2018

Project Implementation Review (PIR)

Empowered lives.
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NAMAs in the energy generation sector

A. Basic Data

Project Information	
UNDP PIMS ID	5232
GEF ID	5586
Title	Appropriate Mitigation Actions in Energy Generation and End-Use Sectors in Sri Lanka
Country(ies)	Sri Lanka, Sri Lanka
UNDP-GEF Technical Team	Energy, Infrastructure, Transport and Technology
Project Implementing Partner	Government
Joint Agencies	*(not set or not applicable)*
Project Type	Medium Size

Project Description
Sri Lanka is highly dependent on imported oil to meet its energy needs with 49% of the primary energy supply coming from imported fuel, where 12% of the total government budget is used for electricity generation alone. This is leading to a heavy reliance on imported fossil fuels and increased GHG emissions. The National Energy Policy of Sri Lanka seeks to diversify supply mix with renewable energy resources whilst seeking to reduce energy demand through demand side management. The Renewable Energy Resources Development Plan seeks to achieve 20% from renewable energy resources by 2020 and 30% by 2030 as part of the national strategy to reduce GHG emissions through appropriate mitigation actions (NAMA). Energy Management Plan (EnMAP) seeks to achieve energy savings from the promotion of EE measures. Often the GHG savings and the cost-benefits of these low carbon interventions are not systematically quantified and their benefits remain obscure and done on ad-hoc basis. It is difficult for sub-national entities to assess the impact of their NAMA interventions at the sectors and sub-sectors level. In order to fill these gaps, the development of a robust, transparent and functional NAMA framework along with clear inventory and MRV system with supporting governance and oversight (NAMA Secretariat, NAMA Coordinating Entity, NAMA Implementing Entity, MRV Committee, and NAMA Registry) is needed. Such framework will systematically quantify GHG savings and benefits of the mitigation interventions using a bottom up approach to aggregate from the provincial and sub-sector levels to the national and sectors level. Furthermore, such a transparent framework will open up opportunity to access regional and international climate funding. In order to achieve this, the project will support appropriate climate change mitigation actions in the energy generation and end-use sectors as part of the initiatives to achieve the voluntary GHG mitigation targets of Sri Lanka To test and verify the framework, this project will seek to overcome the regulatory, institutional, technical, financial and social barriers for the scaling up of RE and EE NAMA through the dissemination of 1,000 bio-digesters, 1,300 high efficiency motors in tea factories, and 205 solar PV net metering systems with battery storage. Furthermore, the project will: 1. Develop a robust provincial inventory system that could be updated periodically and aggregated at the national level using web-based EnerGIS database management system 2. Develop a decision making tools such as MACC tools for analyzing and prioritizing a pipeline of bankable NAMA that could be implemented

3. Leverage public, private and CSOs resources through the NAMA Implementing Entity for the implementation of bankable RE and EE NAMAs based on viable and cost effective business models to incentivize value chain actors to reduce supply risks and create demand and

4. Develop a robust and transparent MRV system that are accurate, reliable and credible and avoid double accounting.

During the implementation, in addition to GEF fund of USD 1,790,411 and UNDP fund of USD 250,000; the project will be supported by in-kind contribution and parallel activities from the government (SLSEA, MERE) to an amount of USD 3,400,000 and USD 230,000 and from private sector with an amount of USD 22,000,000. Thus, total resource for project implementation is USD 27,670,411.

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B. Overall Ratings

Overall DO Rating	Moderately Satisfactory
Overall IP Rating	Moderately Satisfactory
Overall Risk Rating	Substantial

C. Development Progress

Description					
Objective **Support appropriate climate change mitigation actions in the energy generation and end-use sectors as part of the initiatives to achieve the voluntary GHG mitigation targets of Sri Lanka**					
Description of Indicator	**Baseline Level**	**Midterm target level**	**End of project target level**	**Level at 30 June 2017**	**Cumulative progress since project start**
No. of implemented NAMAs in the energy generation and end use sectors by EOP	*(not set or not applicable)*	*(not set or not applicable)*	3	The Project has started the implementation of the identified three Nationally Appropriate Mitigation Actions (NAMAs) technologies; Solar PV with battery storage, High Efficiency Motors (HEM) in the tea plantation sector and domestic and institutional level biogas. The progress of these NAMA implementation can be summarized as follows; 13 Solar PV with battery storage has been installed under the first phase (trial phase) and one more unit to be installed, and performance monitoring is in progress. 24 HEMs and 5 Variable Frequency Drivers (VFDs) were installed in 5 tea factories in the pilot trial phase. Trial monitoring and analysis completed. 79 Biogas digesters have been constructed during the reporting period and further 47 units are under construction.	The Project continued with the implementation of the identified three Nationally Appropriate Mitigation Actions (NAMAs) technologies; Solar PV with battery storage, High Efficiency Motors (HEM) in the tea plantation sector, and domestic and institutional level biogas. Based on Mid-Term Review (MTR) recommendations and lessons learnt during the first 2 years of implementation, the Project has already adopted certain changes to the programme to expedite remaining targets like switching from High Efficiency Motor pilot programme to Variable Frequency Drivers pilot programme. The progress of these NAMA implementation can be summarized as follows; 14 Solar PV systems with battery storages (equivalent of 31 systems of original capacity) has been installed under the first phase and performance monitoring and detail

				The detailed progress and the activities completed to date are provided under outcome No.03. The implementation of these NAMAs will be continued for the next two years (2017-2019).	techno-economical assessment is in progress. The Project has facilitated 48 tea factories to install 344 Variable Frequency Drivers (VFDs) with part-finance support. This is apart from pilot trial phase implementations of 24 High Efficiency Motors (HEMs) and 5 VFDs were installed in 5 tea factories. 205 small scale biogas digesters have been constructed with the project assistance and further 24 units are under construction. As per MTR recommendation, the Project has started the facilitation of medium-large scale projects, 22 projects of medium-large scale (equivalent 260 units scale) are under consideration. The estimated Emission Reduction (ER) from these pilot implementations are 3,698 tons CO2equ and energy saving amount is 5,654 GJ. Further, the pilot implementations are being used for the purpose of demonstration of systematic data collection, MRVing purpose and overall NAMA framework. The detailed progress and the activities completed to date are provided under outcome No.03, and the Project is to expedite the implementation of these three

					programme in the remaining year (2018-2019).
The progress of the objective can be described as:		**On track**			
Objective **Established and regular update of renewable energy utilization baseline & energy intensity reference baselines for the energy generation and end-use sectors**					
Description of Indicator	**Baseline Level**	**Midterm target level**	**End of project target level**	**Level at 30 June 2017**	**Cumulative progress since project start**
No. of provinces that regularly conduct sub-sectoral GHG emission inventories of their energy generation and end-use sectors by Year 4	*(not set or not applicable)*	*(not set or not applicable)*	3	The Project is in the development of a provincial/sectorial GHG emission inventory system that will be aggregated at the national level. The progress to date can be detailed as follows; Existing EnerGIS Data Management System (DMS) of SLSEA has been planned to be upgraded as a fully functional energy DMS which will also include the GHG emission inventory. For this task, the project contracted a local Information and Communication Technologies (ICT) service provider, and two of the major tasks of this service provider are; (1) Development of an Application tool which facilitate energy/GHG data collection of NAMAs (including database/management) feeding to EnerGIS system. This will also	The project is in the mid-way of provincial/sectorial GHG emission inventory system development, and the progress to date can be summarized as follows; EnerGIS data management system of SLSEA was upgraded to ArcGIS 10.5 version. An energy Data Management System (DMS) has been developed for the purpose of inventorying energy sector GHG emissions and Emission Reduction (ER) of mitigation actions. This is now integrated to EnerGIS system of SLSEA. As the first step of this energy DMS, a web-based application was developed, and GHG emission related data from energy generation and end-users can be collected through this online tool directly at the national level. Provision to extract emission levels data at provincial and sectoral levels has been made in the tool.

				include Quality Assurance (QA)/Reporting/etc (2) Upgradation of existing EnerGIS system facilitating the first task. This Web-based App is now in the testing phase, and trials are being performed with the available data from pilot technologies. EnerGIS of SLSEA was upgraded with ArcGIS 10.5 version which will facilitate the development of the proposed energy/GHG data managementsystem, and EnerGIS system is now being customized for the project's requirement. Energy/GHG emission data flow structures have been identified for the selected pilot technologies. These data flow structures include field/factory/installation level data collection, data quality control at provincial/sectorial level, data aggregation and quality verifying at national level (Sustainable Energy Authority) and annual reporting to the final focal unit (Climate Change Secretariat). This system will be tested and verified for the pilot technologies selected under the project, and will be expanded to capture other NAMA technology-applications of the energy sector.	Energy and GHG emission related data can be fed in to the system at the point of generation or end-user level (sectorial or sub-national level) using above application, and quality assurance and reporting facilities are also embedded. This web-based App is now in the testing phase, and trials are being performed with the available data from pilot technologies. The application was also introduced to 4 provinces with the required initial training. The same application was also introduced to the solar PV service providers registered under SLSEA to report their solar PV installations on voluntary basis, and more than 2,500 kW solar PV capacity additions have been reported to date. In parallel, a web portal has been developed within the EnerGIS system to monitor the progress of other renewable energy installations . This facilitates both the project developers and SLSEA to monitor the progress online from the submission of new project proposal/applications to SLSEA. As the second phase of this activity, the project is in the development of a common energy and GHG emission related data reporting application.

				A provincial level stakeholder consultation was conducted in North-Western province to obtain their suggestions for the development. This was in addition to the consultation of the two key stakeholders of the project; Sri Lanka Sustainable Energy Authority and the Climate Change Secretariat. Data of available pilot implementations are now being fed to this DMS, and will be tested and verified before the system is introduced to provincial level. Further system and quality improvements will be done based on the findings from field and sector/provincial level feedbacks.	The project has consulted the following stakeholders when developing this application; • Climate Change Secretariat - National Communication related emission reporting requirements • Sustainable Energy Authority – Data pertaining to Sri Lanka energy balance and energy sector baseline assessments • Provincial Councils – possibility of using the same application for provincial activity reporting and monitoring purpose. Overall activity has been progressing but slightly behind the original schedule. Efforts to complete are being made. These efforts include additional resource mobilization for provincial data collection process including separate budgetary provisions. Further, SLSEA staff inventory and energy manager divisional engagements are sought to operationalize the proposed system.
No. of provinces that have established and operational sub-sectoral GHG emission inventory system by Year 4	*(not set or not applicable)*	*(not set or not applicable)*	3	The project is to establish sub-sectorial GHG emission inventories in North Western, Uva, Southern and Central provinces. A web-based Data Management System (DMS) is being developed as described above and this web-based DMS will be used to make inventories	Overall work progress to date can be summarized as follows; • Energy DSM has been introduced to the provincial levels (four provinces) and project relevant sectors (mainly tea industry) -

				of GHG Emission Reductions (ERs). The same system will also be used for the MRVing of these ERs as detailed under the progress of component 4. The project team has identified potential personnel that could be utilized for data collection, verifying and reporting process at provincial and sectoral level (for these selected three NAMAs in particular) who are listed below At provincial level: Livestock Development Inspectors, Economic Development Officers, and Agricultural Inspectors of respective provinces – A total of 125 officers selected under the programme were provided with one-day capacity development programme on the subject apart from their main involvement in biogas programme. Sectorial level: Energy managers (trained on energy efficiency and energy management in industrial sector by SLSEA). Meter readers of the electricity utility (Ceylon Electricity Board and The Lanka Electrify Company) covering the power generation sector. The project has planned to provide necessary training and capacity building requirements on energy/emission data management	Further details are provided under the next activity progress reporting. • The project team has consulted National Communication team under CCS and the energy manager programme of SLSEA when designing a general GHG emission related data collection template. This is now being reviewed by the International consultant for further improvements and for the consistency with international protocols and standards. • In parallel, energy DSM modification accommodating these data gathering mechanism is now in progress. The project expects to accelerate implementation of these reaming activities once IT based emission inventory tool is fully developed. A separate programme enabling provincial authorities to collect provincial level data will be launched in Q3 of 2018. Sub-national (provincial) level GHG emission inventory data will be collected from this programme, and the same will be used for operationalization and institutionalization of this energy DMS within sub-national (provincial) levels. The project expects to address the sectoral & sub-sectoral emission inventory through SLSEA's energy manager programme.

				and MRVing of ERs for these personnel in the near future.	
No. of provinces that utilize the functioning web-based EnerGIS GHG inventory system by year 1	*(not set or not applicable)*	*(not set or not applicable)*	1	Web-based EnerGIS inventory system which is being developed will be first introduced to the North Western Province (NWP). Data of already installed biogas and solar PV units in the province has already been recorded and will be fed to this inventory system. GHG inventory together with renewable energy utilization baseline & energy intensity reference baselines will be made available to the province with available pilot technology data under the project (scheduled for Sept, 2017). The required capacity building activities on normal operation, how to best use this web-based system for their planning and decision making process have been scheduled for Q3 of 2017. This system will also be introduced to the other provinces as well as will be expanded to capture other technology-applications data.	The web-based Data management System (DSM) has already been introduced to North Western, Uva, Southern and Central provinces (and sectors) for biogas pilot related data collection. Around 180 field officers and executive level officers from North-western, Uva, Sothern and Central provinces were given a comprehensive training on the use of energy DMS for pilots related GHG emission/emission reduction related data collection. Further under the same training programme, It was discussed with provincial councils to expand the data collection mechanism to other sectors / installations/new projects. Provincial officials proposed some important sectors which are relevant for them such as agricultural irrigation (NWP, SP, UP), fisheries (SP), dedicated coconut and solar water pumping (NWP), off-grid solar (UP, CP). These potential sectors/technologies to be included into energy DMS, and such requirements are under consideration during the on-going DMS modifications and GHG emission inventory tool development. The energy DMS has been introduced to tea factories in the VFD pilot programme, and relevant

					reporting and verification officers have been trained. Energy DMS enables measuring energy intensity of each factory comparing with national and sub-national/provincial-level baselines. This system can be expanded to other sectors/industries for reporting emissions reduction through energy savings.
The progress of the objective can be described as:		**Off track**			
Outcome 1 **Prioritized Nationally Appropriate Mitigation Actions (NAMAs) in the energy generation and end-use sectors are identified and designed**					
Description of Indicator	**Baseline Level**	**Midterm target level**	**End of project target level**	**Level at 30 June 2017**	**Cumulative progress since project start**
No. of provinces that established MAC curves for energy sector by year 1	*(not set or not applicable)*	*(not set or not applicable)*	3	1 MAC Curve has been established at national level. Marginal Abatement Cost (MAC) Curve analysis was initially conducted for 17 pre-selected mitigation options in the energy generation and end user sectors. This was mainly conducted as a capacity building activity for key stakeholders of the project (Sustainable Energy Authority, Climate Change Secretariat, project team). This 17 technology list was developed considering the national importance and larger abatement potential at national level. The required data and information for this analysis was collected from primary and secondary data sources. The required expert guidance was	1 MAC Curve covering energy sector technology options has been established at national level. Marginal Abatement Cost (MAC) Curve analysis was initially conducted for 17 pre-selected mitigation options in the energy generation and end user sectors. This was mainly conducted as a capacity building activity for key stakeholders of the project (Sustainable Energy Authority, Climate Change Secretariat, project team). The required expert guidance was provided by an International Consultancy firm with the assistance of local consultants. The project later identified the depth of MAC analysis and its importance

				provided by an International Consultancy firm with the assistance of local consultants. When the project clearly identified the scope of MAC and its usages, the project gave the preference for a comprehensive MAC analysis at national level than a having provincial level MAC Curves which will have a lesser use(mainly due to the fact that energy sector decision making is done at national/central level whereas the Provincial Level authorities do not have much influence in decision making). Thus, the project undertook the task of completing a comprehensive analysis for the sector covering most of energy and cross sector technology- applications. This analysis will be completed this August, and the results will be discussed with the relevant decision & policy makers. The results will also be presented to the national expert committee on Climate Change Mitigation (CCM), and the project has also undertaken the complementary task of reviewing energy sector CCM targets set under Nationally Determined Contributions (NDCs).	in deciding energy sector's Nationally Determined Contributions (NDCs) and related decision making process. Thus, the project completed a comprehensive analysis at country level and results were used to compare the target given under energy NDCs of the country. The results were presented to the national expert committee on Climate Change Mitigation (CCM), and also adopted Multi-Criteria Analysis (MCA) for technology-application screening process. The project has plans for introducing this systematic tool to the relevant decision & policy makers in the near future.
No. of NAMA EE/RE projects that are designed based on the prioritized NAMA projects and the detailed MAC curves for the energy generation and end-use sector by Year 4	*(not set or not applicable)*	*(not set or not applicable)*	3	Three pilot RE & EE NAMA projects (i.e. Solar PV net-metering with battery storage, biogas and High Efficiency Motors) have been pre-identified after stakeholder consultation, and these technologies will be used to test, verify and	The project has undertaken a Barrier Analysis (BA) for energy sector mitigation options and Multi-Criteria Assessment (MCA) to prioritize NAMAs. BA is conducted to identify what barriers and risks (regulatory, technical, financial,

				demonstrate the overall NAMA framework. Validation of the selection of above technologies was performed during MAC analysis, and the following preliminary findings were made; Domestic Solar PV with battery is a costlier GHG abatement option compared with normal domestic Solar PV options. In fact, this option remains as the highest cost option among the list of abatement options selected for the analysis. Efficient motors replacing an existing motor will be a 'cost'. However, efficient motor as a new purchase shall be a 'benefit'. Biogas remains as a grey area due to the fact that baseline data of the technology are not very clear and not available. Further analysis is to be made in this regard. Initial design documents and implementation plans are available for these technologies. Full NAMA design documents will be prepared for these selected NAMAs, using the NAMA template proposed by the UNFCCC.	political/institutional and social) are involved in the scaling up of mitigation actions at national level. The results of MAC analysis and BA will be used for screening and scoping of MCA process. National priorities and policies, co-benefits (socio-economic) and difficulty of implementation are the three main criteria of MCA process. The project expects to select 3 or more appropriate actions to be designed as an activity under the component 4 of the project (refer component 4 for further information and process under this). Full NAMA design documents will be prepared for these selected NAMAs, using the NAMA template proposed by the UNFCCC. In parallel, pre-identified three pilot RE & EE NAMA projects (i.e. Solar PV net-metering with battery storage, biogas and High Efficiency Motors (later this was switched to VFDs) are being used to test, verify and demonstrate the overall NAMA framework. Validation of the selection of above technologies was performed during MAC analysis, and the following preliminary findings were made; Domestic Solar PV with battery is the highest costly GHG abatement option among the list of abatement options selected for the analysis.

				The project has also undertaken the task of development of a selection criteria for prioritizing NAMA in the energy sector. This prioritization process will incorporate a Multi-Criteria Assessment (MCA) methodology with the findings of MAC analysis and barrier analysis for RE/EE technologies of the sector. Sustainable development goals, socio-economic aspects and other co-benefits will be considered in this MCA assessment.	Efficient motors replacing an existing motor will be a 'cost'. However, efficient motor as a new purchase shall be a 'benefit'. Conversely VFD applications has been identified as a 'benefit'. Biogas remains as a grey area due to the fact that baseline data of the technology are not very clear and not available. Possibility of developing full NAMA proposal(s) for pre-selected technologies based on lessons learned during implementation will also be considered, and VFD applications appear to be a promising option under this.
The progress of the objective can be described as:		**On track**			
Outcome 2 **Identified private and public sector entities implemented prioritized appropriate mitigation actions for the achievement of Sri Lanka voluntary mitigation target**					
Description of Indicator	**Baseline Level**	**Midterm target level**	**End of project target level**	**Level at 30 June 2017**	**Cumulative progress since project start**
No. of identified fully capable and qualified private and public sector entities that are interested in funding prioritized NAMA projects by Year 2	*(not set or not applicable)*	*(not set or not applicable)*	2	The identified two capable and qualified private and public sector entities are the Sri Lanka Sustainable Energy Authority (public sector entity which is also the project implementing partner) and the Planters' Association of Ceylon (PAC) which is the private tea producers/industry collaboration.	Sri Lanka Sustainable Energy Authority (public sector entity which is also the project implementing partner) and the Planters' Association of Ceylon (PAC) which is the private tea producers/industry collaboration remain as public and

				The Sustainable Energy Authority (SLSEA) has continued to extend their support and funding for RE & EE programmes in the country. These programmes include establishment of energy baseline (e.g. hotels, hospitals and government institutes in 2016/2017) concessionary financing for establishment or dissemination of RE technologies (including biogas, solar PVs especially of 'Sooryabala Sangramaya - the ambitious action plan to install 1 million domestic scale solar PV units by 2025) and by leading Demand Side Management plan (accelerated implementation of energy efficiency measures to achieve 1895 GWh savings by 2020). Tea industry companies of PAC are also working towards energy efficiency improvements. Reduction of their electricity consumption in tea factories improves productivity and competitiveness as well as emission reductions; which is the particular interest of tea industry companies for investing in High Efficient Motors (HEMs). An initial commitment of USD 4 million from the PAC as cost share to demonstrate the benefits of installing HEMs in tea factories has been secured. Initially the project will assist these tea factories to invest in HEMs and achieve financial viability through matching re-bate scheme (40% gradually reducing to 20%). These companies are expected to invest in energy efficiency	private sector entities continued to invest in NAMA activities. Key roles and responsibilities of Sustainable Energy Authority (SLSEA) include Renewable Energy (RE) resource identification and development, implementation and/or facilitation of RE projects/programme development with grant assistance, promotion of Energy Efficiency (EE) and implementation of EE projects/programme, RE & EE related policy and regulatory support, and knowledge management. Specific ongoing initiatives of SLSEA which can be considered as energy sector Appropriate Mitigation Actions include; • 'Sooryabala Sangramaya'; 1000 MW solar PV capacity addition by 2025 progarmme (sub programmes include 'Rivi Aruna' – Solar PV for religious places at government cost, and Solar PV for government hospitals and schools – a 2 million USD grant programme) • 'Sulan Bala Sangramaya'; newly launched small and medium scale wind turbine programme. • Support to development of other grid connected REs power plants (small hydro, wind, utility scale solar – ground mounted, and biomass)

				applications including HEMs and Variable Frequency Drivers (VFDs) on their own after project co-financing is gradually removed in the future. Note: During the pilot trials of HEMs, it was identified that application of HEMs in the tea industry application did not result in significant energy saving due to various reasons as well as was not financial viable. On the other hand, Variable Frequency Drivers (VFDs) application has a bigger energy saving potential in the same industry with more economic benefits. Thus, the project is to introduce VFDs to the tea industry.	Further, SLSEA leads energy efficiency activities through Demand Side Management plan which is also overlooked by a special Presidential task unit. Apart from these direct RE and EE activities, SLSEA is involved in many policy and regulatory decision making processes, capacity development and promotional activities which facilitate RE/EE mitigation actions. Tea industry companies including those under PAC are also interested in energy efficiency improvements mainly for the cost reduction by energy (electricity) saving which also improves productivity and competitiveness. This also leads to emission reduction as well as such initiatives are perceived as a product & process greening, and this industry highly uses this for product marketing purposes. The initial commitment of USD 4 million from the PAC as cost share to demonstrate the benefits of energy efficiency initiative including HEMs in tea factories is now being realized as investment towards VFD programme of the project. In the first VFD programme cycle, 48 tea factories of which majority of factories were plantation companies under PAC invested in VFDs. The project initially supported them up to 35% of total costs to make their investment viable. This share was reduced to

					25% in the second phase. More than 50+ tea factories have applied for the second phase of the project. As the impacts both on energy savings and product quality are positive, tea factories are expected to invest in Variable Frequency Drivers (VFDs) on their own in the future. Further, it has been noticed that there is a growing interest among tea industry/factories to invest in solar PV installations, and more than 10 factories have already installed solar PVs in their factories. Note: During pilot trial application of High Efficiency Motors (HEMs) in tea sector withering application did not result in significant energy saving whereas Variable Frequency Drivers (VFDs) application was identified as a technology with bigger energy saving potential in the same industry with more economic benefits. This was discussed at the Mid-term Review of the project and all parties agreed on this swiftly technology change in the same sector (tea industry), and now being implemented as a NAMA.
No. of NAMA EE/RE projects that are designed and implemented based on detailed MAC curves for the energy generation and end-use sector by Year 2	*(not set or not applicable)*	*(not set or not applicable)*	3	Three RE & EE NAMA projects (domestic Solar PV with battery storage, biogas as solution for waste management and High Efficiency Motors) were initially preselected after project stakeholder consultations, and are now used to test and verify the	The lessons learned from initial implementation and trail phase have been used to make the required changes for the three pre-selected RE&EE NAMAs in the energy sector; i.e. domestic Solar PV with battery storage, biogas as solution for waste

				proposed NAMA framework. A validation for the pre-selection of these three technologies was completed with MAC analysis as well as the lessons learned from initial implementations and trirals of these NAMAs. The required changes for the selected technologies have now been identified and can be summarized as follows; Biogas of small scale – Provincial biogas programme is not progressing as expected due to inherent technical and other limitations of the technology which is beyond the project scope. Achieving the final target of 1,000 digesters within the project life cycle will be challenging as well as the long-term sustainability after the project support. Thus, the project is to consider medium to large scale biogas units/applications without compromising the overall GHG saving targets set under the programme. Domestic Solar PV with battery – Cost of battery (and technology) is too high which make the technology-application not financially viable or economical in the current reality. Domestic solar PV without battery will be an option to be promoted and demonstrated under the project.	management and High Efficiency Motors. These requirements were discussed and agreed at the Mid-Term Review (MTR) and now being implemented. These can be summarized as follows; • Biogas as a waste management solution – Though the project has supported more than 200+ small scale biogas units in five selected provinces, the programme is somewhat lagging behind due to less demand, inherent technical and other limitations of the technology which is beyond the project scope. the demand for small scale unit as energy generation or alternative fuel has reduced. On the contrary, medium to bigger scale biogas units are being proposed as a waste management option for environment compliance. Hence, the project allowed medium to large scale biogas units to participate in the project as demonstration pilots for MRV in biogas technology sector. the demand for small scale unit as energy generation or alternative fuel has reduced. On the contrary, medium to bigger scale biogas units are being proposed as a waste management option for environment compliance. Hence, the project allowed medium to large scale biogas units to participate in the project as demonstration pilots for MRV in biogas technology sector

				High Efficiency Motors(HEM) in the tea sector – The efficiency gain from an application of HEM was found to be offset by other parameters of the tea withering process and the technology is not financially viable. Application of Variable Frequency Drivers (VFD) has a bigger energy saving potential, financial viability and long-term sustainability than HEMs. Thus, technology change (from HEMs to VFDs) within the same industry (tea) is being considered. The available implementing plans for the pre-selected three NAMA projects will be updated as per the suggested changes. Business and financial models involving public private partnership will also be revised for the implementation of these revised NAMA projects.	with MTR recommendation. The project now aims to achieve the given target in terms of equivalent biogas digester volume (total digester capacity/volume of the original biogas programme as the new target). In the first call for proposal cycle, the project has approved 7 biogas units whereas in the second cycle the project would consider approval of 15 proposals. • High Efficiency Motors(HEM) in the tea sector – The efficiency gain from an application of HEM was found to be offset by other parameters of the tea withering process and the technology is not financially viable. Application of Variable Frequency Drivers (VFD) has a bigger energy saving potential, financial viability and long-term sustainability than HEMs. Thus, technology change (from HEMs to VFDs) within the same industry (tea) is discussed and approved at Mid-Term Review, and is now being successfully implemented. 48 tea factories were facilitated in the 1st programme cycle, and the project received approximately 40 applications for the second phase. Further information are provided in the next indicator progress description.

					• Domestic Solar PV with battery – Though the technical feasibility of the concept was noticed during the trial conducted with 14 Solar PV systems, the cost of battery (and technology) is too high which make the technology-application not financially viable or economical in the current context. Though the project discussed about few technology alternatives like solar PV for government schools and hospitals etc, a growing interest towards the battery application is shown by the key stakeholders of the project. Thus, the project is to continue with the same technology largely due to future prospects. A validation for the pre-selection of these three technologies was completed with MAC analysis, and results were discussed above (indicator 2 of Outcome 2).
No. of individual projects that constitute the country's NAMAs by Year 4	*(not set or not applicable)*	*(not set or not applicable)*	1,000 biogas systems 1,300 tea factories 205 solar systems	79 biogas digesters have been completed in five provinces and 47 units are under construction. 24 High efficiency motors including 5 Variable Frequency Drivers (VFD) have been installed in 5 tea factories 13 Solar PV systems with battery storages have been installed by July, 2017.	205 small scale biogas digesters have been installed in five provinces and 24 units are under construction (126 units for the PIR reporting period). 2 medium-to-large scale biogas units with equivalent total volume capacity of 57 have also been facilitated by the project, and further 5 units are under construction.

					344 Variable Frequency Drivers (VFD) in 48 tea factories. This is excluding the 24 High efficiency motors and 5 VFDs installed under trial phase (349 VFDs and 24 HEMs in total). 14 Solar PV systems (31 equivalent systems under initially proposed capacities) with battery storages have been installed, and total capacity installation is 21.5kWp.
No. of operational Private-funded NAMA projects by EOP	*(not set or not applicable)*	*(not set or not applicable)*	1 (high efficient motors in tea factories)	Privately funded NAMA project (High Efficient Motors in the tea industry) implementation commenced with pilot trials before full scale implementation of HEMs. This was to ensure that the application of HEMs does not have any technical risk and make a viable technology to be promoted and up-scaled under the project. This pilot trial included installation of 24 HEMs and 5 VFDs in five tea factories covering all tea growing areas. The installation of these HEMs and VFDs from 6 different suppliers (and makes) were completed in the last quarter of 2016. Some trial and experimental analysis were conducted in the first quarter of 2017. It was learnt that application of HEMs in the tea industry application did not result in significant energy saving due to various reasons as well as was not financial viable. Alternatively, Variable Frequency Drivers (VFDs) application has a bigger energy saving potential	As the application of HEMs in the tea industry application did not result in significant energy saving due to various constraints as well as was not financial viable., alternatively, Variable Frequency Drivers (VFDs) application indicated bigger energy saving potential in the same industry with more economic benefits. Thus, the project introduced VFDs to the tea industry after key stakeholder consultation (Tea Research Institutes, private tea factories, HEM/VFD suppliers, Sustainable Energy Authority, and other industry experts). The project completed a few awareness programs for the sector before VFD programme was launched. In the first programme cycle, the project provided matching re-bate grant of 35% to 48 tea factories. Project financial support toward these factories was USD 110,000 whereas co-investment

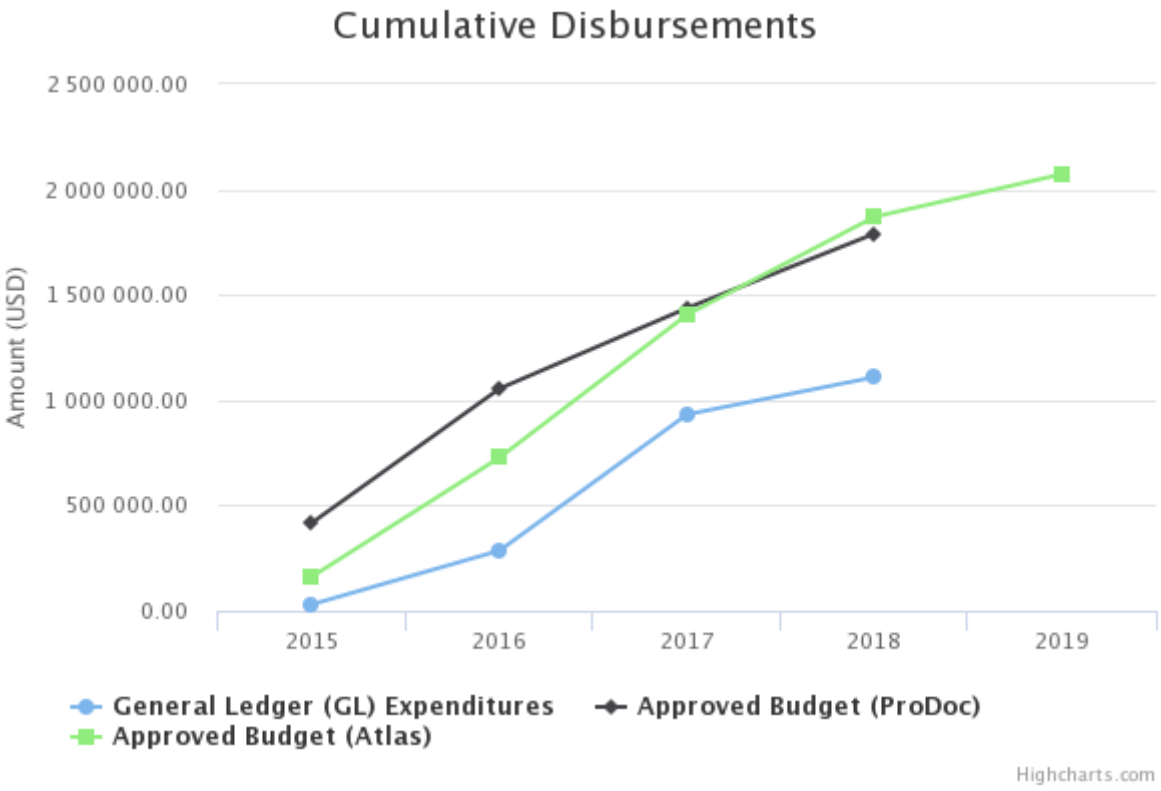
				in the same industry with more economic benefits. Thus, the project is to introduce VFDs to the tea industry. A stakeholder consultation (Tea Research Institutes, private tea factories, HEM suppliers, Sustainable Energy Authority, and other industry experts) was conducted and the findings were presented, and suggestions/comments were obtained for VFDs as a technology alternative to HEMs. The project is now looking for potential suppliers of VFDs. An awareness campaign has been scheduled for the tea sector, and the project is to call for selection of beneficiaries for the full scale implementation from factories of private tea plantations.	made by these factories was USD 294,000. The project also conducted the required O&M training for all levels staff of tea factories, best practices and use of VFDs for their tea withering process, and the required training for Monitoring and Reporting of energy saved. The project has now called for proposal for the second phase.
The progress of the objective can be described as:		**On track**			
Outcome 3 **Accurate measurement and accounting of actual GHG emission reduction from mitigation actions in the energy generation and end-use sectors**					
Description of Indicator	**Baseline Level**	**Midterm target level**	**End of project target level**	**Level at 30 June 2017**	**Cumulative progress since project start**
No. of NAMA projects with GHG ERs correctly verified by the established and operational MRV systems for mitigation actions by Year 4	*(not set or not applicable)*	*(not set or not applicable)*	3	MRV system for mitigation actions is being developed, and the progress to date can be summarized as follows; • A generalized Monitoring, Reporting and Verifying (MRV) system/framework was identified for	The project has progressed in the following key areas: Monitoring procedures, protocols, logbook/template for data collection, reporting and verification at different levels of the data flow structure were developed with the assistance of international consultants. The same

				energy sector technology-applications. • This generalized framework was then used to identify and design project specific MRVing system for the three selected technologies (Solar PV, Biogas and Efficiency Motors). MRVing parameters of these technologies, and field data gathering mechanisms were defined. • With the assistance of the International Consultants, the Project has prepared the monitoring procedures and protocols, logbook/template for data gathering for these three technologies. • The Project is now in the implementation of these proposed MRV systems for the pilot technologies based on the primary data collected through the energy/GHG inventory data management system. Based on these data, GHG Emission Reductions (ERs) will be verified and reported. Based on the findings of initial implementations, improvements will be made to these MRV systems and procedures. • In parallel, the integration of these proposed MRVing systems to already existing institutional setups are now being discussed. • One training workshop on MRVing was conducted for national	energy Data Management System (DMS) has been developed in-line with these protocols and will be extended for any future climate mitigation interventions/CCMAs in energy sector. The energy DSM is now used for the MRVing of Emission Reductions (ER) of biogas pilot in 4 provinces (North Western, Southern, Central and Uva), Variable Frequency Drives (VFDs) in tea factories and Solar PV installations. However, the project is yet to verify the ERs reported under the energy DMS. MRVing of biogas systems is integrated to the administration structure within provincial councils. MRVing of the energy efficiency intervention in tea sector is also integrated to the existing structure within the respective factory/plantation company. Any lesson learned during execution of these MRVing protocols will be used to improve these existing systems and arrangements in place. Training and capacity building under the component 4; Two national level training programs were conducted by international experts on MRVing of GHG mitigation projects. Four provincial level training programs were conducted in North-

				stakeholders and one more workshop is being planned for this September with pilot MRV demonstrations. There will also be provincial level training programs on MRVing specially targeting field officers and extension officers, those who will be engaged as sectorial/provincial focal persons for data collection and actual monitoring of NAMAs.	western, Southern, Uva and Central provinces on MRVing targeting field officers and executives engage in monitoring and verification. Further trainings were provided to provincial level officials on development of MRV framework for future NAMAs/ GHG mitigation interventions. Similar training programmes were conducted for factory and group level operators & officials of tea factories on ERs MRVing of VFD programme.
No. of projects in the energy generation and end use sectors that are registered in the National NAMA registry by EOP	*(not set or not applicable)*	*(not set or not applicable)*	3	The Project is in the implementation of the proposed NAMA Institutional set-up which will facilitate the development of future NAMAs of the country. The proposed NAMA registry will be a part of this set-up under which these pilot NAMAs will be registered. Based on international consultants' recommendations, and already existing institutional arrangements, a governing structure called "NAMA Institutional Framework" was defined for the approval and implementation of NAMAs. This structure includes entities identified as NAMA Coordinating Entity, Designated NAMA Entity, NAMA Secretariat and Approver, and NAMA Expert Committee. These entities' roles and responsibilities were identified as well as the relevant Designated NAMA Entities from different sectors; namely	The project, in collaboration with Climate Change Secretariat of Sri Lanka (CCS), is in the establishment of the proposed NAMA institutional framework. This NAMA Institutional set-up is expected to facilitate the development of future NAMAs of the country, and the proposed NAMA registry will be a part of this set-up under which NAMAs will be registered. This structure includes entities identified as NAMA Coordinating Entity, Designated NAMA Entity, NAMA Secretariat and Approver, and NAMA Expert Committee. These entities' roles and responsibilities were identified as well as the relevant Designated NAMA Entities from different sectors; namely Energy, Transport, Waste, Industry, Agriculture and Forest were identified. The Cabinet of Ministers has already approved the proposed

				Energy, Transport, Waste, Industry, Agriculture and Forest were identified. Above organizational structure and the concept (for NAMA approval) were presented at the first steering committee on NDCs and Climate Change Mitigation committees, and their suggestions were obtained before finalizing this structure. A Cabinet Paper on this governing structure has been prepared and submitted to the approval of Cabinet Ministers. Awareness material on NAMA, draft project proposal templates and NAMA project appraisal formats are now available and will be finalized after consultation of the NAMA Expert Committee. A web portal has been suggested for this NAMA proposal submission and approval process, and this web portal will be linked with NAMA registry. The Project has now called for application from individuals those who would be interested in joining this expert resource group.	institutional framework/structure, and the project is now in the institutionalization of this set-up. Four sector-wise capacity building workshops were conducted on developing NAMA proposals targeting officials nominated by designated NAMA entities. A series of comprehensive training program is scheduled to be conducted in Q3 & Q4 of 2018 by an international expert on NAMA project/programme proposal development. A group of officials from all 5 designated NAMA entities and implementing entities will be selected for the training. Further, the engagement of provincial officials will also be taken considering MTR recommendation on supporting provincial levels with their NAMA development and MRV. It is expected that a minimum of 3 NAMA proposals shall be developed and registered under national NAMA registry as the key deliverable of this activity. Further, the web-based application portal is being developed to facilitate the NAMA proposal submission and approval process. Through the portal, a project can be traced and processed till it appear on the national NAMA registry.
The progress of the objective can be described as:		**On track**			

D. Implementation Progress



Cumulative GL delivery against total approved amount (in prodoc):	61.95%
Cumulative GL delivery against expected delivery as of this year:	61.95%
Cumulative disbursement as of 30 June (note: amount to be updated in late August):	1,109,128.39

Key Financing Amounts	
PPG Amount	100,000
GEF Grant Amount	1790411
Co-financing	25,880,000

Key Project Dates	
PIF Approval Date	Dec 19, 2013
CEO Endorsement Date	Jan 27, 2015
Project Document Signature Date (project start date):	Jun 10, 2015
Date of Inception Workshop	Nov 12, 2015
Expected Date of Mid-term Review	*(not set or not applicable)*

Actual Date of Mid-term Review	Nov 15, 2017
Expected Date of Terminal Evaluation	Mar 10, 2019
Original Planned Closing Date	Jun 10, 2019
Revised Planned Closing Date	*(not set or not applicable)*

Dates of Project Steering Committee/Board Meetings during reporting period (30 June 2017 to 1 July 2018)
2017-11-27

E. Critical Risk Management

Current Types of Critical Risks	Critical risk management measures undertaken this reporting period
Organizational	Inadequate involvement and staff engagement of project implementing partners. Major project work is being led by Project Management Unit with limited human resource involvement of implementing partners. This can be identified as a project sustainability risk as there would be limited number of personnel who are aware of the project activities and for continuation of on-going work/activities. This issue was raised during the Mid-term Review process and discussed at the last Project Board Meeting. As a risk risk management measure, the Implementing Partners (IP) were requested to assign their staff members for working committees on key thrust areas of the project. However, this is still pending (July 2018) though the Project Management Unit has requested IP on this several time. PMU expects to have an another follow-up discussion on this issue in Aug 2018.
Other	Technical: The Project has pre-selected small scale biogas, and High Efficiency Motors as pilot technologies. The Project has set a emission reduction target linking with above pilot technology demonstrations. During initial years of implementations, the Project identified that these selected technologies are having some technical and operational issues. Risk management/mitigation measures; High Efficiency Motors in tea sector did not result in the expected energy saving, and the Project decided to switch to VFD programme with higher energy saving potential subjected to proper operation & management of these units. The Project noticed that small scale biogas programme has been progressing slowly thus the Project decided to support medium-large scale units in order to meet the final target.

F. Adjustments

Comments on delays in key project milestones

Project Manager: please provide comments on delays this reporting period in achieving any of the following key project milestones: inception workshop, mid-term review, terminal evaluation and/or project closure.
Mid-Term Review was completed in Nov 2017 (On time)
Country Office: please provide comments on delays this reporting period in achieving any of the following key project milestones: inception workshop, mid-term review, terminal evaluation and/or project closure.
(not set or not applicable)
UNDP-GEF Technical Adviser: please provide comments on delays this reporting period in achieving any of the following key project milestones: inception workshop, mid-term review, terminal evaluation and/or project closure.
(not set or not applicable)

G. Ratings and Overall Assessments

Role	2018 Development Objective Progress Rating	2018 Implementation Progress Rating
Project Manager/Coordinator	Satisfactory	*- IP Rating provided by UNDP-GEF Technical Adviser and UNDP Country Office only -*
Overall Assessment	Overall project implementation is gradually progressing to achieve to the project targets at End of Project (EOP) as well as a satisfactory level of project physical progress has been achieved during the reporting period. As of June 2018, a satisfactory level of progress towards the project outcomes has been achieved. Key achievements of the project, against the project outputs can be described as; The physical progress and activities completed under the component 1: (business-as–usual energy generation and end-use sector baselines at national and sub-national level) - SLSEA's existing energy database "EnerGIS", which had been limited to the process of Renewable Energy (RE) resource allocation process, was upgraded with the latest software. The energy Data Management System (DMS) is integrated with EnerGIS which was developed for energy/GHG emission inventory management purpose, and this system is now being tested for project pilot initiatives. - The project has introduced this system to the provincial levels, tea sector and solar PV technology providers with the required training. Data are now being generated, and corresponding energy/emission baseline and emission reductions are to be generated once data verifications are completed. This system is now being upgraded with the facility of capturing GHG emission related data of any energy generators and end-users and will be used for GHG emission inventory and baseline activities. In parallel, EnerGIS system is also being facilitated with Renewable Energy (RE) development, progress reporting and monitoring purpose. - The project has engaged National Communication team of Climate Change Secretariat (CCS) and Sustainable Energy Authority (SLSEA) on regulatory and institutional framework supporting this energy sector data (both energy and GHG emission) collection process and long-term sustainability. Two on-going developments related to this discussion are 'Climate Information Management System' under Climate Commission Act of CCS and revamping of SLSEA's energy manager reporting arrangements under the given Energy Manager regulation. The project has a comparatively lower level of progress under this component against the original work plan, and specific focus with more project internal and external resource mobilization with the support of both implementing partners will be done to expedite EOP targets. Project progress under component 2, prioritizing mitigation options for the energy generation and end-use sectors: - Completion of preliminary and comprehensive Marginal Abatement Cost (MAC) analysis of energy sector, mapping of MAC findings with country's Nationally Determined Contributions of the energy sector, and finalized	

	methodologies of Barrier Analysis (BA) for GHG abatement options and Multi-Criteria Analysis (MCA) as the final tool to prioritize mitigation options. Stakeholder consultations are on-going to complete BA and MCA and the project expects to complete these tasks in Q3 2018. The results and findings of MAC, BA and MCA to be presented to the relevant authorities and policy/decision makers as the final outcome of this task. Implementation progress achieved under component 3, implementation of appropriate mitigation actions in the energy generation and end-use sectors, can be detailed as; - The pre-selected NAMA pilot projects i.e. High Efficiency Motors in the tea industry, domestic solar PV with battery storage, and biogas as a solution for waste management and alternative energy are being implemented with some modifications to the initial implementation plans discussed and agreed at Mid-Term Review (MTR). - The provincial biogas programme is slowly moving in the selected province, 205 biogas digester units have been constructed and another 24 units are under construction. The progress of this biogas programme was hampered by the initial implementation delays due to lack of institutional and political commitment, Central and Uva provinces in particular, and technology-application inherent issues. The fact there is no clear driving force for this small scale units also remains as a major challenge. These issues were discussed at MTR, and medium-large biogas scale mainly of commercial and industrial applications has been identified as more sustainable approach. Now, the project facilitates these medium-large scale promotion as well. The project has approved and facilitating 7 medium-scale units through a call for proposals, and another 15 projects are under evaluation stage. In supporting these activities, the project has provided extensive training for 128 extension officers identified as the focal persons for the quality assurance of the programme and those who will also be engaged in inventory/MRVing of the energy sector at provincial level. - 14 units of domestic solar PV with battery has been installed as a trial implementation and full scale implementation was delayed until comprehensive technical and cost-benefit analysis were completed. It was identified that this technology was a mitigation option with very high cost but a growing interest has been noticeable among the energy sector. - Major finding of High Efficiency Motors (HEMs) in tea sector indicated that the saving potential and corresponding economic benefit of the application of HEMs in the tea sector is minimal, and the project made a strategic management decision to consider Variable Frequency Drivers (VFDs) as a technology alternative. Mid-term review team's independent recommendations was obtained after detailed case study presentation, and the project has achieved a commendable results with VFD applications in 48 tea factories since Q4 of 2017. The 2nd stage of beneficiary selection and procurement of VFDs are underway. The implementation of component 4, MRV system and NAMA registry of energy generation and end-user sectors is progressively moving ahead. - NAMA Institutional set-up was finalized and the approval of Cabinet ministers was obtained for implementations. NAMA registry is to be established within this NAMA Institutional Set-up, and initial capacity building activities were completed for key institutions under this institutional structure. Further activities have been planned for operationalization of this structure which includes development of 3 complete NAMA proposals from different sectors registered in NAMA registry. Furthermore, already developed MRVing procedures and

	protocols, logbook/template for data gathering are being applied for the selected technologies (i.e. Solar PV, Biogas and HEM/VFDs), and improvements to this initial designs are to be made based on the findings of field level applications. The reported financial progress of the project is 69% of the total budget as on 30 June 2018.. The project completed Mid-term Review (MTR) in Nov, 2017. The project has achieved 'moderately satisfactory' to 'satisfactory' ratings for overall achievement towards results whereas the project's implementation and adaptive management rating has been 'satisfactory'. However, the project has a lower rating under sustainability category ("moderately unlikely" risk) mainly due to the financial risks (lack of diverse sources of NAMA funding after EOP) and governance risks (lack of critical mass of qualified officers to manage NAMA projects) as highlighted by MTR team. At the time of MTR, one of the major challenge of the project was that the project would require a substantial rate of deployment of the three pilot NAMA technologies during the remaining years. Adding to this challenge was the need to tweak the designs of all three preselected pilot NAMA technologies based on lessons learned, for the purposes of generating higher volumes of GHG ERs and demonstrating a viable process for registering NAMAs and attracting climate finance. This challenge has been partially addressed with certain design changes for the original pilot NAMA technologies & programmes during 2017/2018 (eg: switching from HEMs to VFD, inclusion of medium-large scale biogas digester/system). The project further expects to accelerate the deployment of pilot NAMA technologies to achieve the project's EOP ER targets as well as NAMA framework/process would be demonstrated and contribute to the removal of one of the remaining barriers of the project; the low level of awareness and a lack of comprehensive understanding of the NAMA process with line ministries & subnational levels. The project has successfully addressed some gaps and challenges that hindered the implementation of the project. In particular, the limited in-house and institutional capacities available on the overall NAMA concept, NAMA prioritization processes and tools, MRVing of abatement options, IT knowledge, operation and maintenance capacities of technologies are promoted under the project. Lack of commitment and capacity of some initially identified subnational level stakeholders, and no clear driving force facilitating NAMA framework related activities remain as noticeable barriers for the successful implementation of the project. On top of this, there are only a few SLSEA and CCS staff available to assist with project activities at present. In overall implementation, the project components are slightly delayed against the original Annual Work Plan timeline due to certain gaps and barriers discussed above. The project seeks more counterpart staff participating on project activities as this would assist PMU to expedite remaining project activities and more importantly this would build the required capacity participation and allow SLSEA and CCS to manage the NAMA programme after the EOP.

	The project has also initiated a dialogue on possible policy and regulatory interventions that would support overall NAMA framework. Climate mitigation related data/information management is a key interest area, and the project has sought the support of National Communication team and CCS in this regard. 'Climate Commission Act' which is under the legal draft stage is expected to provide some avenue for accessing important climate change mitigation related data. Further, the project is also looking at possible enforcement of 'Energy Manager' regulation under SLSEA act which would also provide some important data of energy sector. If successful, any of above will essentially support initial steps of NAMA framework which is identifying emission baselines and possible project/programme initiatives. The project has had a substantial engagement with public and private sector entities throughout project implementations. These engagements include key project stakeholders which are government (project implementing agencies, provincial level authorities, ministries and officials), and non-government, related private investors/parties (mainly tea industry, hotel, food and beverage, dairy industries), general public (direct and indirect beneficiaries), private sector service providers (Renewable Energy and Energy Efficiency related services and suppliers) and R&D partners like Tea Research Institute. Further details are provided in Partnership section of this PIR document. The project expects to leverage on these positive engagements to achieve the project's major relevant global environmental objectives with fast tracked implementation over the remaining one year.	
Role	**2018 Development Objective Progress Rating**	**2018 Implementation Progress Rating**
UNDP Country Office Programme Officer	Moderately Satisfactory	Moderately Satisfactory
Overall Assessment	The project has been designed to support appropriate climate change mitigation actions in the energy generation and end-use sectors as part of the initiatives to achieve the voluntary GHG mitigation targets of Sri Lanka. The project interventions include developing a robust emission inventory system that could be used to determine emission baselines of the country, developing decision making tools such as MACC tools for analyzing and prioritizing a pipeline of bankable NAMAs that could be implemented, leverage public, private and CSOs resources through the NAMA Implementing Entity for the implementation of bankable RE and EE NAMAs based on viable and cost effective business models to incentivize value chain actors to reduce supply risks and create demand, and develop a robust and transparent MRV system that is accurate, reliable and credible and avoid double accounting. The Project has been continuing the implementation of the identified three Nationally Appropriate Mitigations Action (NAMAs) technologies; Solar PV with battery storage, High Efficiency Motors (HEM) in the tea plantation sector and domestic and institutional level biogas for 2017/2018 reporting period. As of 30th June 2018, project has achieved a considerable progress towards its project objective. However, the project lags the overall End of Project (EoP) emission targets which have been ambitiously set at the beginning. Project conducted its mid-term review in August - November 2017, and the project was given 'moderately satisfactory' rating at the MTR. It was recommended at the MTR that the project should re-design three NAMAs so that the project can	

	reach overall GHG mitigation targets, support subnational levels to develop their NAMA ideas, expedite the implementations of NAMAs and leverage on the results to attract buy-in from project stakeholders etc. Considerable progress has been made with implementing the NAMA pilots in the field. These include Solar PV with battery storage installations as a trial, more than 200+ small scale biogas units in 5 provinces, and approximately 350 VFDs in the tea sector. The project has secured the private sector investments in these implementations in many instances which is a quite noteworthy. However the project is yet to progress in developing systemic emissions data collection, recording and reporting system that brings together national and provincial energy actors to contribute to a common inventory system. The Project is in the process of developing a provincial/sectorial GHG emission inventory system. The MACC (the Marginal Abatement Cost Curve) analysis has been completed and when this is coupled with the on-going MCA assessment, this can be a vital tool for energy sector climate change mitigation decision making. MRVing systems have been introduced to the selected NAMAs of the project, and the proposed NAMA institutional set-up, which is rather bureaucratic an cumbersome in UNDP CO perspective, has secured the government approval for implementation. Further, the project is looking at possible policy and regulatory frameworks and interventions supporting on-going activities of the project. As the project is mainly driven by the Project Management Unit whereas the expected support from two implementing partners and provincial councils has not been that forthcoming, as the stakeholders don't see this as a priority, the CO foresees a risk of sustainability beyond the project period. This is mainly due to lack of in-house capacities and human resources and priorities of the government not being aligned with the climate targets set through the Paris Agreement. Certain remedial actions were discussed at the project steering committee, but this issue remains as a concern where UNDP CO has a limited control. It is recommended to strengthen the engagement of the Climate Change Secretariat to ensure sustainability of the NAMA framework. Further, the project should tap into other government and private sector programmes to improve and upscale NAMA pilot applications. One such intervention is governments national programme on dairy sector development and biogas applications in this sector. The project should focus more on development of project related communication materials covering key achievements, best practices and lessons learnt. The lessons learned and results of pilot implementations can be used for this purpose, and this is expected to give more visibility to overall work done to date. Though the project does not specifically focus on gender aspects in implementations, the project has some provisions for gender integration and it is recommended to carry out a simple assessment, and incorporate the findings into project implementations in 2018/2019. Except a few environmental risks noticed in pilot programme related implementations (potential methane emission from biogas and battery/solar PV panel disposal) with some risk, no any other environmental safeguard requirements have been identified. The project is already taken some measures to mitigate these risks as training and awareness programme. Overall, the project has yielded in some tangible results during 2017/2018 which is at satisfactory level. However, project should pay more attention on streamlining the MRV system through identified pilots. Moreover, it is recommended to focus on operationalization and institutionalization of these

	proposed structures and mechanisms during the next implementation year as well as expediting remaining NAMA pilot implementations.	
Role	**2018 Development Objective Progress Rating**	**2018 Implementation Progress Rating**
GEF Operational Focal point	*(not set or not applicable)*	*- IP Rating provided by UNDP-GEF Technical Adviser and UNDP Country Office only -*
Overall Assessment	*(not set or not applicable)*	
Role	**2018 Development Objective Progress Rating**	**2018 Implementation Progress Rating**
Project Implementing Partner	Satisfactory	*- IP Rating provided by UNDP-GEF Technical Adviser and UNDP Country Office only -*
Overall Assessment	*(not set or not applicable)*	
Role	**2018 Development Objective Progress Rating**	**2018 Implementation Progress Rating**
Other Partners	*(not set or not applicable)*	*- IP Rating provided by UNDP-GEF Technical Adviser and UNDP Country Office only -*
Overall Assessment	*(not set or not applicable)*	
Role	**2018 Development Objective Progress Rating**	**2018 Implementation Progress Rating**
UNDP-GEF Technical Adviser	Moderately Satisfactory	Moderately Satisfactory
Overall Assessment	This project's overall goal is to develop a robust, transparent and functional NAMA framework to support Government of Sri Lanka towards meeting its voluntary GHG mitigation targets. The project specifically facilitates inventory and MRV system development with supporting institutional approaches to governance and oversight through implementation of a set of pilots in three sub sectors of climate change mitigation sector, namely, solar PV, Biomass, and energy efficiency as proofs of NAMA framework concept. The overall NAMA implementation framework envisaged comprises Secretariat, Coordinating Entity, Implementing Entity, MRV Committee, and Registry. The project's EOP target is to implement three (3) NAMAs in the energy generation and end-use sectors. The project is operational since May 2015 and due for closure by June 2019; the project has been designed around 3 outcomes with an inventory of emissions database in energy sector and MACC tools to assess the interventions for mitigation through NAMA approach by leveraging other resources and business models and MRV systems for reliable emission reduction reporting. The project made some mid-course corrections based on an independent mid-term review carried out in 2017. Key suggestions with regard to pilot	

	implementation were to switch from HEMs to Variable Frequency Drives (VFD) due to marginal energy savings benefits in HEM and lower acceptance by the tea factories and inclusion of medium-large scale biogas digester/system instead of small biogas units due to lack of demand for these smaller biogas units. It was observed that the pilots implemented in 3 NAMA pilot sub-sectors: Solar PV with battery storage, High Efficiency Motors (HEM) in the tea plantation sector and domestic and institutional level biogas benefited through energy savings and realized potential innovations or improvements through effective monitoring systems. Cumulatively, NAMA pilots under the project covers installation of: a) 205 small scale biogas digesters and 7 medium-to-large scale biogas units and 5 are under construction b) 349 (including 5 in trail phase) Variable Frequency Drivers (VFD) in 48 tea factories and 24 High efficiency motors; c) 14 Solar PV systems with battery storages with total capacity of 21.5 kWp. An online monitoring system to report on GHG emissions is being developed. Efforts are being made to link the MRV systems piloted with the national inventory processes. However, there are still challenges and capacity constraints that remain to be addressed in setting up of these mechanisms. Despite these, the project has successfully mobilized private investments and participation in the MRV reporting. With the timely implementation of the MTR recommendations, the project seems to be back on track. The corresponding financial progress reported is 62% approx. The flexibility of the project team to adapt to new solutions is noted. The project had not foreseen any major environmental or social issues at SESP screening stage as it was mainly designed around technical interventions but proposes now to address risks from pilots such as Solar PV and biogas, if any. For the remaining phase, the project needs to put in place an institutional framework that sustains project interventions through pilots and mainstream at the national level. While the MRV systems have been put in place in participating industries and households with PV systems and data monitored, these results and methods needs to be further linked with other national efforts. There are many projects or initiatives that Climate Change Commission is pursuing with other agencies and teams that need to be aligned for a comprehensive and sustained MRV mechanisms demonstrated through the project and pilots ((e.g. Partnership for Market Readiness, National inventory/Communications). These methods and results have to be mainstreamed in NDC processes as well as NAMA development in these sectors. Hence, ‘moderately satisfactory’ rating for both DO and IP is justified in view of the progress and potential risk implementation with respect to sustainability of the interventions.

H. Gender

Progress in Advancing Gender Equality and Women's Empowerment

This information is used in the UNDP-GEF Annual Performance Report, UNDP-GEF Annual Gender Report, reporting to the UNDP Gender Steering and Implementation Committee and for other internal and external communications and learning. The Project Manager and/or Project Gender Officer should complete this section with support from the UNDP Country Office.

Gender Analysis and Action Plan: *not available*
Please review the project's Gender Analysis. If the Gender Analysis is not attached or an updated Gender Analysis and/or Gender Action Plan is available please upload the document below or send to the Regional Programme Associate to upload in PIMS+. Please note that all projects approved since 1 July 2014 are required to carry out a gender analysis.
(not set or not applicable)
Please specify results achieved this reporting period that focus on increasing gender equality and the empowerment of women. **Please explain how the results reported addressed the different needs of men or women, changed norms, values, and power structures, and/or contributed to transforming or challenging gender inequalities and discrimination.**
The pilots implemented under this project have relevance to approaches to addressing gender aspects in the use of technology application and access to data provision /analyses, However, the Project is yet to identify and assess entry points, if any for incorporating the same. (The project was approved under GEF programme cycle 5 for designing MRV for energy sector NAMAs) .
Does this project specifically target woman or girls as direct beneficiaries?
No
Please describe how work to advance gender equality and women's empowerment enhanced the project's environmental and/or resilience outcomes.
N/A

I. Social and Environmental Standards

Social and Environmental Standards (Safeguards)

The Project Manager and/or the project's Safeguards Officer should complete this section of the PIR with support from the UNDP Country Office. The UNDP-GEF RTA should review to ensure it is complete and accurate. For reference, the project's Social and Environmental Screening Procedure (SESP), which was prepared during project design, is available below. If the project began before the SESP was required, then the space below will be empty.

SESP: PIMS 5232 SL NAMA-ESS.pdf
1) Please provide a brief update on the project's social and environmental risks listed in the SESP. If the project has not prepared an SESP (i.e. if the project began before the SESP was required), then please indicate when that screening will be done (recommended before the Midterm Review and/or Terminal Evaluation, or after a significant change to the project context). If the project has updated its SESP during implementation, then please upload that file to this PIR. If any relevant grievances have arisen during the reporting period please describe them in detail including the status, significance, who was involved and what action was taken.
The project has completed SESP before starting the implementation, and reported no socio-environmental risk at that stage. During implementation, the Project Management Unit continuously monitors for social and environmental impacts and risks, and takes appropriate actions as required. However, there has been no any significant social and environmental risk identified to date except for the following two environmental risks (low to moderate) detailed in Section 2 below and appropriate measures are in place. The comment of MTR remains as "environmental risks to sustainability of this Project are viewed to be largely insignificant with the exception of an absence of a disposal plan for solar PV batteries, and resulting in a rating of environmental risks to sustainability as moderately likely (ML)". (para 67 of page 31 - MTR report). The project is to assess this environment risk in detail though the impact of this risk at pilot project scale may not be very significant. The project may include possible actions and directions of battery disposal as a section of on-going technical study if time permissive.
2) Have any new social and/or environmental risks been identified during project implementation?
Yes
If any new social and/or environmental risks have been identified during project implementation please describe the new risk(s) and the response to it.
There can be some adverse environmental impact of improper management of methane/biogas of biogas pilot programme. The Project carefully monitor this situation and already taken the necessary actions; make aware the final users/beneficiaries and technical service providers of biogas digesters on how to properly manage methane, and facilitate them with proper appliances and equipment, and monitor for such adverse sites by third party verifiers and get their recommendations. The Project Management Unit (PMU) has come across one such unanticipated environmental issue to date; disposal of batteries used with Solar PV system and any related environmental issue. The

Project may include possible actions and directions of battery disposal as a section of on-going technical study if time permissive.
3) Have any existing social and/or environmental risks been escalated during implementation? For example, when a low risk increased to moderate, or a moderate risk increased to high.
No
If any existing social and/or environmental risks have been escalated during implementation please describe the change(s) and the response to it.
No

J. Communicating Impact

Tell us the story of the project focusing on how the project has helped to improve people's lives. **(This text will be used for UNDP corporate communications, the UNDP-GEF website, and/or other internal and external knowledge and learning efforts.)**
Media release (draft) by Hayleys Aventura Pvt. Ltd, and Invertek, registered technical service providers under tea sector energy efficiency programme; Invertek Drives is helping create significant efficiencies and savings in the world's fourth largest tea producing country as part of a project to reduce greenhouse gas emissions. Invertek, one of the world's leading designers and manufacturers of variable frequency drives (VFD), is supplying 200 of its Optidrive Eco drives in the first phase through distributor Hayleys Aventura Pvt. Ltd, one of the registered VFD supplier of the Energy NAMA project. One of the objective of this multimillion dollar project to make the tea withering process of Sri lanka's tea industry more efficient and to reduce its impact on the environment. The project, led by Sri Lanka Sustainable Energy Authority under perview of the Ministry of Power and Renewable Energy, Sri Lanka & United Nations Development Programme in Sri Lanka, aims to reduce GreenHouse Gas emissions from the energy sector by developing a NAMA framework, with the objective to support appropriate climate change mitigation actions in country. The project is financially supported by the Global Envirinment Facility. "Tea production is a major industry in Sri Lanka employing over one million people and accounting for three per cent of the country's GDP," said Nick Thorne, Invertek's sales manager responsible for Sri Lanka. "Each tea withering trough uses large amounts of energy to drive a motor powering fan that aerate the tea leaves to remove the moisture of tea leaf, drying them by up to 40 - 50 per cent over a 12-18 hour period. By replacing the existing starters, combined with the efficiencies delivered through the Optidrive Eco, the amount of energy used will be reduced dramatically." The Optidrive Eco VFDs provide optimised speed control of the fan motors used, ensuring greater efficiency that minimises energy usage and thus cuts overall CO2 emissions locally and throughout the energy chain.
What is the most significant change that has resulted from the project this reporting period? **(This text will be used for internal knowledge management in the respective technical team and region.)**
The success of Variable Frequency Drives (VFDs) programme in the tea sector: The project has a achieved a remarkable success within very short time (6 months) since the launch of this NAMA with

Mid-Term Review advise. The project were able to facilitate 48 tea factories in the first cycle with increased interest shown by the industry. The project expects more interest from the sector in the next call for proposal cycle. Although the project would only facilitate appr. 100 tea factories, the transformational impact made by the project is expected to propagate this technology-application to other 500+ tea factories and even into other sectors like hotel, water distribution.

The tea industry is the second most export revenue source of Sri Lanka and employees more than 1 million, and any productivity increase (including energy efficiency) in the sector has a huge impact and it is expected the benefits of these productivity improvements are also partially transferred to these people.

Describe how the project supported South-South Cooperation and Triangular Cooperation efforts in the reporting year.

(This text will be used for internal knowledge management within the respective technical team and region.)

The project is in continuous discussion with Third National Communication (TNC) of UNDP, Sri Lanka for possible synergies between these two projects. GHG emission data management, and policy & regulatory framework assisting these projects are the key focus areas.

Partnership for Market Readiness (PMR) is a Work Bank initiated project at Climate Change Secretariat (CCS). The particular interest of this PMR initiative is to establish a domestic (and international) carbon trading platform and bringing the related regulatory interventions/requirements. A market based approach for Emission Reduction (ER) of GHG mitigations is being discussed and the focused sector is energy sector. This market based approach for ERs of mitigation actions can be a potential driving force of NAMAs in the country. The project has continuously been engaged in PMR work since PMR project formulation stage.

Trilateral South-South Cooperation - Transitioning to Sustainable Energy Uses in the Agro-Industry, Sri Lanka” project under the Chinese government’s “Belt & Road” initiative has not yet approved by the Chinese government though positive responses were received during 2017/2018. The project assisted the overall concept development this project. Possible areas of cooperation identified by the projects include solar PV and biogas application, capacity development of local energy service providers in these technical areas, and technology transfer & knowledge sharing with the Chinese counterpart. This new project also expects to use the same implementation arrangements of Provincial Authorities that are in place under the NAMA project.

Project Links and Social Media

Please include: project's website, project page on the UNDP website, Adaptation Learning Mechanism (UNDP-ALM) platform, Facebook, Twitter, Flickr, YouTube, as well as hyperlinks to any media coverage of the project, for example, stories written by an outside source. Please upload any supporting files, including photos, videos, stories, and other documents using the 'file upload' button in the top right of the PIR.

Energy Data Management System: www.cleanenergy.gov.lk

NAMA sub webpage and portal: http://www.climatechange.lk/nama Other project materials: https://drive.google.com/drive/folders/143kGQ6MhTAusxSK5Lh9Y7rEl1NPifqdG?usp=sharing

K. Partnerships

Give the name of the partner(s), and describe the partnership, recent notable activities and any innovative aspects of the work. Please do not use any acronyms. (limit = 2000 characters).This information is used to get a better understanding of the work GEF-funded projects are doing with key partners, including the GEF Small Grants Programme, indigenous peoples, the private sector, and other partners. Please list the full names of the partners (no acronyms please) and summarize what they are doing to help the project achieve its objectives. The data may be used for reporting to GEF Secretariat, the UNDP-GEF Annual Performance Report, UNDP Corporate Communications, posted on the UNDP-GEF website, and for other internal and external knowledge and learning efforts. The RTA should view and edit/elaborate on the information entered here. All projects must complete this section. Please enter "N/A" in cells that are not applicable to your project.

Civil Society Organisations/NGOs
The tea industry companies under the Planters Association of Ceylon (PAC) have initially agreed to commitment USD 4 million as co-financing to demonstrate the benefits of energy efficient technologies in tea factories, and their continuous engagement was greatly helpful in successful implementation of new VFD pilot programme.
Indigenous Peoples
N/A
Private Sector
The project's private sector engagement is mainly noticeable in technology piloting. Under the High Efficiency Motor (HEM) trial phase, the project closely worked with three private sector tea companies/factories where detail experiments and analysis on HEMs in the tea withering process were conducted amidst some day-to-day process/production disturbance. A similarly a continued support was also received from the tea industry in Variable Frequency Drive (VFDs) trial & experiments. There are more than 10 VFD technology suppliers which whom the project has continued the VFD programme promotional work. Further, the end-users of technologies are mainly from the private sector; plantations companies like Elpitiya Plantations PLC, Talawakelle Tea Estates PLC, Maskeliya Plantations PLC and individual privately owned tea factories. Many of them have brought capital investments as co-finance into the project which is more than 70% of total investments. Similar private sector participation is evident in medium-large scale biogas programme. Janathakshan (GTE) Limited, Isuri Bio Constructors and Eco Engineers & Co Pvt are few of biogas technology service providers, actively involved in medium-large scale biogas programme.
GEF Small Grants Programme
N/A
Other Partners
The project has actively engaged with the Tea Research Institute (TRI) of Sri Lanka. Both TRI, Sri Lanka and the project have benefited from the research collaboration on HEMs & VFDs trial phases and it's findings, and the project expects to continuously working with this partner to increase the

energy efficiency in the tea industry. TRI is the apex semi-governmental institute for generating and disseminating new technologies related to tea cultivation and processing.

Provincial Councils (PCs) and entities under them: Five Provincial Councils (PCs) namely North Western, Southern, Central, Eastern and Uva, are involved in the pilot project of biogas technology dissemination. The project continues to work with various departments and entities under these Provincial Councils like the Local Government Departments, Ministries of Fisheries, Energy and Power etc, and Department of Agriculture, Department of Animal Production and Health, Department of Livestock Development etc. Provincial implementation of biogas programme is led by these PCs.

Ceylon Electricity Board (CEB): The utility has actively supported domestic Solar PV with battery storage pilot phase, and the project has now commissioned a detailed technical assessment to identify the impact on the grid of solar battery application, technical feasibility to use solar battery application for peak demand shaving purpose.

L. Annex - Ratings Definitions

Development Objective Progress Ratings Definitions

(HS) Highly Satisfactory: Project is on track to exceed its end-of-project targets, and is likely to achieve transformational change by project closure. The project can be presented as 'outstanding practice'.

(S) Satisfactory: Project is on track to fully achieve its end-of-project targets by project closure. The project can be presented as 'good practice'.

(MS) Moderately Satisfactory: Project is on track to achieve its end-of-project targets by project closure with minor shortcomings only.

(MU) Moderately Unsatisfactory: Project is off track and is expected to partially achieve its end-of-project targets by project closure with significant shortcomings. Project results might be fully achieved by project closure if adaptive management is undertaken immediately.

(U) Unsatisfactory: Project is off track and is not expected to achieve its end-of-project targets by project closure. Project results might be partially achieved by project closure if major adaptive management is undertaken immediately.

(HU) Highly Unsatisfactory: Project is off track and is not expected to achieve its end-of-project targets without major restructuring.

Implementation Progress Ratings Definitions

(HS) Highly Satisfactory: Implementation is exceeding expectations. Cumulative financial delivery, timing of key implementation milestones, and risk management are fully on track. The project is managed extremely efficiently and effectively. The implementation of the project can be presented as 'outstanding practice'.

(S) Satisfactory: Implementation is proceeding as planned. Cumulative financial delivery, timing of key implementation milestones, and risk management are on track. The project is managed efficiently and effectively. The implementation of the project can be presented as 'good practice'.

(MS) Moderately Satisfactory: Implementation is proceeding as planned with minor deviations. Cumulative financial delivery and management of risks are mostly on track, with minor delays. The project is managed well.

(MU) Moderately Unsatisfactory: Implementation is not proceeding as planned and faces significant implementation issues. Implementation progress could be improved if adaptive management is undertaken immediately. Cumulative financial delivery, timing of key implementation milestones, and/or management of critical risks are significantly off track. The project is not fully or well supported.

(U) Unsatisfactory: Implementation is not proceeding as planned and faces major implementation issues and restructuring may be necessary. Cumulative financial delivery, timing of key implementation milestones, and/or management of critical risks are off track with major issues and/or concerns. The project is not fully or well supported.

(HU) Highly Unsatisfactory: Implementation is seriously under performing and major restructuring is required. Cumulative financial delivery, timing of key implementation milestones (e.g. start of activities), and management of critical risks are severely off track with severe issues and/or concerns. The project is not effectively or efficiently supported.