

21--THE IMPACT OF INDUSTRIAL GROWTH ON RURAL SOCIETY

By Peter D. Miller

A. Introduction

The people of the Northern Great Plains and the Rocky Mountains have witnessed the beginning of an industrial revolution in their region. Because of an international conflict half a world away, domestic resources of coal and oil shale have suddenly increased in value. An entire domestic energy industry, based on the mining and retorting of oil shale and the mining and processing of coal into synthetic fuels, has become more viable almost overnight owing to the new scarcity of once-cheap energy. This scarcity has stimulated intense interest in the abundant deposits of coal and oil shale in the West that have never before been mined on a large scale.

Concomitant with this interest, the Western regions rich in oil shale and coal are experiencing the initial stage-setting for industrialization and urbanization. In one of the most remote places in the continental United States, Colorado's Piceance Basin on the western slope of the Rockies, Rifle, Colorado, now regularly hails visitors from government, banking, industry, academia, and other walks of life rarely seen before in that vicinity. A similar scene can be observed in Gillette, Wyoming, located at the center of about one-fifth of the U.S. continental deposits of coal. At an early hour on a typical day, the motel coffee shop serves hard-hatted construction workers and miners, Stetson-hatted cowhands and tourists, bankers, real estate agents, trailer salesmen, government officials, and researchers. Processions of businessmen, lawyers, branch managers, salesmen, investment analysts,

government bureaucrats, and social scientists stream through the town. Older residents watch the parade with a mixture of awe, excitement, and irritation. Many of them have become interview-hardened from being asked the same questions repeatedly, having developed from extensive practice a smooth, routine answer to every question. For some, opinions about the coal mining industry have hardened, too; it is either "raping the landscape" or "the best thing that ever happened to Wyoming." Retail sales are booming, land prices are bid up, wages are high; merchants, landowners willing to sell, and construction workers therefore derive some immediate benefits from the new industry. They are likely to feel strongly that the industry benefits everyone.

A common topic of conversation in Gillette concerns rumors of new coal mines, electrical generating facilities, or a uranium mine and processing complex. Announcements are made, modified, retracted, and made again. People talk hopefully or apprehensively, depending on their point of view, about possibilities for employment and prosperity or possibilities for a disastrous cycle of boom and bust.

Development of these coal and oil shale resources to the extent necessary to free the United States from dependence on foreign sources of energy would require industrialization of regions in the West that heretofore have known only a rural way of life. Wherever industrialization has occurred in the past, it has profoundly changed the values, lifestyles, and organization of society. The purpose of this chapter is to outline the social changes likely to result from mining for synthetic fuels development. Since qualitative and quantitative data on social impacts are to be found in the impacts that have occurred in similar settings in the past, past and present mining and industrial communities were studied for evidence applicable to social impacts of synthetic fuels development.

The consequences of energy development decisions necessarily spread out in many directions. Which ones are applicable in social impact assessment depend largely on the interests of those affected by these decisions. Some groups are interested in site-specific impacts, while others are concerned with national and international consequences. Some set their sights on the twenty-first century, while others are most concerned about the here and now. Some view social impacts exclusively in terms of planned consequences, while others focus their attention on effects that may have been ignored. These divergent interests can be considered in terms of space, time, and purpose.

Some impacts are clearly meaningful only at the site-specific level. Examples are disturbances of ground surface, reduction of vegetation, unsightly disposal of mine wastes, and other problems of reclamation. Other impacts are concentrated in the locality or county where mining takes place. Effects on the fiscal and institutional capacity of local governments to absorb growth are examples. At the regional (multistate) level, social impacts may involve political relationships between energy-producing states and energy-consuming states. National social impacts concern the attainability and desirability of energy independence and the appropriate balance among domestic production, imports, and conservation. Finally, energy development decisions can have worldwide repercussions, affecting trading relationships, currencies, and international stabilization.

Because of the different size of the units involved in space, it is difficult to compare social impacts at one level with those at another level. The balancing of favorable consequences at one level with unfavorable consequences at another level is a task for the political process.

Social impacts can vary in time as well as in space. Although the term "impact" suggests a definite time, in practice it is difficult to identify exactly when that time occurs. Neither the causes (energy

development decisions) nor the effects (social impacts) are momentary occurrences. Energy development decisions may begin to cause social consequences at any time along the way to implementation--corporate planning, congressional debate, passage of legislation, lawsuits, project planning, environmental impact reporting, project modification, mine and plant construction, mine and plant operation. Similarly, some impacts may be felt immediately, while others may be delayed, or extended. Some may be reversible, others irreversible. Here again, it is important to make comparisons in terms of similar units. Impacts that take place during a construction period, for example, may not be indicative of impacts that take place during an operating period.

A crucial distinction in the assessment of social impacts is the one between intended and unintended consequences.¹ The intended consequences of energy development decisions have to do with increasing domestic energy production to reduce dependence on imports. Decisions of such magnitude often lead to unintended consequences that prove to be at least as important as the intended ones. The National Environmental Policy Act and the growing emphasis on technology assessment attest to the significance of unintended consequences. Environmental impact reporting and technology assessment are two means of attempting to assure consideration of issues that otherwise would have been neglected. Knowing these impacts in advance enables decision-makers to take better account of them in their planning, or to reevaluate their plans.

In assessment of the potential social impacts of a synthetic fuel industry, the discussion is organized as follows:

- The interests of various parties involved in or affected by energy development decisions.
- Local impacts of energy development and analysis of the dynamics and economics of growth that would result from very rapid energy development, compatible with a "maximum credible" level of development.

- Controlled growth consistent with considerations of the interests of the various concerned parties.

Chapter 23 analyses the effects on the urban growth process of varying plant sizes, construction schedules, and rates of population growth, and considers the implications of this analysis for increased energy development in Appalachia and southern Illinois.

B. Interest Groups

All groups to be affected by decisions regarding energy development should be included in a discussion of social impacts. At a minimum, the following groups would be affected by energy development: local government; state government; federal government; ranchers and farmers; workers and other residents; businessmen; new employees and other newcomers; energy industrialists; environmentalists; and energy consumers.* This is a diverse assortment of interest groups. Some of them are better-organized and better-financed than others and thus better able to communicate their position to the general public. Some of them claim to speak for others, and within each group, there may be sharp differences of opinion. Nevertheless by examining the interests of each group separately and assessing the impact of energy development on each it is possible to indicate the problems that would be created for a region subjected to the dynamics of growth discussed in Section C, following.

1. Local Government

Local officials in the coal-producing regions of the Rocky Mountain and Northern Great Plains states are generally oriented to the needs and interests of a local constituency, with strongly-held beliefs

*Impacts on railroads and some impacts on Indians are discussed in Chapter 19.

about what is good and bad for their own. They tend to be conservative in the sense of approaching change cautiously and wishing to preserve the status quo. As a general rule, they believe that government and planning should be minimized. At the same time, they are concerned about the decline of the economic base and population that has afflicted many rural towns and counties. While some of them view energy development as a means to revitalize the local economy and promote growth, others view energy development as a threat to traditional ways of life and regard the costs of very rapid growth as greater than the benefits.

The mining of energy minerals and their conversion to synthetic fuels would bring large numbers of people to regions of the Rocky Mountain and Northern Great Plains states that now have a typical population density of two people per square mile. This influx of people would quickly overwhelm the present institutional capacity of local governments: housing, schools, roads, utilities would have to be provided in relatively short order.

The building of new cities or the expansion of existing ones does not require only money. It also requires an "infrastructure capacity," a network of local service industries, public services, and skilled work force and management, which is formed by the gradual accumulation of the requisite social and economic structure. In almost all areas where energy minerals are plentiful, this capacity would have to be imported, that is, attracted to the region.

Building or expanding a city in the midst of a sparsely populated region requires a sizable public investment. The quicker the pace of development, the more urgent the need for revenues to provide services. At the same time, localities faced with energy development are operating in a high-risk situation. Unable to collect the bulk of tax revenues until after development impacts have occurred, they must nevertheless invest, in effect, in a market whose future is uncertain. Changes in

world oil prices, trade balances, geopolitical arrangements, and so on, could easily remove the need for these energy projects and turn the entire urban apparatus into a ghost town. If intensive western energy development proved unprofitable, the depopulated remains of these localities would be saddled with indebtedness.

Local governments, however, have little to say about the scope, intensity, or location of energy development. In many areas of potential mineral development, land ownership is fragmented among different jurisdictions such that the mineral estate is almost exclusively under federal control, while local governments retain control over surface improvements. At the same time, local governments have little control over the emerging economic base associated with energy development. Without the capacity to raise funds to meet development costs, these localities could find themselves in the position of bearing a large part of the social and economic burden for supplying national energy demands.

Rock Springs, Wyoming, for example, which had lapsed from a railroad boom town in the 1880s to a declining rural town, has become a small industrial center in the last five years. Industrial activity in trona mining and soda-ash refining, oil drilling, as well as coal mining and electrical generating facilities more than doubled the town's 1970 population of 12,000 to 26,000 in 1975. Rock Springs Mayor Paul Wataha referred to the high risks inherent in very rapid development when he stated, "I don't see how we could have adequately prepared for this. Even if in 1970 we could have persuaded the voters to pass bond issues, how were they to know the companies wouldn't change their minds?... If we could have had the same growth over a ten-year period instead of two years, things would have been a lot better."² The implication is that to avert problems of industrialization/urbanization, one would have had to slow the rate of local growth. Similarly, Gillette, Wyoming, doubled its population between 1960 and 1970 (3600 to 7200), and, at the present

rate of growth, will see its population double again by 1977. Once the scene of early coal mining activity, and of an oil boom in the 1950s, Gillette reverted to relative quiescence in the 1960s until the current coal boom. Like Rock Springs, it could well develop into a major western industrial center.

2. State Government

State governments, like local governments, have an interest in maximizing tax revenues while minimizing expenditures for which they are responsible. They share with the regional public an interest in gaining the maximum value for their natural resources. In energy development, the interests of state officials appear to converge with those of local officials. They both wish to ensure the economic stabilization of local jurisdictions by regulating the pace of development so that it does not interfere with orderly growth. State officials have wider responsibility for coordination and planning, of course, and may have to reconcile diverse interests within their states. State officials must also respond to federal pressures for increased coal leasing and mining.

The governors of the Rocky Mountain and Northern Great Plains states have reached some consensus (if not total agreement) on the conditions they believe should govern coal mining, with local autonomy as a major theme. Montana Governor Thomas Judge stated, for example, "If we are going to produce [coal], it's doing to be on our terms--not on terms somebody else dictates."³ In a letter to the Senate Interior and Insular Affairs Committee, North Dakota Governor Arthur Link stated the position of North Dakota: "The State of North Dakota desires to assist in the effort to meet the 'energy needs' (to be distinguished from mere 'energy demands') of the nation. But, concurrent with the offer of assistance, this state will demand necessary environmental, social, and economic safeguards to protect the state. North Dakota will not 'subsidize' the energy

needs of the rest of the nation by bearing a disproportionate share of the social and environmental costs of massive energy production."⁴ The recently-formed Western Governors' Regional Energy Policy Office adopted 19 substantive and eight procedural policies for energy production. Regarding social and environmental impacts of energy production, the governors resolved "to obtain timely assistance for local political entities which are affected by energy development impacts from such appropriate sources as an energy industry or state or federal government," and "to weigh the critical need for food production in the assessment of possible adverse impacts of energy production on top soil, water supply, water quality and air purity."⁵ The position of the governors of the Western coal-producing states is to cooperate with federal and industry efforts to develop the coal resource to the extent such development is compatible with enhancement of living standards and maintenance of environmental values.

3. Federal Government

The federal government includes diverse interests related to the social impact of energy development. Debates within the federal government over such issues as the role of energy conservation, the rights of surface landowners, definition of a fair return to the Treasury from use of the public lands, the scope, pace, and location of coal leases, the feasibility of reclamation, the nation's position in international trade, and the allocation of western water have so far not led to a coherent energy policy. In general, however, federal officials have an interest in reducing American dependence on energy imports.

The ability to cut oil imports as a result of increased domestic energy production would promote other international interests of the United States. The United States currently imports about one-fourth of the total oil in the world market. Former Interior Secretary Morton has

argued that the energy needs of developing countries depend on the United States foregoing some of these oil imports.⁶ This would help preserve existing trade relationships and earn the goodwill of other energy consuming nations.

Federal officials with responsibility for managing the economy have an interest in keeping energy prices down. Although the era of "cheap energy" is undoubtedly over, it is still desirable to minimize the shock of adjustment to higher energy prices. Moreover, circulation of the dollars domestically would be a more desirable alternative than exporting them.

The federal government also has a clearly recognized responsibility to foster orderly community development, and to maintain equitable and efficient administration of all its natural resources. Energy development is a high-risk venture for the public sector as well as for the private sector. If citizens, producers, and consumers are to benefit equitably from energy production, some sharing of the costs and risks of such development will probably be necessary. Although states and localities can provide some assistance, only the federal government has the resources to manage this sharing.

Over a long period, federal policy has been directed toward preventing the burden of community development from falling solely on local residents. Federal compensation for local development costs may be traced back to the federal ordinance of May 20, 1795, in which one-sixteenth of every township was deeded to the township for support of schools. Land grants to the states for specific national purposes, such as higher education, continued throughout the nineteenth century. Concern about the federal government's sovereign immunity from tax liability led to the establishment by Congress in 1907 of a revenue-sharing formula whereby the counties in which federal timber was harvested would

receive one-fourth of all sales revenues for roads and schools. The formula for federal forest lands in Oregon and California was even more generous: 50 percent of income from valuable Pacific Northwest timber was allocated to the counties under the Oregon and California Act of 1937. Similarly, under the Knutson-Vandenberg Act of 1964, timber harvesters can be required to pay for reforestation and other improvements to the public lands. Congress also recognized the adverse impact of military bases on local fiscal capacity to the extent of providing special compensation for schools and other costs.⁷

As a proprietor, the federal government has an interest similar to that of other landowners--to obtain the maximum revenues from use of the land, to prevent environmental degradation, to manage its resources wisely, and to exercise effective control over the use of its land. Thus the federal government has an interest in guaranteeing a fair return to the Treasury for the extraction of valuable resources. The Department of the Interior has procedures for leasing its mineral holdings (see Chapter 7 for a detailed discussion). In addition, it has recommended a new, more participatory leasing program consisting of three phases:⁸

Nominations. In contrast to the past practice in which nominations for leased land were received exclusively from the mining industry, the proposed regulations allow for nominations also to be received by the Bureau of Land Management (BLM) from citizens and from local and state officials. In addition, nominations against the leasing of federal lands for coal mining purposes would be accepted.

Planning. The BLM would undertake an integrated program of land use planning and resource management in relation to multiple-use goals.⁹ Coal leasing decisions would be based on multiple-use principles of the BLM rather than solely on considerations pertaining to the mining industry. The BLM would seek to resolve conflicting land uses, prepare

a land use plan, select lease tracts from nominations, and prepare a leasing schedule.

Leasing. Leasing would take place within the context of overall land use planning objectives and field office objectives. The BLM field office would handle the lease sales.

As managers, federal officials have an interest in resolving the many controversies that divide the country over energy policy and environmental protection. They need to have at least a minimal consensus on the amount of domestic energy production necessary to reduce dependence on imports while at the same time protecting the people and the environment of the coal-producing regions. Without some such minimal consensus, disputes will probably reach the courts in increasing numbers and although legal scholars disagree over whether the courts have a legitimate role in this area,^{10,11} the courts may become involved.

4. Ranchers and Farmers

Ranching and farming are traditional modes of land use in the rural western coal-producing states. Generally, the rancher's interest consists in keeping things as they have been, improving the productivity of the range, preserving a sufficient water supply, and keeping a dependable source of labor. Since it takes 30 to 40 acres to graze a cow on the western range, very large tracts of land are necessary for profitable ranching. Ranchers also have a particular interest in keeping the price of land low if they intend to continue ranching. If the price of land rises, taxes also rise, and ranch profits are reduced.

Intensive coal mining and industrial activity would threaten ranchers' and farmers' traditional ways of life. Major decisions regarding land use, water use, and other matters of importance to ranchers and farmers would probably be made in increasing numbers by people far removed from the local community. The process of industrialization tends

to elevate the importance of economic rationality and to reduce the importance of values that cannot be measured in dollars and cents. Intangibles such as aesthetic appeal, environmental amenities, or open space tend to lose out to easily quantifiable values such as product sales. It is often argued, that because traditional land uses such as ranching and farming are less profitable in the short run than strip mining, mining constitutes the land's "highest and best use." Resource management and environmental management can be integrated with coal mining when renewable resources are dealt with but involves consumptive (nonrenewable) use of a resource and therefore cannot be managed on the basis of securing a sustained yield. Customary mining practice is to recover the most easily accessible and valuable reserves first, and to mine less accessible and valuable resources later. The interests of the mine operator are thus not tied to resource conservation in the same way that the interests of livestock grazers and farmers are tied to the continuing productivity of the land.

Some ranchers have been offered high prices for the right to mine coal under their land, but some have refused to strike a bargain. They may feel that continued occupancy means more to them than the substantial profits they would realize from sale or lease, or they may have concluded that reclamation after surface mining is not possible. Those who have chosen to sell or lease have reaped substantial financial benefits. They were free to retire or buy land elsewhere and relocate their ranches and farms. Incentives to sell or lease may include the desire to move out of an area surrounded by mining operations, future lack of an adequate water supply, higher taxes resulting from high land values and assessments, or difficulties in recruiting a work force. The high wages offered by the new mining industry in areas like Campbell County, Wyoming, have made it difficult for ranchers to rely on a steady supply of labor. Where high school students can drop out and make twice what

their teachers make, part-time jobs at the ranch no longer seem attractive. Ranch hands and virtually anyone else employed at lower wages are candidates for higher-paying industrial employment. Other employers must then pay higher wages to match the competition.

5. Workers and Other Residents

The opportunity to earn higher wages would benefit residents who were prepared to adapt to the industrial environment. Young people with limited opportunities elsewhere would especially benefit. Many of them would receive on-the-job training in the specialized skills necessary to operate a modern surface mine, synthetic fuels facility, or power plant. This would enhance their employability in the energy industry and in other industries. They would enjoy higher income and greater mobility than otherwise possible. Those residents who either chose to remain outside the new industrial environment or who were unable to occupy a place within it would be left behind by energy development. In general, the aged, the poor, and the hard core unemployed would be put at a disadvantage by the higher cost of housing and retail goods resulting from local development-induced inflation.

6. Businessmen

Merchants would benefit from energy development. In Rock Springs, Wyoming, for example, retail sales jumped from \$31,000,000 in 1970 to \$59,000,000 in 1973.² Virtually anyone who owned a business supplying goods and services to the new industry and its employees would gain, but businessmen engaged in the sale of farm and ranch machinery would probably not gain. Increased demand for housing and land would also benefit builders and land developers. Professional incomes would probably rise. These business opportunities would attract new people to

the growing community and would make a larger variety of goods and services available to residents.

7. New Employees and Other Newcomers

People are attracted to mining towns by the prospect of employment at relatively high wages. For the unemployed, productive work is obviously a benefit. Many are attracted by the excitement of starting up a new industry, or by the stimulation of a booming industrial town. One indication of the extent of opportunity open to coal mining employees is the fact that little formal education is required as a qualification for relatively high-paying jobs.¹² A study of North Dakota's coal mining and utility plant work force revealed that 42 percent of the coal employees they questioned* terminated their education after 12 years. Forty percent of the total number of mechanics, welders, carpenters, dozer operators, and truck drivers they questioned† had less than 8 years of formal education,¹² but most had had some vocational training. Despite their lack of formal education, which would have disqualified them for many lesser-skilled jobs with other employers, they were able to find employment and on-the-job training. Moreover, if the study data are generally indicative, the coal companies tend to promote from within. For example, more than 63 percent of the dragline operators (the most highly skilled position) had held four or more positions with their current employer.¹² Thus opportunities for advancement as well as for entry are very good.

On the other hand, newcomers to less stable communities can experience some hardships. For example, Gillette, Wyoming, which has experienced a very high rate of population growth due to energy

*Sample size: (n = 241).

†Sample size: (n = 64).

development," found that its ability to accommodate the newcomers was limited. Housing costs rose rapidly until home ownership was beyond the means of the new residents, despite their increased incomes. By 1970, the median rent of \$140 a month in Campbell County (where Gillette is located) was the highest in Wyoming.¹³ Even trailers were being rented at higher prices than fixed housing would have brought in ordinary times. Many latecomers could find housing only in tents.

Trailer camps typically offered a cramped dwelling space with no yard, little privacy, and sometimes no sewage hookup. Gillette's rapid growth also led to overcrowded schools, strains on public safety manpower, and a sudden need for medical and public health services.¹⁴ Signs of social malaise such as alcoholism, crime, divorce, suicide, and similar problems began to increase, according to local clinical psychologists.¹⁵ The need for such specialized social services as family therapy, mental health counseling, and alcohol detoxification soon became apparent, but the clinic and the jail were forced to function as all-purpose caretakers in the absence of these services. High rates of turnover and absenteeism are thus added to the costs of production. These problems have caused needless suffering.

8. The Energy Industrialists

The economics of the extractive industries favor rapid development of resources to minimize the time and money invested before sales of the resource. Particularly in the current period of high prices for energy minerals, the incentives for rapid exploitation of western coal reserves are very strong. It is reasonable to expect that mining activity will be greatest when energy prices are at their highest. Coal mining activity would probably decline if coal prices declined. Thus, energy industrialists are interested in assuring production as soon as possible.

Energy industrialists also have an interest in minimizing the risk in undertaking new large-scale development. Availability of key equipment such as draglines (now back-ordered several years at many mines), the availability of skilled labor, expected future demand for energy, costs of transporting coal, and commercial feasibility of synthetic fuels conversion technologies are the kinds of uncertainties likely to be faced by any industry contemplating large-scale innovation.

Uncoordinated and contradictory policies among the federal agencies involved with energy development are another source of uncertainty to the energy industry. Policies and regulations of the following federal agencies have to be taken into account in corporate planning: Energy Research and Development Agency, Federal Energy Administration, Environmental Protection Agency, Mine Enforcement and Safety Administration, Bureau of Mines, Bureau of Reclamation, and Bureau of Land Management. Changes in mining practices mandated by Congress, the courts, and the states complete the picture of uncertainty. Industry spokesmen state that they would like to have clearly articulated laws and regulations regarding energy development. To the extent that decisions to undertake extensive energy development would remove regulatory and legal uncertainties, these decisions would benefit the energy industry.

9. Environmentalists

Although environmentalists have no direct economic stake in energy development decisions, they have an interest in preserving wilderness values, natural resources, and rural, land-based ways of life. Environmentalists are a varied interest-group, consisting of fishermen, hunters, hikers, wilderness seekers, and others who wish to preserve opportunities for outdoor recreation, scientific study, or simple enjoyment. Although economists have attempted to quantify such values¹⁷ environmental values also have a symbolic dimension for environmentalists.

Unique features of land in the United States have become symbols of national identity and have thus acquired a protected status. One of the most popular patriotic songs extolls the nation's "shining seas, purple mountain's majesties, and amber waves of grain." The National Parks, and to a lesser extent all public lands are a cultural resource of symbolic value even for those who rarely visit them. Reverence toward land, traditional in most agrarian and nomadic cultures, including that of the Indians and early white settlers, is being revived by environmentalists as a philosophy of resource use. This philosophy means that environmentalists will (and do) exert their influence to control growth, prevent pollution, and conserve and preserve wilderness areas.

Controlling growth. The goal of controlling growth is based on the observation that growth may not always be compatible with human welfare. Environmentalists question the "conventional wisdom" that economic growth and population growth always work to everyone's benefit. Some unintended consequences of growth may be depletion of resources, inequitable distribution of wealth, and externalities such as pollution of air and water.

Conservation. The goal of conservation is an attempt to come to terms with the unpleasant fact of limited resources. It suggests preserving resources (such as energy reserves) for future use rather than using them up at an excessive rate. Environmentalists believe that conservation efforts will soften the effects of reaching resource limits.

Preventing pollution. The goal of preventing pollution stems from the desire to minimize adverse health effects of polluted air and water, and to have the freedom to enjoy pure air and water. Recognizing that industrial growth is a primary cause of air and water pollution, environmentalists seek ways of regulating industry in order to minimize or prevent pollution. In the environmentalists' view, the Rocky Mountain and Northern Great Plains states are the most endangered by energy

development, because these regions have the largest quantities of clean air and pure water to lose.

Extensive development of western coal reserves could lead to uncontrolled urbanization and industrialization of previously rural areas, rapid depletion of domestic energy reserves, weakening of incentives to practice energy conservation, increased pollution of air and water, and loss of wilderness of semiwilderness areas, all of which would be directly contrary to the interests and concerns of environmentalists.

10. Energy Consumers

Energy consumers would benefit from extensive energy development in at least two ways: assured energy supplies, and less reliance on imports.

The Arab oil boycott reminded consumers of the vulnerability of some sources of energy supplies. Extensive domestic energy development would help assure consumers of continued supplies. This would in turn assure a continued flow of goods and services that depend on energy consumption.

C. Dynamics of Urban Growth Related to Public Expenditure

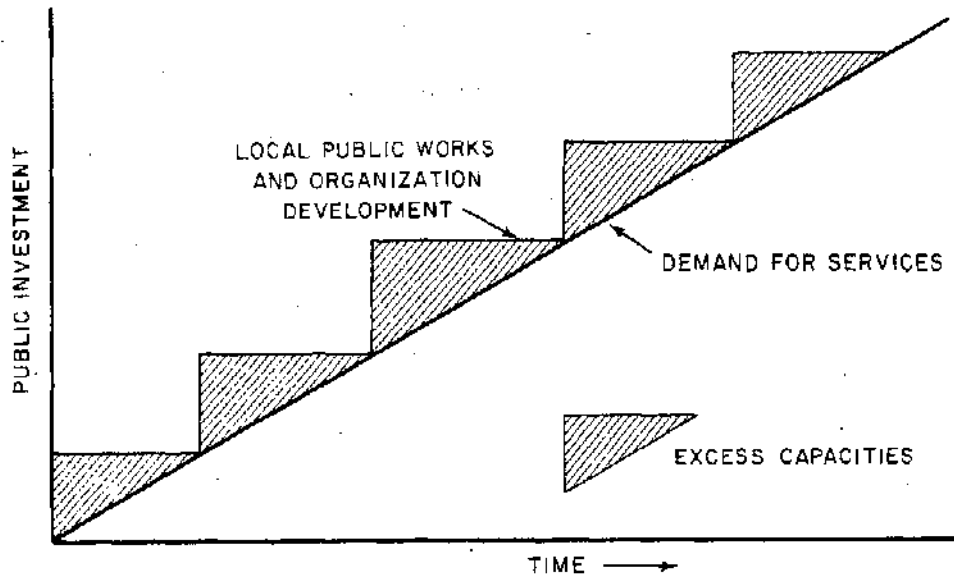
Correlative to energy development and its consequences from the points of view of the various interest groups is the question of growth as it relates to economics. Local growth is neither the blessing that boosters have often portrayed nor the disaster that no-growth advocates have portrayed. To make informed choices about desirable rates of economic development, local and state officials need to have more precise information about the relationship between growth and public expenditures than is generally available. While a full-scale analysis of all possible alternatives cannot be made here, some aspects of the

relationship between growth and public expenditures that can contribute to understanding of decision options, are presented. In general, economic development brings additional population; growing towns and cities require an investment in public services and governmental organization. Unless the locality finds a way of financing these improvements, economic development and population growth will not necessarily benefit it. From the local and state perspective, the decision calls for a judgment whether the investment in public services required for a given rate of growth will be worthwhile.

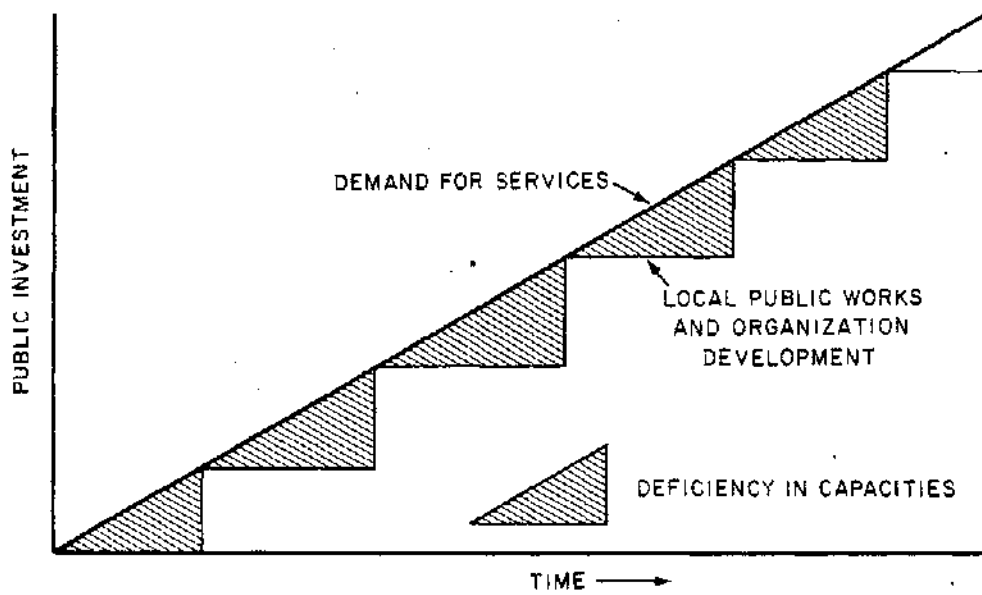
1. Stages of Urban Growth

Localities faced with rapid urbanization have two choices. They can attempt to meet demands for public services and facilities before they occur, or they can allow public works and organizational development to lag behind. In the first choice, they risk being overextended if population growth proves to be less than anticipated. For example, this could happen if mining activity were prematurely curtailed by declining energy prices or other uncertainties in the energy industry. In the second choice, existing public services are continually inadequate for the level of demand. This case tends to be more prevalent under conditions of rapid population growth because the normal life-cycles of bond issues cannot keep up with the pace of expansion. In addition, residents may be reluctant to accept higher taxes and bond issues until they become absolutely necessary. The choices are depicted graphically in Figure 21-1. A midway course between unmet demand and excess capacity would involve the least risk to the locality, but this level may be difficult to determine while expansion is still in progress.

Very rapid spurts of housing and commercial building construction often lead to an "echo effect" in later years.¹⁸ Assuming an approximately equal useful life, buildings completed during the same



A. PUBLIC INVESTMENT LEADING DEMAND



B. PUBLIC INVESTMENT LAGGING DEMAND

FIGURE 21-1. PUBLIC INVESTMENT COMPARED TO DEMAND FOR PUBLIC SERVICES

construction period will all "wear out" at roughly the same time. An initial period of boom construction necessarily creates a second construction boom because the rate of replacement tends to resemble the original rate of construction. Figure 21-2 contrasts the construction boom with the constant rate of construction and replacement. The constant rate results in a flat age-profile of buildings in which ages and conditions are varied, while boom and bust cycles of extreme severity are built into the local economy by an initial construction boom. Since rents are partially a function of a building's age and condition, there would be little basis for variation in rental values other than location, and hence little diversity of lessee choice.

Successive increments of population growth do not necessarily have identical characteristics. In changing from a crossroads to a village, then to a town, and finally into a city, different kinds of decisions are called for at each step. A town has different requirements from a set of villages with equal numbers of people. It has been suggested that this process be treated as a sequence of steps involving progressively higher expenditures.¹⁹ As Figure 21-3 shows, the first improvements to be made are well-drilling (or reservoir construction), road-building, septic tank installation, and school-building. Later, the town may decide to invest in a sewage system, a hospital, and an addition to the school building. At this point, the town may adopt zoning ordinances and building codes. When these steps occur in rapid succession, previous investments are made obsolete before they wear out. Before the next phase arrives, development of a local bureaucracy for planning and service delivery becomes critical. Coordinating transportation, education, health services, water use, and land use for a city of 25,000-50,000 is a major job. At this population level, the stakes are much higher than before, particularly when revenue sources to pay for these commitments are uncertain. Although revenue bonds can pay for some of

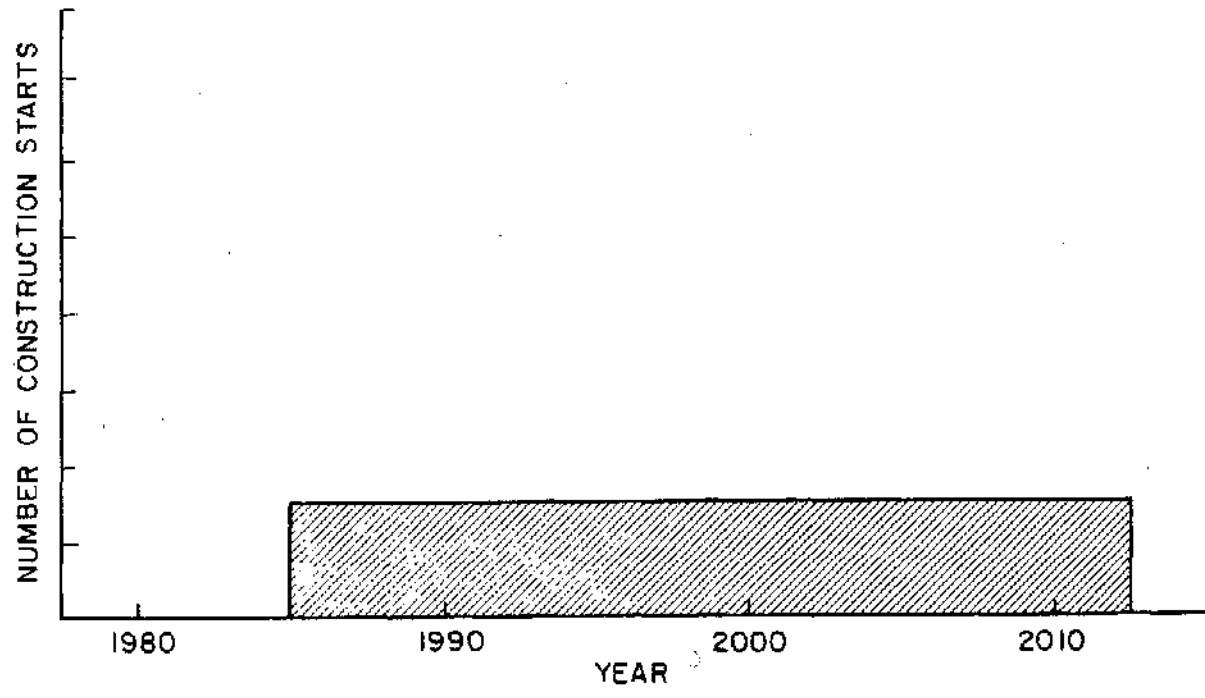
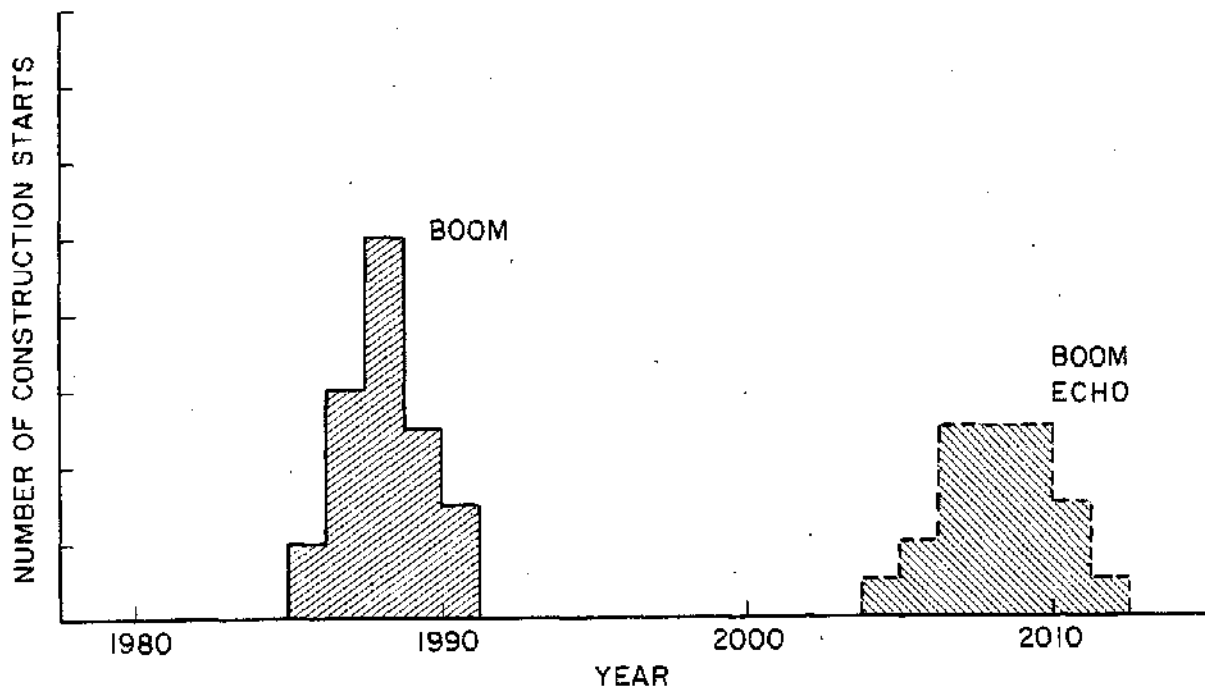


FIGURE 21-2. "BOOM" CONSTRUCTION AND ITS ECHO EFFECT CONTRASTED WITH FLAT-AGE-PROFILE CONSTRUCTION

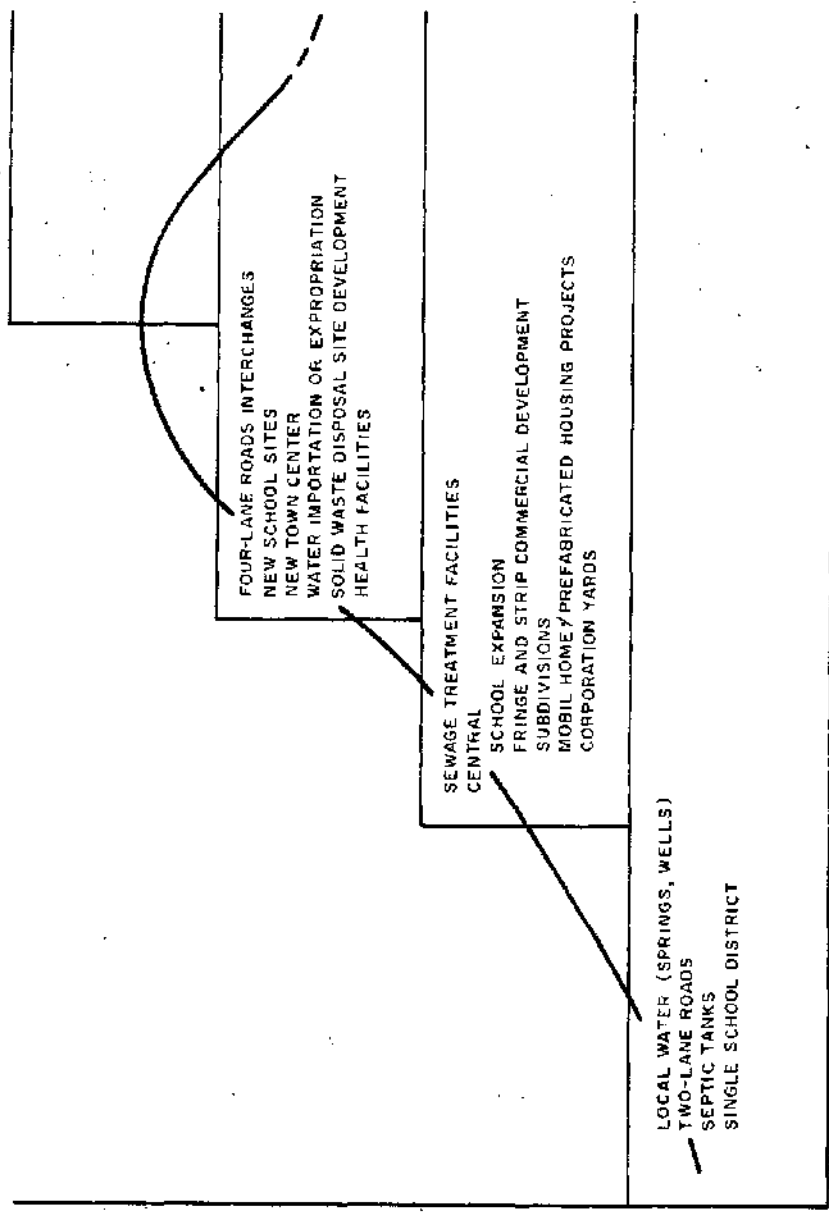


FIGURE 21-3. MAJOR INVESTMENTS AND DECISIONS VS. POPULATION GROWTH FOR AN URBANIZING SMALL TOWN

these costs, these bonds are generally repaid from user charges, not taxes.

2. Population Growth and Per Capita Costs

It might seem reasonable to expect per capita costs of public services to drop as population rises because of possible economies of scale. Once an initial capital investment has been made, the locality has a certain excess capacity that can be used to absorb new growth. Incremental additions to structures and facilities are usually easier to finance when building on an existing base than when starting anew. Many economies of scale in the delivery of local public services are related to increased population densities. Services whose costs are mainly associated with geographical dispersion include police and fire protection, garbage collection, and other field or patrol services. If (other factors being equal) population growth occurs within a relatively concentrated area, the costs of serving 30,000 people can be far less than twice the costs of serving 15,000 people. Similarly, public investments in buildings and equipment may be made with lower per capita costs where population is relatively concentrated rather than dispersed. Hospitals and schools, for example, can benefit from such economies of scale.

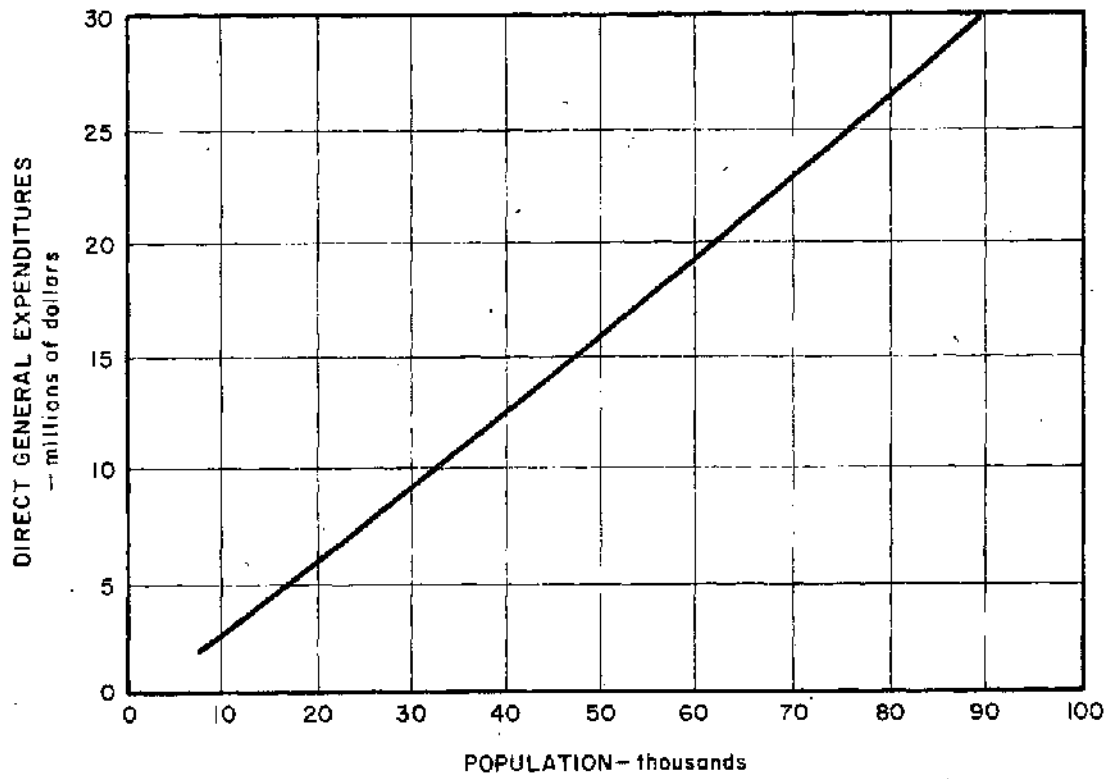
In practice, however, declining per capita public costs thought to result from population growth have not materialized in the western coal-producing counties during periods of rapid growth. In a detailed study undertaken for the Northern Great Plains Resources Program* by the

*The Northern Great Plains Resources Program is an intergovernmental agency composed of representatives of the States of Montana, Wyoming, North Dakota, South Dakota, and Nebraska, and the Department of Interior, Department of Agriculture, and the Environmental Protection Agency.

Bureau of Reclamation and the Institute of Applied Research at Montana State University, it was found that direct per capita public expenditures actually increased faster than the population in the sample.³⁰ The sample included Sheridan and Campbell counties in Wyoming, Big Horn and Rosebud counties in Montana, and Mercer and Oliver counties in North Dakota. The impacts experienced in these counties typify those to be expected in other counties in the same region in which energy development takes place. First, the study projected future populations for the "most probable" schedule of energy development generated by direct and secondary employment at coal mines, gasification plants, and generating facilities. Second, the study projected future public service needs in the areas of health care, social services, schools, fire protection, law enforcement, travel and transportation, municipal services, recreation facilities, and planning. Third, it estimated the costs of these governmental services and facilities and compared these costs with revenues likely to be available. The comparison showed that during the construction period revenues would be inadequate to cover costs and that after the construction period revenues would be adequate in all sampled counties except Sheridan County. Municipalities would experience greater difficulty in financing services, however, because industrial complexes are not expected to be constructed within corporate limits.

Figure 21-4 illustrates the pattern of per capita public expenditures rising faster than population during periods of rapid population growth. A jurisdiction of 15,000 population, for example, spending 4 million dollars a year would be spending more than twice that sum--9 million dollars--when its population reached 30,000. At an annual rate of population growth of 5 percent, total public expenditures, corrected for inflation, would double approximately every 13 years.

Rosebud County, Montana, where coal mining has taken place but no major construction has occurred, saw its per capita expenditures jump



SOURCE: BUREAU OF RECLAMATION (1974)

FIGURE 21-4. CORRELATION OF GOVERNMENT EXPENDITURES TO POPULATION

from \$88 in 1969-70 to \$121 (in constant 1967 dollars) in 1973-74, an increase of almost 40 percent. While taxable valuations rose during that period, they did not rise sufficiently to pay for increased expenditures. According to the Montana State Department of Natural Resource and Conservation, even these increased per capita public costs represent a minimum "make-do" budget.²¹ The same pattern was revealed in Forsyth, the county seat of Rosebud County. While population rose from 2000 to 2800 as a result of coal development from 1970 to 1974, expenditures (in constant dollars) doubled. Per capita public expenditures rose from \$81 to \$116 (constant 1967 dollars) during that period. An increase of 18 percent in municipal taxable valuations stands in sharp contrast to the town's 100 percent increase in expenditures.

3. Growth and Revenue

The examples given above lessen assurance that services to accommodate rapid rates of population growth can always be financed from anticipated revenues. There are at least eight reasons why this might be the case.

Demographic Characteristics--The costs of urbanization are affected by demographic characteristics of the immigrants as well as by their sheer numbers. Five hundred additional young families a year, for example, would have more impact on school budgets than would equal numbers of elderly people. For example, Campbell County, which had the largest proportion of school-age population of any county in Wyoming five years ago, can be expected to increase this proportion still further in subsequent years. Since schools consume at least half of all local government expenditures, this increase alone would have a large impact. The elderly, on the other hand, would require larger expenditures for public health and hospitals. Itinerant laborers without families would

have minimal impact on school budgets. However, their demand for housing would be greater than that by equal numbers of family members because of the greater incidence of one-person households. The younger the incoming population, the more need for expenditures on recreational facilities. Population requiring the more labor-intensive governmental services, such as social welfare, mental health counseling, manpower development, and vocational training, also cause greater per-capita public expenditure.

Diversity of Services--With rapid urbanization, government must assume many of the traditional "caretaker" functions since newcomers cannot depend on personal ties in the community. The newcomers exert pressure for public services not only because of their number but because of their greater dependency on government as well. This is particularly true if the newcomers come from larger urban areas in which dependence on government is heavy. Straight extrapolations of costs resulting from population growth may not indicate the full extent of future costs because "a wider variety of services is likely to be demanded because of the greater diversity of the new populations."²⁰

Narrow Financial Base--Local jurisdictions are generally less able, legally and politically, to impose new or greater taxes than are higher jurisdictions. Dependent on the property tax and on grants from state and federal government, localities stand on a narrow financial base. Municipalities are particularly vulnerable because industrial complexes located outside town boundaries generate no property tax revenues for the town. Local revenue sources are generally less varied and therefore less adequate. States can impose severance taxes, license fees, royalties, income taxes, sales taxes, establish reclamation bond funds, etc., but there is no guarantee that these revenues will be distributed to the localities where the taxes were collected. It has been the practice in a number of states to put severance tax revenues, for example, into the

general fund, remitting only the surplus above state general expenditures to the counties that generated the revenues.

Intercounty Disparities--Just as counties within the same state might be burdened unequally by the costs of urbanization, counties in two different states can experience the same disparity. It would be feasible, for example, for large numbers of people to live in Sheridan, Wyoming, and to commute to work in Montana. In that case, property tax revenues on the plants would be generated for Montana while Sheridan would pay the costs. Sheridan would therefore experience particular difficulty in financing its growth.

Tax Breaks--Many states grant tax breaks to new industry as an inducement to locate in the state. For example, Montana taxes new industrial property at only 7 percent of its "true and full value" for the first three years.²² Machinery and equipment are taxed at 30 percent of their value. New industries in North Dakota may be completely exempt from property and corporate income taxes for five years. These practices remove a source of revenue during the period of fastest growth when it is most needed by urbanizing areas.

Indirect Benefits to Outsiders--Although industrial growth creates secondary employment, it does not necessarily broaden the local tax base as much as is often forecasted. Most of the local secondary employment would be in the services, sales, and government sectors. Relatively little of it would occur in a diversified industrial base on the local level. Large-scale coal mining in Wyoming would generate employment in Ohio where draglines are manufactured, in the Great Lakes states where steel is produced. Thus a substantial proportion of the benefits of secondary employment would accrue to states outside the western coal-producing regions.

Settlement Patterns--Since many economies of scale in the delivery of local public services are related to increased population densities, these economies may not materialize unless certain critical densities develop. Factors inhibiting such densities from developing include incentives toward rural land subdivision, the desire to escape municipal taxes, regulation, zoning, and building codes, and other well-documented dynamics of urban sprawl.²³ Dispersed residential settlement may also be fostered by geographical barriers such as unstable soils, steep slopes, or other rough terrain. In such cases, settlement will tend to spread out along easily buildable sites in river valleys rather than assuming a circular distribution. Unwillingness to accept land-use controls at the county-wide or state-wide levels may also facilitate settlement patterns that fail to realize economies of scale in the delivery of public services. Similarly, access to centralized facilities such as hospitals is reduced by dispersion of residential settlement, in which case effective delivery of such services can only be made with increased transportation costs.

Limited Size--The localities considered in this report are attempting to build governmental services on a relatively restricted base. Their population and their institutional capacity are limited in the beginning, and so they may not yet have reached the point where they can realize economies of scale. It has been suggested that such economies only begin to be realized at the size of 100,000 or 200,000 population.²⁴ None of the localities studied here is expected to reach that size as a result of projected energy development.

4. Tax Lag

A final problem faced by towns trying to finance urbanization--tax lag--deserves separate consideration. Even if there were no tax breaks for industry and no intercounty disparities, the costs of

urbanization would still generally occur before the taxes to finance them arrived.

Tax structures represent the bargain struck between industry and the general public for the privilege of doing business. Since mineral extraction removes wealth from its original jurisdiction, mineral taxes are in part a form of compensation. As extractive industries dealing with foreign countries have found, taxation has become a device for tacitly sharing the wealth. A "fair" tax rate in such cases has come to mean a proportion of profits derived from sale of the raw mineral. Although the American coal and oil shale producing states do not exercise sovereign powers, they have similar interests at stake. They will want to assure themselves, at a minimum, that the costs of minerals development will not exceed their ability to finance required public expenditures. Beyond that, they may seek to regulate various aspects of industrial development by manipulating tax incentives and disincentives.

Montana, which is a leader in mineral taxation, has four major taxes that pertain to coal mining: the Net Proceeds Tax, the Resource Indemnity Trust Account Tax, the Strip Coal Mines License Tax, and the Corporation License Tax.²² The Net Proceeds Tax, or severance tax, is based on the gross dollar value of coal extracted, less the cost of mining and marketing it, and may be averaged over five or more years. This value is then included in the assessed property of the firm and thus becomes subject to county property taxes. However, a drawback is that revenues are not collected until after public costs have occurred. Another potential drawback relates to the procedure for determining the valuation of net proceeds. One of the advantages of vertical integration is the opportunity for a firm to sell crude products to itself at below-market prices, thereby lowering taxable valuation. For in-state mining and conversion operations, this could represent a substantial loss of revenue.

Reclamation fund taxes can be based either on the value of coal extracted, the quantity of coal extracted, or on the anticipated cost of reclamation. When the reclamation bond is equivalent to the value of the coal extracted, the bond operates as a surety that reclamation work is actually performed because there would be no net benefit in forfeiting the bond. The alternative of holding a bond equivalent to the cost of reclamation has been tried in some Appalachian states, but it has been found in a significant number of cases that these were treated as "slip-out costs" by firms unwilling to perform reclamation. In one eastern state, an ingenious operator has apparently circumvented the reclamation tax entirely by stripping the overburden without touching the coal and then selling the land to another operator. Montana's reclamation fund imposes a tax of \$25 plus 0.5 percent of the gross value of coal extracted. Under the vetoed federal strip mine legislation, a federal reclamation fund would collect 35 cents a ton to reclaim "orphan lands"--abandoned by untraceable strip mine operators--and sell them to responsible owners.

States have the option of remitting revenues to the general treasury or of earmarking tax revenues for specific purposes and/or counties. For example, Kentucky treats severance taxes as general-purpose revenue, sending only the surplus above the state expenditures back to the county from which the coal was extracted. Other states earmark these taxes specifically for road maintenance and reclamation work in those counties. Montana's reclamation fund tax is earmarked for the counties where land has been disturbed. In addition, its Strip Coal Mines License Tax, levied proportionally to the heating value of the coal, collects amounts ranging from 12 to 40 cents a ton. Of this amount, the county contributing the coal receives one cent per ton. Finally, Montana's Corporation License Tax imposes a flat 6.75 percent tax on net income earned in the state, of which one-fourth is earmarked for schools.

D. Policy Options for Controlled Growth Rates

The problems attendant to growth cited in the previous section and the interests of the various stakeholders cited in Section B can be addressed through various federal, state, and local policies. Such policies should deal realistically with the choices open to the western coal-producing regions, recognizing the interdependence of rapid growth and subsequent decline. "Every region which is declining today," according to a report by the Old West Regional Commission,* "is so doing because the momentum of some earlier growth carried it to levels it could not sustain."²⁵ The vulnerability of these regions to the changing fortunes of extremely specialized economies suggests an approach "which is neither opportunistically promotional nor dogmatically preservationist, but which keeps local growth rates within a range to which the existing communities can adapt without hardship."²⁶ For these regions to avert the boom-and-bust cycle to which they have been subject in the past, the Old West Regional Commission's report concludes, "the new urban development prospects arising from coal developments should not be regarded as a means of 'saving' declining towns...."²⁵ Policy options to achieve desirable rates of growth can be divided into the broad categories of nonfiscal instruments and fiscal instruments.

1. Nonfiscal Options

Prospects for land use controls at the federal level appear dim since Congress has rejected federal land use legislation and has failed to override presidential veto of legislation to implement land

*The Old West Regional Commission is an intergovernmental organization consisting of the governors of North Dakota, South Dakota, Nebraska, Wyoming, Montana, and federal representatives.

use controls on federally owned coal lease tracts. However, some land use controls are now indirectly applied by the federal government, for example, in the EPA air quality control regions. Thus, existing legislation may be sufficient to authorize some land use controls on the part of federal agencies. The Bureau of Land Management and the Forest Service, two agencies with substantial experience in multiple-use planning, have established a land use plan for management of the Decker-Birney area of southeastern Montana.²⁶ Their plan, produced in cooperation with Montana officials and after extensive consultation with landowners and others in the Decker-Birney area, seeks to accommodate the diverse interests of livestock grazers, timber producers, recreationists, and coal producers.

The EPA could establish land quality categories, similar to its air quality categories, to guide decision-makers on land use. Rather than approaching energy development on a mine-by-mine basis or on the basis of overall requirements, EPA could evaluate land use on the basis of relevant impact factors. Such impact factors might include:

- Vegetative and wildlife production.
- Competing land use requirements (such as farming, ranching, recreation, or residential use).
- Water consumption.
- Institutional and fiscal capacity of localities to absorb population growth.
- Net energy considerations.

A system of land quality categories would help solve two problems that are prevalent in environmental regulation--individual case-by-case treatment on the one hand, and inflexible across-the-board rules on the other hand. Instead, environmental standards could be applied to categories of conditions. For example, the need for reclamation could be treated as something not necessary in all places and at all times but only where some evident impact occurs. The needs of localities for

assistance in accommodating different rates of population growth could be treated similarly.

Various tools of growth management are available at state and local levels. Montana, Wyoming, and North Dakota have enacted laws regulating the siting of synthetic fuels conversion facilities and electrical generating facilities. These laws incorporate some of the regulatory features mentioned above as impact factors in the context of possible federal regulation. Their effect will undoubtedly be to impose some state control over the scope, pace, and timing of energy development within the state. Montana and several other states in the coal-producing region have also enacted environmental protection legislation, which could regulate energy development impacts. Cities and towns can control growth by the indirect means of limiting the number of sewer or utility connections or limiting the reservoir capacity of municipal water systems. If they wish to promote concentrated settlement patterns, they can adopt an "urban service boundary" beyond which public services will not be extended. One successful policy instrument, put into practice by the town of Ramapo, New York, in 1969, required phased construction of public service facilities in parallel with land development. Ramapo's ordinance tied the rate of population growth to the rate at which public capital improvements could be financed. Other conditions besides those associated with timing can be attached to building and construction permits within local jurisdictions. For example, a specific finding on the part of a planning commission that sufficient public facilities exist may be required as a condition of granting a particular building or construction permit. In addition, local jurisdictions can adopt special-purpose zoning ordinances (such as agricultural zoning, conservation zoning, development district zoning, and down-zoning), and quotas or moratoria on building and construction permits.²⁷

2. Fiscal Options

The federal government has a long tradition of aiding localities serving a national purpose which are adversely affected by their efforts. For example, military bases may occupy land that would otherwise belong to the city or county property tax base. However, federally owned land is exempt from local property tax obligations. At the same time, the presence of the military base might create a heavy burden of public expenditures for schools. Congress enacted legislation in 1950 to provide funds to school districts in areas affected by federal activity.⁷ Public Law 874 was intended to aid school districts in financing current educational expenses. It now accounts for an average of 5 percent of the operating expenses of about 10 percent of the school districts in the United States, containing about 30 percent of the nation's public school enrollment. These payments continue as long as the federal activity remains in the area. Public Law 815 provides financial assistance for construction of school facilities in districts where the federal presence creates a need for such new facilities. These laws could well serve as a model for federal assistance to localities experiencing rapid population growth under pressure of energy development.

With regard to development of oil in the outer continental shelf, the Department of Commerce has recommended federal compensation of coastal states adversely impacted by energy development.⁸⁹ A similar arrangement could be formulated for coal mining. Such compensation takes three forms in the recommendation: (1) general revenue sharing, (2) adverse impact grants, and (3) front-end loans.

General Revenue Sharing--A percentage of federal bonus bid and royalty revenues could be earmarked for states affected based on impact factors.

Adverse Impact Grants--States could apply on an individual basis to the federal government for assistance based on demonstrated environmental, economic, or administrative costs associated with resource development.

Front-End Loans--States could receive low-cost federal loans to finance public facilities and services needed to accommodate resource development.

State governments can recover the costs of rapid population growth by means of valuing and taxing all productive wealth. For example, Montana enacted a 30 percent severance tax on coal, earmarking the revenues for schools, roads, recreational facilities, conservation, and reclamation. Reclamation bonds can be required as a condition of permission to mine coal. Similarly, the posting of a bond to cover the cost of expanded public facilities and services can be required.

The options discussed in this section do not offer a complete solution to the problems of energy development, environmental protection, and local growth. Many outstanding problems are not addressed, such as the issue of surface owners' rights, water rights, as discussed more fully in Chapter 19, and the allocation of resources to food and fiber production as well as energy production.

Although localities can limit population growth, the nation as a whole cannot do so, given the fact of at least some national population increase (even if at declining national birth rates). Nevertheless, while it searches for patterns of settlement that serve national needs without adversely affecting the quality of life, the nation can promote equitable and orderly local growth.

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