Coastal Zone
Information
Center

COASTAL ZONE
INFORMATION CENTER

1291

Managing the Socio-Economic Impacts of Energy Development: A Guide for the Small Community

Energy Research and Development Administration, Office of Planning analysis and evaluation

HD
9502
.U52
M36
1977

12912

COASTAL ZONE
INFORMATION CENTER

ERDA 77-79

Managing the Socioeconomic Impacts of Energy Development

Office of Planning, Analysis, & Evaluation
Energy Research & Development Administration

A Guide for the Small Community

SEPTEMBER 1977

US Department of Commerce
NOAA Coastal Services Center Library
2234 South Hobson Avenue
Charleston, SC 29405-2413

NOTICE: THIS DOCUMENT IS UNPUBLISHED

U.S. Energy Research and Development Administration · Office of Planning Analysis and Evaluation.

ERDA 77-79

Managing the Socioeconomic Impacts of Energy Development

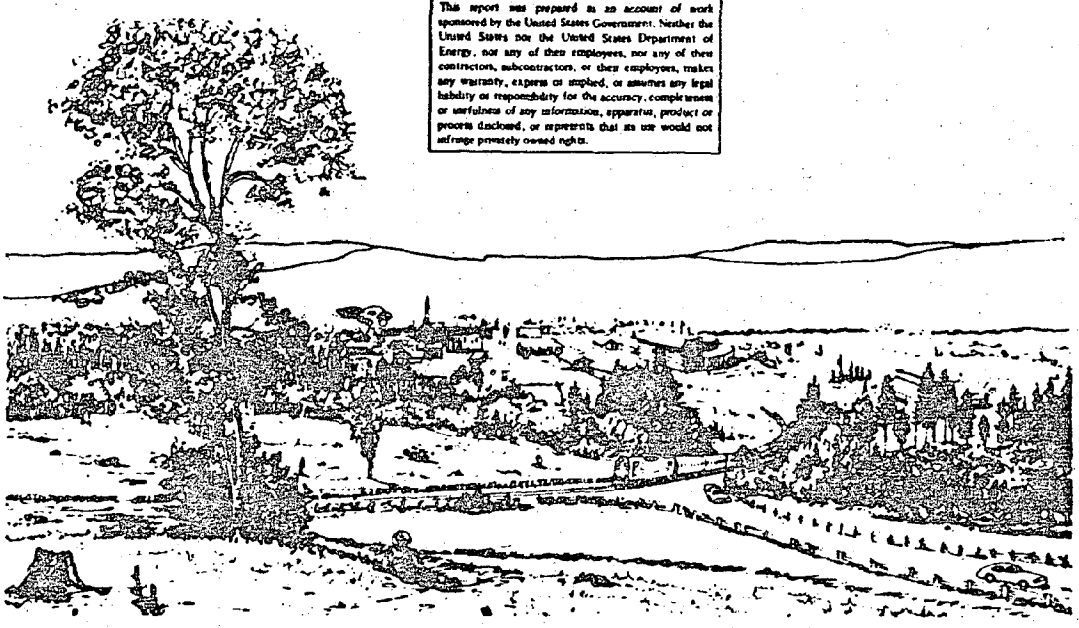
Office of Planning, Analysis, & Evaluation
Energy Research & Development Administration

HD9502.U52M36 1977

A Guide for the Small Community

SEPTEMBER 1977

NOTICE
This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States Department of Energy, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights.



DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

ACKNOWLEDGEMENTS

Mr. Edward H. Pechan of the U.S. Energy Research and Development Administration (ERDA) was the Program Manager for this effort, which was conceived and initiated by Mr. Ellison S. Burton, ERDA.

The guide was written by ERDA consultant, Ms. Roberta Armbrust, based on a contract study by Centaur Management Consultants, Inc. of Washington, D.C. Leading investigators on that study were Ms. Isabel Reiff and Mr. Michael Frankel of Centaur and their consultant, Mr. David Williams. Ms. Susan Rifkin of ERDA managed the final editing and production.

BLANK PAGE

PREFACE

National concern over the energy future of the United States has focused increased attention on ways to attain greater domestic energy self-sufficiency. Toward this end, public and private policies and actions are evolving to increase reliance on more abundant domestic energy resources such as coal and to develop new technologies to exploit those resources. As a consequence, an increase can be expected in large mining and development projects near small communities or in predominantly rural areas. While such projects may offer the prospect of welcomed job opportunities and other perceived benefits, if growth is too rapid a community may find itself confronting new demands for municipal services and new social problems it neither anticipated nor can afford. These adverse impacts from development can overwhelm an unprepared and unaided community and can create the deteriorating conditions contributing to a "bust" following the "boom".

This guide is aimed at helping local leaders and citizens become informed about the nature and extent of community impacts from rapid development associated with energy projects and how adverse impacts may be managed, minimized, or averted. This guide does not provide the detailed tools or advice necessary to perform community planning and exercise day-to-day management. We are convinced that such tools and advice must be shaped by experts in close cooperation with the local officials who face real issues and real people. We have therefore attempted to construct a guide to equip local leadership and citizens with the preliminary knowledge and orientation needed to begin asking questions and to deal productively with developers, government officials, and consultants.

Ellison S. Burton
Assistant Director for
Environmental Analysis
Office of Planning, Analysis, and
Evaluation
U.S. Energy Research and Development
Administration

September 1977
Washington, D.C.

TABLE OF CONTENTS

CHAPTER 1 - INTRODUCTION. 1

CHAPTER 2 - ENERGY DEVELOPMENT. 3

Energy Development Phasing 6
Depletion of the Energy Resource 6
Site and Non-site Specific Development 7
Development Uncertainty. 7

CHAPTER 3 - ADMINISTRATIVE FACTORS AFFECTING ENERGY DEVELOPMENT IMPACTS 9

CHAPTER 4 - MANAGING RAPID GROWTH 13

Planning and Regulating Development. 19

CHAPTER 5 - SOCIAL ECONOMIC, AND ENVIRONMENTAL IMPACT AREAS . . . 24

Economic and Demographic Impacts 24
Housing. 34
Transportation 35
Water Supply 37
Solid Waste. 39
Wastewater Treatment 42
Recreation 46
Education. 47
Health Care. 49
Community Safety 52

CHAPTER 6 - CAPITAL PROGRAMMING 57

Definitions. 57
Issues in Capital Programming. 58
Preparing the Capital Program. 59

CHAPTER 7 - PUBLIC COSTS AND REVENUES 70

Costs. 70
Revenues 71
Comparison of Cost and Revenues. 73
Local Fiscal Management: Monetary and Non-Monetary Revenue-Raising Alternatives 75

TABLE OF ACRONYMS 76

SOURCES 77

CHAPTER 1 - INTRODUCTION

PURPOSE

A decision concerning large-scale energy development is usually a complex one requiring cooperation of all levels of government as well as the general public and the private sector. The purpose of this handbook is to provide local officials with guidance regarding how they may assess, plan, and manage the socioeconomic impacts of such development. Key areas of discussion in this report include: employment; personal income; housing; education; transportation; water supply; solid waste collection and disposal; waste water treatment; health care; recreation; and safety.

It is unrealistic to expect the typical small community to develop capabilities to independently evaluate a highly technical development which to them is a one-time occurrence. Thus, local officials must be aware of resources which they may tap for information and assistance at other levels of government. This handbook advises local officials on how they should organize to most effectively participate in assessing, planning, and managing energy development and how to insure that information is collected and analyzed to reflect local priorities and future planning needs.

CONTENT

Chapter 2 provides a summary of issues which characterize energy development and which shape the kinds of impacts associated with it.

Chapter 3 describes characteristics of local areas which will influence the kinds of impacts the areas will experience and their ability to respond. Also, roles and responsibilities characteristically assumed by other levels of government as well as the private sector are delineated. The success which a community will have in coping with development will depend upon the information and assistance available to it from these different groups.

Chapter 4 provides guidance on developing the necessary administrative structure to regulate, monitor, and permit public and private development.

Chapter 5 provides discussion on each of the four categories of impact areas. The first category is demographic and economic assessment, including direct, indirect, and induced economic effects associated with development. The second category includes housing and transportation, critical areas which require community planning. The adequacy of the housing market and transportation system will influence the distribution of new population within a region. The third category includes environmental services that can limit location, size or type of new development: water supply, wastewater treatment, and solid waste collection, and

BLANK PAGE

disposal. Category four concerns social services commonly provided by a municipality, county, special district or private organization: education, health care, recreation, and safety.

Chapter 6 provides guidance on organizing a capital improvements program, its outputs and limitations, necessary resources and expertise, and local responsibilities. Many communities will need a greater capability to develop and administer such a program since energy development may create a need for expanded public facilities.

Chapter 7 discusses the way changes in public costs and revenues can be assessed and provides some guidance in mechanisms available with which to increase revenues.

CHAPTER 2 - ENERGY DEVELOPMENT

Development of an energy resource or facility will affect a community like any industrial development. There will be changes in the tax base, employment, need for infrastructure (e.g., transportation and waste disposal), as well as demand for goods and services resulting from both the development and any economic and population growth associated with it. Higher levels of government (state and Federal) will become involved because of areawide implications of air and water quality of development. Examples of development characteristics which the local official must be aware of are outlined below.

To the extent that development of an energy facility can be characterized by the information mentioned above, local governments can plan for expansion of services and facilities to meet these needs. Local officials will have to gain further insight into the way the development will proceed, comprising information such as lead time, permit process, degree of certainty, Federal and state involvement, phasing and size of the facility (see example, page 4).

Since energy resources (coal, oil, etc.) are depletable, communities should consider the long-term implications of resource depletion, including the life of the facilities.

In addition to the data describing energy development [employment, induced population growth (see example, page 5), tax revenues], loca' officials will have to develop an understanding of the special service needs associated with both the energy facility and the new population.

Energy development is characterized by phased development and not all projects proceed through completion. Local planning and subsequent actions will have to reflect the fact that development is phased and the full scale of development is often not determined until completion of early exploratory phases, i.e., determination of the size of the resource during the exploratory phases may limit subsequent development.

The developer will influence the range of impacts experienced locally. Some developers play a large role in providing services such as housing or onsite fire protection to the community to moderate impacts. Others often coordinate their projects and transfer personnel between sites.

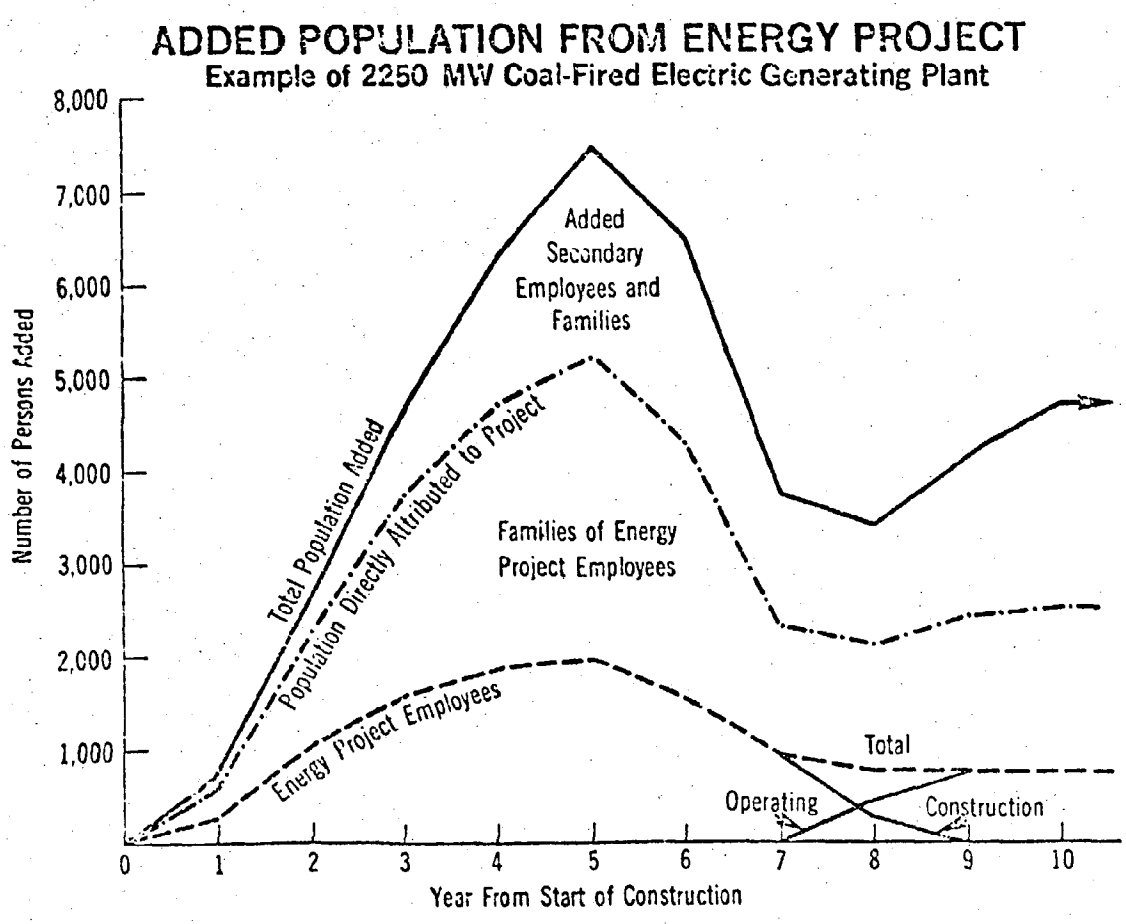
For a community to adequately plan for these developments, it is important to realize that energy development can form the nucleus for subsequent industrial development, some of which may service the energy facility.

To determine possible industrial activity associated with energy development, it will be necessary to review both the development and the

TYPICAL ENERGY PROJECTS

Project	Size	Construction Time	Peak Force Construction	Operating Force
Coal Export Mine	9M tons/yr	2-3 years	175-200	325-475
Electric Generating Plant	700 MW	4-6 years	750-950	75-100
(including coal mine)	2,250 MW	6-8 years	2,000-3,000	350-400
Substitute Gasification Plant (including coal mine)	250 mcf/day	2-1/2-3 years	3,000-3,500	1,050-1,250
Oil Shale Processing Facility (includes mining)	50,000 bbl/day	3-4 years	2,400	1,050-1,450
Nuclear Power Plant	1,600 MW	5-9 years	2,500	150
Offshore Oil and Gas Support	Per Rig	3-4 years	175	90
Platform Fabrication Facility	2 platforms/year	5 years	400	1,000-1,500
Deepwater Port	2 mooring spaces	3-4 years	1,250	75-90
Liquid Natural Gas (LNG) Conversion Plant	1,000 mcf/day	2-3 years	300-400	50-100
Oil Refinery	250,000 bbl/day	2-1/3-3 years	3,500-4,500	450-900

EXAMPLE


ADDED POPULATION FROM ENERGY PROJECT
Example of 2250 MW Coal-Fired Electric Generating Plant
Number of Persons Added
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
1
2
3
4
5
6
7
8
9
10
Year From Start of Construction
Total Population Added
Population Directly Attributed to Project
Energy Project Employees
Added Secondary Employees and Families
Families of Energy Project Employees
Total
Operating
Construction

EXAMPLE

rate structures of locally available labor and materials, tax policies and land and water availability. The topics introduced above are discussed in more detail in the remainder of this chapter.

ENERGY DEVELOPMENT PHASING

Energy development is phased. Not every community will experience all phases of the development of a system; power generation does not always occur at the resource extraction site or the exploration phase may indicate that there is not a sufficient resource to justify commercial facilities. Although certain technologies may be characterized by a single identifiable output such as a nuclear power plant, other systems are characterized by a more incremental pattern of development. In such a pattern, there will be several smaller projects, each at different stages, at any particular point in time. Although the particular phases any one system will go through can be described in terms which are specific to it, the general steps are exploration, development, and operation.

The different phases of energy development are significant for several reasons. First, each phase has different labor requirements. The number of employees and their skill mix vary. This will affect the extent to which local residents will be employed. Communities need to determine the employment implications of the development by phase because estimates of total employment over the life of the project do not provide sufficient detail for population and facility planning purposes. Second, the length of each phase helps in assessing whether outside workers are likely to bring their families to the site, move by themselves for the duration of the project, or simply commute. Third, phasing of energy developments has implications for the regulatory process. Power plants can be treated as a unit. For some of the other technologies where fuel development depends on the extent of the resource determined by exploration, there are often a series of permits - one for exploration, one for drilling, and one for power generation. Although in the exploratory stages it may not be feasible to consider the full possibilities, local communities should be aware of the dangers of a phased regulatory process where opportunity never arises for comprehensive analysis of the total project.

DEPLETION OF THE ENERGY RESOURCE

Energy resources can be depleted or the economy can make certain energy sources or technologies unworkable. Technological innovation renders facilities and processes obsolete. If this happens and the community has made significant capital investments in facilities such as wastewater treatment, it may now have to operate and maintain these facilities without the planned revenues. Thus, loss of an energy facility will represent a loss of both tax revenue and employment. Depletion of the resource may result in abandoned facilities or land which would require reclamation before being converted to alternate uses. Both will place demands upon local governments at the same time that the receipt of

revenue from the energy development terminates. It is important for the community to plan for these contingencies as it develops and sizes facilities and, where appropriate, to adopt necessary regulations and procedures to handle the eventual abandonment of facilities or reclamation of land. Often communities anticipate this problem by diversifying their economy through means such as tax advantages, making large land parcels available, or providing necessary infrastructure such as roads or wastewater treatment plant capacity in addition to whatever advantages accrue from the proximity to an energy source.

SITE AND NON-SITE SPECIFIC DEVELOPMENT

The general location of an energy development is determined in most instances by the resource. Where a community is knowledgeable about the presence of a resource, it has the opportunity to plan for its development and to adopt, within the framework of state legislation, appropriate programs or regulations to provide for orderly development. Even when the general location of development is determined by the resource, there may still be an opportunity for the specific siting of equipment to be accomplished so as to minimize adverse impacts. Examples of this are the location of geothermal wells on farms to avoid interfering with cultivation practices and slant drilling for oil.

DEVELOPMENT UNCERTAINTY

A community attempting to plan for anticipated development faces uncertainty derived from a number of factors. International economic and energy conditions will affect the demand for domestic resources. Federal legislation may alter the economic feasibility of various developments. State legislation and referenda affect the economics or type of facility. Environmental regulations influence cost and relative feasibility of alternative technologies and are subject to constant change.

Often both the developer and local planners are confronted with the same uncertainty and lack of control over the factors determining the feasibility of a project. Even where the developer is making a serious attempt to inform local officials of the project's progress, the ultimate project commencement may be dependent upon legislation or policy at the national level. Uncertainty on the developer's part about the extent of a resource or his unwillingness to release proprietary information frustrates community planning efforts. Changes in the community character and power structure may delay development. Although preparation of contingency plans may be more appropriate for energy development than a single plan attempting to anticipate the likely course of development, it is difficult to get local resoures committed prior to a development commitment with a firm starting date.

Further, the permitting process is complex. Federal agencies have an interest and a legislative mandate for regulation of energy development. The National Environmental Policy Act, which requires preparation of environmental impact statements, must be complied with where there is a

significant Federal involvement. Many states have programs for permitting significant development. Unless the project is on Federal lands, many local communities have a permit responsibility through their zoning procedures. Controversy often surrounding energy development may result in lengthy court suits. Because of this, communities do not want to begin detailed planning or any significant investment until they are certain of the development. Unfortunately, because of expectations associated with the development, many of the impacts may begin to be felt during the permitting process.

Source of Further Information

Energy Alternative: A Comparative Analysis prepared for CEQ, ERDA, EPA, FEA, FPC, Department of Interior, and NSF by The Science and Public Policy Program, University of Oklahoma, Norman, Oklahoma, May 1975.

CHAPTER 3 - ADMINISTRATIVE FACTORS AFFECTING ENERGY DEVELOPMENT IMPACTS

Before communities can collect and utilize data on energy development impacts, they will require an administrative structure which allows them to set priorities and make decisions. Officials will also need an understanding of analysis tools available and the relationships between different services and facilities so that the data are useful and consistent.

The degree to which a community has an administrative structure which can:

- assimilate new functions;
- review and process a surge of development activity;
- seek out and receive Federal financial and technical assistance;
- attach conditions to the development to moderate potential impacts; handle a shifting fiscal balance characterized by needed infrastructure improvements early enough to meet the needs although revenues will be delayed until the project is in operation; and
- plan for the expenditure of these potentially increased revenues within the framework of a capital improvements program;

will determine its ability to cope with energy development.

Energy development impacts a community depending on how well that community can absorb the needs and people associated with it. It is not always sufficient to look only at aggregate numbers of people to be employed or the total unemployment in a particular community. Much of energy-related labor is highly specialized and the required skills may not be locally available. National firms may bring their own personnel with them. Location of the development near an urbanized area with a well-developed transportation system may make it possible for workers to commute rather than relocate, thereby affecting the potential demand for housing and services at the local level.

The degree to which a community has a land use control and building permit system, as well as a planning function, will influence the range of impacts it will experience. Much of the response to the energy development in the way of services and facilities will be accomplished by the private sector. Communities, therefore, have a responsibility to identify the range of tools available to them in order to regulate, permit, and monitor development. This may include revising housing codes, adopting new ordinances facilitating mobile home development or attaching conditions through a subdivision ordinance to help in road and school construction. Communities should develop interim procedures

regulating development, although it may appear desirable to develop a plan for future development, particularly in areas where events are proceeding rapidly.

Although the actual physical impacts associated with a particular facility may be relatively minimal in terms of added population or environment degration, there is concern that energy resource development may be the nucleus for industrial development or signal change in the economic mix of the community. A local community must identify its role in the development process and make use of available mechanisms to influence the process so that it will be consistent with local goals and objectives. Communities desiring to attract industrial development can develop the necessary roads and other transportation systems; provide tax credits or low cost financing; develop industrial parks; allow for the accumulation of large parcels of land; make wastewater treatment capacity available, etc.

Energy development frequently involves other levels of government and private organizations; local government must know what it can expect from those levels. Since local officials will have to ultimately provide many of the services and facilities for the development, they will have to know how to influence activities undertaken by those groups so that those activities address local needs.

It may be that the development is not even located within the jurisdiction having most of the responsibility for providing the services and facilities for the increased population. Often the development may take place in the unincorporated areas of a county while the newcomers will live in the incorporated areas. The county will then receive the tax revenue and not have responsibility for service delivery or facilities. Because of this, there are sometimes conflicts between counties and their constituent cities over the desirability of development and the necessity for attaching conditions to it.

The environmental impact statement (EIS) and preceding developer-sponsored studies will be prepared for all energy developments with a significant Federal involvement. Relatively early in the development process, the EIS presents an opportunity for a particular community to raise key issues regarding energy development implications. In those states with an environmental impact review statement, private energy developers will often prepare the data base for a state prepared EIS. It is necessary for a designated individual of a community to make contact with the project's representatives in order to officially participate in the EIS process. Communities should be specific in articulating concerns so that mitigating measures, where appropriate, may be proposed.

Communities should first make use of the EIS and/or supporting studies (where it exists) before beginning studies of their own. The EIS (state or Federal) is a good source of information which communities can use in order to make necessary decisions regarding facilities and services. For example, solid waste disposal and wastewater treatment options depend upon data concerning hydrology, topography, geology, soils, etc. To a

certain extent, recreation opportunities may depend on water quality. Unfortunately, since the EIS is not always developed early enough in the process, communities should be cautious about waiting too long.

Several states are developing mechanisms to help localities with financing problems they are having in providing necessary infrastructure in time to accommodate development. These include low interest loans, redirecting money received through mineral leases, surcharges on electricity, etc. Two examples of such assistance are the proposed State of Maryland Environmental Trust Fund and the Wyoming Community Development Authority. Because of the legislative constraints they present, the states are also significant in determining options available to local governments in dealing with development issues. Such constraints involve limitations on taxing, borrowing, land use controls, or environmental management.

The Federal Government, often through regional and field offices is a source of financial and technical assistance to the community. Examples of the latter include the Soil Conservation Service, Environmental Protection Agency regional offices, and the Farmers Home Administration. For energy development which occurs on Federal lands, communities cannot exercise a regulatory function. Therefore, responsibility for mitigating any direct impacts involved will rest with the Federal Government.

The private energy developer is an important source of information regarding labor requirements and development schedules. He may be a source of assistance in providing housing and onsite services such as fire protection and occupational safety. As the private developer has little stake in the longer term implications for the community, local areas will deal with this issue on their own. As energy development is often controversial at the local level, the developer may tend to avoid too much local involvement until other permitting and approval requirements are met. Therefore, it is important that local governments use permitting or other form of leverage in exchange for information they will need.

Example

In Sweetwater County, Wyoming, a priorities Board was established made up of county and city officials, industry representatives, and school district personnel. A citizen's advisory board was also established. The Board became a forum in which the diverse requests of various parts of the community were prioritized and presented to industry.

In the case of the nuclear power plants planned for Hartsville by the Tennessee Valley Authority, through the EIS prepared as part of the licensing procedure of the Nuclear Regulatory Commission, the need for a continuing socioeconomic mitigation

process was identified. The recommendation was made for a project area coordinating council made up of the chief, locally elected officials of the area. TVA will provide a portion of the cost of the staff.

Universities and private consultants can help local areas perform their assessments and develop plans. Local universities may have models and data bases which could be useful to local officials.

Example

The Denver Research Institute of the University of Denver has conducted numerous studies of the impact of energy development in the Rocky Mountain States.

Consultants who have worked with other localities facing similar problems can advise officials on what they may anticipate; they may also serve as agents of local governments in their dealings with other governmental agencies and the private sector.

CHAPTER 4 - MANAGING RAPID GROWTH

Many factors which effect the way in which energy development will impact a community are beyond the control or influence of the community itself. This chapter will discuss those actions which a local government can take in organizing itself for planning and regulating new development, and for managing and providing public services.

Highlights

Many of the communities now undergoing or facing rapid growth from energy development have been small and stable.

Local government's control or influence over the location, timing, or scale of energy facilities is much more limited than over the subsequent local development it induces.

Although many services and facilities will be privately provided, local governments still have the opportunities to regulate this development so that it is consistent with local goals and objectives.

Because of the fiscal impacts of energy development, particularly the lag between revenues and infrastructure requirements, communities must develop effective budgeting processes.

Local governments in energy impacted areas may have difficulty retaining present employees against the competition of the energy companies, recruiting new employees for expanded services, and training all employees for new and changed public services.

In answering the questions of what to do first or how to get the staff and money needed to provide services, communities must determine what they want to accomplish and develop and express a philosophy about managing rapid growth. This philosophy might include the following:

- determine community goals and objectives;
- involve citizens in goal-setting and planning;
- take time to organize local government for planning and managing rapid growth;
- utilize available resources of staff, citizens and money to the fullest extent possible;

- take advantage of outside assistance and experience of others to augment local resources;

- coordinate with other local governments and with the energy development company.

As communities grow rapidly, the demands for services increase, and more attention must be given to planning for development and constructing public facilities. A new or expanded framework is needed for: projecting community needs; planning for programs; setting priorities; organizing for services; obtaining needed revenues; supervising service programs; keeping adequate records; and monitoring effectiveness. Communities have a range of alternative ways of doing these tasks.

The remainder of this section, indentifies tasks, responsibilities and sources of information available.

Legislative Body

With the coming of energy development, pressures and demands of growth may create problems for the elected legislative body in local government. There may not be time to deal with existing departments as well as new citizens, the energy company and other governmental agencies.

Potential administrative assistance is outlined below. With this aid, elected officials can concentrate on translating the needs and desires of citizens into practical policies for local government. The legislative body should: make major policy decisions; appoint people to run the government and provide services; adopt the annual and capital budgets; pass needed ordinances; and deal with citizens, other governments at the local, state and Federal level, and the energy companies.

Sources of Further Information

State municipal league or association of counties for advice, publications and conferences; Handbook for Council Members in Council-Manager Cities, National Municipal League, 47 East 68th Street, New York, 10021, 1976.

Administration

With growth and increased demands, there are several possibilities to strengthen the administrative capability of local government. One method is the use of a city (or county) manager (or administrator), a full-time professional appointed to oversee the administrative affairs of the local government and to carry out policy directives of the governing body. This council-manager form of administration is often appropriate for small communities.

Example

In the United States, nearly 700 cities of under 5,000 population have administrators and over 500 serve cities from 5,000 to 10,000 population. One of the best-known energy boom towns - Gillette, Wyoming - has recently hired its first chief administrative officer. Other energy development areas with administrators are Valdez, Alaska and Calvert County, Maryland.

In the community, a key role of the administrator might be seeking financial assistance from state and Federal agencies and energy companies. In some cases, the administrator may be responsible for the planning function.

Recruiting of an administrator may be done through the State Municipal League or the International City Management Association, 1400 Connecticut Avenue, NW., Washington, D.C.

As an alternative, local officials may appoint someone to provide professional administrative assistance, such as an assistant to the mayor. Another option is the use of a project coordinator, who would serve as a liason among all affected agencies and governments, seek financial assistance, and coordinate the research and planning efforts.

Sources of Further Information

Council-Manager Government in Small Cities, International City Management Association (ICMA), 1400 Connecticut Avenue, NW., Washington, D.C., and Selecting a Professional Municipal Administrator, ICMA, 1972.

Budgeting

Fiscal impacts on local governments can be significant during the construction phase of energy development. The property tax revenues from the energy facility generally will not become available until after the facility is completed. Revenues may be distributed without regard to need or the facility may be located within one county, while the residents and their service demands are in another. Under these conditions, it is especially important that local governments be careful about where and how they spend their money.

Requests for the operating budget expenditures should have accepted population projections and work load increases (from impact studies) as their basis; the population numbers should be the same as those used for the capital program. Expenditures should operate projects being built under the capital program and implement the comprehensive plan. Budget requests from departments should be submitted to the city administrator for review. The finance officer will assist the mayor or administrator in preparation and review of the budget.

Equal attention should be given to the revenue side of the budget for two major reasons. First, with rapid extension of expenditures dictated by population growth, the size of the budget will be set by the limited revenues. Second, without regular review of revenues, the government may miss money to which it is entitled. All potential sources should be used; idle funds earning interest; and water, sewage disposal, refuse collection and inspection services paying service charges and fees. The local government may want to identify areas of the budget in which support or assistance of the energy companies would be useful or necessary.

After adoption of the budget, the governing body will set the necessary property tax rates to balance the operating budget. It will be the responsibility of the administrator to control the budget over the course of the year. After adoption, the administrator or finance officer may also make long-range projections of expenditures and revenues for use by the capital programming committee. Indications of significant gaps may be used by the local government to start seeking new revenue sources.

Sources of Further Information

Operating Budget Manual, by Lennox L. Moak & Kathryn W. Killian, Municipal Finance Officers Association, 1313 East 60th Street, Chicago, IL 60637, 1975.

Finance

A cost accounting system can assign costs to departments or programs so the department heads will know from month to month the status of their budget. Such a system may be set up by the administrator, finance officer, or accountant hired for the purpose. It would tie together the budget, payroll, purchasing, capital outlay and capital projects accounts. The exact format of the accounting system may be set by state requirements for reporting by local governments.

While financial records are required for assuring legal compliance with the budget, the primary purpose of the data is for management, for evaluating spending and revenues to date and making decisions to retain, alter or change programs.

In small cities, the financial records may be maintained by an account clerk on a manual system. As the city grows larger, the records may be transferred to an electronic data processing system. Routine programs for most local government accounting functions are available at reasonable prices. These can tie together the elements of the financial system and present reports on a monthly basis, relating the current status to what expenditures and revenues should be at this point.

Sources of Further Information

Government Accounting, Auditing, and Financial Reporting National Committee on Governmental Accounting. Municipal Finance Officers Association, 1313 East 60th Street, Chicago, IL 60637, 1968.

Personnel

Local governments in energy-impacted communities have three major personnel problems: retaining present employees against the competition of the energy companies and the pressures from dealing with difficult and stressful situations; recruiting new employees for expanded services; and training all employees for new and changed public services.

Energy projects, particularly during the construction phase, pay wages significantly higher than those found in the typical small community in which they locate. Thus, loss of some public employees may be inevitable. The general response of energy-impacted governments has been to raise wages to compensate for project-induced inflation and to retain long-time permanent supervisory employees. However, it is often not possible to match the energy company wages. The government may also have to expand present fringe benefits or initiate new ones.

Recruiting new employees becomes difficult in many categories. The problem is with positions similar to those at the energy project. Generally, the persons recruited for these positions do not meet minimum qualifications, requiring intensive in-service training immediately upon employment. Recruiting outside the community for qualified individuals may be difficult because of the housing shortage.

Small energy-impacted communities often lack a position classification plan at the beginning of the growth period. Such a plan is desirable to establish an equitable and partially competitive salary scale. Positions can be classified by the administrator, administrative assistant, or an outside consultant.

Sources of Further Information

Local Government Personnel Administration, edited by Winston W. Crouch, ICMA, 1976.

National Training and Development Service for State and Local Government (NTDS), formed by National League of Cities; National Association of Counties; ICMA; Council of State Governments; and National Governors' Conference conducts and provides information on training and development programs. Contact: Institute for Training in Municipal Administration, ICMA, 1120 Connecticut Avenue, NW., Washington, D.C. 20036.

As important as training for public employees is the development of local government's management staff. The traditional independence of individual departments often cannot continue under conditions of rapid growth and dwindling resources. Management development courses may be provided by NTDS, universities, or ICMA.

Sources of Further Information

The ICMA "Small Cities Management Training Program," self-administered program for managers an department heads with training and resource guide for ten specific areas of public service. Contact: Institute for Training in Municipal Administration, ICMA, 1120 Connecticut Avenue, NW., Washington, D.C. 20036.

Public Services

There are alternate ways of providing services to the public; not every service has to be provided by one jurisdiction. Services can be contracted out to other public agencies in which a county provides certain services to a number of cities in the county at a fee designed to return county costs. This system is especially appropriate for services which both the city and county provide, such as police. In some areas, such as refuse collection, contracts may be let to private firms.

Another method of providing public services without duplication and at a cost savings is to let one jurisdiction, typically the county, take over services within cities and provide uniform service through the county.

Some areas may be handled quite well by the energy companies or private enterprise, with some direction, support or security from local government. The provision of medical care, especially doctors and dentists in private practice, falls in that category. The energy company, in cooperation with local government, may assist financially in recruiting and obtainng faciliites.

Example

One of the most interesting new concepts for providing technical assistance to smaller communities is the "circuit rider." A consultant serves a number of jurisdictions, providing assistance and advice on management, finance, personnel and specific public services. The circuit rider system is generally established by a state league of cities, university, or areawide district. Costs are paid by the using jurisdiction.

General Resources/Sources of Information

Several resources are available to assist energy-impacted communities in organizing for management, including:

- State municipal leagues and associations for counties, generally located in the state capitol, may provide information about state legislation and financial assistance, training programs for employees and elected officials, and the experience of other jurisdictions facing energy development.

- The state agency for local affairs (or community development), located in the state capitol, is designed to coordinate state services with local governments. Services provided include technical assistance and advisory services, assistance on state and Federal aid, and planning services.

- State universities often have a department or research organization able to provide technical assistance to local governments.

- National organizations prepare documents which may be of use locally. The International City Management Association, in addition to providing membership services to administrators, provides direct services to local governments. The Management Information Service presents, by subscription, the Municipal Year Book, Public Management magazine, an inquiry service and monthly MIS reports on management, support and direct services. Contact: ICMA, 1120 Connecticut Avenue, NW., Washington, D.C. 20036. The National Association of Counties has prepared a series of case studies on counties that have been, or will be, impacted by energy development. Their purpose is to alert county officials to potential problems in planning, management, and specific public services. Contact: Energy Project, NACO, 1735 New York Avenue, NW., Washington, D.C. 20006.

PLANNING AND REGULATING DEVELOPMENT

One of the most difficult problems facing energy-impacted communities is planning for and regulating development related to new energy projects. These communities will have to set their own objectives and standards, relying more on the experience of similar communities rather than on national urban experience. Although many of the facilities and services will be provided privately, local governments have a significant responsibility to coordinate these services with other local developments to avoid adverse impacts.

Coordinating Planning and Regulation

Before developing plans and adopting regulations, the jurisdiction or coordinated planning organization will need to determine what it hopes to accomplish. The most successful coordination efforts have come through new organizations created for the purpose of dealing explicitly with energy impacts. Primary examples are the Priorities Board in Sweetwater County, Wyoming; and the Kitsap County Trident Coordinating Committee in Washington. For these and other organizations, the key elements have included: control of the organization by locally elected officials; participation of all potentially affected jurisdictions; representation from the multicounty, areawide district and affected state and Federal agencies; active participation of the energy company or major employer; citizen participation formalized in advisory committees, task forces or commission representation; and professional staffing by staff hired directly for the organization, staff provided from an areawide district or from an agreed-on member agency.

Regulating Energy Resource Development

Local government's control or influence over the location, timing, or scale of energy facilities is more limited than over most subsequent development it induces. In these cases where the local government has some controls, consideration of the proposed facility must be on an ad hoc basis.

Local governments do have at least two development control concerns regarding energy facilities. These are:

- Placing conditions on the development approval so that social and economic impacts are mitigated to the extent possible. Local governments may do this by reviewing and commenting on applications and environmental impact information submitted by the energy company to state and/or Federal agencies.

- Control of land uses around the proposed energy facility which could impair the operation of the facility or be injured by it. These should be prohibited by a buffer zone around the facility.

Regulating Community Development

Cities and counties have powers to regulate the use of land and the construction of buildings within their jurisdictions. An up-to-date comprehensive plan, taking the energy development into account as discussed below, is desirable for allocating land uses, supporting regulations, and developing a capital program. Regulations must be available as soon as possible to guide and control new development, assure maintenance of local standards and to retain options for the long-range planning that will follow as time allows.

Mobile Homes

Elements of the mobile home ordinance should include the following:

- restriction of mobile homes to mobile home parks, with no single lot development (except for mobile homes allowed as a temporary project on an unbuilt subdivision);

- maximum density of mobile homes per acre;

- requirement for open space, paving, laundry and recreation facilities, and room for parking; and

- mobile home parks allowed only within a certain range of existing cities or urban centers.

Standards for the construction of mobile homes have now been set nationwide by the U.S. Department of Housing and Urban Development.

Sources of Further Information

"Suggested Model Ordinance Creating Residential Mobile Home Districts," Manufacturing Housing Institute, P.O. Box 201, Chantilly, Virginia 22021.

Zoning Ordinance

Reasonable zoning must be adopted rather quickly, on the assumption that it will be revised and improved as the plan and experience dictate. Permits and fee schedules should be set as to return most, if not all, of the cost of zoning applications and enforcement to the local government. The quick and brief initial zoning ordinance (or amendments to the existing ordinance to accommodate new growth) should be based heavily on existing maps of land use, topography, and roads. Aerial photos may be used to accelerate the process. Preparation of this initial ordinance may be by the government's planner or engineer, or by a larger jurisdiction such as the county. Universities or consultants may also be used to provide technical assistance. It will be difficult to obtain Federal financial aid, but assistance might be obtained from the state or the energy company. Zoning administrative costs, however, are likely to come out of the local operating budget.

The jurisdiction may also want to include at least two sections providing themselves with more flexibility and more control. The conditional use permit may allow the governing body to attach conditions to any approved development requiring it to meet certain standards such as for parking, design, noise and light pollution. (All uses have to meet local, state and Federal environmental standards.) For residential uses, the planned unit development concept provides flexibility to the developer by allowing an assortment of housing types and individual densities, as long as the overall zoning density is maintained.

Zoning is the most traditional form of land use control. Communities may also want to consider the use of performance controls or other innovative mechanisms to regulate development.

Sources of Further Information

Zoning for Small Towns and Rural Counties, Economic Development Administration, U.S. Department of Commerce, 1970. $1.00 from U.S. Government Printing Office. Performance Controls for Sensitive Lands, prepared by the American Society of Planning Officials for the Office of Research and Development, U.S. Environmental Protection Agency, Washington, D.C. 20460, 1975. Promoting Environmental Quality Through Urban Planning and Controls, prepared by the Center for Urban and Regional Studies, the University of North Carolina, for the U.S. Environmental Protection Agency, Washington, D.C. 20460, 1973.

Comprehensive Plan

Normally the plan is considered the first step and major elements of it include:

- topographical mapping of the physical environment, and existing land use;
- projections of future population growth due to energy development;
- determination of land capabilities for urban development, energy resource development, agriculture and open space;
- setting goals and policies for the community;
- alternative growth and development strategies;
- allocation of appropriate land uses, and supporting elements for transportation, utilities, parks and open space;
- programs for housing and redevelopment; and
- implementation methods and processes, including ties to capital programming, zoning ordinances and other controls.

Almost invariably, the comprehensive plan will be beyond the capability of the local staff to prepare and outside assistance will be necessary. A university staff, the state, or a private consultant may sucessfully prepare the plan.

Example

In Green River, Wyoming, whose population grew from 4,300 in 1970 to 10,000 in 1975, a consultant prepared a comprehensive plan in 1974-75. This plan required 15 months for consultant work and over 6 months for adoption by the planning commission and the city council. Total cost was approximately $40,000, with over one-half the cost met by energy companies and the remainder coming from the city's operating budget.

Financing, Planning and Regulation

The most likely sources of funds for local governments, given current Federal funding programs and policies are local operating budgets and the energy companies. In many communities, this has been done as a joint financing effort.

Recent cutbacks in the HUD Section 701 Comprehensive Planning Assistance Program, a primary source of funds for local planning in recent years, have led to an emphasis on the planning efforts of

areawide districts rather than local governments. Still, with HUD 701 funds as a base, these districts may be of assistance in preparing zoning ordinances and comprehensive plans and they may also prepare plans under contract to local governments.

The Costal Zone Management (CZM) program, another source of Federal funds, is used by state agencies. Allocation of funds to local levels is limited, but the CZM plans can form the basis for local planning efforts.

Applicable Federal assistance programs are summarized by David Williams in Rapid Growth from Energy Projects, Ideas for State and Local Action, which may be obtained from the Department of Housing and Urban Development, Office of Community Planning and Development, Washington, D.C. 20410.

General Resources and Sources of Information

The state agencies for local affairs are primary sources of information for planning and regulating development. Multicounty, areawide districts, usually coordinated by these state agencies, are sources closer to the local community.

The American Society of Planning Officials Planning Advisory Service is a source of technical information and assistance for local planning agencies. Monthly reports have covered topics on planned unit development ordinances, subdivision improvement guarantees, intensity zoning, and performance controls for sensitive lands. Additional services include an inquiry-answering service and subscription to Planning magazine. Contact: Planning Advisory Service, ASPO, East 60th Street, Chicago, IL. 60637.

The National Association of Counties, produced Case Studies on Energy Impacts, under contract with the Federal Energy Administration, NACO, 1735 New York Avenue, Washington, D.C. 20036.

CHAPTER 5 - SOCIAL, ECONOMIC, AND ENVIRONMENTAL IMPACT AREAS

This chapter describes local social and economic impacts of energy development. Questions, data and analytical requirements, management concerns, as well as available assistance and references, are outlined to help communities assess, plan and manage these impact areas.

Communities faced with energy development must first assess economic and demographic impacts since this information will be a vital input to subsequent analyses they will undertake for housing and transportation systems. The housing and transportation systems will need to be expanded or altered and the condition and distribution of the current housing stock and transportation system will influence patterns of development in the increased population and economic activity.

Communities will have to assess the levels of environmental services they will need (water supply, wastewater treatment, and solid waste collection and disposal). Federal standards may influence options available locally (for example, incineration) and state or local environmental regulations will constrain housing and other local development.

Social Services available at the local level (recreation, health, education, police, fire, and community safety) will have to be assessed. To be effective, these services should reflect the needs and character of the community. Local officials must be aware of both the quantitive indicators of adequate services as well as changes in their range, quality, and delivery.

Although each impact area can be assessed separately, some contain overlapping data and analytical requirements. The official responsible for assessments and planning should review the general scope of all the assessments and establish ground rules for consistency so that all the sections are compatible.

ECONOMIC AND DEMOGRAPHIC IMPACTS

Estimating public facility and service requirements associated with energy development as well as related public costs and revenues requires an understanding of the expected economic and demographic impacts of the development. Not only will economic and population growth create a demand for public services, but the presence and adequacy of the services will influence the location of the population.

Questions Facing the Local Planner

- What is the expected direct employment impact of the energy development?
- How is this direct employment distributed between construction and operational phases of the development and how do these phases affect the local economy and labor markets?
- What other employment is generated as a result of the direct employment impact?
- How is production expected to change among the major industrial sectors, requiring substantial public support facilities?
- What personal income is expected from the total employment impact?
- What population changes are expected to occur as a result of this increased employment?
- What are the resulting demographic characteristics of this population (e.g., sex ratios, fertility rates, death rates)?
- How will these demographic characteristics change the longer term population trends of the area?
- How is the increased employment, personal income and population likely to be distributed geographically in the impacted area?

Determining the Scope of the Analysis

Economic and demographic projections should be presented on an annual basis and should be related to the phases associated with energy development. The economic impacts and characteristics of families residing in the project area are usually quite different in each phase; consequently, public facility and service demands will differ.

Projections of the expected impacts should be made for the period from exploration construction to steady state conditions. The time period involved would depend on the particular technology. Consideration should also be given to the project phase-out period.

Economic and demographic characteristics which need to be projected [for both the baseline (i.e., no energy development) case and with energy development] in order to plan for public facilities and services, and ultimately to estimate future public costs and revenues, include the following:

Employment is usually measured as full-time equivalent employment in the area. This compensates for part-time and short-term jobs. However, historical employment estimates may be available only at a particular time or on a specific date during the year. In some cases, it will be necessary to distinguish between full-time, temporary and permanent employment.

Income is generally measured as annual personal income and is defined as wages and salaries, other labor income, proprietors' income, rental income, dividends, interest, and government and business transfer payments. Annual earnings which are defined as wages and salaries and other labor income plus proprietors' income may also be used as an indicator of area income, since there is usually a stable relationship between earnings and personal income.

Economic activity by sector is measured as annual output earnings or employment by the appropriate sector (for example, agriculture or manufacturing services). These measures help to understand impacts associated with major industrial users, such as water consumption, and may be obtained by applying historical demand or use ratios to output, employment, or income data.

Population reflects numbers of persons residing in an area in a particular year. These estimates may be available only on a specific date of the year.

Population characteristics are the age-sex distribution for the population and fertility and death rates which are needed to make estimates of the school-age population, labor force supply, and total future population.

Other economic impact categories providing indication of local commercial activity and viability are annual consumer expenditures, retail sales, and average bank account deposits in the area. An understanding of the population and economic data needs of assessing public service needs should help determine the level of detail in these earlier projections. In preparing projections of these characteristics, it is usually assumed that stability of trends over time exists among many of these factors; for example, relationships between employment and population.

Trend Projections

The local energy plan should attempt to assess the impacts of expected development (in 5 year increments -- less if cyclical changes are expected) on employment, population, earnings and/or personal income, industrial activity, and retail sales over a 10- to 20-year period. The expected impacts, both with and without the energy development should be analyzed. The baseline assessment (without the energy development) helps

to estimate impacts actually associated with a particular energy development. Often baseline projections may already be available locally. At minimum, projections should be made of total employment, personal income, employment by major industrial sector, population and population characteristics.

Preparation of the baseline projections should start by making use of any existing employment and population data. In general, population projections are linked to employment projections, which are a function of the local industrial structure and activity. Of particular importance are those projections already being used by other local planners (for example, HUD 701, transportation, or Air Quality Maintenance). Frequently, a state planning agency can provide the needed local area employment and population projections or there may be local disaggregations of statewide projections based on independent analyses.

States vary in their role in coordinating projections to be used by local agencies. When the county or local planning agency has some flexibility, it should select projections which have the support of its advisory committees and local political units and which are compatible with other projections used or prepared locally.

The planning agency should use caution in extrapolating historical employment and population trends to make population projections since some parts of the country are experiencing relatively abrupt changes in population growth and distribution. Projected fertility and death rates will allow review and analysis of expected future changes in age-sex ratios which, in turn, determine the future natural population increase, the needs for school classrooms, and other age-sex determined conditions. If these population projections are not available, consideration should be given to developing a simple model which projects total population from estimates of the natural population increase plus in-and-out migration.

Personal income projections can be estimated directly from the employment projections. Historical county data on total earnings and earnings per job, and on the ratio of personal income to earnings, are available from the Regional Economic Measurement Division, Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce. These data can be compared with other similar areas and projected approximations can be made of total personal income.

Likewise, BEA provides historical data and projections of earnings by industrial sector for a variety of geographic areas broken down by agriculture, forestry and fisheries, mining, contract construction, manufacturing, transportation, communications and utilities, trade, finance, insurance and real estate, services, and government. Also state employment agencies generally have historical employment data by major industrial sector. Where appropriate, these may be used directly as measures of sector activity (for example, variations over time of employment).

Resources necessary to accomplish projections will depend on the availability and type of existing projections for a particular area, the availability of technical assistance from the state or other local agencies to assist the planning agency in modifying existing projections, or the availability of useful government, university, or private studies. If no projections exist for a particular area, and only historical data and statewide projections are available, it should still be possible for an experienced economist to prepare the needed projections within a period of 1 to 3 months.

Projections might be prepared by planning agency staff members, a local university, consultants, or the Bureau of Economic Analysis in the Department of Commerce. General sources of data include various publications of the U.S. Bureau of Census such as County Business Patterns. The Census of Population provides detailed population, employment, and income data in 10-year intervals for a variety of areas. Industrial censuses such as agriculture and manufacturing are done in 5- to 10-year intervals, depending on the sector. Data on births and deaths are available from Vital Statistics of the United States, Volume I "Nativity" and Volume II "Mortality" (U.S. Department of Health, Education, and Welfare).

Energy Impact Projections

This section reviews the types of analyses and data needed to assess employment income, industrial sector activity, and demographic impacts of expected energy-related development. When an estimate of these impacts is added to the baseline projections (total employment, population and population characteristics, personal income, and industrial sector activity), a comprehensive picture should emerge of expected future economic and demographic conditions in the area.

Since rapid growth associated with energy could occur, the energy impact projections should be performed in 1-year increments and overlaid on 5-year baseline projections. Also, these projections of energy impacts assume a specific type and size of energy development although a range of alternative types and sizes of development are possible. Several growth paths may be possible in the future and these may have to be explored.

Employment

Direct employment impacts associated with the energy projects would first be assessed, requiring an understanding of the numbers and types of jobs expected to be stimulated by the development.

Annualized direct energy employment would be separated into construction and operational job categories, information that can often be provided by the expected developers and operators of the energy system. Other data sources would be the general energy literature that includes estimates of employment for various energy systems.

Consideration must be given to any job losses that result from the energy development. This may include losses in agriculture or other sectors.

It is also possible that other export or basic industries could be attracted to an energy surplus area. These industries could be major power users who find their regional power markets constrained within the forseeable future, and who also discover other amenities in the energy surplus area. Discussions with energy developers and operators should probe possible linked manufacturing or other industrial growth as a result of energy development. It may be reasonable to have several projections relative to income, population, and other economic and demographic conditions.

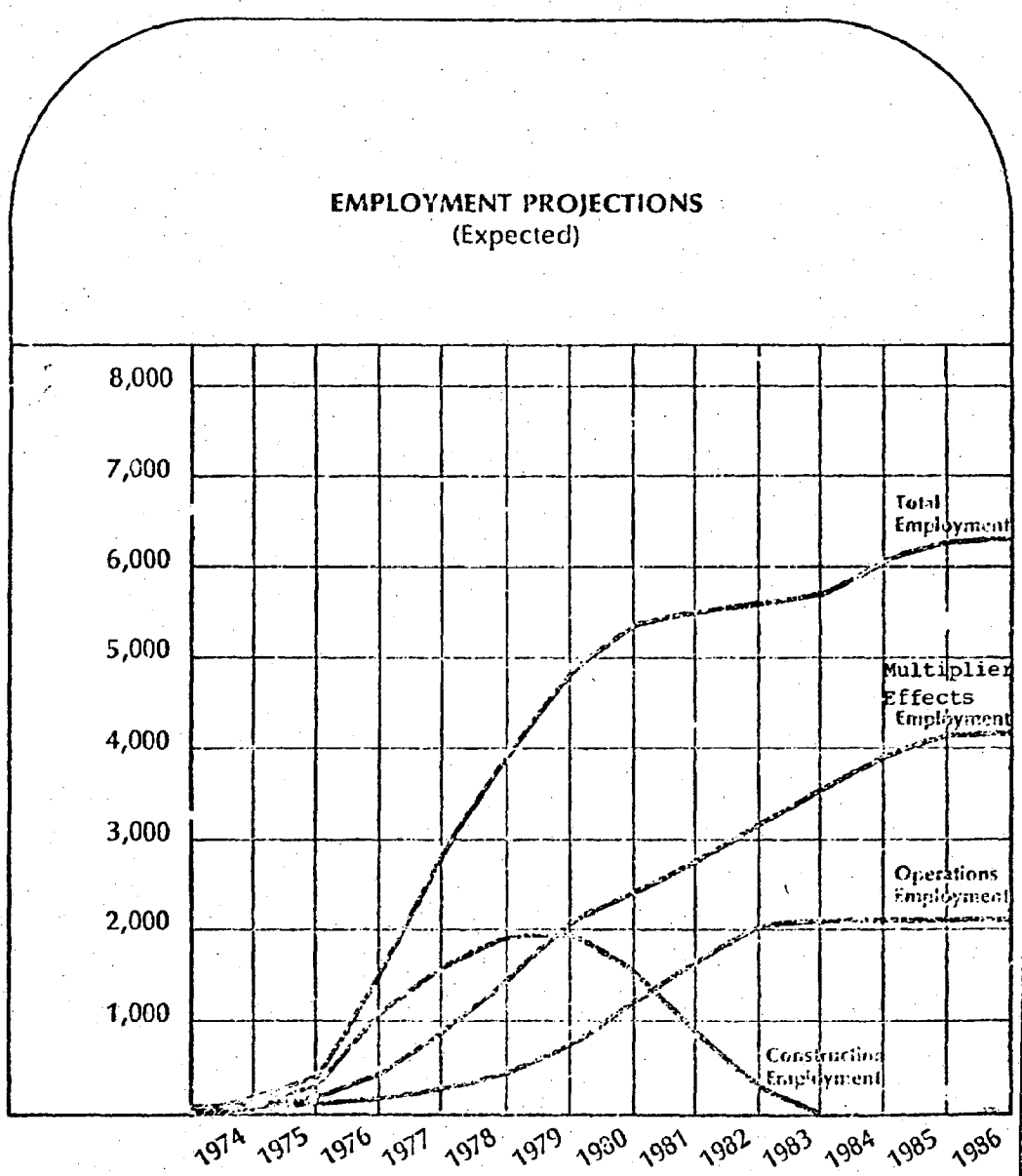
The expected changes in direct employment may have both indirect (i.e., resulting from the purchase of products and services from other industrial sectors) and induced (i.e., resulting from the purchase of goods and services by those directly and indirectly receiving income from this work) employment impacts on the area economy. These multiplier effects must be taken into account. Such effects may be assessed using approaches as economic base-type multipliers, input-output, or ad hoc approaches.

In determining economic base multipliers, the usual procedure is to separate the industrial sectors of the local economy generally as to whether they provide products of export or of local service. There may also be some specialized services in an area that could be termed export. Examples include tourism, financial or insurance centers serving a larger region, or similar national or regional educational or health centers. The proportion of employment allocated to the basic activity is assumed to be associated with export activity, and the remaining portion, or nonbasic, is assumed to be generated by the basic or export activity. Where changes in employment are expected to result in an area from energy developments, the economic base approach allows calculation (by using the historical relationship developed between basic and nonbasic employment) of the gains expected in the nonbasic sectors of an area.

The multiplier resulting from this analysis is equivalent to the basic plus the nonbasic employment divided by the basic employment. The resulting multiplier tends to increase with the size and diversity of a local economy and with time. Employment multipliers may also be lower for the construction phase of a project in comparison with the operational phase. This can be because of the purchase of major construction items in the outside national economy, and the transfer of wages and salaries outside the area to permanent households by specialized itinerant skilled workers who hold full-time construction jobs. An example of the total employment effects of an energy project are displayed on page 30.

An input-output analysis relates purchases of one industry's products by others in a single model, showing the consequences to all other industrial sectors of a specified change in one. Such a model can be designed for most any geographical area where satisfactory data can

EXAMPLE



Construction	0	280	1,025	1,600	1,950	1,970	1,655	950	310	0	0	0	0
Operations	10	30	60	240	470	810	1,295	1,750	2,030	2,090	2,090	2,090	2,090
Indirect	3	93	428	920	1,499	2,108	2,418	2,750	3,200	3,553	3,971	4,180	4,180
Total Employment	13	403	1,513	2,760	3,919	4,888	5,368	5,450	5,540	5,643	6,061	6,270	6,270

be collected, however it is not a simple task. Analyses performed with these models are of great value in quantifying changes in an area's industrialization patterns resulting from some specific proposed change in industrial inputs and/or outputs. These could occur as a result of implementing a particular energy system. The input-output approach can be an excellent analytical tool because of the thoroughness and detail involved in the model. The input-output approach has practical limitations. One is the time and expense involved in collecting the enormous amount of data. Such a model would also require updating every few years since the coefficients are not generally stable over time.

Earnings and Personal Income

A determination of the expected local personal income is needed to assess the change in expected future local public revenues. Revenues from any local income and sales taxes would be dependent on personal income levels. The determination would concentrate almost wholly on the wages and salary component of personal income. These income estimates can be made in constant dollars (assuming 1977 prices) and then converted to current dollars (assuming 1980 prices) as needed assuming an inflator (or a range of hypothesized or potential inflators as desired). However, it should be noted that an inflator estimate is subject to potential error.

Wages and salary estimates for the direct employment of energy construction workers and operators can be obtained from developers and operators. These can be checked with the experience of similar developments in the area, or other parts of the nation. The income multiplier effects could then be estimated by determining a weighted-average of the per worker earnings in those industrial sectors associated with the non-basic portion (for example trade or real estate) of total employment. The employment in the non-basic portion is known from the prior analysis, and earnings for these sectors are available from the Census of Population, County Business Patterns (a publication of the U.S. Bureau of the Census, Department of Commerce), or state employment offices. An estimated per worker earnings times the non-basic employment provides an estimate of the remaining income effects.

Based on historical relationships between earnings and personal income (available from the Bureau of Economic Analysis in the Department of Commerce), estimates could then be made of expected energy-related personal income effects. When added to the baseline projection, this provides a projection of the expected cumulative personal income level for the area.

Economic Activity by Industrial Sector

It should be determined early in the planning stage if major changes are expected in production or output of those industrial sectors having great demands for public infrastructure. Of primary concern would be those developments having substantial demand for transportation or water and sewer facilities. For the energy technologies, expected production levels, water, sewer, transport and other needs can be estimated based on

information from developers and operators. Some developers and operators may supply their own water or other facilities and the impact on the community (for example, use of multiple systems, possibly sharing the developer's systems, or the impact on pollution) should be assessed.

Demographic Characteristics

A determination can be made of related population impacts from estimates of the expected energy system impacts on employment. Baseline projections of employment and population reflect the local historical relationship between employment levels and the working age population. The future population would also be a function of local fertility and death rates, and there may or may not be in-or-out migration depending on the natural population change in relation to employment levels. While employment participation ratios in the area may be expected to rise, or substantially more persons seeking jobs than expected may migrate to the area, it is usually assumed that historical trends will be followed and will provide reasonable estimates of the expected population increases because of the energy development. However, local indicators such as bank deposits or retail sales should be monitored to be sure that the projected employment, income, and population estimates are following the expected trends. Also, local labor market size and skills should be reviewed in advance in relation to the expected numbers and types of jobs to result from energy development. Information should also be obtained from developers and operators on expected hiring practices. This will provide additional knowledge for projecting the possibilities for absorbing energy-related employment opportunities within the local labor market.

For the total energy-related employment impacts, it will be necessary to determine the total population, and the population by age and sex (in 5-year age intervals) generated by this employment. These expected impacts would then be added to the trend population (total and by age-sex) projections.

Employment impacts are to be determined for the energy construction and operation phases. The employment multiplier effects are also to be determined for these phases. The construction phase is unique and there may not be information on the expected sizes and age distribution of worker families. Otherwise, the operation phase and the employment multipliers should be treated as a similar category; that is, the age distribution and size of families among these workers should be similar and follow historical trends.

In determining the population associated with this employment, several approaches might be followed:

Actual population impacts might be reviewed in other similar areas and circumstances.

Census data on in-migration and age-sex distribution of migrants might be used, assuming an historical relationship between employment and population (total, or ages 20-64) among migrants. For example, see U.S. Bureau of the Census, Mobility for the States and the Nation, 1970, Subject Report P6(2)-2B, for data on historical characteristics of migrants.

Employment to population ratios in baseline projections might be assumed to hold.

These population impacts would then be aggregated and birth and death rate trends applied to the resulting population. As the population ages in any long-term projection, a continuing balancing is required between employment and population. This is obtained between younger persons entering and older persons leaving the labor force plus net in-or-out migration and available employment opportunities.

Geographical Allocation of Impacts

Based on information obtained from energy developers and operators, the direct employment impacts associated with the energy developments can be allocated to various geographical areas. Employment multiplier effects can be distributed geographically based partially on where any linked industries are located and partially on where employees reside. The latter can be the most important component; where employees reside largely determines where family expenditures of wages and salaries are made for goods and services.

The location of employee residences is usually directly related to the size of the community, and inversely related to the distance between the job and the residence. Consequently, models have been developed which take into account these factors and are used to allocate population associated with employment. Other factors to consider are the potential to expand residences and public services and facilities in particular communities, the availability and quality of existing services, facilities and residences in particular communities, and other attracting qualities of a particular community.

Source of Further Information

Mountain West Research, Inc., Construction Worker Profile, prepared for the Old West Regional Commission, Denver, Colorado, December 1975.

From these analyses, income levels by place of work can be determined. For public revenue purposes, income by place of residence can be estimated by assigning the total estimated energy income impact in proportion to the population allocations.

HOUSING

Housing problems are often the first sign of the impact of rapid population growth. Employees entering an area will occupy available housing units and the increase in demand will have varied effects on the market. Even for the relatively short term of a construction project, prices will rise on apartments, homes, and lots. The result of the price increase may be a growing number of community residents unable to afford adequate housing. An influx of skilled workers able to compete for housing at higher prices will also alter the types of structures available for occupancy.

Questions Facing the Local Planner

- What is the current supply of housing in the area?

- Is the housing supply adequate to meet existing demand?
  - What is the housing gap?
  - How may existing residents occupy overcrowded or substandard housing?

- How will increased demand alter the existing market structure?
  - How many additional units will be required?
  - For what time period will the units be required?
  - What size of unit and what price ranges will be in demand?
  - Will incoming employees vary significantly in the type of housing that they require?
  - Will the housing and lot price impacts be long term?
  - Will impacts cause out-migration of existing residents?
  - Will any type of additional public housing or welfare services be required because of scarcity or price impacts of housing or poor housing conditions?

- Will large-scale residential development be plausible if the community doubles or triples in size?

Scope of the Analysis

A housing analysis will define the need for housing, the effectiveness of demand and the characteristics of needed housing. Such an analysis is a valuable decisionmaking tool that enables the planner to determine what the housing needs are in a community. These needs are defined by the number of units that will be needed and the size, price, and tenure of units in demand. This information allows the planner to predict both short-term and long-term housing needs.

Several factors will affect the ability of a housing market to absorb new demand. These include: historic growth trends of an area; number of housing starts; demolitions and displacements; number of vacant units; condition of existing units; and ability of prospective in-migrants and existing residents to pay.

Source of Further Information

The U.S. Department of Housing and Urban Development publication, Urban Housing Market Analysis (1969), provides a step-by-step methodology for determining these factors, employing principles of the market analysis that are applicable to communities of all sizes.

Data Requirements

Data required to perform the housing market analysis includes a large cross-section of demographic and economic information on both the incoming worker force and the present population.

Information on the nature of the energy facility will provide data on the inflow rate of employees. It will be necessary to determine when workers will come to the area, how long they will stay, and what their household size and income will be. This information is sometimes available through local or county data sources. A major source is the U.S. Census. Housing information may be available from savings and loan associations, local realtors, housing codes or postal surveys.

A data profile on the present housing market includes the number of households, size, income level, tenure and value of each unit. This information is usually available from U.S. Census publications or local surveys.

Management Considerations

From data available in the housing market analysis, communities can determine additional demand for public services. For example, school populations can be estimated on the basis of numbers and types of housing units to be developed. Through the use of housing ordinances, residents can locate in areas where community service response is most feasible. This action can be expedited by using the information from the housing market study.

TRANSPORTATION

Local areas will need to meet energy-related transportation impacts and the transportation system will influence the likelihood of the relocation of employees and their commuting patterns. Communities will have to seek flexible solutions to allow them to meet short-term needs without making unnecessarily large investments.

Example

Employees at the National Reactor Testing Station, west of Idaho Falls, Idaho, can commute to work on buses owned and operated by an Energy Research and Development Administration contractor.

Questions Facing Local Planners

- What are the elements of the current transportation system: local, county and interstate roads; mass transportation; individual transportation; access into and out of by air, rail, parking?
- What is the current level of service: travel times; traffic flow; congestion; parking availability; accident rates; cost?
- What tools are currently available for traffic management: lights; police officers; one-way streets; or fare rates on buses?
- What is the current automobile ownership rate for the population: do provisions exist for non-drivers?
- How will newcomers and residents vary from current characteristics: commuting patterns; rate of auto ownership; residential location; and economic levels?
- What transportation needs will the energy development create: varied work shifts; material and equipment delivery; waste removal; and distance from supply centers?

Scope of the Analysis

A community faced with energy development must determine how the existing range of transportation options will affect the distribution of new residents within the area.

It is important to determine which population groups and which neighborhoods will be affected by changes in transportation patterns. Certain groups have no transit alternatives and should be given special consideration. The delivery of vital public services of the police and fire departments and ambulances will depend on the transportation network. The adequacy of parking and the costs associated with transportation (for example, gasoline, insurance, and tolls) will affect alternatives and the perceptions of the residents regarding the accessibility to services and facilities.

Data Requirements

To access the current transportation system, it will be necessary to evaluate each of the component parts: physical condition; traffic flow; average daily traffic, major and minor roads; points of congestion; intersection capability; and times of peak use. Much of this information is available from local or state highway departments and the rest can be developed through estimates that reflect normal daily variations.

To access transportation demands of an increased population, changes in the number of automobile trips must be evaluated based on information concerning the social and economic characteristics of the residents, the location of new housing, and the availability of transit alternatives. Data should be collected concerning changes in travel times between residences and places of employment and key local facilities. The developer will be able to provide information about work shifts. Often estimates will have to be made with adjustments for accidents, weather, and vacation periods. Parking demands can be estimated from automobile ownership, building permits, zoning codes, or by survey. It will be necessary to assess the potential for accidents resulting from the increase in daily traffic.

Managing Transportation

The local planner will often be faced with the decision of expanding the system or intensifying use of the existing one. Before making long-term, irreversible capital investments, the community should also consider the operation and maintenance requirements.

The community should determine the potential for special travel arrangements such as commuter buses that may be provided by the developer. Also, staggered shifts, and scheduled truck delivery and pickup may reduce the potential for overloading the system. It will be important to determine the location of major supply centers in order to reroute trucks around residential areas. Through land use controls, communities may attempt to develop innovative transit alternatives (for example, car pooling, dial-a-ride, or jitney service).

WATER SUPPLY

Population growth will result in increased water consumption and changes in the economic mix of the community may alter current patterns of consumption. Not only will the actual water supply be of concern, but the quality of that water should be assessed. Applicable Federal, state and local standards will have to be met.

Questions Facing the Local Planner

- What is the current demand for water?
- How will new development alter consumption patterns?
- What is the current source of water (rainfall, groundwater, surface water)?
- What are the key characteristics of the water supply in terms of: pressure; quality; size; consistency of flow; storage capacity?
- Can supply meet projected demand?

- What additional sources may be available?

- Is there a chance of contamination of the source because of energy development?

Data and Analytical Requirements

To plan for expansion of the water supply system, a community will have to assess the present condition of its existing system. It will be necessary to determine the design period, population, flow, area, and hydrology of the community as well.

The design period must reflect both short- and long-term projections associated with the energy development. Also, the physical condition of the facilities and their financing arrangements will aid in determining the appropriate design period.

The most basic information required to plan for adequate water supply is population. Both the number of people and their social and economic characteristics are indicators of water consumption. Sources of this information are the census, the environmental impact statement, the ulitity companies, and Chambers of Commerce. Consumption will also vary according to climate, cost of water, and availability of private water supplies. Because of shifting demographic characteristics, local officials will have to study past trends and assess how they may change in the future.

The mix of land uses will also be significant. Land uses should be classified and there are tables that describe average consumption rates.

Example

Average water use on a national scale averaged:

60 gallons per capita per day (gpcd) for domestic use
62 gpcd for commercial and industrial use
25 gpcd for public use

For a table of water consumption/use, see Wastewater Engineering: Collection, Treatment and Disposal, Metcalf and Eddy, Inc., McGraw-Hill, Inc. 1972.

Land use information is available from zoning and land use maps, fire insurance maps, as well as aerial and field surveys.

Data will also be required concerning natural environmental factors. Information about rates of rainfall and runoff, soils, topography, and geology will be useful in evaluating the adequacy of the water supply and the potential for its depletion.

Managing the System

Management of the water supply and distribution system will involve responsibility for capital investments, if it is a public system, for quality control, for maintenance of service requirements, as well as for the total supply.

Financing of the system will influence community decisions regarding the design period of the structures and the level of capital investment at any one time. Per capita investment in physical plants depends on many conditions: nature; proximity and abundance of suitable water sources; need for water treatment; availability and price of labor and materials; size and construction conditions of the system; habits of the population; and characteristics of the areas served. Communities will have to make investment decisions about purification, transmission and distribution.

Water supplies must meet standards set forth in the Safe Drinking Water Act (PL 93-523). Also, the Environmental Protection Agency announced in December 1975, the promulgation of National Interim Primary Drinking Water Standards that went into effect in June 1977, and apply to approximately 240,000 public water supply systems. These standards set maximum contaminant levels for bacteria, turbidity, and some organic and inorganic chemicals.

Criteria for the level of service will be required to assure that adequate pressure is maintained, that flows are consistent and meet peak demand requirements, and that there is adequate storage capacity. Systems should be designed with consideration of maintenance and repair responsibilities. Rates and metering will have to be considered. Finally, the water supply will have to be integrated with land use decisions since the types of activities being developed in the community, their location and the ways in which they are developed will affect the water demand.

SOLID WASTE

Changes in the amount, generation rate, and type of solid waste will result from energy development and from the demographic and economic changes associated with it. Existing disposal facilities may become overloaded, necessitating additional landfill area. Increased residential densities with less storage space per unit will require different or expanded collection services. Many communities will expand an existing service to newly developed areas while others will have to formalize what may have been an individual homeowner responsibility into an administrative structure for the collection and disposal of solid waste.

Questions Facing the Local Planner

- How does the current solid waste management system operate?
- What storage facilities are available?
- What are the collection methods?
- What are the current disposal practices and the capacity of disposal facilities?
- Are there wastes requiring different handling?
- Can present methods/practices accommodate changes in waste characteristics?
- If the system is land disposal, are there suitable conditions and adequate land?
- Will a more centralized system be required? Are there private firms to perform any of the functions?
- What systems are available if there is not currently a formal system?
- What are the significant local variables in selecting a system?
  - type and quantity of waste
  - cost and availability of land
  - opportunities for recycling
  - character of the community (likelihood of public-private systems)
  - environmental constraints

Scope of the Analysis

Although the system will ultimately be evaluated and implemented as a unit, each of the five major components (storage, collection, transportation, processing and disposal) of a solid waste management system requires independent analysis.

The adequacy of solid waste storage facilities has implications in terms of public health and safety as well as aesthetics. To the extent that collection is nonexistent or infrequent, adequate storage becomes more important. Communities may require building and zoning codes to incorporate provisions for adequate storage. Actual physical location of storage containers should be consistent with the type of collection system developed. There are three primary alternatives for collection systems: house-to-house collection; small containerized systems; and transfer systems. Besides the economic implications of

these alternatives, population density and adequacy of the road system will influence their feasibility. Local communities seeking to institute or upgrade a solid waste management system should consider collection implications when they approve development plans. Sanitary landfills represent the major community disposal alternative to open dumps although onsite disposal, incineration, composting and animal feeding are also possibilities. However, air quality standards have limited burning and state health regulations often limit animal feeding.

Data Requirements

Certain basic data must be collected prior to developing the solid waste management system. These data will determine the type of solid waste, quantity and generation rate, variations in the rate, the special considerations of toxic substances, and physical constraints of climate and transportaton on storage, collection and waste disposal.

Solid waste can be classified in terms of the familiar kinds of household refuse, bulky appliances, commercial and industrial refuse, mining and mineral operations, and agricultural wastes. Waste is commonly measured by weight, although officials should take other factors such as bulk into consideration because of the collection and disposal implications.

Standard land use classification systems are useful because they will provide access to data availabl from the Federal Government. Two data sources are the Office of Management and Budget's Standard Industrial Classification and the proposed Urban Renewal Administration and Bureau of Public Works. Land use maps, zoning codes, and surveys are useful information sources of community land use patterns. The land use information will not only be necessary for estimating waste quantities and characteristics, but development densities will also be a significant determinant of collection feasibility. The American Public Works Association and the Environmental Protection Agency are two sources of information on average solid waste generation rates. These rates should be used only as a guide because specific rates vary in communities. Local communities can organize themselves into units for purposes of a survey and systematically check waste quantities and characteristics. Information regarding industrial composition, employment groups and retail trade is also correlated with waste generation rates. This information may be available from state and local planning agencies, economic development agencies, Chambers of Commerce, banks, universities, and the census.

Source of Further Information

Methods of Predicting Solid Waste Characteristics, Gail B. Boyd and Myron B. Hawkins (SW-23c) USR Research Company, San Mateo, California, U.S. Environmental Protection Agency, 1971, p. 4.

Demographic characteristics are important in estimating generation rates as well as developing a system. Local officials will need information regarding past, current, and future trends and seasonal variation in population. Much of this information is available through the census. Also, the environmental impact statement and the developer should be able to provide some demographic information for the energy development. Disposal of most of the waste generated by the energy development will be the responsibility of the developer; however, the community may have to provide land for disposal and roads for waste transport. The solid waste management program should be flexible when large capital investments are made since short- and long-term implications of the energy development may differ significantly.

Management Considerations

In developing or expanding their solid waste management systems, communities should consider the kinds of equipment required to support them. Trade-offs between capital expenditures and subsequent operation and maintenance costs are important, especially for energy-impacted areas with uneven revenue patterns. Frequency of repair and availability of repair services as well as operator training requirements, are critical concerns in rural areas. Communities will need to consider the extent to which they will have a mandatory, centralized system as opposed to a voluntary one as well as the extent of coverage of that system. Mandatory systems offer some advantages in terms of centralized, regulated disposal areas. Factors such as weather, transportation availability and vandalism will make certain systems more or less practicable. Decisions will have to be made whether to purchase or lease equipment and land and what department or office will administer the program. Finally, the community will have to comply with state legislation which may place restrictions on financing and collection and disposal practices.

WASTEWATER TREATMENT

Increased population and changes in waste generation and water consumption patterns brought about by new industry will create a demand for expanded and altered wastewater treatment facilities. Such facilities will have to comply with Federal requirements for meeting secondary treatment for their wastes by July 1977 (or 1978 for plants under construction), and meet applicable water quality standards. Many of the solutions available to communities are expensive and relatively permanent and therefore less than ideal for meeting a need which, although significant, may be short-lived. The lead time required to develop some systems may precede their applicability to the more immediate, construction-related impacts. Communities will have to assess options available to them, the financing possibilities, and the long-term water quality and development implications of each option.

Questions Facing the Local Planner

- What level of treatment is, and will be, provided?

- Is the current form of wastewater treatment adequate in terms of capacity, changes in waste characteristics and present and future water quality standards?

- Can the present system be expanded? What are the financial, environmental and technical constraints on expansions?

- If additional capacity will be needed, when will it be required?

- What alternative systems are available?

- What are the alternative sizing options?

- What are the key economic factors which influence the selection and sizing of a system?
  - Land costs
  - Availability of funding
  - Industry cooperation
  - Agricultural reuse
  - Long-term operation and maintenance implications: user changes
  - Development density

- What will be the implications of the different systems in terms of shaping the character of the community?
  - Location and timing of new development
  - Average lot size
  - Flexibility of development patterns
  - Demand for increased centralized management capability

Data and Analytical Requirements

The condition of the present system must first be assessed. This involves looking at the life of the structure, the ease of expansion, the excess capacity, and the range of wastes which can be treated. The operating levels of the system should be determined, as well as the amount of infiltration of groundwater, the quality of the effluent, and the extent to which the system is overloaded. Operations and maintenance requirements should also be assessed. For individual or small community systems, it will be necessary to check the operating efficiency and to determine whether any problems which exist result from the original site limitations, weather, operation and maintenance, or limitations within the system.

In the case of land disposal of wastewater and treated effluent, the ability of the land to assimilate additional wastes adequately should be assessed.

The size of the system will depend ultimately on projections of wastewater flow. Such projections are a function of the design population and mix of land use activities. Also, groundwater infiltration will have to be estimated and seasonal and daily flow variations should be developed.

To determine wastewater flow, communities will have to make population projections. These projections should reflect both short- (1-10 years) and long-term (10-50 years) trends. The general rule is that 60 to 70 percent of the total water supplied eventually becomes wastewater. Therefore, the analyses done as part of the water supply section will be necessary input to this assessment. Plumbing standards and water use records are sources of information. Climate and the standard of living of the resident populaton will affect water consumption. Population information can be obtained from census data, the environmental impact statement (if available), or by local analyses. Climate, if not documented locally, can be obtained from the Weather Bureau.

Source of Further Information

Water and Wastewater Engineering, Gordon Maskew Fair, John Charles Geyer, Daniel Alexander Okun, Vol. I, Water Supply and Wastewater Removal, John Wiley & Sons, Inc., N.Y., p. 5-21.

The mix of land uses must be determined along with their water consumption patterns. Industrial effluent discharged to a publicly-owned facility will have to be assessed for its quantity, rate of flow, and composition. The plans of new industrial and commercial facilities will have to be reviewed to determine whether they will tie into a public facility or treat their own wastes. In the case of residential developments, the types of structures and their plumbing will have to be considered. For new residences, applicable building and plumbing codes should specify required plumbing. Public facilities such as hospitals will also have to be studied, particularly because of the way they may alter flow rates and because of any special characteristics of their wastes. Finally, densities will have to be considered because of their influence on pressure and water use. Land use information is available from building permits, zoning maps, and surveys.

Because it is not always possible to predict peak flows from past records, one way in which it is possible to estimate is from "fixture units". One fixture unit is approximately equal to 1 cubic foot per

minute of flow.[1] Infiltration of groundwater into the system can be calculated based on information about groundwater table, precipitation, soils, and sewer material and construction.

Data describing the natural environment are required in order to assess alternatives, particularly land treatment and individual septic systems. These data include: topography; soils, groundwater; geology; climate; sensitive environmental areas (flood plains, wetlands, coastal zones); seismically sensitive areas; and uses of any potential land disposal sites. Also, because incineration is one of the ways to dispose of sludge, a byproduct of many waste treatment plants, air quality will be of concern.

Long-term management implications of the various wastewater treatment alternatives should be considered early in the decision process. The community should consider developing the system in phases so it can be expanded if the population and wastewater discharge increase. Because of the long lead time required to build a wastewater treatment plant, it may not be ready in time to meet interim construction period needs. Therefore, the community will have to develop two solutions: one for the more immediate construction-related impacts; and another for the longer term development.

The financial implications of the different alternatives will play a large part in selecting a system. Availability of funds from the Federal Government will tend to bias decisionmaking towards those systems which qualify. The likelihood of industry participation and the revenues associated with that will also tend to make certain systems more feasible than others.

The effective operation of treatment plants and septic systems depends on how well they are operated and maintained. Communities will have to consider both the availability of trained personnel to perform these functions as well as the costs associated with them. Federal funds are seldom available for operation and maintenance. The Federal Water Pollution Control Act Amendments of 1972, require that user charges be imposed on dischargers to publicly-owned treatment works and the impact of such a charge on a company may cause that company to treat its own waste and discharge directly. The impact of pretreatment, user charges, and industrial cost recovery* on the likelihood of an industry discharging to a publicly-owned plant must be determined.

---

[1]Metcalf & Eddy, Inc., Wastewater Engineering: Collection, Treatment and Disposal, McGraw-Hill, N.Y., 1972, p. 37.

*Capital Cost Recovery requires that the community collect from the industrial users that portion of the Federally funded capital cost of construction proportional to the strength, volume and flow characteristics of the wastes received from the industrial user. Fifty percent of the funds can be retained by the community.

The wastewater treatment option selected will be a significant factor in shaping a community's future development patterns. Individual systems will require lots of a certain minimum size, thereby affecting both densities and probably the cost of housing. Small community systems may meet water quality objectives but not give the community very much control over development patterns. A large treatment system, with excess capacity, will influence the amount of new development and its location.

RECREATION

Because the recreational services required in a community are a function of the size of the population and its demographic characteristics, population changes brought about by energy development will alter the recreational needs of the community. Persons coming to work on the project will have different recreational needs than the average full-time resident. Outdoor recreation depends, to some extent, on the quality of air and water, reasonable noise levels, and an absence of congestion. Therefore, energy development will affect a community's recreational opportunities through its impact on the physical environment.

Not all recreational services will be the responsibility of the public sector. Many services are privately developed. As part of their economic assessment, communities will have to determine whether there will be adequate growth in the commercial area to handle this need.

Questions Facing the Local Planner

- What is the current range and level of recreational opportunities, public and private, available to community residents?
- Is access limited, in terms of membership, cost, transit dependence, or by time of year?
- How may the energy development affect the quality of existing recreation facilities?

Scope of the Analysis

The community must assess the range and quality of the current recreational opportunities. Services and facilities considered reasonably accessible to the local population should be included. It is therefore necessary to tie the assessment to the social and economic characteristics of the population. These characteristics may include age, sex, marital/family status, income, ethnic/racial groups, and permanent/transient residents. The community should attempt to determine the expections of different groups regarding recreation.

The time phasing of the energy development will have to be considered since the fluctuation of population over time will change the feasibility of the different options the community will consider.

Data Requirements

In order to develop a baseline of existing recreation, the community will need to inventory the range of public and private facilities and services. In addition, the current quality will have to be assessed by developing indicators that are meaningful to the population, such as safety, cleanliness, and public perceptions of satisfaction.

The social and economic characteristics of the current population will have to be determined and the number of new persons and the ways in which they differ from the current population will need to be known. The way in which recreational demand will be distributed over time (for example, weekdays or weekends), is important as is the housing of the new residents, by both location and type. Also, the analysis will have to develop some estimate of commercial development and will have to assess the likelihood of this development serving recreational purposes.

Management Considerations

After the community has determined the demand for recreation and the potential supply, it will have to decide who will be responsible for developing and operating the facilities and services. The energy developer may provide some facilities for employees. Through zoning and subdivision ordinances private housing developers can be required to provide open space. Officials should consider the longer-term population and revenue projections before making large investments in recreational services.

EDUCATION

Growth due to energy development can substantially impact the amount of educational investment and the quality of education offered in a community. Impact, in most cases, is determined by three major factors: the number of school-age children entering the area; the educational needs of the newcomers; and the school capacity available in the area. Past experience with energy developments has indicated a range of school system impacts. For instance, impacts have been significant in areas where coal mines have been developed. In some cases, the school gained one child per each new worker. This growth has resulted in double sessions or overcrowding and a possible decrease in the quality of education available.

Questions Facing the Local Planner

- How many school-age children will enter the system as a result of energy development?
  - What grade levels will be required?
  - What will be the special educational needs as well as day care requirements of the newcomers?

- Will the existing school facilities be adequate to provide required services to the new residents?
  - What is the current space availability of the system?
  - What is the current student/teacher ratio?
  - Will school support services be adequate to service the newcomers?
  - Will increased funding or personnel be required to meet increased demands?

Scope of the Analysis

Increased demand for school services can be defined by the additional number of students entering the system; the grade level of these students; and the type of schooling required. The existing system must be assessed for capacity to absorb the additional students. Capacity should be measured in terms of physical space available for classroom and recreational activities and by the effect the increased school population may have on the quality of education offered.

Information on particular educational demand characteristics of the school-age population can best be determined by studying in-depth case histories of communities that have experienced energy developments.

The student/teacher ratio, along with test scores, is a common measure of school quality. In general, low student/teacher ratios are desirable. An increase in the number of students will generally be considered a negative impact unless existing levels are so low that new students can be easily absorbed without changing learning opportunities.

In order to accurately assess the impact on the student/teacher ratio, the planner needs to consider future staff changes proposed in the school budget. In areas where student population growth is significant and few budget increases have been projected, management decisions will be required. Adjustments in the systems may have to be made in the form of increased staffing, additional facilities, alteration of programs, curriculum, or teaching techniques.

State standards should be reviewed to determine what levels are considered as serious overcrowding. Since schools are large investments, increases in school population will probably have to be projected over time to justify additional capital investments.

In some areas, the number of new students will be small enough to be absorbed into existing facilities with little or no impact to the system. In other areas, additional temporary facilities or expansions will provide adequate educational advantages. Locational factors will impact alternatives, and for this reason, they should be reviewed. Community growth may alter the existing patterns of the school bus system and many localities have standards for the maximum walking or bus riding distance a student should be from school.

In areas where school buildings are used for community programs and services, the school system provides multiple functions. In these instances, the increase in school population may have broad impacts. Increased funding required for new staff may cause the depletion of the school budget to the point where school or community programs are altered. These potential alterations should be specified when assessing the impacts of population growth.

Data Requirements

Data required in assessing school impacts include the following: the number and age of the incoming population; location, capacity and type of existing school facilities; student/teacher ratios; standards for overcrowding; school transportation systems; and any future school facility and staffing plans. Sources for these data are population estimates; the school administration; state agencies; and the school budget system.

Management Considerations

The major consideration is the level of educational services to be offered. Factors impacting these considerations include the nature of the school impacts; the financial capability of the community; community concerns about educational services; and the amount of additional funds available to the school system.

HEALTH CARE

The demand for and quality of health care service depends on the social and economic characteristics of the resident population, the availability of medical and dental services, nursing homes, and a range of special services. The facilities and services must meet the health care needs of the population and provide accessible emergency and special services that may increase during the project construction.

Demand for mental health services may rise because of the influx of new residents with no established roots, family members who are unemployed, or an absence of recreational activities. Special services may include alcoholism and drug abuse treatment that call for more specialized personnel.

Example

Construction workers have accounted for about 15% of the treatment for alcoholism in Calvert County, Maryland, during the construction period of the Calvert Cliffs Nuclear Power Plant in 1970. Howard, Needles, Tammen, and Bergendoff, Review of Socio-Economic Impacts of the Calvert Cliffs Nuclear Power Plant on Calvert County, Maryland, and Comparison with Kent County, Maryland. Maryland Power Plant, Siting Programs, Department of Natural Resources. January 1975.

Questions Facing the Local Planner

- What is the current status and range of health care in the community: health provider/resident ratio; waiting times; emergency services; specialized services; mental health services; dental care; travel time and distance?
- What is the capacity of these services and can they be expanded?
- Will there be adequate health personnel to meet new demands?
- What are the current health conditions and are there any particular problems that may be exacerbated by the development?
- Will the energy development create demand for special health care services?
- Will energy development affect the quality of health care delivery?
- What will be the ability of new residents to afford health care programs and how will this affect the general cost of health care in the community?

Scope of the Analysis and Data Requirements

The community will first have to assess its current health care system, documenting the range of services available as well as their capacity and effectiveness. The range of services should include: in-patient hospitals and facilities; medical and dental professionals; out-patient facilities; programs for special groups (for example, the handicapped or children and mothers); mental health services; emergency care; and emergency services related to natural disaster relief.

Effectiveness of the service delivery will have to be determined. This will include: the ratio of health providers to population; the waiting time for appointments; hospital admissions and ambulance service; the travel time for routine and special needs; the cost of health services; and the availability of health care to low-income residents.

The community will have to develop a health profile[1] for its current residents and estimate how these characteristics will change over time because of the influx of new persons. The health profile should include: physical and economic conditions; demographic characteristics (for example, age, education, or income); housing conditions; numbers of public/private voluntary facilities; personnel; available funds; health utilization characteristics; and health conditions in the community (mortality and morbidity).

The demographic characteristics of the new population will be the most significant indicator of health needs. If analysis of energy phases and employment impacts indicates an influx of men, this would have very different implications for health care planning than would an influx of young families. Housing conditions are also important because of the adverse impacts of poor sanitation or contamination of the water supply.

Communities can use health care standards as a guide but should realize that because the demand resulting from energy development will fluctuate greatly, they may not find it desirable or practicable to make large investments to meet short-term needs.

Example

The Colorado Department of Health, Division of Nursing offered the guidelines for rural public health services: one public health nurse for each 2,000 people in Oil Shale Tract C-b Socio-Economic Assessment Vol II, Impact Analysis, Shell Oil Co., Ashland Oil Inc., March 1976. Department of Health, Education and Welfare - General Standards of Construction and Equipment for Hospitals and Medical Facilities, Washington, D.C., U.S. GPO, 1969 Survey.

Management Considerations

Communities will have to identify the special health needs directly related to the energy facility and determine whether they or the developer will take responsibililty for meeting them.

---

[1]Description of health profile adapted from Community Health Services. Harold Herman and Mary Elisabeth McKay, published for the Institute for Training in Municipal Administration by the International City Management Association, 1968, page 215.

Because it may not be possible to actually develop all the necessary facilities, communities should look to other local services such as schools and churches for assistance. Regional facilities can be made more available through the development of transportation options. Where there is long-term projected need for more health facilities, communities should consider developing clinics, hospitals and office space in an effort to attract more medical professionals.

Example

The U.S. Department of Agriculture recently has found that, on the average, counties under 25,000 people had only one doctor for over 1,770 people, in contrast to counties over 50,000 with one doctor per 768 people. National Association of Counties, Case Studies on Energy Impacts, No. 2, Controlling Boomtown Development, Sweetwater and Uinta Counties, Wyoming.

Example

The Wyoming Human Services Project trains students to work in teams in Wyoming communities. This program is supported by a grant from the National Insitute of Mental Health, Department of Health, Education and Welfare.

COMMUNITY SAFETY

Levels of safety-related services are generally based on population characteristics. Workers migrating into an area may greatly alter population density and response time by their residential location. Often an area subject to development will be located outside the perimeter of existing service patterns. Police and fire stations may require more time to respond to new developments, impacting the entire community.

Other impacts may result from an increase in traffic caused by population growth, construction activities or facility operation. Additional police may be required to patrol roadways into and out of the development area. Although many energy facilities develop security systems, local police often have to patrol areas surrounding the facility, particularly during the construction period. The community should determine whether the developer will be taking the responsibility for onsite protection.

An alteration in the housing market due to the rapidly increasing population may impact fire services. Inadequate housing units contain fire hazards that, in the long run, will increase demands on the fire protection service.

Community planners will need to consider the availability of sufficient water resources to fulfill these additional fire needs. Also, area fire insurance is usually based on a community's fire response capability.

Occupational safety is a source of public concern. A major construction activity creates additional safety hazards. Municipal ambulance services may be called on to respond to work site accidents. Certain types of energy development such as nuclear power plants may require the community to have a safety or civil defense director. Occupational safety concerns and the adequacy of response time of the emergency services require coordination between public safety and health care planning.

Questions Facing Local Planners

- How will the existing municipal safety systems (police, fire, ambulance) respond to increased demand?
- Will the area have adequate police and fire protection?
- What safety services will be required by the energy facility?
- What safety service demands will be generated by the incoming residents?
- Will further capital or operating costs be incurred for safety services?
- Will service areas need to be redefined or personnel reassigned?

Scope of the Analysis

Assessment of safety impacts requires a determination of the increased needs generated by the energy facility, a study of the existing level of service, and an analysis of the present system's ability to respond to additional needs.

Increased safety services may be generated by both the facility and by the population growth. To analyze the facility-related safety needs, an understanding of facility functions and a determination of the safety services to be provided by the energy developer are necessary. Most energy facilities provide fire protection and security systems. Community case studies should also be reviewed to insure that needs for special safety services have not been overlooked.

If municipal ambulance or emergency systems will be used by the facility, industry safety records can be checked to determine the type and number of job accidents related to similar developments. At facilities where local fire protection is required, a representative of the fire department should review the types of structures to be protected. Needs for special or particular fire-fighting equipment should be noted. National fire insurance groups can be consulted to estimate the amount and pressure of available water required to protect the facility.

Safety demands created by the incoming employees are based primarily on the location and type of housing the employees select. New developments or random housing places a burden on safety systems by increasing emergency response time. Some standards have been developed for population/safety system ratios. Police/population ratios vary, however. A review of communities of like size and demographic characteristics can be made to assess the needs for additional personnel.

Once the projected needs of the facility and the community have been assessed, the local planner should list the existing safety services offered by the community. Important factors include: locations of police stations, fire and rescue companies; number of police personnel and cars; existing police response time; number of fire stations; types of fire and rescue equipment; fire and rescue response time; and existing fire flow. The planner can then compare the present services with additional community needs.

Sources of Data

Population characteristics and projected housing locations will have to be determined. Additionally, discussions with the energy developer, a review of the environmental impact statement, and a study of energy development case studies may indicate population characteristics relevant to safety impacts.

Discussions with local police and fire administrations will provide data on service facility locations, the number of police and fire personnel, type of equipment and response rates.

A source of national safety standards is the National Board of Fire Underwriters. Their assessment of the fire-fighting capacity of localities is based on equipment, fire flow, location of facilities and density, structures and value of structures to be protected.

Management Considerations

Depending on the duration of additional safety needs, the community has several options: additional personnel can be leased from county or state systems; added protection can be requested from the county; local staffs can be supplemented with new personnel; additional equipment can

be purchased; or the community can redesign the existing safety system to relocate personnel and services. Once impact information is available, the community can assess its fiscal capabilities and decide on courses of action.

Sources of Further Information

The U.S. Water Resources Council, 1972 OBERS Projections: Economic Activity in the U.S. (based on the Series E Projected National Population), Vol. I-III, Washington, D.C., April 1974, provides historical data and projections to the year 2020 of population, total employment, total personal income, per capita personal income, total earnings, and earnings by industrial sector. Projections are being revised and should be available in 1977 or 1978.

Mountain West Research, Inc., Construction Worker Profile, prepared for the Old West Regional Commission, Denver, December 1975.

U.S. Department of Commerce, Bureau of the Census: U.S. Census of Population: Population Estimates and Projections; County Business Patterns; County and City Data Book; Current Population Reports; Federal-State Cooperative Program for Population Estimates; U.S. Census of Populaton: Subject Reports, Mobility for States and the Nation.

U.S. Department of Health, Education and Welfare, Vital Statistics of the United States: Mortality; Vital Statistics of the United States: Natality; Vital Statistics of the U.S.

Highway Research Board, Highway Capacity Manual - 1965, Washington, D.C.: HRB, 1966.

Improving Rural Solid Waste Management Practices, Theodore L. Goldberg, U.S. Environmental Protection Agency, 1973 SW-107; Guidelines for Local Governments on Solid Waste Management, (SW-17c) National Association of Counties for the U.S. Environmental Protection Agency, 1971.

Gordon Maskew Fair, John Charles Geyer, Daniel Alexander Okun, Water and Wastewater Engineering, Vol. I, Water Supply and Wastewater Removal, John Wiley and Sons, N.Y., 1966. This is a classic text book in the field.

Metcalf & Eddy, Inc., Wastewater Engineering: Collection, Treatment and Disposal, McGraw Hill, New York, 1972.

EPA's total regulations and guidelines are contained in Municipal Wastewater, Treatment Works Construction Grants Program, References. Available from EPA Regional Offices or the Municipal Construction Division, Office of Water Program Operations, U.S. EPA, Washington, D.C.

Standard Schedule for Grading Cities and Towns of the United States with Reference to Their Fire Defenses and Physical Conditions, National Board of Fire Underwriters, 1956.

CHAPTER SIX - CAPITAL PROGRAMMING

Energy development communities, often small, remote and rural, have limited financial resources, little experience with capital programming, and intense time pressures in which to do something. This chapter outlines the elements of a capital programming process geared to these limitations, illustrates the steps involved, and points out sources of information and assistance for local governments.

Rather than jump immediately to the question, "What do we do first?", communities should ask themselves, "How do we decide what to do first?" Ad hoc approaches, reacting to whatever demand appears first or most noticeably, can overlook high priority or long-term needs, build facilities too late to meet demands, or build facilities which are needed for the construction boom, but which are too large for the following operations phase.

Capital programming has the potential for assisting local governments in planning for and meeting the demands of rapid energy development by: determining the magnitude of capital needs; setting priorities for construction; determining available financing; demonstrating financial needs to other agencies such as state and Federal governments and energy companies; coordinating capital planning of all local governments; and coordinating capital spending with operating budgets.

Highlights

A comprehensive Capital Program usually requires centralization of responsibility in one person or group.

A Capital Programming Committee has been found to be a useful mechanism in the absence of an administrator or mayor who can take responsibility.

Energy project impact studies and the experience of the city itself is not a guide for future needs.

For a local government with a fiscal year starting July 1, the capital programming process should start the preceding October and be completed in April, before consideration of the annual operating budget.

DEFINITIONS

Capital expenditures, programs and budgets are defined as follows:

Capital Expenditure - a major, nonrecurring project or facility expected to provide service over a long period of time; for example, sewage treatment plants or fire stations.

Capital Program (CP) - a plan for capital expenditures to be incurred each year over a fixed period of time and the projected resources to finance it. The acceptable term may be adjusted to coincide with the energy development schedule.

Capital Budget (CB) - the first year of the Capital Program, a more detailed plan of specific projects and financing to be adopted with the annual operating budget.

ISSUES IN CAPITAL PROGRAMMING

These include, in order of priority: who will put together and approve the Capital Program; how the Capital Program will be prepared; and what projects will be done first.

Organization

A comprehensive Capital Program is created with one person or group responsible for it. Criteria for this designation include: public accountability; influence relative to other participants: both long-range and immediate operational perspective; skills in analysis and finance; and the ability to achieve internal operational effectiveness.

If the community has an administrator, that person can assume responsibility for preparing the CP and submitting it to the legislative body. A jurisdiction may assign this responsibility to the mayor or to a Capital Programming Committee (CPC) especially formed to prepare the capital plan and budget. Members of this committee might include representatives of the planning commission, the legislative body, and citizens at large appointed by the governing board. This committee could be staffed by the finance director or planning director. As an alternative, the CPC could be formed entirely of city staff and department heads.

Roles of other persons and groups will remain essentially the same; Department heads will identify and justify projects for their program areas. The planning commission will relate proposed projects to the comprehensive plan, and must approve the CP before it is submitted to the governing body. Citizens can serve on the CPC and comment on the proposed Capital Program while it is being considered by the city council or county board.

Energy-impacted communities might consider outside assistance in preparing the Capital Program. Studies of the impact of the project and the format outlined in this chapter may reduce the need for outside aid. Sources of assistance may include consultants, universities, areawide districts, or state agencies. These persons and groups could prepare such program elements as capacity studies, financial analysis, need and cost projects, or the entire program. Skills needed for each element of the CP are different: capacity, need and cost projects can be performed by engineers and consultants; financial analyses require a public finance

and budgetary background. The Capital Program requires either a multidisciplinary group, with persons experienced in public administration, budget, engineering, and public services, or a public administrator who could coordinate the efforts of local officials and staff in putting the program together.

The cost of a Capital Program done by an outside consultant may be in the range of $20,000 to $35,000, assuming good background information on the community and project, but with little previous work done on financial, capacity, and cost projections. Elements of the program, done by private consultants, could cost from $5,000 to $10,000 each. University groups may be less expensive, but they may not have the pertinent experience. Using other governmental agencies may be the least expensive course, although demands on their time are often heavy. The most effective use of outside assistance may be in the form of consultation on how to organize and prepare the Capital Program, rather than in doing elements of it.

Setting Priorities

When the impact is large and sudden, there is little difference as to priority; everything presents immediate problems and seems to have the highest priority.

For communities impacted by energy development, the long-range Capital Program has to consider three major needs:

Projects for the energy project construction phase - a rapid and intensive need, which will slack off;

Projects for the energy project operations phase - a relatively stable need that is oriented to the permanent residents; and

Projects for upgrading facilities for the present residents of the community. This may be possible with the increased tax base of the energy project, although the problem may be entirely different after the project is built and surplus taxes are available.

These needs are not separate and any new project built under the Capital Program will have to consider all three, regardless of the situation or timing.

PREPARING THE CAPITAL PROGRAM

Energy-impacted communities must be able to prepare their Capital Programs quickly and simply. The procedure outlined in this section is designed to prepare a Capital Program with the resources at hand and in a period of 7 months or less. The following example (page 60) presents the eight major steps of the Capital Programming schedule. For local governments with a fiscal year starting July 1, the Capital Programming process should start the preceding October and be complete in April, before consideration of the annual operating budget.

EXAMPLE

SCHEDULE FOR CAPITAL PROGRAMMING

STEP	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1. Assemble Background				———								
2. Inventory Potential Projects				———	———							
3. Analyze Individual Requests					———	———						
4. Prepare Financial Analysis				———	———							
5. Develop Draft Capital Program						———	———					
6. Prepare Proposed Capital Program							———	———	———			
7. Adopt Capital Program and Budget									———	———	———	
8. Follow-Through												———

To illustrate the suggested procedure, a sample Capital Program is created for a hypothetical community, a city of about 5,000 population near which a power plant is just starting construction. Although the example is a city government, the procedure works similarly for a county government. The eight steps of the process are as follows:

Assemble Background Information (1 Month)

The primary determinant of need for capital projects will be the additional population within the community. The example on page 62 shows the city's base population and the projected increase from the power plant construction. Peak population of 9,200 is projected for 1980-81. Population at the operating phase is projected to decline to 8,200, an increase of approximately 3,000 residents from present levels. This projection is critical, for long-range capital projects should be designed to serve the permanent population rather than the peak construction number. Sources of information for the population projections include the environmental impact statement initially done for the energy project, and a review of other communities' experiences in this area.

Special studies that have been done for specific services may also provide background information. Department heads should provide information about current service levels and the condition and capacity of existing facilities in the city. All this material can be compiled by the administrator or the Capital Programming Committee.

Inventory Potential Projects (1 1/2 months)

At the same time background information is being assembled, department heads (or commissions) can be identifying potential projects which they think will be needed during the different phases of energy development. In identifying potential capital projects, limits on what is included should not be based on money limitations or a specific timeframe. If a capital project might be needed at some time, it should go on the list. For each suggested project, department heads should provide: description; justification; priority within the program; estimated costs broken out for land, buildings, equipment, etc.; and time required for construction or purchase. The impact on the operating budget (for example, how many additional people are required or how much will this cost to operate annually), must be included plus any suggestions the department head has on available or likely financing. The projects should be grouped by a set of priorities, such as: urgent; necessary; or desirable. An example of this inventory is shown on page 63.

Analyze Requests for Individual Projects (1 Month)

The administrator or CPC will go over each request for capital projects with the department head or commission to assure full understanding of the demand for and the urgency of each request. For each project, the

EXAMPLE

COMMUNITY PROJECTIONS

	1972-73	1974-75	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	Operating Phase
Population	5,000	5,100	5,950	7,400	8,400	8,900	9,200	9,000	8,200
Assessed Valuation ($000)	5,500	5,600	5,700	6,000	6,300	6,450	6,675	6,750	8,200
Assessed Value Per Capta ($)	1,100	1,100	960	810	740	725	725	750	1,000
General Obligation Bond Limit (@ 15% of Assessed Valuation)	825	840	855	900	945	968	1,001	1,012	1,230
Existing Bonds	625	575	525	460	400	365	325	280	N/A
Available Capacity	200	265	330	420	545	603	676	732	N/A

EXAMPLE

EXAMPLES OF PROJECTS

Program Project	Priority/Justification		Costs	Term	Annual Costs	Operating Manpower
SEWAGE DISPOSAL						
Land Acquisition	1	For Treatment Plant	$. 100,000	1 year	----	--
Treatment Plant	2	Expansion to Serve 3,000 Added pop. = .925 MGD	1,125,000	3 years	21,000	1.5
Expansion of Trunk	3	Needed from city to plant	100,000	1 year	1,000	--
Package Treatment Plant	4	To serve 1,000 "extra" Population at Peak	300,000	6 years	10,000	1.0
FIRE						
New Pumper	1	Added population, and Upgrade Equipment	60,000	1 year	9,000	1.0
Expand Station	2	Room for New Pumper	100,000	2 years	--	--

administrator should evaluate whether there are any land use, design or environmental impact questions to be resolved. The city attorney should look for any potential legal problems. At this point, however, no decisions should be made about priorities or what goes into the final Capital Program.

Prepare Financial Analysis (1 1/2 Months)

While department heads work on individual requests, the administrator and finance office analyze the financial picture of the community, identifying potential revenues to support the Capital Program. The first part of this is to project operating expenditures and revenues for the life of the CP, as shown in the example on page 65. The projects should be made for the same categories found within the annual budget. Preparation of these projections will be helpful in assessing the impacts of energy development on the operating budget, and will determine the net available from operations that may be used for capital projects. In this illustration, most expenditures and revenues are tied to population increases and per capita factors. Experience has shown that in most energy impacted communities the assessed valuation grows much slower than population.

The net available for capital projects is minor the first 3 years of the capital program; it then increases significantly as debt service declines. Even though this net figure is small compared to total capital needs, the money is available now, requires no application to other sources, and has few restrictions on its use. At the same time, projections should be made of assessed valuation and these compared to the outstanding bonded indebtedness. In this city, which has a general obligation bond limit of 15 percent of assessed valuation, the available capacity for new bonds will increase annually, as assessed valuation grows and bond principal declines.

During this analysis, the city will have to determine what its fiscal policy will be toward capital projects. A logical policy is one of "pay as you use," so that those who will use the facilities will pay for them. For example, the city may assume that 90 percent of capital costs would come from bonds.

The city will also have to consider the legal, political, and economic constraints to their fiscal policy. Bonds are limited as to the percentage of assessed valuation; voters must approve a bond issue and the city must have the ability to pay the incurring debt.

Develop Draft Capital Program (2 Months)

With information available on both capital needs and financial resources, the administrator or CPC can draft a tentative capital program. Capital projects are laid out as proposed by department heads using their priorities. As is often the case, projects may be bunched into the first

EXAMPLE

PROJECTED OPERATING BUDGET
(In Thousands of Dollars)

	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82
EXPENDITURES						
Police	117	164	202	231	258	270
Fire	18	22	25	27	28	28
Parks & Recreation	101	119	125	130	135	140
Library	36	37	42	44	46	48
Roads	107	142	168	187	202	207
Sanitation	89	119	143	160	175	180
Water & Sewer	170	237	286	320	350	350
General	232	313	378	418	451	459
Debt. Service	120	120	120	60	60	60
TOTAL	1,000	1,273	1,489	1,577	1,705	1,742
REVENUES						
Property Tax	143	150	158	161	166	169
Sales Tax	327	444	546	623	690	720
Other Taxes	130	149	186	210	222	230
Service Charges	238	313	370	409	442	450
Revenue Sharing	52	60	74	84	89	92
Other Revenue	119	156	185	205	221	225
TOTAL	1,009	1,272	1,519	1,692	1,830	1,886
AVAILABLE FOR CAPITAL	9	(1)	30	115	125	144

few years of the Captial Program. Revenues available on an annual basis are presented and these are spread over the life of the program, primarily in the later years.

Prepare Proposed Capital Program (2 Months)

The most difficult part of the capital programming process is reshaping the draft Captial Program to create a program that meets urgent and essential needs while balancing expenditures and revenues. The administrator or CPC will first identify possible additional funding sources, such as state and Federal grants, local bond issues, state impact aid, and local resources. In the example on page 67, the program first suggested raising service charges on water, sewage disposal and refuse collection to match operating costs. Over 6 years, this would raise $365,000, primarily to furnish sewage collection lines. A Federal grant would be sought for 75 percent of the cost of the sewage treatment plant. Revenue bonds would then be sold for most of the money for producing the water system. Community development block grants would be used for eligible park, recreational, and library projects. A general obligation bond issue of $545,000 would be voted on in the third year of the program, for the full amount allowable by state law, to be used for streets and local share of the sewage treatment plant. State impact aid would be sought for projects not covered by any of these other sources, including fire protection which has urgent priority.

The proposed Capital Program stretches out most of the needed projects to correspond with the availability of funds. High priority needs are met immediately while others are delayed. The 3-year construction time and the time required to obtain a Federal grant means the sewage treatment plant would not be ready for 6 years. To bridge the gap, the program proposes lease of a package treatment plant which could be available immediately. Park, recreational and library needs will be met as community development funds become available annually. The most significant delay will come in the improvement of streets; major reconstruction will have to wait for funding from the general obligation bond and the operating budget.

The final Capital Program can be put together in a number of alternative ways depending on community priorities, the availability of funding, legal requirements, and the condition and capacity of existing facilities. This is an example of the process, not a suggestion of a program for any specific community.

Adoption of the Capital Program and Capital Budget (1 Month)

The administrator or CPC should prepare a concise, graphic presentation of the proposed Capital Program, including charts of proposed projects and revenues to finance them and a map of the city

EXAMPLE

FINAL CAPITAL PROGRAM

PROPOSED EXPENDITURES	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	TOTAL	
Police Station/City Hall				36			36	Available
Fire Station Addition	100						100	State Impact Aid
Fire Pumper	60						60	State Impact Aid
Park-neighborhood			100				100	Community Development
Recreation Center Addition		25					25	Community Development
Library Addition				75	25		100	Community Development
Library Collection	8		5		31	31	75	Net from Operations
Streets - Repaving		20		100	100	80	300	
Widen Main Street				225	225		450	From Government Bond
Collector Streets				30	77	173	280	
Traffic Signals	35	35	35				105	Gas Tax
Sanitation Truck			25				25	Net from Operations
Water Plant Addition			182				182	[80% Revenue Bond ;
Water Distribution Lines		440	160				600	[20% State Impact Aid]
Sewage Treatment Plant				400	450	400	1,250	
Treatment Plant Land			100				100	
Sewage Collection Lines	29	43	159	71	83	90	375	From Service Charges
Package Treatment Plant		40	40	40	40		160	From Service Charges
TOTAL	232	603	706	977	1,031	774	4,323	
REVENUES								
Available from Operations	9	(1)	30	115	125	144	422	
Raise Service Charges	29	43	59	71	83	80	365	To Sewage Collection Lines & Package Plant
State Gas Tax	42	48	59	67	71	74	361	To Traffic Signals & Roads
State Impact Aid	160	236		310			706	
Federal Sewage Grant			70	280	315	280	945	To Land & Sewage Treatment Plant
Community Development Grant	15	44	64	74	80	76	353	To Park, Library, Recreation
General Obligation Bond			545				545	
Revenue Bond (Water)		626					626	To Water
TOTAL	255	996	827	917	674	654	4,323	(8,000)

locating the proposed sites of projects. This document is then submitted to the city council for their review and approval. Copies of the proposed Capital Program should be given to newspapers and radio stations, community organizations, the energy companies and other public agencies. Public hearings should be presented so that citizens understand the proposals and what they mean in services and taxes. Depending on legal requirements, the city council may hold a public hearing on the proposed program.

After review and consideration of the proposals, the city should adopt the Capital Program for the coming several years as a general guide and the first Capital Program year, in conjunction with the operating budget, as the Capital Budget for the coming fiscal year. The Capital Budget is of primary legal concern as it may be used to set tax rates and start more detailed planning of specific projects.

Follow-Through (Throughout the Fiscal Year)

As more detailed planning and analysis is done, the administrator or appropriate department head will submit requests to the city council for authorization to purchase land or seek bids on construction projects or equipment purchases.

Under a normal Capital Programming process, the eight-step cycle would be repeated each year. The first Capital Program is the most difficult as substantial background information must be gathered and projects analyzed for several years in the future. Subsequent Capital Programs would drop the first year, which had been adopted as the capital budget, move each of the following years up, and add a new final year. The new first year of the program would be adopted as the Capital Budget. Each year there would be a reappraisal of projects for priorities and costs. Available and potential revenues would also be reassessed. In the energy-impacted community, however, waiting 1 year may be too long. With changing projections of population and demand, a report on the Capital Budget and Program should be submitted to the city council in the fall, about 6 months after their adoption.

Sources of Further Information

Aronson, J. Richard and Eli Schwartz, Management Policies in Local Government, (Washington, D.C.: International City Management Association, 1976). See Chapter 16 - Capital Budgeting, p. 321.

Evans, Richard D., "Organizing for Capital Programming in Smaller Municipalities," Government Finance, Vol. 3, November 1974.

Howe, George F., "Developing a Capital Improvement Program," Management Information Service, Vol. I, No. S-3, March 1969.

Moak, Lennox L. and Albert M. Hillhouse, Concepts and Practices in Local Government Finance. (Chicago: Municipal Finance Officers Association, 1976). See Chapter 6 - Capital Programming and and Capital Budgeting.

Real Estate Research Corporation, Excess Cost Burden, Problems and Future Development in Three Energy-Impacted Communities of the West, prepared for the Department the Interior, 1975, p. IV-1.

CHAPTER 7 - PUBLIC COSTS AND REVENUES

By using data based on the economic and demographic projections and the separate analyses of expected demands for public facilities and services relative to the actual supply and quality of these facilities and services, an energy-impacted community should be able to prepare projected annual estimates (for the next 10 to 20 years) of public costs and revenues. This chapter discusses procedures to be followed in assessing the extent of future public expenditures and revenues, along with reviews of potential public financing alternatives and revenue tools.

Highlights

Communities will need to review public costs and expenditures and explore a range of financing and revenue-raising alternatives.

Revenue-raising fiscal alternatives include sales tax, income tax, property tax, severance and royalty taxes.

Non-fiscal revenue-raising alternatives which provide local flexibility include bonds, leasing/installment purchase, special districts, intergovernmental assistance, and others.

COSTS

A community's historical data on annual public operating and capital costs should be prepared for at least the past 10 years. Operating expenditures should be separated by function and total. Both function and total should be put on a per capita basis from annual population estimates for the past 10 years. Historical data should also be prepared on capital expenditures which have occured over the past 10 years with some estimate of what this amounts to on a per capita basis.* Also, based on historical experience with public financing alternatives, it may be possible to estimate the annual amortization cost, including interest and debt service, of public investments and put these on a per capita basis.

---

*Both public costs (operating and capital) and revenue projections should take inflation into account. Projections should be shown in current dollars (e.g., 1980 dollars) as opposed to constant dollars (e.g., 1977 dollars). Analytically, it is better to convert historical revenue and cost data to constant dollars and then make all projections in constant dollars. Assumptions would then be stated regarding inflation for the various cost and revenue items and all cost and revenue projections converted to current dollars.

Sources of Further Information

The following sources may be of assistance in performing the historical conversions and analyzing trends. For capital cost inflators, see the U.S. Department of Commerce, Composite Construction Cost Index (from Survey of Current Business), or Engineering News-Record, Building and Construction Cost Increases. For operating cost inflators, a source may be historical data on local government wages and salary increases. For changes in revenues related to personal income tax, trends in average hourly or weekly earnings, taking into account inflation and productivity increases, may be used. These may be found in Bureau of Labor Statistics publications.

Based on the annual population projections of the particular area, annual public operating (by function and total) costs can be projected from the historical trend of per capita public operating costs (total and by function). Variations can be made in these projections based on the plans for changing public service supplies that result from the analyses as discussed in Chapter 5. Data on per capita public operating costs should be obtained from other localities of similar size in the region (i.e., the size the particular locality will eventually become) to provide a check, including correction for inflation on projected future operating costs.

For the major public facility needs, future capital cost estimates (by function and total) should be derived from resulting plans. These estimates should take into account trends in inflation and should be shown in the future years in which they occur. It would be helpful to provide an estimate of these costs annually (by amortizing the investments, taking into account expected interest and debt service) and put time on a per capita basis, using the projected population estimate. The capital cost projections should be compared with historical data for the local area and with similar data from other localities of similar size and characteristics in the region. The projected annual operating costs and capital costs can then be combined to provide an estimate of total public costs by year.

REVENUES

The major sources of revenues to be discussed are sales, income, property, severance, and royalty taxes. Aggregation of these revenues provides an estimate of expected local annual public revenues.

Sales Tax

Local sales taxes may be applied to all or selective retail sales. To estimate future annual revenues from retail sales, a ratio of future

projected local personal income by year to current annual local personal income could be applied to current sales tax revenues. Estimates of these indicators would be determined as described in Chapter 5. More sophisticated assessments include a similar analysis which takes into account a combination of population and income or direct measures of expected changes in retail sales to which the sales tax percentage is applied. The latter could include preparation of historical, annual retail sales estimates for the area. These could be compared with local area, annual personal income estimates, and a trend developed of the ratio of annual retail sales per dollar of personal income. This ratio could be applied to future estimated local area personal income to estimate future annual retail sales. The sales tax percentage could then be applied to expected future sales to estimate revenues.

Income Tax

Estimates of future personal income tax revenues can be made by taking a ratio of expected future annual local personal income to current annual, local personal income and applying this to current annual, personal income tax revenues.

Annual income tax revenues from corporations could be estimated in future years by taking a ratio of future expected annual employment or payroll to current annual employment or payroll and applying this ratio to current annual corporate income tax revenues. More sophisticated analyses may be required, such as making these determinations by major industrial sector, or especially for the direct energy impacts. Also, it may be desirable for a local area to evaluate the degree to which the corporate income taxes have actually been collected. Data for analyzing the energy sector could be obtained from the energy developers and operators.

Property Tax

Another local revenue-generating source is an ad valorem tax on the assessed valuation of property. This tax can be applied to residential and corporate property, both real and personal. Corporate property revenues could be calculated in a similar way as that described for income tax. Another approach would be to estimate the future value of corporate properties from data on production, employment, or payroll, and then to apply the local mileage rate. Similarly, estimates of future corporate property valuation for the energy sector could be obtained directly from developers and operators.

Based on projections of future population and personal income levels, estimates can be made of the type and number of housing units needed to accommodate future local populations. From this data, an estimate of future local, annual property tax revenues can be determined based on recent trends in property tax revenues and the existing and expected stock of residential development.

Severance and Royalty Taxes

Some local areas may receive revenues from a severance tax on the extraction or production of specific minerals. Also, royalties or rents may be obtained from mineral leases or other contracts. These types of taxes would generally be associated with the particular energy development and revenues could be determined based on the plans of energy developers and operators.

Other

Other major, local government revenue sources are the intergovernment transfers. Examples include revenue-sharing, special aid for education, and distribution of state taxes. Careful accounting and estimates of the future likelihood of these revenues should be assessed. Also, it would be helpful to determine what changes might occur in Federal, state, or other local area revenues as a result of the energy developments. It may be that revenues will increase for these entities, whereas the particular local area being analyzed will bear a heavy burden of public costs. In this case, it may be possible to justify and obtain special revenue compensation from these groups.

COMPARISON OF COSTS AND REVENUES

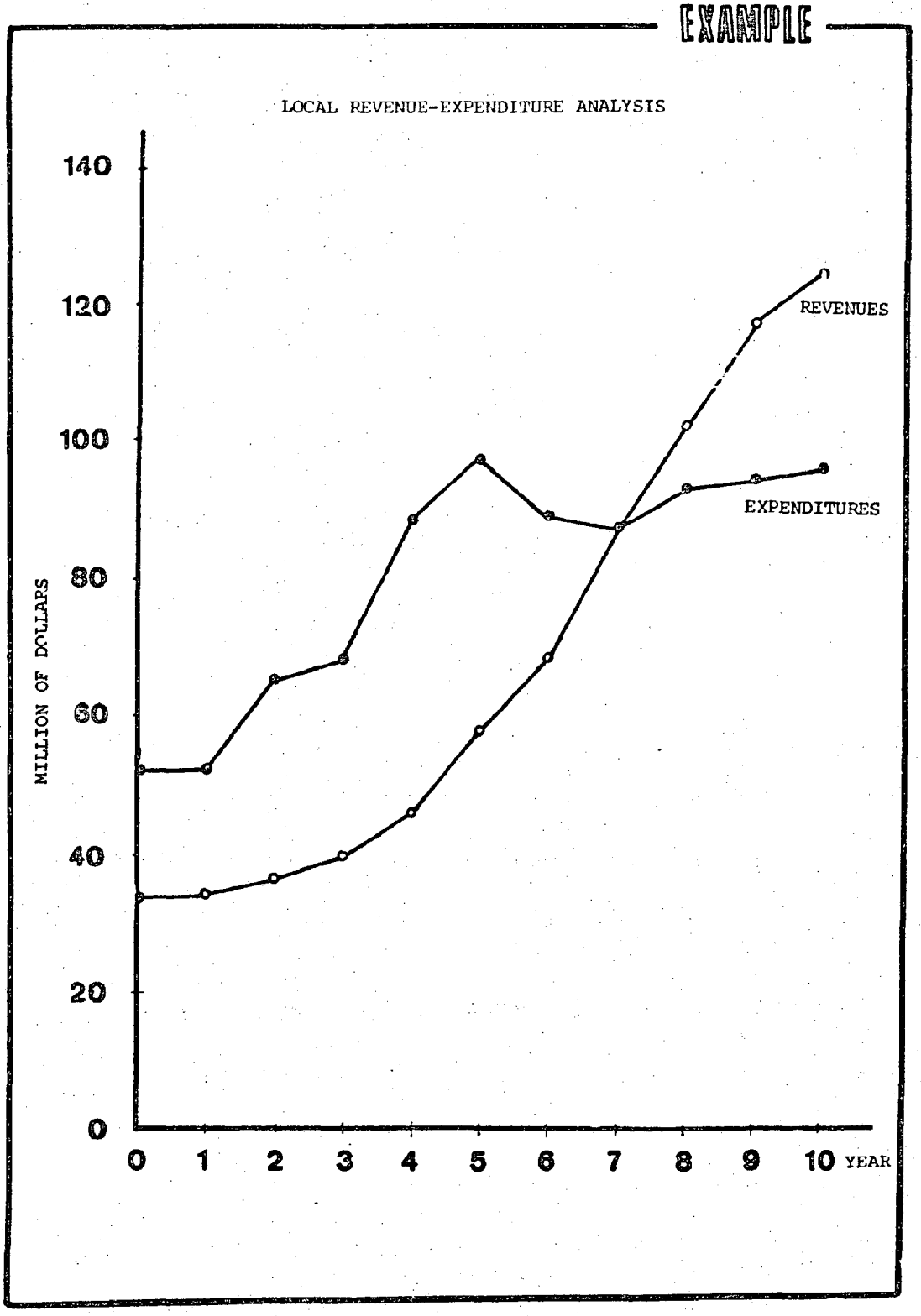
Based on separate aggregations of expected future annual costs and revenues, it will then be possible to assess the possibilities for both budget surpluses or shortfalls in particular future years.* The diagram on page 74 indicates what such a comparison might look like in graphic form. This shows a substantial shortfall in annual revenues for the early years and surpluses in later years. Of primary concern is how to cover the shortfall years and present a balanced budget for each ensuing year.

Example

In the case of Calvert Cliffs, Maryland, the community had a surplus of revenue once taxes were collected from the facility. The community did not use this revenue to reduce property taxes because that would have increased their housing and population growth more than desired. Instead, the community began a capital improvements program to upgrade existing facilities.

*This would be for the year in which they occur. Capital costs would be for the entire capital expenditure (i.e., not amortized).

EXAMPLE


LOCAL REVENUE-EXPENDITURE ANALYSIS
140
120
100
80
60
40
20
0
MILLION OF DOLLARS
REVENUES
EXPENDITURES
0
1
2
3
4
5
6
7
8
9
10
YEAR

LOCAL FISCAL MANAGEMENT: MONETARY AND NONMONETARY REVENUE-RAISING ALTERNATIVES

Having assessed their projected costs and revenues, mmunities may find themselves in a situation where they will have to raise additional revenues. There are a variety of mechanisms available to local communities with which to do this. These mechanisms vary as to their administrative costs, flexibility, and need for state legislation. In addition, there are nonmonetary services that give communities greater flexibility in their ability to raise revenues. Bonds and leasing/installment purchases are examples of nonfiscal, revenue-raising alternatives.

TABLE OF ACRONYMS

ASPO	American Society of Planning Officials
BEA	Bureau of Economic Analysis
CB	Capital Budget
CEQ	Council on Environmental Quality
CP	Capital Program
CPC	Capital Programming Committee
CZM	Coastal Zone Management, U.S. Department of Commerce
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERDA	Energy Research and Development Administration
FEA	Federal Energy Administration
FPC	Federal Power Commission
HEW	Department of Health, Education and Welfare
HUD	Department of Housing and Urban Development
ICMA	International City Management Association
I-O	Input-Output
MFOA	Municipal Finance Officers Association
NACO	National Association of Counties
NEPA	National Environmental Policy Act
NSF	National Science Foundation
NTDS	National Training and Development Service
OBERS	Stands for joint effort by Office of Business Economics (OBE), U.S. Department of Commerce, and the Economic Research Service (ERS), U.S. Department of Agriculture with assistance from the Forest Service.
OCS	Outer Continental Shelf
SDWA	Safe Drinking Water Act
SMSA	Standard Metropolitan Statistical Area

SOURCES OF FIGURES

1. Typical Energy Projects (page 4)

   Source: Williams, David C., Rapid Growth from Energy Projects Ideas for State and Local Action: A Program Guide, Department of Housing and Urban Development, Office of Community Planning and Development - 701 Comprehensive Planning Program in cooperation with the Federal Energy Administration 1976, p.3

2. Added Population from Energy Project - Example of 2250 MW Coal-Fired Electric Generating Plant (page 5)

   Source: Williams

3. Employment Projections (Expected) (page 30)

   Source: Center for Business and Economic Research estimates adapted from Wistisen, Nelson, op. cit.

4. Schedule for Capital Programming (page 60)

   Source: Centaur Management Consultants

5. Community Projections (page 62)

   Source: Williams

6. Examples of Projects (page 63)

   Source: Centaur Management Consultants

7. Projected Operating Budget (page 65)

   Source: Centaur Management Consultants

8. Final Capital Program (page 67)

   Source: Centaur Management Consultants

9. Local Revenue - Expenditure Analysis (page 74)

   Source: Adapted from Department of Natural Resources Tax Load Time Study: The Colorado Oil Shale Region, State of Colorado, Denver, 1974, p. 1-13

COASTAL ZONE
INFORMATION CENTER

NOAA COASTAL SERVICES CTR LIBRARY
3 6668 14110522 3