

**UNITED NATIONS DEVELOPMENT PROGRAMME**

**Biomass-Based Power Generation and Cogeneration in the Palm Oil  
Industry MAL/01/G31  
(The BioGen Project)**

**MID-TERM EVALUATION**

**by**

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## LIST OF ACRONYMS

APR	Annual Project Report
BioGen	Biomass Power Generation and Cogeneration Project
BPIMB	Bank Pembangunan & Infrastruktur Malaysia Berhad
CEO	Chief Executive Officer
CETDEM	Centre for Environment, Technology and Development Malaysia
CETREE	Centre for Education and Training in Renewable and Energy Efficiency
CHP	Combined Heat and Power
CO <sub>2</sub>	Carbon Dioxide
COGEN	Cogeneration
CPO	Crude Palm Oil
CTA	Chief Technical Advisor
DANCED	Danish Cooperation for Environment and Development
DOE	Department of Environment
DSM	Demand Side Management
EFB	Empty Fruit Bunches
EC	Energy Commission
EPC	Engineering and Procurement Contractor
EPU	Economic Planning Unit
ESCO	Energy Service Company
ESI	Energy Services Industry
FMM	Federation of Malaysian Manufactures
FRIM	Forest Research Institute Malaysia
FSM	Full Scale Model
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Green House Gases
GoM	Government of Malaysia
GW; GWh	Gigawatt; Gigawatt-hour
IPP	Independent Power Producer
JBEG	Department of Electricity and Gas Supply
Ktoe	KiloTon of Oil Equivalent
KW	Kilowatt
LFA	Logical Framework Analysis
LPAC	Local Project Appraisal Committee
MECM	Ministry of Energy, Communications and Multimedia
MEWC	Ministry of Energy, Water and Communications
MEOT	Minimum Energy off Take
MESITA	Malaysian Electricity Supply Industry Trust Account
MITI	Ministry of International Trade and Industry
MoF	Ministry of Finance
MOSTE	Ministry of Science, Technology and Environment
MOU	Memorandum of Understanding
MPI	Ministry of Primary Industry
MPIC	Ministry of Plantation Industry and Commodities

MPOA	Malaysian Palm Oil Association
MPOB	Malaysian Palm Oil Board
MSW	Municipal Solid Wastes
MT	Metric Ton
MTIB	Malaysian Timber Industry Board
MW; MWh	Megawatt; Megawatt-hour
NEDO	New Energy and Industrial Technology Development Organization
NPD	National Project Director
NSC	National Steering Committee
PDF-A	Project Development Facility phase A
PIR	Project Implementation Review
PM	Project Manager
PMC	Project Monitoring Committee
PMT	Project Management Team
POME	Palm Oil Mill Effluent
ProDoc	Project Document
PPA	Power Purchase Agreement
PTM	Pusat Tenaga Malaysia or the Malaysia Energy Centre
RE	Renewable Energy
REBF	Renewable Energy Business Fund
RPR	Residue to Product Ratio
SCORE	Special Committee on Renewable Energy
SEB	Sabah Electricity Board
SESCO	Sarawak Electricity Corporation
SIRIM	SIRIM Berhad
SPP	Small Power Producers
SMIDEC	Small and Medium Industry Development Corporation
SREP	Small Renewable Power Programme
TNB	Tenaga Nasional Berhad
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Changes
UKM	Universiti Kebangsaan Malaysia
UNITEN	Universiti Tenaga Nasional
UPM	Universiti Putra Malaysia
USM	Universiti Sains Malaysia
UTM	Universiti Teknologi Malaysia

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## EXECUTIVE SUMMARY

The Biomass-Based Power Generation and Cogeneration in the Palm Oil Industry Project (BioGen Project) is a 5-year project funded by the Global Environment Facility (GEF) through the United Nations Development Program UNDP. The main stakeholders in this project are the Government of Malaysia (GoM), via the main agencies involved in the implementation of this project - MEWC, PTM, MPOB and BI, as well as the private sector. This project aims to promote the use of biomass wastes from the palm oil industry in Malaysia for power generation, resulting in the long-term reduction of the growth rate of GHG emissions.

The BioGen Project is implemented in two phases – Phase 1 over two years and Phase 2 over three years. Phase 1 (Jan 2003 - Dec 2004) has encountered delays in achieving the targeted outcomes and outputs of the five project components and their respective activities and sub-activities. As a result, an extension of one year, until December 31 2005 has been requested by the BioGen Project Team.

A Mid Term Evaluation (MTE) of the BioGen Project was undertaken by a two-member team from 2 – 12 August 2004. It represents an **independent** assessment of the status, relevance and performance of this project measured against the expectations of the *Project Document*. As specified in the ToR, the review undertook both a component-by-component analysis, as well as an overall project analysis to arrive at its conclusions. However, given the complex issues that came to the fore and the limited time, the evaluation focused on what were identified to be the more important issues.

Findings are discussed from the financial, technical and management perspectives. In general, activities in most of the components and sub-components were found to be delayed by about six months to one year with respect to accomplishing planned outputs. The longest delay (about a year) was in the selection of the demonstration site of the FSM. This is claimed to have directly or indirectly resulted in delays in activities in other components. Furthermore, project management issues in the BioGen were found to have negatively affected the progress of this project.

Main findings from the financial perspective indicate that as of May 31, 2004, the project has only utilized 6.53% (US\$ 261,130) of the total GEF project funds although it has completed 75% of the project timeline for Phase 1. The low fund utilization was found to be due to the fact that Component 4, which accounts for almost 65 % of the total project budget had not yet begun disbursement. The main reason for this was the delay in the selection of the demonstration site of the FSM.

From the technical perspective, the MTE found the design of the project to be sound.

The MTE also found that many of the technical problems were attributable to issues in project management, although the delay in the implementation of the FSM was also cited as a critical factor resulting in the delay of activities in other components. For example, the biomass policy formulation was delayed because of the need for actual

data in policy research and impact simulation. This delay in turn has affected the related consultative process and advocacy for the promotion of the FSM demonstration that is critical to the acceptance of the BioGen project goals and activities by the beneficiaries.

The MTE found that the significance of the BioGen Project was often not fully understood by the stakeholders as it was considered to be only an EFB-firing project, although the project's focus includes *POME-derived biogas in combination* with EFB-fired power generation. The biomass-based solid fuel burning is an established technology but the combination is not. Somehow this feature of the BioGen Project seems not to have been sufficiently highlighted to stimulate interest and support among stakeholders and industry players. A development that was noted in the MTE but was not taken into account in the design of this project, is the claim that there is currently a limited supply of POME, given its new competing uses.

Reporting of progress by the BioGen Project team was found to be inaccurate as it was based on preparatory *activities completed* rather than actual delivery of outputs. This led to a significant discrepancy between what was reported in BioGen Progress Reports and the findings of this MTE on the extent of project implementation.

Issues related to the management of this project figure significantly in this report. The following are the main findings. The CTA, as head of the BioGen Project team is both a technical advisor, as well as the project manager. However, the MTE found that the CTA was not seen as an effective leader in providing the necessary guidance and support. The CTA's management style was found to be "ineffective and disruptive to work on the project". As a result, the BioGen team's morale was found to be low and staff turnover high. This problem was compounded by the fact that there were inexperienced contractual staff and fresh university graduates on the team who needed substantial support and guidance to contribute effectively to the project. When this was not forthcoming from the CTA, it led to further dissatisfaction among BioGen team members.

The MEWC as the executing agency has overall responsibility for the implementation of the BioGen project. PTM, as the implementing agency, is responsible for monitoring and ensuring adherence to the work plan of the project. The MTE found a lack of ownership of this project by these agencies, as well as a lack of effective and meaningful communication between these agencies and other main stakeholders. There was also evidence that a close working relationship between the NPD and the CTA did not exist. As a result, many issues related to the BioGen Project, particularly those related to personnel were not effectively handled. Nevertheless, during the MTE the new team at MEWC expressed commitment to take ownership of the BioGen Project to ensure its success.

As in the case of the executing and implementing agencies, there is lack of effective cooperation and support from primary stakeholders. For example, MPOB is clearly an important agency, which needs to play a central role.

UNDP on the other hand, was found to have evolved into a new role far exceeding its responsibility to support and monitor progress towards achieving results. As a result, new expectations and perceptions of UNDP's role in this project have been formed. For example, members of the BioGen project team expect UNDP to play a more active role in resolving some of their internal problems.

Clearly, the findings indicate that there are many inter-related and complex issues that have led to the delays encountered in this project. Based on these findings, the MTE team extends the following main recommendations for consideration and remedial action.

The BioGen project should address the management issues with respect to the CTA's suitability as project manager. In the interim, it is recommended that a Transitory BioGen Project Management Team be put in place comprising of the NPD and his counterparts in MPOB and Bank Industri and a full-time the PTM-designated Program Manager. If the Transitory team works well, then it can continue to function for the remaining duration of the project, including the possible extension.

Speedy implementation and completion of the FSM demonstration is deemed important. It is recommended that PTM/MPOB/ MEWC closely coordinate the final selection of the host company and sufficient planning and comprehensive study be undertaken to ensure that the objectives and desired outputs of the demonstration are met.

Given the continued commitment and interest on the part of MPOB to take a more active role in Components 4 and 5, it is recommended that these components be physically placed with MPOB. Components 1, 2 & 3 may continue to function from the BioGen premises in PTM.

It is recommended that the MEWC with the assistance of the PTM and MPOB and MPIC take the lead in trying to resolve the pending issues of EFB supply and pricing, electricity tariff, and terms and conditions of the demonstration as a full scale commercial model. In view of the general sceptical perception of the BioGen Project by the beneficiaries and stakeholders, it is important to devise strategies to enhance awareness and appreciation of the BioGen Project and highlight expected benefits.

Institutional coordination and effective communication between the MEWC and PTM, as well as with MPOB and BI needs to be improved.

Overall program management and policy synchronization for the utilization of palm oil biomass for energy should be coordinated through PTM/MPOB, with the palm oil industry players taking ownership. It is recommended that the lead for this move be taken by MEWC.

Prior to NSC, pre-NSC and PRC meetings, the BioGen Team should carry out more coordinative work and advanced planning to make sure that the issues and decision points are amply defined and backed-up by relevant information.



In reporting progress, completion of each activity must be reported only if quantifiable results are evident, otherwise it should be reported as incomplete.

Finally, it is recommended that the overall ownership of the BioGen project and continuing biomass utilization for energy programme become a GoM/MEWC undertaking. With the many developments and initiatives in RE and EE, whether funded or private, MEWC is in the best position to evaluate the importance of this project and identify the need for changes (if any) to ensure that it contributes to the overall national agenda on renewable energy and energy efficiency.

It is expected that over time, the role of the UNDP will revert to that of monitoring and support in the progress towards achieving the results. However, considering the critical needs of the BioGen Project at this time, it is important that UNDP continue to assist in putting the project on track again. However, this should be a transitory arrangement until the combined team effort of MEWC, PTM and MPOB and BI takes effect.



# **Biomass-Based Power Generation and Cogeneration in the Palm Oil Industry MAL/01/G31(The BioGen Project)**

## **MID-TERM EVALUATION**

### **1.0 Introduction**

The Biomass-Based Power Generation and Cogeneration in the Palm Oil Industry Project (referred to as the BioGen Project) is a 5-year project funded by the Global Environment Facility (GEF) through the United Nations Development Programme (UNDP). It was supported to implement strategic, methodological and practical interventions to promote and facilitate the accelerated use of biomass wastes from the palm oil industry in Malaysia for power generation, with a main focus on long-term reduction of the growth rate of GHG emissions. The project was designed under GEF Operational Programme # 6, "Promoting the Adoption of Renewable Energy by Removing Barriers and Reducing Implementation Costs."

The main stakeholders of the BioGen Project are the Government of Malaysia (GoM) represented by the Ministry of Energy Communications and Multimedia (MECM, now referred to as Ministry of Energy, Water and Communications or MEWC), the PTM (Pusat Tenaga Malaysia or the Malaysian Energy Center), the private sector particularly the palm oil industry and the UNDP, as represented by the Malaysia Country Office. The whole project is composed of two phases with Phase 1 (January 1, 2003 – December 31, 2004) currently under implementation. This involves activities that are mostly technical assistance and capacity building in nature, to address most of the information, policy/institutional, and part of the financial and technical barriers to the widespread application of biomass-based power generation, particularly in the palm oil industry of Malaysia.

At the end of Phase 1, once the appropriate systems and instruments, and the enabling environments are in place, Phase 2 will proceed to demonstrate further the commercial viability, i.e., business angle, of grid-connected biomass-based power generation and cogeneration. The next phase of the project will help create the business environment for such initiatives from the palm oil industry, supported by the institutional capacity, policy umbrella, financing facilities, electricity pricing, dispatch of biomass-generated power into the electricity supply system, and development of the industrial support that will be established in the present phase of the BioGen project implementation.

As stated in the BioGen ProDoc, the MEWC is the project's executing agency on behalf of the GoM. The project is implemented through coordinated efforts and close working relationships with the relevant institutions (EC and PTM), MPOB and the palm oil industry and the power utilities (TNB, SESCO and SEB). The PTM, MPOB and Bank Industri jointly implement the project, with PTM serving as the lead agency. Other government ministries involved in energy-related policies and programs, as well as

those involved in the palm oil industry (MoSTE, MITI, MoF, MPI are expected to provide institutional support.

The first phase of the project is now in its 18<sup>th</sup> month of implementation. This Mid-Term Evaluation (MTE) Report is based on data gathered during the mid-term evaluation conducted between August 2-11, 2004

## **2.0 The Mid-Term Evaluation**

### **2.1 Purpose of the Evaluation**

This evaluation is a mid-term evaluation of the BioGen Project, which was conducted at the request of UNDPAs part of the Results-Based Management monitoring and evaluation, a GEF-funded project may be reviewed midway in order to track progress, to enhance implementation or to have mid-course redirection. It represents an independent assessment of the status, relevance and performance of this project measured against the expectations of the ProDoc. As specified in the MTE ToR, the evaluation undertook both a component-by-component analysis, as well as an overall project analysis to arrive at the drawn conclusions.

It is hoped that this report will assist the Government of Malaysia, UNDP Malaysia, UNDP/GEF and other stakeholders to address some of the specific issues identified as causal to the delay in the project implementation. .

### **Specific Objectives**

The specific objectives of this evaluation are to:

1. Assess the effectiveness of project implementation measured against planned inputs and budget allocation
2. Evaluate the effectiveness of project implementation from the management perspective.
3. Identify issues requiring decisions and remedial actions
4. Identify lessons learned and best practices
5. Make recommendations to improve the performance of the project implementation

### **Methodology**

The evaluation methodology included:

- Review of the Project Brief, Project Document and the Inception Report
- Review of other project documents and materials including minutes of meetings of the Project Review Committee, pre-National Steering Committee, National Steering Committee, etc. (see Annex 1 for all documents reviewed)

- Interviews with the Chief Technical Advisor (CTA) and the BioGen project staff. The CTA and all members of the BioGen team were interviewed. Each staff member of each project component was interviewed separately to allow members to speak freely on sensitive issues (if any) with respect to other components, as well as to corroborate issues that were brought up by staff members working on the other project components. Similarly, the CTA was interviewed separately to validate information received from members of the BioGen Project Team.
- Interview with the National Project Director (NPD) for the BioGen Project and other stakeholders (see Annex 2 for all persons interviewed/ consulted)
- Drafting of the evaluation report
- Presentation of preliminary results to MEWC and UNDP

A team of two experts conducted the mid-term evaluation. The lead evaluator was the content expert and a trained evaluator focusing on the management aspects of the project assisted him.

## **2.2 Instruments Used**

In the early stage of the evaluation, it became evident that management issues were critical in the timely delivery of the technical outputs and the overall performance of the Project. Hence, management aspects were given importance in the evaluation. Three Guidelines for Structured Interviews were developed and used in the data gathering process (See Annex 3).

## **2.3 Format of the Evaluation Report**

Section 1.0 of this report introduces the MTE in the context of a development project and its background. In Section 2.0 the evaluation process is explained in terms of how the MTE objectives will be achieved.

In Section 3.0, a brief overview about the BioGen Project, its objectives, the project strategy and interrelationships of the components of the project are discussed. The deliverables are likewise presented in terms of how the component activity inputs/outputs are dependent with each other, such that any delay in a component activity will have the resultant effect in the quality and timeliness of the required outputs. This is the reason why the management of the project activities to centrally focus on this synchronized plan is very crucial to the success of the project. The succeeding sections of the report have presented these findings and analysis.

In Section 4.0, the findings of the evaluation are presented in two parts: the technical and financial aspects; and the management aspects..

The analysis of the results and actual accomplishments is supported by a detailed tabulation in Annex 4 showing the original ProDoc targets vis-à-vis the actual accomplishments as of May 31, 2004 and the remarks on the performance for the project component and activities. In the same section, the BioGen Project organizational structure and communication lines are likewise presented.

After knowing the technical and financial status of project implementation and analysis of findings, the evaluation results focused mostly on the management aspects of the project. The MTE Team found the issues gravitating more on the management and administration of the project, which greatly affected the achievement of the technical plans and goals. In order to put the analysis in perspective, the evaluation findings were discussed with respect to the management aspects of the project *at the micro level*, i.e. within the BioGen team, as well as *at the macro level*, i.e. management, gaining support and setting direction for the overall project.

In Section 5.0, the BioGen Team's request for project extension for one year, from December 31, 2004 to December 31, 2005 is noted. The MTE Team then comments on the request for extension (with the reprogramming as proposed in the new LFA) in the context of the inter-related activities of the various components.

, Section 6.0 presents the conclusions of this MTE and the recommendations which highlight areas where changes are needed to put this project back on track.

General lessons learned are presented in Section 7.0. Annexed documents in Section 8.0, include lists of documents reviewed, persons interviewed, structured interview guidelines and the assessment of progress in project implementation by component and the corresponding activities.

### **3.0 Brief Overview of the BioGen Project**

#### **3.1 Background of the Project**

The 8<sup>th</sup> Malaysia Plan estimates that the demand for electricity in 2005 would be about 13,000MW. MEWC is targeting 650 MW of RE capacity under its Fifth Fuel Policy Strategy, with RE contributing 5% to the electricity supply mix.

Among RE sources of biomass, hydro and solar, the biomass has by far the highest energy potential in Malaysia. Studies have shown that among the various sources of biomass, palm oil residues alone have a capacity to produce as much as 542MW per year using existing technologies alone with no efficiency improvements. This suggests that the Government of Malaysia can easily achieve its 5% RE target out of biomass wastes in the palm oil industry alone.

Converting palm oil residues into electricity is also contributing to the global warming issue through mitigation of green house gas (GHG) emissions. The improvement target is to mitigate GHG emissions from the power sector of Malaysia by 3-4% of equivalent 1,300 ktons by the end of the project. Each year, the palm oil industry generates 14 million tons of waste in the form of empty fruit bunch (EFB), fiber, shells and palm oil mill effluent (POME) from the processing of fresh fruit bunches (FFB). Some of the EFBs are used for fertilizer. However, most are indiscriminately disposed or incinerated during which significant amount of CO<sub>2</sub> is emitted. CO<sub>2</sub> from the EFBs is not an issue since biomass (e.g., EFB) is regarded as zero CO<sub>2</sub> emitter. It is the lost potential for avoiding CO<sub>2</sub> from the combustion of fossil fuels that can be supplanted by EFBs that is the issue. Moreover, the inefficient burning/incineration of EFBs, which produces CO and suspended particulate matters, among others, is also the issue that is addressed (albeit indirectly) by the BioGen Project.

The POME is treated in a retention pond to reduce its biological oxygen demand (BOD) before being discharged later into waterways. However, while in the ponds, the POME produces methane gas or biogas.

Incinerating the solid biomass as fuel has long been employed in the palm oil industry. The BioGen Project, as a development initiative, focuses on the widespread utilization of palm oil industry solid biomass for on-grid power generation as well as the recovery and utilization of POME-derived biogas. This gas can be fired along with processed solid biomass in the steam boilers for power generation or as a fuel in gas-fired diesel generator sets.

Thus, the project aims at promoting conversion of EFB and POME into electricity and selling the generated electricity to the utility grid. During Phase I, among other activities to remove barriers, a demonstration of the design, development, engineering, financing, implementation and commercial operation of a grid-connected EFB-fired power plant (with POME-derived biogas co-firing) will be implemented as a Full Scale Model in a selected palm oil mill. This demonstration will be used to generate operational data and experience for such kind of installation that will also serve as a showcase for those palm oil millers who are interested in adopting the same technology at their mills.

There are two things that are being demonstrated: (1) the design, development, engineering, financing, commercial operation, financial viability and M&E of on-grid biomass-based power generation and cogeneration; and (2) the recovery, utilization as fuel, and viability of the use of POME-derived biogas for power generation. Valuable information and operational experience, particularly the overall viability of the BioGen concept, is hoped to be the results of the FSM operation so that the RE policies that will be formulated will have sufficient basis and the private sector will be convinced about the investment potential.

### **3.2 Chronology of the BioGen Project**

The project design was approved for funding by the GEF on January 22, 2001 through the UNDP. The original work plan, as indicated in the BioGen ProDoc dated July 26, 2002 was prepared based on the Project Planning Matrix (PPM) that was developed through a Logical Framework Analysis (LFA).

Phase 1 of the BioGen Project, launched in July 2002 and officially started January 1, 2003, was originally planned for completion on December 31, 2004.

The Chief Technical Advisor was hired on October 14, 2002. Project staff recruitment was done through the participating agencies. This process included the approval for the engagement of Project Managers and Research Officers by the PTM Board of Directors and the secondment of the other Project Managers from the Bank Industri and Malaysian Palm Oil Board (MPOB) as initiated by their respective managements. The filling up of the organizational structure took longer than planned up to March 2003.

The project's inception report was prepared on February 14, 2003. The National Steering Committee (NSC) adopted it during its first meeting on February 21, 2003. The official start of Year 1 of the two-year first phase of project implementation is January 1, 2003 and was expected to be completed by December 31, 2004.

Since then, the PPM was revised two times. The first one was in February 2003 during the preparation of the Inception Report when the BioGen Project Team saw the need to update the PPM in view of the evolving situation in the country's energy sector. This refers particularly to the non-continuance of the planned electricity market reforms anticipated for the electric power industry at that time. The BioGen Team believed that some of the original assumptions in the ProDoc are deemed no longer valid. The second revision of the PPM was initiated beginning May 2004 during the preparation of the Annual Project Report/Project Implementation Review (APR/PIR) for 2004, which needed to reflect the recent developments in the project activities.

As designed, Phase 1 activities will be carried out during the first two years to cover all the activities in Components Nos. 1, 2 and 3. Component 4 is mainly for the implementation of the demonstration schemes. The first demonstration scheme of the project, which was intended originally to be in the PORIM experimental mill at Labu, will be carried out in Phase 1. The technical capacity building activities in Component No. 5 are also implemented during the project's first phase. Phase 2 will mostly be activities related to the design, engineering and operation of the other demonstration schemes. The rest of the technical extension activities in Component No. 5 will also be implemented in the next phase of the project. It should be emphasized that the Phase 2 activities are not yet approved nor committed by UNDP-GEF. The approval of the second phase of the BioGen Project is subject to resources availability and the successful implementation of Phase 1 activities.

### 3.3 Objectives of the BioGen Project

#### 3.3.1 Specific Objectives

The general objective of the BioGen Project is to develop and exploit the energy potentials of the biomass resources from the palm oil industry in Malaysia through biomass-based power generation and combined heat and power (CHP). The demonstration of the recovery and use of POME-derived biogas for power generation is among the incremental activities of the BioGen Project that the GEF is funding. The demonstration schemes are one of the many barrier removal activities of the BioGen Project.

The BioGen Project objective is expected to be realized through the project activities which include: information services and awareness enhancement on biomass energy technology, policy studies and institutional capacity building in the area of biomass energy technology, financial assistance for biomass energy projects, demonstration schemes for biomass-based power generation and CHP, and biomass energy technology development that are designed to remove barriers affecting the program.

The project will help catalyze the implementation of the biomass-based power generation and cogeneration (with supplemental POME-derived biogas firing) technology in the palm oil industry to help reduce greenhouse gas (GHG) emissions from the power sector by 3-4% or equivalent 1,300 ktons CO<sub>2</sub> by the end of the project.

The long-term objective of the project is to reduce the growth rate of GHG emissions, e.g. CO<sub>2</sub> from fossil-fuel-fired combustion processes and to use the unutilized biomass waste through the acceleration of the growth of biomass-based power generation and combined heat and power (CHP).

#### 3.3.2 Barriers Addressed by BioGen Project

The project addresses the following barriers to biomass-based power generation and cogeneration in Malaysia:

1. There is absence of information on biomass-based grid-connected power generation and combined heat and power (CHP) in the palm oil industry
2. Policies/strategy support mechanisms on biomass, renewable energy electricity and biomass-based power generation are not fully developed
3. There is lack of accessible and favorable financing schemes for biomass-based power generation and CHP projects.





4. Existing financing institutions have been reluctant to support the new technology, due to uncertain financial viability.
5. There are technical barriers in steam and power generation equipment related to the burning of EFB which is considered as a “difficult” fuel that hinder the promotion and implementation of biomass-based power generation projects.

### **3.3.3 Project Strategy**

The BioGen Project strategy involves a number of barrier removal activities/deliverables that include, among others, the implementation of demonstration of schemes that will showcase a Full Scale Model (FSM) of a biomass-based power generation and CHP, in conjunction with a POME-derived biogas system in a selected host palm oil mill in Malaysia. The barrier removal activities are aimed at facilitating commercially viable biomass-based power generation and CHP projects in Malaysia.

While biomass utilization is not new in the country, the combined effect of the various capacity-building activities of the project is expected to spearhead the increased biomass-based power generation in the palm oil mills.

As stated in the ProDoc, the overall project strategy is to establish an institutional focus, responsibility and capacity within the Malaysian government through MEWC, PTM and MPOB to identify barriers in the development and implementation of biomass-based grid connected power generation and CHP specifically in the Malaysian palm oil industry and assist in removing these barriers. Simultaneously, capacity will be established to provide technical and financial assistance to biomass-based power generators, so that as the barriers are removed, the capability is there to promote the biomass-based electricity generation technology.

The strategy is to locate this institutional focus within the Malaysia Energy Centre (PTM) and to sufficiently involve other stakeholders, particularly MPOB, such that the project receives the support of all concerned and develops institutional capacity. A comprehensive strategy will be used for project design and implementation where multiple intervention techniques are implemented in a carefully orchestrated sequence focused on a single program on development of biomass-based power generation for maximum impact. These include policy studies, creation of biomass database, demonstration programs as well as the provision of financial incentives, technology development, training courses and dissemination activities.

Specifically, the overall strategy will be to create an institutional focus and capability to promote the biomass-based power generation through the implementation of two distinct groups of programs:

- Policy, database development and financial assistance programs
- Full scale demonstration and technology development programs

### 3.3.4 Project Deliverables and Interrelationships of the Project Components

The BioGen Project consists of integrated barrier removal activities. This section highlights the interrelationships of the activities of the various project components in terms of input-output linkages and how the delay of one or several activities could affect the other component activities.

#### Component 1: Biomass Information Services and Awareness Enhancement Program.

	Activity	Uses Output(s) from	Provides Output(s) for
1.1	Development of comprehensive biomass energy resource inventory	Surveys and existing resource data	1.7, 2.1, 2.2, 2.3
1.2	Biomass energy technologies database	Surveys and existing technology information	1.3, 1.7
1.3	Biomass energy technology one-stop center	1.1, 1.2, 2.1	2.4, 1.7
1.4	RE consultancy service industry development	5.1, 5.2	1.5,
1.5	Biomass industry rating program	5.4	5.3, 5.5
1.6	Organizing biomass energy technology training courses	1.1, 1.2, 1.3, 1.4, 1.5, 3.1 4.4, 5.3	5.3
1.7	Integrated information dissemination program	1.1, 1.2, 1.3, 1.4, 1.5, 1.6	2.1, 2.2, 2.3, 3.1, 4.4, 5.6

#### Component 2: Biomass Policy Study and Institutional Capacity Building

	Activity	Uses Output(s) from	Provides Output(s) for
2.1	Analysis of biomass policy through review of existing policies and regulations in Malaysia as well as other countries	4.1, 4.3	4.2, 4.5
2.2	Implementation of RE electricity policy study as well as pricing study	4.3, 5.2	4.5
2.3	Development of biomass-based power generation market strategy and Malaysia power market simulation model	1.1, 1.2, 1.7, 4.3	4.3, 4.4
2.4	Monitoring and evaluation of RE electricity policy implementation	2.2, 4.3	4.5

#### Component 3. Biomass Initiatives Financing Assistance Program

	Activity	Uses Output(s) from	Provides Output(s) for
3.1	Organizing training courses on financing RE projects	3.2	1.6
3.2	Development of financing schemes mechanics and financing eligibility criteria	2.1, 2.2, 2.3	1.7, 3.4, 4.1
3.3	Establishment of RE Business Fund (REBF)	2.1, 2.3, 2.4	4.1, 4.2, 4.5
3.4	Assistance services to financing applicants, and	3.2, 3.3	4.2, 4.5
3.5	Evaluation of RE projects financing assistance program	3.2, 3.4	4.5

*Component 4: Biomass-Based Power Generation and CHP Demonstration*

	Activity	Uses Output(s) from	Provides Output(s) for
4.1	Selection of host demonstration companies	3.1, 3.2	4.2
4.2	Arrangements of financial assistance to demonstration sites	3.2, 3.3	4.1
4.3	Evaluation and dissemination of demonstration program	4.1, 4.2	2.1, 2.2, 2.3, 2.4
4.4	Organizing seminars and workshops to promote the awareness of biomass-based power generation demonstration schemes	4.3	1.6, 1.7, 4.5
4.5	Follow-up program design for financially supporting the biomass-energy utilization in other relevant industry sectors	3.4, 4.4, 4.3	4.2

*Component 5: Biomass Energy Technology Development Program.*

	Activity	Uses Output(s) from	Provides Output(s) for
5.1	Assessment of other energy and non-energy uses of palm oil biomass waste	1.1	2.1, 2.3
5.2	Evaluation of energy utilization performance of palm oil mills	Survey and existing data	2.3, 4.1, 4.5
5.3	Upgrading skills for palm oil mill power plant engineers and operators	4.1	1.6
5.4	Assessment of manufacturing capability for steam and power generation equipment	Survey, 1.4, 1.5	1.5
5.5	Evaluation of performance of locally produced steam and power generation equipment	1.2, 1.5	1.5
5.6	Organizing training course of high efficiency	5.1, 5.2, 5.4,	1.5

	equipment designs and production technologies	5.5	
5.7	Arranging financial assistance to local steam and power generation, and	4.5	3.3, 3.4, 3.5, 5.2
5.8	Development of sustainable biomass energy research and development program	5.1, 5.2 5.4	1.4, 1.5

Thus, the BioGen project needs the concerted efforts of the main key stakeholders (the Government of Malaysia through its various agencies and the palm oil industry players) and the targeted beneficiaries for it to be truly successful in achieving its goals. Because of these interrelationships among the project components, the technical outputs will only materialize if the project management is able to synchronize in a timely manner.

#### 4.0 Findings of the Mid-Term Evaluation

In summary, most of the components and subcomponents are delayed by about half to a year in terms of accomplishing planned outputs as indicated in the ProDoc.. The longest delay (about a year) is in the selection of the FSM host company. This delay is affecting r activities in other components. Table 1 summarizes the general status of implementation of each project component.

Further details can be seen in Annex 4. MTE Assessment of Progress in Project Implementation, where the actual accomplishments as of May 31, 2004 are compared with the original expected activity outcomes in the logical framework analysis and annual targets. Analysis on the component level is shown in following sections.

**Table 1. Assessment of Progress in Project Implementation Based in ProDoc**

Component	Key Activities Planned in PRODOC vs. Actual (as of May 31, 2004)	Amounts (in Thousand US Dollars)				
		Budget Allocation as Planned <sup>1</sup>		Actual Expenses (as of May 31, 2004)	Percentage of Actual Expenses	
		Amount	% of Total Project Cost		As % of Budgeted Amount per Component	As % of Total Project Cost
A	B	C	C/A	C/TPC		
1. Biomass Information Services and Awareness Enhancement Program	The delivery of most outputs is delayed for almost a year particularly in biomass energy technology databases, consultancy service industry development and rating scheme for biomass-based company.	282.66	7.06%	13.13	4.64%	0.33%

2. Biomass Policy Study and Institutional Capacity Building	Most outputs targeted in end Year 1 (Dec. 2003), particularly biomass policy analysis, biomass energy utilization workshop series, RE electricity pricing study, and biomass-based power generation market strategy, are all delayed by about a year. The BioGen Team claims that they are dependent on Comp. 4 FSM selection.	171.30	4.28%	8.01	4.68%	0.20%
3. Biomass Initiatives Financing Assistance Program	Expected completion of RE Business Fund establishment, financing scheme mechanisms, financing eligibility criteria, one stop shop within Year 1 did not materialize and are delayed by about a year.	164.20	4.10%	20.90	12.73%	0.52%
4. Biomass-Based Power Generation and CHP Demonstration	Site selection expected since last Dec. 2003 has not been successful. No FSM has been ascertained yet. All other related components are greatly affected	179.01	4.48%	6.95	3.88%	0.17%
5. Biomass Energy Technology Development Program	Most activities are not yet program for Year 1 and claimed as dependent on the FSM demonstration. (Not all are dependent on FSM)	257.48	6.44%	6.74	2.62%	0.17%
UNDP Support Activities	All activities in project administration, mission, monitoring and evaluation were done. However, the UNDP CO exerted extra effort in coordinating and managing the project noting the big project delays.	526.67	13.17%	213.25	40.49%	5.33%
EPC for the FSM		2,418.69	60.47%	0.00	0%	0%
Total Cost, net of EPC		1,581.31		261.13	16.51%	
<b>Total Project Cost (TPC)</b>		4,000.00	100.00%	261.13	6.53%	

#### 4.1 Findings Related to Financial Aspects

In terms of financial monitoring, the total expenditure of the project stood at US\$ 261,130 or about 6.53% of total GEF project funds as of May 31, 2004. The observed low fund utilization is due to the fact that Component 4, which accounts for almost 65 % of the total project budget has not yet begun disbursing for its activities because of the delay in the selection of the demonstration site of the FSM. On the other hand, if the budget for the Engineering and Procurement Contract (EPC), which has a total allocation of US\$ 2,418,690, is netted out, the total reported expenditure of US\$ 261,130 is 16.51% of the Project cost, net of the EPC budget. As of May 31, 2004, the project has gone through 18 months out of 24 months of project duration, or 75% of the project timeline for Phase 1. The low expenditure clearly shows that most of the activities have not been implemented as scheduled.

At the component level, Table 1 presents also the percentages of actual expenses in comparison to the budgeted amount per component. For Component 1, the actual expenses amounted to US\$ 13,130 or 4.64% of budgeted amount. The contract amount for comprehensive biomass resource survey has not been fully paid because of non-submission of the final report. The low budget utilization is also due to rescheduling of the training course on biomass energy technology training courses. Processing of the contract for the integration of the information on biomass energy technology in the PTM website has also been delayed.

Component 2 expenditures amounted to US\$ 8,010 or 4.68% of budgeted amount. The low budget utilization is mainly due to the delay in the tendering of various contracts for the policy studies that were supposed to be conducted for the period. These studies include biomass policy analysis, RE electricity generation policy study, RE electricity pricing study and biomass-based power generation market strategy study. Based on the financial draw down, it appears that significant work on RE policies were not completed which surely affected other components particularly the demonstration through the FSM. The budgeted expenses for experts have not been utilized.

Component 3 expenditures amounted to US\$ 20,900 or 12.73% of budgeted amount. The establishment for the REBF facility has also not progressed significantly compared to fund disbursement. As of this MTE, there were no expenses yet registered for RE project international financing expert for REBF, RE financing scheme international expert, economic feasibility expert, and junior economic feasibility international expert.

Component 4 expenditures amounted to US\$6,950 or about 3.88% of budgeted amount net of the FSM cost. It is in this component that the budget for the FSM and related works amounting to US\$ 2,418,610 (or 60.47% of the Total Project Cost) was budgeted. Financial draw down for this component has been low which reflects clearly the slow accomplishment of targeted outputs.

Component 5 expenditures amounted to US\$ 6,740 or about 2.62% of budgeted amount. Only two items appeared to have expenses, local consultant for R&D expert and palm oil mill electrical engineering local expert. It was reported that most of the activities have been reprogrammed for Year 2.

The UNDP component for administrative support amounted to US\$ 213,720 or 40.5% of budgeted amount of US\$526,670. This expenditure corresponds to the provision of support requirements of the project mainly for the Chief Technical Advisor, administrative support in terms of the services of the finance executive and administrative executive, monitoring and evaluation and other office costs.

The MTE Team however did not have the chance to review in detail the above figures as supplied by the project finance officer.

It is therefore observed, based on the above figures and from the information gathered during the interviews that there was no problem regarding the fund disbursement and related procedures. It is in the actual utilization of funds to bring about the required outputs that need to be hastened.

## **4.2 Findings Related to Technical Aspects**

### **Current Relevance of the Project Objectives**

The general objective of the BioGen Project was to develop and exploit the energy potentials of the biomass resources from the palm oil industry in Malaysia through biomass-based power generation and combined heat and power (CHP).

The biomass-based solid fuel burning has been the usual approach, which tended to be the common understanding on what the BioGen Project is all about. The MTE team noted that the BioGen Project is almost always considered to be an EFB-firing project. The project's focus includes POME-derived biogas in combination with EFB-fired power generation. The POME-derived biogas demonstration is among the incremental activities supported by the GEF.

The BioGen Project design, objectives and applicability to current situation are still relevant and implementation of the remaining activities, particularly the FSM demonstration incorporating POME-derived biogas, will be very useful in systematically and purposely removing most if not all barriers in the utilization of palm oil wastes as energy resource. This observation considers other competing uses of the biomass materials, prevailing market conditions and various government and private initiatives.

The demonstration of biomass-based power generation and CHP incorporating POME-derived biogas through a FSM is perceived by most of the stakeholders as the only key to removing the barriers for the accelerated utilization of palm oil biomass among the more than 340 palm oil-based companies in Malaysia. However, it should be conveyed effectively in the advocacy and promotion efforts of the project that the FSM is just but one among the many interventions that will remove the barriers to widespread utilization of biomass (solid and liquid) resources for power generation and cogeneration.

### **Analysis of Results and Actual Accomplishments Achieved per Component**

#### **Component 1:**

1. The completion of the outputs of Component 1 is generally delayed based on original ProDoc commitments. For Item 1.1, the draft report of the survey of available biomass resources was submitted to include biomass such as palm oil wastes, wood wastes, rice husks, bagasse and municipal solid wastes (MSW) on May 31, 2004. However, the report has not been finalized after three revisions. The reported accomplishment of 99% does not reflect this situation. The Component 1 Program Manager has been requesting that the survey detailed tabulations be appended in the

resource inventory report for better understanding of the survey findings. Outputs of Activities 1.2 (biomass energy technologies database), 1.4 (integrated information dissemination program), and 1.5 (Biomass energy technology information exchange program) are affected by the delay in the completion of Activity 1.1

2. The establishment of the biomass energy technology information exchange program is ongoing as planned with the PTM support under its PTM information Bureau as similarly implied in Item 2 above.

3. The Biomass Energy Rating Program is not yet started. Engagement of the planned international consultant is still being processed as the TOR preparation is also delayed.

#### Component 2:

1. The implementation of the component activities is delayed.. For example, the contract for the work to be done has not yet been tendered because the TOR and evaluation criteria preparation underwent several revisions. The CTA cited the non-continuance of the power market sector plan and the lack of actual data on biomass power generation as the reasons for the delay. In support of this concern, PTM sent a staff to Thailand for research and experience sharing on biomass policy matters in order to gather insights in coming up with biomass-related policy directions that could be applicable to Malaysia.

2. Based on information gathered during the interviews, the biomass policy formulation will be affected by the delay in the implementation of the FSM because of the need to have actual data in policy research and impact simulation. This delay has affected greatly the related consultative process and advocacy for the promotion of the FSM demonstration that is very critical to the acceptance of the BioGen project goals and activities.

The RE Electricity Generation Policy Study is delayed. This was pending since the non-continuance of the new electricity market reforms. A lot of policy coordination and private sector consultation is still needed particularly with the palm oil industry, MEWC and TNB to resolve pending issues.

3. The delay of the Electricity Pricing Study has affected the activities concerning the decision of the palm oil companies to host demonstration of the FSM. The targeted palm oil industry players are looking for a credible basis for the electricity tariff being offered by the TNB. But the credible basis according to people interviewed can only come from the actual data and experience derived from the FSM operation. This kind of “which-comes-first” question needs to be clarified and steps to resolve issues be identified, Otherwise, there will be confusion in the order of doing things. The BioGen Project includes this among the important policy recommendations that it has programmed to undertake. The results of the pricing study done and presented by the



BioGen Team in the 3<sup>rd</sup> NSC Meeting in February 2004 are not acceptable because the recommendations were based on mere assumptions without actual data back up. A policy expert has not also been engaged as planned. The MTE Team did not see the TOR for the policy expert and does not know whether these issues and concerns are included for the study.

4. The Biomass-Based Power Generation Market Strategy formulation has been delayed. Because of the non-continuance of the power industry reforms plan, this task was also held pending. This task is now referred to as New Initiatives in the RE Power Generation.

### Component 3:

1. The establishment of the RE Business Fund (REBF) is also delayed. The claimed status of 90% completed for this activity does not reflect actual delivery of outputs. The status of development of lending guidelines and operating plans for the fund manager which is needed for establishing the REBF appears not yet significant in terms of actually putting the facility in place. The MTE Team was informed nevertheless, that around RM 28.2 million has been committed for the REBF initial funding and that this accomplishment can be credited to BioGen Project's efforts.

2. The development of financing schemes is also delayed. The reported status of 64% completed does not reflect actual delivery of outputs because no draft document is yet submitted.

### Component 4:

1. The Biomass-based Power Generation Demonstration Scheme Promotion has been delayed. Reported accomplishment status of 100% completed does not reflect actual delivery of outputs. The reason given for the delay was that the BioGen Team has already exerted all efforts and has done all the necessary work yet the final acceptance by the host companies is not within the control of the Team. Actual promotion work does not appear significant. The actual work of coordinating with targeted host companies and presentation of the criteria was done by the a junior staff and not the CTA. Similarly, the CTA did not lead nor participate in the follow up one-on-one meetings to further promote the project among the short listed companies.

2. Coordination work of the BioGen Team with MEWC and other entities particularly the palm oil industry players, were observed to be lacking in line with the promotional and directional activities of the BioGen Project. For example, coordination with the Small Renewable Energy Power (SREP) Programme and other government programs appear very limited in terms of promoting the BioGen Project and aligning it to the overall direction of the government's programs.

3. The MTE Team noted that most of the time, interviewees refer to the BioGen Project as being more of an EFB-fired power generation project. Very little attention was given to it as also including the recovery and utilization of POME-derived biogas. In fact, while it was the MPOA Chairman who acknowledged this observation also, he said that

even the POME availability presents another supply concern also. The association is planning a new practice of recycling POME into the plantation to recover POME's nutrient value as soil enrichment agent, similar to the mulching value of EFBs.

4. The set of financing criteria developed by the BioGen Team has not been acceptable to the targeted companies. Preparation work on the selection criteria appears to be incomplete. The private sector particularly the palm oil players were not consulted during the process. Feedback during the interview indicated that the set of criteria developed by the Team is very restrictive and does not respond to the actual needs of the clients. For example, the role of the host company's engineer coming from PTM/BioGen Project is being questioned by plant owners who claim that their engineers have more extensive experience in the palm oil industry and have gained their confidence. Conceptually, the industry players perceive that the CTA as not having the appreciation of the needs and culture of the industry and thus, the set of criteria developed is not responsive to the needs of the industry.

5. The site selection for the FSM has suffered much delay. The BioGen Team identified four (4) possible sites, viz. Guthrie's, FELDA, Tannamaran and Bell Thermal as the short-listed plants during the initial promotional activities of the BioGen Team. As of the MTE review, there is no commitment that has been secured from the targeted host companies.

6. Guthrie's project site, which is a palm oil mill owned by government and leased to Guthrie for research and development could have been an ideal site as originally planned during the project preparatory stage. The BioGen Project preparatory activities in 2001 and 2002 had identified possible host companies, with Guthrie identified and selected as the host of the first FSM. It was only in June 2003 that actual negotiations with Guthrie started. In barely a month after, Guthrie officially rejected to be the fuel supplier for the planned FSM. Interviews with people involved indicated that Guthrie's has lost its interest in the project and cited reasons such as non-viability of the project at internal rate of returns (IRRs) lower than its minimum hurdle rate of 18%. The company management declined because of low viability potential resulting from various factors such as biomass fuel price and electricity tariff.

7. In November 2003, FELDA was invited as the second host company to be the site of the first FSM. Due to the inability of the Team to pass the set of criteria later eliminated FELDA. According to reports and interviews, the company has also indicated lack of interest for the project for similar reasons cited above.

8. The Team is processing the two other plants, Tannamaran and Bell Thermal. The Project Team is actively pursuing the activity through the Component 4 Program Manager.

9. The private sector represented by the 4 short-listed companies and the palm oil industry associations are still wary about the project's credibility, terms and conditions of the project demonstration arrangements, the unresolved issues on

biomass pricing, TNB's unacceptable RE-based electricity rate for biomass at 14-17 sen/kWh tied for 21 years, uncertainty in the off-take and the unfavorable financial returns. The private sector expressed concern that the Government has not exerted enough efforts or appropriate intervention to create a good business environment for the RE-based projects to push through during the introductory phase.

10. In terms of technical capability to implement the FSM demonstration, MPOB through MPIC manifests ability and motivation to carry out the activity. The MTE Team observes, however, that at the current arrangement, Component 4 is already under the responsibility of the MPOB-designated Program Manager.

11. Therefore, the implementation of the Specific Demo Scheme is affected by the delays cited above. Various issues which are experienced or anticipated during the FSM selection, demo implementation and future program implementation need to be resolved, starting with the issue of availability and pricing of the biomass because of competing uses for the material for mulching and other uses. The palm oil plantation owners claim to have a policy not to use EFBs, etc. for fuel and rather use it for preserving the nutrients in the soil, particularly for third-generation plantations that are common in the country. A similar situation was mentioned as a merging issue regarding the plan to also use the PMOE as soil enhancer. On the other hand, the palm oil millers who do not have to return the EFBs to the plantation will only be interested if the EFB will be valued favorably and the electricity tariff be adjusted to at least 21 sen/kWh to be reviewed every five years.

12. The learning value to be derived from the FSM demonstration on biomass-based power generation (with supplementary POME-derived biogas firing) by the time it will be available by end 2006 and the one-year experience gathered from the operations by 2007 are viewed by the private sector as some efforts that might not serve its purpose in encouraging the palm oil industry. They cited the situation that there are companies which are already going ahead with the plan to install plants that will use EFBs for power generation by themselves like TSH in Sabah. The desirability of locating biomass-fired power plants in areas outside peninsular Malaysia was also suggested by people interviewed. These private initiatives are outside the BioGen project. There is reason to believe however, that the BioGen Project in its promotional and advocacy activities has influenced these moves. This clearly shows that while the Project Team has been tracking developments in the industry, it tended to operate very independently. However, the MTE Team was not able to gather further relevant data on the above-mentioned private initiatives, e.g. whether they are being done with or without government support, if these include POME biogas recovery and utilization for grid-connected power generation, etc. The MTE Team just presents this unverified information as a way of describing the above-mentioned prevailing perception of the private companies and some government agencies, which are directly involved, with the implementation of other RE-based programs/projects such as the SREP.

#### Component 5:

1. This component is designed to provide technology support to the palm oil industry has also been affected by the abovementioned situation. The assessment of other energy and non-energy uses of biomass in the palm oil industry is not yet completed. The issue on the possible alternative use of POME as soil enhancer was also mentioned in the interviews and can be another potential problem and should also be included in the study. The delay of this component activity resulted to lack of information on the biomass waste supply which could have been very useful in responding to the issues raised by the palm oil industry on the uncertainty of supply of EFBs and therefore affecting the transfer price of this material for use in power generation..

2. Other similarly affected activities include the evaluation of the present energy utilization performance in all areas of operation in local palm oil mills, skills upgrading for palm oil power plant engineers and operators, assessment of the capabilities of the local steam and power generation equipment manufacturers supplying the palm oil industry in Malaysia, performance evaluation of locally produced steam and power generation equipment and financial assistance to local steam and power generation equipment manufacturers.

3. Most of the outcomes of the activities in this component were reprogrammed for Year 2. Because of the intention that this component will serve in meeting the needed technology support for the Project, the MTE Team noted the effects that this delay would bring on the overall project accomplishment.

## **Summary of Findings on Technical Aspects of the Project**

### **1. Delay in the Actual Start of Project Operation**

It is recognized that much of the project's early work lay in organization and familiarization of the needed tasks and coordination with participating agencies after all the Project staff have been hired by March 2003. Not so much actual accomplishments in terms of target outputs stated in the project indicators were realized since the project was launched and the CTA was hired in October 2002. For instance, it took the BioGen Project Team under the leadership of the CTA four (4) months to prepare and present the Inception Report to the NSC for adoption in February 2003. The project officially started January 1, 2003.

### **2. Delay in the Selection of the FSM**

The demonstration of biomass-based power generation and CHP incorporating POME-derived biogas through a Full Scale Model (FSM) is perceived by most of the stakeholders as the only key to removing the barriers for the accelerated utilization of palm oil biomass among the more than 340 palm oil-based companies in Malaysia. However, it should be conveyed effectively in the advocacy and promotion efforts of the project that the FSM is just but one among the many interventions that will remove the

barriers to widespread utilization of biomass (solid and liquid) resources for power generation and cogeneration. It is not the main focus of the project. The main focus of the project is the removal of all barriers to biomass-based power generation and CHP. When the project was designed, the 5 demo plants were already identified.

Among the possible sites, the Labu mill, which is owned by MPOB and leased to Guthrie Plantations, was identified by MPOB to be the 1<sup>st</sup> FSM. However, Guthrie changed its corporate policy in May 2003 and declared that it wants EFBs to be returned to the plantations as organic fertilizers. Hence, it was not agreeable to provide EFBs for the FSM project. The BioGen Team had no choice but to start looking for a site and the MEWC recommended FELDA sites. However, the BioGen Team did not find any of the sites offered by FELDA suitable.

However, according to people interviewed, Guthrie and FELDA declined because they are not comfortable with the present management of the project under the PTM and the CTA who are considered as not well versed and do not have the understanding and appreciation of the palm oil industry culture and situation. For example, one of the reasons cited refer to terms and conditions for the FSM hosting as being unfavorable and very restrictive and do not care to listen to the actual needs of the industry.

The promotional efforts and manner of approach by the BioGen Team under the CTA's representation were not received positively, indicating a diminishing level of confidence and credibility for the BioGen Project. This situation will affect the project's plans during and after the FSM implementation and the future impacts beyond the BioGen Project. Other project developers are reportedly having their own initiatives of pursuing biomass projects without necessarily passing through a government project like BioGen. Government efforts are perceived to be unhelpful and not responsive to the needs of the palm oil industry with respect to biomass utilization for power. The policy on electricity rates at 14 to 17 sen/kWh tied to a 21-year period without escalation that is being offered by TNB, accordingly, is an example of a policy that BioGen should be able to address if it has to remove barriers to the wider biomass utilization. Apparently, from the private sector's point of view, the government through the responsible agencies, like TNB and MEWC do not manifest initiatives in resolving the tariff issues that could be favorable to RE development. The BioGen Project through its policy studies is still viewed to be an instrument that can facilitate resolution of these issues if there will be effective coordination and communication among the relevant agencies.

### 3. Delay and its Impact on the other Components

Based on original project design and plans, there were five (5) plants that were identified to be the sites for the 5 demonstration schemes. The results of the demonstration and operation of the first FSM should provide vital operational and experiential information that should be used by the other, or practically all, BioGen Project components. From the interviews, it will take at least two and a half (2 ½ ) years for such information to be available. This includes an indefinite number of months

needed to have the first host company to be finally selected and arrangements made. This appears to be an issue pertaining to project design. The MTE Team finds no fault in the design of the project. It was when the schedule of activities and outputs did not materialize that the project implementation is affected greatly. This is why the evaluation has found the problems to be rooted in the project management issues.

According to the Component 4 Team, the optimistic projection for the engagement of Tanamaran or Bell Thermal is September 2004. Assuming this is achieved, selection of the Engineering and Procurement Contractor (EPC) will take eight months to one year. The construction and start of initial operation will take about a year. Depending on the level of data accuracy confidence desired, the extent of data gathering period for the needed performance evaluation and feasibility study parameters may take at least another half year. The MTE Team noted the request of the Project Team to extend the Phase 1 completion date to end of December 2005 and the timeline of Component 4 up to December 2006. In view of this, the said proposed one year extension may not also be enough to complete Phase 1 and may not be able to lead to needed decision-making if the Component 4 FSM will not materialize. Activities that lead to the next phase that is already forthcoming for Phase 2 could also be affected, particularly choosing the other demo sites so that the whole project benefits will be attained.

#### 4. Risk Factors Affecting Expected Project Results

Regarding the risks of not meeting the expected project targets, based on the Project Implementation Review and discussions with CTA and program managers, the high-risk factors that could affect expected project targets include: (a) uncertainty still prevailing in not being able to have the first FSM; (b) selected palm oil manufacturers not willing to give full cooperation for fear of losing competitiveness and (c) the fund for financial assistance may not be sustainable. Among those that are considered having substantial risks include: (a) relevant authority not accepting recommendations from PTM for accreditation of consultants, (b) millers lack of support for the government's Fifth Fuel policy because biomass power generation is not their core business, (c) difficulty in obtaining approval for basic design from regulatory bodies and private palm oil plantation owners, and (d) lack of cooperation and interest of targeted palm oil millers as affected by high investment for energy improvement and biomass utilization.

#### 5. Actions Taken Up or Planned by PTM /BioGen Project to Address the Risks

Among the actions taken up or planned by PTM /BioGen Project to address the identified risks mentioned above include the following:

- For high risk activities:
- For the first FSM, 4 short-listed host sites have already gone through pre-feasibility study and only two mills were found qualified to be the FSM and

are currently undergoing comprehensive feasibility study and energy audit. Based on the results, the respective millers will know whether their plant will be suitable for FSM with fuel supply arrangement. PTM/BioGen Project will help them get financial support, fuels supply agreement and other assistance.

- On the cooperation from selected palm oil manufacturers, PTM/BioGen Project will organize coordination meetings with participating entities and briefing them on the advantages of their participation and encourage and arouse their interest to actively participate.
- For the fund sustainability, the BioGen Team will work closely with the MIEEIP project to ensure the sustainability of the fund created under the MEEIP.
- For substantial risk activities:
  - Regarding PTM's accreditation of consultants, the project will develop the framework of the rating scheme and discuss the proposal with the accrediting body (EC)
  - On the millers support for the government's Fifth Fuel policy, the Project plans to establish a special committee to support the program and conduct seminar to inform and convince the pal oil millers.
  - On the difficulty in obtaining approval for basic design from regulatory bodies and private palm oil plantation owners, the EPC contractor and RE power project consultant will be engaged to deal with this issue together with regulatory bodies.
- For the lack of cooperation and interest of targeted palm oil millers as affected by high investment for energy improvement and biomass utilization, the PTM/BioGen Team is finalizing feasibility studies and is committed to help the host companies get financial support, fuel supply agreement and other forms of assistance to encourage palm oil industry participants.

## 6. Necessary Related Action from Relevant Government Agencies

Among the necessary things that are needed to be present or to be established now in order to ensure meeting the set success indicators are as follows: enforcement of the Environmental Quality Act provision on banning open burning of palm oil industry wastes, government intervention on a form of price control by setting appropriate price ceiling to RE resources, and, adequate support and involvement of local government in

providing wide range of support including promotion and awareness program, guidelines and enforcement, etc.

#### 7. Status of the REBF Establishment

On the status of the REBF establishment and the actions taken/planned to facilitate REBF establishment and operation, the commitment for the REBF has reached RM 28.2 million and is in the process of being formalized in terms of actual funding inputs from participating stakeholders through Memoranda of Agreement (MOA). The actual establishment of the facility is in progress, but the drafting of requisite lending guidelines, choice of fund managers, and criteria for availment of loans and/or grants are still to be accomplished by the financing expert to be hired.

#### 8. Status of the FSM and the Actions Taken/Planned

On the status of the FSM and the actions taken/planned to facilitate the expedited implementation of the FSM demo (with target completion end 2005), the FSM demonstration may well be conducted in either Tannamaran or Bell Thermal after the first two other possible sites were discontinued. The comprehensive studies are being completed for the remaining two sites. A more detailed energy audit is scheduled to be conducted in the chosen site by September 2004.

#### 9. Status of Project Targets (Phase 1 and 2)

On the project targets (Phase 1 and 2), based on the above findings, Phase 1 has not satisfactorily prepared the ground for removing the primary barriers that hinder the widespread application of biomass-based power generation/cogeneration using both biomass and biogas generated from biomass sources and may not be able to do so without adjusting the timetable. Together with other barrier removal activities, the FSM demonstration scheme will be implemented to complete the assessment necessary to proceed to Phase 2. There are pending issues that surfaced during Phase 1 which need to be resolved. The overall situation has changed compared to the situation in the project preparatory stage where the mills have negative incremental costs and attractive IRRs when pure financial analysis was conducted. The private mill owners still perceive that the risks exist in greater scale. The success of Phase 2 will largely depend on the progress done in Phase 1.

#### 10. On Objectives and Design of Phase 2

The objectives and design of Phase 2 that involve the implementation of an innovative loan/grant mechanism in cooperation with the Malaysian banking sector still hold. Because of the site selection difficulty experienced in Phase 1, the 3 additional demonstration sites with bigger capacities required for Phase 2 have to be carefully planned with targeted host companies providing ample time and promotional efforts to develop commitment. It is noted that the earlier plants identified for FSM, which have already declined, are part of the 5 selected plants during the preparatory phase. The



prevailing business and organizational situation will naturally affect the selection of the 3 demonstration sites.

#### 11. Revised PPM

On the revised PPM (indicators, MOVs and assumptions), the BioGen Team has considered the adjustments to be done on the various components and the gaps to be addressed to put back the project on track again. The BioGen Project Team saw the need to update the PPM in view of the evolving situation in the country's energy sector. This refers particularly to the non-continuance of the planned electricity market reforms anticipated for the electric power industry at that time. The latest revision of the PPM as initiated beginning May 2004 has been used in the preparation of the Annual Project Report/Project Implementation Review (APR/PIR) for 2004, which needed to reflect the recent developments in the project activities. During the MTE review, the drafting of the APR/PIR 2004 was in progress. An assessment of project accomplishment was also presented as well as the risk review and provision for mitigating the prevailing risk defined in the project design.

#### 12. Delay of the Electricity Pricing Study

The delay of the Electricity Pricing Study affected somehow the activities concerning the selection of the host palm oil companies for the FSM. The targeted palm oil industry players are looking for a credible basis for the electricity tariff being offered by the TNB. But the credible basis according to people interviewed can only come from the actual data and experience derived from the FSM operation. This kind of which-comes-first question needs to be clarified and steps to resolve issues be identified, otherwise, there will be confusion in the order of doing things. The BioGen Project includes this among the important policy recommendations that it has programmed to undertake. The results of the pricing study done and presented by the BioGen Team in the 3<sup>rd</sup> NSC Meeting in February 2004 are not acceptable because the recommendations were based on mere assumptions without actual data back-up. A policy expert has not also been engaged as planned. The MTE Team did not see the TOR for the policy expert and does not know whether these issues and concerns are included for the study. In this connection, while the TNB agrees to have favorable price at least for the demo sites, it is necessary that the policy study should address the electricity pricing issue comprehensively because the private sector is questioning what will happen to the others who are potentially interested but who will not be favorably supported after the demo projects.

#### 13. Unclear Procedure in Measuring Actual Performance

The project has been using a system of reckoning performance/ accomplishment in terms of percentage completion based on the MS Project software. In principle, the system measures the level of effort and inputs but not necessarily the outputs, thus, it becomes difficult to understand how much work is actually done and what outcomes are so far achieved. For example, the following were indicated in the reports, e.g. the National Steering Committee (NSC) reports and the APR/PIR 2004 Report:

- 100% completion was indicated for the Biomass-based power generation FSM scheme promotion. But since the selection of the FSM has not been completed yet, the FSM scheme promotion cannot be marked as completed already and therefore will be a continuing activity.
- 63% completion for preparation of the selection criteria for FSM. This could be misleading. Does this mean that the Team has long been involved in the selection process without an approved set of criteria?

There are other reported % performance/completion indices indicated in the other components of the BioGen Project reports. Validation of the detailed accomplishment per component or subcomponent will take so much time and evaluation was done on a sampling basis only so it will be finished within the MTE period.

Despite instructions from the NSC that the method of reporting performance is misleading, PTM did not seem to have guided the Project Team in using a more realistic method of reporting the achievement of targets.

#### 14. Undemonstrated Expertise and Networking in the Palm Oil Industry by the CTA

A plausible reason for the communication problems is the very nature of this type of project and the need for the effective technical coordination among the BioGen Project Team that considers the culture of the palm oil industry and its unique requirements. This could affect the networking needed to get activities done as planned. While the Component 4 Program Manager is from the palm oil industry, it will be for the best interest of the project if the CTA was able to network effectively with industry players. One instance observed by the MTE Team that illustrates this situation is when the CTA did not involve himself personally in the promotional work with the short-listed companies to promote the project and win confidence of the possible host companies. The CTA had left the Component 4 team do the promotional work.

##### TNB's RE Tariff Policy

The interview with the TNB confirmed that the TNB tariff policy of purchasing electricity generated from biomass stand at 14 to 17 sen/kWh for a period of 21 years. Considering that TNB may have favorable rates for at least the demo sites, the MTE Team explored the possibility that TNB would consider an improvement on the said tariff scheme due to the clamor of the palm oil industry particularly referring to the 21-year lock-up and to the case in Sabah where the tariff was set for 21 sen/kWh. Accordingly, TNB does not have any plan to upgrade the electricity price and will continue to maintain the said tariff policy.

### **4.3 Findings Related to the BioGen Project Organizational and Management Structure**

The present organizational structure showing the lines of communication between and among the key stakeholders of the BioGen Project is shown in Figure 1.

### **Macro Management Structure**

The project management structure is as follows: The overall direction of the BioGen program rests with the National Steering Committee (NSC) chaired by the Secretary General of MEWC (the Executing Agency). The National Project Director (NPD), who is the Chief Executive Officer of PTM (the Implementing Agency), is the secretary and convenor of the NSC. All major stakeholders who have a direct bearing on the successful implementation of the project are represented. The NSC meets once every six months.

The overall responsibility for delivery of project outputs rests with the NPD. Day-to-day project management is the responsibility of a full-time Chief Technical Advisor (CTA).

The role of UNDP is to effectively monitor all aspects of the project implementation, including the financial management of the project and to support and monitor progress towards achieving the results.

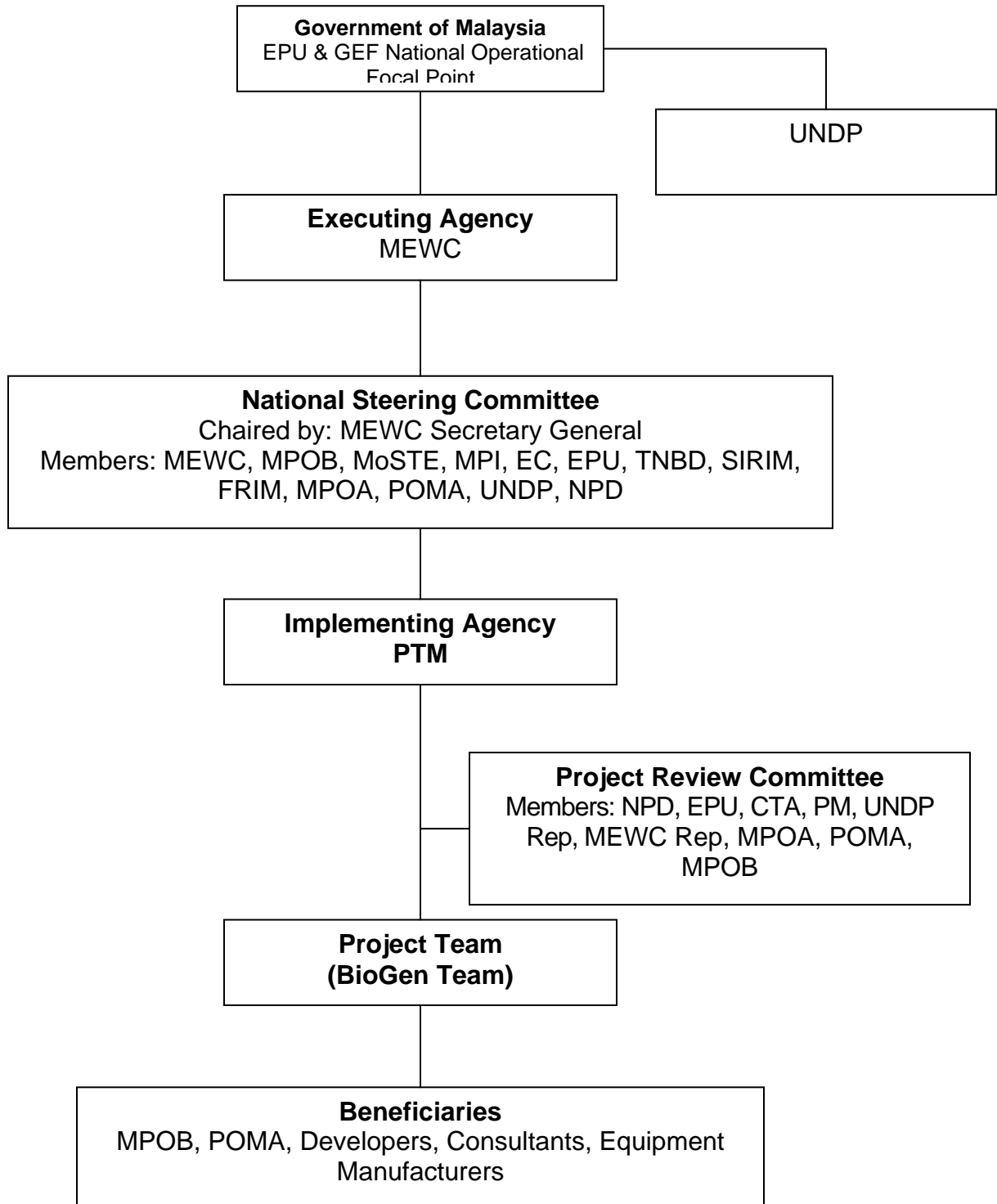
### **Micro Management Structure**

The BioGen Project team is small, headed by the CTA. Under him are five project managers, each in-charge of a project component. Five Research Officers assist these Project Managers.

Though referred to as the Chief Technical Advisor, the ToR for the CTA position clearly states that one of the responsibilities of the CTA is "...coordinating the management and implementation of activities of the project..." (Annex 1F, p. 72, ProDoc).

Hence, clearly the CTA for this BioGen Project is both the overall project manager and the overall technical advisor.

**Fig. 1. BioGen Project Organizational Structure and Lines of Communication**



## 4.4 Findings Related to Management Aspects

A significant part of the evaluation was on the management perspective of this project. Of key interest were the management style of the CTA, the effects of this on the BioGen Team, the morale and dynamics of this team, as well as the influence of external factors influencing the BioGen project in ensuring timely project implementation and technical outputs. This evaluation identified a number of issues related to the management of the project that we believe have negatively affected the progress of the project.

### Macro-Level Management Issues

In the following sub-sections, the main findings of this evaluation are discussed with respect to the overall management of the project.

#### 1. Effective Communication

The main agencies involved in the implementation of the BioGen Project are MEWC, PTM, MPOB and BI. Hence, effective and close communication is crucial among these agencies and the CTA. However, this was found to be lacking.

The NPD admits that he is too busy and only meets with the CTA “as and when required”. Otherwise, he is to be briefed with respect to the Project Review Committee (PRC) Meetings, pre-National Steering Committee (pre-NSC) or National Steering Committee (NSC) meetings. The CTA stated that communication with the NPD was merely to brief him on what to say as the chair of PRC meetings or what to highlight during pre-NSC and NSC meetings.

Discussions with MEWC and MPOB indicate there is hardly any effective or meaningful communication with the CTA or the NPD on the BioGen project. This is clearly seen in the unresolved issue of the Program Managers of Components 4 and 5. It was found that neither the CTA nor the NPD had approached the management of MPOB to discuss this matter. In addition, it is evident that the matter was not highlighted to MEWC in trying to find a way to resolve it.


#### 2. Ownership

The MEWC as the executing agency has overall responsibility for the implementation of the BioGen project. PTM, as the implementing agency, is responsible for monitoring and ensuring adherence to the work plan of the project. Given these responsibilities, the evaluation team expected to find these agencies exhibiting ownership of the project. As in the case of effective and meaningful communication, it was found that evidence of ownership by the executing agency, implementing agency and primary stakeholders is at best, minimal.


- Executing Agency (MEWC)

There was not much evidence of MEWC having played an “overseeing” role in the past. An observation was made that the CTA and PTM work in isolation with no regular feedback mechanism to MEWC.

As a result, MEWC’s involvement in the past has been minimal, limited to membership in PRC and chairing of the NSC. In a related development, the MTE Team had the opportunity to meet with the newly appointed Deputy Secretary General II and the Head of the International and Sustainable Energy Division of MEWC, who were designated effective early August 2004. The new team at MEWC has expressed interest in working to make BioGen a success and looking into policy initiatives that will make biomass-based power generation and co-generation a viable option.

It is worth to specially note that the BioGen Project is a Government of Malaysia project as it was approved based on a proposal made by MEWC and endorsed by National GEF Operational Focal Point (formerly MoSTE, now NRE) and accepted by EPU. However, there is a perception by some at MEWC that this  a UNDP project rather than a Government of Malaysia project. The desk officer consulted claimed that very often the BioGen Project Team prefers to seek advice directly from UNDP on matters related to the project. The staff finds the UNDP responsive to his/her needs for information and direction considering the familiarity and interest of the UNDP regarding the overall strategy, direction and details of the BioGen Project.

- Implementing Agency (PTM)

Though housed in  PTM premises, the BioGen Project was perceived by the NPD (also CEO of PTM) to have been operating “independent of PTM”. Hence the NPD had taken steps to make BioGen “a unit in PTM” and is monitoring it to ensure adherence to the work plan.

From April 2004, he has assigned a Program Manager in one of the PTM divisions (the Energy Industry and Sustainable Development Division) to “assist the CTA and monitor the BioGen Project”. This officer is not a full-time secondment to the Project but attends all the meetings of the BioGen team, including the weekly meetings (where Component Managers present progress reports), as well as assists in some administrative duties of the project such as in-kind contribution issues, staffing, claims, etc. This officer reports on the progress of the BioGen Project to the NPD via his supervisor in PTM. If this was meant to show PTM’s ownership of the BioGen project it has not been quite successful as the CTA sees it as a threat and an intrusion on his role.

The NPD admits that he is busy as CEO of PTM. As such, he is not able to devote time to be very hands-on with this project but just expects to be alerted if there is going to be a problem.

#### b. Stakeholder Cooperation and Support

As in the case of the executing and implementing agencies, it was found there is lack of effective cooperation and support from primary stakeholders. For example, MPOB is clearly an important agency, which needs to play a central role.

It is stated in the *Project Document* (p. 56), "...for more effective implementation ... MPOB be responsible for Components 4 and 5." Yet, it is noted that MPOB had not come forward to help resolve the issue of the Project Managers of Component 4 and 5 who were not fulfilling their full-time secondment to the BioGen project.

However, it is important to note that in the MTE Team's meeting with MPOB, the latter has indicated willingness to take ownership of Components 4 and 5, and run the component activities *at MPOB* (instead of PTM) and to give it priority among its current projects. MPOB has also indicated that they might be able to expedite the identification of the site for the FSM that is so crucial to the progress of the BioGen Project.

### 3. Role of the National Steering Committee

Minutes of the National Steering Committee seem to indicate that this important forum is performing its main function of reviewing and making decisions on overall project activities. However, its effectiveness may have been compromised as indicated by the following findings:

- Though it is supposed to be a high level forum, many representatives who attend are not at the decision-making level
- There is a lack of continuity because different people represent the organization at different meetings
- Held once in 6 months, hence issues are forgotten or need to be explained again because of new membership. Although this has somewhat been addressed with the introduction of pre-NSC meetings, problems noted above still remain.

### 4. Role of UNDP

As per the *Project Document* (p. 57), the role of UNDP is to

“... to monitor effectively the financial activity of the project and to support and monitor progress (of this project) towards achieving results”.

However, it is evident that UNDP has been drawn into providing substantive support for implementation of certain aspects of this project. For example, there is regular communication between UNDP and the BioGen team, almost on a daily basis. UNDP has been drawn into the day-to-day affairs of the BioGen Team. UNDP appears to be fulfilling some of the functions expected of the implementing and executing agencies. From the management perspective, we find that the UNDP has played an important role in carrying out this project thus far. However, this has led UNDP to assume greater responsibilities, beyond what it was originally intended to be (as per the *Project Document*). However, this observation should not be construed in the negative sense, considering UNDP's good intention to put the project on track. It is the responsibility of the UNDP, as the implementing agency on behalf of the GEF for this project, to play a critical role in aspects of adaptive management.

We find the following are important contributing factors for the enhanced role that UNDP has assumed:

- There was a void created by the lack of ownership by the executing and implementing agencies
- Problems with the CTA led members of the BioGen team to seek assistance from the UNDP
- The UNDP was familiar with this area and the project and had to help ensure that it is successfully implemented

As a result, new expectations and perceptions of UNDP's role in this project have been formed. For example, members of the BioGen team expect UNDP to play a more active role in resolving some of their internal problems. MEWC on the other hand, was concerned as to why issues and concerns related to the BioGen Project were not being brought to their attention. The BioGen Team members did not approach MEWC directly because they consider PTM as the entity to which they should report. However, they find it more convenient to approach UNDP personnel because of their historical knowledge and interest of the UNDP personnel in making the project successful.

### **Micro-level Management Issues**

In the following sub-sections are highlighted the main findings of this evaluation with respect to the day-to-day management of the project.

#### 1. Management Style of CTA

The CTA as the head of the BioGen Team is both the technical advisor as well as the project manager. In his capacity, he needs to work closely with all five component



Project Managers and to some extent with the Research Officers. His role is clearly crucial to the successful progress of this project and effective management skills are a necessary part of this position.

The CTA sees his style of management as “situational”, i.e., depending on the situation (his definition). He went on to explain that he sometimes tries to reach decisions by consensus but at other times there is no time for discussion, hence he gives instructions to be followed.

The NPD however describes the CTA’s style of management as “autocratic”. He expressed concern that it was “ineffective and disruptive to work on the project” and went on to elaborate on measures that he had to undertake to diffuse some explosive situations in the BioGen team as a result of this (reported under other sections).

Members of the BioGen team who shared with us their frustrations in working with the CTA expressed similar concerns. Many of them welcomed this mid-term evaluation as an avenue to voice their concerns.

## 2. Lack of Guidance and Leadership

Both the Project Managers and Research Officers claimed that there was no guidance from the CTA to carry out their tasks. According to the CTA, he believes that people learn by doing. Hence, he expects staff members to do tasks first without any guidance or minimal guidance. When they have completed it, he gives feedback on the product and sometimes they need to do it all over again. Staff members claim that there have been occasions where tasks done based on his advice were rejected (for example, the ToR for hiring international consultants) and needed to be worked on for a third time. This has led to unnecessary delays in the project and a sense among staff that he may not be as knowledgeable as he should be. His reluctance to offer guidance is perceived as inability to do so.

The CTA has also not been able to instill a team spirit. The BioGen team is made up of seconded full-time staff from various agencies, as well as contractual staff. He has not been able to establish himself as a leader giving them guidance and support.

## 3. Low Team Morale

A low morale is noted among the BioGen team. There is no obvious team spirit, although a number of team members speak of their passionate interest in this project, whether from the perspective of biomass-based power generation, renewable energy or the palm-oil industry. Some members mentioned their sense of insecurity in their positions and lack of knowledge of what’s happening in the project but were reluctant to ask the CTA.

The CTA has had misunderstandings with a number of them. On one occasion he has threatened to quit if one of the members of his team was not removed. As a result, the

NPD (who is also CEO of PTM) had her transferred to PTM and brought in another person to replace her. The NPD reports that this staff member is performing well in her new position and there was no evidence to substantiate the complaints the CTA had made against her. Another outburst by the CTA has led to the current situation where the Project Managers of Components 4 and 5 who are seconded officers from another agency, no longer come to the BioGen office on a regular basis. Instead they communicate via email with their research officers in working on the sub-activities. Communication between them and the CTA is almost non-existent. This of course is affecting progress in Components 4 and 5.

#### 4. High Turnover of Staff

From the team members, we heard reports of the CTA's indulgence in petty office politics, threatening his staff and using his position to intimidate them. This has purportedly contributed to high *staff turnover*. Since the start of the project, four staff members have left the team, either they have resigned, transferred out of PTM or have been transferred out of the BioGen team but still within PTM.

The NPD too made reference to this when he commented that the CTA "has some problems with people skills and his management style". As a result, the NPD has asked the CTA to focus only on technical matters and to leave administrative and staff matters to a PTM officer assigned to the BioGen Team.

#### 5. Seconded Staff and Their Staff Evaluations

The *Project Document* (p. 56) states, "...for more effective implementation it is proposed that PTM be responsible for Components 1 and 2, BPIMB (as the lead bank) be responsible for Component 3 and MPOB be responsible for Components 4 and 5."

In implementing the project, the BioGen Project will be physically housed in PTM and suitably qualified staff from other agencies was seconded on a full-time basis to the BioGen team. However, it was found that these seconded officers were also expected to perform tasks at their home institutions. Since staff evaluations and promotion decisions are still made by the home institution, these officers mention they feel obligated to fulfill these duties. All seconded BioGen staff reported going back to their home institution at least once a week if not more often. This of course means that progress on the BioGen project is affected.

#### 6. Junior Staff and Fresh Graduates

One of the objectives of the BioGen Project is capacity building. However, it stands to reason that only candidates who have sufficient experience and expertise to contribute effectively should have been selected for the BioGen team (see p. 56 PRODOC). Upon this, capacity building should take place while in the process of working on this project. However, it was noted that there are junior or inexperienced staff members on the team.

For example, one member of the team only has research officer experience but was promoted to become an Acting Project Manager in this project. Naturally, the person lacks adequate leadership and independence to drive the component and instead looks to the CTA for a lot of guidance and support that has not been forthcoming. This of course affects the progress of the component.

Similarly, it was noted that fresh graduates who have just qualified have been recruited as Research Officers. Given that each component only comprises of two people - a Project Manager and a Research Officer; it is important that they are not only suitably qualified but also experienced to ensure efficiency.

## 7. Contractual Staff

One of the contributing factors to high turnover of staff on this project was found to be attributed to the fact that some were employed on a contract basis. People accept such positions as a stopgap measure while they wait to find a permanent job offer. Once they do so, they resign and this was the case of two members on the BioGen team who left after only three months.

Naturally this was found to be disruptive to the progress of the project. More importantly, we question the practice of employing staff on a contract basis when organizational capacity building is one of the immediate objectives of this project.

## 8. System of Incentives and Rewards

The MTE Team is unable to ascertain if the project has attracted the best people for the job. If they are the best then there must be some system of incentives for these people who have been seconded. It is stated in the PRODOC (p.56) with respect to Program Managers (now referred to as Project Managers),

“If funds are available, the Program Managers can be paid from such funds so that it will attract persons with the relevant expertise and provide them incentive to devote their time to the project.”

Currently, some of the seconded team members feel that they are losing out on opportunities available to their colleagues in their home institutions.

## **5.0 Request for Extension and the New LFA**

On the basis of the general delay of the outcomes and outputs of the project components and corresponding activities, the MTE Team was informed that the BioGen Project Team requested for an extension of one (1) year from the previous Phase I completion date of December 31, 2004 to December 31, 2005. The BioGen Team is still hopeful that the MOA will be signed by one of the two possible short listed host companies for the FSM, viz. Tannamaran and Bell Thermal, by September 2004.

Considering the manifested difficulties in convincing a company to be the host company, the said target is still viewed optimistically. In this case, assuming the MOA is signed, it takes about a year to engage an Engineering and Procurement Contractor (EPC) and a year and a half to construct and start-up the power plant. The previous studies that were carried out by SIRIM and funded by PTM indicated that the engineering and construction of the new and/or retrofit facilities is 1 year maximum. Of course this take into account of the fact that the identified host demonstration companies have already done preliminary feasibility studies. From the interviews, it was manifested that Component 2 and the other components that rely on the FSM results for information and parameters on RE policy other technical, operating and cost aspects can only have the actual data needed for the policy formulation and impact simulation after more than two and a half year. It should be emphasized however, that as per project design, Component 2 and the other components do not rely on the FSM implementation. The biomass policy formulation should have been completed by now and the BioGen Project should have started facilitating its implementation. The policy can then be revised based on the findings of the FSM implementation.

The MTE Team has noted, however, the comment that MEWC is not aware of the request for extension by the BioGen Project Team, in spite of the fact that the NSC, chaired by MEWC, has agreed to this request. This manifests the lack of communication between PTM and MEWC. But, this is surprising as the request for extension was agreed in the pre-NSC on July 5, 2004 and NSC on July 22, 2004 and a recommendation was made to UNDP to consider the request.

## **6.0 Conclusions and Recommendations**

The findings of the evaluators as described in the previous sections can now be summarized in the following conclusions and recommendations.

### **6.1 Conclusions**

As in-depth analyses were done, emerging issues centered more on the management aspects of the project. In general, there are several areas for improvement on the way the project is managed can still be done in order to achieve the expected outputs/outcomes. The following are the conclusions drawn from the findings on the Project implementation and according to the set objectives of this MTE:

Effectiveness of project implementation measured against planned inputs and budget allocation

1. The BioGen Project design, objectives and applicability to current situation are still relevant and implementation of the remaining activities, particularly the FSM demonstration (i.e., business angle of biomass-based power generation and cogeneration, with supplementary POME-derived biogas firing

- technology application) will be very useful in systematically and purposely removing most if not all of the barriers to the widespread utilization of palm oil wastes as energy resource for on-grid power generation.
2. Success factors still rely mainly in establishing an effective partnership and communication between the government and the private sector in finding common ground and approach towards realizing the project goals in utilizing biomass materials from the palm oil industry for energy.
  3. The perception by the key stakeholders that the demonstration of biomass-based power generation and CHP incorporating POME-derived biogas through a Full Scale Model (FSM) is the key to removing the barriers to project and program implementation should be clarified that the FSM is just but one among the many interventions that will remove the barriers to widespread utilization of biomass (solid and liquid) resources for power generation and cogeneration.
  4. The BioGen project still faces great challenges in resolving pressing issues from the point of view of other stakeholders in government and private sectors: uncertainty of supply of biomass, electricity tariff, grid off-take and overall feasibility of the biomass utilization in energy generation for the palm oil industry and external supply to the grid.
  5. Various activities have not met significantly the targeted outputs so that extension of time was the proposed measure to accomplish the planned outputs of the components.
  6. The quality of outputs has not met the desired quality level based on the sampled outputs. For example, the criteria for selection have not been acceptable to the targeted host companies.
  7. On the budget and financial side, fund utilization for Year 1 is 6.53 % of the total GEF funding of US\$4.0 million. If reckoned net of the budget for FSM, the actual expenditure is 16.51%. There was no further detailed analysis done on the financial accounting for the project. There was no problem regarding the fund disbursement and related procedures. It is in the actual utilization of funds to bring about the required outputs that need to be hastened.

### **Effectiveness of project implementation from the management perspective**

1. Project performance, outputs and outcomes are largely affected by management-related issues which should necessarily be resolved first in order that the BioGen Project can fast track its implementation in addressing the program barriers that it was intended to achieve as stated in the ProDoc.
2. There are areas for improvement in the inter-agency coordination and policy harmonization on the ministry level where the NSC does not seem to be of help in being a good venue for resolving project issues to place the BioGen Project as a strategic technical support to the country's renewable energy strategy and program.
3. The role and interest of MPOB and the possible coordination route through MPIC is there in terms of coordination work in the palm oil industry sub sector.

4. The CTA's technical advice, directions and inputs are not coming in as expected by the BioGen Team.

## 6.2 Recommendations:


Based on the above findings that focused more on the management perspective of the BioGen Project implementation, the following recommendations for remedial actions and decisions are put forward for consideration. It is emphasized that the whole gamut of findings indicates that there are many inter-related and complex issues that have led to many of the problems faced in this project that greatly affected the technical outputs of the project. Below are some recommendations for consideration that MTE Team believes will serve the best interests of the BioGen project.

1. On how the project will proceed after the MTE in order to realize the objectives (and success indicators) that have to be met.

In view of the shortfalls in meeting the targeted objectives and success indicators within the timeframe of the project, the project should proceed to first address the management issues cited by the MTE, primarily on the CTA's management of the project management and the institutional coordination between the MEWC and PTM, as well as MPOB and BI. Noting the varied comments on the duration of the requested extension for Phase I, the MTE Team recommends that the request for extension be reviewed in terms of the timetable and, when resolved, that the extension be carried out more efficiently. This should lead to filling in the gaps for each component activity towards bringing out the specific outputs (not only merely exerting effort and using resources) in a timely and quality-assured manner considering the interrelationships and linkages among the various components as designed in the ProDoc and updated in the recent PPM. Among other interventions being carried out, the FSM demonstration should be conducted expeditiously as another barrier removal strategy independent of the other components in Phase 1 and the subsequent demonstration of the other schemes in the financial mechanism desired to be conducted in Phase 2. In this way, the BioGen Team will approach the implementation as originally conceptualized and not only depend on the FSM demo results for the outputs of the other components to materialize.

2. On the additional activities that are necessary for implementation in order to: (a) ensure that the objectives and success indicators are met and, (b) strengthen the achievement of the project objectives/success indicators.

In addition, on the institutional level, the program management and policy synchronization for utilizing palm oil biomass for energy should be coordinated through PTM/MPOB with other stakeholders particularly with the palm oil industry players so that the leadership, commitment and ownership roles will be exercised by the entire project organization with MEWC taking the lead. In order to further strengthen the working relationships and harmonize the various interests by the

stakeholders, the effectiveness of NSC, Pre-NSC and PRC meetings in providing the venue for discussion of issues and making decisions at the executive level should be maximized particularly in removing the policy barriers. The Pre-NSC and PRC meetings on the technical coordination level are already being done but the necessary preparatory and coordinative work may not be sufficient yet to reach the stage that could be ripe for the decision at the NSC level. This implies that the BioGen Team should exert more coordinative work and advance planning efforts to make sure that the issues and decision points are amply defined and backed-up by relevant information. Should preparation require activities in addition to regular schedules, the  should be supplemented by one-on-one follow-up meetings to be initiated by the BioGen Team whenever the need arises. Of particular importance is aligning the directions and implementation thrusts of the BioGen Project with other biomass-related programs of the government following the desired synergy and reinforcement of common objectives towards the same program outcomes of accelerating the use and benefits of palm oil biomass to the industry. This could only be possible if the tandem lead role of MEWC/PTM can be reinforced and sustained.

3. On the actions to be taken that will ensure the timely achievement of the target outputs of the project

In order to ensure the timely achievement of the target outputs of the BioGen Project, a closer execution and fast tracking of filling in the gaps in the various tasks should be done and be more rigidly monitored and evaluated so that the outputs are achieved according to the planned schedule and quality standards of the project. The BioGen Team should strengthen its internal monitoring and evaluation system to detect the tasks that need to be facilitated. Considering the necessity to pass through the NSC/PRC in terms of decision making and policy coordination, the BioGen Team should see to it that appropriate ground work and information dissemination are planned and carried out to maximize the time and quality standard of the outputs.

In addition, the BioGen Team should consider enhancing the system of assessing the extent of completion of each activity or the extent of realizing the targets and objectives in each activity, in addition to merely showing percentage completion. A breakdown of the percentage completion in terms of quantifiable results should be done and be reflected in reports such as NSC, PSC and APR/PIR reports.

4. On the actions to be taken (and who will be responsible) to ensure implementation and completion of the FSM demonstration


In specific terms of the recommendation on the institutional strengthening as applied particularly to the implementation and completion of the FSM demonstration, the PTM/MPOB should closely coordinate the final selection of the host company and sufficient planning and comprehensive study be undertaken to ensure that the objectives and desired outputs of the demonstration are met. The choice is now limited to either Tannamaran or Bell Thermal. The BioGen Team through the

PTM/MPOB should be able to decide properly, considering the purpose of the demonstration in paving the way for the other demonstration sites in Phase 2 and establishing the overall interest and confidence by the palm oil industry to use beneficially the palm oil biomass for energy. On the overall, the MEWC with the assistance of the PTM and MPOB, is expected to take the lead role in trying to resolve the pending issues on EFB supply and pricing, electricity tariff, and terms and conditions of the demonstration as a full scale commercial model in close coordination with the MPIC, MPOB and the palm oil plant management.

5. On the actions to be taken to fill in identified gaps in each project component

In connection with the identification of gaps in each project component, which the MTE Team has sampled in the interviews and summarized in Annex 4, it is suggested that the BioGen Team complete the process. The MTE Team feels that because of limited time, the data gathering may not be exhaustive enough to be the sole basis for determining the actions to be taken to address completely the gaps. Therefore, said summary can be used as a starting point. After such a validation process to be supervised by the PRC is completed as soon as possible, each component managers shall be required to present their plans and resources needed in filling in the gaps identified consistent with the timetable and quality standards of planned extension of the Project.

6. On the technical Aspects

The project objectives and measures to remove barriers are still found very relevant. The close interrelationships of the various project components and activities and the important input-output linkages between and among the various activities and component teams in implementing the project's technical plan cannot just be overemphasized. It is recommended that the timeline and fundamental strategies in bringing in maximum participation and ownership from both the government and private sectors be decided to put the proposed extension in proper perspective, felt  and renewed commitment for action. There is sufficient manifestation that the technical capacity of most of the relevant people involved in the BioGen Project with regards to the palm oil industry aspects is existing, based on the work experience and accomplishment gathered by the MTE Team during the evaluation. However, there may be need for the BioGen Project to augment this by additional expertise in the area of improved technology for solid waste fuel utilization and power generation including POME-derived biogas, and additional capacity for engineering management and project implementation which may have to be sourced from countries with successful similar projects or individuals from other countries with relevant experience.

7. On Carrying Out the Awareness Enhancement Projects

Considering the overall low-keyed perception by the targeted beneficiaries and stakeholders on developmental role of the BioGen Project, the primary stakeholders,



viz., MEWC, PTM, MPOB, and Bank Industri shall devise a strategy on how to enhance the awareness, appreciation and advocacy levels in key project participants, particularly in the private sector and the palm oil industry, on the importance and expected benefits of the objectives and what are being done by the BioGen Project to achieve this.

This could be done beginning with the stakeholders own organizations and then expanding to their own circle of clientele. The NSC, Pre-NSC and PRC meetings are also good venues for promoting the Project. Trainings and workshops provide also very important opportunities. The tri-media should also be employed in order to reach more media mileage for the Project

#### 8. On the management aspects

- CTA

In the interest of the BioGen Project Team, it is recommended that consideration be given *not* to renew the CTA's contract that expires in October 2004. This will enable the executing and implementing agencies, primary stakeholders and UNDP to explore options on how the technical and management leadership of this project might be shared or whether a new CTA needs to be brought in. If a new CTA is considered then it is recommended that the need for both technical expertise, *as well* as management experience is emphasized.

- Needed Focus on FSM Component Implementation

Considering that the FSM is key to the achievement of the goals of the BioGen Project, its implementation strategy should be given more focus in terms of coordination not only within the BioGen Project but also around the palm oil industry that it purports to assist. Given that MPOB has continued to manifest its role in the BioGen Project and that there is evidence of continued commitment and interest on the part of MPOB to take more active participation in Component 4 and 5 which are directly in charge of the FSM, as well as the fact that expertise, resources and the industry links necessary to ensure success lie there; it is recommended that these components are physically placed with MPOB. Whereas, Components 1, 2 & 3 may continue to function from the BioGen premises in PTM. In this connection, it is further recommended to install a well-defined coordination mechanism among the players, particularly among MEWC, PTM, MPOB, EC, BI, Utilities and other relevant agencies in terms of decision making and lines of communication towards bringing the overall ownership of the whole project and continuing biomass utilization for energy program as a GoM/MEWC undertaking in close coordination with MPOB.

- Role of the PTM/NPD and Alternative Project Management Structure

If the implementation of the project components is assigned to different agencies, it is recommended for consideration that the CEO of PTM and his counterparts in MPOB

and Bank Industri take joint ownership for this project and co-chair the PRC and relevant component programs meetings. The PTM will continue to provide all the necessary support for the Project. Needless to say, regular communication and sharing of information is vital to ensure project success.

As an alternative project management structure and in view of the limitations of the CTA, it is recommended that the NPD and his counterparts in MPOB and Bank Industri and the PTM-designated Program Manager form a management team for the BioGen Project immediately. The Transitory BioGen Management Team (see Table 2) shall be composed of the following with their respective functions:

**Table 2.** Proposed Transitory BioGen Project Management Team

<b>Position</b>	<b>Designated Person</b>	<b>Functions</b>
Head, BioGen Project Mgt. Team	NPD (and CEO, PTM)	<ul style="list-style-type: none"> <li>• Overall direction of the BioGen Project</li> <li>• Co-Chairman of PRC for Component 1, 2 and 3</li> <li>•</li> </ul>
Member	MPOB Counterpart Officer	<ul style="list-style-type: none"> <li>• Project management of Component 4 and 5</li> <li>• Co-Chairman of PRC for Component 4 and 5 matters</li> </ul>
Member	Bank Industri Counterpart Officer	<ul style="list-style-type: none"> <li>• Project management of Component 3</li> </ul>
Member	PTM Counterpart Officer (and Program Manager of the Energy Industry and Sustainable Development Division)	<ul style="list-style-type: none"> <li>• Project management of Component 1 and 2</li> <li>• Assistant to NPD in administrative and monitoring duties of the project</li> </ul>

The proposed Transitory BioGen Project Management Team shall continue to function until such time as the CTA management issue has been decided. This proposal does not discount the possibility that the transitory nature of the proposed management team can be regularized if found workable for the remaining time of the project including the possible extension being considered for the Project.

- Role of the MEWC (as Executing Agency) and NSC

It is recommended that overall responsibility *remain with MEWC* while they play a more prominent role in giving direction to this project in the light of the government pronouncements on the Fifth Fuel Policy favoring renewable energy projects where BioGen Project belongs. Synergies and complementation possibilities with other government initiatives, e.g. SREP and other RE-related projects will be highly beneficial. With MEWC leadership role, the NSC should be a very good harmonizing venue for aligning directions, sharing resources, building capacities and synchronizing plans. With the many developments and initiatives in RE and EE, whether funded or private, MEWC is probably in the best position to evaluate the importance of this project and identify the need for changes (if any) to ensure that it

contributes to the overall national agenda on renewable energy and energy efficiency.

As chair of the NSC, it is recommended that MEWC keeps the committee informed of the big picture and the role of the BioGen project within this. In addition, it is recommended that given the membership of the NSC, this committee be used as a forum to discuss viable 'packages' to overcome barriers to biomass power generation and cogeneration. Ideally, attendance should be limited to those who are sufficiently senior in their organizations so as to be able to meaningfully participate in these discussions.

Finally, MEWC should consider externally-funded projects and technical assistance as valuable opportunity to facilitate resolution of these issues if there will be effective leadership, coordination and communication among the relevant agencies.

- Role of TNB

It is recommended that on the level of the policy and institutional level of the NSC, the issue of electricity tariff for the palm oil biomass-fired electricity be resolved by TNB providing special tariff incentive beginning with its application in the FSM demonstration plants. As more economic and operational information and experience are gathered, this tariff policy may be reviewed and adapted to pragmatic levels with the overall national benefit of utilizing palm oil biomass wastes in mind. The MEWC, EPU and EC are expected to exert joint efforts in convincing TNB to provide the much needed developmental support for the success of the Project.


- Role of UNDP

The general approach of UNDP in putting responsibility on the executing agency to deliver outputs should continue to be adhered to. MEWC, in close coordination with PTM, should be left to drive this project as per the ProDoc. If this happens, instead of the BioGen Team relying with UNDP to give the direction and guidance, the Team will achieve self-reliance and adopt self-monitoring and pro-active operation and administration of the Project. Therefore, UNDP remains on its function of monitoring and support in the progress towards achieving the results. However, considering the critical needs of the BioGen Project at this time, it is exigent that UNDP should continue to assist in putting the project on its track again in line with its responsibility as the implementing agency for the GEF-funded project, This could be considered as an adaptive management approach and as a transitory arrangement to make sure that the combined team efforts of MEWC, PTM and the BioGen Team will be in place as soon as possible.

## 7.0 Lessons Learned



The following could be the significant lessons learned from the BioGen Project experience in project implementation:

1. The role and commitment of government through the responsible agencies, like TNB and MEWC, are very important in resolving the tariff issues that could be favorable to RE development.
2. The role of the CTA in the project implementation is very crucial to the success of a project. Selection should carefully done to ensure that the person would be strong in technical, management, human relations, leadership, and networking and knowledgeable in the palm oil industry.
3. The project management structure and established communication lines were not adhered to as designed particularly in ensuring that ownership and leadership are guaranteed during the project implementation and there are plans to sustain it beyond the project.
4. There must be some trigger points in the project monitoring and evaluation system so that major slippages and potential for growth in implementation problems could be detected so that attention of responsible stakeholders can be called in a timely manner. The executing agency and the implementing agency need to give urgent attention in setting up such a system. Such a system should also be able to trigger if inter-personal problems arise and quick action taken to resolve the matter.
5. On the technical side, it may not be safe to assume that the biomass material is free or does not cost significantly to affect the economics. It is always imputed some cost, not only for hauling and disposal but also for some competing uses that may arise due to evolving market demand for  material.

## **8.0 Annexes**

Annex 1: List of Documents Reviewed

Annex 2: List of Persons Consulted

Annex 3: Structured Interview Guidelines

Annex 4: MTE Assessment of Progress in Project Implementation

Annex 5: The BioGen Project Team Organization

**Annex 1**  
**List of Documents Reviewed and Presentations Attended**

1. Project Brief (undated presumably 2000) for Project No. MAL/00/G3X and Project Name: Malaysia: Biomass-based Power Generation and Cogeneration in the Palm Oil Industry Phase I.
2. Project Document (undated) for Project No. MAL/00/G3X and Project Name: Malaysia: Biomass-based Power Generation and Cogeneration in the Palm Oil Industry Phase I.
3. Biomass Power Generation & Cogeneration in the Malaysian Palm Oil Industry BioGen Inception Report 21<sup>st</sup> February 2003 by the BioGen Team
4. Revised Logical Framework Analysis (LFA) by Component 1 as at 30 June 2004.
5. Annual Targets: Biomass Power Generation & Cogeneration Projects in the Malaysian Palm Oil Industry updated July 2004
6. Minutes of the National Steering Committee (NSC) Meetings on BioGen, (3 )
7. Minutes of the Pre-NSC meeting, 5 July 2004

**Presentations Attended**

1. Overview and Status Report of the Bio Gen Project by Mr. Ishak Zakaria (CTA BioGen) on Monday 2 Aug 2003

**Annex 2**  
**List of Persons Interviewed / Consulted**

**UNDP**

Mr. Thiyagarajan Velumail  
Assistant Resident Representative  
Program Manager Energy

Dr Kayo Ikeda  
Program Officer

Energy and Environment Unit  
UNDP

**Pusat Tenaga Malaysia (PTM)**

Dr. Anuar Abdul Rahman  
Chief Executive Officer/ NPD BioGen Project

Mr. Ishak Zakaria  
Chief Technical Advisor BioGen Project  
Mrs. Norashikin Abdul Ludin  
Project Manager Component 1

Mr. Mohd Azwan Mohd. Bakri  
Research Officer Component 1

Mr Suhaimi Saad  
Project Manager Component 2

Research Officer Component 2

Mr Abu Hassan Abdul Aziz  
Project Manager Component 3

Ms. Nor Azaliza Damiri  
Research Officer Component 3

Mr Asfazam Kasbani  
PTM Program Manager assigned to  
BioGen project

Mr Hairol Azlin Abdul Latip  
Research Officer Component 4  
Component 4

**MEWC**

Mr Teo Yen Hua  
Deputy Secretary General II

Dr. Anish Kumar Roy  
(newly transferred to Head  
the International and Sustainable  
Energy Division)

Mr Lim Cheong Chuan  
Desk Officer International and  
Sustainable Energy Division

Ms Endang Jati Mat Sahid  
Research officer

**EC**

Mr Jamari Ibrahim  
Deputy Director

Desk Officer  
SREP

**MPOB**

Dr Choo Yuen May  
Director  
Engineering & Processing Division

Ir. N. Ravi Menon  
Project Manager Component 4

Zulkifli Ab. Rahman  
Project Manager Component 5

Nazrin  
Formerly Research Officer

**MPOA**

Mrs Ruwaida Abdul Wahid  
Research Officer Component 5

Mr. M. Chandran  
Chairman

**TNB**

Mr. Toh Weng Ngai  
Senior Manager, Power Procurement

**POMA**

Mr. Low  
President

Mr. Jeffrey  
Company Secretary

**MIEEIP**

Mr. Ponu  
Ex-CTA

**BIPV (Solar)**

Mr. Hadri  
Project Formulation



**Annex 3  
Structured Interview Guidelines**

***Instruments Used***

**Interview Guide for BioGen Team Members**

Name:

Position/ Component:

1. Are you a contractual or seconded permanent staff? Where from?
2. FT or part-time?
3. Do you think you have a clear understanding of your role on this team?
4. How much direction and guidance/ advice do you receive in carrying out your job functions?
5. What are your responsibilities on the BioGen team?
6. What do you consider as your 3 main duties?
7. What % of your time do you spend on these?
8. (for Project Manager) How much time do you spend supervising your Research Officer?
9. What are the 3 main challenges/ problems that you face in carrying out your tasks?
10. How could you be more efficient on this team?
11. What changes, if any do you think are necessary to put your component/ this project on schedule again?

## **Interview Guide for CTA**

1. What do you perceive your role of CTA to be?
2. Do you consider yourself an effective CTA? Why?
3. What would call your management style? Please elaborate.
4. What kind of guidance and support do you give the team?
5. How do you instill a team spirit among the BioGen team?
6. Do you share a vision/ mission for this project with your team?
7. Why are the PM's for component 4 & 5 not here?
8. How do you handle junior staff in key positions?
9. How do you try and ensure that contract staff do not leave the project mid-way?
10. Do you think the staff turnover has been high? Why?
11. Why was the PTM officer assigned to the BioGen team in April 2004? What is his role? Were you consulted on this decision?
13. What do you think are the 3 main reasons for the delay in the project implementation?
14. Do you think the BioGen project is on track now? Why?
15. What support do you need to be more effective in your position?

## **Interview Guide for NPD**

1. What do you perceive your role as NPD?
2. How do you keep informed on the BioGen project?
3. Do you have good communication with the CTA?
4. What was the reason for putting a PTM officer on the BioGen team, in addition to the members already seconded to the team?
5. Do you see the PTM officer on the BioGen team, as a permanent change in the BioGen organizational chart?
6. Has the MEWC been supportive in the BioGen project? How? Examples.
7. Has MPOB been supportive and cooperative as one of the implementing agencies? How? Examples
8. Has BI been supportive and cooperative as one of the implementing agencies? How? Examples
9. Has the NSC served its function well?
10. What is needed to improve the implementation of the BioGen project?

**Annex 4. MTE Assessment of Progress in Project Implementation  
Based on the Original PRODOC Project Plan**

<b>Components/Activities</b>	<b>Planned under PRODOC<sup>1</sup></b>	<b>Reported Actual by BioGen Team (as of May 31, 2004)<sup>2</sup></b>	<b>MTE Remarks/Analysis</b>
<b>Component 1: Biomass Information Services and Awareness Enhancement Program</b>			
1.1 Comprehensive Biomass Energy Resource Inventory	Comprehensive biomass resource survey for at least 90% of available biomass resources by end Year 1(December 2003)	Comprehensive biomass survey of palm oil waste, wood waste, rice husk, bagasse and MSW completed by May 31, 2004 (99% complete) <sup>3</sup>	Delayed. Status of 99% completed does not reflect actual delivery of outputs. Subcontractor's final report is not yet submitted after 3 revisions because it is unsatisfactory. Survey details in the form of attachments to tabulations were required.
1.2 Biomass Energy Technologies Database	Comprehensive biomass resource database completed and subsequently used by researchers and investors by 1 <sup>st</sup> Q Year 2 (March 2004)	Integration work still ongoing (59% complete)	Delayed. Status of 59% completed does not reflect actual delivery of outputs. Results of Item 1.1 will be used in database after final report is submitted.
1.3 Biomass Energy Technology Training courses	Completion of training course for PTM, palm oil mill personnel and university students by end Year 1(Dec 2003)	Preparation of training materials and modules was completed. (87% complete)	Delayed. Status of 87% completed does not reflect actual delivery of outputs. Conduct of training is not yet done.
	Completion of a training course for university students and another for government officials by end year 2 (Dec. 2004)	N.A.	
1.4 Integrated information Dissemination Program	Creation and operation of biomass special unit in PTM by mid Year 1 (June 2003)	Function of information dissemination started March 2003 through PTM. (79% complete)	Delayed. Status of 79% completed does not reflect actual delivery of outputs. Work is done with 3 staff involved in first year. In the process of replacing a staff who resigned.
	Information on biomass energy technology available in PTM	BioGen web page was created and is accessible thru link with	Delayed. Processing of TOR for consultant was delayed. CTA was expected by staff to

<sup>1</sup> These are original targets indicated in the PRODOC for Phase 1 covering Year 1 (January 1, 2003-December 31, 2003) and Year 2 (January 1, 2004-December 31, 2004)

<sup>2</sup> As gathered from reports and interviews with Component Program Managers and Research Officers

<sup>3</sup> Percent completion as basis for indicating accomplishment was taken from the NSC reports (July 22, 2004) by Component Managers. Although the date of the NSC status does not match the cut-off date of May 31, 2004 for MTE, it is presented here to illustrate BioGen Team's system of tracking actual outputs.

	website by 1 <sup>st</sup> Q Year 2 (March 2004)	PTM website. Summaries of reports were drafted to be included.	contribute in providing direction.
	Information materials published by PTM by 1 <sup>st</sup> Q Year 2 (March 2004)	First BioGen Newsletter was published in April 2004.	
1.5 Biomass energy Technology information exchange Program	Fully functioning information exchange services program operated by PTM by end year 1 Dec. 2003)	Services started March 2003 thru PTM link (79% complete)	On going development with PTM support under its information bureau.
	Uploading of at least 10 RE project profiles to the biomass database and website by end of Year 2 (Dec. 2004)	N.A.	
	At least 50 linkages with other international organizations established by end year 2 (Dec. 2004)	N.A.	
1.6 RE consultancy service Industry Development	At least 10 reported RE projects monitored by PTM that are designed and/or conducted by local consultants by end Year 2	N.A.	
1.7 Biomass Energy Rating Program	Developed scheme after discussion with biomass-based industries for biomass industry rating program by end Year 1 (Dec. 2003)	Not yet done. (30% complete)	Delayed. Lack direction from CTA. An international consultant is being planned to be hired.
	Approval and launching of rating scheme by mid Year 2 (June 2004)	N.A.	
<b>Component 2: Biomass Policy Study and Institutional Capacity Building</b>			
2.1 Biomass Policy Analysis	Draft of a clear government policy on the promotion, development and utilization of biomass resources for power generation by end of Year 1 available at MECM	Completed TOR and evaluation criteria for expert engagement (37% complete).	Delayed. Lack of direction from CTA. TOR and evaluation criteria for consultant were prepared after several revisions. Contract for consultant not yet tendered. Staff was sent to Thailand for research and experience sharing. There was no manifestation of consultation or guidance sought by the Project Team from the MEWC.
2.2 Biomass energy utilization workshop	National workshop on biomass energy promotion completed by	Still in the preparation stage for the first workshop. (49%	Delayed. Work is done by the BioGen Team and was finally conducted July 2004.

Series	end Year 1	complete).	
	Second National workshop on biomass energy promotion completed by end Year 2	N.A.	
2.3 RE Electricity Generation Policy Study	Draft policy and regulations on the production and sales of RE electricity by end Year 1 available at MECM and EC	Accomplishment is based on the completion of the revision of REPPA. (98% complete).	Delayed. Status of 98% completed does not reflect actual delivery of outputs. CTA direction is needed. This was pending since the non-continuance of the new electricity market reforms. A lot of policy coordination and private sector consultation is still needed particularly with the private sector and palm oil industry.
2.4 RE Electricity Pricing Study	Recommended favorable power tariff policy on biomass-based power generation and CHP projects available by end Year 1 (Dec. 2003)	Pricing study by BioGen Team done and presented in 3 <sup>rd</sup> NSC February 2004. (80% complete).	Delayed. Status of 80% completed does not reflect actual delivery of outputs. Results of BioGen study are not acceptable CTA direction needed. Expert has not been engaged. This will be greatly affected by the delay of the FSM selection (4.3) as actual data is deemed necessary.
2.5 Biomass-based Power Generation Market strategy	A marketing model for biomass-based power producers and CHP operators by mid Year 1 (June 2003)	Not yet done.	Delayed. Revised output due to non-continuance of the open power market plan of government into a development of institutional framework to implement biomass-based power projects. TOR and Evaluation Criteria for expert engagement delayed. CTA direction needed.
	Terms and conditions for biomass-based power generation sales to utility grid are completed by end Year 1.	N.A.	Delayed. Revised output due to non-continuance of the open power market plan of government into a development of institutional framework to implement biomass-based power projects The activity was redefined to be New Initiatives in the RE Power Generation Project. Still in the drafting of TOR and Evaluation Criteria.
	Policy recommendations for the granting of appropriate incentives for biomass-based power generation and CHP by 1 <sup>st</sup> Q of Year 2	N.A.	
2.6 Malaysian Power	A market simulation model that will	N.A.	

Market Simulation Model	provide guidance in power sales bidding to biomass-based power producers and CHP operators by end year 2		
2.7 RE Policy implementation and Evaluation	An evaluation report on annual production and sales of RE electricity and the % share of biomass energy in the national power mix every year from end Year 2	N.A.	
<b>Component 3: Biomass Initiatives Financing Assistance Program</b>			
3.1 Training course on RE projects financing	1 training course for private and government financial institution by mid Year 1	Training course conducted. Evaluation reports submitted (78% completed)	
	2 training courses for commercial banks on RE project financing and evaluation completed by 3 <sup>rd</sup> Q Year 2	N.A.	
3.2 RE Business Fund Establishment	An RE fund established by the government by mid Year 1	Commitment letters among BITMP, MESITA and UNDP were submitted for funds amounting to RM 28 million. (90% complete)	Delayed. Status of 90% completed does not reflect actual delivery of outputs. CTA direction needed. There are many other steps needed to establish the fund facility. Expert advice is needed. Component manager plan to achieve this should be sought. Development of lending guidelines and operating plans for the fund manager needed for establishing REBF appears not yet significant.
	20% increase in applications by end year 2	N.A.	
3.3 Financing Schemes mechanism	RE fund financing schemes document by 3 <sup>rd</sup> Q Year 1	Not yet done. (64% complete)	Delayed. Status of 64% completed does not reflect actual delivery of outputs. CTA direction needed.
3.4 Financing eligibility criteria	Document on eligibility criteria by 3 <sup>rd</sup> Q Year 1	35% complete	Delayed. Development of lending guidelines, eligibility criteria and operating plans for the fund manager, which are needed for establishing REBF, appears not yet significant.
3.5 Financial Assistance for demo scheme	A "one-stop-shop" established by end year 1	Consultant was hired to propose design and operating plans of the	Delayed. CTA and Component Manager direction needed.

		one-stop shop.	
	5% increase in approved applications by end Year 2	N.A.	
3.6 RE Project Financing Assistance program evaluation	N.A.	N.A.	
<b>Component 4: Biomass-Based Power Generation and CHP Demonstration Program</b>			
4.1 Biomass-based Power Generation Demonstration Scheme Promotion	Seminar-workshop attended by potential biomass-based power generators to be completed by mid year 1	Completed August 2003. Attendance was placed at 178 companies, 56% from palm oil industry and 29 companies expressed interest to join.(100% completed)	Delayed. Status of 100% completed does not reflect actual delivery of outputs. CTA direction needed. Promotion work does not appear significant. Coordination work with MEWC and other entities appear low in terms of actually promoting the BioGen Project. Coordination with SREP and other government programs is very limited in order to promote the project. Private sector has very low expectation that the present structure and management of the Project will achieve the desired results. CTA did not join follow up one-on-one meetings to further promote the project with the short listed companies.
4.2 Selection Criteria for Host Demonstration Companies	Approved set of criteria for host demonstration companies by 1 <sup>st</sup> Q Year 1	Criteria done internally by BioGen Team were presented, among other Project information, in a forum on August 2003. (63% completed)	Delayed. Preparation work on the criteria appear to be incomplete by not consulting significantly with private sector particularly the palm oil players. Feedback during the interview indicated that the criteria developed by the Team is very restrictive and do not respond to the actual needs of the targeted clients. The role of the Owner's engineer is being questioned. CTA direction needed.
4.3 Suitable project demonstration sites	Evaluated all potential demo sites and selected 5 companies for demo schemes by end Year 1	Out of the 29 who expressed interest, 16 submitted Form B. Short listed 4 companies, viz., Potential Gaya, Eco Synthesis, Tennamaran and Bell Thermal.	Much Delayed. No commitment has yet been gathered from the targeted host companies. MPOB's Experimental Station and FELDA identified initially backed out which could have been the ideal sites for demonstration and data gathering purposes. Private sector represented by the 4 short listed companies are still wary



			about the project's credibility and terms and conditions of the arrangements in addition to unresolved issues on biomass pricing, TNB's unacceptable electricity rate for biomass at 14-17 sen/kWh and unfavorable financial returns. Government intervention is much needed to realize this very critical output. MPOB thru MPIC manifests ability and motivation to carry out the activity. MTE Team observes that Component 4 under MPOB designated Program Manager is expected already to carry this out under present arrangement.
	MOAs signed with 5 host demo companies for demo schemes by end Year 1	No MOA signed yet.	Much Delayed. MTE Team feels that there will be major setbacks in terms of actually having the MOAs signed. CTA and overall BioGen project management need to develop a strategy to implement the site selection for FSM.
4.4 Baseline Data Establishment for demo Sites	Energy audits conducted at the 1 <sup>st</sup> demo site and baseline performance data established by mid Year 2	N.A.	
	Operating performance targets for the planned biomass-based power generation and CHP facilities at 1 <sup>st</sup> demo site are defined by mid Year 2	N.A.	
4.5 Specific Demo Scheme Implementation	Verified and confirmed availability of biomass volumes to support demo schemes by end Year1	Not yet done.	Much Delayed. Issues need to be resolved in pricing the biomass because of competing uses for the material for mulching. Some palm oil plantation owners have a policy not to use EFBs, etc. for fuel. The palm oil millers who do not have to return the EFBs to the plantation will be interested if the EFB will be valued favorably and the electricity tariff be adjusted to at least 21 sen/kWh to be reviewed every five years.
	Long term biomass supply	Not yet done.	Same analysis as Item 4.5

	agreements for the demo plants are approved/signed by each host companies and relevant palm oil mills supplying EFB by end of year 1		
	Standard heat/steam off-take and electricity purchase agreements are prepared and approved by relevant parties (TNB, host companies and EFB suppliers) by mid Year 2.	N.A.	
	Financing mechanism for financing investment involved in POME biogas recovery and use is set up and implemented by mid year 2	N.A.	
	Favorable purchase price of RE electricity produced from demo plants is confirmed and PPAs between TNB and host companies are secured by mid Year 2	N.A.	
<b>Comp.5: Biomass Energy Technology Development Program</b>			
5.1 Assessment of other energy and non-energy uses of biomass in the palm oil industry	Individual evaluation reports and project recommendations for each potential energy-related use of palm oil biomass completed and submitted to the MECM by end Year 2.	N.A. . No reported progress in this item before the MTE cut-off date of May 31, 2004	
5.2 Evaluation of the present energy utilization performance in all areas of operation in local palm oil mills	N.A.	N.A.	
5.3 Skills upgrading for palm oil power plant engineers and operators	Completion of two comprehensive training course on biomass-based power generation and CHP for palm oil staff by end Year 2	N.A. . No reported progress in this item before the MTE cut-off date of May 31, 2004	
5.4 Assessment of the capabilities of the local steam and power generation equipment manufacturers	N.A.	N.A.	

supplying the palm oil industry in Malaysia			
5.5 Performance evaluation of locally produced steam and power generation equipment	N.A.	N.A.	
5.6 Training course to local steam and power generation equipment manufacturers on high efficiency designs and production technologies	N.A.	N.A.	
5.7 Financial Assistance to local steam and power generation equipment manufacturers	N.A.	N.A.	
5.8 Development of a sustainable biomass energy R&D program supported by biomass-based power producers	N.A.	N.A.	

## **Annex 5. The BioGen Project Team Organization**

**ORGANISATION CHART**

