of firms involved in lignite-related activities (mining or conversion) in North Dakota.

Methodology for this analysis is similar to that used previously (for a complete description see Coon et al. 1983 and Coon and Leistritz 1986). Expenditures in North Dakota (as reported by companies involved in lignite-related activities) constitute the basic data for the study, and the North Dakota Input-Output model was used to analyze these data. The interdependence coefficients or multipliers (that measure of the level of total gross business volume generated in each sector as a result of an additional dollar of sales to final demand in a given sector) of the input-output model were applied to these expenditures. 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 such economic indicators as tax revenues and indirect and induced employment based on historic relationships (Coon et al. 1984).

It is assumed that the expenditures made by firms involved in lignite-related activities work their way through the local economy in much the same way as expenditures made by firms in other sectors of the North Dakota economy. The estimated ratio of secondary employment (that is, jobs generated in other sectors of the North Dakota economy) to direct employment (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. This is to be expected because of the capital-intensive nature of the industry. That is, firms in the lignite industry have much higher levels of expenditures per employee than do most other economic sectors in the state so that the indirect and induced employment per worker in the lignite and lignite conversion industries is higher than for other basic economic sectors.

Results

The North Dakota lignite industry is an important component of the state's economy. The industry's in-state expenditures totaled $383.6 million in 1990 and were estimated at $405.4 million for 1991 (Table 1). Actual expenditures for 1990 were slightly lower than the projected level for that year (Coon and Leistritz 1990). Annual expenditures during the 1988-1991 period were significantly larger than those for 1987 (Coon and Leistritz 1988). This trend of increasing industry expenditures indicates that the period of stable coal production and conversion activities in North Dakota has given way to a moderate growth trend in recent years. The abundant supplies of lower-priced petroleum that existed several years ago have been reduced, resulting in renewed growth in demand for North Dakota's lignite and lignite products (i.e., particularly electricity). Also, the state's synthetic natural gas plant has operated essentially at full capacity since 1987.

TABLE 1. Estimated North Dakota Expenditures by Economic Sector for Compaines Involved in Lignite-Related Activities, 1990 and Preliminary 1991

Sector	1990	1991
	——million dollars——	
Construction	67.5	56.6
Transportation	2.8	3.3
Communications and public utilities	42.1	42.5
Wholesale trade and misc. manufacturing	31.5	36.6
Retail trade	29.3	44.7
Finance, insurance, real estate	30.8	31.7
Business and personal services	25.6	30.4
Professional and social services	16.7	18.1
Households	137.3	141.5
Total	383.6	405.4

Expenditures from firms involved in lignite-related activities generated total business activity in excess of $1 billion for each year (Table 2). Expenditures by lignite-related firms resulted in $249.8 million in retail sales activity in the state in 1990 and a projected $275.3 million for 1991. In addition, the industry's activities were responsible for generation of $399.3 million in personal income in 1990, with the 1991 level projected to be $416.1 million.

TABLE 2. Estimated Personal Income, *Retail Sales* Activity, Business Activity of All Business Sectors, and Total Business Activity for Companies Involved in Lignite-Related Activities, 1990 and Preliminary 1991

Item	1990	1991
	---million dollars---	
Personal income	399.3	416.1
Retail sales	249.8	275.3
Business activity for all business sectors[a]	667.4	707.2
Total business activity	1,154.6	1,219.4

[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, 1990 and Preliminary 1991

Tax Revenue	1990	1991
	---million dollars---	
Coal severance	25.4	25.1
Energy conversion	12.5	12.5
Sales and use	10.1	11.2
Personal and corporate income	10.5	10.9
Other	5.4	5.8
Total	63.9	65.5

Lignite industry companies contribute heavily to state tax revenues; total taxes attributable to the industry were estimated to be $63.9 million in 1990 and $65.5 million in 1991 (Table 3). Coal severance and energy conversion taxes constituted the major portion of the total. In addition to the 3,455 workers directly employed in 1990 and the projected 3,415 workers for 1991, the industry provided jobs for over 14,000 indirect and induced workers (secondary employment) in each of these years as a result of the levels of business activity attributable to the lignite industry (Table 4).

TABLE 4. Estimated Direct and Secondary Employment for Companies Involved in Lignite-Related Activities, 1990 and Preliminary 1991

Employment	1990	1991
Direct	3,455	3,415
Secondary	14,305	14,632

References

Coon, Randal C. and F. Larry Leistritz. 1985. *The Contribution of North Dakota's Lignite Industry To The State Economy, 1984 and 1985: A Statistical Analysis.* AE 85016. Fargo: North Dakota State University, Dept. of Agr. Econ.

Coon, Randal C. and F. Larry Leistritz. 1986. *North Dakota Lignite Industry's Contribution To The State Economy.* Agr. Econ. Misc. Rpt. No. 99. Fargo: North Dakota State University, Dept. of Agr. Econ.

Coon, Randal C. and F. Larry Leistritz. 1987. *The Contribution of North Dakota's Lignite Industry To The State Economy, 1986 and 1987: A Statistical Analysis.* AE 87003. Fargo: North Dakota State University, Dept. of Agr. Econ.

Coon, Randal C., John F. Mittleider, and F. Larry Leistritz. 1983. *Economic Analysis Of The North Dakota Lignite Industry.* Agr. Econ. Misc. Rpt. No. 67. Fargo: North Dakota State University, Dept. of Agr. Econ.

Coon, Randal C., Carlene F. Vocke, William Ransom-Nelson, and F. Larry Leistritz. 1984. *North Dakota Economic-Demographic Assessment Model (NEDAM): Technical Description Of Update And Enhancement.* Agr. Econ. Misc. Rpt. No. 75. Fargo: North Dakota State University, Dept. of Agr. Econ.

Coon, Randal C., F. Larry Leistritz, Thor A. Hertsgaard, and Arlen G. Leholm. 1985. *The North Dakota Input-Output Model: A Tool For Analyzing Economic Linkages.* Agr. Econ. Rpt. No. 187. Fargo: North Dakota State University, Dept. of Agr. Econ.

Coon, Randal C. and F. Larry Leistritz. 1988. *A Statistical Analysis of the North Dakota Lignite Industry's Contribution to the State Economy for 1987 and Projected 1988.* AE88002. Fargo: North Dakota State University, Dept. of Agr. Econ.

Coon, Randal C. and F. Larry Leistritz. 1989. *A Statistical Analysis of the North Dakota Lignite Industry's Contribution to the State Economy for 1988 and Projected 1989.* AE89008. Fargo: North Dakota State University, Dept. of Agr. Econ.

Coon, Randal C., F. Larry Leistritz, and Thor A. Hertsgaard. 1989. *North Dakota Input-Output Economic Projection Model (NDIO/EPM): Documentation and User's Guide.* Agr. Econ. Software Series No. 4. Fargo: North Dakota State University, Dept. of Agr. Econ.

Coon, Randal C., and F. Larry Leistritz. 1990. *A Statistical Analysis of the North Dakota Lignite Industry's Contribution to the State Economy for 1989 and Projected 1990.* AE90004. Fargo: North Dakota State University, Dept. of Agr. Econ.

Coon is research specialist and Leistritz is professor, Department of Agricultural Economics, North Dakota State University, Fargo.

Printed at North Dakota State University, Fargo. April 1991.