Mid-Term Review for the "Promoting Renewable Energy in Mae Hong Son Province" Project

GEF Project ID: 3359

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Countries included in review: Thailand

Region: Asia Pacific

Strategic Program 3: Promoting market approaches for renewable energy

Strategic Program 4: Promoting sustainable energy production from biomass

Implementing Agency: UNDP

Implementing Partner: Thailand Environment Institute (TEI)

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The project on "Promoting Renewable Energy in Mae Hong Son Province" (RE-MHS henceforth) is a Global Environment Facility (GEF) – supported project, with the United Nations Development Programme (UNDP) as the Implementing Agency (IA). It falls under the GEF-4 Resource Allocation Framework to the Royal Thai Government, with the total GEF contribution of USD 2,712,700 over the period of 5 years for project implementation.

The project aims to overcome barriers that currently prevent the widespread and sustainable utilization of renewable energy technologies (RETs) for the provision of energy services in rural areas of Thailand. The project is focused on Mae Hong Son Province, which the Ministry of Energy has identified as its target to be the first energy self-sufficient province in Thailand.

The project is hosted by Mae Hong Son Province, as the Government Coordinating Authority for the project. The modality is NGO execution, with the Thailand Environment Institute (TEI) as the implementing partner (IP), responsible for the overall project management through the function of Project Management Unit (PMU). UNDP performs the assurance role to ensure that appropriate project milestones are met and that the project is well-managed.

Review rating tables

The rating tables are based on the findings of this mid-term review and reflect the Progress towards Results, Adaptive Management and Management Arrangements

Table 1: Progress towards Results

Outcome	Rating
1. Strengthened institutional, organisation and social capacity results in planning, management and implementation of integrated RE programmes in MHS	U
2. Financially sustainable RE systems operational in MHS	U
3. Technical support is locally available for the development, management & maintenance of RE applications in MHS	U
4. Policies facilitate up-scaling & replication of RE systems in rural Thailand	U

Table 2: Adaptive management

Review Area	Rating
Work Planning	U
Finance & Co-Finance	MU
Monitoring Systems	MU
Risk Management	MU
Reporting	U

Table 3: Management arrangements

Review Area	Rating
Overall Project Management	U
Quality of executive of Implementing Partner	U
Quality of Support provided by UNDP	S

Summary of conclusions, recommendations and lessons

There are three principal conclusions which the MTR focuses on:

- ***Project direction and operational frameworks***

The project lacks an effective activity framework which would prioritise activities as well as ensure that activities are mutually reinforcing and contribute towards the overall project objective. There are a number of reasons for this, including the fact that the original project document is fairly open-ended in its design, not strongly insisting on a specific operational framework (for instance, a technology-led approach), but instead presenting a general framework of barrier analysis that is not practically informed by actual renewable energy project development[1]. In addition, the original grid focus of the project was challenged by subsequent restrictions for construction in national park reserve areas. While constraints and controls to construction in these protected areas were in existence prior to the finalisation of the RE-MHS project document, the proclamation of many of the former protected forests as 'National park reserve areas' converted constraints into absolute restrictions. The proposed 11.8 MW of new generating capacity is now very unlikely to occur within the project's timeframe given the conservation restrictions to developing new hydro-electric generation plants in MHS Province. The specific outcomes regarding greenhouse gases (GHGs) are to be similarly downgraded within the project timeframe. However, that is not to say that the activities of the project will not contribute to this eventual or even inevitable outcome, just that this will not happen within the project timeframe.

Instead of adapting the project to these conditions and realities, the IP appears to struggle to effectively re-orientate the project. With increasingly unobtainable objectives in terms of the expectations on grid-connected developments alone, the IP appeared to create a cover of activities, creating something of an illusion of control and direction. According to the MTR, as well as UNDP's own observations and records, there has been inadequate project progress and achievement. While over 40% of the project budget has been spent, there is little concrete to show for it. And the reasons relate to the second point.

- ***IP capacity***

The MTR has concluded that the Thailand Environment Institute (TEI) has not performed to the levels expected. To be fair, they have had to operate in a changing environment where objectives and outputs contained in the project document can no longer be realistically met. However, what is required from the IP in such conditions is the demonstration of sufficient 'adaptive management'

[1] While the review Team acknowledge that GEF climate change mitigation projects generally follow a barrier removal process, the point we are making here is that these expectations in this case are too generic and not, for instance, based on the adoption of specific technologies.

ability. This has not always been evident. Over two and a half years into the project, the pertinent issue around the constraints to achieving the 12.8 MW of grid-connected RE has not been effectively addressed. There is a sense that the IP hopes that the MWs coming online through the 'business as usual' scenario will be accredited to their efforts. Despite these obvious challenges and no explicit attempt, by the IP, to address them through amending project activities and expectations, the IP is still undertaking a range of activities on the ground as if it were 'business as usual'. There is no clear understanding of the project objectives; the original objectives are patently unobtainable and yet the IP continues as if nothing has changed. For instance, the operational team based in MHS appear to plan their own monthly/weekly activities and yet none of these staff members share a similar idea about the project goals[2]; what is more, none of these project interpretations align with the project document's actual expectations. If the aims and objectives are not [commonly] understood then how are the associated activities meant to achieve these objectives? The short and obvious answer is: they cannot.

In addition, the IP has not recruited the necessary technical skills required to achieve project objectives. The operational team lacks sufficient financial and renewable energy technical skills to really address the full range of barriers presented, particularly in the expanded framework (grid and off-grid) proposed by the mid-term review. The challenges faced by the renewable energy sector in Thailand and other countries are complex given the range of technology options and the varying levels of technical complexity and cost. For instance, the finance requirements of promoting small-scale RETs (e.g. improved cookstoves) are very different to the requirements for obtaining loans for 1MW of solar. It is micro-finance with its own socio-economic risks versus commercial finance with its public/private sector responsibilities towards creating an enabling environment for successful investment. Similarly with regard to RETs, the solar PV lantern represents a vastly different level of technological understanding compared to a 5MW hydro-electric plant. These issues have been repeatedly raised by the IA. And this leads to the third conclusion.

- ***Management model***

There are many examples of the IA advising the IP with regard to challenges in project management, technical constraints of the IP team, co-ordinating relations with Provincial and National stakeholders, with regard to refining and articulating the project objectives, ensuring project activities are effectively co-ordinated, encouraging the appointment of a suitable project manager/director, etc[3]. In many cases, the IP did not address these issues timeously and in some cases, not at all. While this may appear to reflect on UNDP's management performance as the IA, this situation appears to obtain more as a result of the management framework (NGO execution) being applied as opposed to any limitation with regard to the IA's capacity. A management framework that would allow for more direct and persuasive interventions by the IA would, the MTR suggests, facilitate the achievement of the project objectives.

Recommendations

[2] Based on interviews with the MHS project team
[3] The records are captured in the 'notes to file' and other official correspondence with the IP.

- Adopt a more technology-led approach to overcoming barriers to renewable energy. This would include all feasible RETs for both grid and off-grid. Barrier analysis at the specific technology level will provide a better understanding of the costs and benefits of each technology and how these might be vertically integrated into local and provincial government planning.
- A DIM management framework is adopted in order to facilitate greater and more effective intervention by the IA. The IA has made a number of recommendations over the past 2.5 years which the MTR notes and agrees that, if implemented, would have made a substantive difference to project performance. The MTR advises that the current NGO management approach convert to the DIM approach, which will provide a more effective platform for IA intervention.
- The IP should be retained to implement specific activities which are in line with its strengths, but certain technical capacities must be recruited into the project, specifically technology and finance. The IP does not have the capacity and appears reluctant to recruit this capacity on a sub-contracting basis. The original project document required specialist capacities and these requirements have, if anything, been further accentuated by the technology-led approach advised.
- Monitoring and evaluation: the MTR recommends that an independent M&E process[4] is implemented through the contracting of an M&E consultant responsible for all M&E activities. The reporting from the IP is inadequate at this point to support an effective M&E process. Based on the review, it would appear that the IA has inadequate engagement at project level to provide a sufficient platform for the M&E process.
- Strategic review: the MTR recommends that an official 'strategic review' is held to discuss and hopefully implement the findings of the MTR. The review should be held as soon as possible; UNDP should lead and facilitate this process. The outcome of this review should be a new, revised project design document which incorporates the MTR recommendations. The findings and recommendations of the MTR are quite fundamental and far-reaching, and therefore cannot be implemented 'as is'; there are serious consequences related to how the project is implemented with the time and resources remaining, that have to be addressed. Issues to be addressed as part of the strategic review include the revision of the project design, work plan, outputs and activities; the creation of a new, more effective M&E strategy; the change in the management modality; the creation of an appropriate HR profile to inform the recruitment process going forward; changes in project targets and performance indicators, etc.

Lessons

- The goals and objectives of parties involved should be aligned as far as possible; it is very important that possible conflicting goals are addressed early on and project objectives are communicated very clearly and understood by all participants. Conflicting goals result in a project design that is vague and non-specific, leaving an important gap between desired project results and project activities.

[4] An independent M&E process would be undertaken by an individual or organisations not directly involved in the execution of the RE_MHS project.

- The fact that M&E mechanisms exist does not mean that sufficient monitoring and evaluation takes place. These mechanisms need to be linked to actual payment milestones to create the necessary incentives for them to be used correctly. The issues highlighted in the MTR should have been identified *and addressed* much earlier through a formal, structured evaluation process. If the IP is struggling to meet the M&E requirements, an independent M&E party should be appointed to take over this function.

- Renewable Energy market transformation, especially in a specific geographic area, does not take place through merely analysing and addressing clusters of generic barriers. Real barriers are identified through actual renewable energy project implementation and any initiative wishing to address these barriers should be sufficiently connected to this RE project implementation process.

- When it comes to project results, the attribution gap between project impacts/results and project activities cannot be too 'wide'. It is important that a project is able to *prove* at least some level of 'additionality' when it comes to results.

- GEF's exclusion of off-grid activities weakens project impact and limits market transformation. Given the energy access rates in Mae Hong Son province, there are specific realities that need to be addressed by the project and any consequent provincial renewable energy planning. The MTR acknowledges that this is part of GEF's official funding policy, but urges GEF to reconsider this decision in the light of this project's experience, as well as the global drive for universal access to modern energy under the UN's 'Sustainable Energy for All' initiative.

- It should be ensured that appropriate and flexible punitive measures are available to the IA, and stipulated in the contract with the IP. For example, it is proposed that UNDP/GEF policies should allow for results-based payment.

- The project needs to actively demonstrate Renewable Energy Service Models in order to identify and address specific barriers. This has unfortunately not been explored sufficiently, even though it is an essential component of a renewable energy market transformation strategy.

- For a project where much time elapses between the design and implementation phases, it is necessary that risk management matrices be reviewed and adjusted during the inception phase to reflect important changes in national policies, regulations and realities on the ground. Risks which are identified as 'crucial' must be addressed in an early stage of project implementation.

- The NSC should therefore be used more proactively. According to the project document, the National Steering Committee is accountable for project outcomes. They have direct responsibility to assist in implementation issues which need support from policy levels.

List of Abbreviations

BAAC	Bank of Agriculture and Agricultural Cooperatives
CSO	Civil Society Organisation
DEDE	Department of Alternative Energy Development and Efficiency
DIM	Direct implementation modality
DSM	Demand Side Management
EGAT	Electricity Generating Authority of Thailand
EPPO	Energy Policy and Planning Office
EUEI PDF	European Union Energy Initiative Partnership Dialogue Facility
GEF	Global Environment Facility
HH	Household
IA	Implementing Agency
ICS	Improved Cook Stoves
IP	Implementing Partner
kWh	Kilowatt hour
M&E	Monitoring & Evaluation
MHS	Mae Hong Son province
MTR	Mid-term Review
MW	Megawatt
MWh	Megawatt hour
NGO	Non-governmental Organisation
NIM	National implementation modality
O&M	Operations & Maintenance
PEA	Provincial Electricity Authority
PMU	Project Management Unit
PV	Photovoltaic
RE	Renewable Energy
RESM	Renewable Energy Service Model
RET	Renewable Energy Technology
RE-MHS	Promoting Renewable Energy in Mae Hong Son Province project
RTAP	Regional Technical Assistance Program
SHS	Solar Home System
SPP	Small Power Producer
SWH	Solar Water Heater
TAO	Tambon (Sub-district) Administrative Organisation
TBCSD	Thailand Business Council on Sustainable Development
TEI	Thailand Environment Institute
ToR	Terms of Reference
UNDP	United Nations Development Programme
UNDP CO	United Nations Development Programme Country Office
UNDP APRC	United Nations Development Programme – Asia Pacific Regional Centre
VSPP	Very Small Power Producer

1. Introduction

Project background

The "Promoting Renewable Energy in Mae Hong Son Province" project (RE-MHS) is a Global Environment Facility (GEF)–supported project, with the United Nations Development Programme (UNDP) as the Implementing Agency (IA). It falls under the GEF-4 Resource Allocation Framework to the Royal Thai Government, with the total GEF contribution of USD 2,712,700 over the period of 5 years.

The project aims to overcome barriers that currently prevent the widespread and sustainable utilization of Renewable Energy Technologies (RETs) for the provision of energy services in rural areas of Thailand. The project initially focuses on Mae Hong Son Province, which the Ministry of Energy has identified as its target to be the first energy self-sufficient province in Thailand.

The project is hosted by Mae Hong Son Province as the Government Coordinating Authority for the project. The modality is NGO execution, with the Thailand Environment Institute (TEI) as the implementing partner (IP) responsible for the overall project management through the function of Project Management Unit (PMU).

UNDP performs the assurance role to ensure that appropriate project milestones are met and that the project is well-managed.

Purpose of the Review

The main aim of the mid-term review is to ensure that the project achieves (and surpasses) its original objective(s). It is therefore important that the evaluation team not only assesses the letter, but also the spirit of the original project goals and objectives – and recommends appropriate adjustments, if necessary. The mid-term review is broad in scope, but will identify pertinent issues to be probed more intently to ensure project success. The benefit of a mid-term review as opposed to the terminal variety is that there is still scope to influence the outcomes. The review presented here is very much in keeping with this approach, having invested considerable resources in not just the evaluation itself, but the recommendations based on this.

Key issues addressed

The mid-term review specifically looks at the project's implementation status (including its progress towards the achievement of results), the process of achieving these results, factors affecting the successful implementation and achievement of results, project management as well as strategic partnerships. The main 'value add' of this report is however the recommendations regarding the way forward for the project to ensure its success.

Methodology of the review

The review was carried out in three distinct phases:

1. ***Inception Phase***

   During this phase, the evaluation team ensured that they thoroughly understand the project and its context. This phase was mainly desktop-based, complemented by telephonic and electronic interviews where necessary. The activities in this phase concentrated on collating and analysing all relevant documents (reports, project design documents, plans, policies, contracts) from the client, project partners and other sources. Another important task of the first phase was the development of the evaluation questions and tools used in the second phase.

2. ***Field Work Phase***

   The field work phase was conducted mainly in Thailand, and started with the Opening Meeting on 23 July 2013. The team used the questions and tools developed in Phase 1 to gather further evidence, also interviewing the following people:

   - Project Director
   - Project Manager
   - Representative of Responsible Parties, including MHS provincial authority, DEDE, EPPO, EGAT, PEA and BAAC
   - Field Officers
   - Representatives from pilot communities
   - Project Administrative Officer
   - Project Financial Officer
   - Member of Project Steering Committee
   - UNDP Country Office in Bangkok in charge of the 'Promoting Renewable Energy in Mae Hong Son Province' project.

   Further evaluation activities for this phase included site visits in the Mae Hong Son Province, further interviews and focus group discussions.

3. ***Synthesis Phase***

   This phase saw the collation, analysis and professional presentation of the information gathered during the two preceding phases. During this phase the evaluation team also made use of the relationships developed during phases 1 & 2, ensuring that information is accurate and objective, and recommendations realistic. The draft report's findings were presented to the TEI, project staff and UNDP – and feedback incorporated into the final report.

Table 4: Mid-term evaluation tasks

	TASK	DESCRIPTION
1	**Inception Phase**	
1.1	Preparation & Review	Collate & review all available literature. Thoroughly understand project and context. Review reported progress & impact against goals. Adjust evaluation methodology/scope where necessary.
1.2	Inception Report	Present inception report, including evaluation matrix, methodology, tools and proposed itinerary for the field work phase.
2	**Field Work**	
2.1	Opening Meeting	Meeting with the National Project Director, Project Management Unit, Responsible Parties, Field Teams, Beneficiaries, UNDP CO & UNDP APRC.
2.2	Interviews, site visit	Conduct individual and group interviews with stakeholders. Travel to Mae Hong Son province for field visit, further interviews & evidence gathering. Cross-check reported progress with actual evidence on the ground.
3	**Synthesis Phase**	
3.1	Analysis	Analyse all evidence from previous phases, looking specifically at the project's progress, it's process, important influential factors, project management. Identify potential project design problems, lessons learned and recommendations.
3.2	Draft Report	Capture the above in a concise, useful 50-page report, according to the structure provided in the TOR.
3.3	Exit Meeting	Present findings of the assessment to the TEI, project staff and UNDP - for feedback and approval.
3.4	Final Report	Adjust report based on feedback received - and submit to be translated.
3.5	Translate Report	Report translated into Thai - and submitted according to TOR requirements.

The evaluation was carried out using the following methods:

1. *Literature/desktop review*: the evaluation team reviewed the reports and documents provided by UNDP Thailand (please see Annex 5), including quarterly M&E reports, meeting minutes, project planning documents and the Summary documents specifically put together for this Mid-term Review.

2. *Interviews*: interviews were primarily conducted with project management staff, project partners, government officials, community leaders, etc., as set out in the evaluation schedule. The interviews were used to verify and complement information gained from the literature review, as well as to deepen the evaluation team's understanding of the realities faced by the project at this stage.

3. *Focus Groups*: focus groups were used to gain the insights from groups of beneficiaries, project partners and project staff. Focus groups allow for the exchange and validation of ideas and impressions among different stakeholders; they also enable evaluators to get feedback from multiple people at once, and are therefore quite relevant to this evaluation given the limited timeframes available.

4. *Site visits:* the evaluation team visited a number of pilot sites during its evaluation field visit in Mae Hong Son. These visits served to verify installation/maintenance quality and impacts, and again complement information provided in the literature.

To be sure, it has to be emphasised that the goal of the mid-term evaluation is to ultimately ensure that the project is successful. While there are of course accountability considerations to be kept in mind, this guiding principle should not be lost from view.

Structure of the review report

The review report's structure is taken from the original Terms of Reference and GEF evaluation guidelines, and specifically looks at the following:

- *The project and its development context*, including the project background, implementation status, aims and objectives, main stakeholders & expected results.
- *Findings,* including assessments of progress towards results (performed at the hand of the original project logical framework), the adaptive management framework, as well as the management arrangements.
- *Conclusions, recommendations and lessons,* which is specifically concerned with clearly articulating what the evaluation team regards as the most important issues to be addressed, recommendations for addressing these and the lessons learned.
- *Annexes,* including the original Terms of Reference, details on recommendations, review itinerary, etc.

2. The project and its development context

Project start and its duration

The RE-MHS project was formulated in 2007, approved in early 2010, with implementation starting in December 2010. This is a 5-year project, set to end in December 2015.

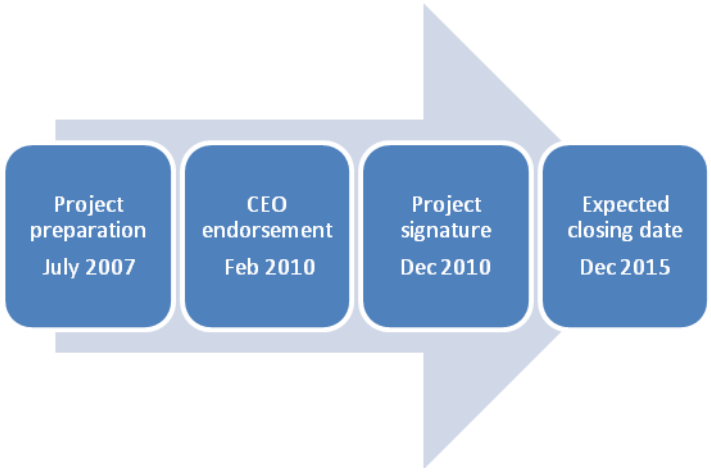

Figure 1: Process - project start and duration (*Source: UNDP)*

Implementation status

The project has now been implemented for almost 33 months – with 27 months still remaining before the project end in 2015. The expenditure to date is 40% of the total project budget, which indicates under-expenditure based on the project contract. However, the review's concern is not simply budget burn rate but rather achievement of results. This remains an area of concern.

Table 5: Cumulative Project Disbursements (*Source: UNDP*)

Year	USD	Note
2011	301,542.88	Final expenditure of 2011
2012	469,125.98	Final expenditure of 2012
2013 (Q1+Q2)	306,128.93	Interim data Jan-June 2013 (excluding exp on UNDP side)
TOTAL	**1,076,797.79**	

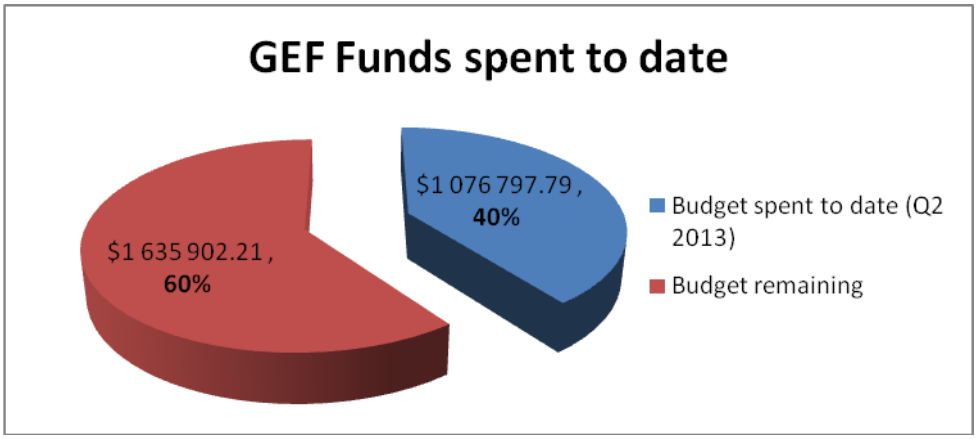

Figure 3: GEF Funds spent to date on RE-MHS

This under-expenditure is placed in context by the table below, which provides a breakdown of budgeted vs. actual expenditure by outcome, and per year. From this table it is clear that there has been under-expenditure since Year 1 of almost 40% per year. However, a recent 'Note to File' on a meeting of the project financial report (Q2 2013), held on the 17th of July 2013, indicated that UNDP had serious concerns regarding especially the escalating personnel costs of the project (also reflected in the increased costs attributed to the project director), the fees paid to consultants vis-à-vis their qualifications and the delays in progress reports and other supporting documents related to the personnel costs[5]. It therefore seems that this 'under-spending' might be even more serious than what is reflected in the actual budget, as the actual costs of personnel as opposed to activities/outputs has been somewhat inflated: the implementing partner spent considerably less than the budgeted amounts, which seems to imply a corresponding lack of related project activities/outputs; when one considers that most of what has been spent to date went to (senior, more expensive) personnel costs, the implication seems to be that even less has been done/achieved than what is reflected in the actual budget expenditure.

Table 6: Budgeted vs. Actual expenditure (2011 - Q1 2013)

	2011			2012			2013			Cumulative		
Component	Budget	Actual	% Spent	Budget	Actual	% Spent	Budget	Actual (Q1)	% Spent	Budget 2011-2013	Actual 2011 - 2013 (Q1)	% Spent
Outcome 1	$ 139 218.00	$ 44 811.23	32.2%	$ 127 636.00	$ 104 837.46	82.1%	$ 56 564.00	$ 30 383.93	53.7%	$ 323 418.00	$ 180 032.62	55.7%
Outcome 2	$ 174 687.00	$ 127 051.18	72.7%	$ 368 202.00	$ 154 724.31	42.0%	$ 224 687.00	$ 31 503.45	14.0%	$ 767 576.00	$ 313 278.94	40.8%
Outcome 3	$ 80 975.00	$ 57 847.63	71.4%	$ 182 700.00	$ 97 982.42	53.6%	$ 149 800.00	$ 20 856.15	13.9%	$ 413 475.00	$ 176 686.20	42.7%
Outcome 4	$ 29 046.00	$ 20 163.61	69.4%	$ 63 332.00	$ 51 651.97	81.6%	$ 85 830.00	$ 8 318.51	9.7%	$ 178 208.00	$ 80 134.09	45.0%
M&E	$ 24 000.00	$ 2 116.93	8.8%	$ 12 000.00	$ 14 874.82	124.0%	$ 31 000.00	$ -	0.0%	$ 67 000.00	$ 16 991.75	25.4%
Proj Mgmt	$ 54 500.00	$ 48 889.88	89.7%	$ 48 000.00	$ 46 615.94	97.1%	$ 48 000.00	$ 5 981.78	12.5%	$ 150 500.00	$ 101 487.60	67.4%
Total	**$ 502 426.00**	**$ 300 880.46**	**59.9%**	**$ 801 870.00**	**$ 470 686.92**	**58.7%**	**$ 595 881.00**	**$ 97 043.82**	**16.3%**	**$ 1 900 177.00**	**$ 868 611.20**	**45.7%**

What is more troubling is the fact that this is accompanied by an even lower, almost negligible rate of results achievement. However, what has to be kept in mind here – and what is argued in more detail below – is that the objectives were never going to be achieved by this project in its current format and context. As the MTR team has proposed, the project requires a different activity framework if it is to achieve its overall objectives and this framework will require a reallocation of budgetary resources. Measuring success against the current indicators is therefore disingenuous,

[5] Based on minutes of meeting (Note to File) which took place on the 17th July 2013. Participants included UNDP and TEI.

and the MTR team proposes that a different set of performance indicators/activities be used to measure success, in line with a change in project scope and outputs (discussed in more detail below).

Table 7: Performance measurement against three main indicators (*Source: UNDP Thailand*)

Indicator	Expected by EOP	Actual to date	% Achievement
Installed RE Capacity (MW)	11.8	0.185[6]	1.57%
Direct GHG Emission Reductions (tCO2e)	702 616	943	0.13%
RE Investment (THB)	800 000 000	n/a	n/a

Problems that the project seek to address

Thailand's Ministry of Energy has set a target to increase the share of alternative energy to the country's overall energy mix from 10% in 2012 to 25% in 2021. While there is thus a substantial commitment on the part of Thailand's government to renewable energy (RE) and RE-based energy access, the reality remains challenging, with substantial barriers to the achievement of this target. The figure below provides an overview of the barriers identified and which the GEF-funded project seeks to address through the different project activities. What is important to notice, already at this stage of the review, is that while a "lack of proven cases" was identified as a barrier, it is not directly addressed by any of the GEF-project interventions. This is one of the main problems identified by the mid-term review, representing a disconnection between the interventions proposed and the actual results required. The project activities are not grounded in actual renewable energy project development, and are therefore not strategically driven or properly informed by the realities 'on the ground'. The outcome is therefore the implementation of seemingly disconnected and quite generic project outputs, with very little real-world application – resulting in the identified barriers remaining intact, despite the project's interventions. What will be argued in more detail – especially in the recommendations section – is that 'proven cases' need to form the starting point and foundation of the entire project. The project activities need to be shaped by and developed around specific and appropriate renewable energy service models.

[6] There is uncertainty regarding this figure, as it seems to be primarily based on the rehabilitation of SHSs – the exact number of which is disputed. Given the lack of a properly functioning M&E system, this figure has not been verified; instead, it serves to verify that the project's reporting and documentation is quite weak.

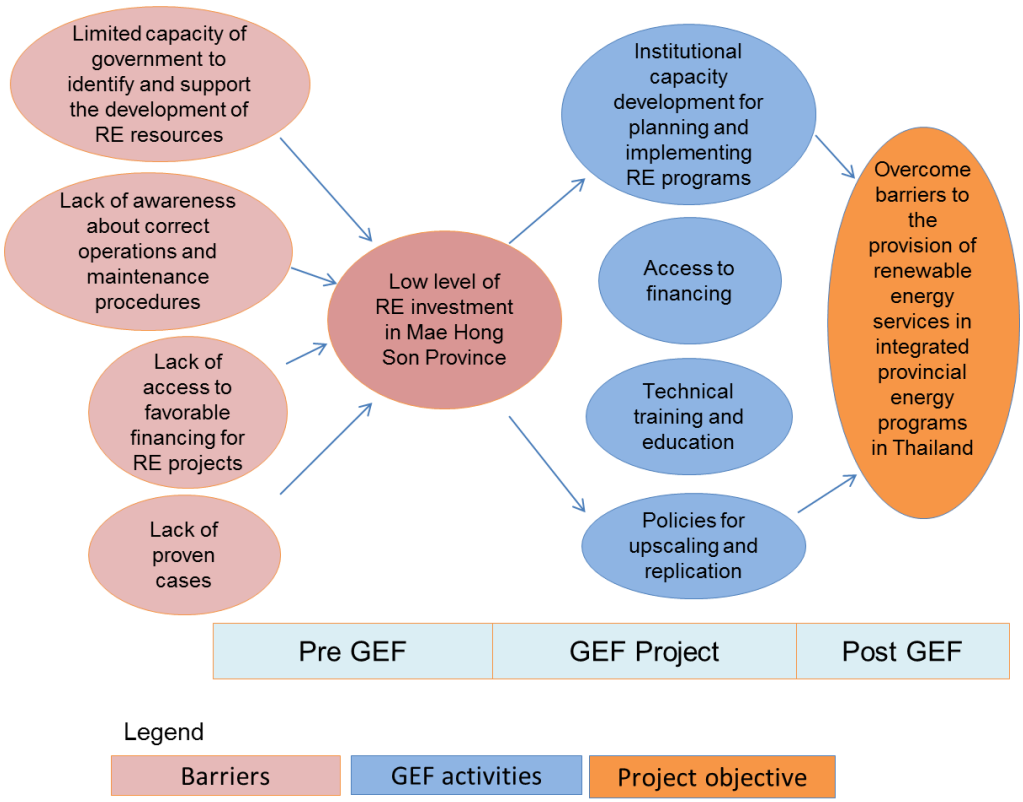

Figure 3: Project Rationale (*Source: UNDP*)

Table 8 below presents a more detailed overview of the barriers to renewable energy uptake identified, and makes reference to the requisite project interventions that aim to address these.

Table 8: Barrier Analysis for RE-MHS Project (*Source: UNDP Project Document: RE-MHS)*

Barrier type	Barrier	Project intervention
Capacity (intuitional and individual)	Lack of awareness about correct operations & maintenance procedures	Output 3.4
	Lack of awareness of appropriate technology for economic/social context	Output 2.1
	Limited educational opportunities in RE	Output 3.1
	Lack of local competent human resources to design/build/install/repair	Output 3.3
	Limited capacity of RE private industry; excessive focus on government contracts	Output 3.1
	Limited capacity of government to identify and support the development and use of renewable energy resources	Outputs 1.2, 3.2, 4.1
Policy/legal	Lack of legal rights to resources	Outputs 1.4, 2.5
	Technology users not aware of warranty rights	Outputs 3.4, 4.6
	Difficulties or delays in getting reimbursement for import tax on RE equipment	Output 4.4
	Onerous requirements to be VSPP / SPP generator	Outputs 2.2, 4.6
	Metering arrangements mean that subsidies only apply to renewable energy production in excess of customer consumption	Output 4.3
	Tariff structural bias towards fossil-fuel generation	Output 4.3
Organizational	Lack of coordination among government organizations/ministries	Output 1.2
	Manufacturer Association of RE technologies does not exist	Output 3.5
	Differing local vs. national priorities	Project strategy adopts integrated planning approach used in previous initiatives
	Lack of tradition of cooperatively-owned renewable energy systems	Output 1.3; 1.4
Economic/ financial	Financial incentives (VSPP tariffs, adder, etc.) provided to RE often insufficient to motivate investment	Outputs 2.7, 4.3
	High transaction costs for small systems	Output 2.7
	Lack of access to favorable financing	Output 2.3, 2.7
	High import tax on equipment	Output 4.2, 4.4
	Low purchasing power/income/ ability to pay	Output 2.7
Technical/ environmental	Unclear/lack of data on possible renewable energy resources	Addressed through pre-feasibility studies
	Technology available in Thailand has quality control or durability challenges.	Output 3.5
	Lack of proven cases	Project strategy is to generate proven cases; Output 4.6
	High equipment/installation/ operational costs	Output 2.3

Objectives of the project

The project objective is to ***overcome barriers to the provision of renewable energy services in integrated provincial renewable energy programmes in Thailand***. Secondary objectives include ensuring that the project assists the province in achieving 100% energy self-sufficiency, and facilitates a significant reduction in greenhouse gas (GHG) emissions through the development and application of renewable energy technologies.

Baseline indicators established

The following set of baseline indicators were provided in the incremental cost matrix of the project design document. Baseline values for each project outcome and output are provided in the logical framework assessment below.

Table 9: Baseline Indicators

Domestic benefits	*Economic development proceeds at an accelerating pace in MHS, but associated with rising electricity and fuel prices, which compromises economic benefits.*
Global benefits	*Global environment continues to degrade due to the adverse impacts caused by high GHG emissions.*
Outcome 1: Strengthened institutional, organisational and social capacity results in planning, management and implementation of integrated RE programmes.	*Little investment in energy planning or strengthened institutional and social capacity. RE systems installed on an ad-hoc basis and prove to be unsustainable in many instances.*
Outcome 2: Financially sustainable RE systems operational in MHS	*Installed on-grid and off-grid systems continue to fail at a paid rate; most systems not financially sustainable, so contribution of RE to on-grid electricity supply in MHS remains very small and below government mandated target.*
Outcome 3: Technical support is available locally for the development, management and maintenance of RE applications	*Little or no technical support to manage and maintain RE systems = high failure rate.*
Outcome 4: Policies facilitate up-scaling and replication of RE systems in rural Thailand	*Policies favouring RE remain incompletely implemented, so progress towards government RE target remains behind schedule; Opportunities for learning through networking are largely absent*

Main stakeholders

The main stakeholders of the project are the following:

Table 10: Main Project Stakeholders

Main Stakeholders
United Nations Development Programme (UNDP)/Global Environment Facility (GEF)
Thailand Environment Institute
Mae Hong Son Province
Department of Alternative Energy Development & Efficiency (DEDE)
Electricity Generating Authority of Thailand (EGAT)
Bank of Agriculture and Agricultural Cooperatives (BAAC)
Provincial Electricity Authority (PEA)
Village Institutions (Committees/Cooperatives)
Community Based Organisations/Networks

These stakeholders are incorporated in the institutional setup for the management of the project, comprising a national steering committee, a project board, project manager (in charge of operations and actual implementation), ad-hoc advisory group, and project assurance function. The project's institutional arrangement is presented in the figure below. One of the biggest challenges for the project to date, which is also addressed in more detail below, is the high turnover rate in the essential "Project Manager" position. Since the start of the initiative, the project has had four different Project Managers, with the position having been vacant for almost three quarters in 2012.

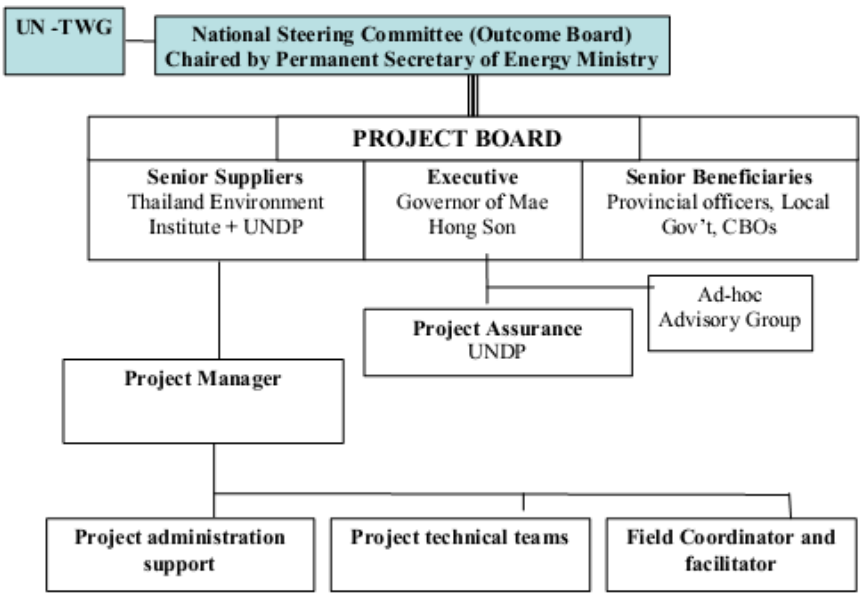

Figure 4: Institutional Arrangement of RE-MHS project (*Source: UNDP Project Document: RE-MHS)*

Results expected

According to the barrier analysis and project rationale, the following are the expected project results linked to each outcome. More details on the key performance indicators and outcomes are provided in the following sections.

- Strengthened institutional, organisation and social capacity results in planning, management and implementation of integrated RE programmes in MHS
- Financially sustainable RE systems operational in MHS
- Technical support is locally available for the development, management and maintenance of RE applications in MHS
- Policies facilitate up-scaling and replication of RE systems in rural Thailand

Table 11: Main Performance Indicators

Indicator	Expected by EOP
Installed RE Capacity (MW)	11.8
Direct GHG Emission Reductions (tCO2e)	702,616
RE Investment (THB)	800,000,000

3. Findings

3.1. Progress toward Results

Project Design

The original project document included a strong grid development focus, including anticipating the bulk of the project's [co] investments coming through almost 12MW's of grid-connected generation power. While the 'business as usual' scenario suggest that a considerable amount of new generating capacity would come online during the project period – effectively 2011-2015 – this would not be as a direct result of the project activities themselves. Indeed, it was noted early on in the evaluation of the MHS-RE project that the grid expectations were unrealistic. During the early phases of drafting the project document back in 2008, conditions might have been more amenable to these kinds of investment expectations. However, much has changed since then, from both a regulatory point of view[7] as well as the overall local and global economic climate, that have significantly reduced the realistic prospects of such an investment within the project timeframe.

These issues are addressed in more detail below; suffice it to say here that the project's almost exclusive emphasis on grid, particularly in terms of the performance indicators below, is not well aligned to the opportunities that exist on the ground. And this has had some impact on the ability of the Implementing Partner to achieve the required outputs. An issue this evaluation emphasizes strongly is that the real prospects within the scope and location of this project lie in both the off-grid and grid sector. This will obviously impact on the outcomes of the project. For instance, the prospects of ensuring almost 12MWs of new RE generation capacity (*read: hydro*) will not be achieved in the grid sector within the project's timeframe. And this will similarly impact on the direct GHG emissions reductions. The off-grid prospects in terms of overall [new] capacity delivered will not come close to the 12MW required either. Appropriate RE technologies in the off-grid sector include micro-hydro and distributed solar home systems, both of which offer an installed capacity at village level of between 15-30kWp[8]. This would require between 400 – 2,400 villages being electrified if 12MW of new generational capacity was to be achieved in the off-grid sector within the project timeframe[9]. This is clearly not realistic[10]. However, there is much that can be achieved in terms of developing a Provincial RE strategy for Mae Hong Son Province and this is outlined and detailed in the evaluation.

Another fundamental problem of the original project design is the fact that there is an important disconnect between the desired results and the outcomes/activities linked to them – essentially

[7] Many 'protected forests' in the MHS area have been declared "National Park Reserved Areas" since the start of the project – a development not originally foreseen by the project developers – which prohibits any construction (including grid-connected micro-hydro plants) in these areas..
[8] These are the average sizes indicated in the PIMS_3908_Thailand_MHS_Prodoc report (p36).
[9] The MTR team acknowledge that outcomes based on the RE_MHS project that fall outside of the active project timeframe are still reflective of the project's overall impact and success. We are simply emphasising that the actual project timeframe however seemingly 'long-term' given its 5 year scope, is inadequate to oversee the commissioning of 12MW of new-build generation capacity. The RE_MHS project needs to be acknowledged as at least, in part, foundational. With real change being precipitated over time.
[10] There are approximately 200 off-grid and unelectrified villages in MHS.

leaving a major attribution gap in the project design. The four 'outcomes' are essentially clusters of potential barriers. They are generic categories that if addressed will, theoretically, promote a market for RETs in Mae Hong Son. However, a 5-year project with close to $3 million invested (with considerably more anticipated through investment leveraging) is about real, material developments and for that to be achieved, the project must start addressing specific barriers and not simply engaging with the clusters/barriers as a whole. Each technology has a different or 'specific' set of barriers and these needs to be understood and addressed.

It is therefore important to go back to the original project design and have a strategic revision of the project, outcomes, and especially outputs and activities. It has to be emphasized again: merely implementing the project as currently designed will *not* lead to the desired results, and this fundamental problem must be addressed.

Progress

The table below, based on the project logical framework, aims to provide an assessment of project performance by the MTR team against the original project outcomes and outputs. Ratings are based on the GEF rating scale below.

Table 12: Rating Scale - Progress towards results

Highly Satisfactory (HS)	Project is expected to achieve or exceed all its major global environmental objectives, and yield substantial global environmental benefits, without major shortcomings. The project can be presented as "good practice".
Satisfactory (S)	Project is expected to achieve most of its major global environmental objectives, and yield satisfactory global environmental benefits, with only minor shortcomings.
Moderately Satisfactory (MS)	Project is expected to achieve most of its major relevant objectives but with either significant shortcomings or modest overall relevance. Project is expected not to achieve some of its major global environmental objectives or yield some of the expected global environment benefits.
Moderately Unsatisfactory (MU)	Project is expected to achieve its major global environmental objectives with major shortcomings or is expected to achieve only some of its major global environmental objectives.
Unsatisfactory (U)	Project is expected not to achieve most of its major global environment objectives or to yield any satisfactory global environmental benefits.
Highly Unsatisfactory (U)	The project has failed to achieve, and is not expected to achieve, any of its major global environment objectives with no worthwhile benefits.

Table 13: Measuring performance against outcomes (based on project log-frame)

Outcome	Output	Indicator	Baseline	Rating	Comments
Overall Goal: Reduction of GHG emissions in Thailand					
Project Objective: To overcome barriers to the provision of Renewable Energy (RE) services in integrated provincial renewable energy programmes in Thailand					
1. Strengthened institutional, organisational and social capacity results in planning, management and implementation of integrated RE programmes in MHS, Chiang Rai, Chiang Mai and Tak. ***Rating: U***	1.1. Integrated Provincial RE plans prepared	Integrated provincial development plan includes RE needs as umbrella for sub-provincial levels	No such integration exists	MU	- Current integrated provincial plan includes projects on RETs submitted by the Provincial Energy Office, but RE is not addressed as a separate strategy. - A roadmap has been developed and progress has been made to include RE needs into MHS provincial development strategies and plans. In August 2013, the draft Provincial RE strategic plan will be reviewed by project sub-PMC, chaired by Chief of Provincial Energy Office, and then presented for a public hearing and submitted to the Governor for approval. -Bottom-up process has been initiated to develop district-based RE management master plans (for all 7 districts in MHS) to be included in next provincial 4-year strategic plan (2017-2021) which is also in line with the national "Green Growth" strategy. **Recommendations** - Integration of RE into the provincial strategies will assure that RE needs will be addressed more comprehensively by concerned line agencies. Provincial projects, however, should take into consideration local needs and capacities. Therefore, the project should facilitate linkages between provincial RE projects with district-based RE management plans. - More consideration given to rolling up experiences at village level into master-plans at District level and ultimately RE plan at Provincial level
	1.2. Strengthened mobilisation and coordination mechanisms	Provincial and sub-provincial working groups	Provincial working group in MHS for assistance in project formulation	U	- Both groups were established but were not sufficiently mobilised and coordinated. **Recommendations** -Need to improve coordination and mobilisation mechanisms to engage more active participation among members of the groups. (e.g., though more regular meetings, joint activities, and clearly defined roles and responsibilities of individual members).

					- The objectives/goals of this project need to be more clearly defined and communicated, so that participants know how they might contribute and/or why they are part of the group. - The project should clearly define the requirements on the ground and then see how such a group can assist/support. This has not been done.
		Village groups focused on RE	No village groups address RE	MU	-A few village groups have been introduced to technical and financial management of community-based hydro power plant schemes. - A number of villages introduced to Improved Cookstoves **Recommendations** -More villages could be reached through the existing community organizations network. Outreach activities could include awareness-raising on RE needs and benefits, introduction to basic RETs such as biomass cook stoves, forest conservation for sustainable hydro power plant management. - Implementer also needs to assess different models/scenarios (SHS/Micro-hydro/grid connect) and establish what the requirements of each of these scenarios are in terms of these village groups. How are they to be constituted by law (for instance if they want to sell back to grid or if they want to control a public asset), what technical capacity do they require to operate effectively, etc.
	1.3. Institutional arrangements for cooperatively owned and PPP RE systems	Existence of guidelines for institutional arrangements	No examples of cooperatively owned or PPP RE systems	U	-Water users' cooperative was set up in one of the project communities in order to be eligible for loans from BAAC. -Hydro power plants management committee in a few communities were trained on fund raising and management, but no clear/written guidelines have been developed and distributed. **Recommendations** - All these potential requirements need to be understood by the IP and built into the actual village structures and the subsequent models that represent them. -Feasible (PPP) models should be developed according to the legal requirements of the energy technology level they are looking to implement, in consultation with community groups, local governments (TAOs) and commercial banks. Need to link feasible technology options with institutional requirements. - There might be different institutional/organisational expectations for

					different requirements. For instance, the group might have to register as a co-operative to receive a loan (BAAC) or they might have to constitute themselves differently to own/operate a micro-hydro (PPP).
	1.4. Local entities with strong leadership to plan, develop and manage RE systems	Number of trained local leaders that initiate formulation of an RE action plan in their locality	No local leader promoting RE	MU	-Village committees in 7 villages have more awareness and understanding on how to plan, develop and manage RE systems, but they need to be strengthened and supported more intensively during the remaining time of the project. **Recommendations** -Villages with potential to be further developed as 'demonstration sites' should be identified. Project should further enhance leadership of committee in these villages in all skills needed for systematic planning, developing and managing community-based RE systems (e.g. through self-sustained PPP schemes). Village-to-Village training/study visits should be organized for mutual support and expansion of robust RE systems to new villages. - The project also needs to assess the technical/financial requirements of different service models. Operating a SHS initiative will require different technical skills and financial resources/arrangements than a village which hopes to sell electricity to the grid. Different skill sets required to manage different RET solutions.
		Number of entities	No cooperatives (for RE) exist	U	- Only one cooperative has been set up (original target: 3 by 2012) **Recommendation** -More cooperatives could be established, using model and experience of the first one as reference. - These co-operatives should reflect the full range of village level institutional requirements for specific RETs. Also linked to TAO (sub-District) requirements in terms of how local government engages with village level.
2. Financially sustainable RE systems operational in MHS, Chiang Mai, Chiang Rai and Tak	2.1. Awareness raised of all stakeholders involved in RE projects regarding social,	Level of awareness among villagers	Awareness levels close to zero	MU	-Workshops on social, economic and environmental costs and benefits of RE systems were held with TAO members, community leaders, government agencies, and private sector (hotel and tour business) in MHS several times during the first year of the project, but there were no follow-up actions to ensure adoption of RE systems by relevant stakeholders. -Brochures about RETs were produced and distributed to the general

Rating: U	economic and environmental costs and benefits of RE systems				public. **Recommendations** -Project should focus on follow-up actions (e.g. plan to motivate applications of RETs by private sector and local communities at least to meet targets set forth in the project document). - Workshop content also has to be more relevant to/focused on the kinds of technologies relevant to particular sectors/markets. While it is expected to be generalist at first, the workshops must narrow their focus to the kinds of technologies that will predominate in a particular context (e.g., village/household level = micro-grid, solar home systems, improved cookstoves. Tourism (hotels) = solar PV, Solar Water Heaters, Heat pumps, etc.). The sectors need to understand the costs/benefits of technologies that are appropriate to their needs.
	2.2. Operational guidance on SPP (RE)/VSPP and other schemes disseminated among stakeholders	Increase in demand for RE services	No guidance exists and no current demand for SPP/VSPP schemes	HU	**Recommendation** -As a follow up on its awareness-raising on RE needs activities, the Project should identify the potential audience of the SPP (RE)/ VSPP operational guidelines, develop the guidelines according to the needs/interest of each specific group, distribute the guidelines and follow-up on its implications for the audience. - Once the models at village level have been identified/ developed then the most appropriate framework (most likely VSPP – given capacity constraints relating to conservation) needs to be developed. This exists already but needs to be integrated (where relevant) into the village/local government level models.
	2.3. RE systems installed under previous initiatives rehabilitated	Number of operational solar and micro-hydro electric units	PV units in MHS: 14 800 (80% non-functional); 4 micro-hydro	U	-8% (1,231) of existing solar home systems were reportedly rehabilitated under the project. Serious reservations from MTR team on what constitutes 'rehabilitation' and provision made for this in project design[11]. **Recommendations**

[11] There is no budget for the procurement of replacement parts for the SHSs. It is therefore highly unlikely that the SHSs are fully operational after being 'rehabilitated', given the fact that a major part of technical rehabilitation will need to be the replacement of components (e.g. batteries). Even if the wiring for SHSs seems to be a problem and is 'fixed', without a functioning battery this merely translates into restricted access (during the day). In our view, rehabilitation should include not only technical operation (whether or not the SHS is functioning), but also financial sustainability and on-going maintenance (as expressed by Outcome 2: 'financially sustainable RE systems').

			non-functional		-A more comprehensive, funded and informed plan to rehabilitate solar home units should be developed, including plan to increase capacity for its maintenance (technically and financially) by communities.
	2.4. Off-grid renewable energy electrical systems to local communities established	Completion of feasibility studies	No feasibility studies undertaken	MS	Feasibility study for micro on-grid and off-grid hydro power plants was completed. 23 potential sites identified and 3 have been selected for construction with TBCSD funding. Studies do not seem to have been further disseminated or used. **Recommendations** -Findings of the studies should be distributed to stakeholders such as TAO, PAO, and private investors to attract investment for construction of micro-hydro plants in the remaining potential sites. - The feasibility of these sites will also depend on the management model developed that takes care of routine maintenance, parts replacement, etc. - The implementer will design a decision making tool based on pilot sites that will determine whether future villages (outside of the pilot sites) get SHS, micro-grid, etc. This process will provide the basis for blanket access to RE electrical systems (using multiple technologies) across the Province. - All this needs to be packaged into a 'Renewable Energy Service Model' which collectively, over time and determined by resources available, will ensure universal access. - Assumptions and findings of feasibility studies should be reviewed, to ensure that costing is realistic and reflects current pricing realities.
		% of off-grid HHs with access to RE electrical energy	85% of HHs with access to RE systems	U	-This output is less likely to be achieved under the current project implementation approach. Project focuses on only a small number of villages and more on capacity building for RET's maintenance and management. -23 potential sites were identified for micro-hydro power plants but only three are committed with funding. -Restriction to construct power plants in protected forest areas remains an unsolved issue. **Recommendations** - Lessons learnt and the models developed upon these lessons will

					guide the province in promoting access to the required levels.
	2.5. Grid-linked RE systems established consistent with integrated provincial development plans.	Number of applications installed and operating	No units in operation	U	- DEDE has completed another 5.3 MW grid-linked hydro power station, which will be in full operation soon[12]. However, this has not been as a direct result of the RE-MHS project activities. -Construction of another plant (at Huay Pong-On) was completed but operation is pending due to restriction by Forestry Bill. -DEDE plans to build another 0.85 MW hydro power plant at Mae Sariang district. Verification and approval process takes 2 years and construction 8 years (according to DEDE). -Unlikely that any of this generation capacity is linked to the RE-MHS project; from UNDP's and MTR's initial assessment, it seems that this is not the case. - There are also the small-scale grid connect micro-hydro systems which we are proposing [to some extent] to grid connect over time. These are subject to different kinds of restrictions/constraints. **Recommendations** -Most of grid-linked RE systems are DEDE projects based on hydropower. MHS has high potential for grid-linked solar powered system. Currently there are 3 privately owned solar plants in MHS (Infinite Solar), with a committed plan to expand to 6 within the next year. The project should try to draw more private investment for solar systems, as there is growing demand (5%/annum) for on-grid electricity from the city. Project should engage with Infinite Solar to establish the barriers for the solar grid-connect sector. - The project implementers should be looking at this PPP (SPP or VSPP) model and determining whether there is sufficient finance available (BAAC?), whether the returns on such an investment are good, whether tariffs are adequate, etc. There was a study produced (2012) for this project that looked at the costs of solar PV grid connect, etc. but these costs are very high, which obviously reduces their appeal. So

[12] The Mae SaNga 2 hydro power (5.3 MW) is completed (99%). In order to officially sell the electricity to PEA, it does not require license from the Forestry Department as it is an extension of Mae SaNga 1. However, it still has to obtain license from Department of Industrial Work before going to the Regulator. The DIW license is being processed by high level management in DEDE; who are unsure as to how long it will take to finalise this.

					solar PV could be considerably more attractive from a PPP perspective than indicated in the feasibility study report. This study should be reviewed to ensure correct pricing. - For Solar Power Plant, the project could develop 'business models' to attract investors (based on RESM). A study could be commissioned and findings shared with potential investors (to be identified, including those who had participated in 'awareness raising' programme during the first half of the project). Access to concessional loans can be facilitated for those who are interested and committed to invest. -For DEDE's hydro power plants, follow up more closely on its plan to build more V/SPP hydro power plants in MHS. According to DEDE's 10-year plan (2012-2021), 18 more plants of different sizes and capacity will be built, totaling 9.14 MW. They have identified locations already. What the project should be doing is to coordinate with DEDE policy makers (Deputy DG is sitting on the NSC) to make sure that some of these plants will get budgeted, and process for approval from Forestry, Department of Industrial Work and the Regulator has started. Approval is beyond the project's control but DEDE has its own way of obtaining licenses from forestry authorities. Construction may not be completed within the project's lifetime, but the project can support and accelerate the process (i.e. remove barriers). - A dedicated credit line, with soft terms, should be set up for RE by BAAC to facilitate investment. - For VSPP at community level. different grid-linked RESMs which are proposed in the MTR report should be considered as the first step to get grounded knowledge through the pilots, in order to scale up the models to other places through the provincial RE plans
	2.6. Non-electrical RE promoted	Proportion of community non-electrical energy from RE	Proportion of community non-electrical energy = 25%	U	- Not enough efforts have been made by the project so far. A 'training of trainers' workshop was organized, focusing on efficient cook stoves, but there was no systematic follow-up on how the trainers can replicate the training in their respective communities and how many households have adopted the stoves. (Original target for non-electric RE by EOP: 40%) **Recommendations** - The role of improved cook stoves needs to be established as part of

					the Renewable Energy Service Models and then the mechanisms that will provide training/information/finance need to be identified as well as at community level or TAO. This activity is regarded as highly relevant by the Governor and other agencies in MHS. - The project would also need to consider solar water heaters for households (or more likely hotels) as another example of non-electrical RE usage. The project would have to look at the supply/value chain around these technologies and how this might be strengthened. - There needs to be a more systematic approach applied. • Identify the full range of relevant non-electrical RETs – ICS, SWH, etc. • Identify value chain for each technology, suppliers, costs, finance available • Identify relevant points of entry for communities (for instance village level and/or TAO) • Undertake community awareness raising/training amongst target group • Possible pilot dissemination • Working with HHs to ensure finance access, take-up and use • Working towards achieving targets • Embedding initiative in terms of local government involvement – they maintain momentum
	2.7. Access to concessional loans facilitated	Volume of loan funding	Essentially no loan funding available	HU	-BAAC has a policy to provide concessional loans to small scale community enterprises. A few communities are interested in accessing loans to support their income generation scheme from eco-tourism (linkages between sustainable micro hydro power plant management and forest conservation), but the plan is still in a very early stage and needs further development. **Recommendations** **-** Project facilitates meeting between community leaders, BAAC and TAO to develop the most feasible/viable financial model based on the proposed 'renewable energy service models'. Need to consider dedicated credit line for RE with soft terms. - Project makes sure the implementation of the model is well documented to provide lessons learnt to other communities and feed

					into provincial RE policies. - Pilot venture to demonstrate the potential, challenges and options in terms of community enterprises (like eco-tourism). -Project needs to attract investors/project developers.
3. Technical support is available locally for the development, management & maintenance of RE applications in MHS, Chiang Rai, Chiang Mai and Tak ***Rating: U***	3.1. RE curricula for vocational training institutes targeting private sector service providers and others developed and officially approved	Curriculum integrated into training program	No curriculum exists	MS	RE vocational curriculum, text book and teaching manual are under development. They will be tested at the Vocational College of Navamintra in MHS. Quality and content of curriculum and materials are not clear.
		Number of technicians graduating from vocational training institute courses	No training in RE systems	U	**Recommendations** -Project needs to establish what the technical needs are in terms of the technologies supported and the level (degree) of technical knowledge required at particular levels (village, TAO, District, etc.). *Then* they need to establish the most appropriate institutions to deliver such training, ensure appropriate curriculum is developed, etc. -Knowledge generated from the implementation of RESMs in different communities/commercial and government sectors should be integrated in curriculum/textbooks as real case examples. -Students should have access to these pilot/demonstration sites as part of their learning.
	3.2. Completed training in business, finance and resource management of RE systems	Number of individuals trained	No training	MU	RE community committees were set up in two villages that have micro hydro power plants. The committees set up rules on electricity use and were trained on account and financial management, group management, and O&M of the plant. **Recommendations** Project needs to develop complete training requirements matrix based on demo/pilot models, which will outline training requirements at all levels from villages up to Province. General training will not achieve specific results.
	3.3. Completed trainings in maintenance and repair of RE systems	Number of community persons graduating from the course	No training	MU	-Training workshop was organized for 96 villagers on how to detect damages, maintain and take care of the batteries for their solar panels. -A training workshop was organized for students from two local vocational colleges on how to detect the failure of solar home system, how to do preliminary survey and how to record data of the solar home survey and repair.

					Recommendations - If the recommendation for output 2.3 (above) is implemented, students who have been trained under this output (3.3) should be further trained on more RE-related advanced skills and engaged as technicians for the activity. - Project needs to ensure all training reinforces the operations of the village models. Training therefore needs to be 'embedded' in the provincial planning process. - Training activities need to reinforce the successful operation of the village models which collectively represent the 'roll-out of RETs' in MHS.
	3.4. Disseminated technology/information	Number of end-users and potential producers reached	No information available for end-users	HU	**Recommendations** - Project needs to ensure that the technology information is based on the appropriate technology choices made at the village level. - Must be based on informing decision makers (TAO and up)
	3.5. Technically capable and skilled local RE technology equipment manufacturers increased	Number of local manufacturers increased	No market competition	HU	**Recommendations** **-**For the remaining period of the project, activities should be streamlined and packaged to demonstrate how RETs could be introduced, adopted/invested, and managed at all levels in MHS. A component on promoting locally-based manufacturers/suppliers of RETs should also be included. - Project needs to undertake a value chain analysis on each of the technologies identified. For instance, for SHS, who are the main suppliers in MHS? What is their capacity to deliver (size of business)? What retail outlet infrastructure is there? Are there any technical standards to be complied with (are these entities compliant?). This would be an audit to determine current capacity and what would be needed in the future to ensure provincial plan/roll-out is achievable. - Perhaps investigate whether a 'trade association' of RET suppliers would add any value.
4. Policies facilitate up-scaling and replication of RE systems in Thailand	4.1. Centre of learning in MHS promoting RE as part of the	Existence of centre of learning	No centre of learning	MS	-The RE learning center was initiated to be displayed at the MHS Community College. It will be a long term RE exhibition in MHS. **Recommendations** - The center should have on-going events to raise awareness and

Rating: U	sufficiency economy established				knowledge of the public about RETs and opportunities to promote MHS as the first and model province on self-sufficient energy management. - Also need to establish how this center might support communities and the various village models on the ground, allowing them to learn about all requirements (knowledge, technical, financial, etc.) of specific energy service options.
		Number of visitors	No centre of learning	N/A	None. Not yet established
	4.2. RE applications prominent in government energy programmes	Government budget allocations to implement RE policy	Govt budget allocations in 2007: 900 mill baht	U	-Only Provincial Energy Office has (5) projects to promote use of RETs in community enterprises for 2014 fiscal year. These projects are small-scale. -DEDE is committed to build more hydro power plants in MHS but is seeking for approval in designs and budgets which will take at least 2 years. **Recommendations** By EOP, project must ensure that the current roadmap to formulate a provincial RE development plan is implemented and results in adoption of RE strategies/projects into provincial integrated plan with secured budget. -More lobbying of Provincial government around RET options and how to integrate them into provincial plans – based on renewable energy service models, etc. - To ensure renewable energy service models are integrated through the various levels of provincial planning from village, TAO, District, etc. - To understand the policy development process to ensure ideas and options are integrated effectively into this process.
	4.3. Flexible subsidies/tax incentives revised and promoted	Guidelines available	Production subsidy: 8 baht/kwh (solar); 0.4-0.8 baht/kwh (micro-hydro); 0.3 baht/kwh	HU	**Recommendations** - Project needs to detail kinds of incentives/policies required to facilitate the recommended results. - Engage with grid connect projects/companies to determine the effectiveness of current tariffs. - Project will have to assess requirements in respect of grid and off-grid; what incentives/conditions will promote SPP and VSPP [grid] and

			(biomass); no support for solar thermal.		what kinds of incentives would promote/facilitate off-grid? - Would have to be based on models developed - Investigate possible subsidies around improved cookstoves to stimulate the market
	4.4. Transparent system of government accountability established	Existence of public accountability monitoring system	No accountability system	HU	**Recommendations** - Project will have to build in/identify role of government at all levels of the Provincial plan and build in/suggest mechanisms that ensure/promote accountability (decision making mechanisms). - Project needs to look at an M&E framework for the whole provincial planning process, from village level upward. - Ensuring Provincial plan is developed around practical and appropriate intervention built up from village-level will promote accountability.
	4.5. Policy makers that support RE development and application programs	Number of (positive) policy changes	0	MU	- At provincial level, the MHS governor, vice governor, Chiefs of provincial energy, Public Relations, Natural Resources and Environment offices are all in support of RE policy and projects. - At national level, the deputy DG of DEDE who also sits as a chairman of project NSC is key person regarding the national RE plan of the Min. of Energy. Recent discussion with him reflects the need to address both demand and supply sides of RE management in MHS. **Recommendations** - Project also needs to bring in the PR 'machinery' of the provincial government. They need to develop a strategy that should identify key decision-makers and approach them to ensure their support for RETs in general and the provincial plan in particular. This process needs to follow the local government decision making pathway from village-level up. Need to identify/create champions to promote RETs all the way up the planning process.
	4.6. A VSPP association consisting of VSPP practitioners, academics, NGOs and govt agencies established	Existence and size of VSPP association	No VSPP association exists	U	-A round table discussion was held in November 2012 to discuss possibility and benefit to set up an "Association of Very Small Power Producer". A number of potential VSPPs in Mae Song Son (mostly from tourism industry) participated in the discussion. So far, there have not been follow-up activities (also linked to the industry/value chain comments above). **Recommendations**

					- This should also be linked with discussions with local VSPP (Infinite Solar) as well as other VSPP examples outside of MHS (where there are more examples) to determine value and objectives of such an organisation. - Would require a clear purpose to retain interest of VSPP, NGOs, etc.
		Number of lessons exchanged	No lessons exchanged	U	-The project's documentation and reporting system is not well managed. Although intensive efforts/inputs on community mobilisation and capacity building have been made with good results, there is no documentation about how the process worked and how it could be used as good practice for others at both operational and decision-making levels. **Recommendations** - The packaging of solutions (see recommendations) will provide a logical framework for activities and will make the value of lessons more obvious in terms of how they impact on specific outcomes.

Key findings on Project Outcomes

1. **Strengthened institutional, organisational and social capacity results in planning, management and implementation of integrated RE programmes in MHS**

   1.1 The assumption contained in the 'outcome statement', that 'strengthened institutional, organisational and social capacity results in planning, management and implementation of integrated RE programmes' is problematic. Capacity building needs to be informed by capacity needs identified through actual RE programme implementation; the assumption that increased capacity will 'automatically' result in the implementation of RE programmes is simply not true. This is borne out by the results thus far – the activities contributing towards this outcome has led to an increased interest in and support for RE, but has not gone further because the capacity building activities did not have a clear, practical goal (e.g., actual RE projects) in mind.

   1.2 While there seems to have been some development with regards to provincial RE programme development, it is feared that these plans will not result in actual implementation as it is not sufficiently informed by ongoing experience with RE Service Model implementation "on the ground" in MHS.

   1.3 In general, the project has been performing relatively well when it comes to setting up institutions, representative bodies and committees – but weak with regards to actually equipping them to make a practical contribution (e.g., guidelines for institutional arrangements to own/operate RE systems). This again comes back to the fact that the increased capacity is not driven by actual RE service delivery activities.

   1.4 The project can also do more to develop/strengthen and build on existing networks, both within Mae Hong Son[13] and at national/regional/international level[14].

2. **Financially sustainable RE systems operational in MHS**

   1.1 The entire outcome was designed without proper provision being made for the results it aims to achieve. There is no real budget allocation for RET rehabilitation, financial surety to secure concessional finance (lower risks), or pilot/demonstration projects opportunities[15]. This is arguably the key outcome, on which the rest of the project should be built – and while it has been allocated the bulk of the project budget, most of these funds are going towards professional fees and travel expenses. Lessons learned from outcome 2 should determine what is done in other outcomes, as the process of implementing outcome 2 will identify the real barriers to renewable energy roll-out in the province.

   1.2 Achievement under this outcome reflects the reality of the IP's (lack of) capacity. The only outputs that show progress are 'awareness raising'- a strong suit of the IP - and 'feasibility studies' (which were outsourced).

[13] E.g. Mae Hong Son Community Organizations Strengthening Network comprising of several thematic CSOs networks, including on Environmental Protection. The network has members in 200 villages across the province

[14] See, for instance, Lighting Asia which is supported by the IFC, World Bank and United Nations. There is also a 'Global Alliance on clean cookstoves' which will have local member companies/organisations in Thailand.

[15] From the guidelines for Operational Program 6 (GEF), it appears that funding may be used to procure technologies/hardware for demonstration project purposes.
http://www.thegef.org/gef/sites/thegef.org/files/documents/document/OP_6_English.pdf

1.3 The outcome's strong grid focus[16] seems to be at the expense of off-grid and non-electrical RE technologies. Given the energy access realities in the province, as well as the regulatory barriers to grid-connected RE, it is important that a reasonable off-grid focus also be incorporated.

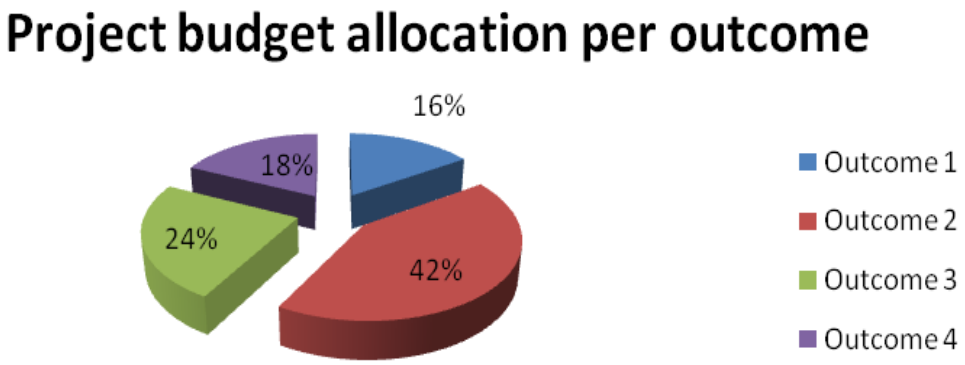

Figure 2: Project budget allocation per outcome

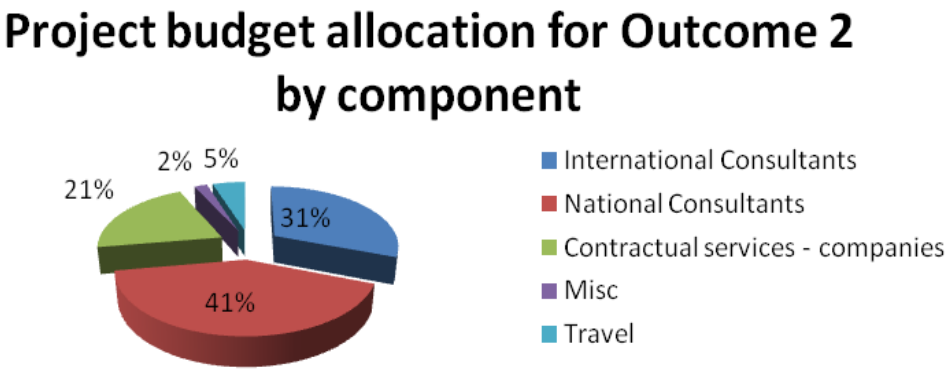

Figure 3: Project budget allocation for Outcome 2 by component

3. Technical support is available locally for the development, management & maintenance of RE applications in MHS

3.1. The training/capacity building that makes up the major part of this outcome does not seem to be linked to or built on actual renewable energy technology implementation. The usefulness of the training, and skills of the trained, is therefore very questionable. It is also worth noting that only a small number of people have actually undergone training as part of the project.

3.2. Overall, this outcome also displays very limited progress due to slow implementation.

[16] MTR understand GEF's grid focus requirements but maintain that a more inclusive approach which focuses on grid as well as off-grid will be more appropriate.

4. **Policies facilitate up-scaling and replication of RE systems in Thailand**

4.1. Outcome 4 displays quite limited achievement to date – although a process to develop a provincial RE strategic plan seems to be under way. This lack of achievement is further worsened by the general lack of information exchange facilitated by the IP.

4.2. The 'clash' between forestry and energy policies/regulations is a serious concern for the project – and has brought many important aspects of the project to a virtual halt. Given the fact that the project is supported by and has buy-in from most authorities concerned, it is surprising that no resolution to this problem has been devised and/or proposed by the IP during the project's 2.5 years' of implementation.

The project made little progress towards its overall objectives and outcomes, despite a considerable portion of the project budget spent so far.

Based on this assessment, the overall rating for the project's progress towards results is **UNSATISFACTORY**, as the project is expected not to achieve most of its major global environmental objectives or to yield any satisfactory global environmental benefits.

Table 14: Summary rating table for project outcomes

Outcome	Rating
1. Strengthened institutional , organisation and social capacity results in planning, management and implementation of integrated RE programmes in MHS	U
2. Financially sustainable RE systems operational in MHS	U
3. Technical support is locally available for the development, management & maintenance of RE applications in MHS	U
4. Policies facilitate upscaling & replication of RE systems in rural Thailand	U

3.2. Adaptive Management

This section reviews the performance of the adaptive management framework of the project.

Table 15: Rating scale - Adaptive Management

Highly Satisfactory (HS)	The project has no shortcomings and can be presented as "good practice".
Satisfactory (S)	The project has minor shortcomings.
Moderately Satisfactory (MS)	The project has moderate shortcomings.
Moderately Unsatisfactory (MU)	The project has significant shortcomings.
Unsatisfactory (U)	The project has major shortcomings.
Highly Unsatisfactory (HU)	The project has severe shortcomings.

Table 16: Adaptive Management Ratings

Review Area	Rating
Work Planning	U
Finance & Co-Finance	MU
Monitoring Systems	MU
Risk Management	MU
Reporting	U

Work Planning

Many of the planned activities were not implemented as planned, mainly because of the high turn-over rate of the project manager and field staff. During the inception period, the logical framework was used as a reference for the 5-year activity planning process. There were also suggested changes to the logframe. Indicators and targets from the log-frame are still referred to by the implementing partner, but sufficient efforts have not been made to achieve the targets/indicators in a timely and systematic way. The project planning and financial frameworks need to be adjusted to align with the activities proposed by the MTR. The logical framework needs to be revised to reflect suggested changes in project focus and coverage by the MTR.

Finance & Co-Finance

As mentioned before, there has been consistent under-expenditure for the project, as well as problems with the actual nature/use of budget (e.g., personnel costs) and outputs related to these expenses.

Table 17: Budgeted vs. Actual expenditure (2011 - Q1 2013)

	2011			2012			2013			Cumulative		
Component	Budget	Actual	% Spent	Budget	Actual	% Spent	Budget	Actual (Q1)	% Spent	Budget 2011-2013	Actual 2011 - 2013 (Q1)	% Spent
Outcome 1	$139 218.00	$ 44 811.23	32.2%	$127 636.00	$104 837.46	82.1%	$ 56 564.00	$ 30 383.93	53.7%	$ 323 418.00	$ 180 032.62	55.7%
Outcome 2	$174 687.00	$127 051.18	72.7%	$368 202.00	$154 724.31	42.0%	$224 687.00	$ 31 503.45	14.0%	$ 767 576.00	$ 313 278.94	40.8%
Outcome 3	$ 80 975.00	$ 57 847.63	71.4%	$182 700.00	$ 97 982.42	53.6%	$149 800.00	$ 20 856.15	13.9%	$ 413 475.00	$ 176 686.20	42.7%
Outcome 4	$ 29 046.00	$ 20 163.61	69.4%	$ 63 332.00	$ 51 651.97	81.6%	$ 85 830.00	$ 8 318.51	9.7%	$ 178 208.00	$ 80 134.09	45.0%
M&E	$ 24 000.00	$ 2 116.93	8.8%	$ 12 000.00	$ 14 874.82	124.0%	$ 31 000.00	$ -	0.0%	$ 67 000.00	$ 16 991.75	25.4%
Proj Mgmt	$ 54 500.00	$ 48 889.88	89.7%	$ 48 000.00	$ 46 615.94	97.1%	$ 48 000.00	$ 5 981.78	12.5%	$ 150 500.00	$ 101 487.60	67.4%
Total	**$502 426.00**	**$300 880.46**	**59.9%**	**$801 870.00**	**$470 686.92**	**58.7%**	**$595 881.00**	**$ 97 043.82**	**16.3%**	**$1 900 177.00**	**$ 868 611.20**	**45.7%**

The Project's Implementing Agency needs to control non-essential or non-budgeted costs by the IP. If the 10% threshold is to apply (for Project Management Costs), the excess should be deducted from

the next quarterly budget should the IP exceed this threshold. There is no point in imposing thresholds if they are routinely ignored. It is also important to clarify which costs are related to project management – and which relate to actual project inputs, as there seems to be some confusion on this issue.

The co-funding expectations were situated in the grid-focused project document. The project cannot realistically proceed along this line. Of course, the 'business as usual' scenario might see fairly significant investment in grid-connect hydro and solar[17], but this will not be as a result of the project's activities (although, as recommended, project activities should play a more facilitating role in creating a more enabling framework for such developments). Instead, the most realistic implementation/demonstration opportunities lie in the off-grid sector (micro-hydro and SHS), but these will typically be small-scale (up to 30kWp) and will not achieve the anticipated levels of investment one would expect from the larger grid-connect plants. That said however, the Very Small Power Producer (VSPP) programme does offer a framework for further investment in small-scale grid-connect activities and moreover, offers additional incentives to particular RETs, including wind and solar, the latter of which has proven application in the Province. The VSPP programme has been extended across the country and includes two important developments; that projects can be less than 10MW and that an incentive 'adder' is applied to Renewable VSPP. While scale is still a constraining factor given the constrictions placed on construction in National Park Reserve Areas, the project should have focused more on the VSPP in order to attract greater levels of co-funding and achieve tangible outcomes on the ground. So far [proposed] investment amounts to $360,000[18] –of the $9 million proposed.

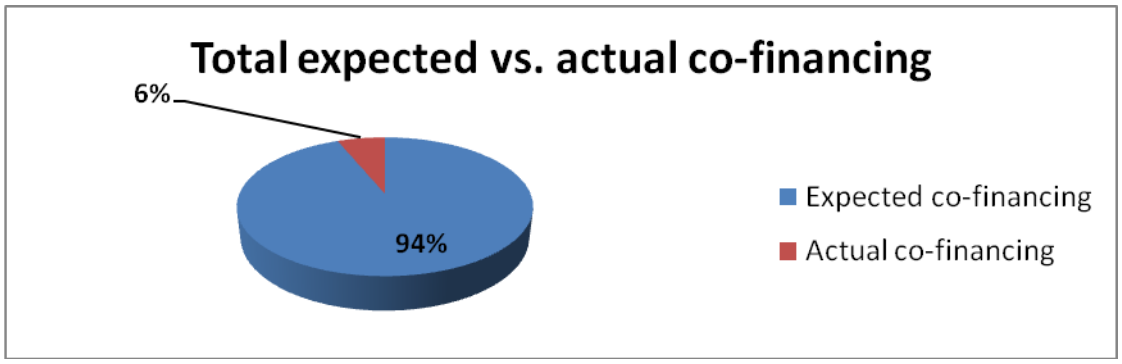

Figure 4: Total expected vs. actual co-financing

[17] While this may appear to contradict earlier statements which suggested an absolute prohibition on hydro-developments within the protected forest areas, we suspect that this particular plant (Mae Sa Nga) may well be allowed to generate based on its advanced stage of development. Future proposed plants will certainly meet 'absolute' levels of resistance implied.

[18] This refers to funding from the Thailand Business Council for Sustainable Development (TBCSD) for the construction of three micro-hydro plants in MHS. However, this funding is not secured as yet and therefore does not feature in the co-financing table.

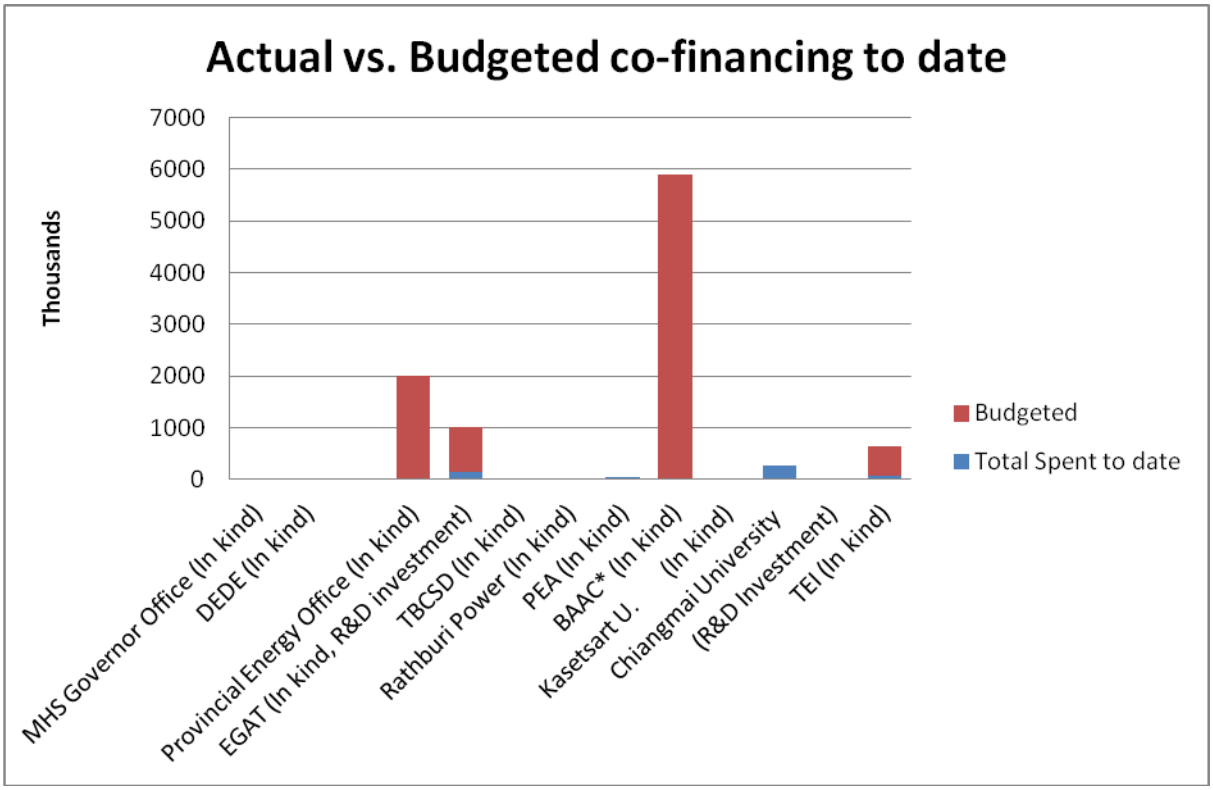

Figure 5: Actual vs. Budgeted co-financing to date, per stakeholder

Table 18: Co-financing table

Sources of Co-financing	Name of Co-financer	Type of Co-financing	Amount Confirmed at CEO endorsement / approval	Actual Amount Materialized at Midterm
Provincial Government	MHS Governor Office	In-Kind	$ 0.00	$ 4 940.00
National Government	DEDE	In-Kind	$ 0.00	$ 15 096.67
Provincial Government	Provincial Energy Office	In-Kind	$ 2 000 000.00	$ 7 533.33
National Government	EGAT	In-Kind, R&D investment	$ 870 000.00	$ 136 800.00
Private Sector	TBCSD	In-Kind	$ 0.00	$ 6 666.67
Other	Rathburi Power	In-Kind	$ 0.00	$ 11 500.00
Provincial Government	Provincial Electricity Authority (PEA)	In-Kind	$ 0.00	$ 35 000.00
Other	BAAC	In-Kind; Soft loans available	$ 5 900 000.00	$ 4183.33
Other	Kasetsart University	In-Kind	$ 0.00	$8 333.33
Other	Chiang Mai University	R&D Investment	$ 0.00	$ 274 166.67
Other	TEI	In-Kind	$ 550 000.00	$ 76 500.00
		TOTAL	**$9 320 000.00**	**$ 580 720.00**

Monitoring Systems

The challenge is to ensure that finance is linked to outputs and not timeframes. The project cash flow needs to be more closely linked to actual outputs (as it was in the original project budget) otherwise resources will be consumed without sufficient project progress. Expectations regarding reporting requirements need to be more vigorously enforced. At this point, despite what is contractually required, the IP's reports are 'flimsy' and because of this, their value as progress monitoring tools is questionable.

While the Implementing Agency has a number of Monitoring Tools and processes in place (PIR, APR, M&E) the information received from the IP in terms of quarterly reports is inadequate to ensure these tools are sufficiently informed and useful. The information channel between IA and IP needs to be made more reliable. The real value of monitoring systems lies in their ability to influence the project activities through the adaptive management framework; the project's unsatisfactory performance to date, two and a half years since its inception, is evidence that the monitoring system is not playing its role.

Risk Management

The following are some of the project's most obvious risks: the conflicting mandates of government agencies (DEDE and Forestry) remain in place. A multi-stakeholders working group has been established, but coordination across agencies was not effective enough to bring them to the same level of engagement in the project. BAAC's policy to provide financial incentives remains unchanged, but the project has not been able to make linkages between technologies/opportunities and the need for finance. Mechanisms to upscale lessons learnt in the field to national level policies and to other provinces have not yet been established. Although a project's national steering committee was set up, it is not clear how and through which channel they will adopt/mainstream the project's lessons learnt into national level policies. Frequent turn-over of Project Manager (hired by TEI) and lack of a good hand over system within TEI result in poor reporting and M&E of project activities.

Table 19: Risk Assessment Analysis

Risk	Initial Risk Assessment	MTR Assessment
Political Stability & Institutional Uncertainty	Low Moderate	High
The NGO-led project may jeopardize government's role in incorporating policy implication of the project	Low	Low
Ineffective Multi-stakeholder coordination	Low	High
Lack of local ownership and insufficient community participation	Low	Low Moderate
Lack of financial incentives	Low	High
Limitations on up-scaling & replication	Low	Moderate
Limitation on Project M&E	Low	Moderate
ADDITIONAL RISKS		
Power regulations for conservation areas	n/a	High
(Key) Project staff turnover	n/a	High
Lack of technical backstopping	n/a	High
Major On-grid focus inappropriate	n/a	High
Considerable attribution gap for results	n/a	High

Reporting

It is not clear to which extent the M&E systems are applied. In addition they will have to be recalibrated to accommodate the changes suggested by the MTR. The reporting by the IP is inadequate (Quarterly reports) and should at least include a project implementation plan (PIM) that tracks all activities, outputs and ultimately outcomes. The narrative report provided by the IP is rather wordy and repetitive; it should, in addition to a PIM, provide a more analytical framework which connects activities undertaken during the quarter. It is insufficient to refer to the reporting requirements outlined in the project documents (PIRs, APRs, TTRs, etc.) as these are not really met by the contractor and provide little information for the IA to work with. A more independent and structured M&E strategy appears necessary. This must be based on information obtained independently from the field and other institutional stakeholders as opposed to relying on information from the IP.

General

The IP has not displayed the necessary 'adaptive management' to inspire much confidence in their ability to achieve the objectives expected. Staff continuity is obviously an issue, but perhaps the most significant contributor in this regard is the lack of clear single, overarching objective which will provide a framework for activities and the ability to adapt and adjust processes, where necessary, to reduce uncertainty and achieve the objectives.

3.3. Management Arrangements

The following section discusses the MTR team's findings on the project's management arrangements, looking specifically at overall project management, Quality of executive of Implementing Partner, and Quality of Support provided by UNDP. The summarised performance ratings for the management arrangements are provided based on the rating scale below.

Table 20: Rating Scale - management arrangements

Highly Satisfactory (HS)	The project has no shortcomings and can be presented as "good practice".
Satisfactory (S)	The project has minor shortcomings.
Moderately Satisfactory (MS)	The project has moderate shortcomings.
Moderately Unsatisfactory (MU)	The project has significant shortcomings.
Unsatisfactory (U)	The project has major shortcomings.
Highly Unsatisfactory (HU)	The project has severe shortcomings.

Table 21: Management Arrangement Ratings

Review Area	Rating
Overall Project Management	U
Quality of executive of Implementing Partner	U
Quality of Support provided by UNDP	S[19]

Overall project management

The project has eight staff members based in Mae Hong Son, including the project manager, project coordinator, community workers, administrative and planning staff and an RE technician. This number should have been adequate if TEI was able to find qualified people to fill the positions.

The Project Director and project support team are based in the TEI Bangkok Office. Communication between the Bangkok office and field team is done through e-mail and telephone, which proved to be adequate. However, TEI is a centralized organization; hence its communication with the field team is more or less a 'directive' rather than 'consultative' and the field-based team was not empowered to make decisions on project implementation on the ground.

It was also obvious that project management is not results-based. Many activities have been implemented without being clearly and coherently directed towards the project objective. Project staff, particularly at field level, have divergent understandings of the project. Although some were able to explain project outputs, not all could provide a broader picture of how different outputs are inter-related in order to contribute to the relevant outcomes and hence overall project objective.

TEI also did not engage enough technical assistance from outside. Most activities used in-house expertise which was not sufficient for effective implementation, particularly in RETs.

[19] The management framework (NGO Led) does not permit sufficient involvement of the UNDP team. The IA has the capacity to understand project requirements but not always the mandate to effectively intervene. This is a short-coming in terms of the management framework adopted.

Although the indicators and targets from the original project logical framework are still referred to by the Implementing Partner, insufficient efforts have been made to achieve the targets/indicators in a timely and systematic way.

Several financial and technical monitoring mechanisms have been used in the project, including quarterly reports by IP, management meetings between UNDP and IP, field trips, and PIRs. However, follow-up/corrective actions based on information from the monitoring have been delayed by the IP, (and in some cases ignored), as will be discussed further in the following section.

There is also a disbursement issue between the TEI Bangkok office and field office. Budget is transferred to the field office on a case-by-case basis (upon receiving a request from the field office). Sometimes the money was not transferred on time. There is no arrangement to transfer the budget on a quarterly basis based on an approved work-plan. In addition, the UNDP office tends to pay TEI upfront, where the option on a more outcomes-based payment system would enable UNDP more leverage in ensuring outcomes.

Quality of executive of Implementing Partners

Based on the review of project management-related documents[20], the MTR team concluded that over the course of the project's two and a half years, TEI did not demonstrate adequate capability to perform as an effective Implementing Partner. This contributed, in part, to poor project performance towards the achievement of its outcomes and objectives. Listed below are core management issues which have been constantly raised in management meetings between UNDP and TEI from Year 1, some of which still remain unsolved/insufficiently addressed to date.

1. ***High turn-over rate of project staff***. Over the past two years, there have been 4 project managers and 2 project coordinators. One reason is the difficulty of living in Mae Hong Son; the other reason is the management and rewarding system of TEI, which appears to be insufficient to maintain the commitment and interest of staff on the ground.

2. ***Lack of technical expertise.*** It has been raised during the first year of implementation that it is critical to strengthen the project's technical capacity. It was suggested then that a full-time RE expert should be hired to provide overall technical backstopping to the project and to provide overall technical quality control. However, there was no progress made on this front in 2012. Inadequate technical expertise in the financial requirements of the project is similarly evident. The financial opportunities and challenges for RETs are not convincingly addressed. What kind of finance is available for the full range of [feasible] RETs? From which institutions is it available and on what terms? With regard to the V/SPP initiatives, what additional opportunities are available and on what terms? TEI has not demonstrated that it has the capacity to adequately address these critical questions.

[20] Note-to-files on management meetings between UNDP and TEI dated 1/08/2010, 25/05/2012, 28/09/2012, 18/07/2013; trip reports; and PIRs 2011, 2012

3. ***Inadequate understanding of the project***. Implementation of the project was done as piecemeal and ad-hoc activities. This reflected that the TEI project management team did not have a clear and firm grasp on the overall direction of the project. The issue has been raised up to the level of senior management of TEI in different meetings. Only in January 2013 did TEI change the team that is responsible for the project, as it was indicated by UNDP that a change of implementing partner may be called for if there is no significant progress in this third year.

4. ***Lack of results-based management.*** TEI has commissioned at least 9 reports and prepared another 4 reports using its in-house expertise. Few of these reports are of good enough quality to be used to inform the project direction and activities. Despite several follow-ups by UNDP to see completed reports, only some were provided. None of these reports have been uploaded on the internet for sharing either.

   It was also clear that a substantive amount of budget is spent with little results on the ground. Most of the budget went into management costs of TEI. In the UNDP-TEI management meeting on 18 July 2013, the issues have been raised with TEI's President, but no clear answer was given.

5. ***Inability to meet reporting and M&E requirements***. It was reflected that over the two and a half years of project implementation, TEI hardly provided the quarterly progress reports on time; and usually these reports did not meet UNDP's quality standards. The financial reports have always been submitted before the quarterly progress reports. According to UNDP rules, the financial reports would not be accepted without the progress report. Because of the frequent changes in project teams, quarterly reports also came in different forms and qualities.

6. ***No systematic documentation of the project activities/results***. The project has no systematic records/documentation on what has been done; who participated; and what are the results, despite the emphasis given to this matter since the start of the project. In the MTR team's assessment, this has become a fundamental issue as the project team changes several times, and there is no good hand-over from one team to the other due to this lack of systematic documentation.

Quality of support provided by UNDP

UNDP has invested considerable efforts and time in assisting TEI to solve these management issues. Management meetings between UNDP and TEI were held several times a year to discuss the issues and jointly identify solutions. Several solutions have been offered or provided by UNDP, including:

- An offer to hire the Project Manager through UNDP with an increased remuneration package in order to get qualified and committed persons on board.
- Hiring a part-time Principal Technical Advisor (using the project budget) to address the problematic lack of technical expertise. Mr. Ivo Besselink, the technical expert, is on board as of May 2013.

- Coaching TEI staff to get the project reporting (both on the content and the financial reports) up to some kind of standard.
- Providing critical comments on project annual work-plans and quarterly reports in meetings and via writing.
- At the latest meeting with TEI (18 July 2013), an issue was raised on unusually high personnel and project management costs compared to the low delivery of results.

While UNDP has certainly identified the quality issues surrounding the IP's performance, little has however been done to enforce these changes. There are certain characteristics of the management relationship that do not lend themselves to asserting sufficient control – including the fact that payments are made up-front and are not output-based. In addition, it is not clear that UNDP has sufficient punitive tools at their disposal (short of terminating contract) to ensure IP compliance. The IP has been underperforming for some time; while this is first-up a reflection of TEI's professional capacities, it is also a reflection of the inadequacy of the management framework. The management framework needs to evolve to include enforcement mechanisms/incentives (examples might include Performance bond[21] or a liquidated damages clause which would reduce the amount owed to the contractor for non-fulfilment of contact services). While it is therefore acknowledged that the UNDP IA is constrained by policies and procedures, it should also be recognised that these are UNDP policies and procedures. If UNDP support is compromised by its own policies and procedures, this needs to be accepted and addressed. The ultimate responsibility for project design also rests with UNDP – and as such the problems with this project's design therefore also reflect on UNDP.

[21] This is usually a bank guarantee that would typically be a feature of a construction/works project but could be applied to a service type contract.

4. Conclusions, Recommendations & Lessons

Conclusions

There are a number of fundamental findings that should be discussed in addition to the more standardized observations. These include strategic focus, management capacity and project integration.

Strategic focus

A constant thread running through the evaluation is the assertion that the objectives are not well understood by the IP (TEI). We need to understand how this situation came about. The original project scope contained a strong grid-based focus. The general project motivation spoke of the overall energy intensity of the economy, pointing out that the demand for energy exceeded the rate of economic growth. It also referred to the energy sector being the 'largest source of CO_2 emissions'. The motivating dialogue also referred to the grid connect programme with specific reference to the Small Power Producer (SPP) and Very Small Power Producer (VSPP) programmes. And to top it all, the project's Logical Framework Analysis included a reference to over 10MW of additional generation capacity on the grid. This is first and foremost a grid project. It is effectively a macro-economic initiative which needs to understand the government's economic imperative in terms of improving access to modern energy services, growing the economy, consuming energy more efficiently, increasing private sector investments in the economy, etc. Yet the Project Implementer, The Thailand Environment Institute (TEI) is an NGO which specialises in 'conducting research activities within and outside the country to benefit the conservation of natural resources and the environment'[22]. There is a fundamental mismatch between the original project goals and the organisation appointed to achieve them.

Importantly however, these original project goals, particularly those relating to increasing large-scale (MW) renewable energy generation capacity on the grid, are no longer realistic. Over the project conceptualisation period, dating back to 2008, there have been significant policy developments that have made the achievement of these already *improbable goals*[23] absolutely impossible. We have seen very unlikely become the impossible. More rigorously applied government policies such as the Forestry and National Park Reserve Act have rendered the process of establishing further hydro-electric plants very complex. The complexity and associated bureaucratic process is time-consuming and well beyond the scope and capacity of this project. With the principal goals now arguably unattainable, the project has lost its sense of direction and purpose. The project Implementing Partner (TEI) is increasingly uncertain of the project objectives and this has resulted in project activities becoming increasingly random and strategically disconnected. Ironically, TEI was arguably not the right organisation to facilitate investment in 10MW of new electricity generating capacity, being far better disposed to a community based initiative – at the micro level. However, while the

[22] http://www.unep.ch/etb/areas/tei.php

[23] Excluding the capacity growth associated with 'business as usual', the lead time for conceptualisation to commissioning of a substantial hydro-electric plant (MW) is longer than the project life (personal communications with DEDE official).

off-grid opportunity, which the MTR team has strongly proposed in the evaluation, has come increasingly into the frame, TEI has not seized upon this due to both a lack of strategic management and poor communications with the Implementing Agency (UNDP). The project scope should have officially expanded to include a more achievable 'off-grid' focus instead of allowing the impractical grid development expectations to linger and foster a general uncertainty. There are critical and substantial opportunities in the off-grid sector (45% of villages remain off-grid) which must form an important part of a Provincial RE strategy. These components include grid-connected villages where more renewable and energy efficient practices can be promoted.

The project documents are replete with references to the opportunities and challenges faced in the off-grid sector. These include the massive failures in a number of solar home system initiatives, where it has been estimated that 80% of the 300,000 systems installed over the last decade or so have broken down[24]. Of the 60 or so micro-hydro projects developed by DEDE since 1979, only 25 remain operational. It was estimated that over 10% of units installed (micro-hydro) break down and were not repaired within the first few years of operation. Based on these observations, there is also a need to develop local operational frameworks where villages can ensure systems are maintained. Another area of potential intervention is non-electrical RETs such as improved cookstoves (ICS) and solar water heaters (SWH) which will reduce biomass consumption (presently 13% of MHS's total energy consumption). There is much work that is needed in the off-grid sector if a comprehensive and inclusive Provincial RE plan is to be developed, but these opportunities are not being systematically embraced by the IP as they are still committed to the principal grid-connect outcomes of the original TOR. To be sure, TEI is involved in a number of villages, has commissioned a survey on SHS, is looking at improved cookstoves, etc., but they are not undertaking these activities with an overarching and strategic off-grid purpose in mind. Instead, they are undertaken in response to individual barriers and outcomes rather than being systematically planned to address the off-grid requirements (along with grid) of an effective Provincial RE strategy.

Synergy

Hackneyed it may be, but the 'whole is still greater than the sum of its parts'. Related to the ambivalence surrounding the project outcomes – grid or not – the current approach in terms of its activities lacks cohesion. Instead of a single outcome or vision which would organise and regulate activities, the approach lacks an integrating thread. What is needed is a clearer understanding of the outcomes (what are we aiming for here) and then to coordinate activities so they collectively achieve this. At this point, activities are being organised around the 4 principal outcomes (which are effectively barriers) rather than ensuring that these outcomes combine to create a single end result. For instance, technical training requirements are generically considered rather than being regarded as a contributing requirement for a specific solution, such as SHSs or a micro-hydro facility. A greater practical understanding of what is possible and feasible needs to be developed and activities need to be co-ordinated around this goal. A five year project with a significant budget and with very tangible outcomes expected needs to be focused on real and specific solutions and not simply creating the right enabling environment for developments to take place 'organically'.

[24] This according to 'French Development Agency AFD, Thailand Mission Report August 2007, Rouland Louvel'

There is a sense that if these 'outcome' boxes are ticked then a stronger RE economy or reality will emerge on its own, which is simply not the case. These conditions are necessary but insufficient to ensure particular outcomes. What is required is greater agency and initiative to make this happen. For instance, the challenge is not finance per se, but particular financial solutions on particular terms associated with particular technologies. The real challenge is to identify an effective RE solution and determine what specific financial requirements there are and how such a product should be structured based on the value, life-cycle, costs of the technology, the beneficiaries, etc[25]. It's not simply getting an MOU from a bank outlining their commitment to support RETs. Similarly, technical training requirements should be shaped by the suitability of certain technologies (for instance micro-hydro) within particular contexts. At this point is appears that, in the off-grid sector, SHSs and micro-hydro facilities are the most appropriate RETs. The maintenance requirements of these systems – informed by an analysis of past experiences – should dictate the kind of training required. In addition, the location of these requirements (the *geography* of need) should influence the institution which provides such training. A further angle would be identifying at which local government level these technical capacities should be available (i.e., at village level, TAO, District, etc.). This should be determined by the relative complexity of the task and the overall demand for such skills. These are the specific technical requirements/capacities that need to be in place. Once again, it's not about ensuring that institutions of learning offer a general course on RETs, but rather that those specific technical skills are available to address specific technical requirements.

There might be a sense that the critique is too utilitarian, not allowing a more general sense of the benefits of RETs to pervade. But this is the MTR's position; the approach needs more purpose and direction if it is to achieve the material outcomes expected of it.

Management capacity

There is a strong sense that the IP does not have the requisite capacity to complete all the tasks successfully. This was true in the case of the original grid-focused TOR and it remains true for the inclusion of the off-grid focus now proposed by the MTR. But it's not simply capacity that concerns us but structure as well; structure both in terms of the management hierarchy and its location.

In terms of the management hierarchy, the MTR believes that the Bangkok head office is too resource heavy (TEI President and Project Director) at the expense of the project manager. While the RE-MHS project does require leadership which has the necessary experience and network that the top management undoubtedly has, it also requires a far more substantial presence on the ground in terms of the project manager and his/her staff. More resources need to be directed to the project manager level. It is also unclear if there is enough leadership capacity and experience on the ground to ensure project continuity in the project manager's routine absence. Of course, a more clearly defined set of project objectives would assist in empowering staff but this issue remains a MTR concern.

[25] For instance, engaging with Infinite Solar around their grid connect solar PV plants. What are the financing requirements? How complex are they? The number of financial institutions that would participate, what kinds of financial institutions would be willing? Examples (Best Practice) elsewhere in the world?

Implementation and Renewable Energy Service Models (RESM)

There is a perturbing sense that the outcomes or results of the project are being considered as 'knowledge based'. An interview with a former RE-MHS project director implied that the existing expectations were too 'outcome based' and that the purpose of the RE-MHS project should be 'process based'. In addition, much of the content and expectations surrounding village-level activities are knowledge based, introducing village communities to RETs and more general 'sustainability' concepts. While knowledge certainly has its place, this project will be evaluated on material outcomes – specifically improved RE generation and access. All activities at this stage of the project need to be geared towards implementation.

Renewable Energy Service Models (RESM) is the range of appropriate energy service options that need to be considered as part of the grid and off-grid components of an overall provincial electrification plan. These are service models or technology options that will contribute to improved overall renewable energy access, which will inform the overall provincial strategy. The IP needs to develop practical implementation packages or 'service models' which would include the full suite of RET options for MHS Province, including Hydro, grid connect solar PV, ICS, SHS, micro-hydro, VSPP scenarios, etc. These RESMs need to be analysed and the barriers and opportunities understood. The packages should be sustainable business models that will keep on operating after the project. As such, the development of these RESMs should be focused on creating the supportive structure to provide for their long-term sustainability. Where possible, the RESMs need to be piloted in participating TAOs and villages in order to address the barriers and understand the holistic requirements of these energy service options. Knowledge needs to facilitate implementation rather than simply promoting a better understanding. The IP cannot lose sight of the practical, tangible expectations surrounding the RE-MHS project.

Replication

The original scope of the TOR is based on MHS Province, with lessons for neighbouring provinces. This is too broad given the slow progress to date. We are proposing a microcosm approach based on a limited area and number of modalities (RESMs), which will provide a representative system with strong analogies to the larger reality which is the MHS Province. The work will take place within a defined area (a District including a number of sub-districts and villages) which will demonstrate and refine the overall requirements for RE electrification for the province as a whole. What is learnt, implemented and recorded in this delineated District area will be replicated in other Districts and across the province as a whole.

Recommendations

This section is divided into three: project activities, the management model and the proposed strategic review.

Project activities

The following section details the MTR's suggestions surrounding future project activities. A common thread through the review is that the project's TOR does not impose sufficient structure on the project's development. In addition, it can be argued that the project has failed to identify specific, targetable barriers to RE in MHS. The MTR has therefore recommended an approach that will provide the necessary structure and enable the project to achieve its objectives through a systematic barrier identification and removal process.

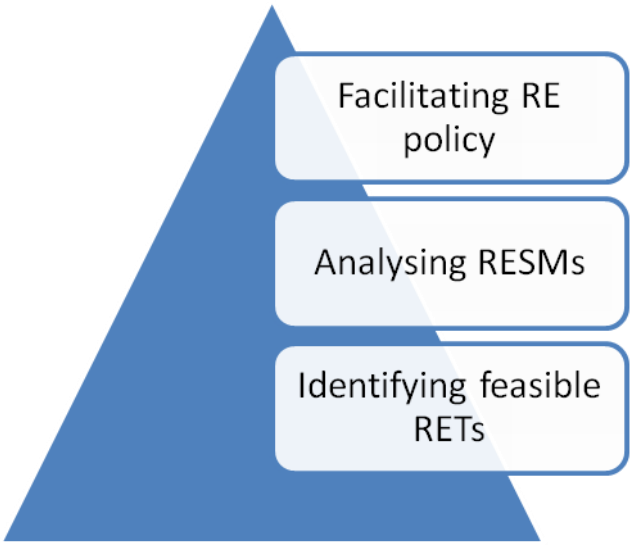

Figure 6: Activities going forward

The three activity stages include:

- Identifying all feasible RETs for the Province,
- Analysing and developing those feasible technologies into Renewable Energy Service Models (RESMs) within which the barriers are identified and addressed in detail. Part of this process would include, where feasible, the piloting of the RESMs and/or engaging existing installations in order to understand the barriers and develop a packaged solution.
- These RESMs then need to be integrated into the provincial planning process, with all barriers to this likelihood being addressed as well. Stage two and three should be implemented concurrently where possible.

The underlying assumption behind these recommendations is that the outcomes and especially outputs need to be more refined. We have discussed the project requirements from a management framework point of view as well as the competency of the IP. These important issues

notwithstanding, the specific project outcomes and outputs need to be significantly more refined and detailed if the overall objective, i.e., 'to overcome barriers to the provision of renewable energy services in integrated Provincial RE programmes in Thailand' is to be achieved. While there are significant barriers in place for the grid-connect sector that can be addressed by the project, it should also acknowledged that much of the material and practical opportunities lie in the off-grid and general renewable energy technology market. The constraints to generation developments in the conservation areas, discussed in detail elsewhere, do not really apply, for the most part, to the off-grid market. In addition, the forested and mountainous nature of the MHS province means that the grid will advance quite slowly and may never reach certain villages and sub-Districts. At the same time there are new and improving technologies that are becoming increasingly commercialised and available, including improved cookstoves (ICS), solar lighting packages as well as solar water heaters (SWHs). What this situation suggests is that *the project's scope needs to be expanded to openly and actively include off-grid and non-electrical RE technologies, alongside the important on-grid focus*.

Instead of hoping the impasse will disappear and the project can achieve the results expected, the MTR has proposed an alternative approach that will make a fundamental contribution to a Provincial RE plan as well as assisting MHS in becoming energy self-sufficient. This approach is bottom-up and looks at developing renewable energy service models which address all the appropriate mainstream technology options in MHS Province. Specific RE technology or service options need to take centre stage, replacing what has until now been largely a generic barrier driven analysis. Where possible, given the existing policy constraints impacting on Hydro and V/SPPs, a series of RESM demonstration sites need to be established in order to practically address the barriers, while in the case of the more complex grid connect options, a framework for these RESMs needs to be developed which identifies and addresses the range of barriers, processes, requirements, etc., up to the point of implementation. These RESMs are discussed in more detail below.

1. Feasibility studies/RET selection

There have been a number of feasibility studies commissioned by the IP. The first of these was a six-month study into the feasibility of small and very small electricity generation options for grid connection[26]; the second was a 12-month project which aimed to evaluate the potential of alternative energy resources in Mae Hong Son[27]. These reports do appear to provide a fairly comprehensive review of the appropriate and feasible RETs in MHS. From this, the IP will have to select a number of potential service options and address the associated barriers. This is the process of developing Renewable Energy Service Models (RESM).

[26] 'Feasibility Study of Small and Very Small Scale Electricity Generation from Renewable Energy for Grid Connection in Mae Hong Son', Science and Technology Research Institute, Chiang Mae University.
[27] 'Feasibility Study of Small and Very Small Electricity Generation Systems from alternative Energy for on-Grid and off-grid applications in Mae Hong Son', faculty of Engineering, Chiang Mae University

2. Renewable Energy Service Models (RESM)

What the MTR has proposed is the piloting and/or packaging of a number of Renewable Energy Service Models that capture the full range of feasible RETs in MHS Province. These models must capture both the village level off-grid realities as well as the grid-connect opportunities that together will form the building blocks of an integrated Provincial RET plan[28]. Where possible each of these RE service scenarios needs to be piloted, understood and packaged in order to address the specific barriers. In terms of the grid-connect RESMs, there is neither sufficient time remaining within the project scope nor time to leverage the required finance to showcase such an option anew. However, the IP would have to analyse the specific barriers relating to these service options using a combination of existing market experience (for instance, engaging with DEDE with regard to hydro requirements and with Infinite Solar and their grid-connect solar PV plants), international best practice (for instance the Renewable Energy Independent Power Producer Procurement Programme [IPP Procurement Programme] in South Africa[29]), engagement with DEDE/PEA/EGAT, the regulatory authority, engagement with potential financiers[30], analysing the appropriate supply chain, etc. The specific barriers to these, and those more immediately demonstrable RESM options (largely off-grid), need to be understood and addressed so that they may inform a future, more RE-oriented Provincial energy programme. In addition, a more effective community based approach needs to be applied in understanding the socio-economic, political and cultural challenges that villages represent (please see Annex 8).

Off-grid		**Combined/Transitional**		**Grid connect**		
Electrical (SHS)	Electrical (Micro-hydro)	Non-Electrical (ICS, SWH, etc.)	Grid connect micro-hydro	Solar PV	Hydro-electric	Commercial (Solar, SWH, Heat pumps, etc.)

Renewable Energy Service Models include:

- **Non-electrical RESM**

  This model will be developed to represent the RET opportunities across grid and off-grid communities. Non-electrical RET options, more specifically Improved Cookstoves (ICS) and Solar Water Heaters (SWH), offer relatively simple and increasingly affordable RE/energy efficiency solutions. In communities where there is no or limited access to electrical loads (SHS and no-

[28] The MTR emphasises the operational requirements, the 'plan' as opposed to simply referring to a provincial 'policy'. A policy captures the intension and the plan the actions required. We would expect more operational results from a project of this nature.
[29] http://www.ipprenewables.co.za/
[30] Such engagement would be around specific finance options in terms of amounts, nature (for instance balance sheet), rates/terms etc. The amounts required would be based on actual scenarios.

electrical loads), these interventions are likely to reduce reliance on biomass, while in grid-connected (mini-grid and PEA) communities and households, these interventions would represent effective Demand Side Management (DSM) options to reduce electricity demand and further contribute towards energy self-sufficiency. In understanding the barriers, some training and information would be required, a level of 'value chain analysis' would be needed to ensure suppliers of the products are available, micro-finance products are accessible etc. Please see Annex 7 for a more detailed proposed activity framework.

- **Electrical RESM: micro-grid**

This model should capture the broad sustainability requirements of a mini-grid supported village community. In all likelihood, the generation source will be micro-hydro. Based on research, observations and demonstrations, the complete requirements of this scenario need to be understood and presented as a packaged RESM. How do villages need to constitute themselves to apply to DEDE (or other public service providers) for a micro-grid? What technical skills would be required to determine suitability for micro-hydro? At what level should these skills (village level would be inappropriate so perhaps TAO or District?) be available? What financial contribution should the community make? Should contributions cover operational requirements rather than capital costs? How much revenue using what mechanism should the community collect to cover maintenance costs? What kind of training is required for first line/routine maintenance of a micro-hydro and what are the technical/training requirements of more complex maintenance interventions? Is the policy/regulatory environment supportive of this RESM? Other thermal and small scale RET technologies discussed in the non-electrical energy access model should be included in this model as well (ICS, SWH, etc.). Please see Annex 7 for a more detailed activity framework.

- **Electrical RESM: SHS**

Certain off-grid communities where micro-hydro is not feasible should be considered for more distributed SHS-type interventions. This service model needs to establish the right system design, research the maintenance requirements of these RETs as well as how to imbed this in a village management framework. Should there be a single service provider offering basic maintenance services to village households? What technical/training requirements are required to provide these services? What business models are available in terms of best practice? Would longer-term component replacement (for instance batteries) require micro-finance products? Who would undertake user training in these communities to ensure systems are optimally used and who would 'train the trainers'? Other thermal and small-scale RET technologies discussed in the non-electrical energy access model should be included in this model as well (ICS, SWH, etc.). Please see Annex 7 for a more detailed activity framework for this model.

- **Electrical RESM: grid connect micro-hydro**

This model represents the situation where the PEA grid has reached a village community that already have access to a micro-grid. The opportunity here is to enable the community to feed-in their power supply to the PEA grid. Key questions include: what are the regulatory requirements of this? Would VSPP regulations and processes apply? What technical expertise is required at

village/TAO/District level to support this scenario? Where would such training take place? Would the village fund be able to administer the revenue received from the sale of electricity to the grid? Would village representatives require financial training in order to manage funds/disbursements more effectively? What technical capacity is required to maintain micro-hydro? Where should such technical capacity exist/be located? Other thermal and small scale RE technologies discussed in the non-electrical energy access model should be included in this model as well (ICS, SWH, etc.). Please see Annex 7 for a more detailed activity framework for this model.

- **Electrical RESM: Grid connected large scale hydro**

The elaboration of this service model needs to capture the opportunities and barriers associated with large scale grid-connect hydro plants. The IP is advised to develop the RESM based on a 1MW+ hydro-electric facility[31]. The significant barriers associated with this service option include regulatory constraints, accessing finance, operational requirements, existing feed-in tariffs (what kind of IPP options exist?) etc. This RESM will not be implemented during the course of the project, but such plants are already operational; the challenges (and opportunities) should therefore be researched against these experiences, and other SPP examples from other Provinces better understood. The complete set of barriers, including capacity, technical support, finance and policy must be researched in developing this RESM. Please see Annex 7 for a more detailed activity framework for this model.

- **Electrical RESM: Grid connected solar PV**

There are a number of solar PV grid connect plants in MHS Province (under the VSPP programme). This RESM needs to understand the challenges and opportunities surrounding this technology. The Infinite Solar Group[32] in Thailand has 3 existing 1MW grid-connect plants in MHS, thereby offering a very useful and practical insight into the opportunities that this RESM presents. This RESM would have to understand the financial constraints in terms of accessing finance (loan structures, willing institutions), regulatory requirements (licencing, etc.), technology, etc. All the barriers should be addressed in understanding the solar PV grid-connect option. Please see Annex 7 for a more detailed activity framework for this model.

- **Commercial RESM**

There has been some interest in promoting access to RETs in the commercial sector – which in MHS is dominated by the tourism industry. The IP should demonstrate and package a service model that would appeal to hotels, restaurants, etc. that incorporates RETs. Key questions include: what technologies are appropriate? What do they cost? Is the supply chain in place to support these? Is access to finance required? What kind of finance is required? What would the payback be on certain technologies (for instance SWHs, heat pumps, solar PV)? What is the baseline in terms of energy expenditure that the RET options would have to compete against?

[31] This development will place such a facility in the SPP range. The VSPP issues/opportunities should be covered in the grid connect RESM discussed above.
[32] http://infinitesolargroup.net/main/aboutus

What is the market for these interventions? Please see Annex 7 for a more detailed activity framework for this model.

Each of these RESMs needs to be researched (and implemented, where possible) to address the associated barriers. This approach would allow the specific barriers to be addressed as opposed to the situation that obtains at this point where the IP is not sure how to define and prioritise activities, and to ensure that such activities are mutually reinforcing. We have developed an activity matrix around each of these RESM which outlines what is required in each case (Annex 7). To re-iterate, the MTR is not expecting the IP to implement these service models within the timeframe and budget that remains. While there are certainly opportunities to do this in the case of certain RESMs (for instance, SHS, mini-grid micro-hydro, Non-Electrical service model as well as the Commercial model) others such as the grid connect solar PV as well as large scale grid connect hydro are, for various reasons, more complicated propositions and the IP would only be expected to document RESMs through engagement with stakeholders as opposed to actually implementing the service model within the project scope.

3. Facilitating policy

Once the IP has developed and (where possible) implemented the RESMs, they would be expected to ensure this knowledge is shared with the most appropriate people and institutions in order to influence future energy policy developments in the province. Future MHS energy policies and activities will have to integrate renewable energy service provision to indicate this project's success. The challenge here is: how to do this? Once again, more agency and strategic effort is required. Simply addressing the barriers as suggested in the RESM process will not automatically translate into greater RE presence in the provincial energy strategy. Instead, the IP will have to work closely with the full range of stakeholders (public and private) to ensure that the opportunities are widely disseminated, and that industry and government platforms are used to this end[33].

Important activities for the IP include:

- Ensure a number of RESMs are showcased and visited by representatives at all levels of government as well as at community level
- Private sector presentations/engagements on costs and benefits of RETs
    - Develop and showcase case-study(s) on benefits of shifting to more RETs
- Supplier/vendor engagements around technologies associated with the RESMs.
    - Outline opportunities – this should be with local governments participation.
- Building capacity and awareness at all levels of local government around RETs and the specific outcomes of the RESM process.
- High level meeting with provincial planning/governor's office on how best to integrate RETs into provincial policy.
- Develop various provincial scenarios where renewable energy service options are built into provincial plans over time (this would include grid and off-grid). Key objectives should include:

[33] For instance, the PR department at Mae Hong Son Provincial Government was interested in supporting this end but was not properly engaged by the IP

    - Reduction of GHG emissions
    - Reducing reliance on diesel – which would reduce overall generation costs
    - Effective DSM interventions which would benefit households
    - Improved technical capacity to make the interventions more sustainable
    - How this would contribute to energy self sufficiency of province
    - Develop 'business as usual' scenarios versus increased RET reliance
- To develop scenarios for presentation to DEDE, Forestry Department, PAE, EGAT, etc.
    - Need to understand impasse and agree on way forward in terms of issues and timeframes.
- Put a rational timeframe to achieve tangible increases in renewable energy usage through RESMs and the achievement of energy self-sufficiency at Provincial level.

Management model

As one of the key findings of this MTR revolves around the problems of the management model used, the MTR team presents the following management modality options for consideration by the client. The MTR team recommendation is Option 3 – changing the management modality from NGO execution to DIM – as we see it as the management model that offers the greatest possibility for project success.

Table 22: Management Modality Options

Option	Explanation/conditions	Pros	Cons/Risks
Option 1: Continue NGO execution with TEI as IP	Continue with TEI as Implementing Partner but develop a tighter controlling system through existing management /monitoring mechanisms to ensure that the project is implemented with due professional expertise and commitment for achievements. Suggestions for improvements in the management mechanism include the following: • Approval of project annual workplan and expenditure by NSC (using the National Steering Committee as effective control mechanism for ensuring project costs for all activities are reasonable, including costs for management and personnel) • Ensuring quality of project activities by closely engaging the service of the Principal Technical Adviser. It must be mutually agreed that the Advisor will have an important role in coaching and	• Save time in finding new IP and get it oriented to the project • TEI is known to most concerned parties in MHS and have been doing a lot of work on the ground[34] which has been acknowledged by local agencies • Current management team (Project Director and Project Manager) as well as TEI Board have demonstrated some commitment to improve project implementation since they are on Board (e.g., engagement of TBCSD's funding to construct 3 mini hydro power plants in project areas; development of a draft (5 year) comprehensive RE strategic plan to be approved by provincial authorities).	• TEI is expensive in terms of costs for project management and personnel. With only about US$ 1.6 million left and substantial targets to be achieved in the remaining time of the project, such high management costs cannot be continued. • TEI Board is concerned about losing the Institution's reputation. It is not in favour of engaging outside consultants while activities in the remaining time require people with specialized knowledge and skills in areas that TEI is lacking. • TEI is highly centralized in its management. Although the new management team is committed to success, TEI's management system may not allow for

[34] Although this work's relevance to the project objectives is highly questionable

	ensuring quality of project implementation in all stages (i.e., planning, implementation, follow-up and reporting) • (If possible), adjust payment system from advancing based on approved work-plan to output-bound payment. • Include punitive measures/ incentive mechanisms, e.g. performance bond and/or liquidated damages clause, in contract.		flexibility on ground to address emerging needs as the pilots progress. • Even with a stronger/tighter management framework in place, a very significant risk remains that TEI does not have the capacity to deliver on the project results. • If stronger control mechanisms are not available (e.g. output-based payments), project will merely be back where it started. • Would require more resources from UNDP
Option 2: Switch to NIM modality with new IP	Switch to NIM modality engaging a more capable organisation as IP within an appropriate management framework. New IP should demonstrate the following qualifications (at a minimum): • Proven experience in developing and promoting different RE schemes, especially in remote areas • Solid knowledge about provincial planning and budgeting procedures and channels for RE needs integration • Having in-house expertise or good connection to outside service providers/experts in appropriate RETs, commercial RETs, RE value chain analysis, finance access and	• New IP with more relevant background can contribute more directly to the achievement of the project outputs and outcomes. • Flexible/adaptive management is more relevant to nature of the proposed interventions (piloting different RESMs to get the best informed knowledge) as opposed to rigid/centralized planning and management	• Finding a new, qualified IP may take some time, which will affect continuity of project interventions on the ground and result in significant project delays. • With tighter budget and shorter timeframes left, more effective project and financial management is needed. A new IP presents a new risk in this area. • Appointing a new IP may merely result in the same situation as with TEI – especially given the limited timeframes and the lack

	management, community learning, community organization strengthening, and knowledge of local/tribal cultures. If this expertise is not available in-house, the IP's contract should include MOUs and/or partnership agreements with appropriate experts to ensure availability. • Have strong action research (piloting RESMs) and knowledge management competency, including effective and professional public communication. • Flexible and adaptive management approach, especially with regard to timely responses to specific requirements of the pilots on the ground. • Sufficiently attractive remuneration packages for staff members to ensure lower turnover In working with new IP, all recommendations about quality control and monitoring of project activities proposed under Option 1 should also be applied.		of appropriate punitive measures for the IA. • Project traction/momentum and knowledge to date is lost If TEI is entirely removed from the project.
Option 3: Direct Implementation Modality (DIM)	UNDP implements the project directly with the following arrangements: • Engagement of Project Team. Project Manager and Project Coordinator should be recruited based on their proven records on results-based, technical RE project management, especially with UN standard/system.	• Using existing M&E tools and mechanisms more effectively and having more control over project implementation through the Project Team, UNDP can ensure that project is going on the right track and that its objectives will eventually be	• Finding and appointing new Project Team and relevant parties for different outputs may take some time, which will affect continuity of project interventions on the ground. • The added administrative burden that this might place on

	The Project Team will be based in MHS. • Attractive remuneration packages should be offered to get qualified and genuinely committed applicants/staff • Principal Technical Adviser should work closely with the Project Team as a technical backup. • Competent consultants, NGOs, CSOs with relevant experiences will be engaged to implement project interventions for specific outputs/outcomes. Suggested areas of expert engagement are appropriate RETs, commercial RETs, RE value chain analysis, finance access and management, community organization strengthening, etc. (as needs emerge) • Apply for project extension from GEF to allow for change in management modality	achieved. • Direct Implementation allows for better management of especially personnel costs; reduced mark-ups means that better remuneration packages can be offered to personnel – resulting in better qualified staff and lower turn-over. • Lack of continuity is a small price to pay at this stage, given the limited relevance and impact of project activities to date.	the UNDP CO needs to be carefully considered. • UNDP rules & regulations might result in less flexibility from the project to be able to respond to project needs as/when needed (e.g. pilot project implementation).
Option 4: Project Termination	If the proposed changes take too long to implement (e.g. 6 months), or the time and budget remaining is deemed too little based on the strategic review, or the project objective(s) is deemed unattainable under GEF funding regulations, it is recommended that the project be terminated.	• GEF/UNDP able to cut losses, ensuring that more resources are not 'wasted'	• Dead loss of more than $ 1 million and 2.5 years, with no results to show for it. • Damage reputation of UNDP/GEF with Thai authorities, local populations and private sector. • The barriers to RE in MHS (and other rural provinces) remain.

Strategic review

The Mid-term Review process has shown that there are fundamental project conceptualisation and design issues that impede the project's ability to deliver the desired results. These findings have significant implications for how the project progresses. The MTR has made its recommendations to this end, with a more technology-led approach which focuses on addressing barriers at the specific technology level, and then developing and facilitating a provincial energy plan which increasingly integrates renewable energy service options. We have also made recommendations regarding the management modality going forward. Given the limited time-frame available as well as limited funds, it is proposed that the Implementing Agency (UNDP) holds a strategic review, with the goal of developing a more practical project design that will guide future project activities to achieving the agreed objectives. The MTR suggests that this review is held as a first order of business for the RE-MHS project, where the new requirements and expectations of the project are openly discussed and the way forward agreed upon.

Table 23: Strategic Review

Timeframe:	To be concluded within 2 months from MTR report acceptance
Review Process:	Accept/modify MTR findings & recommendations
	Develop Strategic Review document: new project document (including new logframe, new workplan, new M&E plan, new HR profile, new indicators/targets and new budget) – based on MTR findings
	Submit to GEF for approval (incl. request for project extension, if necessary)
	Submit to Project Stakeholders (at Strategic Review workshop) for approval
	Implement new project plan
Lead agency:	UNDP Thailand - with possible technical assistance

Issues to be addressed during the review process would include:

- A re-evaluation of project targets, outcomes, outputs, indicators and overall design to incorporate the findings and recommendations of the MTR into a new project logical framework. This includes ensuring the correct 'balance' between on- and off-grid renewable energy.
- Shift from NGO execution to DIM, facilitating increased direct involvement of UNDP
- Ensuring that requisite specialist capacity (Financial & Technical) is identified and recruited
- Costing and planning of RESM approach
    - Conclude expectations around demonstration/implementation sites within balance of project timeframe
- Conclude M&E requirements which may be more than the annual reporting requirements contained in the TPR, APR and PIR. Develop ToR and budget for independent M&E function.
- A revision of project targets based on resources and time available.

Lessons

Below are some of the most pertinent lessons to emerge from this review.

- The project needs to ensure that the goals and objectives of parties involved are aligned; for this project, the GEF goal was to reduce GHG emissions, the project's objective was to integrate RE in provincial energy plans, the goal of the Thai government was energy self-sufficiency for Mae Hong Son, and the goal of villages/communities is energy access. While it is not necessarily possible that everyone has the same goal in mind, it is very important that possible conflicting goals are addressed early on and project objectives are communicated very clearly and understood by all participants. Conflicting goals result in a project design that is vague and non-specific, leaving an important gap between desired project results and project activities.

- The fact that M&E mechanisms exist does not mean that sufficient monitoring and evaluation takes place. These mechanisms need to be linked to actual payment milestones to create the necessary incentives for them to be used correctly. These milestones should also allow for sufficient evaluation throughout the project lifetime – especially during the first phase. The issues highlighted in the MTR should have been identified *and addressed* much earlier through a formal, structured evaluation process. The project design should also allow for adjustments to be made throughout the project life, at reasonable intervals, to ensure that evaluation has an impact. If the IP is struggling to meet the M&E requirements, an independent M&E party should be appointed to take over this function.

- Renewable Energy market transformation, especially in a specific geographic area, does not take place through merely analysing and addressing clusters of generic barriers. Real barriers are identified through actual renewable energy project implementation and any initiative wishing to address these barriers should be sufficiently connected to this RE project implementation process. The Regional Technical Assistance Program being implemented in East Africa by AFD and the EU Energy Initiative Partnership Dialogue Facility (EUEI PDF) is a good model of what such a project design might look like[35]. In addition, there are obvious constraints to what the Implementing partner can personally achieve within time/resource limits, so secondary sources, engagement with other initiatives, research/understanding best practice, etc. must form part of 'connecting to RE implementation process'.

- When it comes to project results, the attribution gap between project impacts/results and project activities cannot be too 'wide'. This is one of the fundamental problems of the RE-MHS project, where the project design document posited extremely tenuous links between considerable project results (11.8 MW of new RE generation) and project activities (primarily capacity building)[36]. It is important that a project is able to *prove* at least some level of 'additionality' when it comes to results. The fact that RE investments continue to take place

35 http://www.afd.fr/webdav/shared/PORTAILS/PAYS/KENYA/KAM%20AFD%20press%20release%20_vf_.pdf. Also see Annex 9.

36 RE-MHS Project Document – Page 59.

in MHS[37], despite the project's lack of progress, seems to undermine the assumptions made about the project's contributions to GHG emissions reductions in the Project Document[38]. GEF should reconsider point 27 in the "Manual for calculating GHG benefits of GEF projects: Energy Efficiency and Renewable Energy Projects"[39], which states that "the decisive criterion for the questions of whether to exclude or include an investment is whether it is included in the M&E framework proposed in the logframe"; as this project has illustrated, this is not an effective method of ensuring additionality in GEF-project emissions calculations. A clearer, more direct link between project activities and investments is required.

- GEF's exclusion of off-grid activities weakens project impact and limits market transformation. Given the energy access rates in Mae Hong Son province, there are specific realities that need to be addressed by the project and any consequent provincial renewable energy planning. The MTR acknowledges that this is part of GEF's official funding policy, but urges GEF to reconsider this decision in the light of this project's experience, as well as the global drive for universal access to modern energy under the UN's 'Sustainable Energy for All' initiative.

- It should be ensured that appropriate and flexible punitive measures are available to the IA, and stipulated in the contract with the IP. For example, it is proposed that UNDP/GEF policies should allow for results-based payment.

- The project needs to actively demonstrate Renewable Energy Service Models in order to identify and address specific barriers. This has unfortunately not been explored sufficiently, even though it is an essential component of a renewable energy market transformation strategy.

- For a project where much time elapses between the design and implementation phases, it is necessary that risk management matrices be reviewed and adjusted during the inception phase to reflect important changes in national policies, regulations and realities on the ground. Risks which are identified as 'crucial' must be addressed in an early stage of project implementation. Similarly, risks should be monitored *and addressed* through the project's M&E mechanisms.

- According to the project document, the National Steering Committee is accountable for project outcomes. They have direct responsibility to assist in implementation issues which need support from policy levels (e.g. settling conflicting mandates/regulations between different ministries). The NSC should therefore be used more proactively.

[37] E.g. 5.3 MW Mae Sangaa Hydro plant; 3x1 MW Solar plants by Infinite Solar.
[38] RE-MHS Project Document; pp. 58 – 65.
[39] http://www.thegef.org/gef/sites/thegef.org/files/documents/C.33.Inf_.18%20Climate%20Manual.pdf

Annex 1: Terms of Reference

REQUEST FOR PROPOSAL (RFP)

Dear Sir / Madam:

We kindly request you to submit your Proposal for conducting the Mid-Term Review for Promoting Renewable Energy in Mae Hong Son Province' Project.

Please be guided by the form attached hereto as Annex 2, in preparing your Proposal.

Proposals may be submitted on or before **Tuesday, June 4, 2013**, via email, courier mail or fax to the address below:

United Nations Development Programme
UN Service Building 3rd Floor, Rajdamneon Nok Avenue, Bangkok 10200
Ms. Somlak Supkongyu
somlak.supkongyu@undp.org; Fax. 662-280-2700

Your Proposal must be expressed in the English language, and valid for a minimum period of 120 days.

In the course of preparing your Proposal, it shall remain your responsibility to ensure that it reaches the address above on or before the deadline. Proposals that are received by UNDP after the deadline indicated above, for whatever reason, shall not be considered for evaluation.

Services proposed shall be reviewed and evaluated based on completeness and compliance of the Proposal and responsiveness with the requirements of the RFP and all other annexes providing details of UNDP requirements.

The Proposal that complies with all of the requirements, meets all the evaluation criteria and offers the best value for money shall be selected and awarded the contract. Any offer that does not meet the requirements shall be rejected.

Any discrepancy between the unit price and the total price shall be re-computed by UNDP, and the unit price shall prevail and the total price shall be corrected. If the Service Provider does not accept the final price based on UNDP's re-computation and correction of errors, its Proposal will be rejected.

No price variation due to escalation, inflation, fluctuation in exchange rates, or any other market factors shall be accepted by UNDP after it has received the Proposal. At the time of Award of Contract or Purchase Order, UNDP reserves the right to vary (increase or decrease) the quantity of services and/or goods, by up to a maximum twenty five per cent (25%) of the total offer, without any change in the unit price or other terms and conditions.

1

Any Contract or Purchase Order that will be issued as a result of this RFP shall be subject to the General Terms and Conditions attached hereto. The mere act of submission of a Proposal implies that the Service Provider accepts without question the General Terms and Conditions of UNDP, herein attached as Annex 3.

Please be advised that UNDP is not bound to accept any Proposal, nor award a contract or Purchase Order, nor be responsible for any costs associated with a Service Providers preparation and submission of a Proposal, regardless of the outcome or the manner of conducting the selection process.

UNDP's vendor protest procedure is intended to afford an opportunity to appeal for persons or firms not awarded a Purchase Order or Contract in a competitive procurement process. In the event that you believe you have not been fairly treated, you can find detailed information about vendor protest procedures in the following link: http://www.undp.org/procurement/protest.shtml.

UNDP encourages every prospective Service Provider to prevent and avoid conflicts of interest, by disclosing to UNDP if you, or any of your affiliates or personnel, were involved in the preparation of the requirements, design, cost estimates, and other information used in this RFP.

UNDP implements a zero tolerance on fraud and other proscribed practices, and is committed to preventing, identifying and addressing all such acts and practices against UNDP, as well as third parties involved in UNDP activities. UNDP expects its Service Providers to adhere to the UN Supplier Code of Conduct found in this link : http://www.un.org/depts/ptd/pdf/conduct_english.pdf

Thank you and we look forward to receiving your Proposal.

Sincerely yours,

Somlak Supkongyu
Procurement and Administrative Services Manager
21 May 2013

Annex 1

Description of Requirements

Context of the Requirement	*Mid-Term Review for Project* "Promoting Renewable Energy in Mae Hong Son Province' Project
Implementing Partner of UNDP	Thailand Environment Institute
Brief Description of the Required Services[1]	See TOR attached.
List and Description of Expected Outputs to be Delivered	The key product expected from this exercise is a review report in Thai and in English that should, at least, include the following contents: ■ Executive summary ▪ Brief description of the project ▪ Important observation and analysis of information ▪ Main conclusions, recommendations and lessons learned ■ Introduction ▪ Project background ▪ Purpose of the review ▪ Key issues addressed ▪ Methodology of the review ▪ Structure of the review ■ The Project and its development context ▪ Project start and its duration ▪ Implementation status ▪ Problems that the project seek to address ▪ Immediate and development objectives of the project ▪ Main stakeholders ▪ Results expected ■ Assessments of the progress made towards the attainment of outcomes. ■ Key findings (including best practice and lessons learned, assessment of performance) • Project formulation ▪ Implementation approach ▪ Country ownership ▪ Stakeholder participation ▪ Replication approach ▪ Cost-effectiveness

[1] *A detailed TOR may be attached if the information listed in this Annex is not sufficient to fully describe the nature of the work and other details of the requirements.*

<table>
<tr><td></td><td>

UNDP comparative advantage
Linkages between project and other interventions within the sector
Management arrangements

Implementation

Financial planning
Monitoring and evaluation
Execution and implementation modalities
Management by the UNDP country office
Coordination and operation issues
Identification and management of risks (adaptive management)

Recommendations

Recommendations for modification and future course of action
Suggestions for strengthening ownership, management of potential risks

Lessons learned

Good practices and lessons learned from the project structure, coordination between different agencies, experience of the implementation, and output/outcome.

</td></tr>
<tr><td>Person to Supervise the Work/Performance of the Service Provider</td><td>Programme Analyst, Environment Unit, UNDP Thailand</td></tr>
<tr><td>Frequency of Reporting</td><td>Two

Draft Report presented to the Project Team, Implementing Partner and beneficiaries

Finalization of the Review Report to UNDP Thailand</td></tr>
<tr><td>Progress Reporting Requirements</td><td>One
Validation of preliminary findings with stakeholders for comments.</td></tr>
<tr><td>Location of work</td><td>☒ At Contractor's Location</td></tr>
<tr><td>Expected duration of work</td><td>Three weeks during the period from 1-26 July 2013 (20 working days)</td></tr>
<tr><td>Target start date</td><td>1 July 2013</td></tr>
<tr><td>Latest completion date</td><td>26 July 2013</td></tr>
<tr><td>Travels Expected</td><td>
<table>
<tr><th>Destination/s</th><th>Estimated Duration</th><th>Brief Description of Prpoe of the Travel</th><th>Target Date/s</th></tr>
<tr><td>Mae Hong Son</td><td>3 working days</td><td>Interview stakeholders and project site visits</td><td>Early July 2013</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
</table>

4

<table>
<tr><td>Names and curriculum vitae of individuals who will be involved in completing the services</td><td>☒ Required</td></tr>
<tr><td>Currency of Proposal</td><td>☒ USD</td></tr>
<tr><td>Value Added Tax on Price Proposal[2]</td><td>☒ must be exclusive of VAT and other applicable indirect taxes</td></tr>
<tr><td>Validity Period of Proposals (Counting for the last day of submission of quotes)</td><td>☒ 120 days

In exceptional circumstances, UNDP may request the Proposer to extend the validity of the Proposal beyond what has been initially indicated in this RFP. The Proposal shall then confirm the extension in writing, without any modification whatsoever on the Proposal.</td></tr>
<tr><td>Partial Quotes</td><td>☒ Not permitted</td></tr>
<tr><td>Payment Terms[3]</td><td>
<table>
<tr><th>Outputs</th><th>Percentage</th><th>Timing</th><th>Condition for Payment Release</th></tr>
<tr><td>Inception report including work plan and review matrix prepared and accepted by UNDP Manager.</td><td>20%</td><td>5 calendar days from signing the contract.</td><td>Within thirty (30) days from the date of meeting the following conditions:
a) UNDP's written acceptance (i.e., not mere receipt) of the quality of the outputs; and
b) Receipt of invoice from the Service Provider.</td></tr>
</table>
</td></tr>
<tr><td>Person(s) to review/inspect/ approve outputs/completed services and authorize the disbursement of payment</td><td>Programme Analyst, Environment Unit, UNDP Thailand</td></tr>
<tr><td>Type of Contract to be Signed</td><td>☒ Institution Contract</td></tr>
</table>

[2] *VAT exemption status varies from one country to another. Pls. check whatever is applicable to the UNDP CO/BU requiring the service.*

[3] *UNDP preference is not to pay any amount in advance upon signing of contract. If the Service Provider strictly requires payment in advance, it will be limited only up to 20% of the total price quoted. For any higher percentage, or any amount advanced exceeding $30,000, UNDP shall require the Service Provider to submit a bank guarantee or bank cheque payable to UNDP, in the same amount as the payment advanced by UNDP to the Service Provider.*

Criteria for Contract Award	☒ Highest Combined Score (based on the 70% technical offer and 30% price weight distribution)
Criteria for the Assessment of Proposal	**Technical Proposal (70%)** ☒ Expertise of the Firm 15% ☒ Methodology, Its Appropriateness to the Condition and Timeliness of the Implementation Plan 45% ☒ Management Structure and Qualification of Key Personnel 40% **Financial Proposal (30%)** To be computed as a ratio of the Proposal's offer to the lowest price among the proposals received by UNDP.
UNDP will award the contract to:	☒ One and only one Service Provider
Annexes to this RFP[4]	☒ Form for Submission of Proposal (Annex 2) ☒ General Terms and Conditions / Special Conditions (Annex 3)[5] ☒ Detailed TOR
Contact Person for Inquiries (Written inquiries only)[6]	*Ms. Somlak Supkongyu* *Procurement and Administrative Services Manager* *email: somlak.supkongyu@undp.org* Any delay in UNDP's response shall be not used as a reason for extending the deadline for submission, unless UNDP determines that such an extension is necessary and communicates a new deadline to the Proposers.
Other Information *[pls. specify]*	

[4] *Where the information is available in the web, a URL for the information may simply be provided.*
[5] *Service Providers are alerted that non-acceptance of the terms of the General Terms and Conditions (GTC) may be grounds for disqualification from this procurement process.*
[6] *This contact person and address is officially designated by UNDP. If inquiries are sent to other person/s or address/es, even if they are UNDP staff, UNDP shall have no obligation to respond nor can UNDP confirm that the query was received.*

Terms of Reference for the Mid-Term Review

1. Introduction

1.1. Standard UNDP/GEF M&E Requirements

The Monitoring and Evaluation (M&E) policy at the project level in UNDP/GEF has four objectives: i) to monitor and evaluate results and impacts; ii) to provide a basis for decision making on necessary amendments and improvements; iii) to promote accountability for resource use; and iv) to document, provide feedback on, and disseminate lessons learned. A mix of tools is used to ensure effective project M&E. These might be applied continuously throughout the lifetime of the project – e.g. periodic monitoring of indicators -, or as specific time-bound exercises such as mid-term reviews, audit reports and independent evaluations.

Mid-term reviews are intended to identify potential project design problems, assess progress towards the achievement of objectives, identify and document lessons learned (including lessons that might improve design and implementation of other UNDP/GEF projects), and to make recommendations regarding specific actions that might be taken to improve the project, substantively or operationally. Mid-term reviews could also explicitly focus on the constraints and opportunities for scaling up which is crucial to achieve transformational change. It is expected to serve as a means of validating or filling the gaps in the initial assessment of relevance, effectiveness and efficiency obtained from monitoring. The mid-term review provides the opportunity to assess early signs of project success or failure and prompt necessary adjustments.

This TOR is for the Mid-Term Review of the following project: 'Promoting Renewable Energy in Mae Hong Son Province'. This five-year project commenced in June 2010 with funding from the Global Environment Facilities (GEF), and in-kind co-financing from Thailand Environment Institute (TEI).

1.2. Country Context

Despite the government's commitment to Renewable Energy, there have been constraints to the wider and more sustained application of Renewable Energy Technologies in Thailand. This project will overcome barriers that currently prevent widespread and sustainable utilization of Renewable Energy Technologies for the provision of energy services in rural areas of Thailand.

The project will work initially in Mae Hong Son province, which the Ministry of Energy has identified as its target to be the first energy self-sufficient province in Thailand, in conformity with the king's sufficiency economy concept. Furthermore, the project will also work in the neighbouring provinces Chiang Mai, Chiang Rai, Lampoon, and Lampang.. These provinces have comparable geographic and economic situations and RE potential. By including these provinces a critical mass is created to leverage change in national policies and governmental planning processes regarding RE development and utilization in Thailand's rural areas. The project will facilitate an integrated RE planning process at provincial and local level, in order to translate targets set at national level to local level and into real action. Various new approaches, concept and policies will be developed and applied,

e.g. new ownership models for RE systems, improvements to tariff system and loan management to be endorsed by the government and applied elsewhere in Thailand.

Furthermore information on existing incentives/policies for RE promotion which are available but sometimes seldom used will be disseminated and promoted. The project will also contribute to the broader goal of reducing GHG emissions in Thailand. The 4 components deal with (a) institutional capacity development for planning and implementing RE programmes; (b) access to financing; (c) technical training and education and (d) policies for up-scaling and replication.

1.3. Project Summary

The RE-MHS project is the Global Environment Facility (GEF) – supported project, with the United Nations Development Programme (UNDP) as the Implementing Agency (IA). It is under the Resource Allocation Framework 4 to the Royal Thai Government, with the total GEF contribution of USD 2,993,000 over the period of 5 years.

The project aims to overcome barriers that currently prevent widespread and sustainable utilization of Renewable Energy Technologies (RETs) for the provision of energy services in rural areas of Thailand. The project will work initially in Mae Hong Son province, which the Ministry of energy has identified as its target to be the first energy self-sufficient province in Thailand.

The project is hosted by Mae Hong Son Province, as the Government Coordinating Authority for the project. The modality is NGO execution, with the Thailand Environment Institute (TEI), as the implementing partner (IP), responsible for the overall project management through the function of Project Management Unit (PMU). UNDP performs the assurance role to ensure that appropriate project milestones are met and that the project is well-managed.

1.4. Project's Objective, Expected Outcomes and Outputs

The project's objective, outcomes and outputs covered by the entire project duration include:

Project Objective:

The Project Objective is "To overcome barriers to the provision of Renewable Energy (RE) services in integrated provincial renewable energy programmes in Thailand". This will contribute to the broader Goal of reducing GHG emissions in Thailand. Importantly, it will also contribute to the Goal of Thailand's GEF strategy, which is to mobilize GEF resources in support of the implementation of Sufficiency Economy principles, as enshrined in the 10th National Economic and Social Development Plan.

- Outcome 1: Strengthened institutional, organizational and social capacity results in planning, management and implementation of integrated RE programmes in MHS (and another provinces in the Regional Energy Office 10)

- Output 1.1: Integrated provincial RE plans prepared
- Output 1.2: Strengthened mobilization and co-ordination mechanisms
- Output 1.3: Institutional arrangements for cooperatively-owned and PPP renewable energy systems
- Output 1.4: Local entities with strong leadership to plan, develop and manage RE systems

- Outcome 2: Sustainable RE systems operational in MHS (and another province in the Regional Energy Office 10)
  - Output 2.1: Awareness raised of all stakeholders involved in RE projects regarding social, economic and environmental costs and benefits of RE systems
  - Output 2.2: Operational guidance on SPP /VSPP and other schemes disseminated among stakeholders
  - Output 2.3: RE systems installed under previous initiatives rehabilitated
  - Output 2.4: Off-grid RE electrical systems to local communities established
  - Output 2.5: Grid-linked RE systems established consistent with integrated provincial development plans
  - Output 2.6: Non-electrical RE (e.g. charcoal kilns, biodiesel) promoted
  - Output 2.7: Access to concessional loans facilitated at least $5 M is available to promote RE through concessional loans

- Outcome 3: Technical support is available locally for the development, management and maintenance of RE applications in MHS (and another province in the Regional Energy Office 10)
  - Output 3.1: RE curricula for vocational training institutes targeting private service providers and others developed and officially approved
  - Output 3.2: Completed training in business, finance and resource
  - Output 3.3: Completed trainings in maintenance and repair of RE system
  - Output 3.4: Disseminated technology/information
  - Output 3.5: Technically capable and skilled local RE technology equipment manufacturers increased

- Outcome 4: Policies facilitate up-scaling and replication of RE systems in Thailand
  - Output 4.1: Centre of learning in MHS promoting as part of the Sufficiency Economy established
  - Output 4.2: RE applications prominent in government energy programmes
  - Output 4.3: Flexible subsidies/tax incentives revised and promoted
  - Output 4.4: Transparent system of government accountability established
  - Output 4.5: Policy makers that support RE development and application programs
  - Output 4.6: A "VSPP association" consisting of VSPP practitioners, academics, NGOs and government agencies established

2. Scope of the Review

The scope of the MTR covers the entire UNDP/GEF-funded project and its components as well as the co-financed components of the project.

The Review is intended to identify weaknesses and strengths of the project design and provide recommendations for any necessary changes or alignments in the overall design and orientation of the project. This is done through assessing the progress of Project implementation, since the beginning of implementation, against planned Outputs and Outcomes set forth in the Project Document, taking into account the resource disbursements made up to March 2013. The review will also address underlying causes and issues that have contributed to targets not adequately achieved. Consequently, the review mission is also expected to make detailed recommendations on the work plan for the remaining project period. It will also provide an opportunity to assess early signs of project success or failure, and prompt necessary adjustments.

The review will include, but not limited to, analyses/assessments on following issues:

Progress towards achievement of results (internal and within project's control)

- Is the Project making satisfactory progress in achieving project Objective, Outcomes, and Outputs vis-à-vis the targets and related delivery of inputs and activities?
- What are the planned activities that are critical for attainment of project Outputs in the remaining project implementation period?
- Are the direct partners and project consultants able to provide necessary inputs or achieve results?
- Given the level of achievement of outputs and related inputs and activities to date, is the Project likely to achieve its Immediate Purpose and Development Objectives?
- Are there critical issues relating to achievement of project results that have been pending and need immediate attention in the next period of implementation?
- Is the project logical framework and design still relevant in the light of the project experience to date?
- Assessment of the long-term viability and sustainability of the project, and recommendations to Government and relevant stakeholders on how to upscale good practices
- Lessons learned during project implementation and recommendations to replicate them
- Are there effective relationship and communication between/among components so that data, information, lessons learned, best practices and outputs are shared efficiently, including cross-cutting issues?
- At the rate of progress observed at MTR, is the project likely to achieve all of its project Objective and Outcomes. If not, provide a justification for an extension of the project implementation.

Process of achievement of results

- Has the project achieved (or is it likely to achieve) its Objective, Outcomes, and Outputs efficiently? This includes an assessment of attained Outcomes and Outputs with

respective expenditures vis-à-vis planned expenditures. Assessments of expenditure should also include actual co-finance materialized by the project against the planned co-financing as indicated in the Project Document.

- Are the performance measurement indicators and targets used in the project monitoring system specific, measurable, achievable, reasonable and time-bound to achieve desired project Outcomes and Outputs
- How relevant and appropriate are the work plan and financial plan in guiding the project activities?
- How well are the disbursements, procurement, coordination among project team members and committees, and the UNDP country office support being carried out?
- Any issue or factor that has impeded or accelerated the implementation of the project or any of its components, including actions taken and resolutions made should be highlighted.

Factors affecting successful implementation and achievement of results (beyond the Project's immediate control or project-design factors that influence outcomes and results)

- Is the project implementation and achievement of results proceeding well and according to plan, or are there any outstanding issues, obstacles, bottlenecks, etc. on the consumer, government or private sector or the electricity industry as a whole that are affecting the successful implementation and achievement of project results?
- To what extent does the broader policy environment remain conducive to achieving expected project results, including existing and planned legislations, rules, regulations, policy guidelines and government priorities?
- Is the project logical framework and design still relevant in the light of the project experience to date?
- To what extent do critical assumptions/risks in project design make true under present circumstances and on which the project success still hold? Validate these assumptions as presently viewed by the project management and determine whether there are new assumptions/risks that should be raised?
- Are the Project's institutional and implementation arrangements still relevant and helpful in the achievement of the Project's objectives, or are there any institutional concerns that hinder the Project's implementation and progress.

Project management (adaptive management framework)

- Are the project management arrangements adequate and appropriate?
- How effectively is the project managed at all levels? Is it results-based and innovative?
- Do the project management systems, including progress reporting, administrative (including procurement and recruitment) and financial systems , operate as effective management tools, aid in effective implementation and provide sufficient basis for evaluating performance and decision making?
- Is technical assistance and support from project partners and stakeholders, including UNDP, appropriate, adequate and timely?

- Validate whether the risks originally identified in the project document and, currently in the APR/PIRs, are the most critical and the assessments and risk ratings placed are reasonable.
- Describe additional risks identified during the review. if any, and suggest risk ratings and possible risk management strategies to be adopted.
- Assess the use of the project logical framework and work plans as management tools and in meeting with UNDP-GEF requirements in planning and reporting.
- Assess the use of electronic information and communication technologies in the implementation and management of the project.
- On the financial management side. assess the cost effectiveness of the interventions and note any irregularities.
- Are the Project's institutional and implementation arrangements still relevant and helpful in the achievement of the Project's objectives, or are there any institutional concerns that hinder the Project's implementation and progress.
- Assess the effectiveness of the monitoring mechanisms employed by the project in monitoring progress of project execution, both in financial as well as technical terms
- How have the APR/PIR process helped in monitoring and evaluating the project implementation and achievement of results?

Strategic partnerships (project positioning and leveraging)

- Are the project partners and their other similar engagements in the 'Promoting Renewable Energy in Mae Hong Son Province' strategically and optimally positioned and effectively leveraged to achieve maximum effect of the climate change mitigation program objectives for the country?
- Asses how project partners, stakeholders and co-financing institutions are involved in the Project's adaptive management framework.
- Identify opportunities for stronger collaboration and substantive partnerships to enhance the project's achievement of results and outcomes.
- Are the project information and progress of activities disseminated to project partners and stakeholders? Are there areas to improve in the collaboration and partnership mechanisms?

3. Review Methodology

The MTR Team is expected to become well versed as to the project objectives, historical developments, institutional and management mechanisms, activities and status of accomplishments. To the extent possible, results presented in the MTR should be substantiated with evidence or triangulated.

The MTR Team will carry out the following activities:
a) Document desk review;
b) An opening meeting with the National Project Director (NPD), Project Management Unit (PMU), Responsible Parties, Field Teams, Beneficiaries, UNDP CO, and, UNDP APRC
c) Group and individual interviews with stakeholders listed below;
d) Site visit: Mae Hong Son

e) An "exit" meeting to discuss the findings of the assessment with TEI, project staff and UNDP, prior to the submission of the draft Final Report.

Prior to engagement and visiting the PMU, the MTR Team shall receive all the relevant documents including at least:

- 'Promoting Renewable Energy in Mae Hong Son Province' Project Document and Project Brief
- Inception Report
- Annual Work and Financial Plans
- Annual Project Reports/Project Implementation Reviews (API/PIR) Minutes of Project Board and Project Team Meetings
- Back-to-Office Mission Reports

To provide more details, as may be needed, the following will be made available for access by the MTR Team:

- Executive summary of all quarterly reports
- Internal monitoring results
- Terms of Reference for past consultants' assignments and summary of the results
- Past audit reports

The MTR Team should at least interview the following people:

- Project Director
- Project Manager
- Representative of Responsible Parties, including MHS provincial authority, DEDE, EPPO, EGAT, PEA, and BAAC
- Field Officers
- Representatives from pilot communities
- Project Administrative Officer
- Project Financial Officer
- Members of Project Steering Committee
- UNDP Country Office in Bangkok in-charge of the Promoting Renewable Energy in Mae Hong Son Province' Project.

With the aim of having an objective and independent evaluation, the MTR Team is expected to conduct the project review according to international criteria and professional norms and standards as adopted by the UN Evaluation Group.

4. Review Team

The MTR Team will be composed of one locally-based International Consultant and one National Consultant. The Team is expected to combine international standards of evaluation

expertise, excellent knowledge of Climate Change Adaptation projects and national context of project and program implementation in Thailand.

At the minimum, the members of the MTR Team shall have the following professional background and responsibilities:

A. International Lead Consultant

Profile

- Post-Graduate in environmental studies, development studies, social sciences and/ or other related fields.
- Minimum of ten years accumulated and recognized experience in climate change mitigation, renewable energy promotion, and sustainable development
- Minimum of five years of project evaluation and/or implementation experience in the result-based management framework, adaptive management and UNDP or GEF Monitoring and Evaluation Policy
- Familiarity in similar country or regional situations relevant to that of Promoting Renewable Energy in Mae Hong Son Province' Project
- Experience with multilateral and bilateral supported climate change mitigation projects
- Comprehensive knowledge of international climate change mitigation best practices
- Very good report writing skills in English

Responsibilities

- Documentation of the review
- Leading the MTR Team in planning, conducting and reporting on the evaluation.
- Deciding on division of labor within the Team and ensuring timeliness of reports
- Use of best practice evaluation methodologies in conducting the evaluation
- Leading presentation of the draft evaluation findings and recommendations in-country
- Conducting the debriefing for the UNDP Country Office in Thailand and Core Project Management Team
- Leading the drafting and finalization of the MTR Evaluation Report

B. National Consultant

Profile

-Post-graduate in environmental studies, development studies, social sciences and/ or other related fields with at least ten years of project development and implementation.
-A minimum of five years of project management experience in climate change mitigation or sustainable livelihoods.
-Multilateral and bilateral funded project development and implementation
-Familiarity with Thailand national development policies, programs and projects

Responsibilities

- Documentation review and data gathering
- Contributing to the development of the review plan and methodology
- Conducting those elements of the evaluation determined jointly with the international consultant and UNDP
- Contributing to presentation of the review findings and recommendations at the wrap-up meeting
- Contributing to the drafting and finalization of the review report.
- The members of the Team must be independent from both the policy-making process and the delivery and management of the UNDP/GEF assistance. Therefore, candidates who had any direct involvement with the design and implementation of Promoting Renewable Energy in Mae Hong Son Province' Project will not be considered.

5. Schedule and Deliverables

The MTR will commence on 1 July 2013, for 20 working days. There will be an orientation meeting with UNDP CO, UNDP APRC and a briefing session with the project management team at the start. The review report will be produced in the Thai and English language with executive summary (for both versions), highlighting important observations, analysis of information and key conclusions including its recommendations. Based on the scope of the MTR described above, the Review Report will include, among others:

- Findings on the project implementation achievements, challenges, and difficulties to date;
- Assessments of the progress made towards the attainment of outcomes;
- Recommendations for modification
- ns and the future course of action;
- Lessons learned from the project structure, coordination between different agencies, experience of the implementation, and output/outcome and,

The report will be initially shared with the Project's PMU to solicit comments or clarifications and will be presented to the UNDP Country Office (CO) in Thailand for further deliberations. Consequently, the final MTR Report (in three copies) will be made and submitted to the UNDP CO with a copy furnished to the Project's PMU.

There will be two main deliverables:

- Mid-Term Review Report, including an executive summary (in Thai and in English), fulfilling the requirements set out in this Terms of Reference (TOR). The final report is to be cleared and accepted by UNDP CO in Thailand before final payment. The final report (including executive summary, but excluding annexes) should not exceed 50 pages.
- A power-point presentation of the findings of the review. Depending upon the complexity of the findings, UNDP CO in Thailand may consider organizing a half-day stakeholders meeting at which to make a presentation to the partners and stakeholders.

Annex 2

FORM FOR SUBMITTING SERVICE PROVIDER'S PROPOSAL[7]

(This Form must be submitted only using the Service Provider's Official Letterhead/Stationery[8])

[insert: *Location*].
[insert: *Date*]

To: Ms. Somlak Supkongyu

Dear Sir/Madam:

We, the undersigned, hereby offer to render the following services to UNDP in conformity with the requirements defined in the RFP dated 21 May 2013, and all of its attachments, as well as the provisions of the UNDP General Contract Terms and Conditions :

A. Qualifications of the Service Provider

The Service Provider must describe and explain how and why they are the best entity that can deliver the requirements of UNDP by indicating the following :

a) *Profile – describing the nature of business, field of expertise, licenses, certifications, accreditations;*
b) *Business Licenses – Registration Papers, Tax Payment Certification, etc.*
c) *Track Record – list of clients for similar services as those required by UNDP, indicating description of contract scope, contract duration, contract value, contact references;*
d) *Certificates and Accreditation – including Quality Certificates, Patent Registrations, Environmental Sustainability Certificates, etc.*
e) *Written Self-Declaration that the company is not in the UN Security Council 1267/1989 List, UN Procurement Division List or Other UN Ineligibility List.*

B. Proposed Methodology for the Completion of Services

The Service Provider must describe how it will address/deliver the demands of the RFP; providing a detailed description of the essential performance characteristics, reporting conditions and quality assurance mechanisms that will be put in place, while demonstrating that the proposed methodology will be appropriate to the local conditions and context of the work.

C. Qualifications of Key Personnel

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[7] *This serves as a guide to the Service Provider in preparing the Proposal.*
[8] *Official Letterhead/Stationery must indicate contact details – addresses, email, phone and fax numbers – for verification purposes*

If required by the RFP, the Service Provider must provide :

a) *Names and qualifications of the key personnel that will perform the services indicating who is Team Leader, who are supporting, etc.;*
b) *CVs demonstrating qualifications must be submitted if required by the RFP; and*
c) *Written confirmation from each personnel that they are available for the entire duration of the contract.*

D. **Cost Breakdown per Deliverable***

	Deliverables *[list them as referred to in the RFP]*	**Percentage of Total Price** *(Weight for payment)*	**Price** *(Lump Sum, All Inclusive)*
1	Deliverable 1		
2	Deliverable 2		
3	....		
	Total	100%	

**This shall be the basis of the payment tranches*

E. **Cost Breakdown by Cost Component** ***[This is only an Example]:***

Description of Activity	**Remuneration per Unit of Time**	**Total Period of Engagement**	**No. of Personnel**	**Total Rate**
I. Personnel Services				
1. Services from Home Office				
a. Expertise 1				
b. Expertise 2				
2. Services from Field Offices				
a . Expertise 1				
b. Expertise 2				
3. Services from Overseas				
a. Expertise 1				
b. Expertise 2				
II. Out of Pocket Expenses				
1. Travel Costs				
2. Daily Allowance				
3. Communications				
4. Reproduction				
5. Equipment Lease				
6. Others				
III. Other Related Costs				

[Name and Signature of the Service Provider's Authorized Person]
[Designation]
[Date]

Annex 3

General Terms and Conditions for Services

1.0 LEGAL STATUS:

The Contractor shall be considered as having the legal status of an independent contractor vis-à-vis the United Nations Development Programme (UNDP). The Contractor's personnel and sub-contractors shall not be considered in any respect as being the employees or agents of UNDP or the United Nations.

2.0 SOURCE OF INSTRUCTIONS:

The Contractor shall neither seek nor accept instructions from any authority external to UNDP in connection with the performance of its services under this Contract. The Contractor shall refrain from any action that may adversely affect UNDP or the United Nations and shall fulfill its commitments with the fullest regard to the interests of UNDP.

3.0 CONTRACTOR'S RESPONSIBILITY FOR EMPLOYEES:

The Contractor shall be responsible for the professional and technical competence of its employees and will select, for work under this Contract, reliable individuals who will perform effectively in the implementation of this Contract, respect the local customs, and conform to a high standard of moral and ethical conduct.

4.0 ASSIGNMENT:

The Contractor shall not assign, transfer, pledge or make other disposition of this Contract or any part thereof, or any of the Contractor's rights, claims or obligations under this Contract except with the prior written consent of UNDP.

5.0 SUB-CONTRACTING:

In the event the Contractor requires the services of sub-contractors, the Contractor shall obtain the prior written approval and clearance of UNDP for all sub-contractors. The approval of UNDP of a sub-contractor shall not relieve the Contractor of any of its obligations under this Contract. The terms of any sub-contract shall be subject to and conform to the provisions of this Contract.

6.0 OFFICIALS NOT TO BENEFIT:

The Contractor warrants that no official of UNDP or the United Nations has received or will be offered by the Contractor any direct or indirect benefit arising from this Contract or the award thereof. The Contractor agrees that breach of this provision is a breach of an essential term of this Contract.

7.0 INDEMNIFICATION:

The Contractor shall indemnify, hold and save harmless, and defend, at its own expense, UNDP, its officials, agents, servants and employees from and against all suits, claims, demands, and liability of any nature or kind, including their costs and expenses, arising out of acts or omissions of the Contractor, or

the Contractor's employees, officers, agents or sub-contractors, in the performance of this Contract. This provision shall extend, inter alia, to claims and liability in the nature of workmen's compensation, products liability and liability arising out of the use of patented inventions or devices, copyrighted material or other intellectual property by the Contractor, its employees, officers, agents, servants or sub-contractors. The obligations under this Article do not lapse upon termination of this Contract.

8.0 INSURANCE AND LIABILITIES TO THIRD PARTIES:

8.1 The Contractor shall provide and thereafter maintain insurance against all risks in respect of its property and any equipment used for the execution of this Contract.

8.2 The Contractor shall provide and thereafter maintain all appropriate workmen's compensation insurance, or the equivalent, with respect to its employees to cover claims for personal injury or death in connection with this Contract.

8.3 The Contractor shall also provide and thereafter maintain liability insurance in an adequate amount to cover third party claims for death or bodily injury, or loss of or damage to property, arising from or in connection with the provision of services under this Contract or the operation of any vehicles, boats, airplanes or other equipment owned or leased by the Contractor or its agents, servants, employees or sub-contractors performing work or services in connection with this Contract.

8.4 Except for the workmen's compensation insurance, the insurance policies under this Article shall:

8.4.1 Name UNDP as additional insured;
8.4.2 Include a waiver of subrogation of the Contractor's rights to the insurance carrier against the UNDP;
8.4.3 Provide that the UNDP shall receive thirty (30) days written notice from the insurers prior to any cancellation or change of coverage.
8.5 The Contractor shall, upon request, provide the UNDP with satisfactory evidence of the insurance required under this Article.

9.0 ENCUMBRANCES/LIENS:

The Contractor shall not cause or permit any lien, attachment or other encumbrance by any person to be placed on file or to remain on file in any public office or on file with the UNDP against any monies due or to become due for any work done or materials furnished under this Contract, or by reason of any other claim or demand against the Contractor.

10.0 TITLE TO EQUIPMENT:

Title to any equipment and supplies that may be furnished by UNDP shall rest with UNDP and any such equipment shall be returned to UNDP at the conclusion of this Contract or when no longer needed by the Contractor. Such equipment, when returned to UNDP, shall be in the same condition as when delivered to the Contractor, subject to normal wear and tear. The Contractor shall be liable to compensate UNDP for equipment determined to be damaged or degraded beyond normal wear and tear.

11.0 COPYRIGHT, PATENTS AND OTHER PROPRIETARY RIGHTS:

11.1 Except as is otherwise expressly provided in writing in the Contract, the UNDP shall be entitled to all intellectual property and other proprietary rights including, but not limited to, patents, copyrights, and trademarks, with regard to products, processes, inventions, ideas, know-how, or documents and other materials which the Contractor has developed for the UNDP under the

Contract and which bear a direct relation to or are produced or prepared or collected in consequence of, or during the course of, the performance of the Contract, and the Contractor acknowledges and agrees that such products, documents and other materials constitute works made for hire for the UNDP.

11.2 To the extent that any such intellectual property or other proprietary rights consist of any intellectual property or other proprietary rights of the Contractor: (i) that pre-existed the performance by the Contractor of its obligations under the Contract, or (ii) that the Contractor may develop or acquire, or may have developed or acquired, independently of the performance of its obligations under the Contract, the UNDP does not and shall not claim any ownership interest thereto, and the Contractor grants to the UNDP a perpetual license to use such intellectual property or other proprietary right solely for the purposes of and in accordance with the requirements of the Contract.

11.3 At the request of the UNDP; the Contractor shall take all necessary steps, execute all necessary documents and generally assist in securing such proprietary rights and transferring or licensing them to the UNDP in compliance with the requirements of the applicable law and of the Contract.

11.4 Subject to the foregoing provisions, all maps, drawings, photographs, mosaics, plans, reports, estimates, recommendations, documents, and all other data compiled by or received by the Contractor under the Contract shall be the property of the UNDP, shall be made available for use or inspection by the UNDP at reasonable times and in reasonable places, shall be treated as confidential, and shall be delivered only to UNDP authorized officials on completion of work under the Contract.

12.0 USE OF NAME, EMBLEM OR OFFICIAL SEAL OF UNDP OR THE UNITED NATIONS:

The Contractor shall not advertise or otherwise make public the fact that it is a Contractor with UNDP, nor shall the Contractor, in any manner whatsoever use the name, emblem or official seal of UNDP or THE United Nations, or any abbreviation of the name of UNDP or United Nations in connection with its business or otherwise.

13.0 CONFIDENTIAL NATURE OF DOCUMENTS AND INFORMATION:

Information and data that is considered proprietary by either Party and that is delivered or disclosed by one Party ("Discloser") to the other Party ("Recipient") during the course of performance of the Contract, and that is designated as confidential ("Information"), shall be held in confidence by that Party and shall be handled as follows:

13.1 The recipient ("Recipient") of such information shall:

13.1.1 use the same care and discretion to avoid disclosure, publication or dissemination of the Discloser's Information as it uses with its own similar information that it does not wish to disclose, publish or disseminate; and,

13.1.2 use the Discloser's Information solely for the purpose for which it was disclosed.

13.2 Provided that the Recipient has a written agreement with the following persons or entities requiring them to treat the Information confidential in accordance with the Contract and this Article 13, the Recipient may disclose Information to:

13.2.1 any other party with the Discloser's prior written consent; and,

13.2.2 the Recipient's employees, officials, representatives and agents who have a need to know such Information for purposes of performing obligations under the Contract, and employees officials, representatives and agents of any legal entity that it controls controls it, or with which it is under common control, who have a need to know such Information for purposes of performing obligations under the Contract, provided that, for these purposes a controlled legal entity means:

13.2.2.1 a corporate entity in which the Party owns or otherwise controls, whether directly or indirectly, over fifty percent (50%) of voting shares thereof; or,
13.2.2.2 any entity over which the Party exercises effective managerial control; or,
13.2.2.3 for the UNDP, an affiliated Fund such as UNCDF, UNIFEM and UNV.

13.3 The Contractor may disclose Information to the extent required by law, provided that, subject to and without any waiver of the privileges and immunities of the United Nations, the Contractor will give the UNDP sufficient prior notice of a request for the disclosure of Information in order to allow the UNDP to have a reasonable opportunity to take protective measures or such other action as may be appropriate before any such disclosure is made.

13.4 The UNDP may disclose Information to the extent as required pursuant to the Charter of the UN, resolutions or regulations of the General Assembly, or rules promulgated by the Secretary-General.

13.5 The Recipient shall not be precluded from disclosing Information that is obtained by the Recipient from a third party without restriction, is disclosed by the Discloser to a third party without any obligation of confidentiality, is previously known by the Recipient, or at any time is developed by the Recipient completely independently of any disclosures hereunder.

13.6 These obligations and restrictions of confidentiality shall be effective during the term of the Contract, including any extension thereof, and, unless otherwise provided in the Contract, shall remain effective following any termination of the Contract.

14.0 FORCE MAJEURE; OTHER CHANGES IN CONDITIONS

14.1 In the event of and as soon as possible after the occurrence of any cause constituting force majeure, the Contractor shall give notice and full particulars in writing to the UNDP, of such occurrence or change if the Contractor is thereby rendered unable, wholly or in part, to perform its obligations and meet its responsibilities under this Contract. The Contractor shall also notify the UNDP of any other changes in conditions or the occurrence of any event that interferes or threatens to interfere with its performance of this Contract. On receipt of the notice required under this Article, the UNDP shall take such action as, in its sole discretion; it considers to be appropriate or necessary in the circumstances, including the granting to the Contractor of a reasonable extension of time in which to perform its obligations under this Contract.

14.2 If the Contractor is rendered permanently unable, wholly, or in part, by reason of force majeure to perform its obligations and meet its responsibilities under this Contract, the UNDP shall have the right to suspend or terminate this Contract on the same terms and conditions as are provided for in Article 15, "Termination", except that the period of notice shall be seven (7) days instead of thirty (30) days.

14.3 Force majeure as used in this Article means acts of God, war (whether declared or not), invasion, revolution, insurrection, or other acts of a similar nature or force.

14.4 The Contractor acknowledges and agrees that, with respect to any obligations under the Contract that the Contractor must perform in or for any areas in which the UNDP is engaged in, preparing to engage in, or disengaging from any peacekeeping, humanitarian or similar operations, any delays or failure to perform such obligations arising from or relating to harsh conditions within such areas or to any incidents of civil unrest occurring in such areas shall not, in and of itself, constitute force majeure under the Contract..

15.0 TERMINATION

15.1 Either party may terminate this Contract for cause, in whole or in part, upon thirty (30) days notice, in writing, to the other party. The initiation of arbitral proceedings in accordance with Article 16.2 ("Arbitration"), below, shall not be deemed a termination of this Contract.

15.2 UNDP reserves the right to terminate without cause this Contract at any time upon 15 days prior written notice to the Contractor, in which case UNDP shall reimburse the Contractor for all reasonable costs incurred by the Contractor prior to receipt of the notice of termination.

15.3 In the event of any termination by UNDP under this Article, no payment shall be due from UNDP to the Contractor except for work and services satisfactorily performed in conformity with the express terms of this Contract.

15.4 Should the Contractor be adjudged bankrupt, or be liquidated or become insolvent, or should the Contractor make an assignment for the benefit of its creditors, or should a Receiver be appointed on account of the insolvency of the Contractor, the UNDP may, without prejudice to any other right or remedy it may have under the terms of these conditions, terminate this Contract forthwith. The Contractor shall immediately inform the UNDP of the occurrence of any of the above events.

16.0 SETTLEMENT OF DISPUTES

16.1 **Amicable Settlement**: The Parties shall use their best efforts to settle amicably any dispute, controversy or claim arising out of this Contract or the breach, termination or invalidity thereof. Where the parties wish to seek such an amicable settlement through conciliation, the conciliation shall take place in accordance with the UNCITRAL Conciliation Rules then obtaining, or according to such other procedure as may be agreed between the parties.

16.2 **Arbitration:** Any dispute, controversy, or claim between the Parties arising out of the Contract or the breach, termination, or invalidity thereof, unless settled amicably under Article 16.1, above, within sixty (60) days after receipt by one Party of the other Party's written request for such amicable settlement, shall be referred by either Party to arbitration in accordance with the UNCITRAL Arbitration Rules then obtaining. The decisions of the arbitral tribunal shall be based on general principles of international commercial law. For all evidentiary questions, the arbitral tribunal shall be guided by the Supplementary Rules Governing the Presentation and Reception of Evidence in International Commercial Arbitration of the International Bar Association, 28 May 1983 edition. The arbitral tribunal shall be empowered to order the return or destruction of goods or any property, whether tangible or intangible, or of any confidential information provided under the Contract, order the termination of the Contract, or order that any other protective measures be taken with respect to the goods, services or any other property, whether tangible or intangible, or of any confidential information provided under the Contract, as appropriate, all in accordance with the authority of the arbitral tribunal pursuant to Article 26 ("Interim Measures of Protection") and Article 32 ("Form and Effect of the Award") of the UNCITRAL Arbitration Rules. The arbitral tribunal shall have no authority to award punitive damages. In addition, unless otherwise expressly provided in the Contract, the arbitral tribunal

shall have no authority to award interest in excess of the London Inter-Bank Offered Rate ("LIBOR") then prevailing, and any such interest shall be simple interest only. The Parties shall be bound by any arbitration award rendered as a result of such arbitration as the final adjudication of any such dispute, controversy, or claim.

17.0 PRIVILEGES AND IMMUNITIES:

Nothing in or relating to this Contract shall be deemed a waiver, express or implied, of any of the privileges and immunities of the United Nations, including its subsidiary organs.

18.0 TAX EXEMPTION

18.1 Section 7 of the Convention on the Privileges and Immunities of the United Nations provides, inter-alia that the United Nations, including its subsidiary organs, is exempt from all direct taxes, except charges for public utility services, and is exempt from customs duties and charges of a similar nature in respect of articles imported or exported for its official use. In the event any governmental authority refuses to recognize the United Nations exemption from such taxes, duties or charges, the Contractor shall immediately consult with the UNDP to determine a mutually acceptable procedure.

18.2 Accordingly, the Contractor authorizes UNDP to deduct from the Contractor's invoice any amount representing such taxes, duties or charges, unless the Contractor has consulted with the UNDP before the payment thereof and the UNDP has, in each instance, specifically authorized the Contractor to pay such taxes, duties or charges under protest. In that event, the Contractor shall provide the UNDP with written evidence that payment of such taxes, duties or charges has been made and appropriately authorized.

19.0 CHILD LABOUR

19.1 The Contractor represents and warrants that neither it, nor any of its suppliers is engaged in any practice inconsistent with the rights set forth in the Convention on the Rights of the Child, including Article 32 thereof, which, inter alia, requires that a child shall be protected from performing any work that is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical mental, spiritual, moral or social development.

19.2 Any breach of this representation and warranty shall entitle UNDP to terminate this Contract immediately upon notice to the Contractor, at no cost to UNDP.

20.0 MINES:

20.1 The Contractor represents and warrants that neither it nor any of its suppliers is actively and directly engaged in patent activities, development, assembly, production, trade or manufacture of mines or in such activities in respect of components primarily utilized in the manufacture of Mines. The term "Mines" means those devices defined in Article 2, Paragraphs 1, 4 and 5 of Protocol II annexed to the Convention on Prohibitions and Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects of 1980.

20.2 Any breach of this representation and warranty shall entitle UNDP to terminate this Contract immediately upon notice to the Contractor, without any liability for termination charges or any other liability of any kind of UNDP.

21.0 OBSERVANCE OF THE LAW:

The Contractor shall comply with all laws, ordinances, rules, and regulations bearing upon the performance of its obligations under the terms of this Contract.

22.0 SEXUAL EXPLOITATION:

22.1 The Contractor shall take all appropriate measures to prevent sexual exploitation or abuse of anyone by it or by any of its employees or any other persons who may be engaged by the Contractor to perform any services under the Contract. For these purposes, sexual activity with any person less than eighteen years of age, regardless of any laws relating to consent, shall constitute the sexual exploitation and abuse of such person. In addition, the Contractor shall refrain from, and shall take all appropriate measures to prohibit its employees or other persons engaged by it from, exchanging any money, goods, services, offers of employment or other things of value, for sexual favors or activities, or from engaging in any sexual activities that are exploitive or degrading to any person. The Contractor acknowledges and agrees that the provisions hereof constitute an essential term of the Contract and that any breach of this representation and warranty shall entitle UNDP to terminate the Contract immediately upon notice to the Contractor, without any liability for termination charges or any other liability of any kind.

22.2 The UNDP shall not apply the foregoing standard relating to age in any case in which the Contractor's personnel or any other person who may be engaged by the Contractor to perform any services under the Contract is married to the person less than the age of eighteen years with whom sexual activity has occurred and in which such marriage is recognized as valid under the laws of the country of citizenship of such Contractor's personnel or such other person who may be engaged by the Contractor to perform any services under the Contract.

23.0 AUTHORITY TO MODIFY:

Pursuant to the Financial Regulations and Rules of UNDP, only the UNDP Authorized Official possesses the authority to agree on behalf of UNDP to any modification of or change in this Contract, to a waiver of any of its provisions or to any additional contractual relationship of any kind with the Contractor. Accordingly, no modification or change in this Contract shall be valid and enforceable against UNDP unless provided by an amendment to this Contract signed by the Contractor and jointly by the UNDP Authorized Official.

Annex 2: Itinerary

Date	Programmes
Tue 23/07/13	MTR team arrival in BKK
	3 – 5 pm: Orientation meeting at UNDP (@UNDP)
Wed 24/07/13	09.30 *a.m.:* Meeting with the Implementing Partner – TEI Get the overview of project implementation in Mae Hong Son @TEI
	12.00 *p.m.:* Meeting Department of Alternative Energy Development and Efficiency (DEDE), Ministry of Energy @ The Tawana Ramada, Suriwong, Bangkok Dr.Twarath Sutabutr Deputy Director General
Thu 25/07/13	11.00 a.m.*:* Meeting with Mr.Jaras Thongbun, Manager of Provincial Electricity Authority **Location:** Provincial Electricity Authority Office
	11.30 a.m.: Meeting with Mrs.Onsri Sri-umporn, Director of Provincial Public Relations Office **Location:** Provincial Public Relations Office
	1.30 p.m.: Meeting with Mr.Natthakit Ratthasinphokin, Chief of Provincial Energy Office **OR a representative** **Location:** Provincial Energy Office
	2.00 p.m. : Meeting with Ms.Sivaporn Piyawongphaiboon, Manager of the Bank for Agriculture & Agricultural Cooperatives (BAAC) OR a representative **Location:** the BAAC office
	3.30 p.m.: Meeting with Mr.Suthep Nuchsuang, Chairman of Assembly of Mae Hong Son Community Organizations Strengthening Network **Location:** Ban Suan Klang Muang Resort
	4.00 p.m. : Meeting with Mr.Chaiyasith Sanga-ngam, Deputy director of Navamintarachinee Maehongsorn Industrial College **Location:** The College
Fri 26/07/13	09.00 a.m. : Meeting with Mr.Noppadon Jiamton, Chief of Mae Sa Nga Hydroelectric project
	12.00 p.m. Lunch
	1.00 p.m. : **Visit pilot sites:** Ban Thong Luang and Ban Na Pu Pom, Na Pu Pom Sub district, Pang Ma Pha District,
Sat 27/07/13	08.00 A.M.- 7.00 P.M. **Visit pilot sites:** Ban Mae Ko Pi, Mae Yuam Noi Sub district, Khun Yuam District Ban Pha Yoi, Mae U-Khor Sub district, Khun Yuam District Ban Hua Ha, Mae U-Khor Sub district, Khun Yuam District
Sun 28/07/13	**08.00 A.M.-5.00 P.M. Visit pilot sites:** Ban Huai Pu Ling, Huai Pu Ling Sub district, Muang District
Mon 29/07/13	a.m. : Debrief with MHS RE team in Mae Hong Son
	2.00-2.30 p.m. : Meeting with Mr.Taveesak Watthanathammarak, Vice-Governor
	3.00 p.m. : The MTR team travels back to BKK
Tue 30/07/13	11.30 am: Meeting with Mr. Samart Phoopaiboon – Director of Social Affairs Electricity Generating Authority of Thailand (EGAT)
	PM: Debrief with UNDP and TEI (@UNDP)

Annex 3: List of persons interviewed

	Agencies	Roles and Responsibility
BKK	UNDP Thailand and UNDP Asia Pacific Regional Centre	Project Assurance
BKK and MHS	Thailand Environment Institute	Implementing Partner
Central Level (BKK)	- Department of Alternative Energy Development and Efficiency (DEDE), M. Of Energy - Electricity Generating Authority of Thailand (EGAT) - Provincial Electricity Authority (PEA) - Bank of Agriculture and Cooperatives (BAAC)	4 Strategic Partners
Provincial/ District Level (Mae Hong Son)	- Governor of Mae Hong Son - Provincial Energy Office - District Chiefs of pilot sites - Public Relations Officer (Ms. Onsri Sriamporn) - CSO representative (Former Mayor of MHS City – Mr. Suthep Nutsuang) - Chief of Mae SaNga Hydropower Station (DEDE) - Representative from Vocational Colleges (Nawamin)	Members of project board Members of project sub-committee Project's partners at provincial level
Communities and Local Government (Mae Hong Son)	- Community Leaders at pilot sites - Chief of Tambon (sub-district) Administrative Organisation at pilot sites - Schools	Beneficiaries
Consultants[40]	- Chatchawan Chaichana – Chiang Mai University	Technical supports
Ex-consultant/ UNDP[41]	- Mr. Martin Krause, Former Practice Team Leader of UNDP APRC's Energy and Environment Group - Mr. Tim Boyle, Former project development specialist for this project	Project Formulation (PPG) Team

[40] One or two more will be added, pending TEI's suggestions. Considering time constraints, some of them could be iv later via phone or skype

[41] Ex-consultants/ UNDP can be iv over skype

Annex 5: Literature review

List of Literary Resources made available to Restio Energy

Co-financing of RE-MHS Project

Demo Site MHS Project (14 Jun 2013)

Duty and responsibility of personnel RE-MHS

FACE form 1-26 Apr 2013

GEF. Tracking tool for climate change mitigation projects (for Mid-term evaluation).

Inception Report: Promoting Renewable Energy in Mae Hong Son Province project.

LPAC Minutes: Promoting Renewable Energy in Mae Hong Son province. 30 April 2008, 15h30 – 17h00 hours, UNDP Conference Room.

Main events & achievement of the MHS Project

Minute Middle MS Oct 27

Minute North MS Oct 20

Minute South MS Oct 26

Minute SEP 8

Note to file: Meeting on UNDP/GEF Promoting Renewable Energy in Mae Hong Son and nearby provinces. 25 May

Note to file: UNDP/GEF Promoting Renewable Energy in Mae Hong Son and nearby provinces. Meeting on Project Implementation Review. 1 Aug 2011.

Note to file: Meeting on UNDP/GEF Promoting Renewable Energy in Mae Hong Son and nearby provinces. 28 Sep 2012

Note to file: UNDP/GEF Promoting Renewable Energy in Mae Hong Son and nearby provinces. Meeting on Project Financial Report (Q2/2013). 17 July 2013.

Overview of studies/researches conducted under the Promoting Renewable Energy in Mae Hong Son and nearby provinces

Press Release: project opening

Project Cooperation Agreement between United Nations Development Programme (UNDP) and Thailand Environment Institute (TEI)

Promoting Renewable Energy in Mae Hong Son province project: Work Plan 2013

Promoting Renewable Energy in Mae Hong Son province project: Work Plan 2013 (remaining)

Quarterly Operational Report (Jan – Mar 2011)

Quarterly Operational Report (Apr – Jun 2011)

Quarterly Progress Report (Jul – Sep 2011)

Quarterly Status Report (Jan – Mar 2012)

Quarterly Status Report (Apr - Jun 2012)

Quarterly Status Report (Jul - Sep 2012)

Quarterly Status Report (Oct - Dec 2012)

(Draft) Quarterly Status Report (Jan – Mar 2013)

Quarterly Status Report (Apr – Jun 2013)

Signed DOA

Thailand: Promoting Renewable Energy in Mae Hong Son province. Inception Phase Guidance

The Promoting Renewable Energy in Mae Hong Son province project Statement of Expenditure, Statement of assets and equipment, Statement of Cash Position and Auditor's report for the period from 1 June 2010 to 31 December 2011.

UNDP. Combined Delivery Report by Activity with Encumbrance: Jan – Dec 2011

UNDP. Combined Delivery Report by Activity: Jan - Dec 2012

UNDP. Combined Delivery Report by Activity: Jan – Apr 2013

UNDP. Combined Delivery Report by Project: Jan – Dec 2011

UNDP. Combined Delivery Report by Project: Jan – Dec 2012

UNDP. Combined Delivery Report by Project: Jan – Apr 2013

UNDP/GEF 2011 Annual Project Review (APR): Project Implementation Report (PIR)

UNDP/GEF 2012 Annual Project Review (APR): Project Implementation Report (PIR)

UNDP Project Document: Promoting Renewable Energy in Mae Hong Son Province. UNDP Thailand, Government of Thailand

Annex 6: Regulatory requirements for sale of VSPP electricity to PEA

1. In order to get contract for electricity sale to PEA (public grid), the project must have a license from the REGULATOR.

2. In order to get approval from the REGULATOR, the owner of the VSPP must submit the "License" from the Department of Industrial Work (DIW).

3. One of DIW's approval criteria is that "*the project must be located at least 100 meter from schools or academic institutes, temples or religion centers, hospitals, historical sites, and public offices. This also applies to natural conservations areas as identified by the Cabinet*" *(Industrial Ministry's Regulation, issued in 1992, based on the Industrial Factory Act, 1992).*

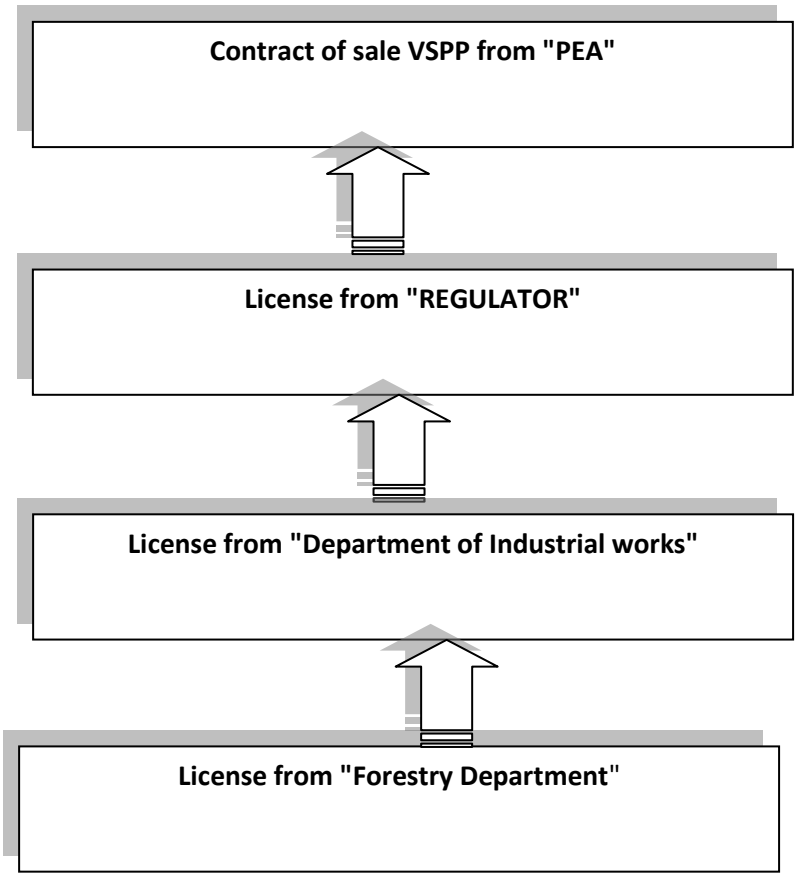
4. For VSPP located in forestry area, two forestry regulations are applied.

   4.1 Use of national protected forests can be allowed, including for construction of hydro-power plants. However, the approval process is quite lengthy. Application must be submitted to Minister of Environment and Natural Resources for approval. The process of approval generally takes quite a long time (about 2 years). In addition, there are also other approval channels including:
   - Engagement of Forestry officials in (hydro-power) project formulation and implementation. The project must be submitted by forestry official with proof that it has direct/indirect benefits to forest conservation. The approval authority is with Director General of Forestry Department.
   - Proof that the project is a continuation or expansion of Royal Initiatives/Projects.

   4.2 Use of National Park Reserves. There have not been any laws which allow use of national park.[42]

[42] One of DEDE's VSPP in MHS (Huay Pong On Project) started its construction in 2008. At that time, the area was classified as "protected forest' and DEDE obtained permission for the plant construction. In 2009, the area surrounded the power plant was announced as "national park reserve". Although the plant itself was not included in the reserve, its location is less than 100 meter from the reserved park. Hence, connection lines to public grid through these reserved areas are not allowed.

Figure 1: Procedure of Contract for Sale VSPP



Annex 7: Activity framework for Renewable Energy Service Models

Table 24: Activity framework for developing renewable energy service models according to the four barriers: non-electrical RET access

	Institutional and organisational capacity		Financially sustainable RE systems		Technical support		Policy to facilitate up scaling	
	Issue	**Comment**	**Issue**	**Comment**	**Issue**	**Comment**	**Issue**	**Comment**
Non-Electrical RET access	Village leadership informed about RET products.	Champion RETs	Micro finance available	Appropriate financial products developed	Technical standards developed	Institutions testing and determining technical standards.	Technical standards developed	Quality goods support market growth & sentiment
	RET user group	To mainstream RETs in local Gov. forums (TAO?)	Technical standards reduce credit risks	knowing product, performance and durability will reduce perceived risks	User groups trained on appropriate RETs	Local learning institutions up skilled to provide adequate training	Ensure credit/lending regulations support small scale RET distribution	Consumer & institutional protection
	Local government informed about products	As above	Fuel supply & auxiliary components available	Is charcoal affordable, batteries for lanterns, etc.	Local government trained	As above	Sub/Districts informed about plans	
	MFI's made aware of products	Promoting product knowledge, reducing risks	Vendor finance options?	Does the supply chain require finance to expend?	Sector support	What additional technical/training support does model need?		
	Supply chain reviewed	Can these products reach the market?						
	Retail/private sector development	Small scale products well suited to private sector distribution models						
	Communication with industry associations	Are there pvt trade groups well disposed this role?						

Table 25: Activity framework for developing renewable energy service models according to the four barriers: (Hydro Micro-grid)

	Institutional and organisational capacity		Financially sustainable RE systems		Technical support		Policy to facilitate upscaling	
	Issue	**Comment**	**Issue**	**Comment**	**Issue**	**Comment**	**Issue**	**Comment**
Electrical RET access: micro-grid	Establish appropriate village organisation	What formations are required by regulation to operate mini-grid?	Village loans for operational repairs	If revenue collection doesn't cover incidental costs	Provide technical training for 1st level/ routine maintenance	At village level	Ensure management regulations of public assets (mini-grid) are compatible	Can villages constitute themselves appropriately?
	Develop revenue collection models	To address operational costs	Small-scale loans for RETs	For products like ICS or insulated cooker	Provide more detailed training	At local government level	Education facilities make maximum use of improved energy access?	Do schools have right to offer evenning classes, etc.?
	User behaviour training	DSM tool to ensure efficiency	Institutional development loans	Example, equip schools with computers, AV equip, etc.	User/consumer awareness modules	Promote energy efficiency at village level	Easing regulatory requirements	Smaller systems subject to easier application process
	Introduction and training on small scale RETs	ICS, SWH, insulated cookers, etc.	Vendor loans	Ensuring business start-ups in the supply/service/ procurement sector have access to capital	Training for MFIs on RETs, opportunties, technical specifications, etc.	To create awarnesss amongst MF/I and the market surroundoing RETs and opportunities	Tariff settings	That village can set own tariffs
	Create platform for sharing knowledge	carrying village experience to sub/district level			Oerational and maintenace standards for micro-hydro	To spell out these requirements		
	Develop capacity in finance institutions	Ensure they are willing to proivide finance where necessary						
	Promote capacity to promote income generation opportunities	Improved access to energy = improved livelihood opportunites						
	Working with Health and education facilities	Promoting optimal use to maximise benefits						
	Mobilising the private sector	Ensuring that procurement and service opportunities are exploited						

Table 26: Activity framework for developing renewable energy service models according to the four barriers: SHS

	Institutional and organisational capacity		Financially sustainable RE systems		Technical support		Policy to facilitate up scaling	
	Issue	**Comment**	**Issue**	**Comment**	**Issue**	**Comment**	**Issue**	**Comment**
Electrical RET access: SHS	Establish appropriate village organisation	What formations are required by regulation to own/manage SHS?	Village loans for operational repairs	If revenue collection doesn't cover incidental costs	Provide technical training for 1st level/ routine maintenance	Routine maintenance covered at village level. Appropriate training institution?	Long-term ownership of SHS	Depending on business model, ownership could be important for balance sheet financing
	Develop revenue collection models	To address operational costs	Small-scale loans for batteries	Battery replacement is crucial to longer term usage	Provide more detailed training	Higher level training at more centralised level (for instance around inverters, etc.)? Institution?	Tariff issues	Can villages set own tariffs?
	User behaviour training	Important to preserve battery life	Institutional development loans	Example, equip schools with computers, AV equip, etc.	Develop user behaviour modules & signage	Make sure SHS investment is optimally used	Engaging local government	Local Gov. need to be informed if they are to make the correct decisions around SHS
	Introduction and training on small scale RETs	ICS, SWH, insulated cookers, etc.	Vendor loans	Ensuring solar PV business start-ups in the supply/service/ procurement sector have access to capital.	Training for MFIs on SHS in order to reduce perceived risks	Assuming sufficient scale, there might be opportunities for MFI in terms of whole systems and/or components	Village organisations	Can villages constitute themselves appropriately? What are the requirements?
	Create platform for sharing knowledge	carrying village experience to sub/district level	Business models	Which model is most appropriate - 1) commercially led model 2) Multi-stakeholder 3) Utility	Operational and maintenance standards for SHSs	To spell out these requirements which will inform training, procurement, etc.	Education facilities make maximum use of improved energy access?	Do schools have right to offer evening classes, etc.?
	Develop capacity in finance institutions	Ensure they are willing to provide finance where necessary						
	Promote capacity to promote income generation opportunities	Improved access to energy = improved livelihood opportunities						
	Working with Health and education facilities	Promoting optimal use to maximise benefits						
	Mobilising the private sector	Ensuring that procurement and service opportunities are exploited						

Table 27: Activity framework for developing renewable energy service models according to the four barriers: Mini-grid connected to PEA grid

	Institutional and organisational capacity		Financially sustainable RE systems		Technical support		Policy to facilitate up scaling	
	Issue	**Comment**	**Issue**	**Comment**	**Issue**	**Comment**	**Issue**	**Comment**
Electrical RET access: Mini-grid connect hydro	Establish appropriate village organisation	What formations are required by regulation to own/manage SHS?	Village/local Gov. loans for operational repairs	If revenue collection doesn't cover incidental costs. Who is responsible? At what level are households or village responsible for repairs?	Provide technical training for 1st level/ routine maintenance	Routine maintenance covered at village level. Determine requirements	Tariff issues	Can village set own tariffs?
	Develop revenue collection models	To address operational costs	MFI financial products	To purchase small-scale RETs (ICS, etc.)	Provide more detailed training	Higher level training. Available at more centralised level (TAO, District?).	Regulatory issues	Are villages permitted to sell power back to grid? On what terms?
	User behaviour	Training village organisation to promote efficient use of power (DSM)	Public capital/expenses for institutions	Example, equip schools with computers, AV equip, etc.	Training	Identify institution to provide training. Kinds of training (content?)	Engaging local government	Do technologies impose additional costs on local government?
	Develop capacity in finance institutions	Ensure they are willing to provide finance where necessary	Access to finance	Improved access to electricity might result in increased product/convenience purchases. Could be linked to livelihoods?	End-user behaviour	What kind of guidance, end-user training is required to promote optimal use of system?	Local Gov. platform	Present options (costs & benefits) on appropriate local government platform
	Local government capacity	Ensure local government (TAO in particular) understands grid connect opportunities	Promoting income generation will increase sustainability	incomes associated with access will improve ability to pay			Showcasing opportunities	Position an existing grid connect micro-grid as demonstration site for benefits
	Small business	Train village level and TAO formations around productive use of renewable energy opportunities (PURE)					Package process	Develop a kit which captures all the requirements and issues surrounding grid-connect micro-grids
	Revenue management	Tariffs from grid feed-in would need to be effectively managed by village committees					Selling the concept	Make sure DEDE/PEA/EGAT amongst others are aware of the benefits of this RET option
	Measuring the benefits	Develop baselines against various opportunities such as education & healthcare to determine impact						
	DSM opportunities	these would include introduction to ICS, etc. Lowering electrical demand will ensure greater revenue from surplus fed to grid						

Table 28: Activity framework for developing renewable energy service models according to the four barriers: Commercial model (Hospitality Industry)

	Institutional and organisational capacity		Financially sustainable RE systems		Technical support		Policy to facilitate up scaling	
	Issue	**Comment**	**Issue**	**Comment**	**Issue**	**Comment**	**Issue**	**Comment**
Commercial RESM (for instance tourism sector)	Empowering Trade/Industry organisations	Capacitating the sector rather than individual entities. Drawing attention to opportunities	Finance available	To ensure fiancé is available for purchase of RETs	Technical standards	To ensure technical standards are developed to promote high quality/effective products	Showcase	Ensure effective examples (hotels, back-packers, etc.) are available to showcase performance and benefits of RETs.
	Informing local government	Making sure local government understands commercial opportunity	Energy audit	To ensure solution is cheaper than current practices	After-sales service	Ensure products are sold with warranties and that level of practical maintenance is available	Public sector	Ensure levels of government (TAO upwards) are aware of sector opportunities
	Informing public sector entities (DEDE, PEA, EGAT, etc.)	Making sure relevant public [energy] sector understands commercial opportunity	Supply chain	To ensure vendors of products are established and provide after-sales service			Facilitating environment	Encourage local public sector to create facilitating environment for greater commercial shift to RETs.
	Developing a green brand	Engaging around commercial opportunities associated with green activities	Vendor finance	To ensure vendors have access to finance to cover larger scale procurement			Broaden benefits beyond established commercial sector	Look at village level opportunities including cultural tourism
	Energy audit	Train businesses to measure own energy costs						

Table 29: Activity framework for developing renewable energy service models according to the four barriers: Large-scale hydro-electric

	Institutional and organisational capacity		Financially sustainable RE systems		Technical support		Policy to facilitate up scaling	
	Issue	**Comment**	**Issue**	**Comment**	**Issue**	**Comment**	**Issue**	**Comment**
Large scale hydro	Capacity is well established	DEDE has been operating hydro-electric plants for many years	Tariffs	Are tariffs still cost reflective for new hydro-electric facilities? What are the regulatory conditions (ERC?)?	Technical support capacity	Would there be sufficient technical support available if hydro-electric capacity was to increase?	Licencing	What licencing issues would deter/encourage pvt sector investors?
	Inter-departmental communications	Facilitate dialogue between relevant government departments (DEDE, Forestry, etc.)	Finance	Are there finance institutions - particularly from a private sector perspective, that are involved?	Training	What institutions are available to support process?	Government/industry presentations	Providing platform to encourage public/private sector engagement
	Private sector opportunities	What are the regulatory constraints (if any) on pvt sector involvement in hydro electric generation facilities	Finance experience	What finance institutions were involved in the V/SPP programmes?	Supply chain	Is the necessary vendor/supply chain in place to support increased use of large scale hydro?	Inter-departmental	Facilitating dialogue between relevant government departments
	Private sector involvement	Are there pvt sector representative bodies in Thailand (hydro/renewable, etc.)	Income generation	Promoting income generation amongst beneficiary communities to improve sustainability				

Annex 8: Recommendation – Community Approach

More than 90% of households in Mae Hong Son are located in mountainous areas and majority of them are ethnic minority groups. All of these tribal groups have their own dialects, beliefs and culture. In order to gain their active engagement in project activities, the project should take into considerations socio-cultural factors in addition to technical capacity of these communities.

Language: In general, community leaders who have frequent contacts with outsiders and younger people who are educated in formal school system can understand and communicate in Thai. Most women and the elderly still have limited understanding of Thai language. So the project should try to work through local people who 'speak the same language in the same manner' with the communities. Specifically, MTR recommends that the Mae Hong Son Community Organizations Strengthening Network is engaged as 'change agents' in pilot communities. The Network has volunteers working on environmental issues in more than 200 villages in MHS. They are hill tribes who are committed to development work.

Beliefs: In terms of natural resources conservation, every tribe has its own beliefs and practices as their survival relies heavily on these resources. Introduction of RETs which are environmentally friendly and contributing to long-term sustainability of their natural resource bases should build upon these beliefs and practices. For example, forest conservation based on traditional practices will increase water volume in the streams not only for more secured electricity supply, but also to show respect to their 'forest' and 'water' spirits.

Learning: For tribal people who do not understand much Thai and live in remote communities, the best way to learn is "by doing" and "peer teaching". Formal training should be done only when necessary and with assistance of 'change agents' in translation. Training should be accompanied with demonstration (of RETs) and practical exercises by the villagers themselves and close follow-up by project staff or change agents (Training-Action-Follow-up Model). Study visits to other places to see examples of 'good practices' should be organized only with specific learning purpose and questions in mind. Villagers should be encouraged to reflect what they have learned from the visits and how it could be applied to their 'RESM' piloting.

Follow-up and documentation of experiences: In most cases, hill tribe villagers have limited writing ability (in Thai) but they should be facilitated to share the knowledge gained from piloting RESM in their respective village, and project staff document the knowledge for them. This way, villagers will get thorough understanding about their RESM and its application. They can serve as facilitator of 'RESM" learning center in their own village. Pilot villages with proven RESM management capacity can be promoted to be 'learning center' for other communities in the future.

Annex 9: RE Market Transformation Process