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16. Abstracts

The document discusses energy inventories, audits, and energy impact statement guidelines to be followed for production of these items at the substate district level. Completion of these items will enable the substate district to produce an energy plan for the respective constituents. This plan can then provide proper grass roots input to State and Federal agencies.

17. Key Words and Document Analysis. 17a. Descriptors

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Energy Audit
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GUIDELINES FOR AN ENERGY IMPACT STATEMENT AND AN ENERGY AUDIT FOR SUBSTATE DISTRICTS

Prepared under Contract
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by
The Research Institute, Georgia Institute of Technology
Philip D. Koos, Jr.
(Principal Author)
and
Robert E. Collier
(Project Director)
Economic Development Laboratory
Engineering Experiment Station
for the
Bureau of Community Affairs

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Bureau of Community Affairs
7 Hunter Street, S. W., Room 640
Atlanta, Georgia 30334

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Preface

This publication has been written as a guide for professional practitioners in substate districts. Both the substate district professional planner and the developer should be able to utilize this technical memorandum in the assessment, evaluation, and development of energy plans.

This document comprises four parts. Part I deals with introductory material. Part II deals with aids for an energy inventory. Part III provides information on an energy audit. Part IV presents a guide for an energy impact statement.

The energy inventory is done to provide a general idea of the volume of energy needed at the local constituent level. These needs can then be totaled so that an estimate of need is available on the district level.

The energy audit is designed to give specific quantitative amounts of energy needed in specific operations locally and within the district. These quantifiable needs must be backed by certified records such as billings. The audits for a specific operation may be totaled for all such operations in the district and thus give a specific and accurate need for such an item.

The energy impact statement provides a vehicle for evaluation based on assessment of the project's effect on the local and areawide plans and development programs. The impact statement permits consideration of a project's assets and liabilities in terms of the physical and cultural environment, the economy, and the general quality of life.

The document presents a wide array of suggested forms for data gathering. These forms are not meant to be all inclusive. Rather they are to serve as a guide to the practitioner, and they may be altered, enlarged, or reduced to meet the particular needs of each substate district.

Finally, this document may be divided into individual parts. Each part concerns a specific work item; thus, the energy audit part may be used exclusive of the energy impact statement and so on.

Part I

INTRODUCTION

INTRODUCTION

Energy and its impacts remain a topic of concern among those involved in planning activity, development activity, and governmental operations activity. While the layman has currently been lulled into complacency, professional planners, developers and/or administrators have become more and more concerned about this primary element of well-being. A recent meeting of 14 Georgia substate district representatives evidenced a unanimous concern about energy in relation to their planning and development activities. Other evidence of this concern by Georgia executive directors was observed as early as 1974 when Mr. Clint Lane, Executive Director, Northeast Georgia APDC, gave testimony at the Project Independence Hearings in Atlanta, Georgia. This testimony was supported by Mr. Lane's Board, the Georgia Regional Executive Directors Association (GREDA), and the Georgia Association of Area Planning and Development Commissions (GAAPDC). Portions of this testimony are presented here:

> At a recent meeting of the Board of Directors of the Northeast Georgia Area Planning and Development Commission, it was noted that energy resources and their proper utilization are a key concern of most business and governmental leaders in our region. This conclusion reflects a philosophy that is abroad in the land today and a fact of life that prompted this hearing.
>
> Although it is conceded that the sudden energy drought in recent months is not peculiar to our region or to our state, it is most certainly true that the problems generated by these energy shortages "came home to roost" in Northeast Georgia. Further, it is evident that the private sector and local units of government in our region are at a loss to cope with present and future energy constraints on a coordinated basis.
>
> In the absence of any contingency plans that would provide some guidance and insight into an assessment of energy needs in the region, it was determined that regional and local policies should be formulated in conjunction with state and national initiatives. To this end, it appears that a systematic approach to planning and management of energy resources, under an energy shortage constraint, should be developed, at the community level, to guide local governmental policies on this subject.
>
> Although the foregoing objectives are worthy of priority implementation, our board recognized that our staff (and probably all APDC staffs) are not technically qualified to accomplish meaningful energy planning or to provide technical assistance to area municipal and county governments in the field of energy technology or to relate local energy and energy-related needs to state and federal agencies involved while effecting necessary coordination with local energy producers and distributors.

Reasoning that our relationship to local government is firmly established by activities mentioned earlier in this paper, the need for a partner to enhance our effectiveness is evident. The partner, possessing the needed technical and engineering skills, is available through the university system of Georgia. In recent conversations with university system officials, it was concluded that the partner could impact on the problems described herein by:

A. Defining and relating energy constraints to local situations.

B. Recommending local governmental policies to deal with these situations.

C. Providing for continuing assessment of the situation, on a long-range basis, as it relates to the citizen and his residence, industry, agriculture, business, and the economy of the region overall.

D. Establishing workable energy linkages among municipal, county, state, and federal governments.

E. By planning for the impact of long-range energy shortages on industrial locations, land use planning, public services, tax revenues, employment, and other related planning matters.

With consideration for the points covered by this position paper, it is respectfully requested that the Federal Energy Administration consider the following recommendations:

A. National policy take into account the aspirations, needs and resources of municipal and county governments.

B. National policy formulation include inputs from the substate level to the appropriate state agencies.

C. A national energy development policy provide for adequate interaction among federal, state, county and municipal governments, and those associations and organizations that represent these commissions.

D. Substate development districts and councils of governments be recognized as the legitimate agencies for local elected officials, public administrators, private economic sector and citizen interest groups to develop goals, strategies and plans for assessing and managing the impact of energy shortages on local and regional economic, social and physical development.

E. Federal funds be made available for the transfer of engineering and technological information, expertise and assistance to multijurisdictional agencies to develop long-range solutions to energy and productivity related problems at the local level and to develop means of coping with periodic energy and energy-related material shortages.

A second evidence of this concern was observed in the passing of resolutions in regard to energy-related involvement by GREDA and several of the

individual APDC's. In addition, substate districts from other states have indicated their concern on this matter and their need to incorporate this concern into their action programs. Several of the non-Georgia districts have discussed energy programs at the substate level with the Georgia Tech staff, and a questionnaire that dealt with this subject was mailed out to 222 substate districts in late 1975 and early 1976. In a 50% response (111 questionnaires), the overwhelming conclusion of 72% of the respondents was that when the energy situation is considered, it is important that the agency be involved. That the agency did not possess the needed expertise and that a need existed for training on this matter was the opinion of 85% of the respondents. These figures are very significant as they represent a good cross section of the U. S. Consequently, they also sustantiate the need for this type of technical memorandum to all the substate districts to aid them in designing a total energy and productivity program that meets the needs of their respective constituent memberships.

Finally, as in the case of Georgia (which has 159 counties and 500 municipalities), the other states are faced with the problem of dealing with a large number of governmental units. Neither time, personnel nor money permit this contact; thus the substate district can form the necessary focal point between the local governments, the state, and the federal agencies involved. Minimum resources then lead to maximum results, which is necessary if the need for energy planning and management is going to be met now and in the future.

The Problem

It has been stated that a great deal of concern has been directed toward energy resources and their local ramifications. However, this concern has been evidenced largely by substate district professionals and boards, and in Georgia, also the State Energy Office and Bureau of Community Affairs - Office of Planning Assistance. That the nation has this concern is doubtful. The unpopularity of any constraints on any activity because of energy shortages is evident. It would appear that another boycott is the only thing that might reverse this philosophy.

National

The problem at the national level can be summed up in several short sentences. Political tactics preclude any real exposure of the true situation. National policy with a solid direction and course of action is lacking.

Halfhearted efforts such as the 55-mile speed limit have been promoted to the consumer. The general public is unaware of and chooses to ignore the critical situation the country is in energy-wise. High fuel prices have not yet had a significant impact on the average American's pocketbook. Thus, while there is very definitely a national problem of energy dependence, a greater problem exists in convincing the people that such a problem is real.

State

The degree of awareness and action on this problem varies from state to state. Georgia's State Energy Office has been very active, while other state offices have taken other less active approaches. The Georgia State Energy Office has recognized the need for good backup data, contingency planning abilities, local inputs that present the true picture in terms of impacts, and total local inventory and audit at a local aggregate level. Once this has been done, it will enable the state to have data that could never otherwise be obtained for 159 counties and 500 localities. Finally, energy supplies, sources, and any alternatives affect the entire state's economy; major problems in every economic sector will occur given certain situations. Thus, local input is necessary to aid the state in its development of the best possible implementable energy management/conservation plan.

Local

Locally, a number of problems occurred during the energy crisis. Perhaps the greatest number of visible problems occurred in the area of allocations. However, even with this problem, the need for aid locally to analyze, assess, and come up with supportive data became very apparent. The logical place to turn for such backup support would be the local substate district. Other areas of concern occurred and still occur in governmental operational costs which are due to increasing energy costs; the need for possible contingency planning within energy constraints; the need for a clear picture of energy flows at the local, interregional, and intraregional levels; and the need for an energy inventory, an energy audit, and study of the economic, cultural, and total operational energy milieu of the area on the local and substate scale. Finally the need for impact statements premising certain energy scenarios is paramount if the total economy is not to be disrupted by this energy element that touches everything man does. Ultimately, energy is a component that must be considered in every element of the master plan from housing, through population and economy,

to land use and major thoroughfare plans. In addition a plan with energy as a focal point into which the various other elements are figured needs to be done. The substate district can only provide the proper and necessary energy management when this is done.

What, Why, and How

This document provides guidelines for: 1) an energy inventory; 2) an energy audit; and 3) an energy impact statement. The guidelines herein will provide the necessary base upon which such activity can be conducted by the planner and/or other professional personnel of the substate district. Through use of these guidelines, basic data needed to do required and contingency planning will be available.

This technical memorandum has been organized in a manner that will enable the planner at the substate district level to have guidelines available for his use in performing energy inventories, audits, and impact statements. Today's problems indicate that over the next few years, local governments will have to become heavily involved in resource management, especially in the field of energy. Consequently, there is a need for professional help at the local level. The substate planning district will be called upon to furnish the majority of the professional expertise required through its own staff or through other channels available for its use. Furthermore, impact statements dealing with the resource base are already coming into being (e.g., EDA). This means that each substate district must be prepared to perform this type of activity for its constituency.

The elements and items in this document are presented in a manner that will allow the professional to follow them as a basis for his data gathering and the writing of his energy-related documents (e.g., district plans for the mandatory 5% reduction in energy use, input to state energy plans, local economic development plans, contingency plans, and others). He will then be able to develop the necessary plan, statement, or required material.

Finally, differences between inventory, audit, and impact statement should be examined:

1. Inventory is defined as a detailed descriptive list, a formal list or a complete list. Thus, the guidelines for this item would show those

items that one should consider to get the overall listing of energy resources, uses, and alternatives available locally and districtwide.

2. Audit is defined as an official examination and verification of accounts and records by reference to vouchers. The energy audit, therefore, should be an official examination of energy resources and uses by studying accounts and records of energy that can be officially verified. For example, the substate district, in conjunction with local officials, would make an audit of energy resources and uses in the solid waste collection and disposal system.

3. Impact Statement is defined as a statement that considers a particular element and its relationship to surrounding elements. This item would be studied for actions, interactions, and reactions to and from the various other elements. An example of this might be a solid waste landfill and its impact or effect on the surrounding physical and cultural features.

The above, then, are the three items that will be addressed in this memorandum. Each item is separately discussed in a major section of the report, and necessary work sheets, forms, and other materials are appended.

An energy/resource person should be appointed to each substate district staff. This person will use this guide to aid him in any overall planning that involves energy. His program and duties are discussed in Appendix A-1 of this report.

Appendix A-1

DUTIES OF THE ENERGY/RESOURCE MANAGEMENT COORDINATOR

ENERGY/RESOURCE MANAGEMENT COORDINATOR

In order to carry out a total, successful program in energy and resource management, the substate district must have an energy/resource management coordinator. This person should devote the majority of his time to those items involving energy and resources. Time allotted would be based upon available funding; but such funding should be made available to assure that such a position does function full time in each substate district. Crisis or not, costs and consequent negative effects on the areawide economy warrant funding of such a position. Perhaps funding of this position could be jointly done by HUD, EDA, and FEA, since certain joint agreements already exist between these three agencies that could cover this item. Funding of this position could possibly be aided by the State or even through local contributions on a pro rata basis by members of the substate district.

Duties for this position would include a variety of items. The following listing of duties is comprehensive but not all-inclusive:

1. Organize an energy/resource management program in the substate district.
2. Develop an energy/resource inventory for the substate district at both a districtwide and local level.
3. Develop energy audits for local government units and other nongovernmental units as requested or determined. Make such a system available to all membership. (See guidelines in this publication, page III-1.)
4. Develop and do energy impact statements for all projects in the substate district. Consider both local and areawide implications of each project. (See guidelines in this publication, page IV-1.)
5. Make any necessary inputs on energy/resources to all other district activity (e.g., OEDP, 701, LEAA) programs and projects.
6. Develop a contingency plan for possible occurrence of energy crises that might occur in the district or at the local, state, and national levels. This plan might then provide the best technical assistance in the energy area to the district.
7. Develop lists of energy supply and demand in specific sectors of the district economy (e.g., manufacturing, commerce, transportation, supplier).

8. Develop and establish an energy information and data center for the district.

9. Assist in referring or solving problems. Establish a problem referral and solution network for those involved in the program. Gather pertinent data on the problem and make referral to an agency or organization that is equipped to provide a means of solution. In Georgia, the Engineering Experiment Station (EES) of Georgia Tech provides one such source in its units such as the Economic Development Laboratory (EDL).

10. Seek support from any and all interested organizations at local, state, federal, and private levels. Such support can be achieved by networking with each organization. Set up information program that would funnel information and data to and from the local area via various media.

11. Develop a listing of organizations at local, state, and federal levels that might provide technical assistance (TA) in the energy area to the district.

12. Develop a list of key contact persons in the above agencies.

13. Develop a list of key persons locally to operate within the energy program.

14. Provide technical assistance with an ongoing segment of the program devoted to finding new TA that may be provided to the district's membership.

15. Develop a listing of energy programs (civilian and government) that are available to the district.

16. Publish on a monthly basis a one- or two-page newsletter pertaining to energy and resource management activity in the district.

17. Develop a promotional energy conservation program for the various segments of the district. Put this program on throughout the district, using a variety of vehicles from civic clubs to technical workshops. Programs on other segments of the energy situation also should be done.

18. Provide other items and services pertaining to energy as they become available.

The professional involved in the energy activity suggested herein should be aware that this is not a program for immediate full development. To develop

this entire program in a short time would require a number of individuals full time for at least a year. Rather, the development of the program herein should be phased over a period of time commensurate with data and staff availability and capability, and only those forms deemed necessary to cover the local situation should be used in the inventory, audit, and impact statement.

Part II of this report presents guides for Energy Inventory. Part III presents guidelines for Energy Audit; and Part IV presents guidelines for the Energy Impact Statement.

Part II

ENERGY INVENTORY GUIDELINES

ENERGY INVENTORY GUIDELINES: RECOMMENDED PROCEDURE

An inventory is defined as a detailed descriptive list. Guidelines for an energy inventory, then, should consider an overall listing of the items of energy supply and demand at the district and local levels. Energy resources, uses, and alternatives for all segments -- physical, economic and cultural -- should be considered. Primary (agriculture, mining, etc.), secondary (manufacturing) and tertiary (service activities -- largely commercial and personal) activities must each be inventoried as to energy needs, supply availability, growth potential, alternatives, and effect to and on the district and local economy. In addition, transportation, government (including schools, hospitals, and recreational activities), and residential energy needs, demand, alternatives, sources, and the like must be considered. Energy data must be gathered on all these item areas and then analyzed and evaluated in terms of the total district and local picture so that maximum benefits may continue to accrue to the district.

To help the district planner to develop such an inventory, a number of forms for information on the various sectors are presented herein. Other aids to permit estimations through use of census and other such data are also presented. These aids should facilitate the collection of much of the data base that is needed for his energy impact statements. Such data also should prove useful in his routine planning for area growth because energy must now be considered one of the main elements in such physical and land use planning. In addition, the data will be of great use to the economic development contingent of the district staff, since energy and its implications have become of primary importance to economic development. In fact, this element ranks at the top even when such basic things as raw materials, labor, and the like are considered because if energy is not available, then all other items cannot be processed or operative.

This section contains a series of appendices that provide suggested forms for inventorying data in the various sectors of the district. Forms are presented for data recording on general fuel and power resources and uses, including existing industry. Other forms deal with in-depth industrial inventories. Still others cover agriculture, housing, commercial, governmental, and recreational uses. Methods for gathering data on vehicular gasoline consumption are also provided, and a form for examining potential for change on all types of energy impacts is presented.

Finally, suggestions for contingency planning, a list of data and information sources, a bibliography of pertinent literature sources, information on grid systems, and information on conservation programs are presented. Use of any or all those items to varying degrees should help the substate district professional staff in all its activities (day-to-day, short-range, mid-range, and long-range).

The various forms are done in a manner that will allow for adaptation to various situations. It is therefore hoped that these forms will be used, tested, updated and adjusted by professional groups at all levels so that the maximum benefits can be realized for each substate district constituent and for the district overall. Only when this is accomplished can plans and development schemes come to an implementable reality.

Appendix B-1

GENERAL SURVEY FORMS FOR POWER,
FUEL, AND RAW MATERIALS

The following form should be used as explained:

Form B-1: Power and Fuel

This form should be used to ascertain the capacities of the various energy and fuel types locally and at the substate district level. Data on each major energy or fuel source can be gathered through use of this form. In addition to the total energy or fuel data, provision is made to obtain data on each of four major use categories (i.e., industry, commercial, residential, and public use).

Finally, the last page examines raw materials, forest products, and agricultural pursuits. This page allows gathering of data on energy amounts used, type, costs, and sources of supply for major pursuits of this type in the substate district.

Data for this series may be obtained from utility companies, municipal systems, bulk dealers, wholesalers, and others. Distribution systems for power and natural gas can be seen on county road maps.

POWER AND FUEL

Electric Power:

(Company serving)	(Does town distribute?)
_____ kv	_____ kv
(Distribution system voltage)	(Voltage of transmission lines feeding system)
_____	(Number of transmission lines feeding system)

Total substation capacity _____ kva Total peak demand _____ kw

Industries Served: (By individual substations directly from transmission lines)

Name	Substation Capacity	Voltage Transmission Line	Plant

(By other than above)	Demand	Peak	Source

Commercial Activity:

Name	Substation Capacity	Voltage Transmission Line	Plant

Residential Activity:

Total Houses	Substation Capacity	Voltage Transmission Line	Plant

Public Activity:

Name	Substation Capacity	Voltage Transmission Line	Plant

Natural Gas:

_____ (Transmission company)

_____ (Service company)

System capacity or allotment _____ (cfd)

Consumption _____ (Winter peak - cfd)

Size of line feeding system _____ (Inches)

Btu content _____ (Per cubic foot)

Industries:

Name	Storage Capacity	Firm Allotment	No. of Days Allotment Exceeded	Source

Commercial Activity:

Name	Storage Capacity	Firm Allotment	No. of Days Allotment Exceeded	Source

Residential Activity:

Total Homes	Firm Allotment	No. of Days Allotment Exceeded	Source

Public Activity:

Name	Storage Capacity	Demand	Peak	Source

Interruptible Activity:

Type - Name	Arrangements

Peak Shaving Plant Yes____ No____ If yes, capacity_____

LP Gas:

Company Name (Supplier)	Location	Type of Gas	Storage Capacity*	Annual Sales (Gallons)*	Service Area

* Give only for firms by county in the district.

Industrial Use:

Name	Location	Amount Used & Peak Period	Storage Capacity	Supplier

Commercial Use:

Name	Type	Location	Amount Used & Peak Period	Storage Capacity	Supplier

Residential Use:

Total Homes	No. of Suppliers	Fuel Used	Peak Use

Public Use:

Name	Type	Location	Peak Use	Amount Used	Storage Capacity	Supplier

Fuel Oil: (Companies with bulk oil plant in town or county)

Name	Location Bulk Station	Service Area

Users:*

Name	Type	Amount	Peak

* Include all uses but residential.

Gasoline:

Bulk Plant Name	Location	Storage Capacity	Trucks	Service Area

RAW MATERIALS

Minerals Presently Produced:

Type	Producer	Location

Energy Used (Amount)	Type	Cost	Source

Formerly Mined:

Type	Location

Energy Used (Amount)	Type	Cost	Source

Forest Resources (Processors and Users):

Name	Product

Energy Used (Amount)	Type	Cost	Source

Agricultural Products (Processors):

Name	Product

Agricultural Resources (Crops):

Crop_____ Acreage_____ Fertilizer_____

Energy Used (Amount)	Type	Cost	Source

Appendix B-2

INDUSTRIAL ENERGY INVENTORY*

Form B-2A, Part I: Consumption Inventory
Form B-2B, Part II: Consumption Inventory
Form B-2C: Energy Flow Inventory

* Each of these three parts (A, B, and C) also can be used as detailed audit forms for industry.

Form B-2A

PART I: CONSUMPTION INVENTORY

The following form should be used as explained:

Form B-2A, Part I: Consumption Inventory

This form should be used to inventory each manufacturing operation in the district. This would include any type of operation where a product is made. Data can then be compiled that will give district information on total industrial demand. This form also can be used as a general audit form for an industry.

Data for this form should be secured from the industry itself.

INDUSTRIAL ENERGY CONSUMPTION INVENTORY

Company Name_____ Date_____

Plant Location_____ County_____ SIC #_____

(1) Please provide the following information on the products your plant manufactures or processes:

Primary Products	19__ Production	Unit (Pounds, parts, yards, etc.)
a._____	_____	_____
b._____	_____	_____
c._____	_____	_____
d._____	_____	_____
e._____	_____	_____

(2) 19___ dollars sales:_____

(3) 19___ employment: Number of employees_____

(4) 19___ normal production schedule: Days per year _____

Shifts per day_____ Hours per shift_____

(5) Consider your fuel type usage for 19___. Circle "P" for Primary and "S" for Secondary.

a. P S Electricity
b. P S Natural Gas
c. P S LP Gas
d. P S Fuel Oil
e. P S Coal
f. P S Other, please specify_____

(6) *Estimate the percent of total for each fuel type used (excluding transportation) in 19___ for:

	Electricity	Natural Gas	LP Gas	Fuel Oil	Coal	Other
a. Space Heating and Air Conditioning	____%	____%	____%	____%	____%	____%
b. Processing/ Production	____	____	____	____	____	____
c. Fuels used but not counted in "a" and "b"	____	____	____	____	____	____
	100%	100%	100%	100%	100%	100%

(7) Transportation Energy Consumption in 19___:

(a) Estimate the percent of each fuel type used in 19___ for:

	Gasoline	Diesel	Other
1. Over-the-road use	_____%	_____%	_____%
2. Off-road use, (fork lifts, cranes, etc.)	_____%	_____%	_____%
3. Fuels used but not counted in 1 or 2	_____%	_____%	_____%
	100%	100%	100%

(b) Provide the following information on your transportation fuel use in 19___:

	Quantity (Gallons)	Cost (Dollars)
Gasoline	_____	_____
Diesel	_____	_____
Other	_____	_____

(8) Electricity Consumption in 19___:

a. Provide the following information from your monthly electrical bills for 19___:

	Quantity (KWH/mo.)	Cost (Dollars/mo.)
Jan.		
Feb.		
Mar.		
Apr.		
May		
June		
July		
Aug.		
Sept.		
Oct.		
Nov.		
Dec.		
Total		

*Provide the following information from your February and August electrical bills for 19___:

	February (19__)	August (19__)
KWR or RKVA		
Peak Demand		
Connected KW/Mo.		

b. Where monthly electricity bill information is not available, present data on the electricity bill in 19___ _____ dollars/year.

c. Have you generated electricity for your plant operations in 19___?

No_____ Yes_____ What were the KWH/yr. of electricity generated in 19___? _____

*If peak demand months or minimum demand months differ, so indicate in the space provided.

d. Electricity used in your plant for general purposes in 19___ included:

1. Processing/Production _____Yes _____No
2. Space Heating _____Yes _____No
3. Space Air Conditioning _____Yes _____No
4. Other, Please Specify_____

(9) Was natural gas used in 19___? _____Yes _____No

a. Indicate which of the following fuel types you received through the natural gas pipeline.

_____Natural Gas _____Manufactured Gas _____Propane/Air

b. Billing procedures used by different gas companies vary. Indicate the quantity measurement shown on your bill.

_____therms

_____c.f. at _____Btu/c.f.*

_____c.c.f. at _____ Btu/c.f.*

_____m.c.f. at _____ Btu/c.f.*

*If Btu/c.f. is not shown on the bill, list your gas supplier.

---

c. Provide the following information from your monthly natural gas bills for 19___:

	Quantity/Mo.	Dollars/Mo.	Number of Curtailments	Additional Amount Needed
Jan.				
Feb.				
Mar.				
Apr.				
May				
June				
July				
Aug.				
Sept.				
Oct.				

Nov. _____ _____

Dec. _____ _____

Total _____ _____

d. If monthly natural gas bill information is not available, what was the natural gas bill in 19___?

_____dollars/yr.

e. If natural gas was used for processing and there was a 20% reduction in your gas supply, estimate the percent reduction in your production.

(1) Alternate fuel is available _____%

(2) Alternate fuel is not available _____%

f. If your plant is on interruptible gas, what is the alternate fuel (i.e., #2 fuel oil, LP gas, etc.)?

1. _____

2. _____

3. _____

4. _____

g. Indicate your natural gas consumption pattern in 19___:

_____ All months _____ Seasonal use. Please circle specific months:
J F M A M J J A S O N D

_____As needed _____ Other, specify _____

10. Did you use LP gas (propane) in 19___? _____Yes _____No

a. Provide the following information on your LP gas use in 19___:

Quantity _____ Gallons/year

Cost _____ Dollars/year

b. If annual LP gas information is not available, provide the following information from your LP gas bills for 19___:

Delivery	Quantity* (Gallons)	Cost (Dollars)
1	_____	_____
2	_____	_____

3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
Total	_____	_____

*Where order quantity is by tank, please specify tank capacity. _____ gallons

c. If LP gas was used for processing and there was a 20% reduction in your LP gas supply, estimate the percent reduction in your production.

(1) Alternate fuel is available _____%

(2) Alternate fuel is not available _____%

d. Indicate your LP gas consumption pattern in 19___:

_____ All months _____ Seasonal use. Please circle specific months:
J F M A M J J A S O N D

_____ As needed _____ Other, specify _____

e. If LP gas is used for a backup or secondary fuel source, what is the primary fuel? _____

Can any other fuel besides LP gas be used as a backup fuel? ____Yes ____No

If no, why not? _____

_____

Please comment on the efficiency of energy use in your production process using the backup fuel (LP gas) rather than the primary fuel.

_____

_____

f. Please indicate the amount of storage capacity available for LP gas: _____ gals.

(11) Did you use fuel oil in 19___? _____Yes _____No

a. Indicate grades of fuel oil used.

_____#1 Kerosene _____#2 Fuel Oil _____#4 Intermediate Grades

_____#5, #6, Bunker C Fuel Oil

b. Provide the following information for each fuel grade used in 19___:

Fuel Grade	Delivery	Quantity (Gallons)*	Cost (Dollars)
#___	1	___	___
	2	___	___
	3	___	___
	4	___	___
	5	___	___
	6	___	___
	Total	___	___
#___	1	___	___
	2	___	___
	3	___	___
	4	___	___
	5	___	___
	6	___	___
	Total	___	___
#___	1	___	___
	2	___	___
	3	___	___
	4	___	___
	5	___	___
	6	___	___
	Total	___	___

*A barrel contains 42 gallons, and a drum contains 55 gallons.

c. If individual fuel oil bill information is not available, what was the total fuel oil bill for 19___?

Quantity __________ Gallons/year

Cost __________ Dollars/year

d. If fuel oil was used for processing and there was a 20% reduction in your fuel oil supply, please estimate the percent reduction in your production.

(1) Alternate fuel is available _____%

(2) Alternate fuel is not available _____%

e. Please indicate your fuel oil consumption patterns in 19___.

Fuel Grade #____

_____ All months _____ Seasonal use. Please circle specific months.
J F M A M J J A S O N D

_____ As needed as backup fuel _____ Other, specify _____

Fuel Grade #____

_____ All months _____ Seasonal use. Please circle specific months.
J F M A M J J A S O N D

_____ As needed as backup fuel _____ Other, specify _____

f. If fuel oil is used for a backup or secondary fuel source, what is the primary fuel?_____

Comment on the efficiency of energy use in your production process using the backup fuel (fuel oil) rather than the primary fuel.

_____

_____

g. Indicate the amount of storage capacity available for fuel oil.

Fuel Grade	Storage
#____	_____gallons
#____	_____gallons
#____	_____gallons

(12) Did you use coal in 19___? _____Yes _____No

a. Indicate the type of coal you used in 19___:

_____ steam coal (nut and slack) _____ stocker coal

_____ other, specify _____

b. List your local supplier _____

c. Provide the following information on your coal use in 19___.

Quantity _____ Tons/year.

Cost _____ Dollars/year.

d. If annual coal information is not available, provide the following information from your coal bills for 19___.

Delivery	Quantity (Tons/yr.)	Car Loads	Cost (Dollars/yr.)
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____
6	_____	_____	_____
Total	_____	_____	_____

e. If coal was used for processing and there was a 20% reduction in your coal supply, estimate the percent reduction in your production:

(1) Alternate fuel is available _____%

(2) Alternate fuel is not available _____%

f. Indicate your coal consumption patterns in 19___.

_____ All months _____Seasonal use. Circle specific months.

J F M A M J J A S O N D

_____ As needed as backup fuel _____Other, specify_____

g. If coal is used for a backup fuel or secondary fuel source, what is the primary fuel? _____

Comment on the efficiency of energy use in your production process using the backup fuel (coal) rather than the primary fuel.

_____

_____

h. What average inventory of coal do you maintain?_____

(13) Did you use any fuel not covered in previous questions? _____Yes _____No

a. Describe fuel_____

_____

b. What was the total quantity and cost of this fuel in 19___?

Quantity _____ Cost _____

c. If fuel was used for processing and there was a 20% reduction in your fuel supply, estimate the percent reduction in your production.

(1) Alternate fuel is available _____%

(2) Alternate fuel is not available _____%

d. Indicate your fuel consumption patterns in 19___.

_____All months _____Seasonal use. Circle specific months.

J F M A M J J A S O N D

_____As needed as a backup fuel _____Other, specify_____

(14) Analysis of Economic Energy Costs.

a. List below the total energy cost using the data provided in the previous questions. If the data are incomplete, estimate total energy cost.

	*19__ Cost of Energy	% Change Inventory Level	19__ Energy Consumption
Electricity	$_____	_____	_____
Natural Gas	_____	_____	_____
LP Gas	_____	_____	_____
Fuel Oil	_____	_____	_____
Coal	_____	_____	_____
Other	_____	_____	_____
Total	_____	_____	_____

b. Estimate the percent of your cost of raw materials in 19___ represented by your energy costs. _____%

c. Estimate the percent of your total cost of production represented by your energy costs. _____%

d. In general, what has been the effect of the increase in energy cost on product price?

_____

_____

_____

* Year for which data are being gathered.

e. In general, has the increase in energy cost had any effect on your ability to maintain and serve your existing markets?

Processing _____

_____

_____

Transportation _____

_____

_____

(15) Raw Materials and Waste Analysis.

a. Has your production been affected by the loss, cutback or price rise in energy-related or other types of raw materials?

_____No _____Yes, list the raw materials and the nature of the problems.

Material	Problem
1. _____	_____
	_____
	_____
2. _____	_____
	_____
	_____
3. _____	_____
	_____
	_____
4. _____	_____
	_____
	_____
	_____

b. What waste materials are produced and in what amounts?

Waste	Quantity Units/Time Period
_____	_____ per _____
_____	_____ per _____
_____	_____ per _____
_____	_____ per _____

c. Are these wastes separate or are they mixed together and could they be easily separated?

Waste	Comments
_____	_____
	_____
	_____
_____	_____
	_____
	_____
_____	_____
	_____
	_____
_____	_____
	_____
	_____

Persons contacted:

Name: _____ Title: _____

Phone: _____

Name: _____ Title: _____

Phone: _____

Survey made by: _____ Date _____

Form B-2B

PART II: CONSUMPTION INVENTORY

The following form should be used as explained:

Form B-2B, Part II: Consumption Inventory

This form may be used to record data on any activity classified by the Standard Industrial Classification (SIC). Data received on this form will give the district an estimate of total energy types used, percentage for the various parts of each operation (i.e., space heating, processing, etc.), and inventory levels of energy kept on hand.

Data for this form can be received from each individual activity. An interview is preferable, but forms may be left for completion.

Code No._____

SIC No._____

ENERGY CONSUMPTION INVENTORY

County_____

Output Data

1. What were your 19___ sales in dollars?_____

2. What was your 19___ production in units (pounds, etc.)?

   Quantity_____Units_____

3. What was your 19___ average employment?_____

4. What was your production schedule in 19___?

   Days per year_____Shifts per day_____Hours per shift_____

Energy Data

5. Circle "P" for primary and "S" for secondary (i.e., backup fuel used when your primary supply is interrupted for those fuels you used in 1973 (excluding transportation).

Electricity	1.	P	2.	S	Fuel Oil	1.	P	2. S
Natural Gas	1.	P	2.	S	Coal	1.	P	2. S
LP Gas (Propane)	1.	P	2.	S	Other	1.	P	2. S
					What type?_____			

6. Estimate the percentage of each type of fuel used (excluding transportation) in 19___ for:

	Electricity	Natural Gas	LP Gas	Fuel Oil	Coal	Other
(a) Space Heating and Air Conditioning	____%	____%	___%	____%	____%	____%
(b) Processing/ Production	____%	____%	___%	____%	____%	____%
(c) Fuels used but not counted in (a) or (b)	____%	____%	___%	____%	____%	____%
	100%	100%	100%	100%	100%	100%

7. Estimate your total energy cost in 1973 (excluding inventory changes).

19___ Cost of Energy

Electricity	$_____	Fuel Oil	$_____
Natural Gas	$_____	Coal	$_____
LP Gas	$_____	Other	$_____

8. Estimate the percentage of your total cost of production represented by your energy costs. _____%

9. Transportation Energy Consumption in 19___.

(a) Estimate the percentage of each type of fuel used in 19___ for:

	Gasoline	Diesel	Other
(1) On-road use	_____%	_____%	_____%
(2) Off-road use (i.e., forklifts)	_____%	_____%	_____%
(3) Fuels used but not counted in (1) or (2)	_____%	_____%	_____%
	100 %	100 %	100 %

(b) Provide the following information on your transportation fuel use in 19___:

	Quantity (in gallons)	Cost (in dollars)
Gasoline	_____	_____
Diesel	_____	_____
Other	_____	_____

10. Electricity Consumption in 19___:

Provide the following information from your monthly electrical bills for 19___:

	Quantity (in KWH/mo.)		Quantity (in KWH/mo.)
January	_____	July	_____
February	_____	August	_____
March	_____	September	_____
April	_____	October	_____
May	_____	November	_____
June	_____	December	_____

11. Did you use natural gas in 19___? _____Yes _____No; if not, go to question 12.

(a) The billing procedures used by different gas companies vary; please indicate the quantity measurement shown on your bill.

_____ therms

_____ c.f. at _____ Btu/c.f.*

_____ c.c.f. at _____ Btu/c.f.*

_____ m.c.f. at _____ Btu/c.f.*

*If Btu/c.f. is not shown on the bill, please list your gas supplier.

_____

(b) Provide the following information from your monthly natural gas bills for 19___:

	Quantity (in KWH/mo.)		Quantity (in KWH/mo.)
January	_____	July	_____
February	_____	August	_____
March	_____	September	_____
April	_____	October	_____
May	_____	November	_____
June	_____	December	_____

12. Did you use LP gas (propane) in 19___? _____Yes _____No; if not, go to question 13.

(a) Provide the following information from your LP gas bills for 19___:

Delivery	Quantity (in gallons)	Delivery	Quantity (in gallons)
1	_____	7	_____
2	_____	8	_____
3	_____	9	_____
4	_____	10	_____
5	_____	11	_____
6	_____	12	_____

(b) Storage capacity: _____Gallons

13. Did you use fuel oil in 19___? _____Yes _____No; if not, go to question 14.

(a) Provide the following information for each fuel grade for 19___:

Fuel Grade	Delivery	Quantity (in gallons)	Delivery	Quantity (in gallons)
No.___	1	_____	7	_____
	2	_____	8	_____
	3	_____	9	_____
	4	_____	10	_____
	5	_____	11	_____
	6	_____	12	_____
No.___	1	_____	7	_____
	2	_____	8	_____
	3	_____	9	_____
	4	_____	10	_____
	5	_____	11	_____
	6	_____	12	_____

(b) Storage capacity: Fuel Grade No._____ Gallons_____

Fuel Grade No._____ Gallons_____

14. Did you use coal in 19___? _____Yes _____No

(a) Provide the following information from your coal bills for 19___:

Type of coal_____

Delivery	Quantity (in tons)
1	_____
2	_____
3	_____
4	_____

Delivery	Quantity (in tons)
5	_____
6	_____

(b) What is the average inventory level of coal you maintain?

_____

Form B-2C

ENERGY FLOW INVENTORY

The following form should be used as explained:

Form 2-C: Energy Flow Inventory

This form should be used to show by flow diagram where raw materials and energy enter the process, where products and energy are used and where wastes leave. This diagram would enable technical personnel to appraise the current operation and perhaps make the operation more efficient in terms of energy usage and waste utilization.

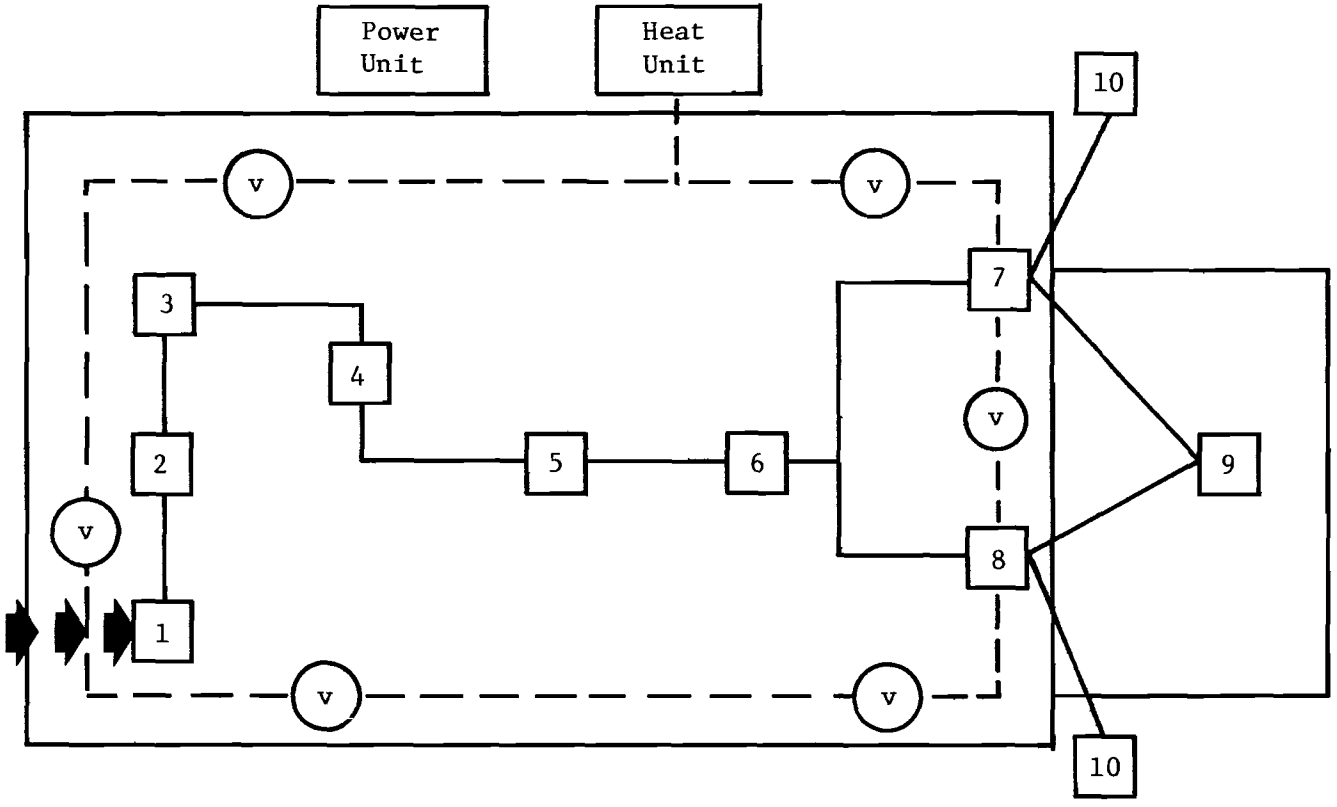
Data for this form must be obtained at the activity. However, the same type of operation will generally have the same type flow so that when data are obtained on one, generalizations may be used for similar activities in the district. Again, while an interview is desirable, the forms may be left for completion.

INDUSTRIAL ENERGY FLOW INVENTORY*

Company Name_____

(1) Sketch a flow diagram of the process indicating where raw materials (including energy) enter and where products and wastes leave. (Please include the power plant and heating system.) * See attached example.

FLOW DIAGRAM
(Example)



1. Raw material
2. Washing
3. Drying
4. Process
5. Process
6. Process
7. Final process
8. Final process
9. Product
10. Wastes

v - vent

(2) (a) Identify on the sketch the parts of the process that are the major energy consumers and estimate the amount of fuel used.

(b) What specific pieces of equipment consume large amounts of energy?

Equipment	Make and Model	Fuel Used	Amount (Unit/Time Period)
_____	_____	_____	_____ per _____
_____	_____	_____	_____ per _____
_____	_____	_____	_____ per _____
_____	_____	_____	_____ per _____
_____	_____	_____	_____ per _____

(If additional space is needed, use the back of this page.)

(3) Remarks (include comments on efficiency of energy use, the use of infrared heaters, etc., special ventilation requirements or safety standards that affect energy consumption, and light levels):

(4) List any energy conservation ideas obtained from employees and describe the company's energy conservation program if one exists.

Appendix B-3

EXISTING INDUSTRY

The following form should be used as explained:

Form B-3: Existing Industry

This form should be used to compile a general listing of the industries in the district. Data for this can be obtained by a telephone survey, interview, or from the forms of B-1 and B-2.

EXISTING INDUSTRY*

Complete Firm Name	Energy Type Used	Products	Employment Male	Employment Female	Truck Lines Serving	Is Firm New - Has it Expanded in Last 5 Years?**

* Use extra page if needed to complete listing.

** If either applies, state which and the year (list only plant or major equipment expansions).

Appendix B-4

ENERGY INVENTORIES

B-4-I: Agriculture
B-4-II: Residential
B-4-III: Commercial/Services
B-4-IV: Recreation

FORM B-4-I: AGRICULTURE

ESTIMATION OF AGRICULTURAL NEEDS

In many of the substate districts, agriculture is an important element of the overall economy. Therefore, this element must be analyzed in terms of energy supply, demand, and consumption.

The following process will provide a method for estimation of the necessary factors. Current work at the state level may provide a more reliable methodology for increasing accuracy of data. However, until such a system becomes available, the data can be estimated in this manner:

a. Establish the energy used in production of the various fertilizer types, then apply this to the needs for each crop. The energy amount per crop per acre then can be multiplied by the respective number of acres in a specific crop. (Regardless of the source of the fertilizer, it can be said that this amount of energy is consumed in the area and, therefore, needed by the area). Acreage data may come from the census, ASCS, or other sources.

   Example: Using the Fertilizer Progress data of January-February, 1975, per 40,000 cu. ft. of natural gas, 2/3 is used as feed stock and 1/3 is used for the energy to process one ton of nitrogen. Using these figures, one can then find the pound requirements per acre of specific crop and multiply by the total of county acreage in the crop. This then can be re-translated into energy needs. Similar figures for each type of fertilizer can be computed. One source for such data is Fertilizer Progress.

b*. Establish a representative type of farm in your area by acreage, crop, production, etc. Once this has been done, establish a reasonable sample of the most common type or types (size, etc.) and then run a fuel and any other energy consumption inventory on the unit. When this has been done, then averages can be established and applied to census and other data sources.

The following form can serve as a data sheet.

---

* Data of this type may be secured from the Branch Agricultural Experiment Station at Midville, Plains, and Rome. For detailed data on physical and dollar cost per acre on fertilizer, equipment use, etc., contact Dr. Fred B. Saunders, Department of Agricultural Economics, University of Georgia, Athens, Georgia.

AGRICULTURAL NEEDS

Location: _____

Crops:	Acreages:
_____	_____
_____	_____
_____	_____

Fertilizer Types:	Fuel Types:
_____	_____
_____	_____
_____	_____

Equipment:	Fuel Amounts:
_____	_____
_____	_____
_____	_____

FORM B-4-II: RESIDENTIAL

RESIDENTIAL ENERGY USE ESTIMATIONS

The residential sector of each substate district uses substantial amounts of energy for heating, cooling, and general day-to-day operations. Consequently, the supply, demand, and amounts of energy going to this sector must be known to the substate district.

There are several ways by which these data can be obtained. The electric supplier or natural gas supplier may have such data in usage per house unit. If such data are available, then the use per unit (by size -- 2, 3, or 4 bedrooms, etc.) can be multiplied by the total number of units. If these sources of data are not available, then a sampling should be taken and monitored for usage. Data are readily available on usage by the various appliances. This can be added into the mix. The Housing Census will give the data on number of rooms, appliances, etc., and this can then be converted to percentages. The percentage of the total of each size unit can then be converted to amounts of energy used through a simple multiplication process.

Another way that these data can be estimated would be through use for a total governmental unit (town or county) of residences. This method has been used successfully by one substate district. However, this would leave a gap on LP gas use in residences. These data can be obtained by talking to the LP gas distributors in the district. Data on the number of units (residential customers) and total volume should be obtained.

The State is developing some methodology on residential use. However, it is not yet available. When these data become available, each substate district will be given a copy.

Housing data may be recorded on the following form.

HOUSING ENERGY NEEDS

County/City:_____

Total Housing Units:_____

1 bedroom _____ 4 bedroom _____

2 bedroom _____ 5 bedroom _____

3 bedroom _____

Fuel/Power Types: (No. of units)

Electricity _____ Gas _____

Fuel Oil _____ Other _____
(Specify)

LP Gas _____

Units with:

Air Conditioning _____ Washer _____

Central Heating _____ Dryer _____

A/C and C/H _____ Range _____

Television Refrigerator _____

Color _____ Other (Specify)_____

B/W _____

Unit Price: (See census categories and tally from same.)

Multifamily Units: Total _____

Duplex_____ Five _____

Three _____ Six _____

Four _____ More than Six_____

Codes: (Those in force) Type: _____

(Housing, Plumbing, etc.)_____

_____

_____

Name of Code (BOAC, SBCC, etc.):

FORM B-4-III: COMMERCIAL/SERVICES

ESTIMATION OF COMMERCIAL AND/OR SERVICE NEEDS

This segment of the economy is found in every part of every substate district. It may range from a shipping center of regional prominence, through a small central business district (CBD), to a crossroads general store. In addition, service-oriented activities are found grouped and scattered throughout the area.

Energy usage in commercial and services establishments may be estimated by the following process. Classify the various uses by type (e.g., grocery, clothing, drugstore, specialty) and size (e.g., mom and pop grocery, country store, supermarket, convenience store). When this has been done, select a sampling of each type and size of the various stores in the substate district. Assure that this will be a representative sample for the entire area (this can be done based upon the empirical knowledge of the area) and then inventory their energy use by type, supply, and demand. The figures thus arrived at can then be averaged and applied to the area's total stores in the various categories.

For example, consider the major chain grocery stores. There are X number of these at 10,000 square feet in the area. Select by sample at least 20% or one in every constituent number. Inventory usage in these and average them. When this is done, multiply this average by the total number of such stores.

Data can be obtained from the census, local land use inventories, and utility companies on account usage volumes. Sample selection should use a recognized random method, and when selections are made, interviews should be done.

The accompanying forms may be used for data collection.

COMMERCIAL AND/OR SERVICE ENERGY NEEDS

1. Type of Activity: Commercial_____ Service_____

   Specific type (grocery,etc.)_____

2. Location_____

3. Energy Types Used: _____

   _____

   _____

4. Energy Amount Used: _____

   _____

   _____

5. Floor Space: _____

6. Other Data:

FORM B-4-IV: RECREATION

RECREATION ENERGY USE ESTIMATES

Each substate district has some use or uses in varying degree devoted to the recreation and tourism activity. Energy has implications in several ways herein. Availability of energy is a primary factor on incoming dollars in an area where this activity draws outsiders; thus, the economic effects must be considered. Lack of energy availability also can lead to local people seeking more local recreational activity. Consequently, this sector plays a role which varies in importance among the various substate districts.

A form for data recording is included.

RECREATION ENERGY NEEDS

County/City _____

Is there a year-round recreation program? _____ Summer recreation program? _____

Paid director _____ Part-time director _____

Source of Funds: _____ (City, county, etc.) Budget: _____ (Dollars)

Facilities: Park/Athletic Fields:

Name	Equipment	Size	Energy Use

List Other Facilities: (Name and number)

_____
(Tennis courts, swimming pools, gyms, golf courses, country clubs, boating, etc.)

Energy Use: _____

Theaters: _____ (Number) _____ (Seating capacity) Energy Use: _____

_____

Drive-in Theaters: _____ (Number) _____ (Car spaces)

_____

State parks or other large recreation areas: _____

_____

Type Facility: _____ Season: _____

Activities: _____ Energy Uses: _____

Attendance: _____

Appendix B-5

ENERGY INVENTORY

FORM B-5-I: GOVERNMENT
FORM B-5-II: VEHICULAR CONSUMPTION

FORM B-5-I: GOVERNMENT

The forms should be used as explained:

Form B-5-I: Government

There are two forms that can be used to record this information. The one on energy impacts of municipal and local government uses provides a quick method to inventory energy uses in general. Inspection and interview can establish the use and its importance. The second form provides a mechanism for recording specific data on certain basic services. Data for this form can best be obtained by interview.

ENERGY IMPACTS OF MUNICIPAL AND LOCAL GOVERNMENT USES

Criteria: (0) Almost no energy uses involved to basic service

(1) Energy used is not essential to basic service

(2) Energy used is essential to basic service

Place the number that best describes the energy use under each respective heading (i.e., transportation, etc.)

Service Area	Transportation	Facilities	Other Uses
1. Law Enforcement			
a. Administration			
b. Patrolling			
c. Surveillance			
d. Air Support			
e. Public Relations			
f. Other, Specify			
2. Fire Protection			
a. Service Calls			
b. Preventive Activity			
c. Public Relations			
d. Administration			
e. Training			
3. Solid Waste Disposal			
a. Collection			
b. Disposal			
c. Site Maintenance			
d. Secondary Calls			
e. Special Calls			
f. Other, Specify			
4. Sewage Treatment			
a. Collection			
b. Disposal			
c. Site Maintenance			
d. Support Facilities			
5. Water			
a. Distribution			
b. Site Maintenance			
c. Billing			
d. Line Maintenance			
e. Installation			
6. Streets and Parks			
a. Installation			
b. Maintenance			
c. Repair			
d. Inspection			

7. Municipal Administration
   a. Buildings
   b. General Accounting
   c. Taxes
   d. Vehicles (specifically attached to administration)
   e. Lighting
   f. Cleaning
   g. Heating
   h. Cooling
   i. Other, Specify

8. Housing Codes
   a. Inspections
   b. Travel
   c. Enforcement
   d. Other, Specify

9. Schools
   a. Buildings
   b. Transportation System
   c. Lighting
   d. Heating
   e. Cooling
   f. Maintenance
   g. Machinery (Instructional)
   h. Grounds Maintenance
   i. Other, Specify

10. Hospitals

CITY/COUNTY SERVICES

Fire Protection:

No. of Fire Stations_____ No. of Fire Engines_____

No. of Paid Firemen _____ No. of Volunteer Firemen_____

Class of Insurance Rating_____ Fuel Consumption_____

Police Protection:

City:

No. on Force_____ No. Uniformed_____

No. of Patrol Cars_____ Regular Patrols at Night_____

Fuel Consumption_____

County: (Sheriff's Office)

No. on Force_____ No. Uniformed_____

No. of Patrol Cars_____ Regular Patrols at Night_____

Fuel Consumption_____

County: (Police Department)

No. on Force_____ No. Uniformed_____

No. of Patrol Cars_____ Regular Patrols at Night_____

Fuel Consumption_____

Garbage/Solid Waste Pickup System:

No. of Vehicles_____ Type(s) of Vehicles_____

Capacity of Vehicles_____ No. of Employees_____

Pickup Schedule (Weekly, biweekly, etc.)_____

No. of Pickups_____ Residential_____ Commercial_____ Industrial_____

Total_____ Public (School, hospital, etc.)_____

Volume (Tons)_____ Residential_____ Commercial_____ Industrial_____

Total_____ Public_____

Fuel Consumption_____

Disposal Site

Location_____ Area_____

Equipment_____ Fuel Consumption_____

Reclamation: Yes_____ No____ Type_____

FROM B-5-II: VEHICULAR CONSUMPTION

ESTIMATION OF VEHICULAR GASOLINE CONSUMPTION BY COUNTY

In order that the total energy situation can be assessed locally, there is a need to know the approximate amount of auto fuel used in the area. The following suggested methodology can aid in obtaining this information.

When license plates are distributed based on size of vehicle and by county, as is the case in Georgia:

1. Gather tag data from the county tag office.
2. Separate data into license plate categories.
3. Match license categories to types of cars.
4. Obtain EPA data on mileage ratings for the various vehicle types.
5. Obtain data on commuting patterns in and out of the county and its localities (the Georgia Department of Transportation can furnish such a map of traffic volumes).
6. Apply the percentages of the various types of vehicles to the trips that have been converted to mileage and then multiply that number by the gallon rating.

Example: Total tags in county X = 100. Tags of small cars A are 50 (50%), and heavier class cars B are 50 (50%). Mileage rating for car A is 40 over the road and 30 in town or 40 + 30 ÷ 2 = 35 m.p.g. average. Mileage rating for car B is 20 over the road and 10 in town or 20 + 10 ÷ 2 = 15 m.p.g. average. Commuting patterns are 100 trips daily between town X and town Y (a distance of 20 miles) and 100 trips from Y to X; thus, 4,000 miles are traveled between these two cities daily. Assume 50% of the A cars make the trip and 50% of the B cars make the trip; this means that each type car travels 2,000 miles. Those of A type at 35 m.p.g. would then consume 57.1 gallons and those of B type would consume 2,000 - 15 = 133.3. Thus, daily consumption on this run would be estimated at 57.1 + 133.3 = 190.4 per day X a 5-day work week = 952 gallons per work week X 52 weeks = 49,504 gallons of gasoline on this run per year. This will then give rough estimates, and a weekend factor can be agreed upon. If the commuting pattern figures are daily, then these daily summed figures can be multiplied directly by 365. The notation should appear on the DOT map as to whether these are daily trips.

Forms for data recording are included.

VEHICLE ENERGY NEED

County _____

Total Number of Vehicles: Auto _____

Truck _____

Other _____

_____

Vehicle by Year and License Class:

Year	Class
_____	_____
_____	_____
_____	_____
_____	_____

EPA Gas Rating by Class:

Rating	Class
_____	_____
_____	_____
_____	_____
_____	_____

Rating for Non-EPA, Years by Class:

Year	Rating	Class
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Percentage of Total Vehicles by Class: _____

_____

_____

_____

Commuter Patterns*:

Origin Pt.	Destination Pt.	Mileage	Trips
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Other Data:

* Origin and destination data can be obtained from the commuter or traffic volume maps, State Department of Transportation. This information appears as number of trips and mileage must be figured.

Appendix B-6

ENERGY IMPACT AREAS
(Potential for Change)

The form should be used as explained:

Form B-6: Energy Impact Areas

This form should be used to build a file on those activities where technical assistance can reduce and/or make more efficient use of energy. Data may be obtained from other forms in this series, particularly the one on energy flow. Interviews and operational inspections in the field also can be used to obtain data for this form.

Type of Activity_____

Initiator(Agency)_____

Location_____

ENERGY IMPACT AREAS: POTENTIAL FOR CHANGE

1. Energy uses identified for potential change._____

_____

2. Specific use to be investigated._____

_____

3. Use can be: ( ) eliminated. ( ) decreased. ( ) altered.

4. Can efficiency/productivity be increased by change?_____

_____

5. Is there a new application of technology for the operation involved with this change?_____

What are the financial costs involved in the change?_____

_____

What are the benefits?_____

_____

Will a long-term operation cost-benefit result?_____

6. Identify barriers to implementing the change?_____

_____

7. Why is it in the interest of the agency to recommend the change to the manager, the council, and the public?_____

_____

8. What political problems are anticipated if the change is initiated?

_____

_____

_____

Appendix B-7

CONTINGENCY PLANNING

CONTINGENCY PLANNING FOR ENERGY CRISIS MANAGEMENT

The United States, as well as the rest of the world, has moved into an era of expensive and ever scarcer energy sources. This will significantly affect every aspect of the social, economic, political, and physical life as well as future development in the substate district. Therefore, it is necessary that local, state, and national resources, especially energy, are managed properly. Only then can a balance be ensured between current economic and social purposes and conservation and protection of resources.

Concurrent with entry into an era of expensive and scarce energy, an era of recurrent energy and resource crisis has been introduced. Energy is the foundation of the modern industrial society. It, therefore, follows that since a substantial portion of the world's known energy reserves is under control of foreign governments, it is essential that decision makers in all sectors of society and at all levels be prepared to make prompt decisions in the event of crisis.

While energy supply, availability, and costs are essentially matters of national policy and the interplay of international forces, national energy policies have not been forthcoming from either the executive branch or the legislative branch of the government. Nor is a comprehensive national energy policy expected in the foreseeable future. Much of the cause for this is due to regional and other complex factors that could lead to unpopular constituent reaction.

Energy emergency contingency planning, just as comprehensive energy policy, must eventually be determined by national government and directed downward through the federal regions to states and then to local governments. However, federal regional agencies and state governments will both find it difficult to deal immediately and effectively with local governments during the early phases of an energy crisis. Sheer numbers of local governmental units indicate this (e.g., Federal Region IV - 3,000+ cities and 700+ units of county government; Georgia - 500 municipalities and 159 units of county government.) Thus, while national policy and administrative procedures may furnish guidance for energy emergency operations, it is at the substate level where: 1) energy is consumed; 2) energy is converted into jobs (national well-being is really determined

by this); and 3) citizens will want answers to questions concerning the effect of current and future energy situations on the quality of life.

It is apparent, then, that all state energy agencies will have great difficulty in dealing with the cumbersome number of units of local governments as well as the many industrial firms, commercial establishments, health care units, and private interest groups. Substate districts (in Georgia, the 18 area planning and development commissions) are manageable groups for dealing with such local governmental units. These districts also are the most significant source of technical talent that can be found in most nonmetropolitan areas.

Planning Objectives

The energy contingency plan should then set forth certain objectives that should lead to successful implementation of measures by public and private decision makers in the substate district. Such measures should lead to minimal disruption of day-to-day activity in all sectors of the district's total activity, ranging from the economic through the social. These operational objectives that should be set as goals of the energy contingency planning are as follows:

a. To prepare individual public and private decision makers at the substate level to handle emergency situations during critical periods of energy availability and/or rapidly escalating energy costs. Such situations would directly and adversely affect the economic, social, physical, and political well-being of citizens served by local and area leadership.

b. To further develop a technical capability at the substate district level that can provide advice, assistance, and encouragement to public and private decision makers in preparing for and handling emergency situations resulting from energy shortages and/or rapidly escalating costs of energy.

c. To institutionalize areawide mechanisms, processes, and communication networks that may be utilized by decision makers in preparing for and handling energy crisis situations, and to provide adequate interface operations with state and federal agencies and/or programs during such times.

Planning Approach

A planning approach must be considered for the contingency activity. The decision-making process is more effective when it takes into account all factors relevant to the problem at hand. In an emergency such as that occasioned by the oil embargo of 1973-1974, decisions have to be made promptly. Since crises are the recurrent feature of our national life, quick, dependable reaction is required at all levels of government and in the quasi-public and private sectors. To decide how to advance to meet emergency needs, there must be an understanding of the general nature of these needs together with processes and techniques for dealing with them.

Energy contingency planning should enhance the understanding of public and private decision makers with respect to energy considerations involved in community and area planning, development, and management. Basically, the objective of the plan is to prepare elected officials, public administrators, directors and the professional staff members of substate districts, officials of public institutions (such as health care facilities), and managers of private enterprises to manage their respective affairs (individually and collectively) should a crisis arise as the result of a situation involving scarce energy and/or rapidly escalating costs of energy. An indirect but immediate benefit accruing from energy contingency planning will be an improvement in energy management practices in current operations on the part of the public and private managers and planners.

Specifically, then, the planning approach should include the following considerations:

a. The broad categories of decisions which must be made in periods of emergency and the ways in which decision makers may react to these situations;
b. major resources currently existing in the public and private sectors;
c. mobilization of resources to meet the needs of crisis managers;
d. identification of constraints which may inhibit such mobilization; and
e. intersectorial energy dependencies and communication networks.

Now that consideration has been given to an approach, the next task deals with development of the energy contingency plan.

Developing the Plan

Although the contingency plan for energy crisis management may be similar in many respects to planning for general disasters, the energy plan differs in that: 1) it need not be as rigorous; and 2) it need not address an immediate potential disaster situation. However, both plan types (i.e., disasters and energy crisis management) should be designed to preserve the social structure and to assure continuity or early resumption of production and/or services in the economic sector.

Since energy supply is essentially a matter that involves the direction of the national government via state governments, comprehensive contingency planning at the local level cannot be completely done until appropriate guidance is received from the foregoing governmental units through their respective agencies. However, some preliminary plans can be completed that will serve to expedite more comprehensive planning when such upper echelon guidance is available. This planning can occur in the form of district staff planning.

Staff Planning. The initial phase of the planning should involve only the district staff. This team would develop a plan for its own use prior to and during an energy crisis. Elements of this plan could include the following:

a. Vulnerability Analysis: The plan should be based on a vulnerability assessment that can determine the damage-causing factors involving an unforeseen shortage of energy. This should include effects on the residents of the district area and on production and services. Vulnerability analysis should examine internal vulnerability which results from activities and conditions within the district area, and an external vulnerability that results from sources outside the district area.

b. Establishment and Maintenance of Communication Networks: It will be necessary for the staff to establish communications within and without the commission area relevant to energy crisis planning and operations. This network would include federal agencies within the district's federal region, appropriate state agencies, neighboring districts, power suppliers, local governments, and other pertinent agencies and groups to be identified. Such contacts should cover both public and private sectors.

c. Establishment of an Energy Crisis Information Center: The district staff should be prepared to establish some form of information center. This center should be capable of keeping client organizations and the general public informed on the energy situation in times of an energy crisis. This course of action will require preplanning and the establishment of appropriate communication networks as outlined above.

d. Public Relations: Contingency planning must provide for appropriate public relations to be undertaken at the outset on an energy crisis. Consequently, preplanning of informational releases for the media should be done.

Comprehensive Planning. Finally, energy emergency guidelines and regulations are prepared and issued by federal and state agencies. District staffs can expand internal staff plans into comprehensive contingency plans involving all client governments and related users of energy. At this point, it probably will be necessary to involve a wider spectrum of citizen participation and to establish appropriate mechanisms that can readily and immediately be activated in the event of a declared energy emergency by the federal government.

Appendix B-8
INFORMATION SOURCES FOR DATA ON ENERGY

INFORMATION SOURCES FOR DATA ON ENERGY

Community Data

Bankers
Building inspector
Chambers of commerce - state and local
Civic leaders
Development agencies - state, area, and local
Employment Security - state and local offices
Fire insurance inspection rating organization - state
Industrial associations in area
Industrial realtors
Libraries - public and technical
Manufacturers in area
Merchants in area - retail and wholesale
Municipal officials
Newspapers
Planning commission
Postmaster
Public health agencies - state and local
Publications (see Appendix B)
Schools, superintendent of - state and local
Telegraph and telephone companies
Transportation companies - air, rail, highway, water
Utilities serving area - electric power, gas, water*
Weather Bureau - local station

Construction Costs

Architects
Building supply companies
Contractors and engineering firms
Georgia Power Company
Manufacturers in area
F. W. Dodge Corp. reports

Electricity and Gas

Chamber of commerce
Development agencies - state, area, and local
Federal Power Commission, Washington, D. C.
Utilities serving area

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* Where Georgia Power Company is listed, the researcher should first check with the State Energy Office because much of Georgia Power's information has been given to the state office to assure accuracy on data.

Natural gas data on volumes used by major customers are available from the supplier (e.g., South Georgia Natural Gas Company).

Housing

Chamber of commerce
Civic officials
Development agencies - state, area, and local
Federal savings and loan institutions
Newspapers
Real estate brokers
National Association of Homebuilders
State Home Builders Associations
Local Home Builders Association chapters

Industry in Area

Chamber of commerce
Development agencies - state, area, and local
Georgia Department of Labor offices - state and local
Industrial associations in area
Newspapers
Publications

Markets

1. Present markets (customers' location, types of products, volume)

   Development agencies - state, area, and local
   Publications
   Sales records of wholesale distributors

2. Growth potential of individual markets (present and possible new customers -- possible new markets)

   Financial reporting services, such as Moody's Industrials
   Development agencies - state, area, and local
   Publications
   Sales forecasts by companies, salesmen, customers
   Studies by advertising agencies - chamber of commerce
   Trade and financial papers, such as Steel, Wall Street Journal, Journal of Commerce

3. Transportation costs (to customer locations; present versus new locations)

   Carriers serving area
   Freight bureau - local

Natural Resources

1. Minerals

   Chamber of commerce
   Development agencies - state, area, and local
   Georgia Department of Mines, Mining and Geology, Atlanta
   Georgia Tech, Industrial Development Division

Natural Resources (continued)

Mining companies
Publications (see Appendix B)
University of Georgia, Geology Department
U. S. Bureau of Mines, Washington, D. C.
U. S. Geological Survey, Washington, D. C.

2. Timber

American Forest Products Industries, Inc., 1816 N Street, N. W., Washington, D. C. 20036
Chamber of commerce
Development agencies - state, area, and local
Georgia Forestry Commission, Macon and Atlanta
Manufacturers - lumber, paper and pulp
Publications (see Appendix B)
U. S. Forest Service, Regional Office, Atlanta

3. Agricultural products

Chamber of commerce
County agricultural extension agent
Development agencies - state, area, and local
Food processing plants in area
Georgia Department of Agriculture, Atlanta
Publications (see Appendix B)
University of Georgia, College of Agriculture
U. S. Department of Agriculture, Information Division, Atlanta

Transportation

Chamber of commerce
Carriers serving area - air, motor freight, bus, railroad, barge, steamship lines
Development agencies - state, area, and local
Freight bureau - local (rates)
Georgia Motor Trucking Association
Georgia Ports Authority
State Highway Department

Water Supply - Waste Water Treatment

Chamber of commerce
City water department
Development agencies - state, area, and local
Fire insurance agencies
Georgia Tech, Economic Development Laboratory
Georgia Department of Mines, Mining and Geology
U. S. Geological Survey, Water Resources Branch, Atlanta
Well drilling companies

Energy Information

Chamber of commerce
Department of commerce
Development agencies - state, area, and local
Energy Research and Development Administration (ERDA)
Georgia Tech, Economic Development Laboratory
State and regional energy offices
Utility companies
Bulk distributors
LP Gas Association
Gasoline Retailers Association

Appendix B-9

GRID SYSTEMS

Grid systems are those systems by which electricity is distributed throughout the state and the nation. These distribution systems are constantly changing in terms of voltage availability and other factors. Consequently, the planner who wishes to know about these systems must inquire at that time to the electric suppliers. Currently, in Georgia one would contact Georgia Power, Savannah Electric Company, or the Crisp County distributor.

Appendix B-10
CONSERVATION PROGRAMS

The substate district affords a credible vehicle for promotion and implementation of energy conservation in programs that range from the general public to specific activities for specific pursuits in the economic and governmental sectors. A number of programs have been instituted over the past several years, and other programs are pending at FEA and ERDA. The State Energy Office can be a source of information on where to find data on such programs and this office may also have some such programs itself. Other sources for such programs may be the required State Energy Conservation Plan, soon to be done by every state, universities, energy suppliers (electric power companies, etc.), consumer groups, other government agencies (e.g., Commerce, HEW, NSF-RANN). These programs vary from the common to the highly technical. Many agencies, government and private, have films and printed materials that can aid in a program tailored to the specific substate district's needs. Again, the substate district should utilize the various aids and sources to create a presentation of its own that can be given to civic groups and the general lay public. The district also should create a means by which industry or other specific groups can be notified of specific existing conservation programs tailored to the particular operation. Constant contact should be made with the conservation units of FEA-Washington and regional offices, ERDA, state energy offices, universities, energy suppliers, and any other groups involved in conservation programs. All programs so obtained must then be tailored to the district's unique needs. The district, assuming that personnel is available, can conduct a program of direct contact and aid through district and nondistrict personnel, providing technical assistance to local governments, enterprises, and social service agencies. This type of program could include such programs as the EDA-sponsored project that Georgia Tech currently performs on industry conservation. It could also include a program such as is outlined in "Energy Conservation, A Technical Guide for State and Local Governments," by Public Technology Inc., March 1975. This project was sponsored by NSF in the RANN program.

Finally, use of the data from these various forms can provide the state with a data base upon which it can do a meaningful program in the required 5% reduction of energy use. This data, when assembled, can permit the state to measure energy use in terms of conservation savings.

Appendix B-11

INDUSTRIAL (SIC) ESTIMATES OF ENERGY USE

ENERGY USAGE*

SIC Number	Industrial Category	Mean Annual Usage (KWH/Day/Employee)
201	MEAT PRODUCTS	508.65
202	DAIRIES	695.34
203	CANNED, FROZEN FOODS	691.28
204	GRAIN MILLS	1583.44
205	BAKERY PRODUCTS	313.06
206	SUGAR	5454.92
207	CANDY	331.76
208	BEVERAGES	655.13
209	MISCELLANEOUS FOODS	1408.66
221	WEAVING, COTTON	322.58
222	WEAVING, SYNTHETICS	562.95
223	WEAVING, WOOL	494.93
225	KNITTING MILLS	286.544
226	TEXTILE FINISHING	1396.11
227	FLOOR COVERING	748.46
228	YARN, THREAD MILLS	339.45
229	MISCELLANEOUS TEXTILES	535.95
242	SAW-PLANING MILLS	487.70
243	MILLWORK	345.30
244	WOOD CONTAINERS	137.23
249	MISCELLANEOUS WOOD	664.78
251	HOME FURNITURE	146.10
259	FURNITURE, FIXTURES	266.32
261	PULP MILLS	8247.10
262	PAPER MILLS	4872.21
263	PAPERBOARD MILLS	7578.70
264	PAPER PRODUCTS	432.38
265	PAPERBOARD BOXES	376.89
266	BUILDING PAPER MILLS	4387.93
270	WHOLE PRINT INDUSTRY	115.49
281	BASIC CHEMICALS	9345.01
282	FIBERS, PLASTICS	2959.83

SIC Number	Industrial Category	Mean Annual Usage (KWH/Day/Employee)
283	DRUGS	618.77
284	SOAP, TOILET GOODS	614.77
285	PAINT, ALLIED PRODUCTS	375.79
286	GUM-WOOD CHEMICALS	1967.76
287	AGRICULTURE CHEMICALS	2004.32
289	MISCELLANEOUS CHEMICALS	1722.29
295	PAVING, ROOFING	2804.92
301	TIRES, TUBES	1013.03
302	RUBBER FOOTWEAR	144.69
306	RUBBER PRODUCTS	474.64
307	PLASTICS PRODUCTS	405.62
311	LEATHER TANNING	794.48
322	PRESSED, BLOWN GLASSWARE	2186.87
323	PRODUCTS OF PURCHASED GLASS	616.52
324	CEMENT, HYDRAULIC	19302.72
325	STRUCTURAL CLAY	3213.52
326	POTTERY PRODUCTS	789.38
327	CEMENT, PLASTER	1741.55
328	CUT STONE PRODUCTS	419.56
329	NONMETALLIC MINERALS	1546.58
331	STEEL-ROLLING	3076.56
332	IRON, STEEL FOUNDRIES	877.40
334	SECONDARY NONFERROUS	1993.64
335	NONFERROUS ROLLING	1085.03
336	NONFERROUS FOUNDRIES	623.22
339	PRIME METAL INDUSTRIES	1664.35
341	METAL CANS	544.12
342	CUTLERY, HARDWARE	264.11
343	PLUMBING, HEATING	334.49
344	STRUCTURE, METAL	260.25
345	SCREW MACHINES	297.58
346	METAL STAMPING	302.90
347	METAL SERVICE	549.38

SIC Number	Industrial Category	Mean Annual Usage (KWH/Day/Employee)
348	FABRICATED WIRE	211.78
349	FABRICATED METAL	405.88
352	FARM MACHINERY	384.41
353	CONSTRUCTION EQUIPMENT	296.88
354	METALWORK, MACHINERY	222.93
355	SPECIAL INDUSTRY MACHINERY	217.42
356	GENERAL INDUSTRIAL MACHINERY	264.45
357	OFFICE MACHINES	126.60
358	SERVICE INDUSTRIAL MACHINES	312.55
359	MISCELLANEOUS MACHINES	207.90
361	ELECTRIC DISTRIBUTION PRODUCTS	156.91
362	ELECTRIC INDUSTRIAL APPARATUS	310.07
363	HOME APPLIANCES	311.78
364	LIGHT-WIRING FIXTURES	240.43
366	COMMUNICATION EQUIPMENT	121.33
367	ELECTRONIC COMPONENTS	173.12
369	ELECTRIC PRODUCTS	246.52
371	MOTOR VEHICLES	365.74
372	AIRCRAFT AND PARTS	195.72
373	SHIP AND BOAT BUILDING	144.98
374	RAILROAD EQUIPMENT	351.54
375	MOTORCYCLES, BICYCLES	364.06
381	SCIENTIFIC INSTRUMENTS	183.17
382	MECHANICAL MEASURING INSTRUMENTS	136.85
384	MEDICAL INSTRUMENTS	144.04
387	WATCHES, CLOCKS	138.58
394	TOYS, SPORTING GOODS	148.45
396	COSTUME JEWELRY	151.38
399	MISCELLANEOUS MANUFACTURING	214.68

* These data have been developed internally at EDL. Conversion factors were arrived at as indicated by the table, which follows, as taken from the 1972 Census of Manufactures, Special Report Series, Fuels and Electric Energy Consumed (Supplement), PC72(SR)-6S, U. S. Department of Commerce, Social and Economic Statistics Administration, Bureau of the Census.

Table A

FACTORS USED TO COMPUTE KILOWATT-HOUR EQUIVALENTS OF FUELS: 1971

Kind of Fuel	Unit of Measure	Killowatt-Hour Equivalent per Unit of Measure
Coal	Short ton	7,677
Coke	do	7,618
Fuel oil:		
Distillate	Barrel (42 gals.)	1,707
Residual	do	1,842
Natural gas	MCF	303.3
Other fuels	Dollar	170

Note: For costs of "Fuels, not specified by kind," conversion factors for 1971 were developed for each 2-digit SIC group, based on the relationship of total cost of fuels to the total kilowatt-hour equivalents for those groups as published in U. S. Bureau of Census, Census of Manufactures: 1963, "Fuels and Electric Energy Consumed in Manufacturing Industries: 1962," Series MC63(1)-6, U. S. Government Printing Office, Washington, D. C., 1964, adjusted to reflect the change in wholesale prices between 1962 and 1971 for the category, "Fuels and related products, including power" (U. S. Department of Labor, BLS).

Appendix B-12

ENERGY BIBLIOGRAPHY

ANNOTATED BIBLIOGRAPHY

ENERGY

ACHIEVING ENERGY INDEPENDENCE. Committee for Economic Development, 477 Madison Avenue, New York 10022. 91p. $2.00.

Statement offered "as an aid in bringing about greater understanding of actions that should be taken to meet energy needs without compromising basic objectives for the security of the nation and its allies, jeopardizing a sound domestic and international economy, or endangering the environment."

"Are the States Rising to the Energy Challenge?" INDUSTRIAL DEVELOPMENT, July/August, 1975, pp. 11-15.

"A report on what the states are doing to help close the energy gap."

Barnaby, David J., and Richard C. Reizenstein. "Perspectives on the Energy Crisis: Gasoline Prices and the Southeastern Consumer," TENNESSEE SURVEY OF BUSINESS, September/October, 1975, pp. 28-31.

Reports the results of a mail survey conducted in October 1974 of respondents that had been surveyed earlier in the year. This second study was undertaken "to assess the impact of the lifting of the embargo and ensuing changes in gasoline price levels and availability."

Barr, Robert J. "Energy Rehab Project -- How Is It Working?" PENNSYLVANIA DEPARTMENT OF COMMUNITY AFFAIRS REPORTS, September, 1975, pp. 3-4.

Describes the home energy rehabilitation project, identifies its problems, and discusses modifications that have been made in the program.

"Behind the Energy Crisis," RESOURCES, January, 1971, pp. 1-4.

A concise review of the status of power and fuel resources leads into a statement of the near- and longer-term outlook concerning these resources and the policy changes that may be required.

Bridges, Jack. "The National Energy Dilemma, Displayed for Total Viewing," CONFERENCE BOARD RECORD, August, 1973, pp. 14-30.

A "series of comprehensive models provides a systematic picture of the developing problem." Includes forecasts.

Citizens' Advisory Committee on Environmental Quality. CITIZENS ACTION GUIDE TO ENERGY CONSERVATION. U. S. Superintendent of Documents, Washington 20402. 1973. 62p. $1.75.

"Directed to citizen leaders, public officials, and others who are in a position to promote understanding of the need for energy conservation and to encourage its practice on a broad scale by the American people."

Crump, Lulie H., and Charles L. Readling. FUEL AND ENERGY DATA: UNITED STATES BY STATES AND REGIONS. Bureau of Mines Information Circular 8647. Washington 20402, U. S. Superintendent of Documents, 1974. 82p. $1.25.

"The data are broken down by fossil fuels (coal, petroleum, and natural gas) and hydropower and nuclear for the major consuming sectors: Household-Commercial, Industrial, Transportation, Electric Power and Miscellaneous."

Darmstadter, Joel. LIMITING THE DEMAND FOR ENERGY: POSSIBLE? PROBABLE? Reprint No. 116. Resources for the Future, Inc., 1755 Massachusetts Avenue, N. W., Washington 20036. 1974. pp. 717-731. Free.

In this article reprinted from ENVIRONMENTAL AFFAIRS, the author concludes that energy conservation "steps are likely to make modest, but not decisive, inroads into the energy problems confronting this country."

Downs, Anthony. "How Will Development Fare in Its Bout with the Energy Shortage?" INDUSTRIAL DEVELOPMENT, May/June, 1974, pp. 17-19.

Brief comments concerned with the impact of the energy shortage on land use and land values.

ENERGY CONSUMPTION IN GEORGIA 1973. Georgia State Energy Office, 7 Hunter Street, Atlanta 30334. 1975. 27p. Inquire as to availability.

"The purpose of this report is to bring together in one document the statistics needed to identify how much energy was used in Georgia in 1973 and how it was used."

"The Energy Crisis," TENNESSEE SURVEY OF BUSINESS, July/August, 1974, pp. 3-.

Three articles treat, respectively, the short-run effects, the long-run prospects, and the impact on income and tax revenues.

ENERGY: CRITICAL CHOICES AHEAD. Office of Energy Programs, U. S. Department of Commerce, Washington 20230. 1975. 16p. Free.

"Designed to put our energy problem into perspective, to demonstrate the dimensions--the orders of magnitude--of the efforts required to meet our future energy needs."

EXPLORING ENERGY CHOICES: A PRELIMINARY REPORT. Ford Foundation Energy Policy Project, 1776 Massachusetts Avenue, N. W., Washington 20036. 1974. 81p. 75¢.

"Does not contain detailed information or analyses of particular issues but rather seeks to provide a framework for thinking about energy policy."

Foell, W. K., and J. E. Rushton. ENERGY USE IN WISCONSIN: A SURVEY OF ENERGY FLOW IN THE STATE OF WISCONSIN. Working Paper 4. Institute for Environmental Studies, University of Wisconsin, Madison 53706. 1972. 46p. Inquire as to availability.

Part of a larger study planned to create a state energy model, "the bulk of the information contained in this first report deals with the physical flow of energy, i.e., types, quantities, and the purposes for which it is used."

Frank, Helmut J. "Energy Prospects and Options for Arizona," ARIZONA REVIEW, February, 1975, pp. 2-7.

Based on an energy inventory of Arizona which was completed recently.

A GUIDE TO ENERGY MANAGEMENT: HOW TO CONDUCT AN ENERGY AUDIT. American Society of Association Executives, 1101 16th Street, N. W., Washington 20036. 1974. 16p. $5.00.

"Intended for the use of trade and professional associations seeking to help their members cope with and plan for the energy-related problems we face."

Haren, Claude C. IMPACT OF THE ENERGY CRISIS ON RURAL AREAS. Industrial Development Note 39. Program Leader, Economic Development, Community Resource Development Staff, U. S. Department of Agriculture, Washington 20250. 1974. 7p. Free.

Briefly considers what the impact has been in eight areas of activity or aspects of rural life.

"Hope on the Horizon for New Industrial Energy Sources," SITE SELECTION HANDBOOK, September, 1975, pp. 292-.

"This report prints up what's new in attempts to meet future demands."

"How Soaring Cost of Energy Spurs New Ways to Save," U. S. NEWS, May 27, 1974. pp. 49-50.

Cites specific steps taken by individual industrial and business firms to conserve energy and reports the value of the savings achieved.

Hudson, Edward A., and Dale W. Jorgenson. "U. S. Energy Policy and Economic Growth, 1975-2000," BELL JOURNAL OF ECONOMICS AND MANAGEMENT SCIENCE, Autumn, 1974, pp. 461-514.

"Presents a new approach to the quantitative analysis of U. S. energy policy, based on an integration of econometric modeling and input-output analysis."

Mills, Madolia Massey. THE POTENTIAL OF DIRECT SOLAR ENERGY IN PLANNING. Exchange Bibliography 476. Council of Planning Librarians, P. O. Box 229, Monticello, Illinois 61856. 1973. 13p. $1.50.

Intended "to call attention to literature - past and present - which deals with the potential of utilizing direct solar heat in planning our cities and in redeveloping older, lower-income urban areas."

Myers, John G. "Energy Conservation and Economic Growth -- Are They Incompatible?" THE CONFERENCE BOARD RECORD, February, 1975, pp. 27-32.

After reviewing the facts concerning energy use and economic growth, the author concludes that although the two "are certainly not independent . . . the link between them is more elastic than is commonly assumed, provided time is allowed for the necessary adjustments in production and consumption that will permit less energy to be consumed per unit of product."

Myhra, David. "Let's Put an End to Energy Waste in Housing," PLANNING, August, 1974, pp. 16-18.

Recommends the defining of criteria for an energy-efficient house by planners.

NACO INFORMATION: ENERGY CONSERVATION. National Association of Counties Research Foundation, 1735 New York Avenue, N. W., Washington 20006. 1975. Portfolio. Inquire as to availability.

The portfolio contains several pamphlets and releases which describe conservation potentials in different areas of activity and conservation practices by specific county governments.

NTIS (National Technical Information Service), U. S. Department of Commerce, 15285 Royal Road, Springfield, Virginia 22161.

Bibliographies on the subject of energy and an assortment of energy studies are available on microfilm.

PROFESSIONAL BUILDER. Cahners Publishing Company, 53 Wabash Avenue, Chicago, Illinois 60603. Monthly.

This magazine covers the building trade and addresses specific energy issues in the home building trade.

Roberts, James S. "Energy and Land Use: Analysis of Alternative Development Patterns," ENVIRONMENTAL COMMENT, September, 1975, pp. 2-11.

"The present energy balance in the Metropolitan Washington D. C. area is presented, showing the pattern of sources and uses. Several alternative scenarios for future development are presented, with varying allocations of households, employment, and automobile travel."

Schutz, Harald. "Maryland and the Energy Shortage," BALTIMORE ENGINEER, December, 1974, pp. 8-9.

Brief statement of background of energy problem and description of specific difficulties in Maryland plus recommendations concerning action to meet the crisis in Maryland.

Seidel, Marquis R., and others. ENERGY CONSERVATION STRATEGIES. EPA-R5-73-021. U. S. Environmental Protection Agency, Forms and Publications Center, Route 8, Box 116, Highway 70, West, Raleigh, North Carolina 27612. 1973. 114p. Inquire as to availability.

"Deals first with restoring proper market functioning, then with the effects of energy price increases, and finally with selected regulatory actions."

Smith, Turner T., Jr., "Electricity and the Environment -- The Generating Plant Siting Problem," BUSINESS LAWYER, November, 1970, pp. 169-197.

A lawyer analyzes the conflicting needs for more power and for a cleaner environment and stresses that "lawyers must participate in developing and implementing workable solutions."

STATE RESPONSES TO THE ENERGY CRISIS. Council of State Governments, Iron Works Pike, Lexington, Kentucky 40511. 1974. 42p. $3.00.

"Efforts of the States to resolve and relieve the causes and effects of the energy crisis are discussed and the framework through which those actions were pursued are described."

THE STATES AND THE FUEL AND ENERGY CRISIS. Council of State Governments, Iron Works Pike, Lexington, Kentucky 40511. 1974, 5p. Free.

Includes a suggested model state crisis management act.

SURVEY OF THE EFFECT OF THE ENERGY CRISIS ON TRAVEL RELATED BUSINESSES IN COASTAL GEORGIA. Coastal Area Planning and Development Commission, P. O. Box 1316, Brunswick 31520. 1974. Unpaged. Inquire as to availability.

Report of the results of a survey carried out in March, 1974.

U. S. Committee on Interior and Insular Affairs. ENERGY INFORMATION NEEDS -- STUDY BY THE GENERAL ACCOUNTING OFFICE. 93d Congress, 2d Session. Committee Print. U. S. Superintendent of Documents, Washington 20402. 1974. 65p. $1.10.

Appendix contains "Energy Data Profiles" for major federal agencies. Profiles describe type and source of data collected plus other descriptive information about the data.

U. S. Council on Environmental Quality. ENERGY AND THE ENVIRONMENT: ELECTRIC POWER. U. S. Superintendent of Documents, Washington 20402. 1973. 58p. 85¢.

"Considers the elements underlying our growing demand for energy and the environmental implications of the complex energy systems for meeting this demand."

U. S. Department of Commerce Technical Advisory Board. CTAB RECOMMENDATIONS FOR A NATIONAL ENERGY PROGRAM. U. S. Superintendent of Documents, Washington 20402. 1975. 70p. $1.80.

In addition to the specific recommendations, the report includes statements concerning the alternatives suggested by the Board.

U. S. Department of Housing and Urban Development. IN THE BANK -- OR UP THE CHIMNEY? U. S. Superintendent of Documents, Washington 20402. 1975. 69p. $1.70.

"A dollars and cents guide to energy-saving home improvements."

U. S. Legislative Reference Service. THE ECONOMY, ENERGY, AND THE ENVIRONMENT. Prepared for the use of the Joint Economic Committee. Joint Committee Print, 91st Congress, 2d Session. U. S. Superintendent of Documents, Washington 20402. 1970. 131p. 55¢.

"Surveys the existing literature relating to various technical aspects of electric power production, with primary emphasis on the supply of the various fuels used in the production of electricity and on the environmental consequences of energy conversion."

U. S. National Bureau of Standards. ENERGY CONSERVATION PROGRAM GUIDE FOR INDUSTRY AND COMMERCE. NBS Handbook 115. U. S. Superintendent of Documents, Washington 20402. 1974. Various pagings. $2.50.

"Focuses on two aspects of energy conservation: (1) The key steps in an implementation plan for an energy conservation program. (2) Energy conservation opportunities which have been identified by industry."

U. S. National Bureau of Standards. MAKING THE MOST OF YOUR ENERGY DOLLARS IN HOME HEATING & COOLING. NBS Consumer Information Series 8. U. S. Superintendent of Documents, Washington 20402. 1975. 16p. 70¢.

Based on findings contained in a technical study, this report provides homeowners with guidelines for determining the "best combination of energy conservation improvements" and offers suggestions on the financing of the improvements.

U. S. Office of Emergency Preparedness. THE POTENTIAL FOR ENERGY CONSERVATION: A STAFF STUDY. U. S. Superintendent of Documents, Washington 20402. 1972. Various pagings. $3.00.

"The objective of this study is to suggest programs which would either improve on the efficiency with which energy is consumed or minimize the consumption of energy . . . while providing the same or similar services to the consumer."

WAYS TO SAVE MONEY ON YOUR UTILITY AND GASOLINE BILLS. Institute of Community and Area Development, University of Georgia, Athens 30601. 1974? 16p. Inquire as to availability.

"The ideas outlined . . . suggest ways to reduce consumption of electricity, natural gas and petroleum in your home and automobile and save on your energy costs - without a tremendous amount of discomfort or inconvenience."

Zink, Lee B. ENERGY SHORTAGE AND THE NEW MEXICO ECONOMY IN 1974. Business Information Series No. 50. Bureau of Business and Economic Research, University of New Mexico, Albuquerque 87131. 1973. 4p. Inquire as to availability.

Describes "what is likely to happen to employment in the various sectors of the State's economy."

GUIDELINES FOR AN ENERGY AUDIT FOR SUBSTATE DISTRICTS

Prepared under Contract
with the
Department of Community Development
of the
State of Georgia
by
The Research Institute, Georgia Institute of Technology
Philip D. Koos, Jr.
(Principal Author)
and
Robert E. Collier
Economic Development Laboratory
Engineering Experiment Station
for the
Bureau of Community Affairs

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Bureau of Community Affairs
7 Hunter Street, S. W., Room 640
Atlanta, Georgia 30334

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PART III

ENERGY AUDIT GUIDELINES

ENERGY AUDIT GUIDELINES: RECOMMENDED PROCEDURE

An audit was defined in the introduction as an official examination of accounts and records. The energy audit, therefore, would be defined as an official examination of accounts and records on energy supply and consumption in the various activity sectors (physical, economic, and cultural) of the substate district's area. It should be recognized that success may vary in the private sectors (industrial, commercial, and residential) because of difficulty in obtaining the necessary records and accounts. The number of units engaged in these activities alone precludes a 100% sample. However, certain general formulas are applicable for use in arriving at figures that can be designated for substate planning district use.

The energy audit would include creation of a methodology that could lead to determination of exact energy amounts consumed by each governmental unit (departments, sections, etc.) and by each sector of district activity -- residential, commercial, industrial, and agricultural. Both supply and demand should be considered in a more detailed and official manner than was the case with the general approach of the inventory. The methodology for such energy audits also should be applicable for use in any substate district.

The energy audit would include several steps that would lead to successful culmination of this activity. These steps include:

1. Determination of main district sectors and subsectors of activity to be audited.
2. Determination of energy types to be audited.
3. Determination of energy measurement to be used.
4. Determination of possible methods to be used to obtain energy supply, demand, and consumption data.
5. Collection of energy supply, demand, and consumption data from those sources determined in item 1 by -
   a. energy type,
   b. unit, department, or activity type, or
   c. the process used.
6. Examination and analysis of the collected data to determine total amounts of energy supply, demand, and consumption, percentages by

sector and subsector (e.g., residential single-family or multi-family units), and other pertinent manipulations. The data should be worked up by type of energy consumed, by type of unit consuming, and, where possible, by process used in consumption.

7. A system should then be devised that can be given to the local unit being audited.

The major thrust of these guidelines will be to collect data describing the various aspects of energy and to place this descriptive information into an accountable system. Sample forms for recording data are included. However, the record situation (available or lacking) will dictate form use and approach. Where possible, it would be advisable for the substate district office to have such data as fuel and power bills from the various units and/or department of government and other activities that bear on the energy situation. There should be one focal point for gathering the data needed in each type of activity, and there should be one overall focal point for analysis and evaluation of the data. The latter focal point should be the substate district. The former source could be a specific department of each government unit, a trade association chapter for business or industry, and jobber or power furnishers for residential uses.

Certain forms, some of which appear in this report, could be used to record the necessary data. Data should include quantities of energy available, consumed, and needed. They also might include dollar figures. Other data would include items pertinent to the particular substate district. Energy should be measured in specific units such as gallons, tons, KWH, etc. Data should be compiled on a monthly basis as a minimum period of time, and daily or weekly data might be used in some cases.

Some of the forms to be used for the auditing process include monthly consumption, monthly summary, yearly consumption, and an energy review. The monthly consumption data would be recorded on forms C-1 - C-1b (Appendix C-1). A separate form should be used for each energy source (i.e., electric, natural gas, fuel oil, LP gas, diesel, gasoline, coal, and any other). Items on these forms include:

a) Department, unit, or activity -- the name and location of the user (e.g., a governmental department such as fire, police, recreation and

the physical address, the pharmacy department at Smith's Drug, the finishing department of XYZ industry, or OR room at Z hospital, etc.);

b) Measuring device location -- (e.g., electric meter by local address of the user);

c) Company account number -- the account number by which the energy service supplier identifies the user;

d) Activity accounts number -- the number given by the overall activity to the specific unit;

e) Meter, tank, or other measurement device -- identification number;

f) Rate -- the structure used to bill the customer (request information from the local supplier);

g) Bill or statement -- the statement sent by the energy supplier to the energy user. These statements should be maintained in a file by month and by type of energy.

The tabular portion of the monthly form then records energy data by type and use. Considerations here include:

a) Electric -- Billed and actual KW demand by specific use are not usually found on the monthly use statement. This is true of the bill in general, depending on what activity is being considered. However, where an objective of the study is peak demand use, then this information is necessary. (Consult local supplier for definition of these two items.) The unit of measurement which the consumer sees on his bill is KWH (kilowatt hours). This appears along with cost. Although some of the consumption may have occurred in the previous month, due to reading and billing dates, this does not negate use of this type of form, as bills are usually paid on a monthly basis. A check number will identify the check used to pay the bill, and this can serve as an item to aid in researching a specific payment.

b) Natural gas -- Volume of gas used appears as CCF or hundreds of cubic feet (volume also may appear as therms, and this is the most desirable unit measure for Btu calculation). Both volume and cost are to be transferred to the monthly consumption record for the month which appears on the billing date. Again, the check number can be used as a reference source.

c) LP gas -- Volume of gas used appears as gallons. Both volume and cost appear on billing. These items are to be transferred to the monthly sheet. Use month of date appearing on the bill. Check number can serve as reference for research.

d) Diesel and fuel oil -- These two types of fuel will be considered as one type of energy. Volume purchased and cost should be placed on the monthly data sheets. This information will come from the unit's bills or other records. Check numbers can serve for research reference purposes.

e) Gasoline -- Cost and gallons purchased should be logged for the month in those spaces provided on the form. Here information should be broken down by subunit if such data are available.

f) Coal -- Amount purchased should be logged, as should cost. Pounds is a preferable unit of measure; thus, ton price must be converted to a pound price figure.

Information on energy costs and consumption can perhaps best be transferred, with maximum efficiency, to the monthly data sheets when each bill is paid. This procedure should preclude any missing of data and the consequent confusion of back tracing.

When the desired 12-month period has been recorded, volumes and costs can be totaled. These totals then can be transferred to the yearly data sheets on cost and consumption.

Monthly summary data should be recorded on Form C-2. This information allows each unit (considering its subunits) to record for one month the consumption of energy. The data also can serve as a mechanism to assess the effect of implemented conservation efforts. Such data are also useful in forecasting demands on energy as the data are current enough to permit accurate projections.

The monthly summary should be done as soon as monthly consumption records are filled out. Unit name, year, and month should be filled in as the form indicates. Subunit name and energy type consumption are then logged in the appropriate spaces. Totals can be tabulated on the bottom lines.

Form C-3 - C-3b (Appendix C-3) depicts the sheet to be used for yearly consumption records. Energy used by all subunits in a unit is recorded for the

unit's fiscal year period on this form. These data allow one to find total consumption and cost for each energy type used within the unit. A separate yearly sheet should be used for each energy type used by the unit.

Information on billing location and year should be entered in the blanks provided. Each subunit within the unit is listed under the column provided herein. Corresponding costs and consumption for the year then can be transferred from monthly records. Total unit energy consumption and cost can be assessed by addition of appropriate columns. Totals are listed on the bottom line.

Records for multi-year energy consumption and costs can be kept through use of Form C-4. Here data are compiled to give consumption volumes and costs for each energy type used throughout the year. Such data permit observation of type and amount of change in annual rates of use of energy.

Consumption and cost totals for the year can be obtained for each type of energy from the yearly consumption records. These figures then can be logged in the energy review for the particular year. Total costs and consumption by type of energy can be summed on this sheet.

The recommended steps for this auditing procedure are as follows:

1. As billing for energy use is received, record the cost and consumption for each unit by entering the totals for each type of energy on respective monthly consumption sheets.

2. When the month ends, complete the monthly summary and distribute it to the appropriate unit heads, subunit personnel, and other interested individuals.

3. When the fiscal year ends, compile costs and consumption from the monthly consumption records. These are added to find totals for each energy type used during the year and entered on the bottom line. Totals are then transferred to the yearly consumption records.

4. Then, for the unit, add figures on the yearly consumption records to obtain total consumption and cost of each energy type used by the unit during the year.

5. Finally, for long-term analysis, transfer totals found on the bottom line of the five-year consumption records to the energy review sheets provided for each subunit.

Copies of the foregoing forms should be distributed to the unit head, subunit managers, and other interested personnel. These forms also should be forwarded to the substate district office to that person designated to receive the same. The substate district should then set up files similar to those recommended in the foregoing discussion. By this method of approach, everyone is informed on the current trends of energy consumption. The staffer assigned to the incoming reports can become the energy analyst and the source point for collection of all four forms. It might be noted here that these forms are so constructed that they can be used with minor modifications for government, industry, commerce, and other activities as locally defined.

Use of the energy accounting forms will provide a systematic procedure by which consumption and cost data may be acquired in a form that permits analysis with a minimum of unnecessary work. In addition, record keeping of this type permits periodic analyses to establish trends in consumption and cost and to locate areas of waste. Meaningful collection of data also assures that technical assistance may be sought when needed in the analysis. Here again, the substate district, with its focal function, can expedite this process when the need becomes apparent.

Establishment of an effective energy conservation program and/or a total overall energy program means that a specific person must be appointed to handle energy-related records and items in each unit participating in the program and in the substate district office. These persons should undertake the necessary liaison and coordinative activities to assure success of the auditing program and other energy-related activities. All energy items -- problems, data, analyses, evaluation, etc. -- should be directed at and through this network of persons. These persons should be trained in the energy arena so that they will have a broad overall knowledge of energy matters and the necessary networks needed to achieve results on such items. Training could be done at a center or locally, and such training should be funded by one or more federal agencies -- HUD, EDA, FEA, or others.

In terms of the energy audit, the energy resource person would:

1. Be responsible for establishing and carrying out the energy audit system described in the foregoing pages. (Persons actually compiling the audit data would be instructed, initially and periodically, by the

energy resource person; the substate district person would perform this function with the unit resource persons.)

2. Analyze and make recommendations based on the completed audit data. (Based on analysis, the resource person would then instruct his subunit personnel in necessary actions -- the subdistrict person would serve this role districtwide.)

3. Direct activity involving any alternatives in design, equipment, or innovations that would be used to create more efficient consumption and reduce costs without altering output.

4. Be involved in all planning activity relating to energy management and/or conservation in his respective activity.

5. Be knowledgeable to a degree (predetermined) on modern energy conservation methods, both technical and nontechnical.

6. Work with any PR staff on promotion of a total energy program that will reach both general and specific sectors of the public.

Again, training programs should be made available for the energy resource person. Necessary technical assistance at the local level also should be made available as a part of this program. Constant contact should exist between the substate district energy resource person, the state energy office, other state agencies involved in direct or related energy activity, universities, federal agencies (especially those FEA and ERDA sections involved in conservation activity), and any other agencies (local, state, or federal) engaged in such activity.

In summary, the audit program is again considered: To analyze the present energy situation in any unit, the first step is to perform an energy audit. This should be done at a subunit level (e.g., police, fire, etc.). Then the process may be totaled on a unitwide level (e.g., total local government) and a district level (e.g., all governments). The purpose of such an energy audit would be to analyze all processes and procedures and arrive at a determination of:

1. How and where energy is consumed;

2. What energy-consuming steps can be combined or eliminated;

3. What alternate methods can successfully be used;

4. What improvements leading to efficiency can be introduced and implemented.

A continuing program to evaluate and apply energy conservation efforts should be initiated. Techniques of evaluating the energy audit must then be developed to aid in the continuing efforts of monitoring and conserving energy consumption once initial conservation methods have been incorporated for use.

A first consideration is an evaluation of basic requirements. An evaluation based on energy cost may be important when considering budget limitation; but energy consumed per unit of service is a more meaningful way of measuring basic energy requirements (e.g., KWH consumed per gallon of water pumped). This type of measurement can be made for each energy-consuming service or activity and compared with standards set after examination of energy-efficient processes within the specific system/activity or in comparison with other systems/activities.

Several factors must be weighed, when changes in consumption are considered over a period of time. An increase in consumption may not always indicate waste; it may be the result of expanded services. Additional office space, greater water consumption, more heating and cooling of space, or other items resulting from expansion may be the cause of increase. Adverse weather is another uncontrollable factor affecting increased consumption through lighting, heating, and cooling requirements.

Higher energy consumption, on the other hand, may be attributed to inefficiency at some level of operation. Such inefficient energy operations might include:

a. Improperly functioning equipment;

b. Lighting of unused office space;

c. Use of higher wattage lighting sources than necessary for proper illumination;

d. Inefficient heating or cooling practices;

e. Poorly insulated buildings;

f. Inefficient pumps and motors;

g. Inefficient routing of services.

Until recently, local energy users had little trouble in acquiring sufficient energy to meet their needs. The increasing possibility of shortages necessitates planning and preparation to meet any possible crises.

Supply and demand forecasting are techniques for predicting the local energy situation over short periods of time (six months or less). Frequent information from fuel distributors and utilities is necessary in determining short-range supply expectations. This information may take the form of questionnaires submitted monthly by the substate district to the utilities.

In conjunction with supply forecasting, estimations of energy demands are also needed. This is done by projecting data contained in the energy audit into the future. Since more current information on consumption is needed for demand forecasting, it becomes necessary to submit information to the unit heads and substate district offices on a monthly basis.

Finally, if an inefficient area of operation is detected, resources should be directed toward evaluating methods of conservation. Recommendations should be forthcoming from resource persons at the substate district level, the unit level, or from outside technical advisors. Such recommendations should be put into effect by the proper management personnel.

Efforts should be made to inform all managers of the value of energy conservation, and encouragement should be given to all employees to adopt energy-saving measures. While many techniques for reducing consumption may or may not involve initial expenditures, it is likely that a conservation program undertaken areawide will result in considerable savings.

Appendix C-1

ENERGY AUDIT
(MONTHLY CONSUMPTION)

Year_____ C-1

ENERGY AUDIT
(MONTHLY CONSUMPTION)

Type of Energy Electricity

Department/Unit _____

Meter Location _____

City/County/Other Account Number _____

*Power Company Account Number _____

Meter Number _____

Rate _____

MONTH[1]	BILLED KW DEMAND	ACTUAL KW DEMAND	KWH	COST	CHECK#

* Where the town sells electricity, it also sells to its own departments; thus, the form should include this information.

1. Monthly schedules to be established in accordance with governmental planning calendar year.

Year _____ C-1a

ENERGY AUDIT
(MONTHLY CONSUMPTION)

Type of Energy Natural Gas

Department/Unit _____

Meter Location _____

City/County/Other Account Number _____

Supplier Company Account Number _____

Meter Number _____

Rate _____

MONTH[1]	BILLED CCF DEMAND	ACTUAL CCF DEMAND	CCF	COST	CHECK #

1. Monthly schedules to be established in accordance with governmental planning calendar year.

Year _____

C-1b

ENERGY AUDIT
(MONTHLY CONSUMPTION)

*Type of Energy _____

Department/Unit _____

City/County/Other Account Number _____

Supplying Company Account Number _____

Unit of Measurement _____

Rate _____

MONTH[1]	BILLED DEMAND[2]	ACTUAL DEMAND[2]	CONSUMPTION	COST	CHECK #

* Other than electricity or natural gas.

1. Monthly schedules to be established in accordance with governmental planning calendar year.
2. Fuel measurement (Btu's, gallons, tons, etc.)
   A. To be used for LP gas, gasoline, coal, diesel or fuel oil, or any other fuel.

Appendix C-2

ENERGY AUDIT
(MONTHLY SUMMARY)

ENERGY AUDIT
(MONTHLY SUMMARY)

YEAR _____ MONTH _____

DEPARTMENT/UNIT	ELECTRICITY (KWH)	NAT. GAS (CCF)	FUEL OIL (GALS.)	GASOLINE (GALS.)	COAL (LBS.)	LP GAS (GALS.)	OTHER (C)

Appendix C-3

ENERGY AUDIT
(YEARLY CONSUMPTION)

Year _____

ENERGY AUDIT

(YEARLY ELECTRICITY CONSUMPTION)

Department/Unit	MTR.#	KWH	Cost
TOTAL			

Year _____

ENERGY AUDIT

(YEARLY _____ CONSUMPTION)

Department/Unit	Account or MTR. #	Unit of Measure ( )	Cost
TOTAL			

MUNICIPAL SERVICES

DEPARTMENTAL BREAKDOWN

19___ to _____

		Administration	Airport	Fire Dept.	Police Dept.	Water Works	Other	TOTAL
Electricity	KWH							
	Cost							
Natural Gas	CCF							
	Cost							
Fuel Oil & Diesel	Gal.							
	Cost							
Gasoline	Gal.							
	Cost							
LP Gas	Gal.							
	Cost							

Appendix C-4

ENERGY AUDIT
(REVIEW)

ENERGY AUDIT
(REVIEW)

Department/Unit _____

Years 19____ - 19____

		19___	19___	19___	19___	19___	19___
Electricity	KWH						
	Cost						
Natural Gas	CCF						
	Cost						
LP Gas	Gals.						
	Cost						
Fuel Oil and Diesel	Gals.						
	Cost						
Gasoline	Gals.						
	Cost						
Coal	Lbs.						
	Cost						
Other							
	Cost						
Total Cost							

GUIDELINES FOR AN ENERGY IMPACT STATEMENT FOR SUBSTATE DISTRICTS

Prepared under Contract
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of the
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by
The Research Institute, Georgia Institute of Technology
Philip D. Koos, Jr.
(Principal Author)
and
Robert E. Collier
Economic Development Laboratory
Engineering Experiment Station
for the
Bureau of Community Affairs

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Bureau of Community Affairs
7 Hunter Street, S. W., Room 640
Atlanta, Georgia 30334

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PART IV

ENERGY IMPACT STATEMENT GUIDELINES

ENERGY IMPACT STATEMENT GUIDELINES: RECOMMENDED PROCEDURE

An impact statement is defined as a statement that considers a particular element and its relationship to surrounding elements. This portion of the document outlines an approach and format for preparing an energy impact statement. The relationship between types of development and their energy impacts are not always completely understood. The approach herein presented attempts to list only the part of energy which can be affected by development, the natural processes through which those impacts can occur, and the types of information one would gather to analyze those impacts. In each case, sources are given for the energy information which should be presented, any standards or criteria which have been established for certain types of energy use, and additional information on particular energy impacts.

Current guidelines suggest that the impact statement include separate impact of the project on energy. Since these impacts are closely interrelated, the guidelines below include discussion of both of these types of impacts under each heading. Any current guidelines of the various agencies should always be consulted, however, before proceeding with a draft of an Energy Impact Statement.

The statement may be divided into the following sections:

1. Description of the project
2. Description of existing energy
3. Impacts of/on energy
4. Internal project energy
5. Alternative strategies
6. Unavoidable adverse impacts
7. Impacts over time
8. Irreversible/irretrievable commitments
9. Possible actions, methodologies and/or techniques to be used to minimize any harmful effects

The emphasis under each topic should be in accordance with the type and size of the project being proposed and the setting in which the development will take place. To illustrate how the Energy Impact Statement might differ, projects

can be divided into several categories: planned or unplanned, large or small, urban or rural, local or substate district, and intra- or inter-substate district.

The Energy Impact Statement might be done in a three-stage process as suggested below:

1. Identify any environmental, social, and economic conditions that may be changed by the project's energy implications and results;
2. Predict intensity and any spatial dimensions of changes that are likely to occur; and
3. Evaluate cost and benefits of the condition changes in terms of the project's costs and benefits to different sectors of the economy and society.

Of course, the Energy Impact Statement for smaller projects would be less involved. Fewer energy commitments would be made; thus, lesser impacts probably would occur. However, even where the small project is to be undertaken in an area of critical energy significance, the detailed impact statement is necessary. Conversely, the larger project would require a great amount of detail on primary and secondary impacts.

Items that might have significant impacts would include adverse environmental characteristics (waste materials), economic ramifications (employment/unemployment), traffic generation, and others. In addition, any potential satellite activity should be considered for impact.

The Energy Impact Statement also should reflect the type of project being proposed and the types of energy and other resources which are affected. In an urban area, for example, one would expect greater impacts on social, economic, natural, and physical environments, as there has already been considerable alteration. In rural areas, social impacts and economic impacts are just as important and should be given equal attention when energy impacts are considered. For example, a power project built adjacent to a stream or lake will have impacts on that water body, and the Energy Impact Statement, therefore, should be expanded into full environmental sections on water quality, flooding, and other necessary items.

The context and extent of the Energy Impact Statement can dramatically vary, depending upon size, type, location, and operation of the project. These

guidelines attempt to cover many of the impact potentials of all types of energy-related projects. Finally, the guidelines herein are so written as to provide inputs of supportive evidence for the Energy Impact Statement. It should be remembered that such support data should be specific rather than those broad statements so often found in association with the various impact statements.

Several objectives should be kept in mind when the Energy Impact Statement is being done. These include:

1. Assurance of continued supplies of energy.
2. Attainment of the widest range of beneficial uses of existing and potential energy without degradation or risk to health or safety.
3. Preservation and conservation of important energy resources. Maintenance, wherever possible, of a diversity and variety of energy uses, which will assure full utilization with no waste of resources.
4. Achievement of a balance between population, with consequent economic pursuits, and energy use. Such a scheme should permit highest possible living standards and wide sharing of amenities.
5. Enhancement of the quality of renewable energy resources and an approach to maximize those resources attainable through recycling of existing resources.
6. Conservation of all possible energy and energy resources so that a practical standard of life and consequent amenities might continue for generations to come.

A method of approach for attaining the above objectives is given below:

1. Utilize a systematic interdisciplinary approach that assures integrated use of natural, social, and engineering sciences in the planning and decision making that impacts on man's energy uses.
2. Identify and develop methods and procedures that will insure that presently unquantifiable energy-related items may be given consideration in decision making along with economic and technical considerations.
3. Include in every recommendation or report on local, state, or federal actions a detailed statement on:

a) energy impacts of the proposed action,

b) adverse effects (environmentally, economically, socially) which cannot be avoided should the project or proposal be implemented,

c) alternatives to the proposed action,

d) relationship between local short-term uses of energy and maintaining enhancement of long-term productivity, and

e) nonreversible or nonretrievable commitments of energy resources that would be involved in the proposed action should it be implemented.

4. Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources.

5. Recognize the worldwide and long-range character of energy problems and, where consistent with the policy of the United States, lend appropriate support to initiatives, resolutions, and programs designed to maximize cooperation in anticipating and preventing a decline in the energy resources of mankind's world.

6. Make available to state, counties, municipalities, institutions, and individuals, advice and information useful in restoring, maintaining, and enhancing the energy supply and conservation program.

In addition, the following should be considered:

1. Status and condition of major man-made or altered resources and environment, including but not limited to: air, water, and terrain (the agricultural, forest, range, urban, suburban, and rural).

2. Current and foreseeable trends in the quality, management, and utilization of all energy resources and the effects of these trends on the social, economic, and other requirements of the area.

3. Adequacy and availability of energy resources for fulfilling human and economic requirements of the area in light of expected population and growth changes.

4. A review of programs and activities (including the regulatory activities of local, federal, state, and nongovernmental entities or individuals) with particular reference to their effect on the local and area energy situation on the conservation, development, and utilization of energy resources.

5. A program for remedying the deficiencies of existing programs and activities, together with recommendations via programs (new or altered) and/or possible legislation.

Finally, the items below should be considered when doing the Energy Impact Statement:

1. Cost impact on consumers, businesses, markets, or federal, state, and local government.
2. Effect on productivity of wage earners, business, or government.
3. Effect on competition.
4. Effect on supplies of important materials, products, or services.
5. Effect on employment.
6. Effect on energy supply or demand.

Each substate district should develop procedures for the evaluation of proposals identified by application of approved criteria. The evaluation should include, where applicable:

1. An analysis of the principal cost or other inflationary effects of the action on markets, consumers, businesses, etc., and where practical, an analysis of secondary cost and price effects. These analyses should have as much quantitative precision as necessary and should focus on a time period sufficient to determine economic and inflationary impacts.
2. A comparison of the benefits to be derived from the proposed action with the estimated costs and inflationary impacts. These benefits should be quantified to the extent practical.
3. A review of alternatives to the proposed actions that were considered, their probable costs, benefits, risks, and inflationary impacts compared with those of the proposed action.

A basic lineage must then be established for energy assessment regulations that will lead to the Energy Impact Statement. It is felt that the assessment and ultimate impact statement should be broad enough to cover the entire spectrum, and if more specifics are needed in a particular area (i.e., physical elements, etc.), this can be done in the necessary micro scale.

Each project or proposal should be assessed and evaluated by this suggested format:

1. Description of present conditions and situation and the proposed action.
2. Probable impact of the proposed action economically, socially, and environmentally.
3. Any adverse effects economically, socially, and environmentally that cannot be avoided should the proposed action be implemented.
4. Alternatives to the proposed action.
5. The relationship between local short-term uses of man's energy resources, his environment, and the maintenance and enhancement of long-term productivity.
6. Any irreversible and irretrievable commitments of resources which are to be involved in the proposed action should it be implemented.
7. Any actions or forces that may moderate or lessen the negative factors that will occur if the proposed action is implemented.
8. Any growth inducing impacts.

Figure 1 illustrates the suggested process.

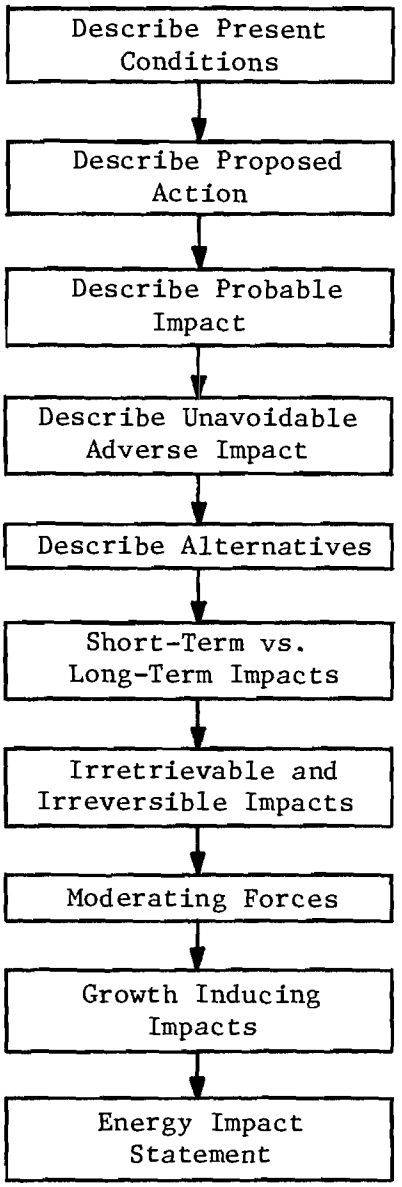
A suggested content for the Energy Impact Statement is given in Appendix D-1. This should be the general information needed in such an impact statement. However, dependent upon local, state, and federal requirements, it may be more or less detailed.

Finally, Appendix D-2, an Energy Impact Checklist, is offered. Use of this form can allow a degree of quantification to the subjective impact statement.

Other tools for aid in doing the Energy Impact Statement may be found in Part I (Energy Inventory) appendices.

Figure 1

SUGGESTED ENERGY IMPACT STATEMENT FRAMEWORK



Appendix D-1

ENERGY IMPACT STATEMENT
(SUGGESTED CONTENTS)

ENERGY IMPACT STATEMENT: SUGGESTED CONTENTS

A. Describe the Project Area.

1. General location

a. Site

b. Situation

B. Describe the Development and its Purposes.

1. Description

2. Purpose

C. What Are the Probable Impacts on the Economy?

1. General Statement

2. Specifics

a. Is the development accepted locally?

b. Will the development substantially alter current economic patterns and uses?

c. Will the development cause an increase or decrease in any type of emissions?

d. Will the development cause an increase or decrease in employment?

e. Will the development cause an increase or decrease in ultimate economic stability?

f. Will the development necessitate a substantial increase in service needs (e.g., water and sewer)?

g. Will the development increase energy needs for the project itself or for associated uses (e.g., residential, commercial).

h. Will the development cause possible demands on energy supplies that could cause shortages?

i. Will the development disturb existing patterns of economic activity and/or employment?

j. Will the development cause alterations in commuting patterns and increase auto use?

k. Are there any other unusual aspects that will have effects on the overall economic structure of the area?

l. What alternatives can be considered that will permit this project to occur with its benefits?

m. Does the development fit into the local and regional economic development scheme?

D. What Are the Probable Impacts on Energy?

1. General Statement

2. Specifics

   a. Will energy supplies and demand be altered by the development?

   b. Will energy consumption patterns be altered?

   c. Will energy demands cause any alteration to existing land use and development patterns?

   d. Will energy demand of the development cause increased energy demands for services, etc.?

   e. Will energy demands be increased because of commuting employees?

   f. What alternatives can be considered in regard to energy supply and demand that would still make the project feasible?

   g. How do the energy implications of the development fit in the local and regional energy picture?

E. Are There Probable Adverse Environmental Effects That Cannot Be Avoided?

1. Natural

2. Cultural

F. What Energy Monitoring Programs Are Needed?

1. Supply

2. Demand

3. Environmental

4. Alternatives

G. What Are the Probable Impacts on the Environment?

1. General statement

2. Specifics

   a. Is the development controversial?

   b. Will the development substantially alter the patterns of current usage?

   c. Will the development cause or increase water pollution?

   d. Will the development adversely affect the water table in the area?

   e. Will the development cause or increase air pollution?

   f. Will the development increase the stability or instability of the soils and/or geology of the site?

g. Are the geologic or soils conditions of the site hazardous to continuous human occupancy on-site or off-site?

h. Will the development increase the potential fire hazards of the site?

i. Will the development disturb existing vegetation?

H. What Are the Probable Impacts on Cultural Environments?

1. General statement

2. Specifics

a. Will the development product abnormal amounts of traffic?

b. Will the development divide or disrupt existing land uses (including economic base)?

c. Will the development destroy or have adverse effects on existing recreational uses?

I. Are There Probable Adverse Environmental Effects That Cannot Be Avoided?

1. Natural

2. Cultural

J. What Alternatives Exist to the Proposed Development?

K. Does the Relationship of the Development Fit the Long-Term Goals for Local and Regional Development?

L. What Are the Growth-Inhibiting Factors of the Proposed Development?

M. What Problems or Objections Have Been Raised by Local, State, and Federal Agencies?

N. What Are the Growth-Inducing Factors of the Proposed Development?

O. What Reversible and Irretrievable Effects Will Occur as a Result of the Project?

P. What Economic Assets or Liabilities Will Be Caused by Project Development or Nondevelopment?

Q. Should a Contingency Plan Be Done because of One Project?

Appendix D-2

ENERGY IMPACT CHECKLIST

Energy Impact Checklist:

Rate the proposed activity or project on the following energy components in terms of actual or potential impacts of the project on energy and of the energy on the project.

Any identified impacts must be discussed along with the corrective measures that will be taken, where applicable. In addition, all major adverse impacts (rated 4) also must be evaluated in terms of trade-offs to be made between energy concerns and the community's need for the project.

All clearances containing ratings of N/A, 0, 1, and 2 are considered "normal" clearances, but those clearances having ratings of 3 and 4 are "special" clearances.

The rating scale is as follows:

0 = no impacts

1 = beneficial impacts

2 = minor adverse impacts (i.e., those impacts which can be easily mitigated with minimal extra expense or delay in project implementation)

3 = moderate adverse impacts (i.e., those impacts which can be mitigated through the use of special measures which may add reasonable extra costs to the project or result in short delay of project implementation)

4 = major adverse impacts (i.e., those impacts which cannot be mitigated or which would require extensive mitigative techniques which would be very costly and/or which would result in long delays of project implementation)

N/A = not applicable to the type of activity proposed.

	Project on Energy	Energy on Project
1. Environment*	_____	_____
2. Overall Economy	_____	_____
3. Employment	_____	_____
4. Services		
Police	_____	_____
Fire	_____	_____
Solid waste	_____	_____
Water/sewer	_____	_____
Natural gas	_____	_____
Electricity	_____	_____
Streets and roads	_____	_____
Transportation (city bus)	_____	_____
Other (specify)	_____	_____

5.	Schools		
	Elementary	_____	_____
	Junior high school	_____	_____
	Senior high school	_____	_____
	Other (Specify)	_____	_____
6.	School Services		
	Transportation	_____	_____
	Maintenance	_____	_____
7.	Hospitals	_____	_____
8.	Social Services	_____	_____
9.	Fuel Supply		
	Electricity	_____	_____
	Natural gas	_____	_____
	Fuel oil	_____	_____
	LP gas	_____	_____
	Gasoline	_____	_____
	Other (specify)	_____	_____
10.	Fuel Demand		
	Electricity	_____	_____
	Natural gas	_____	_____
	Fuel oil	_____	_____
	LP gas	_____	_____
	Gasoline	_____	_____
	Other (specify)	_____	_____
11.	Residential Patterns	_____	_____
12.	Health Services	_____	_____
13.	Commercial Facilities	_____	_____
14.	General Transportation	_____	_____
15.	Contingency Planning	_____	_____
16.	Land/Water Balance	_____	_____
17.	Recreation/Open Space	_____	_____
18.	Compatibility of Land Use	_____	_____
19.	Circulation Patterns	_____	_____
20.	Aesthetic Compatibility	_____	_____
21.	Displacement of Families or Persons	_____	_____

* For a detailed environmental review, HUD Form AER-1 is recommended.

Finding

Based on the information derived from the review and evaluation of the above items and of supporting documentation, the following finding is made:

_____ The request for the release of funds for the proposed activity/ project is not an action which may significantly affect the quality of energy.

_____ The request for the release of funds for the proposed activity is an action which may significantly affect the quality of energy. An Energy Impact Statement is required.

_____ The proposed activity should not be undertaken. Even after appropriate modifications to the proposal, there exist unacceptable energy impacts which are unavoidable.

Briefly summarize the basis for the above finding.

_____ _____

Date Reviewed Reviewer