

<b>UNDP / GEF PROJECT</b>	
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PROJECT OF THE GOVERNMENT OF  
MALAYSIA

MALAYSIAN INDUSTRIAL ENERGY  
EFFICIENCY IMPROVEMENT PROJECT  
(MIEEIP)  
MAL/98/G31

MID-TERM EVALUATION REPORT

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# ***UNDP / GEF***

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## 1. ACRONYMS AND TERMS

ABEEIS	Advisory Board on Energy Efficiency in the Industrial Sector
ADB	Asian Development Bank
ASEAN	Association of South East Asia Nations
CEO	Chief Executive Officer
CETDEM	Centre for Environment, Technology & Development Malaysia
CO <sub>2</sub>	Carbon Dioxide
CTA	Chief Technical Adviser
DEGS	Department of Electricity and Gas Supply
DSM	Demand-Side Management
EE	Energy Efficiency
EPC	Energy Performance Contract
EPU	Economic Planning Unit
EU	European Union
ESCO	Energy Service Company
FMM	Federation of Malaysian Manufacturers
GEF	Global Environmental Facility
GHG	Greenhouse Gas
GoM	Government of Malaysia
IEEIP	Industrial Energy Efficiency Improvement Project
IPP	Independent Power Producer
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
kgoe	kilogrammes of oil equivalent
MECM	Ministry of Energy, Communications and Multimedia
MESITA	Malaysian Energy Supply Industries Trust Account
MIEEIP	Malaysian Industrial Energy Efficiency Improvement Program
MIDA	Malaysia Industrial Development Authority
MIDF	Malaysian Industrial Development Finance
MITI	Ministry of International Trade and Industry
MJ	Megajoule
MOSTE	Ministry of Science, Technology and Environment
NGO	Non-Governmental Organisation
NPD	National Project Director
NSC	National Steering Committee
OPP	Outline Perspective Plan
PD	Project Document
PORIM	Palm Oil Research Institute of Malaysia
PTM	Pusat Tenaga Malaysia (Malaysia Energy Centre)
RM	Ringgit Malaysia
SIRIM	SIRIM Bhd (formerly Standards and Industrial Research Institute of Malaysia)
TAC	Technical Advisory Committee
TNB	Tenaga Nasional Berhad
TOE	Tons of Oil Equivalent
TOR	Terms of Reference
TPR	Tri-Partite Review
UNDP	United Nations Development Program.

## 2. EXECUTIVE SUMMARY

### 2.1 Context and Purpose of the Evaluation

This mid-term evaluation has been made at the request of UNDP. It has been conducted in compliance with the requirements of the Standard Procedures of the UNDP Monitoring and Evaluation Unit. The purpose is to provide donors, government and project partners with an independent assessment of the status, relevance and performance of the project against the expectations of the project document. The interviews and field trips took place between 22<sup>nd</sup> April and 2<sup>nd</sup> May 2003.

The development objective of this project is to improve energy efficiency in Malaysia's industrial sector, through removing barriers to efficient industrial energy use, and through creating a sustainable institutional capacity to provide energy efficiency sources, and a conducive policy, planning and research framework.

This objective is to be achieved through the creation of an institutional focus within PTM and the development of capability to improve the efficiency of energy use in the industrial sector through the implementation of two linked groups of programs:

- Energy Technology Application Programs
- Energy Efficiency Support Programs.

The first group comprises programs that will provide the management information to characterise energy use and demonstrate improvements; the second group comprises programs that are designed to help industry improve its performance.

There are eight components to the project.

Component 1: Energy Use Benchmarking Program

Component 2: Energy Auditing Program

Component 3: Energy Rating Program

Component 4: Energy Efficiency Promotion Program

Component 5: ESCO Support Program

Component 6: Energy Technology Demonstration Program

Component 7: Local Energy Efficient Equipment Manufacturing Support Program

Component 8: Financial Institutional Participation Program

The Immediate Objectives of each Component are given in more detail in *Section 3*.

The Outputs of each Immediate Objective are given in more detail in *Section 6*.

Recently, in agreement with the UNDP, the project has hired a person with journalistic skills as Communications and Editorial Manager. The reason for creating the post was a view that the achievements of the project need better promotion. The evaluator agrees with this decision.

## **2.2 Conclusions**

### **2.2.1 Efficiency**

Efficiency in this context means the conversion of the Inputs assigned to the project into the Outputs specified in the project document. Inputs for each Component after revision in the Inception Report are shown in the budget summary in *Section 7.10*. Efficiency has been variable. Those Components requiring direct action in industry have been implemented efficiently; this includes Components 2, 5, 6, and 8. Those Components requiring more economic or policy analysis have been generally less efficient.

In Component 1, progress has been slow, but if the online energy benchmarking can be completed and shown as being used by a community of say 80 users then the efficiency will be high. The efficiency so far of the Component 3 is low. Only one piece of electrical equipment has been analysed and the work here is only about 50% completed. Little has been done so far on thermal equipment. Completion of the policy analysis for electric motors and, if justified, the implementation of the testing and labelling program would be a reasonable target for the electric equipment. Implementation of a good best practice program is a reasonable target for the thermal side. Achievement of these targets will require a more productive approach than that achieved to date. The efficiency of Component 4 is moderate. Eleven Newsletters have been produced and a web-site developed. The output from Component 7 for three years work is low; only 4% of the budget allocated to this Component has been spent; efficiency is disappointing.

### **2.2.2 Effectiveness**

Effectiveness in this context measures the extent to which the Outputs have achieved the Objectives of the Component. Effectiveness has been variable; where there has been little Output there is clearly little effect. In some cases the Components have effectively achieved their Objectives, but whether this is sustained depends on whether further support is provided from public funds.

Energy benchmarking is not yet in place. The Effectiveness of this Component will depend in equal measure on the effectiveness of the benchmarking programs at NPC where it is hosted and on the efforts of the team to develop a functioning energy benchmarking community.

The Effectiveness of the audit program is high; it will achieve all the goals set.

The Effectiveness of the ratings program so far is limited. It appears to have had some influence on Energy Commission, but it is difficult to distinguish its impact from that of other assistance programs. The limited effectiveness stems in part from problems with using standards and labels as policy instruments for energy efficiency in industry.

It is unlikely that the Newsletter is effective. A recent evaluation form included within the 1000 distributed copies gave only 36 returns, which indicates a low level of interest. It is unclear also how effective is the Malaysian Energy Professional Association. The membership of 27 is well below the critical mass for such an organisation. The Association has no significant activities and an attempt to solicit material from the members for the Newsletter failed.

The Effectiveness of the ESCO support has also been limited. There have been no spontaneous ESCO developed projects. Future effectiveness will depend strongly on the public policy of Malaysia with respect to energy efficiency. Demonstration projects and the financial support

program have been quite effective in stimulating interest, but their long term effectiveness will depend in large measure on whether the GoM sustains its efforts in the area.

The Effectiveness of the demonstration projects in Component 6 cannot yet be judged, but they have attracted much interest and promise well. Their Effectiveness will be enhanced if the Newsletter and web-site can be used to make them widely known.

Little has been done under Component 7 and its Effectiveness at present is nil. Its future Effectiveness is also doubtful. Suggestions for revision are made in *Section 9.2.7*.

Component 8 has been Effective in creating a fund for the demonstration projects and in raising interest and obtaining the cooperation of MIDF.

### **2.2.3 Impact**

Impacts in this context means the contribution to the overall development objective of the project.

The project in the view of the evaluator has made important and real contributions to removing barriers, creating a sustainable institutional capacity and in creating a conducive framework for policy. Few of the achievements will be sustainable without continued government support and legislative and financial intervention.

The PD envisages that the energy consumption in industry in 2004 would be 10% lower than "business as usual". Energy consumption in industry in Malaysia is around 10 mtoe/yr; a 10% reduction would require investment of some USD 450 million. It seems an unrealistic expectation after a 4-year program of around USD 20 million. In reality the impact of the project on energy demand in that year will be imperceptible.

Several interviewees advised the evaluator that the main barrier to improved energy use in Malaysia was the subsidised energy prices. There is little that the project can do directly to remove that barrier. The project has made a first step to understand the factors affecting decision-making concerning energy efficiency by industrial energy users and can potentially help to design financial instruments to counter the effect of energy subsidies.

The project has had little impact in providing information to energy users as yet. It needs urgently and greatly to enhance information dissemination through the web-site, because this vehicle will be vital when UNDP funding for the Newsletter ceases. The Newsletter itself needs dramatic improvement.

The project has had a significant impact in capacity building in several institutions. It has helped build capacity in important areas like benchmarking, best practice, audits, standards, design of demonstration programs and financial support instruments.

The project has strengthened the policy framework in several respects. It has contributed to the possibilities of defining good practice either through standards, labelling or best practice programs. It has raised the perception of the possibilities of energy efficiency in industry and therefore contributed to a more realistic understanding of the issues. Potentially it has generated powerful insights into the technical and economic potential for energy efficiency and the means available to government to realise that potential.

## **2.2.4 Relevance**

There can be no doubt that the project is relevant to the development objectives of Malaysia. Generally, the country has to face the challenges of future development in an environment where the spur to growth from hydrocarbon rents will be proportionally weaker than in the past. Growth will need to come from the manufacture and sale of products that are competitive on international markets in quality and price. This challenge must be faced over a wide range of issues. Efficient use of energy makes an important contribution to lower costs and therefore to competitiveness.

The project is also relevant to immediate specific development objectives of the GoM and to new institutional initiatives. The Third Outline Perspective Plan (OPP3) and the 8<sup>th</sup> Malaysian Development Plan for 2001-2005 both indicate the importance of energy efficiency.

## **2.2.5 Sustainability**

PTM has proposed a restructuring of the organisation that has been approved by the Board. This structure would require 4 new positions at Assistant Director level. At the conclusion of the project the MIEEIP work will be absorbed within several of the research teams. PTM has requested funding from MECM for 2004/2005 to continue the activities of the MIEEIP under the name of as Industrial Energy Efficiency Project. The evaluator concurs fully with the restructuring plan, which is sound and demonstrates the importance given by PTM to the MIEEIP.

The sustainability of public policy in the area of energy efficiency goes beyond the scope of this evaluation, but it is worth noting that the project has the information and the skills to make a major contribution to the determination of policy in this area for the 9<sup>th</sup> Plan.

## **2.2.6 Project Management**

The project is well managed. Quality control procedures are adopted fairly consistently. Supervision by the NSC is good and stakeholders attend regularly and contribute usefully.

The tendering procedure is cumbersome and has led to delays in the recruitment of consultants. It could be a serious source of delay in the closing stages of the project.

## **2.3 Recommendations**

The recommendations are associated with a *Section* number in the main text for ease of reference.

### **2.3.1 Extension**

In principal the project expires in July 2003. It has not yet been extended. It is recommended that the project be extended for one year as much remains to be done and there are sufficient funds to cover the costs, (4.1).

No general extension beyond this period is recommended as most Components can complete their work in the period, (7.13.1)

It is recommended that the Component 7 be reviewed and then extended for 2 years using funds that are likely to remain when the project ends. The evaluator recommends that some consideration be given to converting the approach to funding the incremental costs of efficient equipment, (7.13.2).

If MESITA agrees then the funds remaining from Component 3 could be redirected to fund another round of demonstration projects in parallel with a monitoring activity funded from remaining GEF funds. These demonstration projects might focus on boiler best practice (7.13.3).

### **2.3.2 Sustainability**

PTM have designed a convincing management structure to absorb the project when it closes and have proposed to continue work with GoM funding. The evaluator concurs with the recommendations of PTM that he believes are well thought through, (8.4.1).

The present project management structure should be left untouched until the end of the project to maximise delivery of Outputs, but the newly appointed Assistant Directors should attend Project Review Meetings and receive project documentation in the areas that are relevant to them, (8.4.1).

It is recommended that PTM explore the possibilities of generating revenue from audit activities after the project is completed. Revenue could be raised from modest rental charges for the equipment, from consultancy fees for use of its staff and from training. It is recommended that PTM seek to register some of the MIEEIP training course for company Human Resource funding. These charges should not be such as to discourage potential users, (8.4.1).

### **2.3.3 Project Management**

It is recommended that the tendering process be reviewed. It may be adequate that the Tender Committee approve proposals of the Tender Evaluation Committee by circulation, assent being assumed if no reply is received within two weeks. In the case of dissent then the Committee can be convened, (7.3).

The MIEEIP should seek to engage more local consultants on appropriate tasks, (7.7).

### **2.3.4 Content**

Component 1 should continue to work with NPC and build upon that relationship, (6.1.1).

It is important to know what the return would be on the investment in labelling assuming a plausible penetration of efficient motors into applications where they are justified. Such a paper is crucial to any proposal for labelling and testing. The Component 3 should produce a cost-benefit analysis of the proposal, (6.1.3).

The evaluator concurs that there is no merit in pursuing a labelling program for thermal industrial equipment and agrees that a best-practice program is appropriate. The team for Component 3 should consider cooperation with NPC for this, (6.1.3).

The Newsletter should become the responsibility of the Editorial and Communications Manager. Transfer of this responsibility will require recruitment of an assistant for the work. The web-site needs to be provided with high quality material as soon as possible. Publication on the web will be very important when UNDP funds are not available for other forms of dissemination, (6.1.4).

Component 5 should focus now on business planning aspects of ESCOs and the transfer of skills to PTM, (6.1.5).

Based on its experiences from Components 2, 6 and 8, the MIEEIP has the information and the skills to make a major contribution to the determination of policy for energy efficiency in the 9<sup>th</sup> Plan. MIEEIP should seize this chance. The main areas would be in the evaluation of financial instruments and in the contents of the Energy Efficiency Act especially as concerns the need for audits and the functions of Energy Managers, (8.4.2).

## **2.4 Lessons Learnt**

This section proposes some lessons of general application to UNDP/GEF projects.

Impact on policy requires a broad coherence with development aims of government. This coherence has been achieved as a consequence of the close cooperation between UNDP and the GoM in the original preparation of the PD that has ensured coherence with development aims at a high level.

The pre-existence of an institutional focus for the project in PTM has been an aid to legitimacy and a vehicle of sustainability. It may be that the creation of such an agency should be considered as a pre-condition in other similar projects.

Involvement of the public sector requires sensitivity to their needs and constraints. The choice of a private sector manager as CTA has helped mobilise the private sector and overcome their caution. It has also contributed to the Effectiveness of outputs for industry (notably audits).

The use of international consultants is a key issue in technical cooperation. The general approach of the UNDP in putting responsibility on the executing agency to deliver outputs with the international consultants as a resource is good, but most project managers start without the experience of managing such large resources of consulting skills and they face a steep learning curve. UNDP may wish to consider providing training courses or a manual on the use of consultants.

Promotion of energy efficiency is a long-term public policy. The sustainability of the work and the eventual impact depend much on whether the GoM decides to put substantial resources behind energy efficiency in the future; if it does then the outputs from the project will be important. This analysis suggests that if similar projects are implemented in future they should be predicated on the expectation that substantial government funding will subsequently be available.

## **2.5 Acknowledgement**

The evaluators would like to acknowledge the help received from the UNDP, project staff and other beneficiaries in the preparation of this evaluation. The project staff put considerable effort into explaining their work and arranging interviews and field trips. No more constructive response and helpful engagement could have been envisaged.

### **3. INTRODUCTION**

#### **3.1 Purpose of the Evaluation**

This evaluation has been undertaken at the request of UNDP. It is a mid-term evaluation conducted in compliance with the requirements of the Standard Procedures of the UNDP Monitoring and Evaluation Unit.

The purpose of the evaluation is to:

- Provide donors, government and project partners with an independent assessment of the status, relevance and performance of the project against the expectations of the project document

And in particular, to:

- Determine the effectiveness of project implementation
- Assess the impact and sustainability of results
- Highlight issues requiring decisions and actions
- Present initial lessons concerning the project design, implementation and management.

The evaluation covers all components of the project from the inception to the date of the mission.

#### **3.2 Expected Product of Evaluation**

The physical deliverable of the evaluation is a comprehensive report prepared according to the GEF mid-term evaluation guidelines. The report includes:

- Assessment of the project concept and design
- Progress achieved to date against planned targets
- Identification of slow progress and identification of remedial measures
- Lessons learnt
- Revision or reprioritisation of scheduled activities
- Recommendations for improving the performance of the project

#### **3.3 Use of Evaluation Results**

The stakeholders will use the results of the evaluation to help in redirecting and reprioritising the project and identifying specific issues that require the attention of the project management. On this basis decisions will be taken to ensure a successful implementation of the remaining activities, to determine an appropriate exit strategy and to make sure that capabilities are sustained.

#### **3.4 Key Issues Addressed by Evaluation**

The key issues to be addressed by the evaluation as specified in the ToR are:

*Capacity Development* - The effects of the project activities on strengthening the capacities of the Pusat Tenaga Malaysia (PTM) and the industries.

*Sustainability* - Efforts undertaken to ensure that the results of successful projects are sustained beyond the period of GEF financing will be evaluated, as well as the project's existing mechanisms

for sustainability.

*Leverage* - The project's effectiveness in leveraging funds that would influence larger projects or broader policies to support its goal will be assessed.

*Awareness Raising* - The Project's contribution to raise awareness about energy conservation and energy efficiency in industries should be examined, as well as the project's contribution to promote policy or advocacy activities and collaboration among the industries.

*Lessons Learned and Best Practices* - Both good and bad experiences and lessons learned from the implementation of the project thus far will be identified and evaluated. The integration and application of experience from the various components of the project (holistic approach) will be documented.

*Operational recommendations*- Recommendations will be developed to help the executing agency and project partners improve its operational and support activities.

### **3.5 Methodology Adopted**

The methodology comprised:

- Review of project document
- Review of project management documentation: quarterly reports, Annual Project Reports, Project Implementation Reports,
- Review of technical reports, information materials and training materials from the project
- Interviews with project staff, beneficiaries and other stake-holders
- Field visits to target beneficiaries
- Drafting of report
- Presentation of results to UNDP and the CTA.

The evaluation took place during the period 22<sup>nd</sup> April to 2<sup>nd</sup> May 2003. Annex 1 lists documents reviewed and Annex 2 lists the persons consulted.

### **3.6 Structure of Evaluation Report**

In Section 4 of this report we review the project, its objectives, the main stakeholders and expected results. In Section 5 we analyse the project design, in particular the realism of the objectives, the relevance and the way in which it was prepared. In Section 6 we examine implementation, in particular Efficiency (conversion of inputs into outputs) and Effectiveness (the impact produced by the outputs relative to objectives and beneficiary needs) and we consider whether the results will influence legislation and policy. In Section 7 we examine how well the management of the project is working. We identify areas where changes are needed and areas where there are signs of success. In Section 8 we analyse the project results against indicators of success in the project document. We identify the factors that have influenced the success of the project. In Sections 9 and 10 we present our recommendations and the general lessons learnt.

## 4. THE PROJECT

### 4.1 Project Overview

The project document was signed between the EPU, PTM and UNDP on 30<sup>th</sup> July 1999. The total value of the project is USD 20,790,200 funded as follows:

Source of funds	Amount (USD)
UNDP	300,000
UNDP/GEF	7,300,600
Government contribution (in cash)	6,302,000
Government contribution (in kind)	1,627,600
Private sector contribution (in cash)	5,260,000
<b>TOTAL</b>	<b>20,790,200</b>

Work on the project brief began in late 1996. The project document was drafted in 1998 and presented to a stakeholders' workshop in December 1998. After revision the project document was signed in July 1999. In principal the project expires in July 2003. It has not yet been extended. It is recommended that the project be extended for one year as much remains to be done and there are sufficient funds to cover the costs.

The GoM counterpart is the Ministry of Energy, Communications and Multimedia. The Executing Agency is the Malaysian Energy Centre or Pusat Tenaga Malaysia (PTM). PTM was established roughly concurrently with the project and it is a prior obligation cited in the PD that the GoM should create and house the Centre as an independent unit under the MECM and should provide a full-time CEO.

Staff members of PTM were recruited in late 1999 and began work in November of that year. Consulting services were tendered and Consultancy Services Agreements were signed with two consortia in July 2000. The consortia were requested to provide Inception Reports for their components and these were delivered in September 2000. The delay of more than one year from the signature of the project document to delivery of the Inception Report is regrettable.

### 4.2 Project Objectives

#### 4.2.1 Development Objective

The development objective of this project is to improve energy efficiency in Malaysia's industrial sector, through removing barriers to efficient industrial energy use, and through creating a sustainable institutional capacity to provide energy efficiency sources, and a conducive policy, planning and research framework.

#### 4.2.2 Immediate Objectives

The development objective is to be achieved through eight project components with immediate objectives as listed below.

#### Component 1: Energy Use Benchmarking Program

- To establish and develop energy-use benchmarks for various industrial sub-sectors (based on industrial processes, operations and energy systems) that can be used by industries as guides in their EE&EC efforts.

#### Component 2: Energy Auditing Program

- To promote energy auditing as an effective tool for industrial energy management.
- To establish Sectoral Energy Audit Teams; and,
- To conduct a continuing Energy Audit Program for industries

#### Component 3: Energy Rating Program

- To provide information on energy-efficient equipment and energy rating programs to increase awareness and encourage the use of energy efficient equipment in industry and set up an industrial equipment testing facility to label equipment.

#### Component 4: Energy Efficiency Promotion Program

- To disseminate information on energy efficient practices in industries, EE&EC technology applications and establish an association of accredited energy specialists, consultants and technology developers and providers.

#### Component 5: ESCO Support Program

- To develop a suitable institutional and legal framework for ESCO activities in the country
- To develop institutional arrangements that will promote ESCOs to the industrial sector
- To assist the local ESCOs in making bankable project proposals, business plans, and in securing financing arrangements for their clients.
- To advice ESCOs in defining the feasible products and services that they can offer and evaluating the risks associated with performance contracting.

#### Component 6: Energy Technology Demonstration Program

- To demonstrate the applicability and the feasibility (technical and economic) of proven energy efficiency technologies.
- To document and disseminate information on the application and benefits of energy efficiency technologies in local industrial settings.
- To provide technical and financial assistance to industrial energy users.

#### Component 7: Local Energy Efficient Equipment Manufacturing Support Program

- To initiate design and manufacturing improvement projects of local industrial equipment manufacturers as a means of promoting and accelerating the production and utilization of energy efficient equipment in industries.

#### Component 8: Financial Institutional Participation Program

- To promote and accelerate the production and utilization of energy efficient industrial equipment through dissemination of information and techniques on energy efficient

equipment designs and production.

- To set up financing arrangements for the provision of loans to eligible companies/ equipment manufacturers that can host energy efficient technology demonstration programs and design applications and produce energy-efficient industrial equipment amongst local markets for the technology demonstration activity

Recently, in agreement with the UNDP, the project has hired a person with journalistic skills as Communications and Editorial Manager. Written Terms of Reference for the post indicate that the holder should liaise with the media and improve the visibility of the project and the communication at technical level and to policy makers. The reason for creating the post was a view that the achievements of the project need better promotion. The evaluator finds this decision to be a sensible use of funds.

This activity is called informally within the project "Component 9". This term is convenient and is adopted here.

### **4.3 Main Stakeholders**

The main stakeholders in the project identified in the project document are:

- The Malaysian Energy Centre (PTM) that will acquire technical and managerial capacity, data and equipment to allow it to discharge its duties
- Technical institutes that will have extended opportunities in energy efficiency. This includes SIRIM that will acquire testing facilities and a role within a standards program, also FRIM and PORIM that will extend their capacities in the field
- The Government of Malaysia that will obtain support to its declared intentions to promote energy efficiency and energy service providers
- Industrial consumers of energy that can save energy, lower their costs and improve their position in new competitive markets
- Local private-sector companies that can upgrade their skills and contribute to an eventual private sector offer of services
- Manufacturers of appliances who should be better positioned to compete on world markets
- TNB that will face less rapid increases in peak demand
- The global environment that will benefit from reduced emissions of GHG
- The population of Malaysia that will enjoy higher income as a consequence of improved competitiveness of the economy

These stakeholders are well represented in the project's National Steering Committee.

### **4.4 Expected Results**

The project document envisages the following results:

- Information on EE&EC technologies are documented, easily accessed, and are disseminated.
- Regular campaign programs on the rational use of energy are provided to industries by the government /other autonomous bodies.
- Sectoral energy benchmarks are set and published.
- Industries become interested in investing in the implementation of EE&EC projects and practices that are economically and financially viable.
- Industry personnel are adequately trained on energy management.

- Financial incentives to industries to conserve energy are provided.
- Financiers provide financing for EE&EC projects to interested industries.
- Energy efficient equipment becomes affordable to industries.
- The government enforces stringent regulations on energy efficiency.
- Local energy support services are promoted, strengthened and utilized.
- The government or relevant agencies in collaboration with the private sector and financial institutions implement significant EE&EC technology demonstration programs.

The PD proposes that energy consumption in the industrial sector during the year 2004 should be 10% lower when compared to the energy consumption based on a "business as usual" scenario. The industrial sector energy intensity is also expected to reduce by 10% by 2004. Based on 1995 levels, and calculations performed in 1996, the proposed project could directly and indirectly help reduce GHG emissions from the industry sector by 10% by the year 2004.

## **5. PROJECT CONCEPT AND DESIGN**

### **5.1 Project Document**

The project document has notable strengths and weaknesses. A review performed in 2003 of a document prepared in 1998 benefits from the considerable advantage of hindsight. With this advantage, one might say that the PD:

- Underestimates some of practical difficulties of implementing the energy efficiency activities and measures proposed
- Overestimates the likely effectiveness of the measures in reducing energy consumption and emissions.

Energy efficiency has proved to be a difficult area of public policy all over the world because of the large number of actors and the complex consequences of any intervention. Whereas the technical basis of energy efficiency has changed little in the past few years, understanding of the costs and limitations of policy interventions the need to sustain policy efforts over long periods has progressed.

With this caveat, the project document provides a clear, logical structure in eight Components. The Outputs of each Component are clearly specified and would if achieved meet the Objectives of each Component. The Activities are not always practical, but they provide a good guidance to the kind of efforts that are necessary to achieve the specified Outputs. These issues are discussed in detail in later Sections. With some exceptions the PD provides a sound plan of Action with clear goals.

The eight Components themselves are closely interlinked. There are particularly strong links between the Components on benchmarking, ratings and support to manufacturers and between the Components for audits, demonstrations, ESCO support and promotion. The final Component for financial instruments links the two groups. The interrelationship of Components is a strength of the project, because it indicates that the project is moving in an integrated manner towards a significant overall goal. It would be helpful to make these linkages clear in the PD and to provide an analysis of the linkages in terms of:

- Mutual inputs and outputs
- Timings of critical outputs
- Common stakeholders and their management

A diagrammatic representation of such relationships could be helpful. UNDP may wish to consider as a general requirement that the relationships between Components are explicitly addressed in the PD.

Section H specifies the main prior obligations of the Government of Malaysia to the project are:

- Create, support and staff PTM as an independent unit under MECM
- Commit a part of the Energy Supply Industry Trust Fund to the project

#### **5.1.1 Realism of Objectives and Outputs**

Most of the Objectives and Outputs are realistic, subject to the following qualifications:

- The viability of energy ratings programs in industry may have been overestimated (Component 3).
- The success of ESCOs elsewhere in the world in the industrial sector may have been somewhat exaggerated (Component 5).
- It may have been optimistic to expect manufacturers to improve the offer of energy efficient equipment before the demand for efficiency had been created through standards, best practice programs and audits (Component 7).
- The PD may have underestimated the difficulties of getting banks to develop financial products dedicated to energy efficiency; this has been true across the world (Component 8).

These issues are discussed in more detail in the appropriate Sections. None of them has been a fundamental obstacle to the delivery of useful Outputs except in the case of Component 7.

### 5.1.2 Relevance

There can be no doubt that the project is relevant to the development objectives of Malaysia. Generally, the country has to face the challenges of future development in an environment where the spur to growth from hydrocarbon rents will be proportionally weaker than in the past. Growth will need to come from the manufacture and sale of products that are competitive on international markets in quality and price. This challenge must be faced over a wide range of issues. Efficient use of energy makes an important contribution to lower costs and therefore to competitiveness.

The project is also relevant to immediate specific development objectives of the GoM and to new institutional initiatives. The Third Outline Perspective Plan (OPP3) and the 8<sup>th</sup> Malaysian Development Plan for 2001-2005 both indicate the importance of energy efficiency. The OPP3 notes that without further discoveries Malaysia will become an oil importer by 2008 and in two Articles states:

- Efficient use of energy is to be encouraged with a particular emphasis on buildings and urban development
- Efforts are needed to promote the development of domestic energy-related services.

The 8<sup>th</sup> Malaysia Energy Plan is even closer to the substance of the MIEEIP. Among the strategies detailed there are:

- Developing energy-related industries and services and increasing local content
- Promoting Malaysia as a regional centre for energy related services and
- Encouraging efficient utilisation of energy, particularly in the industrial and commercial sectors.

The content of the MIEEIP was consciously designed from the beginning to feed into and to support the energy efficiency priorities of the government. This appears to have ensured good and cohesive support for government agencies because those agencies could easily relate the priorities of the project to their own institutional priorities through their shared origin in the priorities of the 8<sup>th</sup> Plan.

The rather obvious, but important, general lesson to be learnt from this is that projects will gather and retain wider support much more easily if they are visibly integrated into a wider planning process and support shared wider priorities.

The MIEEIP is also highly relevant to the UNDP/GEF thematic areas because energy efficiency is the most cost-effective strategy to reduce GHG emissions in the short-term and performance and

policy are both weak in Malaysia.

## **5.2 Preparation of the Project**

The project was first discussed between the Ministry of Energy and UNDP in 1995. Up to that time there had been a large amount of work in Malaysia on energy efficiency with a variety of cooperation agencies, but it had been uncoordinated, piecemeal and had left little trace. The decision of the GoM to create the Pusat Tenaga Malaysia (PTM) as a focus for energy efficiency activities and the emphasis on energy efficiency in the 5<sup>th</sup> Plan justified further technical cooperation within this more favourable planning and institutional environment.

Work to prepare the project brief began in late 1996. The project document was prepared in 1997 by Hagler Bailly consultants and submitted to a Stakeholders' Workshop in 1998. Feedback from the workshop was incorporated into an amended project document that was signed between EPU, PTM and UNDP in July 1999.

Stakeholders consulted by the evaluator were of the view that consultation had been adequate and effective.

It is commendable that consultations involved Ministries as well as technical agencies. To include affected Ministries from the beginning of the process is helpful in gaining support for later policy proposals. This is obvious, but often emphasis is placed on technical consultation to ensure the good technical quality of the project document and the policy level given less weight. It is an aim of UNDP to affect policy and so affected Ministries should be brought in from the start.

## 6. PROJECT IMPLEMENTATION

### 6.1 Efficiency

Efficiency in this context means the conversion of the Inputs assigned to the project into the Outputs specified in the project document. Inputs for each Component after revision in the Inception Report are shown in the budget summary in *Section 7.10*. The planned Outputs from each Component are specified in the following Sections.

#### 6.1.1 Component 1: Energy Use Benchmarking

The Outputs from this component are designed to be:

- Output 1.1 Data Collection System for Energy Benchmark Setting
- Output 1.2 Energy Consumption Benchmarks for Malaysian Industries
- Output 1.3 Industry Energy-Use Database
- Output 1.4 Dissemination of Industry Energy-Use Benchmarks

The Activities for the Component were modified both in the Inception report and the Amendment to the Inception report, but the Outputs were unchanged.

An amount of USD 191,990 is allocated to this Component of which USD 107,464 had been spent by the end of March 2003.

Initially progress with this Component was slow. The PD requires the project to design a form to be used by industrial firms in reporting regularly their energy consumption data to the PTM. This was attempted, but industry was uncooperative. This is really only to be expected; there is no reason why industry should spend time and money completing a questionnaire that is of no immediate value to them, when the return is not compulsory and when confidentiality is always a concern. The Energy Efficiency Act, now in draft, will compel the appointment of Energy Managers for companies above a threshold defined by volume of energy use. The draft act does not specify functions for these Managers. The project might consider tabling an opinion on the draft with respect to the advisability of compulsory annual or bi-annual returns.

The international consultants recommended a model for energy benchmarking used in Thailand, but as it was designed for the Thai system of compulsory annual reporting it was in practice of little value to the MIEEIP with its poorer data and has now been abandoned. It is surprising that the consultants did not foresee this problem.

An energy-use database has been constructed with information from nine countries. Information on international benchmarks has been disseminated to users. Two seminars have been held for the cement and rubber industries. The team has joined the *International Network for Energy Demand in the Industrial Sector* and the *Network of Excellence for the Development and Application of Industrial EE and Environment Benchmarking*.

The project is now working with the National Productivity Centre (NPC) to disseminate and strengthen energy benchmarking in Malaysia. NPC has begun a benchmarking exercise for industry directed mainly at conventional managerial measure of productivity in terms of labour and capital. The scheme operates through the internet. Various "communities" agree on a voluntary basis to contribute responses to data requests defined by their community and in return they receive

statistical aggregates defining the average practice and deviations up and down. In collaboration with the MIEEIP the NPC has agreed to extend the benchmarking system to energy. The MIEEIP is now modifying the software to permit energy benchmarking. An Industrial Energy Efficiency Community will be created with eight clusters corresponding to eight industrial sub-sectors as required by the PD. These clusters will contribute information and receive in return a password by which they can access the benchmarking reports.

This approach is promising and the project is to be commended for the initiative. It should however be stressed that the development is at an early stage. The NPC initiative itself has only recently begun and there is no evidence as yet as to how widely it is referenced. The MIEEIP has only recently begun to construct the forms for the energy benchmarking and the system has yet to go on-line to users.

The efficiency up until now has not been high because of several false starts. Expenditure on the Component has been USD 107,000 or 56% of the budget. The largest expenditure has been on International consultants with rather poor return. The project team have now found a sound approach. If the online energy benchmarking can be completed and if it can be demonstrated to be used by a community of say 80 users then the efficiency will be high.

### **6.1.2 Component 2: Energy Auditing**

The Outputs from this component are designed to be:

- Output 2.1 Energy Audit Skills Upgrading for PTM
- Output 2.2 Review of Energy Audit Practices and Needs
- Output 2.3 Seminar-Workshops on Energy Efficiency and Energy Audit Techniques
- Output 2.4 Standardized Energy Auditing Procedures and Auditing Tools
- Output 2.5 Establishment of Sectoral Energy Audit Teams
- Output 2.6 Development of Sectoral Energy Audit Programs
- Output 2.7 Procurement of Energy Audit Instruments
- Output 2.8 Conduct of Energy Audits
- Output 2.9 Program Evaluation
- Output 2.10 Sustainable Energy Audit Follow-up Program
- Output 2.11 Energy Audit Program for Other Industry Sub-Sectors
- Output 2.12 Energy Efficiency Features Assessment of New Industrial Facilities

The Activities underlying these Outputs underwent substantial revision in the Inception Report and the Component benefited from a redistribution of funds from Component 7.

The revised Outputs were:

- Output 2.1 Procurement of Energy Auditing Materials and Instruments
- Output 2.2 Classroom training - workshops
- Output 2.3 Training on the use of the instruments
- Output 2.4 Development of standard Energy Auditing tools
- Output 2.5 Conduct energy audits and on-the-job training
- Output 2.6 Sustainable Energy Audit Follow-up Program
- Output 2.7 Energy Efficiency Features Assessment of New Industrial Facilities
- Output 2.8 Audit study tour to Germany

The original scope is preserved in the new structure and a study tour was added. The PD proposes

that six factories be audited in each of eight sectors, but in fact some sectors in Malaysia do not contain six factories, so a better stratified sample was constructed. All these changes were sensible.

An amount of USD 1,689,000 is allocated to this Component of which USD 1,391,267 had been spent by the end of March 2003.

There has been much output from the Component. A nine-day basic training by the consultants was well received and evaluated. There has been less satisfaction with the quality of some of the specialist consultants supplied by the consortium. Forty-four audits of the total of forty-eight have been completed. The evaluation and follow-up process is underway.

The evaluator reviewed eight audit reports of varying dates and for various sectors. The general standard is high. The reports are well constructed with readable Executive Summaries for senior management and clear statements of the costs and expected benefits. There is indication of a steady improvement with time in quality and scope. Communication with management has been good in the engagement phase, the work phase, and the presentation stage and in follow-up. A preliminary policy paper has been prepared for the Economic Policy Unit from the initial 24 audits.

The team had to overcome severe challenges in the early stages arising from the inexperience of the project team, the scepticism of industry and some bad experiences with previous technical assistance programs offering audit services that were not perceived as useful. The successful removal of these obstacles is in large part due to the skills and perseverance of the CTA. In the view of the evaluator his background in the private sector was a significant benefit. It permitted effective communication, demonstrated an understanding of their priorities and constraints, and facilitated an engagement with senior management.

Engagement with government companies such as SIRIM and private sector ESCOs has also been good. The evaluator would also commend the good quality control and systematic procedures that are essential in establishing credibility in a young team.

Overall the implementation of this Component has shown high efficiency.

### **6.1.3 Component 3: Energy Rating**

The Outputs from this component are designed to be:

Output 3.1 Information on Energy Efficient Equipment and Energy Rating Programs Available to Industries.

Output 3.2 Policy Paper to Support Energy Rating Programs

Output 3.3 Plans for Implementing a Comparative Energy Rating Program

Output 3.4 Comparative Energy Rating Program Implementation

Output 3.5 Specifications for an Equipment Testing Facility

Output 3.6 Design and Construction of Testing Facilities

In the Inception Report some resources originally allocated to Component 7 were reallocated to Component 3. There is some common ground between Component 3 and Component 7 in the data required on the efficiency of equipment used and available in Malaysia.

An amount of USD 3,285,054 is allocated to this Component of which USD 7,245 had been spent by the end of March 2003. Of this USD 3,000,000 is allocated by the MESITA for procurement of

testing facilities.

The PD does not specify what equipment is to be included within the scope of Component 3. The project has taken a fairly limited view of the scope and most work to date has been done on electric motors. The team produced an Electric Motor Market Survey Report in May 2002. The Policy Paper to support an energy labelling programs was produced in July 2002 and submitted to a Committee within the structure of the Energy Commission. No mandatory standards are proposed at present. A performance testing protocol has been proposed based on EU procedures. Sirim Bhd has been recommended to the Energy Commission as the appropriate site for an electric motor test bed and this has been agreed by the EC. The specifications, tendering, installation and commissioning of the test-bed are expected by the end of the year.

For thermal equipment the team has made little progress. A working paper from the international consultants concluded that they could find no programs elsewhere in the world for the labelling of industrial thermal equipment. The consultants suggested instead that the project should work on a best practice program for boilers. There is some intention to install a demonstration high efficiency boiler on a site in Malaysia.

The Component 3 has now established good working links with other institutions in Malaysia concerned with issues of standards, labelling and testing. The main cooperation is with Sirim and the Energy Commission. Sirim is a government owned company with a wide brief in standards and scientific research. The evaluator visited the laboratories and it quite clearly an appropriate location for the test-bed. The Energy Commission is a regulatory body that has also been attributed a competence in energy efficiency. Under the EC is an Advisory Board on Energy Efficiency in the Industrial Sector (ABEEIS) and under ABEEIS there are several Working Groups one of which is the Energy Rating Work Group. Within this work group is a sub-group on electric motors including suppliers and manufacturers. A similar sub-group on boilers is also under consideration.

The project does not appear to have yet made a case that labelling of industrial motors is cost-effective. Labelling has a cost to the economy through the testing, monitoring and inspection and efficient motors are more expensive than others. It is important to know what the return would be on the investment in labelling assuming a plausible penetration of efficient motors into applications where they are justified. The evaluator believes such a paper to be crucial to any proposal to develop such practices and recommends that the Component produce it.

The EC has a cooperative program with the Danish agency DANCED to support its responsibilities for energy efficiency. The cooperation of Component 3 with this structure is highly appropriate and the evaluator commends it.

The evaluator concurs that there is no merit in pursuing a labelling program for thermal industrial equipment and agrees that a best-practice program is appropriate; he recommends that the project team consider cooperation with NPC for this. Boilers are a good choice for a best practice program; they are widespread, fairly homogenous, easily characterised, large energy consumers and with large scope for savings. NPC has been moving into web-based best practice programs and could be an excellent platform for a boiler program.

The evaluator is sceptical about the proposal for a demonstration efficient boiler. Demonstration programs are for technologies where there is perceived to be technical risk and this is not the case with efficient boilers. Moreover they tend to look similar to other boilers and it is not clear what purpose would be served.

The MESITA has provided 11 million Ringgits for investment in test facilities. The test bed is unlikely to cost more than 1 million. The remainder if not used will be returned to MESITA. It cannot apparently be deployed in other Components without the prior approval of MESITA.

The efficiency so far of the Component is low. The electric motor work is about 50% completed and one piece of industrial equipment is a restricted view of the scope of the PD. Little has been done so far on boilers. Completion of the policy analysis for electric motors and, if justified, the implementation of the testing and labelling program would be a reasonable target for the electric equipment. Implementation of a good best practice program is a reasonable target for the thermal side. Achievement of these targets will require a more productive approach than that achieved to date.

A factor contributing to the inefficiency is probably the intrinsic problems of introducing standards and labelling in the industrial context.

#### **6.1.4 Component 4: Energy Efficiency Promotion**

The Outputs from this component are designed to be:

Output 4.1 Brochures and Regular Newsletters & Bulletins on EE&EC Technology Studies and Applications.

Output 4.2 Energy Technology Information Services.

Output 4.3 An Association of Energy Services Professionals and Industry.

Output 4.4 Accreditation Scheme for ESCOs and Energy Professionals

An amount of USD 232,710 is allocated to this Component from the GEF fund of which USD 103,307 had been spent by the end of March 2003. USD 95,000 was allocated from the UNDP fund of which USD 7,596 has been spent.

The project has produced and distributed ten newsletters and an eleventh is in preparation. The style of the Newsletter is ponderous and comprises mainly case studies from US web-sites. There is little information about the project or success stories from Malaysia. It is hard to believe that it is of real interest to most recipients. It also does not seem to be thoughtfully targeted. It goes mainly to Managing Directors of enterprises and it is unknown what they do with it when they get it.

The website is nicely designed and works well, but comprises mainly excerpts from the project document. Project quarterly reports are available there and are maintained up-to-date. The Newsletter is also on the site, but only up to Issue 7. The biggest deficiency is in the technical information. Only one single technology is covered (electro-technologies for energy efficiency) and that is rather specialist. Simple techniques such as boiler controls would have more impact. Publication of the web-site is important; because when project funds are not available for dissemination it will be the main vehicle of communication.

The reasons for this disappointing performance are not obvious. Putting technical information on the site is a straightforward task and a strategy to do it (covering scope, level of detail, structure) should be established and implemented immediately. The weakness in the Newsletter is possibly because there are no personnel with the appropriate skills set. The evaluator notes that the Component Manager is also an Assistant Director of PTM and may be overloaded. It would be sensible to review the wisdom of combining these posts.

The responsibility for the Website has now passed to "Component 9". This is likely to be an

improvement. The evaluator recommends that the Newsletter should also become responsibility of "Component 9". The Editorial and Communications Manager is an experienced journalist and should be able to provide a more interesting product. Transfer of these responsibilities may require recruitment of an assistant for "Component 9".

On the institutional and accreditation Outputs there has been progress. The Malaysian Energy Professional Association has been created with 27 members and a first draft of accreditation scheme for ESCOs will be sent to the Energy Commission soon

### **6.1.5 Component 5: ESCO Support**

The Outputs from this component are designed to be:

- Output 5.1 A survey and evaluation of the capacity of known, existing ESCOs in Malaysia
- Output 5.2 Establish links between ESCOs and industrial firms
- Output 5.3 Establish Legal framework for the ESCO industry in Malaysia
- Output 5.4 Monitoring and evaluation of local ESCO industry performance
- Output 5.5 Training of local engineering firms and consultants in integrating energy efficiency in their designs
- Output 5.6 Energy engineering design tools for ESCOs
- Output 5.7 Marketing Strategy for ESCOs

An amount of USD 197,004 is allocated to this Component of which USD 96,237 had been spent by the end of March 2003.

The project has done an excellent job of promoting the ESCO concept. The work was initiated with an ESCO Business Development Workshop in February 2001 that was well received. A Training Manual on ESCOs Project Development Procedures was produced in August 2001. Despite the enthusiasm, there was little progress in real project development by ESCOs, partly because of some problems identified later in *Section 6.2.5* and partly because of unfamiliarity with the concept and with the idea of an Energy Performance Contract (EPC). Consequently, the project has decided to adapt the demonstration program in Component 6 to incorporate some ESCO inputs with the intent to publicise the idea. This decision is discussed in *Section 6.1.6*.

In the later stages of the project the team has given attention to the business planning needs of ESCOs. A main distinction between an ESCO and a consultant is the financial participation of the ESCO. A Mini Workshop on ESCO Model Business Plan and Strategy was held in November 2002 and followed by dialogue sessions with individual ESCOs. An Engineering Manual for ESCOs was produced in February 2003 and a Workshop on Industrial Energy Performance Contracting was held in March 2003

Generally this Component has been conducted with high efficiency.

### **6.1.6 Component 6: Energy Technology Demonstration**

The Outputs from this component are designed to be:

- Output 6.1 Catalogue of Energy Saving Technologies for Demonstration Program
- Output 6.2 Seminar-Workshop on Energy Technology Demonstration
- Output 6.3 Baseline Data Establishment
- Output 6.4 Demonstration Project Designs

Output 6.5 Funding Arrangements and Hardware Procurement  
Output 6.6 Hardware Installation, Testing and Commissioning  
Output 6.7 Performance Monitoring and Evaluation of the Demonstration Projects  
Output 6.8 Demonstration Program Evaluation

An amount of USD 2,366,112 is allocated to this Component from the GEF fund of which USD 1,106,656 had been spent by the end of March 2003; USD 2,000,000 is intended for financial support to demonstration projects of which USD 1,061,011 has been used. USD 2,260,000 is allocated by the MESITA support for of which none has yet been used.

Under the original ToR, eight projects were to be implemented as demonstration projects through direct agreements between MIEEIP and the host companies. As a consequence of the difficulties experienced in launching ESCO projects, MIEEIP proposed to extend Component to include four “fast-track” demonstration projects to be implemented by ESCOs. With the approval of the NSC a fund of RM 8 million was established at the Malaysian Industrial Development Bank for this purpose. The fund is financed equally by the Malaysian Electricity Supply Industry Trust Account (MESITA) and by GEF. The money is on-lent by MIDF at 4%; the interest covers the administrative costs.

Criteria for the selection of demonstration projects have been defined by the project and four projects selected. One selected company chose eventually to implement the project independently. A Master Energy Service Agreement was signed between the first host company and ESCO in April 2003.

These “fast-track” projects are additional to the eight projects foreseen in the ToR that will be attributed loans from the same fund up to 50% of the project value at 0% interest.

The MIEEIP has executed this Component efficiently. It will have to work hard to complete procurement, installation, testing and commissioning for the remaining projects. Monitoring and evaluation will not be complete in the period of the project and will need to be transferred to MIEEIP.

### **6.1.7 Component 7: Energy Efficient Equipment Manufacturing Support**

The outputs from this component are designed to be:

Output 7.1 Assessment of Local Equipment Manufacturing Capabilities  
Output 7.2 Evaluation of Typical Energy Performance of Selected Locally Produced Industrial Equipment  
Output 7.3 Potential Improvements and New Designs for Locally Manufactured Industrial Equipment  
Output 7.4 Local Industrial Equipment Manufacturers Trained on High Efficiency Designs and Production Technologies  
Output 7.5 Technical Assistance to Local Equipment Manufacturers  
Output 7.6 Selection and Funding of Eligible Equipment Design and Manufacturing Improvement Projects of Local Industrial Equipment Manufacturers  
Output 7.7 Evaluation of the Improvement Projects

A budget of USD 974,330 is allocated to the Component of which USD 600,000 is a subcontract intended to support loans to manufacturers to improve their offer of energy efficient equipment.

Little has been achieved under this Component. A market survey was conducted in conjunction with Component 3. The survey had to be conducted in three phases because of the poor response

to postal questionnaires. Eventually the necessary information was obtained by direct interview.

An agreement has been reached with MIDF to act as the fund manager for the disbursement of the loan under this Component. Criteria have been defined to select potential manufacturers and on the basis of these criteria a short-list of manufacturers has been drawn up from which to seek applications. A procedure for soliciting and evaluating applications is to be developed in the next mission of the international consultant.

The output for three years work is low. Only 4% of the budget allocated to this Component has been spent. Efficiency is poor.

### **6.1.8 Component 8: Financial Institutional Participation**

The outputs from this component are designed to be:

Output 8.1 Local Banking and Financial Institutions Trained on Financing and Evaluating EE&EC Projects in Industries

Output 8.2 Selection Criteria for Host Demonstration Sites of Component No. 6

Output 8.3 Final List of Host Demonstration Companies

Output 8.4 Selection Criteria for the Local Manufacturers Support Program

Output 8.5 Final List of Eligible Local Industrial Equipment Manufacturers

Output 8.6 Financing Assistance Program Evaluation

Output 8.7 Sustainable Energy Technology Support Program

USD 110,250 is allocated to this Component of which USD 23,477 had been spent by the end of March 2003.

A Financial Institutions Forum was held in February 2002 to train the institutions in concepts of energy efficiency and the financial implications. Selection criteria have been prepared for demonstration projects and a short-list established. Arrangements have been made with MIDF to manage the funds available for demonstration projects; the terms are rather favourable for MIDF, but it was actually the only bank to show interest.

The MIEEIP has efficiently discharged its tasks in this Component with respect to the demonstration projects. The fund for local industrial equipment manufacturers depends on progress with Component 7.

## **6.2 Effectiveness**

Effectiveness in this context measures the extent to which the Outputs have achieved the Objectives of the Component.

### **6.2.1 Component 1: Energy Use Benchmarking**

The Immediate Objective is to establish and develop energy-use benchmarks for various industry sub-sectors (based on industrial processes, operations and energy systems) that can be used by industries as guides in their EE&EC efforts.

Energy benchmarking is not yet in place. Its effectiveness will depend in equal measure on the effectiveness of the benchmarking programs at NPC where it is hosted and on the efforts of the team to develop a functioning energy benchmarking community.

The evaluator attended an impressive presentation of the benchmarking program at NPC. The program is carried out professionally and with determination and substantial resources. The project team also is well motivated, so there are positive indications of an effective implementation.

Among the factors contributing to the positive expectations of future effectiveness is the coherence of the aims of the project with those of NPC. This coherence bears arises from the common origin of these aims in the development process. This example is a specific case of the general tendency noted in *Section 5.1.2*.

### **6.2.2 Component 2: Energy Auditing**

The Immediate Objectives of this Component are:

- To promote energy auditing as an effective tool for industrial energy management.
- To establish Sectoral Energy Audit Teams; and,
- To conduct a continuing Energy Audit Program for industries

These Objectives will all be achieved within the duration of the project. Effectiveness is high. An important factor contributing to the effectiveness of the Component is the private sector background of the CTA that was helpful in creating fruitful relationships with industry.

### **6.2.3 Component 3: Energy Rating**

The Immediate Objectives of this Component are:

- To provide information on energy-efficient equipment and energy rating programs to increase awareness and encourage the use of energy efficient equipment in industry and set up an industrial equipment testing facility to label equipment.

The effectiveness of the project so far is limited. It appears to have had some influence on the Energy Commission, but it is difficult to distinguish how much of what has happened there is a consequence of the UNDP and how much of the DANCED project. (No visit to the EC was possible because the pertinent staff were in Denmark.) The narrow range of equipment selected also limits the value of the Outputs.

There is no sign that the thermal work has been effective as yet, but a successful boiler best practice program would be a useful output and likely to be effective.

The limited effectiveness is part because standards and labels are difficult instruments for energy efficiency in industry. The Component has made no cost-benefit analysis of labelling for industry as a policy; this is an important deficit and should be corrected. Such analysis is essential to an informed decision by the Energy Commission to proceed.

### **6.2.4 Component 4: Energy Efficiency Promotion**

The Immediate Objectives of this Component are:

- To disseminate information on energy efficient practices in industries, EE&EC technology applications and establish an association of accredited energy specialists, consultants and technology developers and providers.

It is unlikely that the Newsletter is effective. A recent evaluation form included within the 1000 distributed copies gave only 36 returns, which indicates a low level of interest. It is unclear also how effective is the Malaysian Energy Professional Association. The membership of 27 is well below the critical mass for such an organisation. The Association has no significant activities and an attempt to solicit material from the members for the Newsletter failed.

### **6.2.5 Component 5: ESCO Support**

The Immediate Objectives of this Component are:

- To develop a suitable institutional and legal framework for ESCO activities in the country
- To develop institutional arrangements that will promote ESCOs to the industrial sector
- To assist the local ESCOs in making bankable project proposals, business plans, and in securing financing arrangements for their clients.
- To advise ESCOs in defining the feasible products and services that they can offer and evaluating the risks associated with performance contracting.

The Component is ambitious. ESCOs are generally more successful in the commercial sector than in industry. Commercial institutions often have a minimum engineering staff with restricted skills; in particular they lack design and contracting skills. The energy services are distinct from the core business and the delivery of energy services is easy to specify: air-conditioning, lighting, hot water and some machinery. In these circumstances, management may well be prepared to allow ESCOs to provide equipment and possibly to manage the services. In industry there is generally a well-staffed engineering department, with high-level skills. Once the basic concept of an energy efficient process is understood then they have all the necessary skills to design and implement probably more cheaply than an ESCO. Moreover, the energy services are often integrated with the process. The main concern of industrial engineers is with the quality of the product; they will be concerned for example that installation of a heat recovery unit on a furnace does not change flame characteristics to the detriment of the product. This may well lead them to prefer their own engineering staff to execute work. Finally, industry is always concerned to ensure that details of its technical processes are not released to competitors. Industrial companies may therefore not wish to give information to ESCOs.

For these reasons the effectiveness of the Component has been until now limited. There have been no spontaneous ESCO developed projects. Future effectiveness will depend strongly on the public policy of Malaysia with respect to energy efficiency. If there is no firm policy then the ESCO business is likely to collapse. It is improbable that it will be self-sustaining. If there is reasonable policy for energy efficiency then the efforts made by the project could be effective in supporting a variety of potential instruments; these could include compulsory audit and financial support to investments. It is likely that the ESCO impact would be stronger in the commercial sector.

### **6.2.6 Component 6: Energy Technology Demonstration**

The Immediate Objectives of this Component are:

- To demonstrate the applicability and the feasibility (technical and economic) of proven energy efficiency technologies.
- To document and disseminate information on the application and benefits of energy efficiency technologies in local industrial settings.
- To provide technical and financial assistance to industrial energy users.

The evaluator is of the view that the decision to involve ESCOs in a fast-track demonstration scheme was sound. It has created publicity for the ESCO concept and the EPC concept. The experiment will be closely watched. One should nevertheless not overlook some problematic aspects with the arrangement. The conditions are extremely favourable to all parties. Under the terms of the Special Funding Scheme, if the ESCO defaults on payment MIDF is responsible in recovering the principal. The company benefits from a 90% contribution to the investment, a guaranteed saving on its electricity bill and ownership of the assets after 5 years. The ESCO takes some risk because it is responsible to repay the loan.

The main weakness in the model is that the host companies only accept the participation of an ESCO because it is a condition to access this favourable finance; it is not a genuine commercial relationship between the host and the ESCO. This is not to criticise the initiative, which is good, but to make clear that replication and sustainability are not guaranteed.

It follows that the effectiveness of the Component once again depends on the extent of public policy support in the future. If the support is forthcoming then the experience gained in this Component will be valuable and effective. If no support is forthcoming then it is unlikely that the demonstration projects will have much impact.

### **6.2.7 Component 7: Energy Efficient Equipment Manufacturing Support**

The Immediate Objectives of this Component are:

- To initiate design and manufacturing improvement projects of local industrial equipment manufacturers as a means of promoting and accelerating the production and utilization of energy efficient equipment in industries.

It is likely that if the Component continues on its present track that it will succeed in soliciting proposals from manufacturers and will eventually disburse the funds available. It is questionable whether the exercise will have any effect on the offer of energy efficient equipment. Many suppliers in Malaysia are importers of foreign equipment; where they do manufacture locally they almost always manufacture under licence. The ability of Malaysian manufactures to improve the designs they sell is therefore highly constrained.

Nor is there any evidence that the absence of manufacturing facilities is a constraint on the offer of equipment. The evaluator met two manufacturers who confirmed that the main constraint is demand. If the market were there, then they could and would offer more efficient equipment.

The effectiveness of this Component must therefore be in doubt. It is however important to involve manufacturers in energy efficiency policy and debate. It is recommended to rethink this Component comprehensively. Suggestions for the revision are made in *Section 7.13.2*.

### **6.2.8 Component 8: Financial Institutional Participation**

The Immediate Objectives of this Component are:

- To promote and accelerate the production and utilization of energy efficient industrial equipment through dissemination of information and techniques on energy efficient equipment designs and production.
- To set up financing arrangements for the provision of loans to eligible companies/ equipment manufacturers that can host energy efficient technology demonstration programs and design

applications and produce energy-efficient industrial equipment amongst local markets for the technology demonstration activity

The effectiveness of Component 8 depends as for Components 5 and 6 on the future development of public policy in Malaysia. If there is no future support for energy efficiency then the effectiveness of this work will be zero. There will certainly not be a spontaneous offer of energy efficiency financial products from the banks. Only one bank was interested to take on the task in the first place and only then on fairly favourable terms, so the prospects of them putting their own money at risk must be low.

The work could prove effective if the GoM were to extend the pilot demonstration scheme to make funds available on concessionary terms to industrial investment in energy efficiency. The evaluator proposes that the MIEEIP should produce a comprehensive review of the possible role of public financial incentives in energy efficiency under the 9<sup>th</sup> Malaysian Plan. The paper should review the experience of the MIEEIP on the energy saving potential in industry as determined by the audits and of the effectiveness of financial incentives to industry and therefore of the impact of various levels and types of government funding. The paper should also recognise that in an environment of subsidised energy prices the opportunity cost of energy savings is higher than the savings determined at market prices and should make a cost-benefit analysis of the financial incentives policy accordingly.

There appears to be a view in some circles in the GoM that energy efficiency should be a purely commercial decision between banks and companies and that further progress will arise spontaneously. This is unlikely to be true. International experience tends to show that a long sustained campaign is necessary to have a real impact on energy use and that financial instruments, despite some serious deficiencies, are essential.

The idea of such a review paper was well received by the EPU when suggested by the evaluator. It is apparently a good time for such input because the preparation of the 9<sup>th</sup> Plan will proceed in 2005 and policy inputs in 2004 would be appropriate.

### **6.3 Impact on Legislation, Regulations and National Policies**

There is as yet no change in legislation, regulation and policy that can be traced to the project, but several papers have been put to policy making and regulatory bodies and the future impact of the project in this regard is potentially high.

Among the submissions of this kind made are:

- A set of policy recommendations to the EPU for a sustainable approach to energy benchmarking
- A review and evaluation of the energy saving potential in industry as identified to date by the energy audits, requested by the EPU
- Recommendations to the Energy Commission for the design and implementation of a labelling system for electric motors.

As noted in *Section 6.2.8* there is also the opportunity to develop important policy inputs into the 9<sup>th</sup> Plan relating to the need for financial incentives, their design and likely impact.

### **6.4. Local Benefits**

Please say something about local benefits that have been achieved so far and/or expected to achieve after the project.

## **7. MANAGEMENT**

### **7.1 Project Management**

The project management structure is as follows. Overall direction of the MIEEIP rests with a National Steering Committee chaired by the Deputy Director of the Economic Planning Unit (Prime Minister's Department). All major stakeholders are represented, including an environmental NGO. The NSC meets approximately every six months; attendance appears to be good, contributions are pertinent and minutes are satisfactory. Papers are apparently not always made available to the members in time and this should be corrected.

The overall responsibility for delivery of project outputs rests with the National Project Director who is the Chief Executive Officer of PTM. Day-to-day project management is the responsibility of a full-time Chief Technical Adviser (CTA). A Component Manager or Leader manages each Component, in most cases with an assistant. Each Component has also a part-time Technical Adviser, although in some cases it has proved difficult to find capable people with the time to make sustained contributions.

Every two weeks the Component Managers meet with the CTA and Technical Advisers may attend. At every second such meeting the Technical Advisers are supposed to attend, but it would seem this does not always happen. The proceedings of all meetings are recorded. Every six weeks there is a Project Review Meeting attended by the project team and the stakeholders and chaired by the NPD. These meetings also appear to be well attended and taken seriously by all parties.

Communication amongst stakeholders is effective. The evaluators came across no cases where stakeholders complained of a lack of access to materials or information. This is an important achievement that reflects well on the project. Communication vertically within the project is good.

### **7.2 Staffing**

All project staff that were interviewed were clear about their aims and responsibilities. The team is young and at the beginning of the project was inexperienced, although enthusiastic. This skewed experience profile caused some difficulties in implementation in the early stages and reduced the credibility of the project. As the team gained in experience so these problems diminished, but it is still the case that without the CTA or someone of equivalent status the team would probably not be able to carry the work on. This has implications for sustainability that are discussed in *Section 8.4*.

### **7.3 Tendering**

The CEO can approve tenders below RM 250,000 RM within PTM. Tenders above this figure require approval by the Tender and Finance Committee of the PTM Board. For the MIEEIP the same general system applies, but a special tendering structure was introduced to allow a wider spread of interests to be incorporated. A Tender Evaluation Committee composed of middle managers from the stakeholders and chaired by the CTA makes recommendations to a Tender Committee comprising senior management of the same stakeholders for approval. This arrangement has proved cumbersome and it has taken on occasions six months to arrange meetings of the Tender Committee. Such delays are a significant handicap for any project manager and are likely to be a major problem in the closing stages of the project as tenders are made for test equipment and demonstration projects.

It is recommended that the tendering process be reviewed. It may be adequate that the Tender Committee approve proposals of the Tender Evaluation Committee by circulation, assent being assumed if no reply is received within two weeks. In the case of dissent then the Committee can be convened.

#### **7.4 Monitoring and Reporting**

PTM is an ISO 9000 organisation and its quality control procedures have been adopted by the MIEEIP. The procedures when observed are good. Compliance appears to be acceptable on the whole, but some Component Managers do comply better than others and an effort to upgrade the whole to the quality of the best would be useful.

Quarterly reports are prepared and published on the web-site. A UNDP/GEF Project Implementation Report was produced on the 17<sup>th</sup> August 2001 and an undated UNDP Annual Project Report is available presumably from summer 2001. A combined APR and PIR was produced on 25<sup>th</sup> May 2002. The documentation appears objective and satisfactory.

#### **7.5 Support from UNDP**

The arrangement with UNDP works satisfactorily. No problems were reported. UNDP staff has made some contributions to the project by fostering links with other government institutions to which the project might not have had easy access.

#### **7.6 Stakeholder participation**

Stakeholders participate through the regular review meetings, but also through direct involvement in project activities. Several good links have been established between the project and other agencies for example with FMM, representative industrial organisations, MIDF, Sirim and NPC. Others have been fostered by MIEEIP, e.g. between industry and ESCOs. The main government stakeholders, EPU and MECM both expressed satisfaction with their relationship to the project.

The development of good working relationships with the private sector is worthy of note. Productive relationship with energy users and equipment manufacturers is key to this type of work. This has been achieved in part by approaching industrial organisations as intermediaries with their members. The background of the CTA is also important. An experienced energy manager from the private sector was appointed as CTA and this was wise. It helped ensure that the audits were conducted in a manner that met the needs of industry and that the products were of value. The ability to communicate with authority and yet with recognition of industry needs and constraints is vital in obtaining their participation.

#### **7.7 Use of Consultants**

##### **7.7.1 International Consultants**

Experience with the international consultants has been generally good, but there have been some areas of friction. The international consultants were asked to prepare the Inception Report for the project. Strictly, project staff should have prepared this, although consulting support could certainly have been sought. The attribution of this responsibility to the international consultants appears to have caused them to take an undue level of control of activities in a manner that was not entirely appropriate and to appoint a local assistant project manager of their own within the project structure. There is no project management justification for what appears to be a costly and redundant

appointment.

Some difficulties were subsequently experienced by the project in imposing their wishes on the consultants. The difficulties now seem to have been resolved and the consultants have accepted that the project staff should draw up detailed Terms of Reference for each mission. In the view of the evaluator this is normal and proper.

The quality of services rendered by the international consultants in basic training has been good. There appear to have been some areas where the consultants found it hard to identify appropriate experts, for example in ESCO business planning and for some specialist aspects of efficiency in particular industries. Experts were proposed that the project found unsuitable and rejected. The evaluator concurs with this disciplined approach to management of the consultants.

Working with international consultants is key to technology transfer. Expectations of the role of consultants may vary from one situation to another. Local experts may not always have experience of the management of international consultants. It might be that the production of a short manual by UNDP on the use of international consultants might be useful.

### **7.7.2 National Consultants**

National consultants are included within the international consortium. Their role is not clear. They do not seem to have contributed in any detectable manner to any project outputs and they have no liaison role because relationship with local institutions is handled by the MIEEIP.

The original project document envisaged the direct recruitment of local consultants. In practice there has been little use of local consultants, except in Component 8, because it proved hard to find local consultants with the necessary skills. Qualified personnel were all apparently in full-time employ. A stronger resort was made instead to Technical Advisers for short-term inputs. This has worked well in some cases, but not in others.

There is a loss in not using local consultants. Part of the wider impact of the project is the strengthening of local consulting skills and this is lost if they are not used. It may also be easier for the project to get useful local inputs through properly specified contractual inputs than from advisers. The looser relationship with Technical Advisers is harder to manage. It is recommended that the MIEEIP reconsider this decision and seek to engage local consultants on appropriate tasks.

### **7.8 Equipment**

Equipment was purchased to the amount of USD 400,000, mainly for use in Component 2. The evaluator inspected the equipment. It is properly stored, inventoried and maintained and is appropriate to the tasks. The availability of the equipment was a critical to the success of the audits.

The equipment will pass to PTM at the end of the audit and it is recommended that PTM consider renting the equipment to private sector ESCOs at modest rates thereafter.

### **7.9 Changes in Work Plan**

Various revisions were made to the work plan during the Inception Report and in a later amendment to the Inception Report. These are described in the material in *Section 6* particular to each Component. The changes did not specify changes to Outputs, but only to the structure of Activities

and to the budget. Resources were moved from Components 7 and 3 to Component 2.

The NSC decided on 21<sup>st</sup> February 2002 to approve the fast-track demonstration projects.

The evaluator has reviewed the reasons for these changes and agrees that they were justified.

## 7.10 Budget Expenditure

The resources under the direct control of the project come from GEF, UNDP and the MESITA. The overall status of expenditure under from these funds at end March 2003 is shown in the Table.

Fund	Allocated (USD)	Spent (USD)	Percentage
GEF fund	7,300,600	3,217,114	44.1%
UNDP fund	300,000	200,520	66.8%
MESITA	5,260,000		
GOM (Cash)	1,042,000		

See Table E-1.1 in the PD. Total GoM cash contribution is US\$ 6.302 million, inclusive of the MESITA contribution.

The apparently low level of expenditure arises in part because the large allocations for testing-equipment, demonstration programs and support to equipment manufacturers fall at the end of the project. Adjusting for these expenditures, the GEF fund is at present 68.4% spent. As the project has little more than one year to run out of four, and as some of the large consulting contracts are nearly completed, the general impression is that the project is likely to be under-spent. This general impression is strengthened by the observation that USD 359,233 are allocated for the mission expenses of international consultants, but in fact the mission expenses are included within the subcontracts signed with the consultants, so this sum is in practice not allocated at present.

The percentage spent varies strongly according to the Component. This is shown in the Table.

	Allocated (USD)	Spent (USD)	Percentage
Component 1			
GEF	191,990	107,464	56%
Component 2			
GEF	1,689,000	1,391,267	82.4%
UNDP	200,000		96.2%
Component 3			
GEF	285,054	7,245	2.5%
MESITA	3,000,000	0	0%
Component 4			
GEF	232,710	50,290	44.4%
UNDP	95,000	7,596	8.0%
Component 5			
GEF	197,004	96,237	48.9%
Component 6			
GEF	2,366,112	1,103,570	46.8%
MESITA	2,260,000	0	0%
Component 7			
GEF	974,330	41,979	4.3%

Component 8			
GEF	110,250	23,399	21.3%

### 7.11 Areas of Corrective Action

Detailed recommendations for improving the delivery of Outputs are given in the relevant *sub-Sections* of *Section 6*.

The main general areas of corrective action are:

1. To improve the production and delivery of the Newsletter and greatly to enhance the materials on the web-site by transferring these Activities to "Component 9".
2. To improve the delivery of Outputs from Component 3 and in particular the development of a best practice program for boilers
3. To revise Component 7 and to extend its life by 2 years or whatever shorter period the budget allows.

### 7.12 Areas of Potential Success

The project is potentially successful in creating the basic skills, understanding and information to underpin an important program of public policy in energy efficiency.

There are only a few Outputs that will persist in the absence of continued public policy support, probably only the benchmarking and best practice programs as these are not costly and can be continued within NPC.

### 7.13 Proposed Revisions to Project and Extensions

#### 7.13.1 Available funds

At present the Component 7 has made little progress and has spent little money. Some USD 930,000 is left in the budget; these are GEF funds.

There is another USD 359,000 of GEF funds assigned for mission costs that will not be used. Other areas of the budget may well be under spent.

The expenditure on testing equipment in Component 3 will be much less than expected. There is USD 3,000,000 of MESITA funds available of which only an estimated USD 300,000 will be needed for the electric motor test-bed. If not used these funds will return to MESITA.

The evaluator is opposed to a blanket extension of the project. This will simply lead to a relaxation of effort in Components where delivery could be completed on time. The evaluator recommends that these funds be used to extend Components 6 and 7. The issues are discussed for each Component below.

#### 7.13.2 Extension of Component 7

Component 7 is important, but little has been achieved. This is understandable because the offer of efficient equipment depends on the demand and this can only materialise after the other Components have had some impact. It is also unclear that as constructed at present Component 7

will be effective.

It is recommended that the Component be reviewed and then extended for 2 years. The evaluator recommends that some consideration be given to converting the approach to funding the incremental costs of efficient equipment. This is an approach that is well-known to GEF and has many advantages. In this model the GoM would need to establish base-line efficiencies for equipment and then would offer incentives to consumers to buy equipment of better efficiency than the base-line. Incremental costs vary greatly between designs so a practical approach might be to offer an incentive based on the likely difference in fuel saving assessed on some notional utilisation. It might be advantageous to channel the incentives through manufacturers, as there are fewer manufacturers than users and more importantly such an approach will engage the marketing skills of the manufacturers in the process.

There are some practical issues in the implementation of this scheme but it has many operational advantages:

- It targets directly the incremental costs that are the source of efficiency
- It is performance oriented because if no efficient equipment is sold then no payments are made
- It enrolls the manufacturers marketing skills in the policy
- It attacks the real obstacle, which is the market not the manufacturer.

Such a change would be significant and would require the approval of the NSC.

### **7.13.3 Extension of Component 6**

As it stands the monitoring and evaluation of the demonstration projects will not be possible within the remaining period. This is not a sufficient reason to extend this Component because the tasks can be done by PTM.

However if the MESITA agrees then the remaining funds from Component 3 could be redirected to fund another round of demonstration projects in parallel with a monitoring activity funded from remaining GEF funds. The present intention within Component 3 is to use the remaining money to fund a demonstration efficient boiler, not on a site, but in a scientific institution. There seems to be little point in this: efficient boilers look much like others and there is no reason to believe that it would stimulate take up of improved boilers by industry. A set of demonstration projects in industry showing best practice in combustion would be more useful, e.g. improved boiler controls, heat recovery, condensate return, and regenerative burners on furnaces.

### **7.13.4 Additional Barrier Removal Activities**

Some of the project activities were reported to be difficult to implement and are considered not practical due to certain factors. It is recommended that pertinent activities that will remove the barriers to the implementation of these difficult activities be identified and carried out.

## **8. PROJECT RESULTS**

### **8.1 Impacts of Project**

Impacts in this context means the contribution over and above the Immediate Objectives of each Component, to the overall development objective of the project, i.e. to improve energy efficiency in Malaysia's industrial sector, through:

- Removing barriers to efficient industrial energy use
- Creating a sustainable institutional capacity to provide energy efficiency sources
- Creating a conducive policy, planning and research framework.

The PD specifies numerical targets for the project impact. It envisages that the energy consumption in the industrial sector during the year 2004 would be 10% lower when compared to the energy consumption based on a "business as usual" scenario. This target is ambitious. Energy consumption in industry in Malaysia is around 10 mtoe/yr; a 10% reduction would require saving 1 mtoe/yr, worth about USD 150 million/yr. Assuming on average a three-year payback for the investment this would require an expenditure of some USD 450 million. It seems an unrealistic expectation after a 4-year program of around USD 20 million.

In reality the impact of the project on energy demand in that year will be virtually imperceptible. It is in the nature of energy efficiency policy that it has a long lead-time to take effect and needs sustained policy effort. The project has created the basic skills and awareness to take energy efficiency forward if the political will exists.

#### **8.1.1 Removing barriers**

Several interviewees advised the evaluator that the main barrier to improved energy use in Malaysia was the subsidised energy prices. Evidently there is little that the project can do directly to remove that barrier. The project has made a first step to understand the factors affecting decision-making concerning energy efficiency by industrial energy users and can potentially help to design financial instruments to counter the effect of energy subsidies.

The project has had little impact in providing information to energy users as yet. It needs urgently and greatly to enhance information dissemination through the web-site, because this vehicle will be vital when UNDP funding for the Newsletter ceases. The Newsletter itself needs dramatic improvement.

#### **8.1.2 Creating a sustainable capacity**

In this respect, the project has had a significant impact. It has created much capacity in several institutions. It has helped build capacity in important areas like benchmarking, best practice, audits, standards, design of demonstration programs and financial support instruments.

All this capacity is intrinsically sustainable. Whether it is sustained depends on whether the public policy environment provides a reason for it to be sustained and whether the pertinent institutions take the appropriate steps. The latter condition appears likely to hold at least in the short-term. In particular PTM have taken steps to ensure the sustainability of the skills. Whether the second condition will hold is beyond the powers of the evaluator to judge.

### **8.1.3 Creating a conducive policy, planning and research framework.**

The project has strengthened the policy framework in several respects. It has contributed to the possibilities of defining good practice either through standards, labelling or best practice programs. It has raised the perception of the possibilities of energy efficiency in industry and therefore contributed to a more realistic understanding of the issues. Potentially it has generated powerful insights into the technical and economic potential for energy efficiency and the means available to government to realise that potential.

## **8.2 Factors Affecting Implementation of the Project**

### **8.2.1 Negative factors**

As noted in *Section 5.1*, some areas of the project document were excessively optimistic, so the Activities were not always practical. This applies especially to Components 3, 5 and 7. This caused delays, although ways of working around the problems were found in most cases.

It was found more difficult than envisaged to engage the cooperation of industry. Previous audit programs through technical cooperation had not been seen as successful and this added to the usual caution of industry in allowing access to data and information.

Banks were in the main not interested in special financial instruments for energy efficiency; their main consideration in making moderate loans is the creditworthiness and repayment record of the borrower rather than the application of funds.

The inexperience of the project team was also a factor in the slow start.

The cumbersome tendering procedure delayed the appointment of the international consultants and could be a major problem in the closing stages if it is not improved.

Misunderstandings between the MIEEIP and the international consultants have affected the timely delivery of Outputs in a few cases.

### **8.2.2 Positive factors**

Despite the problematic nature of some Outputs, the project document describes a coherent and generally sound body of work and specifies in most cases a good process for implementation.

The concurrent establishment of PTM by the GoM has provided the project with a credible institutional home and the means of sustainability. This was a pre-condition of the funding.

The availability of substantial funding from the MESITA has significantly increased the potential impact.

The coherence of the project objectives with national planning objectives has been a major contributory factor to the cooperation and support of government agencies such as the EPU, MECM, the Energy Commission and NPC.

The private sector background of the CTA has helped overcome the caution of industry and has been a major factor in ensuring that audits met the needs of industry and were communicated effectively to senior management.

Good management practice through regular meetings has kept stakeholders engaged and maintained their support.

### **8.3 Leverage**

The project should achieve leverage of funds through the demonstration projects as industry is expected to contribute 50% funding of projects.

Potentially of much significance is the possibility that the project could provide a supporting case for large financial instruments funded by the GoM in the 9<sup>th</sup> Plan. In *Section 6.2.9* it is proposed that the MIEEIP should develop a policy paper examining the consequences of various levels of funding.

### **8.4 Sustainability**

We differentiate here between the sustainability of project impacts and the sustainability of public policy.

#### **8.4.1 Institutional Capacity**

The PTM has thought effectively about how to preserve the skills and sustain the effort after the project. One of the difficulties with the present arrangements is the relative youth of the team and the absence of middle managers to provide an intellectual focus for the work and to demonstrate credibility to stakeholders.

PTM has recognised this and proposed a restructuring of the organisation that has been approved by the Board. The new structure would comprise three new Divisions including an Energy Industry Development Division and a Policy Analysis and Research Management Division. In each of these Divisions would be three research groups each headed by an Assistant Director. This structure would require 4 new positions at Assistant Director level. The funding of these posts has not yet been approved by the MECM, but the PTM is at present functioning within the new structure.

At the conclusion of the project the MIEEIP work will be absorbed within several of the research teams. PTM has requested funding from MECM for 2004/2005 to continue the activities of the MIEEIP under the title *Industrial Energy Efficiency Project*.

The evaluator concurs fully with the restructuring plan, which is sound and demonstrates the importance given by PTM to the MIEEIP. There is still an issue of transition from one structure to the next and hand-over of project achievements. From a simple managerial point of view it might be desirable to begin to insert the project as soon as possible into the new structure, but this would greatly affect delivery from the closing stages of the project. There is a great deal to be done in the remaining year and in the view of the evaluator it would be unwise to disturb the present managerial structure; changes will prevent timely delivery. The evaluator recommends leaving the present project management structure untouched until the end of the project, but the newly appointed Assistant Directors should attend Project Review Meetings and receive project documentation in the areas that are relevant to them. This should assure good delivery from the project and a good hand-over of skills and capacity.

It is recommended that PTM explore the possibilities of generating revenue from audit activities after the project is completed. Revenue could be raised from modest rental charges for the equipment, from consultancy fees for use of its staff and from training. It is recommended that PTM

seek to register some of the MIEEIP training course for company Human Resource funding.

#### **8.4.2 Public policy**

The sustainability of public policy in the area of energy efficiency goes somewhat beyond the scope of this evaluation, but it is worth repeating that the project des have the information and the skills to make a major contribution to the determination of policy in this area for the 9<sup>th</sup> Plan. The evaluator recommends that MIEEIP should seize this chance. The main areas would be in the evaluation of financial instruments and in the contents of the Energy Efficiency Act especially as concerns the need for audits and the functions of Energy Managers.

## **9. RECOMMENDATIONS**

Recommendations made throughout the text are collected here, along with a reference to the *Section* in which the recommendation was made.

### **9.1 Extension**

In principal the project expires in July 2003. It has not yet been extended. It is recommended that the project be extended for one year as much remains to be done and there are sufficient funds to cover the costs, (4.1).

No general extension beyond this period is recommended as most Components can complete their work in the period, (7.3.1)

It is recommended that the Component 7 be reviewed and then extended for 2 years using funds that are likely to remain when the project ends. The evaluator recommends that some consideration be given to converting the approach to funding the incremental costs of efficient equipment, (7.13.2).

If MESITA agrees then the funds remaining from Component 3 could be redirected to fund another round of demonstration projects in parallel with a monitoring activity funded from remaining GEF funds. These demonstration projects might focus on boiler best practice (7.13.3).

### **9.2 Sustainability**

PTM have designed a convincing management structure to absorb the project when it closes and have proposed to continue work with GoM funding. The evaluator concurs with the recommendations of PTM that are well thought through, (8.4.1).

The present project management structure should be left untouched until the end of the project to maximise delivery of Outputs, but the newly appointed Assistant Directors should attend Project Review Meetings and receive project documentation in the areas that are relevant to them, (8.4.1).

It is recommended that PTM explore the possibilities of generating revenue from audit activities after the project is completed. Revenue could be raised from modest rental charges for the equipment, from consultancy fees for use of its staff and from training. It is recommended that PTM seek to register some of the MIEEIP training course for company Human Resource funding. These charges should not be such as to discourage potential users, (8.4.1).

### **9.3 Project Management**

It is recommended that the tendering process be reviewed. It may be adequate that the Tender Committee approve proposals of the Tender Evaluation Committee by circulation, assent being assumed if no reply is received within two weeks. In the case of dissent then the Committee can be convened, (7.3).

It is recommended that the MIEEIP seek to engage more local consultants on appropriate tasks, (7.7).

## **9.4 Content**

Component 1 should continue to work with NPC and build upon that relationship, (6.1.1).

It is important to know what the return would be on the investment in labelling assuming a plausible penetration of efficient motors into applications where they are justified. Such a paper is crucial to any proposal for labelling and testing. The Component 3 should produce a cost-benefit analysis of the proposal, (6.1.3).

The evaluator concurs that there is no merit in pursuing a labelling program for thermal industrial equipment and agrees that a best-practice program is appropriate. The team for Component 3 should consider cooperation with NPC for this, (6.1.3).

The Newsletter should become the responsibility of the Editorial and Communications Manager. Transfer of this responsibility will require recruitment of an assistant for the work. The web-site needs to be provided with high quality material as soon as possible. Publication on the web will be very important when UNDP funds are not available for other forms of dissemination, (6.1.4).

Component 5 should focus now on business planning aspects of ESCOs and the transfer of skills to PTM, (6.1.5).

Based on its experiences from Components 2, 6 and 8, the MIEEIP has the information and the skills to make a major contribution to the determination of policy for energy efficiency in the 9<sup>th</sup> Plan. MIEEIP should seize this chance. The main areas would be in the evaluation of financial instruments and in the contents of the Energy Efficiency Act especially as concerns the need for audits and the functions of Energy Managers, (8.4.2).

## 10. LESSONS LEARNT

This section proposes some lessons of general application.

Impact on policy requires a broad coherence with development aims of government. Many political actors may need to be mobilised to achieve policy relevant results. The project has been successful in this respect and has the potential to be even more so. It is likely that this is a consequence of the close cooperation between UNDP and the GoM in the original preparation of the PD that has ensured coherence with development aims at a high level.

The pre-existence of an institutional focus for the project in PTM has been an aid to legitimacy and a vehicle of sustainability. It may be that the creation of such an agency should be considered as a pre-condition in other such projects.

Involvement of the public sector requires sensitivity to their needs and constraints. The choice of a private sector manager as CTA has greatly helped mobilise the private sector and overcome their caution. It has also contributed to outputs for industry (notably audits) that are effective and convincing.

The use of international consultants is a key issue in technical cooperation. The general approach of the UNDP in putting responsibility on the executing agency to deliver outputs with the international consultants as a resource is undoubtedly correct, but as most project managers start without the experience of managing such large resources of consulting skills; they face a steep learning curve. UNDP may wish to consider providing training courses or a manual concerning the use of consultants.

Promotion of energy efficiency is a long-term public policy. In Europe it was begun in the early seventies and continues still. It is an important aspect of the work of GEF because energy efficiency is a cost-effective manner of reducing emissions of greenhouse gases. There is a tendency in the project document to exaggerate the potential of certain instruments, especially ESCOs and financial incentives. In part this stems from the long lead times of GEF projects. When the project document was written the particular conditions prevailing in the US at the time were favourable to these instruments. They are not so easily transferred. As noted earlier the sustainability of the work and the eventual impact depend much on whether the GoM decides to put substantial resources behind a public campaign; if it does then the outputs from the project will be important. This analysis suggests that if similar project are implemented in future they should be characterised, as pilot projects and capacity building projects with the expectation that substantial government funding will subsequently be available.

## **Annex 1: List of Documents Reviewed**

## **List of Documents Reviewed and Presentations Attended**

### ***Project Management Documents***

- Malaysian Industrial Energy Efficiency Improvement Project Document, UNDP, July 1999
- Malaysian Industrial Energy Efficiency Improvement Project, UNDP/GEF Project Implementation Report (PIR), 17<sup>th</sup> August 2001
- Malaysian Industrial Energy Efficiency Improvement Project, UNDP Annual Project Report, undated, presumably summer 2001
- Malaysian Industrial Energy Efficiency Improvement Project, UNDP Annual Project Report (APR) and UNDP/GEF Project Implementation Report (PIR), 25<sup>th</sup> May 2002
- Malaysian Industrial Energy Efficiency Improvement Project Mid-Term Review (Summary of performance produced for mid-term review), April 2003
- Malaysian Industrial Energy Efficiency Improvement Project Inception Report, Techno-Economists and Dansk Energi, September 2000
- Malaysian Industrial Energy Efficiency Improvement Project Inception Report Amendment, ZET-Fichtner-Econoler-CESI, February 2002
- Malaysian Industrial Energy Efficiency Improvement Project Document, UNDP, July 1999
- Minutes of National Steering Committee Meeting 1, 17<sup>th</sup> December 1998
- Minutes of National Steering Committee Meeting 2, 27<sup>th</sup> March 2000
- Minutes of National Steering Committee Meeting 3, 1 March 2001
- Minutes of National Steering Committee Meeting 4, 15<sup>th</sup> October 2001
- Minutes of National Steering Committee Meeting 5, 21<sup>st</sup> February 2002
- Minutes of National Steering Committee Meeting 6, 10<sup>th</sup> September 2002
- Consultancy Services Agreement for MIEEIP between PTM and ZET Consortium, July 2000
- Consultancy Services Agreement for MIEEIP between PTM and Techno Economist Consortium, July 2000
- Files on Demonstration Project Implementation of Thermo Oil Heater at Heavabond Sdn Bhd, various dates
- Component 8: Project Monitoring Files, various dates

### ***Tender Documents and Related Materials***

Tender Evaluation Report, Tender Evaluation Committee, May 2000

### ***Project Outputs***

#### *Component 1*

Workshop on Energy Use Bench Marking Program for the Rubber Sector, (Workshop Papers and evaluations returns), September 2002

Bench Marking Workshop - Bench Marking an Important tool for Energy Efficiency, (Workshop Papers and evaluations returns), June 2001

#### *Component 2*

Malaysian Timber Industry Board, Training Course in Energy Management, Papers, March 2001

Energy Audit: Sinmah Food Industries (Food), draft, undated

Energy Audit: JEBCO (Rubber), draft, undated

Energy Audit: Tritex (Pulp and Paper), draft, undated

Energy Audit: Sunway Ceramo (Ceramics), draft, undated

Energy Audit: Koko Malaysia Sdn. Bhd. (Food), May 2001

Energy Audit: Sanitech Johnson Suisse (Ceramics), Nov 2001

Energy Audit: Phoenix Rubber Products, (Rubber), June 2001

Energy Audit: Fung Keong Rubber Manufacturing, (Rubber), March 2003

Energy Audit: Malaysia Newsprint Industrial Paper, (Pulp and Paper), April 2002

Input Study for EPU, Jan 2003

#### *Component 3*

Market Survey Report, August 2001

Electric Motor Market Survey Report, May 2002

Energy Rating Program, Output 3.2, Policy Paper, July 2002

Energy Efficiency Plan 2003 for Sub-Work Group of Motors, undated

Inception Report: Boilers for Industrial Use in Malaysia, Danish Technological Institute, undated

#### *Component 4*

Various Issues of the Newsletter

Evaluation form and summary return of evaluation for Newsletter

*Component 5*

ESCO Business Development Workshop (papers), Feb 2001

ESCOs Project Development Procedures, Training Manual, Aug 2001

Mini Workshop on ESCO Model Business Plan and Strategy, November 2002

Dialogue Sessions with Malaysian ESCOs, Seminar papers, November 2002

Engineering Manual for ESCOs in Malaysia, Feb 2003

Workshop on Industrial Energy Performance Contracting, March 2003

*Component 6*

Literature Review of Energy Saving Technologies, undated, ongoing

Selection of Qualifiers for Demonstration Project Management Scheme, undated

Master Energy Service Agreement between Mensilin Holding Sdn Bhd and Heavabond Sdn Bhd, April 2003

*Component 7*

Local Energy Efficient Equipment Support Program, Market Survey Report, July 2002

ToR Energy Efficiency Design Expert, April 2003

*Component 8*

Draft Work Plan Report, Component 8, July 2001

Report and Papers from Financial Institutions Forum, February 2002

***Presentations Attended***

14<sup>th</sup> Project Review Meeting, MIEEP Project Team, 22<sup>nd</sup> April 2003

e-Benchmark for Industrial Energy Efficiency Community, National Productivity Corporation, 24<sup>th</sup> April 2003

**Web-sites visited**

PTM ([www.ptm.org.my](http://www.ptm.org.my))

MIEEIP ([www.ptm.org.my/mieeip](http://www.ptm.org.my/mieeip))

***Miscellaneous***

Electrical Energy Efficiency, Copper Development Centre, Department of Electricity and Gas Supply, Jan 1997

Third Outline Perspective Plan, EPU, 2001-2010

8<sup>th</sup> Malaysia Development Plan, EPU, April 2001

Productivity Report, National Productivity Corporation, 2001

Annual Report, 2001, National Productivity Corporation

Benchmarking Study Approach, the NPC Model, National Productivity Corporation, undated

Energy Business Fund, Draft Report, Dansk Energi Management for DANCED, November 2000

## **Annex 2: Persons Consulted**

## **PERSONS CONSULTED**

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