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**IMPACT ASSESSMENTS IN THE PLANNING AND
REGULATORY PROCESS: THE CASE OF COAL AND
PETROLEUM DEVELOPMENT IN NORTH DAKOTA**

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Abstract

Rising energy prices in the early 1970s stimulated considerable development of both coal and petroleum resources in western North Dakota. Between 1975 and 1985 lignite coal production more than tripled, while crude oil production increased 148 percent. Expansion of the energy industry was both rapid and localized and posed the prospect of substantial environmental and socioeconomic impacts. Within this context, the recent history of coal and petroleum development offers sharp contrasts in the extent to which impact assessment was integrated into the planning and regulatory processes for these two industries.

The regulation of coal development was characterized by a proactive stance featuring (1) development of a comprehensive program for special state taxation of energy extraction and conversion facilities and redistribution of part of the proceeds to local governments and (2) state energy facility siting regulation. Impact assessment played an integral role in this process. Preliminary assessments of the local fiscal impacts of development were used in designing the state's taxation and impact finance program. Subsequent comprehensive assessments of each project were made an integral part of the facility-siting process and served as the basis for permit conditions imposed by the siting authority. Retrospective analyses generally suggest that the state's planning and regulatory processes were effective and enabled affected communities to avoid the "boom town" problems often associated with large-scale development projects located in remote rural areas.

Petroleum development, on the other hand, was characterized by very little predevelopment planning or assessment. State control was limited to traditional controls over well spacing. After oil-related growth led to major infrastructure and service problems for a number of communities, the state responded with an impact assistance program, but this grant program was not initiated until development activity had reached its peak. Oil-related fiscal problems became so intense that several communities were nearly forced to default on bonded debt obligations (one actually did so).

IMPACT ASSESSMENTS IN THE PLANNING AND REGULATORY PROCESS: THE CASE OF COAL AND PETROLEUM DEVELOPMENT IN NORTH DAKOTA*

F. Larry Leistritz and Steve H. Murdock

In response to growing public concern regarding the environmental and socioeconomic impacts of major development projects, the U.S. Congress enacted the National Environmental Policy Act of 1969 (NEPA). Over the next few years, many states enacted similar legislation, calling for the preparation of environmental impact statements (EISs) for major development projects. A number of states also enacted legislation during the 1970s to regulate the siting of major energy facilities. Each of these factors led to an increased interest in predicting the environmental and socioeconomic impacts of development projects.

Shortly after the enactment of NEPA, an international trend toward higher energy prices encouraged expanded development of energy resources in the western United States. Because the areas where many of the more commercially attractive deposits of coal and oil shale were located were sparsely populated rural areas far from major population centers, the potential immigration of large numbers of project-related workers and their dependents and the implications of rapid population growth for small communities located near development sites became major concerns of state and local officials as well as residents of areas where major projects might be sited. These concerns were heightened by reports from communities affected by western energy projects in the early 1970s--reports indicating that rapid, unplanned growth had led to major shortfalls in housing and public services and that the quality of life in those communities had been degraded (Gilmore and Duff 1975). Because the areas where development seemed likely to occur often were in regions well known for their scenic beauty and other natural amenities, the effects of large mining and/or energy conversion facilities on the area's air quality, water resources, and landscapes were also often major issues (Murdock and Leistritz 1979).

Substantial development of western energy resources occurred during the period 1975-85. Many of the development projects came under the requirements of NEPA and/or state siting laws, and were thus the subject of EIS and similar studies. Planning studies were undertaken by numerous state and federal agencies in an effort to anticipate and mitigate the impacts of development. In all, the level of impact analysis and planning associated with the development of energy resources in the western United States perhaps ranks as one of the most extensive such efforts in history. Yet despite the substantial level of resources devoted to anticipatory impact assessments, there have been few attempts to assess the extent to which the information generated by these studies has actually been used in the planning process or whether the availability of such information has led to better outcomes.

The experience of the state of North Dakota in dealing with the effects of large-scale energy development provides a case study of the use of impact assessment information in planning and regulatory processes. Between the mid-1970s and mid-1980s, production of both coal and oil increased substantially, and several large coal conversion plants were built. Expansion of the energy industry was both rapid and localized and posed the prospect of

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substantial environmental and socioeconomic impacts. Within this context, the recent history of coal and petroleum development offers sharp contrasts in the extent to which impact assessment was integrated into the planning and regulatory processes of these two industries.

HISTORICAL CONTEXT OF ENERGY INDUSTRY EXPANSION IN NORTH DAKOTA

Rising energy prices in the early 1970s stimulated considerable development of both coal and petroleum resources in western North Dakota. Between 1975 and 1985, lignite coal production more than tripled, while crude oil production increased 148 percent (Table 1). Most of the increased coal production was intended to fuel new mine-mouth electric generating plants; between 1973 and 1980 construction of four new power plants was initiated. In addition, several synthetic fuel projects were proposed for development in the region, and one, the Great Plains Gasification Project, became fully operational in 1985.

Expansion of the energy industry in western North Dakota was both rapid and localized. Coal development centered on the construction and subsequent operation of the four power plants and the synfuel facility mentioned earlier. Each of these projects was a major undertaking, requiring several years to complete and utilizing a construction work force of several hundred to several thousand workers. (The peak construction work force for the Great Plains Gasification Project exceeded 5,000.) Once the facilities were completed, each would require a permanent work force, which was quite substantial in relation to the predevelopment population of nearby communities (typically several hundred workers for a power plant and mine and about 1,000 for the gasification complex). Nearby communities were thus confronted with the need to plan for the influx of a large but temporary population associated with facility construction followed by a smaller but still substantial permanent population associated with project operation.

Petroleum development followed a pattern of rapid growth in exploration activities beginning in the mid-1970s and peaking in 1981. The rig count (number of rigs drilling) rose from 17 in 1975 to 119 in 1981 (Table 1). Softening oil prices then led to a precipitous decline in drilling activity beginning in 1982. Oil development activities were also relatively localized. In 1984 the top four oil-producing counties accounted for 78 percent of the state's total production. Equally significant to state and local planning as the magnitude and localized nature of energy resource development in western North Dakota was the uncertainty concerning its actual extent and timing and the levels of local population growth that might result. Each of the coal development projects mentioned earlier was subject to at least one postponement, and construction work force requirements often differed substantially from those originally projected. (One power plant, for example, required a peak construction work force of about 2,200, compared to a predevelopment projection of 980.) Initial lack of information concerning likely demographic characteristics and settlement patterns of project workers further complicated the problem of estimating likely population growth and resulting infrastructure requirements. In addition, several large synfuel projects that had been proposed for development were first postponed and then canceled, often after several years of planning.

Table 1. Lignite Coal Production, Coal-Fired Electric Generation, Crude Oil Production, and Number of Oil Rigs Drilling, North Dakota, Selected Years 1960-1988

| Year | Lignite Coal Production (million tons) | Electric Generation (billion KWH) | Crude Oil Production (million barrels) | Number of Rigs Drilling |
|------|---|--------------------------------------|---|-------------------------|
| 1960 | 2.5 | NA | 22.0 | 16 |
| 1970 | 5.0 | 4.0 | 22.0 | 9 |
| 1975 | 7.1 | 5.2 | 20.5 | 17 |
| 1980 | 16.8 | 13.1 | 40.4 | 83 |
| 1981 | 17.4 | 14.2 | 45.7 | 119 |
| 1982 | 17.5 | 15.4 | 47.5 | 69 |
| 1983 | 18.0 | 16.9 | 50.7 | 41 |
| 1984 | 20.1 | 18.5 | 52.7 | 57 |
| 1985 | 25.7 | 19.9 | 50.9 | 45 |
| 1986 | 25.5 | 19.9 | 45.7 | 13 |
| 1987 | 25.1 | 21.5 | 41.4 | 14 |
| 1988 | 28.0 | 27.4 | 39.4 | 12 |

STATE PROGRAMS TO REDUCE IMPACTS OF COAL DEVELOPMENT

By 1974, North Dakota policymakers had become aware of the magnitude of coal development projects proposed for the state, and many desired that the state adopt a positive, proactive stance in response to both the problems and the opportunities associated with development. As a result, three major programs were enacted by the 1975 Legislative Session to provide a basis for constructively managing the development of large-scale energy facilities. These were (1) a program for special state taxation of energy extraction and conversion facilities and redistribution of part of the proceeds to local governments, (2) an energy facility siting act which ensured that local officials would receive information concerning developers' intentions, and (3) a program to provide projections of anticipated economic, demographic, and service impacts of proposed projects to affected communities.

State Taxation Policies. The state taxation program developed for the lignite industry reflected legislators' concerns that development of large-scale energy projects could pose major fiscal problems for local governments (e.g., counties, cities, and school districts). These fiscal problems relate to the timing and inter-jurisdictional distribution of the local government costs and revenues resulting from the project. (For further discussion of these issues, see Leistritz and Murdock 1981 and Leistritz and Murdock 1988.) A third factor complicating effective planning for growth associated with major projects is uncertainty regarding the extent of local growth that may actually be experienced. Nearby communities can be exposed to considerable levels of risk if the project is postponed or abandoned (Halstead et al. 1984).

The coal taxation legislation adopted in 1975 represented an attempt to prevent major fiscal problems in communities dependent on coal development. A coal severance tax was imposed, and a portion of the tax proceeds was made available to local governments. The original legislation returned only a relatively small percentage of the tax revenues to local units; when subsequent impact assessments indicated that the local share of revenues would not be adequate to meet local needs, the 1977 legislative session changed the distribution formula. Under the revised formula, up to 70 percent of the severance tax revenues would be available to local governments through a combination of direct, formula payments to the coal-producing countries (and their subdivisions), grants to local governments (awarded on the basis of need), and loans (at below-market interest rates) (Leistritz and Murdock 1987). A coal conversion tax was applied to the electrical generating plants and other coal conversion facilities (e.g., coal gasification plants). This tax is in lieu of all ad valorem (i.e., property) taxes except for taxes on the land on which the facility is located. As with the severance tax, a portion (in this case 35 percent) is returned to the county where the facility is located.

Facility Siting. Other aspects of the state's energy development strategy included two efforts to provide decision makers with timely and accurate information. The first of these was the Energy Facility Siting Act. Enacted by the 1975 Legislative Session, this act provided the state Public Service Commission with siting authority over energy conversion and transmission facilities. Energy facilities covered by this act include electric generating plants, synfuel facilities, transmission lines, and pipelines.

The Public Service Commission was empowered to establish siting criteria and procedures for permit application and review for facilities covered by the act. In determining whether to grant a certificate of site compatibility (for plants) or a construction permit (for transmission facilities), the Commission conducts an extensive review and holds public hearings to determine that the construction and operation of the facilities will produce minimum environmental and socioeconomic impacts. Further, the Commission has the authority to impose requirements designed to minimize or mitigate such impacts as a condition of granting a permit. One condition which the Commission has imposed on all major projects is a requirement for regular reporting of current and anticipated work force levels. This information can be very useful in planning for infrastructure needs.

Regional Environmental Assessment Program. A second major effort to provide information to affected entities was the North Dakota Regional Environmental Assessment Program (ND-REAP). This state entity developed a variety of computerized data bases and software to make key information readily available to decision makers. Of particular relevance to this discussion was REAP's sponsorship of the development of a computerized economic, demographic, and fiscal impact projection model that became known as the REAP Economic-Demographic Model-1 or RED-1. The RED-1 model was made available for general use by decision makers in January 1977. During the next two years the model was utilized extensively as a planning and policy tool by local governments, state agencies, and legislative committees (Leistritz et al. 1979). As coal development progressed, impact monitoring programs were instituted at three of the four major project sites, and information from these efforts gradually replaced the model projections as the primary basis for funding decisions.

While the time and space available here preclude a detailed, ex post assessment of the impacts of coal development in North Dakota, those analyses that have been completed appear to indicate that the state's policy initiatives were quite effective in coping with the impacts of development (for example, see ITAT 1984; Gilmore et al. 1982; Leistritz and Murdock 1987). Impact projections, coupled with monitoring as the projects progressed, provided information to support local planning, and the grant and loan funds derived from the severance tax provided affected local governments with much of the financial resources needed to develop infrastructure and deliver services in a timely manner. Problems that could have been associated with inequitable distribution of tax revenues among jurisdictions were alleviated by the flexibility of the grant and loan programs. These programs also addressed the risks associated with facility cancellation or closure. Because much of the infrastructure was financed through state grants (state coal impact grants over the period 1976-89 totaled \$54.8 million), local entities incurred much smaller debt obligations than would otherwise have been the case.

SOCIOECONOMIC IMPACTS OF PETROLEUM DEVELOPMENT

From the standpoint of impact assessment and mitigation, petroleum development received less attention from state policymakers than did coal development. Several factors probably were responsible for this relative lack of attention to petroleum-related growth. First, the oil industry had been present in much of western North Dakota for nearly 30 years prior to the upsurge of activity in the late 1970s, and a taxation program which returned a portion of the oil revenues to the producing counties was already in place. Second, the decentralized nature of decision making in the oil industry (involving literally hundreds of individual firms) tended both to mask the full magnitude of economic, demographic, and service effects associated with its expansion and to complicate the task of predicting future levels of activity. Finally, the effects of oil development tended to be concentrated in regional trade centers (especially the towns of Dickinson and Williston) rather than in smaller communities near the producing fields (Chase and Leistritz, 1983).

Whatever the reasons, little was done to impose requirements for predevelopment planning or assessment on the oil industry. State control was limited primarily to traditional controls over well spacing. In 1981, after petroleum-related growth had created substantial needs for new infrastructure and services in several communities, the North Dakota Legislature initiated a special financing program for communities affected by petroleum development. This program was essentially the same as the Coal Impact grants program and was initially funded by a special legislative appropriation of \$10 million for the 1981-83 biennium. An additional \$5 million was appropriated in 1983, and by 1989 a total of \$20.6 million had been awarded as grants to local governments.

Because the grant program for communities affected by petroleum development was initiated just as oil development activity was reaching peak levels, many grants were made to assist in coping with impacts that had already occurred, and little emphasis was placed on forecasting future impacts. Then falling oil prices led to a substantial decline in exploration and development activities during the 1982-85 period and a virtual halt in development during 1986-88. In the wake of the collapse of the oil industry, the focus of impact assistance shifted toward aiding communities that had become financially overextended because of

commitments to infrastructure development during the growth phase of the industry. Several towns have experienced difficulty in meeting debt service requirements (i.e., interest and principal payments) on their special assessment bonds. (Such bonds are the type typically issued to finance the provision of infrastructure to new housing developments.) State grants have helped some communities continue making their payments, but at the time of this writing (early 1990) one community had been in default for more than two years.

The growth and decline of the oil industry in North Dakota also provides vivid examples of mismatches between costs incurred and revenues received by certain jurisdictions. For example, a given county may receive substantial revenues because many wells are located there, but most of the associated workers may reside in a different county.

CONCLUSIONS

The recent history of coal and petroleum development in North Dakota offers sharp contrasts in the extent to which impact assessment was integrated into the planning and regulatory processes for these two industries. In the case of the coal industry, impact assessment efforts were relatively successful in anticipating potential problems, and the state's policy initiatives were effective in coping with them. The petroleum industry, on the other hand, offers a classic case of the effects of essentially unregulated development and of the results of failure to undertake anticipatory assessment and planning.

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