

Independent Terminal Evaluation

Climate change related technology transfer for Cambodia: Using agricultural residue biomass for sustainable energy solutions

UNIDO Project ID: 100223

GEF Project ID: 4042



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO INDEPENDENT EVALUATION DIVISION

Independent Evaluation

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Abbreviations and acronyms

| Abbreviation | Meaning |
|---------------|--|
| BOOT | Build, Own, Operate, Transfer |
| CCD | Climate Change Department |
| CTA | Chief Technical Advisor |
| EPC | Engineering, Procurement and Construction |
| ET | Evaluation Team |
| FSP | Full-Size Project |
| GDP | Gross Domestic Product |
| GEF | Global Environment Facility |
| GHG | Greenhouse Gas |
| RGoC | The Royal Government of Cambodia |
| HDI | Human Development Index |
| HQ | Headquarters |
| IPR | Intellectual Property Right |
| MME | Ministry Mines and Energy |
| MIH | Ministry of Industry and Handicraft |
| MIME | Ministry of Industry, Mines and Energy |
| MoE | Ministry of Environment |
| MTE | Mid-term Evaluation |
| NCPO | National Cleaner Production Office |
| PIF | Project Information Form |
| PIR | Project Implementation Review |
| PMU | Project Management Unit |
| PPG | Project Preparatory Grant |
| PRF | Project Result Framework. |
| Prodoc | Project document |
| PSC | Project Steering Committee |
| R&D | Research and Development |
| SS | South-South |
| TE | Terminal Evaluation |
| TORs | Terms of References |
| TT | Technology Transfer |
| UNIDO | United Nations Industrial Development Organization |
| UNIDO ODG/IED | UNIDO Office of the Director General/Independent Evaluation Division |

Glossary of evaluation-related terms

| Glossary of evaluation-related terms | |
|--------------------------------------|--|
| Activity | Actions taken or work performed through which inputs, such as funds, technical assistance and other types of resources are mobilized to produce specific outputs. |
| Assumptions | Hypotheses about factors or risks which could affect the progress or success of a development intervention. |
| Beneficiaries | The individuals, groups, or organizations, whether targeted or not, that benefit, directly or indirectly, from the development intervention. |
| Conclusions | Conclusions point out the factors of success and failure of the evaluated intervention, with special attention paid to the intended and unintended results and impacts, and more generally to any other strength or weakness. A conclusion draws on data collection and analysis undertaken, through a transparent chain of arguments. |
| Data collection tools | Methodologies used to identify information sources and collect information during an evaluation. |
| Effect | Intended or unintended change due directly or indirectly to an intervention. |
| Effectiveness | The extent to which the development objectives of an intervention were or are expected to be achieved, considering their relative importance. |
| Efficiency | A measure of how economically resources/inputs (funds, expertise, time, etc.) are converted into results. |
| Evaluation | The systematic and objective assessment of an ongoing or completed project, programme or policy, its design, implementation, and results. The aim is to determine the relevance and fulfillment of objectives, development efficiency, effectiveness, impact, and sustainability. |
| External evaluation | The evaluation of a development intervention conducted by entities and/or individuals outside the donor and implementing organizations. |
| Finding | A factual statement based on evidence from one or more evaluations. |
| Goal | The higher-order objective to which a development intervention is intended to contribute. |
| Impact | Positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended. |
| Independent evaluation | An evaluation carried out by entities and persons that are not under the control of those responsible for the design and implementation of the development intervention. |
| Indicator | Quantitative or qualitative factor or variable that provides a simple and reliable means to measure achievement, reflect changes connected to an intervention, or help assess the performance of a development actor. |
| Inputs | The financial, human, and material resources used in a development intervention. |

| Glossary of evaluation-related terms | |
|--------------------------------------|--|
| Lessons learned | Generalizations based on evaluation experiences with projects, programs, or policies that abstract from the specific circumstances to broader situations. Frequently, lessons highlight strengths or weaknesses in preparation, design, and implementation that affect performance, outcome, and impact. |
| Logical framework (Log frame) | A management tool used to improve the design of interventions, most often at the project level. |
| Mid-term evaluation | Evaluation performed towards the middle of the period of implementation of the intervention. |
| Monitoring | A continuing function that uses a systematic collection of data on specified indicators to provide management and the main stakeholders of an ongoing development intervention with indications of the extent of progress and achievement of objectives and progress in the use of allocated funds. |
| Outcome | The likely or achieved short-term and medium-term effects of an intervention's outputs. |
| Outputs | The products, capital goods, and services resulting from a development intervention; may also include changes resulting from the intervention which are relevant for achieving the outcomes. |
| Project or program objective | The intended physical, financial, institutional, social, environmental, or other development results to which a project or program is expected to contribute. |
| Quality assurance | Quality assurance encompasses any activity concerned with assessing and improving the merit or worth of a development intervention or its compliance with given standards. |
| Recommendations | Proposals aimed at enhancing the effectiveness, quality, or efficiency of a development intervention; at redesigning the objectives and/or reallocating resources. Recommendations should be linked to conclusions. |
| Relevance | The extent to which the objectives of a development intervention are consistent with beneficiaries' requirements, country needs, global priorities, and partners' and donors' policies. |
| Reliability | Consistency or dependability of data and evaluation judgments regarding the quality of the instruments, procedures and analyses used to collect and interpret evaluation data. |
| Results | The output, outcome or impact (intended or unintended, positive and/or negative) of a development intervention. |
| Results framework | The program logic that explains how the development objective is to be achieved, including causal relationships and underlying assumptions. |
| Review | An assessment of the performance of an intervention, periodically or on an ad hoc basis. |
| Risk analysis | An analysis or assessment of factors (called assumptions in the log frame) that affect or is likely to affect the successful achievement of an intervention's objectives. A detailed examination of the potential unwanted and negative |

| Glossary of evaluation-related terms | |
|--------------------------------------|--|
| | consequences to human life, health, property, or the environment posed by development interventions; A systematic process to provide information regarding such undesirable consequences; the process of quantification of the probabilities and expected impacts for identified risks. |
| Stakeholders | Agencies, organizations, groups or individuals who have a direct or indirect interest in the development intervention or its evaluation. |
| Sustainability | The continuation of benefits from a development intervention after major development assistance has been completed. The probability of continued long-term benefits. Resilience to the risk of net benefit flows over time. |
| Terms of reference | Written document presenting the purpose and scope of the evaluation, the methods to be used, the standards against which performance is to be assessed or analyses are to be conducted, the resources and time allocated, and the reporting requirements. |
| Validity | The extent to which data collection strategies and instruments measure what they purport to measure. |

Executive summary

The project “Climate change related technology transfer for Cambodia: Using agricultural residue biomass for sustainable energy solutions” is a full size GEF project implemented by UNIDO in Cambodia and hosted initially by the Ministry of Industry, Mines and Energy and later on by the Ministry of Industry and Handicraft.

This evaluation started in July 2018 and was conducted by the international consultant Mr. Alfredo Curbelo Alonso, and the national consultant, Mr. Chou Phanith. The evaluation covered the whole project duration from September 2011 to December 2018.

The overall purpose of the TE is to assess whether the project has achieved or is likely to achieve its main objective, i.e. to support the sustained transfer of cost-effective, efficient and biomass energy technology systems derived from agricultural waste for power generation and thermal energy applications, and to what extent the project has also considered sustainability and scaling-up factors to enhance its contribution to the sustainability of its results and further impact.

Key Findings of the Evaluation.

A. Progress to impact

None of the planned outcomes were achieved.

B. Project design

This project design has serious failures both in the overall design as well as in the project result framework.

One of the reasons for the poor performance of this project is its weak design. The formulation of outcomes and outputs is not satisfactory and some outcomes were designed in such a way that they cannot be achieved within the scope of the project implementation. Additionally, the planned schedule conditioned the startup of some project components to the completion of outputs related to pilot projects, thus reducing the achievement opportunities of other outcomes.

The project result framework was ineffective. Its assessment showed that most of result indicators were not SMART and most target indicators were unappropriated. Subsequently, it was not useful for guiding project monitoring. In addition, some outputs could not be evaluated due to their confusing formulation.

C. Project Performance

Relevance

The project objective is in line with government policies on national development and for the promotion of renewable energy sources in the country. In addition, it contributes to improving the competitiveness of the national industry, particularly agribusiness, and helps achieve climate change-related national commitments. Nonetheless, ownership of some relevant project stakeholders was limited.

Effectiveness

The effectiveness is too low. No outcome was achieved and only some outputs were completed.

Efficiency

Expenditure of GEF funds for three of the five outcomes of the project range between 95% and 119% of the planned budget. However, such expenses are not supported by achieved outcomes or benefits.

Sustainability of benefits

No benefits were obtained, so there are no considerations about sustainability.

D. Cross-cutting performance criteria

Gender mainstreaming

Despite the fact that gender was not considered in the project design, the project management encouraged reduction of the gender gap among participants in project activities.

Monitoring and evaluation

All monitoring activities were executed and the corresponding report produced and used for evaluation proposals by UNIDO, the PMU, and the PSC. However, its effectiveness was low due to serious problems in the design of the project result framework. The M&E budget was only allocated for the Terminal Evaluation in the approved project document. This was amended during project implementation.

Results-based Management (RBM)

The PMU's capacity to fulfill its assignment was constrained because it was understaffed throughout the whole project period. In addition, none of the project partners were assigned any specific responsibility by the PMU. In addition, its leading role in the project implementation process was very limited during the first half of the project time scope when it was under the National Cleaner Production Center.

Monitoring and evaluation effectiveness were limited by the weakness of the PRF and the lack of a specific monitoring and evaluation plan.

The overall assessment is **unsatisfactory**.

E. Conclusions

The goal of this project is to demonstrate the viability of using biomass for energy purposes in small and medium-sized industrial facilities, particularly on agro-industrial facilities. This goal is in line with national priorities for energy development.

The approach to achieve this proposal was to support a technology transfer process between technology suppliers and end-user companies in order to establish commercial pilot plants.

This was a very complex task, since the regulatory framework for supporting this kind of independent power producers is inappropriate, the financial system is weak, and local technical resources are very limited. Besides, the small scale of the power facility makes the design of a technological and economic feasible solution very difficult.

The above-mentioned circumstances, insufficiencies in the project design, and some project management failures –despite the efforts of the project management unit-- led to an unsatisfactory performance of the project.

F. Recommendations

To GEF:

- Request the STAP to avoid, when providing project reviews, recommending for CEO endorsement projects with evident failures in their design.
- Establish that TT project designs should always be based on a previous specific Technology Need Assessment or include an outcome aimed at addressing the TNA, before selecting the technological solution to be transferred.

To UNIDO

- In case that some of the pending pilot projects would finally be implemented, to formulate an exit strategy for supporting companies with technical advice during the procurement, building and startup processes.
- Have a flexible approach when designing technological interventions for bioenergy projects, in order to select technological solutions on a case by case basis.
- Consider improving the technical and methodological review of project proposals during the process for approval.
- Establish a reporting mechanism providing information about actual co-financing expenditure on a regular basis.
- Avoid frequent change of project managers to ensure a more coherent and effective contribution to project implementation processes.

To the government of the Kingdom of Cambodia:

- Based on the experience of this project, provide a detailed assessment of the opportunities for the introduction of biomass energy technologies to replace conventional fuels used in industrial facilities. Consider the impact of this renewable energy solution for the national development goals --at least in the energy and agricultural sectors--, as well as for fulfilling the climate change-related national commitments.
- Follow up the project recommendations for improving the legal and regulatory frameworks to foster the contribution of small and medium scale renewable energy solutions to the energy development goals of the country.

G. Lessons learned

- For designing technology transfer projects, the design of outputs related to commercial pilot plants is critical:
 - Objective and in-depth considerations about existing conditions for specific technology transfer actions should be provided.
 - Special attention should be paid to time and financial resources limitations, deciding what should be the scope of this sort of output.
- Designing outputs focused on improving policy framework; should be limited to promoting change, but not to effecting actual change of regulations during the project implementation period.
- Outputs aimed at private sector involvement in technology transfer should be carefully formulated, considering real needs, expectations and business orientation.
- Training and awareness raising activities implementation should receive maximum attention due their importance for developing an enabling environment for the specific technology transfer process.

I. Evaluation objectives, methodology and process

The terminal evaluation (TE) covers the whole duration of the project from its starting date up to the date of the evaluation. It assesses project performance considering the evaluation criteria of relevance, effectiveness, efficiency, sustainability, and impact.

The TE has an additional purpose of drawing lessons and developing recommendations for UNIDO, the Government, Donors, and project stakeholders and partners that may help improve the selection, design and implementation of similar future projects and activities in the country and on a global scale, upon project completion. The TE report should include examples of good practices for other projects in the focal area, country, or region.

The TE should provide an analysis of the attainment of the project's objective and the corresponding outputs and outcomes. The assessments of the Evaluation Team (ET) should enable the Government, counterparts, UNIDO, and other stakeholders and donors to verify prospects for development impact and sustainability, providing an analysis of the achievement of global environmental objectives, project objectives, delivery and completion of project outputs/activities, and outcomes/impacts based on indicators. The assessment shall include a reexamination of the relevance of the objectives and other elements of project design according to the project evaluation parameters defined in the TORs.

The overall purpose of the TE is to assess whether the project has achieved or is likely to achieve its main objective, i.e. to support the sustained transfer of cost-effective, efficient and biomass energy technology systems derived from agricultural waste for power generation and thermal energy applications, and to what extent the project has also considered sustainability and scaling-up factors for increasing contribution to sustainable results and further impact.

The evaluation has three specific objectives:

- (i) Assess project performance in terms of its relevance, effectiveness, efficiency, sustainability, and progress to impact;
- (ii) Identify key learning to inform the design and implementation of forthcoming projects; and;
- (iii) Provide a series of findings, lessons, and recommendations to enhance the design of new UNIDO projects and the implementation of ongoing ones.

The evaluation methodology to be used by the evaluation team is based on indications in the TORs.

The evaluation will have two main components:

- an overall assessment of the performance of the project,
- learning from successful and unsuccessful practices in project design and implementation.

The project team had access to relevant monitoring reports: Progress reports, Project Implementation Reviews (PIRs), and the Mid-Term Evaluation Report. All these documents are informative, include relevant information for the evaluation and provide insight about project implementation.

The evaluation team officially started this assignment in July 2018.

This evaluation benefitted from very productive teamwork among the UNIDO Energy Department staff directly involved in this TE, the UNIDO office in Cambodia, the PMU and the evaluation team.

II. Country and project background

A. Brief country context and sector-specific issues

Brief country context and sector-specific issues relevant to the project and important developments during the project implementation period:

Cambodia, also Kampuchea, officially the Kingdom of Cambodia is a country located in the southern portion of the Indochina peninsula in Southeast Asia. It covers an area of 181,035 km², bordered by Thailand to the northwest, Laos to the northeast, Vietnam to the east and the Gulf of Thailand to the southwest. Phnom Penh, its capital and largest city, is the political, economic and cultural center of Cambodia. The sovereign state of Cambodia has a population of over 15 million. The Kingdom is an elective constitutional monarchy with a monarch, chosen by the Royal Throne Council, as head of state.

While per capita income remains low, compared to most neighboring countries, Cambodia has one of the fastest growing economies in Asia, with growth averaging 7.6% over the last decade. Agriculture remains the dominant economic sector. Cambodia was upgraded from the status of a Least Developed Country to a Lower Middle-Income country in the year 2016. Oil and natural gas deposits found beneath Cambodia's territorial waters in 2005 yield great potential but remain mostly untapped.

The electrical system of Cambodia is based on relatively small regional/ local distribution power grids. Most of the electricity is produced by hydro and coal power plants, plus small and medium size fuel oil and diesel power generators, in addition to electricity imported from neighboring countries. The quality of power supply is not good. Outside the Phnom Penh region, power shortage and variation of frequency and voltage of power supply are frequent. For this reason, many industries in rural areas are self-producers of electricity, generated in most cases by power diesel sets. In 2016, only 74% of villages and 65% of households had access to on-grid electricity. The RGoC recognized that improving the energy sector is a national development priority.

The main goals of the national energy policy¹ are to:

- provide an adequate supply of energy throughout Cambodia at a reasonable and affordable price;
- ensure a reliable and secure power supply at a reasonable price, which facilitates investment in Cambodia and the development of the national economy;
- encourage exploration and the environmentally sound and socially acceptable development of energy resources required for supplying all sectors of Cambodia's economy;

¹ Current Status of Renewable Energy in Cambodia. New and Renewable Energy Dept. Ministry of Mines and Energy. IRENA . Renewable Energy Statistics Training. 12-14 December 2016, Bangkok, Thailand

- encourage the efficient use of energy and minimize the detrimental environmental effects from energy supply and consumption.

The Cambodia Power Strategy has three pillars:

- ❖ Development of power generation
 - Increase diversification of power supply sources such as hydro, coal, imported electricity, solar, biomass and other renewable energies to meet the electricity demand and reduce the use of fuel oil for power generation.
- ❖ Development of transmission lines
 - develop the national transmission line
 - GMS & ASEAN power grid
 - maximize mini-grid in rural areas
 - upgrade the high, medium and low voltage transmission lines
- ❖ Development of rural electrification
 - Supply from the national grid, mini-grid, grid extension, and stand-alone systems
 - Increase the use of renewable energy sources (biomass, solar, hydro)

The national effort to develop the energy sector is focused on rural electrification. The target is to have 100% of the villages in Cambodia with access to some power supply source by 2020, and at least 70% of households with access to on-grid electricity by 2030.

The total power capacity experienced an almost fourfold increase from 2010 to 2015 and energy sources have been diversified. While in 2010 power was basically produced using diesel and fuel oil, in 2015 hydro and coal generations were incorporated.

However, during the project implementation period the enabling environment for implementing renewable energy projects, and in particular biomass-based energy project, has not improved. All the barriers described in the Prodoc were again reported during a policy assessment workshop in 2018.

B. Project summary

Project Factsheet:

| | |
|---|--|
| Project Title | Climate change related technology transfer for Cambodia: Using agricultural residue biomass for sustainable energy solutions |
| GEF ID | 4042 |
| UNIDO project ID | 100223 |
| Region | Asia and the Pacific |
| Country(ies) | Cambodia |
| GEF Focal area(s) and operational program | GEF-4 STRATEGIC PROGRAM: CC-SP4 |
| GEF Agencies (implementing agency) | UNIDO |

| | |
|--|---|
| Project executing partners | National Cleaner Production Office-Cambodia (NCPO-C) hosted by the Ministry of Industry, Mines & Energy (MIME)) |
| Project size (FSP, MSP, EA) | FSP |
| Project CEO endorsement/Approval date | September 2011 |
| Project implementation start date (PAD issuance date) | May 2012 |
| Original expected implementation end date (indicated in CEO endorsement/approval document) | May 2016 |
| Revised expected implementation end date (if any) | |
| Actual implementation end date | December, 2018 |
| GEF Grant (USD) | 1,690,000 |
| GEF PPG (USD) (if any) | 80,000 |
| UNIDO inputs (USD) | 300,000 (cash) |
| Co-financing (USD) at CEO Endorsement | 4,565,000 (cash + in-kind) |
| Total project cost (USD) (GEF Grant + Co-financing at CEO Endorsement) | 6,335,000 |
| Mid-term review date | June, 2015 |

This project is focused on technology transfer for power generation from agricultural residues to address the issues of high dependency on imported fossil fuels and high energy cost in the industrial sector.

Within this scope, the identified project beneficiaries are private companies from the agro-industrial business, departments of the RGoC, academic institutions, and national providers of technical services.

The objective of this project is to bring about sustained transfer of efficient, cost-effective and environmentally friendly (low carbon) agro-waste biomass-fueled energy systems to replace fossil-fuel powered generators and boilers for power generation and thermal energy applications.

To achieve this objective five outcomes were formulated:

- Outcome 1: Transfer of clean and energy efficient low carbon technologies.
It is the central outcome of the project. Outputs are focused on the implementation of biomass-based co-generation systems, dissemination of the results and experiences associated with the technology transfer process and the operation of pilot projects, and training of operation and maintenance personnel.
- Outcome 2: Supply of national service providers in technology evaluation and technology transfer.
This outcome pursues to reinforce national capacities for technology transfer, including technology evaluation and adaptation, financial mechanism, and development of tools to facilitate access to relevant technical information.

- Outcome 3: Stronger institutional framework in place to ensure long-term support for renewable energy (biomass) promotion.
Outputs of this outcome are aimed to strengthen the capacity of relevant institutions for assuring the sustainability of project results. Target institutions are governmental departments and academic and financial institutions.
- Outcome 4: Increased adoption of biomass-based energy generation technologies by Cambodian businesses and private investors.
This outcome is focused on increasing awareness among relevant stakeholders regarding transferred technologies. Special attention is paid to investors and private and governmental decision-makers.
- Outcome 5: Establishment of policy, legal, and regulatory frameworks that sustainably promote and support renewable energy generation.
Improvement of the regulatory and legal framework for wider deployment of biomass-based power technologies is the goal of this outcome.

Based on these outcomes the following impacts were foreseen:

1. Transfer of clean and energy efficient low carbon technologies reducing GHG emission due to energy generation.
2. National capacity building to ensure long-term support for renewable energy promotion.
3. Establishment of policy, legal and regulatory frameworks that promote and support renewable energy generation using available biomass and replace/substitute dependency on imported fossil fuel as much as possible.
4. Raising awareness and technical capacity building for the transfer of efficient low carbon technologies and improving energy management within relevant institutions, the market, and enterprises.
5. Increased adoption (multiplying effect) of energy generation technologies by Cambodian businesses and private investors.

The project launching workshop was held in February 2013.

III. Project assessment

A. Project design

The National Cleaner Production Office in Cambodia (NCPO-C), hosted by the Ministry of Industry, Mines & Energy at the time, was in charge of preparing the Project. The “Pilot Projects” window of the Technology Transfer Strategic Program under the GEF-4 replenishment was selected for project presentation.

The preparatory phase of the project lasted from July 2009 to September 2011

The main milestones of this process are:

- July 2009: The PIF was sent to GEF.
- September 2009: GEF CEO gives clearance to the PIF with an indicative amount of 1,690,000 and a PPG for 80,000 US\$.
- February 2012: The STAP, after three reviews (October 2009, December 2011, February 2012), recommended CEO endorsement of the PIF.
- February 2012: GEF Secretariat, after three reviews (first in October 2011), finally recommended it for CEO endorsement.

A useful reference for the assessment of project design is the characterization provided by the STAP screening on October 2010:

“The bioenergy technology transfer project is a very comprehensive proposal. It aims at covering all aspects; technology needs assessment, biomass supply, infrastructure requirement, human capacity needs, techno-economic assessment, preparation of bankable proposals, technology installation and operation, capacity building, dissemination, removal of financing barriers, and policy development. It may be too comprehensive to achieve all objectives.”²

The objective of this project is “to bring about sustained transfer of efficient, cost-effective and environmentally friendly (low carbon) agro waste biomass-fueled energy systems to replace fossil-fuel powered generators and boilers for power generation and thermal energy applications.”

The scope of application of these technologies is defined in the Prodoc as follows:

“GEF-UNIDO technology transfer project using agricultural residue biomass as fuel substituting fossil fuel will holistically address the removal of the barriers to technology transfer and its successful implementation. The project will target specifically the industrial sector possessing its own biomass which will also help in improving the competitiveness of the locally manufactured products.” Examples of such sectors are rice processing industries, the palm oil industry, and rubber refineries.

The project document does not develop a specific analysis of barriers for achieving project objective and does not specify what barriers are going to be addressed by the project. However, it refers to barriers identified by the Energy Sector Strategy (2007) related to the promotion of a decentralized, demand-driven approach in electrification and facilitating private sector involvement. The abovementioned barriers are³:

- Lack of policy and legal frameworks;
- Access to financing for renewable energy devices;
- Lack of information on market characteristics and resource potentials;
- Institutional capacity for planning, implementation, and maintenance;
- Incentive regime for renewable energy;
- General lack of awareness and communication.

The project document also includes a list of major limitations identified during the project preparation, which are more specific to the project context than those listed above. These are:

- Lack of competent local suppliers of after-sales services;
- Inadequate RE policy, institutional and regulatory frameworks;
- Lack of resources to effectively promote and support biomass-based renewable energy in the country;
- Lack of understanding among industry decision-makers of the economic and environmental potentials of clean and green energy using the available surplus of

² STAP Scientific and Technical screening of the Project Identification Form (PI F). Second Screening. 4th February 2010.

³ Extract from *“Review of Issues faced by Cambodia Power Sector-Energy Sector Strategy*

- biomass;
- Insufficient technical capacity, both in enterprises and the market, to identify, develop and implement renewable energy projects and measures;
- Financing and credit constraints faced by private enterprises.

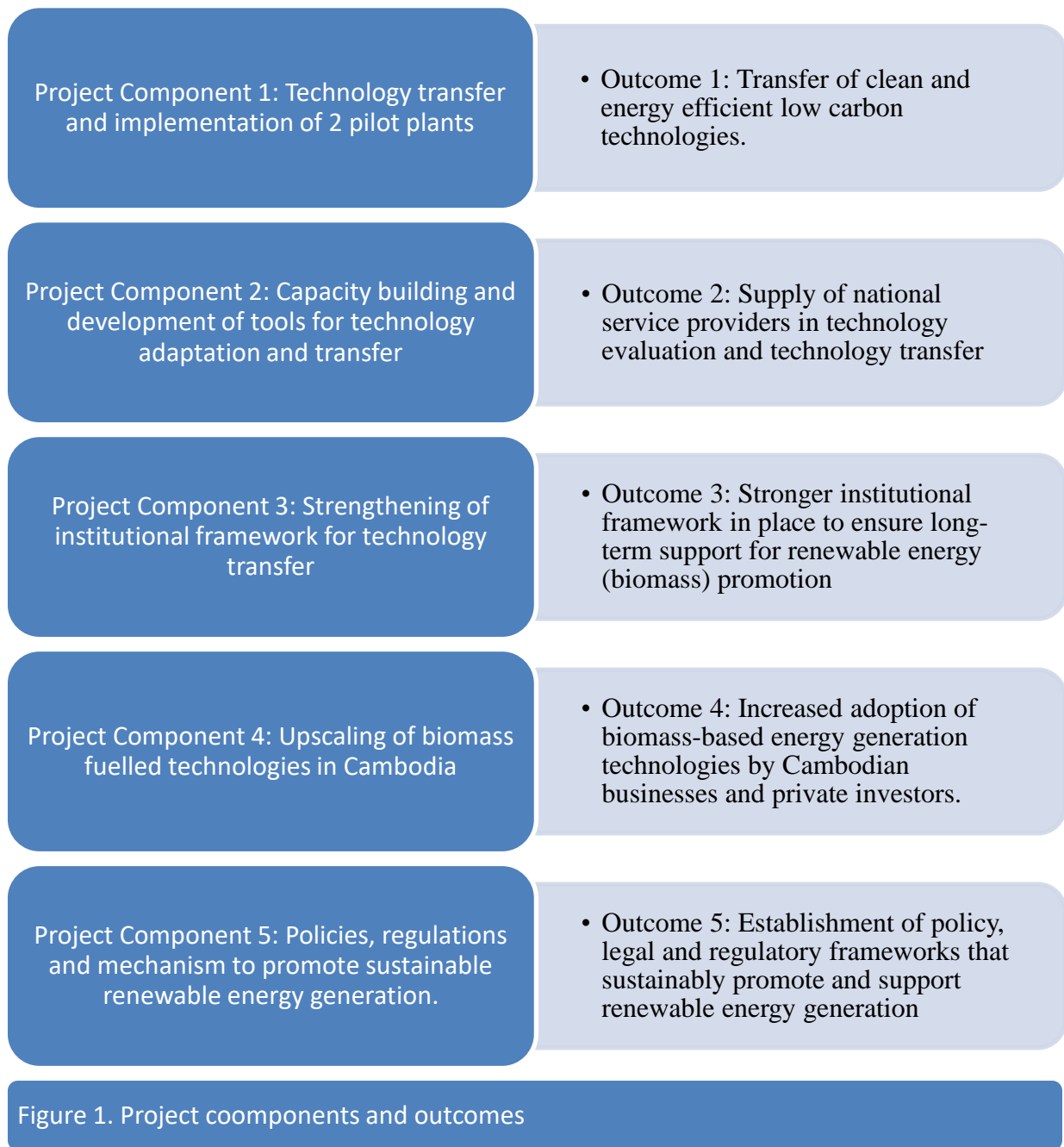
For achieving the project's objective, five components and outcomes were formulated (Fig. 1.) For a better understanding of the project design analysis, project outcomes are described below:

- **Outcome 1: Transfer of clean and energy efficient low carbon technologies.**
This outcome is focused on the implementation of three biomass-based power systems, mostly financed by the owners and the project providing support for financial engineering and development of bankable proposals.
The project also plans to provide training for operation and maintenance personnel in biomass power facilities and to disseminate information about the investment process and the performance of these pilot projects.
- **Outcome 2: Supply of national service providers in technology evaluation and technology transfer.**
This outcome pursues to reinforce national capacities for technology transfer, including technology evaluation and adaptation, financial mechanism, and development of tools to facilitate access to relevant technical information
- **Outcome 3: Stronger institutional framework in place to ensure long-term support for renewable energy (biomass) promotion.**
Outputs of this outcome are aimed to strengthen the capacity of relevant institutions for assuring the sustainability of project results. Target institutions are governmental departments and academic and financial institutions. Special attention is paid to the latter.
- **Outcome 4: Increased adoption of biomass-based energy generation technologies by Cambodian businesses and private investors. The creation of a national market for biomass energy technologies.**
This outcome is described in the Prodoc as an outcome focused on replication of implemented technologies mentioned in component 1.

A compilation of biomass-based best practices in Cambodia shall be developed demonstrating success stories.

It was expected that trained national experts would continue offering and providing technical evaluation and other related services to users as a result of increased demand for RE technologies through the demonstration of RE benefits derived from pilot plants mentioned in component 1.

- **Outcome 5: Establishment of policy, legal and regulatory frameworks that sustainably promote and support renewable energy generation.**
Improvement of the regulatory and legal framework supporting a wider deployment of biomass-based power technologies is the goal of this outcome.



- ✓ Some problems were identified in the formulation of outcomes.
- a. Components number two and three could have been fused into one component focusing on capacity building for technology transfer. This reduction in the number of components would have facilitated project management.
 - b. Formulation of project outcomes is not adequate.
As referred in the Glossary, outcomes should reflect “the likely or achieved short-term and medium-term effects of an intervention's outputs” while the effect is the “intended or unintended change due directly or indirectly to an intervention.”

Outcomes 1 and 2 do not express any effect or change. On the other hand, the expected changes in outcomes 3 and 5 –formulated to change a condition-- have been formulated in such general terms that it is not possible to link those changes to any specific output.

c. Some outcomes are unlikely to be achieved:

- Outcome 1 is the most critical example.

The list of barriers identified in the 2007-2009 period clearly indicated that output 1.1 was very unlikely to be completed by the project. This output required the commitment of private companies to a very risky investment initiative, which, according to Prodoc information, would cost the investor between 3.5 to 5 million US dollars, minimum.

Such a commitment by private investors is very difficult to achieve when the regulatory and policy environment is inappropriate, the companies face financing and credit constraints, the financial system is not ready for supporting risky investments, etc. The most relevant obstacles faced during project implementation were the non-regulation of electricity surplus sale under PPA and lack of attractive prices encouraging independent power producer to use biomass as fuel.⁴

- Outcome 5 is also very unlikely to be achieved.

This outcome is formulated for the establishment of policy, legal and regulatory frameworks. It means that this outcome pursues that project recommendations for improving the regulatory framework are implemented by the government (output 5.2) before the end of the project and this is very unlikely.

d. Some technical assumptions used for designing this outcome were inaccurate:

- All selected agro-industrial facilities operate 8,000 h/year⁵.

While the last Prodoc version sent to STAP for review at the end of 2011 included the assumption of 8,000 operating hours/year, the real operation time reported was 50% of that planned in October 2013⁶.

The documents that the evaluation team had access to, provide no clear explanation of the reason for such reduction.

One of the reasons mentioned was lower rice production.⁷ A year later, however, CTA stated that one of the “killer assumptions” was that “the rice industry will grow significantly within the next few years.” In any case, it is a very risky assumption because most of the agroindustry facilities have a sessional exploitation regime and work at full capacity only a fraction of the year.

The consequence of this non-valid assumption was that to maintain the economic viability of pilot projects it was necessary to consider the option of selling electricity surplus to the grid, but the regulatory framework required was not in place.

- The energy efficiency of power steam cycle is much higher than that of biomass gasification power plants at small scale (less than 5 MW).

This assertion is true for steam power plants with over 20-25 MW capacity. For smaller power capacities foreseen to be installed by the project (3-5 MW), the energy efficiency of both technologies is similar.

⁴ PIR 2013

⁵ Prodoc

⁶ PIR 2013

⁷ Minutes of PSC meeting, February 2015

The consequence of this assumption was that it was not possible to consider biomass gasification technology when looking for the most suitable technological solution. Keeping open the gasification technology option would give more flexibility to the project.

Furthermore, conditions for assimilating the gasification technology were better than for the steam cycle. While the Prodoc mentions that two biomass steam power facilities were installed in the country at that time, it also states, referring to biomass gasification, that:

- “Biomass gasification is still in the development stage, but it promises high efficiency and may offer the best option for future biomass-based generation.”
- “Biomass-based energy generation in Cambodia has gain momentum during the last 2-3 years, mainly by applying biomass gasification technology both for captive consumption as well as for electricity generation and supply companies.”
- “Though biomass-based gasification system is quite flexible regarding its capacity in terms of requirement, hours of operation and dual fuel generators to ensure uninterrupted supply, gasified electricity generation efficiency is low and application is limited to smaller capacity.”

A project designed for keeping and supporting such momentum for the introduction of biomass gasification technology would probably have had more chances of success than the selected option.

e. Formulation of the outcome is confusing.

This is the case of outcome 4.

- While the formulation of this outcome is about the adoption of technologies and the creation of a biomass market, the outputs of the component are not focused on that direction but rather on the dissemination of pilot project results, raising awareness among investor decision-makers and other stakeholders.
- Besides, result indicators of this outcome in the project result framework refer to:
 - A methodology for technology transfer and biomass-based renewable energy is produced in English and Khmer languages.
 - Technology suited to local conditions and integrated as far as possible with indigenous technologies.
 - Contractual obligations between various stakeholders are identified and fulfilled.

However, none of these result indicators are supported by any output under the component.

- ✓ The assessment of project outputs (see Annex 2a) also reveals that formulation of some of these outputs (6 out of 15) is inappropriate. These are the following cases:

a. Output formulation does not follow the definition of outputs.

An output is described in the glossary as “The products, capital goods, and services which result from a development intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes.”

According to that description, some outputs have an inaccurate formulation, because they are not related to any specific result of the project intervention. This is the case of outputs 2.2, 3.1, 3.3, and 5.2.

b. Output formulation is vague and its accomplishment is difficult to verify.

Examples of such outputs are:

- Output 4.2 Investors and decision-makers understand the potential for biomass energy sources.
 - Output 4.3 Other stakeholders understand the role they can play to promote the uptake of this kind of technology
- ✓ The project result framework (Annex 2) is a relevant component of the project design. In particular, the definition of result indicators and its target are the foundation of the M&E system.

According to the glossary, indicator is the “Quantitative or qualitative factor or variable that provides a simple and reliable means to measure achievement, reflect changes connected to an intervention, or help assess the performance of a development actor.” But they should also be SMART (specific, measurable, attainable, relevant and, where possible, time-bound.) While indicators and targets for monitoring the project’s objective are well formulated, this is not the case with the outcomes. The most common problems are that some indicators do not reflect an expected effect and most of the targets do not fit with the indicators.

Most of the output indicators (10 out of 15) are not useful for M&E. The typical problems are that:

- Indicators are formulated using a similar wording as that of the output. (1.2, 1.3, 2.3)
- Indicator formulation does not reflect expected changes associated with the outputs: 2.2, 4.1, 4.2, 4.3, 5.1, 5.2
- There is no indicator formulated for one output (output 2.4.)

But even in the case of the five outputs with well-formulated indicators, only the target of one of them fits the indicator. Non-fitting cases are outputs 2.1, 2.3, 3.2, and 3.3.

In conclusion, the project result framework is not suitable for supporting the monitoring and evaluation system. The Prodoc does not describe the role and responsibility of project participants.

B. Implementation performance

Ownership and relevance:

The project is focused on the promotion of the use of biomass for heat and power production.

The agro-industrial activity was the sector originally chosen for transferring technologies for biomass energy use. It is a relevant sector for the economy of Cambodia due to its contribution to the GDP, exports and job creation.

The main direct benefits for agro-industry facilities is the contribution to reducing negative environmental impacts associated to waste deposition, the reduction of production costs and

increasing economic viability of the companies. The project also contributes to the reduction of GHG emissions and the fulfillment of national climate change-related commitments.

Besides the potential impacts in the industrial sector, the project's objective is totally in line with the energy policy of the country:

- The project promotes the use of an important renewable energy source: biomass. The annual theoretical biomass energy potential of agricultural residues is estimated around 15,000 GWh⁸. The total power generation was 5,590 GWh in 2015⁹, therefore that theoretical potential is very significant for Cambodia.
- The heat and power cogeneration approach, promoted by the project, contributes not only to increase power generation capacity in rural areas, but also to reduce fuel imports.
- The establishment of distributed small power generation capacities in rural areas could contribute to the energy policy target of achieving 70% of households with access to grid quality power supply by 2030.

Notwithstanding the relevance of the project for the country's development goals, governmental institutions linked to the project implementation showed weak project ownership. Unfortunately, the role played by the PMU in some cases contributed to this situation.

The most evident case is the role of the former Ministry of Industry, Mines and Energy and later the Ministry of Mines and Energy in the project implementation. The Prodoc indicates that "the Department of Energy Techniques under MIME will have the overall responsibility of the project." This is a recognition of the importance of this ministry for a successful project implementation

However, during project implementation, the role and involvement of this Department and later of the Department of New and Renewable Energy was minimized by the PMU. The fact that the evaluation team could not meet a representative from the DNRE, due to agenda issues, could be an expression of the lack of ownership of this ministry. The lack of systematic communication, apart from the PSC meetings, with key governmental departments, narrowed the opportunities for greater involvement on their part in the implementation of the project. Accordingly, there was lack of support and advice to address some problems affecting project progress.

Effectiveness:

Assessment of project effectiveness is based on the analysis of the progress of project outcomes and outputs.

- Outcome 1. Transfer of clean and energy efficient low carbon technologies.
This outcome pursues to demonstrate the viability in commercial conditions of transferred bioenergy technology for power generation in facilities of the agro-industrial sector.

This goal was planned to be achieved with three outputs.

⁸ Renewable energy developments and potential in the Greater Mekong Subregion. Mandaluyong City, Philippines: Asian Development Bank, 2015

⁹ Current Status of Renewable Energy in Cambodia. New and Renewable Energy Dept. Ministry of Mines and Energy. IRENA. Renewable Energy Statistics Training. 12-14 December 2016, Bangkok, Thailand

- Output 1.1: Biomass-based RE-TT projects for 4-5 MW power generation replacing more than 12,000 TOEs and related potential economic and environmental savings in 3 pilot enterprises are identified and appraised by project experts.

The target of this output is three technology transfer projects, using biomass for heat and power production, are implemented with direct support from the GEF project. This support would consist in a minor participation in co-financing private investment and doing financial engineering and preparing bankable proposals.

It is a central output of the project and has concentrated the efforts of the PMU, but its completion has been troublesome.

Main performed activities are:

- Survey of potential suppliers of equipment.
This activity was focused on identifying potential suppliers of equipment and technology for the implementation of the biomass-based energy facilities for the three companies originally committed with the project. With this aim, the PMU sent a call for technology offers for pilot project implementation to multiple international companies.

A list of 27 offers was compiled with the replies to the call made. This list includes offers for main technological equipment: boilers or steam turbines and complete power plant.

This information was complemented with the results of a visit to the premises of some of these companies by the project's CTA during a mission to Thailand and India in June 2013. During the mission, specific conditions of the company's participation in the project were clarified. The requirements for the three pilot projects, details about the expected performance of the equipment to be supplied, the option of EPC or BOOT contracts and operation and maintenance services contract were discussed during the meetings with potential suppliers.

Finally, a short list of potential technology suppliers ready to participate in the project was set up. Some of these suppliers even visited client facilities.

- Screening of companies for selecting project partners for the implementation of pilot projects.

A serious setback was the withdrawal from the project of the three companies initially committed with the implementation of pilot projects in June 2014.

It should be noticed that the evaluation team had no access to any report describing these three pilot projects or the reported feasibility studies.

Some reasons that drove to this decision were:

- The process to close a business agreement had taken a long time.
Companies issued the letters of commitment in 2009, and five years later there were no significant progress in closing a business proposal.

- The economic viability of the investment had been affected by the fact that:
 - The price of electricity had fallen drastically since the project preparation phase, making the biomass-based alternative less economically attractive.¹⁰
 - An agreement with the regulatory authorities to sign a Power Purchase Agreement for selling electricity surplus was expected to be reached. After a series of meetings with the MME, this approval was never received. Under such conditions, estimated economic incomes of the pilot projects associated with power generation were halved¹¹.
 - The investment risk perception of local companies was high. It not only included the financial and economic risks, but also the risk associated with the technical sustainability of the power facility operation, given the lack of trained personnel and local capacity to provide maintenance and repair services.

Reacting to this situation, which seriously jeopardized the achievement of this output, the PMU set out to search for new companies to implement the pilot projects. During the 2016-2018 period, 23 companies (most of them in 2017) were contacted, production facilities were visited and an initial screening of candidates was undertaken. With the approval of the PSC, new industrial sectors were considered as potential participants and the options for using biomass for energy applications were expanded.

Finally, out of the 23 companies considered, 8 were selected as potential candidates, all from the food production sector.

- Provision of economic feasibility studies.
 Technical-economic feasibility studies were provided for six of the eight selected companies.

It should be noticed that these are pre feasibility studies since costs are estimated but there is no detailed engineering project in place.

Besides, while these feasibility studies assess the viability of biomass for energy pilot projects, the benefits resulting from these investments for the core business of the company are not evaluated. Like, for example, how the expected reduction in energy costs will reduce production costs and how significant will that cost reduction be for the company's profitability.

At the time of this evaluation, three of these studies were showing positive results.

- Agreement between UNIDO and the selected companies for the implementation of pilot plants.

At the time of this evaluation, the procedures and contractual pro-forma for implementation agreements between UNIDO and the private investors for the pilot plants were in the final preparation stage. Only one company has decided to implement the project and has signed the contract with UNIDO. They are now in tendering process. The tender documents and draft contract between company and supplier have been sent out to supplier for the offers. The contract signing between company and supplier is expected in mid of December 2018 and the installed plant is expected next year. Other two companies have decided withdraw

¹⁰ PIR 2015.

¹¹ PIR 2013

from the project due to high investment cost of the project.

A new round of factories screening has identified 2 new companies and the feasibility study has been conducted. One company is very interested with the project and is waiting for the decision from the board. The other company also interested with the project but decided not to involve with the project for the moment due to lack of financial resource (new start-up company).

- Output 1.2 Results of the pilot projects both in economic and environmental context are compiled in a compendium for effective dissemination.

Pending until implementation of pilot plants.

- Output 1.3 Personnel from the participating companies have been trained in operation, maintenance & troubleshooting.

Pending until implementation of pilot plants.

In conclusion, this outcome has not been achieved.

The lack of progress of this outcome demonstrates that selected technological solution (steam cycle heat and power cogeneration) to be transferred for biomass energy use is not viable in the current situation of the energy sector of Cambodia and its regulatory framework.

- Outcome 2: Supply of national service providers in technology evaluation and technology transfer.
- Output 2.1: A cadre of at least 20 national experts from relevant TT support institutions (the Cleaner Production Centre, technical universities/university departments, EDC, EAC, MIME, and independent engineers), are trained on technology evaluation and transfer including financial mechanisms.

Description of this training activity in the Prodoc specifies that trainees will be provided with in-depth training and equipped with the technical capacity and tools required for:

- a) conducting technology assessments which also factor in related environmental, social, financial and policy implications
- b) capacity building related to intellectual property rights (IPR), patents and trade secret regimes
- c) providing training to industry and energy professionals and offering commercial technology transfer related services.

A training program was elaborated within the scope of this output. This program did not follow most of the indications described in the Prodoc. This training program was attended by a cadre of 26 specialists, out of which at least 11 were from private companies. The lecturer was the international consultant hired by the project to provide the feasibility studies.

This training program consisted of four workshops:

- A one-day workshop on “Biomass Technology, Feasibility Studies, and Technology Transfer”, held on March 16th, 2018.
- A two-day workshop on “Project development and Financial modeling” held on March 27-28, 2018.

- A one-day workshop on “Conditions and Procurement Procedure of the Project” held on May 2nd, 2018.
- A final one-day workshop on “Summary on biomass technology, feasibility studies and project development” held on June 4th, 2018

Developing basic skills for project assessment and implementation was the focus of these workshops. The information collected from the feasibility studies was transmitted during the workshops, since it provides a better understanding of opportunities and barriers for this kind of projects under local conditions.

Since these workshops were organized at the end of the project and given the lack of systematic training activities, their impact on project performance was reduced.

- Output 2.2: Capacity building of indigenous partners for technology adaptation
The goal of this output, according to the prodoc, is ‘The training of selected professional coming from participating training companies and from institutions/ consulting & engineering companies’. Trained professionals will support absorption of transferred technologies by local companies, participants or not in the project. With the aim to increase the contribution of these trainees supporting technology transfer, a network of services provider to assist companies will be established.
Because of the lack of advance in pilot project implementation and identification of business opportunities by local companies, this type of professional was not trained and as consequence the network was not established. The output is considered with “not advance”
- Output 2.3: Web-based guidance tool/manual on RE-TT developed
This output was designed for contributing to replicability of implemented technological solutions based on project experiences. The description of the output in the prodoc included three components:
 - Dissemination of training materials.
 - Facilitating access to contact details of technology suppliers, experts and users.
 - Links to websites of interest for development of biomass-based energy projects.
 Of these components only the training materials in both Khmer and English have been uploaded to the website www.npcc-mih.org

The output has been partially achieved.

- Output 2.4: Technology database and case study database created
There is no evidence of progress in this output.
The compilation of equipment offers received by the PMU in a three-volume hard copy compendium cannot be considered as the result of this outcome.
- Outcome 3: Stronger institutional framework in place to ensure long-term support for renewable energy (biomass) promotion
- Output 3.1 Capacity building of relevant stakeholders, Government departments and academic institutions to provide technical support to promote biomass-based renewable energy technology transfer and assistance in implementation.

The only reported activity of this output is a two-day workshop on “Biomass-Based Power Generation Technology by Co-generation Technology” that was held in October 2014.

The program of the workshop was focused on biomass cogeneration, and the country manager of the Indian company Thermax Limited was in charge of these activities.

A total of 36 persons attended the workshop, out of which 19 were from government institutions and 5 were company representatives.

Undoubtedly, this workshop contributed to raising awareness among participants, but it was not subsequently complemented with any other capacity building activity focused on this target group.

In addition, the project had cooperated with project counterpart NPCC of MIH to select local technical persons to work with International expert. The team of 3 persons consist of 2 officers from NPCC and 1 from technical institution (ITC). They received both class room training and on-the job training. However, during interviews at NPCC and ITC was established that this capacity building effort was not transform into institutional capacity to promote biomass-based renewable energy technology transfer and assistance in implementation.

- Output 3.2: Financial Institutions are trained in TT financing including the use of available mechanisms like CCCA, LDCF, CDM and preparation of bankable TT project proposals. There was COMFAR training conducted in Lao PDR in 2014. 3 persons from NCPO participated in the training. However, no representatives from financial institutions participated.
No progress was achieved.
- Output 3.3: Capacity building of financial institutions to include environmental and social costs while assessing investment proposals in biomass-based renewable energy technologies.
No progress was achieved.
- Outcome 4: Increased adoption of biomass-based energy generation technologies by Cambodian businesses and private investors.
- Output 4.1: The results of the pilot projects are compiled and widely disseminated in the most appropriate manner.
No progress was achieved due to non completion of pilot projects.
- Output 4.2: Investors and decision- makers understand the potential for biomass energy sources. Formulation of this output in the project result framework makes difficult its assessment. Besides, activities related to this output are not reported.

The project has conducted several feasibility studies in close cooperation with the private sector investors. During the data collection and development of the studies investors and decision-makers had been closely involved. This also involved practical trainings/ workshop including targeted discussions to present the results of the feasibility studies. Through their engagement, their understanding on the potential for biomass energy has been built.

No progress was achieved

- Output 4.3: Other stakeholders understand the role they can play to promote the uptake of this kind of technology.
Formulation of this output in the project result framework makes difficult its assessment. Besides, activities related to this output are not reported.
No progress was achieved.
- Outcome 5: Establishment of policy, legal and regulatory frameworks that sustainably promote and support renewable energy generation.
- Output 5.1 Gap analysis performed to assist government in identifying where formulation of appropriate laws, regulations, and policy instruments are crucial for the transfer and diffusion of renewable energy technologies.

According to the Prodoc, the expected result of this output was an analysis of the limitation of the existing laws, regulations and policy tools and specific recommendations about improvements required.

Two main activities were delivered for achieving this output: A “Consultative Workshop on Policy Needs on Renewable Energy Development” hold on August 2018 and the report on “Climate Change Related Technology Transfer for Cambodia: Using Agricultural Residue Biomass for Sustainable Energy Solutions” issued on September 2018.

The “Consultative Workshop on Policy Needs on Renewable Energy Development” was jointly organized by the Ministry of Industry and Handicraft, UNIDO, and UNDP on August 16th, 2018. The workshop was attended by 60 participants, including 21 participants from 4 government technical line ministries, 6 participants from 3 academic institutions, 4 participants from 4 international development partners; 4 participants from 4 civil society organizations; 3 participants from 3 financial institutions, and 22 representatives from the private sectors as well as renewable energy project developers. This composition of the participants guaranteed a comprehensive approach for achieving the objective of the workshop.

The objective of this Consultative Workshop was “Through consultative process feedback, recommendations and suggestions shall be collected from key stakeholders and line ministries, private sector companies (especially manufacturing industry), financial institutions and development partners who have been actively involved in promoting renewable energy.”

The output of the workshop was a list of relevant issues regarding the following four questions, as a result of a consultative process among participants:

- Q1. What are the barriers for implementing RE (biomass and solar power) in the industrial sector in Cambodia?
- Q2. What are the main policy gaps for the promotion and implementation of RE in Cambodia with a focus on the industrial applications?
- Q3. What are the recommendations to enhance RE investment in Cambodia with a focus on industrial applications?
- Q4: How should a potential energy policy look like to create an enabling environment for investments in RE technologies?

The report on “Climate Change Related Technology Transfer for Cambodia: Using Agricultural Residue Biomass for Sustainable Energy Solutions” provides a comprehensive analysis of the current situation for introducing renewable energy in the energy supply sector in Cambodia.

This report describes the current status of power generation and renewable energy in Cambodia and analyses the legal, institutional regulatory and policy frameworks of the energy sector and more specifically for renewable energy. Likewise, the document provides a detailed analysis of existing barriers for the development of renewable energies and in particular the use of biomass for energy.

Recommendations for establishing an enabling environment for renewable energies are included in the report. These proposals offer government authorities a wide range of potential actions for:

- Improving the policy formulation process.
- Strengthening the regulatory and legal frameworks.
- Establishing financial arrangements
- Enhancing public awareness
- Increasing support for Research & Development
- Promoting inclusive and sustainable industrial development (ISID)
- Ensuring social and environmental sustainability

Both activities contribute to the completion of this output. The workshop contributed to raising awareness among policymakers about the needs and reasons for improving the renewable energy policy framework. While the report offers an excellent input for a future process to develop an enabling environment for the promotion of renewable energy and in particular the use of biomass-based energy. However, the fact that both activities were performed during the last six months of the project implementation period, reduced their impact on the outcome progress.

- Output 5.2: Implementation of the missing laws, regulations and policy instruments.
No progress was achieved.

An assessment of progress made is provided on Table 1, based on the completion of outcomes/outputs described above.

Table 1. Assessment of achievement of project outcomes and outputs

| Project Outcome/Output | Evaluation |
|---|-------------------|
| Outcome 1: Transfer of clean and energy efficient low carbon technologies. | Little progress |
| Output 1.1: Biomass-based RE-TT projects for 4-5 MW power generation replacing more than 12,000 TOEs and related potential economic and environmental savings in 3 pilot enterprises are identified and appraised by project experts. | Little progress |
| Output 1.2 Results of the pilot projects both in economic and environmental context are compiled in a compendium for effective dissemination | No progress |
| Output 1.3 Personnel from participating companies have been trained in operation, maintenance & troubleshooting. | No progress |

| Project Outcome/Output | Evaluation |
|---|-----------------------|
| Outcome 2: Supply of national service providers in technology evaluation and technology transfer | Little progress |
| Output 2.1 A cadre of at least 20 national experts from relevant support institutions (the Cleaner Production Centre, technical universities/university departments, EDC, EAC, MIME, and independent engineers, are trained on technology evaluation and transfer including financial mechanisms. | Almost fully achieved |
| Output 2.2 Capacity building of indigenous partners for technology adaptation. | N/A |
| Output 2.3 Web-based guidance tool/manual on RE-TT developed. | Partially achieved |
| Output 2.4 Technology database and case study database created | Little progress |
| Outcome 3: Stronger institutional frameworks in place to ensure long-term support for renewable energy (biomass) promotion | Little progress |
| Output 3.1 Capacity building of relevant stakeholders viz. Govt. Departments and academic institutions to provide technical support to promote biomass-based renewable energy technology transfer and assistance in implementation. | Almost fully achieved |
| Output 3.2 Financial Institutions are trained in TT financing including the use of available mechanisms like CCCA, LDCF, CDM and preparation of bankable TT project proposals | No progress |
| Output 3.3 Capacity building of financial institutions to include environmental and social costs while assessing investment proposals in biomass-based renewable energy technologies. | No progress |
| Outcome 4: Increased adoption of biomass-based energy generation technologies by Cambodian businesses and private investors. | No progress |
| Output 4.1 The results of the pilot projects are compiled and widely disseminated in the most appropriate manner | No progress |
| Output 4.2 Investors and decision-makers understand the potential for biomass energy sources. | No progress |
| Output 4.3 Other stakeholders understand the role they can play to promote the uptake of this kind of technology | N/A |
| Outcome 5: Establishment of policy, legal and regulatory frameworks that sustainably promote and support renewable energy generation | Partially achieved |
| Output 5.1 Gap analysis performed to assist the government in identifying where the formulation of appropriate laws, regulations, and policy instruments are crucial for the transfer and diffusion of renewable energy technologies. | Almost fully achieved |
| Output 5.2 Implementation of the missing laws, regulations and policy instruments | No progress |

Evaluation categories used:

- Fully achieved
- Almost fully achieved
- Partially achieved
- Little progress
- No progress
- No assessment (N/A)

Efficiency:

The planned project budget is USD 6.25 million including USD 1.69 million from the GEF grant that represents 27% of the total budget (Table 2).

The budget distribution by project component differs in accordance with the specific activities of each component. 62% of the GEF funding was assigned to Component 1. The reason is that funding for co-financing contribution to pilot projects was included under this component.

Component 2 is the second in terms of the amount of funding assigned. In this case, most of the funding is for organizing training activities. Project management cost represents 6% of the GEF contribution.

In the case of co-financing, the planned figure was as high as USD 4.5 million. Most of the planned co-financing comes from the financial contribution of private companies to the pilot plant (91% of the total).

Table 2. Resource distribution in the project budget

| Project Components | Indicative | | Total |
|--|------------------|------------------|------------------|
| | GEF | Co- fin. | |
| 1 Technology transfer and implementation of 3 pilot plants | 1,050,000 | 4,150,000 | 5,200,000 |
| 2. Capacity building and development of tools for technology adaptation and transfer of generators and boilers for power generation and thermal energy applications. | 200,000 | 100,000 | 300,000 |
| 3. Strengthening of institutional framework for technology transfer | 150,000 | 85,000 | 235,000 |
| 4. Upscaling of biomass fueled technologies in Cambodia | 140,000 | 80,000 | 220,000 |
| 5. Policies, regulations, and mechanism to promote sustainable renewable energy generation. | 50,000 | 50,000 | 100,000 |
| 6. Project management | 100,000 | 100,000 | 200,000 |
| Total project costs as per PIF | 1,690,000 | 4,565,000 | 6,255,000 |

Total planned co-financing contribution was based on private sector (87.6%). This contribution was not materialized due the no implementation of planned pilot projects. The rest of the co-financing was provided completing a 104% of planned figure. It should be noticed that the NCPO-C and the Ministries over fulfill the committed figure. (Table 3).

Table 3. Co-financing contribution.

| Source of Co-financing | Classification | Type | Planned | | Reported | | % |
|--|---------------------|--------------|------------------|----------------|----------------|-------------|------------|
| | | | Project | % | Project | % | |
| UNIDO | Implementing Agency | In-kind | 100,000 | 2.19% | 100,000 | 17% | 100% |
| | | Cash | 200,000 | 4.38% | 200,000 | 34% | 100% |
| National Cleaner Production Office- Cambodia | Executing Partner | In-kind | 115,000 | 2.52% | 126,000 | 21% | 110% |
| Ministry of Industry Mines and Energy | National Government | In-kind | 150,000 | 3.29% | 164,000 | 28% | 109% |
| Others sources than private sector | | In-kind | 365,000 | 8.00% | 390,000 | 66% | 107% |
| | | Cash | 200,000 | 4.38% | 200,000 | 34% | 100% |
| | | Total | 565,000 | 12.38% | 590,000 | 100% | 104% |
| Private sector for RE-TT Pilot | | In-kind | 400,000 | 8.76% | 0 | 0% | 0% |
| | | Cash | 3,600,000 | 78.86% | 0 | 0% | 0% |
| | | Total | 4,000,000 | 87.62% | 0 | 0% | 0% |
| Total | | In-kind | 765,000 | 16.76% | 390,000 | 66% | 51% |
| | | Cash | 3,800,000 | 83.24% | 200,000 | 34% | 5% |
| | | Total | 4,565,000 | 100.00% | 590,000 | 100% | 13% |

The expected rate of project expenditures¹² is 58%, considering that co-financing of pilot plants will not take place till the end of 2018. In case that resources assigned to pilot plants are to be used, the rate of project expenditure will increase to 93% (Table 4).

It should be noticed that in the case of outcomes 2 and 4, expected expenses at the end of the project will represent between 95 and 119% of the planned budget. Such expenses, however, are not supported by the achieved outcomes or benefits. Therefore, the project’s efficiency is low.

Table 4. Balance of project expenditure 2017, 2018

| | GEF Approved Financing (US\$) | GEF Funds expenditure (US\$) | | Implementation rate | |
|-----------|-------------------------------|------------------------------|---------|---------------------|------|
| | | 2017 | 2018 | 2017 | 2018 |
| Total | 1,690,000 | 864,130 | 712,830 | 49% | 58% |
| Outcome 1 | 1,050,000 | 762,182 | 748,882 | 27% | 29% |
| Outcome 2 | 200,000 | 19,548 | 9,048 | 90% | 95% |
| Outcome 3 | 150,000 | 29,200 | -5,800 | 81% | 104% |
| Outcome 4 | 140,000 | -9,410 | -26,910 | 107% | 119% |
| Outcome 5 | 50,000 | 45,007 | 25,007 | 10% | 50% |
| PMU | 100,000 | 17,603 | -37,397 | 82% | 137% |

¹² Work plan 2017 - 2018

Likelihood of the sustainability of project outcomes:

None of the planned outcomes were fully achieved.

The project did not produce any outcome or benefit so no consideration of their continuation after the project ends is required.

Some of the outputs obtained by the project could produce some benefits in the short term backing possible efforts of the government for moving on developing the energy use of biomass. It is the case, for example, of the cadre of specialists that participated in the training workshops or the list of recommendations for improving the policy framework in the country.

Project coordination and management:

Project coordination arrangements, according to the Prodoc, are described below:

The Project was designed to be directly executed by UNIDO in collaboration with the Climate Change Department (CCD) of the Ministry of Environment (MoE), the Department of Energy Techniques of the Ministry of Industry, Mines & Energy (MIME), and the National Cleaner Production Office-Cambodia (NCPO-C), an autonomous institution hosted by MIME.

UNIDO, as the project implementing agency, had the full responsibility of implementing the project, delivering the planned outputs and achieving the expected outcomes.

The Department of Energy Techniques under MIME will have the overall responsibility, while the NCPO-C will be responsible for the substantive work to be performed under all the project components.

The NPCO-C established a project management unit (PMU) for taking care of the substantive work of the project. In close collaboration with MIME, the PMU coordinated all project activities being carried out by project national experts and partners.

The PMU staff is made up by the National Project Coordinator (NPC), a Deputy Project Coordinator, an Interpreter/Translator and the Project Administrative Assistant (PAA), besides the Chief Technical Advisor (CTA).

During project implementation there were some deviations from the planned coordination arrangements and some issues affected project management.

The management staff of the project (UNIDO project manager and the PMU staff) underwent systematic changes.

During the implementation period the project had three different project managers.

Some positions within the PMU staff experienced changes during the project implementation period.

During the 2013-2016 period, only the CTA and the Project administrative staff members remained unchanged through the whole period, while the positions of National and Deputy Project Coordinator were both only filled in 2013 and 2016 respectively.

During 2017 and 2018 the only PMU staff member was the Deputy Project Coordinator and a project driver. In addition, a national policy expert had been recruited in 2018 to conduct the policy gap analysis and develop recommendations.

This lack of personnel affected the management capacity of the PMU and contributed to burden the role of the CTA. In many cases, the CTA performed the role of project coordinator affecting the efficiency of the PMU.

The foregoing could have also contributed to a delayed implementation of activities under some project components due to lack of personnel in the PMU.

Project management has been a challenging process. Some of the following situations are an example:

- Changes in the baseline assumptions (reduction of electricity prices and non-approval of the PPA for selling surplus electricity) that affected the economic profitability of the initially agreed pilot projects and made private companies pull out from the project.
- Changes in the structure of the MIH, leading to the integration of the NCPO-C under NPCC, forced to change the host of the PMU from NCPO to UNIDO country office and establish a new PSC.
- The need to find new company candidates for installing the pilot projects under new conditions and in a short period of time. The project management addressed this situation by introducing relevant changes in the scope of the pilot projects: accepting heat and power cogeneration projects, taking into consideration new industrial sectors, and accepting other technology solutions besides the power steam cycle.

Although in some occasions project management took too long to make decisions and not always these were the best for the specific situation, an acceptable adaptive management approach was evinced.

The weaknesses of project management were:

- Lack of collaboration with leading governmental agencies.
The best example is the case of the former Department of Energy Techniques under MIME and the Climate Change Department of the Ministry of Environment. The project management did not involve them in project implementation activities despite clear indications in the Prodoc about the leading role of these governmental departments, thus missing the opportunity to receive effective and well-informed support and advice.
- There was very limited collaboration and interaction for complementarities and synergies with other UNIDO and donors projects implemented in Cambodia.¹³

The following weaknesses were still evidenced when the PMU was transferred from the NCPO to the UNIDO Office in Cambodia in 2016.

- Suboptimal communication and collaboration between NCPO-C (that hosted the PMU) and UNIDO office in Cambodia.

¹³ MTR, August 2015

- Absence of teamwork between PMU and the CTA.
- Inability to keep documental evidence of activities reported in the PIRs.
Examples of lacking evidence are:
 - PIR 2013: “Draft policy on renewables finalized with Power Purchase Agreement (PPA) and Feed-In Tariff (FIT).”
 - PIR 2014: “Comprehensive gap analysis was done on the potential of biomass-based power generation, techno-economic viability and need of policy instrument to encourage implementation.”
 - PIR 2015: “Over 20 technology transfer support experts were trained, including financial analysis with COMFAR license”.

The role of the PSC for supporting management has been, in general, positive. The composition of the project steering committee provides it with a very high decision making level.

Relevant governmental institutions, academic representatives, and private companies are represented in the PSC. Members of the PSC include Secretary of State, General Directors and Ministry Directors. The Chairman is the Secretary of State of the MIH and the Vice-Chairman is the Director General of General Department of Industry, MIH and the National GEF Focal Point.

PSC meetings were held in 2014, 2015 and 2016, but not in 2017. The PSC has been very supportive in the analysis of PMU project reports and the approvals requested by the project management. However, taking into consideration its composition, a more proactive attitude and a more effective performance in supporting the PMU regarding project implementation challenges would have been expected from this Committee.

After the PSC meeting in Dec 2016, the Technical Working Group (TWG) has been established and several meetings were conducted to update the project progress and seek advice/support for project implementation. Members of the TWG consisted of PSC members and UNIDO.

Assessment of monitoring and evaluation system:

The monitoring and evaluation system has been designed in accordance with established UNIDO and GEF guidelines and procedures. The Project Implementation Reports (PIRs), the Mid-term Review (MTR) and a Terminal Evaluation are the core of the system.

All the PIRs have been issued during the project implementation period. They have been prepared according to the guidelines.

The MTR was delivered as planned. This report included recommendations to improve the project implementation process.

The effectiveness of the above-mentioned monitoring tools has been seriously diminished by the inadequacies of the project result framework.

A detailed monitoring plan for tracking and reporting project time-bound milestones and accomplishments was not laid out.

The budget for the M&E plan was included in the general project budget, but only considered the final evaluation. Later on, the budget for the MTE was allocated during

project implementation.

Assessment of processes affecting the achievement of project results

Preparation and readiness of the project were acceptable.

Relevant government stakeholders participated in the preparation of the project and were aware of project activities and expected outputs. However, the specific role and responsibilities of every project partner were not discussed nor assigned.

Private companies were engaged to participate in pilot projects. However, there was no in-depth assessment of technological needs. The number of annual operation hours of production facilities, a critical input for economic analysis, was overestimated.

The staff and housing conditions for the PMU were ready at project entry in NCPO.

The UNIDO country Office has been more actively involved in the project during the last two years, considering that it hosted the PMU. Nonetheless, a more proactive approach could have helped to improve communication with the Ministry of Mines and Energy and develop a more participative relationship.

A serious implementation issue was the decision to initiate some output activities only after achieving certain progress in implementing the pilot projects. The delay in carrying out capacity building actions prevented the formulation of a comprehensive training program for the relevant actors in the technology transfer process for biomass-based energy technologies, as well as the creation of a cadre of trained specialists for promoting biomass-based energy projects. Likewise, it prevented training benefits and raising awareness actions from contributing to project progress.

The same thing happens with output activities of the outcome related to policy framework, which were planned for the final stage of the project. Making progress in this component required a time-consuming program of activities with relevant institutions. Therefore, this program should have been initiated at the beginning of project implementation.

This program should have been aimed at raising awareness and understanding of the problems faced by this kind of technology transfer process and creating a common vision among participant institutions on the need to improve the legal and regulatory frameworks. Had this been the case, the chances for making a comprehensive policy framework gap analysis and increasing the readiness of policymakers to accept and implement project recommendations would have been much higher.

C. Gender mainstreaming

Because this project is under GEF-4 replenishment, the gender issue was not contemplated in the project design.

However, project management encouraged participants in project activities to bridge the gender gap.

D. Evaluation rating

Rating of the project performance is delivered as required by GEF and UNIDO Evaluation Policies and Guidelines for conducting Evaluations. A summary of the project rating based on the findings of the evaluation is displayed in the following table.

| # | Evaluation criteria | Summary comments | Rating |
|---|----------------------------|---|---------------------------|
| A | Progress to impact | No outcome was achieved | Unsatisfactory |
| B | Project design | This project design has serious failures both in the overall design as well as in the project result framework. | Moderately unsatisfactory |
| 1 | Overall design | One of the reasons for the poor performance of this project is its weak design. The formulation of outcomes and outputs is not satisfactory and some outcomes were designed in such a way that they cannot be achieved within the scope of the project implementation. Additionally, the planned schedule conditioned the startup of some project components to the completion of outputs related to pilot projects, thus reducing the achievement opportunities of other outcomes. | Moderately unsatisfactory |
| 2 | Log frame | The project result framework was ineffective. Its assessment showed that most of result indicators were not SMART and most target indicators were unappropriated. Subsequently, it was not useful for guiding project monitoring. In addition, some outputs could not be evaluated due to their confusing formulation. | Moderately unsatisfactory |
| C | Project performance | The project performance is deficient. Beside the acceptable relevance of the project, the rest of performance indicators are rated too low. | Unsatisfactory |
| 1 | Relevance | The project objective is in line with government policies on national development and for the promotion of renewable energy sources in the country. In addition, it contributes to improving the competitiveness of the national industry, particularly agribusiness, and helps achieve climate change-related national commitments. Nonetheless, ownership of some relevant project stakeholders was limited. | Satisfactory |
| 2 | Effectiveness | No outcome was achieved, only some outputs were completed. | Unsatisfactory |
| 3 | Efficiency | GEF funds expenses of outcomes number 2, 3 and 4 are expected to range between 95% and 119% of the planned budget. Such expenses, however, are not supported by achieved outcomes or benefits. | Moderately unsatisfactory |
| 4 | Sustainability of benefits | No benefits were obtained | N/A |

| # | Evaluation criteria | Summary comments | Rating |
|---|---|--|---------------------------|
| D | Cross-cutting performance criteria | | |
| 1 | Gender mainstreaming | Despite the fact that gender was not considered in the project design, the project management encouraged reduction of the gender gap among participants in project activities. | Satisfactory |
| 2 | M&E | All monitoring activities were executed and the corresponding report produced and used for evaluation proposals by UNIDO, the PMU, and the PSC. Its effectiveness, however, was low due to serious problems in the design of the project result framework. The budget was allocated only for the TE. | Moderately unsatisfactory |
| 3 | Results-based management (RBM) | The PMU's capacity to fulfill its assignment was constrained because it was understaffed throughout the whole project period. In addition, none of the project partners were assigned any specific responsibility by the PMU. In addition, its leading role in the project implementation process was very limited during the first half of the project time scope when it was under the National Clean Production Center. Monitoring and evaluation effectiveness was limited by the weakness of the PRF and the lack of a specific monitoring and evaluation plan. | Moderately satisfactory |
| E | Performance of partners | While UNIDO and the organization that hosted the PMU fulfilled their responsibilities, the other partners did not receive any specific tasks. | Moderately satisfactory |
| 1 | UNIDO | Project implementing agency and host of the PMU at the end of the project. | Satisfactory |
| 2 | NPCO | Project executing agency and host of the PMU at the beginning of the project. | Satisfactory |
| | Climate Change Department of MoE. | This partner role was described in the Prodoc as one of the project collaborators with UNIDO as implementing agency. No responsibilities were assigned. | N/A |
| | Department of Energy Technique (MIME) /New an Alternative Energy (MoME) | As per the Prodoc, the DET/DNAE should have the overall responsibility of the project, but this role was never assigned | N/A |
| 3 | Donor | The main donor of this project is the Global Environmental Facility, that fulfilled its role according to the rules. | Satisfactory |

| # | Evaluation criteria | Summary comments | Rating |
|---|---------------------|---|----------------|
| F | Overall assessment | The project design was weak, and outcomes were not achieved | Unsatisfactory |

IV. Conclusions, Recommendations and Lessons learned

Conclusions

The goal of this project is to demonstrate the viability of using biomass for energy purposes in small and medium-sized industrial facilities, particularly on agro-industrial facilities. This goal is in line with national priorities for energy development.

The approach to achieve this proposal was to support a technology transfer process between technology suppliers and end-user companies in order to establish commercial pilot plants.

This became a very complex task, since the regulatory framework for supporting this kind of independent power producers is inappropriate, the financial system is weak, and local technical resources are very limited. Besides, the small scale of the power facility makes the design of a technological and economic feasible solution very difficult.

The above-mentioned circumstances, a project design with many insufficiencies, and some project management failures –despite the efforts of the project management unit-- lead to an unsatisfactory performance of the project.

Recommendations

To GEF:

- Request the STAP to avoid, when providing project reviews, recommending for CEO endorsement projects with evident failures in their design.
- Establish that TT project designs should always be based on a previous specific Technology Need Assessment or include an outcome aimed at addressing the TNA, before selecting the technological solution to be transferred.

To UNIDO

- In case that some of the pending pilot projects would finally be implemented, to formulate an exit strategy for supporting companies with technical advice during the procurement, building and startup processes.
- Have a flexible approach when designing technological interventions for bioenergy projects, in order to select technological solutions on a case by case basis.
- Consider improving the technical and methodological review of project proposals during the process for approval.
- Establish a reporting mechanism providing information about actual co-financing expenditure on a regular basis.

- Avoid frequent change of project managers to ensure a more coherent and effective contribution to project implementation processes.

To the government of the Kingdom of Cambodia:

- Based on the experience of this project, provide a detailed assessment of the opportunities for the introduction of biomass energy technologies to replace conventional fuels used in industrial facilities. Consider the impact of this renewable energy solution for the national development goals (at least in the energy and agricultural sectors), as well as for fulfilling the climate change-related national commitments.
- Follow up the project recommendations for improving the legal and regulatory frameworks to foster the contribution of small and medium scale renewable energy solutions to the energy development goals of the country.

Lessons learned

- For designing technology transfer projects, the design of outputs related to commercial pilot plants is critical:
 - Objective and in-depth considerations about existing conditions for specific technology transfer actions should be provided.
 - Special attention should be paid to time and financial resources limitations, deciding what should be the scope of this sort of output.
- Outputs aimed at private sector involvement in technology transfer should be carefully formulated, considering real needs, expectations and business orientation.
- Designing outputs focused on improving policy framework should be limited to promoting change, but not to affect actual change of regulations during the project implementation period.
- Training and awareness raising activities implementation should receive maximum attention due their importance for developing an enabling environment for the specific technology transfer process.

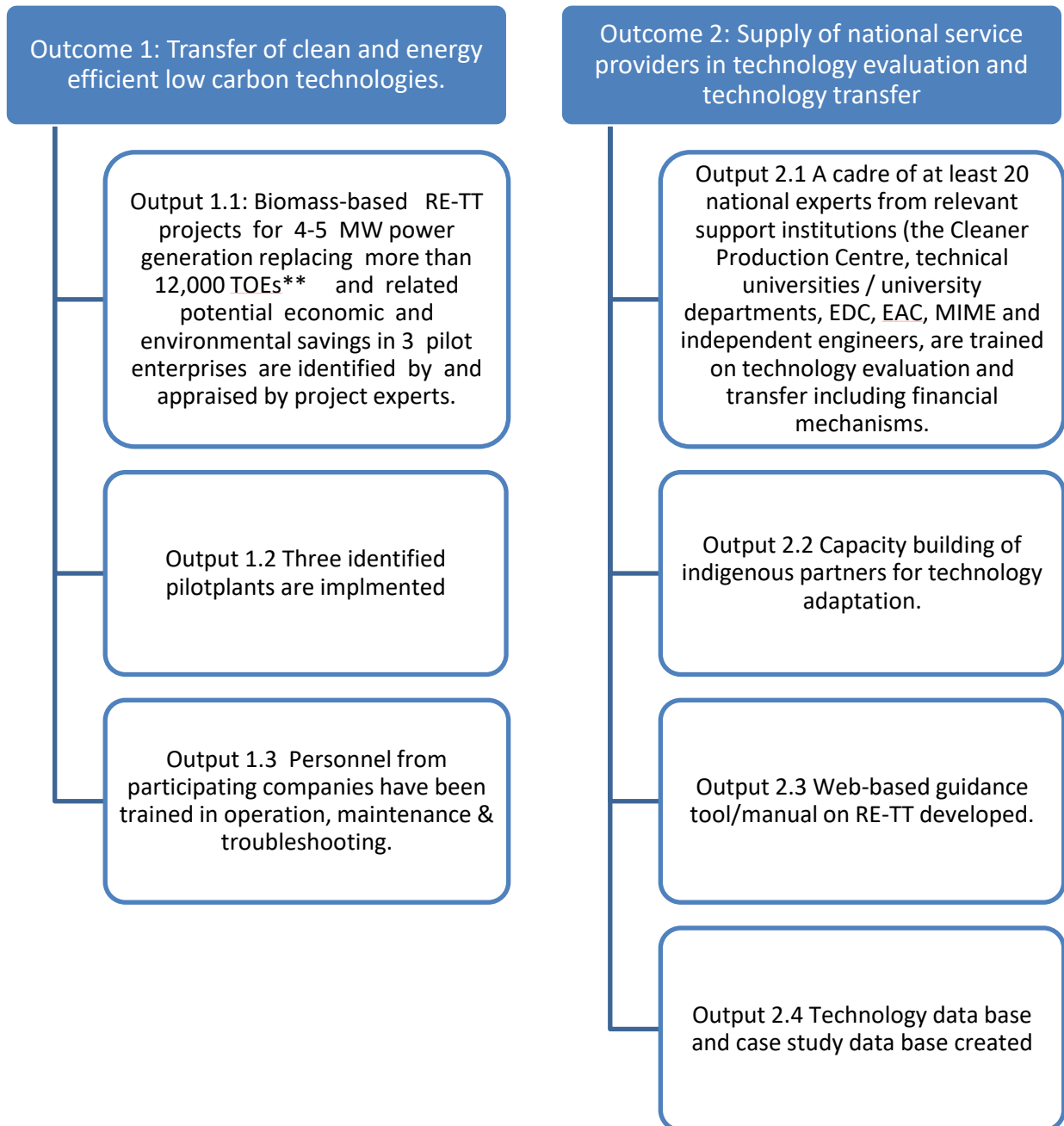
ANNEXES

Annex I. Schedule of field mission and list of persons met

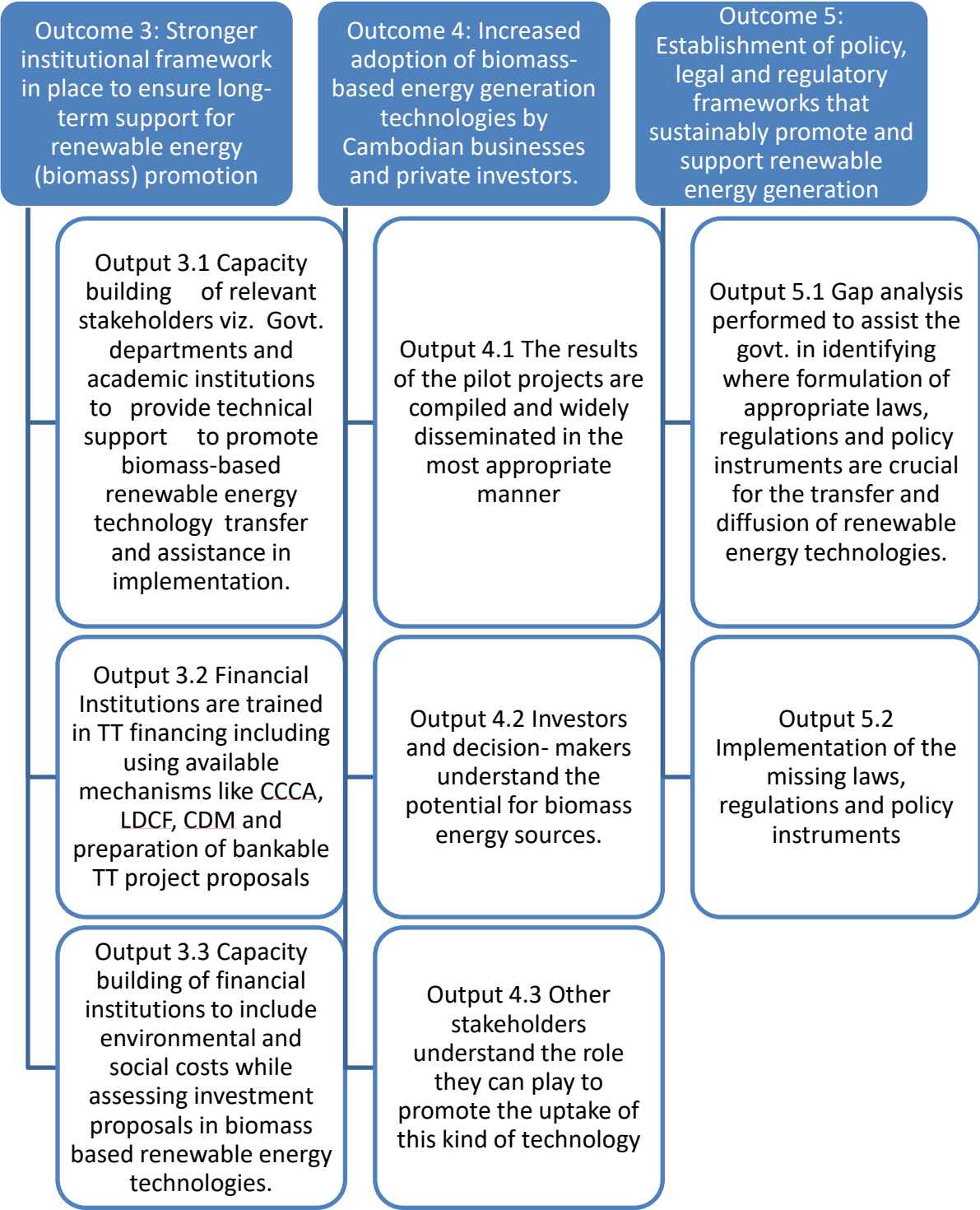
| Date | Time | Activities | Key Persons | Location |
|--|-----------------|--|---|--|
| Monday, September 10 th , 2018 | 9 am - 11 am | Meeting with UNIDO-Cambodia | 1) Sok Narin, UNIDO Country Representative Phone: 012 757 327 2) Mr. Suon Panha; Phone: 077 791 143 3) Mr. Hou Sereyvathana; Phone: 012 634 238 | UNIDO-Cambodia Office in Phnom Penh Center, Phnom Penh, Cambodia |
| | 1:30 pm - 4 pm | Meeting with Amru Rice (beneficiary) | Mr. Song Saran, CEO and President of Amru Rice Phone: 012 303 016 | Amru Rice Office in Phnom Penh |
| Tuesday, September 11 th , 2018 | 10 am - 11 am | Meeting with Bayon (beneficiary) | Mr. Chan Vannak, Managing Director Phone: 012 583 483 | Bayon Office in Phnom Penh |
| | 6 pm - 7 pm | Meeting with Green Move Consulting (firm) | Mr. Nun Sophanna, Managing Director Phone: 017 309 77 Skype meeting because he had a mission to Battambang | Green Move Consulting (in Phnom Penh) |
| Wednesday, September 12 th , 2018 | 9 am - 10:30 am | Meeting with GEF focal point-Cambodia, MoE | 1). Mr. Long Rithi Reak Phone: 012 927 001 | MoE, 1 st floor, left side, deputy director |
| | 2 pm - 3:30 pm | Meeting with General Department of Industry, Ministry of Industry and Handicraft (MIH) | 1) H.E Soem Nara, Director General of Department of Industry 2) Mr. Him Phanith (MIH) Email: phanith.npcc@gmail.com ; Phone: 077 369 007 3) Ms. Soeu Sophea (MIH) Email: soeusophea@gmail.com | MIH, Phnom Penh |
| Thursday, September 13 th , 2018 | 9 am - 11 am | Meeting with Institute of Technology of Cambodia (ITC) | Mr. Eth Oudaya Email: ou.day@ymail.com Phone: 015310 851 | ITC in Phnom Penh |
| | 2 pm - 4 pm | Meeting with MME | Mr. Toch Sovanna, Director, Department of New and Renewable Energy Phone: 017 856 927 | #13-14, Russian Federation Blvd (Near the airport) |
| Friday, September 14 th , 2018 | 9 am - 11 am | Present preliminary report finding and comment, wrap up meeting with UNIDO-Cambodia team | UNIDO-Cambodia Team | UNIDO-Cambodia Office in Phnom Penh Center, Phnom Penh, Cambodia |

Annex II: Project Result Framework

Annex IIa: Project Outcomes/Outputs.



Annex IIb: Project Results



Annex IIc: Project Result Indicators

| | Indicator | Baseline | Target |
|-------------------------------------|---|---|---|
| The objective of the Project | <ol style="list-style-type: none"> 1. Incremental direct CO₂eq emission reduction (tons of CO₂eq) 2. Incremental indirect CO₂eq emission reduction (tons of CO₂eq) 3. Transfer of techno-economically viable RE technologies leading to a reduction of fossil fuel consumption for energy generation | <ol style="list-style-type: none"> 1. No direct CO₂eq emission reduction 2. No indirect CO₂eq emission reduction 3. Technology transfer mechanism does not exist. | <ol style="list-style-type: none"> 1. Direct emission reduction: 295,095 to 393,460 tons CO₂eq over a ten year period(2013-2023) 2. Indirect emission reduction: 289,091 to 381,028 tons CO₂eq over a ten year period (2016-2026) 3. A 5% annual reduction in fuel used for energy generation over a ten year period (2013-2023) |
| Outcome 1 | <ol style="list-style-type: none"> 1. 3 Pilot projects for RE-TT demonstration are selected with co-financing commitments 2. Anticipated savings in GHG emissions are estimated 3. Personnel from the participating companies have been trained in operation, maintenance, and troubleshooting. | <ol style="list-style-type: none"> 1. A limited number of RE investment projects are in place. Technology transfer mechanism for efficient biomass-based generation is yet to be proven 2. Co-generation for efficient conversion of energy is still not practiced, and technologies are not applied. | <ol style="list-style-type: none"> 1. Learning to utilize and replicate a given technology, including the capacity to choose it, adapt it to local conditions and integrate it with indigenous technologies. Develop and standardize energy audit reporting format, worksheets, and tools to be used by RE-TT projects 2. Technology performance benchmark and potential of GHG emissions reduction. 3. Compendium of case studies from Pilot projects |
| Output 1.1 | <ol style="list-style-type: none"> 1. 3 RE-TT projects are implemented with direct support from the GEF project 2. GHG savings T CO₂eq achieved annually as well as over the project lifetime | All companies selected for RE-TT have their biomass and potential captive consumption but not the resources (human and/or financial) to develop and implement such projects. | <ol style="list-style-type: none"> 1. 3 technology transfer projects implemented with direct support from the GEF project 2. Cumulative 12,000 TOEs of fossil fuel (DO) replaced annually and more than 120,000 TOE's over the life period of the technology. |
| Output 1.2 | Compendium of case studies/success stories are published in English and local language | No such information/document is available in Cambodia on RE-TT neither for manufacturing nor for energy supply private sector entities. | Compendium is compiled and printed by the end of the third year, when most of the RE-TT projects are either implemented or under implementation. |

| | Indicator | Baseline | Target |
|-------------------|--|--|---|
| Output 1.3 | <p>1. Develop training modules for technicians and entrepreneurs on:</p> <ul style="list-style-type: none"> - Technology operation - Maintenance, including technology preventive maintenance - Technology troubleshooting for effective implementation. | So far, no training on technology transfer for biomass-based energy generation has been conducted for beneficiaries in the country. | Participants from participating units with technology suppliers are identified and training is done both in class room and on the job during commissioning and operation of the projects |
| Outcome 2 | <p>1. A cadre of at least 20 national experts from relevant TT support institutions (the Cleaner Production Centre, technical universities/university departments, EDC, EAC, MIME, and independent engineers, are trained on technology evaluation and transfer including financial mechanisms</p> <p>2. Capacity building of indigenous partners for technology adaptation</p> <p>3. Web-based guidance tool/manual on technology transfer, such as EnTA/Comfar, developed</p> <p>4. Technology database and case study data base created</p> | <p>1. No specific national experts are trained in technology evaluation and transfer including financial mechanisms</p> <p>2. Limited or no RE-TT service is provided by equipment/technology suppliers.</p> <p>3. No ICT-based tool is available on RE-TT in the country</p> | <p>1. 20 national renewable energy generation experts capable of delivering quality services are available.</p> <p>2. National RE-TT network is established.</p> <p>3. Local supplier of technology is capable of providing RE-TT services to their clients as well as after sale service.</p> |
| Output 2.1 | <p>1. Number of renewable energy experts in the Cambodian market</p> <p>2. Number of technology transfer support experts in the Cambodian market</p> <p>3. Number of RE-TT related seminars and training delivered</p> | <p>1. No high-efficiency biomass energy generation experts in the Cambodian market</p> <p>2. No technology transfer support system experts in the Cambodian market. Only few engineering companies and NGO's provide partial services</p> <p>3. RE-TT seminars and training is mostly delivered by international experts</p> | <p>1. 20 biomass-based technology assessment and selection; identifying technology options, their strengths and weaknesses, and to do a techno – economic – social - environmental assessment of the options to identify the most suitable one.</p> <p>2. 10 seminars and 12 training modules for enterprise managers and engineers delivered by national experts trained by the GEF-UNIDO, IEE, RE-TT projects</p> |

| | Indicator | Baseline | Target |
|-------------------|---|---|--|
| Output 2.2 | Network of indigenous partners for technology adaptation is established. Network is meeting regularly to exchange/share biomass-based technologies operating in Cambodia | No such network exists in Cambodia and client has no access to RE-TT experts. | A registry of local partners/experts is available with MIME and NCPO. A formal network of technology transfer partners & experts is in place. |
| Output 2.3 | Dedicated web portal for technology transfer is in place and populated with training material, information and links with relevant web sites. | No such ICT-technology transfer-based instrument exists in Cambodia. There is no information on renewable energy experts/technology suppliers/ local partners. | GEF-RE-TT project web portal with relevant information is continuously updated and linked to relevant websites. Technology transfer dynamic mechanism manual relevant to Cambodian industries is available. |
| Output 2.4 | | | |
| Outcome-3 | <ol style="list-style-type: none"> List of institutional participants trained to promote technology transfer for renewable energy generation. Number of experts trained in preparing RE-TT bankable proposals. Number of financial institutions participated in financial engineering training. Guide for the implementation of biomass-based RE projects is developed. | <ol style="list-style-type: none"> No institutional framework to promote high efficiency RE at implementation level. Access to finance is a problem due to lack of knowledge in preparing bankable proposals Financial institutions evaluate the project on a conventional basis rather than including all the factors, such as environment, safety and liability, etc. There is no manual on technology transfer nor biomass-based renewable energy. | <ol style="list-style-type: none"> At least 100 participants from Govt. and regulatory agencies are trained in technology transfer and RE applications. 60 personnel from Industry are trained in financial engineering (bankable proposals) Guidelines on biomass-based energy generation, operation and maintenance of boiler, turbine and auxiliaries is available. At least 5 companies get access to finance through GEF project. |
| Output 3.1 | <ol style="list-style-type: none"> Number of intensive training programs conducted Number of Government and institutional staff trained in biomass-based energy project implementation support. | No such capacity building program exists in Cambodia. However, seminars/workshops on rural electrification, renewable energy (mainly solar) are conducted by foreign experts | <ol style="list-style-type: none"> 10 intensive capacity building programs are conducted during the project period. 100 participants trained to promote industrial energy efficiency |

| | Indicator | Baseline | Target |
|-------------------|--|---|---|
| Output 3.2 | <p>1. Number of training programs on financial engineering for technology transfer of biomass energy generation conducted.</p> <p>2. Number of experts from FI's trained in preparing RE bankable proposals.</p> | No such facility on comprehensive financial engineering on technology assessment, including environmental impacts, exists in Cambodia | <p>1. Two training programs conducted in year 1 and one in each subsequent year.</p> <p>2. At least 60 personnel from financial institutions and Government Departments are trained in preparing bankable proposal.</p> <p>3. At least 10 proposals for RE technology financing are prepared and considered for financing.</p> <p>4. Technology support instruments (e.g., financing subsidies, risk guarantee facilities, banker training and transaction support services) that are helping financiers share risks, buy down transaction costs etc.</p> |
| Output 3.3 | <p>1. Number of training programs conducted for FII's in Cambodia</p> <p>2. Number of experts trained in comprehensive technology evaluation to facilitate financing.</p> | No such training on total costs, including environmental and social liability, in technology assessment for FII's is available in Cambodia | <p>1. Four training programs conducted during project period.</p> <p>2. At least 20 personnel from development banks and FII's are trained in assessing Re-TT project for financing.</p> <p>3. 10 proposals for RE financing are received and considered for financing.</p> <p>4. Build capacity and address other barriers that make financing energy investment portfolios a challenge.</p> |
| Outcome-4 | <p>1. Tools available for supporting technology transfer for biomass- based energy generation in industry</p> <p>2. Demand for assistance in RE-TT is created. At least 5 requests are received annually.</p> | <p>1. No such tools are and will most likely not be available during and immediately after the GEF-UNIDO project implementation period.</p> <p>2. Due to the perception of high cost and financial unavailability, there is no demand for RE-TT projects.</p> | <p>1. Dynamic and user-friendly methodology for technology transfer and biomass-based renewable energy is produced in English and Khmer languages.</p> <p>2. Adapt the technology to local conditions and integrate it, as far as possible, with indigenous technologies.</p> <p>3. Identify and fulfill the contractual relationship between the different stakeholders, namely, the technology supplier, technology recipient, financier, and the government, giving due recognition to intellectual property rights and patent national and international rules and regulations.</p> |

| | Indicator | Baseline | Target |
|-------------------|--|---|---|
| Output 4.1 | <ol style="list-style-type: none"> 1. Number of technology transfer assistance experts in the Cambodian market 2. Number of biomass-based energy experts in the Cambodian market 3. Number of TT-RE seminars and trainings delivered | <ol style="list-style-type: none"> 1. There are no such experts in the Cambodian market 2. There are no high efficiency biomass-based energy generation experts in the Cambodian market except for a few engineering companies and NGOs providing services in biomass gasification 3. RE-TT seminars/workshop and training depend mostly on international experts. | <ol style="list-style-type: none"> 1. 20 renewable energy generation experts trained 2. Use and replicate appropriate technologies, including the capacity to choose it. 2. 10-20 experts on technology transfer support have been trained 3. 10 seminars and 10 training activities for enterprise managers and engineers delivered by national experts trained by the GEF-UNIDO project |
| Output 4.2 | <ol style="list-style-type: none"> 1. Number of CEOs/owners attended RE-TT clinics. 2. Number of companies participating in the RE-TT project seminars/workshops. 3. Number of personnel from potential companies participating in project training activities. | <ol style="list-style-type: none"> 1. So far, there are no tools for marketing renewable energy generation like the RE-TT clinics. 2. Limited training on TT/Boiler operation & safety, turbine, CHP is planned. Starting in 2011, the National Cleaner Production Office of Cambodia delivered training on IEE. | <ol style="list-style-type: none"> 1. 100 CEOs attend the 10 RE-TT Clinics, which are organized sector-wise and per geographic areas having biomass. 2. 100 companies participating in seminars and workshops held under the project. 3. Establish mutually beneficial or reciprocal exchanges on technology transfer and technology support. |
| Output 4.3 | <ol style="list-style-type: none"> 1. Number of technology and equipment suppliers participating in seminars/training held under the project. 2. Number of contracts received by suppliers through GEF projects. | <p>NO training/capacity building on RE-TT for technology and equipment suppliers. Suppliers hardly get contracts for renewable energy generation in Cambodia</p> | <ol style="list-style-type: none"> 1. 50 suppliers/vendors participating in seminars and workshops held under the project. 2. Build partnerships with external experts, or actively support established RE-TT networks. 3. 10 RE-TT implementation contracts are bagged by suppliers trained under the project. |
| Outcome-5 | <ol style="list-style-type: none"> 1. Policy to promote technology transfer of renewable fuel-based technologies developed and recommended to MIME. 2. Adoption of regulatory measures to support RE implementation and market transformation. | <ol style="list-style-type: none"> 1. No specific policy program on biomass-based energy generation is in place. 2. No specific regulation to support technology transfer of biomass-based energy for captive consumption is in place. | <ol style="list-style-type: none"> 1. At least 2 national renewable energy policy programs operate and develop smoothly. 2. Technology transfer support system including financial availability, IPR on technologies are developed 3. Technology support instruments to help users per RE policy, regulation and law. |

| | Indicator | Baseline | Target |
|-------------------|---|--|--|
| Output 5.1 | <p>1. Increased role for TT-related energy and environmental policies at national levels</p> <p>2. Biomass-based energy generation opportunities are recognized and used for fulfilling UNFCCC commitments.</p> | <p>1. No such policy to promote and encourage the implementation of RE-TT by Cambodian manufacturing and service sectors exists.</p> <p>2. The role of increased share of renewable energy generation in climate change mitigation is not well understood by the Cambodian industry.</p> | <p>1. Policy document on renewable energy as a clean and alternative energy is prepared for the RGOC action.</p> <p>2. Tools and instruments to calculate GHG reduction as a result of RE technology projects are in place.</p> |
| Output 5.2 | <p>1. Increased role of RE-TT projects in energy related policies/regulations of RGOC.</p> <p>2. Structures, tools and methodologies to monitor, track and benchmark technology performance</p> | <p>So far biomass-based energy generation for captive consumption has no significant role in Cambodia's energy policy.</p> <p>No such structures, tools and methodologies are in place.</p> | <p>1. Reporting/recording structure is in place.</p> <p>2. Simple user-friendly reporting templates are developed and tested.</p> <p>3. Website is created and continuously updated with success/failure cases.</p> <p>4. A tool for benchmarking biomass-based energy technology performance is developed and tested.</p> |



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

DRAFT

TERMS OF REFERENCE

Independent terminal evaluation

**Climate change related technology transfer for Cambodia: using
agricultural residue biomass for sustainable energy solutions**

UNIDO Project No.: GF/CMB/12/002

UNIDO Project ID: 100223

GEF ID: 4042

JULY 2018

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I. Project background and overview

1. Project factsheet

| | |
|--|--|
| Project title | Climate change related technology transfer for Cambodia: using agricultural residue biomass for sustainable energy solutions |
| UNIDO project No. and/or ID | Project No: GF/CMB/12/002 Project ID: 100223 |
| GEF project ID | 4042 |
| Region | Asia and the Pacific |
| Country | Cambodia |
| Planned implementation start date | 25 May 2012 |
| Planned implementation end date | 25 May 2016 |
| Actual implementation start date | 01 August 2012 |
| Actual implementation end date | 31 December 2018 |
| GEF Focal Areas and Operational Project | Climate Change, CC-SP4 Strategic Program |
| Implementing agency | UNIDO |
| Executing partner(s)/entity(ies) | National Cleaner Production Office Cambodia (hosted by MIH) |
| Donor: | GEF |
| Total project allotment | USD 6,335,000 |
| Total co-financing at design (in cash and in-kind) | USD 4,565,000 |
| Mid-term review date | June 2015 |

(Source: Project document)¹⁴

2. Project context

At the time the project was conceived, between 2011 and 2012, the Cambodian economy was growing quickly, mainly due to: (i) the rebound in exports of garments; (ii) growing trend demand for agricultural and food products, leading to higher volumes of export; (iii) increase in tourism and (iv) Government's policy focusing on diversification and modernization of economy through the development of the industrial sector.

In this scenario, energy plays a key role to ensure efficiency and sustainability of production, supply and proper maintenance of the power infrastructure across the whole country. The need of making electricity available at an affordable price as well as attracting private sector investment and their active participation in expanding the power infrastructure were only some of the Government's priorities in order to meet the growing demand for electricity.

¹⁴ Project information data throughout these TOR are to be verified during the inception phase.

Not very endowed in terms of natural resources and reliable electricity supplies, Cambodia used to import heavy fuel oil and diesel oil to satisfy energy demands of the industrial sector. As such, most industrial enterprises meet their energy demands through fossil fuel based captive power generation. This exposes their businesses to uncertain production costs exacerbated by fluctuating global fossil fuel prices.

Within this framework, the UNIDO project *Climate change related technology transfer for Cambodia: Using agricultural residue biomass for sustainable energy solutions* proposes an alternative by generating power from agricultural residues such as rice husk.

The overall objective of this technology transfer project is to obtain sustained transfer of cost effective, efficient and biomass energy throughout a technology derived from agricultural waste (to replace fossil fuels for powered generators and boilers) for power generation and thermal energy applications.

Started in May 2012, the project is foreseen to be operationally closed by the end of 2018.

An independent Midterm Review (MTR) was carried out May – August 2015, and included a field mission to Phnom Penh, Cambodia, carried out from June 9 – 24 2015.

3. Project objective

The key objective of the project is to support the sustained transfer of cost effective, efficient and biomass energy technology systems derived from agricultural waste for power generation and thermal energy applications.

To achieve the ultimate goal, and in addition to project management, the 5 following **technical project components** have been developed to achieve the project objectives:

Project Component 1: Technology transfer and implementation of 3 pilot plants based on biomass-based energy generation

Principally the Technology Transfer (TT) projects will be demonstrated in the industrial sector having own biomass and aim to demonstrate financial and environmental benefits of renewable energy including reduction in GHG emissions.

Project Component 2: Capacity building and development of tools for Technology adaptation and transfer

Project will ensure supply of national service providers (Private sector) in technology evaluation, technology transfer and also building technical capacity within pilot enterprises to sustain the implemented technology. Web based tool on technology transfer mechanism, technology evaluation and case studies will be developed. This component is aimed principally to build capacity for RE-TT in private sector specifically in direct beneficiaries.

Project Component 3: Strengthening of institutional framework for technology transfer

This component aims to strengthen institutional framework to ensure long term technical and financial support for promotion and development of renewable energy in Cambodia. Capacity building of relevant stakeholders including Government department and academic institutions responsible for promotion of renewable and alternative energy including technical support (policy level intervention will be addressed in component-5) and financial institutions to

provide capital for techno-economically viable projects based on financial engineering and decision-making tools on total feasibility analysis including financial and environmental analysis. Project will also use available mechanism like Cambodia Climate Change Alliance (CCCA), Clean Development Mechanism (CDM) etc. to assist in preparing bankable proposals

Project Component 4: Up- scaling of biomass fueled technologies in Cambodia

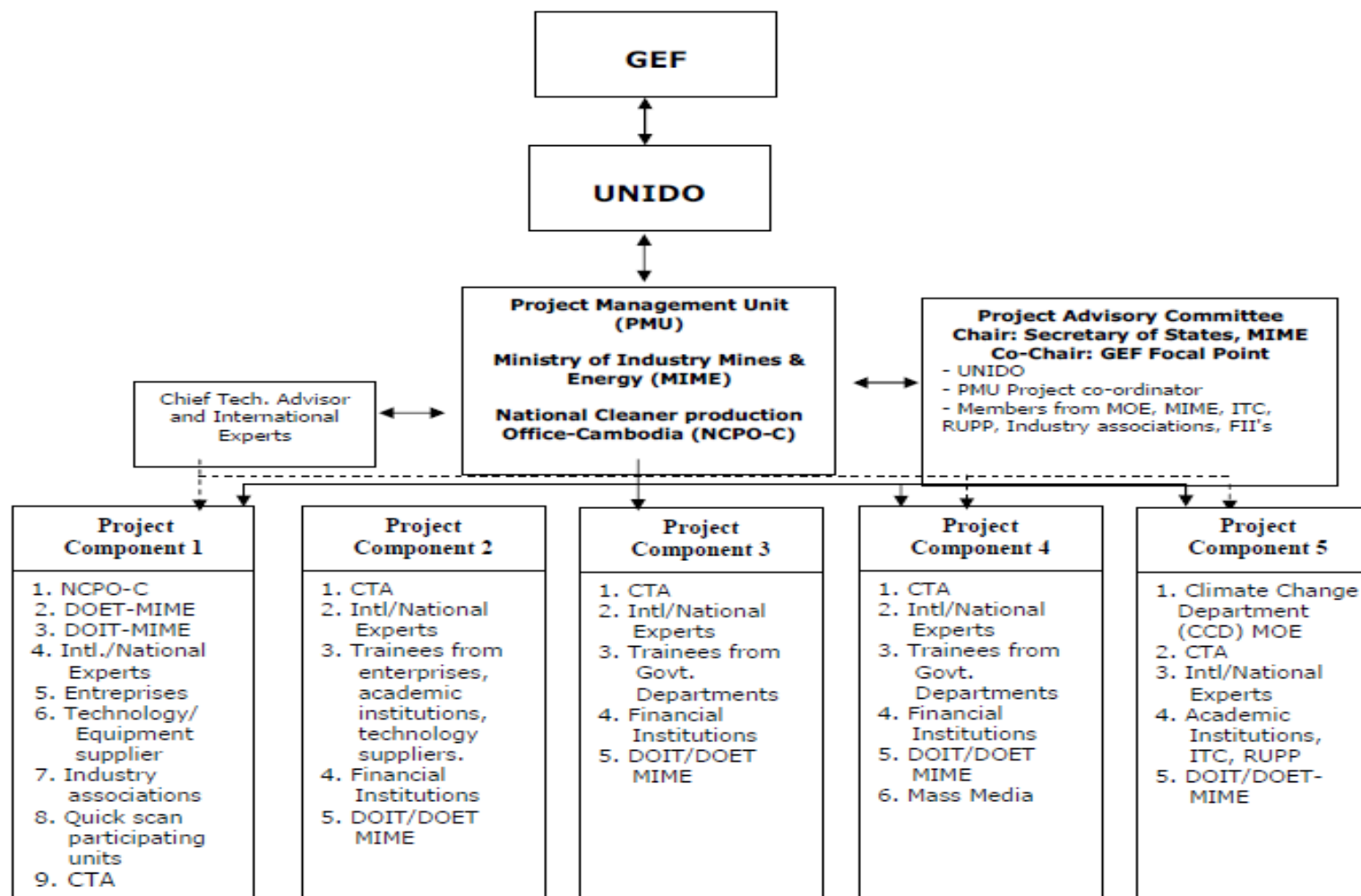
The project will assist in the creation of a national market for biomass technologies through compiling and disseminating the results of the pilot demonstrations in most effective manner.

Project Component 5: Policies, regulations and mechanism to promote sustainable renewable energy generation

Gap analysis performed to assist the Royal Government of Cambodia (RGC) in identifying where formulation of appropriate laws, regulations and policy instruments are crucial for the transfer and diffusion of renewable energy technologies as well as Implementation of the missing laws, regulations and policy instruments.

4. Project implementation arrangements

As GEF Implementing Agency, UNIDO holds the ultimate responsibility for the implementation of the project, the delivery of the planned outputs and the achievement of the expected outcomes. The project is directly executed by UNIDO in collaboration with the Climate Change Department (CCD) of the Ministry of Industry Mines & Energy (MIME) and the National Cleaner Production Office-Cambodia (NCPO-C), an autonomous institution hosted by MIME and supported by UNIDO RECP programme to promote resource efficiency and cleaner production in Cambodia. During project implementation the NCPO-C has become an office integrated under the National Productivity Center of Cambodia (NPCC) which is one of the departments of the General Department of Industry under the Ministry of Industry and Handicraft (MIH).



5. Main findings on project progress

Conducted from May to August 2015, the Mid-Term Review (MTR) covers the activities carried out within the project during the period August 2012 to May 2015. Herewith below the main findings by the Evaluation Team:

The Project suffered a setback in mid-2014 when three co-financing enterprises withdrew their commitments to invest in pilot biomass energy systems. These systems should be used as a technology transfer vehicle to demonstrate the benefits of renewable energy generation to the industrial sector.

Any achievements or successes on the Technology Transfer (TT) Project will, to a large extent, be determined on the success of finding an investor for a techno-economically feasible pilot biomass energy cogeneration project. The conditions for a techno-economically feasible pilot project, however, consist of a plant that has a 24-hour energy demand for thermal and electrical energy. Such a pilot project would be able to successfully demonstrate lower production costs for industrial enterprises. Project personnel, however, are experiencing a number of obstacles in achieving this outcome:

- TT Project plans have been shared with the Project Steering Committee (PSC). However, there has not been full dissemination of this information within the relevant institutions due to a need for more effective communication between TT Project personnel and certain government departments (such as the Department of New and Renewable Energy under Ministry of Mines and Energy (MME)). This scenario limits opportunities to network and increase the number of potential pilot projects in biomass energy. The evaluators have not seen any documentation of current biomass energy investment opportunities. The Chief Technical Advisor (CTA), however, has detailed knowledge of these opportunities involving industrial enterprises that includes the use of biomass energy for:
 - Cogeneration for industrial facilities requiring electricity and thermal energy on a 24-hour basis;
 - Drying ovens located in cassava and rubber plantations;
 - Absorption chiller units that would replace the use of diesel oil for cooling units

There is an urgent need to strengthen the efforts of the CTA in preparing and promoting biomass energy system opportunities to a wider selection of industrial enterprises in Cambodia. This should include the addition of a senior national energy expert to the PMU to improve the effectiveness of these efforts. The evaluators understand that the Project has been pursuing such a person for the past 18 month but without much success to date.

- There are a small number of foreign equipment suppliers making regular business visits to Cambodia to finalize strategic partnerships that may result in:
 - Cambodian equipment vendors increasing their sales of imported quality equipment such as boilers and gasifiers;
 - a long-term possibility that there will be local production of this equipment under license;
 - Considering the importance of the pilot biomass energy project and its demonstration of energy cost reductions, and to increase the likelihood that a pilot biomass energy project can be implemented in 2015, there is a need to consider alternative financial incentives other than the current buy down of 20%;
- The evaluators are concerned over the sustainability of TT Project efforts to promote biomass energy solutions for the industrial sector:

- In 2013 and 2014, many of the senior staff left the PMU within NCPO and were replaced by less experienced staff. As such, NCPO capacity to undertake development of renewable energy, energy efficiency and cleaner production is weaker;
 - the need for more effective communication between the PMU and a certain subset of government officers within MIH and MME as well as the Head of UNIDO operations in Cambodia (HUO) that has not resulted in full institutional cooperation with TT Project personnel;
 - Management of the TT Project is almost entirely in the hands of the CTA with no meaningful roles being played by local PMU staff. While this situation is entirely understandable given the difficulties in recruiting qualified personnel, there is a need for UNIDO to develop PMU staff to share in the management of the TT Project. The difficulties in finding assistance for the CTA (to offload some of the management responsibilities of the TT Project at the field level) only raises the risk that biomass energy promotion after the EOP is unsustainable;
- It is difficult to envision the Project making any progress with regards to policy and regulatory framework for biomass energy systems and renewable energy in general. This is on the basis of the aforementioned need for more effective communications between certain government departments (such as the Department of New and Renewable Energy under MME) and Project personnel, and the lack of clarity on indicators and targets on the regulatory framework aspects (Component 5) on the Project log frame;
 - With 10 months remaining on the TT Project, there is insufficient time to set up an operational pilot biomass energy project, train personnel on its insulation operation and maintenance, and assist RGoC in drafting policy on renewable biomass energy.

Further details can be obtained from the MTR report.

6. Budget information

Table 1. Financing plan summary

| Description | Project Preparation (in USD) | Project (in USD) | Total (in USD) |
|--|---|-----------------------------|---------------------------|
| Financing (GEF) | 80,000 | 1,690,000 | 1,770,000 |
| Co-financing ¹⁵ (in cash and/or in-kind) | 80,000 | 4,565,000 | 4,645,000 |
| Total (in USD) | 160,000 | 6,255,000 | 6,415,000 |

Source: Project document/GEF: CEO endorsement document

¹⁵ Co-financing types are grant, soft loan, hard loan, guarantee, in kind, or cash.

Table 2. Financing plan summary – project component breakdown

| Project outcomes | GEF grant amount (excl. PPG) Donor(s) (in USD) | Co-financing (in USD) | Total (in USD) |
|--|---|------------------------------|-----------------------|
| 1. Technology transfer and implementation of 3 pilot plants | 1,050,000 | 3,550,000 | 4,600,000 |
| 2. Capacity building and development of tools for technology adaptation and transfer | 200,000 | 100,000 | 300,000 |
| 3. Strengthening of institutional framework for Technology transfer | 150,000 | 85,000 | 235,000 |
| 4. Upscaling of biomass fueled technologies in Cambodia | 140,000 | 80,000 | 220,000 |
| 5. Policies, regulations and mechanism to Promote sustainable renewable energy generation. | 50,000 | 50,000 | 100,000 |
| Project Management | 100,000 | 100,000 | 200,000 |
| Total (in USD) | 1,690,000 | 3,965,000 | 5,655,000 |

Source: Project document/GEF: CEO endorsement document

Table 3. Co-financing source breakdown

| Name of co-financier (source) | Classification | Type (Specify: cash and/or in-kind) | Total (in USD) |
|---|-----------------------|--|-----------------------|
| UNIDO | Implementing Agency | Grant | 200,000 |
| | | In-kind | 100,000 |
| National Cleaner Production Office-Cambodia (Own Income generation & Seco Phase-2) | Executing Partner | In-kind | 115,000 |
| Ministry of Industry Mines and Energy | National Government | In-kind | 150,000 |
| Hong Vannin Co.,Ltd | Private sector | Cash | 900,000 |
| | | In-kind | 100,000 |
| Nikoline Investment Co.; Ltd | Private sector | Cash | 1,800,000 |
| | | In-kind | 200,000 |
| Yamn Loeung-Rice mill | Private sector | Cash | 900,000 |
| | | In-kind | 100,000 |
| Total co-financing (in USD) | | | 4,565,000 |

Source : Project document/GEF: CEO endorsement document

Table 4. UNIDO budget execution¹⁶ (Grant No.: 4000276 and 200000224), in USD

| Items of expenditure | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Total exp. |
|-----------------------------|-----------------|-------------------|------------------|-------------------|-------------------|------------------|------------------|---------------------|
| Contractual Services | | | | 50,799.00 | | -6,243.40 | 31,414.00 | 75,969.60 |
| Equipment | | | | | | | | |
| International Meetings | | | | 4,794.96 | -272.02 | 2,114.03 | | 6,636.97 |
| Local travel | | 6,904.40 | 3,265.65 | 6,969.45 | 5,889.15 | 1,179.83 | | 24,208.48 |
| Natl. Consult./Staff | 883.98 | 41,072.45 | 32,568.78 | 86,465.96 | 61,182.31 | 19,028.68 | 8,212.07 | 249,414.23 |
| Other Direct Costs | 1.97 | 5,640.67 | 5,536.11 | 17,338.76 | 5,675.46 | 11,672.49 | 1,988.48 | 47,853.94 |
| Premises | | 13,957.20 | | 24.43 | | | | 13,981.63 |
| Staff and Intl. Consult. | | | 45,718.80 | 179,855.46 | 224,141.68 | 41,525.21 | 16,316.00 | 507,557.15 |
| Staff Travel | 767.37 | 10,699.60 | 2,757.76 | 10,383.86 | 4,700.73 | 4,841.74 | | 34,151.06 |
| Train/Fellowship/Study | | 39,064.11 | 19.19 | 4,754.45 | | | | 43,837.75 |
| Grand total (in USD) | 1,653.32 | 117,338.40 | 89,866.29 | 361,386.33 | 301,317.31 | 74,118.58 | 57,930.55 | 1,003,610.81 |

Source: UNIDO. ERP database as of [8/03/2018]

¹⁶ Disbursement: Expenditure, incl. commitment

II. Scope and purpose of the evaluation

The terminal evaluation (TE) will cover the whole duration of the project from its starting date up to the date of the evaluation. It will assess project performance against the evaluation criteria: relevance, effectiveness, efficiency, sustainability and impact.

The TE has an additional purpose of drawing lessons and developing recommendations for UNIDO, the Government, Donors, and the project stakeholders and partners that may help improving the selection, enhancing the design and implementation of similar future projects and activities in the country and on a global scale upon project completion. The TE report should include examples of good practices for other projects in the focal area, country, or region.

The TE should provide an analysis of the attainment of the project objective and the corresponding outputs and outcomes. Through its assessments, the Evaluation Team (ET) should enable the Government, counterparts, UNIDO and other stakeholders and donors to verify prospects for development impact and sustainability, providing an analysis of the attainment of global environmental objectives, project objectives, delivery and completion of project outputs/activities, and outcomes/impacts based on indicators. The assessment shall include reexamination of the relevance of the objectives and other elements of project design according to the project evaluation parameters defined in Chapter III below.

The overall purpose of the TE is to assess whether the project has achieved or is likely to achieve its main objective, i.e. to support the sustained transfer of cost effective, efficient and biomass energy technology systems derived from agricultural waste for power generation and thermal energy applications, and to what extent the project has also considered sustainability and scaling-up factors for increasing contribution to sustainable results and further impact.

The evaluation has three specific objectives:

- (i) Assess the project performance in terms of relevance, effectiveness, efficiency, sustainability and progress to impact;
- (ii) Identify key learning to feed into the design and implementation of the forthcoming projects; and
- (iii) Develop a series of findings, lessons and recommendations for enhancing the design of new and implementation of ongoing projects by UNIDO.

III. Evaluation approach and methodology

The TE will be conducted in accordance with the UNIDO Evaluation Policy¹⁷ UNEG Norms and Standards for evaluation and the UNIDO Guidelines for the Technical Cooperation Project and Project Cycle¹⁸.

In addition, the GEF Guidelines for GEF Agencies in Conducting Terminal Evaluations, the GEF Monitoring and Evaluation Policy and the GEF Minimum Fiduciary Standards for GEF Implementing and Executing Agencies must to be

¹⁷ UNIDO. (2018). Director General's Bulletin: Evaluation Policy (DGB/2018/08, 1 June 2018)

¹⁸ UNIDO. (2006). Director-General's Administrative Instruction No. 17/Rev.1: Guidelines for the Technical Cooperation Programme and Project Cycle (DGAI.17/Rev.1, 24 August 2006)

considered.

The evaluation will be carried out as an independent in-depth evaluation using a participatory approach whereby all key parties associated with the project will be informed and consulted throughout the evaluation. The evaluation team leader will liaise with the UNIDO Independent Evaluation Division on the conduct of the evaluation and methodological issues.

In line with its objectives, the evaluation will have two main components. The first component focuses on an overall **assessment of performance** of the project, whereas the second one focuses on the **learning** from the successful and unsuccessful practices in project design and implementation.

The evaluation will use a theory of change approach and mixed methods to collect data and information from a range of sources and informants. It will pay attention to triangulating the data and information collected before forming its assessment. This is essential to ensure an evidence-based and credible evaluation, with robust analytical underpinning.

The theory of change will identify causal and transformational pathways from the project outputs to outcomes and longer-term impacts, and drivers as well as barriers to achieve them. The learning from this analysis will be useful to feed into the design of the future projects so that the management team can effectively manage them based on results.

In those cases where baseline information for relevant indicators is not available, the evaluation team will aim at establishing a proxy-baseline through recall and secondary information.

1. Data collection methods

The ET will be required to use different methods to ensure that data gathering and analysis deliver evidence-based qualitative and quantitative information, based on diverse sources, as necessary: desk studies and literature review, statistical analysis, individual interviews, focus group meetings/discussions, surveys and direct observation. This approach will not only enable the evaluation to assess causality through quantitative means but also to provide reasons for why certain results were achieved or not and to triangulate information for higher reliability of findings. The specific mixed methodological approach will be described in the inception report.

Following are the main instruments for data collection:

- (a) **Desk and literature review** of documents related to the project, including but not limited to:
 - The original project document, monitoring reports (such as progress and financial reports), mid-term review report, output reports, back-to-office mission report(s), end-of-contract report(s) and relevant correspondence
 - Notes from meetings of committees involved in the project

- (b) **Stakeholder consultations** will be conducted through structured and semi-structured interviews and focus group discussion. Key stakeholders to be interviewed include:
 - UNIDO Management and staff involved in the project; and
 - Representatives of donors, GEF national focal point and counterparts
- (c) **Field visit** to Cambodia
 - On-site observation of results achieved by the project, including interviews of actual and potential beneficiaries of improved technologies
 - Interviews with the relevant UNIDO Country Office representative to the extent that he/she was involved in the project, and the project's management members and the various national [and sub-regional] authorities dealing with project activities as necessary
- (d) Other interviews, surveys or document reviews as deemed necessary by the evaluation team and/or by the Independent Evaluation Division for triangulation purposes

2. Evaluation key questions and criteria

The evaluation team will develop interview guidelines. Field interviews can take place either in the form of focus-group discussions or one-to-one consultations.

The key evaluation questions are the following:

- (a) What are the key drivers and barriers to achieve the long term objectives? To what extent has the project helped put in place the conditions likely to address the drivers, overcome barriers and contribute to the long term objectives?
- (b) How well has the project performed? Has the project done the right things? Has the project done things right, with good value for money?
- (c) What have been the project's key results (outputs, outcome and impact)? To what extent have the expected results been achieved or are likely to be achieved? To what extent the achieved results will sustain after the completion of the project?
- (d) What lessons can be drawn from the successful and unsuccessful practices in designing, implementing and managing the project?
- (e) What is the project's contribution and relevance to the *Poznan Strategic Program on Technology Transfer*, as conceptualized and approved by the GEF?

The evaluation will assess the likelihood of sustainability of the project results after the project completion. The assessment will identify key risks (e.g. in terms of financial, socio-political, institutional and environmental risks) and explain how these risks may affect the continuation of results after the project ends. Table 5 below provides the key evaluation criteria to be assessed by the evaluation. The detailed questions to assess each evaluation criterion are in annex 2. The **rating criteria** and table to be used is presented in annex 8.

Table 5. Summary of Project evaluation criteria

| Index | Evaluation criteria | Mandatory rating |
|----------|--|------------------|
| A | Progress to Impact | Yes |
| B | Project design | Yes |
| 1 | • Overall design | Yes |
| 2 | • Logframe | Yes |
| C | Project performance | Yes |
| 1 | • Relevance | Yes |
| 2 | • Effectiveness | Yes |
| 3 | • Efficiency | Yes |
| 4 | • Sustainability of benefits | Yes |
| D | Cross-cutting performance criteria | |
| 1 | • Gender mainstreaming | Yes |
| 2 | • Environment and socio-economic aspects ¹⁹ | Yes |
| 2 | • M&E: (focus on Monitoring) ✓ M&E design ✓ M&E implementation | Yes |
| 3 | • Results-based Management (RBM) | Yes |
| E | Performance of partners | |
| 1 | • UNIDO | Yes |
| 2 | • National counterparts | Yes |
| 3 | • Donor | Yes |
| F | Overall assessment | Yes |

IV. Evaluation process

The evaluation will be implemented in phases which are not strictly sequential, but in many cases iterative, conducted in parallel and partly overlapping:

- UNIDO Independent Evaluation Division (IED) identifies and selects the Evaluation Team members, in consultation with project manager
- Inception phase
 - ✓ Desk review and data analysis: The evaluation team will review project-related documentation and literature and carry out a data analysis (incl. familiarization with GEF programmes and strategies, and with relevant GEF policies such as those on project cycle, M&E, co-financing, fiduciary standards, gender, and environmental and social safeguards)
 - ✓ Briefing of consultant(s) at UNIDO Headquarters (HQ)

¹⁹ All GEF-4 and GEF-5 projects have incorporated relevant environmental and social considerations into the project design / GEF-6 projects have followed the provisions specified in UNIDO/DGAI.23: UNIDO Environmental and Social Safeguards Policies and Procedures (ESSPP)

- ✓ Preparation of inception report: The evaluation team will prepare the inception report providing details on the methodology for the evaluation and include an evaluation matrix with specific issues for the evaluation; the specific site visits will be determined during the inception phase, taking into consideration the findings and recommendations of project progress reports or mid-term reviews.
- ✓ Interviews, survey
- Field phase
 - ✓ Country field visit(s)
 - ✓ ET Debriefing in the field to project stakeholders
- Reporting phase
 - ✓ After field mission, HQ debriefing with preliminary findings, conclusions and recommendations by the ET leader
 - ✓ Data analysis and draft report writing
 - ✓ Draft report submission
 - ✓ Sharing and factual validation of draft report with stakeholders
 - ✓ Final evaluation report Submission and QA/clearance by IED, and
 - ✓ Two pages summary take-away message
- IED Final report issuance and distribution with the respective management response sheet and further follow-up, and publication of evaluation report in UNIDO intra/internet sites

V. Evaluation team composition

A staff from the UNIDO Independent Evaluation Division will be assigned as Evaluation Manager and will coordinate and provide evaluation backstopping to the evaluation team and ensure the quality of the evaluation. The UNIDO Project Manager and national project teams will act as resourced persons and provide support to the evaluation team and the IED evaluation manager.

The evaluation team will be composed of at least one international evaluation consultant acting as the team leader and one national consultant. The evaluation team members will possess relevant strong experience and skills on evaluation and evaluation management, including social safeguards and gender. Expertise and experience in the related technical subject of the project is desirable. The evaluation consultants will be contracted by UNIDO.

In some specific cases (e.g. complex projects, regional projects, projects at risk), an IED evaluation officer could be also assigned to be part of the evaluation team and hence participate in the whole conduct as such. The tasks of each team member are specified in the job descriptions in annex 3 to these terms of reference.

According to UNIDO Evaluation Policy, members of the evaluation team must not have been directly involved in the design and/or implementation of the project under evaluation.

The UNIDO GEF Coordinator and GEF OFP(s) will be briefed on the evaluation and provide support to its conduct. GEF OFP(s) will, where applicable and feasible, also be briefed and debriefed at the start and end of the evaluation mission.

VI. Time schedule

The evaluation is scheduled to take place from August to October 2018.

The evaluation field mission is tentatively planned for September 2018.

The Draft Evaluation report will be submitted 2 to 4 weeks after the end of the mission.

The Final Evaluation report will be submitted 2 weeks after comments received.

VII. Evaluation deliverables

Inception report

These terms of reference (TOR) provide some information on the evaluation methodology, but this should not be regarded as exhaustive. After reviewing the project documentation and initial interviews with the project manager, the International Evaluation Consultant will prepare, in collaboration with the national consultant, a short inception report that will operationalize the TOR relating to the evaluation questions and provide information on what type of and how the evidence will be collected (methodology). It will be discussed with and approved by the responsible UNIDO Evaluation Manager.

The Inception Report will focus on the following elements: preliminary project theory model(s); elaboration of evaluation methodology including quantitative and qualitative approaches through an evaluation framework (“evaluation matrix”); division of work between the International Evaluation Consultant and the national consultant; mission plan, including places to be visited, people to be interviewed and possible surveys to be conducted and a debriefing and reporting timetable²⁰.

Evaluation report and review procedures

The draft report will be delivered to UNIDO Independent Evaluation Division (the suggested report outline is in annex 4) and circulated to UNIDO staff and national stakeholders associated with the project for factual validation and comments. Any comments or responses, or feedback on any errors of fact to the draft report provided by the stakeholders will be sent to UNIDO Independent Evaluation Division for collation and onward transmission to the project evaluation team who will be advised of any necessary revisions. On the basis of this feedback, and taking into consideration the comments received, the evaluation team will prepare the final version of the terminal evaluation report.

The ET will present its preliminary findings to the local stakeholders at the end of the field visit and take into account their feed-back in preparing the evaluation report. A presentation of preliminary findings will take place at UNIDO HQ after the field mission.

²⁰ The evaluator will be provided with a Guide on how to prepare an evaluation inception report and a Guide on how to formulate lessons learned (including quality checklist) prepared by the UNIDO Independent Evaluation Division.

The TE report should be brief, to the point and easy to understand. It must explain the purpose of the evaluation, exactly what was evaluated, and the methods used. The report must highlight any methodological limitations, identify key concerns and present evidence-based findings, consequent conclusions, recommendations and lessons. The report should provide information on when the evaluation took place, the places visited, who was involved and be presented in a way that makes the information accessible and comprehensible. The report should include an executive summary that encapsulates the essence of the information contained in the report to facilitate dissemination and distillation of lessons.

Findings, conclusions and recommendations should be presented in a complete, logical and balanced manner. The evaluation report shall be written in English and follow the outline given in annex 4. The ET should submit the final version of the TE report in accordance with UNIDO Independent Evaluation Division standards.

VIII. Quality assurance

All UNIDO evaluations are subject to quality assessments by UNIDO Independent Evaluation Division. Quality assurance and control is exercised in different ways throughout the evaluation process (briefing of consultants on methodology and process of UNIDO Independent Evaluation Division, providing inputs regarding findings, lessons learned and recommendations from other UNIDO evaluations, review of inception report and evaluation report).

The quality of the evaluation report will be assessed and rated against the criteria set forth in the Checklist on evaluation report quality, attached as annex 5. UNIDO's Independent Evaluation Division should ensure that the evaluation report is useful for UNIDO in terms of organizational learning (recommendations and lessons learned) and is compliant with UNIDO's Evaluation Policy and these terms of reference. The draft and final evaluation report are reviewed by UNIDO Independent Evaluation Division, which will issue and circulate it within UNIDO together with a management response sheet, as well as submit to relevant stakeholders as required.

Annex 1: Project results framework

| Project Strategy | | Objectively verifiable indicators | | | | |
|---------------------------------|--|---|--|---|---|---|
| | | Indicator (quantified and time-bound) | Baseline | Target | Source of verification | Risks and Assumptions |
| Objective of the project | To bring about sustained transfer of efficient, cost effective and environmentally friendly (low carbon) agro-waste biomass-fuelled energy systems to replace fossil-fuel powered generators and boilers for power generation and thermal energy applications. | <ol style="list-style-type: none"> 1. Incremental direct CO₂eq emission reductions (tons of CO₂eq) 2. Incremental indirect CO₂eq emission reductions (tons of CO₂eq) 3. Transfer of Techno-economically viable RE technologies leading to reduction of fossil fuel consumption for energy generation | <ol style="list-style-type: none"> 1. No direct CO₂eq emission reductions 2. No indirect CO₂eq emission reductions 3. Technology transfer mechanism does not exist. | <ol style="list-style-type: none"> 1. Direct emission reductions: 295,095-393,460 tons CO₂eq over period 2013-2023 2. Indirect emission reductions: 289,091-381,028 tons CO₂eq over period 2016-2026 3. Annual reduction of fuel used for energy generation 5% over period 2013-2023 | <ol style="list-style-type: none"> 1. Technology evaluation, implementation support including financial tools established by the project with MIME and NCPO-C 2. End of project Survey 3. Final evaluation | <ol style="list-style-type: none"> 1. Sustained and full Government support to the project. 2. User and generator drive for energy costs reduction and enhanced share of RE energy grows progressively 3. Various ongoing international RE related technical cooperation programs achieve good synergy with the project. |

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| Outcome 1 | Transfer of clean and energy efficient low carbon technologies | <ol style="list-style-type: none"> 3 Pilot projects for RE-TT demonstration are selected with co-financing commitments Anticipated savings in GHG emissions are estimated Personnel from the participating companies have been trained in operation, maintenance & trouble shooting. | <ol style="list-style-type: none"> Limited no. of investment related RE projects are in place. Technology transfer mechanism for efficient biomass-based generation is yet to be proven Co-generation for efficient conversion of energy is still not practiced and technologies are not applied. | <ol style="list-style-type: none"> Learning to utilize and replicate a given technology, including the capacity to choose it, adapt it to local conditions and integrate it with indigenous technologies. To develop and standardise energy audit reporting format, worksheets and tools to be used by RE-TT projects Technology performance benchmark and saving potential of GHG emissions reduction. compendium of case studies from Pilot projects | <ol style="list-style-type: none"> Department of Energy techniques (DOET) MIME, NCPO-C Annual Reports Mid-term and end of project survey Final evaluation of project | <ol style="list-style-type: none"> Sustained Government support to agreed project activities and policies conducive to promote RE technologies. A2. Participating companies can arrange to get requisite finance for RE-TT implementation. |
| Project Component 1: Technology transfer and implementation of 2 pilot plants | | | | | | |
| Output 1.1 | Biomass-based RE-TT projects for 4-5 MWhr power generation replacing > 12,000 TOEs** and related potential economic and environmental savings in 3 pilot enterprises are identified by and appraised by project experts. | <ol style="list-style-type: none"> 3 RE-TT projects are implemented with direct support from the GEF project GHG savings T CO₂eq achieved annually as well as over the project lifetime | All companies, selected for RE-TT have their own biomass and potential captive consumption but not the resources (human and/or financial) to develop and implement such projects. | <ol style="list-style-type: none"> 3 technology transfer projects implemented with direct support from the GEF project Cumulative 12,000 TOEs of fossil fuel (DO) replacement annually and more than 120,000 TOE's over the life period of technology. | <ol style="list-style-type: none"> Environmental, financial and/or sustainability reports of Companies partnering in the RE-TT projects. MIME, EAC, participating units & NCPO-C annual report Project report Independent final evaluation of project | <ol style="list-style-type: none"> Timely availability of resources required for activities subcontracts of Companies partnering with the GEF project with technology suppliers Companies partnering with the GEF project fulfil their co-financing commitments |

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| Output 1.2 | Results of the pilot projects both in economic and environment context are compiled in a compendium for effective dissemination | Compendium of case studies/success stories is published in English and local language | No such information/document are available in Cambodia on RE-TT both for manufacturing and energy supply private sector entities. | Compendium is compiled printed by end of 3 rd year when most of RE-TT projects are either implemented or under implementation. | 1.MIME, EAC & NCPO-C annual reports 2. GEF-UNIDO RE-TT Project progress report 3. Final project evaluation report | 1. Participating Industries are ready to publish and share the results with others. |
| Output 1.3 | Personnel from participating companies have been trained in operation, maintenance & trouble shooting. | 1. Develop training modules for technicians and entrepreneurs on: - operation of technology - Maintenance including preventive maintenance of technologies - Trouble shooting of technology for effective implementation. | So far no training on technology transfer for biomass related energy generation has been conducted for beneficiaries in the country. | Participants from participating units with technology suppliers are identified and training is done both in class room and on the job during commissioning and operation of the projects | 1.Participating companies and NCPO-C annual reports 2. GEF-UNIDO RE-TT Project progress report 3. Final project evaluation report | 1. It is assumed that the right participants are nominated by the participating units. 2. Technology transfer has been successfully carried out |
| Outcome 2 | Supply of national service providers in technology evaluation and technology transfer | 1. A cadre of at least 20 national experts from relevant TT support institutions (the Cleaner Production Centre, technical universities / university departments, EDC, EAC, MIME and independent engineers, are 2. Capacity building of indigenous partners for technology adaptation 3. Web-based guidance tool/manual on technology transfer like EnTA/Comfar developed 4. Technology data base and case study data base created | 1. No specific national experts are trained on technology evaluation and transfer including financial mechanisms place 2. Limited or no RE-TT service is provided by equipment/technology suppliers. 3. No ICT based tool is available on RE-TT in the country | 1. 20 National Renewable Energy generation experts capable of delivering quality services are available 2. National RE-TT network is established. 3. Local supplier of technology is capable to providing RE-TT services to their clients as well as after sale service. | 1. Annual reports of NCPO-C and relevant institutions 2. Project survey, visits report during project implementation 2. Final evaluation report of project | 1. Sustained Government support for agreed project activities. 2. Energy experts, consultants, local equipment supplier and vendors, and other relevant entities recognize the economic potential of the renewable energy market in Cambodia |
| Project Component 2: Capacity building and development of tools for technology adaptation and transfer | | | | | | |

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| Output 2.1 | 1. A cadre of at least 20 national experts from relevant support institutions (the Cleaner Production Centre, technical universities / university departments, EDC, EAC, MIME and independent engineers, are trained on technology evaluation and transfer including financial mechanisms | 1. Number of renewable energy experts in the Cambodian market 2. Number of technology transfer support experts in the Cambodian market 3. Number of RE-TT related seminars and trainings delivered | 1. No biomass-related high-efficiency energy generation experts in the Cambodian market 2. No technology transfer related support system experts in the Cambodian market only few engineering companies and NGO's provide partial services 3. RE-TT related seminars and trainings mostly delivered by international experts | 1. 20 biomass-based technology assessment and selection; identifying technology options what are their strengths and weaknesses, and to do a techno-economic-social-environmental assessment of the options to identify the most suitable one. 2. 10 seminars and 12 trainings modules for enterprises managers and engineers delivered by national experts trained by the GEF-UNIDO, IEE, RE-TT projects | 1. Project progress report of PMU 2. Visit reports, project Survey during execution 3. Final evaluation report of the project | 1. Sustained Government support to agreed project activities 2. Drive for energy supply & costs reduction is and will remain strong 3. Technology transfer involving high investments is successfully implemented for on-the-job training |
| Output 2.2 | Capacity building of indigenous partners for technology adaptation | Network of indigenous partners for technology adaptation is established. Network is meeting regularly to exchange/share biomass-based technologies operating in Cambodia | No such network in Cambodia exists and client has no access to RE-TT experts. | A registry of local partners/experts is available with MIME and NCPO. A formal network of technology transfer partners & experts is in place | 1. RE-TT web portal and registry of partners. 2. RE-TT Project report 3. Final evaluation of project | 1. Indigenous partners experts recognize the business potential of the biomass-based RE technologies in Cambodia and also in neighbouring countries |
| Output 2.3 | Web-based guidance tool/manual on RE-TT developed. | Dedicated web portal for technology transfer is in place and populated for training material, information and links with relevant web sites. | No such ICT based instrument exists on technology transfer in Cambodia. Information on renewable energy experts/technology suppliers local partners do not exist | GEF-RE-TT project web portal with relevant information is continuously updated and linked with relevant websites. Technology transfer dynamic mechanism manual relevant to Cambodian industries is available | Number of hits on the website and links to other websites. Khmer and English version of RE-TT manual | No specific assumption or risk for required resources for this output. |
| Output 2.4 | Technology data base and case study data base created | | | | | |

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| Outcome-3 | Stronger institutional framework in place to ensure long-term support for renewable energy (biomass) promotion | <ol style="list-style-type: none"> 1. List of institutional participants trained to promote technology transfer for renewable energy generation. 2. No. of experts trained in preparation of bankable RE-TT proposals 3. No of financial institutions participated in financial Engineering training 4. Guide for the Implementation of biomass-based RE projects is developed. | <ol style="list-style-type: none"> 1. No institutional framework exists to promote high efficiency RE at implementation level. 2. Access to finance is a problem due to lack of knowledge in preparing bankable proposals 3. Financial institutions evaluate the project on conventional basis rather than incl. all factors such as environment, safety and liability etc. 4. No technology transfer and Renewable energy using biomass Guidance manual exists | <ol style="list-style-type: none"> 1. At least 100 participants from Govt. and regulatory agencies are trained in technology transfer and RE applications. 2. 60 personnel from Industry are trained in financial engineering (bankable proposals) 3. Guidelines on biomass-based energy generation, operation and maintenance of Boiler, turbine and auxiliaries is available 4. At-least 5 companies get access to finance through GEF project. | <ol style="list-style-type: none"> 1. Project progress report 2. Annual reports of project implementing partners 3. Number of RE-TT projects selected for financing 4. Total investment made by beneficiaries during project period | <ol style="list-style-type: none"> 1. Resource allocated and committed is available in time. 2. Sustained Government support to agreed project 3. Biomass energy promoters, financial institutions recognize the need and economic & Environmental saving potential of the RE market in Cambodia |
| Project Component 3: Strengthening of institutional framework for technology transfer | | | | | | |
| Output 3.1 | Capacity building of relevant stakeholders viz. Govt. departments and academic institutions to provide technical support to promote biomass-based renewable energy technology transfer and assistance in implementation. | <ol style="list-style-type: none"> 1. Number of intensive training programme conducted 2. No. of Government and institutional staff trained in biomass-based energy project implementation support. | No such organized capacity building programme exists in Cambodia. However, seminars/ workshops on Rural electrification, renewable energy (mainly solar) are conducted by foreign experts | <ol style="list-style-type: none"> 1. 10 intensive capacity building programmes are conducted during the project period. 2. 100 participants trained to promote industrial energy efficiency | <ol style="list-style-type: none"> 1. GEF-UNIDO RE-TT Project progress report 2. Annual reports of project implementing partners and PMU 3. Final evaluation of project | <ol style="list-style-type: none"> 1. Government & academic institution interest & support to build capacity for RE transfer & promotion 2. RE promoters recognize the benefits of RE in Cambodia |

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| Output 3.2 | Financial Institutions are trained in TT financing including using available mechanisms like CCCA, LDCF, CDM and preparation of bankable TT project proposals | 1.Number of training programmes conducted on financial engineering for technology transfer of biomass fuelled energy generation 2. No. of experts trained from FI's in preparation of bankable RE proposals | No such facility on comprehensive financial engineering on technology assessment including environmental impacts exist in Cambodia | 1. Two training programmes conducted in year-1 and 1 each in subsequent years. 2. At least 60 personnel from financial institutions and Government Departments are trained in preparing bankable proposal. 3. At least 10 proposals for RE technology financing are prepared and considered for financing 4. Technology support instruments (e.g., financing subsidies, risk guarantee facilities, banker training and transaction support services) that are helping financiers share risks, buy down transaction costs etc. | 1. Annual reports of project implementing partners 2. End of project report 3. Final project evaluation | 1. Industry drive for energy availability and costs reduction is and will remain strong 3. Renewable Energy promoters, financial institutions recognize the need and benefits of the RE market in Cambodia |
| Output 3.3 | Capacity building of financial institutions to include environmental and social costs while assessing investment proposals in biomass based renewable energy technologies. | 1.Number of training programmes conducted for FII's in Cambodia 2. No. of experts trained in comprehensive technology evaluation to facilitate financing. | No such organized training on total costing including environmental and social liability in technology assessment for FII's available in Cambodia | 1. Four training programmes conducted during project period 2. At least 20 personnel from development banks and FII's are trained in assessing Re-TT project for financing 3. 10 proposals for RE financing are received and considered for financing 4. Build capacity and address various other barriers that make financing energy investment portfolios a challenge. | 1. Annual reports of project implementing partners 2. Project midterm/ completion report 3. Final project evaluation 4. Annual reports of participating FII's | 1. FII's recognize RE as a business opportunity for their lending operations. 2. Industry drive for energy costs reduction is and will remain strong 3. RGOC support industrial development bank/FII's through dedicated fund allocation for RE. |

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| Outcome-4 | <p>Increased adoption of biomass-based energy generation technologies by Cambodian businesses and private investors.</p> <p>The creation of a national market for biomass technologies.</p> | <p>1. Tools available for supporting technology transfer for biomass-based energy generation in industry</p> <p>2. Demand for assistance in RE-TT is created. At least 5 requests are received annually.</p> | <p>1. No such tools are and will be most likely available during and immediately after the GEF-UNIDO project implementation period</p> <p>2. In perception of high cost and financial availability, no demand for RE-TT project</p> | <p>1. Dynamic and user friendly methodology for technology transfer and biomass-based renewable energy is produced in English and Khmer language</p> <p>2. Adapt the technology suited to local conditions and integrate as far as possible it with indigenous technologies</p> <p>3. Identify and fulfil the contractual aspects between various stakeholders such as technology supplier, technology recipient, financier, and the government, giving due recognition to intellectual property rights and patents, national and international rules and regulations.</p> | <p>1. Technology transfer related information/case studies dissemination program website</p> <p>2. Project report</p> <p>3. Final evaluation</p> | <p>1. Availability of finance and other resources are available.</p> <p>2. Sustained Government support to promote RE share in National energy supply.</p> |
| Project Component 4: Upscaling of biomass fuelled technologies in Cambodia | | | | | | |
| Output 4.1 | <p>The results of the pilot projects are compiled and widely disseminated in the most appropriate manner</p> | <p>1. Number technology transfer related assistance experts in the Cambodian market</p> <p>2. Number of biomass-based energy experts in the Cambodian market</p> <p>3. Number of TT-RE seminars and trainings delivered</p> | <p>1. No such technology system experts in the Cambodian market</p> <p>2. No such biomass-based high efficiency generation experts in the Cambodia except few engineering companies, NGO's provide services in biomass gasification</p> <p>3. For RE-TT related seminars/workshop and trainings dependency mostly on international experts</p> | <p>1. 20 Renewable energy generation experts trained</p> <p>2. utilize and replicate a appropriate technology, including the capacity to choose it</p> <p>2. 10-20 experts for providing technology transfer support trained</p> <p>3. 10 seminars and 10 trainings for enterprises managers and engineers delivered by national experts trained by the GEF-UNIDO project</p> | <p>1. Project progress report including implementation directly outside project support</p> <p>2. Project mission visits, Survey</p> <p>3. Final evaluation</p> | <p>A1. Sustained Government support to agreed project activities for the RE generation promotion</p> <p>A2. Industry demand for biomass energy is increasing</p> <p>A3. Availability of feedstock and price of feed stock is economically sustainable to produce energy at affordable price.</p> |

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| Output 4.2 | Investors and decision-makers understand the potential for biomass energy sources. | <ol style="list-style-type: none"> 1. Number of CEOs/owner attended RE-TT clinics. 2. Number of companies participating in the RE-TT project seminars/workshops 3. Number of personnel from potential companies participating in the project trainings | <ol style="list-style-type: none"> 1. No tool for marketing of renewable energy generation like RE-TT clinic exists so far. 2. Limited trainings on TT/Boiler operation & safety, turbine, CHP are planned though from 2011 National Cleaner production office Cambodia will deliver training on IEE. | <ol style="list-style-type: none"> 1. 100 CEOs attend the 10 Re-TT Clinics organized sector-wise & as per geographic potential areas having biomass 2. 100 companies participating in the project seminars and workshops 3. Establish mutually beneficial or reciprocal exchanges related to technology transfer and technology support, | <ol style="list-style-type: none"> 1. Project progress report and NCPO annual report. 2. List of participants in RE-TT Clinics/ Directors meetings, training and seminars 3. Final evaluation report | <ol style="list-style-type: none"> 1. Sustained Government support to agreed project activities 2. Biomass is available at affordable price 3. Regenerative biomass programme is well-developed to ensure stable biomass supply |
| Output 4.3 | Other stakeholders understand the role they can play to promote the uptake of this kind of technology | <ol style="list-style-type: none"> 1. Number of technology & equipment suppliers participating in the project seminars/training 2. Number of contracts received by suppliers through GEF projects | <p>NO training/capacity building done for of technology & equipment suppliers on RE-TT</p> <p>Hardly suppliers get contract for renewable energy generation in Cambodia</p> | <ol style="list-style-type: none"> 1. 50 suppliers/vendors participating in the project seminars and workshops 2. Build partnerships with external experts, or actively support established networks related to RE-TT. 2. 10 contracts related to RE-TT implementation is bagged by supplier trained by project. | <ol style="list-style-type: none"> 1. Project progress report and NCPO annual report. 2. Balance sheet/annual report of suppliers. 2. End of project report 3. Final project evaluation | <ol style="list-style-type: none"> 1. Government support in terms of policy regulation and law promoting biomass-based energy generation. 2. All envisaged players have interest in RE-TT promotion. |
| Outcome-5 | Establishment of policy, legal and regulatory frameworks that sustainably promote and support renewable energy generation | <ol style="list-style-type: none"> 1. Policy conducive to promote technology transfer on renewable fuel based technologies developed and recommended to MIME. 2. Adoption of regulatory measures to support RE implementation and market transformation | <ol style="list-style-type: none"> 1. No specific policy program on biomass-based energy generation is in place 2. No specific regulation to support technology transfer of biomass-based energy for captive consumption is in place | <ol style="list-style-type: none"> 1. At least 2 national renewable energy policy programs operate and develop smoothly: 2. Technology transfer support system including financial availability, IPR on technologies are developed 3. Technology support instruments to help user by RE policy, regulation and law. | <ol style="list-style-type: none"> 1. Policy/ strategy Government regulation/law on renewable energy. 2. Incentives for Renewable energy equipment viz. reduced or no import duty/accelerated depreciation 3. Policy support needs to enhance technology transfer. | <ol style="list-style-type: none"> 1. Sustained Government support to agreed project activities. |
| Project Component 5: Policies, regulations and mechanism to promote sustainable renewable energy generation. | | | | | | |

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| Output 5.1 | Gap analysis performed to assist the govt. in identifying where formulation of appropriate laws, regulations and policy instruments are crucial for the transfer and diffusion of renewable energy technologies. | <ol style="list-style-type: none"> 1. Increased role for TT related energy and environmental policies at national levels 2. Biomass-based energy generation opportunities are recognised and utilised for achieving UNFCCC commitments. | <ol style="list-style-type: none"> 1. No such policy exists to promote and encourage the implementation of RE-TT by Cambodian manufacturing and service sector 2. Role increased share of renewable energy generation in climate change mitigation from Cambodian industry is not well recognised | <ol style="list-style-type: none"> 1. Policy document on renewable energy as clean and alternative energy is prepared for RGOC action. 2. Tools and instruments to calculate GHG reduction from RE technologies projects are in place | <ol style="list-style-type: none"> 1. Annual report of NCPO-C, MIME 2. Independent final project evaluation 3. Publication of relevant policies, strategies and guidelines by RGOC | <ol style="list-style-type: none"> 1. Uptake of RE-TT by enterprises and other organisations is constrained by lack of government incentive 2. Proper enforcement of policy/ regulation to help uptake of RE-TT |
| Output 5.2 | Implementation of the missing laws, regulations and policy instruments | <ol style="list-style-type: none"> 1. Increased role for RE-TT project in energy related policies/regulations of RGOC. 2. Structures, tools and methodologies to monitor, tracking and benchmarking of technology performance | <p>So far biomass-based energy generation for captive usage has no significant role in Energy Policy in Cambodia.</p> <p>No such structured, tools and methodologies are in place</p> | <ol style="list-style-type: none"> 1. Reporting/recording structure is put in place 2. Simple user-friendly reporting templates are developed and tested 3. Website is created and continuously updated for success/failure cases. 4. Biomass-fuelled energy Technology performance benchmarking tool is developed and tested | <ol style="list-style-type: none"> 1. MIME, MOE-CCD and NCPO Annual Report 2. Internet/Web 3. Project reports and visit reports 4. Final evaluation of project | <ol style="list-style-type: none"> 1. Sustained Government support to renewable energy expansion both for direct users and rural electrification 2. Policy on feed stock usage and export to avoid non-availability for captive users. |

Annex 2: Detailed questions to assess evaluation criteria

The evaluation team will assess the project performance guided by the questions below.

| No. | Evaluation criteria |
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| A | Progress to impact |
| 1 | <ul style="list-style-type: none"> ✓ <u>Likelihood</u> to contribute to the expected impact ✓ Positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended, including redirecting trajectories of transformational process and the extent to which conditions for trajectory change are being put into place. ✓ <u>Replication</u>: To what extent the project's specific results (e.g. methodology, technology, lessons, etc.) are reproduced or adopted ✓ <u>Mainstreaming</u>: To what extent information, lessons or specific results of the project are incorporated into broader stakeholder mandates and initiatives such as laws, policies, regulations and project? ✓ <u>Scaling-up</u>: To what extent the project's initiatives and results are implemented at larger geographical scale? ✓ What difference has the project made to the beneficiaries? ✓ What is the change attributable to the project? To what extent? ✓ What are the social, economic, environmental and other effects, either short-, medium- or long-term, on a micro- or macro-level? ✓ What effects are intended or unintended, positive or negative? <p>[The three UNIDO impact dimensions are:</p> <ul style="list-style-type: none"> ✓ <u>Safeguarding environment</u>: To what extent the project contributes to changes in the status of environment. ✓ <u>Economic performance</u>: To what extent the project contributes to changes in the economic performance (e.g. finances, income, costs saving, expenditure) of individuals, groups and entities? ✓ <u>Social inclusiveness</u>: To what extent the project contributes to changes in capacity and capability of individuals, groups and entities in society, such as employment, education, and training?] |
| B | Project design |
| 1 | <ul style="list-style-type: none"> • <u>Overall design</u>²¹ ✓ The project design was adequate to address the problems at hand? ✓ Is the project consistent with the Country's priorities, in the work plan of the lead national counterpart? Does it meet the needs of the target group? Is it consistent with UNIDO's Inclusive and Sustainable Industrial Development? Does it adequately reflect lessons learnt from past projects? Is it in line with the donor's priorities and policies? ✓ Is the applied project approach sound and appropriate? Is the design technically feasible and based on best practices? Does UNIDO have in-house technical expertise and experience for this type of intervention? |

²¹ All GEF-4 and GEF-5 projects have incorporated relevant environmental and social considerations into the project design / GEF-6 projects have followed the provisions specified in UNIDO/DGAI.23: UNIDO Environmental and Social Safeguards Policies and Procedures (ESSPP); is it in line with GEF Minimum Fiduciary Standards: Separation of Implementation and Execution Functions in GEF Partner Agencies? (GEF/C.41/06/Rev.01)).

| No. | Evaluation criteria |
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| | <ul style="list-style-type: none"> ✓ To what extent the project design (in terms of funding, institutional arrangement, implementation arrangements...) as foreseen in the project document still valid and relevant? ✓ Does the project document include a M&E plan? Does the M&E plan specify what, who and how frequent monitoring, review, evaluations and data collection will take place? Does it allocate budget for each exercise? Is the M&E budget adequately allocated and consistent with the logframe (especially indicators and sources of verification)? ✓ Were there any changes in project design and/or expected results after start of implementation. ✓ Did the project establish a baseline (initial conditions)? Was the evaluation able to estimate the baseline conditions so that results can be determined? ✓ Risk management: Are critical risks related to financial, social-political, institutional, environmental and implementation aspects identified with specific risk ratings? Are their mitigation measures identified? Where possible, are the mitigation measures included in project activities/outputs and monitored under the M&E plan? |
| 2 | <ul style="list-style-type: none"> • <u>Logframe</u> ✓ Expected results: Is the expected result-chain (impact, outcomes and outputs) clear and logical? Does impact describe a desired long-term benefit to a society or community (not as a mean or process), do outcomes describe change in target group's behaviour/performance or system/institutional performance, do outputs describe deliverables that project will produce to achieve outcomes? Are the expected results realistic, measurable and not a reformulation or summary of lower level results? Do outputs plus assumptions lead to outcomes, do outcomes plus assumptions lead to impact? Can all outputs be delivered by the project, are outcomes outside UNIDO's control but within its influence? ✓ Indicators: Do indicators describe and specify expected results (impact, outcomes and outputs) in terms of quantity, quality and time? Do indicators change at each level of results and independent from indicators at higher and lower levels? Do indicators not restate expected results and not cause them? Are indicators necessary and sufficient and do they provide enough triangulation (cross-checking)? Are they indicators sex-disaggregated, if applicable? ✓ Sources of verification: Are the sources of verification/data able to verify status of indicators, are they cost-effective and reliable? Are the sources of verification/data able to verify status of output and outcome indicators before project completion? |
| C | Project performance |
| 1 | <ul style="list-style-type: none"> • <u>Relevance</u> ✓ How does the project fulfil the urgent target group needs? ✓ To what extent is the project aligned with the development priorities of the country (national poverty reduction strategy, sector development strategy)? ✓ How does project reflect donor policies and priorities? ✓ Is the project a technically adequate solution to the development problem? Does it eliminate the cause of the problem? ✓ To what extent does the project correspond to UNIDO's comparative advantages? ✓ Are the original project objectives (expected results) still valid and pertinent to the target groups? If not, have they been revised? Are the revised objectives still valid in today's context? |
| 2 | <ul style="list-style-type: none"> • <u>Effectiveness</u> ✓ What are the main results (mainly outputs and outcomes) of the project? What have been the quantifiable results of the project? ✓ To what extent did the project achieve their objectives (outputs and outcomes), against the original/revised target(s)? ✓ What are the reasons for the achievement/non-achievement of the project objectives? ✓ What is the quality of the results? How do the stakeholders perceive them? What is the feedback of the beneficiaries and the stakeholders on the project effectiveness? |

| No. | Evaluation criteria |
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| | <ul style="list-style-type: none"> ✓ To what extent is the identified progress result of the project rather than external factors? ✓ What can be done to make the project more effective? ✓ Were the right target groups reached? |
| 3 | <ul style="list-style-type: none"> • <u>Efficiency</u> ✓ How economically are the project resources/inputs (concerning funding, expertise, time...) being used to produce results? ✓ To what extent were expected results achieved within the original budget? If no, please explain why. ✓ Are the results being achieved at an acceptable cost? Would alternative approaches accomplish the same results at less cost? ✓ What measures have been taken during planning and implementation to ensure that resources are efficiently used? Were the project expenditures in line with budgets? ✓ To what extent did the expected co-financing materialize, in cash or in-kind, grants or loan? Was co-financing administered by the project management or by some other organization? Did short fall in co-financing or materialization of greater than expected co-financing affected project results? ✓ Could more have been achieved with the same input? ✓ Could the same have been achieved with less input? ✓ How timely was the project in producing outputs and outcomes? Comment on the delay or acceleration of the project's implementation period. ✓ To what extent were the project's activities in line with the schedule of activities as defined by the Project Team and annual Work Plans? ✓ Have the inputs from the donor, UNIDO and Government/counterpart been provided as planned, and were they adequate to meet the requirements? |
| 4 | <ul style="list-style-type: none"> • <u>Sustainability of benefits</u> ✓ Will the project results and benefits be sustained after the end of donor funding? ✓ Does the project have an exit strategy? <i>Financial risks:</i> ✓ What is the likelihood of financial and economic resources not being available once the project ends? <i>Socio-political risks:</i> ✓ Are there any social or political risks that may jeopardize the sustainability of project outcomes? ✓ What is the risk that the level of stakeholder ownership (including ownership by governments and other key stakeholders) will be insufficient to allow for the project outcomes/benefits to be sustained? ✓ Do the various key stakeholders see that it is in their interest that project benefits continue to flow? ✓ Is there sufficient public/stakeholder awareness in support of the project's long-term objectives? <i>Institutional framework and governance risks:</i> ✓ Do the legal frameworks, policies, and governance structures and processes within which the project operates pose risks that may jeopardize the sustainability of project benefits? ✓ Are requisite systems for accountability and transparency and required technical know-how in place? <i>Environmental risks:</i> ✓ Are there any environmental risks that may jeopardize the sustainability of project outcomes? ✓ Are there any project outputs or higher level results that are likely to have adverse environmental impacts, which, in turn, might affect the sustainability of project benefits? |
| 5 | <ul style="list-style-type: none"> • <u>Monitoring of long-term changes</u> <p>The M&E of long-term changes is often incorporated in GEF-supported projects as a separate component and may include determination of</p> |

| No. | Evaluation criteria |
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| | <p>environmental baselines; specification of indicators; and provisioning of equipment and capacity building for data gathering, analysis, and use. This section of the evaluation report will describe project actions and accomplishments towards establishing a long-term monitoring system. The evaluation will address the following questions:</p> <ul style="list-style-type: none"> ✓ Did the project contribute to the establishment of a long-term monitoring system? If it did not, should the project have included such a component? ✓ What were the accomplishments and shortcomings in establishment of this system? ✓ Is the system sustainable — that is, is it embedded in a proper institutional structure and does it have financing? How likely is it that this system continues operating upon project completion? ✓ Is the information generated by this system being used as originally intended? |
| D | Cross-cutting performance criteria |
| 1 | <ul style="list-style-type: none"> • <u>Gender mainstreaming</u> ✓ Did the project design adequately consider the gender dimensions in its interventions? Was the gender marker assigned correctly at entry? ✓ Was a gender analysis included in a baseline study or needs assessment (if any)? Were there gender-related project indicators? ✓ Are women/gender-focused groups, associations or gender units in partner organizations consulted/ included in the project? ✓ How gender-balanced was the composition of the project management team, the Steering Committee, experts and consultants and the beneficiaries? ✓ Do the results affect women and men differently? If so, why and how? How are the results likely to affect gender relations (e.g., division of labour, decision-making authority)? ✓ To what extent were socioeconomic benefits delivered by the project at the national and local levels, including consideration of gender dimensions? |
| 2 | ✓ Environment and socio-economic aspects ²² |
| 3 | <ul style="list-style-type: none"> • <u>M&E: (focus on Monitoring)</u> ✓ M&E design <ul style="list-style-type: none"> ○ Was the Monitoring plan at the point of project approval practical and sufficient? ○ Did it include baseline data and specify clear targets and appropriate indicators to track environmental, gender, and socio economic results? ○ Did it include a proper M&E methodological approach; specify practical organization and logistics of the M&E activities including schedule and responsibilities for data collection; ○ Did it include budget adequate funds for M&E activities? ✓ M&E implementation <ul style="list-style-type: none"> ○ How was the information from M&E system used during the project implementation? Was an M&E system in place and did it facilitate timely tracking of progress toward project results by collecting information on selected indicators continually throughout the project implementation period? Did project team and manager make decisions and corrective actions based on analysis from M&E system and based on results achieved? ○ Are annual/progress project reports complete and accurate? |

²² All GEF-4 and GEF-5 projects have incorporated relevant environmental and social considerations into the project design / GEF-6 projects have followed the provisions specified in UNIDO/DGAI.23: UNIDO Environmental and Social Safeguards Policies and Procedures (ESSPP)

| No. | Evaluation criteria |
|----------|---|
| | <ul style="list-style-type: none"> ○ Was the information provided by the M&E system used to improve performance and adapt to changing needs? Was information on project performance and results achievement being presented to the Project Steering Committee to make decisions and corrective actions? Do the Project team and managers and PSC regularly ask for performance and results information? ○ Are monitoring and self-evaluation carried out effectively, based on indicators for outputs, outcomes and impact in the logframe? Do performance monitoring and reviews take place regularly? ○ Were resources for M&E sufficient? ○ How has the logframe been used for Monitoring and Evaluation purposes (developing M&E plan, setting M&E system, determining baseline and targets, annual implementation review by the Project Steering Committee...) to monitor progress towards expected outputs and outcomes? ○ How well have risks outlined the project document and in the logframe been monitored and managed? How often have risks been reviewed and updated? Has a risk management mechanism been put in place? |
| 4 | <ul style="list-style-type: none"> ● <u>Project management</u> ✓ Review overall effectiveness of project management as outlined in the Project Document. Have changes been made and are they effective? Are responsibilities and reporting lines clear? Is decision-making transparent and undertaken in a timely manner? Recommend areas for improvement. ✓ Review whether the national management and overall coordination mechanisms have been efficient and effective? Did each partner have assigned roles and responsibilities from the beginning? Did each partner fulfil its role and responsibilities (e.g. providing strategic support, monitoring and reviewing performance, allocating funds, providing technical support, following up agreed/corrective actions)? ✓ The UNIDO HQ-based management, coordination, monitoring, quality control and technical inputs have been efficient, timely and effective (e.g. problems identified timely and accurately; quality support provided timely and effectively; right staffing levels, continuity, skill mix and frequency of field visits)? ✓ The project implemented outreach and public awareness campaigns. Outreach and public awareness materials produced are in line with the relevant UNIDO and donor advocacy guidelines?" |
| E | Performance of partners |
| 1 | <ul style="list-style-type: none"> ● <u>UNIDO</u> ✓ Design <ul style="list-style-type: none"> ○ Mobilization of adequate technical expertise for project design ○ Inclusiveness of project design (with national counterparts) ○ Previous evaluative evidence shaping project design ○ Planning for M&E and ensuring sufficient M&E budget ✓ Implementation <ul style="list-style-type: none"> ○ Timely recruitment of project staff ○ Appropriate use of funds, procurement and contracting of goods and services ○ Project modifications following changes in context or after the Mid-Term Review ○ Follow-up to address implementation bottlenecks ○ Role of UNIDO country presence (if applicable) supporting the project ○ Engagement in policy dialogue to ensure up-scaling of innovations ○ Coordination function ○ Exit strategy, planned together with the government |

| No. | Evaluation criteria |
|----------|---|
| 2 | <ul style="list-style-type: none"> • <u>National counterparts</u> ✓ Design <ul style="list-style-type: none"> ○ Responsiveness to UNIDO’s invitation for engagement in designing the project ✓ Implementation <ul style="list-style-type: none"> ○ Ownership of the project ○ Support to the project, based on actions and policies ○ Counterpart funding ○ Internal government coordination ○ Exit strategy, planned together with UNIDO, or arrangements for continued funding of certain activities ○ Facilitation of the participation of Non-Governmental Organizations(NGOs), civil society and the private sector where appropriate ○ Suitable procurement procedures for timely project implementation ○ Engagement with UNIDO in policy dialogue to promote the up-scaling or replication of innovations |
| 3 | <ul style="list-style-type: none"> ✓ Donor ✓ Timely disbursement of project funds ✓ Feedback to progress reports, including Mid-Term Evaluation ✓ Support by the donor’s country presence (if applicable) supporting the project for example through engagement in policy dialogue |
| F | <p>Overall project achievement</p> <ul style="list-style-type: none"> ✓ Overarching assessment of the project, drawing upon the analysis made under Project performance and Progress to Impact criteria above but not an average of ratings. |

Annex 3: Job descriptions

TERMS OF REFERENCE FOR PERSONNEL UNDER INDIVIDUAL SERVICE AGREEMENT (ISA)

| | |
|--|--|
| Title: | International evaluation consultant, team leader |
| Main Duty Station and Location: | Home-based |
| Missions: | Missions to Vienna, Austria and to Cambodia |
| Start of Contract (EOD): | 01/08/2018 |
| End of Contract (COB): | 31/10/2018 |
| Number of Working Days: | 27-35 working days spread over 3 months |

ORGANIZATIONAL CONTEXT

The UNIDO Independent Evaluation Division (ODG/EIO/IED) is responsible for the independent evaluation function of UNIDO. It supports learning, continuous improvement and accountability, and provides factual information about result and practices that feed into the programmatic and strategic decision-making processes. Evaluation is an assessment, as systematic and impartial as possible, of a programme, a project or a theme. Independent evaluations provide evidence-based information that is credible, reliable and useful, enabling the timely incorporation of findings, recommendations and lessons learned into the decision-making processes at organization-wide, programme and project level. ODG/EIO/IED is guided by the UNIDO Evaluation Policy, which is aligned to the norms and standards for evaluation in the UN system.

PROJECT CONTEXT

Detailed background information of the project can be found the terms of reference (TOR) for the terminal evaluation. The international evaluation consultant/team leader will evaluate the project in accordance with the evaluation-related TOR. He/she will perform, inter alia, the following main tasks:

| MAIN DUTIES | Concrete/ Measurable outputs to be achieved | Working days | Location |
|---|---|--------------|------------|
| Undertake a desk review of project documentation (incl. familiarization with the GEF programmes and strategies, and with relevant GEF policies such as those on project cycle, M&E, co-financing, fiduciary standards, gender, and environmental and social safeguards) and relevant country background information (national policies and strategies, UN strategies and general economic data); determine key data to collect in the field and adjust the key data collection instruments accordingly (if needed); Assess the adequacy of legislative and regulatory framework relevant to | <ul style="list-style-type: none"> - Division of evaluation tasks with the National Consultant - An adjusted table of evaluation questions, depending on country specific context - A draft list of stakeholders to be interviewed during the evaluation field mission - A brief assessment of the adequacy of the country's legislative and regulatory framework | 5 days | Home-based |

| MAIN DUTIES | Concrete/ Measurable outputs to be achieved | Working days | Location |
|---|--|--------------|-----------------|
| the project's activities and analyze other background info. | | | |
| Prepare an inception report which streamlines the specific questions to address the key issues in the TOR, specific methods that will be used and data to collect in the field visits, detailed evaluation methodology confirmed, draft theory of change, and tentative agenda for field work | - Inception report submitted to the evaluation manager | 3 days | Home-based |
| Briefing with the UNIDO Independent Evaluation Division, project managers and other key stakeholders at UNIDO HQ. | Detailed evaluation schedule with tentative mission agenda (incl. list of stakeholders to be interviewed and planned site visits) submitted to evaluation and project manager | 2 days | Vienna, Austria |
| 3. Undertake evaluation field mission ²³ to consult field project stakeholders, partners and beneficiaries to verify and complete preliminary evaluation findings from desk review and assess the institutional capacities of the recipient country | - Field mission conducted - Evaluation/debriefing presentation of the evaluation's preliminary findings prepared, draft conclusions, recommendations and lessons learnt to stakeholders in the country, at the end of the mission - Agreement with the National Consultant on the structure and content of the evaluation report and the distribution of writing tasks | 6-10 days | Cambodia |
| 4. Debriefing mission: Present preliminary findings, recommendations and lessons learnt to project stakeholders at UNIDO HQ for factual validation and comments; Hold additional meetings with and obtain additional data from | - Power point presentation - Feedback from stakeholders obtained and discussed - Additional meetings held as required | 2 days | Vienna, Austria |

²³ The exact mission dates will be decided in agreement with the Consultant, UNIDO HQ, and the country counterparts.

| MAIN DUTIES | Concrete/ Measurable outputs to be achieved | Working days | Location |
|---|--|--------------|------------|
| evaluation/ project manager and other stakeholders as required. | | | |
| 5. Prepare the draft evaluation report, with inputs from the National Consultant, and in accordance with the evaluation TOR; Submit draft evaluation report to the evaluation manager for feedback and comments. | - Draft evaluation report submitted to evaluation manager for review and comments | 6-8 days | Home-based |
| 6. Revise the draft evaluation report based on comments and suggestions received through the evaluation manager and edit the language and finalize the evaluation report according to UNIDO Independent Evaluation Division standards; Prepare a two pages summary of a take-away message from the evaluation. | Final evaluation report submitted to evaluation manager Two pages summary take-away message from the evaluation submitted to the evaluation manager | 3-5 days | Home-based |
| TOTAL | | 27-35 days | |

MINIMUM ORGANIZATIONAL REQUIREMENTS

Education: Advanced degree in environment, energy, engineering, development studies or related areas

Technical and functional experience:

- Minimum of 10 years' experience in energy project management and/or evaluation (of development projects), including social safeguards and gender
- Knowledge about GEF operational programs and strategies and about relevant GEF policies such as those on project life cycle, M&E, incremental costs, and fiduciary standards
- Experience in the evaluation of GEF projects and knowledge of UNIDO activities an asset
- Knowledge about multilateral technical cooperation and the UN, international development priorities and frameworks
- Working experience in developing countries

Languages: Fluency in written and spoken English is required.

Reporting and deliverables

- 1) At the beginning of the assignment the Consultant will submit a concise Inception Report that will outline the general methodology and presents a concept Table of Contents
- 2) The country assignment will have the following deliverables:
 - Presentation of initial findings of the mission to key national stakeholders
 - Draft report
 - Final report, comprising of executive summary, findings regarding design,

- implementation and results, conclusions and recommendations
- 3) Debriefing at UNIDO HQ:
- Presentation and discussion of findings
 - Concise summary and comparative analysis of the main results of the evaluation report

All reports and related documents must be in English and presented in electronic format.

Absence of conflict of interest:

According to UNIDO rules, the consultant must not have been involved in the design and/or implementation, supervision and coordination of and/or have benefited from the programme/project (or theme) under evaluation. The consultant will be requested to sign a declaration that none of the above situations exists and that the consultants will not seek assignments with the manager/s in charge of the project before the completion of her/his contract with the UNIDO Independent Evaluation Division.

TERMS OF REFERENCE FOR PERSONNEL UNDER INDIVIDUAL SERVICE AGREEMENT (ISA)

| | |
|--|---|
| Title: | National evaluation consultant |
| Main Duty Station and Location: | Home-based |
| Mission/s to: | Travel to potential sites within Cambodia |
| Start of Contract: | 01/08/2018 |
| End of Contract: | 31/10/2018 |
| Number of Working Days: | 25-30 days spread over 3 months |

ORGANIZATIONAL CONTEXT

The UNIDO Independent Evaluation Division (ODG/EIO/IED) is responsible for the independent evaluation function of UNIDO. It supports learning, continuous improvement and accountability, and provides factual information about result and practices that feed into the programmatic and strategic decision-making processes. Evaluation is an assessment, as systematic and impartial as possible, of a programme, a project or a theme. Independent evaluations provide evidence-based information that is credible, reliable and useful, enabling the timely incorporation of findings, recommendations and lessons learned into the decision-making processes at organization-wide, programme and project level. The UNIDO Independent Evaluation Division is guided by the UNIDO Evaluation Policy, which is aligned to the norms and standards for evaluation in the UN system.

PROJECT CONTEXT

Detailed background information of the project can be found the terms of reference (TOR) for the terminal evaluation. As evaluation team member, the national evaluation consultant will evaluate the project according to the TOR under the leadership of the team leader (international evaluation consultant). S/he will perform, inter alia, the following main tasks:

| MAIN DUTIES | Concrete/measurable outputs to be achieved | Expected duration | Location |
|--|--|-------------------|------------|
| <p>Desk review Review and analyze project documentation (incl. familiarization with the GEF programmes and strategies, and with relevant GEF policies such as those on project cycle, M&E, co-financing, fiduciary standards, gender, and environmental and social safeguards) and relevant country background information; in cooperation with the team leader, determine key data to collect in the field and prepare key instruments in Khmer language (questionnaires, logic models) as required; If need be, recommend adjustments to the tools in order to ensure their understanding in the local context;</p> | <ul style="list-style-type: none"> - A list of evaluation questions; questionnaires /interview guide; logic models adjusted to ensure understanding in the national context - A list of key data available; and to be collected - A brief assessment of the adequacy of the country's legislative and regulatory framework in the context of the project - Input to inception report | 7 days | Home-based |

| MAIN DUTIES | Concrete/measurable outputs to be achieved | Expected duration | Location |
|---|--|-------------------|--|
| Coordinate and lead interviews in local language and assist the team leader with translation where necessary; Analyze and assess the adequacy of legislative and regulatory framework, specifically in the context of the project's objectives and targets. | | | |
| Coordination of evaluation field mission agenda, ensuring and setting up the required meetings with project partners and government counterparts, and organize and lead site visits, in close cooperation with project staff in the field; Assist and provide detailed analysis and inputs to the team leader in the preparation of the inception report. | <ul style="list-style-type: none"> - Detailed evaluation schedule - List of stakeholders to be interviewed during the field mission | 6 days | Home-based (telephone interviews) |
| Participation in interviews during evaluation field missions | <ul style="list-style-type: none"> - Interview notes - Input to presentations of the evaluation's initial findings, draft conclusions and recommendations to stakeholders in the country at the end of the mission | 6-10 days | Home based, including in-country project sites |
| Draft evaluation report Prepare inputs and analysis to the evaluation report according to TOR and as agreed with the team leader. | Inputs to the draft evaluation report submitted to evaluation team leader | 4 days | Home-based |
| Final evaluation report and summary take-away message Contribute to the finalization of the evaluation report on basis of comments and suggestions received through the evaluation team leader; Contribute to the preparation of a two pages summary of a take-away message from the evaluation. | Inputs to the Final evaluation report submitted to evaluation team leader | 2-3 days | Home-based |
| TOTAL | | 25-30 days | |

REQUIRED COMPETENCIES

Core values:

1. Integrity
2. Professionalism

3. Respect for diversity

Core competencies:

1. Results orientation and accountability
2. Planning and organizing
3. Communication and trust
4. Team orientation
5. Client orientation
6. Organizational development and innovation

Managerial competencies (as applicable):

1. Strategy and direction
2. Managing people and performance
3. Judgement and decision making
4. Conflict resolution

MINIMUM ORGANIZATIONAL REQUIREMENTS

Education: Advanced university degree in energy science, engineering or other relevant discipline like developmental studies with a specialization in industrial energy efficiency and/or climate change.

Technical and functional experience:

- Exposure to the needs, conditions and problems in developing countries.
- Familiarity with the institutional context of the project is desirable.
- Experience in the field of environment and energy, including evaluation of development cooperation in developing countries and social safeguards and gender is an asset

Languages: Fluency in written and spoken English and Khmer is required.

Absence of conflict of interest:

According to UNIDO rules, the consultant must not have been involved in the design and/or implementation, supervision and coordination of and/or have benefited from the programme/project (or theme) under evaluation. The consultant will be requested to sign a declaration that none of the above situations exists and that the consultants will not seek assignments with the manager/s in charge of the project before the completion of her/his contract with the UNIDO Independent Evaluation Division.

Annex 4: Outline of an in-depth project evaluation report

Acknowledgement (incl. list of evaluation team members)

Abbreviations and acronyms

Glossary of evaluation-related terms

Executive summary

- Must provide a synopsis of the storyline which includes the main evaluation findings and recommendations
- Must present strengths and weaknesses of the project
- Must be self-explanatory and should be maximum 3-4 pages in length

I. Evaluation objectives, methodology and process

- Information on the evaluation: why, when, by whom, etc.
- Scope and objectives of the evaluation, main questions to be addressed
- Information sources and availability of information
- Methodological remarks, limitations encountered and validity of the findings

II. Country and project background

- Brief country context: an overview of the economy, the environment, institutional development, demographic and other data of relevance to the project
- Sector-specific issues of concern to the project²⁴ and important developments during the project implementation period
- Project summary:
 - Fact sheet of the project: including project objectives and structure, donors and counterparts, project timing and duration, project costs and co-financing
 - Brief description including history and previous cooperation
 - Project implementation arrangements and implementation modalities, institutions involved, major changes to project implementation
 - Positioning of the UNIDO project (other initiatives of government, other donors, private sector, etc.)
 - Counterpart organization(s)

III. Project assessment

This is the key chapter of the report and should address all evaluation criteria and questions outlined in the TOR (see section VI Project Evaluation Parameters).

Assessment must be based on factual evidence collected and analyzed from different sources. The evaluators' assessment can be broken into the following sections:

A. Project design

B. Implementation performance

- Ownership and relevance (Report on the relevance of project towards countries and beneficiaries, country ownership, stakeholder involvement)
- Effectiveness (The extent to which the development intervention's objectives, outcomes and deliverables were achieved, or are expected to be achieved, taking into account their relative importance)
- Efficiency (Report on the overall cost-benefit of the project and partner countries' contribution to the achievement of project objectives)
- Likelihood of sustainability of project outcomes (Report on the risks and vulnerability of the project, considering the likely effects of sociopolitical and institutional changes in partner countries, and its impact on continuation of

²⁴ Explicit and implicit assumptions in the logical framework of the project can provide insights into key-issues of concern (e.g. relevant legislation, enforcement capacities, government initiatives, etc.)

- benefits after the project ends, specifically the financial, sociopolitical, institutional framework and governance, and environmental risks)
 - Project coordination and management (Report project management conditions and achievements, and partner countries commitment)
 - Assessment of monitoring and evaluation systems (Report on M&E design, M&E plan implementation, and budgeting and funding for M&E activities)
 - Monitoring of long-term changes
 - Assessment of processes affecting achievement of project results (Report on preparation and readiness / quality at entry, financial planning, UNIDO support, co-financing, delays of project outcomes/outputs, and implementation approach)
- C. Gender mainstreaming
- At the end of this chapter, an overall project achievement rating should be developed as required in annex 8. The overall rating table should be presented here.

IV. Conclusions, recommendations and lessons learned

This chapter can be divided into three sections:

A. Conclusions

This section should include a storyline of the main evaluation conclusions related to the project's achievements and shortfalls. It is important to avoid providing a summary based on each and every evaluation criterion. The main conclusions should be cross-referenced to relevant sections of the evaluation report.

B. Recommendations

This section should be succinct and contain few key recommendations. They should:

- be based on evaluation findings
- be realistic and feasible within a project context
- indicate institution(s) responsible for implementation (addressed to a specific officer, group or entity who can act on it) and have a proposed timeline for implementation if possible
- be commensurate with the available capacities of project team and partners
- take resource requirements into account.

Recommendations should be structured by addressees:

- UNIDO
- Government and/or Counterpart Organizations
- Donor

C. Lessons learned

- Lessons learned must be of wider applicability beyond the evaluated project but must be based on findings and conclusions of the evaluation
- For each lesson, the context from which they are derived should be briefly stated

For further guidance on the formulation and expected quality of lessons learned, please consult the guidance document on lessons learned prepared by the UNIDO Independent Evaluation Division (annex 6). The document also includes a checklist on the quality of lessons learned.

Annexes should include the evaluation TOR, list of interviewees, documents reviewed, a summary of project identification and financial data, including an updated table of expenditures to date, and other detailed quantitative information. Dissident views or management responses to the evaluation findings may later be appended in an annex.

Annex 5: Checklist on evaluation report quality

Project title:

UNIDO Project ID:

GEF ID:

Evaluation team

Evaluation team leader:

National evaluation consultant:

Evaluation manager (IED):

Quality review done by:

Date:

| Report quality criteria | UNIDO Independent Evaluation Division assessment notes | Rating |
|---|--|--------|
| A. Was the report well-structured and properly written? (Clear language, correct grammar, clear and logical structure) | | |
| B. Was the evaluation objective clearly stated and the methodology appropriately defined? | | |
| C. Did the report present an assessment of relevant outcomes and achievement of project objectives? | | |
| D. Was the report consistent with the ToR and was the evidence complete and convincing? | | |
| E. Did the report present a sound assessment of sustainability of outcomes or did it explain why this is not (yet) possible? (Including assessment of assumptions, risks and impact drivers) | | |
| F. Did the evidence presented support the lessons and recommendations? Are these directly based on findings? | | |
| G. Did the report include the actual project costs (total, per activity, per source)? | | |
| H. Did the report include an assessment of the quality of both the M&E plan at entry and the system used during the implementation? Was the M&E sufficiently budgeted for during preparation and properly funded during implementation? | | |
| I. Quality of the lessons: were lessons readily applicable in other contexts? Did they suggest prescriptive action? | | |
| J. Quality of the recommendations: did recommendations specify the actions necessary to correct existing conditions or improve operations ('who?' 'what?' 'where?' 'when?'). Can these be immediately implemented with current resources? | | |
| K. Are the main cross-cutting issues, such as gender, human rights and environment, appropriately covered? | | |
| L. Was the report delivered in a timely manner? (Observance of deadlines) | | |

Rating system for quality of evaluation reports

A rating scale of 1-6 is used for each criterion: Highly satisfactory = 6, Satisfactory = 5, Moderately satisfactory = 4, Moderately unsatisfactory = 3, Unsatisfactory = 2, Highly unsatisfactory = 1, and unable to assess = 0.

Annex 6. Guidance and checklist on lessons learned quality criteria

UNIDO evaluation lessons learned

Definition

The Organisation for Economic Cooperation and Development's (OECD) Development Assistance Committee (DAC) (2002) defines lessons learned related to the evaluation of development assistance as follows: *“Generalizations based on evaluation experiences with projects, programs, or policies that abstract from the specific circumstances to broader situations. Frequently, lessons highlight strengths or weaknesses in preparation, design, and implementation that affect performance, outcome, and impact.”*²⁵

Focus
on
generalization

The International Labour Organisation (ILO) provides one of the most comprehensive definitions of lessons learned with relevance for evaluations in the UN system (2014) **“A lesson learned is an observation from project or programme experience which can be translated into relevant, beneficial knowledge by establishing clear causal factors and effects. It focuses on a specific design, activity, process or decision and may provide either positive or negative insights on operational effectiveness and efficiency, impact on the achievement of outcomes, or influence on sustainability. The lesson should indicate, where possible, how it contributes to 1) reducing or eliminating deficiencies; or 2) building successful and sustainable practice and performance”**²⁶.

Focus
on
transferability
&
generalization

UNIDO evaluation lessons learned contain information about the context, challenges, causal factors, target users and success/failure, as also shown in below **Lessons learned quality criteria checklist**.

What is not a lesson learned?

| | |
|---------------------------------|---|
| Lessons learned are not: | <p>Simply restating or paraphrasing existing doctrine, policy, process, etc. This does not qualify as an appropriate and bona fide lessons learned²⁷.</p> <p>Just applicable to a specific situation but applicable to a generic situation²⁸</p> <p>The same as recommendations. Recommendations usually refer to very specific situations including who should take action on what by when</p> |
|---------------------------------|---|

²⁵ <http://www.oecd.org/dataoecd/29/21/2754804.pdf>

²⁶ [ILO Evaluation Unit, 2014: Guidance Note 3: Evaluation lessons learned and emerging good practices](#)

²⁷ www.dtic.mil/ndia/2004cmmi/CMMIT2Tue/LessonsLearnedtc3.pdf

²⁸ www.globalhivmeinfo.org/Pages/Glossary.aspx www.globalhivmeinfo.org/DigitalLibrary/Digital%20Library/Glossary%20of%20Monitoring%20and%20Evaluation%20Terms.doc

Examples of lessons learned

| Source | Well-identified lessons learned in UNIDO evaluations |
|--|---|
| UNIDO, 2016: Independent UNIDO country evaluation: Thailand | <ul style="list-style-type: none"> A more effective collaboration between the government of Thailand and UNIDO (<i>context; target users</i>) will be more beneficial in developing a “country programme” that identifies the priority areas in which they should work together and then seek funding from potential sources (<i>success</i>) than the choice of the projects being driven by UNIDO on the basis of the financial support the latter is able to mobilize (<i>causal factor; challenge</i>). |
| UNIDO, 2017: Evaluación final independiente del proyecto: Centro de Automatización Industrial y Meca- trónica (Uruguay) | <ul style="list-style-type: none"> It is important that UNIDO projects get adequate technical in-house support (<i>context</i>). When this capacity is limited to persons that at a later stage get detached from the project the risk emerges (<i>challenge</i>) that UNIDO can’t adequately met the expectations raised (<i>causal factor; failure</i>). UNIDO (<i>target user</i>) risks to loose its reputation as a strategic partner in such situations. |
| UNIDO, 2016: Independent Terminal Evaluation: Demonstration of BAT/BEP in fossil fuel-fired utilities and industrial boilers in response to the Stockholm Convention on POPs | <ul style="list-style-type: none"> To UNIDO programme managers (<i>target users</i>): The implementation of this regional project involving six countries (<i>context</i>) was very challenging and required more time and better planning to meet deadlines (<i>challenge</i>). One important lesson that emerged is that the design should be kept simple. For the same set of objectives, the design should consider to have smaller number of components meaning less administrative burden and more flexibility (<i>success</i>) resulting in a better and more successful implementation process (<i>causal factor</i>). <i>Lesson learned was amended for this guideline.</i> |
| UNIDO, 2016: Independent terminal evaluation. Industrial Energy Efficiency in Ecuador | <ul style="list-style-type: none"> To UNIDO country director (<i>target user</i>): Lack of synergies (<i>challenge</i>) between energy efficiency projects and Clean Production activities developed by UNIDO at local level (<i>context</i>) drives to lose opportunities (<i>failure</i>) for a more efficient achievement of shared goals (<i>causal factor</i>). <i>Lesson learned was amended for this guideline.</i> |

Examples of statements that do not qualify as lessons learned

| Statements identified in UNIDO evaluation reports in the lessons learned sections that are in fact no lessons learned |
|--|
| <ul style="list-style-type: none"> “Focus on product development innovation methods and tools”. <i>The context, challenge, causal factors, success/failure and target users are omitted. This statement resembles more to a recommendation with suboptimal formulation.</i> |
| <ul style="list-style-type: none"> “UNIDO, as the International executing Agency, was instrumental in: a) introducing new technologies such as the Vallerani System, the use of Zander in tree planting; b) linking environmental preservation to economic development; c) providing support to the HCEFLCD for upgrading its nursery network”. <i>The context, challenge, causal factors, success/failure and target users are omitted. This statement is a finding.</i> |
| <ul style="list-style-type: none"> “Include in the peer review process also other agencies, such as UNEP and UNDP, which also support countries in the implementation of Enabling Activities and NIP update projects for the Stockholm Convention”. <i>The context, challenge, causal factors, success/failure and target users are omitted. This statement resembles more to a recommendation with suboptimal formulation.</i> |

Lessons learned quality criteria checklist

The evaluator should cite and explain the points below.

✓ **Context** – Explain the context from which the lesson has been derived (e.g. economic, social, political). If possible, point to any relevance to the broader UNIDO mandates or broader technical or regional activities.

✓ **Challenges** – Cite any difficulties, problems or obstacles encountered / solutions found - Positive and negative aspects should be described.

✓ **Causal factors** – Present evidence for “how” or “why” something did or did not work?

✓ **Target users affected by the lessons learned should be cited** (e.g. Management, programme managers, donors or beneficiaries)

✓ **Success or failure** – The lessons learned should cite any decisions, tasks, or processes that constitute reduced or eliminated deficiencies or built successful and sustainable practice and performance; or have the potential of success. Avoid repetition of failure

✓ **The lesson learned is not mistaken for a recommendation or conclusion**

(Source: ILO Evaluation Unit, 2014: Guidance Note 3: Evaluation lessons learned and emerging good practices, amended with UNIDO IEV)

For assessing the quality of evaluation lessons learner UNIDO uses a 6-point (with one point for each criterion) rating scheme:

Ratings 4-6 are satisfactory and meet quality criteria.

Ratings 1-3 are unsatisfactory and fail to meet quality criteria.

The criterion “The lesson learned is not mistaken for a recommendation or conclusion” **is an exclusion criterion**, i.e. when this criterion is met the lesson learned automatically fails the quality check regardless the quality in other criteria.

Annex 7. GEF Minimum requirements for M&E²⁹

Minimum requirement 1: Project design of M&E

All projects will include a concrete and fully budgeted M&E plan by the time of work program entry for full-sized projects (FSP) and CEO approval for medium-sized projects (MSP). This M&E plan will contain as a minimum:

- SMART indicators for project implementation, or, if no indicators are identified, an alternative plan for monitoring that will deliver reliable and valid information to management;
- SMART indicators for results (outcomes and, if applicable, impacts), and, where appropriate, indicators identified at the corporate level;
- Baseline for the project, with a description of the problem to be addressed, with indicator data, or, if major baseline indicators are not identified, an alternative plan for addressing this within one year of implementation;
- Identification of reviews and evaluations that will be undertaken, such as mid-term reviews or evaluations of activities; and
- Organizational set-up and budgets for monitoring and evaluation.

Minimum requirement 2: Application of project M&E

Project monitoring and supervision will include implementation of the M&E plan, comprising:

- SMART indicators for implementation are actively used, or if not, a reasonable explanation is provided;
- SMART indicators for results are actively used, or if not, a reasonable explanation is provided;
- The baseline for the project is fully established and data compiled to review progress reviews, and evaluations are undertaken as planned; and
- The organizational set-up for M&E is operational and budgets are spent as planned.

²⁹ http://www.thegef.org/gef/sites/thegef.org/files/documents/ME_Policy_2010.pdf

Annex 8. Rating tables

The following table should be used for rating the different key evaluation criteria:

Evaluation Rating Table

| # | Evaluation criteria | Definition | Mandatory rating |
|----------|---|---|------------------|
| A | Progress to impact | Positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended, including redirecting trajectories of transformational process and the extent to which conditions for trajectory change are being put into place. | Yes |
| B | Project design | Formulation of the intervention, the plan to achieve a specific purpose. | Yes |
| 1 | Overall design | Assessment of the design in general. | Yes |
| 2 | Logframe | Assessment of the logical framework aimed at planning the intervention. | Yes |
| C | Project performance | Functioning of a development intervention. | Yes |
| 1 | Relevance | The extent to which the aid activity is suited to the priorities and policies of the target group, recipient and donor. | Yes |
| 2 | Effectiveness | The extent to which the development intervention's objectives were achieved, or are expected to be achieved, taking into account their relative importance. | Yes |
| 3 | Efficiency | A measure of how economically resources/inputs (funds, expertise, time, etc.) are converted to results. | Yes |
| 4 | Sustainability of benefits | The continuation of benefits from a development intervention after major development assistance has been completed. The probability of continued long-term benefits. The resilience to risk of the net benefit flows over time. | Yes |
| D | Cross-cutting performance criteria | Other important criteria that cut across the UNIDO intervention. | |
| 1 | Gender mainstreaming | The extent to which UNIDO interventions have contributed to better gender equality and gender related dimensions were considered in an intervention. | Yes |
| 2 | M&E | Refers to all the indicators, tools and processes used to measure if a development intervention has been implemented according to the plan (monitoring) and is having the desired result (evaluation). | Yes |
| 3 | Results-based management (RBM) | Assessment of issues related to results-based work planning, results-based M&E and reporting based on results. | Yes |

| | | | |
|----------|--------------------------------|--|------------|
| E | Performance of partners | Assessment of partners' roles and responsibilities engaged in the intervention. | Yes |
| 1 | UNIDO | Assessment of the contribution of partners to project design, implementation, monitoring and reporting, supervision and backstopping and evaluation. The performance of each partner will be assessed individually, based on its expected role and responsibilities in the project life cycle. | Yes |
| 2 | National counterparts | | Yes |
| 3 | Donor | | Yes |
| F | Overall assessment | Overarching assessment of the project, drawing upon the analysis made under Project performance and Progress to Impact criteria above but not an average of ratings. | Yes |

It is acknowledged that some issues covered by one criterion might overlap with others. Yet to enable UNIDO to learn from the deeper evaluation analyses and lessons on a number of areas, separate criteria are included such as those on Monitoring and Evaluation and Results-Based Management. The consistent use of the criteria pertinent to the evaluation object allow for comparability of UNIDO's performance over time. Evaluation questions are formulated around those evaluation criteria in UNIDO, as specified in the following section.

Rating systems and criteria

UNIDO introduced a six-point rating system for the evaluation criteria in 2015, in line with the practice adopted by other development agencies, including the GEF. The aim of the system is to quantify the judgment of evaluators, identify good and poor practices, to facilitate aggregation within and across projects and enable tracking performance trends over a period. The six-point rating system, with six (6) representing the best and one (1) the worst score, allows for nuanced assessment of performance and results. The same rating scale is used for all rating areas as shown below.

UNIDO evaluation rating scale

| Score | | Definition* | Category |
|-------|---------------------------|---|----------------|
| 6 | Highly satisfactory | Level of achievement presents no shortcomings (90% - 100% achievement rate of planned expectations and targets). | SATISFACTORY |
| 5 | Satisfactory | Level of achievement presents minor shortcomings (70% - 89% achievement rate of planned expectations and targets). | |
| 4 | Moderately satisfactory | Level of achievement presents moderate shortcomings (50% - 69% achievement rate of planned expectations and targets). | |
| 3 | Moderately unsatisfactory | Level of achievement presents some significant shortcomings (30% - 49% achievement rate of planned expectations and targets). | UNSATISFACTORY |
| 2 | Unsatisfactory | Level of achievement presents major shortcomings (10% - 29% achievement rate of planned expectations and targets). | |

| Score | | Definition* | Category |
|-------|-----------------------|---|----------|
| 1 | Highly unsatisfactory | Level of achievement presents severe shortcomings (0% - 9% achievement rate of planned expectations and targets). | |

Note: * For impact, the assessment will be based on the level of *likely* achievement, as it is often too early to assess the long-term impacts of the project at the project completion point.

The table below contains the formula applied to transform the results of UNIDO’s six-point rating scale to the GEF’s four-point scale for sustainability³⁰.

Formula transforming UNIDO ratings into GEF ratings

| UNIDO rating | UNIDO rating: sustainability | GEF rating: sustainability |
|--------------|------------------------------|----------------------------|
| 6 | Highly likely (HL) | Likely (L) |
| 5 | Likely (L) | Moderately Likely (ML) |
| 4 | Moderately likely (ML) | Moderately Likely (ML) |
| 3 | Moderately Unlikely (MU) | Moderately Unlikely (MU) |
| 2 | Unlikely (U) | Moderately Unlikely (MU) |
| 1 | Highly unlikely (HU) | Unlikely (U) |

This formula underscores the distinction of ratings into “satisfactory” and “unsatisfactory”, both in applying UNIDO’s six-point rating scale and the transformation into the GEF four-point rating scale for sustainability. To ensure coherence in ratings, the rating is defined above. The use of benchmarks like the performance of peers for the same criteria helps to facilitate the interpretation of ratings.

Project design

Criteria for rating project design are related to the logical framework approach and the quality of overall project design. These criteria include:

Overall design quality

- Pertinence to country priorities, needs of target groups and UNIDO strategies
- Consideration and use of lessons and evaluative evidence from other projects
- Technical feasibility and validity of project design
- Budgeted M&E plan with clear timelines, roles, and responsibilities
- Adequacy of risk assessment (for example financial, sociopolitical, institutional, environmental and implementation aspects)

Logframe/logframe-like matrix based on the project’s theory of change

- Clarity and logic of results-chain, including impacts, outcomes and outputs
- SMART indicators
- Adequacy of Means of Verification and Assumptions

³⁰ GEF uses a four-point scale for the criterion of sustainability.

Implementation performance

Implementation performance criteria correspond broadly to DAC criteria and need to be customized according to the context of the intervention to be evaluated.

- Relevance
- Effectiveness
- Efficiency
- Progress to Impact
- Sustainability of benefits

Partners' performance

UNIDO's projects are characterized by a group of main partners with specific roles and responsibilities. UNIDO itself acts as project implementer and supervisor. Though supplemented by implementation performance criteria listed above, the criteria to assess UNIDO as a partner are more specific and help to address frequent issues in its performance. Governments are local executors, and owners of the project and donors provide project funding. Hence, rating the partners is a key part of UNIDO project evaluations³¹. The six-point rating scale applies³².

The key issues to be addressed to rate **UNIDO's performance** are:

Project design

- Mobilization of adequate technical expertise for project design
- Inclusiveness of project design (with national counterparts)
- Previous evaluative evidence shaping project design
- Planning for M&E and ensuring sufficient M&E budget

Implementation

- Timely recruitment of project staff
- Project modifications following changes in context or after the Mid-Term Review
- Follow-up to address implementation bottlenecks
- Role of UNIDO country presence (if applicable) supporting the project
- Engagement in policy dialogue to ensure up-scaling of innovations
- Coordination function
- Exit strategy, planned together with the government
- Overall effectiveness of project management as outlined in the Project Document
- Project's governance system
- National management and overall coordination mechanisms
- UNIDO HQ-based management, coordination, monitoring, quality control and technical input

To assess the *performance of national counterparts*, the evaluation looks into the following issues:

Project design

- Responsiveness to UNIDO's invitation for engagement in designing the project

³¹ As practiced by the World Bank and the International Fund for Agriculture Development.

³² 6 = Highly satisfactory; 5 = Satisfactory; 4 = Moderately satisfactory; 3 = Moderately unsatisfactory; 2 = Unsatisfactory; 1 = Highly unsatisfactory

Implementation

- Ownership of the project
- Financial contributions (cash or in-kind)
- Support to the project, based on actions and policies
- Counterpart funding
- Internal government coordination
- Exit strategy, planned together with UNIDO, or arrangements for continued funding of certain activities
- Facilitation of the participation of Non-Governmental Organizations (NGOs), civil society and the private sector where appropriate
- Suitable procurement procedures for timely project implementation
- Engagement with UNIDO in policy dialogue to promote the up-scaling or replication of innovations

For the assessment of *donor performance*, the following issues require ratings:

- Timely disbursement of project funds
- Feedback to progress reports, including Mid-Term Evaluation, if applicable
- Support by the donor's country presence (if applicable) supporting the project for example through engagement in policy dialogue

Gender mainstreaming

The UNIDO Policy on gender equality and the empowerment of women, issued initially in April 2009, and revised in March 2015 (UNIDO/DGB/(M).110/Rev.), provides the overall guidelines for establishing a gender mainstreaming strategy and action plans to guide the process of addressing gender issues in the Organization's industrial development interventions. It commits the organization that evaluations will demonstrate effective use of the UNEG guidance on evaluating from a human rights and gender equality perspective, as indicated by the Organization's meta-evaluation scores according to the UNEG Evaluation Scorecard.

In line with the UNIDO Gender Equality and Empowerment of Women Strategy, 2016-2019, all UNIDO technical assistance projects post-2015 are to be assigned a gender marker and should go through a gender mainstreaming check-list before approval. UNIDO's gender marker is in line with UN System-wide action plan (SWAP) requirements, with four categories: 0 — no attention to gender, 1 — some/limited attention to gender, 2a — significant attention to gender, 2b — gender is the principal objective³³.

Besides, Guides on Gender Mainstreaming for Inclusive and Sustainable Industrial Development (ISID) Projects in different areas of UNIDO's work have been developed and published during 2015³⁴, which have specific guidance on suitable outputs/activities/ indicators per technical area.

If the project design and gender analysis/existing indicators are not sufficient to allow for an accurate appraisal at the final evaluation, specific indicators could be created during the evaluation planning stage (preparing and revising the inception report) and assessed during the evaluation process. Together with the budget, the time required to adequately carry out a gender responsive evaluation will need to be taken into account. The evaluation time depends on the

³³ http://intranet.unido.org/intra/Gender_Mainstreaming_Tools_and_Guides

³⁴ www.unido.org/en/what-we-do/cross-cutting-issues/gender/publications.html

questions the assessment needs to answer, on how deep the analyses are requested to be, and on financial and human resources available as well as other external factors.

For terminal evaluations of projects that have been approved after 2015, evaluations should assess if the rating was correctly done at entry, if appropriate outputs/activities/indicators and monitoring were put in place during implementation and what results can be actually observed at the time of terminal evaluation (in line with UNIDO's organizational results reporting to SWAP). The Gender Mainstreaming six-point rating scale should then be used accordingly.

For projects that have **2a** or **2b ratings** at project design/entry at least one evaluation team member should have demonstrated/significant experience in evaluating GEEW projects. For other projects, evaluators are encouraged to further familiarize themselves with the key gender aspects and impacts of UNIDO projects, both through the foundation modules of "I know Gender" online course of UN Women and the UNIDO's Guides on Gender Mainstreaming ISID Projects.

Annex IV: List of documents referred

| Title | Date/ Period |
|--|--|
| Project Document | September 2011 |
| Mid-Term Evaluation Report | October 2015 |
| Mid-Term Review Report (Mtr) | September 2015 |
| Minute of Steering Committee Meeting | <ul style="list-style-type: none"> • February 2015 • December 2016 |
| Minute of Technical Working Group Meetings | <ul style="list-style-type: none"> • 1st, May 2017 • 2nd, June 2017 • 3rd, July 2017 |
| Annual Project Implementation Report (Pir) | 2013, 2014, 2015, 2016, 2017 |
| GEF Annual Monitoring Report FY 2017 | 2016 - 2017 |
| Project Progress Update Report | 2016 - 2017 |
| Work Plan | 2013, 2014, 2015, 2016, 2017, 2018. |
| Feasibility studies | <ul style="list-style-type: none"> • Feasibility Study AMRU Rice Noodle Enterprise. • Feasibility Study Bayon Heritage Holding Group Co., Ltd. • Feasibility Study Medai GB Enterprise Co., Ltd. • Feasibility Study INDOCHINA Rice Mill Ltd. • Feasibility Study MISOTA Food Import Export Co., Ltd. |
| Policy documents | <p>Proceeding Report (draft). Consultative Workshop on Policy Needs on Renewable Energy Development. Phnom Penh August 2018.</p> <p>Review of Renewable Energy Policy Framework in Cambodia. UNIDO. 2018.</p> |
| Material for 2-day trainings workshops | <ul style="list-style-type: none"> • “Biomass Based Power Generation Technology by Co-generation Technology”. Phnom Penh . October 2014. • “Biomass Technology, Feasibility Studies and Technology Transfer”. Phnom Penh. March 2018. |
| Material for 1-day training workshops. | <ul style="list-style-type: none"> • “Biomass Technology, Feasibility Studies and Technology Transfer”, Phnom Penh, March 2018. • “Conditions and Procurement procedure of the project”, Phnom Penh, May 2018. |