

**1984 ANNUAL REPORT    MANAGING ENERGY AND RESOURCE EFFICIENT CITIES**

**UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT  
BUREAU FOR SCIENCE AND TECHNOLOGY  
OFFICE OF MULTISECTORAL DEVELOPMENT  
RURAL AND INSTITUTIONAL DEVELOPMENT DIVISION**

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# INTRODUCTION

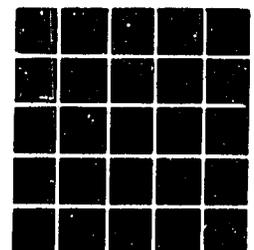
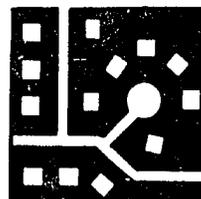
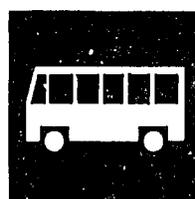
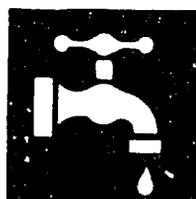
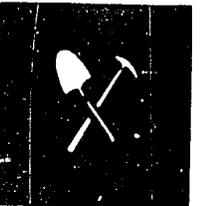
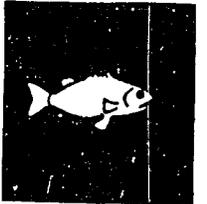
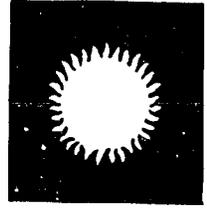
This is the second summary report for the activities of the Managing Energy and Resource Efficient Cities (MEREC) program. It focuses on activities during the twelve months ending in December 1984.

An energy resource management initiative of the U.S. Agency for International Development (AID), MEREC began as an experiment in Tacloban, Philippines during 1981. Now, based on the success of the Tacloban demonstration, MEREC has broadened the scope of its efforts to include Guarda, Portugal, and Phuket, Thailand.

During 1984, the Tennessee Valley Authority (TVA) served its second full year as contractor for the MEREC project. As such, TVA staff (Developmental Planning Section) manages the project for AID and maintains the MEREC Information System (MIS). In addition, the TVA staff—in conjunction with AID staff and private consultants—provides a broad range of technical assistance to MEREC cities.

Briefly, in 1984: MEREC staff continued ongoing activities in Tacloban, Philippines, focusing on project implementation and project monitoring; documented the energy and resource efficiencies gained through MEREC; completed the planning phase of MEREC in Phuket, Thailand, and initiated implementation activities in July 1984; completed the planning workshops in Guarda, Portugal, and initiated implementation activities in July 1984; and conducted a MEREC conference in Knoxville, Tennessee, during May with participants from Portugal, Thailand, and the Philippines.

USAID and TVA will concentrate on broadening the implementation of MEREC in Tacloban, Phuket, and Guarda and evaluating the impact of MEREC in the next two years. Discussions have been held in Portugal, Thailand, and the Philippines, regarding expansion of MEREC into other areas. MEREC initiatives have already captured the imagination of government representatives in Tanzania, Brazil, St. Kitts and Nevis, Sri Lanka, and Indonesia. That suggests the opportunity exists to extend the MEREC program to other countries and regions should additional funds become available.



## **OVERVIEW**

This report summarizes the activities and progress of TVA management, TVA technical specialists, and MEREC consultants. MEREC milestones for 1984 are noted in the chart on page 3.

### **PURPOSE**

The primary purpose of MEREC is to identify, demonstrate, refine, and promote means of increasing energy and resource efficiency in secondary (medium-sized) cities in developing countries. MEREC concentrates on those cities where basic growth patterns are emerging; where transportation, waste disposal, water systems, and electric power systems are in the early stages of development; and where it is not too late to influence the design, layout, and material content of housing, buildings, and other structures.

### **PHASES**

MEREC projects have three broad phases: startup, planning, and implementation/continuation. Tacloban, Philippines, the first MEREC city, is now in the implementation phase. The other project cities, Guarda, Portugal, and Phuket, Thailand, have completed the planning phase and are entering the implementation phase.

### **PROJECT MANAGEMENT**

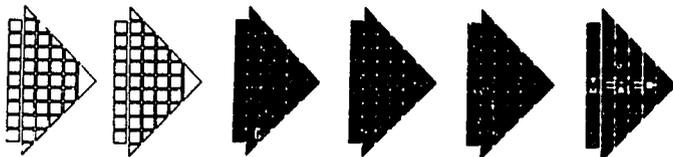
TVA is responsible for overall project management, including refining project design, submitting progress reports, and approving budgets and expenditures. In addition, during 1984 TVA and several private consultants, along with AID staff, provided technical assistance to MEREC cities. As project manager, TVA maintains the MEREC Information System (MIS) which collects, organizes, and disseminates state-of-the-art technical information; collects and analyzes data from the cities; and collects information about technical experts, MEREC city contracts, and MEREC-oriented training opportunities. The material contained in the MIS will be available to any city interested in more efficient use of locally scarce resources.

### **1985 OUTLOOK**

In 1985 AID and TVA will use their experience to assist Tacloban, Phuket, and Guarda in implementation activities, and to evaluate the impact of project initiatives in the three MEREC cities. A major component of the impact measurement activities involves developing monitoring handbooks for Guarda, Portugal, and Phuket, Thailand.

# MEREC MILESTONES

GENERAL	FY 1984								FY 1985			
	J	F	M	A	M	J	J	A	S	O	N	D
Annual MEREC Review Session held in Washington		●										
International MEREC Conference held in Knoxville, Tennessee					●							
<b>NEAR EAST</b>												
<b>PORTUGAL-GUARDA</b>												
Quarterly field visits made to Guarda				●			●			●		●
Mid-Term Workshop held in Guarda				●								
Final Planning Workshop held in Guarda							●					
Implementation Phase Initiated								●				
Workplans & Budgets reviewed & revised				●			●			●		●
MEREC expansion discussions held with USAID/Liebon & Regional Commission												●
<b>ASIA</b>												
<b>PHILIPPINES-TACLOBAN</b>												
Quarterly field visits made to Tacloban				●			●			●		
MEREC projects monitored	●	●	●	●	●	●	●	●	●	●	●	●
Technical consultants selected & fielded				●			●					
Transportation & electric systems studies completed										●		
Workplans & budgets reviewed & revised			●				●			●		
<b>THAILAND-PHUKET</b>												
Quarterly field visits made to Phuket		●	●			●				●		
Mid-term Workshop held in Phuket			●									
Final Planning Workshop held in Phuket						●						
Implementation Phase Initiated							●					
Technical consultant selected & fielded									●	●		
Workplans & budgets reviewed & revised	●	●				●				●		



## MEREC MANAGEMENT ACTIVITIES

TVA management and technical support for the MEREC project continued in 1984, based on a Participating Agency Service Agreement (PASA) between AID and TVA signed in 1983. The PASA calls for a project workplan to be prepared based on the scope of work outlined in the PASA. The workplan is revised each year to reflect changes that are necessary to accommodate additional technical assistance requirements and local needs and objectives.

Current workplan activities, shown on page 8 include such major action items as: overall project management, managing technical assistance specialists, maintaining the MEREC Information System, report preparation, and field activities. The first fifteen months of TVA's participation in MEREC were characterized by a range of startup and planning activities in MEREC cities. The next year, 1984, was marked by the completion of planning phase workshops in Phuket and Guarda, an international MEREC conference in Knoxville, Tennessee, and implementation activities in all three MEREC cities—Tacloban, Phuket, and Guarda.

Here is a quick rundown of some of the 1984 highlights of MEREC management activities: organizing and planning the MEREC conference in Knoxville, Tennessee; monitoring implementation activities; documenting and disseminating MEREC information; and selecting and managing TVA technical specialists. Completing this work involved five major field trips. The scope of management activities in specific areas is discussed in the following section.



## MEREC INTERNATIONAL CONFERENCE

In the spring of 1984, a MEREC conference was held in Knoxville, Tennessee, and Washington, D.C. Eighteen representatives from MEREC cities, as well as representatives from regional and central government agencies, attended. TVA specialists provided information on MEREC subjects considered important to implementing MEREC projects in the three demonstration cities. Equally important was the sharing of experiences among MEREC city representatives. For example, Tacloban representatives shared their plans for energy efficient houses, using local materials, with Phuket representatives. Tacloban also presented its plan for a sanitary landfill and solid waste collection system to Phuket and Guarda.

## MONITORING AND EVALUATION

**MONITORING PROCEDURES.** TVA has completed a MEREC monitoring handbook which is being used in Tacloban, Philippines. This handbook outlines procedures for gathering data that can be used to measure (1) the completion of MEREC projects—implementation monitoring, (2) the use of MEREC projects to demonstrate resource management concepts—demonstration monitoring, and (3) the transfer of resource management concepts from the MEREC projects to citywide activities—citywide transfer monitoring. Data gathering activities were initiated in 1984, and the data obtained will be placed on a microcomputer in Tacloban and a computer in the U.S. at TVA. In Guarda and Phuket, the development of monitoring handbooks by TVA has been scheduled for 1985.

## DOCUMENTATION AND DISSEMINATION

**MEREC INFORMATION SYSTEM (MIS).** The purpose of the MIS is to provide information on resource management and MEREC procedural experience to participants in a MEREC project. It serves as the key information resource for MEREC demonstration cities and for MEREC core staff and technical specialists. An important goal of the MIS is to establish and maintain a MEREC library which focuses on resource management and to disseminate information gained through experience in MEREC cities.

**Dissemination.** The MEREC experience is being incorporated into a TVA course on integrated resources management, which will be offered to officials from Third World countries. The course may be operational as early as mid-1985. Last October, the MEREC project was showcased at the National Solar Energy Conference held in Lisbon, Portugal. The conference provided an excellent opportunity for the Portuguese public to view a MEREC display, and to discuss energy and resource management projects with the MEREC team from Guarda. Four technical papers on MEREC were presented at the National Energy Seminar in Coimbra, Portugal, November 5 and 6.



**MEREC Library.** Professional librarians from the TVA Technical Library have assisted in the development of a thesaurus for indexing MEREC information. Building on information provided by AID/Washington, the MEREC library has been established with a four-way cross-reference file. All MEREC publications have been examined and catalogued. These library materials are available to the MEREC cities and MEREC staff.

The cataloguing of MEREC documents is currently up to date, and will soon be computerized. The library is serving as a key resource in transferring MEREC information and experiences among MEREC cities and other secondary cities with similar resource and energy concerns.

### **MANAGING TECHNICAL SPECIALISTS**

During 1984, TVA fielded three technical specialists, an electrical engineer, a transportation planner, and a landscape architect. A major work activity for MEREC management was to identify the technical skills needed to assist the local MEREC community and to select technical specialists with the proper training and skills for MEREC assignments.

The TVA transportation planner made two field trips to Tacloban, Philippines, and completed an innovative transportation plan during 1984. This plan focused on low-cost improvements to the transportation system while encouraging energy conservation. A TVA cooperative engineer conducted an electric distribution system assessment during 1984 and prepared a report outlining low-cost measurements to be taken by the local electric cooperative in order to improve system efficiency. The third specialist, a landscape architect, made a field trip to Phuket, Thailand, and prepared a concept plan for the redevelopment of an abandoned strip mine. These technical skills provided by MEREC to Tacloban and Phuket were unavailable from incountry specialists. It should be noted that technical skills for the other MEREC projects such as energy efficient housing, the biogas digesters, the oxidation pond, the land use plan, the urban agriculture project, and the water system assessment were provided by incountry technical specialists.



#### **FIELD TRIPS AND FIELD ACTIVITY.**

The field activities for the 12-month period are summarized below:

**FEBRUARY 1984 FIELD TRIP.** In the first field trip of the year, TVA staff participated with USAID and Royal Thai government representatives in a review of MEREC project expenditures in Phuket. TVA staff also assisted in the development of a Phuket MEREC workplan and budget for the second quarter of 1984. In addition, final preparations were made for the March MEREC workshop planned for Phuket.

**MARCH/APRIL 1984 FIELD TRIP.** The MEREC staff returned to the Philippines in March to review MEREC implementation progress and to review and revise MEREC workplans and budgets. During the March/April field trip, the MEREC team conducted midterm planning workshops in Phuket, Thailand, and Guarda, Portugal.

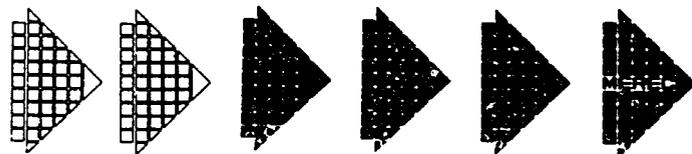
**JUNE/JULY 1984 FIELD TRIP.** Workshops were the focus of MEREC activities in Guarda, Portugal, and Phuket, Thailand, during this field trip. In Phuket and Guarda, final planning workshops were conducted, which prepared these cities for MEREC implementation activities. In the Philippines, the main thrust of MEREC activity was field reconnaissance work by TVA technical specialists in transportation and electric system efficiency. The normal review and revision of workplans and budgets was conducted by staff in all three MEREC cities.

**OCTOBER 1984 FIELD TRIP.** During the October field trip to the Philippines, consultants' reports on transportation were delivered to the city of Tacloban and to the Leyeco II Electric Co-Op. A quarterly review and revision of workplans and budgets was conducted by MEREC staff in Tacloban, Philippines; Guarda, Portugal; and Phuket, Thailand. In addition, a technical specialist, under contract with TVA/MEREC, conducted an initial survey of the tin mine reclamation area and developed a preliminary concept plan for redevelopment in Phuket.

**DECEMBER 1984 FIELD TRIP.** The final field trip of the year was made to Portugal to participate in discussions with USAID/Washington staff, USAID/Lisbon staff, and Comissao De Coordenacao Da Regia Centro (CCRC) about expanding MEREC in Portugal. While in Portugal, staff conducted the regular quarterly workplan and budget review in Guarda.

# MEREC WORKPLAN HIGHLIGHTS

	FY 84												FY 85												FY 86												FY 87											
	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
<b>OVERALL PROJECT MANAGEMENT :</b>																																																
DAY TO DAY DUTIES	●																																															
BUDGET AND WORKPLAN	●																																															
CONFERENCE IN U.S.																																																
<b>MANAGING TVA SPECIALISTS :</b>																																																
SELECTION OF CONSULTANTS	●																																															
MONITORING OF CONSULTANTS	●																																															
<b>LIASON WITH WASHINGTON :</b>																																																
QUARTERLY REVIEWS	●																																															
ANNUAL REVIEW	●																																															
<b>MEREC INFORMATION SYSTEM :</b>																																																
DEVELOP MONITORING PROCEDURES	●																																															
PREPARE MONITORING HANDBOOKS	●																																															
PROCESS MONITORING DATA	●																																															
UPDATE MEREC LIBRARY	●																																															
DISSEMINATE INFORMATION	●																																															
<b>REPORT PREPARATION :</b>																																																
QUARTERLY REPORTS	●																																															
ANNUAL REPORT	●																																															
TACLOBAN REPORT	●																																															
PHUKET REPORT	●																																															
GUARDA REPORT	●																																															
PHUKET HANDBOOK	●																																															
GUARDA HANDBOOK	●																																															
<b>FIELD ACTIVITIES :</b>																																																
TACLOBAN, PHILIPPINES	●																																															
PHUKET, THAILAND	●																																															
GUARDA, PORTUGAL	●																																															
<b>TECHNICAL ASSISTANCE :</b>																																																
FIELD VISITS	●																																															
PREPARATION OF REPORTS	●																																															



## TVA BUDGET

TVA expenditures for MEREC activities through September 30, 1984, are summarized below.

TVA began FY84 with a MEREC budget of \$217,500. To cover an anticipated budget shortfall in FY85, AID/Washington asked TVA in May to limit FY84 expenditures to \$187,500. TVA staff cut back on staff work involving monitoring procedures for Guarda and Phuket, and computerizing information in the MEREC library. As a result, FY84 expenditures totaled \$197,871. This total included \$23,100 for which TVA is to be reimbursed from the Tacloban MEREC budget.<sup>1</sup>

### TVA MEREC BUDGET (FY 1984)

	EXPENDITURES	REVISED BUDGET
Central Staff	\$101,647 <sup>2</sup>	\$ 86,200
Travel	49,256	45,400
Contracts	3,237	5,000
TVA technical assistance	— <sup>2</sup>	11,000
Other <sup>3</sup>	12,348	10,100
Overhead	31,383	29,800
Subtotal		<u>\$187,500</u>
Tacloban budget		9,400 <sup>1</sup>
Tacloban budget		<u>13,700<sup>1</sup></u>
	\$197,871	\$210,600

<sup>1</sup>\$9,400 will be reimbursed from the Tacloban budget to cover the cost of energy audit equipment and fielding a TVA specialist who assessed the Leyeco II electric distribution system. An additional \$13,700 was allocated to TVA from the MEREC funds of Tacloban project budget to reimburse TVA for the development of an energy-efficient transportation plan by TVA specialist.

<sup>2</sup>TVA technical assistance included under central staff expense.

<sup>3</sup>Includes materials, supplies, and reproduction.

## The MEREC Cities

The three current MEREC cities provide interesting contrasts in culture and geography. The MEREC process has shown its adaptability to varying conditions and requirements as indicated in the following descriptions.

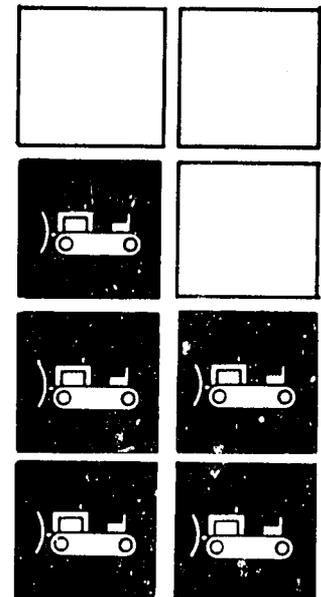
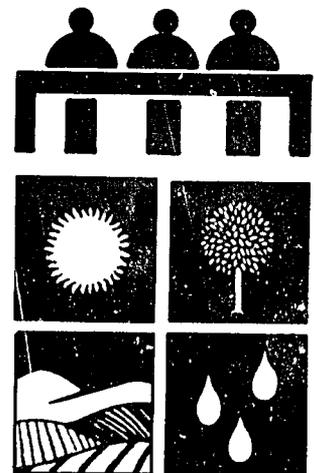
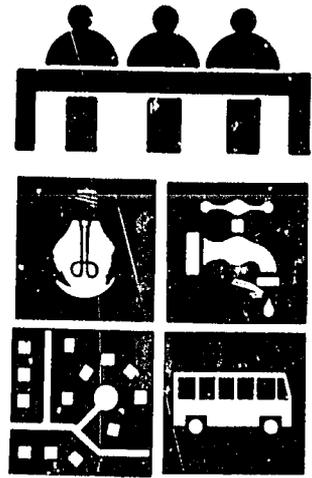
### Tacloban, Philippines

Tacloban, with a population of 103,433 in 1980, is the capital of Leyte Province. It is located in the northeast sector of the Island of Leyte and covers 1,770 hectares. Tacloban is the trade center of the province. Population, personal income, trade and commerce, education, and transportation are all experiencing growth. Major deterrents to growth, particularly industrial growth, have been an expensive and unreliable supply of electricity, and a water system with a high level of unaccounted losses.

Tacloban is a part of the Eastern Visayas administrative and planning region, and is one of the three cities in the region. Only 20 percent of the region's population lives in urban areas, and agriculture, which employs 66 percent of the labor force, is very important to the region. The unemployment rate in 1980 was 10.5 percent. Tacloban has an effective and energetic city administration which is interested in improving the city. Much of the success of MEREC in Tacloban is due to the local leaders.

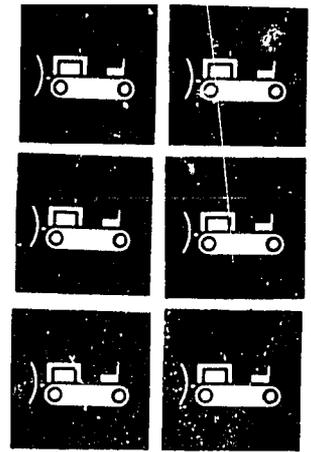
Tacloban has successfully completed the first two phases of the MEREC project—the startup phase and the planning phase. As a result of the work completed in these phases, Tacloban has an overall MEREC strategy, individual resource strategies for each sector, and action plans for each resource including projects identified for each city sector. Key projects in the first MEREC city are an energy/resource-efficient housing demonstration and an energy-efficient land use plan. In addition to completing the first two phases of the project, Tacloban has been involved in implementation for 21 months. Accomplishments thus far have included:

- An estimated savings of \$137,000 for 1983 and 1984 by the water district due to efficiency improvements made to the distribution system.
- Improvements in the distribution efficiency of the Leyeco II Electric Co-Op, from 68.08 percent to 79.85 percent from January 1982 to August 1984.
- A new energy-efficient system, which has reduced local fuel consumption by an estimated 59,800 liters per year. This represents an estimated savings of \$23,920 per year.
- The harvesting of \$7,600 of vegetables and \$500 of firewood under the urban agriculture project.
- Vaccine and medicine provided for pigs and chickens grown in the back yards of the urban area. The total market value of the MEREC vaccinated livestock was approximately \$192,000.



- A 12 percent fuel savings for solid waste collection, which was documented during the first year of operation of the centralized container system.
- A 17 percent fuel savings for solid waste collection, which was documented during the first year of operation of the push cart collection system.

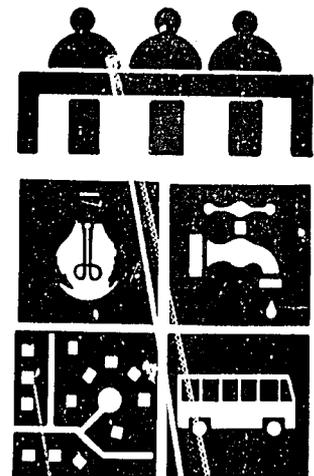
The details concerning Tacloban's progress can be found in the *1984 Annual Report: Tacloban, Philippines*. With the full commitment of Tacloban's mayor and city government, this Philippine city is moving toward the successful completion of the Tacloban MEREC project by the end of FY 1985.



### Guarda, Portugal

Guarda is located in central Portugal on the northeastern slopes of the Serra de Estrela approximately 120 kilometers from the western Atlantic coast. Located near the Mondego River, Guarda is in the Beira Alta province in the central region which encompasses almost one-third of Portugal.

The Council of Guarda has a population of 40,000, and socioeconomic conditions are somewhat poorer in the interior of Portugal, where Guarda is located, than other areas of the country. Guarda, which lost population in the years just prior to 1970, gained population between 1970 and 1976. Guarda is one of 275 municipios in Portugal. The government of Portugal is centralized, and local governments control a relatively small share of public expenditures.



In August 1983 a MEREC project agreement was signed, obligating \$150,000 of AID funds for the project in Guarda with a completion date of September 30, 1985. The project agreement provides for TVA field visits to Guarda at three-month intervals to assist the city with all phases of the MEREC project. The Comissao de Coordenagao da Regiao Centro (CCRC) is administering the grant funds and the project is being managed by the city of Guarda. In order to allow time for monitoring and documenting project results, the CCRC and Guarda plan to request a 12-month extension of the project.



After completing the third MEREC workshop in July 1984, Guarda initiated its implementation activities. Resources of concern identified by the workshops were water, solid waste, energy supply, agricultural land, and construction materials. Highlights of the MEREC project in Guarda for 1984 include:

- MEREC project presentations by Guarda MEREC staff at the National Solar Energy Conference in Lisbon, Portugal, in early October.
- A MEREC presentation at the National Energy Seminar, which was held in Coimbra, Portugal, in early November.
- Completion of 35 percent of the study evaluating short-term alternatives for expanding the water system.



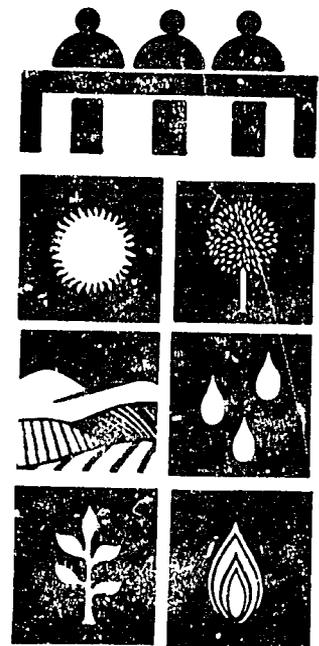
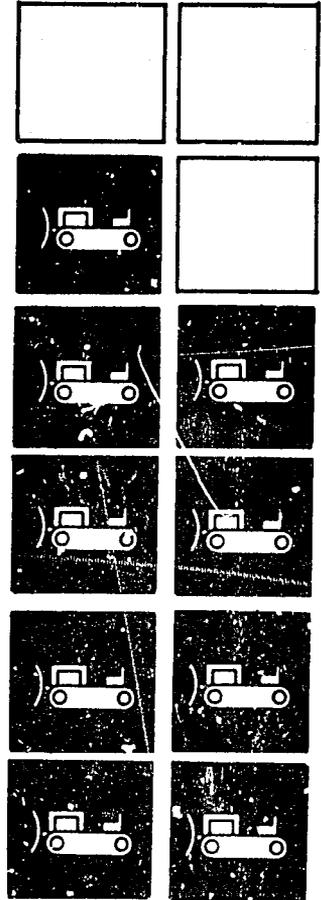
- Collection of 20 percent of the base data for the study of long-term water source alternative.
- Completion of 30 percent of the survey of the existing sewerage system, as a part of the plan for system expansion.
- Completion of 50 percent of the survey of the potential for recycling solid waste.
- Completion of 50 percent of the base data for the feasibility study of the methane gas from landfill project.
- Development of 50 percent of the data requirements for the energy/resource efficient land use/urban management plan.
- Development of energy conserving building codes for wood burning stoves, wall insulation, roof insulation, and ventilation.

Guarda is proceeding with MEREC implementation activities in 1985. Local, regional, and central government support for Guarda's MEREC project promises a highly successful demonstration. As a result of the Guarda experience, the CCRC is proposing to USAID/Lisbon that MEREC be expanded to include several more cities in the central region.

### Phuket, Thailand

Phuket is Thailand's largest island and forms a province with a population of over 130,000. The island is linked to the mainland by a bridge and is served by air from Bangkok, Songkhla, and Singapore. Phuket City located on the island is approximately 900 kilometers from Bangkok and equidistant (250 kilometers) from the southern tip of Burma, the northern tip of Malaysia, and the Thai city of Songkhla. Located on the Strait of Malacca, this MEREC city is in a region dominated by rain forests. Rubber and coconuts are important agricultural products of this area, which has a tropical monsoon climate.

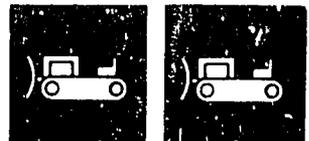
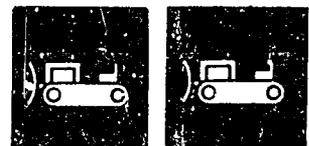
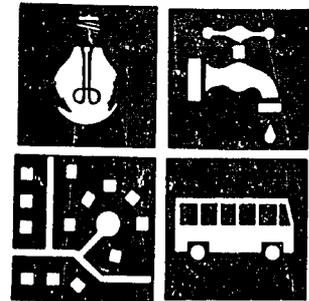
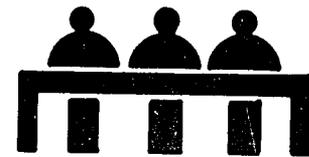
On December 1, 1983, USAID signed a MEREC project agreement obligating \$250,000 of AID funds for planning and implementation of a project in Phuket, which is expected to be completed by December 1, 1986. The agreement provides for TVA field visits to Phuket at approximately three-month intervals to assist the municipality with project management and technical support.



The third MEREC planning workshop was held in Phuket in June 1984. Implementation activities were then initiated. The resources of concern in Phuket are water, urban waste, land, food, and energy. Highlights of the MEREC project in Thailand for 1984 include:

- Initiated implementation of two projects, the tin mine reclamation and the economic crops project.
- Completed workplans and budgets for six projects, water meter calibration and leak detection, the rain water storage tanks, the fermentation tanks, the biogas generator, the centralized waste containers, and low-cost housing projects.
- Completion of a plan for a sanitary landfill at the existing landfill site by the National Science and Technology Research Institute.
- Selection of a consultant to prepare an energy-efficient transportation plan for Phuket.
- Completion of a study which identifies products which can be manufactured with local agricultural resources.
- Preparation of preliminary information on soils, water quality, topography, and potential uses for the tin mine reclamation project by the Prince of Songkla Community College and the Municipality of Phuket.
- Preparation of a preliminary site plan for the tin mine reclamation project by a TVA consultant.
- Selection of sites for nine water storage tanks in the rain water storage tank project. Four of the sites are located at new housing demonstrations; two at public schools; and three at existing low-income housing projects.
- Identified locations for four low-cost housing units using energy-efficient designs and local building materials.

Phuket appears to be an excellent demonstration city having the commitment and support of municipal, provincial, and the central government, as well as the Prince of Songkla University.



## SUMMARY AND CONCLUSIONS

The MEREC project is proceeding according to the project workplan and moving toward successful completion. Tacloban, Philippines; Phuket, Thailand; and Guarda, Portugal, are in the implementation phase of MEREC. All three cities have the critical elements needed for success in MEREC: (1) strong local support, (2) adequate technical and administrative skills at the local level, and (3) a clear need for MEREC.

Key highlights in the second year of this energy resource management project were: completion of the planning workshops in Phuket, Thailand, and Guarda, Portugal; initiation of implementation activities in Phuket and Guarda; continuation of implementation activities in Tacloban, Philippines; and the international MEREC conference in Knoxville.

For the next 12 months of the project TVA will focus attention on such specific activities as:

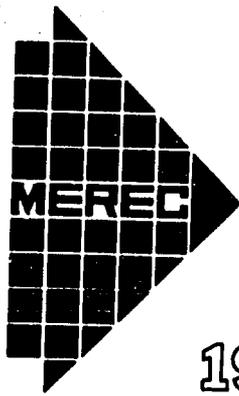
- Implementing MEREC projects in Tacloban, Philippines; Phuket, Thailand; and Guarda, Portugal.
- Completing consultants' studies in the MEREC cities.
- Developing monitoring handbooks for Phuket, Thailand, and Guarda, Portugal.
- Documenting resource/energy efficiencies gained through MEREC in all three demonstration communities.
- Disseminating MEREC information to cities pursuing energy and resource management projects.

During the first 27 months of MEREC, interest in this project has been expressed by government representatives from Tanzania, Brazil, St. Kitts and Nevis, Sri Lanka, Indonesia, Rwanda, and Peru. This suggests an excellent opportunity for extending the project to other regions should additional funds become available. In Portugal, the CCRC is proposing to expand MEREC to other cities in the central region. Local, regional, and central government funds would combine with USAID funds to support this expansion.

The most important lessons learned after more than two years of the MEREC project are:

- 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.
- Local governmental institutions are strengthened through a resource management project such as MEREC.
- 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.
- The MEREC concept is flexible enough to work in a country with a centralized government or a country with dispersed governmental power.
- A high level of integration will occur in resource management projects which utilized the MEREC interactive group process.
- MEREC acts as a catalyst in developing links between regional universities and secondary cities.
- Project institutionalization takes place in participating cities and regional organizations.

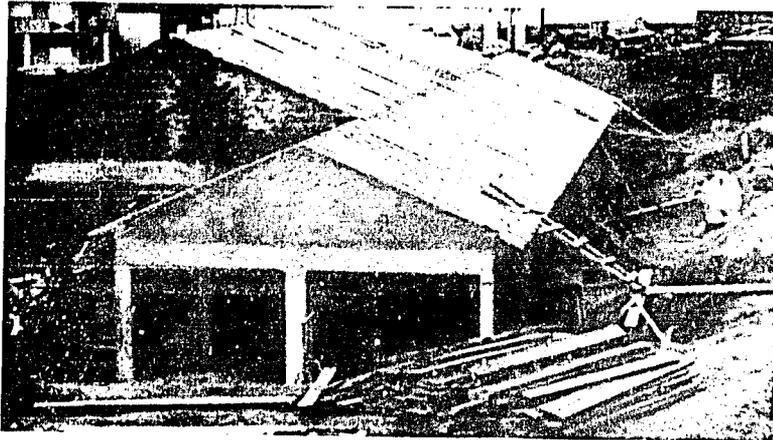
Water, urban land, urban waste, and energy were identified as critical resources in all three MEREC cities. From this we believe the MEREC experience will be highly relevant to most secondary cities experiencing rapid growth.



1984



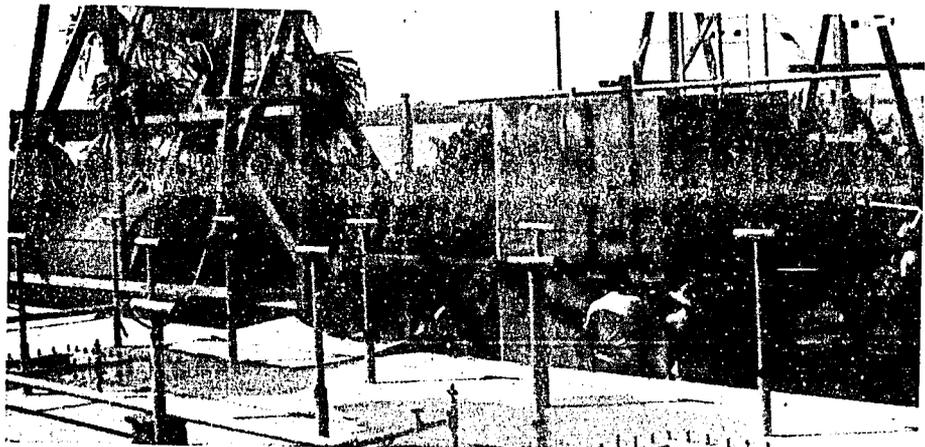
Education Project—Philippines



Local Materials in Construction—Portugal



Mine Reclamation—Thailand



Biogas Digester—Philippines



Efficient Water System Improvements—Philippines



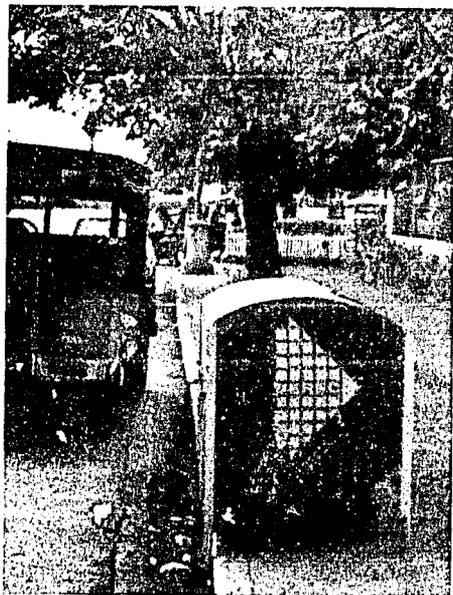
**Urban Agriculture—Philippines**



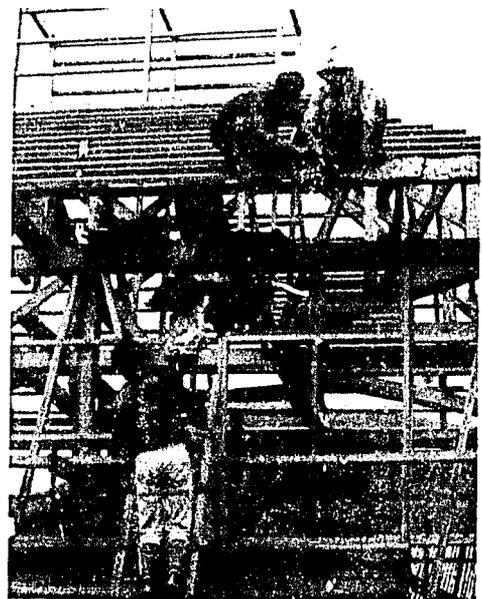
**Electric System Assessment—Philippines**



**MEREC Conference—United States**



**Waste Collection—Philippines**



**Housing—Philippines**

***For further information contact the MEREC project office, Tennessee Valley Authority, 1G96  
Old City Hall Building, Knoxville, Tennessee 37902.***

**TVA/ONRED/LER--85/20**

Managing Energy and Resource Efficient Cities  
(MEREC)  
Briefing Summary

Background

- o MEREC is an international demonstration project sponsored by the Bureau for Science and Technology, U.S. Agency for International Development (USAID).
- o The primary purpose of MEREC is to identify and demonstrate means of increasing resource and energy efficiency in medium-sized cities in developing countries.
- o USAID initiated the MEREC demonstration in Tacloban, Philippines, in 1981-82. In 1983 Phuket, Thailand, and Guarda, Portugal, were selected as MEREC demonstration cities.

Project Management

- o TVA is responsible for overall project management, including refining project design, submitting progress reports, and helping MEREC cities prepare workplans and budgets. TVA maintains the MEREC Information System which collects and disseminates state-of-the-art technical information which is available to any city interested in more efficient use of locally scarce resources. TVA, along with host country universities and private consultants, provides technical assistance to MEREC cities. Since 1983 TVA has fielded specialists in electrical engineering, transportation planning, land use planning, landscape architecture, municipal water systems, and solid waste management.
- o Local government provides onsite project management, is responsible for preparing workplans and budgets, and project implementation. Each MEREC city receives some USAID funds to support local planning and implementation of MEREC subprojects. Funds from local government, central government departments, and World Bank loans supplement the AID funds.

Project Phases

MEREC projects have three broad phases: startup, planning, and implementation. Tacloban is completing the implementation phase this year. Phuket and Guarda will complete project implementation in 1987.

Demonstration Cities

Tacloban, Philippines

Tacloban, population 103,400, is the capital of Leyte Province located about 500 miles south of Manila. As the trade center of the province, Tacloban's population, personal income, trade, and transportation are all experiencing growth. MEREC in Tacloban focuses on the efficient management of six key resources--urban land, transport fuel, energy, urban waste, local building materials, and water. Eighteen projects have been developed to demonstrate use of the six selected key resources.

## Highlights

Housing Demonstration - The MEREC housing project involves the construction of eight demonstration housing units using local building materials. These houses are designed for energy efficiency and include rainwater collection systems and biogas generators which produce methane gas.

Urban Agriculture - The urban agriculture project is designed to maximize use of idle land to increase food and wood supplies by initiating gardening, livestock production, and tree farming in ten neighborhoods.

### Energy:

Meter Calibration - A phantom load and watt-hour meter was supplied to the local electric power distributor to calibrate electric meters in the city.

Biogas Generator at Slaughterhouse - A biogas plant at the city slaughterhouse is designed to use the waste products of animals to produce methane gas.

## Phuket, Thailand

Phuket is Thailand's largest island and forms a province with a population of 130,000. Phuket city, located on the island, is 550 miles south of Bangkok in a region with a tropical monsoon climate. Rubber, coconuts, and tin are important products of this area. MEREC in Phuket focuses on the efficient management of seven resources--water, urban waste, energy, local building materials, urban land, economic crops, and transport fuel. Eleven projects are being implemented to demonstrate the efficient use of these key resources.

## Highlights

Rainwater Storage Tanks - In order to demonstrate the collection and storage of rainwater for use during the dry season, water tanks and jars are being built and located at public facilities in the province.

Tin Mine Reclamation - The tin mine reclamation project involves the development of a 75-acre site for multiple uses. These uses include Phuket Community College facilities, fish ponds, vegetable gardens, cashew trees, turf growing, and recreation areas.

### Urban Waste

Fermentation tank for fertilizer - MEREC funds are being used to construct a fermentation tank which will convert human waste to fertilizer. Human wastes are now dumped on open land prior to any treatment.

Solid waste collection and disposal - To more efficiently collect waste in the city, a TVA specialist is making recommendations on solid waste collection and disposal.

## Guarda, Portugal

Guarda has a population of 40,000 and is located in the mountainous interior near the border with Spain. With an elevation of 3,000 feet, Guarda is the highest city in Portugal. Winter temperatures are often below freezing requiring residents to use various forms of energy for heating. MEREC in Guarda addresses the efficient use of six resources--urban land, water, energy, transport fuel, urban waste, and local building materials. Fifteen projects are being implemented to demonstrate efficient use of the six resources.

### Highlights

Water leak detection survey - The municipal water system loses approximately 40 percent of the treated water due to leaking pipes. A TVA specialist trained municipal water department officials in the use of a water leak detection instrument. MEREC funds will be used to purchase an instrument.

Energy - Public schools and public housing are being designed for energy efficiency and use of local building materials, mainly wood and granite.

Land Use Planning - A land use plan is being prepared as a guide for future urban development. In mountainous terrain such a plan and supporting regulations are required to protect the best agricultural land from scattered urban development.

### Lessons Learned

- o The MEREC concept is flexible enough to work in a country with a centralized government or a country with dispersed governmental power.
- o Local resources and energy are being used more efficiently in the MEREC demonstration cities.
- o Local governmental institutions are strengthened through a resource management project such as MEREC.
- o 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.
- o A high level of integration will occur in resource management projects which utilized the MEREC interactive group process.
- o Studies and plans are useful in attracting outside funds.
- o MEREC acts as a catalyst in developing links between regional universities and secondary cities.

### 1986-87 Outlook

- o MEREC is being expanded in Portugal to include seven other cities. Sources of funding are LUSO American Foundation, GOP, Local Governments, and USAID/Lisbon.
- o Government of Thailand and USAID/Thailand are planning to apply the MEREC approach to rural development.