

Readiness Proposal

**with GGGI for the Lao People's Democratic
Republic**

30 October 2020



READINESS & PREPARATORY SUPPORT

PROPOSAL TEMPLATE



Proposal title: Market Preparation for Industrial Energy Efficiency in Lao PDR

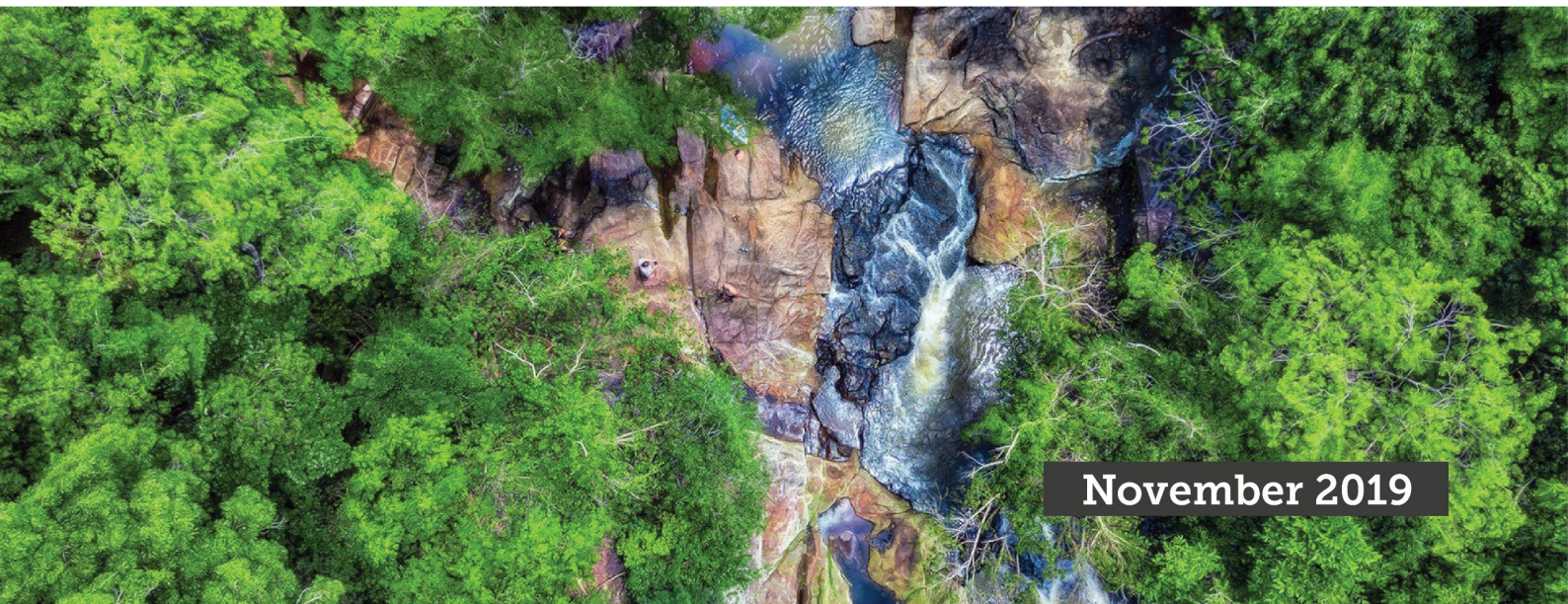
Country: Lao People's Democratic Republic

National designated authority: Department of Climate Change, Ministry of Natural Resources and Environment

Implementing Institution: Global Green Growth Institute

Date of first submission: 31 March 2020

Date of current submission / version number: 30 September 2020 V.3



November 2019

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Note: Environmental and Social Safeguards and Gender

Throughout this document, when answering questions and providing details, please make sure to pay special attention to environmental, social and gender issues, particularly to the situation of vulnerable populations, including women and men. Please be specific about proposed actions to address these issues. Consult Annex IV of the Readiness Guidebook for more information.

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When submitting the proposal, please name the file:
GCF Readiness -[Country]-[yymmdd]

1. SUMMARY

1.1 Country submitting the proposal

Country name: Lao People's Democratic Republic

Name of institution representing NDA or Focal Point: Ministry of Natural Resources and Environment

Name of contact person: Mr. Syamphone Sengchandala

Contact person's position: Acting Director General, Department of Climate Change

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1.2 Date of initial submission

31 March 2020

1.3 Last date of resubmission

30 September 2020

Version number V.3.0

1.4 Which institution will implement the Readiness and Preparatory Support project?

- ☐ National designated authority
- ☐ Accredited entity
- ☒ Delivery partner

Please provide contact information if the implementing partner is not the NDA/focal point

Name of institution: Global Green Growth Institute (GGGI)

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1.5 Title of the Readiness support proposal

Market Preparation for Industrial Energy Efficiency in Lao PDR

1.6 Type of Readiness support sought

Please select the relevant GCF Readiness objective(s) below (click on the box – please refer to Annex I and II in the Guidebook):

- ☐ I. Capacity building

- ☒ II. Strategic frameworks
- ☐ III. Adaptation planning
- ☐ IV. Pipeline development
- ☐ V. Knowledge sharing and learning

1.7 Brief summary of the request

Ambitious policies, innovative business models and financial mechanisms combined with existing cost-effective technologies could improve energy intensity globally at a rate of 3% per year (IEA, 2019). However, most recent data available indicates that the primary energy intensity level in Lao PDR regressed¹ by 72.3% between 2010 and 2015 due to, among others, limited information on energy consumption patterns, lack of public or private sector capacity for energy efficiency planning and implementation, limited regulatory framework, and low level of understanding of the benefits of energy efficiency.

Lao PDR government published in 2016 the National Policy on Energy Efficiency and Conservation which sets a 10% reduction target in energy consumption by 2030 compared to business-as-usual scenario. The target will be included in the Country's first revision of its Nationally Determined Contribution (NDC) to be submitted to the UNFCCC in 2020. The Lao Government is also implementing its National Green Growth Strategy (NGGS) approved in January 2019 by the PM, and the industrial sector was selected as a priority because of its importance for local economic & social development and environmental sustainability. Specifically, "the design and implementation of financial mechanisms that provide industrial entrepreneurs access to efficient, environmentally friendly, energy and raw material-saving modern technologies" is one of the focus areas.

This Readiness proposal has been prepared to help the Government of Lao PDR implement the NGSS and achieve the energy consumption reduction target. It consists of developing a comprehensive set of activities to increase levels of awareness about green industrial practices and catalyze private investments in the deployment of energy efficiency measures in the industrial sector. The project deliverables comprise:

- An effective stakeholder coordination mechanism
- Lao PDR's industrial energy efficiency policy guidelines and action plan.
- A training program for the development of local energy services companies (ESCOs) and auditing skills.
- At least 25 energy audits, technology options assessment and financial models completed across the industrial sectors.
- An Information Memorandum and an investor forum which will highlight identified energy efficiency investment opportunities and match private and public enterprises in the industrial sector with investors and financiers.
- A GCF concept note on industrial energy efficiency investment through ESCO delivery model

In parallel to this Readiness program, GGGI will undertake the following complementary activities: (1) awareness raising and capacity building on industrial energy efficiency to government officials and the private sector and (2) preparation of the Lao PDR Green Industry Policy and action plan.

As a result of this Readiness project, policy gaps for an energy efficient industrial sector will be addressed, an action plan for private investments in industrial energy sector will be developed, sectoral expertise will be improved, and stakeholders including the private sector will be engaged and effectively coordinated. In the medium term it is expected that the project will have contributed to scale-up private sector investments in industrial energy efficiency. Longer-term impacts include lower energy intensity of industries, reduced

¹ World Bank, Sustainable Energy for All (SE4ALL) database from the SE4ALL Global Tracking Framework

emissions from industries, and a shift of the industry sector to a low emission sustainable development pathway.

Direct beneficiaries are the Ministry of Industry and Commerce, the NDA, Ministry of Natural Resources and Environment, Ministry of Energy and Mines, public and private enterprises in the industrial sector, Lao national chamber of commerce and industry, sub-sectoral associations such as Association of Lao Garment Industry, Lao Cement Association, Lao Rice Mills Association, Lao Agro-processing association etc.; financing institutions, the national electricity company, as well as local SMEs. Indirect beneficiaries include consumers of industrial products as well as the green jobs sector through the creation of business opportunities in energy efficiency services.

1.8 Total requested amount and currency

USD 299,457

1.9 Implementation period

18 months

1.10 Is this request a multiple-year strategic Readiness implementation request?

☐ Yes

☒ No

For more information on how a country may be eligible to access Readiness support through this modality, please refer to **Annex III of the Readiness Guidebook**.

1.11 Complementarity and coherence of existing readiness support

☒ Yes

☐ No

This readiness support builds on existing readiness support provided to the Government of Lao PDR. A chart summarizing complementarity and coherence with existing initiatives is provided in Annex I.

2. SITUATION ANALYSIS

Lao PDR is a landlocked Least Developed Country (LDC) of 236,800 km² and 6.7 million inhabitants. The country's total greenhouse gas (GHG) emissions were only 51,000 Gg CO₂e in the year 2000. Nonetheless, annual GDP growth averaged 7.7% over the last decade and the country has set ambitious targets for low-emissions development. The Government published in 2016 the National Policy on Energy Efficiency and Conservation which sets a 10% reduction target in energy consumption by 2030 compared to business-as-usual scenario. The target is included in the country's first revision of its Nationally Determined Contribution (NDC) to be submitted to the UNFCCC in 2020. The Lao Government is also implementing its National Green Growth Strategy (NGGS) approved in 2019, and the industrial sector was selected as a priority because of its importance for local economic & social development and environmental sustainability. Specifically, "the design and implementation of financial mechanisms that provide industrial entrepreneurs access to efficient, environmentally friendly, energy and raw material-saving modern technologies" is one of the focus areas.

While a number of existing policies and strategies identify efficient industrial production as a key element towards sustainable development, the guidelines, measures and action plans that would enable industrial energy efficiency investments are lacking. For example, government should require large, energy-intensive industries, and encourage other industrial energy users, to conform to ISO 50001 or an equivalent energy management protocol, implement actions to deliver cost-effective energy efficiency measures and periodically report on their efforts.

The below table summarizes the gaps in the existing policy framework of Lao PDR.

Policy	Year	Objective / aspect of EE covered	Policy Gaps to be addressed by the Readiness proposal
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<i>Law on Industrial Processing</i>	1999	Article 32 promotes the use of advanced and suitable technology industries to ensure productivity and to avoid or reduce [adverse] environmental impact.	The need for efficient industrial production is identified while no further information is provided.
<i>Law on the Promotion of Foreign Investment</i>	2004	Promotes foreign investments in industrial activities using advanced technologies, research, and development and towards protection of environment.	Investments in sustainable industrial technologies are encouraged but no reference to energy efficiency in existing industries
<i>National Policy on Energy Efficiency and Conservation</i>	2016	The policy aims at introducing energy efficiency and conservation issues to national socio-economic development agenda. It promotes efficient energy machines, appliances and systems, establishment of energy service companies (ESCO), improvement of energy management systems in factories, and in the long-term aim for international carbon credit exchanges	- Lack of specific focus on industrial energy efficiency opportunities. - Lack of policies to facilitate investments including from the private sector - No action plan to implement the policy - No framework and guidelines to implement recommendations such as ESCO development - No requirement to conform to ISO 50001 or an equivalent energy management protocol; implement actions to deliver cost-effective energy efficiency measures; and periodically report efforts.
<i>National Green growth Strategy to 2030</i>	2018	Promotes efficient industrial production and measures to reduce raw material use and energy consumption.	No guidelines and no action plan for the private sector implementation of efficient industrial production and energy consumption reduction

Total energy consumption of the industrial sector in Laos amounts to 555.61 ktOE. IPCC's Assessment Report #5 (2014) states that the energy intensity of the industry sector could be reduced globally by approximately up to 25 % through widescale upgrading, replacement and deployment of best available technologies. Maximum energy savings potential in the Lao industry context can thus be estimated around 139 ktOE or 1.6 Million MWh. At current average electricity tariff (USD 83/MWh, UNESCAP 2019), it is equivalent to USD 132M savings potential. The industrial sector is the largest consumer of electricity with 42% of total consumption in 2018. Lao power grid GHG emission factor is 0.5595tCO₂e/MWh mainly due to imports of fossil-fuel based electricity from Thailand. The main sources of energy in the industrial sector are electricity, oil, coal and biomass. 100% coal is consumed by the industry sector. The food, beverage and tobacco industry are the largest energy consumers, followed by the cement, wood, steel and garments sub-sectors. Achieving 25% reduction of energy intensity through energy efficiency in the industrial sector would lead to around 650,000tCO₂e/y GHG emission reductions.

Energy consuming equipment available in all industries which can be upgraded and/or better maintained for enhanced efficiency includes boilers, air compressors, pumps, lights, motors, fans, air conditioners, coolers, transformers, chillers, cooling towers, gas burners, pre-heaters, kilns, etc. In addition, if deemed financially attractive the installation of rooftop solar panels can reduce grid electricity bill. There are also specific equipment types at sub-sector level from which electricity/fuel savings can be achieved, such as for example washing, drying, and sewing machines, dyeing processes at textile and garment plants, or withering trough, CTC (Cut, Tear & Curl) machines, leaf dryers in the tea industry. Moreover, the distribution of energy as well as the building envelope offer electricity consumption reduction between 5% and 85%, including through the installation of capacitor banks, insulators, and opening skylights, etc.

Adoption of best available climate technologies in the Lao industrial sector is limited to a few energy efficiency initiatives involving larger leading enterprises such as the introduction of a Vapour Re-Compression system, a heat-pump system, and a biogas boiler to reduce fuel consumption at Lao Beer Company², or within foreign-owned corporations in the cement (Waste Heat Recovery) or the garment sectors (LED lights). Although there are records of walk-through audits undertaken at Vientiane Steel Industry Co. Ltd., concluding to savings potential of 5,000 USD/y, and at a salt company highlighting savings between 147,600 and 161,900 USD/year, small and Medium Enterprises (SME), which account for both the highest number of companies and highest number of workers employed, lag behind due to various barriers. The UN Energy study on “Policies and Measures to realize Industrial Energy Efficiency and mitigate Climate Change” found that obstacles to the implementation of energy efficiency technologies and measures include a lack of information and awareness, a focus on production capacity rather than energy efficiency measures, giving greater weight to investment costs compared to energy costs, and interest in larger investment opportunities rather than on the more modest investments needed to improve energy efficiency, even where the profits can be relatively large. Local industries, consultants and suppliers also lack sufficient capability and training on how to implement energy efficiency (Gupta, 2012). For larger-scale energy-intensive industries, additional barriers include upfront capital expenses.

Barriers removal on energy efficiency is deemed more challenging in least developed countries. In the Lao context identified barriers are: (1) Lack of information on electricity consumption patterns by rate class or end use; (2) Lack of public or private sector capacity for planning and implementation; (3) Limited regulatory framework, including strategy and targets, and lack of incentives; (4) Limited technical expertise or awareness by end-use customers as regards energy efficiency technologies and practices; (5) Low level of understanding of the benefits of energy efficiency (Vongchanch, 2015). For SMEs additional barriers include the disaggregated, scattered and smaller-scale nature of associated energy savings opportunities. The Lao PDR National Green Growth Strategy also highlights the difficulty to access the funding sources for importing modern techniques and technology as one major cause for the reported low efficiency in the industrial sector. Finally, the relatively low cost of electricity in Lao compared to other ASEAN countries, due to abundant hydropower resources, is often perceived as a disincentive for the implementation of energy efficiency measures. Table below provides an overview of industrial tariffs in the region (UNESCAP, 2019).

Country	USD/MWh	Country	USD/MWh
Cambodia	130	Malaysia	85
Singapore	98	Lao PDR	83
Philippines	94	Indonesia	81
Thailand	88	Vietnam	65
Myanmar	86		

Nevertheless, numerous studies at global level indicate that industrial energy efficiency measures have on average short payback periods and high return on investment. Improved maintenance and processes, behavior change are low cost measures that can achieve immediately measurable results. According to Nauc  r et al (2009), industrial energy efficiency is among the most cost-effective GHG mitigation interventions available, while a large share of EE opportunities already offers today net economic benefits. A UNIDO benchmarking study (Gupta, 2012) on energy consumption in the Lao construction sector highlights that significant fuel and electricity savings could be achieved in the cement, steel and brick subsectors through low cost energy efficiency measures, including due to the obsolete nature of equipment in the country compared to the rest of the region. Lao specific data from official sources on payback periods of different measures being extremely scarce, a study from the Energy research Centre of the Netherlands (ECN) focusing on energy efficient electric motor systems in Indonesia, which benefits from lower electricity tariffs than Laos, states that payback periods “are often relatively short, for example less than 3 years”³. This Readiness program is aligned with the International Energy Agency and the Asian Development Bank which recommend that measures directed at improved energy efficiency in ASEAN SMEs should include supporting energy audits on a voluntary or mandatory basis, access to information on proven energy efficiency practices relevant to SME operations, and access to affordable financing, as is appropriate to each business sector. Finally, proposed activities will strive not only to generate savings from electricity bills but also from reduced consumption of biomass and imported

² <https://cdm.unfccc.int/Projects/DB/DNV-CUK1171447004.47/view>

³ https://www.ecn.nl/fileadmin/ecn/units/bs/EE_motors_Indonesia/E15048.pdf

fossil fuels, including diesel oil, fuel oil and coal. Identified EE measures with payback period less than 3 to 5 years will be prioritized.

This Readiness programme aims to co-ordinate and engage stakeholders including the domestic private sector to catalyze investments in the deployment of energy efficiency measures in large, medium and small industrial enterprises. The programme will also address policy gaps, remove identified investment barriers, and develop a quality project concept note for submission to the GCF.

Policy gaps will be addressed through the development of industrial energy efficiency policy guidelines and action plan which will provide the necessary framework, directions and priorities at industry sector level. Beyond this proposal, the guidelines and action plan will be mainstreamed into a broader Green Industry Policy and action plan, with the objective of transforming the economic production structure to generate environmental benefits. The Green Industry Policy and action plan is not part of this proposal and will be developed by the Ministry of Industry and Commerce with GGGI's core budget support (GGGI Activity 2). The document will describe measures to accelerate the sector's transformation towards a low-carbon, resource-efficient economy, in a way that also enables productivity enhancements.

Barriers identified above will be alleviated including through raising levels of awareness and sectoral technical expertise by means of a training program hosted by the Ministry of Industry's Cleaner Production Center focusing on auditing skills and on a proven model for successful delivery of energy efficiency projects, which is the use of private sector Energy Service Companies (ESCOs), in line with recommendations from the IEA and Asian Development Bank for the industry sector (Southeast Asia Regional Energy Efficiency Policy Recommendations, 2014). ESCOs are organizations that offer specialized technical and/or financial services for design through implementation of energy efficiency projects and solutions using energy savings performance contracting approach (World Bank, 2018). While there are no examples of performance contracting for industrial energy efficiency projects in Lao, the experience in other countries demonstrates that this approach can overcome some of the major barriers to EE project implementation especially in the SMEs sector. ESCOs provide or arrange financing of energy efficiency measures and undertake "shared savings" or "guaranteed savings" contracts, under which the payments to the ESCO are made from the cost savings that result from project implementation. ESCOs provide specific performance guarantees at project level (as opposed to individual equipment guarantees offered by equipment manufacturers or suppliers) and generally guarantee a level of energy and/or cost savings. Most of the technical, financial, and maintenance risks are borne by the ESCO thereby substantially reducing the risk exposure for industrial enterprises. The ESCO model also allow aggregation of smaller, stand-alone EE opportunities in SMEs at sub-sector level. ESCO have not been tested in the country. Examples of industrial energy efficiency initiatives mentioned above were implemented using either own resources or by (mainly foreign-based) Energy Services Providers (ESP) that offered conventional energy services and no value-added risk management services to ensure ongoing performance, i.e. if payback was not achieved through savings or other performance related outcomes, the company still got paid. Moreover, the Cleaner Production Center did provide technical assistance to the industrial sector but most activities are halted due to lack of funding available. The sustainability of the training program will be ensured through a Training of Trainers (ToT) component and the procurement auditing tools for the Cleaner Production Center.

Coordination and engagement of stakeholders including the private sector will endeavor to remove market barriers for the deployment of finance into industrial energy efficiency through the establishment of a coordination mechanism, identification of bankable project opportunities, the preparation of audits, technology options, financial studies and information memorandum, and the organization of an investors' forum. Moreover, the key opportunities identified in the studies and information memorandum will be further developed into a GCF project concept note where ESCO will have the pivotal role towards increasing the number of investments in industrial energy efficiency in Lao PDR.

In addition, GGGI will use own budget to undertake complementary industrial energy efficiency awareness raising and stakeholder's engagement activities consisting of 3 half-day workshops for private industrial enterprises in the construction materials, garments and agro-processing sub-sectors. Workshops will be followed by a demonstration half-day walk-through energy audit at one selected enterprise for each sub-sector (GGGI Activity 1). GGGI activities will be implemented in partnership with the Ministry of Industry and Commerce, the Lao Chamber of Commerce and sectoral associations.

The present governance structures for energy efficiency in Lao PDR are divided between the Institute for Renewable Energy Promotion (IREP) under the Ministry of Energy & Mines which developed the National Policy on Energy Efficiency and Conservation, the Department of Housing at the Ministry of Public Works and Transport, which is responsible for the residential sector, as well as the Ministry of Industry and Commerce which oversees industrial and commercial sectors.

The NDA has been taking the lead in raising awareness towards other government agencies, including the Ministry of Industry and Commerce (MOIC), as well as the private sector with respect to accessing climate finance and technical assistance for NDC implementation and energy efficiency uptake in Lao PDR. During the preparation of this proposal, MOIC and the Delivery Partner consulted relevant government agencies, the Lao Chamber of Commerce, industry associations, selected industrial enterprises at sub-sector level and financial institutions.

This Readiness Proposal is strictly in line with the Lao PDR GCF Country Programme approved in February 2019 which sets the assessment and implementation of low carbon and green technology options (e.g. fuel switching, reducing process emissions, energy efficiency, waste to energy) for key emitting industries as a priority climate activity in the energy sector. This Proposal is coherent with existing Readiness support and will complement the on-going efforts in the field of energy efficiency under the approved proposal “Development of Action Plan for Designing and Implementing Standards and Labelling Programme in Lao PDR” which main beneficiaries include the Ministry of Energy and Mines as well as the residential and commercial sectors. Detailed description of complementarity with this proposal and other Readiness initiatives is provided in Annex I. To date there has not been any national scale program on the preparation of energy efficiency investments in the industrial sector. The previous most significant energy efficiency initiative in the country was the “Demand-Side Management and Energy Efficiency (DSM/EE)” project funded by the World Bank. The project which ended in 2015 focused on energy efficient appliances in public and residential sectors buildings. The project involved the distribution of 400,000 CFLs nationwide and the retrofitting of lighting and ACs in government buildings.

3. LOGICAL FRAMEWORK

Outcomes	Baseline ⁴	Targets	Outputs	Activities (brief description)	Deliverables ⁵
Outcome 1.3: Relevant country stakeholders (which may include executing entities, civil society organizations and private sector) have established adequate capacity, systems and networks to support the planning, programming and implementation of GCF-funded activities.	There is no system in place to support on-going engagement of country stakeholders towards the mobilization of investments in industrial energy efficiency.	An effective coordination mechanism allows stakeholders to be fully engaged towards the mobilization of investments in industrial energy efficiency. Stakeholders engagement will be measured through questionnaire survey following each steering committee meeting	Output 1.3.1: A validated and gender balanced coordination mechanism is operational between NDA, Ministry of Industry and Commerce, Ministry of Energy and Mines and key stakeholders to steer the planning and programming of energy efficiency investments in the industrial sector	Activity 1.3.1a: Establish and validate a steering committee as coordination mechanism between the NDA, Ministry of Industry and Commerce, Ministry of Energy and Mines and private sector representatives for industrial energy efficiency.	Deliverable 1.3.1a: Terms of Reference and workplan for industrial energy efficiency steering committee
				Activity 1.3.1b: Government convenes 3 half-yearly industrial energy efficiency steering committee workshops	Deliverable 1.3.1b: 3 half-yearly steering committee workshop reports

⁴ Please briefly elaborate on current baselines on which the proposed activities can be built on, processes that are in place that the current Readiness proposal can strengthen, or any gaps that the proposed activities would fill in. If more space is needed, please elaborate this in Section 4.

⁵ Please include tangible and specific deliverables for each activity proposed, Please note that during implementation all deliverables should be included within the implementation reports for GCF consideration.

Outcome 2.2: GCF recipient country has developed or enhanced strategic frameworks to address policy gaps, improve sectoral expertise, and enhance enabling environments for GCF programming in low-emission investment.	Existing policies identify efficient industrial production as a key element towards sustainable development, but the guidelines, measures and action plans that would enable industrial energy efficiency investments are lacking	The policy and strategic framework to enable investments in industrial energy efficiency is in place	Output 2.2.1: Lao PDR industrial energy efficiency policy guidelines and action plan are published by the Government Note: This Output will be mainstreamed in GGGI's own Activity 2 as described in section 2	Activity 2.2.1a: Organize and conduct one stakeholders' engagement workshop including the private sector to kickstart the preparation of the industrial energy efficiency policy guidelines and action plan Note: This activity will be complemented by GGGI's own Activity 1 as described in section 2	Deliverable 2.2.1a: Stakeholders' engagement workshop report
				Activity 2.2.1b: Development of Lao PDR's industrial energy efficiency policy guidelines and action plan	Deliverable 2.2.1b: Draft industrial energy efficiency policy guidelines and action plan
				Activity 2.2.1c: Organize and conduct the stakeholders' validation workshop for the industrial energy efficiency policy guidelines and action plan	Deliverable 2.2.1c: Final version of the industrial energy efficiency policy guidelines and action plan
Outcome 2.4: Strategies for transforming and attracting private sector investment for low emission and resilience developed and being used.	Lack of public and private sector capacity for implementation of industrial energy efficiency; limited awareness and understanding of the benefits of energy efficiency	Local capacity exists to implement energy efficiency measures including through energy services companies (ESCOs); <i>Quantitative target:</i> 15 professionals have completed the training program and received certification (Output 2.4.1) Stakeholders are aware of energy efficiency investment opportunities in the industrial sector, including delivery through the ESCO model that will form the basis of an investment Concept Note for GCF	Output 2.4.1: Delivery of an industrial energy efficiency training program under the Lao PDR's Clean Production Centre, with a focus on ESCOs and energy auditing skills. Trained individuals will support GCF programming through Output 4.3.1, as the GCF Concept Note will apply the ESCO model to attract private sector investments in EE.	Activity 2.4.1a: Mapping of the ESCO market, including an analysis of regulatory environment, market barriers and financing options, to facilitate identification of candidates (organizations or persons) for training	Deliverable 2.4.1a: ESCO market mapping report
				Activity 2.4.1b: Design and implement a gender balanced training program at the Clean Production Center within the Ministry of Industry and Commerce for the development of ESCOs and auditing skills. The latter will be complemented by on-site training through Activity 2.4.2a. Details of the training program are provided in Section 5.5.	Deliverable 2.4.1b: Pre-training and post training survey report; training materials; list of trainees and certifications
			Output 2.4.2: 25 Technical and financial studies, sub-	Activity 2.4.2a: Undertake at least 25 energy audits across the industrial sector	Deliverable 2.4.2a: 25 energy audits reports

		<i>Quantitative target:</i> Deliverable 2.4.2c has been publicly made available to at least 50 representatives from the private sector (industrial enterprises, financiers, investors) and 50 representatives from the public sector.	sectoral investment memorandum, and investors' forum that highlight energy efficiency investment opportunities in the local industrial sector.	Activity 2.4.2b: Assess technology options and develop financial models for energy efficiency based on findings from Activity 2.4.2a. Main beneficiaries comprise private and public industrial enterprises, but also wider stakeholders such as potential investors including ESCOs and lenders.	Deliverable 2.4.2b: Technology options assessment and financial models for industrial energy efficiency
				Activity 2.4.2c: Prepare Information Memorandum (IM) at sub-sector level that highlight investment opportunities identified through Activities 2.4.2a and b to potential investors. IM will comprise a summary of audit findings, technology options assessment and financial models from Activities 2.4.2a and b, including but not limited to a description of proposed technological upgrades in selected industrial sub-sectors, capital costs, energy savings, payback period, return on investment, as well as a market overview and a risk analysis. IM will be made publicly available to potential investors and wider stakeholders such as industrial enterprises, potential lenders as part of Activity 2.4.2d.	Deliverable 2.4.2c: Information Memorandum
				Activity 2.4.2d: Organize an investors' forum for industrial energy efficiency to highlight identified energy efficiency investment opportunities and match private and public enterprises in the industrial sector with investors and financiers. The process and result of the energy audits under Activity 2.4.2a will also be communicated and shared in the forum.	Deliverable 2.4.2d: Investors' forum report including prioritized list of identified EE investments
Outcome 4.3: An increase in the number of quality project concept notes developed and submitted that target SIDS, LDCs and African states	No concept note submitted to GCF covering industrial energy efficiency in Lao PDR.	One quality concept note submitted to GCF covering industrial energy efficiency in Lao PDR	Output 4.3.1: One GCF concept note developed and submitted to GCF for consideration (No PPF assistance required)	Activity 4.3.1a: Investment idea prioritization stemming from Output 2.4.2, Concept Note validation by steering committee, and NDA clearance	Deliverable 4.3.1a: Investment idea prioritization summary report.
				Activity 4.3.1b: Develop one GCF concept note from deliverables D2.4.2a, D2.4.2b and D2.4.2c	Deliverable 4.3.1b: One GCF concept note

4. THEORY OF CHANGE

Theory of Change Diagram

GOAL	Lao PDR develops a robust strategic framework to guide investments in industrial energy efficiency
Goal Statement	" IF Lao PDR sets up a high-level steering committee, a capacity building program, publishes policy guidelines and action plan, while highlighting potential financial returns, THEN Lao PDR will have built a robust strategic framework to guide investments in industrial energy efficiency, BECAUSE policy gaps will be addressed, local capacity will be available to design and implement projects, stakeholders will be effectively coordinated and mindful of opportunities."
Outcomes	Lao PDR addressed policy gaps, improved sectoral expertise, raised awareness, increased the number of GCF concept notes submitted and enhanced enabling environments for investments in industrial energy efficiency.
Outputs	A coordination mechanism is operational to steer the planning and programming of energy efficiency investments in the industrial sector, policy guidelines and action plan are published by the Government, domestic capacity on energy auditing skills and ESCO delivery model is available to support GCF programming and attract private sector, investment opportunities have been identified and communicated to stakeholders, one GCF concept note has been developed and submitted to GCF for consideration.
Inputs	- 2020 Update of the Lao PDR Nationally Determined Contribution - GCF Country Programme - GGGI's own activities in awareness raising and capacity building on industrial energy efficiency to government officials and the private sector and preparation of the Lao PDR Green Industry Policy and action plan - Deliverables from UNEPs' Readiness program including the development of a framework and recommendations on regulatory options for establishing Minimum Energy Performance Standards (MEPS) and labelling for priority appliances; capacity building on implementation of MEPS and labelling; lighting and appliance market study; Cost-effectiveness analysis of EE lighting and appliances in different end-use sectors; recommendation on fiscal policy instruments and develop financing program to scale adoption of EE lighting and appliances.
Barriers	Lack of information and awareness; Focus on production capacity rather than energy efficiency; Giving greater weight to investment costs compared to energy costs; Interest in larger investment opportunities rather than on more modest investments needed to improve energy efficiency; Low level of understanding of the benefits of energy efficiency; relatively low cost of electricity
Assumptions & Risks	Significant stakeholder engagement; sufficient energy efficiency opportunities with short payback period are identified through the audits; Strong interest from local entrepreneurs to consider energy efficiency and seize highlighted business opportunities by the program; Energy efficient technologies and equipment are available in-country at competitive prices;

Activities in the logical framework will help deliver the country's readiness needs by developing regulatory scheme to expedite the deployment of climate finance into areas of national priority, and by removing the market barriers for the engagement of stakeholders including the domestic private sector in preparing the market for climate-relevant investments.

The various outcomes, outputs, activities and deliverables from the logical framework address the core Readiness challenges identified in the situation analysis as follows: lack of information and awareness, low level of understanding of the benefits of energy efficiency will be addressed through the stakeholders' engagement process, which involves the establishment of a coordination mechanism and organization of national level workshops. Limited regulatory framework, including strategy and targets, and lack of incentives will be addressed by designing and validating Lao PDR's industrial energy efficiency policy guidelines and action plan. The proposal will also respond to the general tendency by industrial enterprises to give greater weight to investment costs compared to energy costs by performing energy audits, assessing technology options and preparing financial models to highlight the short payback period and high return on investment of selected energy efficiency measures. Moreover, limited technical expertise, lack of public or private sector

capacity for planning and implementation will be improved by delivering a comprehensive training program to enable energy efficiency implementation by the local private sector (detailed program in the following section). Such contribution to the creation of an enabling environment is also expected to tackle the perceived limited interest for more modest investments needed to improve energy efficiency by transferring the responsibility for the implementation of energy efficiency to specialized energy services companies using the energy savings performance contracting approach. Key government stakeholders will also be invited to take part in the energy auditing and ESCO training, for institutional capacity building purpose. In addition, the opportunities identified through the energy audits, technology options assessment and financial models will form the basis of the development of a GCF concept note for an investment project proposal, which will build upon the skills developed as part of the training program.

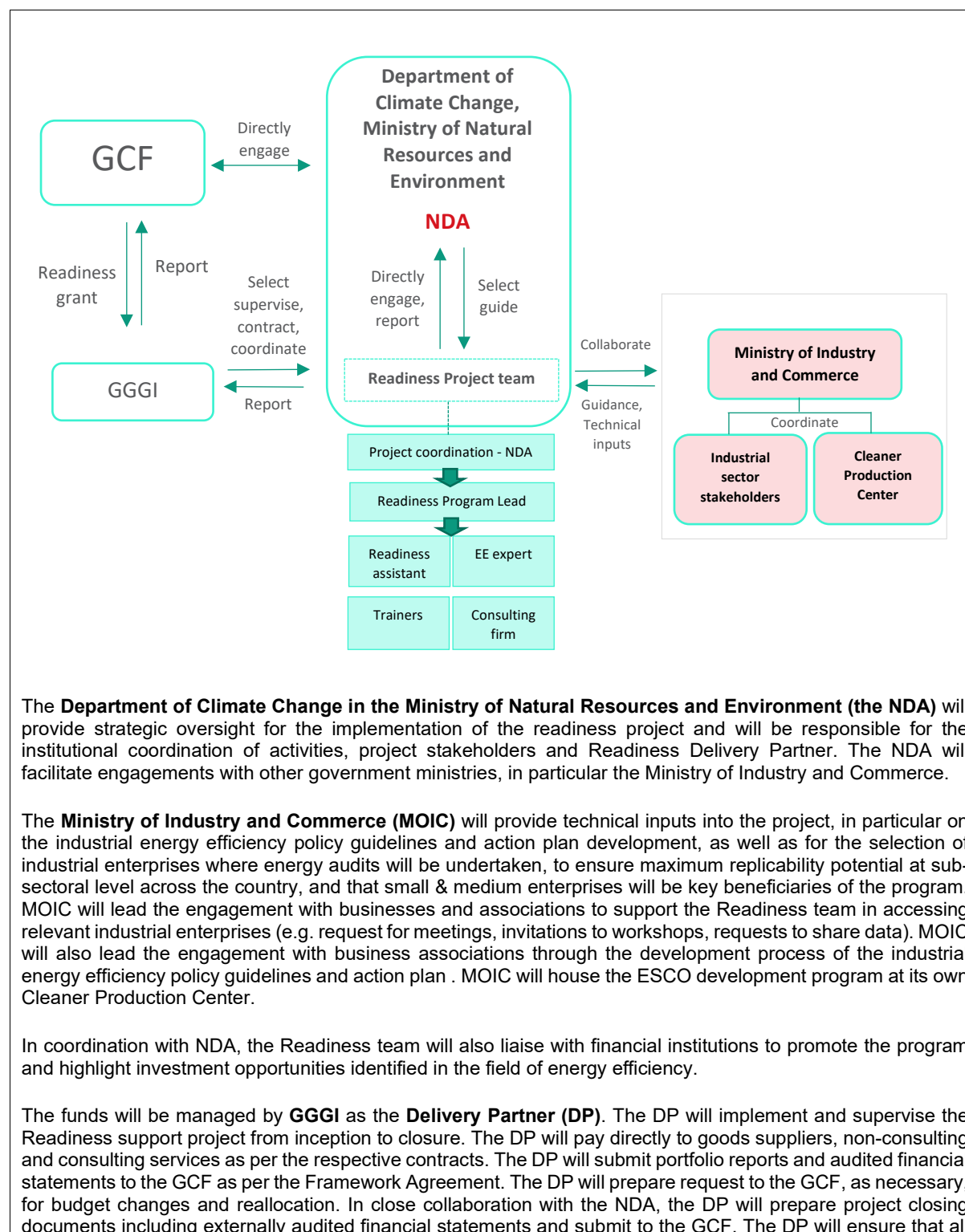
The Readiness project will advance national climate priorities as the implementation of energy efficiency measures for industrial processes is a major component of Lao PDR's 2010 National Climate Change Strategy. Lao PDR government published in 2016 the National Policy on Energy Efficiency and Conservation which sets a 10% reduction target in energy consumption by 2030 compared to business-as-usual scenario. The target will be included in the Country's first revision of its Nationally Determined Contribution (NDC) to be submitted to the UNFCCC in 2020. Lao PDR GCF Country Programme approved in February 2019 sets the assessment and implementation of low carbon and green technology options (e.g. fuel switching, reducing process emissions, energy efficiency, waste to energy) for key emitting industries as a priority climate activity in the energy sector. In addition, according to Lao PDR's 8th five-year national socioeconomic development plan (2016-2020), the construction materials (cement, tiles, steel bars, roof tiles, paint and other materials) sub-sector is one of the most outstanding within the industrial sector.

Although it is the first Government-led national scale program to focus on the mobilization of investments for energy efficiency in the industrial sector, the proposal builds on institutions, processes and existing work already underway. Asian Development Bank supported the preparation of the National Policy on Energy Efficiency and Conservation (2016), but there is no strategy or action plan for implementing such policy and associated target at sectoral level. The Ministry of Energy received technical assistance from ASEAN Center for Energy and Energy Conservation Center of Japan (ECCJ) on air conditioning labelling and standardization and benefit from Readiness support through approved program "Development of Action Plan for Designing and Implementing Standards and Labelling Programme in Lao PDR". The World Bank financed the "Demand Side Management and Energy Efficiency (DSM/EE)" project which was implemented by the electricity utility as a component of the Rural Electrification Adoptable Program Lending Project (2007-2014). The project included the expansion of the Public Sector Energy Database, the cleaning of air conditioners and the installation of timers, the installation of lamp switches, awareness building for energy savings, replacing light bulbs in the residential sector, compact fluorescent light (CFL) lamps in the residential sector (with high-quality CFL bulbs), and lighting and air conditioner units in government buildings, disseminating information about energy savings and conducting other awareness activities.

5. IMPLEMENTATION ARRANGEMENTS AND OTHER INFORMATION

5.1 Implementation arrangements

Please describe how implementation arrangements will be made and how funds will be managed by the NDA and/or the Delivery Partner.



funds are provided on a timely basis to ensure expediting and acquittal of funds are not delayed, and all funds are accounted and transparent. The DP will be responsible for the recruitment and day-to-day management of consultants as well as quality assurance of the deliverables. The DP will work with the NDA to implement work plan and ensure timely delivery of outputs. GGGI will share all outputs with the NDA, including data collected and studies developed. The NDA will have final ownership of the data. The NDA has requested GGGI to be its Delivery Partner (DP) for this Readiness proposal. The project formulation has involved in-country consultations with the NDA and MOIC. As per the design, under the guidance of the NDA, all day-to-day activities will be closely coordinated and reported. Further, GGGI will conduct the recruitment including drafting TOR and interviews for the Readiness project team and/or procurement evaluations. GGGI will carry out all procurement activities under the proposal, in compliance with GGGI procurement policies and procedures.

Readiness project team

This Readiness program will be implemented by a team of local and international GGGI staff and consultants, local trainers, as well as an international consulting firm. GGGI's delivery approach adds value as systematic backstopping helps build local capacity by leveraging international expertise to support Readiness project implementation. For this Readiness proposal, one international and one local GGGI staff, both full-time based in Lao PDR, will help with the hiring of qualified experts, provide advice and direction in the development of the outputs, coordination of research, quick response to questions from government and consultants, ensure consistency with GCF requirements, and quality assurance. They will ensure lessons learnt from other GGGI projects are applied to this project and help ensure high quality submissions to the government and the GCF.

5.2 Implementation and execution roles and responsibilities

Please briefly describe how the activities will be implemented and outputs delivered by project staff and consultants.

The profile, responsibilities, duty station and reporting line for each member of the team are as follows:

- **Readiness Lead**
The Readiness Lead is an existing GGGI international green investment specialist based full-time in Lao PDR for the duration of the project. The Readiness Lead will dedicate 37% of total staff time to this Readiness program over its duration and will hold the overall responsibility for the Readiness program in close coordination with the NDA and MOIC. Main tasks include:
 - o Overall program delivery
 - o Supervision, facilitation and coordination of all Activities
 - o Review of all deliverables for quality control and assurance
 - o Technology options assessment and financial models design
 - o Information Memorandum design
 - o Identification of financiers
 - o Organization of the investors' forum
 - o Develop a GCF concept note on industrial energy efficiency investment.
- **Readiness Assistant**
The Readiness Assistant is an existing GGGI local program assistant based full-time in Lao PDR for the duration of the project. The Readiness Assistant will dedicate 45% of total staff time to this Readiness program over its duration and will report directly to the Readiness Lead in close coordination with the NDA and MOIC. Main tasks include:
 - o Support the overall delivery of the program;
 - o Support, facilitation and coordination of all Activities with a focus on facilitating the work of external consultant, local trainers and consulting firm, especially in liaising with key partners including the industry sector, the NDA, Ministry of Industry and Commerce and the training center;
- **Energy Efficiency Expert**
The Energy Efficiency Expert is an international consultant with engineering background and extensive experience conducting energy audits for the industry sector in the ASEAN region, to be based in Lao PDR for the duration of associated activities. The Energy Efficiency expert will be under the management of the Readiness Lead. Main tasks include:
 - o Conduct at least factory-level 25 energy audits in accordance with ASHRAE⁶ standard in selected industrial sub-sectors;

⁶ American Society of Heating, Refrigerating and Air-Conditioning Engineers

○ Prepare the assessment of technology options and support the design of financial models ○ Design the energy related courses of the training program. ○ Deliver keynote speeches as part of the training program.
- Trainers Trainers are experienced local teachers with engineering and business administration backgrounds. They will be recruited in close coordination with the host training center. Maximum 3 trainers will be needed. Their main tasks include: ○ Support the design of the ESCO and energy auditing training program. ○ Training program delivery. ○ Details of the training programme are provided under section 5.5. - Consulting Firm The Consulting firm is an international firm specializing in industrial policy and sustainability. Its main tasks include: ○ Organization of the stakeholder's engagement workshop for the industrial energy efficiency policy guidelines and action plan. ○ Draft the industrial energy efficiency policy guidelines and action plan. ○ Organization of the stakeholder's validation workshop for the industrial energy efficiency policy and action plan. A draft ToR is provided in Annex 2 to this proposal.

5.3 Risks and mitigation measures

Implementation of the activities under this proposal shall be carried out in line with the Amended and Restated Framework Readiness and Preparatory Support Grant Agreement between the GGGI and the GCF dated December 13, 2017 as amended by the side letter agreement between the GCF and the GGGI which took effect on 30 March 2020 (the "Framework Agreement").

Risk category	Specific risk(s) / Risk(s) description	Probability of occurrence (low, medium, high)	Impact level (low, medium, high)	Mitigation action(s)	Entity(ies) responsible to manage the risk(s)
Execution	Failure to capture lessons learnt from previous approved GCF grants	Low	Medium	NDA will be part of the coordination mechanism to be created under Activity 1.3.1a; NDA will provide strategic oversight for the implementation of the readiness project and will be responsible for the institutional coordination of activities, project stakeholders and Readiness Delivery Partner	NDA and DP
Execution	Lack of engagement from stakeholders and beneficiaries	Low	Medium	MOIC will be leading the engagement of industries, business associations and other relevant stakeholders in project's activities.	NDA, MOIC and DP

Risk category	Specific risk(s) / Risk(s) description	Probability of occurrence (low, medium, high)	Impact level (low, medium, high)	Mitigation action(s)	Entity(ies) responsible to manage the risk(s)
Execution	Limited NDA's capacity for overseeing the project due to increasing readiness portfolio	Low	Medium	The coordination mechanism specifically for this project will be established for efficient engagement and coordination of stakeholders; Most activities focus on the industrial sector and can be facilitated by MOIC	NDA and DP
Execution	Public health response measures to COVID-19 inhibit specific activities	High	Medium	Activities will be conducted in accordance with national measures in response to COVID-19 pandemic	NDA, MOIC and DP
Execution	Lengthy start up period delays implementation due to procurement, project team setup, government clearances	Low	Medium	Industrial energy efficiency has been added to the MOU between GGGI and Lao PDR Government which will facilitate government clearances; GGGI project team has been setup; procurement will be done in line with GGGI procurement rules	NDA and DP
Technical	Risk of data accessibility and reliability for the energy audits	Medium	Medium	Engage and mobilize stakeholders in the industry sector to introduce the program and highlight the benefits of energy efficiency for the sector's competitiveness	NDA, MOIC and DP
Financial	Risks concerning Money Laundering/ Financing of Terrorism	Low	High	GGGI's Rules on Integrity Due Diligence set out the principles for conducting integrity due diligence on third parties engaged by GGGI involving financial commitment or transaction, to screen them, including their beneficial owners, regarding issues relating to money	GGGI

Risk category	Specific risk(s) / Risk(s) description	Probability of occurrence (low, medium, high)	Impact level (low, medium, high)	Mitigation action(s)	Entity(ies) responsible to manage the risk(s)
				laundering, terrorism, organized crime, human rights violations, and modern slavery.	

GGGI as Delivery Partner is committed to transparency, accountability and openness in the organization. GGGI's Whistleblower Policy aims to create an environment where staff members and external persons feel safe to report any misconduct or activities that work against the best interests of GGGI without the fear of Retaliation. To report allegations, GGGI's website provides an online communication channel as a Whistle Blower Report Form for third parties as well as GGGI staff.

5.4 Monitoring

GGGI undertakes monthly and annual project reporting to provide mechanism for regular collection of information on progress to support oversight and adaptive management and external reporting to GGGI members/donors. The project progress is reported against the log frame and budget. GGGI also engages independent evaluators to ensure unbiased, credible project evaluation and the final report is being published on GGGI website.

In line with the Framework Readiness and Preparatory Support Grant Agreement between the GCF and GGGI, progress reports using the GCF template will be submitted for disbursement requests and project closing as well as audited financial statements at the portfolio level at the end of each year. GGGI will prepare periodic revisions to reflect changes in six monthly and annual expense category budgets, monitor and review project expenditure reports and communicate and share with the NDA and GCF Secretariat (if required).

5.5 Other Relevant Information

Workshops

This Readiness program will deliver a total of six workshops to engage and coordinate stakeholders, validate the draft green industry strategy, and match investors, energy service companies with industrial enterprises. All workshops and events will be planned to ensure equal gender participation and align with GGGI policies on social and gender inclusion. The consultation workshops and trainings will be planned to focus on the SME sector in Laos which ensures socially inclusive participation. In consultations with the industry associations, the workshops will be planned to include associations focusing on gender or youth such as the Lao Business Women's association.

The workshops are described in more details below:

Activity 1.3.1b: Industrial energy efficiency coordination mechanism workshops 1,2 and 3

These 3 workshops are half-day events to be organized every six months with around 25 participants from key ministries, government officials at sub-national level, as well as representatives from the industry sector. Objectives are:

- To ensure smooth delivery of the Readiness program in accordance with the Terms of Reference of the Coordination Mechanism to be produced under Activity 1.3.1a;
- To retain engagement of all key stakeholders through the duration of the Readiness program;
- To prepare the post-Readiness engagement with GCF and other source of climate finance for investment mobilization into industrial energy efficiency.

Activity 2.2.1a: Industrial energy efficiency policy and action plan development, workshop 4

The workshop is a 1-day event with ca. 80 participants from key ministries, government officials at provincial levels, enterprises in the industrial sector and other stakeholders, such as equipment suppliers, existing energy services companies, training institutions, chamber of commerce, sub-sectoral business associations and relevant NGOs. Objectives are:

- To officially launch the development of the Industrial energy efficiency policy guidelines and action plan, introduce key principles, methodology and process, engage and collect feedback from all stakeholders
- To present Activities 2.4.1 and 2.4.2, including the concept of energy services companies (ESCO) and the process towards the mobilization of investments for energy efficiency, as well as other potential opportunities to be created through the greening of the industry, such as water/materials efficiency, recycling, etc.

Activity 2.2.1c: Industrial energy efficiency policy guidelines and action plan development, workshop 5 (Validation Workshop)

The workshop is a 1-day event with ca. 80 participants from key ministries, enterprises in the industrial sector and other stakeholders, such as equipment suppliers, existing energy services companies, training institutions, chamber of commerce, municipalities, sub-sectoral business associations and relevant NGOs. Objectives are:

- To validate the draft industrial energy efficiency policy guidelines and action plan and collect final comments from stakeholders.
- To highlight policy implementation action plan with workshop participants to better understand what the needs are including existing financing gaps.

Activity 2.4.2d: Industrial Energy Efficiency Bankable Project Preparation, workshop 6 (Investor's Forum)

The workshop is a 1-day event with ca. 80 participants from key ministries, enterprises in the industrial sector and other stakeholders, such as equipment suppliers, existing energy services companies, training institutions, chamber of commerce, municipalities, sub-sectoral business associations and relevant NGOs. Objectives are:

- To disclose the results of the energy audits to stakeholders.
- To present energy efficiency investment opportunities highlighted through the technology options assessment and financial models and the information memorandum.
- To host the certification ceremony for the first cohort of students enrolled in the ESCO training program.
- To match financiers, potential investors and industrial enterprises towards energy efficiency project implementation in the industrial sector.

Training program for the development of ESCOs and auditing skills (Activity 2.4.1b)

The training program will focus on capacity development in setting up and operationalizing ESCOs, as well as in undertaking walk-through energy audits. The longer-term goal is to harness future development of domestic energy services companies in Lao PDR and realize the energy savings potential at national level, including through the submission of a Concept Note to the GCF with ESCOs taking a pivotal role. Additional support needed to establish and finance ESCOs is beyond this training program and will be included in the GCF Concept Note to be prepared under Activity 4.3.1b.

The Clean Production Center of the Ministry of Industry and Commerce will host the training program in partnership with stakeholders including the Lao Chamber of Commerce, industry associations and the faculty of engineering at the National University of Lao in Vientiane capital.

Curriculum

It will consist of a 200-hours module to be delivered over a semester period and divided into 7 courses: energy efficiency principles and energy management systems (EMS) (40 hours); energy auditing (50 hours); ESCO delivery model (40 hours); business administration (20 hours), financial analysis (20 hours); marketing (10 hours); business law (20 hours). Trainers will be experienced local university teachers with academic background in engineering and/or business administration. Each course will include a Training of Trainers (ToT) sub-component to ensure the sustainability of the capacity built for the staff of the Clean production Center and other relevant entities. Through Activity 2.4.2a, the energy auditing course will provide trainees with on-site

practical experience using auditing equipment to be procured as part of the Readiness proposal and described in Annex 3. At the end of the module, the auditing equipment will remain with the Clean Production Center and will be used in subsequent training sessions by the trainers.

Trainee selection process

Around 15 trainees will be selected to join the program based on criteria defined in coordination between NDA, MOIC, delivery partner and steering committee members. Selected trainees will be personnel from the Clean Production Center, staffs from private sector industrial enterprises and sectoral associations, master students or professionals with at minimum bachelor's degree plus 5 years work experience in a relevant field, as well as other volunteer government officials for institutional capacity building purpose. Candidates able to demonstrate a clear potential to startup their own ESCO business will be given priority. The selection process will ensure equal gender participation. The selected candidates will be assessed through a pre-training survey for identifying the gaps in skills. The training will be tailored to address these gaps.

Certification

A post-training survey will be conducted to understand the capacity gaps that were addressed through the training. At the end of the training students should have acquired sufficient capabilities to start and operate their own energy services company. Training certificates will be issued by the Clean Production Center.

Project Assets and Knowledge Generated

All reports, products, processes, documents and other materials generated during the implementation of this project using GCF resources shall be with NDA to be freely shared for all stakeholders as well as the means to update and manage these intellectual assets beyond the project life.

GCF concept note development

The concept note investment proposal will be developed based on the bankable energy efficiency opportunities identified from the energy audits, technology options assessment, financial models and information memorandum, and considering the anticipated pivotal role of domestic ESCOs in achieving energy efficiency's national objective. The concept note will serve to stimulate investments in industrial energy efficiency in Lao PDR, thereby increase the number of quality project concept notes developed and submitted targeting LDCs.

Start Date

After the approval of the Grant, a notification letter will be sent by the GCF to NDA with copy to the DP. The date of such notification by the GCF will be treated as the start date for project implementation. From that date, the end date of implementation will be calculated considering the total duration of the project as presented in the approved proposal.

Sustainability Plan

Long-term impacts of this Readiness Program will be ensured in the Concept Note to be prepared under Activity 4.3.1b, including technical assistance for the continuation of the coordination mechanism as well as financing necessary to achieve identified investment opportunities, including via ESCOs. Moreover, energy auditing capacity will be built in a sustainable manner within the Cleaner Production Center through a Training of Trainers component, as well as the capacity to implement industrial energy efficiency through energy services companies. Energy Management Systems (EMS) principles will be introduced in the policy documents, during the training program, audits and the workshops, to raise awareness on longer-term monitoring and reduction of energy consumption.

Annex 1: Lao PDR GCF Readiness Pipeline

This proposal is coherent with previously approved proposals it expands the list of beneficiary government agencies to the Ministry of Industry and Commerce. Moreover, the focus is on strategic frameworks for low-emission investment in industrial energy efficiency, which is an objective that was not addressed by other proposals, while the Government published in 2016 the National Policy on Energy Efficiency and Conservation which sets a 10% reduction target in energy consumption by 2030 compared to business-as-usual scenario. This target will be included in the country's first revision of its Nationally Determined Contribution (NDC) to be submitted to the UNFCCC in 2020. The industry sector is the largest consumer of electricity with 42% of total consumption in 2018.

As described in the below overview table, out of 7 approved proposals, only proposal #5 developed by UNEP features an energy efficiency component. As per detailed description of Readiness complementarity with UNEP proposal in the next table below, the present proposal will build upon the outputs from the UNEP proposal which aims at recommending regulatory options for establishing Minimum Energy Performance Standards (MEPS) and labelling for priority appliances, recommending fiscal policy instruments and developing financing program to scale adoption of EE lighting and appliances.

Readiness Approved Proposals in Lao PDR

#	Project Title	DP	TOTAL	Benef.	Duration	Status
Readiness Projects in Lao PDR						
1	Green Climate Fund Readiness and Preparatory Support for Lao PDR	UNDP	\$300,000	MONRE	18	Closed
2	Getting Lao PDR EPF accredited to the GCF	GIZ	EUR 412,070	EPF	18	Approved
3	Readiness Support to enhance green finance in the areas of green cities	GGGI (1)	\$476,485	MONRE MPWT	18	Completed
4	Incentive mechanisms for private sector engagement under REDD+	FAO	\$348,975	MAF MONRE	18	Approved
5	Development of Action Plan for Designing and Implementing Standards and Labelling Programme in Lao PDR	UNEP	\$345,500	MEM	18	Approved
6	Urban resilience in the cities along the GMS East-West Economic Corridor	UN-Habitat	\$415,000	MPWT	18	Approved
7	Enhancing NDA Capacity and Access to the GCF in the Lao PDR	GGGI (2)	\$239,000	MONRE	18	Approved
Readiness Pipeline						
1	Completion of the accreditation of the EPF as DAE for Lao PDR	EPF	\$400,000	EPF	24	GCF Review
2	Industrial Energy Efficiency	GGGI (3)	\$300,000	MOIC	18	GCF Review

Detailed Description of Readiness Complementarity with UNEP proposal:

GCF Readiness Outcomes	Contributions of UNEP Approved Readiness project	Link to current GCF Readiness Proposal
Outcome 2.2: GCF recipient country has developed or enhanced strategic frameworks to address policy gaps, improve sectoral expertise, and enhance enabling environments for GCF programming in low-emission investment.		
Output 2.2.1:	Develop framework and recommend regulatory options for	Although the industrial energy efficiency policy guidelines and

Lao PDR industrial energy efficiency policy guidelines and action plan are published by the Government	establishing Minimum Energy Performance Standards (MEPS) and labelling for priority appliances.	action plan will not be expected to define exhaustive industry minimum standards, reference should be made to the MEPS and labelling program, which could serve as a basis for future standardization in the industry sector.
Outcome 2. Strategies for transforming and attracting private sector investment for low emission and resilience developed and being used.		
Output 2.4.1: Delivery of an industrial energy efficiency training program under the Lao PDR's Clean Production Centre, with a focus on ESCOs and energy auditing skills. Trained individuals will support GCF programming through Output 4.3.1, as the GCF Concept Note will apply the ESCO model to attract private sector investments in EE.	Capacity building on implementation of MEPS and labelling.	Materials developed as part of the capacity building program on MEPS and labelling will, where relevant, be incorporated in technical modules of the training program
Output 2.4.2: 25 Technical and financial studies, sub-sectoral investment memorandum, and investors' forum that highlight energy efficiency investment opportunities in the local industrial sector.	Conduct lighting and appliance market study; Cost-effectiveness analysis of EE lighting and appliances in different end-use sectors; recommend fiscal policy instruments and develop financing program to scale adoption of EE lighting and appliances.	Findings of the market study and cost-effectiveness analysis will, where applicable, feed into the financial models to be designed under activity 2.4.2b.

ANNEX 2: TERMS OF REFERENCE (Consulting Firm) for Output 2.2.1
Preparation and Validation of Lao PDR industrial energy efficiency policy guidelines and action plan

Background and Objectives

The Government of Laos (GoL) has set the target in its National Policy on Energy Efficiency and Conservation to reduce 10% in energy consumption by 2030 compared to baseline scenario. The target is also included in the first revision of the Nationally Determined Contribution (NDC). The industrial sector was selected as a priority sector in Lao National Green Growth Strategy approved in 2019 because of its importance to local socio-economic development and environmental sustainability. In this context, the Department of Industry and Handicraft (DoIH) under Ministry of Industry and Commerce (MoIC) is seeking the support of an experienced international consulting firm to set the regulatory framework through the development of the national industrial energy efficiency policy guidelines and action plan, with the objective of transforming the economic production structure to generate environmental benefits. The industrial energy efficiency policy guidelines and action plan will describe measures to accelerate the sector's transformation towards a low-carbon, resource-efficient economy, in a way that also enables productivity enhancements.

Scope of Work and Proposed Activities

The scope the work consists of the organization of a 1-day stakeholders' engagement workshop, the preparation of the draft industrial energy efficiency policy guidelines and action plan, and the organization of a 1-day stakeholders' validation workshop. The work involves the review of existing policies well as consultations and data collection to ensure that the industrial energy efficiency policy guidelines and action plan will provide the adequate regulatory framework to achieve the country's energy efficiency and green growth objectives in the industry sector.

Activities include the following:

- **Activity 1: Stakeholders' engagement workshop**
 The workshop is a 1-day event with approximately 80 participants from key ministries, government officials from provincial levels, enterprises in industrial sector and other stakeholders such as equipment suppliers, existing energy service companies, training institutes, chamber of commerce, sub-sector business associations, and relevant NGOs.

Objectives of the workshop are to:

- Officially launch the development of the Lao PDR industrial energy efficiency policy guidelines and action plan.
- Introduce green industry key principles, policy development methodology and process.
- Engage and collect feedback from all stakeholders with a focus on the private sector.

- **Activity 2: Draft industrial energy efficiency policy guidelines and action plan**
 This activity involves drafting the industrial energy efficiency policy guidelines and action plan, in light of existing policies, international best practices, inputs from bilateral consultations and data collected. The process also includes incorporating comments and feedback from all stakeholders during the engagement and validation workshops, until formal submission of the validated version of the policy.

The industrial energy efficiency policy guidelines and action plan will aim to drive the transformation of the industry sector in Lao PDR towards a low-carbon, energy-efficient economy in ways that also enable productivity gains. Interested consulting firms should submit a proposed workplan which will at minimum cover the following phases that draw upon UN-PAGE's Practitioner Guide to Strategic Green Policy (UN, 2016):

- a. Policy and data stocktaking: an analysis of the existing industrial system and its potential future state.
- b. Priorities: the identification of the key issues for energy efficiency in the industrial system and a theory of change.
- c. Objectives: a definition of objectives to be reached within a proposed time frame, including measurable targets.
- d. Instruments: a description of the key policy instruments to be used to reach the targets.
- e. Action plan: a list of different steps and activities that are required to achieve the objectives.

- **Activity 3: Stakeholders' validation workshop**

The workshop is 1-day event with approximately 80 participants from key ministries, enterprises in industrial sector and other stakeholders such as equipment suppliers, existing energy service companies, training institutions, chamber of commerce, municipals, sub-sector business associations, and relevant NGOs.

The objectives of the workshop are:

- To validate the draft industrial energy efficiency policy guidelines and action plan and collect final comments from stakeholders.
- To highlight policy implementation action plan with workshop participants with a focus on the private sector and better understand what the needs are including existing financing gaps.

Methodology

Workshops will be hosted by MoIC with support from GGGI Lao Country office. The consulting firm will be responsible for the workshop facilitation and presentation. Policy review will be undertaken by means of desk-based research. The industrial energy efficiency policy guidelines and action plan should be formulated in accordance with international best practices guidance, such as relevant publications from UNIDO, UN-PAGE or other development organizations. Policy formulation process will be supervised by GGGI experts based at HQ and at Lao country office in close coordination with key stakeholders, namely, MoIC, Ministry of Natural Resources and Environment (MoNRE, NDA), Ministry of Energy and Mines (MEM), etc.

Deliverables

The deliverables of these terms of references are as follows:

Activity	Description	Deliverables
Stakeholders' Engagement Workshop	To introduce the industrial energy efficiency policy guidelines and action plan principles and development process to stakeholders	Workshop report including comments from stakeholders
Draft industrial energy efficiency policy guidelines and action plan	The industrial energy efficiency policy guidelines and action plan will describe measures to accelerate the sector's transformation towards a low-carbon, resource-efficient economy, in a way that also enables productivity enhancements.	Final draft version of industrial energy efficiency policy guidelines and action plan
Stakeholders' Validation Workshop	To present the draft policy and collect final comments from all stakeholders	Validated industrial energy efficiency policy guidelines and action plan

Timeline

The project is expected to be completed within 13 months of the start date.

Team and Competence Requirements

The team should comprise at least 3 members with extensive experience and specialization in industrial policy and environmental sustainability. Team members should demonstrate a combination of relevant technical skills and expertise on industrial policy formulation, and environmentally sustainable development. At least 1 member should speak fluent Lao.

- Industrial Policy Specialist (Team Leader)
The team leader (TL) is an international industrial policy specialist with track record leading similar assignments. The industrial policy specialist will be in charge of the overall development of the industrial energy efficiency policy guidelines and action plan, team coordination and facilitation of the workshops.
- Sustainability Specialist
The sustainability specialist is an international expert with track record in the delivery of similar assignments. The specialist will be responsible for all sustainability aspects of the industrial energy efficiency policy guidelines and action plan. He/she will also support the organization and facilitation of the workshops.
- Domestic industry expert

The domestic industry expert should demonstrate in-depth knowledge of Lao PDR's industrial context. The industry expert will facilitate data collection, access and review relevant documents including existing related policies and regulations, as well as support the overall development of the industrial energy efficiency policy guidelines and action plan and the organization of the workshops.

Annex 3: Auditing equipment

List of Measuring Equipment and Tools to Perform Energy Audits in Industry - Aug 2020							
Item	Usage	Ideal product	Picture	Reference	Qty	Unit cost (USD)	Total (USD)
Infrared thermal camera	Measurement of temperature of outer surfaces of equipment, in particular boilers, steam pipes and dryers, faulty contacts in electrical cabinets (over heating), unbalanced phases in three phase electrical distribution, worn off motors, excessive friction in mechanical transmissions (belts, bearings, chains)	Fluke TiS20 thermal camera (-20°C/+350°C)		http://sg.rs-online.com/web/p/thermal-imaging-cameras/8882484/	1	2,094	2,094

Electricity data logger	Recording energy consumption (kWh), variation of voltage (V), peak power (kW), variation of power factor, variation of phase balance over periods of time	Dent ElitePro XC-I-N-C (crocodile voltage clips and leads provided) 		https://www.powermeterstore.com/P16777/dent-elitepro-esp-xc-power-meters	1	1,350	1,350
Shark clips and leads	Reaching voltage points that crocodile clips cannot reach	CLP-SHARK clips 	https://shop.dentinstruments.com/collections/accessories/products/shark-clip	4	30	120	
1,000 Amps current transformer clamps	Measuring currents in 3 phase circuits for the electricity data logger, for electric cables	CT clamp 1,000 Amps CT-CON-1000-U 	https://www.powermeterstore.com/category/current-transformers-for-sub-meters	4	180	720	
5,000 Amps Rogowski current transformer coils (RoCoils)	Measuring currents in 3 phase circuits for the electricity data logger, for bus bars in distribution board cabinets, when CT clamps are too small	CT-RMV-24-2000-U, 5000 Amps 	https://www.powermeterstore.com/category/current-transformers-for-sub-meters	4	229	916	

Current data logger	Monitor current usage	Lascar EL-USB-4 Current Data Logger, Maximum Current Measurement 20mA DC, USB, Battery Powered		http://sg.rs-online.com/web/p/data-loggers/5363277/	2	79	158
Temperature logger with K-probe 0 to 400°C (-200 to +1,350°C with other appropriate probes)	Monitor temperature of dryers, boilers	Lascar EL-USB-TC Temperature Data Logger, USB, Battery Powered		http://sg.rs-online.com/web/p/data-loggers/0126717/	1	102	102
Current transformer clamp		Pico Technology MI077 Current Probe		http://sg.rs-online.com/web/p/current-probes-clamps/8986810/	1	124	124

Ultrasonic leak detector	Checking of proper operation of steam traps, leaks on compressed air networks, worn off bearings in motors	AccuTrak VPE (standard set with contact needle probe included)		- http://superiorsignal.com/products/ultrasonic-instruments/accutrak-vpe-ultrasonic-leak-detector - https://www.tequipment.net/leakage-detectors/ultrasonic-leak-detectors/	1	425	425
Wattmeter (clamp on power hitester)	Measurement of instant current (Amps), voltage (V), active power (W), power factor, phase balance, harmonics (to the 20th, in % for each)	RS Pro IPM 6200 (crocodile voltage clips and leads provided)		http://sg.rs-online.com/web/p/power-quality-analysers/1232207/	1	758	758

Combustion gas analyser	Measurement of oxygen content of flue gas in boilers (%), carbon dioxide (%), carbon monoxide (%), temperature of flue gas (°C) [efficiency of combustion]	Kane 250/RS		http://sg.rs-online.com/web/p/combustion-gas-analysers/4686018/	1	835	835
Ambient thermometer + humidity meter (thermohygrometer)	Measurement of ambient temperature (°C) and relative ambient humidity (%RH) in working spaces and in dryer exhaust or evaporative cooling systems	RS Pro Thermohygrometer		http://sg.rs-online.com/web/p/thermohygrometers/1278296/	1	224	224

Wood log humidity meter	Measurement of wood logs humidity (%RH) used for firing in boilers	Testo 606-1 Moisture Meter, Maximum Measurement 50%		http://sg.rs-online.com/web/p/moisture-meters/0292341/	1	100	100
Luxmeter	Measurement of luminosity (lux) at working stations	RS Pro ILM1332A		http://sg.rs-online.com/web/p/light-meters/1232220/	1	57	57
Digital thermometer	Measurement of temperature of flue gas in boilers (°C) and heat flow in dryers and withering troughs	Fluke 52 (+1,372°C)		http://sg.rs-online.com/web/p/digital-thermometers/3534455/	1	432	432

Thermocouple probe	To be connected to digital thermometer to measure temperature of flue gas in boilers and heat flows in dryers and withering troughs	Fluke 80PK-22 (1,090°C)		http://sg.rs-online.com/web/p/temperature-probes/8507669/	1	128	128
Air flow meter	Measurement of air flows (m3/s) and air speed (m/s) in withering troughs, dryers, evaporative cooling systems	RS Pro AVM-01		http://sg.rs-online.com/web/p/anemometers/1232202/	1	103	103
Laser distance meter	Measurement of distance (m) without contact for sizing the buildings	RS Pro Distance Meter 70m		http://sg.rs-online.com/web/p/distance-meters/8282244/	1	203	203

Electrical latex safety gloves 400V	Safe handling of electricity measuring devices, electrical insulation	Sibille Beige Electrical Safety Latex Electricians Gloves 11 - XL, 500V		http://sg.rs-online.com/web/p/reusable-gloves/9182243/	1	39	39
Electrical leather safety gloves	Safe handling of electricity measuring devices, mechanical protection	Sibille Electrical Safety Leather Electricians Gloves 11 - XL		http://sg.rs-online.com/web/p/reusable-gloves/9182451/	1	21	21
Safety glasses	Eye protection when making measurements/observations in the factories	3M Virtua AP Safety Glasses, Clear		http://sg.rs-online.com/web/p/safety-glasses-shields/7401453/	1	2	2

Eye shield	Face protection when making electrical measurements	JSP AFA Eye Shield, Clear		http://sg.rs-online.com/web/p/safety-glasses-shields/2853216/	1	35	35
Electrical insulation mat	Insulating the operator making electrical measurements in electrical cabinets and on electrical machinery	Grey Elastomer Electrical Safety Mat, 1m x 600mm		http://sg.rs-online.com/web/p/electrical-safety-mats/9182482/	1	67	67
Battery charger	Charging of batteries used in measuring devices	RS Pro 9V, AA, AAA Battery Charger, EURO Plug		http://sg.rs-online.com/web/p/battery-chargers-aaa-aa-c-d-9-volt/8003060/	1	11	11
Universal electrical adapter	Connection of the different pieces of measuring equipment and battery charger to grid for charging, in the 4 countries visited	RS Pro World Plug Adapter, Rated At 2.5A		http://sg.rs-online.com/web/p/mains-connector-adapters-converters/8246077/	1	19	19



GCF READINESS & PREPARATORY SUPPORT

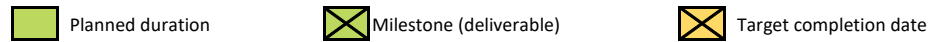
						Total (USD)	9,043
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5.3 Implementation Plan

Please list all the deliverables (e.g. D.1.1.1a) per activity (e.g. A1.1.1) with the identifier and mark the planned duration as show in the example. Please also indicate milestones for any deliverables to be completed during the implementation period of the activity in question.

Make sure the identifier number of each activity and deliverable matches with the proposal as this table does not require its name or description. Please refrain from adding descriptions.

For more guidance on how to fill out this tables, please see Part III Section 5 of the Readiness Guidebook

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