UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOALS

Project Implementation Report

(1 July 2022 – 30 June 2023)

Project Title:	Strengthening of national capacities for the development of solar photovoltaic (PV) in Cuba
GEF ID:	9473
UNIDO ID:	160046
GEF Replenishment Cycle:	GEF- 6
Country(ies):	Cuba
Region:	LAC – Latin America and Caribbean
GEF Focal Area:	Climate Change Mitigation (CCM)
Integrated Approach Pilot (IAP) Programs[1]:	Not applicable
Stand-alone / Child Project:	Not applicable
Implementing Department/Division:	ENE – Energy Systems and Infrastructure
Co-Implementing Agency:	Not applicable
Executing Agency(ies):	Electrical Union of Cuba (UNE – Unión Eléctrica de Cuba)
Project Type:	Medium-Sized Project (MSP)
Project Duration:	36
Extension(s):	1
GEF Project Financing:	811,050
Agency Fee:	77,050
Co-financing Amount:	4,880,000
Date of CEO Endorsement/Approval:	05/07/2018
UNIDO Approval Date:	05-22-18
Actual Implementation Start:	07-08-18
Cumulative disbursement as of 30 June 2023:	USD 787,857.57
Mid-term Review (MTR) Date:	Not applicable

[1] Only for **GEF-6 projects**, if applicable

Original Project Completion Date:	7/31/2021
Project Completion Date as reported in FY22:	12/31/2022
Current SAP Completion Date:	6/30/2023
Expected Project Completion Date:	6/30/2023
Expected Terminal Evaluation (TE) Date:	9/30/2023
Expected Financial Closure Date:	12/31/2023
UNIDO Project Manager[2]:	Marco Matteini

I. Brief description of project and status overview

Project Objective
The project aims to reduce GHG emissions by enhancing the capacity, skills, and knowledge of relevant actors to successfully implement solar photovoltaic (PV) investments. The objective is to increase the use of local renewable energy sources in order to decrease the dependence on imported fossil fuels.

Baseline
In recent years, the Cuban Government has given great importance to the development and exploitation of RE resources, where solar energy is confirmed as the preferred development industry that will be combined with other sources of RE. Cuba produces 96% of its electrical energy with the use of fossil fuels – which are mainly imported from neighbouring countries such as Venezuela. The Cuban electricity generation system is characterized by a high dependence on imports, with high generation costs and a technological infrastructure with high greenhouse gas emissions. For this reason, the Council of Ministers, on June 21, 2014, approved the Policy for the Perspective Development of Renewable Sources and the Efficient Use of Energy, aimed at making the most of the renewable resources available in the country. The policy foresees the intensive introduction of low-emission technologies with the aim of generating 24% of its electrical energy from renewable energy sources (FRE) by 2030. As a consequence of the RE & EE Policy, UNE has prepared a detailed plan for the different energy technologies including identified macro or micro-locations for installation, capacities and pre-feasibilities. Site identification, stakeholder consultations and construction approval is completed by the Physical Planning Institute for all 191 PV sites and the approval documents for each site are already with UNE and the properties are also transferred to UNE. Some 71 projects are already into concrete planning or under implementation. As baseline at the beginning of the project, 22 parks for wind and PV were distributed on the island. 37 MW of PV were installed in 2016, another 87 MW were synchronized in 2017, and 124 MW of PV capacity in different parks were under preparation. To achieve the intended increase in solar PV generation, currently 3199 MW are programmed to be

[2] Person responsible for report content

implemented by UNE as solar farms investments, 86% of them with direct foreign investments and private sector initiatives. The new project achievement consist in the strengthening of national capacities for developing more than 3000 MW in solar photovoltaic (PV) in Cuba until 2030 instead of 700 MW projected as power. Also, UNE develops 5 international cooperation projects of electrification in rural country regions with isolated photovoltaic systems.

The country has one solar panel manufacturing plant called Empresa de Componentes Electrónicos Ernesto Che Guevara to produce 150 and 250 W photovoltaic panels; located in Pinar del Río Province and with an annual production capacity of 15 MW. In 2018, the panel size was increased to 260 W. Nowadays the manufacturing plant can produce 380 W photovoltaic panels. It is foreseen that private generators could be granted rights to feed electricity back to the grid. This could include Cuban public and private sector entities, such as agricultural cooperatives, or building owners with large roof surfaces.

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

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

Overall Ratings[4]	**FY23**	**FY22**
Global Environmental Objectives **(GEOs)** / Development Objectives **(DOs)** Rating	Moderately Satisfactory (MS)	Moderately Satisfactory (MS)
Implementation Progress **(IP)** Rating	Moderately Satisfactory (MS)	Moderately Satisfactory (MS)
Overall **Risk** Rating	Moderate Risk (M)	Moderate Risk (M)

II. Targeted results and progress to-date

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

Project Strategy	**KPIs/Indicators**	**Baseline**	**Target level**	**Progress in FY23**

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

[4] Please refer to the explanatory note at the end of the document and assure that the indicated ratings correspond to the narrative of the report

Component 1 – BUILDING OF CAPACITY AND DELIVERY SKILLS FOR SOLAR PV INVESTMENTS				
Outcome 1: Outcome 1: Capacity of national entities for development, financing, implementation, and operation of large scale RE investments (in particular PV) improved.				
Output 1.1: Competence Unit definition and job task analysis concerning the technical, financial and project management capacities within key entities, including UNE, INEL, EDIFRE amongst others, as they relate to solar PV investments.	Documentation package (report including annexes) available after 6 months of project implementation	0		After the Diagnostic Report identified knowledge gaps within UNE, it was determined that UNE's technical proficiency in SPV software needed enhancement. In response, Low Carbon consultancy aided UNE and UNIDO in choosing software solutions compatible with UNE's technical and IT needs. The resulting document was titled: - Guide on Solar Photovoltaic Software for Design, Monitoring, and Project Development. - One of the main findings of the guide, was the identification of the suitability of the software PV Syst, specifically for Cuba. Consequently, and due to their technical experience with SPV software and successful trainings in Cuba, the firm CIRCE was selected to provide the "Provision of training services on PVSyst Software for the design, simulation and calculation of Solar Photovoltaic projects for the Electric Cuban Union (UNE)". This training offered 90 hours, including technical assistance, simulations, and Q&A sessions in Spanish. The package comprised the purchase of six PVSyst licenses within the contract, which would be utilized for training purposes, along with the continuous support of a coordinator and a technical assistant.
Output 1.2: Design, development and establishment of comprehensive training programs for each specific target group at the UNE Training Center to enhance required capacities in close collaboration with other local institutions and ongoing investment activities.	Documentation package (report including annexes) of 3 trainings designed, developed and established available at end of year 1 of project implementation	0 Curriculum 0 training materials 0 tools 0 trainers have received specific training to be a trainer on PV		During the reporting period, the design and conduction of an international study trip took place, it was conducted by CIRCE. From 17 to 28 October 2022, a total of eight experts from UNE and one UNIDO Cuba colleague travelled to Zaragoza, Spain to attend the training: **Topic: Solar Photovoltaic Energy and Microgrids based on Renewable Energy was held**. Number of men: 4 Number of women: 5 Total attendance: 9 The development and organization of the replication of the trainings where there was an international study trip was prepared during the reporting period. **Topic: Implementation, maintenance and operations of battery energy storage system for frequency regulation.** **Topic: Solar Photovoltaic Energy and Microgrids based on Renewable Energy was held**.
Output 1.3: 120 technicians individuals in 3 target groups received	Number of trainees in 3 different target groups have received	0 trainees have received adequate training for PV in different		Please see Output 1.2 above. A total of 303 people were trained during the replications of the two (2) trainings/curricula during the reporting period, which were international study trips were conducted, in cooperation with CIRCE in Spain and

training in development, financing, implementation and maintaining national PV projects.	adequate training for PV in different stages of project realization by end of year 2 of project implementation	stages of project realization		Kyushu Electric Power Co. in Japan. The gender disaggregation can be found below: **Topic: Implementation, maintenance and operations of battery energy storage system for frequency regulation. → Kyushu Electric Power Co.** The training was replicated and the following information can be reported: **Replication Date(s): 6-10 March 2023** **# of men: 5 technicians that were part of the international study trip as trainers / 120 attendees** **# of women: 41 women** **Total attendance: 161 (36 presential / 125 online)** **Topic: Solar Photovoltaic Energy and Microgrids based on Renewable Energy was held**. **Replication Date(s): 20-24 February 2023** **Number of men: 114** **Number of women: 33** **Total attendance: 147 (26 presential/ 121 online)** A specialist (men) from UNE, who is also a technical member of the UNE project team, underwent training on microgrids in Nicaragua. This training was harmonized with the activities of the "FRE Local" project, which is funded by the European Union. Under the guidance of the National Project Director and in collaboration with a colleague from UNIDO Cuba, the project designed and conducted a training focused on creating international cooperation projects involving SPV technologies. This training, held at the EMFRE center, had 12 participants, of which 3 were women. The training targeted local technicians involved in photovoltaic solar technology across the 16 electricity companies, INEL, ATI, ECIE, and EMFRE. These technicians also offer professional services related to photovoltaic technologies in foreign investment projects. This training took place from **20-24 March 2023.**
Output 1.4: Investments in grid connected PV parks are realized faster and at higher quality and sustainability.	MW of PV have been synchronized to the grid during project implementation period	Planned 130 MW of PV will be synchronized to the grid in the baseline assumption	Additional 2 MW of PV will be synchronized to the grid	As part of the initiative to accelerate and enhance the quality and sustainability of grid-connected PV park investments, a target was set to synchronize an additional 2 MW of PV to the grid, building upon a baseline of 130 MW. By the project's conclusion, a total of 5 MW was synchronized, exceeding the project's target by 3 MW. This new addition boosts Cuba's PV total installations to 238 MW. Specifically, with the IRENA project, the solar photovoltaic installations established amounted to 5 MW. These are projected to generate approximately 7,500 MWh of clean electricity annually, resulting in a yearly saving of about 2,350 tons of oil. This not only reduces the reliance on fossil fuels but also prevents the emission of around 6,345 tons of CO2 into the atmosphere each year. Moreover, the project purchased spare parts for two UNE cars, which are used for operation and maintenance purposes. Ensuring the mobility and effective transportation of technicians, equipment, and other resources is crucial to

				ensure the rapid and high-quality establishment of PV parks. Reliable transportation (through well-maintained cars) ensures timely visits to sites, proper supervision, and immediate response to on-ground issues. The more efficiently technicians and project managers can travel to and from project sites, the more quickly and sustainably these projects can be realized.
Component 2 – SUPPORTIVE ACTIVITIES FOR RE INVESTMENT PROMOTION AND DISSEMINATION.				
Outcome 2: Awareness for the concept and benefits of RE and investments therein (specifically in solar PV) raised.				
Output 2.1: a study of local investment conditions for solar PV technology (importation, basic and detailed engineering, assembly, construction, startup), through a technical analysis of investment laws (n. 327) and foreign investment (118)	Methodology for project investment in solar PV is published	0 There are no domestic guides assessing the specific foreign investment conditions for RE investments	1 knowledge management system for RE investments in place at UNE 1 document is produced and published in English and Spanish	During the reporting period the following report was finalized: 1. Methodological Report on best international practices for the development, design, installation, and operations of commercial-scale solar PV plants/projects. Consequently, the results of Output 2.1 and 2.2 for FY2023 have been merged into a single document.
Output 2.2: a study to evaluate i) the constructive dimension of the investments made; ii) the selection criteria for the technologies; and iii) to propose an evaluation and monitoring methodology for future UNE projects	Documentation about knowledge management system for UNE available in year 2	0	1 1 documents is produced and revised by UNE	Please see the results of Output 1.1. During the reporting period the following report was finalized: 1. Financing models for the development of RE projects in Cuba Consequently, the results of Output 2.1 and 2.2 for FY2023 have been merged into a single document.
Output 2.3: Dissemination campaign for general public implemented	Frequency of systematic gender-sensitive public dissemination activities for the national investments and achievements in	No systematic public dissemination activities for the national investments and achievements	5 gender-sensitive public dissemination activities in 5 provinc	The scale-model of the renewable energy based grid developed if FY2021 was installed in Q4 2021 in the "*Centro de Entrenamiento de la UNE*" and since then it is continuously used for general public awareness raising, related to renewable energy. This centre provides a space to conduct training services to enterprises from UNE and others companies of the country.

	the RE sector to the general public Number of the people which increased awareness of adoption the RE in their community	in the RE sector. Baseline not established.	es in which solar PV investment are planned are conducted, each for 50 people. A total of 250 people have increased awareness, whereof at least 40 % women	The project established synergies with another titled, "Increasing energy resilience in communities facing extreme meteorological events through the use of renewable energy sources (DGFRE[5])." From May 17 to June 27, 2023, joint visits to five provinces took place. During these visits, training sessions and awareness campaigns were held on the proper use of photovoltaic systems, highlighting their benefits for rural life and environmental sustainability. In total, 1,507 villagers participated in the workshops, where sensitization materials like brochures were disseminated, and the floor was open for locals to present their own experiences and ask questions related to SPV technologies. A detailed breakdown by province, including gender distribution, follows below: PROVINCE / NUMBER OF PEOPLE BENEFITED / OF THEM WOMEN / PERCENTAGE OF WOMEN Camagüey / 770 / 182 / 24% Ciego de Avila / 324 / 103 / 32% Villa Clara / 99 / 40 / 40% Sancti Spíritus / 314 / 102 / 32% TOTAL / 1507 / 427 / 28% In January 2023, a circle of influence on Renewable Energy Sources was created at the Elementary School: Mario Muñoz Monroy. The project supported this circle by distributing awareness, promotional, and educational materials. PROVINCE / NUMBER OF PEOPLE BENEFITED / OF THEM WOMEN / % WOMEN La Habana / 20 / 10 / 50% On 31 May 2023, and in cooperation with the project *Resilencia Energética*, a workshop on the lessons learned on the logistics, installation, monitoring, and environmental safeguards of SFVA was organized. Five provinces were visited, where isolated SPV systems were installed (2kW): La Habana, Sancti Spiritus, Ciego de Avila, Villaclara, and Camaguey. In total, 102 technicians participated, of which 33 were women and 69 men. The province and its gender disaggregation can be found below: PROVINCE / NUMBER OF PEOPLE BENEFITED / OF THEM WOMEN / % WOMEN Camagüey / 15 / 3 / Ciego de Avila / 11 / 3 / Villa Clara / 12 / 6 / Sancti Spíritus / 21 / 8 /

[5] "Incremento de la resiliencia energética de las comunidades ante eventos meteorológicos extremos a partir del uso de fuentes renovables de energía"

				La Habana(Taller final) | 43 | 13 | TOTAL | 102 | 33 | 32%
Output 2.4: international seminar on best practices in renewable energy investment	Number of international seminar organized in Cuba and number of participants in international events abroad on best practices in renewable energy investment by year 3	Currently no international investment specific exchange of RE sector experiences		Participation in an international webinar in the framework of the international study trip: **Solar Photovoltaic Energy and Microgrids based on Renewable Energy in Zaragoza, Spain,** which was held in Australia: - "Managing EVs in Australian Urban and Rural Grids" (by Nando Ochoa, University of Melbourne)." Number of men: 4 Number of women: 5 Total attendance: 9
Output 2.5: Elaboration of dissemination materials (500 brochures) for communication to the general public	Number of brochures distributed Number of brochures downloaded	0 brochures available		By the operational completion of the project, all (500) brochures on the correct use of stand-alone systems and on the Instructional Manual on grid-connected photovoltaic systems were distributed in their entirety.
Output 2.6: Updated and enhanced methodological guides for the Basic Business Units (UEBEs) of the UNE	Number of different technical manuals and guides for the Basic Business Units (UEBEs) updated in year 3	1 technical manual for the Basic Business Units (UEBEs) exists without specific and updated guidance on PV investment project cycle		This product was expected to be updated and later reviewed by UNE. However, due to the amount of classified information on the national electric grid, it was deemed too sensitive and potentially compromising to national security to be broadly disseminated. As a countermeasure to ensure the project's objectives were met without compromising critical information, a document focusing on Financing models for the development of Renewable Energy (RE) projects in Cuba was developed and provided as an alternative guide. Since then, UNE has informed the Project Team that the guide is being updated using the products produced from this project as a baseline.
Component 3 – MONITORING AND EVALUATION				
Outcome 3: Project's progress towards objectives continuously monitored and evaluated				
Output 3.1: Project monitoring and evaluation	Output 3.1: Project monitoring and evaluation	Output 3.1: Project monitoring and evaluation	Output 3.1: Project monitoring and evaluation	- The 5th and last Project Steering Committee meeting took place on 8 December 2022, where the UNIDO-UNE teams discussed latest updates, remaining activities, and workplan for the remaining time of the project. The following was agreed: o A second and final project extension would be requested by UNE/GEF OFP until 30/06/2023. o Workplan for 2023 approval o Terminal Evaluation: Terms of Reference would be prepared by UNIDO, and shared with UNE. o The recruitment of an international and national project evaluators by UNIDO. o Terminal Evaluation of the project to be conducted and findings presented to the UNIDO-UNE team.

III. Project Risk Management

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

	(i) Risks at CEO stage	(i) Risk level FY 21	(i) Risk level FY 22	(i) Mitigation measures	(ii) Progress to-date	New defined risk[6]
1	Lack of adequate institutional support would affect the success of the Project.	Low	Low	The development, installation and operation & maintenance of solar PV plants demand a certain level of active management. Hence, it will be vital that any existing gaps and needs will be addressed within Component 2 of the project through the strengthening of the in-country knowledge and skill base. That way, management and scaling-up of solar PV should be without major disruptions.	The assessment has been finalized to define detailed competencies and capacity building needs.	☐
2	Limited confidence about the benefits of investment focused capacity building activities would impede the development of further solar PV projects and private investment.	Low	Low	The planned capacity building activities will be developed in close cooperation with relevant stakeholders to assure buy-in and commitment. Close cooperation with national training centers is intended to assure activities can be institutionally anchored and continued after project execution	The project has maintained close communication and collaboration with UNE and INEL to advise them on capacity building activities. Moreover, the project has also maintained communication with national training centers to guarantee activity continuity, but also to train key center personnel on SPV related matters.	☐
3	No immediate demand of services for trained experts	Low	Low	In particular for the government agencies the risk is low, but since the training is institutionalized in the own training centre of UNE, the retraining of new and additional staff is not a problem.	Renewable energy and PV remain a near/medium/ long-term top priority in the energy security agenda of the Cuban Government. The availability of more competent and skilled workforce for PV project and systems will certainly be levered.	☐
4	Trainings will be using tools, equipment and software that are not practical or available for everyday use to the trained teams.	Low	Low	With the help of the project and during preparation of the training programme (job-task-analysis) wishes by staff and trainers for tools, software and other equipment will be evaluated carefully. After thorough assessment the project will invest in special equipment required for design, engineering, management and maintenance of PV power plants, and to be used by the trained staff after the project.	The project team (and some project contractors with specialized knowledge) has closely collaborated and advised with UNE and INEL colleagues on all decisions made related to tools, equipment and software to procure, and it will continue to do so until the	☐

[6] New risk added in reporting period. Check only if applicable.

					projects operational closure.	
5	Very few women are involved in the project, so that the project serves to reinforce the gender gap rather than reduce it	Low	Low	As the project equally targets both men and women, social risks are expected to be low. In addition, an Environmental and Social Management Plan (ESMP) has been developed as a further mitigation measure.	The project has ensured that gender mainstreaming and equality themes are taken in due account during activities planning. The ESMP is regularly monitored.	☐
6	Vulnerability to climate events.	Medium		As the majority of project activities will be centred on capacity building, they are unlikely to be impacted by climate change. Further, the capacity building will among many things target especially the potential risks of hurricanes and other climate change induced disasters and mitigation measures in terms of siting, design, engineering and operation of the RE power plants. The solar PV investments that are to be promoted via these activities are also not expected to be directly impacted. Cuba has incorporated disaster risk reduction to its governmental structures through a civil defence system with national and supra-institutional scope and a structure according to the political-administrative division of the country. Hence, in the case of natural disasters, preventive measures should come into force. Environmental aspects are considered as part of the due diligence carried out for the investments being made.	The project is and will be following Cuba's disaster risk reduction guidance and procedures when and as applicable.	

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

N/A

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

The COVID19 pandemic during FY2023 posed *some* challenges, especially during the last months of 2022 and mostly related to traveling. However, the project team and its counterparts managed to successfully carry on with the expected activities: One travel to Tokyo and Fukuoka, Japan, to attend a training on: Implementation, maintenance and operations of battery energy storage system for frequency regulation by 9 UNE staff and 1 UNIDO Cuba colleague; and one travel of eight (8) UNE staff, and one (1) UNIDO Cuba colleague to Zaragoza, Spain, to attend a Solar Photovoltaic Energy and Microgrids based on Renewable Energy. Training preparation required in general more staff time than what use to be and travel costs for trainers or Cuban delegates were significantly higher than pre-Covid times.

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

The project has been declared operationally closed as of 30 June 2023.

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

N/A

IV. Environmental and Social Safeguards (ESS)

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

☐ Category A project

☒ Category B project

☐ Category C project

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

Please expand the table as needed.

	E&S risk	**Mitigation measures undertaken during the reporting period**	**Monitoring methods and procedures used in the reporting period**
(i) Risks identified in ESMP at time of CEO Endorsement	Waste management	The project will consider the sustainable management of waste and used materials	Logs of the monitored results
	Expansion in land use	Monitoring of agricultural activities and productivity as well as livestock	Feasibility studies and monitoring logs
	Increased transportation, GHG emissions and local air quality	Monitoring of transport distance to minimize the carbon footprint caused by the transportation of materials	Logs of fuel use by transport vehicle
	Emissions to soil and groundwater	Adequate storage of materials	Logs of the monitored results
(ii) New risks identified during project implementation (if not applicable, please insert 'NA' in each box)	N/A	N/A	N/A

V. Stakeholder Engagement

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

The project has continued to work closely with its Cuban executing partners and beneficiaries: Empresa de Desarrollo de Inversiones en Fuentes Renovables de Energía (EDIFRE), which later became Empresa de Fuentes Renovables de Energía (EMFRE). During the reporting period of FY2023, collaboration went smoothly, with the UNIDO team and UNE jointly working on development of terms of reference, consulting on adjustments to work plans, reviewing deliverables of international and national service providers, reviewing Terms of Reference for the Terminal Evaluation and the recruitment of the independent evaluation consultants involved; and Project Steering Committee meetings.

The project team has held regular meetings and dialogue also with project counterparts such as the Ministry of Energy and Mines (MINEM), Ministry of Foreign Trade and Investments (MINCEX) and GEF OFP office.

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

N/A

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

- 9473_5thPSCMeeting2022
- 9473_BestInternationalPractice
- 9473_REFinancialModels
- 9473_PVSoftwareGuide

VI. Gender Mainstreaming

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

The project continues to make efforts to mainstream the gender dimension through:

- Promotion of women's participation in training activities, both at managerial and technical levels.
- Gender-sensitive recruitment.
- Consideration of gender dimensions in all decision-making processes
- Collection and inclusion of gender-disaggregated data and indicators wherever possible.
- Gender balanced participation, to the extent feasible, of men and women, and youth in training courses, workshops, and certifications.

Aligned with the UNE gender guidelines, a target of at least 40 percent of women involved in work related to the projects has been pursued for trainings, workshops, and/or study tours from the start of implementation until operational closure.

VII. Knowledge Management

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

Knowledge products so far generated by the project are retained and administered according with UNE's practices and policies.

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

N/A

VIII. Implementation progress

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

Component 1 – BUILDING OF CAPACITY AND DELIVERY SKILLS FOR SOLAR PV INVESTMENTS

After the Diagnostic Report identified knowledge gaps within UNE, it was determined that UNE's technical proficiency in SPV software needed enhancement. In response, Low Carbon consultancy aided UNE and UNIDO in choosing software solutions compatible with UNE's technical and IT needs. The resulting document was titled:

- PV Software Information

Consequently, and due to their technical experience with SPV software and successful trainings in Cuba, the firm CIRCE was selected to provide the "Provision of training services on PVSyst Software for the design, simulation and calculation of Solar Photovoltaic projects for the Electric Cuban Union (UNE)".

This training offered 90 hours, including technical assistance, simulations, and Q&A sessions in Spanish. The package comprised the purchase of six PVSyst licenses within the contract, which would be utilized for training purposes, along with the continuous support of a coordinator and a technical assistant.

During the reporting period, the design and conduction of an international study trip took place, it was conducted by CIRCE. From 17 to 28 October 2022, a total of eight experts from UNE and one UNIDO Cuba colleague travelled to Zaragoza, Spain to attend the training:

Topic: Solar Photovoltaic Energy and Microgrids based on Renewable Energy was held.

#of men: 4

# of women: 5

Total attendance: 9

The development and organization of the replication of the trainings where there was an international study trip was prepared during the reporting period.

Topic: Implementation, maintenance and operations of battery energy storage system for frequency regulation.

Topic: Solar Photovoltaic Energy and Microgrids based on Renewable Energy was held.

Moreover, replicated trainings were organized:

- Training on **"Implementation, maintenance, and operations of battery energy storage system for frequency regulation"** by **Kyushu Electric Power Co. in Japan**. It took place from 6-10 March 2023, attracting 161 attendees (36 presential / 125 online).
- A repeated session on **Solar Photovoltaic Energy and Microgrids based on Renewable Energy** was held from 20-24 February 2023. The attendance was 147 individuals (26 presential/ 121

online).

A total of 303 people were trained during the replications of the two (2) trainings/curricula during the reporting period.

Furthermore, a specialist (men) from UNE, who is also a technical member of the UNE project team, underwent training on microgrids in Nicaragua. This training was harmonized with the activities of the "FRE Local" project, which is funded by the European Union.

Under the guidance of the National Project Director and in collaboration with a colleague from UNIDO Cuba, the project designed and conducted a training focused on creating international cooperation projects involving SPV technologies. This training, held at the EMFRE center, had 12 participants, of which 3 were women. The training targeted local technicians involved in photovoltaic solar technology across the 16 electricity companies, INEL, ATI, ECIE, and EMFRE. These technicians also offer professional services related to photovoltaic technologies in foreign investment projects. This training took place from **20-24 March 2023.**

Additionally, as part of the initiative to accelerate and enhance the quality and sustainability of grid-connected PV park investments, a target was set to synchronize an additional 2 MW of PV to the grid, building upon a baseline of 130 MW. By the project's conclusion, a total of 5 MW was synchronized, exceeding the project's target by 3 MW. This new addition boosts Cuba's PV total installations to 238 MW. Specifically, with the IRENA project, the solar photovoltaic installations established amounted to 5 MW. These are projected to generate approximately 7,500 MWh of clean electricity annually, resulting in a yearly saving of about 2,350 tons of oil. This not only reduces the reliance on fossil fuels but also prevents the emission of around 6,345 tons of CO2 into the atmosphere each year.

Finally, the project invested in spare parts for two UNE vehicles dedicated to operation and maintenance tasks. This investment underpins the critical importance of having dependable transportation for technicians and other staff. With well-maintained vehicles, there's a guarantee of timely visits to project sites, effective oversight, and swift reactions to any on-site challenges.

Component 2 – SUPPORTIVE ACTIVITIES FOR RE INVESTMENT PROMOTION AND DISSEMINATION

Two essential reports were formulated during this phase:

1. **Methodological Report** on best international practices concerning solar PV plants/projects.
2. **Financing models** tailored for the development of RE projects in Cuba.

The **"Centro de Entrenamiento de la UNE"** continued serving as a hub for public awareness about renewable energy post its establishment in Q4 2021.

The project collaborated with another initiative named "Increasing energy resilience in communities facing extreme meteorological events through the use of renewable energy sources (DGFRE)." Within a span from May 17 to June 27, 2023, combined efforts led to visits across five distinct provinces. The main objectives of these visits were to conduct training sessions and launch awareness drives about the correct utilization of solar photovoltaic (SPV) systems. The emphasis was on showcasing the advantages these systems offer for the enhancement of rural living and the promotion of environmental sustainability. These sessions had the purpose of disseminating informative materials, including brochures, were shared with the participants. Furthermore, an interactive segment was incorporated, allowing the villagers to share personal stories and raise queries about SPV technologies. A total of 1507 villagers participated, of which 427 were women.

Furthermore, in January 2023, a circle of influence on Renewable Energy Sources was created at the Elementary School: Mario Muñoz Monroy. The project supported this circle by distributing awareness, promotional, and educational materials. Twenty students participated, of which 10 were female.

In collaboration with the Resilencia Energética project, a workshop focused on logistics, installation, monitoring, and environmental precautions of SFVA took place. This workshop involved visits to five provinces - La Habana, Sancti Spiritus, Ciego de Avila, Villaclara, and Camaguey, where 2kW isolated SPV

systems were set up. The workshop was attended by 102 technicians, consisting of 33 women and 69 men.

Finally, an international webinar titled **"Managing EVs in Australian Urban and Rural Grids"** by Nando Ochoa, University of Melbourne was held in Australia, focusing on the international study trip theme.

Component 3 – MONITORING AND EVALUATION

The 5th Project Steering Committee meeting took place on 8 December 2022. Several decisions were taken, including a proposed project extension until 30/06/2023, the approval of the 2023 workplan, and the terminal evaluation of the project.

Overall, the project has shown significant strides in bridging knowledge gaps, promoting renewable energy, and fostering international collaboration. Efforts in gender balance and regional engagement also stand out as highlights of the project's tenure.

2. Please briefly elaborate on any **minor amendments**[7] to the approved project that may have been introduced during the implementation period or indicate as not applicable (NA).

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

☐	Results Framework	**N/A**
☐	Components and Cost	**N/A**
☐	Institutional and Implementation Arrangements	**N/A**
☐	Financial Management	**N/A**
☐	Implementation Schedule	**N/A**
☐	Executing Entity	**N/A**
☐	Executing Entity Category	**N/A**
☐	Minor Project Objective Change	**N/A**
☐	Safeguards	**N/A**
☐	Risk Analysis	**N/A**
☐	Increase of GEF Project Financing Up to 5%	**N/A**
☐	Co-Financing	**N/A**
☐	Location of Project Activities	**N/A**
☐	Others	**N/A**

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

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

GRANT DELIVERY REPORT

Grant:	2000003935	**Grant Status:**	Authority to implement	**Grant Validity:**	08.07.2018 - 30.06.2023
Sponsor:	400150 - GEF - Global Environment Facility	**Currency:**	USD	**Reporting Period:**	08.01.2018 - 28.07.2023
Other Reference:	9473-U3-PJ-MS-GR-01	**Fund:**	GF	**Prepared on:**	28.07.2023

Project	Project Description	Country	Region	Project Manager	Project Validity
160046	STRENGTHENING OF NATIONAL CAPACITIES FOR THE DEVELOPMENT OF SOLAR PHOTOVOLTAIC (PV) IN CUBA	Cuba	The Americas	Marco Matteini	30.05.2017 - 31.07.2023

	Description	Released Budget Current Year (a)	Obligations Current Year (b)	Disbursements Current Year (c)	Expenditures Current Year (d=b+c)	Total Agreement Budget (e)	Released Budget (f)	Obligations + Disbursements (g)	Funds Available (h=f-g)	Support Cost (i)	Total Expenditures (j=g+i)
2000003935		USD	USD	USD	USD	USD	USD	USD	USD	USD	USD
1100	Staff & Intern Consultants	56,116.44	6,110.00	14,385.68	20,495.68	76,506.32	76,506.32	40,885.56	35,620.76	0.00	40,885.56
1500	Local Travel	4,500.00	(6,798.86)	10,733.54	3,934.68	78,011.20	78,011.20	77,445.88	565.32	0.00	77,445.88
1700	Nat.Consult./Staff	12,000.00	1,477.71	11,114.17	12,591.88	71,971.30	71,971.30	72,563.18	(591.88)	0.00	72,563.18
2100	Contractual Services	20,000.00	(14,753.29)	25,988.06	11,234.77	348,979.12	348,979.12	340,213.89	8,765.23	0.00	340,213.89
3000	Train/Fellowship/Study	5,498.60	(30,616.78)	31,322.80	706.02	45,425.03	45,425.03	40,632.45	4,792.58	0.00	40,632.45
3500	International Meetings	0.00	0.00	2,971.04	2,971.04	0.00	0.00	2,971.04	(2,971.04)	0.00	2,971.04
4300	Premises	76.53	0.00	0.00	0.00	8,381.89	8,381.89	8,305.36	76.53	0.00	8,305.36
4500	Equipment	4,789.66	41,458.84	1,223.52	42,682.36	146,000.00	146,000.00	183,892.70	(37,892.70)	0.00	183,892.70
5100	Other Direct Costs	1,926.27	(10,714.04)	485.43	(10,228.61)	35,775.14	35,775.14	23,620.26	12,154.88	0.00	23,620.26
9300	Support Cost IDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	74,794.18	74,794.18
2000003935	USD Total	104,907.50	(13,836.42)	98,224.24	84,387.82	811,050.00	811,050.00	790,530.32	20,519.68	74,794.18	865,324.50

*** Does not include Unapproved Obligations**

The above statement has been certified electronically by the designated officials in UNIDO's Financial Services.

GRANT DELIVERY REPORT

Grant:	2000003658	**Grant Status:**	Closed	**Grant Validity:**	30.05.2017 - 30.05.2018
Sponsor:	400150 - GEF - Global Environment Facility	**Currency:**	USD	**Reporting Period:**	30.01.2017 - 28.07.2023
Other Reference:	9473-U3-PP-PP-GR-01	**Fund:**	GF	**Prepared on:**	28.07.2023

Project	Project Description	Country	Region	Project Manager	Project Validity
160046	STRENGTHENING OF NATIONAL CAPACITIES FOR THE DEVELOPMENT OF SOLAR PHOTOVOLTAIC (PV) IN CUBA	Cuba	The Americas	Marco Matteini	30.05.2017 - 31.07.2023

	Description	Released Budget Current Year (a)	Obligations Current Year (b)	Disbursements Current Year (c)	Expenditures Current Year (d=b+c)	Total Agreement Budget (e)	Released Budget (f)	Obligations + Disbursements (g)	Funds Available (h=f-g)	Support Cost (i)	Total Expenditures (j=g+i)
2000003658		USD	USD	USD	USD	USD	USD	USD	USD	USD	USD
1100	Staff & Intern Consultants	0.00	0.00	0.00	0.00	5,000.00	5,000.00	0.00	5,000.00	0.00	0.00
1500	Local Travel	0.00	0.00	0.00	0.00	2,500.00	2,500.00	0.00	2,500.00	0.00	0.00
1700	Nat.Consult./Staff	0.00	0.00	0.00	0.00	10,000.00	10,000.00	0.00	10,000.00	0.00	0.00
2100	Contractual Services	0.00	0.00	0.00	0.00	1,500.00	1,500.00	20,000.00	(18,500.00)	0.00	20,000.00
5100	Other Direct Costs	0.00	0.00	0.00	0.00	1,000.00	1,000.00	0.00	1,000.00	0.00	0.00
9300	Support Cost IDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,900.00	1,900.00
2000003658	USD Total	0.00	0.00	0.00	0.00	20,000.00	20,000.00	20,000.00	0.00	1,900.00	21,900.00

*** Does not include Unapproved Obligations**

The above statement has been certified electronically by the designated officials in UNIDO's Financial Services.

IX. Work Plan and Budget

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

This project has been operationally completed as of 30/06/2023.

X. Synergies

1. **Synergies** achieved:

FRE Local project funded by the European Union:

- A specialist from UNE underwent training on microgrids in Nicaragua. This training was harmonized with the activities of the "FRE Local" project.

Project Energetic Resilience funded by the European Union:

- In cooperation with this project, a workshop on lessons learned on the logistics, installation, monitoring, and environmental safeguards of SFVA was organized.

3. Stories to be shared (Optional)

Yanelis Rodríguez Reyes, against all odds and societal expectations, took on the challenging role of becoming the first female lineman in Cuba. Fresh out of the Lineman Training School of Juan Ronda Lezcano, she was unexpectedly recognized during an International Women's Day at the Electrical Union of Cuba (UNE) celebration for "women performing jobs traditionally held by men." Yet, for Yanelis, this journey wasn't without its challenges. From gruelling physical training, scepticism from her peers, to societal eyebrows raised at her career choice, she faced it all. But what propelled her forward was her unwavering determination and audacity. Taking on a physically demanding role in the electrical field was not just about sustaining herself financially; for Yanelis, it was about breaking barriers. She stands tall, not only as a competent professional in a male-dominated field but as a testament to the idea that with determination and resilience, stereotypes can be dismantled, and new pathways can be forged for generations to come. Media and further information: http://www.cubadebate.cu/especiales/2023/03/13/realizar-bien-su-labor-leitmotiv-de-la-primera-liniera-cubana/

XI. GEO LOCATION INFORMATION

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

Web mapping applications such as OpenStreetMap or GeoNames use this format. Consider using a conversion tool as needed, such as: https://coordinates-converter.com

Please see the Geocoding User Guide by clicking here

Location Name	Latitude	Longitude	Geo Name ID	Location and Activity Description
Havana, Cuba	*23.133*	*-82.383*	3553478	

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

N/A

EXPLANATORY NOTE

1. **Timing & duration:** Each report covers a twelve-month period, i.e. 1 July 2022 – 30 June 2023.

2. **Responsibility:** The responsibility for preparing the report lies with the project manager in consultation with the Division Chief and Director.

3. **Evaluation:** For the report to be used effectively as a tool for annual self-evaluation, project counterparts need to be fully involved. The (main) counterpart can provide any additional information considered essential, including a simple rating of project progress.

4. **Results-based management**: The annual project/programme progress reports are required by the RBM programme component focal points to obtain information on outcomes observed.

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

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

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