



## Project Implementation Report

(1 July 2022 – 30 June 2023)

<b>Project Title:</b>	<i>Reducing Greenhouse Gas Emission in Industrial Sector through Pelletization Technology Lao PDR</i>
<b>GEF ID:</b>	<i>5743</i>
<b>UNIDO ID:</b>	<i>140057</i>
<b>GEF Replenishment Cycle:</b>	<i>GEF-5</i>
<b>Country(ies):</b>	<i>Lao PDR</i>
<b>Region:</b>	<i>East Asia and Pacific</i>
<b>GEF Focal Area:</b>	<i>Climate Change Mitigation (CCM)</i>
<b>Integrated Approach Pilot (IAP) Programs<sup>1</sup>:</b>	<i>N/A</i>
<b>Stand-alone / Child Project:</b>	<i>Stand-alone</i>
<b>Implementing Department/Division:</b>	<i>EAE/ENE/CTI</i>
<b>Co-Implementing Agency:</b>	<i>No selection</i>
<b>Executing Agency(ies):</b>	<i>Department of Industry and Handicrafts (DIH), Ministry of Industry and Commerce Renewable Energy and New Materials Institute (REMI), Ministry of Science and Technology</i>
<b>Project Type:</b>	<i>Medium-Sized Project (MSP)</i>
<b>Project Duration:</b>	<i>72 months</i>
<b>Extension(s):</b>	<i>Four extensions (November 2019-to November 2020; Nov. 2020 – Dec. 2021, Dec 2021- Dec 2022, 1 Jan. 2023 - 31 Mar 2023)</i>
<b>GEF Project Financing:</b>	<i>1,268,539 USD</i>
<b>Agency Fee:</b>	<i>120,511 USD</i>
<b>Co-financing Amount:</b>	<i>6,690,000 USD</i>
<b>Date of CEO Endorsement/Approval:</b>	<i>09/28/2015</i>
<b>UNIDO Approval Date:</b>	<i>03/07/2014</i>
<b>Actual Implementation Start:</b>	<i>11/02/2015</i>
<b>Cumulative disbursement as of 30 June 2023:</b>	<i>1,260,226.74</i>
<b>Mid-term Review (MTR) Date:</b>	<i>N/A</i>

<sup>1</sup> Only for **GEF-6 projects**, if applicable

Original Project Completion Date:	11/2/2019
Project Completion Date as reported in FY22:	12/31/2022
Current SAP Completion Date:	3/31/2023
Expected Project Completion Date:	3/31/2023
Expected Terminal Evaluation (TE) Date:	1/5/2022
Expected Financial Closure Date:	12/31/2023
UNIDO Project Manager <sup>2</sup> :	Jossy Thomas

## I. Brief description of project and status overview

Project Objective		
<p>The GEF5 project "Reducing of greenhouse gas (GHG) emissions in the industrial sector through pelletization technology in Lao PDR" aims at promoting the production and usage of industrial grade solid bio-fuel for thermal energy generation. In this way the project intends to reduce coal consumption and promote waste-to-energy methods. Thus, the project aims to contribute to the sustainable energy usage practices in Lao. This shall enhance national energy security, to promote job creation and to reduce carbon dioxide emissions as well as avoid deforestation. The project will employ a two-pronged strategy of removing technological barriers for both producers and end users on one hand, and improving policies to expedite investments in the production and use of solid biofuels. This will be done through building necessary human and institutional capacities at all levels. In particular, this project will involve salt production companies as users of solid biofuels and the furniture manufacturers and saw mills as generators of wood wastes; focusing on synergies in particular on the efficient use of wood waste to cover not only the own power needs of the wood processing industry but also cover energy needs of the salt industry.</p> <p>By achieving this, the project will reduce GHG emissions as well as promote the use of available agricultural waste</p>		
Project Core Indicators		Expected at Endorsement/Approval stage
6	Greenhouse Gas Emissions Mitigated (metric tons of CO <sub>2</sub> e)	1,465 tCO <sub>2</sub> e
11	Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment	x
x	x	x

Baseline
<p>Owing to the traditional method of production by evaporating brine water into salt, Lao PDR's salt has increasingly become a niche product due to its authenticated and pure taste. As per the information from Lao PDR salt producer's association, there are eight salt factories in the country excluding small producers with one or two boiling pots. Annual production in these factories is around 3,500 ton of industrial salt and around 32,200 tons of table salt. Starting from the year 2010, owing to increased price and scarcity of sawdust in market added with higher transportation cost, the industries started using anthracite cakes as additional fuel source. These cakes are made from low heating value grade anthracite purchased from cement factories and clay. There is a potential for replacing the anthracite and its products usage in salt industries through the pellets generated from wood wastes 25 and other biomass.</p>

Please refer to the explanatory note at the end of the document and select corresponding ratings for the current reporting period, i.e. FY23. Please also provide a short justification for the selected ratings for FY23.

<sup>2</sup> Person responsible for report content

In view of the GEF Secretariat's intent to start following the ability of projects to adopt the concept of adaptive management<sup>3</sup>, Agencies are expected to closely monitor changes that occur from year to year and demonstrate that they are not simply implementing plans but modifying them in response to developments and circumstances or understanding. In order to facilitate with this assessment, please introduce the ratings as reported in the previous reporting cycle, i.e. FY22, in the last column.

Overall Ratings <sup>4</sup>	FY23	FY22
Global Environmental Objectives (GEOs) / Development Objectives (DOs) Rating	<i>Moderately Satisfactory (MS)</i>	<i>Satisfactory (S)</i>
<i>Only Simmalakham briquette factory out of the three identified private investors has completed the installation of a 25 ton per day biomass pellet plant within its facility.</i>		
Implementation Progress (IP) Rating	<i>Moderately Satisfactory (MS)</i>	<i>Satisfactory (S)</i>
<i>The biomass energy strategy has been drafted but not yet finalized as expected by the end of 2022. Most of the pending activities for this reporting period have been completed and the project is operationally closed.</i>		
Overall Risk Rating	<i>Moderate Risk (M)</i>	<i>Moderate Risk (M)</i>
<i>The project is operationally completed with most of the outputs already achieved.</i>		

## II. Targeted results and progress to-date

Please describe the progress made in achieving the outputs against key performance indicator's targets in the project's **M&E Plan/Log-Frame at the time of CEO Endorsement/Approval**. Please expand the table as needed.

Project Strategy	KPIs/Indicators	Baseline	Target level	Progress to-date (July 2022- June 2023)
<b>Component 1 – Capacity development and knowledge management</b>				
Outcome 1: Improved awareness, knowledge and capacity on solid biofuel production and usage in the country				
Output 1.1: An information and learning centre for solid biofuel production and usage established	I&LC for solid biofuel usage and production created and functioning.  Number of trainings organized for different target groups (such as policy makers,	Lack of one-stop technical centre on solid biofuel usage and production.	To establish a sustainable centre for technical capacity building.  To undertake training activities to improve the awareness on solid biofuel of 20 beneficiaries in each target groups.	Laboratory at BTILC: <ul style="list-style-type: none"> <li>List of required equipment has been developed by UNIDO international expert</li> <li>ToR for procuring the equipment is being developed</li> <li>UNIDO announce call for proposals for the lab equipment with the RFX7000004698</li> </ul>

<sup>3</sup> Adaptive management in the context of an intentional approach to decision-making and adjustments in response to new available information, evidence gathered from monitoring, evaluation or research, and experience acquired from implementation, to ensure that the goals of the activity are being reached efficiently

<sup>4</sup> Please refer to the explanatory note at the end of the document and assure that the indicated ratings correspond to the narrative of the report

	solid biofuel producers & users, RE / technical institutions and bank / financial institutions).		To target at least 20% women participation in each group.	<ul style="list-style-type: none"> <li>Suppliers had submitted proposal, UNIDO evaluated and selected vendor for supplying the equipment</li> </ul>
Output 1.2: Capacity of at least 20 policy makers developed and capacities of potential solid biofuel producers & users, RE / technical institutions and bank / financial institutions developed (target 20 persons).	<p>No. of key policy makers available with sufficient knowledge on solid biofuel.</p> <p>No. of persons trained.</p>	<p>Key policy makers are not aware of the benefits of solid biofuel production and utilization.</p> <p>2. Insufficient local capacity to develop, finance and operate solid biofuel production and usage systems.</p>	<p>To build capacity of at least 20 policy makers</p> <p>To train at least 20 industries and the identified institutions on solid biofuel production, system implementation and maintenance.</p> <p>To target at least 20% women participation in each group.</p>	No new progress to-date
<b>Component 2 – Strengthening policy and regulatory framework for promoting investments in solid biofuel use in industries</b>				
Outcome 2: Improved confidence among investors in solid biofuel production and utilization				
Output 2.1: Database developed on agro & wood wastes availability and on final energy consumption in industrial sector	<p>No. of solid biofuel production units.</p> <p>No. of solid biofuel co-firing plants.</p>	Lack of comprehensive data.	<p>To demonstrate solid biofuel production plants for at least 3.6 tph cumulative capacity.</p> <p>Industries co-firing at least 3.6 tph solid bio-fuel with anthracite.</p> <p>3. Replicate at least 18 tph solid bio-fuel production plants.</p>	No new progress to-date
Output 2.2: National strategy to promote investment in solid biofuel production and utilization in place (international & national experts to be contracted)	<p>No. of strategies facilitated to promote investment in production and utilization of solid biofuel.</p> <p>No. of standards ensuring quality of the produced solid biofuel.</p>	Inadequate policies and regulations to create confidence among various stakeholders	<p>At least one relevant strategy for promoting investment in production and utilization of solid biofuel.</p> <p>At least one quality standard for solid biofuel established.</p>	<ul style="list-style-type: none"> <li>The PSC agreed that the biomass strategy shall be developed and it should be conducted by the Department of Industry and handicraft represented by the Cleaner Production Center Lao PDR</li> <li>CPC-L is drafting the biomass energy strategy by organizing the consultation workshop in Vangvieng in July 2022, first validation workshop in Thakhaek Khammouane province in October 2022 and second validation workshop in July 2023 for the final draft of the biomass energy strategy.</li> </ul>
<b>Output 2.3:</b> Technical adjustments for solid biofuel usage in participating industries	No. systems developed to co-fire or combust pellet fuel	<p>1. Lack of demonstrable wood pellet combustion systems.</p> <p>2. Industries currently use coal or anthracite.</p>	Industries installed with adequate combustion systems to burn wood pellet	<ul style="list-style-type: none"> <li>It has been decided in the PSC to transfer the Jacketed steam boiler of the pilot in Veunkham to other factory to use it. Identification of suitable user is conducted by CPC-L, considering the lack of pellet need to be used for running the boiler, there is no decision to handover the equipment to other party..</li> </ul>

				<ul style="list-style-type: none"> <li>The design and installation of new furnace pellet technology had been prepared by CPC-L and it was combine with the Biomass energy strategy under a waiver request and include in the RFP 700004770.</li> <li>UNIDO is preparing contract given to CPC-L together with output 2.2 biomass strategy formulation</li> <li>CPC-L had started the construction, installation in early 2022 and commissioning and completed the installation of pellet furnace in early 2023.</li> </ul>
<b>Component 3 – Demonstration of solid biofuel production and utilization</b>				
Outcome 3: Increased use of solid biofuel for industrial applications				
Output 3.1: Systematic and comprehensive biomass resource assessment in target areas	No. of biomass resource assessment reports.	Lack of reports on available biomass resource and logistics	At least one biomass assessment report for each target area.	No new progress to date
Output 3.2: Detailed plant designs prepared for the demonstration projects	No. of detailed plant designs.	Lack of detailed plant design reports.	To develop detailed plant design reports for each demonstration plant.	No new progress to date
Output 3.3: Solid biofuel pelletizing systems established for a cumulative capacity of 3.6 tph	TPH of the installed solid biofuel pelletizing systems.	<ol style="list-style-type: none"> <li>Lack of demonstrable solid biofuel pelletizing systems.</li> <li>Available agro-wastes being unutilized.</li> </ol>	Solid biofuel plants for a cumulative 3.6 tph capacity demonstrated.	Simmalakham briquette factory had completed their installation and production of pellet plant in Q1 2023,

### III. Project Risk Management

1. Please indicate the overall project-level risks and the related risk management measures: (i) as identified in the CEO Endorsement document, and (ii) progress to-date. Please expand the table as needed.

	(i) Risks at CEO stage	(i) Risk level FY 22	(i) Risk level FY 23	(i) Mitigation measures	(ii) Progress to-date	New defined risk <sup>5</sup>
1	Political risk: Low government commitment and support for transfer of solid biofuel production and utilization technology to the country	Low risk (L)	Low risk (L)	The project objectives and activities are perfectly in line with national policies and objectives for climate change mitigation through GHG reduction	No political risk encountered so far. High level government commitment exists. However, this does not translate into proactive interested and support of the project at lower hierarchy levels. In particular, there is only little progress at REMI/ BTILC.	<input type="checkbox"/>
2	Technical risk: Solid biofuel technologies are relatively new in the country, and there	Low risk (L)	Low risk (L)	Detailed techno-economic feasibility studies will be carried out. The technical personnel in the industries will be trained on deployment of such technologies. Capacity of the	Biomass Technology Information and Learning Center (BTILC) had been established under the Renewable Energy and new Materials Institute, ministry of science and technology (MOST) in	<input type="checkbox"/>

<sup>5</sup> New risk added in reporting period. Check only if applicable.

	is a lack of technical expertise for development and implementation of such projects.			government officials and relevant institutions will be built.	December 2018. The center has been built their capacity to be able to provide technical assistance to enterprise with pelletization technology and information. The government of Laos has dissolved the MOST and REMI is transferred to ministry of energy and mines. Up to date REMI still exist and BTILC is still operated under REMI.	
3	Market risks: No offtakers for the generated solid biofuel.	Low risk (L)	Low risk (L)	The demand for clean and cheap fuel is very high among Lao PDR industries	The project is trying to create a market demand for biomass pellets. On the one hand, the project works to adapt the salt production process, so that it can use biomass pellets. On the other hand, the world bank is trying to introduce cookstoves in Lao PDR that use biomass pellets. Discussions with the world bank team have been made to identify possible synergies. Also discussions with MimiMoto, potential supplier of cookstoves for Lao have been made to check on technical aspects, e.g. to ensure that produced pellets can be used in the cookstoves. In addition, the project is formulating biomass energy strategy to promote the production and utilization of pellet solid biofuel.	<input type="checkbox"/>
4	Sustainability risk: Application of solid biofuel production technologies in agroindustries might be halted by the shortage of inputs. Lack of human capacity to operate the demonstration projects.	Low risk (L)	Low risk (L)	All the demonstration projects O&M staffs will be trained by the respective suppliers. Moreover, under the project, there will be several trainings on successful operation and maintenance of biomass and biogas projects. In addition to this, information and learning centre will be established for continuous capacity building activities. All these would sustain the objectives of the proposed project.	Some sustainability risk encountered so far. Staff at the factories as well as BTILC staff (REMI) and other stakeholders are closely involved in all activities to assure transfer of knowledge. Formal launch of BTILC was in December 2018. The pilot system at Veunkham salt factory is not in operation and some part start to corrode since no solid biofuel (pellets) are yet produced in Lao PDR and the import is too expensive. The greenhouse solar dryers are well operated at Veunkham salt factories for drying wet salt but not so well at Khosath salt factory for evaporate brine in comparison to normal conventional sun drying in opened yard. A new pellet furnace system was installed and commissioning at Veunkham salt factory to demonstrate the use of solid biofuel (pellet) in traditional salt cooking	<input type="checkbox"/>
5	Climate Change risk: Flooding	Low risk (L)	Low risk (L)	Demonstration plant and site office will be located on an elevated area to prevent flooding. All buildings and structures will be designed and built appropriately to avoid flooding.	Some climate change risk encountered so far at Veunkham salt where the pilot system for salt production using pellets has been installed. The system has been threatened by a flood due to rainy season combined with a broken dam (Xe Pian-Xe Nam Noy dam; <a href="https://thediplomat.com/2018/08/laosdam-disaster-may-not-be-its-last/">https://thediplomat.com/2018/08/laosdam-disaster-may-not-be-its-last/</a> ). However, it will be closely considered in the feasibility studies to be conducted.	<input type="checkbox"/>
6	Feedstock availability: Uncertainty of supply of biomass feedstock from wood processing factories due to the prime minister decree 15/PO	Substantial risk (s)	Substantial risk (s)	The project aims at diversifying solid biomass waste used for pellet production. For instance, the project identified risk husk and other biomass resources as potential feedstock during the conducted biomass resource assessment.	The project a biomass resource assessment to identify other possible feedstock for solid biomass pellets. Government of Laos has recently announced that processing and moving of existing wood, product and raw material for the purpose of manufacturing and create value of the woody raw material	

	dated one 13 May 2016 on forest management, restricting logging and movement in the wood business				(agreement of the Ministry of Industry and Commerce on approval of wood product for export, include wood pellet no 939/MOIC.DoIH dated on 1 <sup>st</sup> August 2019). This could again open the market for wood waste pellets.	
7	Covid-19 pandemic	Substantial risk (s)	Moderate risk (m)	All capacity building activities and events will consider recommendations from health authorities how to minimize the risk of infection of covid-19, such as physical distancing.	<p>Lao was and is also affected from the COVID-19 pandemic in the year 2020 and also 2021. Lao government had recently announced a ban on local and international travel, national and international borders, and physical distancing in public and working office from April to June 2021.</p> <p>Subsequently, the borders are closed for the public, with exception for diplomatic reasons, transport of goods, experts, workers, and students that need to enter Laos. However, they must follow the instruction of the task force committee such as quarantine.</p> <p>General basic prevention measurements are wearing mask and frequently washing hands with soap and alcoholic or disinfected washing gel, avoid to go area of crowded people etc. UNIDO staff and vendors are taking the precautions announced by the UNDP/UNIDO safety rule against COVID-19.</p> <p>Person meetings and trainings are avoided and instead online meetings and trainings are held. If possible smaller groups from the same office gather in one place. Government staff were requested to work by rotating basis. UNIDO staff were also requested to work from home during the period.</p>	

2. If the project received a **sub-optimal risk rating (H, S)** in the previous reporting period, please state the **actions taken** since then to mitigate the relevant risks and improve the related risk rating. Please also elaborate on reasons that may have impeded any of the sub-optimal risk ratings from improving in the current reporting cycle; please indicate actions planned for the next reporting cycle to remediate this.

N/A

3. Please indicate any implication of the **COVID-19** pandemic on the progress of the project.

The COVID-19 pandemic has affected the implementation of the project activities, especially the activities connected to travel and group gatherings, such as trainings. Travel within the country and international travel is on hold. Since the pandemic started in February 2020, and last till end of 2021. The Government of Lao had taken measurement to protect and intercept COVID-19 at an early stage by lock down the country since end of April 2021 to end of November 2021. This included a ban on internal travel between provinces and immigration of foreigner to Laos. Project office had to be closed some time to follow the instruction of COVID-19 committee to keep social distance and work from home.

Form the measurement taken both from Lao government and UNIDIO, it affected directly the implementation of project activities. Some activities could not be implemented as planned such as the pelltization workshop for policy makers, which shall be organized by BTILC. As the main activities in 2021 were the procurement of the laboratory equipment, the formulation of the biomass strategy and the demonstration of the pellet plant installed. The COVID-19 affected the implementation of those project activities and lead to delayed of the implementation in from 2020-2022.

4. Please clarify if the project is facing delays and is expected to request an **extension**.

N/A

5. Please provide the **main findings and recommendations of completed MTR**, and elaborate on any actions taken towards the recommendations included in the report.

*TE was conducted and completed in January 2022, some points were concluded as below:*

**Efficiency:** Project commenced in October 2015 with a project implementation period of 36 months. At the time of the terminal evaluation, the initially foreseen time of 36 months had been surpassed by 36 months. At the time of the terminal evaluation, although several activities had been accomplished, even additional activities, pellet production had not commenced and a shift in industries from traditional fossil fuel to solid biofuel had also not commenced. Additional activities, such as the demonstration of solar dryer, have taken place. Nonetheless, the order of activities was not appropriate, for example, the data collection for resource and sinks assessment should have been carried out latest right after project commencement. USD 1,268,539 has been provided by the GEF, and from that, USD 318,875 is still left for implementing a few activities in 2022.

The overall rating for efficiency is '**unsatisfactory**'.

**Effectiveness:** Several activities have been accomplished, namely, energy audits at 7 salt factories, demonstration of pellet-fired steam boiler and jacket, comprehensive data collection from 262 factories for the resource and sinks assessment, guidebook on pellets. Additional activities have been carried out, which were initially not foreseen, namely, demonstration of solar dryer at two salt factories. Three out of eight technical Outputs have been achieved; three partially achieved; and two not (yet) achieved. Two Outcomes are partially achieved; and one not (yet) achieved. A few activities are expected to be accomplished in 2022, for example, the installation of pellet machine and commencement of pellet production at three factories and the preparation of a national biomass strategy.

The overall rating for effectiveness is '**moderately unsatisfactory**'.

*Some recommendation from the TE:*

For **Project**:

- Should prepare a concrete exit-strategy;
- Should ensure linkage with the World Bank pellet-cooking-stove program;
- Invite Department of Forestry/Ministry of Forests and Agriculture to participate in the project;
- Support the enterprises to implement non-cost/low-cost recommendations from the energy audits, also taking the gender aspect into consideration;
- Prepare a workplan for 2022;
- International Expert for pellets to visit the new pellet-production factories, in 2022 (as realistic due to COVID-19), to assess the installed pellet-producing equipment, processes, inputs, and pellets, carry out (hands-on) training and make recommendations for enhancement of production and quality, as necessary;
- Expedite the preparation of the national biomass strategy and ensure completion within 2022;
- Prepare and implement, at the earliest, an alternative plan for usage of the steam boiler and jacket (from the demonstration);
- Explore ways to mainstream gender in project activities;
- Holding a workshop on preparing project proposal and monitoring, for national stakeholders, especially for BTILC staff;
- Consider supporting Laos to prepare an incentive system for enterprises for shifting to biomass fuel;

- Ensure consistency in project reporting, especially regarding number of participants and gender-disaggregated data;
- Maintain project-related documentation in a structured way;
- Consider cross-checking with other, also previous, UNIDO projects regarding synergies (for example, with partner institutions of the previous UNIDO boiler project in Laos);
- In view of the project extension, UNIDO should conduct an update to the terminal evaluation shortly before the end of the project, covering activities carried out since January 2022/not covered by this evaluation, till project completion.

#### IV. Environmental and Social Safeguards (ESS)

1. As part of the requirements for **projects from GEF-6 onwards**, and based on the screening as per the UNIDO Environmental and Social Safeguards Policies and Procedures (ESSPP), which category is the project?

- Category A project
- Category B project
- Category C project

(By selecting Category C, I confirm that the E&S risks of the project have not escalated to Category A or B).

Please expand the table as needed.

	E&S risk	Mitigation measures undertaken during the reporting period	Monitoring methods and procedures used in the reporting period
(i) Risks identified in ESMP at time of CEO Endorsement	N/A	N/A	N/A
(ii) New risks identified during project implementation (if not applicable, please insert 'NA' in each box)	N/A	N/A	N/A

#### V. Stakeholder Engagement

1. Using the previous reporting period as a basis, please provide information on **progress, challenges and outcomes** regarding engagement of stakeholders in the project (based on the Stakeholder Engagement Plan or equivalent document submitted at CEO Endorsement/Approval).

Veunkham salt factory, one of the private investors benefitting from the project, mobilized the required financing to install and commission a pilot pellet furnace at Veunkham salt factory in early 2023. The result of the pilot was quite satisfied. With the new furnace, the pellet produced is used to replace coal used for heating the brine solution to make salt. In addition, three companies got financial incentives from the GEF grant. From the three companies only Simmalakham briquette factory has utilized the result-based financing facility to complete its proposed pellet plant and

ready for production since May 2022. The other two private developers are hesitating to invest due the lack of confidence of the market.

2. Please provide any feedback submitted by national counterparts, GEF OFF, co-financiers, and other partners/stakeholders of the project (e.g. private sector, CSOs, NGOs, etc.).

Feedback from RIEM

“On behalf of Research Institute of Energy and Mines, as a project partner of Reducing of Green House Gas (GHG) emission in the industrial sector through pelletization technology in Lao P D R. I would like to share with you on the feedback from RIEM in the progress of implementation of establishment and operating the Biomass Technology Information and Learning Centre (BTILC) in 2023. As we know there are three phases of establishment and operating namely Start-up phase with 6 months of implementation, Incubation phases with 18 months of implementation and sustainable phase that implement onward of project end. In 2023, we are still implementing the start-up phase which started since 2018. There are 8 main activities with 19 sub-activities to be done in this phase, until now just only 4 sub-activities had been implemented and some sub-activities are ongoing of implementation. If compare to planed schedule and project life, the implementation is quite late. The procurement of laboratory equipment was completed in early 2022 and the setting up the laboratory was completed in May 2022, thanks to UNIDO. The project was officially closed in November 2022, however, it was a non-cost extension to 31 March 2023. Even though the project was closed but the collaborator with RIEM which took the role of REMI just started. So, RIEM would like to continue working with UNIDO in other project on R&D and thank you for the great support to UNIDO and GEF as donor and apologize for all the failures.”

Feedback from DIH

“On my behalf of the executing agency, I found that since the project commencement in early 2016, there were many activities have been implemented. The main output in Component 1 was the establishment of Biomass Technology Information and Learning Center (BTILC) at RIEM, in Component 2 was the biomass resource assessment conducted by the Cleaner Production Center of Laos, and Component 3 was the installation and testing of greenhouse dryers at two salt factories, energy audits at salt factories, and pilot salt cooking that uses jacketed-steam vessel and pellet fuel boilers in 2017 and 2018, as well as intervention of investment on pellet by technical and partial financial support from UNIDO in since 2019. In 2023, there was pilot on pellet furnace at Veunkham salt factory completely installed and commissioned in early 2023.

The project was extended for three times till the end of 2022 and again non-cost extension till 31 March 2023. Some planned activities and new activities had been implemented such as the formulation of the biomass energy strategy, the policy exchange and technical visit to neighbouring countries Thailand and Viet Nam was conducted and successful in March 2023.

Overall, there was slow progress on project implementation. In 2021 the implementation of the project activities is also being affected by the COVID-19, many plan activities have been delayed. The formulation of biomass energy strategy is still on-going till July 2023 and need few months to be completed. The strategy is important and necessary to Lao PDR to promote the production and utilization of solid bio-fuel in Lao PDR.

On behalf of the implementing partner, I would like to thank UNIDO and GEF for the great support and look forward to collaboration with UNIDO on the other project and activities.”

3. Please provide any **relevant stakeholder consultation** documents.

- *Project Steering Committee minutes 2022*
- *Final project report*

## VI. Gender Mainstreaming

1. Using the previous reporting period as a basis, please report on the **progress achieved on implementing gender-responsive measures and using gender-sensitive indicators**, as documented at CEO Endorsement/Approval (in the project results framework, gender action plan or equivalent),.

N/A

## VII. Knowledge Management

1. Using the previous reporting period as a basis, please elaborate on any **knowledge management activities / products**, as documented at CEO Endorsement / Approval.

N/a

2. Please list any **relevant knowledge management mechanisms / tools** that the project has generated.

N/a

## VIII. Implementation progress

1. Using the previous reporting period as a basis, please provide information on **progress, challenges and outcomes achieved/observed** with regards to project implementation.

**Outcome 1: Improved awareness, knowledge and capacity on solid biofuel production and usage in the country.**

**Output 1.1: An information and learning centre for solid biofuel production and usage established:**

- ToR for procurement of laboratory equipment was prepared end of 2020 and revised in early 2021  
UNIDO announce RFX 7000004698 for procurement of the laboratory equipment to BTILC  
UNIDI is evaluating and selecting the supplier for procurement and delivery of the laboratory equipment to BTILC.
- Some BTILC staff took gender training in May 2021
- Challenges: limited human resources at BTILC; limited initiative/ interest from BTILC staff; delays in identifying suitable long-term partner for BTILC  
Procurement of the laboratory equipment for BTILC and completion of setting in May 2022.

**Output 1.2: Capacity of at least 20 policy makers developed and capacities of potential solid biofuel producers & users, RE / technical institutions and bank / financial institutions developed (target 20 persons).**

- BTILC conduct Need Assessment of policy workshop and preparation.

**Outcome 2: Improved confidence among investors in solid biofuel production and utilization**

**Output 2.1: Database developed on agro & wood wastes availability and on final energy consumption in industrial sector (this output is combined with 3.1)**

- Biomass resource assessment was finalized by CPC-Lin Q2 2021, no activities implemented in 2021
- Challenges: Biomass resource at factories is not constant and varies of the months. The assessment of some biomass is difficult e.g. rice husk. The availability of sawdust is limited as the government of Laos has stopped logging and export

of sawn wood or semi product from wood is prohibited by decree of the prime minister.

**Output 2.2: National strategy to promote investment in solid biofuel production and utilization in place**

- CPC-L for is formulating and finalising the Biomass Energy strategy, expected to finished in October 2023
- CPC-L submitted their proposal

**Output 2.3: Technical adjustments for solid biofuel usage in participating industries**

- It has been decided in the PSC to transfer the Jacketed steam boiler of the pilot in Veunkham to other factory to use it. Identification of suitable user is conducted by CPC-L, due to no availability of pellet the system is still remain located in Veunkham salt factory.
- UNIDO has combine the two activities: biomass energy strategy and technical adjustment 2.2 and 2.3 and awarded to CPC-L under RFX 7000004770.
- CPC-L completed the installation and commissioning the new pellet furnace in early 2023.

**Outcome 3 – Increased use of solid biofuel for industrial applications.**

- *Challenges: uncertainty of investment into solid biofuel production and utilization for industrial applications due to:*
  - Lack of policy on biomass technology and promotion.
  - Insecure market for pellet uptake
  - Investment costs

**Output 3.1: Systematic and comprehensive biomass resource assessment in target areas**

- see output 2.1

**Output 3.2: Detailed plant designs prepared for the demonstration projects**

- Draft ToR for techno-socio-economic FS for pellet production facility available
- No detailed plant design has been conducted so far since companies are hesitant to confirm co-investment
- *Challenges: The CEOI and RFP showed that factories do not have sufficient information available to develop detailed plant designs and feasibility studies. However, the project decided to give incentive to factories which submitted their project proposal under RFX 7000004855 and the plant design will be taken from the one prepared by the factories.*

**Output 3.3: Solid biofuel pelletizing systems established for a cumulative capacity of 3.6 tph**

- UNIDO announced RFX no. 7000004013 on 25<sup>th</sup> January 2020 closing date 6<sup>th</sup> March 2020 and announced the similar RFX 7000004855 in May 2021
- Three factories had submitted their proposals.
- UNIDO had contacted three factory for financial incentive on installation of pellet plant.
- *Challenges: only one company, Simmalakham briquette factory invested for pellet plant. The other two were hesitate to invest due to lack of confidence on market.*

*Additional activities as greed at the 7<sup>th</sup> PSC 2022:*

- Policy exchange and technical visit to neighbouring countries Thailand and Viet Nam in March 2023
- Procurement of measuring equipment to PMU (on-going)

**2. Please briefly elaborate on any **minor amendments**<sup>6</sup> to the approved project that may have been introduced during the implementation period or indicate as not applicable (NA).**

<sup>6</sup> As described in Annex 9 of the *GEF Project and Program Cycle Policy Guidelines*, **minor amendments** are changes to the project design or implementation that do not have significant impact on the project objectives or scope, or an increase of the GEF project financing up to 5%.

Please tick each category for which a change has occurred and provide a description of the change in the related textbox. You may attach supporting documentation, as appropriate.

<input type="checkbox"/>	Results Framework	
<input type="checkbox"/>	Components and Cost	
<input type="checkbox"/>	Institutional and Implementation Arrangements	
<input type="checkbox"/>	Financial Management	
<input checked="" type="checkbox"/>	Implementation Schedule	Two new activities were added to the implementation schedule and completed in March 2023
<input checked="" type="checkbox"/>	Executing Entity	REMI was dissolved and merged with RIEM
<input type="checkbox"/>	Executing Entity Category	
<input type="checkbox"/>	Minor Project Objective Change	
<input checked="" type="checkbox"/>	Safeguards	As REMI was dissolved and RIEM took the role of collaboration, some personnel had been appointed for other duties, new personnel be in charge, it causes discontinuation of implementation of project activities and failure of some activities
<input type="checkbox"/>	Risk Analysis	
<input type="checkbox"/>	Increase of GEF Project Financing Up to 5%	
<input type="checkbox"/>	Co-Financing	
<input type="checkbox"/>	Location of Project Activities	
<input type="checkbox"/>	Others	

3. Please provide progress related to the **financial implementation** of the project.

*Please see the attached grant delivery report.*

## IX. Work Plan and Budget

1. Please provide **an updated project work plan and budget** for the remaining duration of the project, as per last approved project extension. Please expand/modify the table as needed.

The project is operationally completed.

## X. Synergies

1. **Synergies** achieved:

MimiMoto: MimiMoto is potentially supplying the cookstoves for the world bank project. Discussions have been held and calls to identify potential synergies and ensure that pellets produced under the UNIDO project can be used in the

cookstoves. In addition, MimiMoto offered to provide support with their experience in pellet production in other countries. Further discussions will be held.

The project imported 300 cook stoves and 50 tons pellet in middle 2022 for piloting. The purpose was to testing and evaluate the use of the cook stove with user (villagers). The project has contacted Simmalakham factory for local supply of pellet. The project could be extended in 2023 and there is possibilities of contacting Simmalakham as local supplier.

### 3. Stories to be shared (Optional)

*Five minutes video documentary:*

[https://drive.google.com/file/d/1sWcnKV8OrWzu-jLeQyHFHlHuMdU0O\\_CSf/view?usp=share\\_link](https://drive.google.com/file/d/1sWcnKV8OrWzu-jLeQyHFHlHuMdU0O_CSf/view?usp=share_link)

*The 90 seconds version:*

[https://drive.google.com/file/d/1crVa4trvmR1PU6erLx-Bmlpqe-GQPaw-/view?usp=share\\_link](https://drive.google.com/file/d/1crVa4trvmR1PU6erLx-Bmlpqe-GQPaw-/view?usp=share_link)

## XI. GEO LOCATION INFORMATION

The Location Name, Latitude and Longitude are required fields insofar as an Agency chooses to enter a project location under the set format. The Geo Name ID is required in instances where the location is not exact, such as in the case of a city, as opposed to the exact site of a physical infrastructure. The Location & Activity Description fields are optional. Project longitude and latitude must follow the Decimal Degrees WGS84 format and Agencies are encouraged to use at least four decimal points for greater accuracy. Users may add as many locations as appropriate.

Web mapping applications such as [OpenStreetMap](#) or [GeoNames](#) use this format. Consider using a conversion tool as needed, such as: <https://coordinates-converter.com>

Please see the Geocoding User Guide by clicking [here](#)

Location Name	Latitude	Longitude	Geo Name ID	Location and Activity Description
<a href="#">Lao PDR</a>	<a href="#">17.96667</a>	<a href="#">102.6</a>	1651944	Vientiane Lao PDR

**Please provide any further geo-referenced information and map where the project interventions is taking place as appropriate.**

## EXPLANATORY NOTE

1. **Timing & duration:** Each report covers a twelve-month period, i.e. 1 July 2022 – 30 June 2023.
2. **Responsibility:** The responsibility for preparing the report lies with the project manager in consultation with the Division Chief and Director.
3. **Evaluation:** For the report to be used effectively as a tool for annual self-evaluation, project counterparts need to be fully involved. The (main) counterpart can provide any additional information considered essential, including a simple rating of project progress.
4. **Results-based management:** The annual project/programme progress reports are required by the RBM programme component focal points to obtain information on outcomes observed.

Global Environmental Objectives (GEOs) / Development Objectives (DOs) ratings	
<b>Highly Satisfactory (HS)</b>	Project is expected to achieve or exceed <u>all</u> its major global environmental objectives, and yield substantial global environmental benefits, without major shortcomings. The project can be presented as “good practice”.
<b>Satisfactory (S)</b>	Project is expected to <u>achieve most</u> of its <u>major</u> global environmental objectives, and yields satisfactory global environmental benefits, with only minor shortcomings.
<b>Moderately Satisfactory (MS)</b>	Project is expected to <u>achieve most</u> of its major <u>relevant</u> objectives but with either significant shortcomings or modes overall relevance. Project is expected not to achieve some of its major global environmental objectives or yield some of the expected global environmental benefits.
<b>Moderately Unsatisfactory (MU)</b>	Project is expected to achieve <u>some</u> of its major global environmental objectives with major shortcomings or is expected to <u>achieve only some</u> of its major global environmental objectives.
<b>Unsatisfactory (U)</b>	Project is expected <u>not</u> to achieve <u>most</u> of its major global environmental objectives or to yield any satisfactory global environmental benefits.
<b>Highly Unsatisfactory (HU)</b>	The project has failed to achieve, and is not expected to achieve, <u>any</u> of its major global environmental objectives with no worthwhile benefits.

Implementation Progress (IP)	
<b>Highly Satisfactory (HS)</b>	Implementation of <u>all</u> components is in substantial compliance with the original/formally revised implementation plan for the project. The project can be presented as “good practice”.
<b>Satisfactory (S)</b>	Implementation of <u>most</u> components is in substantial compliance with the original/formally revised plan except for only few that are subject to remedial action.
<b>Moderately Satisfactory (MS)</b>	Implementation of <u>some</u> components is in substantial compliance with the original/formally revised plan with some components requiring remedial action.
<b>Moderately Unsatisfactory (MU)</b>	Implementation of <u>some</u> components is <u>not</u> in substantial compliance with the original/formally revised plan with most components requiring remedial action.
<b>Unsatisfactory (U)</b>	Implementation of <u>most</u> components in <u>not</u> in substantial compliance with the original/formally revised plan.
<b>Highly Unsatisfactory (HU)</b>	Implementation of <u>none</u> of the components is in substantial compliance with the original/formally revised plan.

Risk ratings	
Risk ratings will assess the overall risk of factors internal or external to the project which may affect implementation or prospects for achieving project objectives. Risk of projects should be rated on the following scale:	
<b>High Risk (H)</b>	There is a probability of greater than <b>75%</b> that assumptions may fail to hold or materialize, and/or the project may face high risks.
<b>Substantial Risk (S)</b>	There is a probability of between <b>51%</b> and <b>75%</b> that assumptions may fail to hold or materialize, and/or the project may face substantial risks.
<b>Moderate Risk (M)</b>	There is a probability of between <b>26%</b> and <b>50%</b> that assumptions may fail to hold or materialize, and/or the project may face only moderate risk.
<b>Low Risk (L)</b>	There is a probability of up to <b>25%</b> that assumptions may fail to hold or materialize, and/or the project may face only low risks.

