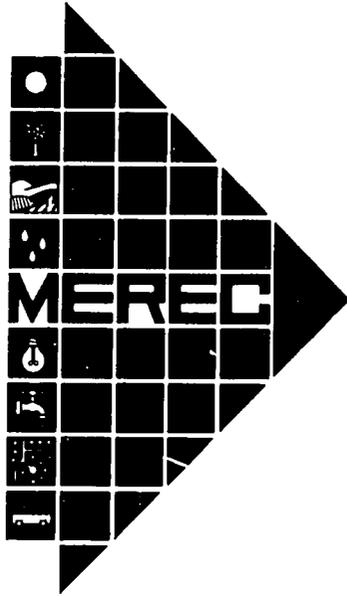


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1.11.2010



MANAGING ENERGY AND RESOURCE EFFICIENT CITIES

FIELD MANUAL

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

BUREAU FOR SCIENCE AND TECHNOLOGY

OFFICE OF MULTISECTORAL DEVELOPMENT

REGIONAL AND RURAL DEVELOPMENT DIVISION

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The Purpose of a MEREC Project

The overall purpose of MEREC is to increase energy and resource efficiency in medium-size cities in developing countries by solving energy and resource problems and fully utilizing resource and energy opportunities. The results of a MEREC project are reduced costs for local citizens, local businesses, and local governments, and improved local economic conditions. Ultimately, MEREC is both a resource management and a city management tool.

Cities that are involved in MEREC develop strategies to efficiently use local resources such as energy, wood, land, and water. The local leaders devise means for carrying out the strategies through plans for the various economic sectors such as electric supply, water supply, land use, and transportation. Before the end of the first year of MEREC activity, the cities begin to implement projects and lay the groundwork for continuing coordination among economic sectors that ensure future improvements in energy and resource efficiency.

Cities starting a MEREC project should understand that this project is based on an integrated approach to resource management. Although MEREC has a basic process to be used in every city, MEREC is experimental and flexible which means that every city's experience will be unique. Different types of projects will be selected and developed in each new MEREC city. All of the local urban sectors are involved in the planning and implementation of MEREC. Local officials are responsible for planning, implementing, and monitoring MEREC activities. Project selection, development, and monitoring are based on data and technical information. MEREC also involves a broad range of representatives from the public and private sectors, as well as representatives from local, regional, and national organizations.

MEREC projects have been successfully developed in Tacloban, Philippines; Phuket, Thailand; and Guarda, Portugal. These projects have resulted in significant savings to local communities. Water distribution systems have been improved, strip mine land has been reclaimed, electric systems have been improved, energy-efficient houses have been constructed, agricultural projects have been harvested, water collection systems have been improved, biogas digesters have been constructed, transportation and land use plans have been developed, and local building materials have been used in construction. MEREC projects have included a variety of activities, but the common element is a more efficient use of local resources which results in savings and earnings for local citizens and a higher level of service provided by local governments.

Certain questions come to mind when considering a MEREC project:

What are resources?

What are resource problems?

What are resource opportunities?

What are economic sectors?

Who participates in MEREC?

What type of project is a local MEREC project?

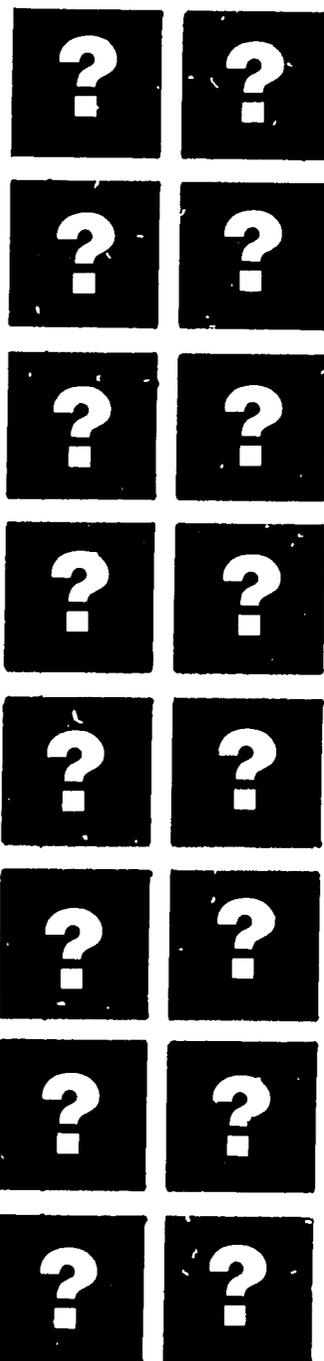
Who provides the money for MEREC?

How long does it take to complete MEREC?

What happens during each project phase?

What happens during the planning workshops?

What happens after MEREC?



WHAT ARE RESOURCES?

Almost anything can be thought of as a resource. For the MEREC effort it is important to focus on the few resources of greatest concern to the city or region.

It may be helpful to think first of categories of resources, according to their main types of uses.

For example:

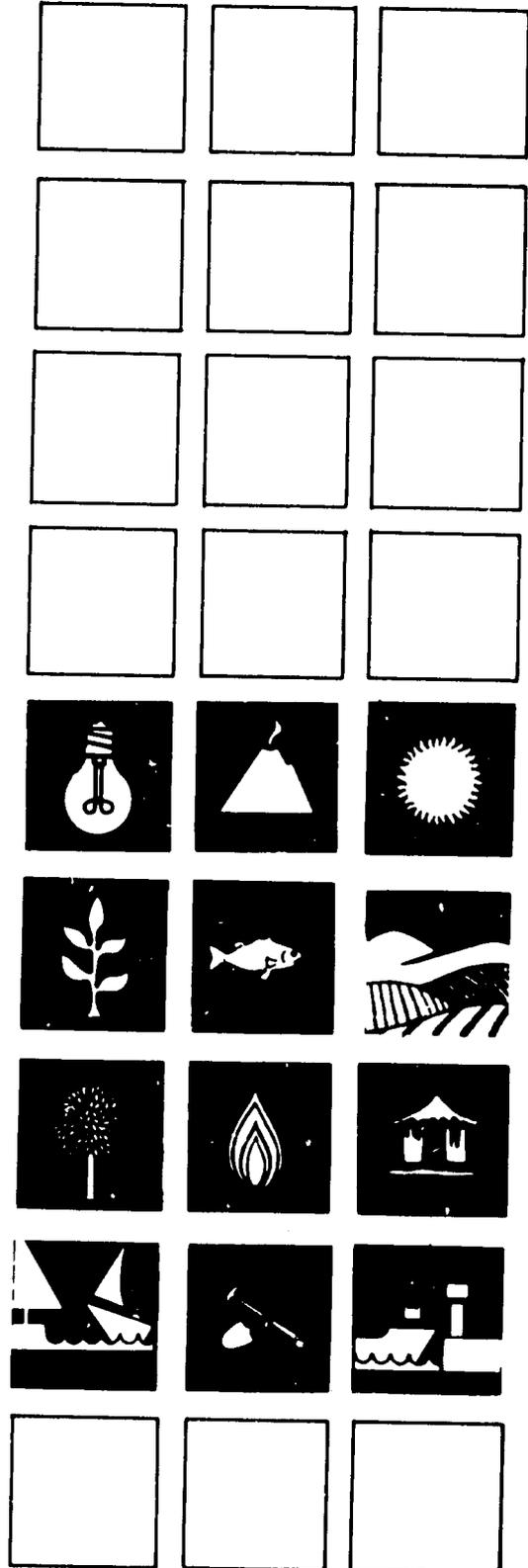
- Energy resources
- Food resources
- Building resources
- Economic development resources

Energy resources might include solar energy, oil, coal, geothermal energy, natural gas, wood, and other types of fuels.

Food resources might include agricultural land, fishing areas, water, vacant land, compost, and other resources.

Building resources might include local building materials, buildable land, heating fuel, cooking fuel, and more.

Economic development resources might include mineral deposits, recreation and heritage areas, waterways, transportation fuel, industrial land, fisheries, and raw materials for local production.



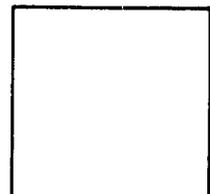
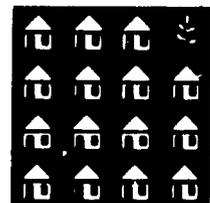
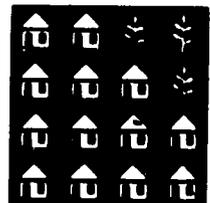
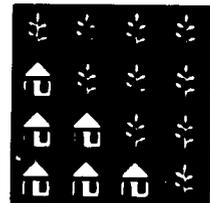
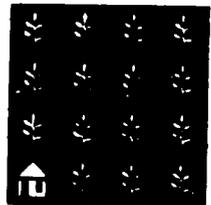
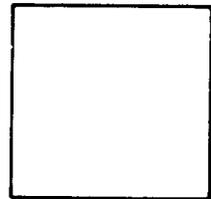
WHAT ARE RESOURCE PROBLEMS?

A resource may be of concern because of problems associated with it.

The resource problems of each MEREK city will be unique, and should be given careful thought.

The following are examples of resources and potential problems:

ENERGY	Scarcity of wood fuel
WATER	Water loss in distribution network
AGRICULTURAL	Prime farm land used for urban development
URBAN WASTE	Unsanitary or ecologically dangerous dump site
TRANSPORT FUEL	Fuel cost too high
LOCAL BUILDING MATERIALS	Local materials not used
FISHERIES	Fishing areas polluted



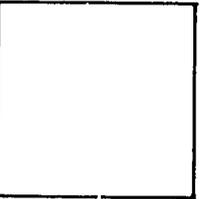
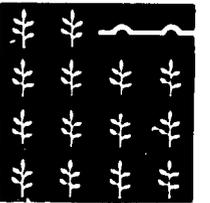
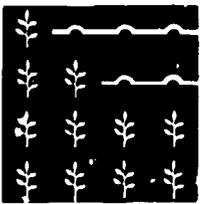
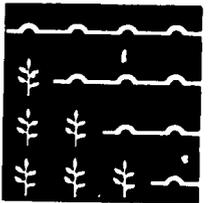
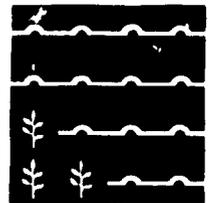
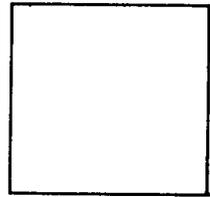
WHAT ARE RESOURCE OPPORTUNITIES?

A resource may be of concern because of promising opportunities associated with it.

The resource opportunities of each MEREK city will be unique, and should be given careful thought.

The following are examples of resources and potential opportunities:

ENERGY	More can be produced locally.
WATER	Untapped water sources
AGRICULTURAL LAND	Undeveloped urban land that could be used for food production
URBAN WASTE	Waste can be converted to fuel, compost, and recycled materials
TRANSPORT FUEL	Greater efficiencies will reduce cost
LOCAL BUILDING MATERIALS	Increased use will increase income and employment
FISHERIES	Increased fish population will reduce food costs



WHAT ARE URBAN SECTORS?

An urban sector is one general area of economic activity.

For the MEREK effort it is important to designate a few key sectors of greatest importance for achieving efficiencies in the chosen resources.

It may be helpful to think first of categories of sectors, according to their main types of functions.

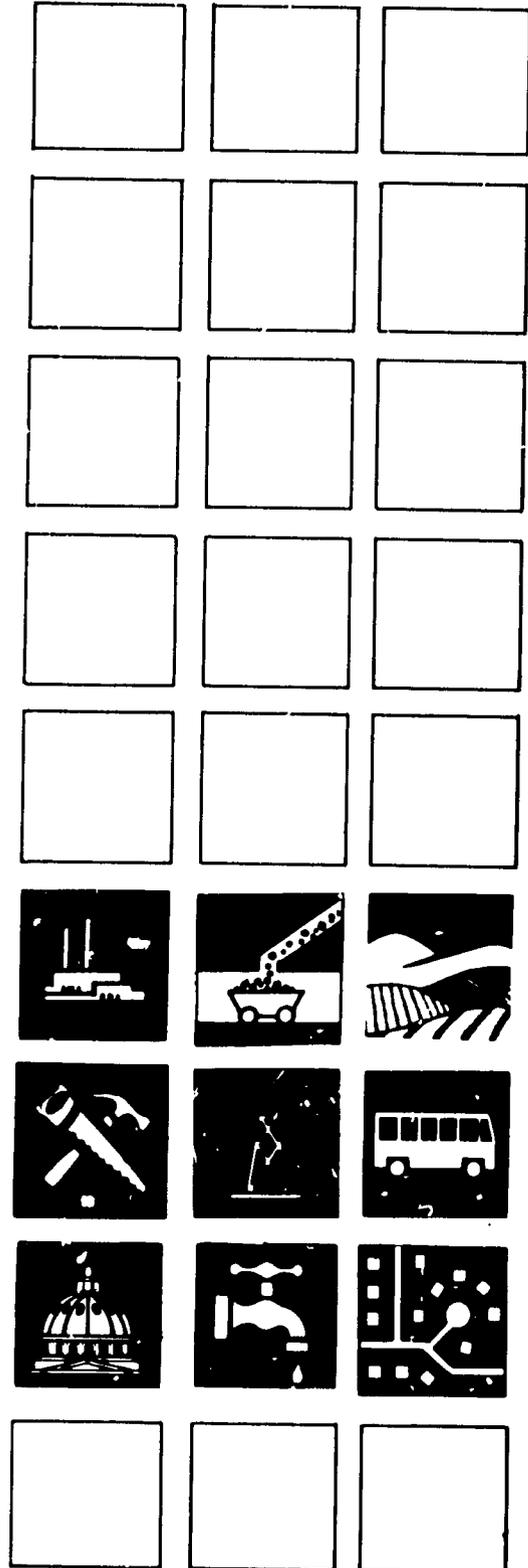
For example:

- Primary production sectors
- Trade and service sectors
- Public service sectors

Primary production sectors might include agriculture and agro-processing, manufacturing, mining, transportation and distribution, and other primary production sectors.

Trade and service sectors might include construction, food supply, crafts, commerce, energy supply, transportation, and other sectors serving residents of the city and surrounding areas.

Public service sectors might include human services, public institutions, transportation, water supply, recreation, sanitation, waste management, public works, land use planning, and other sectors.

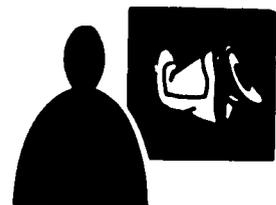
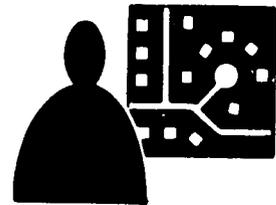
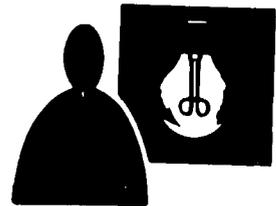
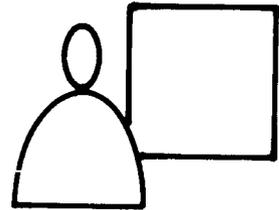


WHO PARTICIPATES IN MEREC?

Careful thought should be given to how a sector works in each MEREC city so that appropriate representatives of the sector can be invited to participate in the MEREC effort.

Following are examples of sectors and potential sector representatives:

ENERGY SUPPLY	Local electric company National energy agency Local industrial energy users
LAND USE PLANNING	Local land use planning and enforcement offices Local developers Citizen groups
TRANSPORTATION	Local transportation agencies Citizen groups Local traffic control agency
URBAN AGRICULTURE	Local land use planning offices Agricultural extension office Local farmer groups
WASTE MANAGEMENT	Waste management office Local farmer groups Local commercial and industrial groups



WHAT TYPE OF PROJECT IS A LOCAL MEREC PROJECT?

All MEREC projects involve the improved management of a critical resource. Since critical resources are different in each MEREC city, MEREC projects are tailored to each city. It should be noted that MEREC does not include health projects, population projects, and general education projects. MEREC projects involve a quantifiable attempt to improve a measured resource efficiency.

The following list notes examples of local MEREC projects:

Land Use Projects

- Mine Land Reclamation: Thailand
- Land Use Planning: Philippines
- Urban Agriculture: Philippines

Water Projects

- Leak Detection: Portugal
- Distribution System Evaluation: Philippines
- Rain Water Collection and Storage: Thailand

Waste Management Projects

- Solid Waste Collection: Philippines
- Biogas Digester: Philippines
- Oxidation Pond: Philippines
- Fermentation Tank: Thailand

Transportation Fuel Project

- Transportation Plan: Philippines



Land Reclamation Project—Thailand



Solid Waste Collection—Philippines



Urban Gardens—Philippines



Water Conservation Project—Portugal

Electricity Projects

- Energy Conservation in Public and Private Construction: Portugal
- Meter Calibration: Philippines
- Energy Audit Workshop: Philippines
- Electric System Evaluation: Philippines

Local Building Materials

- Housing Demonstration: Philippines
- School Demonstration: Portugal

Educational Projects

- School Programs in Resource and Energy Conservation: Philippines
- Water Jar Construction Manuals: Thailand
- Energy Conservation in Residential Construction Manual: Portugal



Water Conservation Project—Thailand



Housing using local materials—Philippines



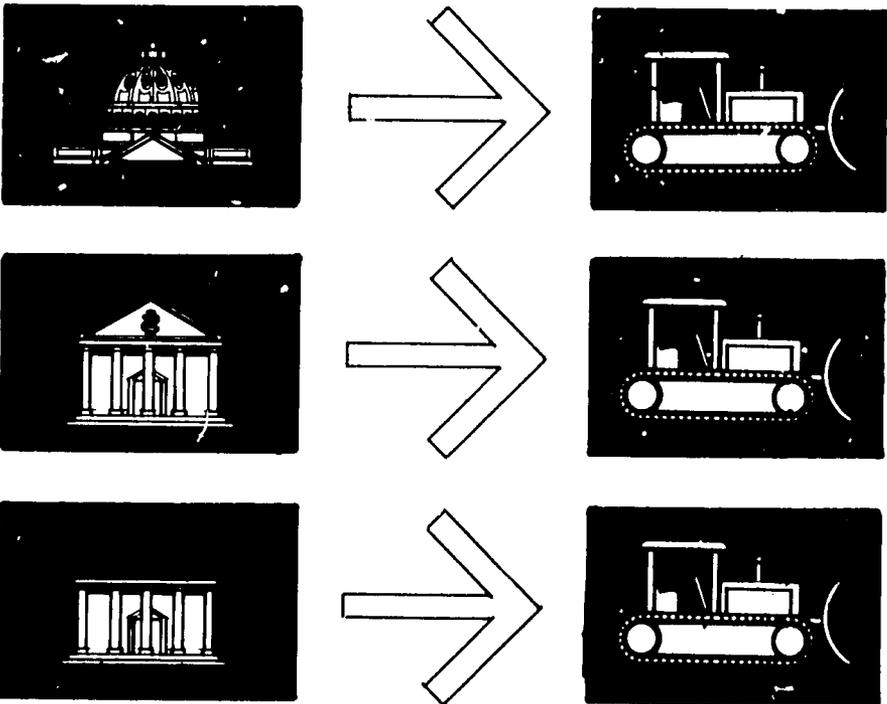
Energy Conserving School—Portugal



Biogas Digester—Philippines

WHO PROVIDES THE MONEY FOR MEREC?

MEREC funds come from a variety of sources including local governments, regional governments, national governments, USAID, the World Bank, regional development banks, and the private sector. Since MEREC projects actually save and earn money for local governments and businesses, local officials can recover funds invested in MEREC. It is a wise investment for any organizations to pursue a MEREC project that reduces cost, increases productivity, and lengthens the useful life of resources while creating jobs in the local economy.

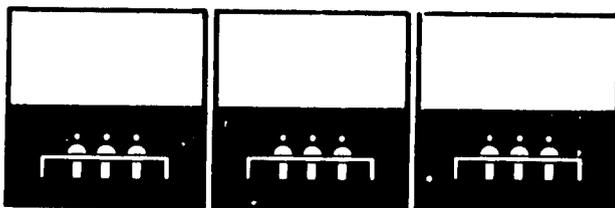


HOW LONG DOES IT TAKE TO COMPLETE THE MEREC PROCESS?

The MEREC process takes approximately three years to complete. The start-up or orientation activities are completed within three months, and planning activities are finalized within the first nine months of the project. These activities are then followed by implementation which takes approximately 27 months. Of course, implementation times will vary according to the types of projects selected by local officials. It should also be noted that for projects requiring a research component, the planning phase will extend beyond the normal six-month period.

Although the initial MEREC projects are usually completed within a 36-month period, it is anticipated that a second set of MEREC activities will then be started. The second set of projects will utilize the data and experience of the initial projects to refine and improve local efforts to manage key resources efficiently.

STARTUP



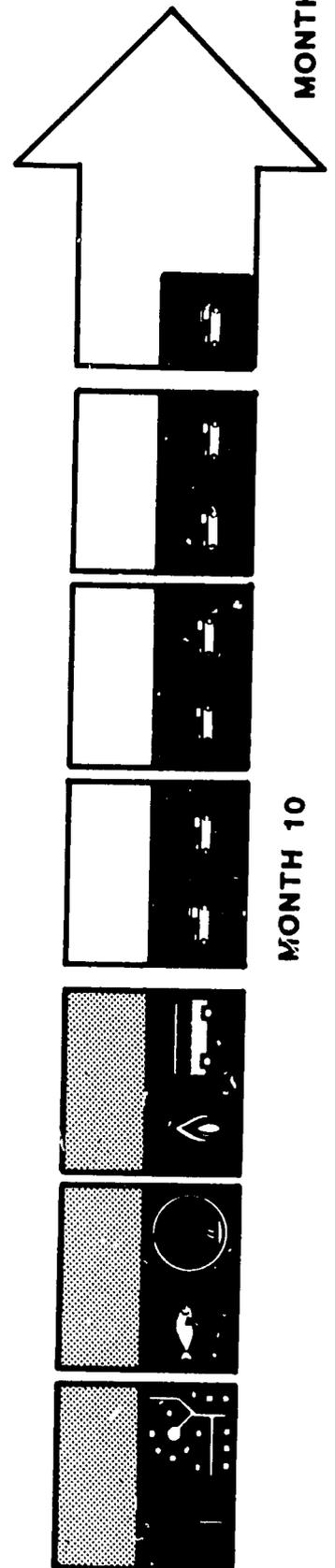
MONTH 1

PLANNING



MONTH 4

IMPLEMENTATION



MONTH 10

MONTH 36

WHAT HAPPENS DURING EACH PROJECT PHASE?

The Startup Phase

Overview:

Startup activities extend over approximately a three-month period, beginning with a "startup workshop." Participants in the workshop include city officials and private sector representatives designated by the mayor, officials from other levels of government, and consultants. The workshop is designed, prepared, and conducted by local officials in a manner appropriate to the circumstances of the particular city. The purpose of the workshop is to develop and detail the local MEREC workplan.

Startup Workshop

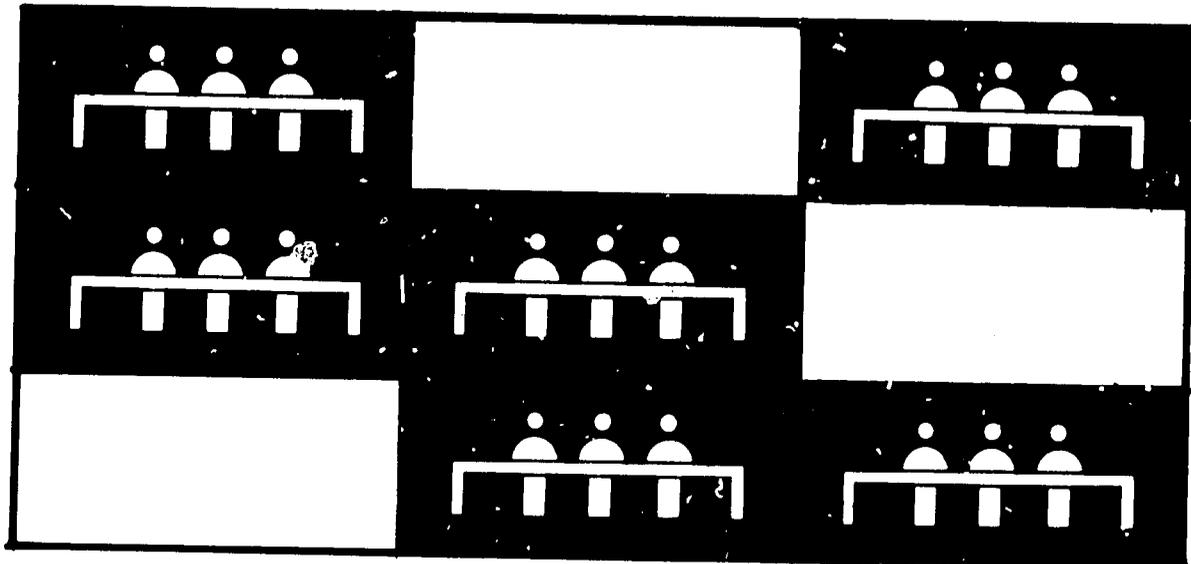
Purposes:

Develop local MEREC workplan.
Conclude cooperative agreements.

Post Workshop

Activity :

Establish and review institutional agreements
Identify educational and training needs
Identify technical assistance needs
Develop preliminary ideas for MEREC strategy



STARTUP

The Planning Phase

Overview:

Planning activities extend over a six-month period, during which time the MEREC city conducts three workshops. Technical specialists assist local officials as needed throughout the planning phase.

Generally, local MEREC projects are conducted through an organizational framework comprising Sectoral Working Groups, each of which is represented on an overall MEREC Task Force headed by the mayor. The Sectoral Working Groups, which include public and private officials from the various urban sectors, undertake research, planning, and implementation tasks relevant to their respective sectors of concern. The MEREC Task Force integrates and coordinates the work of the different Working Groups. The planning phase proceeds through a process of successive refinement and is based on continuing interaction between the Sectoral Working Groups and the MEREC Task Force.

Planning Workshop

Purposes:

Identification of resources of concern.
 Identification of economic sectors with critical resource management responsibilities.
 Selection of MEREC resource management projects.

Post Workshop

Activity:

Implementation of resource management projects.



SECTORS



RESOURCES

The Implementation Phase

Overview:

Activities in this phase entail implementation of the MEREC strategy. Specific projects and long-term planning activities will be launched; associated energy/resource savings will be monitored and evaluated and fed back into the MEREC process.

During the implementation phase, technical specialists assist with implementation of projects and continue to lend followup support in terms of identification of funding sources, technical assistance, training, and assistance with local monitoring and evaluation efforts.

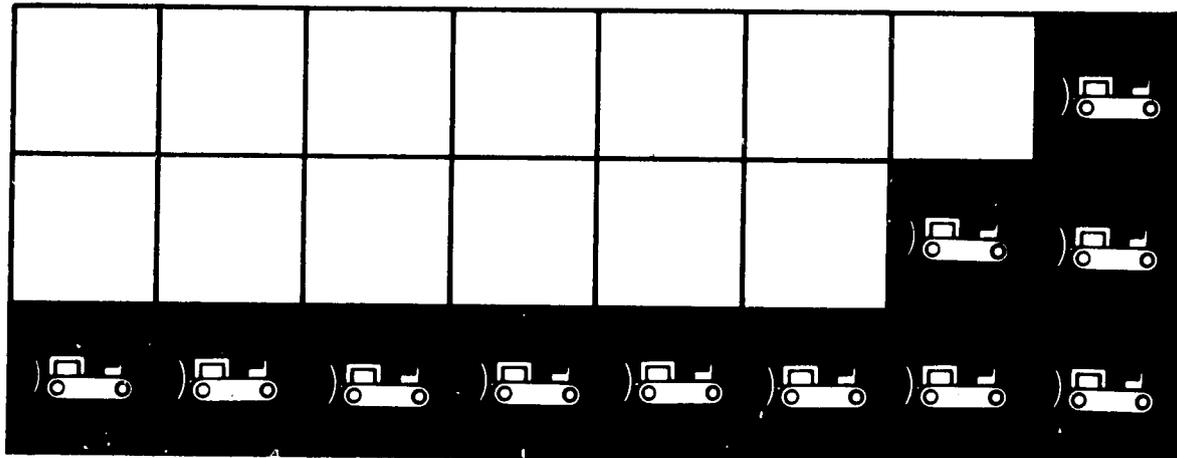
Implementation Phase

Purpose:

Develop or construct selected MEREC projects.
Institutionalize the MEREC approach in ongoing activities.
Monitor MEREC projects and activities.

Post Implementation Activity:

Continue MEREC activity through institutionalization of MEREC.



IMPLEMENTATION

WHAT HAPPENS DURING THE PLANNING WORKSHOPS?

The First Planning Workshop (A Two-Day Meeting)

WORKSHOP PURPOSE:

Identify resources of concern. (Appendix 1)

Identify urban sectors responsible for resource management or regulation. (Appendix 2)

Identify the resource goals for each economic sector. (Appendix 3)

POST WORKSHOP NO. 1 ACTIVITY:

Prepare resource situation reports. (Appendix 4)

Describe resource problems. (Appendix 4)

Describe resource opportunities. (Appendix 4)

Investigate current resource management projects. (Appendix 4)

The MEREC Task Force begins its work by identifying the critical resources of its community. This identification process is conducted by local leaders with the assistance of MEREC staff. A matrix is a useful tool in guiding the MEREC discussions on resources, sectors, and goals, during project planning.

The next step is to identify the economic sectors responsible for management and use of the critical resources. It is most important that sectors which include organizations that manage, primarily consume, or regulate the critical resources be involved in the planning workshops. If the key organizations are not involved, MEREC becomes a planning exercise with limited implementation possibilities.

The final activity in the first planning workshop is to identify the goals of each sector for each of the key resources. The MEREC task force focuses on each resource and identifies goals for that resource. Then the task force addresses the next resource, identifying goals by sector. This activity is completed when goals have been established for every resource.

With the completion of the initial workshop, sector chiefs will focus on preparing situation reports for each resource of concern identified by the Task Force. This work is conducted during a three-month period in preparation for the second planning workshop.

		RESOURCES						
SECTORS								

		RESOURCES						
SECTORS								

The Second Planning Workshop (A Two-Day Meeting)

Workshop Purpose: Present and review resource situation reports. (Appendix 4)
Identify potential resource management projects. (Appendix 5)

Post Workshop No. 2 Activity: Develop background information for proposed projects. The background information documents potential resource and energy savings and project costs. (Appendix 6)

The first activity of the Second Workshop involves the presentation, by sector leaders, of the Resource Situation Reports. Since most communities have five to eight resources of concern, the resource reporting period lasts approximately one day.

During the second day of the conference, activities focus on the identification of resource management projects. Each sector leader describes projects that will improve the management of key resources.

After the second workshop, the sector chiefs develop background information on each project during a three-month period. This background information includes estimated resource and energy savings, as well as estimated project costs. The information is prepared by city officials and in certain cases, university staff and private consultants assist local officials.



The Third Planning Workshop (A Two-Day Meeting)

Workshop Purpose: Present and review background information for proposed resource management projects. (Appendix 6)

Select resource management projects to be funded.

Post Workshop No. 3 Prepare workplans for selected projects. (Appendix 7)

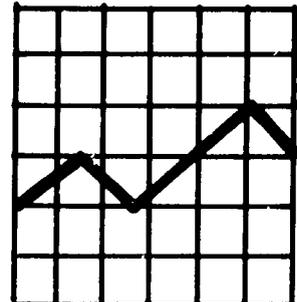
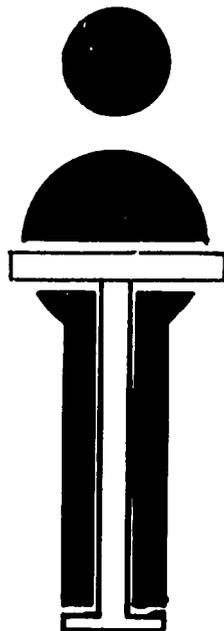
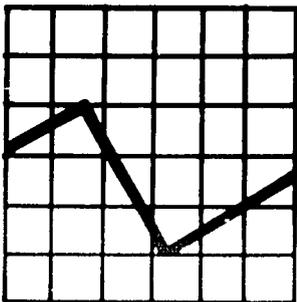
Activity:

Implement resource management projects.

Monitor project results. (Appendix 8)

The first activity of the final and third workshop involves the presentation by sector chiefs of the background information for the proposed resource management projects. Utilizing this information, it is then the responsibility of local leaders to select projects that are most cost effective. After selecting the MEREC projects to be funded, the MEREC task force members take responsibility for implementation of each project.

With the completion of this workshop, the sector leaders prepare a workplan for each selected project and pursue implementation. When the projects are completed or substantially underway, project monitoring begins. This monitoring activity assists the community in understanding the benefits of a MEREC project. In addition, the data gathered can be used in the development of additional MEREC-type projects.



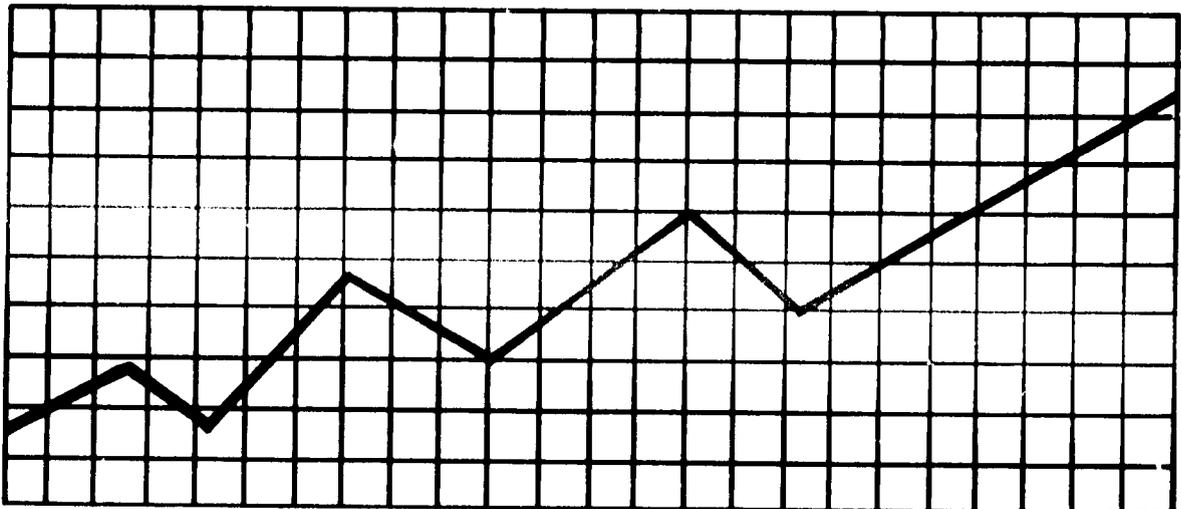
WHAT HAPPENS AFTER MEREC?

If a growing city conducts a MEREC project, its leaders can be assured that the city will more efficiently manage its resources. By managing resources efficiently, the local leaders will encourage orderly economic development.

The most important lessons learned from MEREC projects are:

- MEREC cities have saved and continue to save money by participating in the MEREC project.
- New economic opportunities have been created by the MEREC project.
- New jobs have been created by the MEREC project.
- Project institutionalization takes place in participating cities and regional organizations.
- Secondary cities in developing countries can develop and implement resource management plans.
- Local resources and energy are being used more efficiently in the MEREC demonstration cities.
- Leadership at the local level is developed by guiding leaders through the MEREC planning and implementation process and by providing these leaders with new management tools.

Water, urban land, urban waste, and energy were identified as critical resources in all three MEREC cities. From this we believe the MEREC experience will be highly relevant to most secondary cities experiencing rapid growth. After completing a MEREC project, your city will be stronger economically.



APPENDICES

APPENDIX 1

RESOURCES OF CONCERN

- 1. **Resource:
Concern:**

- 2. **Resource:
Concern:**

- 3. **Resource:
Concern:**

- 4. **Resource:
Concern:**

- 5. **Resource:
Concern:**

- 6. **Resource:
Concern:**

- 7. **Resource:
Concern:**

- 8. **Resource:
Concern:**

- 9. **Resource:
Concern:**

- 10. **Resource:
Concern:**

**URBAN SECTORS WITH
RESOURCE MANAGEMENT RESPONSIBILITIES**

1. Sector: resource managed/regulated
2. Sector: resource managed/regulated
3. Sector: resource managed/regulated
4. Sector: resource managed/regulated
5. Sector: resource managed/regulated
6. Sector: resource managed/regulated
7. Sector: resource managed/regulated
8. Sector: resource managed/regulated
9. Sector: resource managed/regulated
10. Sector: resource managed/regulated

SECTOR/RESOURCE GOALS MATRIX

	Resource 1:	Resource 2:	Resource 3:	Resource 4:
Sector 1:				
Sector 2:				
Sector 3:				
Sector 4:				
Sector 5:				
Summary				

APPENDIX 4

RESOURCE SITUATION REPORT

1. **Overview:** Provide background information on the selected resource with data on the supply of and demand for the resource.
2. **Resource Problems:** Describe the significant resource problems associated with the selected resource.
3. **Resource Opportunities:** Describe the significant resource opportunities associated with the selected resource.
4. **Current Projects and Plans:** Describe the current projects and plans related to the selected resource.

APPENDIX 5

**POTENTIAL LOCAL MEREC PROJECTS
FOR A SELECTED RESOURCE OF CONCERN**

LOCAL RESOURCE:

1. PROJECT:

2. PROJECT:

3. PROJECT:

4. PROJECT:

5. PROJECT:

6. PROJECT:

7. PROJECT:

8. PROJECT:

9. PROJECT:

10. PROJECT:

APPENDIX 6

BACKGROUND INFORMATION FOR PROPOSED PROJECT

- 1. Describe proposed project noting relationship and importance to a critical resource.**

- 2. Provide schedule for the development and implementation of the proposed project.**

- 3. List the organizations that will be involved in project development and implementation.**

- 4. Estimate the initial (year 1) cost of the proposed project and provide cost figures for each component of the project.**

- 5. Estimate the annual operating cost of the project after year 1.**

- 6. Estimate the annual resource management savings and earnings that will result from the project.**

WORKPLAN FOR LOCAL PROJECT IMPLEMENTATION

Provide information on the project funding, responsible organizations for each task, and the task's schedule.

PROJECT:

LEAD SECTOR:

FUNDING SOURCES AND BUDGET:

Responsibility	Schedule																							
No. 1 Task:	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N
No. 2 Task:																								
No. 3 Task:																								
No. 4 Task:																								
No. 5 Task:																								

APPENDIX 8

PROJECT MONITORING WORKSHEET

Provide the following information for each project: the objective of the project, the achievement measurement procedure, the efficiency measurement procedure, and the organization responsible for measurement. An achievement measurement procedure measures the completion of the planned project tasks (i.e., the construction of a house or water system). The efficiency measurement procedure measures the resource efficiency gained or lost due to the project (i.e., the water distribution system is 20 percent more efficient).

PROJECT:

OBJECTIVE:

Achievement Measurement Procedure:

Efficiency Measurement Procedure:

Responsible for Measurement: