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COMMENTS ON THE  
ENERGY MANAGEMENT TRAINING PROGRAM (EMTP)  
EVALUATION REPORT

October 1982

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**COMMENTS ON THE**  
**ENERGY MANAGEMENT TRAINING PROGRAM (EMTP) EVALUATION REPORT**

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## Executive Summary

The findings of the EMTP evaluation report prepared by IEAL for AID attempt to pose answers to three important questions:

1. Are the course managers performing their tasks under the current contract in an effective and efficient manner?
2. Is the Program as presently constituted cost-effective?
3. What new directions in energy planning and management training, if any, should be undertaken by AID?

Although we have some specific reservations on a number of points in the report dealing with criticisms of the course managers that bear on this question, we find ourselves in essential agreement with their findings and accept the criticisms made in the report pertaining to inadequate documentation of the program content and activities, participant reactions, alumni feedback, and the need for improved management.

With respect to the second question, we do not take issue with the primary finding of the evaluation report bearing on this question, in and of itself, i.e., the EMTP course should be terminated in its present form. We do believe, however, that there has been an over-reliance by the authors on impressions received from a handful of quick trips to a few developing countries and a limited set of responses to questionnaires from participants. As a result the evaluation team may have been led to some generalizations not reflective of the needs and the situation in other AID countries. We consider it more productive for AID to think in terms of "major new approaches" which the course managers have been discussing with AID over the past year and are elaborated on in Appendix I.

The answers in the evaluation report to the third question - What new directions . . . should be undertaken by AID? - go to the heart of the matter. Here we must take strong issue with many of the authors' general recommendations on the goal of AID energy training programs as well as with their specific suggestions. They are, we believe, based on the erroneous notion that energy planning in 1982 should continue

to be taught to a relatively select group of individuals as a means of familiarizing them with the broad elements of top-down national energy policymaking as was the case in 1978. Virtually all the independent sources we have consulted hold a widely differing view, which is that most of this select group is now familiar with these broad national energy policy concepts and that training must now be directed to a much larger group at the detailed level of comprehensive micro-analysis of the few specific energy options open to most AID countries.

It is the lack of trained manpower in the skills which is preventing many AID countries from proceeding beyond this preliminary phase in the energy planning and management of their energy systems. Such micro-level training lends support to other energy assistance programs in AID and the development banks which are centered around specific options intended to help AID countries reduce their dependency on oil.

Finally, we note that the model proposed by the authors for meeting the needs of energy policy formulation training, even if AID were to adopt such as its training goal, presupposes that AID-supported training programs in energy planning are operating in a vacuum and that they therefore must undertake a comprehensive, stand-alone program. This ignores entirely the growing number of other energy planning training programs supported by the World Bank, various U.N. organizations, and the Commission of European Communities as well as by the Governments of Japan, France and Germany and universities in the U.S., Europe, and Japan. The top-level audiences to whom the authors would assign priority are, in fact, the focus of a number of these programs. Other programs take a specific regional focus and still others concentrate on narrow topical issues. While some duplication is inevitable, it seems only reasonable to include in AID considerations of future directions and targeted audiences for energy planning training the existence and the content of these courses. Based on the experience of the course managers and other planning program managers in energy and other areas of development, the location of the course, its length, and focus should be guided by the following:

- . Courses sited in a country are the most cost-effective arrangement for training groups of 15-25 on a range of topics that are directly related to timely issues under current consideration by the governments in question.
- . Regional-sited courses are the most cost-effective arrangement when there is a topic of interest common to countries in the region (e.g., industrial energy conservation, energy prices, utility expansion planning, utilization of forestry resources).
- . Centrally-located courses are the most cost-effective arrangement for courses that teach skills that have application to a broad range of interests, issues, and concerns of large numbers of developing countries.

Our suggestions for dealing with the management criticisms noted in the evaluation report are as follows:

1. In the area of documentation the course managers would prepare Session Reports (covering course content, experiences, write-ups on applicants, participants and lecturers, summation of reasons for rejection or acceptance, and a budget breakdown), Monthly Progress Reports, Trip Reports and International Energy Planning Meeting Reports.
2. Concerning the participant selection we would broaden the admissions committee to include an individual from AID and an outside consultant appointed by AID.
3. With respect to improved interaction with AID Regional Bureaus and Country Missions, we suggest a semi-annual review meeting at AID or trips by EMTP staff to selected AID countries in each region once a year.
4. As to the Program administration we suggest Peter Meier replace Robert Nathans as Program Director and David Jhirad of the BNL staff serve full-time as Deputy Director. A full-time program administrative assistant and secretary would be retained. With these changes we believe no additional administrative staff will be needed.

Our suggestions for improving the evaluation procedures of the Program are as follows:

1. A new Advisory Committee be appointed and funded separately by AID.
2. An outside consultant review the quality and quantity of technically qualified persons applying to the Program.
3. A Visiting Committee of 4-5 persons holding top positions in energy planning and/or service organizations be appointed and funded by AID to conduct an annual 5-day review of the Program.
4. AID maintain an up-to-date representative profile of graduates by a) requesting AID Mission staff connected with energy to solicit opinions of supervisors on the value of EMTP for graduates; b) AID Mission officers to convene a 1/2 day meeting of EMTP graduates annually to solicit information and their opinions of the Program; c) energy project managers and Office of Energy staff and AID energy consultants traveling overseas to meet with graduates. Also the Program publish a booklet each year profiling EMTP graduates (a practice used by the World Bank's Economic Research Institute).

Our suggestions for new program directions for energy planning for AID are summarized below:

1. In-country seminars for high level officials each one week in length, patterned on the Sudan training experience undertaken by an AID consultant.
2. Regionally-located advanced short courses of 1-2 weeks would be offered to graduates of EMTP and similar type courses focusing on 1-2 special topics of special interest to AID countries in the region.
3. Regionally-located topical courses, 2-3 weeks in length offered on a rotating basis patterned on the up-coming seminar on energy conservation in Africa.

4. Centrally-located revised EMTF, shortened to six weeks, with 3 weeks' time spent on multiple tracks emphasizing the interaction of small working groups with instructors, problem solving, and field visits, and one week devoted to seminars for presentation and discussions of the results of working groups, and elimination of Washington-New York tours.

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COMMENTS ON THE  
ENERGY MANAGEMENT TRAINING PROGRAM (EMTP) EVALUATION REPORT

Section 1

1.0 Introduction

The findings of the EMTP evaluation report prepared by IEAL for AID attempt to pose answers to three important questions:

1. Are the course managers performing their tasks under the current contract in an effective and efficient manner?
2. Is the Program as presently constituted cost-effective?
3. What new directions in energy planning and management training, if any, should be undertaken by AID?

In seeking answers to the first question, we believe that the authors of the report have made a serious, if cursory, attempt to understand the nature of the difficulties encountered in planning as well as administering a training program for mid-career officials from developing countries. Although we have some specific reservations on a number of points in the report dealing with this question, we find ourselves in essential agreement with their findings. Any federally funded program which has gone on for an extended period can only profit by exposure to an experienced and impartial evaluation team.

We (referred to as the course managers in the report) accept the criticisms made in the report pertaining to inadequate documentation of the program content and activities, participant reactions, alumni feedback, and the need for improved management. We also acknowledge that the frequency of interaction with AID staff at the country level may have been insufficient. While the close working relationship that the course managers maintained with the AID EMTP Program Manager during the period 1978-81 as well as the lack of funds assigned to staff travel in the

79-81 budgets for follow-up evaluation purposes may have been contributing factors, in themselves they cannot be used as valid reasons for this deficiency. In Section 2.0 we offer specific suggestions on how these procedures can be tightened up should the Program be continued.

With respect to the second question, the authors conclude that the EMTP should be terminated in its present form (see page 99 of evaluation report). Here too we believe the authors made a sincere effort to obtain as much information as they could in the 2-3 month evaluation period bearing on this question. And here again, we do not take issue with their primary finding in and of itself. We do believe, however, that there has been an over-reliance by the authors on impressions received from a handful of quick trips to a few developing countries (two of which, Egypt and Indonesia, are not at all typical of AID countries) and a limited set of responses to questionnaires from participants.\* As a result they may have been led to some generalizations not reflective of the needs and the situation in other AID countries.

The fact is that the course managers, in both oral and written presentations to AID starting over a year ago, strongly suggested that the time had come for AID to consider what we described as "major new approaches" to training in this vital area of planning and management of energy resources.\*\* Their suggestions were based on a variety of sources:

- . lengthy and repeated interviews with a number of AID Mission energy officers
- . contacts with top officials of energy commissions, planning ministries, and utilities from more than 30 developing countries who attended several international meetings on energy planning for developing countries held in Sweden, Germany and the U.S. which were attended by EMTP staff
- . the staff of the Economic Development Institute and the Energy Department at the World Bank

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\*We are not in a position to determine if these 20 interviewees out of the 195 participants to date are typical in any sense - country, technical background, etc. - since the report does not present sufficient data in this regard.

\*\*See draft report "New Directions for the EMTP" - Appendix I.

- . energy planning specialists from developed and developing countries actively involved in teaching mid-career and regular university courses
- . the staff of several United Nations organizations involved in energy planning training in developing countries
- . consultants to AID and the World Bank working on energy planning projects in developing countries.

While we consider it more productive for AID to think in terms of "major new approaches" rather than "termination of the EMTP as presently constituted . . .", in point of fact both groups have concluded that the usefulness of the overview approach to energy planning is dwindling.

We do, however, take issue with the cost/benefit arguments that the authors use to support their sweeping conclusions, primarily because such arguments erroneously, we believe, lead to consideration of changes in the form and arrangements of what is to be taught in offering new training alternatives and not changes in substance. This is not to say that the cost/benefit methodology is at fault, but in any training endeavor it is well-known that it is much easier to quantify costs as opposed to benefits. In Section 3 we suggest procedures which have been used by AID in other areas of training and by universities and other educational endeavors to evaluate education and research programs.

The answers in the evaluation report to the third question - What new directions should be undertaken by AID? - go to the heart of the matter. Here we must take strong issue with many of the authors' general recommendations on the goal of AID energy training programs as well as with their specific suggestions. They are, we believe, based on the erroneous notion that energy planning should continue to be taught to a relatively select group of individuals as a means of familiarizing them with the broad elements of top-down national energy policy making. Virtually all of the sources we alluded to earlier hold a widely differing view, which is that most of this select group is already familiar with these broad national energy policy concepts and that training must now be directed to a much larger group at the detailed level of comprehensive

micro-analysis of the few specific energy options open to most AID countries. A number of the other suggestions put forth by the authors, moreover, were considered at the previous AID evaluation in 1979 (such as regionally-based programs, for example) and rejected as being impractical or too expensive. Other suggestions have been considered at meetings of the EMTP Advisory Committee.

The basic differences between the course managers and the authors concerning this third, most vital question center around three points:

1. What should be taught?
  2. To whom should the training be directed?
  3. What arrangements are most cost-effective for training audiences from AID countries in energy planning?
1. What should be taught?

Our approach to this question, as noted earlier and described more fully in Appendix I, is to focus future training on the micro-analysis of known specific energy options. This contrasts with the point of view held by the authors that broad national policy formulation should be the goal of energy planning training (see p. 91 of evaluation report).

It is worth noting that the authors' viewpoint that national policy formulation is the proper goal of AID energy planning was, in fact, the major focus of the initial EMTP program in 1978. But the situation in 1982 is quite different. The major investments made by AID, the World Bank, ECC, UNDP, OLADE, and others in comprehensive assessments have produced at least some of the desired results. They have contributed to developing country policymakers' understanding of the technical and economic dimensions of their countries' energy situation. What interests them now is to move on to the next step.

It is the lack of trained manpower to take them beyond this preliminary phase in the energy planning and management of their energy systems that is preventing these countries from attracting

the needed external resources from public and private sources necessary to support implementation. Our proposal for a substantially revised EMTP offered in Appendix I represents what we think would be a more timely basis for considering AID energy planning training programs to help these countries develop this kind of manpower. Such micro-level training lends support to other energy assistance programs in AID and the development banks which are centered around specific options intended to help AID countries reduce their dependency on oil.

## 2. To whom should the training be directed?

The notion that the authors set forth that better national energy policy formulation should be the primary goal of energy planning training leads naturally to the conclusion that it should be directed to a small cadre of central planners. This may be a useful goal in a normative sense, but in most AID countries the policies and more importantly the decisions affecting energy are and will continue to be a highly fragmented, disjointed affair (as they are in many industrialized countries). Not to recognize this situation runs the risk of training a core group who will go on planning and planning and planning, without ever having the power (or even the interest) to influence decisions taken at the operating level. The focus of measurements of cost-effectiveness in training in any area of development planning - population, agriculture, natural resources - must be directed toward its utility in improving the decision-making process at the operating level, not only in improving the ability of policymakers to formulate national policy. That is why the energy planning training must be directed to a variety of levels of persons in a variety of organizations - at the enterprise as well as the national level. This difference in perspective lies at the root of the divergence between the authors and ourselves in determining the audiences to whom AID training in energy planning should be directed and in evaluating the true cost-effectiveness of such training programs.

As in any AID-sponsored training program, certain practicalities must be taken into consideration which the authors do not seem to

recognize, namely that the mechanisms for choice of who comes to AID-supported training programs in any technical area are the closely guarded prerogatives of the in-country personnel and the local AID Mission. Their on-location knowledge of what really is going on, moreover, is and should be an essential element in the selection process. While one of their criteria will be the "level" of the candidate, many other factors have to be taken into consideration.

Finally, we note that the model proposed by the authors for meeting the needs of energy policy formulation training, even if AID were to adopt such as its training goal, presupposes that AID-supported training programs in energy planning are operating in a vacuum and that they therefore must undertake a comprehensive, stand-alone program. This ignores entirely the growing number of other energy planning training programs supported by the World Bank, various U.N. organizations, and the Commission of European Communities as well as by the Governments of Japan, France and Germany and universities in the U.S., Europe, and Japan. The top-level audiences to whom the authors would assign priority are, in fact, the focus of a number of these programs. Other programs take a specific regional focus and still others concentrate on narrow topical issues. While some duplication is inevitable, it seems only reasonable to include in AID considerations of future directions and targeted audiences for energy planning training the existence and the content of these courses. On the other hand, the course outline presented in Appendix I presently is not being sponsored by any other assistance agency in the comprehensive form we have proposed.

3. What arrangements are most cost-effective for training audiences from AID countries in energy planning?

AID has a number of energy planning activities already in place. Some operate through the Office of Energy, others through regional bureaus, and some involve country Missions. A few take the form of in-country short, intensive seminars on selected topics in energy planning. Examples of countries where such seminars have been held are the Sudan, the Dominican Republic and Indonesia. As noted earlier,

a number of other technical assistance organizations offer courses either on a country-by-country basis or on a regional basis (World Bank, IAEA, U.N., France, etc.). Still others offer 1-3 week seminars on special topics either in their home countries or overseas. Finally, several countries and international organizations (France, Japan, ECC, ILO) offer centrally-located extended courses similar in form to the EMTP. The problems inherent in country-specific courses are: (1) there frequently is difficulty in attracting high-quality lecturers familiar with the country; (2) local diversions make class attendance by higher level staff sporadic; (3) considerable effort and expense must be directed to preparing material that is applicable to the situation in each country, and (4) cost per participant/attendee-day (which includes lecturer travel, staff preparatory time, logistic support staff, local expenses) turns out to be high - approximately 150-200% higher than an EMTP attendee-day.

Yet in spite of the difficulties and high costs such overseas programs perform a valuable role. First, the country programs manage to attract individuals who cannot take the time away from their positions to leave the country. Second, they encourage open discussions of country-specific options among participants coming from a wide variety of ministries, the utilities, and planning and finance offices - with the lecturers acting as informed and presumably objective moderators. This give-and-take will often open up communication tracks not only between disparate organizations, all of whom make decisions affecting energy outcomes, but between top-level policymakers and lower-level technocrats.

Many of the same remarks apply to lengthier (3-6 week) courses held at regional locations (a number of which EMTP staff have participated in). Daily attendance by other than the country staff in which the course is held is generally only fair. A much more serious difficulty arises in trying to preserve continuity of the course content. This is due mainly to scheduling of lecturers who, even with much advance notice, somehow manage to seek last minute revisions in their schedules or to back out completely. On-location

logistical arrangements are complicated and sometimes accommodations are poor. Finally, unless one is fortunate to attract individuals with specific familiarity with regional energy problems, extra costs are involved in preparing relevant case material. Again cost per participant/attendee-day are high.

Regional programs do best when they concentrate on a topic of known interest to countries in the region. In such cases benefits derive from formal and informal follow-up meetings between participants. These can lead to extended regional cooperative programs involving demonstrations, analysis and further training. They have the further advantage that participant travel costs are lower. This can lead to much more substantial participation by countries in the region if travel costs are borne by the governments represented.

For courses similar to the EMTP which concentrate on teaching skills in combination with case material (e.g., ECC, Japan, France, ILO Turin Center), almost all have determined that a central location near their home base is most cost-effective. (The exception is IAEA, which as a U.N. organization is constrained to holding its course on-location in developing countries.) Costs per attendee-day for such courses are substantially lower, the range of lecturers available is much larger, the facilities are better, logistics are simplified. The Economic Development Institute of the World Bank has come to similar conclusions. The primary difficulty associated with such "home-base" courses is the higher travel costs entailed by the developing country governments. This tends to discriminate against more junior applicants and sometimes leads to attendance by too "high level" individuals who can become diverted (and divert others) by their lack of substantive interest.

To summarize, we are saying:

- . Courses sited in a country are the most cost-effective arrangement for training groups of 15-25 on a range of topics that are directly related to timely issues under current consideration by the governments in question.

- . Regional-sited courses are the most cost-effective arrangement when there is a topic of interest common to countries in the region (e.g., industrial energy conservation, energy prices, utility expansion planning, utilization of forestry resources).
- . Centrally-located courses are the most cost-effective arrangement for courses that teach skills that have application to a broad range of interests, issues, and concerns of large numbers of developing countries.

In Section 4 we present a series of alternative suggestions to those in the evaluation report which take into consideration the above characteristics.

## Section 2

### 2.0 Management Issues: Suggestions for Change

In this section we make a number of suggestions for dealing with the management of the EMTP including activities, documentation, participant selection, and improved interaction with users, AID regional bureaus and country Missions. This section is a response to pp. 25-27 of the evaluation report.

### 2.1 Documentation

To make AID staff more aware of the EMTP we suggest the following:

#### 2.1.1 Session Report

Immediately following each session of the Program a report would be submitted to AID containing the following:

- A. A detailed description of the program content.
- B. A description of experiences gained, lessons learned, and information derived from participant-course manager interactions that bear on future EMTP sessions and other AID energy training activities.
- C. A background write-up on all applicants and program lecturers.
- D. A summary of contacts and meetings with AID Missions, U.S. embassies and other organizations bearing on participant selection.
- E. A description of the selection process with a written reason given for selection or rejection of candidates.
- F. A financial statement of session expenditures with a budget breakdown.
- G. Written instructional material prepared for the course.

#### 2.1.2 Monthly Progress Report

A report would be prepared monthly containing:

- A. A summary of on-going activities - recruitment, selection, course write-up, etc.

- B. A listing of financial expenditures during the last month.
- C. A listing of U.S. AID and U.S. embassy contacts.
- D. A description of problems encountered.

### 2.1.3 Trip Reports

Reports would be written up by EMTP staff and outside consultants following each overseas trip containing:

- A. Summary of discussions with AID Missions, past participants, energy officials and representatives of other assistance organizations involved in energy planning.
- B. Conclusions bearing on EMTP and other AID energy planning training programs.

### 2.1.4 International Energy Planning Meeting Reports

Reports would be submitted following EMTP staff attendance at international meetings on energy planning containing (where appropriate):

- A. Course outlines for energy planning programs being sponsored by other national and international groups.
- B. List of attendees at meetings.
- C. Summary of discussions and conclusions reached.

## 2.2 Participant Selection Process

We suggest that our admissions committee, now consisting of 3 EMTP staff, be broadened to include at least one representative from AID, a member of the EMTP Visiting Committee (see p. 7 below) and an outside consultant to be selected by AID. We further suggest that a new write-up of the criteria for participant selection be submitted to the AID Program Manager for approval and then be sent out to AID Missions.

## 2.3 Improved Interaction with AID Regional Offices and Country Missions

We have the following suggestions to formalize what has operated as an informal process.

### 2.3.1 Review Meeting

Semi-annually a 1/2-day meeting to be held in Washington, to be attended by Office of Energy staff and one or more representatives of regional bureaus and other interested AID offices, to review existing program structure and content and to suggest changes. Prior to this meeting attendees will receive the Session Reports referred to in Section 2.1.1.

### 2.3.2 Trips to AID Countries

In an attempt to improve the interaction with AID Missions, once a year EMTP staff or outside consultants appointed by AID would travel to a representative number of AID countries in each of the four AID regions. These trips by EMTP staff were included in the 1978-79 budgets, but later dropped for budgetary reasons. Extensive interviews would be held with appropriate Mission staff, key officials in energy planning and energy service organizations and past participants. Conclusions based on these extensive trips would be used to:

- A. Determine if AID Mission inputs into the selection process were adequate.
- B. Solicit Mission staff views on changes in emphasis needed in EMTP and other AID training programs.
- C. Solicit views of participants' supervisors on EMTP and other AID training activities.
- D. Obtain information pertaining to current activities and responsibilities of past participants and their views on the effectiveness of their training.

## 2.4 Current Program Administration

At present there are funds in the budget for the equivalent of four full-time staff who contribute to the content, logistical support and administration of the program. In addition, the program overhead pays for fiscal and logistical services at Brookhaven National Laboratory and the State University of New York. Part of SUNY expenses are absorbed by the University.

The Program Director, Dr. Robert Nathans, spends 50% of his time on administering the program on a day-to-day basis. Dr. Peter Meier, Deputy Director, spends 100% of his time on the program during sessions and 50% between sessions. His responsibilities are to deal with all matters pertaining to course content, choice of lecturers, preparation of course material and to assist in participant selection. Ms. Ruth Shepard spends 100% of her time on the program as Administrative Assistant. Ms. Sally Dickman serves full-time as the Program secretary. Other IER and BNL staff take responsibilities for organizing and coordinating the overseas seminars that are a part of EMTP program responsibilities. The position held formerly by, first, Mr. James Bever (who left to take an overseas position on an AID project) and then by Dr. Gerhard Tschannerl (who left to take a World Bank position) was not filled. Part of the duties of that position have been assumed by Dr. David Jhirad of the Brookhaven staff.

#### 2.4.1 New Program Administration

Our suggestions in response to the management problems noted in the evaluation report (p. 27) are as follows:

- A. Dr. Peter Meier, currently Deputy Director, would take over as Director of the Program. He would continue his responsibilities as outlined above and assume responsibility for overall direction of the Program.
- B. Dr. David Jhirad would assume the role of Deputy Director on a full-time basis. Dr. Jhirad is a member of the International Programs Group in the National Center for the Analysis of Energy Systems at Brookhaven, and has been a lecturer in past EMTP sessions. He is currently taking on the role of Technical Coordinator of a two-week AID-sponsored seminar in Africa on energy conservation. Dr. Jhirad would take over responsibilities for documentation, participant recruitment, participant selection and liaison with AID, in addition to his continuing to serve as a principal lecturer in the program.
- C. Dr. Robert Nathans would serve as an unpaid consultant to the program taking part in lecturing and the participant selection process.

- D. Ms. Shepard and Ms. Dickman would continue in their full-time roles as Program Administrative Assistant and secretary.
- E. IER and BNL technical and support staffs would continue to be used to organize overseas activities of the EMTP on an as-needed basis.

We believe that with this change in staff and the increased time commitment on the part of Drs. Meier and Jhirad, no additional personnel need be added to bring about the improved administration of the Program.

### Section 3

#### 3.0 Evaluation Procedures

An AID evaluation of a training program in any area of development which involves planning/management/policy analysis is not unlike that of a university program for students undertaking similar pursuits. Standard procedures for evaluating such programs involve:

- A. Reputation among peers. This measure has particular relevance when there is a basis for comparing it with equivalent programs.
- B. A review of the numbers of highly qualified individuals applying for entrance to the program. This has particular application as an evaluation measure where there are equivalent programs competing for these highly qualified students.
- C. Periodic reviews of the program by persons who are judged to be successful practitioners in the field. These involve a 4-5 day thorough review of course content, lengthy, and sometimes individual interviews with students, meetings with faculty, discussions with deans or department chairmen on administrative matters, and finally a private meeting with university provosts and presidents.
- D. Detailed follow-up of graduates in their careers. This means periodic interviews first with the graduates themselves, second with the immediate supervisors and finally, as a cross-check, with their colleagues.

The evaluation procedures proposed in connection with initial EMTP programs were patterned on these four component measures. Because of budgetary considerations, however, the more expensive measures, namely A and B, were set aside and heavy reliance was placed on measures C and D.

#### 3.1 Advisory Committee

The current Advisory Committee acts as a group of peers. The Committee is made up of individuals with well-established reputations in either energy planning training, training in other development areas, or both, as well as familiarity with related university-based educational programs

(see Appendix II for names and brief resumes of members of the Committee). The team was chosen from a set of names submitted to the AID Program Manager by the course managers. They have met either during or immediately after each session with the AID Program Manager and EMTTP course managers. The Advisory Committee also has met privately from time to time with the participants, either on an individual basis or in small groups. In spite of the fact that they did not generally submit an independent written report after all their meetings, in each case the AID Program Manager was present at their meeting to hear their comments, criticisms and suggestions. It should be emphasized that the EMTTP Advisory Committee has played a vital role which has led to significant changes in the EMTTP course content, the continuity of the Program and the nature of the selection process. The Committee members also have interested themselves in such matters as lodging arrangements and social amenities for EMTTP participants. It is noteworthy that all these individuals have served without remuneration - a fact which has limited the ability of the course managers to call on their services for extensive written comments.

We recommend that:

- A) AID select a new team of advisors to act as the peer review team, and that they be paid.
- B) The team be funded independently of the EMTTP at a sufficient level to allow them to meet 2 times a year in Washington with AID staff and that they be required to submit a written report containing their comments, criticisms and suggestions for change.

### 3.2 Review of Quality of Applicants

On average there have been 75-100 applicants for the 30-35 openings in EMTTP sessions. Not all of these satisfy the technical criteria for admission to the Program, but, on average, for each session there have been at least 50-60 applicants that easily meet the Program's technical criteria. The other criteria that enter into the final selection process include

- . restricting individual country acceptances in any one session to 3 persons.

- . restricting non-AID countries' acceptances to 10 persons.
- . maintaining a mix between persons with engineering and economic backgrounds.
- . giving special priority to AID countries not represented in previous sessions.

Because of these additional criteria, the final group selected for any session almost always falls below the quality of the individuals applying for acceptance. But, as noted earlier, it is the ratio of qualified applicants to admittances that constitutes the basis of this evaluation measure.

We have no quantifiable data on how this compares with other similar programs being held in Europe and elsewhere, but based on discussions with lecturers in the EMTP who have lectured in some of these other programs, presentations made by course managers of other similar programs at international meetings, and surveys by the UNDP, several points are evident:

- A) The EMTP is regarded as the most rigorous and advanced program in energy planning now in operation along with the program at the Bariloche Foundation in Argentina (which accepts students only from Spanish-speaking countries).
- B) The quantity as well as the quality of the applicants applying to the EMTP is substantially higher than those attending similar courses at Ispra (sponsored by the ECC), the ILO Turin Center (sponsored by the U.N. and the Italian government), and IAEA's regional courses.
- C) None of the 3-4 similar programs now in existence have had the continuing high ratio of qualified applicants to acceptances of the EMTP.

This evaluation measure could be improved by having an independent consultant solicit such data on similar programs and periodically submit reports to AID.

### 3.3 Visiting Committee of Experienced Practitioners

Such a visiting committee, not now in existence, would be made up of 5-6 persons holding top positions in energy planning and/or energy service organizations in developing countries. They would be convened during a

session of the EMTP for a period of one week to perform the functions of a practitioner review committee. The agenda of this visiting committee might be arranged something like the following:

- Day 1: Presentation to the committee by course managers on course content, statistics on course applicants, and other pertinent data, followed by extensive discussions.
- Day 2: Individual and group meetings with participants.
- Day 3: Meetings and discussions with staff and outside lecturers in residence plus a tour of housing and lecture facilities.
- Day 4: Preparation of written report by visiting committee.
- Day 5: Meeting in Washington with AID staff.

### 3.4 Participant Follow-Up Evaluations

The cost incurred in obtaining and maintaining an up-dated set of statistically valid profiles of graduates of AID energy planning training programs is substantial. Questionnaires of the type used in the evaluation report and those used in the past by the EMTP course managers can be substituted for more expensive on-site interviews with graduates, their supervisors and working colleagues. However, these suffer from several important deficiencies:

- A) The response is low; 15-25% at most.
- B) Those who respond tend to be those who feel most at ease with English.
- C) Because of cultural differences, questions which seem straightforward to Americans are subject to misinterpretation, particularly when they require essay-type answers.

We have four suggestions of alternative, less costly methods which can be used to obtain these valuable follow-up profiles:

- A) Coordinated by the Office of Energy with EMTP staff backup, AID Mission staff connected with energy or related scientific and technical assistance programs, who are most apt to come into regular contact with EMTP participants' supervisors, should be asked to solicit the opinions of these supervisors on the value of the EMTP

training activities, using a standardized series of questions. Interviews of EMTP participants' supervisors by these Mission energy/science officers should be coordinated with:

- B) AID Mission training officers, who would be requested to convene a short 1/2 day meeting of participants of EMTP training activities. Using an outline prepared for them to use as a guide, they could also use a standard series of questions for the group. Wherever possible, the Mission energy/science officer and the training officer should participate in each others' meetings. Using this information they would together submit a report to AID on their findings. While the success of this approach depends on the cooperation of the Mission officers with AID/W, it has the advantage of utilizing the detailed local knowledge of Mission officers both in training and in local energy projects. Where the Office of Energy is unable to have the cooperation of local Mission staff or in the case of countries where AID has no direct programs, then:
- C) Energy project managers from AID Regional Bureaus and the Office of Energy going on overseas trips would be given a list of participants from EMTP training activities, and their supervisors, and would be asked to meet and interview as many of them as possible in order to identify the participants' current positions and responsibilities and ask both participants and supervisors a standard series of questions. The same request could be made, with prior AID approval, of AID consultants involved in energy planning projects in the field.
- D) Regardless of which of the above methods used, EMTP participants should be contacted through their supervisors by EMTP staff in order to publish a booklet profiling their current responsibilities, positions and addresses, organized by country, and nominating agency. This booklet would be circulated to all EMTP participants, supervisors, lecturers, staff and relevant AID staff as a valuable mechanism to stimulate communication between them all and to keep all interested parties up to date on participants' activities. A very successful, similar booklet is published and distributed widely by the Economic Development Institute of the World Bank. It serves not only to keep EDI fellows in touch with each other, but is also a valuable tool for publicizing the EDI program.

## Section 4

### 4.0 Suggestions for New Program Directions for AID Energy Planning Training Programs

In this section we present a number of suggestions for the future direction of energy training based on the observations and conclusions of Section 1. Table 1 summarizes the major components.

#### 4.1 Seminars for High Level Officials

These would be modelled on the Sudan training experience, which brought a series of lecturers to the Sudan over a 4-month period to give 1-week seminars. By offering the seminars in the late afternoon/evening, attendance was achieved of high level officials, including the Minister of Energy, and the Heads of the National Energy Administration and the State Oil Company. As noted earlier, to be successful, such seminars must offer country-specific material focussed on particular technical or policy issues: general presentations of the "nature and value of policy analysis and integration" to such groups is not likely to elicit their sustained interest. We believe this type of activity is best organized by on-site AID programs. The revised EMTP program, if implemented, would contribute lecturers and case study material, if and as appropriate.

#### 4.2 Advanced Short Courses

These would be targeted at graduates of the general EMTP course (or of equivalent courses offered elsewhere - ILO Turin, Grenoble, World Bank, etc.); would focus on a particular topic, emphasizing the development of specific skills (e.g., development of project financing applications, energy pricing, management of "new" energy enterprises).

#### 4.3 Topical Courses

These would be modelled on the AID Workshop currently being organized on Energy Conservation in West Africa. These courses, of 2-3 weeks' duration, would be offered on a rotating regional basis and deal with topics considered to be of special interest to a number of countries in the region.

Table 1

<u>TARGET GROUP</u>	<u>TYPE/DURATION</u>	<u>FOCUS</u>	<u>MODEL</u>
1. High Level Officials	Seminar series, 1 week in-country	Country-specific treatment of specific technical problems (energy and foreign exchange, performance of electric utility systems, allocation and pricing of petroleum products)	Sudan Training Program (Feb.-Sept.1982)
2. Senior Technical Staff, Senior Management (former graduates)	Advanced courses, 1-2 weeks, in-country or regional	In-country or regional treatment of specific problems, offered to graduates of EMTP, ILO Turin, Grenoble, and other general courses (e.g., Pricing and Tarification; Electricity Generation Planning; Energy Information Systems; Project Financing; Management of New Energy Enterprises).	New
3. Senior Technical Staff, Middle Management	Topical workshops, 2-3 weeks, regional	Regional treatment of broad topics (e.g., conservation, bio-mass utilization, utility management)	AID West Africa Conservation Workshop (Jan. 1983)
4. Senior Technical Staff, Middle Management	6 weeks, U.S., multiple tracks	Cross cutting micro-analysis course (see Appendix I)	New (major modification of EMTP)

The target audience would be senior technical staff and middle-management, not just in the central ministries but in the major parastatal and private sector organizations. In the case of conservation, for example, the audience includes plant engineers (for industry and utilities) and maintenance managers (for transportation), as well as any of the senior staff of any energy ministry group concerned with energy conservation.

#### 4.4 Revised EMTP

In Appendix I we set forth the details of our proposals for major changes in the current EMTP. Based on the argument given in Section 1.0, we continue to believe the best location is the U.S. On the other hand, we agree with a number of other recommendations in the evaluation report:

- A) the Program should be shortened to six weeks.
- B) the course instruction should be organized as follows:
  - . 2-week single track, emphasizing lecture presentations of the basic analytical tools.
  - . 3-week, multiple tracks, emphasizing the interaction of small groups of students with their instructor(s) in work groups, each focussed on some particular evaluation problem, and using computers, exercises and field demonstrations to demonstrate viable solution approaches.
  - . 1-week single track, emphasizing seminar-type discussion of the results of the work groups.
- C) The Washington and New York tours should be eliminated. Instead, field trips should be organized by each study group (e.g., a group concerned with coal conversion would visit a utility plant currently being converted; a group concerned with industrial energy conservation would visit a manufacturing facility which had incorporated energy conservation practices and equipment into its operation).

## Section 5

### 5.0 Final Remarks

Underlying the detached nature of our comments on the EMTTP evaluation report are the beliefs of the course managers that:

1. Training in energy planning and management must be a vital component of any technical assistance program as long as energy continues to be one of the key problems of development.
2. The goals as well as the approaches to energy planning as applied to the situation in AID countries are substantially different from those of the advanced industrial countries.
3. Evaluation of such programs and interactions with users, although expensive, is vital to maintaining responsive and high quality programs.
4. The U.S., which took the lead in 1978 in initiating energy planning training for AID countries, should continue to play a lead role in developing new kinds of training programs to meet current needs in these countries.
5. Continuation of adequate AID support for such programs is much more important than the decision on what group will manage them.

AID evaluations have accomplished a variety of results. The most successful lead to an open discussion of substantive differences in points of view which can be illuminating and productive to AID. We have intended our response to contribute to this outcome.

APPENDIX I

New Directions for the Energy Management Training Program\*

September 1982

\*Prepared by Peter Meier and Robert Nathans of the Institute for Energy Research of the State University of New York at Stony Brook.

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## New Directions for the Energy Management Training Program\*

### Background

Large numbers of LDCs now have energy planning agencies in place. Some have been in existence for several years and have generated a series of national energy plans and strategies, as well as macro-energy assessments. These activities, combined with the many publications now available, the assessments undertaken by the World Bank and others, the numerous seminars and meetings organized by bilateral and international assistance agencies, all have contributed to increasing the general awareness among policymakers as well as technicians of the importance of integrated national energy planning. Not an insignificant contribution to this increased recognition has derived from the training received by the some 200 individuals from some 57 developing countries in the Energy Management Training Program (EMTP). A sizeable number of these individuals now constitutes the core groups of energy planning units in their countries.

But now, energy planners in many LDCs increasingly are focusing their attention on the micro-level technical, economic, and fiscal evaluation of specific energy options. Surrounding the examination of these options is the urgency recognized by top domestic LDC policymakers, bilateral assistance agencies, and development banks that an acceleration of effort is required to maximize near-term utilization of indigenous resources (which include effecting higher efficiencies in fuel expenditures). This does not mean that the need for planning at the macro-level is past. Such planning continues to be needed in countries that have yet to establish the overall context in which their energy infrastructure development is to take place. It is also needed to evaluate the macro-level economic fiscal impacts of decisions to invest very substantial amounts of capital, trained manpower, and, in some cases, land and water resources. Even so, it is fair to conclude that the priority in a large number of LDCs has undergone a shift

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from integrated national energy planning to micro-analysis of specific energy options involving the use of what are, for most of these countries, "new" domestic resources (we include in this category energy conservation as one such "new" resource).

To some extent the evolution of the EMTP curricula has been reflecting this gradual shift of emphasis. While the first sessions in 1978 and 1979 were constructed around the theme of what one has to know to conduct, or participate in, a comprehensive national energy assessment, the 1981 and 1982 sessions can be best described as a compendium of selected topics involving both macro- and micro-level energy planning analyses. Not only was time spent on macro-analytic models and supply-demand balancing techniques, but also on topics dealing with the application of micro-analytical energy planning techniques to conventional, renewable and conservation options, energy pricing, sectoral demand forecasting, and utility expansion. Notwithstanding the inclusion of these added topics, as presently constituted the EMTP course continues to place a higher priority on macro-level as opposed to micro-level planning techniques and applications.

In what follows we describe:

- .... The makeup and needs of the audiences to whom future energy planning training should be directed.
- .... The outline of a substantially revised EMTP course which highlights the new priorities for micro-analysis of energy options.
- .... The utility of such a cross-cutting micro-oriented course in meeting the requirements of these audiences.
- .... The numbers of persons likely to be interested in attending such a course, and its relationship to other training courses.

#### Energy Planning Training Audiences and Their Needs

Based on discussions with past EMTP participants and organizers, and participants in other energy planning programs sponsored by IAEA, UN, ECC, and the World Bank, and discussions at UN and ECC sponsored international

meetings on energy planning which have been attended by policymakers from LDC energy organizations, it is apparent that the audiences for energy planning training can be divided into two distinct categories (See Table 1):

- I. Those working for organizational units in LDCs that deal with macro-energy issues and concerns, e.g., technical advisory units to top policymakers, economic planning sections, urban and rural development agencies, central banks, energy planning units within energy commission and/or ministries, and nonprofit organizations and university groups advising governments in energy planning and policy.
- II. Those working for units either within such above organizations or others responsible for delivering energy resources and/or performing services directly related to the financing of energy projects or the expenditure of energy, e.g., electric utilities, petroleum refineries, rural electric cooperatives, large energy consuming industries, domestic energy consultancies, etc.

Persons working for organizational units in Category I will look for energy planning training courses to offer them a view of internal as well as external energy developments as they relate to the primary concerns of their parent organization. Aside from general information on the basic facts on how national energy systems function, these individuals will also want to learn about the characteristics of new energy technologies becoming available and their associated costs as well as their broad societal impacts. On a more technical level, their interests are in, first, acquiring macro-analytical techniques and, then, understanding their applications. Examples of such techniques are energy systems and economic models, sectoral energy demand forecasting, methods for setting prices of energy fuels that take into account fuel and device substitution, price and income elastic effects, longer term impacts on specific target groups, and, finally, a macro-economic model for taking into account energy investments.

Table I

DOMESTIC ORGANIZATIONS AND ENERGY PLANNING INTERESTS

ORGANIZATION	MACRO LEVEL	MICRO LEVEL
Economic Planning Unit	Integration of Energy Sector Investment into National Economic Development Plans	Project Evaluation
Energy Commission	Comprehensive Energy Analysis: Supply/Demand Balances, Energy-Economic Relationships	Promotion + Coordination of Domestic Energy Resources; Energy Audits
Central Bank	Energy-related Hard Currency Debt Service Planning	Day-to-day Allocation and Management of Foreign Exchange
Utility	Demand Projections, Generation Mix Planning	Project Evaluation + Investment Planning; Tariff Analysis
Refinery	World Oil Markets; Product Demand Projections	Project Evaluation + Investment Planning; Fuel Pricing Structure
National Oil Company	Demand Projections	Allocation Systems; Optimal Inventory Policy
Industry	Energy-Economic Relationships	Project Evaluation + Investment Planning; Management of Conservation Programs
Ministries of Mines & Energy, Special Agencies Established to Promote New Resources.	-----	Resource Development, Exploration, Production Sharing Agreements, Risk Evaluation, and Institutional Effectiveness

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In addition, however, Category I units typically have staff assigned to specific energy resource and technology areas, charged with coordinating and/or analytical functions. While the specific concerns vary widely from country to country, the techniques of resource and technology assessment are common to all.

On the other hand, persons working for organizational units in Category II, which form a much larger population, have a more divergent set of interests when it comes to management and planning of energy. Some individuals in these organizations, often guided by the wishes of their supervisors, want training in more advanced subject matter of direct concern to the more narrow and immediate objectives of their parent organizations. Courses with curricula restricted to topics dealing with operational and financial management of electric utilities or petroleum refineries, which have been around for some time, offer examples of such advanced training. While such programs have broadened their curricula somewhat in recognition of the changed situation in LDCs facing these energy delivery organizations, they still are intended primarily for individuals dealing with day-to-day management.

More recently, the Economic Development Institute of the World Bank, the International Atomic Energy Agency, the UN, as well as ECC, USAID, and others have sponsored special topical seminars devoted to such subjects as electricity load management, managing refinery output under changing demand for petroleum refinery products, electric facilities expansion in rural areas, marginal cost energy pricing, industrial energy conservation, and the role of nuclear power. These seminars, running from one to several weeks, are aimed at a set of individuals with a fairly narrow set of interests. Attendance is generally confined to individuals coming from at most one or two of these Category II organizations. None of the courses and seminars, however, address themselves in a comprehensive way to training in the cross-cutting set of techniques needed to perform technical, economic, and fiscal micro-analysis of energy options involving "new" domestic energy resources. The fact that the technical nature of many of these "new" domestic resources frequently differs from country to country does not obviate the need to have

trained individuals in all LDCs able to perform such cross-cutting comprehensive micro-analyses. The need for such a non-resource specific course is, in fact, one of the major conclusions to have come out of the discussions and international meetings referred to above. Examples of problems and issues for which persons trained in such a course are intended to deal with are:

- .... What are the cost and benefits of using specific domestic conventional resources as feedstock or as an energy supply?
- .... How does one compare options dealing with expanding supply of fuel to rural households (tree planting in wood lots or plantations, investments in wood stoves, charcoal kilns, delivery of low-grade lignite or agricultural waste)?
- .... What are appropriate institutional arrangements for energy conservation programs, and what is magnitude of return in terms of fuel and foreign exchange savings, and pay-back to factory owners and government?
- .... How do the investments by owners of end-use devices (e.g., on-site auto generators, autos, trucks, and buses, and stoves designed to limit increasing demand for middle distillates) compare with those needed to modify domestic refineries to accommodate shifts in petroleum product consumption?
- .... What are the associated direct and indirect costs of integrating new energy resources into existing energy supply-demand systems?
- .... How should energy projects be designed to attract outside financing and what are the costs and benefits of alternative arrangements (supplier credits, joint ventures, barter arrangements, etc.)?
- .... To what extent should energy prices by producers, converters (utilities, refineries), and consumers reflect replacement costs, opportunity costs, or other basis?

Irrespective of resource, the common techniques used in performing micro-analyses bearing on these problems and issues are those dealing with:

1. Defining the extent of the resource: There exists a structured set of techniques and procedures for ascertaining the potentially usable extent of the resource and estimating the cost of extraction to various levels of depletion (or in the case of conservation, saturation).
2. Establishing the parameters required to integrate the new resource with existing systems: For resources established by the above procedures to be viable, methodologies can be used to establish the associated infrastructured requirements that take into account existing physical facilities and end-use equipment. Micro-economic methods can be used to evaluate the economic value of the final product (energy fuel or energy saving) to the users as they relate to other options (which may, in the case of industrial and commercial energy consumers, be to curtail production and for service or change output product mix depending on the price charged and the dependability of supply).
3. Examining investment options for financing: Based on the outcome of the above, one moves to the use of established financial methods for evaluating an assortment of financing schemes and ranking them according to different types of criteria.
4. Reviewing modifications in existing management, organizational and government policy initiatives: Depending on the extent to which the new resource is to be used, it often becomes necessary to apply management procedures to explore areas of jurisdiction and responsibility to be assigned to existing energy delivery organizations. One must also investigate such issues as the structure of internal management, as well as the role of government in promoting use of these resources.

5. Determining the macro-level implications of energy resource development:

These techniques cover impact analysis for new resource development sufficiently sizeable in country-specific terms either to require large amounts of capital over long periods, or to place demands on other scarce resources of land, water, or skilled manpower, or which will necessitate large energy price increases in the near future or which will interfere environmentally with air, water, or land resources.

It is worth emphasizing that just as in the case of macro-level energy planning, where existing methodologies had to be substantially modified for use in the LDC context, existing micro-level techniques, procedures, and methods referred to above will also require similiar adjustments.

Proposed Outline for Revised EMTP

The revised course has four main objectives:

1. To help participants develop skill in the theory and application of technical, economic, and financial micro-level techniques entailed in a comprehensive evaluation of "new" domestic resources.
2. To familiarize participants with institutional management problems associated with exploiting such resources and with the ensuing macro-level impacts.
3. To expose participants to case material covering practical problems and decisions involved in the evaluation, design, and implementation phases of programs already in place in LDCs.
4. To allow participants the opportunity to meet with groups of individuals from the U.S. and other LDCs who have practical experience in carrying out energy projects from inception to implementation.

The length of EMTP sessions would continue to be eight weeks and organized around a series of approximately week-long modules; each module constitutes more-or-less a self-contained mini-course offering both theory and application. Case studies, which form a critical component of the revised curricula, would be presented two to three times weekly throughout the session after completion of the tutorials in the first two weeks. Participants would continue to be required to attend tutorials offered in the first two weeks and designed to review the fundamentals of the quantitative analytical techniques employed in the modules:

Tutorials

1. Decision Analysis: Review of decision analysis techniques, decision-trees, simple game theoretical models.

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2. Statistics and Probability: Review basic concepts, statistical inferences.
3. Investment Criteria: Annuity factors, internal rate of return, present value, benefit/cost criteria, impacts of uncertainty.
4. Accounting: Income statements, balance sheets, depreciation, financial ratios and financial statement analysis.
5. Micro-economics: Supply-demand curves, elasticity concepts, statistical estimation techniques.

#### Module I: Fossil Resource Evaluation

Familiarizes the participant with: the techniques of fossil resource evaluation, including coal, gas, oil, uranium, and peat; basic concepts of reserves, resources, and geological issues; models of exploration; decision-tree analysis of exploration options; options for tie-ins with multinational corporations. Two case studies: coal resource evaluation in Colombia, and peat exploration in Burundi.

#### Module II: Renewable Resource Evaluation

Serves to expose the participant to: the problems of the evaluation of renewable resources; the kinds of meteorological data required; design of data collection programs (location, duration, type of measurement); problems of data analysis (how much data is enough data); techniques for data collection in the traditional sector; estimation of fuel wood consumption; the role of demonstration projects. Two case studies: fuel wood consumption in an African country; design of a solar measurement program in a Southeast Asian country.

#### Module III: Energy Conservation

Introduces the participant to: the particular problems involved in the audit, design, and implementation of site-specific energy conservation programs. Reviews energy audit programs; training of plant engineers and managers in the parastatal and private sectors; design of financial incentives. Describes organization of energy conservation units. Case studies of Tunisia and Senegal to take the participants through the individual steps of a successful program, from initial program of industrial energy audits

through the design of a program of action, to the financing, implementation, and monitoring of final results.

#### Module IV: Economic and Financial Project Analysis

Reviews the most important methods of economic evaluation criteria, and their advantages and disadvantages as they apply to energy projects. Emphasis on the treatment of problems raised by inflation, uncertainties, and currency de- and revaluations. Discussion of the current requirements for economic analysis from the perspective of lending institutions. Review of impact of projects on cash flow, debt/equity requirements, etc. Impact of project investment of product pricing. Application to fossil, renewable, and conservation projects in LDC context.

#### Module V: Institutions Organization and Management

Discussion of the advantages and disadvantages of different institutional arrangements for resource promotion; negotiations with, and oversight of, any multinationals; the role of government agencies, independent state-owned corporations, and the private sector; financing, management, and organization of new institutions created for domestic resource exploitation. Case material to be drawn from the experience of a number of LDCs that have dealt successfully (and unsuccessfully) with these problems.

#### Module VI: Investment Planning

Exposes the participant to the practical dimensions of investment planning. Includes a field trip to the First Boston Corporation for discussions with the members of the New York investment banking community. Discussion of capital planning and budgeting, to preparation of loan proposals.

#### Module VII: Energy Pricing

Presents the theoretical and practical dimensions of energy pricing and tariffication. Case studies of Tunisia and Senegal illustrate the problems of petroleum product subsidies and the constraints to tariff reform.

Module VIII: Infrastructure Issues and Externalities

Reviews the relationship of energy sector investment projects to related infrastructure issues; relationship of energy investment to other sectoral development plans; their impact on transportation systems, especially for energy projects in remote areas; assessment of the adequacy of port, railway, and road systems in the construction phase. Multipurpose projects and environmental externalities. Treatment of joint costs and externalities in economic evaluations.

Module IX: Macro-economic Implications of Domestic Energy Resource Development

Serves to expose the participant to the techniques of analyzing the macro-economic consequences of major energy investment programs. Impact on foreign currency debt service, debt service ratios, overall capital investment plans for economic development. Enclave projects. Case study on Sudan.

Size of Potential Audience for Revised EMTP

This revised type of cross-cutting micro-course complements rather than competes with more specialized courses referred to earlier. For example, organizations in LDCs interested in an evaluation of peat will still need to send one or more engineers to a course such as that offered by the Irish Industrial Development Board. But the same engineers, as well as their immediate supervisors, will also benefit from the skills and applications in the EMTP course outlined above. Specialized courses such as the Irish course tend to offer little in the way of the more general analytical tools that are needed to deal with such issues as, for example, the integration of peat resources with the existing energy system, energy organizations, financial evaluation, and so forth. The same reasoning applies to a number of other specialized courses now being offered for LDCs in such areas as industrial energy management, utility capacity expansion, and renewable resource utilization. This being the case, we expect potential attendees to the revised EMTP course from Category II organizations (see Page 3) will be made up of:

1. Engineers from the special government agencies (or corporations) established to promote a particular resource (including conservation) who may well also need to attend appropriate specialized courses, but who can benefit from enhanced knowledge of these micro-analytical tools.

2. Supervisory personnel in such agencies who must grapple less with engineering detail but more with organization, financial and economic planning, and government policy.

3. Economists and fiscal analysts working in all areas of energy project assessment.

The revised EMTP course can also be expected to attract some individuals from Category I organizations (see Page 3):

1. Staff and supervisory personnel of energy planning agencies charged with overall coordination of energy planning efforts.

2. Staff assigned to specific energy subsectors, many of whom lack the appropriate technical background for project analysis and technology and resource assessment.

The numbers of individuals likely to be interested in the revised EMTP program are based on figures given in a report put out by the UNDP Global Projects Divisions (see Table II). This was prepared by a Steering Committee of persons involved in energy planning in LDCs with the assistance of IER staff. Each member of the Steering Committee was assigned to visit countries in the region from which he came. During his visit he met with officials from mainly Category II organizations--utilities, industrial companies, etc. On the basis of these discussions, he prepared estimates of the numbers of persons to be trained in energy planning in each of several categories. While we have no independent way of checking their accuracy, they do serve as a basis for the claim that the numbers far exceed the 100 or so individuals trainable on the basis of 2-3 EMTP sessions per year of 35-40 participants/session. Over the next several years other EMTP-type programs will undoubtedly get underway both in Europe, India, and Latin America. Even so, we can expect that the demand

Table II

**SIZE ESTIMATES OF POTENTIAL ENERGY PLANNING AUDIENCES\***  
**OVER NEXT 3 - 5 YEARS**

<u>REGION</u>	<u>POLICY-MAKERS</u>	<u>MID-CAREER TECHNICIANS</u>
Asia (incl. China)	1,100	1,900
Latin America	500	1,500
Middle East	100	330
Africa	300	1,000
Total	2,000	4,730

\*Based on estimates of the magnitude of training needs done by the Steering Committee of the Feasibility Study on an International Network for the Training of Energy Planners UNDP project INT/81/004

from AID countries will continue to far exceed the number of EMTP openings for at least the next 2-3 years.

Concluding Remarks

Should the revised curricula for the EMTP be adopted, it will require a substantial investment in new curricula development--particularly in the preparation of 4-6 new case studies. This investment could be minimized were the EMTP staff and lecturers to have access to the past and ongoing technical assistance programs in the energy area being supported by USAID, both by the Office of Energy, regional bureaus, and country missions. This means access to individual AID staff, consultants, and counterparts, as well as written reports.

The availability of such access has the further advantage that it would serve as a mechanism to reinforce the relationship of the EMTP to other ongoing programs of energy assistance in USAID. While it is clear that the focus and content of the EMTP program should continue to reflect AID priorities and perceptions, it is also apparent that the individuals coming to the EMTP, as well as its alumni--many of whom go on to occupy key decision-making positions--can serve as a useful source of input to AID staff in the design and evaluation of its energy assistance programs.

**Appendix II**

**EMTP Advisory Committee**

## Appendix II

### EMTP Advisory Committee

Mr. James H. Howe, President of International Renewable Energy Services, Inc., Washington D.C. Mr. Howe formerly was Director of International Programs for the Solar Energy Research Institute, Golden, Colorado and before that, was Senior Fellow of the Overseas Development Council in Washington, D.C. From the late 1950's to the early 1970's, he served USAID in senior program director positions in Viet Nam, Kenya, Brazil, and the Policy Planning Council. Prior to that he served in the International Division of the Bureau of the Budget, Executive Office of the President. Mr. Howe has been Chairman of the EMTP Advisory Committee since 1979.

Dr. William Gouse, Vice President and General Manager of the METREK Division of MITRE Corporation, Washington, D.C. Dr. Gouse also has served as Assistant to the Director, Office of Science and Technology, Executive Office of the President; as Associate Dean of the Carnegie Institute of Technology and School of Urban and Public Affairs; and as Director of the Environmental Studies Institute of Carnegie-Mellon University. He was Science Advisor and Assistant to the Secretary of Interior, Director of its Office of Research and Development, and Acting Director of its office of Coal Research. He also served as Deputy Assistant Administrator of ERDA, for Fossil Energy. In 1977 he became Chief Scientist of MITRE Corporation, and Vice President in 1979.

Mr. Edward Minnig, Senior Lecturer, Power and Energy Sector, Economic Development Institute, International Bank for Reconstruction and Development (World Bank), Washington, D.C. Mr. Minnig transferred to the Institute in 1976 from the World Bank's East Asia and Pacific Region, where he had worked as an engineering expert since joining the Bank in 1966. Prior to that, Mr. Minnig worked as a consulting engineer for various Swiss power development companies, including the BORSARI Corporation of Zurich and was Executive Engineer for the Snow Mountains Power Authority of Australia.

Professor Arpad Von Lazar, Professor, Fletcher School of Law and Diplomacy, Tufts University, Medford, Massachusetts. He is advisor and consultant to various international energy companies, including OPEC member oil companies. He is also energy advisor to many U.S. companies. He is on the Board of Governors of the Middle East Institute of Washington, D.C.

Professor Milton Esman, Director of the Center for International Studies at Cornell University, Ithaca, New York. Professor Esman is also Cornell's John F. Knight Professor of International Affairs, and was formerly Special Advisor to the Prime Minister of Malaysia from 1966-1968. In his role with the Center for International Studies, Professor Esman has directed numerous interdisciplinary studies on various international issues for USAID, Rockefeller Foundation, and Ford Foundation.

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