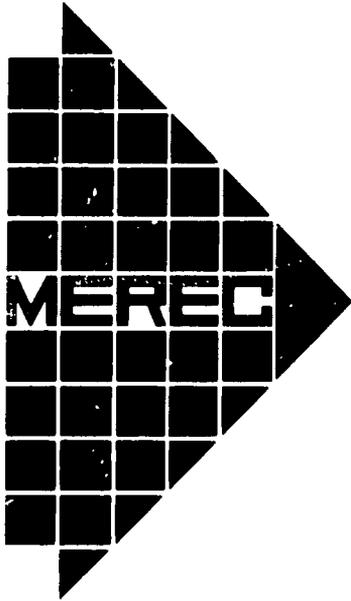


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1985 ANNUAL REPORT

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**

CONTENTS	Page
INTRODUCTION	1
OVERVIEW	2
Purpose	2
Phases	2
Project Management	2
1986 Outlook	2
MEREC Milestones	3
MEREC MANAGEMENT	
ACTIVITIES	4
Managing Technical Specialist	5
Monitoring and Evaluation	5
Documentation and Dissemination	6
MEREC Training	6
Field Trips and Field Activity	7
MEREC Workplan Highlights	9
TVA Budget	10
THE MEREC CITIES	11
Tacloban, Philippines	11
Phuket, Thailand	12
Guarda, Portugal	13
SUMMARY AND CONCLUSIONS	15
PHOTOGRAPHS	16

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INTRODUCTION

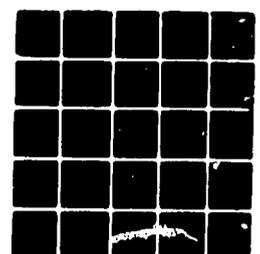
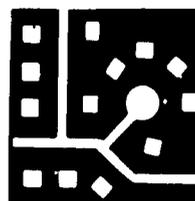
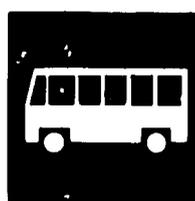
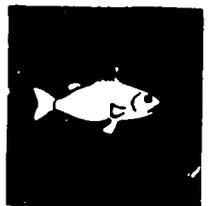
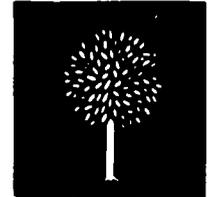
This is the third summary report for the activities of the Managing Energy and Resource Efficient Cities (MEREC) program. It focuses on activities during the twelve months ending in December 1985.

An energy resource management initiative of the U.S. Agency for International Development (USAID), 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 1985, the Tennessee Valley Authority (TVA) served its third full year as contractor for the MEREC project. As such, TVA staff (Developmental Planning Section) manages the project for USAID and maintains the MEREC Information System (MIS). In addition, the TVA staff—in conjunction with USAID staff and private consultants—provides a broad range of technical assistance to MEREC cities.

Briefly, in 1985: MEREC staff continued implementation activities in Tacloban, Philippines, and investigated opportunities for transferring the MEREC strategy to other Filipino communities; established monitoring standards for activities implemented in Guarda, Portugal, and assisted with plans for the expansion of MEREC to seven communities in the region; saw the implementation of a multifaceted MEREC project in Phuket, Thailand, which involved the cooperation of several organizations, and trained representatives of the Thai government's Rural Employment Generation Program in resource management.

During 1985 it became clear that the MEREC process is being disseminated—and utilized—as both a management tool and a training tool. MEREC staff at TVA developed materials that are being utilized for training in MEREC communities, in international training seminars for representatives from developing countries, and even in inhouse training of TVA managers. The expansion of MEREC activities appears assured in Portugal and likely in both the Philippines and Thailand. Additional funds from both USAID and other sources are being secured.



OVERVIEW

This report summarizes the activities and progress of TVA management, TVA technical specialists, and MEREC consultants during 1985. MEREC milestones for 1985 are noted in the chart on page 3.

PURPOSE

The primary purpose of MEREC is to identify, demonstrate, refine, and promote means for 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. 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 1985 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 is available to any city interested in more efficient use of locally scarce resources.

1986 OUTLOOK

In 1986 AID and TVA will use their expertise to assist Tacloban, Phuket, and Guarda in implementation activities, and to evaluate the impact of project initiatives in the three MEREC cities. Dissemination of the MEREC experience, training, and expansion opportunities will also be pursued in 1986.

MEREC MILESTONES

GENERAL	FY 85									FY 86		
	J	F	M	A	M	J	J	A	S	O	N	D
Annual MEREC workplan review session held at AID/W International MEREC conference—Tacloban, Philippines Philippine MEREC conference—Tacloban, Philippines			●					●			●	
NEAR EAST												
PORTUGAL—Guarda												
Quarterly field visits to Guarda				●			●			●		
MEREC projects monitored	●	●	●	●	●	●	●	●	●	●	●	●
Workplans and budgets reviewed and revised				●			●			●		
MEREC expansion discussions held with USAID/Lisbon and Regional Commission				●			●			●		●
Technical consultants selected and fielded							●					
ASIA												
PHILIPPINES—Tacloban												
Quarterly field visits to Tacloban				●			●			●		
MEREC projects monitored	●	●	●	●	●	●	●	●	●	●	●	●
Workplans and budgets reviewed and revised				●			●			●		
MEREC expansion discussions held with USAID/Manila							●			●		
THAILAND—Phuket												
Quarterly field visits to Phuket	●			●			●			●		
MEREC projects monitored	●	●	●	●	●	●	●	●	●	●	●	●
Thai officials visit Tacloban MEREC project			●				●			●		
Technical consultants selected and fielded				●						●		
Workplans and budgets reviewed and revised				●			●			●		
MEREC Resource Management Training—Knoxville									●			

MEREC MANAGEMENT ACTIVITIES

TVA management and technical support for the MEREC project continued in 1985, based on a Participating Agency Service Agreement (PASA) between USAID 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 9 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 the MEREC cities including a planning workshop in Tacloban. 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.

The 1985 highlights of MEREC management activities include: selecting and managing TVA technical specialists; monitoring implementation activities; and documenting and disseminating MEREC information. Completing this work involved eight major field trips. Additional activities in 1985 were: planning, organizing, and implementing MEREC training in Knoxville, Tennessee; and coordinating two MEREC conferences in Tacloban.



64

MANAGING TECHNICAL SPECIALISTS

A major work activity for MEREC management is the identification of technical skills needed to assist MEREC cities and the selection of technical specialists with the proper training and skills for MEREC assignments. During 1985 TVA fielded five technical specialists: two water leak detection specialists, two solid waste management specialists, and a landscape architect.

The TVA specialists in water leak detection and solid waste made field trips to Guarda and Phuket. The TVA leak detection specialist trained 16 Thai water technicians from four cities in the use of leak detection equipment. Equipment has been ordered for Phuket. TVA used its equipment to train the technicians and then loaned the TVA equipment to Thailand to use until their equipment arrived. A TVA specialist also trained Guarda water department personnel in the use of water leak detection instruments. A TVA instrument was loaned to Guarda until they could purchase an instrument.

A TVA waste management specialist provided a feasibility study of a recycling project in Guarda and worked with a local consultant to project the expected volume of methane gas that could be generated by the landfill.

In Phuket a TVA specialist worked with Prince of Songkhla University faculty and Phuket staff in October 1985 to analyze the waste collection system and to explore the potential for a compost project. The compost project is designed, among other things, to extend the life of the landfill. The landscape architect completed a site and grading concept plan for the redevelopment of a former tin mine in Phuket.

Whenever possible, technical skills required by MEREC projects are obtained locally. The technical skills provided by TVA are unavailable in the project countries.

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 was placed on a microcomputer in Tacloban. Based on the Tacloban monitoring procedures, Guarda participants developed their own procedures which they are using to quantify resource and energy efficiency. Monitoring procedures will be developed for Phuket in 1986.



85

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.

MEREC TRAINING

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.

Training activities continued in 1985. MEREC materials were utilized in the first Integrated Regional Resources Management (IRRM) seminar provided for eight representatives from the People's Republic of China, including the Vice-Governor of Guangxi Province, in April 1985.

In October 1985 MEREC staff began the first Resource Management Training Seminar for three representatives of the Royal Government of Thailand. The six weeks seminar, funded by USAID/Thailand, included an indepth review of TVA activities, field trips, and a planning exercise which applied the MEREC planning model to a province in Thailand. TVA hosted the director of the Rural Employment Generation Program office (REGP), Mrs. Sirimalaya, and two more REGP officers from her staff for the second seminar which began the first week of December 1985. A highlight of the second seminar was a visit by Minister Meechai Ruchupan, Minister Attached to the Prime Minister's Office, and Representative Samart in January 1986.

The MEREC model and experience will be part of future TVA workshops designed for MEREC country officials. Two four-week workshops are planned for Thai officials in 1986.



FIELD TRIPS AND FIELD ACTIVITY.

Field trips for 1985 included the following activities:

JANUARY 1985—Phuket, Thailand. A project review meeting was held in Phuket January 14-18. USAID initiated an interim evaluation of the Phuket MEREC project to determine the project's impact on decentralized development as well as its impact on municipal planning and implementation capability. Projects in tin mine reclamation and agricultural resource utilization were on schedule. 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 1985. In addition, final preparations were made for the March MEREC workshop planned for Phuket.

JANUARY 1985—Tacloban, Philippines. A project review meeting was held in Tacloban January 21-24. Typhoon Undang struck Tacloban on November 6, 1984, knocking out electric service and causing significant damage to buildings in the city. Due to the storm four MEREC projects were behind schedule. They were the housing project, the MEREC information system, the biogas generator, and electric meter calibration project. Five other projects documented significant improvements in resource and energy efficiency. Plans were also made for a Tacloban MEREC conference to be held in March.

MARCH 1985—Phuket, Thailand and Tacloban, Philippines. Tacloban sponsored a MEREC workshop March 25 and 26 to review the status of all local MEREC projects. Ten Thai government officials attended the workshop, including six from Phuket: the governor, mayor, and four other key local officials. The Thai delegation obtained information on the Tacloban experiences which they will be able to apply to their own MEREC projects. Phuket officials were especially interested in the active involvement of Mayor Cinco and in projects in water conservation, low-cost housing, biogas generation, rainwater collection, urban agriculture, and MEREC project information dissemination.

APRIL 1985—Phuket, Thailand. TVA staff attended a MEREC project review and management session and workshop April 1-4, 1985. TVA and USAID staff had an opportunity to brief Robert Halligan, Director, USAID/Thailand, on the status of the MEREC project in Phuket. A site visit was made to the Phuket tin mine reclamation area by the TVA consultant in landscape architecture. At that time the final site and grading plans were reviewed and minor adjustments were made to the plans.

APRIL 1985—Guarda, Portugal. Two TVA specialists in water leak detection and solid waste management visited Guarda in April. Their services had been requested by the local Regional Commission and Guarda officials. Field reconnaissance and training were completed by the specialists and resource management reports submitted to the TVA MEREC staff and regional commission and local government officials. TVA MEREC staff and CCRC staff conducted visits to several other cities in the central and northern regions in April. The CCRC developed a proposal to expand the MEREC process to seven other Portuguese cities. The proposal was submitted to the LUSO-American Foundation and USAID/Lisbon.

JULY 1985—Phuket, Thailand. A project review meeting was held in Phuket July 15-17. The conclusions of the mini-evaluation of the MEREC project which was conducted by a representative from the National Institute of Development Administration (NIDA) were discussed. It was decided that additional staff support for MEREC project management will be provided by the Department of Local Administration (DOLA) instead of hiring a full-time project manager.

JULY 1985—Tacloban, Philippines. Staff documented the completion of the urban farming, transportation planning, and land use planning MEREC activities during this field trip. After the normal quarterly review activities were completed, staff and local leaders developed plans for a MEREC conference for Philippine officials to be held in Tacloban in October. A major activity of the Tacloban MEREC project in 1985 was to disseminate the success story of Tacloban's MEREC effort. The planned October conference was one part of the dissemination strategy.

OCTOBER 1985—Phuket, Thailand. A number of new officials (mayor, provincial governor, and vice-governor) participated in the MEREC project in Phuket. The new vice-governor attended some of the MEREC project review sessions, and agreed to hold weekly meetings with MPK and provincial government staff to help expedite MEREC project development. DOLA staff, including the Director of Local Government Affairs, also attended the project review sessions. The director is attending monthly project review meetings in Phuket. The active participation of the provincial government and DOLA is having a positive effect on local MEREC efforts, including implementation.

JULY 1985—Guarda, Portugal. During the workshop which was held in Guarda in July, plans and budgets through September 1986 were finalized. This time period would allow for the completion of all subprojects and provide for a one-year period of project monitoring.

OCTOBER 1985—Tacloban, Philippines. A Tacloban MEREC conference was held in October to present information on successful MEREC energy/resource projects to local Philippine officials. Representatives of two Philippine cities, Legaspi and Ormoc, attended the conference. During this same field trip staff documented the completion of all eight MEREC demonstration houses.

OCTOBER 1985—Guarda, Portugal. During the October project review TVA and CCRC staff met with LUSO-American Foundation board members to review the proposal to expand MEREC to seven other cities in the central region. The foundation reaction was positive, and the CCRC was asked to submit a formal proposal for project expansion.

TVA BUDGET

TVA expenditures for MEREC activities through September 30, 1985, are summarized below and compared with the MEREC budget.

TVA began FY85 with a MEREC budget of \$170,200. A total of \$152,928 was expended, allowing \$17,282 to be carried over into FY86. These funds will be used to complete monitoring handbooks deferred until FY 1986.

TVA MEREC BUDGET AND EXPENDITURES (FY 1985)

	BUDGET	EXPENDITURES
Central Staff*	\$ 89,500	\$ 74,275
Travel	41,000	41,182
Contracts	2,300	6,962
Other**	5,200	5,615
Overhead	<u>27,200</u>	<u>24,894</u>
Subtotal	\$170,200	\$152,928

*Includes TVA technical assistance.

**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.

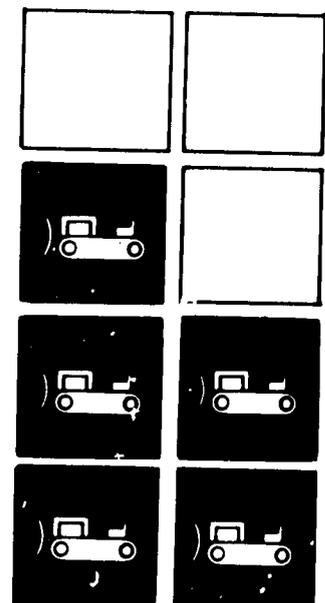
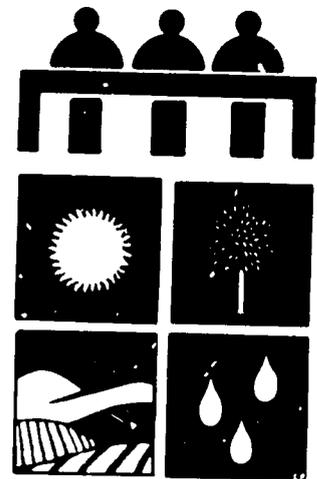
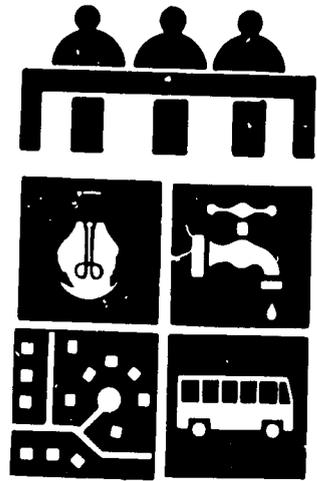
Tacloban, Philippines

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. 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.

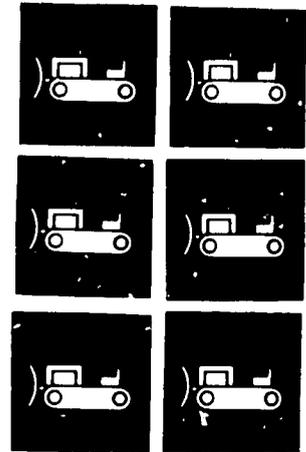
Tacloban is a part of the Eastern Visayas administrative and planning region, and is one of the three cities in the region. Only 20 percent of the region's population lives in urban areas, and agriculture, which employs 66 percent of the labor force, is very important to the region. Tacloban has an effective 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 33 months. Accomplishments thus far have included:

- All eight MEREC demonstration houses have been completed and occupied. A new school will utilize a design developed for the roof of the MEREC houses.
- An estimated savings of \$352,000 resulted from improvements in the distribution efficiency of the Leyeco II Election Co-Op. The system's efficiency improved from 68 percent in January 1982 to 79 percent in August 1984.
- An estimated savings of \$137,000 resulted from improvements in the water district distribution system in 1983 and 1984.
- 300 new energy-efficient fluorescent street lamps are being placed in service throughout the city.
- A total of \$10,300 worth of vegetables and \$850 worth of firewood have been harvested under the urban agriculture project.



- The total market value of MEREC-vaccinated livestock has reached \$262,500.
- An energy-efficient land use plan has been developed and adopted.
- A two-day MEREC mini-conference was held in Tacloban in October 1985. Local leaders from other Philippine communities attended.
- The combined savings of the centralized contained system and the pushcart collection system total a 29 percent reduction in fuel consumption.



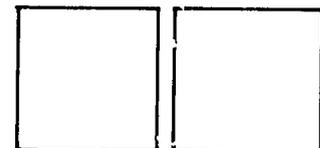
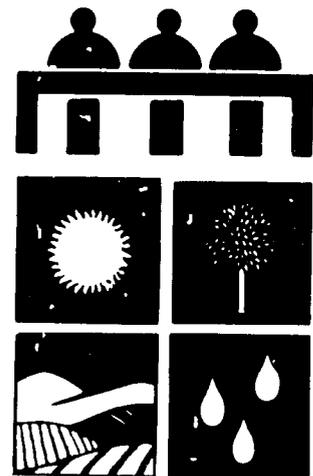
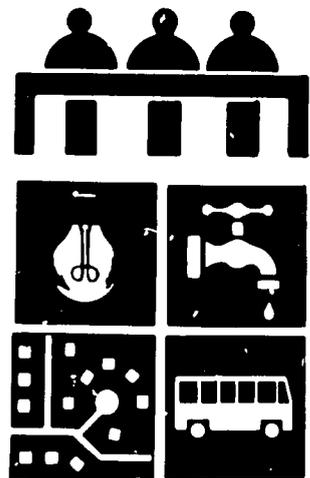
Phuket, Thailand

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, Songkla, 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 the area, which has a tropical monsoon climate.

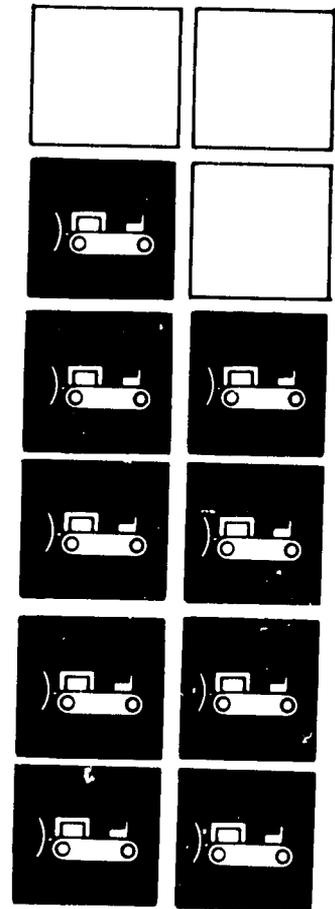
On December 1, 1983, USAID signed a MEREC project agreement obligating \$250,000 of AID funds for planning and implementation of a project in Phuket, which is expected to be completed by December 1, 1986. Monitoring and documentation of project results will extend the Phuket project through September 1987. The agreement provides for TVA field visits to Phuket at approximately three-month intervals to assist the municipality with project management, technical support, and monitoring activities.

Highlights of progress in the MEREC project in Thailand include:

- The tin mine reclamation project has been an exceptional example of cooperation between Thai government agencies and regional universities. Initial site grading and planting have been completed.
- A TVA specialist trained 16 water department technicians from Phuket and three other municipalities in the use of leak detection equipment. TVA equipment was loaned to Phuket until equipment which has been ordered by the Water Supply Department arrives. In the first three days of use, Phuket technicians located and repaired leaks which represented a loss of \$8,400 per year in treated water. The cost of a water leak detection instrument is approximately \$2,500.
- Construction has begun on a fermentation tank to produce fertilizer. Sludge from the project will be used in the tin mine reclamation project and on other MPK lands.



- Preliminary findings of a TVA specialist who studied means of more efficiently collecting waste have been delivered. The potential for a compost project at the landfill is also being explored.
- Prince of Songkhla faculty coordinated the second seminar in energy conservation for 40 representatives from local industries and hotels.
- Contracts were let for the four low-cost housing units which are due to be completed by March 1985.
- Six rain water storage tanks have been completed and located at five schools and a mosque. They are the only sources of safe potable water at the schools. Fifteen water jars were constructed and located at preschool centers and Tambon Centers.
- A biogas generator was constructed at the new municipal slaughterhouse. The slaughterhouse is scheduled for completion by mid-1986. Methane gas produced in the generator will replace wood now being used as fuel in the slaughtering process.
- A study of the potential for industrial uses of selected agricultural resources (primarily rubber and coconut wood) was completed. The consultants' recommendations were reviewed with local business and financial leaders.



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. 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.

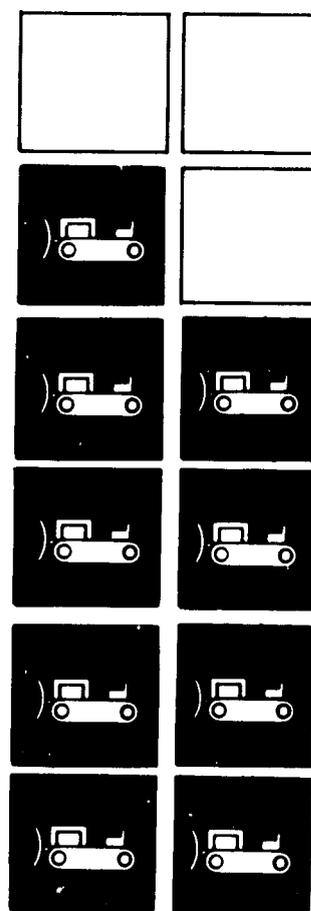
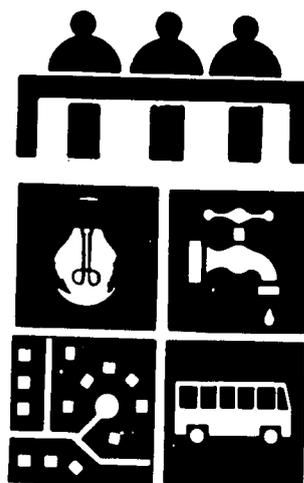
In August 1983 a MEREC project agreement was signed, obligating \$150,000 of AID funds for the project in Guarda with a completion date of September 30, 1985. The project agreement provides for TVA field visits to Guarda at three-month intervals to assist the city with all phases of the MEREC project. The Comissao de Coordenacao 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 requested and received 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 1985 include:

- Water department personnel surveyed the municipal water system using leak detection equipment loaned by TVA. More than 27 leaks were located and repaired. The value of water saved totals \$132,500 per year. USAID approved purchase of leak detection equipment for Guarda.
- A study of the economic feasibility of recycling glass and paper was completed. Guarda plans to initiate a program to recycle glass and paper. A TVA specialist acted as consultant for the study.
- It is estimated that the more efficient routing of trucks will result in a 20 percent savings in motor fuel.
- A TVA specialist assisted in the completion of an economic feasibility study of the potential for the production of methane gas at the municipal land fill.
- A survey of solar energy opportunities in Guarda was completed. The results of the survey were presented in a workshop for local architects. A brochure on energy consumption in buildings was completed.
- The intermediate urban management plan has been completed and approved by the municipal government. The plan is being reviewed at the national level. The comprehensive planning work in Guarda is being considered a national model.
- The elementary school which is being built with local materials is complete. Wood, insulation, and a wood-burning stove are being utilized. Construction costs were reduced by 10 percent by substituting wood and granite for concrete. The energy-efficient features of the new school are expected to reduce consumption of electricity by 70 percent.

Guarda is proceeding with MEREC implementation and monitoring activities in 1986. 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 with the assistance of the LUSO-American Foundation and USAID/Lisbon plans to expand MEREC to include seven more cities in the central region.



74

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 third year of this energy resource management project were: initiation of implementation activities in Phuket and Guarda; continuation of implementation and monitoring activities in Tacloban, Philippines; and the MEREC conference in Tacloban, Philippines.

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

- Monitoring and documenting project results in Tacloban, Philippines.
- Implementing MEREC projects in 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.

Interest in MEREC 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 and LUSO-American Foundation funds to support this expansion. In Thailand and the Philippines discussions have been held regarding opportunities for project expansion.

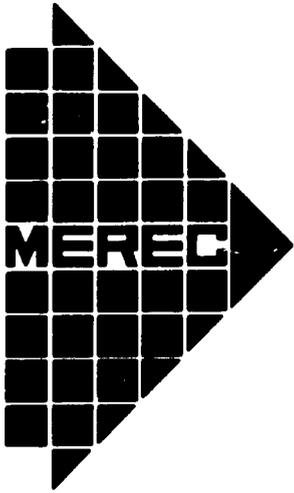
The most important lessons learned by the cities involved in MEREC are:

- MEREC saves energy.
- MEREC saves money—both for local governments and for individual citizens.
- MEREC is a management tool that results in a long term improvement in the efficiency and effectiveness of local government sectors.

In more general terms, MEREC illustrates that:

- 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 utilize 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.



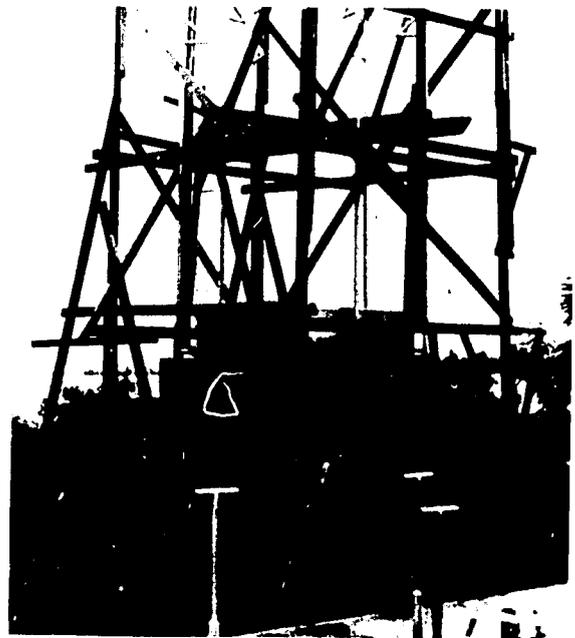
1985



WATER CONSERVATION PROJECT—THAILAND



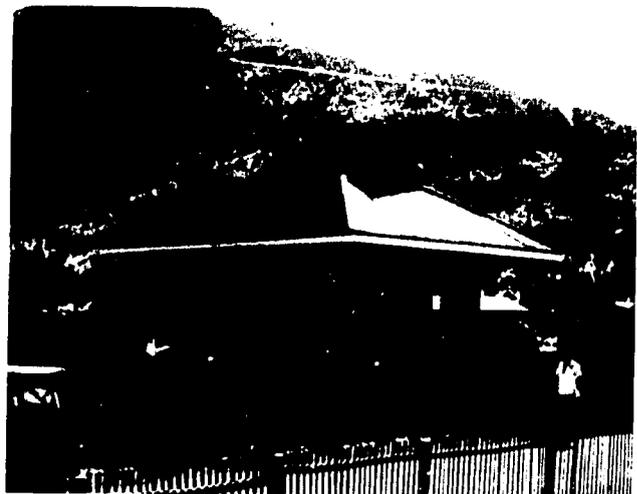
HUMAN WASTE CONVERSION TO FERTILIZER—THAILAND



BIOGAS DIGESTER—PHILIPPINES

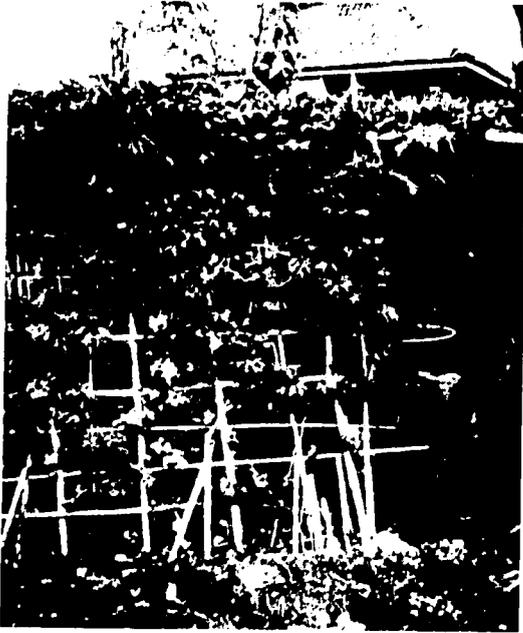


WATER CONSERVATION PROJECT—PORTUGAL



HOUSING USING LOCAL MATERIALS—PHILIPPINES

76



URBAN GARDENS—PHILIPPINES



SOLID WASTE COLLECTION—PHILIPPINES



LAND RECLAMATION PROJECT—THAILAND



ENERGY CONSERVING SCHOOL—PORTUGAL



WATER CONSERVATION PROJECT—THAILAND