

Funding Proposal

SAP013: Scaling Smart, Solar, Energy Access Microgrids in Haiti

Haiti | Nordic Environment Finance Corporation (NEFCO) | Decision B.25/15

15 April 2020



**GREEN
CLIMATE
FUND**

Simplified Approval Process Funding Proposal

Project/Programme title:	Scaling Smart, Solar, Energy Access Microgrids in Haiti
Country(ies):	Haiti
National Designated Authority(ies):	Ministry of the Environment (Haiti)
Accredited Entity:	Nordic Environment Finance Corporation (NEFCO)
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If available, indicate GCF code:	SAP-FP-NEFCO-190606



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This section highlights some of the project's or programme's information for ease of access and concise explanation of the funding proposal.

Section B **PROJECT / PROGRAMME DETAILS**

This section focuses on describing the context of the project/programme, providing details of the project/programme including components, outputs and activities, and implementation arrangements.

Section C **FINANCING INFORMATION**

This section explains the financial instrument(s) and amount of funding requested from the GCF as well as co-financing leveraged for the project/programme. It also includes justification for requesting GCF funding and exit strategy.

Section D **LOGIC FRAMEWORK, AND MONITORING, REPORTING AND EVALUATION**

This section includes the logic framework for the project/programme in accordance with the GCF Results Management Framework and Performance Measurement Framework, and gives an overview of the monitoring, reporting and evaluation arrangements for the proposed project/programme.

Section E **EXPECTED PERFORMANCE AGAINST INVESTMENT CRITERIA**

This section provides an overview of the expected alignment of the projects/programme with the GCF investment criteria: impact potential, paradigm shift, sustainable development, needs of recipients, country ownership, and efficiency and effectiveness.

Section F **ANNEXES**

This section provides a list of mandatory documents that should be submitted with the funding proposal as well as optional documents and references as deemed necessary to supplement the information provided in the funding proposal.

Note to accredited entities on the use of the SAP funding proposal template

- The Simplified Approval Process Pilot Scheme (SAP) supports projects and programmes with a GCF contribution of up to USD 10 million with minimal to no environmental and social risks. Projects and programmes are eligible for SAP if they are ready for scaling up and have the potential for transformation, promoting a paradigm shift to low-emission and climate-resilient development.
- This template is for the SAP funding proposals and is different from the funding proposal template under the standard project and programme cycle. Distinctive features of the SAP funding proposal template are:
 - *Simpler documents*: key documents have been simplified, and presented in a single, up-front list;
 - *Fewer pages*: A shorter form with significantly fewer pages. The total length of funding proposals should **not exceed 20 pages**, annexes can be used to provide details as necessary;
 - *Easier form-filling*: fewer questions and clearer guidance allows more concise and succinct responses for each sub-section, avoiding duplication of information.
- Accredited entities can either directly incorporate information into this proposal, or provide summary information in the proposal with cross-reference to other funding proposal documents such as project appraisal document, pre-feasibility studies, term sheet, legal due diligence report, etc.
- Submitted SAP Pilot Scheme funding proposals will be disclosed simultaneously with submission to the Board, subject to the redaction of any information which may not be disclosed pursuant to the [GCF Information Disclosure Policy](#).

Please submit the completed form to:

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Please use the following name convention for the file name:

“SAP-FP- [Accredited Entity Short Name]-[yyymmdd]”

A. PROJECT/PROGRAMME SUMMARY					
A.1. Has this FP been submitted as a SAP CN before?			Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
A.2. Is the Environmental and Social Safeguards Category C or I-3?			Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
A.3. Project or programme	<i>Indicate whether this FP refers to a combination of several projects (programme) or one project.</i> <input checked="" type="checkbox"/> Project <input type="checkbox"/> Programme	A.4. Public or private sector	<input type="checkbox"/> Public sector <input checked="" type="checkbox"/> Private sector	A.5. RFP	Choose an item. Mobilising Funds at Scale
A.6. Result area(s)	<i>Check the applicable GCF result area(s) that the proposed project/programme targets. Indicate for each checked result area(s) the estimated percentage of GCF budget devoted to it. The summed-up percentage should be equal to 100%.</i> Mitigation: Reduced emissions from: <input checked="" type="checkbox"/> Energy access and power generation: <u>60</u> % <input type="checkbox"/> Low emission transport: <u>Enter number</u> % <input type="checkbox"/> Buildings, cities and industries and appliances: <u>Enter number</u> % <input type="checkbox"/> Forestry and land use: <u>Enter number</u> % Adaptation: Increased resilience of: <input checked="" type="checkbox"/> Most vulnerable people and communities: <u>40</u> % <input type="checkbox"/> Health and well-being, and food and water security: <u>Enter number</u> % <input type="checkbox"/> Infrastructure and built environment: <u>Enter number</u> % <input type="checkbox"/> Ecosystem and ecosystem services: <u>Enter number</u> %				
A.a.¹ Total investment (GCF + co-finance)	Amount: 45.748 million USD	A.a.1 Total GCF funding requested	Amount: 9.9 million USD		
A.b. Type of financial instrument requested for the GCF funding	<i>Mark all that apply.</i> <input checked="" type="checkbox"/> Grant <input checked="" type="checkbox"/> Loan ² <input type="checkbox"/> Equity <input type="checkbox"/> Guarantees <input type="checkbox"/> Others:				
A.7. Implementation period	5 years				
A.8. Total project/ programme lifespan	25 years (20-year concession, then infrastructure transferrable or extendable)	A.9. Expected date of internal approval	1/10/2020		
A.10. Executing Entity information	A special purpose project company named Participant Power Haiti 1, LLC (PPH1) will be incorporated in Delaware, US and will be the Executing Entity for the purposes of the project. PPH1 will be majority owned by EarthSpark International (the original project Sponsor and US non-profit organization) via Participant Power (PP) which is a holding company and EarthSpark International's majority-owned subsidiary also incorporated in Delaware. EarthSpark International, with field support from Enèji Pwòp, S.A (a Haitian social enterprise incorporated in Haiti – launched by EarthSpark International) will provide support and contributions to PPH1 through management/advisory services, contributed equity (2 operating microgrids from EarthSpark International), and other technical assistance and consulting as needed.				
A.11. Scalability and potential for transformation (Eligibility for SAP, max. 100 words)					
Project is highly scalable and builds on EarthSpark's 10 years of energy access work in Haiti. Taking EarthSpark's pioneering clean energy microgrid work from 2 to up to 24 grids using 100% renewable energy and 99% service availability will fundamentally alter the narrative of energy in Haiti. The supporting activities will ensure that economic opportunity and local capacity development accompany the grids.					



¹ These fields will be automatically calculated in the OSS system.
² Senior loans and subordinated loans.

A.12. Project/Programme rationale, objectives and approach (max. 300 words)

Solar-powered microgrids are the lowest-cost, most resilient, and most climate-friendly method of quickly delivering high-quality energy services to rural Haitian communities. The Project will launch up to 22 100% renewable energy grids and will operate up to 24 grids (incl. 2 existing solar-diesel hybrid grids) and will provide local business support, 'energy literacy' training, local energy governance capacity building, and an overarching gender inclusive approach.

The Project aims to build an additional 22 community-scale solar photovoltaic micro-grids in southern Haiti in communities where currently no grid power exists. The Project will provide affordable and reliable access to modern energy services in communities previously identified through extensive market scoping in this region of the country. Successful implementation of these 22 micro-grids will be the basis for the company and its local affiliates to expand to up to 80 towns and communities across Haiti. As one of the least electrified countries in the Western Hemisphere with only approximately 30% of the population with access to electricity (5-10% in rural areas), Haiti has an opportunity to leverage clean energy to quickly and sustainably address energy access. The Project offers an opportunity to highlight how solar energy, combined with storage, smart controls, and customer participation—from design to consumption—can deliver high-quality energy services quickly and affordably.

This Project leverages both private sector funding and Climate Investment Funds via the World Bank SREP Program for Haiti. GCF funding is essential for crowding in the necessary levels of project debt and equity. Consequently, GCF funding will enable the project to build on existing foundations and scale this innovative model to new levels not available under existing finance structures.

B. PROJECT/PROGRAMME DETAILS

B.1. Context and baseline (max. 500 words)

Haiti faces serious governance, capacity, and finance challenges for responding to climate change. Capacity is weak because of a lack of sensitization to climate change, inadequate technical knowledge, and meagre finances.³ Energy poverty is also acute in Haiti, with 70 percent of the population lacking access to electricity. In the absence of reliable electricity, economic growth is stifled and households must resort to costly fossil fuel and biomass-based lighting and cooking⁴ solutions (in the South, South East, Nippes, and Grand Anse regions that EarthSpark is focused on, average current expenses on these alternatives ranges from \$10.66 USD – \$20.78 USD per month (980 HTG – 1911 HTG), which not only contribute greenhouse gas emissions, but also present serious respiratory health threats (see Annex 14 – Tariff Justification for additional background on status quo energy cost comparisons). EarthSpark International is directly resolving this challenge with the introduction of Haiti’s first prepay smart micro-grid. In the town of Les Anglais, EarthSpark has been operating a small pilot grid since 2012 and in 2015 EarthSpark expanded service with an exemplary ‘town-size, solar, smart grid’ providing nearly 450 homes and businesses with 24-hour electricity (see Annex 21 for lessons learned applicable to this project). This decentralized approach to grid infrastructure development makes sense in Haiti where the central grid is crippled and >100 unconnected towns lack access to electricity.

Haiti is also the poorest country in the Western Hemisphere, with Gross Domestic Product (GDP) per capita of \$870 in 2018 and a Human Development Index ranking of 163 out of 188 countries in 2016.⁵ It is also one of the most climate vulnerable countries. Ranked 173 out of 181 surveyed countries for Climate Readiness under the ND-GAIN index - Haiti is the 27th most vulnerable country and the 6th least ready country.⁶ In total, the cost of inaction on climate change in Haiti amounts to an estimated 1.8 billion USD annually in 2025 and 3.6 billion in 2050.⁷ Higher frequency and intensity of extreme weather events such as cyclones and consequential flooding, is particularly concerning for Haiti as more than 93% of the country and more than 96% of the population are exposed to these natural disasters. The poorest Haitians, including low-income women, children, and elderly people, are especially vulnerable and the project area in the southern peninsula of Haiti is the most threatened and vulnerable area in the country.^{8,9} Without adaptation actions,

³ Oxfam, Climate Change Resilience: The Case of Haiti (2014), Available at: https://www-cdn.oxfam.org/s3fs-public/file_attachments/rr-climate-change-resilience-haiti-260314-en_2.pdf

⁴ While electrification of cooking to displace charcoal is not included as part of this Project, EarthSpark is preparing a pilot project that could lead to the adoption of electric appliances for cooking which would directly offset charcoal use. The climate and health impacts of such a switch would be notable, and this Project is laying the foundation for such work in the future if cooking pilot results prove promising.

⁵ World Bank Country Profile – Haiti (2018); Available at <https://www.worldbank.org/en/country/haiti/overview>

⁶ Notre Dame Global Adaptation Initiative – ND-GAIN Indicators (2017); Available at: <https://gain.nd.edu/our-work/country-index/rankings/>

⁷ UNDP, Estimation des coûts des impacts du changement climatique en Haiti (2015); Available at:

<https://www.undp.org/content/dam/haiti/docs/Protection%20de%20l%20environnement/UNDP-HT-ProEnv-EtuEconoCC.pdf>

⁸ World Bank Country Profile – Haiti (2018); Available at <https://www.worldbank.org/en/country/haiti/overview>

⁹ Oxfam, Climate Change Resilience: The Case of Haiti (2014), Available at: https://www-cdn.oxfam.org/s3fs-public/file_attachments/rr-climate-change-resilience-haiti-260314-en_2.pdf

climate change is likely to magnify the damaging effects of these hazards and to increase existing poverty conditions (See Annex 13 for extended Climate Baseline).¹⁰

The Government of Haiti has named rural electrification and renewable energy as a major priority and has announced a plan to work with the World Bank and others under the Scaling Renewable Energy Programs (SREP) goals. The Project's operations and business methods are cited 13 times in the World Bank's SREP justification for Haiti and will play a key role in enabling the successful implementation of clean energy for energy access. The Project is also in alignment with the goals in Haiti's Nationally Determined Contribution (NDC), namely, to reduce relative emissions 31% by 2030 as well as the goals of the Second National Communication on Climate Change which called for projects to expand renewable energy at the community and neighborhood levels.

The GCF project, "Scaling Smart, Solar, Energy Access Microgrids in Haiti" is looking to support national climate policy, and particularly the rural electrification strategic goals outlined by the Government of Haiti and SREP by developing solar microgrids in rural communities. These microgrids not only directly address the issue of energy poverty by providing clean affordable energy access to off-grid communities, but they also improve the adaptive potential and resiliency of rural communities by lowering energy expenditures and enabling new and improved livelihoods as a result of electrification. Microgrids can further provide a measure of resilience for communities by islanding electric service and critical operations like telecommunications and reducing recovery time following storm and natural disaster events.^{11 12 13} Additional information on climate baseline and barriers addressed by the project can be seen in Annex 13 – Climate Baseline and Annex 15 – Pre-Feasibility Study.

B.2. Project/Programme description (max. 1,000 words)

The succinct theory of change that drives this Project is that the provision of affordable, reliable, and clean electricity and accompanying activities through the deployment of solar microgrids in rural Haitian towns can directly support the expansion of renewable energy and reduction of GHG emissions compared to the status quo of energy alternatives like kerosene, diesel, and charcoal while also enabling people living in rural Haiti to access basic services and economic opportunities near where they live. The target beneficiaries of the Project are people living in rural Haiti who face a depressed local economy, food insecurity, and very high levels of poverty and unemployment. While people in these areas often have very little disposable income, they nevertheless pay extremely high prices for low-quality fuels like kerosene, candles, diesel, charcoal, and 3rd party battery charging services – approximately 50% of Haitian households are spending over \$20 US/month on such energy alternatives.¹⁴ Not only are these fuels inconvenient and expensive, they are often also bad for people's health and emit greenhouse gases that contribute to global climate change (see Annex 14 – Tariff Justification).

Further, establishing a foundation of clean, reliable, and affordable electricity can fundamentally change how communities in rural Haiti are able to plan for and respond to climate change by providing for local energy literacy training and business support; and enabling new technology, approaches, and resources for long-term adaptation. New enterprises and income, sustained power for critical services like health clinics, water purification, post-harvest processing for food security, and food distribution are all avenues enabled by microgrid electrification.^{15 16 17} Renewable energy-powered grids also offer local resilience in the face of frequent national fuel shortages for diesel and gas. In addition to these benefits, the project also adopts two other pathways for driving transformational change. The first is through gender empowerment and EarthSpark's "Feminist Electrification" platform which directly addresses the power dynamics and inequity of opportunities that persist as key underlying drivers for vulnerability to climate change. In particular this approach supports gender mainstreaming across all aspects of project operations and development. The second pathway is through advocacy for transformational shifts in policy that will change the way

¹⁰ Climate Investment Fund, SREP – Investment Plan for Haiti (2015) Available at:

http://ciat.gouv.ht/sites/default/files/docs/Plan%20Investissement%20SREP_Document%20Principal_30mars.pdf

¹¹ Siemens, "Resilient by Design: Enhanced Reliability and Resiliency for Puerto Rico's Electric Grid" (2018), Available at:

<https://microgridknowledge.com/white-paper/mini-grids/>

¹² NREL, Distributed Generation to Support Development-Focused Climate Action (2016); Available at:

<https://www.nrel.gov/docs/fy16osti/66597.pdf>

¹³ IRENA, Off-grid renewable energy solutions to expand electricity access: An opportunity not to be missed (2019); Available at:

https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Jan/IRENA_Off-grid_RE_Access_2019.pdf

¹⁴ Climate Investment Fund, SREP – Investment Plan for Haiti (2015) Available at:

http://ciat.gouv.ht/sites/default/files/docs/Plan%20Investissement%20SREP_Document%20Principal_30mars.pdf

¹⁵ Siemens, "Resilient by Design: Enhanced Reliability and Resiliency for Puerto Rico's Electric Grid" (2018), Available at:

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¹⁶ NREL, Distributed Generation to Support Development-Focused Climate Action (2016); Available at:

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¹⁷ IRENA, Off-grid renewable energy solutions to expand electricity access: An opportunity not to be missed (2019); Available at:

https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Jan/IRENA_Off-grid_RE_Access_2019.pdf

the country approaches the issues of electrification and community climate resiliency (Additional discussion of status quo, barriers and theory of change in Annex 15 – Pre-Feasibility Study).

The Project is composed of two primary interconnected components driving the development and deployment of solar microgrids and their supporting activities as detailed below.

Component 1: Construction and operation of clean energy microgrids

The **primary component** of the Project is the construction and operation of clean energy microgrids in rural towns in Haiti that have been pre-selected as viable candidate towns for microgrids (see Annex 15 – Pre-Feasibility Study and Annex 19 – Sub-Project Selection). The objective is to empower rural households and businesses to spend less on energy while accessing higher quality, healthier, more convenient energy, and improving resiliency to climate change. The primary outputs for this component are the design and construction of up to 22 100% clean energy microgrids (operation of up to 24 grids) and expanded capacity of local technicians and grid operations staff to support the reliable delivery of electricity service to rural communities including through the development of a customer SMS system for bulk communications and outreach. All of the microgrids will be supported by a rigorous pre-development process that includes surveying to identify community energy needs and priorities and tailoring design and operations to meet those needs, particularly as it relates to the differentiated needs of women and men in energy access (See Annex 4 – Gender, Annex 15 – Pre Feasibility Study and Annex 20 – Stakeholder Engagement). Further, this component supports expanded opportunities for employment in local communities, especially for women in technical and leadership roles as the project deliberately supports expanded recruitment both for internal Enèji Pwòp operations, as well as for partner contracting. The component is supported by the following subcomponents, outputs and activities:

Subcomponent 1.1: Development, construction, and commissioning of up to twenty-two (22) solar photovoltaic microgrid power plants as well as initial O&M

- **Output 1.1.1: Launch of commercial operations of up to 22 100% clean energy microgrids**
 - Activity 1.1.1.1 Pre-development and design of 100% clean energy microgrids including specification and publication of competitive RFP
 - Activity 1.1.1.2 Acquisition of contributed assets
 - Activity 1.1.1.3 Procurement and installation of technical components for generation (PV modules, balance of systems, batteries, etc.) and initial O&M.
 - Activity 1.1.1.4 Procurement and installation of technical components for distribution (Wiring, meters, transformers, home installations, etc.) and initial O&M.
 - Activity 1.1.1.5 Customer registration and interconnection for new customers in microgrid locations
 - Activity 1.1.1.6 Establish bulk SMS system for customer alerts and communication on issues like bill and electricity use management, operations and maintenance, energy literacy/tips, and safety

Subcomponent 1.2: Operation and maintenance of commissioned microgrids

- **Output 1.2.1: Ongoing operations of microgrids**
 - Activity 1.2.1.1: Maintain 99% service availability for all microgrid customers through reliable operation and maintenance of microgrid components.

Subcomponent 1.3: Capacity building of Enèji Pwòp employees to scale grid management and operations for solar microgrids

- **Output 1.3.1: Enhanced capacity of Enèji Pwòp team to manage local microgrid operations and support expanded project portfolio**
 - Activity 1.3.1.1 Hire and train new Enèji Pwòp employees to scale grid management and operations in local communities

Component 2: Technical assistance to build capacity for microgrid deployment and operation.

Component 2 is composed of three sub-components as detailed below.

Sub-component 2.1: Build energy literacy and opportunity in microgrid-powered communities through public consultations, meetings, and trainings and the establishment of Energy Committees in target communities

The first subcomponent of the technical assistance component is building local 'energy literacy' in microgrid towns. The objective is to empower rural households and businesses to safely use electricity, to wisely consume electricity, and to

competently engage in local governance discussions about clean energy. This includes tailored energy literacy, engagement, and public outreach centered around the needs and priorities established as part of the pre-development surveys, as well as the establishment of Energy Committees (with equal representation of women and men) in the local towns to improve local-governance/buy-in and improve energy literacy and outreach outcomes (see Annex 20 for additional information on Stakeholder Engagement). The success of this subcomponent directly supports the success of the primary component by ensuring that community members are safe and well-informed about the operations of the microgrid. This will, in turn, strengthen ongoing local support. The key outputs and activities supporting this subcomponent include:

- **Output 2.1.1: 22 Energy Committees established - one in each of the new microgrid communities**
 - Activity 2.1.1.1: Identify 10 community members in each microgrid community to serve as representatives in the community Energy Committee for the first year of existence of the committee.
 - Activity 2.1.1.2: Refine and implement bylaws, code of conduct, implementation procedures for fair elections of members and operating procedures for the Energy Committees
 - Activity 2.1.1.3: Conduct capacity building trainings for Energy Committee members on energy governance, and the basics of energy literacy including home and business energy economics, basic safety, the value of efficiency, and how time-of-use pricing works.
 - Activity 2.1.1.4: Develop and equip Energy Committee members with broader curricula and training materials for community outreach
- **Output 2.1.2: Build the capacity of microgrid customers to understand basic energy literacy including economics, end uses, technology/applications and safety**
 - Activity 2.1.2.1: Conduct public meetings and trainings for community stakeholders on best practices for the use of electricity, safety, economics, and new technology
 - Activity 2.1.2.2: Develop and implement a school curriculum for children to teach them about basics of electricity, renewable energies and safety.

Sub-component 2.2: Launch productive uses of energy for small/medium enterprises in microgrid-powered communities

The second subcomponent of the technical assistance is supporting local businesses with the selection and trial of electric-powered equipment, best practice trainings, and value chain linkages to increase profitability. This subcomponent will particularly focus on supporting women-led SMEs by increasing training and capacity building, developing pathways for improving profits, and expanding opportunities for access to finance through microloans for development and expansion of Productive Use of Energy (PUE) applications. The inputs for this subcomponent are information about and funding for high-quality equipment, a business engagement methodology, and follow-on financing for local business' adoption of successfully piloted equipment. An additional input to this subcomponent is knowledge of and successful engagement with adjacent value chain actors. These Productive Use of Energy (PUE) applications¹⁸ will provide a key avenue for improving community and enterprise resiliency to climate change by supporting adaptive income streams and food security outcomes over time. Key outputs and activities for this subcomponent include:

- **Output 2.2.1: Support local businesses with new technologies and practices enabled by electricity to support income generation, diversification, and profitability**
 - Activity 2.2.1.1: Conduct stakeholder consultations in each town to identify opportunities for electrification and productive uses of energy for SMEs
 - Activity 2.2.1.2: Conduct targeted trials, trainings and demonstrations for SMEs on electrically-powered income-generating activities and new technology
 - Activity 2.2.1.3: Extend micro-loans to SMEs to enable uptake of new electric technology

Sub-component 2.3: Enabling environment for rural microgrid development and “Feminist Electrification”

The third subcomponent is developing an enabling environment for rural microgrid development and “Feminist Electrification” advocacy at the national and international levels including lessons learned and best practices for conducive policies for rural microgrid development and operation, such as appropriate subsidies, tax incentives, concession terms, technical standards, and tariff requirements.

¹⁸ Financing for PUE equipment will be external based on relatively short-term debt. The debt will be revolving with most having less than a 4-year term, and discussions have been held with socially-motivated private debt providers. The facility shall likely make \$800K-\$1m available for this purpose (NB: not included in core budget).

EarthSpark's 'feminist electrification' meaningfully engages women to help ensure that the arrival of electricity in a town is truly unlocking opportunities for all. Specifically, the approach integrates a gender-lens specifically into 5 key pillars of microgrid development – infrastructure planning, training and employment, SME promotion, domestic energy use, and community resource availability (see Annex 4 for additional information on the Feminist Electrification Approach and Project Specific Gender Action Plan). Key efforts for this subcomponent under this approach include collecting gender disaggregated survey data to better understand key priorities and needs for women with respect to energy and utilizing this data to better tailor microgrid design and operations; ensuring effective representation of women in Energy Committees (see above) and Enèji Pwòp leadership and staffing (including the staffing of partners, particularly the EPC), creating new opportunities for women-led SMEs, and providing for general social benefits like improved work and leisure hours and safety through access to electric lighting for homes and for communities.

Upon the end of implementation of the first phase of the Project and commissioning of initial 10 microgrids, the Executing Entity will present to GCF a detailed report on affordability and willingness to pay prepared on the basis of collected data and applicable established methodologies utilized in similar projects. The report will outline quantifiable metrics and key findings, as well as, specific undertakings that will be made by the Executing Entity for the purpose of implementing these findings in the subsequent microgrids for the purpose of improvement of the affordability of the renewable electricity for the poorest customers and overall effectiveness of the Project.

Therefore, the objective of the third subcomponent is twofold: 1) to support the establishment of a stable and enabling environment for private sector engagement in rural electrification in Haiti to enable future investments in the sector and 2) further provide a pathway for the advancement of women through electrification and energy access. Key outputs and activities for this subcomponent include:

- **Output 2.3.1: Advocacy at the national level for conducive policies for rural microgrid development and operation, such as appropriate subsidies, tax incentives, concession terms, technical standards, and tariff requirements, as well as an elevation of the national dialogue for Feminist Electrification (see Annex 4)**
 - Activity 2.3.1.1: Development of willingness to pay report, lessons learned documents and recommendations from microgrid operations and development to support advocacy
 - Activity 2.3.1.2: Outreach to other microgrid developers, the energy regulator, and other Haiti ministries and officials to facilitate knowledge transfer from lessons learned
 - Activity 2.3.1.3: Publications of lessons learned in international media to contribute to global evolution of best practices for renewable energy-powered energy access programs in other geographies, focusing on SIDS and LDCs.

It should be noted that EarthSpark has been working on elements of each of these components in Haiti for 10 years and has developed key lessons learned for project design and operations including (see Annex 21 for detailed Lessons Learned):

- **Need for batteries and smart meters** – Integrating battery storage and smart meters into the design of microgrid operations provides for greater efficiency and an improved ability for microgrids to provide reliable service especially in the midst of supply disruptions like fuel shortages and natural disasters – both of which are quite common in Haiti.
- **Distribution voltage and losses** – Tracking distribution voltage and electricity losses and proactively working to improve grid efficiency on the distribution side is critical to support long term financial and technical stability
- **Collaboration with EPCs** – A focused measure of communication and expectation setting, as well as developing a shared mission, are critical for ensuring effective collaboration with EPCs during the installation process.
- **Metering, monitoring and billing** – Leveraging smart meters to address issues of unreliability, loss exposure, and inaccessibility in a low-bandwidth environment has been critical for financial viability and customer operations.
- **Managing theft** – Community engagement, particularly leadership from Energy Committees, coupled with technical solutions like installing effective monitoring through totalizers, are critical for addressing the issue of electricity theft which hampers both microgrid financial viability and equity of service for the community.
- **Natural disasters** – Stemming from direct experience with Hurricane Matthew in 2016, EarthSpark has highlighted the need to deliberately plan and consider flood and disaster vulnerability when siting grid infrastructure, particularly on the customer side of the meter as a resilient energy system is really only as resilient as the customers and businesses it serves. To this end, it is also necessary to develop and disseminate information on disaster preparedness as a general course of engagement with customers. Further, especially

for critical loads, it is necessary to site them close to generation sites and provide for spare parts for responsive repair. Additionally, providing contingency funding and insurance for supporting repairs is important for aiding recovery efforts.

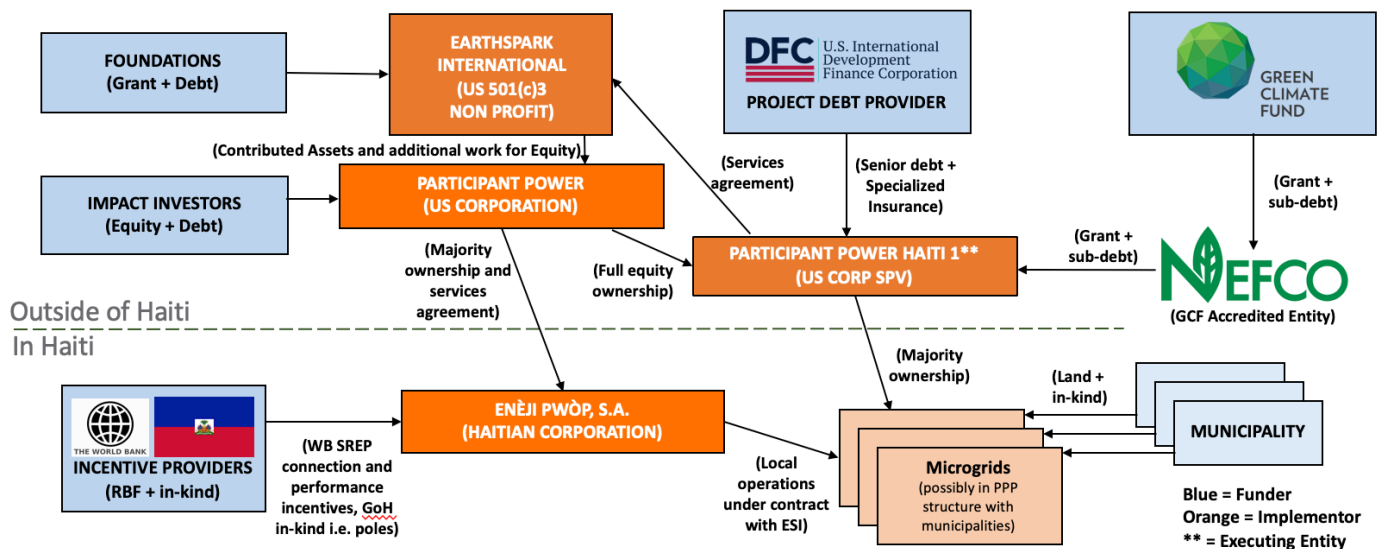
- **Political uncertainty** – Proactive and sustained collaboration with the regulatory and policy environment is really the only approach towards managing the significant uncertainty that it imposes on the operational and investment environment.
- **Feminist electrification** – Applying a gender lens to all aspects of microgrid development and operations is not only possible, it also strengthens the projects by opening opportunities, deepening community engagement, improving the labor force, stimulating demand, and broadening local stakeholder governance.

Additional details on project activities and outputs can be found in the logframe in Annex 2a and project timeline in Annex 2b, climate justification for the components and activities can be found in Annex 13, and additional information on the “Feminist Electrification” approach and project specific gender action plan can be seen in Annex 4.

B.3. Implementation / institutional arrangements (max. 750 words)

The overall project/programme implementation structure and governance structure is presented in the diagrams below:

Entity Relationships



As a shortlisted concept note for the Mobilizing Funds for Scale RFP, this Project has secured the Nordic Environment Investment Corporation (NEFCO) as the accredited entity and a special purpose project company named Participant Power Haiti 1, LLC (PPH1) will be incorporated in Delaware, US to serve as the Executing Entity for the purposes of the project. PPH1 will be majority owned by EarthSpark International (the original project Sponsor and US non-profit organization) via Participant Power (PP) which is a holding company and EarthSpark International’s fully owned subsidiary also incorporated in Delaware. Both EarthSpark International and Enèji Pwòp, S.A (a Haitian social enterprise incorporated in Haiti – second spin off from EarthSpark International) will provide support and contributions to PPH1 through management/advisory services, contributed equity (2 operating microgrids from EarthSpark International), and other technical assistance and consulting as needed. For the implementation of the Project, a consortium formed by Enèji Pwòp and PPH1 will bid for the development of the Microgrids under the Government RFPs.¹⁹ PPH1 will directly contract all works and services for the implementation of the Project and will directly own all project microgrids. Annex 17 offers additional entity relationship diagrams.

Because it will be benefitting from several Haitian authorities and international funders, each with their own guidelines and safeguards, the Project will be heavily guided by existing protocols and vigorously overseen by multiple actors. The World Bank, the Haitian Ministry of Public Works and the Haitian Energy regulator (ANARSE) shall oversee allowable costs and tariffs; the World Bank and the Haitian Ministry of the Environment shall oversee environmental

¹⁹ Flexibility has been established in the term sheet to target up to two grids outside of the RFP process should that RFP process be delayed.

and social impact planning and management. The Haitian Ministry of Finance oversees the public-private partnership establishment and governance protocols for the potential PPPs between PPH1, Enèji Pwòp, and the municipalities (in case of PPPs creation). Ultimately NEFCO, as the Accredited Entity, will have overall responsibility and oversight for the project including project preparation and implementation, financial management and procurement.

The Nordic Environment Finance Corporation (NEFCO) is the GCF accredited entity for this Project and will manage all GCF funds, oversee implementation of the investment programme and undertake reporting to GCF. NEFCO is a green bank / DFI established in 1991 by the five Nordic governments, with a focus on green growth and climate impact, with a global mandate; small & medium sized projects and the private sector. NEFCO has **over 25 years of financing renewable energy** (solar, biomass, wind) and energy efficiency projects globally, through provision of early stage capital, junior and senior debt, equity, grants, carbon finance and results-based finance. Of particular relevance to this proposal is the Beyond the Grid Fund for Africa, managed on behalf of Sweden, which focuses on rural, off grid energy access through solar investments, including mini-grids and solar home systems.

NEFCO has undertaken a detailed Integrity and Due Diligence exercise on the project and ESI. The assessment finds that this is a medium risk assignment taking into account the lack of any credit risk to NEFCO, aspects of the counterparty capacity and financial standing, and the nature of planned activities and the organisational structure, with some findings requiring further work. As part of its due diligence, NEFCO conducted a successful Financial Management Capacity Assessment on EarthSpark and Enèji Pwòp and Internal investment committee and management approvals to proceed have been secured. An additional third party legal due diligence was conducted by a Haitian legal firm which further validated NEFCO's assessment. (See Annex 9).

NEFCO will be responsible for oversight of the implementation, supporting EarthSpark and ensuring that ESG and other safeguards in particular NEFCO policies and guidelines on environment, gender, procurement and anti-corruption are adhered to. The project will be overseen by the Trust Funds and Climate division of NEFCO, which will apply its standard procedures for monitoring and oversight. In addition to financial administration, NEFCO has in-house technical specialists, engineers and an environmental unit. NEFCO's technical expertise and fiduciary capacity have been judged compliant with international standards for example EU's stringent requirements for delegated funds (where it has passed all 7 Pillars) and accreditation by GCF. If approved, GCF's funding amount will be transferred to NEFCO as Accredited Entity (AE) as governed by the Term Sheet (Annex 6) and the Funded Activity Agreement (FAA). It is envisioned that NEFCO will on-grant and on-lend GCF Funding to PPH1 as per an agreed schedule against milestones executed via appropriate financing agreements (see Annex 6). As AE, NEFCO will provide monitoring / progress reports to the GCF in accordance with the AMA, Term Sheet and FAA. Further, NEFCO as AE confirms that it has in-house gender expertise and supporting and monitoring capacity. Ms Heli Sinkko is the gender specialist within NEFCO who will be supporting the implementation of the gender action plan.

The core tenet of the Project is **“moving microgrids towards market”** in Haiti with diverse, specialized partners and **blended finance for energy access**. The World Bank and the Government of Haiti, the US International Development Finance Corporation (IDFC, formerly OPIC) and/or other senior lenders, social impact investors, and local Haitian municipalities will each play important roles in the Project.

- World Bank SREP funds and in-kind support from the Government of Haiti contribute to project costs in a **grant-equivalent** form. Concessions and regulatory clarity from the government significantly de-risk the project. Funding from the World Bank and other DFIs and in-kind support from GoH buy down the total project cost. Status: Pending upcoming RFP (expected April 2020). The results of the RFP shall not be announced before planned GCF approval, however results-based financing from the RFP program shall make up a key element of the planned co-financing requirements. Timeline for this is out of the control of the project, but listed here for awareness
- International Development Finance Corporation (IDFC, formerly OPIC) and/or other similarly concessionary IFIs shall provide project **debt and specialized insurance**. IDFC debt and political risk insurance add more critical pieces to the project finance package. Status: Letter of intent secured from IDFC; Live conversations with other IFIs interested in joining.
- Impact investors will provide **equity** to ensure that the two small grids to complete Phase 2 are completed, to cover project development costs, and to enable project launch before final disbursements are secured from the larger institutional funders. Status: LOIs secured from two US-based foundations

EarthSpark International is a non-profit that builds business models to solve energy poverty. We focus on what can work in Haiti while building best practices relevant to other SIDS and LDCs. EarthSpark has been working on energy access in rural Haiti since 2009:

- 2009-12: Built network of 100 independent retailers for small-scale solar + cookstoves
- 2015: Established microgrid energy data for Haiti through national microgrid market study
- 2012: Launched Haiti’s first pre-pay microgrid in 2012, expanded to a town-sized solar smart grid for ~2000 people in 2015.
- 2019: EarthSpark’s second grid launched, and two smaller grids are in pre-development.

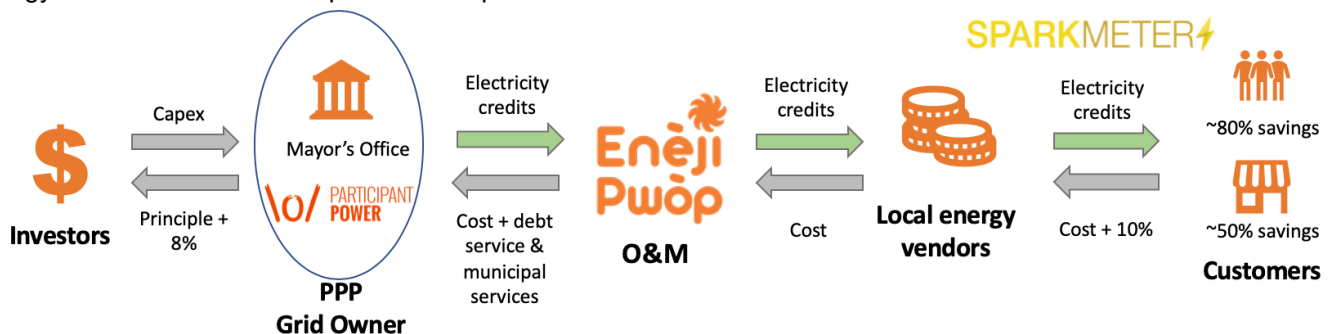
So far, EarthSpark has incubated and spun off 3 companies, each of which will play a key role in the Project:

- **Enèji Pwòp** (“Clean Energy” in Haitian Creole) is a Haitian microgrid operations company. Enèji Pwòp is a pre-qualified microgrid supplier eligible for upcoming rounds of the World Bank + GoH request for proposals for private sector microgrid development.
- **SparkMeter** provides microgrid operators with smart metering and billing services. SparkMeter, developed initially for EarthSpark’s microgrid work in Haiti, is now the leading global supplier of smart metering services for energy access microgrid operators around the world. SparkMeter now serves over 40 microgrid operators in 25 countries.
- **Participant Power** is the project development company that can leverage blended finance to build microgrids. The Executing Entity (PPH1) will be majority owned by EarthSpark via Participant Power and Participant Power will be the vehicle by which EarthSpark will contribute equity to PPH1.

After 10 years of “proving what is possible” and “de-risking by doing”, **EarthSpark is “moving microgrids towards market” in Haiti.** Enèji Pwòp shall secure 20-year operating concessions from the Government of Haiti (Ministry of Public Works and Electricity Regulator) and will work to form public-private partnerships with the individual municipalities where the microgrids will be located. Forming these PPPs will increase **local ownership and oversight at the community level.** NEFCO as AE will retain full responsibility for any delegated authority over financial management and /or procurement and will ensure that any entity relevant to the project will comply with international accounting standards.

Enèji Pwòp also sets up local “Energy Committees” in each town where it develops a microgrid. With local representatives elected to the EC, the EC serves as the most grassroots interface between the community and Enèji Pwòp (See Annex 15 Pre-Feasibility Study for the full community and stakeholder engagement plan and consultations). EarthSpark has already worked with Haitian scholars, lawyers, and government officials to draft these PPP documents, but they need to be finalized with the actual launch of the first microgrid PPP. Though PPPs remain the preferred path, PPP formation is not necessarily required for grid launch as long as a GoH concession has been secured. Broader regulatory clarification in the sector with input from the World Bank’s current policy work with the GoH will also be undertaken.

At the local operations level, EarthSpark has developed operations with Enèji Pwòp, SparkMeter, and local independent energy vendors based on its operational experience in Haiti to-date.



EarthSpark’s pioneering work on microgrids in Haiti has led to the launch of Haiti’s first pre-pay microgrid in 2015, expanded to Haiti’s first ‘town-sized solar-powered smart grid’ in 2015. EarthSpark’s second grid in the town of Tiburon was launched in 2019. Beyond these two grids, EarthSpark’s work has been foundational to local, national, and international perceptions of what is possible in Haiti. With its 2015 national microgrid market study, EarthSpark and its Haitian partner Enèji Pwòp made the case that over 80 towns across Haiti would be good candidates for energy access microgrids. EarthSpark’s work was cited 13 times in the World Bank’s Scaling Renewable Energy

Projects (SREP) [justification document for Haiti](#). EarthSpark's Les Anglais grid is widely viewed as the standard bearer for clean energy microgrid service provision in Haiti.

C. FINANCING INFORMATION						
C.1. Total financing						
(a) Requested GCF funding (i + ii + iii + iv + v + vi)		9.9		million USD (\$)		
GCF Financial Instrument		Amount	Currency	Tenor	Pricing	
(i)	Senior loans	Enter amount	Options	Enter years	Enter %	
(ii)	Subordinated loans	8.4	million USD (\$)	<u>20</u> years	<u>2</u> %	
(iii)	Equity	Enter amount	Options		Enter % equity return	
(iv)	Guarantees	Enter amount	Options	Enter years	Enter %	
(v)	Reimbursable grants	Enter amount	Options			
(vi)	Grants	1.5	million USD (\$)			
(b) Co-financing information²⁰		Total amount		Currency		
		35.848		million USD (\$)		
Name of institution	Financial instrument	Amount	Currency	Tenor	Pricing	Seniority
International Development Finance Corporation (Formerly OPIC)	Senior Loans	23.579	million USD (\$)	<u>12</u> years	<u>7</u> %	<u>senior</u>
World Bank SREP / Government of Haiti	<u>Grant</u>	7.967	million USD (\$)	Enter years	Enter%	Options
Contributed Assets from EarthSpark International	<u>Equity</u>	3.000	million USD (\$)	years	Enter%	
Dunn Family Charitable Foundation + Other Impact Investors	<u>Equity</u>	1.302	million USD (\$)	Enter years	Enter%	Options
(c) Total investment (c) = (a)+(b)		Amount		Currency		
		45.748		million USD (\$)		
(d) Co-financing ratio (d) = (b)/(a)		3.62				
(e) Other financing arrangements for the project/programme (max ½ page)		<p>As written earlier, the municipalities may contribute land and rights of way along with some legal enforcement services. In some cases, the municipalities and/or the Government of Haiti will contribute distribution assets (existing poles and wires) and we expect tax benefits both from the PPP status of the individual grid operators and by virtue of a favorable sector status from the national government (tax benefits are yet to be confirmed.)</p> <p>Specific to assets developed by the project, majority ownership of all assets rests with Participant Power Haiti 1. Nominal ownership from municipalities is envisioned for the life of the project to ensure that decision making power and asset ownership rests with PPH1 throughout the life of the project finance term. Concession will offer the option of 5-year extensions beyond the initial 20-year term, and PPPs will be structured with this flexibility as well.</p>				

²⁰ If the co-financing is provided in different currency other than the GCF requested, please provide detailed financing information and a converted figure in the GCF requested currency in the comment box. Please refer to the date when the currency conversion was performed and the reference source.

C.2. Financing by component

Component financing presented below, but additional details can be seen in Annex 10 - Financial Model, Annex 8 – Procurement Model, and Annex 3 – Budget Plan. All numbers are indicative based on best-assumption modelling.

Component	Output	Indicative cost (USD)	GCF financing		Co-financing			
			Amount	Financial Instrument	Type	Amount	Financial Instrument	Name of Institutions
			(USD)			(USD)		
Subcomponent 1.1: Development, construction, and commissioning of up to twenty-two (22) solar photovoltaic microgrid power plants as well as initial O&M	Output 1.1.1: Launch of commercial operations of up to 22 100% clean energy microgrids	40,639,019	0	Grants	Private	23,578,672	Senior Debt	OPIC and/or other institutional senior loan providers
			0		Public	4,469,000	RBF Grant	World Bank/GoH SREP Results-based Financing Grant
			0		Private	1,191,348	Equity	Dunn Family Charitable Foundation + Other Impact Investors
			8,400,000	Sub-Debt	Private	3,000,000	Equity	EarthSpark Contributed Assets
Subcomponent 1.2: Operation and maintenance of commissioned microgrids	Output 1.2.1: Ongoing operations of microgrids	52,122	0	Grants	Private	52,122	Equity	Dunn Family Charitable Foundation + Other Impact Investors
Subcomponent 1.3: Capacity building of Enèji Pwòp employees to scale grid management and operations for solar microgrids	Output 1.3.1: Enhanced capacity of Enèji Pwòp team to manage local microgrid operations and support expanded project portfolio	268,823	0	Grants	Public	218,823	RBF Grant	World Bank/GoH SREP Results-based Financing Grant
			0	Sub-Debt	Private	50,000	Equity	Dunn Family Charitable Foundation + Other Impact Investors
Subcomponent 2.1: Build energy literacy and opportunity in microgrid-powered communities through public consultation	Output 2.1.1: Up to 22 Energy Committees established and supported - one in each of the	232,874	232,874	Grants	N/A	N/A	N/A	N/A

<p>s, meetings, and trainings and the establishment of Energy Committees in target communities</p>	<p>new microgrid communities</p>							
<p>Sub-component 2.2: Launch productive uses of energy for small/medium enterprises in microgrid-powered communities through business advisory, access to and awareness of new technologies, and connection to market linkages</p>	<p>Output 2.2.1: Support local businesses with new technologies and practices enabled by electricity to support income generation, diversification, and profitability</p>	<p>316,001</p>	<p>316,001</p>	<p>Grants</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>
<p>Sub-component 2.3: Enabling environment for rural microgrid development and “Feminist Electrification” through advocacy at the national level for conducive policies for rural</p>	<p>Output 2.3.1: Advocacy at the national level for conducive policies for rural microgrid development and operation, such as appropriate subsidies,</p>	<p>368,036</p>	<p>359,006</p>	<p>Grants</p>	<p>Private</p>	<p>9030</p>	<p>Equity</p>	<p>Dunn Family Charitable Foundation + Other Impact Investors</p>

microgrid development and operation	tax incentives, concession terms, technical standards, and tariff requirements, as well as an elevation of the national dialogue for Feminist Electrification (see Annex 4)							
Financing costs ²¹	3,279,439			Public	3,279,439	Financing Costs	World Bank/GoH SREP Results-based Financing Grant	
Indicative total cost (USD)	45,748,434	9,900,000		35,848,434				

C.2.1 Financing structure (if applicable, mandatory for private sector proposal (max.300 words))

For private sector proposals, provide an overview (diagram) of the proposed financing structure. Please note that this section should focus on describing what is being paid for, either by GCF funding and/or co-financing.

The bulk of the GCF contribution will be provided through a \$8.4M subordinated loan from NEFCO (junior to the senior debt providers, hence sub-debt) at the 2% interest rate agreed in the Mobilising Funds at Scale RFP and Term Sheet (Annex 6). In addition, a grant component is requested (\$1.5m) to partially fund project launch and supporting activities including a willingness to pay and affordability study following the first 10 grids. Referencing the GCF RFP, grant funding is justified²² by the small size of the project, the large demonstration value of 100% clean energy high-reliability energy access grids without lead-acid batteries in a combined SIDS and LDC context.

NEFCO's administration costs will be covered by separate funds, additional to the Project. See Annex 17 and B.3 for Implementation Arrangements and Financing Structure Diagrams. See Annex 18 and Annex 6 for proposed AE fees.

C.3 Capacity Building and Technology development/transfer

If the project/programme is envisaged to support capacity building and technology development/transfer, please specify the total requested GCF amount for these activities respectively in this section.

C.3.1 Capacity building Amount: 894,200 USD (Total All Finance Sources) 731,444 USD (GCF)

C.3.2. Technology development Amount: 535,236USD (Total All Finance Sources) 106,067 USD (GCF)

C.4. Justification for GCF funding request (max. 500 words)

GCF is considered the most appropriate donor for the proposed project in Haiti given the macroeconomic situation and poorly developed capital and banking sectors in the country. Haiti has a very poor investment climate (none of the major credit rating agencies accord it a country rating and the country is ranked 182 out of 190 countries in the World Bank's

²¹ Financing costs include Senior Debt closing costs and fees, senior debt interest during construction, debt service reserve (6 mo int), and transaction costs.

²² Section 2.1.8 of the Mobilising Funds for Scale RfP stipulates the conditions under which grants in excess of 5% of total GCF funding are warranted.

Doing Business Report). The EIU reports that one of the major tasks facing the government is to address a culture of rampant corruption and illegal tax evasion, which has been a longstanding impediment to fiscal responsibility and to economic growth.

The Project faces severe challenges to access finance (public and private) including high prevailing interest rates, short loan tenors and a high level of perceived risk from the commercial banking sector. The Haitian banking sector consists of nine commercial banks under the supervision of the Banque de la République d'Haïti (BRH), Haiti's central bank. Renewable energy projects, and mini-grids in particular, face a number of barriers in accessing debt finance. These include a lack of understanding from commercial banks of business models and cashflows in the mini-grid sector and how to evaluate loan applications from this sector, as well as high collateral requirements and interest rates in Haiti which are comparatively high. Firstly, the Haitian central bank has been making use of a contractionary monetary policy, in particular through higher interest rates. Between 2011 and 2016, the Central Bank's interest rate on reserves in gourdes increased from 29 to 44 percent and the rate on reserves in dollars increased from 34 to 48 percent. This policy has resulted in an increase in commercial banks' interest rates. Further, commercial banks have access to a decreasing amount of liquidity to make loans, resulting in a higher cost of loans and thus higher interest rates on loans.

Notwithstanding the difficult financing environment in Haiti, the project attempts to apply a least concessional approach whereby it seeks to provide the least concessional funding that makes the Project viable. GCF funding as concessionary sub-debt will play a catalytic role in crowding in not just development finance debt, but also attracting additional investors (both equity and debt) for this Project and future expansion of micro-grids to more communities in Haiti by building a business case for other financiers to enter the sector. Given the barriers to private sector investment in the microgrid sector in Haiti, GCF's projected engagement and level of concessionality critical to enable other funders (debt and equity) to participate in the Project to make it possible.

Finally, the demonstration value of delivering 100% renewable energy with at least 99% reliability along with the elimination of lead acid batteries and the implementation of a materials reclamation plan, along with the local business development and other supporting activities offers an extremely important replication and scale-up model for Haiti and other SIDS and LDC nations.

Additional barrier details and country background found in Annex 15 – Pre-Feasibility Study.

C.5. Exit strategy and sustainability (max. 300 words)

Post project sustainability is a key feature of this Project. EarthSpark's "enterprise ecosystem" and local engagement ensure the long-term viability of the Project. As a non-profit that builds business models to solve energy poverty, EarthSpark has so far incubated and spun off 3 companies, each of which will play a key role in the Project as previously described. PPH1 is a long-term investment in Haiti, which will focus on the operation and maintenance of the activities during implementation and in the post-implementation phase. It will be responsible for key infrastructure, own and maintain assets and honour contractual arrangements. It is expected that at the end of the 20-year term Participant Power Haiti-1 will either renew the concessions or will fully transfer ownership to the municipality which will have by then been participating in the local engagement by the utility for 20 years.

In terms of financial sustainability and barriers to investment, perceived country risk and the lack of clarity around the legal and regulatory framework have been the two principal barriers to investment, along with the overall high costs of delivering electricity in remote Haiti (see Annex 15 – Pre-Feasibility study for barriers discussion).

Tariff setting is an open regulatory question, but the regulator has committed to approving cost-recovery tariffs. The ability to adjust tariffs according to the Haitian Gourde's inflation is essential to this Project, and the government has indicated that this will be possible. As evidence, the RFP issued in 2018 for microgrids in Haiti by the World Bank and GoH RFP outlines that the microgrid operator may request tariff modifications under a variety of circumstances and explicitly outlines four circumstances due to external factors:

1. the general index of price developments in Haiti, determined by the Ministry of Economy and Finance,
2. a change in the currency exchange rate if the concessionaire indexes its tariff to a foreign currency, using exchange rates determined by the Central Bank of Haiti,
3. an increase in the price of fuel if the mini grid generation relies on said fuel, using fuel prices published by Ministry of Economy and Finance and/or Ministry of Commerce and Industry,

4. a change in the tax code as published by the appropriate government entity²³

In order to ensure community participation and training to ensure a sustained upkeep of facilities, EarthSpark has an extensive community engagement methodology including the creation of a local Energy Committee and also local operations through a local grid operator, Enèji Pwòp (see Annex 20 for additional details on Stakeholder Engagement). The Project has been structured to include reserve funds for equipment replacement, and tariffs and funding levels have been set in the financial model to ensure income covers both financial and operational costs.

To avoid electricity theft, the Project takes both a technical and a community-engagement approach which complement each other. On the technical side, EarthSpark developed a smart metering technology, now spun-out into a separate company, [SparkMeter](#), that can monitor line losses through “totalizer” meters. SparkMeter issues weekly loss reports and sends alerts if any metric changes in a way that would indicate likely theft so that any unexplained losses may be investigated immediately. EarthSpark has chosen to invest in a relatively high number of totalizers per grid so that suspected theft can be localized to a small section of the distribution system.

On the community-engagement side, EarthSpark works closely with the Energy Committees and the municipalities to ensure that any electricity theft is negatively regarded within the community and that legal processes are effective and swift if theft is uncovered.

The selection of PV as the generation technology for the Project follows from EarthSpark’s experience and wider microgrid sector norms. Haiti has an excellent solar resource that is generally consistent on a daily basis with some seasonality. PV is thus well-adapted to solar+storage configurations with daily charging. With no moving parts, PV is also a good choice to minimize maintenance costs. The scalability of PV is also appealing for this Project because the microgrids will have the ability to grow with future demand if needed.

In terms of financial exit for GCF, the sub-debt is structured to repay principle plus modest interest over the 20-year concession. This will be through the repayment of the subordinated loan extended by NEFCO using GCF funds.

C.6. Financial management/procurement (max. 300 words)

All projects to be financed by or through NEFCO need to be able to demonstrate that they will benefit the environment/climate in a cost-effective way. To ensure that these benefits will in fact materialize, financing is released in tranches against monitored milestone results and environmental/climate outcomes are monitored annually for as long as NEFCO is financially involved. This approach effectively mitigates the risk of corruption and increases the requirements for borrowers’/beneficiaries’ capacity building, transparency and accountability. It also ensures improved predictability and long-term sustainability of the project. The normal starting point in NEFCO’s Agreements for delegated and entrusted funds, is that NEFCO undertakes to manage donor funding and assist in the implementation of projects financed through donor funds with the same care as NEFCO handles its own funds and assists in the implementation of projects financed by NEFCO’s own capital. The relevant policies and guidelines which guide NEFCO’s work, and will be followed by ESI (with oversight from NEFCO) are listed below²⁴:

- NEFCO Sustainability Policy
- NEFCO Environmental and Sustainability Guidelines
- NEFCO Risk Policy
- NEFCO Risk Management Guidelines
- NEFCO Procurement Guidelines
- NEFCO Resolution of the Board of Directors on Fighting Corruption
- NEFCO Gender Policy
- NEFCO Management of Trust Funds
- NEFCO Disclosure Policy

NEFCO takes seriously, and shall take appropriate measures to prevent, the occurrence of fraud, corruption, involvement in a criminal organisation, money laundering, terrorist related offences, child labour, trafficking in human beings, tax avoidance, tax fraud or tax evasion relative to the use of the GCF resources and require that suppliers and

²³ This list is pulled verbatim from the English language translation provided by the regulator of the 2018 microgrid RFP in Haiti. The full RFP is included as an annex to the Project pre-feasibility study Annex 15

²⁴ Full NEFCO policy documentation is available at <https://www.nefco.org/about-nefco/legal-framework-and-guidelines/>

consultants financed with said resources refrain from illegal or corrupt practices. NEFCO has recently issued updated Policies on, respectively, “Anticorruption and Compliance” and “Integrity Due Diligence” (both adopted by NEFCO’s Board of Directors on 12 December 2019 and with entry into force as of 1 January 2020). As before, the main governing principles for these Policies are transparency, prevention, predictability, accountability and openness. Under the Anticorruption and Compliance Policy, Prohibited Practices are not tolerated in any of NEFCO’s activities (zero tolerance). NEFCO acts both proactively to prevent Prohibited Practices and takes all reasonable measures to ensure that any alleged Prohibited Practice are reported and appropriately investigated and addressed. The new Anticorruption Policy also sets out principles for protection of whistle-blowers and witnesses. To further strengthen NEFCO’s focus on integrity, ethics and accountability, an independent compliance function, the Office of the Chief Compliance Officer is about to be established, in addition to NEFCO’s Anticorruption Committee. Other relevant documents for NEFCO’s anticorruption work are NEFCO Procurement Guidelines, Code of Conduct for the Staff and Staff Policy. NEFCO will ensure and provide oversight that the aforementioned guidelines will be followed by ESI.

The financing agreement between NEFCO and PPH1 (see Annex 6) will be subject to periodic financial reviews, reporting of the project expenditures and include standard audit requirements (typically on an annual basis) to ensure that funds are used for the intended purposes and project complies with the covenants, including environmental and social safeguards. As part of this the project will be annually audited by a qualified internationally recognized firm. Funding disbursement shall be staged as outlined above based on compliance reports and verification to further ensure adequate and on-going safeguarding. NEFCO’s approved Procurement and Consultant Guidelines 2013 which have been reviewed and accepted by the Fund will apply to the Project, and will be specified in the financing agreement between NEFCO and PPH1. The Guidelines can be viewed at https://www.nefco.org/wp-content/uploads/2019/04/NEFCO_Procurement-Guidelines_12122013_0.pdf

Additional details on procurement and legal structures can be seen in Annex 8 – Procurement Plan Model and Annex 6: Term Sheet.

D. LOGIC FRAMEWORK AND MONITORING, REPORTING AND EVALUATION

This section refers to the project/programme’s logic framework in accordance with the GCF’s [Performance Measurement Framework](#) under the [Results Management Framework](#) to which the project/programme contributes as a whole, including in respect of any co-financing. This is different from the project/programme-level log frame (as there may be other impact measures for example that go beyond those defined by the GCF).

A project-level logical framework, with specific indicators, baselines and targets, means of verification and assumptions should be provided as part of Annex 2.

D.1. Paradigm shift objectives (max.200 words)

<i>Shift to low-emission sustainable development pathways</i>	The Project will increase the installed capacity of renewable energy and will expand energy access through zero-emissions generation displacing existing fossil fuels.
<i>Increased climate-resilient sustainable development</i>	The Project will strengthen adaptive capacity of vulnerable households, businesses, communities, and public service providers in Haiti by providing new and alternative livelihoods, reduced energy expenditures, and new technology enabled by clean energy access.

D.2. Impacts measured by GCF indicators

Select the appropriate impact for the project/programme. Note that more than one indicator may be selected per expected impact result. Add results as appropriate.

Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	

<p>Estimated cost per t CO₂ eq, defined as total investment cost / expected lifetime emission reductions</p>	<p>Cost per t CO₂ eq, decreased for all Fund-funded mitigation projects/ programmes</p>	<p>GHG inventory Project operational budget Consumer Surveys Sparkmeter data</p>	<p>US\$/tCO₂eq²⁵</p>	<p>All - US\$ 128 / tCO₂eq GCF only - US\$ 27.7 / tCO₂eq</p>	<p>All - US\$ 128 / tCO₂eq GCF only - US\$ 27.7 / tCO₂eq</p>	<p>Calculated using 60% of total financing to account for mitigation and adaptation split of financing</p>
<p>Expected volume of finance to be leveraged by the proposed project/programme as a result of the Fund's financing,</p>	<p>Volume of financing mobilized</p>	<p>Co-financing commitment letters Investor agreements Grant agreements</p>	<p>US\$0</p>	<p>N/A</p>	<p>Total financing leveraged from GCF investment US\$ 35.848million (Public - US\$ 7.967 million Private - US\$ 27.881 million)</p>	
<p>Expected total number of direct and indirect beneficiaries, (disaggregated by sex)</p>	<p>Total Number of direct and indirect beneficiaries; Number of beneficiaries relative to total population Number of beneficiaries</p>	<p>Customer surveys Sparkmeter data</p>	<p>Initial microgrid operations in Tiburon and Les Anglais have approximately 3,240 direct beneficiaries and 7,128 indirect beneficiaries. With a number of new</p>	<p>Additional 21,115 individuals directly impacted (~50% m/50% f)²⁶ Additional 46,453 indirect beneficiaries (~50% m/50% f)²⁷ 0.002 % of total</p>	<p>Additional 83,970 direct beneficiaries 50% of female Additional 184,734 indirect beneficiaries 50% of female</p>	<p>We assume 5 direct individual beneficiaries per connection – this is in line with generally accepted people/hh assumptions for Haiti 11 indirect beneficiaries per connection based on observations and customer surveys in the Les Anglais microgrid – includes, for example family members, grid enabled businesses, customers access to cold drinks,</p>

²⁵ Reflects a lack of baseline information on marginal abatement costs in Haiti, particularly for the towns of focus.

²⁶ Based off of initial 8 microgrids (Beaumont, Casse, Chardonnerie, Corail, Ile a Vache, La Cahouane, Pestel, Roseaux)

²⁷ Based off initial 8 microgrids (Beaumont, Casse, Chardonnerie, Corail, Ile a Vache, La Cahouane, Pestel, Roseaux)

			connection requests pending.	population (direct) 0.4 % of total population (indirect)	0.8 % of total population (direct) 1.7% of total population (indirect)	more accessible phone charging, etc. Total population of Haiti is estimated at 11 million people.
<i>M1.0 Reduced emissions through increased low-emission energy access and power generation</i>	M1.1 Tonnes of carbon dioxide equivalent (t CO ₂ eq) reduced or avoided as a result of Fund funded projects/programmes – gender-sensitive energy access power generation (sub-indicator)	Pre-grid baseline surveys of consumption and generation, smart meter data and generation system data for grid operations	0tCO ₂ eq	1,985 MtCO ₂ eq/year ²⁸	10,721 MT CO ₂ /year 214,414 MT CO ₂ eq reductions over 20 years	The methodology outlined in CDM AMS-I.L Small-scale Methodology Electrification of rural communities using renewable energy Version 3.0 ²⁹ was selected because of its alignment with project activities, namely the construction of renewable energy microgrids in brown and greenfield communities (See Annex 16a and Annex 16b for full write-up).
<i>A1.0 Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions</i>	A1.1 Number of males and females benefiting from the adoption of diversified, climate-resilient livelihood options (including fisheries, agriculture, tourism, etc.)	1.1 Business accompaniment reports, Enèji Pwòp records of electric equipment sold or leased, SparkMeter and customer registration data to measure use of business-	489 connections in Les Anglais (approximately 2,445 direct beneficiaries provided with clean energy) and 159 connections in Tiburon	4,223 additional households and businesses (est. 21,115 direct beneficiaries) provided with clean energy and the associated cost savings ³⁰ Additional	16,794 additional households and businesses (est. 83,970 direct beneficiaries) provided with clean energy and the associated cost	We assume 5 direct individual beneficiaries per connection – this is in line with generally accepted people/hh assumptions for Haiti Energy savings from clean energy access enable improved livelihoods both from new income opportunities as well as savings against the status quo. Adaptation methodology uses BRACED 3A framework – more

²⁸ Based off of initial 8 microgrids (Beaumont, Casse, Chardonniere, Corail, Ile a Vache, La Cahouane, Pestel, Roseaux)

²⁹ AMS-I.L.: Electrification of rural communities using renewable energy --- Version 3.0, retrieved from <https://cdm.unfccc.int/methodologies/DB/CCZKY3FSL1T28BNEGDRSCKS0CY0WVA>

³⁰ Based off initial 8 microgrids (Beaumont, Casse, Chardonniere, Corail, Ile a Vache, La Cahouane, Pestel, Roseaux)

		related electric equipment	(approximately 795 direct beneficiaries). 87 streetlights currently across Les Anglais and Tiburon.	470 streetlights added. At least 8 high-impact SME support cases for climate-adapted income	savings. Additional 1755 streetlights added. At least 22 high-impact SME support cases for climate-adapted income	details can be seen in Annex 13.
<i>A3.0 Increased resilience of infrastructure and the built environment to climate change</i>	3.1 Number and value of physical assets made more resilient to climate variability and change, considering human benefits (reported where applicable)	Receipts and invoices; commissioning documents	2 solar battery diesel hybrid microgrids valued at an estimated US\$1.4 million	8 additional solar + battery microgrids valued at US\$5.3 million	22 additional solar+battery microgrids valued at US\$31.8 million	Valuation includes the US\$ value of capital costs for microgrid components, but does not include other costs like construction and commissioning. Distribution components are also left out of these calculations.

D.3. Outcomes measured by GCF indicators

Expected Outcomes	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	
M6.0 Increased number of small, medium and large low-emission power suppliers	M6.2 Number of households, and individuals (males and females) with improved access to low-emission energy sources	SparkMeter data + Enèji Pwòp customer contracts (gender of head of household signing the contract shall be noted) + customer surveys for beneficiaries /household	489 connections in Les Anglais (approximately 2,445 direct beneficiaries provided with clean energy) and 159 connections in Tiburon (approxim	4,223 additional grid connections and 21,115 individuals directly impacted (~50% m/50%f) ³¹ Additional 470 streetlights added.	Additional 16,794 grid connections and 83,970 individuals directly impacted (~50% m/50%f). Additional 1,755 streetlights added.	We do not disaggregate connections by household or SME because the vast majority of SMEs in rural Haiti are home-based businesses. We assume 5 direct individual beneficiaries per connection – this is in line with generally accepted people/hh assumptions for Haiti

³¹ Based off of initial 8 microgrids (Beaumont, Casse, Chardonniere, Corail, Ile a Vache, La Cahouane, Pestel, Roseaux)

			ately 795 direct beneficiaries)			
	M6.3 MWs of low emission energy capacity installed, generated and/or rehabilitated as a result of GCF support	Grid commissioning documents	Les Anglais 93.3kWp Tiburon 95.04kw	Additional 0.951 MWp ³² installed	5.839 additional MWp installed	Capacity values are reported in kWp and MWp, but effective solar capacity and nameplate capacity will also be tracked
M5.0 Strengthened institutional and regulatory systems	M5.1 Institutional and regulatory systems that improve incentives for low emission planning and development and their effective implementation	ANARSE decrees and decisions, ANARSE regulations, ANARSE guidance documents, other GoH documents, reports or guidance materials issued by WorldBank SREP Program for Haiti	Baseline regulatory, policy, and investment environment for microgrid development is characterized by a high degree of uncertainty, particularly with regards to the development process, tariffs, taxes, permitting, etc.	At least 2 coordination meetings with other stakeholders in the microgrid space for prioritization and level-setting Established advocacy and communications plan based on lessons learned and coordination meetings for prioritization of needed regulatory and policy changes Lessons learned publication	Lessons learned reports and documents have been communicated to ANARSE and other institutions including international institutions working in the microgrid electrification space and made publicly available on the EarthSpark website Regulatory and Investment	This indicator focuses on coordination amongst key microgrid stakeholders to help drive advocacy for changes to the regulatory, policy, and investment environment. Scorecard for Regulatory/policy and investment frameworks strengthened and integrated into central planning for microgrids and electrification is proposed as follows: 0 – No additional strategies/policies supporting microgrids and electrification; No engagement of public/private sector actors by ANARSE and other regulatory institutions to enhance microgrid

³² Based off of connections from initial 8 microgrids (Beaumont, Casse, Chardonniere, Corail, Ile a Vache, La Cahouane, Pestel, Roseaux)

				<p>(including WTP study) and stakeholder priorities are initially communicated to ANARSE and other institutions and published on EarthSpark website</p>	<p>Scorecard Rank: at least 2</p>	<p>investment environment</p> <p>1 – Plans exists to integrate conducive policies for rural microgrid development and operation, such as appropriate subsidies, tax incentives, concession terms, technical standards, and tariff requirements into central/sectoral planning; Commitments or plans exist to consult public/private sector actors by ANARSE and other regulatory institutions to enhance microgrid investment environment, but no action.</p> <p>2 – Draft or slow progression for integration of conducive policies for rural microgrid development and operation, such as appropriate subsidies, tax incentives, concession terms, technical standards, and tariff requirements into central/sectoral planning; Limited engagement of public/private sector actors by ANARSE and other regulatory institutions with no impacts on microgrid investment environment.</p> <p>3 – Conducive policies for rural</p>
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						<p>microgrid development are embedded into principal planning, but are not utilized or in need of significant revision and there is limited operationalization of policies; Engagement of some public/private sector partners, with limited impact on microgrid investment environment.</p> <p>4 – Conducive policies for rural microgrid development are being used to inform planning decisions and processes to moderate effect, but need modest improvements. Engagement of key public/private sector partners with moderate impact on microgrid investment environment.</p> <p>5 – Conducive policies for rural microgrid development are being used to inform planning decisions and processes and are having a major impact. Strong engagement of public/private sector partners, significant impact on microgrid investment environment, and plans/structures are in place for continued engagement</p>
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<p>A5.0 Strengthened institutional and regulatory systems for climate-responsive planning and development</p>	<p>A5.1 Institutional and regulatory systems that improve incentives for climate resilience and their effective implementation.</p>	<p>ANARSE decrees and decisions, ANARSE regulations, ANARSE guidance documents, other GoH documents, reports or guidance materials issued by WorldBank SREP Program for Haiti</p>	<p>Baseline regulatory, policy, and investment environment for microgrid development is characterized by a high degree of uncertainty, particularly with regards to the development process, tariffs, taxes, permitting, etc.</p>	<p>At least 2 coordination meetings with other stakeholders in the microgrid space for prioritization and level-setting</p> <p>Established advocacy and communications plan based on lessons learned and coordination meetings for prioritization of needed regulatory and policy changes</p> <p>Lessons learned and priorities are initially communicated to ANARSE and other institutions</p>	<p>Lessons learned reports and documents have been communicated to ANARSE and other institutions including international institutions working in the microgrid electrification space</p> <p>Regulatory and Investment Scorecard Rank: at least 2</p>	<p>This indicator focuses on coordination amongst key microgrid stakeholders to help drive advocacy for changes to the regulatory, policy, and investment environment.</p> <p>Scorecard: Same as Above</p>
<p>A7.0 Strengthened adaptive capacity and reduced exposure to climate risks</p>	<p>A7.1 Use by vulnerable households, communities, businesses and public-sector services of Fund supported tools, instruments, strategies and activities to respond to climate change and variability</p>	<p>SparkMeter data + Enèji Pwòp customer contracts (gender of head of household signing the contract shall be noted) + customer surveys for</p>	<p>648 customers with access to reliable climate-resilient energy sources</p> <p>Baseline energy</p>	<p>4,223 customers with access to reliable climate-resilient energy sources</p> <p>10% of direct project</p>	<p>16,794 customers with access to reliable climate-resilient energy sources</p> <p>30% of direct</p>	<p>Tools, instruments and strategies are focused on utilizing clean energy from microgrids to enable climate-resilient livelihoods and improved adaptive capacity from energy access. Specific “tools and instruments” will vary between microgrids, but in general these</p>

		beneficiaries /households ; SME surveys and assessments	literacy beneficiaries is not tracked	beneficiaries in new microgrid locations with improved energy literacy including knowledge of available technologies for climate adapted livelihoods	project beneficiaries in new microgrid locations with improved energy literacy including knowledge of available technologies for climate adapted livelihoods	will promote both productive uses of electricity and general savings from clean energy for household energy budgets.
			79 productive use of energy customers currently in Les Anglais and 61 in Tiburon (chillers, water pumps, freezers, woodworking, milling, threshers, etc.)	250 climate adapted productive use of energy customers (chillers, water pumps, freezers, woodworking, milling, threshers, etc.)	500 climate adapted productive use of energy customers (chillers, water pumps, freezers, woodworking, milling, threshers, etc.)	

D.4. Arrangements for Monitoring, Reporting and Evaluation (max. 300 words)

In addition to the arrangements laid out in the Accreditation Master Agreement (e.g. annual performance reports), project/programme specific institutional and implementation arrangements for monitoring, reporting and evaluation will be established by NEFCO in agreement with GCF. As with all projects financed by NEFCO, it expects to monitor the project in accordance with all relevant internal policies and procedures. It expects to undertake progress monitoring missions, at a minimum annually, during the first five years of the Project when the construction activities in Haiti are greatest.

The Project's M&E plan will evaluate the project on three tiers.

- The first tier will assess the Corporate Development, considering such elements as legal affairs, concessions, funding and funder reporting.

- The second tier will monitor the development of a microgrid, from the initial legal registration and site surveys through to grid commissioning. Note that this tier is distinct in that it is designed for evaluation of a single grid, whereas the other two tiers are for the entirety of the 22 planned grids.
- The third and final tier will assess the project's operations, including capturing the development of new grids and connections, the anticipated direct and indirect benefits, and the greenhouse gas emissions reductions. And perhaps most importantly, it will monitor the grid availability, a key performance indicator which will quantify the percentage of time the commissioned grids are operational.

Independent mid-term and final evaluations will be commissioned and procured by NEFCO with timing appropriate to the duration of the financing agreement (s). An interim evaluation may also be undertaken after the initial grant phase (3 years). Additional monitoring and evaluation activities related to indicator collection and impact evaluation studies may also be undertaken.

E. EXPECTED PERFORMANCE AGAINST INVESTMENT CRITERIA

E.1. Impact potential (max. 300 words)

E.1.1. Expected tons of carbon dioxide equivalent (t CO ₂ eq) to be reduced or avoided (Mitigation and cross-cutting)	Annual	10,721 tCO ₂ eq/Year
	Lifetime	214,414 tCO ₂ eq
E.1.2. Expected total number of direct and indirect beneficiaries, disaggregated by gender (Adaptation and Cross-cutting)	Direct ³³	83,970 At least 50% of which female
	Indirect ³⁴	184,734 At least 50% of which female
	<i>*For both, Specify the % of female against the total number.</i>	
E.1.3. Percentage of beneficiaries relative to total population ³⁵	Direct	0.8 (Expressed as %) of the country
	Indirect	1.7 (Expressed as %) of the country

E.1.4 The Project offers a high potential to contribute to the achievement of the GCF's objectives and result areas in Haiti, one of the most climate vulnerable locations in the western Hemisphere, where there is already evidence of climate change, including higher mean temperatures, increased storm frequency, and altered rainfall patterns. First and foremost, in terms of mitigation, the project addresses reduced emissions by deploying clean energy microgrids displacing baseline energy emissions from kerosene, candles, individual diesel, etc. as well as existing diesel mini-grids.

Annual Emissions Reductions: 10,721 MT /year.

Over the 20-year lifespan: 214,414 MT

(See Annex 16a and 16b for GHG calculation methodology.)

For adaptation, the project focuses on improving the resilience of the most vulnerable people and communities by improving the adaptive, anticipatory, and absorptive capacities of communities and households to climate change through improved and alternative livelihoods, access to basic services, and a flexible less vulnerable grid that can recover faster from natural disasters than central grids.³⁶

Total Households and Businesses Supported: 16,794 households and businesses (est. 83,870 individuals) with improved resiliency to climate change

Productive Use of Energy: At least 22 high-impact SME support cases for climate-adapted income

³³ Assumes 5 direct beneficiaries per connection – in line with Haiti statistics for ~5 persons/household

³⁴ 11 indirect beneficiaries per connection based on observations and customer surveys in the Les Anglais microgrid – includes, for example family members, grid enabled businesses, customers access to cold drinks, more accessible phone charging, etc.

³⁵ Uses 11 million people for total population in Haiti

³⁶ Siemens, "Resilient by Design: Enhanced Reliability and Resiliency for Puerto Rico's Electric Grid" (2018), Available at: <https://microgridknowledge.com/white-paper/mini-grids/>

(See Annex 13 – Climate Baseline for more in depth discussion of climate benefits aligned with GCF’s performance measurement framework)

E.2. Paradigm shift potential (max. 300 words)

The status quo for many rural communities in Haiti is characterized by a depressed local economy, food insecurity, and very high levels of poverty and unemployment. While people in these areas often have very little disposable income, they nevertheless pay extremely high prices for low-quality fuels like kerosene, candles, diesel, charcoal, and 3rd party battery charging services. Not only are these fuels inconvenient and expensive, they are often also bad for people’s health and the environment (see Annex 14 – Tariff Justification).

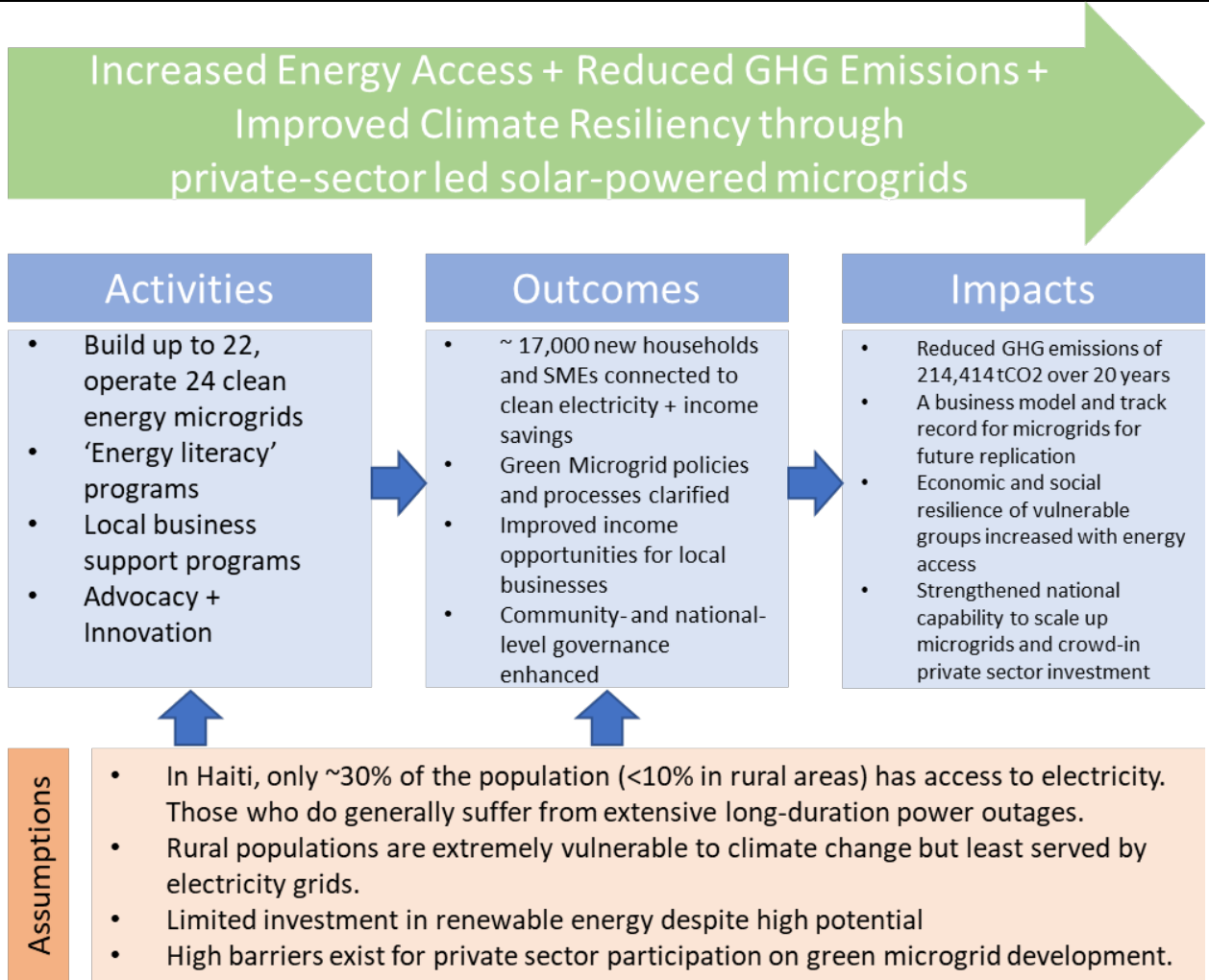
The project proposes to change this paradigm by expanding EarthSpark’s proven microgrid model that leverages clean energy, storage, smart grid infrastructure, and customer participation to help rural Haitians access basic services and economic opportunities near where they live by providing affordable, reliable electricity, along with local business support, ‘energy literacy’ training, local energy governance capacity building, and an overarching gender inclusive approach.

Further, establishing a foundation of clean, reliable, and affordable electricity can fundamentally change how communities in rural Haiti are able to plan for and respond to climate change by enabling new technology, approaches, and indeed resources for long-term adaptation. New enterprises and income, islanding and sustained power for critical services like health clinics and food distribution, load balancing for outages, and distributed generation and spatial diversification for faster grid recovery times are all avenues enabled by microgrid electrification.^{37 38 39} In addition to these benefits, the project also adopts two other pathways for driving transformational change. The first is through gender empowerment and EarthSpark’s “Feminist Electrification” platform which directly addresses the power dynamics and inequity of opportunities that persist as key underlying drivers for vulnerability to climate change. The second pathway is through advocacy for transformational shifts in policy that will change the way the country approaches the issues of electrification and community climate resiliency (Additional discussion of status quo, barriers and theory of change in Annex 15 – Pre-Feasibility Study).

³⁷ Siemens, “Resilient by Design: Enhanced Reliability and Resiliency for Puerto Rico’s Electric Grid” (2018), Available at: <https://microgridknowledge.com/white-paper/mini-grids/>

³⁸ NREL, Distributed Generation to Support Development-Focused Climate Action (2016); Available at: <https://www.nrel.gov/docs/fy16osti/66597.pdf>

³⁹ IRENA, Off-grid renewable energy solutions to expand electricity access: An opportunity not to be missed (2019); Available at: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Jan/IRENA_Off-grid_RE_Access_2019.pdf



The proposed project can catalyze impact beyond a one-off programme investment in a number of ways:

- This Project offers the opportunity to rapidly accelerate the shift to off-grid electrification in Haiti, and change risk perceptions and the investment climate for such investments.
- The Project offers ample opportunity for scaling up and replication, particularly in the small island developing country context and offers associated benefits in knowledge sharing and learning. EarthSpark has demonstrated that the innovations and business models it develops for rural Haiti are relevant to other geographies. The most notable example of this to-date is SparkMeter, EarthSpark's smart meter spin-off company which is now serving microgrid operators in 25 countries. EarthSpark's 'feminist electrification' approach of microgrid development and operations has also been recognized as a globally relevant methodology. This Project shall not only scale low-emissions energy access to dozens of towns in rural Haiti, it will also solidify clean energy microgrids as the most direct approach to reliably electrifying rural communities globally.
- In particular, the lessons learned and proof of concept achieved in this Project (including productive use of energy, 100% RE, etc.) shall be well documented and widely shared in order to influence global perceptions of what is possible in the energy access arena and to accelerate the energy transition in the region.
- By supporting a frontrunner in the development of rural electrification in Haiti, the Project will provide an excellent demonstration effect, enhance technology and knowhow transfer and contribute to the creation and reinforcement of an enabling environment for microgrids including regulatory framework and policy reform.

Expanded barriers and theory of change discussion can be seen in Annex 15 – Pre-Feasibility Study.

E.3. Sustainable development (max. 300 words)

Economic co-benefits

By supplying affordable and clean sources of energy, ESI's business is also expected to create additional economic opportunities, primarily through local job creation, and development of entrepreneurial opportunities. Specifically, through ESI's experience in developing the Les Anglais grid, where 4 direct and 3 indirect permanent jobs were created through the Haitian social enterprise, Enèji Pwòp, S.A. The construction phase directly employed 20 unskilled and 5 highly skilled local laborers in addition to employing several local firms. Phase 3 is expected to generate an additional 50 direct and 80 indirect permanent jobs and an additional 500 temporary jobs through the staggered construction phases. Secondary job and economic opportunities are also created through the supply of reliable electricity. For example, past experiences have demonstrated that households with stable access to electricity and some savings in place can purchase refrigerators that can better preserve perishable goods, which they can in turn sell within the community. This indirect result of ESI's development of micro-grids will further allow economic growth within certain households and communities. Household savings are also identified as a co-benefit. Modest HHs on EarthSpark's existing grid are saving 80% of their pre-grid energy expenditure. This money is now available for the HHs to use elsewhere, including in economic activities, education, and resilience-building investments (See Annex 14 – Tariff Affordability).

Through ESI's local partner, Enèji Pwòp, S.A., employment and capacity building of local work force(s) in each municipality and regionally, ESI will help create immediate jobs, access to basic infrastructure, and income opportunities, thus helping to support the development of a sustainable and inclusive economy. This includes a focus on developing opportunities for women, particularly in the technical workforce, through development of recruitment support and employment requirements for partner contracting.

Moreover, the development of these economic opportunities is consistent with the World Bank Group's general strategy for Haiti, mainly "generating greater economic opportunities outside Port-au-Prince by increasing energy access and developing renewable energy."⁴⁰

Social co-benefits

The Project, on one side, enables women that may otherwise be spending time collecting charcoal/diesel can now use it to study, and on the other side provides electricity for powering learning tools, such as TV and radios. Past experiences have demonstrated that households with stable access to electricity are often associated with the improved household environment for education. Additionally, PUE applications can lead to improved food and water security and provision of basic services like healthcare. Finally, past microgrid customers have reported increased feeling of safety from provision of streetlighting, particularly for women.

Environmental + Health co-benefits

Despite over 90% of households in Haiti using charcoal or other biomass for cooking, this project isn't directly targeting electrification of cooking loads. This is largely because the penetration of and access to electric alternatives for cooking in the microgrid locations is limited because of limitations on market access and logistics, but more critically the high price point of electric cooking appliances and fuel compared to existing alternatives. To the extent that there is displacement of cooking emissions in the project areas, it is assumed to be minimal, and therefore not included in this conservative estimate of benefits. However, EarthSpark is preparing a pilot project that could lead to the adoption of electric appliances for cooking which would directly offset charcoal use. The climate and health impacts of such a switch would be notable, and this Project is laying the foundation for such work in the future if cooking pilot results prove promising. Coupled with inefficient cooking methods, the usage of charcoal results in the emission of greenhouse gases (GHG) and short-lived climate pollutants relative to population size, thus posing significant health risks. In particular, the emission of dangerous levels of particulate matter contributes to household air pollution (HAP), which according to some estimates, result in 8000 premature deaths annually.⁴¹ ESI anticipates that its plan would alleviate environmental pressures through decreased charcoal consumption, uptake of improved cooking methods, and the subsequent reduction and mitigation of GHG emissions. Importantly, the adoption of clean cooking appliances will also result in

⁴⁰ <http://www.worldbank.org/en/country/haiti/overview#2>

⁴¹ Global Alliance for Clean Cookstoves; <https://cleancookstoves.org/binary-data/RESOURCE/file/000/000/476-1.pdf>

increased health benefits, through the reduction in acute and chronic illnesses related to HAP. In addition, harmful cooking approaches often disproportionately affect women, who often have greater exposure to HAP.⁴²

Gender-sensitive development impact

ESI has mainstreamed gender considerations into its business practice through its “Feminist Electrification” approach to microgrid development and operations that was named a 2018 UNFCCC Momentum for Change Lighthouse Activity. The approach integrates a gender-lens specifically into 5 key pillars of microgrid development – infrastructure planning, training and employment, sme promotion, domestic energy use, and community resource availability. In Les Anglais, ESI prioritized reaching out to women for training as clean energy and micro-grid entrepreneurs, as customers, and employees. Anecdotally, having all-female teams climbing ladders and manage micro-grid planning has challenged gender stereotypes held by some in the inaugural town of Les Anglais. ESI is also committed to supporting technical apprenticeships for females in this field through its partner Eneji Pwop, and to continue encouraging female entrepreneurship.

Viewed in the context of the project, the following actions and outcomes are envisioned as part of the Gender Action Plan and overall Feminist Electrification Approach (See Annex 4 for a detailed description of the Feminist Electrification Approach and Gender Action Plan):

- **Infrastructure Planning** – Increasing women’s roles in planning, identifying key energy needs and priorities for women, and ensuring that the microgrids are built and operated to meet these identified needs and priorities. For the project this will mostly focus on ensuring representation from women within the Energy Committees in the microgrid towns (at least 50%), conducting predevelopment surveys with a specific focus on gathering gender-disaggregated data, utilizing that data to better tailor the design and operations of the grids, and elevating the discussion of Feminist Electrification to national and international dialogues.
- **Training and Employment** – Increasing women’s capacity in the technical workforce and directly and indirectly develop professional opportunities for women, particularly within the technical workforce. Specifically, the project will be developing and implementing a recruitment strategy to better support applications from women, demonstrating women’s leadership within Enèji Pwòp management (At least 40%), and requiring partners, particularly EPCs and installers to employ a workforce that is at least 25% women.
- **SME Promotion** – Increasing support and income for women-led SMEs by increasing training and capacity building and expanding opportunities for access to finance. The project will specifically focus on increasing profits for women led SMEs in the target communities (8% increase) and extending microloans to women-led SMEs (at least 11 women-led SMEs supported by project end)
- **Domestic Energy Use** – Improving health outcomes and increasing usable work and leisure hours by providing electric lighting alternatives and limiting exposure to kerosene for indoor lighting. The project will be connecting households with electricity service and enabling them to reduce or eliminate kerosene consumption (80% of homes connected will eliminate kerosene use). Additionally, the project is aiming to provide 24-hour electricity service which greatly extends working and leisure hours for target households.
- **Community Resource Availability** – Improving women’s safety and women’s health by providing electric street lights and providing electric lighting and tools into child birthing rooms. The project is aiming to provide streetlighting for 80% of the distribution footprint and connect all major birthing facilities in the microgrid communities to electricity service.

E.4. Needs of recipient (max. 300 words)

Natural and human-induced hazards (storms, floods, and droughts) already have highly destructive impacts on buildings, land, water, livestock, and people in Haiti. The poorest Haitians, including low-income women, children, and elderly people, are especially vulnerable. There is already evidence of climate change, including higher mean temperatures and altered rainfall patterns. Without adaptation actions, climate change is likely to magnify the damaging effects of hazards and to increase poverty. Haiti faces serious governance, capacity, and finance challenges. Capacity is weak because of a lack of sensitization to climate change, inadequate technical knowledge, and meagre finances.

⁴² Haiti & The Global Alliance for Clean Cookstoves Frequently Asked Questions (2017) <https://cleancookstoves.org/binary-data/RESOURCE/file/000/000/476-1.pdf>

Haiti's energy sector is characterized by low access to basic electricity services, intensive use of biomass (over 75% of total primary energy consumption in 2013) and reliance on imported fossil fuels (21% of primary energy and more than 80% of the electricity mix). Total energy and electricity consumption per capita are amongst the lowest in the world. Only a third of Haitians have access to electricity (less than 10 percent in rural areas). Despite low electrification rates, power demand has been growing rapidly, while on-grid generation capacity has increased only marginally, resulting in unmet demand, deteriorating reliability on the grid, and the informal development of auto-generation as back-up. Many who are connected to the national grid receive power for only a few hours *per week* at unscheduled times. In the absence of reliable electricity, economic growth is stifled, and households must resort to costly fuel-burning lighting and cooking solutions, which also present serious indoor health threats.

Though limited in availability, the most recent willingness to pay studies⁴³ for energy substitutes in Haiti highlighted that "more than 50% of households pay more than \$20 per month for energy substitutes. The initial experience of off-grid energy companies in Haiti is positive, showing that rural customers are willing to pay for reliable electricity, particularly if they can control their expenses, such as through pre-paid meters." In the South, South East, Nippes, and Grand Anse regions that EarthSpark is focused on, average current substitutable energy expenses ranges from \$10.66 USD – \$20.78 USD per month (980 HTG – 1911 HTG). User data from ESI's existing grids in Haiti indicates that modest homes save over 80% of their pre-grid energy expenditures once they connect to a clean energy microgrid. Businesses often save over 50% of their energy expenditures compared to their pre-grid spending. This is detailed further in Annex 14. As mentioned above and discussed in detail in Annex 15 – Pre-Feasibility Study and Annex 20 – Stakeholder Engagement, given the limited availability of town level WTP values, as part of its pre-development work in potential microgrid locations, EarthSpark conducts extensive surveys of individual households assessing current energy expenditures/needs, interest in electricity service, and feasibility of sustained purchasing to more specifically match and meet the needs of recipients in target communities. Further, these surveys are designed to specifically identify the differentiated needs of women and men when it comes to energy access and opportunity (see Annex 4). All of this enables EarthSpark to better design and tailor its microgrids and operations to meet the individual needs of our customers (see Annex 20 – Stakeholder Engagement). Special attention has also been given to the issue of cross subsidization of low-income customers by business and higher-consumption (higher income) customers. Essentially, by encouraging business and other high-consumption customers to use more electricity both through attractive rates and programs for expanded use of electric technology, current rate structures are effectively increasing the total volume of financing received (increasing total kWh used) which allows for a greater portion of capital costs to be borne by these higher income customers (i.e. cross subsidizing the lower income customers) (see Annex 14 -Tariff Justification for additional details).

To further justify tariffs and affordability, upon the end of implementation of the first phase of the Project and commissioning of initial 10 microgrids, the Executing Entity will present to GCF a detailed report on affordability and willingness to pay prepared on the basis of collected data and applicable established methodologies utilized in similar projects. The report will outline quantifiable metrics and key findings, as well as, specific undertakings that will be made by the Executing Entity for the purpose of implementing these findings in the subsequent microgrids for the purpose of improvement of the affordability of the renewable electricity for the poorest customers and overall effectiveness of the Project.

In addition to the above focus on affordability and willingness to pay, EarthSpark has put in place an extensive stakeholder engagement process to ensure that the needs and priorities of different stakeholders are being identified and risks are being managed effectively. This starts with regular and ongoing engagement with the municipalities, particularly the mayor's office to identify energy needs, establish public-private partnerships, and identify suitable generation sites. Alongside this, EarthSpark proactively works with ANARSE (energy regulator in Haiti) and the national utility *Électricité d'Haïti* (EDH) to secure the appropriate permitting for operations and also support national priorities and efforts in the electricity sector. Critically, EarthSpark also works to directly engage with consumers in the towns through surveys (part of pre-development work identifying key energy priorities and needs as well as the baseline energy situation), energy literacy outreach, and by establishing Energy Committees for improved local connectivity to ongoing operations (see Sub-component 2.1). The project also directly works with SMEs and local businesses, particularly women-led SMEs, to identify key opportunities for income development through expanded applications of Productive Use of Energy (see Sub-component 2.2). The combination of these steps helps to ensure that EarthSpark is dynamically supporting the specific and evolving needs of the communities it serves. See Annex 20 for more information on the specific stakeholder engagement plan for each stakeholder and the specific stakeholder engagement

⁴³ World Bank SREP Investment Plan for Haiti, 2015, Available at: http://ciat.gov.ht/sites/default/files/docs/Plan%20Investissement%20SREP_Document%20Principal_30mars.pdf

activities tied to each individual project component, as well as the specific risks and risk mitigation measures for stakeholders throughout the development and project cycles.

Recent dramatic currency devaluation is seen as both a symptom of and a danger for the fragile energy sector, making imported fuels even more costly. Haiti had been a PetroCaribe beneficiary with very favourable import terms from Venezuela. The end of PetroCaribe has led to increased political tensions both because of the additional budgetary strain from the more apparent trade imbalance and because of allegations of corruption.

The government has designated a regulatory body for energy (ANARSE) which is nascent but publicly very supportive of private sector microgrids. Many international bodies are supporting the development of the agency, and EarthSpark is contributing real-world microgrid data and operational perspective to help ensure that enabling policies will be established.

E.5. Country ownership (max. 500 words)

The project/programme contributes to a number of Haiti identified national priorities:

- **Climate:** The Project's operations and business methods are aligned with Haiti meeting its Nationally Determined Contribution (NDC) goals, namely, to reduce relative emissions 31% by 2030. It will also support project goals outlined in the Second National Communication on Climate Change to expand renewable energy particularly in neighborhoods and communities.
- **Energy:** Currently, the legal and regulatory frameworks for off grid access are evolving and need to be further strengthened to avoid legal uncertainty related to this Project, as well as subsequent phases of the Project. GoH and international funders are currently working with the relatively new energy regulator in Haiti to clarify the concession and regulation process. Haiti's current President Jovenel Moïse has named electricity a priority, and there is great potential for President Moïse and his government to unlock microgrid potential for rural Haiti with thoughtful electricity regulation. The GoH is working closely with the World Bank through their SREP program and with other international funders to manage a series of RFPs for community-level microgrids. This process is not only expected to provide results-based grant funding for the sector but also much-needed regulatory clarity by the beginning of 2020.

EarthSpark has been working on energy access in rural Haiti since 2009 with a deeply community-minded approach. It has taken many steps to ensure country ownership, including engagement with relevant NDAs on the funding proposal design and applicable no-objection letter, and to ensure that **country ownership is embedded in the scope and concept** of the Project. In addition to building two microgrids (the first of which launched in 2012 and second of which in 2019) EarthSpark and its local social enterprise partner, Enèji Pwòp, conducted a national microgrid market assessment in 2015 and have since secured LOIs from mayors in 18 pre-qualified towns in the target geography for the Project. Over 50 towns are strong candidates for microgrids, so should any LOIs not be secured or any towns be excluded for any other reason, there are plenty of additional towns to complete the Project. To effectively select sub-projects, a combination of additional factors beyond this initial suitability are considered including the technical proposals and RFP from ANARSE the energy regulator in Haiti, pre-development surveys, ESAs, community engagement, and specific metrics like geography (i.e. focused in the Southern part of Haiti), population density, support and buy-in from local policy makers particularly mayors, types of existing economic activity, quality of roads/entry points, existing distribution networks. In addition to this the sub-projects will be subjected to exclusionary criteria relevant to maintaining Category C risk levels (Additional detail on sub-project selection can be seen in Annex 19).

As highlighted above, multi-stakeholder engagement and associated consultations have been conducted, and will continue to form a key part of the project development cycle. EarthSpark first consulted/consults directly with municipalities to understand the energy and electricity situation. Following this EarthSpark worked/works with mayors and communities to identify municipally-owned land that would be appropriate for the power generation site. EarthSpark will continue identifying these generation sites and will continue its work with the municipalities and the Ministry of Finance towards setting up a public-private structure for municipal-level microgrid operations. In addition to these consultations, EarthSpark proactively works with ANARSE (energy regulator in Haiti) and the national utility Électricité d'Haïti (EDH) to secure the appropriate permitting for operations and tariff recovery. Critically, EarthSpark also works to establish Energy Committees for improved local connectivity to ongoing operations (see Sub-component 2.1). By setting up the local energy committees and the municipal-level PPP structures, the Project is ensuring multiple levels of local governance in addition to the participation of the national regulator and relevant ministries. See Annex 20 for

more information on the specific stakeholder engagement plan for each stakeholder and the specific stakeholder engagement activities tied to each individual project component, as well as the specific risks and risk mitigation measures for stakeholders throughout the development and project cycles.

E.6. Efficiency and effectiveness

E.6.1. Estimated cost per t CO ₂ eq, defined as total investment cost / expected lifetime emission reductions (Mitigation and Cross-cutting)	(a) Total project financing	US\$ 45.748 million
	(b) Requested GCF amount	US\$ 9.90 million
	(c) Expected lifetime emission reductions	214,414 tCO ₂ eq
	(d) Estimated cost per tCO₂eq (d = a / c)	US\$ 128 / tCO₂eq⁴⁴
	(e) Estimated GCF cost per tCO₂eq removed (e = b / c)	US\$ 27.7 / tCO₂eq⁴⁵
E.6.2. Expected volume of finance to be leveraged by the proposed project/programme and as a result of the Fund's financing, disaggregated by public and private sources (Mitigation and Cross-cutting)	(f) Total finance leveraged	US\$ 35.848 million
	(g) Public source finance leveraged	US\$ 7.967 million
	(h) Private source finance leveraged	US\$ 27.881 million
	(i) Total Leverage ratio (i = f / b)	3.62
	(j) Public source leverage ratio (j = g / b)	0.80
	(k) Private source leverage ratio (k = h / b)	2.82

E.6.3

By bringing together GCF with IDFC, the World Bank, other grant-makers, and social impact investors, the Project is crowding in different and complementary funders none of whom would be able to participate alone to achieve a Project of this scale. The scale of the project, in turn, makes it both more impactful and more cost-effective than what could have been achieved at the very slow rate that small scale, grant-making alone would enable. Given the relatively high risks associated with microgrids, relatively low returns in addition to funders' overall risk perceptions of doing business in Haiti, without the proposed level of concessionality the Project would not be possible at this scale. If further investments in clean energy microgrids as a result of the track record and enabling environment built by this project are taken into account, then the co-financing ratio, including leveraged funds from private investors for additional rural communities across Haiti will be much higher.

The project applies a minimum concessional approach whereby it seeks to provide the least concessional funding that makes the project viable. GCF funding as concessionary subdebt will play a catalytic role in crowding in not just development finance debt, but also additional investors (both equity and debt) for this Project or future expansion of micro-grids to more communities. Best available technologies and mini-grid practices have been considered and applied by ESI. Because of the rising costs and frequent shortages of diesel in Haiti, the Project is seeking to build 100% renewable energy powered microgrids that will offer at least 99% service availability to customers. By installing solar PV capacity beyond what would be used in a hybrid system, and by encouraging user participation through smart-meter enabled demand-management tariffs, EarthSpark sees the path to 100% renewable energy as not only possible, but deeply demonstrative and ultimately cost-effective.

⁴⁴ Calculated using 60% of total financing to account for mitigation and adaptation split of financing

⁴⁵ Calculated using 60% of total financing to account for mitigation and adaptation split of financing

F. ANNEXES

F.1. Mandatory annexes

- Annex 1 NDA No-objection Letter(s) ([Template](#))
- Annex 2a Example project level logframe ([Example](#))
- Annex 2b Example timetable ([Example](#))
- Annex 3 Budget plan that provides breakdown by type of expense ([Template in excel sheet](#))
- Annex 4 Gender assessment and action plan ([Template](#))
- Annex 5 Co-financing commitment letter
- Annex 6 Term sheet and evidence of internal approval
- Annex 7 Risk assessment and management ([Template](#))
- Annex 8 Procurement plan model ([Template](#))
- Annex 9a Legal Due Diligence (regulation, taxation and insurance) ([Template](#))
- Annex 9b Legal Opinion/Certificate of Internal Approvals ([Template](#))

F.2. Other annexes to be submitted when applicable/requested

- Annex 10 Economic and/or financial analysis
(mandatory for private-sector proposals)
- Annex 11 Appraisal, due diligence or evaluation report for proposals based on up-scaling or replicating a pilot project
- Annex 12 Environmental and Social Action Plan (ESAP) ([Template](#))
- Annex 13 Climate Baseline
- Annex 14 Tariff Justification and Affordability
- Annex 15 Pre-Feasibility Study
- Annex 16a GHG Calculation Methodology
- Annex 16b GHG Calculation Excel Sheet
- Annex 17 Detailed Entity Relationships
- Annex 18 AE Fee Structure
- Annex 19 Sub Project Selection
- Annex 20 Stakeholder Engagement
- Annex 21 Lessons Learned from Microgrid Operations

** Please note that a funding proposal will be considered complete only upon receipt of all the applicable supporting documents.*