



PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: Medium-sized Project

TYPE OF TRUST FUND: GEF Trust Fund

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PART I: PROJECT INFORMATION

Project Title:	Greening Industry through Low Carbon Technology Application for SMEs		
Country(ies):	Thailand	GEF Project ID: ¹	5725
GEF Agency(ies):	UNIDO	GEF Agency Project ID:	130279
Other Executing Partner(s):	<ul style="list-style-type: none"> The Office of Small and Medium Enterprises Promotion (OSMEP), Ministry of Industry (MoI) and The Foundation of Institute for Small and Medium Enterprises Development (ISMED) 	Submission Date: Resubmission Date: Resubmission Date:	03/07/2014 04/16/2014 06/11/2014
GEF Focal Area (s):	Climate Change	Project Duration (Months)	36
Name of parent program (if applicable):		Agency Fee (\$):	178,600
	<ul style="list-style-type: none"> For SFM/REDD+ <input type="checkbox"/> For SGP <input type="checkbox"/> 		

A. INDICATIVE FOCAL AREA STRATEGY FRAMEWORK²:

Focal Area Objectives	Trust Fund	Indicative Grant Amount (\$)	Indicative Co-financing (\$)
CCM-3 Promote Investment in Renewable Energy (RE) Technologies	GEFTF	1,880,000	9,510,000
Total Project Cost		1,880,000	9,510,000

B. INDICATIVE PROJECT FRAMEWORK

Project Objective: To promote investments in renewable energy technologies (RETs) for heat generation in manufacturing SMEs for reduction of carbon footprint (CFP) of their products						
Project Component	Grant Type ³	Expected Outcomes	Expected Outputs	Trust Fund	Indicative Grant Amount (\$)	Indicative Cofinancing (\$)
1. Development and enforcement of policy measures and streamlining of incentive schemes	TA	Conducive environment for carbon footprint (CFP) reduction in SMEs created	1.1. Approved national policy in place 1.2. Existing incentive schemes for promoting RETs under various ongoing projects and programmes will be streamlined for supporting	GEFTF	479,000	720,000

¹ Project ID number will be assigned by GEFSEC.

² Refer to the reference attached on the Focal [Area Results Framework and LDCF/SCCF Framework](#) when completing Table A.

³ TA includes capacity building, and research and development.

			technologies for thermal energy generation in SMEs			
2. Development of human and institutional capacity	TA	Improved capacity on RETs for heat generation	<p>2.1. An information and learning centre (I&LC) on RETs for SMEs established</p> <p>2.2. Technical capacity of OSMEP, ISMED, SMEs and local technical experts developed</p> <p>2.3. Database of GHG emissions from the participating SMEs developed and publicly accessible</p>	GEFTF	450,000	750,000
3. Promotion of RETs for heat generation in SMEs	INV	Increased investments in RETs for heat generation in the SMEs	3.1. Installation of RETs for heat generation in 3 factories leading to 20% replacement of their fossil fuel consumption	GEFTF	737,000	7,400,000
4. Monitoring and evaluation (M&E)	TA	Effectiveness of the outputs assessed, corrective actions taken and experience documented	<p>4.1. Mid-term M & E report</p> <p>4.2. End of project M & E report</p> <p>4.3. Experiences and information dissemination workshops</p> <p>4.4. Publications and websites</p>	GEFTF	50,000	200,000
Subtotal					1,716,000	9,070,000
Project Management Cost (PMC) ⁴				GEFTF	164,000	440,000
Total Project Cost					1,880,000	9,510,000

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

Sources of Cofinancing	Name of Cofinancier	Type of Cofinancing	Amount (\$)
National Government	OSMEP	In-kind	1,230,000

⁴ To be calculated as percent of subtotal.

Sources of Cofinancing	Name of Cofinancier	Type of Cofinancing	Amount (\$)
Foundation (non-profit organization)	ISMED	In-kind	680,000
Private Sector	Thai Rubber Glove Manufacturers Association (TRGMA)	In-kind	50,000
Private Sector	Selected industries	Investment	7,400,000
GEF Agency	UNIDO	Grant	60,000
GEF Agency	UNIDO	In-kind	90,000
Total Cofinancing			9,510,000

D. INDICATIVE TRUST FUND RESOURCES (\$) REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY⁵

GEF Agency	Type of Trust Fund	Focal Area	Country Name/Global	Grant Amount (\$) (a)	Agency Fee (\$) (b) ⁶	Total (\$) c=a+b
						0
Total Grant Resources						

E. PROJECT PREPARATION GRANT (PPG)⁷

Please check on the appropriate box for PPG as needed for the project according to the GEF Project Grant:

	<u>Amount Requested (\$)</u>	<u>Agency Fee for PPG (\$) ⁸</u>
• No PPG required.	-- 0--	--0--
• (up to) \$50k for projects up to & including \$1 million		
• (up to) \$100k for projects up to & including \$3 million	34,000	3,230
• (up to)\$150k for projects up to & including \$6 million		
• (up to)\$200k for projects up to & including \$10 million		
• (up to)\$300k for projects above \$10 million		

PPG AMOUNT REQUESTED BY AGENCY(IES), FOCAL AREA(S) AND COUNTRY(IES) FOR MFA AND/OR MTF PROJECT ONLY

Trust Fund	GEF Agency	Focal Area	Country Name / Global	(in \$)		
				PPG (a)	Agency Fee (b)	Total c = a + b
(select)	(select)	(select)				0
Total PPG Amount				0	0	0

MFA: Multi-focal area projects; MTF: Multi-Trust Fund projects.

⁵ 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. PMC amount from Table B should be included proportionately to the focal area amount in this table.

⁶ Indicate fees related to this project.

⁷ On an exceptional basis, PPG amount may differ upon detailed discussion and justification with the GEFSEC.

⁸ PPG fee percentage follows the percentage of the GEF Project Grant amount requested.

PART II: PROJECT JUSTIFICATION⁹

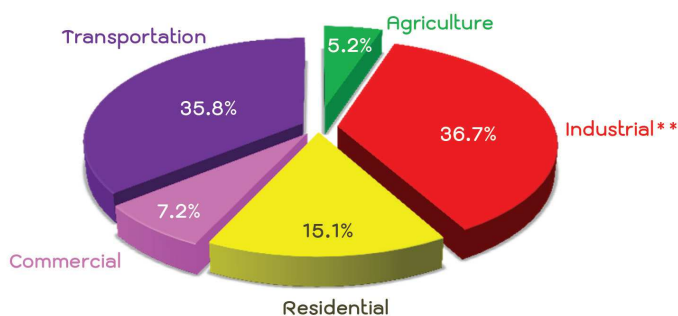
A. PROJECT OVERVIEW

A.1. Project Description

1) Global environmental problem, root causes and barriers

In 2012, Thailand's energy consumption was 73,316 ktoe, which was a 3.9% increase from the previous year. Energy consumption by different economic sectors is shown in figure 1. Highest energy consumption is seen in the industrial sector followed by the transportation sector. Within the industrial sector, 47.5% of the final energy consumption came from fossil fuels (Figure 2). Heat consumption from renewable energy (RE) reached 4,886 ktoe, accounting for 15% of total heat consumption in Thailand (Figure 2)¹⁰.

Thailand is the world's 24th largest carbon polluter with average emissions of 321.3 million tons of CO₂ per year¹¹. According to the 2nd National Communication submitted to United Nations Framework on Climate Change Convention (UNFCCC) in April 2011, energy sector contributed to 69.6% of the total emission in the country followed by agricultural (22.6%) and industrial sectors (7.2%)¹². In the industrial sector, the emission from coal/lignite use alone contributed to around 30% of the total¹³. Thailand Greenhouse Gas Management Organization (TGO) reported that GHG emissions in the manufacturing sector grew by 18.8% within the period 2002-2010.



** - including mining, construction and manufacturing

Figure 1: Energy consumption in different sectors

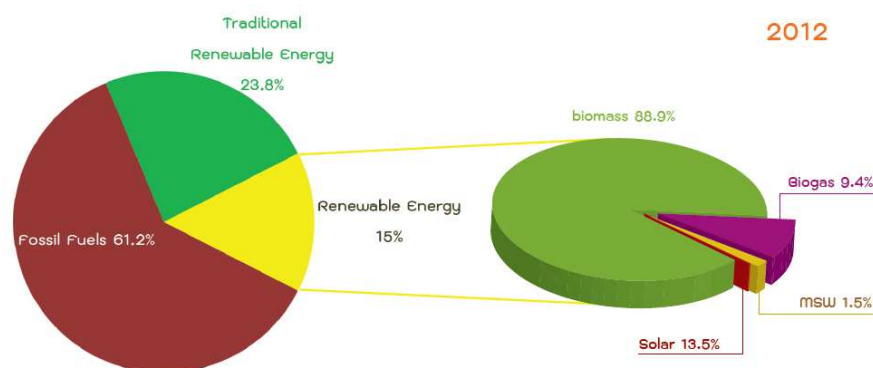


Figure 2: Status of RE in heat generation

⁹ Part II should not be longer than 5 pages.

¹⁰ Energy in Thailand, Facts & Figures 2012, DEDE

¹¹ As per statistics of World Resources Institute

¹² 2nd National Communication submitted to United Nations Framework on Climate Change Convention (UNFCCC), April 2011

¹³ Figure from Energy Policy and Planning Office, Ministry of Energy, www.eppo.go.th

The impact of climate change such as higher surface temperatures, floods, droughts, severe storms and sea level rise is more likely to put Thailand's food production at risk, especially the rice. A World Bank study concluded that the 2011 flood in Thailand caused an overall economic damage of USD 45.7 Billion until December 2011. It was also claimed that this disaster is ranked as the world's fourth most expensive natural disaster till 2011, surpassed only by the 2011 earthquake and tsunami in Japan, the 1995 Kobe earthquake and Hurricane Katrina in 2005¹⁴.

The 2011 rain caused flash flooding and landslides in several provinces along the Gulf of Thailand, uprooting trees and completely destroying rubber plantations. On the mountainous land, large areas of rubber plantation and trees were uprooted and destroyed by landslides. On the plain below, many agricultural settlements were totally overwhelmed by flash flooding and were buried underneath sandy sediment and mud. The estimated cost of damage was about US\$ 268 million¹⁵. Thai government also warned that the price of rubber, a key export commodity, would increase as a result of the flooding¹⁶.

The SME sector contributes greatly to Thailand's economy. In 2011, the SME sector's share of the GDP was around 37%. Among the SMEs, manufacturing enterprises contributed 31.2% of the GDP and around 30% of total SME employment¹⁷. Despite significant contribution to the economy, specific data on energy consumption and GHG emission from SME sector is not available. This makes it difficult to set targets for GHG reduction in SME sector.

For a long time, Thai manufacturing SMEs were using LPG for their energy requirements. However, in April 2012, due to reduction in LPG subsidy, there was a steep price increase from THB 18.1 to 30.1 (nearly 66% increase). This steep increase has forced these SMEs to switch to other cheaper fuels including imported coal. Increasing usage of coal, lignite and other coal products in SMEs poses a greater threat to global environment and adds to Thailand's GHG emission. Reducing the fossil fuel dependency in SMEs without hampering its production and revenue is a challenging task.

On the other hand, with its agricultural based economy, Thailand is rich in both agricultural wastes and organic-industrial wastes. A study conducted in Thailand in 2012, by the Department of Alternative Energy Development and Efficiency (DEDE), estimated that the annual excess biomass available is around 26 million metric tons or 8,600 ktoe. Another study conducted in the year 2011, estimated the annual excess biomass available to be around 33.8 million metric tons or 11,810 ktoe per year¹⁸.

Geographically situated in the equator, Thailand also has high potential in solar resource with an average radiation of 18.2 MJ/m²/day, whereas in other areas, it has good wind speed potential¹⁹. Such abundant alternative energy sources provide a lot of opportunities to strengthen energy security in the future.

Biogas from waste water and animal manure also provides good opportunity for renewable energy investment. Biogas technology has been expanding from animal farms to agricultural and food industry for wastewater treatment since the 1990s with the strong support from the government in terms of tariff and non-tariff incentives. There exist more than 1,000 biogas plants throughout Thailand²⁰.

¹⁴ The World Bank Supports Thailand's Post-Floods Recovery Effort". World Bank. 13 December 2011. Retrieved 25 January 2012.

¹⁵ http://www.isprs.org/proceedings/xxix/congress/part7/744_XXIX-part7.pdf

¹⁶ <http://www.bbc.co.uk/news/15916553>

¹⁷ White Paper on Small and Medium Enterprises of Thailand in 2011 Trend of 2012

¹⁸ Potential Crops Residues and Industrial Wastewater as Renewable Energy Resources for Thailand, Thailand Institute of Scientific and Technological Research (TISTR)

¹⁹ Energy in Thailand, Facts & Figures 2012, DEDE

²⁰ [http://www.sti.or.th/th/images/stories/files/1_Thailand_Bioenergy_Technology_Status_Report_2013%20-%20July%202029_Final%20\(2\).pdf](http://www.sti.or.th/th/images/stories/files/1_Thailand_Bioenergy_Technology_Status_Report_2013%20-%20July%202029_Final%20(2).pdf)

Alternative Energy Development Plan 2012 – 2021, targets heat generation of 9,300 ktoe from RE sources (solar – 100 ktoe; biomass – 8,200 ktoe; biogas – 1,000 ktoe). However, as mentioned earlier, the achievement until the year 2012 was only around 4,886 ktoe²¹.

It is clear that abundant RE potential exists in Thailand, which can be used to replace fossil fuel usage for heat generation in the SME sector. However, SMEs perceive the investment in a new technology and required employee training programs as risky. Even if the RETs offer an alternative cheaper choice of fuel to LPG/coal products, they are reluctant to invest, mainly due to lack of confidence. The main barriers to the implementation of RETs for heat generation include: a) inadequate data on baseline GHG emission in SMEs to plan for mitigation activities, b) lack of awareness and technical know-how among SMEs in RETs potential for heat generation, c) lack of framework to develop policy and incentives to reduce GHG emission from SMEs, d) lack of interest among SMEs to gain access to the available funds due to lack of trust in RETs, e) inadequate technical capacity among key decision makers in public & private sector, technical institutions, banks/financial institutions, engineering companies, etc. and f) limited experience in RETs for heat generation.

2) Baseline scenario and baseline project

Thailand is a pioneer among Asian countries in introducing policies to promote RE resources. Several plans were laid down to increase the share of RE in the country's energy mix. However, most of them focused on RE in electricity generation and energy efficiency (EE) in industrial sector. On the other hand, no specific policies or regulatory framework to promote RETs for heat generation in SMEs have been made.

The Thai Government introduced the “Green Industry Initiative” (GII) in 2011, which aims at the sustainable growth of industrial sector in accordance with ecology and social well-being²². Green Industry Promotion and Development Office (GIPO) under MoI is directly responsible for this initiative. It encourages the manufacturing enterprises in continuously improving their climate friendly production process and environmental management. MoI aims to get 70,000 enterprises certified as Green Industry by 2018. There are around 2,675 certified organizations²³ under the GII program (as of Jan 2013).

An industry can implement RE and EE measures to leverage their competence as green industry and go up the level. Some of the incentives received by the industries depending upon their compliance levels include the following²⁴:

- Exemption of annual factory license fee for 5 years
- Investment promotion
 - Machine import duty exemption
 - Corporate income tax exemption for 8 years
 - Income tax exemption

Although such incentives are available, these lack the ability to create a major impact on the sector.

One among the major incentives which would give a significant thrust to RETs for thermal energy generation is Renewable Thermal Incentives (RTIs)²⁵. This can be compared to providing incentives in the form of Feed-

²¹ Energy in Thailand, Facts & Figures 2012, DEDE

²² This initiative rewards the environmental friendly firms by certifying with 5 levels of green industry mark as follows: Level 1 - Green commitment; Level 2 – Green Activity; Level 3 – Green System; Level 4 – Green Culture; Level 5 – Green Network (Green Supply Chain). For further details please refer to <http://www.greenindustrythailand.com/en/content.php?pagename=condition>

²³ http://www.greenindustrythailand.com/en/content.php?pagename=factory_map

²⁴ Thailand: Green Economy: The 7th Seoul Initiative Leadership Programme on Green Growth : The dividend between “Green” and “Economy”, October 16 - 26, 2012, The Office of Industrial Economics (OIE), Ministry of Industry (MoI)

²⁵ Renewable Thermal Incentive (the RTI) is a payment system for the generation of heat from renewable energy sources

in-tariff (FiT) for renewable energy (RE) based electricity projects. Provision of FiT has given a thrust to RE based electricity projects in many countries including Thailand.

The proposed project is developed as a part of the above baseline initiative. This project will link up with certified energy intensive manufacturers under GII to promote the installation of RETs for heat generation. This will help them rise up in the compliance levels and enjoy the privileges/incentives under the initiative.

MoI is also implementing other energy related projects including *Energy Efficiency for SMEs* and *Total Energy Management Project*, to support the objectives of the 11th National Economic and Social Development Plan (2012-16) and National Industrial Development Master Plan (2012-31). Since such programs on energy efficiency are already in place, the proposed GEF project will focus only on RETs for heat generation.

Participating SMEs from the above ongoing projects can be involved in the proposed GEF project because of their awareness on RE and GHG emission reduction.

Baseline scenario in rubber glove industries (SMEs)

Under this project, RETs for heat generation will be demonstrated in rubber glove SMEs, which is one among the major SME sectors in Thailand.

Rubber industry sector plays an important role in Thailand's economy. Over the past 20 years, the Thai rubber glove sub-sector has grown and the annual export has reached a value of nearly USD 1 billion. At present, Thailand is the world's second largest exporter of natural rubber gloves for medical purposes. There are 58 SMEs²⁶ which manufacture rubber gloves for medical purposes. This sector is expected to grow benefitting from the annual growth of 12% per year in global market for rubber gloves and diversification of rubber glove demand to science, food industries and household uses.

According to ISMED's primary survey and analysis on SMEs, most of them spend around 16-25% of their total production cost for energy requirements alone (around 90% attributed to heat generation and 10% to electricity). This survey was complemented by UNIDO preliminary analysis. Based on the available data on GDP of manufacturing SMEs in 2011 (THB 603.3 Billion) and final energy consumption as per GDP in 2012 (0.015 ktoe per million THB²⁷), the energy consumption in manufacturing SMEs was estimated to be around 9 million toe per year. Also, it was found that manufacturing SMEs contributed around 15.9 million t CO₂e emissions every year (nearly 33.7% of total industrial sector emission)²⁸.

An ISMED survey also identified the primary carbon reduction opportunities in SMEs which included: i) reduction of energy losses in the production process and ii) use of solar hot water and biomass boiler technologies for process heat generation.

Existing financial schemes and funds

Thailand Sustainable Energy Finance Program (started in 2009 with a budget of around USD 30 Million), by International Finance Corporation (IFC), World Bank under their Clean Technology Fund is currently ongoing. The program aims to help Thailand address its climate change challenges by making a major contribution in three critical areas: a) Increasing private sector involvement in the development and financing of EE/RE/energy service company (ESCO) investments, b) Supporting EE market transformation, by

²⁶ Registered enterprises from Department of Industrial Works, Ministry of Industry (Data as of May, 2013)

²⁷ Thailand Energy Statistics 2012 by DEDE, Ministry of Energy

²⁸ During the PPG phase, this baseline would be revised and would be calculated based on the input and output database of SME productivity.

developing EE/RE/ESCO investments and providing new clean energy technologies and energy efficient equipment in Thailand's large corporate, SME, commercial, residential and municipal sectors, and c) Enhancing energy savings by raising market awareness of benefits to induce new clean technology and to reduce GHG emissions²⁹. This program is implemented through DEDE. It also encourages financial institutions in Thailand to develop financing programs for small sized carbon mitigating investments such as EE projects and small-scale RE investments³⁰.

This is an unfunded portfolio risk sharing facility (denominated in local currency). Under this mechanism, International Finance Corporation (IFC) pledges to cover a percentage of the losses that may arise for up to US\$70 million portfolio of sustainable energy leases originated by the partner financial institution³¹.

Incentive Programmes for Solar Thermal Technology: This programme has been running since 2008. The Thai Government has plans to operate this incentive scheme until 2022. The sixth and final phase from 2013 to the year 2022 has a target of 25,000 m² of solar thermal collector area³². Incentive allocation for the sixth phase is set around USD 2.6 million. In 2011 and 2012, grants for a total of 21,034 m² of collector area were distributed. According to DEDE, the majority of the subsidy receivers were from industries, followed by hotels, farms and hospitals. However, SMEs have so far shown very little interest in gaining access to this fund, mainly due to lack of confidence in the RETs.

The proposed project, which will expand the above mentioned baseline activities in Thailand, and will focus on overcoming the barriers in the deployment and commercialization of RET's usage in SME for heat generation. If there is no action taken, then, Thailand will increase its CO₂ emission level owing to its increasing usage of LPG and coal products³³.

3) GEF alternative scenario and project:

The project aims at promoting RETs for heat generation in manufacturing SMEs to reduce CFP of their products.

The proposed intervention aims at removing the barriers and enabling the SMEs to utilize RETs such as biomass (boiler/gasifier), biogas, solar energy, etc., to generate thermal energy for the production process, which will replace fossil fuels and offset the GHG emissions.

The proposed project will have the following 4 components:

Component 1: Development and enforcement of policy measures and streamlining of incentive schemes

Under this component, a new national policy to promote RETs for heat generation will be established by the Thai Government.

²⁹

<http://www.climateinvestmentfunds.org/cifnet/sites/default/files/Thailand%20Sustainable%20Energy%20Finance%20Program%20-%20Approved.pdf>

³⁰ <https://www.climateinvestmentfunds.org/cifnet/project/thailand-sustainable-energy-finance-program/>

³¹ [https://energypedia.info/images/1/18/Thailand - Sustainable Energy Finance Program.pdf](https://energypedia.info/images/1/18/Thailand_-_Sustainable_Energy_Finance_Program.pdf)

³² Information Workshop: Solar Thermal Technology in Thai Businesses and Industries. Incentive Programmes for Solar Thermal Technology in Thailand, Department of Alternative Energy Development and Efficiency (DEDE) Thailand's Ministry of Energy, March 2013

³³ Majority users include cement factory (in clinker and cement kilns), pulp and paper industries (coal fired boilers), food processing industries (coal fired boilers), lime industries (lime kilns), tobacco and small to medium size agricultural process industries (drying process)

During PPG stage, a gap analysis will be conducted on policy aspects to identify the gap that would be bridged by this project.

This policy would be linked to the Green GDP strategy of MoI.

Types of policy support targeted, includes the following (the exact policy support(s), and would be identified by the gap analysis):

- a) Fiscal incentives (production/investment tax credits, capital subsidy, grant, or rebate, etc.)
- b) Grants for resource assessment, technical studies, bankable proposals, demonstration, etc.

The policy would also include setting of targets for thermal energy generation from RET, industries eligibility criteria for participation, incentives and promotional measures, etc.

Investments in renewable energy projects for thermal energy generation are profitable and generally yield a quick payback period within two years. (please refer to the case studies given in the footnote, indicating the quick payback period for such projects)³⁴.

In spite of that, the SME owners are reluctant to change the status quo and make investments in RETs because of their low level of technical knowledge and lack of trust in the RETs in thermal energy generation, lack of technical/financial capacities to develop a bankable proposal and information on the financial viability. As a result, they have not gained much from the available renewable energy incentives. This was also confirmed by the interviews conducted with the few manufacturing SMEs that do not have any access to the existing financing schemes. To bridge the gap, the project aims to achieve the following:

- Streamlining the existing RE incentive schemes for increasing the SMEs access including adding special conditions. These conditions will be studied during the project implementation stage to identify the opportunities for streamlining the existing incentives for increasing the access of SMEs to the existing RE incentive schemes.
- Awareness creation among SMEs for thermal energy generation technologies based on RE, including its financial viability (please refer to PC 2)
- Technical capacity development for thermal energy generation technologies based on RE (please refer to PC 2)
- Building capacities of national level consultants/consultancies for continuous project development (please refer to PC 2)
- Assistance for the preparation of bankable proposal through I & LC (refer to PC 3)

Various awareness programmes such as seminars, informal and consultative meetings will be conducted to enable the SMEs to gain knowledge on the available subsidies and credit lines.

These will be conducted in 4 or 5 locations in Thailand to increase the outreach. During the seminars, representatives from the different funding agencies/ministries will also be invited to make presentations and interact with interested project developers. Head-to-head meetings will be conducted for match making and facilitating the development of RE based heat generation.

In addition, the project will facilitate and secure the finance from these schemes for at least 10 projects. On a continuous basis support will be provided to the SMEs (advisory supports) to avail these. All such advisory supports will be provided by the Information & Learning Centre. All these will facilitate flow of financing from the available schemes to the SMEs.

³⁴ a) Solar thermal heating in a textile mill in India

<http://solarthermalworld.org/content/india-less-one-year-pay-back-textile-industrys-solar-preheating>

b) Biomass gasification system in Thailand

http://www.eepmekong.org/downloads/Biomass_Gasification_report_final-submitted.pdf (page no. 65)

In addition, during the PPG stage, a more thorough analysis of the barriers to renewable thermal energy development would be conducted to identify the perceived risk by the investors, especially SMEs.

Also, during the PPG stage, all efforts will be made to include and cover the demonstration projects and all replication projects under a risk guarantee scheme similar to the existing IFC risk sharing facility for energy efficiency projects.

Possibilities of such a scheme will be studied for renewable energy based heat application projects in collaboration with the Office of Small and Medium Enterprises Promotion (OSMEP) and participating banks. The risk guarantee facility will cover a portion of the potential losses from loans to eligible projects. This study will identify the funding requirement and the co-financing partner and also the necessary modalities and procedures of the risk sharing facility.

Such efforts on the risk guarantee scheme will also include efforts to include or dove tail any RET based thermal application projects under the existing IFC risk sharing facility.

Apart from the above,, GEF grant of around USD 0.3 million will be used for providing incentives for the SMEs who are willing to adapt RETs for heat generation in their industries. This incentive mechanism would be established within the first 6 months of the proposed GEF project, so that sufficient time is available for testing with the demonstration projects. Incentives from the GEF grant would be given to the demonstration projects based on the level of investment needed. Such incentives would be disbursed on a pro-rata basis based on the development in project implementation.

This scheme would be established under OSMEP through a participating bank. Initial discussion with SME Development Bank indicates their interest to participate and collaborate with OSMEP on this.

During PPG stage, efforts would be taken to identify additional sources from ministries and government agencies for providing incentives. This scheme will be continuing, until the national policy for promoting RETs (which will have its own incentive schemes) for heat generation is implemented.

The proposed GEF project, also aims at creating an exclusive special lending scheme with preferred interest (soft loan) to help manufacturing SMEs investing in RETs for thermal energy generation. It has to be noted that a final decision on the creation of soft loan for investments in the RETs will be finalized only during the PPG stage.

As already mentioned above, SME Development Bank is interested to participate in the project and would provide soft loans to assist SMEs on the RE projects. SME development bank is a Thai Government Bank, whose mission is to “Support government policy for helping and promoting SMEs by financial and other services to Thai SMEs’ need”³⁵. Since it is a government bank, with a mission to assist SMEs, the funding source and the sustainability of the funding sources is not an issue.

This will encourage the investors to invest in RETs. SMEs that have not benefitted from the already existing schemes will be targeted under this scheme.

Sustainability within the market (market proliferation), is expected because the chosen bank in the project will be a role model for other market participants. IFC’s experience in Eastern Europe shows that once it is proven that the energy efficiency / renewable energy projects can generate additional income for the financial institutions; other banks will follow using their own funds to develop the new products. It should also be

³⁵ <http://www.smebank.co.th/en/visions.php>

noted that the barriers for new entrants will be significantly reduced as much of the learning from the initial banks will be captured and shared with new market entrants³⁶.

A study analysing success stories from other countries (regarding GHG mitigation scheme and incentives for SMEs) will be undertaken as recommendations to support policy mechanisms. This study would be completed using co-financing resources. Also many seminars and stakeholder consultation workshops will be conducted.

Policy measures and incentives once created would instil more confidence among manufacturing SMEs to invest in RETs leading to greener and lesser carbon-footprint manufacturing SMEs. Detailed policy measures and incentive schemes will be designed, discussed and agreed up on during the PPG phase.

To ensure cost-effectiveness, all incentives / support created under the proposed GEF project will be gradually reduced in line with targeted capacity levels, which will reflect the increased economies of scale corresponding to the market maturity.

Component 2: Development of human and institutional capacity

Through this component, capacity development and knowledge management will be developed on RETs for heat application and CFP of products in manufacturing SMEs.

a) An information and learning centre (I&LC) will be established on RETs for heat application. It has been foreseen to establish it within ISMED or any other existing one-stop centre on renewable energy in the Department of Alternative Energy Development and Efficiency (DEDE). The exact location and arrangement will be finalized during the PPG stage. This centre will be located strategically in a place where there is a high concentration of SMEs.

This centre will be providing various information related to RETs for thermal energy generation. In case any SMEs approach this centre for other solutions such energy efficiency, electricity generation, etc., this centre would guide them appropriately or lead to other institutions/organizations for further guidance. The I&LC would closely collaborate with other similar centres on renewable energy already existing in the country. Such collaboration activities will also be studied and the arrangements will be finalized during the PPG stage.

The financial sustainability of the I & LC would be ensured through the following means:

- Well trained staff members of the university/institution would be managing the I & LC and hence, there would be no additional manpower cost.
- A fee would be charged for the training activities. This amount would be used to manage and maintain the activities of the centre.

Since the I&LC will function even after the completion of the proposed GEF project, the database would be updated on a continuous basis.

b) Technical capacity will be built for OSMEP, ISMED technical staff, national experts and decision makers from other related ministries such as Ministry of Finance, who would be identified during the PPG stage, (all together at least 50 persons) on the following: a) Introduction on RETs for heat generation, b) supporting, developing and implementing RETs for heat generation projects in industries, c) access to finance, d) necessary policy intervention and e) carbon emission reduction in SME sector

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<http://www.climateinvestmentfunds.org/cifnet/sites/default/files/Thailand%20Sustainable%20Energy%20Finance%20Program%20-%20Approved.pdf>

The ultimate goal is to equip ISMED technical staff and national experts to provide consultancy services to the manufacturing SMEs and OSMEP staff (who are involved in designing policy measures and incentive schemes).

These trained national experts will be catering to the needs of SMEs and function as private market based consultancy service providers. Later on many other consultancy service providers may come up. However, for the technology penetration to be effective, a stable body (without major profit motive) to carry out the capacity building and consulting activities, ISMED is chosen as the initial target. I&LC would continue to train whoever wishes to gain knowledge in this sector. This would ensure that whoever wishes to become a private market-based consultancy service provider, can get adequately trained before providing services.

c) Capacity building activities will also be conducted with targeted SMEs (at least 30 technical personnel from SMEs). Awareness will be raised among SMEs to invest in RETs and thus reduce GHG emissions. Capacity development of 30 SMEs is the target under the project. I&LC would be engaged in continuous capacity building. This would ensure that more and more SMEs will be adequately trained on a continuous basis.

These trainees will include technical personnel from the following SMEs: a) light industries (textiles and apparel, shoes, gems and jewellery, printed matter, and plastic packaging), b) engineering industries (steel and alloy, machinery, mould, electrical appliances and electronics and automobiles and parts) and c) natural resource-based industries (food, pharmaceuticals and herbs, wooden furniture, gifts, souvenirs, household decorative items made from rubber, and ceramics).

Advertisements will be done, through the e-mail communications to respective organizations, newspapers, radio, etc. about the trainers training program. Interested participants will be requested to apply for the trainers training programme. I & LC centre along with UNIDO will screen the applications and select the participants based on his/her impact in spreading the CFP labelling initiative among SMEs.

Trainings for various target groups such as local engineering and O&M institutions will be provided (at least 50 people) to facilitate sustainable operation of the demonstration and replication projects. All capacity building activities will be carried out in collaboration with ISMED and the I & LC.

d) A database of GHG emissions of participating SMEs will be established and will be accessible to the public. The database will serve as an important tool to OSMEP in developing policy measures to promote RET investment in SMEs and policy measures to curb GHG emission from SMEs in future.

Since there is inadequate private market based consultancy providers for RET based thermal energy generation, to begin with, the proposed GEF project aims to train the SMEs directly. In addition, national experts - aimed at developing the private market based consultancy - are also trained along with ISMED, OSMEP, decision makers, etc. on various aspects of RET based thermal energy projects development. After the initial set of trainings under the GEF project (with GEF funding and co-financing contribution) is over, all capacity building activities will be market based without the involvement of subsidies. Even the proposed, I&LC, will charge a fee for the training activities and services. These activities will ensure that the project will develop a gradual transition from subsidized SME capacity building to market based SME capacity building over the duration of the project.

Component 3: Promotion of investments in RETs for heat generation in rubber glove industries

As mentioned above, investments in renewable energy projects for thermal energy generation are profitable and generally yield a quick payback period within few years. However, SME owners are reluctant to invest because of their lack of knowledge on the technology and its financial viability, trust on the technology and technical capacity to develop such projects. It is crucial to demonstrate the technical reliability and financial viability of RETs for heat generation in manufacturing SMEs. A demonstration project will give confidence

among manufacturing SMEs and other SMEs at large. These demonstration projects will prove that RETs through careful design and accurate selection of technology can offer the same output, with less GHG emission, while minimizing the CFP of a product³⁷.

As one of the industrial sectors which are highly energy-intensive, the rubber sector is selected as the demonstration sub-sector. Biomass boiler and solar thermal technologies will be demonstrated through private sector investments in rubber glove manufacturing SMEs.

In addition, training of up to 30 people from local stakeholders and technical staff in the management of the technologies will be conducted. Performance of the demonstration projects will be monitored, documented and results will be published and disseminated for replication and will be considered as inputs to formulate policy measures to support Thai SMEs in reducing GHG emissions. The demonstration sites will be opened for visitors, in particular for potential and interested SMEs.

At least, the 3 rubber glove manufacturers below will serve as demonstration sites. During the PPG stage, efforts will be taken to identify potential projects from other sectors for demonstration under the GEF project.

The following section describes the tentative demonstration sites. As of now, these industries have expressed their interest in investing in RETs with GEF support. SMEs that have not benefitted from already existing schemes will be targeted as demonstration projects. Brief details of these schemes are added in Annex 1.

In case if the SMEs have been benefitted from the above mentioned schemes, they would not receive any benefits through the incentive scheme under the proposed GEF project. This arrangement is to benefit as many SMEs as possible.

During the PPG stage, the demonstration sites will be confirmed along with the co-financing letters.

Both electricity and heat are used in rubber glove production process in these industries. Electricity is mostly used in chiller, air compressor and motor systems, whereas heat is used in drying and chemical warming systems. The annual energy consumption of the 3 factories is 17,624 t of imported coal, 3,450,200 liters of fuel oil and 7,696 t of LPG, corresponding to an annual emission of 67,854 t CO₂.

Table 1: Tentative demonstration sites and their present energy consumption

S. No.	Factory	Province	Average disposal rubber gloves production (million)	Annual energy bill (Million USD)	Split of energy cost			
					LPG	Coal	Fuel oil	Electricity
1.	Wattanachai Rubbermate factory	Chonburi	480.8	1.9	88%	-	-	12%
2.	MRI factory	Chonburi	524.3	1.4	-	63%	7%	30%
3.	SGMP factory	Songkhla	770.9	5.2	45%	-	37%	18%

The proposed technology intervention in these factories includes either biomass boiler or solar thermal technology. Efforts would be taken to demonstrate both these technologies which can then be evaluated

³⁷Other activities to promote SME investment such as capacity building, policy support, etc. are taken care by project component 1 and 2.

against each other. The exact technology to be used will depend on the project condition and the availability of natural resources at the project site.

The detailed feasibility studies would be completed during the PPG stage. Only after confirming that RE based thermal generation is a suitable option for reducing the SME's CFP, will be considered. The following information will be established in the feasibility studies: i) Practical heat generation capacity, ii) Specific technology and energy source proposed, iii) Techno-economic feasibility of the project, iv) Global environmental benefits and v) Potential for additional demonstration capacity and investment opportunities for replication.

For biomass demonstration projects (steam thermal as well as gasifier), in addition to the detailed feasibility study, a detailed fuel supply availability study will be conducted to ensure the reliable availability and sustainability of the biomass resources (during the PPG stage). These two studies will then confirm the capacity of the biomass plant based on the sustainable supply.

Also, it has to be noted that there will be no resource competition, as the demonstration projects will be targeting mainly the self-generated wastes and other locally available resources for their thermal energy generation. Also, the SMEs that procure biomass from nearby will have a clear contract for the biomass supply.

It needs to be noted that UNIDO is developing another GEF project on "Reduction of GHG Emission in Thai Industries through Promoting Investments of the Production and Usage of Solid Bio-fuel". Its objective is *to reduce GHG emission in Thai industries and power plants by promoting the use of industrial-grade solid biofuels as energy source*. As per the available details in this project, there is excess biomass available in Thailand. This project aims to utilize this available biomass (after ensuring sustainability and necessary certification) and to create solid bio-fuel depots market for the sale and purchase of solid bio-fuels in each province.

If required, SMEs may procure certified and sustainable solid bio-fuel for their energy requirements from these solid bio-fuel depots. In addition to this, each replication project will follow the same procedure as that of the demonstration projects and will ensure through a detailed fuel supply and feasibility study that the biomass procurement is sustainable and reliable for the chosen plant capacity.

For solar thermal utilization, detailed studies will be made on the SME industrial process and suggestions would be made to modify the process cycle to match with the solar thermal energy generation. Also the baseline conventional thermal energy generation system would be used as a backup to supply the required energy.

Usage of other renewable energy technologies for heat generation such as biogas will also be considered for both demonstration and replication projects, depending on their suitability. For biogas based systems, daily and seasonal availability of the waste water / organic waste throughout the year, present utilisation of the waste, cost incurred for waste disposal, etc. will also be carefully studied. It has to be noted that wherever possible and required, a combination of RETs shall also be used to replace fossil based thermal energy generation.

Detailed technical designs will be prepared for the proposed demonstration projects.

Once when the SMEs are confident in investing the technologies, it is expected that they will themselves fund for the studies and other project development activities.

The project would also support the development of at least 10 bankable proposals for similar initiatives.

Component 4: Monitoring & Evaluation (M&E)

The project will be subjected to mid-term and final evaluations. The project will be monitored from the beginning and a mid-term evaluation will be conducted and follow up corrective measures will be carried out. An independent final evaluation will be conducted three months prior to the terminal review meeting. The final evaluation will look at the impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefit goals. The final evaluation will also provide recommendations for follow-up activities.

After successful completion and operation of the demonstration projects for a period of one year, the project performance monitoring will be conducted to study the technical, financial, environmental and socio-economic performance of the projects. Full scale project demonstration site visit and seminars will be organized and the project experiences will be disseminated to various interested stake holders in order to increase the replication potential of the project. Various dissemination tools such as leaflets, website, etc., will be used for effective dissemination. All such activities within the GEF project duration (36 months) will be conducted using GEF resources. If the aforementioned activities are to be conducted after the GEF project duration, the cost of the activities will be borne by executing partners OSMEP and ISMED.

Methodologies/tools will be developed to use the collated information for better planning and decision making. Case studies will be prepared and presented to raise more investment in RETs for heat generation, using the trained capacity that is created.

An annual report and periodical newsletter on best practices, information on country level projects and key indicators of progress made under the project, will be prepared and distributed to the key stakeholders and agencies.

4) Incremental/Additional cost reasoning

At present, the heat energy requirements in industries are met through LPG, coal and fuel oil usage. It is targeted that at least 20% of the present heat generation requirements would be met through RETs. GEF funding will be used for meeting the incremental cost of RETs installation. Out of this, GEF provides a grant of only USD 737,000, which is approximately 8.8% of total incremental cost.

5) Estimation of global environmental benefits

Direct global environmental benefits are from the implementation of the proposed demonstration projects. The project aims at avoiding 24,146 t CO₂e³⁸ annually throughout the project lifetime of 15 years. This is calculated based on the target that at least 20% of the present heat generation requirements would be met through RETs. This initial estimation will be refined during the PPG stage.

Indirect benefits are calculated from potential replication. It is expected that due to the market transformation, many other SMEs would also initiate and implement RETs for heat generation in their factories. Based on a preliminary survey of ISMED, at least 15 rubber glove manufacturers have potential to invest in the RETs to reduce the CFP of their products. In addition SMEs in other sectors are also expected to invest in RETs. This clearly indicates that indirect benefits are estimated to be around 120,730 t CO₂e³⁹ per year.

³⁸ Emission factor of 2.626 ton CO₂e/ton LPG, 3.05 kg CO₂e /liter fuel oil, 2.56 ton CO₂e/ton coking coal is considered and the estimation of at least 20% of current consumption of fossil fuels from 3 demonstration sites is to be replaced by biomass and/or solar energy sources.

³⁹ Calculated from at least 15 rubber glove SMEs to invest in RETs as a result of project's intervention

A more detailed assessment of potential CO₂ emissions reduction and investment opportunities for replication will be carried out during the PPG phase. The total GEF resources of around USD 1.9 million will be used to mitigate CO₂e emission at a rate of USD 5.2/t CO₂e directly and around USD 1.7/t CO₂e indirectly. These initial estimates will be refined during the PPG phase.

6) Innovation, replication and sustainability

Innovation: The project offers an innovative approach by being the first of its kind in Thailand that aims to reduce CFP in manufacturing SMEs in an holistic manner and enabled environment through the investment in RET application for heat generation to reduce the CFP.

Replication: By choosing the rubber glove industry as demonstration sub-sector, the project will produce “bottom up and comprehensive data” on GHG emission for the specific-industrial SME sector. This data will serve as a useful national baseline for the calculation of accurate GHG emission and mitigation target from the SME sector. The proposed demonstration projects, capacity development to local stakeholders and policy measures will be designed not only to demonstrate the viability of the RETs, but also to provide a framework for sustainability and replication in other manufacturing SMEs.

Even though the demonstration projects focus on rubber glove companies, replication and scaling up are ensured because of the following:

- a) Training to OSMEP, ISMED and other experts for supporting biomass boiler and solar thermal technologies
- b) Training to technical personnel belonging to different SMEs on RE based heat generation
- c) Establishment of information and learning centre (I&LC) for continuous human and institutional capacity building
- d) Policy measures and incentives available to encourage manufacturing SMEs investing in RE for heat generation

Even though the demonstration projects focus on rubber glove industries, the technologies (solar thermal or biomass boiler), as such can be adapted to any other industry requiring thermal energy. Technical specificity of the different industrial sectors, does not have any impact on the usage of solar thermal or biomass boiler.

Any renewable energy technology penetration requires various supports from governments and donors. Initial phase always require additional support. Later on when the technology has penetrated and has seen success, the level of support can be reduced. However, still some level of supports is required. For example, Renewable energy based electricity generation (especially biomass) in Thailand is a proven technology in Thailand. However, still the RE electricity projects receive some supports such as feed-in-tariff, tax holidays, import duty exemption, other tax deductions, etc. Such incentives are essential, until such time when the technologies are viable even without any financial support or when the market forces take over.

Long term vision and support for RE based thermal energy generation projects will be clearly elaborated in the National policy to be established under this project (under PC 1).

The major barriers, among others, in utilizing the RE for thermal energy generation are: a) lack of awareness and technical know-how among SMEs in RETs potential for heat generation, b) lack of framework to develop policy and incentives to reduce GHG emission from SMEs and c) inadequate technical capacity among key decision makers.

Through demonstration projects, capacity building, developing national policies and incentive system, the project aims to mitigate these barriers.

Hence, when the investors see that the barriers are removed and a favourable investment environment is available, they will be ready for investment in these technologies (which is not currently happening).

In addition, replication and scaling up will be ensured through the following:

- Successful implementation and operation of the demonstration projects: *This will lead to gain in confidence among private investors*
- Incentive scheme for SMEs: *This would promote the use of RETs for thermal energy utilization*
- Establishment of capital incentive scheme: *This would encourage investors invest in RETs*
- National policy: *Any national strategy from the central government is expected to create a sizable impact on the market. For e.g., renewable energy (RE) promotion has supported the emergence of a decentralized electricity generation from the projects that are not owned and operated by large utilities. By the end of 2011, over 260 RE plants were operational under the Small power producer (SPP) and Very small power producer (VSPP) schemes, with a cumulative generating capacity of around 1 GW⁴⁰. Similarly a thrust on RETs for thermal energy generation, result in significant achievements in the sector.*

Sustainability: I & LC will sustain the promotional and development activities within the sector. Soft loans and incentive schemes will be designed to attract new investors. Capacities of ISMED, OSMEP and others will be built throughout the duration of the project implementation. That would help them to streamline the technical knowledge RETs for heat generation. They will continue to provide technical guidance to a wider group of SMEs.

Thai government is expected to allocate funds for promoting RE utilization. This will support the project activities beyond the GEF project duration.

In addition to this, various donors/banks and financing institutions are expected to support the Thai government in the coming years. A part of this money will be channelled for this purpose, to ensure the financial sustainability of the soft loan and incentive schemes, until such time when the technologies are viable without any financial support or when the market forces take over.

During PPG stage, the project would identify activities to assess the residual need for the financial support before the end of the project.

Sustainability within the market (market proliferation), is expected because chosen bank in the project will be role models for other market participants. IFC's experience in Eastern Europe shows that once it is proven that the EE/RE projects can generate additional income for financial institutions; other banks will follow using their own funds to develop the new products. It should also be noted that the barriers for new entrants will be significantly reduced as much of the learning from the initial banks will be captured and shared with new market entrants⁴¹.

A.2. Stakeholders

The project components will be implemented in partnership with key SME development agencies as well as financial institutions in the country.

Under this project, OSMEP will be the main counterpart. OSMEP is a government agency under MoI. Its main responsibility is to provide policies and plans for SME promotion. The agency will be responsible for

⁴⁰ http://cdkn.org/wp-content/uploads/2013/05/Thailand-MIT_InsideStory.pdf

⁴¹

<http://www.climateinvestmentfunds.org/cifnet/sites/default/files/Thailand%20Sustainable%20Energy%20Finance%20Program%20-%20Approved.pdf>

the development of policy and incentive schemes for investment in RETs for SMEs and provide “one-stop” service for SMEs to access and utilize the financing mechanism and funds.

ISMED, under MoI is mandated for SME development and it works with OSMEP as its implementing arm. Under this project, ISMED will be a key project executing partner and beneficiary. ISMED’s extended and strong network with industries will play a key part in bringing the project into place. ISMED’s team will be provided with on-the-job trainings on RET investment. Thereafter, ISMED will be able to incorporate them into their core business.

The role of Thai Rubber Glove Manufacturers Association (TRGMA) is to coordinate with the rubber glove SMEs/manufacturers. The project team will work with SME development bank to help manufacturing SMEs to access the financial investment with the Bank’s terms and conditions.

Key decision makers from related departments/ministries such as DEDE, Ministry of Finance will also be involved in the Project Steering Committee.

Eligible female candidates will be involved as trainers and technical consultants. Terms of References will be prepared to attract qualified female experts to work in capacity building and policy components. Moreover, women will also be encouraged to participate as trainees in various capacity building sessions.

A.3 Risk. Indicate risks

Component	Risk	Risk Level	Proposed Mitigation Measure
Technical risk	RET for heat application is relatively new for SMEs and there is lack of technical expertise for development and implementation of the projects.	Low	Detailed techno-economic feasibility studies will be carried out. The technical personnel in SMEs will be trained on deployment of RETs. Capacity of the government officials (i.e., of OSMEP) and relevant institutions will be developed. This capacity building will help mitigate the perceived risk.
Financing risk	There is a general perception that investments in RETs do not provide sufficient / high returns. Lack of funding for replication of the projects.	Moderate	UNIDO and other executing partners will mobilize investors and enterprises to invest in the demonstration projects. GEF is providing incentive for the demonstration projects which will encourage them to invest in RETs. Also for replication projects, a special lending scheme with preferred interested (soft loans) is proposed at CIMB or any other bank which will encourage the investors investing in RETs. Also, the project aims at utilizing / creating a risk sharing facility for investments in RE for heat application. The risk sharing facility will cover a portion of the potential losses from loans to eligible projects. It is expected that by sharing credit risk in sustainable energy financing, the project will encourage the partner banks to provide long-term lease financing, and will eventually reduce the perceived risks within this sector. The project team will also work with participating SMEs to develop bankable proposals for the

Component	Risk	Risk Level	Proposed Mitigation Measure
			investment. GEF / UNIDO participation is expected to help successful mobilization of financing in the form of both equity and loan for demonstration projects as well as replication projects.
Sustainability risk	Application of RETs in SMEs might be halted due to the shortage of energy inputs.	Low	A proper assessment of local energy resources (biomass and solar) and feasibility studies will be done before the installations are initiated to ensure the sustainability of the supply of local energy resources.
	Lack of human capacity to operate the projects.	Low	Local engineering and O&M companies will be trained in O&M of RETs for thermal energy generation. Also, the O&M staff of the demonstration projects will be trained by the respective suppliers. The established I&LC will ensure continuous capacity building and hence the sustainability of the projects.
Co-financing risk	Co-financing may not be committed by the co-financiers.	Moderate	Letter of commitment will be obtained from the co-financiers to ensure their financial role in the project.
Implementation risk	Failure to implement the project.	Low	UNIDO has significant experience in developing and implementing RE projects and it has a good knowledge of the key variables that determine the success and the failure of project implementation. The project will be implemented in close collaboration with the project partners, stakeholders and project developers. UNIDO's experience in the country will also help mitigate the risk.
Political risk	Security issues in the demonstration sites due to the existing political situation	Low	Thailand recently went for general elections. This is expected to ease off the perceived political and security risks. Also, the demonstration sites are not near Bangkok which is the epicentre of the recent political unrests.
Climate Change risk	Flood at the project sites.	Low	The demonstration sites will be located in existing rubber glove SMEs, which continue to exist and operate without any flood related threats. In any case, the demonstration plant owners will take efforts to sustain their SME operation. This would automatically ensure the operation of the demonstration plants.

A.4. Coordination

The project will build on the experiences and achievements of the following projects to ensure that they are complimentary with each other.

Green Industry Project Initiative of MoI: The proposed project will support and complement this initiative, which promotes energy conservation in production processes, efficient use of resources, use of RETs, green productivity development, eco-design and eco-products, green label or eco-label, life-cycle GHG inventory and reduction of GHG emissions.

Promoting Small Scale Biomass Power Plants in Rural Thailand for Sustainable Energy Management and Community Involvement project: This is a UNIDO/GEF project implemented since 2012. UNIDO will coordinate with Phare Provincial Administrative Office (PAO), which is one of the executing agencies. Phrae PAO may be interested to be a project partner, in particular, to set up the solid biofuel trade center in the province. The produced solid bio-fuel shall be used in the biomass boiler in the participating SMEs. Other projects with which the proposed project would seek synergy are given in Annex 1.

The proposed project will also supplement the ongoing national efforts under the 11th National Economic and Social Development Plan (2012-2016), the National Industrial Development Master Plan (2012-2031), Alternative Energy Development Plan (2012-2021) and Environmental Management Plan (2012-2016), which are briefed in the next section.

The proposed project will seek close coordination with all the above initiatives and other concerned stakeholders to ensure that relevant lessons that are learnt and experiences undergone are incorporated into the project. More in-depth consultation will be carried out during the PPG phase to identify possible collaborative activities.

B. DESCRIPTION OF THE CONSISTENCY OF THE PROJECT WITH:

B.1 National strategies and plans or reports and assessments under relevant conventions

The proposed project will support the above government policies and strategies targeted to increase the usage of RE in industrial sector.

Initial National Communication to UNFCCC (2000): It identified the following measures to enhance the GHG mitigation: a) demand-side management, b) fuel switching, c) energy conservation programs, d) solar energy, f) public campaigns on energy conservation and g) improving public transportation system.

Thailand's National Capacity self-assessment (NCSA) to UNFCCC (2010): Based on national priorities for addressing climate change and environmental issues NCSA identified the following capacity needs: a) Greater coordination and communication, b) greater political will and high level support from industries, c) establish institutional arrangements for maintaining the continuity of climate change implementation strategies, projects and programs, d) increase scientific knowledge through specialized training and education and e) increase communications with stakeholders through enhanced outreach strategies.

Incentives, Guarantee and Protection under the Investment Promotion Act (1977 and amended in 2009 and 2011): The incentives that are offered under this policy include import duty exemption on machinery, 8-year corporate income tax exemption without being subject to a corporate income tax exemption cap, 50% reduction of corporate income tax on net profit for 5 years after expiry of tax holiday, double deduction of transportation, electricity and water supply costs for 10 years from the date of income derivation from promoted project and 25% deduction of the cost of installation or construction of facilities in addition to normal depreciation deduction.

Second National Communication to UNFCCC (2011): It identified the following techniques, know-how and technologies to mitigate GHGs: a) analytical techniques to prioritize mitigation options for energy

conservation and renewable energy, b) technologies for biomass and biogas energy production appropriate for local conditions, c) efficient technologies and systems for traffic and mass transport, especially for logistics, d) advanced technologies for energy conservation for electricity production and consumption, e) environment-friendly technologies for cement production, f) development of knowledge and infrastructure for innovation of clean technologies and g) technologies to mitigate GHG from rice paddy fields.

National Portfolio Formulation Exercise, NPFE (2011): It concluded that the challenges to Thailand are enhancement of the national GHG mitigation and maintenance of the national sustainable development path. It suggested the integration of various environmentally sound technologies to enhance energy conservation and energy efficiency, to promote bio-energy while ensuring food security and livelihood of farmers.

Technology Needs Assessment (TNA) and Technology Action Plan (TAP) Report, TNA (2012): The results of the technology prioritization are summarized as follows: a) Smart grid, b) Waste (to power generation), c) Second and third generation of biofuels, d) Energy efficiency in combustion in the industrial sector and e) Carbon capture and storage (CCS). It also concluded that Thailand needs an international support on technology knowledge transfer. It also suggested linking with international organizations and experts to ensure the proper application of the state of the art technologies.

It has to be however noted that this report does not discuss much on the renewable energy based thermal energy generation.

The National Industrial Development Master Plan (2012 – 2031) by MoI, prioritizes the RE sector as one of the 8 strategic sectors for achieving the goals under the plan. It also acknowledges challenges and opportunities to move the sector forward as part of the country's industrial development strategies. OSMEP plans to implement this strategy and project initiative under the 3rd SME Promotional Master Plan (2012-2016). Its overall aim is to strengthen the competitiveness of Thai SMEs.

The 11th National Economic and Social Development, NESDP (2012-2016): This plan emphasizes on restructuring the country's production and consumption behavior in order to prepare for a transition towards a low-carbon and environmentally friendly economy.

Alternative Energy Development Plan, AEDP (2012-2021): Its target is to increase the share of RE energy mix, to be at least 25% of the total energy consumption by the year 2021. With respect to solar for thermal energy utilization, AEDP aims at 100 ktoe by 2021. For biomass and biogas, the thermal energy utilization targets are 8,200 and 1,000 ktoe respectively.

The 20-year National Industrial Development Plan (2012-2031) of MoI: MoI has formulated 20 years Industrial Development Plan (2012-2031) to develop Thailand's industry from knowledge based industry (within 5 years) to innovative industry (within 10 years) and to become sustainable industry in the long-run (within 20 years).

Environmental Management Plan, EMP (2012-2016): There are six key priorities in this plan, including "Promotion of low carbon manufacturing and sustainable consumption and climate change". This priority aims at reforming manufacturing process and consumption behavior to low carbon basis. The action plans include: a) promoting sustainable consumption, b) low carbon manufacturing c) low carbon development of basic infrastructure and d) sustainable RE management, e) low carbon agriculture f) sustainable tourism.

B.2. GEF focal area and/or fund(s) strategies, eligibility criteria and priorities:

The proposed project promotes the use RETs, more specifically, biomass and solar water heater technologies for process heat and cooling generation, in SMEs. These are in line with *GEF-5 climate change focal area strategic programme CCM-3: Promoting the investment in RE technologies*.

B.3. The GEF Agency's comparative advantage for implementing this project:

The project is a technical assistance / capacity development intervention that fits in with the climate change focal area objectives CCM-3. The GEF Council paper "Comparative Advantages of the GEF Agencies" (GEF/C.31/5rev.1) recognizes the comparative advantage of UNIDO in this objective.

UNIDO has been implementing 2 GEF projects under GEF 4 cycle in Thailand. This project will benefit from the experiences gained and the administrative structures established for the UNIDO-GEF and other UNIDO projects in the country including the UNIDO Regional Office in Thailand.

The proposed project is in alignment with the recently approved UNPAF 2012 – 2016 (the United Nations Partnership Framework, Thailand 2012-2016). UNIDO is also part of the UN country team which is responsible for implementing the UNPAF which has six priority areas: social protection; human rights and access to justice; strategic information; climate change; international cooperation; and creative economy. This project contributes to one of the expected outcomes under the joint partnership on Climate change: *Energy, industry and transport sector progressively contribute to the development of a low-carbon and green economy*.

This outcome emphasizes the management of natural resources and an environment towards sustainability, as one of the key development strategies agreed upon the Royal Thai Government (11th National Economic and Social Development Plan).

UNPAF shows its commitment to UN agencies in Thailand supporting the country in responding to the challenges of climate change without hampering its economic development by setting up the United Nations Joint Team (UNJT) on Climate Change (CC).


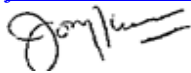
PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

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)
Mr.Chote Trachu	Operation Focal Point	Ministry of Natural Resources and Environment	02/15/2013

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. Philippe Scholtès, Managing Director, PTC, UNIDO GEF Focal Point		06/11/2014	Mr. Jossy Thomas, Project Manager, PTC/ECC/RRE	+43 -1- 26026-3727	j.thomas@unido.org 

ANNEX 1

Coordination with other relevant GEF financed and other initiatives

GEF projects

Industrial Energy Efficiency (IEE) project: This UNIDO/GEF project which is implemented since 2011 aims to bring maximum benefit to industries in Thailand. Some SMEs that participate in the IEE project may also be interested in participating in this project.

Removal of Barriers to Biomass Power Generation and Co-generation: This is a GEF UNIDO project which is completed. The objectives of this projects were: a) build capacity to provide information and services to potential biomass power project investors; b) improve the regulatory framework to provide financial incentives to biomass co-generation and power projects; c) create easy access to commercial financing for biomass co-generation and power projects; and d) facilitate the implementation of two initial biomass power pilot plants through support for commercial guarantees which will reduce the technical risks associated with the deployment of this new technology in Thailand. It is quite clear, that the above mentioned project focused only in promoting biomass power and cogeneration technologies. Renewable energy based thermal energy generation, which the proposed GEF project aims to promote was not associated with this GEF UNIDO project.

Reduction of GHG Emission in Thai Industries through Promoting Investments of the Production and Usage of Solid Bio-fuel: This is a GEF/UNIDO project currently under project preparation. The objective of this project is to reduce GHG emission in Thai industries and power plants by promoting the use of industrial-grade solid biofuels as energy source.

The major differences between this and the proposed GEF project are summarized below:

S. No	Item	Reduction of GHG Emission in Thai Industries through Promoting Investments of the Production and Usage of Solid Bio-fuel	Greening Industry through Low Carbon Technology Application for SMEs
1.	Target	Industries and Power Plants	SMEs
2.	Form of energy	Both thermal and electricity	Only thermal
3.	Target stakeholders	Coal users for thermal energy and electricity generation	LPG, coal and fuel oil users
4.	Focussed technology	Solid bio-fuel (pellet) usage	Biomass and Solar Thermal
5.	Fuel production	Yes. It involves the establishment of complete biomass market chain from biomass production, pellet production and pellet use	No
6.	Changes required at end-user side	Technical adaptation for pellet combustion	May require major changes in their thermal energy generation equipment

TT-Pilot (GEF-4): Overcoming Policy, Market and Technological Barriers to Support Technological Innovation and South-South Technology Transfer: The Pilot Case of Ethanol Production from Cassava: This is an ongoing GEF/UNIDO project: The objectives of this project is removing barriers and creating conducive environment, to promote ethanol technology and South-South technology transfer. It aims to replace gasoline usage in transportation.

The proposed GEF project has a completely different objective in reducing the carbon foot print of Thai SMEs. It does not involve production of cleaner transportation fuel.

National initiatives

Thailand's Greenhouse Gas Management Organization (TGO): It has the objectives of promoting climate change mitigation, specifically in SMEs.

The project will utilize the benefits and integrate with the following national projects to provide supports to SMEs on energy and carbon foot print aspects:

- a) DEDE's ESCO Revolving Fund managed by Energy for Environment Foundation⁴²
- b) Energy Efficiency for SMEs by Department of Industrial Works, MoI
- c) Total Energy Management for SMEs by Department of Industrial Promotion, MoI
- d) Greening Supply Chains in the Thai Auto and Automotive Parts Industries (SMEs) funded by EU SWITCH ASIA and the German Development Agency, GIZ
- e) Thailand Sustainable Energy Finance Program, CTF, IFC/World Bank
- f) Incentive Programmes for Solar Thermal Technology by DEDE

Some of them are briefly explained below:

Thailand Sustainable Energy Finance Program, CTF, IFC/World Bank

Thailand Sustainable Energy Finance Program (started in 2009 with a budget of around USD 30 Million), by International Finance Corporation (IFC), World Bank under their Clean Technology Fund is currently ongoing.

The program aims to help Thailand address its climate change challenges by making a major contribution in three critical areas: a) Increasing private sector involvement in the development and financing of EE/RE/energy service company (ESCO) investments, b) Supporting EE market transformation, by developing EE/RE/ESCO investments and providing new clean energy technologies and energy efficient equipment in Thailand's large corporate, SME, commercial, residential and municipal sectors, and c) Enhancing energy savings by raising market awareness of benefits to induce new clean technology and to reduce GHG emissions⁴³. This program is implemented through DEDE. It also encourages financial institutions in Thailand to develop financing programs for small sized carbon mitigating investments such as EE projects and small-scale RE investments⁴⁴.

The financial mechanism used in Thailand Sustainable Energy Finance (SEF) Program project is an unfunded portfolio risk sharing facility (denominated in local currency). Under this mechanism, IFC pledges to cover a

⁴² The fund promotes and supports potential entrepreneurs to invest in energy efficiency measures and renewable energy technologies. The funds offer 5 types of investment promotion, namely, equity investment, ESCO venture capital, equipment leasing, carbon credit facility, credit guarantee facility and technical assistance.

⁴³

<http://www.climateinvestmentfunds.org/cifnet/sites/default/files/Thailand%20Sustainable%20Energy%20Finance%20Program%20-%20Approved.pdf>

⁴⁴ <https://www.climateinvestmentfunds.org/cifnet/project/thailand-sustainable-energy-finance-program/>

percentage of the losses that may arise on an up to US\$70 million portfolio of sustainable energy leases originated by the partner Financial institution⁴⁵.

Incentive Programmes for Solar Thermal Technology by DEDE

This programme has been running since 2008. The Thai Government has plans to operate this incentive scheme until 2022. The sixth and final phase from 2013 to the year 2022 has a target of 25,000 m² of solar thermal collector area⁴⁶. Incentive allocation for the sixth phase is set around USD 2.6 million. In 2011 and 2012, grants for a total of 21,034 m² of collector area were distributed. According to DEDE, the majority of the subsidy receivers were from industries, followed by hotels, farms and hospitals. However, SMEs have so far shown very little interest in gaining access to this fund, mainly due to lack of confidence in the RETs.

ESCO revolving fund⁴⁷

This 500 million Thai Baht fund has been established by Department of Alternative Energy Development and Efficiency (DEDE), to encourage private investments in RE and EE projects. This will benefit the projects in the following ways: a) Equity investment (10 to 50%), b) Venture capital, c) equipment leasing, d) Facilitation of Project design document (PDD) development under Clean Development Mechanism of UNFCCC, f) credit guarantee facility and g) technical assistance (energy audits, feasibility studies, limited to 100,000 Baht per project).

Greening Supply Chains in the Thai Auto and Automotive Parts Industries (SMEs) funded by EU SWITCH ASIA and the German Development Agency, GIZ⁴⁸

The overall objective of the action is to improve sustainable production of SMEs in the Thai auto and automotive parts supply chains. The objectives of the project include the following:

- To improve productivity and environmental performance of Thai auto and automotive parts production.
- To enhance networks, business and financial services for greening of the Thai auto and automotive parts industry.
- To disseminate good practices and promote the development and implementation of related policy and economic instruments.

⁴⁵ [https://energypedia.info/images/1/18/Thailand - Sustainable Energy Finance Program.pdf](https://energypedia.info/images/1/18/Thailand_-_Sustainable_Energy_Finance_Program.pdf)

⁴⁶ Information Workshop: Solar Thermal Technology in Thai Businesses and Industries. Incentive Programmes for Solar Thermal Technology in Thailand, Department of Alternative Energy Development and Efficiency (DEDE) Thailand's Ministry of Energy, March 2013

⁴⁷ <http://www.efe.or.th/escofund.php?task=&sessid=&lang=en>

⁴⁸ http://archive.switch-asia.eu/index.php?eID=tx_nawsecuredl&u=0&file=/uploads/tx_dbsaprojects/Information_Green_Auto_Parts_02.pdf&t=1397115597&hash=42ff2bfceefc0a008c159e983960983e0a1e9704