



# PROJECT IDENTIFICATION FORM (PIF)<sup>1</sup>

PROJECT TYPE: Full-sized Project  
 TYPE OF TRUST FUND: GEF Trust Fund

## PART I: PROJECT IDENTIFICATION

Project Title:	GHG Emissions Reductions In Targeted Industrial Sub-Sectors Through EE And Application Of Solar Thermal Systems		
Country(ies):	Malaysia	GEF Project ID: <sup>2</sup>	4878
GEF Agency(ies):	UNIDO	GEF Agency Project ID:	
Other Executing Partner(s):	KeTTHA, SIRIM, UKM, MIGHT, FMM, MoSTI	Submission Date:	12 March 2012
		Re-submission Date:	11 April 2012
GEF Focal Area (s):	Climate Change	Project Duration (Months)	60 months
Name of parent program (if applicable):		Agency Fee (\$):	400,000
➤ For SFM/REDD+ <input type="checkbox"/>			

## A. FOCAL AREA STRATEGY FRAMEWORK<sup>3</sup>:

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Trust Fund	Indicative Grant Amount (\$)	Indicative Co-financing (\$)
CCM-2	Outcome 2.3: GHG emissions avoided	Output 2.3: Energy savings achieved	GEFTF	1,710,000	7,500,000
CCM-3 (select)	Outcome 3.1: Favorable policy and regulatory environment created for renewable investments.	Output 3.1: Renewable energy policy and regulation in place	GEFTF	100,000	300,000
CCM-3	Outcome 3.2: Investment in renewable energy technologies increased	Output 3.2: Renewable energy capacity installed.	GEFTF	2,000,000	11,200,000
(select) (select)	Others		(select)		
Sub-Total				3,810,000	19,000,000
Project Management Cost <sup>4</sup>			(select)	190,000	1,000,000
<b>Total Project Cost</b>				4,000,000	20,000,000

## B. PROJECT FRAMEWORK

Project Objective: To reduce GHG emissions by promoting and demonstrating sector-specific EE improvements and solar thermal technology utilization in industry						
Project Component	Grant Type	Expected Outcomes	Expected Outputs	Trust Fund	Indicative Grant Amount (\$)	Indicative Cofinancing (\$)
Component 1: Development of regulatory framework, support programme and financial incentive mechanism to facilitate solar thermal energy utilization	TA	Adequate policy framework, support programmes and financing mechanism facilitating implementation of solar thermal energy utilization in industry.	1.1. Institutional capacity strengthened, including international experiences shared with government stakeholders; 1.2. Monitoring, evaluation and impact assessment of previous and existing policies, programmes and also of this new project.	GEFTF	100,000	300,000

<sup>1</sup> It is very important to consult the PIF preparation guidelines when completing this template.

<sup>2</sup> Project ID number will be assigned by GEFSEC.

<sup>3</sup> Refer to the reference attached on the [Focal Area Results Framework](#) when filling up the table in item A.

<sup>4</sup> GEF will finance management cost that is solely linked to GEF financing of the project. PMC should be charged proportionately to focal areas based on focal area project grant amount.

			1.3 Support programmes and mechanisms (e.g., financial incentives, non-grant instruments, technical assistance, certification and financing schemes) developed and approved				
Component 2: Awareness raising and capacity building program relating to process optimization and solar thermal energy utilization in targeted industrial sub-sectors	TA	Widespread awareness and capacity strengthened amongst various stakeholders (industry, SMEs, financial institutions) in process optimization and solar energy utilization in 5 targeted industrial sub-sectors	2.1 Skills and competency of service providers, consultants and industry in the implementation of energy saving based on process optimization and process heating and cooling, in selected sub-sectors strengthened. 2.2. Skills and competency of service providers, consultants and industry in solar thermal technology improved. 2.3 Enhanced awareness among industry management and financial institutions to take decisions on investments in energy saving and solar thermal application (including using results of case studies of component 3)	GEFTF	1,000,000	4,000,000	
Component 3: Demonstration and scaling up of sector-specific EE and solar thermal energy utilization in targeted industrial subsectors.	INV	Commercial and technical viability of energy saving and solar energy applications assessed and demonstrated in 5 sub-sectors (e.g. Plastic & rubber, textile, food & beverage, pharmaceutical, etc.) using trained capacity under component 2 and created incentives and mechanisms under component 1.	3.1. Energy saving measures and investment projects implemented in 40 factories. 3.2. Out of these 40 factories, at least 10 will implement solar thermal demo projects. 3.3. Case studies prepared and presented under output 2.3 to raise more investment in EE and solar thermal integration using the trained capacity and created various financing mechanisms.	GEFTF	2,710,000	14,700,000	
Sub-Total						3,810,000	19,000,000
				Project Management Cost <sup>5</sup>	(select)	190,000	1,000,000
<b>Total Project Costs</b>						<b>4,000,000</b>	<b>20,000,000</b>

**C. INDICATIVE CO-FINANCING FOR THE PROJECT BY SOURCE AND BY NAME IF AVAILABLE, (\$)**

<sup>5</sup> Same as footnote #3.

Sources of Cofinancing	Name of Cofinancier	Type of Cofinancing	Amount (\$)
GEF Agency	UNIDO	Grant	60,000
National Government	UNIDO	In-kind	140,000
National Government	SERI-UKM	In-kind	800,000
National Government	KeTTHA	In-kind	350,000
National Government	MoSTI, MIGTH	In-kind	250,000
National Government	SIRIM	In-kind	900,000
Private Sector	Industry	In-kind	7,150,000
Private Sector	Industry	Grant	10,000,000
Private Sector	FMM	In-kind	250,000
Others	SME Banks and other Banks	In-kind	100,000
<b>Total Cofinancing</b>			<b>20,000,000</b>

**D. GEF/LDCF/SCCF/NPIF RESOURCES REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY<sup>1</sup>**

GEF Agency	Type of Trust Fund	Focal Area	Country Name/Global	Grant Amount (a)	Agency Fee (b) <sup>2</sup>	Total c=a+b
UNIDO	GEFTF	Climate Change	Malaysia	4,000,000	400,000	4,400,000
<b>Total Grant Resources</b>				<b>4,000,000</b>	<b>400,000</b>	<b>4,400,000</b>

<sup>1</sup> In case of a single focal area, single country, single GEF Agency project, and single trust fund project, no need to provide information for this table

<sup>2</sup> Please indicate fees related to this project.

## **PART II: PROJECT JUSTIFICATION**

### **A. DESCRIPTION OF THE CONSISTENCY OF THE PROJECT WITH:**

#### *A.1.1 The GEF focal area/LDCF/SCCF strategies /NPIF Initiative:*

The proposed project aims at supporting the reduction of the fossil CO<sub>2</sub> emissions in Malaysia's industry in general and, in particular in selected industrial sub-sectors, by improving the energy efficiency in industrial heating and cooling processes and process optimization, and the utilization of solar thermal energy whenever applicable and feasible. The project is therefore fully consistent with the Objective 2 of the GEF Climate Change Focal Area Strategy, namely "Promote market transformation for energy efficiency in industry and the building sector" as well as Objective 3, namely "To promote investment in renewable energy technologies". As a result of the proposed project intervention, Malaysia will have improved regulations, financial incentive mechanisms: grant and non-grant instruments and strengthened technical and institutional capabilities for the development, financing and implementation of solar thermal energy applications and energy efficiency improvements in industry on a sustainable basis.

#### *A.2. National strategies and plans or reports and assessments under relevant conventions, if applicable, i.e. NAPAS, NAPs, NBSAPs, national communications, TNAs, NIPs, PRSPs, NPFE, etc.:*

The project is consistent with the following national policies, plans, and programmes, as well as the goals identified in Malaysia's Second National Communication.

Under the 10th Malaysia Plan 2011-2015 (10MP), the country will place emphasis on the use of renewable energy and on increasing energy efficiency to ensure the sustainability of the environment. Various measures such as guidelines, standards and laws, would be introduced to ensure efficient use of energy, and to reduce greenhouse emission. The government has introduced among others, appropriate feed-in tariffs for grid-connected renewable energy technologies and the Renewable Energy Fund<sup>6</sup> (managed by the newly established Sustainable Energy Development Authority, SEDA) to encourage the implementation of renewable energy projects. In 2010, the government introduced the Green Technology Financing Scheme (GTFS) worth RM 1.5 billion, equivalent to \$ 450 million, for industries to enhance the application of green technology in the production of goods, technology and provision of services<sup>7</sup>.

In July 2009, the National Green Technology Policy was introduced which was the turning point in the country's history of initiatives on sustainable growth and development. Under this policy, Malaysia is to focus on four pillars, namely energy, environment, economy and society. The Ministry of Energy, Green Technology and Water (KeTTHA) has been assigned to oversee the Green Technology Policy, that will inter-alia, support the government to achieve the target of 40% greenhouse gas (GHG) reduction per GDP per capita by the year of 2020 as compared to 2005 levels.

The new Economic Transformation Program (ETP) provides strong focus on 12 growth areas, labelled as National Key Economic Areas (NKEAs), of which one area is "oil, gas and

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<sup>6</sup> More info on the Renewable Energy Act 2011 and Feed-in Tariffs can be found on the website of the Sustainable Energy Development Authority (SEDA), at <http://seda.gov.my>

<sup>7</sup> See [www.gtfs.my](http://www.gtfs.my). This includes the energy supply sector (power generation), energy utilization and demand-side management, buildings (incl. industrial), water and waste management and transportation sectors. The GTFS scheme is implemented by GreenTech Malaysia. Financing can be up to RM 10 million for users and 50 million per company for suppliers to registered Malaysian-owned companies. In principle, all commercial, Islamic and development banks and financial institutions can participate

energy”. Within the area, sustainable green technology, renewable energy and manufacturing of energy efficient products is given proper attention<sup>8</sup>.

The UNFCCC Second National Communication (2011) calls for the “implementation of energy efficiency (EE) and renewable energy (RE) in the industrial, commercial and residential sectors”. It further quotes the National Renewable Energy Policy and Action Plan that calls for a total of 2080 MW of grid-connected capacity based on renewable energy (RE), of which 255 MW from solar photovoltaics (PV). The Communication also mentions that energy efficiency (EE) savings in the industrial sectors could be 0.8% annually in the period 2015-2020<sup>9</sup>.

It’s expected that National EE Act will be adopted in 2013 that will further foster the effort by the industry and other sectors to reduce the energy consumption.

## **B. PROJECT OVERVIEW:**

### *B.1. Describe the baseline project and the problem that it seeks to address:*

The rate of industrialization in Malaysia is reflected in rapid growth of the manufacturing sector and increased energy consumption. Malaysia has been recording a substantial real GDP growth rate (4.6% in 2008). In 2010, the maximum demand of the grid system in Peninsular Malaysia grew by 3% from 13,620 MW in 2007 to 15,072 MW recorded on Jun 2010. The total electricity energy sold by TNB, the main power provider, increased in 2008 by almost 4% to 84,493 gigawatt-hours (GWh) from 81,360 GWh sold in 2007. The industrial sector recorded the highest percentage of energy sold at 47.4% (followed by the commercial sector at 32.2% and the domestic sector at 8.9%). Against the background of power consumption increases, the Government has embarked on awareness campaigns to encourage the use of renewable energy such as solar energy to replace fossil fuels and promote energy efficiency to reduce electric energy consumption.

While these efforts are very laudable, the emphasis in renewable energy has been on promoting substitution or energy savings in electric energy mainly. This means that in solar energy, the focus has been so far mainly on solar PV<sup>10</sup>. At present, the government does not have policy, incentives and standards for solar thermal systems (STS) to encourage the more widespread usage of these systems.

There exists great potential as well in reducing fossil fuel consumption in thermal energy by employing solar thermal energy in combination with energy efficiency improvements. However, solar thermal energy has been mainly utilized in the household sector, or some commercial buildings, but almost none in industrial heating and cooling processes.

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<sup>8</sup> For example, the AUO Sun Power facility in Melaka will continue construction through 2013 to produce high-efficiency solar cells capable of generating more than 1,400 megawatts (MW) annually. The government target is to have 65 MW of grid-connected solar energy supported by ETP. The ETP will be led by the private sector; the Government will primarily play the role of a facilitator. Most of the funding will come from the private sector (92 percent) with public sector investment being used as a catalyst to spark private sector participation. Another initiative will support EE investments in buildings. For example, Philips Lumileds Lighting will be establish a new LED manufacturing facility in Penang; the first in Malaysia to be designed with 100% LED lighting

<sup>9</sup> Estimates based on energy audits performed during the UNDP/GEF Malaysian Industrial Energy Efficiency Improvement Programme (MIEEIP)

<sup>10</sup> For example, the MBIPV project is implemented by UNDP with GEF support under the 9th Malaysia Plan (9MP) to promote widespread and sustainable use of PV in buildings in order to reduce the long-term cost of building integrated photo voltaic (BIPV) technology in Malaysia. The energy provider TNB has been promoting solar PV in its rural electrification program as well as for (small) independent power producers to provide renewable energy for power generation. A Solar Power Road Map has been prepared as well

In the baseline scenario, the Government will continue to fund R&D into new technologies which can improve the viability of solar thermal system installations, e.g. medium-temperature collectors and suitable heat transfer fluids. However, there are no specific policy and plans for capacity building and improvement of financing for solar thermal application and process optimization of the selected sub-sectors.

Baseline Projects:

Over the past few years, a number of “baseline projects” related to thermal EE and solar thermal energy utilization in industry have been undertaken by the government, industries and research institutions (e.g. KeTTHA, MITI, MOSTI, SIRIM, FMM, MIDA, UKM/SERI, UTM, etc.), as described in subsequent paragraphs.

SIRIM, the GEF/UNDP Project on Malaysian Industrial Energy Efficiency Improvement Project, SERI, FMM spent significant amount of resources to carry out during the last 10 years many quick surveys and energy audits in the industry to identify potential for thermal energy efficiency and solar thermal energy. With the establishment of SERI, Solar Energy Research Institute, in 2005 at UKM, more than RM 15 million (equivalent to about \$ 5 million) has been spent for establishment of facilities, research grant, small demonstration projects, but mainly on PV, household SWH and solar drying.

Under KeTTHA’s support programme, Universiti Kebangsaan Malaysia Medical Centre (PPUKM) in Cheras currently set to be the first green hospital in Malaysia with the installation of country’s first large-scale hot water system using solar energy. The solar energy system is made up of 1,750 evacuated tube solar collectors to supply hot water to 1,000 beds at PPKUM. The solar thermal system has been designed, manufactured and installed by Zamatel, a local company, with technical support of SERI. This encourages local solar energy companies, SERI and related government authorities to invest resources for design, manufacturing and installation of solar thermal systems in the potential industrial sub-sectors, which is more complicated than SWHs for households and buildings. Therefore they need support in technical capacity building and demonstration.

The on-going GEF/UNIDO project on IEEMMS with a total budget of more than \$ 20 million will improve the policy, regulatory framework, incentives schemes, etc, for EE in industry, as well as capacity building and demonstration in energy system management and in optimization of energy systems, such as compressed air, pumping, fan, motor, steam; it does not cover process optimization and process heating and cooling, as the later ones are very much sector-specific, the ones covered by the on-going project are more of industry-cross-cutting nature. It is expected that after implementing energy management systems and energy system optimizations, many companies and factories of the 5 targeted sub-sectors want to look for additional measures to reduce further their energy consumptions. Process optimization, optimization of process heating and cooling in combination with solar thermal integration will help them to reduce further their energy consumption. The new project will support them in providing technical assistance, and demonstration in process optimization, optimization of process heating and cooling, and solar thermal energy integration. It will also assist them to access to improved policy frame work, support programme and financing mechanisms: grant and non-grant instruments for solar thermal energy. The new project will provide training at various levels on process optimization, optimization of process heating, and cooling, and solar thermal integration in the 5 selected sub-sectors.

*B. 2. Incremental /Additional cost reasoning: describe the incremental (GEF Trust Fund/NPIF) or additional (LDCF/SCCF) activities requested for GEF/LDCF/SCCF/NPIF financing and the*

associated [global environmental benefits](#) (GEF Trust Fund/NPIF) or associated adaptation benefits (LDCF/SCCF) to be delivered by the project:

*Incremental reasoning and approach*

Despite the fact that there have been policies, support programmes, research and small demonstration projects, as described above, Malaysia still need external support, such as this proposed project, to realize the high potential to reduce energy consumptions and utilize solar thermal energy in selected sub-sectors of the industry.

A paper by UKM estimates the potential surface area available for solar thermal energy in Malaysia to be about 110,000,000 m<sup>2</sup>, of which about 42,000,000 m<sup>2</sup> on industrial buildings.

There exist high potential for thermal energy savings and solar thermal energy utilization, as illustrated in table 1.

**Table 1: The requiring heat for processes in five industrial sectors and the estimated energy savings and emission reduction**

Industry	Process requiring heat	Temp-range (°C)	Estimated energy use (for heating) (in GWh)	Potential of thermal energy savings	Estimated energy savings (in GWh)
Food & Beverage	Boiling	95-105	5,931	15%	889.7
	Pasteurizing	80-100			
	Sterilizing	140-150			
Textile	Coloring	40-130	500	20%	100.0
	Drying	60-100			
	Dyeing	100-160			
Chemical	Distillation	100-200	17,445	10%	1,744.5
	Compression	110-170			
	Cooking	80-100			
Plastic & Rubber	Drying	50-100	10,467	5%	523.35
	Pre-heating	50-70			
Wood	Steaming	70-120	1,047	5%	52.3
	Cooking	90-100			
	Compression	120-170			
TOTAL			35,390		3,309

The potential for energy savings in these subsectors is about 3,309 GWh/yr (gigawatt-hour per year). The potential for employing solar thermal might be 3%, which adds another 1,062 GWh/yr. During the PPG phase, detailed assessment of energy saving potentials through process optimization, optimization of process heating and cooling, and solar thermal

applications will be conducted in these 5 sub-sectors and other sub-sectors for the final selection of the sub-sectors to be target.

Nonetheless, the market niche of thermal EE and solar thermal applications in industry faces a number of gaps and barriers that are described in the table below. To mitigate these barriers, GEF resources are requested to complement the baseline projects of the Government and industry.

The project will build on existing experience and develop new knowledge and approaches, on optimization of the production process based on best available practices, boiler optimization, optimization of cooling devices and heat recovery, heat exchanging devices, heat integration and pinch analysis for design of heat exchanger networks, detailed calculation of heat exchangers, storage management, solar process heat, process integration, identification of suitable solutions, and system integration, etc.

The project will utilize the experience of SIRIM & SERI in Malaysia, as well as building on the accumulated knowledge and experience of AEE Institute for Sustainable Technologies (INTEC), Austria, as well as from other industrialized countries: USA, Germany, Japan, and developing countries: China, India, Brazil, in the field of process optimization, optimization of process heating and cooling, and solar thermal integration. The project will also introduce existing softwares, such as: Pinch software, Sankey software, and solar simulation tool, etc.

Specific awareness raising campaigns are needed targeted at decision makers i.e. industries most suitable for solar thermal process heat in selected subsectors. Several numbers of market demonstration projects are required to gain more experience and to increase confidence in this emerging technology. Expertise is needed to promote thermal energy saving and applications of solar thermal technology. Training courses for professionals are required to raise awareness and to overcome the current lack of specific expertise among professionals (planners, installers). The proposed GEF-supported project will recommend the government to provide policy guidelines and policy instruments to companies which install solar thermal systems to drive their industrial process.

*Identified barriers and proposed project outputs to removing them.*

<i>Barrier</i>	<i>Project output (incremental activity)</i>
Lack of enabling policy framework and support programmes to promoting solar thermal energy. Focuses have so far only paid to PV promotion for power generation; lack of adequate financing investment and incentives	1.1. Institutional capacity strengthened, including international experiences shared with government stakeholders; 1.2. Monitoring, evaluation and impact assessment, incorporating results of other components 1.3 Support programmes (e.g., financial incentives: grant and non-grant instruments, technical assistance, certification schemes) developed and approved;
While knowledge and experience exists on solar water heating or cooling for domestic uses, there is little awareness and capacity in applying solar energy in thermal applications, and thermal EE in industry (e.g., textile, food, biochemicals, service industry, wood and wood products, palm oil); Industry and financial institutions not	2.1. Skills and competency of service providers, consultants and industry in the implementation of energy saving in selected sub-sectors strengthened; 2.2. Skills and competency of service providers, consultants and industry in solar thermal technology improved. 2.3 Enhanced awareness among industry management and financial institutions to take decisions on investments in thermal energy saving and solar thermal application (including using results

aware of high potential for thermal EE and solar thermal energy.	of case studies of component 3)
Lack of demonstration on thermal energy saving and commercial viable solar thermal systems in selected subsectors industry	3.1. Energy saving measures implemented in 40 factories of the selected sub-sectors, 3.2. At least 10 solar thermal demo projects implemented 3.3. Case studies preparation and presentations to spur the market for solar thermal energy utilization.

**Component 1: Enhanced regulatory framework and incentive programmes, including grant and non-grant instruments.**

Activities in this component will support the Government’s efforts to creating an enabling environment for local manufacture and application of solar thermal system, by strengthening the capacity of concerned government institutions and performing a detailed assessment of costs and benefits with proposals to improve current policy instruments (which could include financial incentives, tax break, subvention of R&D programmes, certification scheme for solar thermal technology). Evaluation of other related policies, and programmes, as well as monitoring and evaluation will be carried out during the project implementation together with an assessment of the impacts of the project at the end will lead to a set of recommendations to the Government to stimulate a sustainable market for investment in solar thermal technologies in industry.

GEF’s support will be used to hire international and local consultants to carry out detailed assessment of the current policy framework, and potential for thermal energy saving and solar thermal technologies, to share experience and practices from other countries, and to develop new policy, support programmes, incentives, and financing mechanisms. Grant and non-grant instruments, for example those related to the Green Technology Financing Scheme with a total budget of equivalent to \$ 450 million, and the Renewable Energy Fund will be developed and applied to ensure adequate availability of financing sources for energy saving implementation and solar thermal application in industry. Advice will be also given on suitable institutional structure. On-the-job training will be carried out for relevant Government officials.

**Component 2: Awareness raising and capacity strengthening**

This component will develop training materials and programme, and deliver the training on process optimization and optimization of process heating and cooling, and solar thermal technologies in the targeted industrial sub-sectors. Training on thermal EE can be for user and expert level and focus on process optimization, process heat for cleaning, drying, evaporation, sterilization, pre-heating boiler water, boiler optimization, etc. for technical staff, plant and energy managers and consultants.

Solar thermal technology suppliers will be trained on determining solution, system design, system integration, manufacturing, installation, operation and maintenance, etc. So that they can provide a high-quality and affordable product and to deliver appropriate and affordable after-sales service to their clients. It will firstly focus on the technologies for low temperature range, up to 100 degree C, and then for medium temperature range up to 400 degree C. It is expected that:

1. 50 experts will be trained in process optimization, optimization of process heating and cooling in the 5 selected sub-sectors,
2. 40 experts will be trained in solar thermal application in the selected industry sub-sectors,

3. 100 plant managers and energy managers will get basic training on EE based on process optimization, process heating and cooling and solar thermal integration.

Training will be also provided to develop bankable project proposals to apply for various funding and incentives schemes, and also to financial institution in the evaluation of funding applications.

Another set of activities will focus on raising awareness on the potential, costs and benefits of, availabilities of various support programmes created, different grant and non-grants instruments for energy saving in selected sub-sectors and for application of solar thermal energy, allowing company owners and managers to take an informed decision on the investment opportunities and develop viable proposals. The case studies to be developed based on comprehensive technical and economic analyses, and tangible results in GHG reduction of the demonstration projects under component 3 will be used for awareness raising activities. An awareness raising programme will be developed during the PPG phase.

### **Component 3: Implementation of energy saving measures and demonstration of solar thermal energy applications in targeted industrial sub-sectors**

While solar water heating in domestic sector has been demonstrated, there is lack of demonstration of larger thermal applications in industry. This component will provide direct support to about 40 plants of the sub-sectors to improve their EE through process optimization and optimization of process heating and cooling, and at least 10 of these 40 plants will install solar thermal energy systems to substitute fossil fuel energy. The GEF grant will be used to providing technical assistance, and covering a small percentage of equipment costs, maximum up to 20% of the total equipment costs. The rest of the investment can be provided by SME Bank, SME Corp, Green Technology Financing Scheme (GTFS) Renewable Energy Fund, MIDA, etc. The demonstrations are mainly for consolidating the expertise provided under component 2 and the policy framework developed under component 1, and supporting the awareness raising programme under component 2.

The technical assistance (TA) is to support investors and developers (on an as-needed basis) in assessment and cost-benefit analysis, pre-feasibility analysis, full feasibility analysis, formulation of bankable proposals and, designing, manufacturing, installation and commissioning of solar thermal systems. The GEF TA support is crucial to attract the 'early birds' that want to invest in solar thermal energy production and its application as part of energy efficiency improvements in selected industrial subsectors. The industrial subsectors will be identified in greater detail in field study and stakeholder consultations during the PPG phase.

The experts trained under component 2 will be used to provide TA alongside with international experts to have hands-on experience.

Case studies will be prepared based on comprehensive technical and economical analyses of the pilot projects, and will present also experience gained and tangible GHG emission reductions achieved. These case studies will be used in the awareness raising activities under component 2. It's expected that more factories within the targeted sub-sectors and also other suitable sub-sectors in the industry and commercial building will use the expertise trained, and the various funding schemes and incentives created to implement EE improvements projects and installations of STSs during the last two years of the project and beyond the project completion.

*Associated Global Environmental and local benefits:*

The environmental benefits are two-fold:

- ✓ Reduction of greenhouse gas (GHG) emissions by the reduction of fossil by thermal energy efficiency improvements and the replacement of fossil by solar thermal technology in industry by (i) creating adequate policy framework, support programmes, (ii) capacity buildings and awareness raising, and (iii) investing in thermal EE and solar thermal projects;
- ✓ Reduction of pollutants due to avoided fossil fuel burning;

*Cost-effectiveness and sustainability of the global environmental benefits*

The project approach is deemed to be most cost-effective and most likely to lead to sustainable results, because the combination of technical assistance from the GEF, support from the Government (in a combination of various Government ministries and agencies) will leverage substantial investment from industrial enterprises to install solar thermal energy technology in a concerted effort, not only during the project's period of implementation, but thereafter as indirect result by having created a wider portfolio of investment opportunities and in general by creating the conditions for commercialization of the advanced solar thermal technology for application in the industrial sector. Grant and non-grant instruments created during the project, for example those related to the GTFS and Renewable Energy Fund, and others, will ensure availability of funds for future investment in EE and STS projects. Thus, the GEF technical assistance support of USD 4 million would not only trigger the investment of some USD 20 million (direct and direct post-project), but also have long-term indirect investment impacts that could be an order of magnitude higher.

From table 1 above, the potential for energy savings in the sub-sectors is about 3,309 GWh/yr (gigawatt-hour per year). The potential for employing solar thermal might be 3%, which adds another 1,062 GWh/yr. The source of fuel for heating is a mix of coal, oil and natural gas. Based on the fuel mix in industry (2010) of respectively 10%, 38% and 52%, the potential for energy for greenhouse gas emission reduction (due to energy efficiency and solar thermal applications the above-mentioned sectors is) 1.060 ktCO<sub>2</sub> per year, which can be regarded as an upper limit for indirect emission reductions of the project. Depending on the size and other parameters of the companies to be selected for the demo component, direct emission reduction could be 5% of this amount.

A more detailed assessment of energy savings through energy efficiency improvements and substitution of fossil fuels by solar thermal applications will be conducted during the PPG phase following the GEF GHG calculation manual. Careful attention will be given in tracking GHG emissions reduction attributed to this new project and those attributed to the on-going UNIDO/GEF project to avoid double accounting.

*B.3. Describe the socioeconomic benefits to be delivered by the Project at the national and local levels, including consideration of gender dimensions, and how these will support the achievement of global environment benefits (GEF Trust Fund/NPIF) or adaptation benefits (LDCF/SCCF). As a background information, read [Mainstreaming Gender at the GEF.](#)":*

With the increased penetration of solar thermal technologies and improvement of EE in the selected sub-sectors, expertise and skilled manpower will be developed whilst providing better job opportunities and income generation. The quality of jobs can potentially be improved through better working and safe environment with high efficient solar thermal systems. Since the job opportunities cover various technical skills and expertise there are opportunities for women to participate. The selected sub-sectors have a high percentage of female employees. The project

will monitor the socioeconomic benefits and gender impact of this job and skills creation.

*B.4 Indicate risks, including climate change risks that might prevent the project objectives from being achieved, and if possible, propose measures that address these risks to be further developed during the project design:*

Main risks and proposed measure to address them:

<b>Risk</b>	<b>Rating</b>	<b>Mitigation</b>
Management priorities in the participating public sector and private sector organizations change over time before and during project implementation	Low	Signing of Terms Of Reference (ToR) and Cooperation Agreement with the project partners before commencement of the project as well as Co-financing letters
Lack of effective coordination between various project partners.	Low	A proper coordination will be sought through the Project Steering Committee and ad-hoc working groups per subsector or theme that can be set up as needed, bringing in other partners and beneficiaries
Companies have doubts on techno-economic viability. Thus, demonstration projects are delayed, limiting the opportunity to disseminate success stories and develop case studies.	Medium	Technologies are applied in developed and developing countries. To overcome this risk, the factories selected as demonstration sites will be carefully evaluated. This will include the management support, financial strength, and technical backup and replication abilities. The demonstration project proponents are anticipated to provide initial case studies results and thus serve as examples for other factories to replicate;
Limited number of participants interested in training and no immediate demand of services for trained experts as the growth of the market for solar thermal technology is slower than expected	Low	The integrated approach by the project is expected to mitigate this risk by not promoting only the technology by creating new market and demand of application in heat processes in the industrial and commercial sector; The project proponents SIRIM Bhd, SERI,UKM and industrial collaborators will play a proactive promotion and campaign to create interest
Incentive and financial support system are insufficient.		The capacity of financial and governmental institutions will be strengthened on energy saving opportunities and STS and their potentials. Grant and non-grant instruments will be developed and applied to ensure availability of financing resources. Experiences from other countries will be shared, and results from the demonstration will be widely presented.

*B.5. Identify key stakeholders involved in the project including the private sector, civil society organizations, local and indigenous communities, and their respective roles, as applicable:*

UNIDO is the implementing agency of the project, and is accountable to the GEF grant, and other funding resources to be provided by the Government and private sector. The other major stakeholders involved in the execution of the project are:

<b>Stakeholder</b>	<b>Mandate and/or function in Malaysia</b>
Ministry of Science, Technology and Innovation (MoSTI)	MoSTI seeks to increase productivity and competitiveness in agriculture, manufacturing and services sectors, generate new sources of wealth in technology and knowledge-intensive sectors and to raise the country's capacity for knowledge, creativity and innovation. As the line ministry of SIRIM, MoSTI will act as the Co-chair of the Project Steering Committee, together with KeTTHA.
Ministry of Energy, Green Technology and Water, KeTTHA	KeTTHA's mission is to formulate policies and establish the legal framework and effective regulation as well as setting the direction for the energy industry, green technologies and the water industry in line with national development goals. Regarding energy the mandate includes promoting energy efficiency and renewable energy. KeTTHA and its Energy Commission will get support in terms of capacity building. As the line ministry responsible sustainable energy development and utilization and green technology, including the GTFS, KeTTHA will act as the Co-chair of the Project Steering Committee
Ministry of Natural Resources and Environment (MNRE)	MNRE is the GEF Focal point in Malaysia and its major areas are as follows: (i) Natural resources management (ii) Conservation and management of environment and shelters and (iii) Management of land survey and mapping administration. MNRE will be a member of the NPSC to ensure, inter-alia, that the project is in line with applicable commitments made by the Government.
Department of Standards Malaysia	The Department of Standards Malaysia (DSM) is an agency under the ambit of MoSTI. DSM is the national standards and accreditation body for Malaysia. Its roles and functions are governed by the Standards of Malaysia Act 1996 (Act 549), which establishes the Malaysian standards development). DSM is also the national representative for Malaysia in international and regional standardisation activities.
Energy Commission, EC and Sustainable Energy Development Authority	The Energy Commission (Suruhanjaya Tenaga, ST) has been the regulatory agency for the electricity and piped gas supply industries in Malaysia since 2001. One of functions of the Commission is to promote the use of renewable energy and the conservation of non-renewable energy. SEDA has been recently established, and currently only assigned to administering FIT. The capacity of both ST and SEDA will be strengthened by the project, and they will coordinate the development of

	grant and non-grant instruments relating to GTFS and Renewable Energy Fund and others.
SIRIM Bhd.	DSM has appointed Standards and Industrial Research Institute of Malaysia (SIRIM Berhad) as the sole 'national standards development agency'. SIRIM Berhad is a wholly-owned company of the Government (incorporated in 1996). While Standards Malaysia is responsible at a policy level, SIRIM is responsible at the technical level for the development structure in Malaysia and representation in relevant regional and international standards committees to meet the expectation of all stakeholders. SIRIM will be local project coordinating body, and it will appoint one of its senior managers to be the National Project Director.
SERI (Solar Energy Research Institute), University Kebangsaan Malaysia (UKM)	SERI carries out research and knowledge dissemination in solar energy and renewable energy technology, management and policy in the context of economic and environmental sustainability. SERI together related universities will coordinate the training activities relating to STS and EE improvement.
Malaysian Industry – Government Group for High Technology (MIGHT)	Under the purview of the Prime Minister's Office, MIGHT is a membership-driven organization which members from industry, government and academia to promote high technology development and industrial advancement.
Federation of Malaysian Manufacturers (FMM)	FMM was established in 1968 and is Malaysia's largest private sector economic organisation in Malaysia, representing over 2,000 manufacturing and industrial service companies of varying sizes. FMM is the officially recognised and acknowledged as the voice of the industry in Malaysia. The FMM institute offers training courses to upgrade the skills and knowledge of employees in the manufacturing sector. FMM will coordinate the organization of training courses, participate in the selection of plants for EE improvements and installation of STSs and awareness raising activities towards its members.
SME Bank and other Banks	The bank officials will get training from the project and will provide loans for the demonstration projects, when applicable, participating in the application of non-grant instruments.

*B.6. Outline the coordination with other related initiatives:*

Research and development promote and support the production of high quality, up-to-date and relevant output, products and services related to solar thermal energy. It also has a crucial and

important part in the on-going efforts to further improve production processes, to raise the quality standards of solar thermal technology to cut costs through the introduction of new and innovative methods. The sources of funding for R&D in Malaysia are mainly from MoSTI through IRPA (Intensification of Research in Priority Areas) Funds and the Industrial Research and Development Grant Schemed (IGS).

During the 9th Malaysia Plan the TECHNOFUND was introduced by MoSTI for ‘pre-commercialization based projects’. Two solar thermal related projects have funded namely large-scale solar hot water heating systems in hospitals by University Kebangsaan Malaysia (UKM) and solar drying of agricultural/marine products by SIRIM Berhad. Total budget of these projects was RM 4 million. The results of these pilots will be incorporated in the project design.

The project will use the results from the on-going GEF project on Industrial EE for the Malaysian Manufacturing Sector (IEEMMS), as explained in the last paragraph under the baseline project section. For example it will select those companies or plants, which have got the support from the IEEMMS project in implementing energy management system and energy system optimization, to provide support and assistance to further reduce their energy consumption by process optimization, optimization of process heating and cooling, solar thermal energy integration.

On capacity building and demonstration the project will coordinate with the University Kebangsaan Malaysia (UKM), University Technology Malaysia (UTM), University Sains Malaysia (USM), University Putra Malaysia (UPM), SIRIM Berhad, University Technology Mara (UiTM), Malaysian Agricultural and Research Development Institute (MARDI), and the University of Malaya.

The project will be hosted by SIRIM, and managed daily by a Project Management Unit. A Project Steering Committee will be established to provide strategic guidance, and coordination between various ministries. A National Project Director will be appointed to ensure the counterparts ownership of the project. Many key partners of this new project are also those of the on-going IEE project, such as: SIRIM, FMM, KeTTHA, EC, etc. This will ensure the effective coordination of the two projects via many project management levels, the PSC or working groups, etc...

### **C. DESCRIBE THE GEF AGENCY’S COMPARATIVE ADVANTAGE TO IMPLEMENT THIS PROJECT:**

UNIDO’s mandate is to assist developing countries and transition economies to develop their industries, and presently focus on Green Industry. UNIDO has been formally recognized by GEF as having comparative advantages in IEE and RE. It currently manages the implementation of the GEF project on IEEMMS in Malaysia. The UNIDO Regional Office in Bangkok covers also Malaysia. UNIDO has an International Solar Energy Centre, ISEC, in China.

#### *C.1 Indicate the co-financing amount the GEF agency is bringing to the project:*

It’s expected that UNIDO will contribute USD 60,000 in cash and USD 140 K in-kind to the main phase of the project. Contribution in-kind will be provision of technical expertise by UNIDO staff and the UNIDO-International Solar Energy Centre, ISEC, based in China, and training materials already developed by UNIDO.

#### *C.2 How does the project fit into the GEF agency’s program (reflected in documents such as UNDAF, CAS, etc.) and staff capacity in the country to follow up project implementation:*

The project objectives match within two thematic areas UNIDO is focusing on, namely “poverty reduction” through productive activities by promoting renewable energy as the energy source for such industrial/productive activities; and “energy and environment” where UNIDO helps its clients solve two fundamental problems: de-linking intensity of energy and material use from economic growth, and reducing the environmental damage that occurs with energy and material use.

In addition, UNIDO's Energy Strategy aims at helping developing countries and countries in transition to achieve the following objectives:

- Increase the competitiveness of their industries by reducing the dependence on fossil fuels;
- Reduce their impact on climate change by decreasing the carbon emissions of their industries and by promoting renewable energy technologies;
- Increase the viability of their enterprises, particularly in rural areas, by augmenting the use of locally available renewable energy sources.

**PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)**

**A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):** (Please attach the [Operational Focal Point endorsement letter\(s\)](#) with this template. For SGP, use this [OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Dr. Lian Kok Fei	GEF Operational Focal Point Undersecretary of Environmental Management & Climate Change Division	MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT (MONRE), MALAYSIA	11/23/2011

**B. GEF AGENCY(IES) CERTIFICATION**

This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for project identification and preparation.					
Agency Coordinator, Agency name	Signature	DATE (MM/dd/yyyy)	Project Contact Person	Telephone	Email Address
Mr. Dmitri Piskounov, Managing Director PTC, UNIDO GEF Focal Point		March 14, 2012	Khac-Tiep NGUYEN	+43-1-26026-3086	k.nguyen@unido.org