CLEAN DEVELOPMENT MECHANISM
SIMPLIFIED PROJECT DESIGN DOCUMENT
FOR SMALL-SCALE PROJECT ACTIVITIES (SSC-CDM-PDD)
Version 02

CONTENTS

CONTENTS

A. GENERAL DESCRIPTION OF THE SMALL-SCALE PROJECT ACTIVITY

A.1 Title of the small-scale project activity:

KUNAK BIO ENERGY PROJECT [November 2005]

A.2. Description of the small-scale project activity:

The project activity is to install a power generation plant at the TSH Kunak Palm Oil Mill utilising biomass waste for power generation and further export to the electricity grid. This will reduce the grid system's dependency on fossil fuel resources and reduce the emissions of GHG emissions.

The bio energy plant will be fuelled with biomass waste from the existing palm oil extraction process. This biomass is abundantly available and was earlier incinerated, but since the ban on open air burning entered into force the biomass has to be disposed in the plantations. However as the palm oil mill is receiving palm oil fresh fruit bunches from a number of plantations it has abundant biomass waste and faces problems with disposal in its own plantation.

From the palm oil milling process three types of biomass waste is generated; Fibres, Shells and Empty Fruit Bunches (EFB). Today fibres and shells are used in the power and steam production at the mill. This process is based on a low efficient steam boiler in order to use as much of the biomass waste as possible. The power plant supplies the palm oil mills own consumption of steam and power.

The project is to install a highly efficient bio energy plant, where the biomass waste can be used to generate useful electricity and steam, which will not only supply the palm oil mill itself, but also export excess electricity to the electricity distribution grid. The plant will be able to utilise waste products from the milling process such as fibres, shells and Empty Fruit Bunches.

The CDM project is limited to the electricity export to the electricity distribution grid, where the CO_2-neutral electricity generation will replace conventional electricity generation highly dependent on fossil fuel in the grid system and thereby reduce GHG emission in the electricity grid system.

Electricity will be supplied to Sabah Electricity Sdn. Bhd. (SESB) under a 21-year renewable energy purchase agreement (REPA).

Key data for the project:

Power generation capacity	14 MW_e
In house power demand	4 MW_e
Scheduled export capacity	10 MW_e
Annual minimum export to the grid system	64,000 MWh
Annual consumption of biomass	122,000 Tonnes of EFB, Fibres and Shells

The project is a part of the Government of Malaysia's Small Renewable Energy Programme (SREP), which is to facilitate the development of electricity generation on small scale renewable energy plants. This programme allows electricity export to the grid of a capacity up to 10 MW_e.

Sustainable development

The Malaysian Government has formulated a set of sustainable development criteria for small scale CDM projects within the energy sector. The project has received a positive response from the Designated National Authority in Malaysia on its compliance with the national criteria for CDM.

The project will contribute to the use of sustainable renewable energy sources in the electricity generation system and be a part of the country's development policy of renewable energy as a fifth fuel.

Details on the project's compliance with the national criteria were described in the project idea note submitted to the Designated National Authority (DNA). The DNA's response to the Project Idea Note is submitted in Annex 7.

Environmental sustainability

The project will have a positive impact on the environment as it will reduce power production on fossil fuels and lead to an increased sustainability in the power generation sector. Furthermore the power plant will be equipped with high-efficient technologies that reduce the fuel consumption per unit output and increase the combustion efficiency. Pollution control equipment will be installed in order to ensure minimum emissions of particulates etc. from the plant.

The project will lead to reduced disposal and indiscriminate incineration of waste at the palm oil mill and increase the self-sufficiency in the power supply.

Social sustainability

The project will be more efficient than the existing plant and less labour intensive per produced unit. However, the plant is bigger than the existing and the operation hours will be increased as it is designed for electricity export, so the total number of staff is expected to increase. Furthermore the project will require more skilled staff than the existing plant. The current workforce will be trained to operate the new plant and new qualified staff will be employed.

Economic sustainability

The project will lead to economic sustainability as the fuel source is a sustainable, indigenous resource, which reduces fuel imports and negative impact on the foreign exchange. The project will also have a positive impact on the economic performance of the palm oil mill as their energy production will become more reliable and efficient, which will enable a more reliable crude palm oil production in general.

Additional to a business-as-usual scenario

The project is additional to a business-as-usual scenario as it will be among the first cogeneration plants fired mainly with EFB from palm oil process to supply electricity to the grid system in

Malaysia. The business as usual scenario for the power generation sector is to add capacity based on gas, coal and oil fired units, and this practise is expected to continue in the future.

The business-as-usual for new palm oil mills is still to install a biomass cogeneration plant to produce steam and power for the mills own use, but not for electricity export. Hence the project is additional to both the business-as-usual scenario for the development in the power generation sector and the palm oil industries.

A.3. Project participants:

The project owner is TSH Bio-Energy Sdn Bhd. Contact for the CDM project activity is Corporate Finance and Planning Department, TSH Resources Berhad.

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Malaysia	TSH Bio-Energy Sdn Bhd	No
(*) In accordance with the CDM modalitities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

Project Owner

TSH Bio-Energy Sdn. Bhd.

TSH Bio-Energy Sdn. Bhd, a subsidiary of TSH Resources Berhad (TSH), will be the project owners and will invest the equity portion of the project.

TSH is a company listed on the Main Board of the Malaysia Securities Exchange Berhad under the Industrial Products Sector. TSH was incorporated under the Malaysian Companies Act, 1965 on 7 August 1979

The principal activities of TSH are investment holdings and sustainable forest management. The principal activities of its subsidiaries are oil palm plantation, palm oil milling, manufacturing of cocoa products, and manufacture of Ekowood®, engineered solid wood flooring and its distribution in Europe, e.g. the UK, France, Spain, German, and the USA (Collectively referred to as “TSH Group”)

TSH Group enjoys an A+ credit rating, which indicates a strong credit standing and has a shareholders’ fund worth more than RM200 million. The asset size of the TSH Group is RM360 million.

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

A.4.1.1. Host country Party(ies):

Malaysia

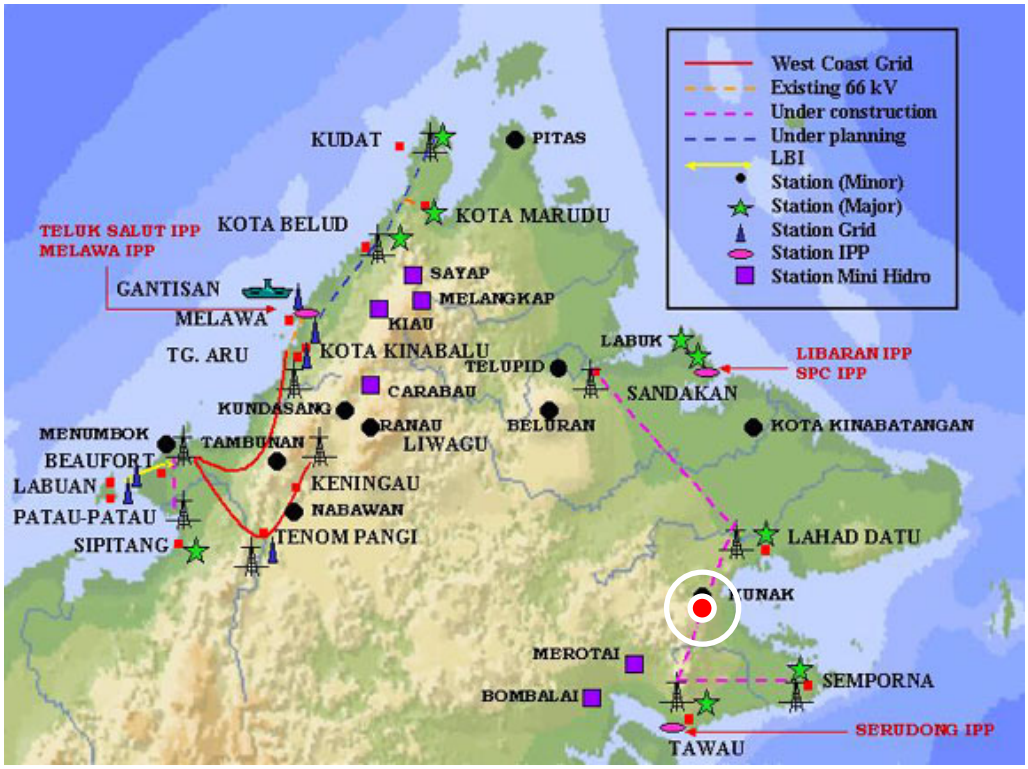
A.4.1.2. Region/State/Province etc.:

State of Sabah

A.4.1.3. City/Town/Community etc:

Kunak

A.4.1.4. Detailed of physical location, including information allowing the unique identification of this small-scale project activity(ies):



TSH Kunak Palm Oil, KM 56, Tawau-Kunak Highway, 91000 Tawau, Sabah, Malaysia

The project is located within the premises of the TSH Kunak Palm Oil Mill. The mill itself is located 28km from Kunak town, which is populated with 7000 inhabitants.

The Palm Oil Mill is considered a medium size mill with a fresh fruit bunch (FFB) throughput of 45 t/h (225,000 t/year). It produces 9 t/h (45,000 t/year) crude palm oil.

A.4.2. Type and category(ies) and technology of the small-scale project activity

A.4.2.1. Project type and category

The project is a small scale project activity and falls under the category **I.D** according to the Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM project activities. It is a renewable energy project – renewable electricity generation for a grid.

The categorisation is justified by the following parameters:

1. Electricity generation capacity 14MW

2. Fuel type is biomass waste

The CDM project only includes the electricity generation to the grid system and excludes the generation of electricity and steam for own consumption in the mill.

This part will not derive any GHG reductions as the generation of steam and power for own consumption will replace the present generation, which is also based on biomass. So the project will only focus on the incremental generation capacity and production of electricity that is exported to the grid and reduce emissions in the grid system.

A.4.2.2. Technology to be employed by the project activity:

The main components of the cogeneration plant are the biomass fired steam boiler, the turbine and the fuel preparation system.

Biomass fired steam boiler

The biomass steam biomass steam boiler is an efficient boiler with guaranteed energy conversion efficiency of 85%. It has an automatic combustion control system that ensures the effectiveness of biomass combustion and control of emission. Emission control is effected using multicyclone system and complies with the prevailing emission regulation standards in Malaysia. In fact, the system performs much better than the existing palm oil mill boilers which are manually operated.

The boiler receives dewatered biomass from the palm oil mill and generates steam for electricity generation in the steam turbine.

Steam turbine

The steam turbine receives superheated steam at 50 bar_g, 402ºC from the boiler. It is used to drive a 14 MW_e generator. About 35 tons/h of low-pressure steam is extracted from the turbine for palm oil processing. This steam extraction and electricity generation allows the current inefficient energy system to be decommissioned. The plant is contracted to export a minimum of 64,000 MWh of electricity to the distribution grid every year.

Fuel preparation system

The bio energy plant requires a steady supply of biomass. To achieve this objective, a fuel preparation system is designed with storage capacity of up to 7 days. Since the main source of fuel comprises empty fruit bunches which contains about 65-70% moisture content when it exits from the palm oil mill, a special dewatering facility is incorporated in the design. The fuel preparation station also cut the dewatered fibres into consistent length for ease of feeding into the boiler. The fluid from the dewatering process is channelled back to the palm oil mill where the residual crude palm oil is recovered.

A.4.3. Brief explanation of how the anthropogenic emissions of greenhouse gas (GHGs) by sources are to be reduced by the proposed small-scale project activity, including why the emission reductions would not occur in the absence of the proposed small-scale project activity, taking into account national and/or sectoral policies and circumstance:

The project will generate power based on renewable biomass resources, which are GHG neutral energy sources. The bio-energy power plant will export electricity to the grid system, which will reduce the emissions of the power generation capacities in the electricity distribution grid system. This is also reducing the grid system's dependency on fossil fuel resources and reducing the emissions of GHG emissions.

A.4.3.1 Estimated amount of emission reductions over the chosen crediting period:

The total GHG emission reductions are estimated to 358,400 tCO_{2eqv} over the crediting period.

Years	**Annual estimation of emission reductions in tonnes of CO_{2eqv}**
Year 2005	51,200
Year 2006	51,200
Year 2007	51,200
Year 2008	51,200
Year 2009	51,200
Year 2010	51,200
Year 2011	51,200
Total estimated reductions (tonnes of CO_{2eqv})	358,400
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_{2eqv})	51,200

A.4.4. Public funding of the small-scale project activity:

The project will not receive any public funding that will result in a diversion of official development assistance.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a larger project activity:

The project activity is not a debundled component of a larger project activity and there is not registered a small-scale CDM project activity and will not be applied to register another small-scale CDM project activity:

- With the same project participants; and
- In the same project category and technology/measure; and
- Registered within the previous 2 years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point

B. APPLICATION OF A BASELINE METHODOLOGY

B.1. Title and reference for the approved baseline methodology applied o the project activity:

Title of baseline methodology: "Renewable Electricity Generation for a Grid", Type I.D in Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM project activities.

B.2. Project category applicable to the small-scale project activity

The project is a renewable energy project that produces electricity for an electricity grid system by combustion of the biomass fuel sources. The project type is therefore a Type I category D that covers renewable energy projects for electricity generation for a system.

The emission reductions are obtained by supplying electricity to the electricity system generated by using renewable resources in the form of biomass waste. The electricity export to the grid system will avoid emissions in the electricity system by reducing the emissions from the existing power generation capacities. Renewable biomass electricity generating units are covered by the selected methodology.

The electricity generating capacity to be installed is 14 MW_e. The project is a combined steam and power system where steam will be produced for own consumption and for electricity generation. The electricity output does not exceed the threshold of 15 MW_e for small scale CDM projects.

The power plant will also produce steam for the user's processes, but this part will not be part of the CDM project as the steam generated by the new plant will replace the renewable steam production that is currently taking place on an old biomass fired steam boiler. Thus there will be no GHG reductions from this replacement of supply.

B.3. Description of how the anthropogenic GHG emissions by sources are reduced below those that would have occurred in the absence of the proposed small-scale CDM project activity:

The project activity is to supply electricity from renewable biomass fuel sources to the electricity grid system in Sabah. This will equally reduce the amount of power to be generated by the present capacities connected to the grid system.

The generation of electricity in the state of Sabah, Malaysia is dominated by the West Coast grid system and the recently implemented East Coast grid. The project will be connected to the East Coast Grid, which is currently supplied by 100% diesel generated power from existing power plants.

B.3.1. Prevailing practice in electricity generation

B.3.2.1. Characteristics of the East Coast Grid

All the power plants connected to the East Coast Grid are fuel oil or diesel oil fired power plants. The operators of the plants are the utility Sabah Electricity Sdn. Bhd. and independent power producers.

The existing power development plans does not include any planting up of capacity based on renewable energy sources.

B.3.2. Prevailing practice in palm oil mill power supply

Almost all palm oil mills in Malaysia have its own power plant to supply electricity and steam for the milling process. Most mills are located away from the electricity generation grid system, so in general own power generation has been cheaper than electricity supply from the grid.

The power plants dedicated to the palm oil milling process are mainly fuelled with the fibres and shells and only a few are using the empty fruit bunches as this will require an additional dewatering process to reduce the water content of the fuel. Furthermore the available amount of fibres and shells in a palm oil mill is more than sufficient for the generation of the required power and steam. In fact most mills have abundant waste biomass and operate power plants at low efficiencies to be able to burn the shells and fibres to reduce the need for waste disposal.

The project activity will be among the first project in Malaysia to utilise all the biomass waste products from the palm oil milling process, including empty fruit bunches, for generation of power and steam and supply excess electricity to the electricity grid system.

B.3.3. Investment barrier

The project is a pioneer in utilisation of waste from palm oil mills for electricity supply connected to the grid. It is part of the Small Renewable Energy Programme launched by the Malaysian government to facilitate interconnection of small power producers to the grid system. However, there are currently no special incentives for these small power producers to offset the generally higher costs of renewable energy production as compared to conventional power production based on fossil fuel.

Some of the investment barriers are:

- The renewable energy purchase agreement (REPA) has a fixed price for 21 years of supply and this price is not indexed. This means that the effective price of electricity sold to the grid from the bio-energy plant will decline over time.
- The cost of biomass fuel is low at the moment, as the renewable energy market is limited. If the market for renewable energy increases in Malaysia or other uses of the waste emerge, the costs of production increases as a result of the sacrifice of alternative revenues for the project owner.
- There are no special tariffs or grants schemes available in Malaysia for renewable energy projects and the project has to be finance on the behalf of the financial strength of the project owner.

- The project uses new technologies that have not been implemented in Malaysia before. The technological risk is higher than conventional projects as the know-how and support facilities in manufacturers etc. will be established together with the project.

The above barriers leads to an investment barrier and increased risk for the project owner compared to establishing a conventional power plant for his palm oil mill.

B.3.4. Technological barrier

The project is the first of its kind in Malaysia utilising a high pressure boiler fired with shells, fibres and empty fruit bunches from the palm oil mill. The boiler will be manufactured through a joint venture between a local and a Danish company. Parts of the boiler will be manufactured in Denmark, while the bulk of the work, including assembly, will take place in Malaysia supervised by the Danish partner. The project will lead to technology transfer and increasing the manufacturing capacity of more efficient, high pressure boilers in Malaysia.

- As the technology is not readily available in Malaysia and the capacity to design and manufacture does not exist, there is a technology barrier that leads to higher risk and higher costs for the project than in a situation where conventional technologies was to be used.
- The prevailing practice in the palm oil industry is to use shell and fibres for steam generation. Empty fruit bunches are more difficult to utilise as they have to be dewatered and shredded before they can be used as fuel. The technology to prepare the empty fruit bunches is new. The large scale dewatering technology has not been used in Malaysia before and forms a certain technological risk for the project.

B.3.5. Clean Development Mechanism

To overcome the above barriers CDM has been identified as a way of mitigating the financial and economical risks of the project. In September 2002 a project idea note was prepared and submitted to the Malaysian National Authority for CDM, and potential buyer parties for the emission reductions were approached. In April 2003 the project owner entered into cooperation with a potential buyer and secured the possibility for improving the revenue stream by the income from transaction of the future certified emission reductions.

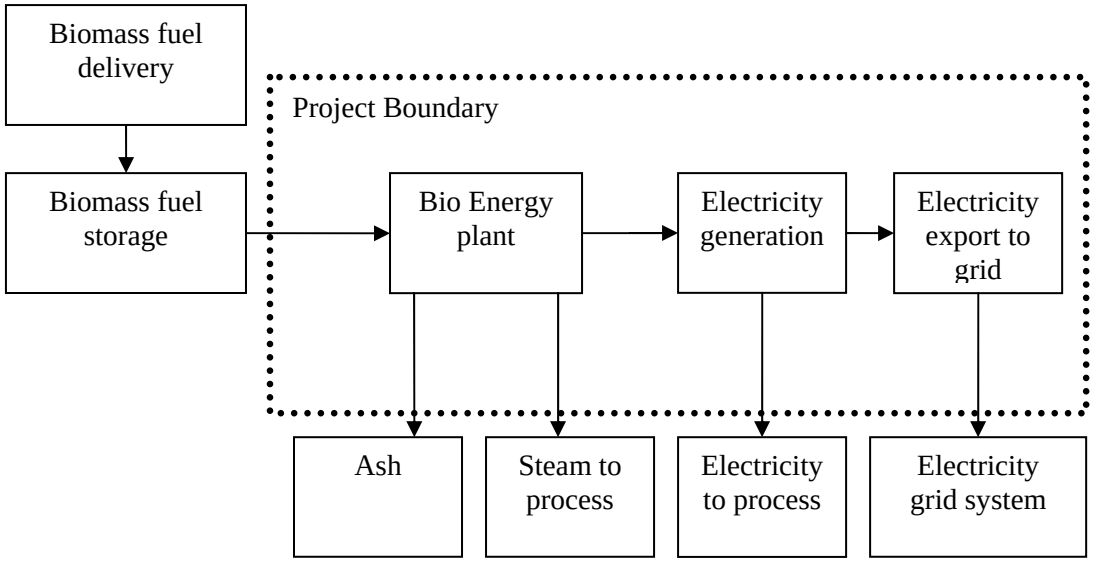
The response from the Malaysian Designated National Authority was given in September 2003 and is attached in annex 7.

With the positive response from the Designated National Authority and a buyer party identified, the project owner decided to continue the project development and implementation, confident that CDM can provide the necessary contribution to the project economy.

B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the project activity:

According to the applied methodology, the project boundary encompasses the physical and geographical site of the renewable generation source.

The physical site is the bio-energy plant itself, incl. fuel feeding system, boiler system and steam turbine and generation system. The first interface of the project boundary is at the fuel feeding system, so fuel storage system is excluded. Another interface is the ash and waste water disposal. The third interface is the connection point to the electricity grid, where electricity is exported to the grid system, which forms the baseline boundary (See section B.6).



The emissions generated within the project boundary occur from the combustion of the biomass fuel, which comprises empty fruit bunches (EFB), shells and fibres. As all of these are renewable energy sources the CO_2 emissions are defined as being zero. Biomass energy sources emit an amount of CO_2, which equals the amount of CO_2 taken up during the growing of the biomass source and CO_2 emission is therefore neutral.

The combustion of biomass can also lead to methane emission. However, the amount of methane emission from energy production based on biomass is set at a level of 30 kg/TJ according to the default value in the Revised 1996 IPCC guidelines - reference manual. For the present project this will amount to a total of 580 tonnes CO_{2eqv}/year, which is considered minor and therefore this emission will not be considered in the emission reduction calculations.

Similar the emission of N_2O is assumed to be minor and is not considered in the calculations.

Assessment of Direct off-site emissions

This assessment is made to justify the selection of project boundary and omission of increased or reduced emissions outside the project boundary.

Biomass fuel storage:

The biomass fuel is the waste product of the palm oil production process. In the present situation the waste products are stored at the mill for a short period. About 1,000 tons of waste is stored in various locations at the palm oil mill. The average storage period is between two and three weeks. Thereafter it is picked up by trucks and brought back to the plantations.

The biomass fuel storage for the bio-energy plant will also store the waste products. However, the waste products will be dewatered and stored under a roof. The fuel storage system can accommodate up to 7 days of bio-energy plant requirement estimated to be about 3,000 tons. Any possible emissions of GHG from the storage are estimated to be equal to the present emissions. For biomass resources brought in from other mills the storage at the bio-energy plant the emission is estimated to be equal to or lower than the emissions that is currently taking place at these mills' storages.

Biomass fuel transportation:

The bio energy plant will consume biomass fuels, which are waste products from the mill's own palm oil production process. At present these waste products are transported from the mill and back to the plantations by trucks, which result in GHG emissions from combustion of diesel oil in the trucks' engines. This amount will be reduced in the future as the biomass waste products will not need to be brought to the plantations.

The bio energy plant will also consume biomass waste from other mills. This has to be transported by trucks to the bio-energy plant. The transportation will result in GHG emissions from the diesel combustion. However the transportation from other mills will be limited as the biomass fuel is brought from nearby mills within a radius of 50 km. At present the waste products are brought back to the plantations by trucks, resulting in CO_2 emission. Therefore it is estimated that the distance of transportation will be about the same whether the fuel is brought back to the plantation or to the bio energy plant.

The emissions from biomass fuel transportation is therefore not expected to increase and is estimated to be zero or negligible to the overall emission reductions from the project activity.

Transportation of ash:

Ash is a waste product from the bio energy plant and is to be transported back to the plantations as potash for application to the field. This will be done by trucks and result in emission of CO_2 from the combustion of diesel oil. In the present situation more tonnes of waste products are transported back to the plantation as the whole EFB is transported. The waste product in terms of tonnes will be reduced and hence the need for transportation will be less. So the transportation will be reduced in the future project compared to the present situation, resulting in less CO_2 emissions.

Assessment of Leakage:

No significant leakages are foreseen as a result of the project.

All the equipment for the bio energy plant is new and is not transferred from another activity and do not result in any leakage.

B.5. Details of the baseline and its development

B.5.1 Specify the baseline for the proposed project activity using a methodology specified in the applicable project category for CDM small-scale project activities contained in appendix B of the simplified M&P for CDM small-scale project activities:

B.5.1.1 Emissions from electricity grid system

The baseline is the kWh generation by the bio-energy plant and exported to the electricity grid multiplied by the carbon emission coefficient (in $kgCO_2/kWh$) for the electricity grid system.

The carbon emission coefficient is determined by the emissions from the electricity generation in the grid system that the bio-energy plant is to export its electricity to.

As described in section B.3 the Sabah electricity grid system consists of two major grids; the West Coast Grid and East Coast Grid. The project will be connected to the East Coast Grid, which was commissioned in 2003 and interconnects the cities of Tawau, Semporna and Sandakan (See map in A.4). The supply to the grid is solely from diesel or fuel oil fired power plants.

The base year for the calculation is from the fiscal year 2002/3, which is the latest year statistics are available. The data is obtained from Sabah Electricity Sdn. Bhd. (SESB)

No	Area	Technology	Fuel Type	Capacity [MW]	Annual Generation [GWh]	CO_2-emission $[tCO_2]$[1]
1.	Tawau	DG/GT	Diesel	64.5	110	88,000
2.	Sandakan	DG/GT	Diesel	73	12	9,600
3.	Kunak	DG	Diesel	6.6	17	13,600
4	Lahad Datu	DG	Diesel	31.6	138	110,400
5.	Kota Kinabatangan	DG	Diesel	3.5	9	7,200
6.	Sandakan	DG	MFO	60	290	232,000
7.	Sandakan	DG	MFO	34	126	100,800
Total				273	702	561,600

[1] The emission coefficient for the grid system is obtained from Table I.D.1 in appendix B, which prescribes emission factors for diesel generator systems. The system is supplied by power plants with a capacity higher than 200 kW and the table prescribe an emission coefficient of 0.8 $kgCO_{2eqv}/kWh$.

The table above shows that all units connected to the transmission grid are either diesel or medium fuel oil fired. It is considered that all or some of these units will be in operation for at least the crediting period and that the project activity will displace diesel fired units throughout the crediting period. The baseline is therefore static for the crediting period using an emission coefficient of 0.8 $kgCO_{2eqv}$/kWh, as prescribed in Table I.D.1 in appendix B of the simplified M&P for CDM small-scale project activities.

B.5.1.2 Emissions from the present disposal of biomass waste:

The biomass is currently transported back to the plantation for mulching. The decomposing of the empty fruit bunches will result in the emission of GHG in the form of mainly CO_2, if digestion is aerobic or CH_4 if the process is anaerobic. The baseline does not take into account the possible methane emission from the anaerobic digestion of empty fruit bunches. This is a conservative approach, as methane emission would otherwise have increased the emissions in the baseline.

In some cases burning of biomass occurs. This practice, however, is not allowed under the environmental quality act of Malaysia as a ban on open burning exists. The emissions from open burning or incineration of biomass are not considered in the baseline as it must be assumed that the praxis of open burning biomass will stop in the near future. This assumption is conservative and will reduce the emissions of the baseline.

B.5.1.3 Emissions from the present disposal of biomass waste:

Biomass is currently used for steam and power generation at the palm oil mill. The existing boiler system is low efficient as the biomass is abundantly available and using it for energy purposes allows the palm oil mill to dispose the waste in a legal manner. The present system is manually operated and the combustion is uncontrolled in terms of air/fuel ratio leading among other things to incomplete combustion of the biomass. Such combustion leads to emissions of CH_4 and N_2O and other harmful gasses. For simplicity the baseline does not take these emissions into consideration, but assumes that the emissions of these gasses will be reduced in the new project by introducing an efficient and controlled combustion of the biomass, where the purpose is to maximise the energy output.

B.5.1.1 Gases and sources

The table below presents an overview of the emissions in the baseline and project, that has been considered for the project activity.

	Source	Gas	Remarks
Baseline	Grid electricity generation	CO_2	Yes, by using the default value for diesel fired generation systems
	Disposal of biomass	CO_2	No, biomass is considered carbon neutral
		CH_4	No, it is assumed that the thickness of layer of disposed biomass will not allow anaerobic digestion – this is conservative
		N_2O	No, for the purpose of simplification – this is conservative
Project	Renewable electricity generation	CO_2	No, biomass is considered carbon neutral
		CH_4 N_2O	No, for the purpose of simplification. It is assumed that CH_4 and N_2O will be lower than the present, inefficient system
	Transportation of biomass and ash	CO_2 CH_4 N_2O	No, the emissions from transportation of biomass and ash will more or less be equal to the present transportation of biomass to disposal sites
	Storage of biomass	CO_2 CH_4	No, the biomass will only be stored for a short period of time – up to one week. Emissions will not be different from the emissions from the current storage of biomass waste before final disposal.

B.5.2 Date of completing the final draft of this baseline section (DD/MM/YYYY):

10/04/2004

B.5.3 Name of person/entity determining the baseline:

Mr. Henrik Rytter Jensen
Danish Energy Management A/S
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E-mail: henrik.rytter.jensen@dem.dk

Danish Energy Management is a CDM consultant to the Project and is not a project participant.

C. DURATION OF THE PROJECT ACTIVITY / CREDITING PERIOD

C.1. Duration of the project activity:

C.1.1. Starting date of the project activity:

The project activity started upon the host country approval of the project idea in August 2003. In the same period the preparation of this project design document started. The project activity is expected to be operational 1st August 2004.

C.1.2. Expected operational lifetime of the project activity: (in years and months, e.g. two years and four months would be shown as: 2y-4m)

The expected operational lifetime of the project is estimated to be 21 years, which is equal to the electricity purchase agreement entered with the electricity distribution company.

C.2 Choice of the crediting period and related information: (Please underline the appropriate option (C.2.1 or C.2.2.) and fill accordingly)

C.2.1. Renewable crediting period (at most seven (7) years per period)

Yes

C.2.1.1. Starting date of the first crediting period (DD/MM/YYYY):

01/01/2005

C.2.1.2. Length of the first crediting period (in years and months, e.g. two years and four months would be shown as: 2y-4m):

7y-0m

C.2.2. Fixed crediting period (at most ten (10) years):

No

C.2.2.1. Starting date (DD/MM/YYYY):

N/A

C.2.2.2. Length (max 10 years): (in years and months, e.g. two years and four months would be shown as: 2y-4m)

N/A

D. APPLICATION OF A MONITORING METHODOLOGY AND PLAN

D.1. Name and reference of approved monitoring methodology applied to the small-scale project activity:

Title of monitoring methodology: "Renewable Electricity Generation for a Grid", Type I.D in Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM project activities.

D.2. Justification of the choice of the methodology and why it is applicable to the small-scale project activity:

The emission reductions are obtained by avoidance of emissions in the existing fossil fuel based electricity system by supplying renewable based electricity to the electricity system generated from a renewable biomass fired power plant.

Electricity is generated by a condensing extraction turbine with a design capacity of 14 MW_e. Steam will be partly extracted for own consumption and electricity is generated in a fully condensing mode. Since the capacity of the turbine is below 15MW_e, the project can be considered under the above methodology.

The methodology prescribes that the monitoring shall consist of metering the electricity generated by the renewable energy technology. The emission reductions are proportional to the electricity supplied to the electricity system. The most exact measurement is the amount of electricity supplied to the grid system.

The renewable electricity generating unit is solely fired with biomass, so there is no need for separate monitoring of the energy content of the biomass input.

D.2.1 Data collection and reporting

The project owner will appoint the energy plant manager to record the kWh supply of electricity to the grid system monthly. The readings will follow the same periods as the billing period in the renewable energy purchase agreement under which electricity is supplied to the grid, meaning that the readings will be for each calendar month.

The project owner and the electricity company (SESB) will jointly read the main metering equipment at the Interconnection Point within five Business Days after the end of each calendar month.

According to the Renewable Energy Purchase Agreement the project owner will keep records on electricity supply to the grid system, properly stored and maintained at its offices at the site, for a minimum of seven years and for such additional time period as may be required by Law or by Government Authority having jurisdiction over the project owner and project activity.

D.3. Data to be monitored:

ID number *(Please use numbers to ease cross-referencing to table D*	Data type	Data variable	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data to be kept?	Comment
M1	Electrical Energy	Electricity supplied to the grid	kWh	m[(1)]	Monthly	100%	Electronic and paper	7[(2)] years	[(1)]Main meter and/or check meter. [(2)]Requirement in the Renewable Energy Purchase Agreement between the project owner and the electricity company SESB.

D.4. Qualitative explanation of how quality control (QC) and quality assurance (QA) procedures undertaken:

N/A

D.5. Please describe briefly the operational and management structure that the project participant will implement in order to monitor emission reductions and any leakage effects generated by the project activity:

N/A

D.6. Name of person/entity determining the monitoring methodology:

Mr. Henrik Rytter Jensen
Danish Energy Management A/S
Vestre Kongevej 4-6
DK-8260 Viby J, Denmark
Tel: +45 8734 0600
Fax: +45 8734 0601
E-mail: henrik.rytter.jensen@dem.dk

Danish Energy Management is CDM consultant to the Project and is not a project participant.

E. CALCULATION OF GHG EMISSIONS BY SOURCES

E.1. Formulae used:

E.1.1. Selected formulae as provided in appendix B:

The formula applied to calculate the baseline emission is obtained from paragraph 30 in Appendix B, and is applicable for a system where all fossil fuel fired generating units use fuel oil or diesel fuel.

Baseline Emissions	=	Electricity Generated by Project	X	Emission Coefficient for Grid
$kgCO_{2equ}$		kWh		($kgCO_{2equ}$/kWh)

The electricity generated by the project is the amount of electricity supplied to the electricity grid system.

The emission coefficient for the grid system is obtained from Table I.D.1 in appendix B, which prescribes emission factors for the diesel generator systems. The system is supplied by power plants with a capacity higher than 200 kW and the table prescribe an emission coefficient of 0.8 $kgCO_{2equ}$/kWh.

E.1.2. Description of formulae when not provided in appendix B:

E.1.2.1 Describe the formulae used to estimate anthropogenic emissions by sources of greenhouse gases due to the project activity within the project boundary: ***(for each gas, source, formulae/algorithm, emissions in units of CO2 equivalent)***

N/A

E.1.2.2 Describe the formulae used to estimate leakage due to the project activity, where required for the applicable project category in appendix B to the simplified modalities and procedures for small-scale CDM project activities ***(for each gas, source, formulae/algorithm, emissions in units of CO2 equivalent)***

N/A

E.1.2.3 The sum of E.1.2.1 and E.1.2.2 represents the project activity emissions:

N/A

E.1.2.4 Describe the formulae used to estimate the anthropogenic emissions by sources of greenhouse gases in the baseline using the baseline methodology for the applicable project category in appendix B to the simplified modalities and procedures for small-scale CDM project activities: ***(for each gas, source, formulae/algorithm, emissions in units of CO2 equivalent)***

N/A

E.1.2.5 Difference between E.1.2.4 and E.1.2.3 represents the emission reductions due to the project activity during a given period:

N/A

E.2. Table providing values obtained when applying formulae above:

Year	A Electricity Generated by Project MWh	B Emission coefficient for Grid tCO_{2eqv}/MWh	A x B Baseline Emissions tCO_{2eqv}
2005	64,000	0.8	51,200
2006	64,000	0.8	51,200
2007	64,000	0.8	51,200
2008	64,000	0.8	51,200
2009	64,000	0.8	51,200
2010	64,000	0.8	51,200
2011	64,000	0.8	51,200
Total	448,000	-	358,400

F. ENVIRONMENTAL IMPACTS

F.1. If required by the host Party, documentation on analysis of the environmental impacts of the project activity: (if applicable, please provide a short summary and attach documentation)

According to the Malaysian regulations renewable energy projects are not required to prepare an Environmental Impact Assessment. This has been confirmed by the Malaysian Department of Environment (cf. Annex 6). Thus no EIA has been prepared.

The project must comply with the environmental regulations of the country and obtain the necessary approvals before commissioning and during operation of the project.

The project will apply modern, efficient technologies and the environmental impact will be managed better than in the existing situation, as the biomass waste will be used for energy production to the highest possible extent, which includes efficient combustion of the biomass.

G. Stakeholders comments

G.1. Brief description of the process on how comments by local stakeholders have been invited and compiled:

The stakeholder consultation has been involving authorities and government agencies. As the project is developed under the Small Renewable Energy Programme, information regarding the project was prepared early in the development stage to qualify for this programme and to apply for licensing approvals.

The CDM project development has also been through a consultation process with relevant agencies on state and local level and Ministry of Science, Technology and Environment and Ministry of Energy, Communications and Multimedia.

G.2. Summary of the comments received:

The overall comments of the stakeholders are positive and encouraging. Based on the correspondence there are no significant concerns reported on the present bio-energy project. The tabulation below gives an overview of the correspondence and comments received.

No.	**G.2.1**
Type	Letter
Date	25th March 03
From	Perunding AME SDN.BHD.
To	Department of Environmental. Ministry of Science Technology and Environment. Federal Government Administrative Centre
Brief Description	Acquiring weather the proposed SREP plant is exempted from the Environmental Impact Assessments Act (EIA Report)
Reply	The SREP plant project does not constitute under the Environmental Impact Assessments Act (EIA Report) but must ascertain written approval from Ketua Pengarah Alam Sekitar Sekeliling

No.	**G.2.2**
Type	Letter (see also annex 6)
Date	22nd April 03
From	Department of Environment. Ministry of Science Technology and Environment. Federal Government Administrative Centre
To	TSH Bio-energy Sdn. Bhd.
Brief Description	Notifying that the SREP plant project does not fall under “Section 34A under Quality Surrounding Environment Act 1974”.
Reply	The SREP plant project does not constitute under the “Section 34A under Quality Surrounding Environment Act 1974”. However it is govern under ruling 36 and 38. Quality Surrounding Environment (Clean Air) 1978 which stipulated that the SREP project must get the written approval letter from the Director General of Surrounding Environments.

No.	G.2.3
Type	Letter (see also annex 7)
Date	28th August 2003
From	Designated National Authority for CDM, Ministry of Science Technology and Environment.
To	TSH Bio-energy Sdn. Bhd.
Brief Description	Notifying that the project idea has been approved under the condition that 1) an annex 1 partner is identified and 2) that the aspect of methane avoidance is considered in the project design document.
Reply	The present PDD is the response to the approval letter from the Designated National Authority. 1) The Danish Ministry of Foreign Affair has been identified as the partner and future buyer of certified emission reductions. 2) Methane avoidance is taken into account when defining the project boundary and it has been chosen not to include the methane emissions from anaerobic digestion of empty fruit bunches in the plantation as it will be complex assess the present methane emissions as the decomposing is both aerobic and anaerobic. It has therefore been decided to establish a conservative baseline, which is lower than if methane emissions from decomposition of empty fruit bunches was considered.

No.	G.2.4
Type	Progress Report
Date	10th Sept 03
From	TSH Bio-Energy Sdn. Bhd.
To	Suruhanjaya Tenaga
Brief Description	Progress Report on SREP plant project for the month of June, July, August 2003. It is a formal report with a standard format given by Suruhanjaya Tenaga to TSH Bio-Energy Sdn. Bhd. This is to monitor the progress in stages.

No.	G.2.5
Type	Letter
Date	14th Oct 03
From	Suruhanjaya Tenaga
To	TSH Bio-Energy Sdn Bhd.
Brief Description	Suruhanjaya Tenaga award the Licence to provide electricity to TSH Bio-Energy Sdn. Bhd. The licence is valid for one year renewable basis per year.

G.3. Report on how due account was taken of any comments received:

See section G.2 above.

ANNEX 1. INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Project Owner

Organization:	TSH Bio-Energy Sdn. Bhd.
Street/P.O.Box:	No. 9, Jalan 16/11, Off Jalan Damansara
Building:	Suite 702, Block E, Phileo Damansara 1
City:	Petaling Jaya,
State/Region:	Selangor D.E.
Postfix/ZIP:	46350
Country:	Malaysia
Telephone:	+6 03 76606288
FAX:	+6 03 76606280
E-Mail:	tsh@tsh.com.my
URL:	www.tsh.com.my
Title:	Executive Director
Salutation:	Mr.
Last Name:	Lim
Middle Name:	
First Name:	Fook Hin
Department:	
Mobile:	+60 019 320 6354
Direct FAX:	+6 03 76606280
Direct tel:	+6 03 76606288
Personal E-Mail:	tsh@tsh.com.my

ANNEX 2. INFORMATION REGARDING PUBLIC FUNDING

N/A

ANNEX 3. NEW BASELINE METHODOLOGY

N/A

ANNEX 4. NEW MONITORING METHODOLOGY

N/A

ANNEX 5. TABLE: BASELINE DATA

(Please provide a table containing the key elements used to determine the baseline (variables, parameters, data sources etc.). For approved methodologies you may find a draft table on the UNFCCC CDM web site. For new methodologies, no predefined table structure is provided.)

Year	Emission coefficient for Grid tCO_{2equ}/MWh
2005	0.8
2006	0.8
2007	0.8
2008	0.8
2009	0.8
2010	0.8
2011	0.8
Total	-

ANNEX 6. LETTER CONFIRMING THAT ENVIRONMENTAL IMPACT ASSESSMENT IS NOT REQUIRED

The following letter is the Ministry of Science, Technology and the Environment, Dep. of Environment's confirmation that an environmental impact assessment does not have to be made for the project. The letter is followed by an unofficial translation to English.

ANNEX 7. LETTER FROM THE DESIGNATED NATIONAL AUTHORITY

The following letter is the Malaysian Designated National Authority's initial acceptance of the project idea and an unofficial translation to English.