United Nations Development Programme

Project Document template for projects financed by the various GEF Trust Funds

Project title: São Tomé and Príncipe National Child Project under the Africa Minigrid Program		
Country(ies): São Tomé and Príncipe (STP)	**Implementing Partner (GEF Executing Entity):** Directorate-General Natural Resources and Energy (DGRNE)	**Execution Modality:** Support to National Implementation Modality
Contributing Outcome (UNDAF/CPD, RPD, GPD): **Contributing Outcome (UNDAF/CPD, RPD, GPD):** **UNSDCF outcome 2: By 2027, institutions integrate climate change adaptation, low carbon and renewable energies into policies and programmatic implementation.** **CPD Output 2.3: 2.3 Investment in renewable energy enhanced for improved access to clean energy for poor households and businesses.**		
UNDP Social and Environmental Screening Category: Moderate	**UNDP Gender Marker:** 2	
Quantum Award ID: 00132379.1	**Quantum Project ID:** 00132379	
UNDP-GEF PIMS ID number: 6657	**GEF Project ID number:** 10832	
LPAC meeting date: 26 July 2023		
Last possible date to submit to GEF: 31 August 2022		
Latest possible CEO endorsement date: 19 December 2022		
Project duration in months: 48 months		
Planned start date: 1 July 2024	**Planned end date:** 30 June 2028	
Expected date of Mid-Term Review: 1 February 2026	**Expected date of Terminal evaluation:** 15 November 2027	
Brief project description: As part of the UNDP-supported, GEF-financed Africa Minigrids Program (AMP), this project seeks to increase access to clean energy by increasing the financial viability, and promoting scaled-up commercial investment, in renewable energy (RE) minigrids, with a focus on cost-reduction levers and innovative business models. This will be achieved through five outcomes as follows: (i) Stakeholder ownership in a national minigrid delivery model is advanced, and appropriate policies and regulations are adopted to facilitate investment in low-carbon minigrids. (ii) Innovative business models based on cost reduction operationalized, with strengthened private sector participation in low-carbon/renewable energy minigrid development; (iii) Financial sector actors are ready to invest in a pipeline of low-carbon minigrids and concessional financial mechanisms are in place to incentivize		

scaled-up investment.; (iv) Digitalization and data mainstreamed, across stakeholders, into local minigrid market development; and (v) Monitoring and Evaluation. Increased knowledge, awareness and network opportunities in the minigrid market and among stakeholders, including benefitting from linkages to international good practice. The project is expected to bring about the direct commissioning of 0.7 MW in solar photovoltaic (PV) generation capacity and 1.0 MWh of battery storage. The lifetime greenhouse gas (GHG) emissions reduction from project activities, particularly investment in minigrid pilots, is estimated at 20,500 metric tons of carbon dioxide equivalent (tCO2eq) (direct) and 5,500 tCO2eq (indirect). The number of direct beneficiaries is estimated at 21,800 people, of which at least 50% are women, as a result of 4,400 new and/or improved minigrid connections.

FINANCING PLAN	
GEF Trust Fund grant	USD 1,968,349
UNDP TRAC resources	USD 50,000
Confirmed cash co-financing to be administered by UNDP	USD 0
(1) Total Budget administered by UNDP	**USD 2,018,349**
(2) Total confirmed co-financing to this project not administered by UNDP	**USD 6,088,210**
(3) Grand-Total Project Financing (1)+(2)	**USD 8,106,559**

SIGNATURES:

Signature: **José Carvalho do Rio, Minister**	**Agreed by** Ministry of Infrastructure, Natural Resources and Environment	**Date/Month/Year:** 16/08/2024 República Democrática de São Tomé e Príncipe Ministério das Infra-estruturas e Recursos Naturais O Ministro
Signature: **José Bastos Vaz do Sacramento, General Director**	**Agreed by** Directorate-General Natural Resources and Energy (DGRNE)	**Date/Month/Year:** 16/08/2024
Signature: **Lovita Ramguttee, Resident Representative**	**Agreed by** UNDP	**Date/Month/Year:** 16/08/2024 PNUD *Au service des peuples et des nations*

I. TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF BOX INSERTS

LIST OF ACRONYMS

AfDB	African Development Bank
AFAP	Fiduciary Agency for Project Administration
AGER	National Regulatory Agency
ALER	Lusophone Renewable Energy Association
AMDA	African Minigrid Developers Association
AMP	Africa Minigrids Program
APCI	Trade and Investment Promotion Agency
APERAS	Association for the Promotion of Renewable Energy and Sustainable Environment
BESS	Battery Energy Storage System
BPPS NCE	Bureau for Policy and Programme Support, Nature, Climate and Energy
CAPEX	Capital Expenditure
CERMI	Centre for Renewable Energy and Industrial Maintenance (Cabo Verde)
CFP	Centre for Professional Formation
CO	Country Office
CoP	Community of Practice
DGRNE	Directorate-General Natural Resources and Energy
DREI	Derisking Renewable Energy Investment
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
ECREEE	ECOWAS Centre for Renewable Energy and Energy Efficiency
EE	Energy Efficiency
EIB	European Investment Bank
EMAE	Empresa de Agua e Electricidade (Water and Electricity Company)
ENCO	Empresa Nacional de Combustíveis e Óleos (National Fuel and Oil Company)
EPC	Engineering, Procurement and Construction
ESCO	Energy Service Company
ESIA	Environmental and Social Impact Assessment
ESMAP	Energy Sector Management Assistance Program
ESMF	Environmental Safeguards Management Framework
ESMP	Environmental and Social management Plan
ETISP	Energy Transition and Institutional Support Programme (AfDB)
FSP	Full Sized Project
GAP	Gender Action Plan
GDP	Gross Development Product
GEF	Global Environment Facility
GEFSEC	Global Environment Facility Secretariat
GHG	Greenhouse Gases
GIS	Geographic Information System
GIZ	German International Cooperation
GoSTP	Government of São Tomé e Príncipe
HVAC	Heating, Ventilation and Air Conditioning
IDA	International Development Agency

IMF	International Monetary Fund
INPIEG	National Institute for the Promotion of Gender Equality and Equity
IP	Implementing Partner
IPP	Independent Power Producer
IR	Inception Report
ISCSVSM	Institute of Health Sciences “Victor Sá Machado”
IW	Inception Workshop
KPI	Key Performance Indicator
LCDP	Least-Cost Power Development Plan
LCOE	Levelized Cost of Energy
LDC	Least Developed Country
LPG	Liquified Petrol Gas
MDB	Multilateral Development Bank
MG	Mini-Grid
MIRN	Ministry of Infrastructure and Natural Resources
MPFEA	Ministry of Planning, Finance, and Blue Economy
MPP	Minigrid Pilot Plan
MSP	Medium Sized Project
MTR	Mid-Term Review
MH(h)	Megawatt(hour)
M&E	Monitoring & Evaluation
NREL	National Renewable Energy Laboratory
NDC	Nationally Determined Contribution
NIM	National Implementation Modality
OFP	Operational Focal Point (GEF)
OPEX	Operational Expenditure
O&M	Operation & Maintenance
PALOP	African Countries of Portuguese Official Language
PANEE	National Energy Efficiency Action Plan
PANER	National Renewable Energy Action Plan
PAYG	Pay-as-you-Go
PB	Project Board
PFD	Program Framework Document
PIF	Project Identification Form (GEF)
PIR	Project Implementation Report (GEF)
PMC	Project Management Cost
PMU	Project Management Unit
POM	Project Operations Manual
POPP	Programme and Operations Policies and Procedures
PPA	Power Purchase Agreement
PPG	Project Preparation Grant
PPP	Public-Private Partnership
PRSP	Power Sector Recovery Project (WB)
PSC	Project Steering Committee
PUE	Productive Use of Energy

PV	Photo-Voltaic
QAMF	Quality Assurance and Monitoring Framework
RAP	Autonomous Region of Príncipe
RE	Renewable Energy
RGPH	General Population and Housing Census
RJSE	Legal Framework Energy Sector
RMI	Rocky Mountains Institute
SDG	Sustainable Development Goal
SEFA	Sustainable Energy Fund for Africa
SESP	Social and Environmental Screening Procedure
SE4All	Sustainable Energy for All
SHS	Solar Home System
SIDS	Small Island Development State
SME	Small- and Medium Enterprise
STAP	GEF Scientific Technical Advisory Panel
STN	STP Nova Dobra (national currency)
STP	São Tomé e Príncipe
TBWP	Total Budget and Work Plan
TE	Terminal Evaluation
ToC	Theory of Change
ToR	Terms of Reference
T&D	Transmission & Distribution
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organisation
USD, US$	United States Dollar
VAT	Value Added Tax
WB	World Bank

II. DEVELOPMENT CHALLENGE

1. The Democratic Republic of São Tomé and Príncipe (STP) is a small island state in the Gulf of Guinea consisting of the larger island of São Tomé (859 km^2) and smaller island of Príncipe (142 km^2) about 140 km to the Northeast. STP is characterized as a Small Island Developing State (SIDS); it is also a Least Developed Country (LDC). The coordinates of STP are: latitude 1°45'N and 0°01'S; longitude 6°26'N and 7°30'E. STP's main commodity is cacao, accounting for 90% of total exports. About 15% of food is imported.[1] The country's GDP in 2020 was USD 472.9 million.[2]

2. Based on extrapolations from the 2012 General Population and Housing Census (RGPH), population has grown from 178,739 inhabitants (2012) to 219,161 (2020); STP is expected to have 279,981 inhabitants by 2030. 61% of the population is under 25 years. The population is concentrated in the northeast of Sao Tome, notably the Água Grande and Mé-Zóchi districts hosting 64% of the population on 13% of the territory. There is a migration trend to the urban centers. STP's Human Development Index (HDI) is 0.589 (2017), which is a significant increase from 0.452 (1990) as a result of improved access to education and health among others. As a subscriber to the UN 2030 Agenda for Sustainable Development, STP prioritizes poverty (SDG1), decent work and economic growth (SDG 8), industry, innovation and infrastructures (SDG 9), protecting life below water (SDG 14), and peace, justice and strong institutions (SDG 16).

3. More than 2/3 of population is classified as poor (<USD 3/day), with 25.6% below USD 1.9/day (2017). The RGPH (2012) shows that poverty particularly affects women (poverty rate 71.3%, compared to 63.4% for men). Poverty is prevalent in rural areas. Unemployment in 2021 was around 15.9% and GDP growth 3.1% (2020). Over 90% of the State's investment budget comes from foreign aid and the debt rate is high (70% of GDP).

4. STP's energy sector is governed by the Ministry of Infrastructure and Natural Resources (MIRN) through its Directorate-General for Natural Resources and Energy (DGRNE). In the Autonomous Region of Príncipe (RAP), energy is under the Regional Secretariat for Environment and Sustainable Development. The Empresa de Água e Electricidade (EMAE, founded by Decree-Law 34/1979) acts as the monopolist for transmission and distribution (T&D) and commercialization of electricity. Since 2008, independent power producers (IPPs) are allowed in the market, with EMAE as the sole off taker (Decree 40/2008). The sector is regulated by the Autoridade Geral de Regulação (AGER, Decree-Law 14/2005). The Regime Jurídico do Sector Eléctrico (RJSE, Decree-Law 26/ 2014) redefined sector organization and the legal framework and formally puts EMAE under AGER purview. However, the design and adoption of specific regulation is work in progress. As of 2022, EMAE still operates as a de facto monopolist, except for electricity generation. Of 104.9 GWh total generation in 2017, just 3.6 GWh was provided under an IPP scheme.

5. With growing electricity demand and arrears in maintenance of a legacy of small hydropower plants, STP's electricity matrix has shifted towards thermal generation (diesel). In 2019, 94% (45MW) of generation capacity was non-renewable, and 6% (3 MW) renewable (5% hydro and 1% solar PV). Reportedly, the effective hydropower capacity had dropped to 1.22 MW in 2019.[3] STP's (conditional) commitment made in its updated Nationally Determined Contribution (NDC) is to achieve 49 MW renewable energy (RE) electricity generation by 2030 (of which 32.4 MW solar, 14 MW hydropower, and 2.5MW biomass).[4] Access to electricity is around 87% and increasing, but with large geographical and socio-economic disparities and supply issues. Following up on SDG-7, Government policy is to achieve 100% electricity coverage by 2030 as well as 100% access to

[1] Source: PANER
[2] https://data.worldbank.org/country/sao-tome-and-principe
[3] PANEE, p.7
[4] Sao Tome and Principe, Nationally Determined Contributions (NDC-STP) Updated, 2021. Source: https://unfccc.int/documents/497944.

clean cooking solutions.[5] STP's overall energy balance however is still dominated by the use of traditional biomass (fuelwood and charcoal) which represent about 80% of total energy supplies.

6. Fuel imports are conducted through the Empresa Nacional de Combustíveis e Óleos (ENCO), a mixed capital society operating under private law (Decree 60/1997). The main shareholders are the STP State and Sonangol (Angola) which provided access to petroleum products under concessional terms. As revenues from EMAE's operations are insufficient to cover costs, fuel costs were partly borne by the State. Accumulated payment arrears[6] led Sonangol to suspend exports to STP, which then had to start sourcing at the commodity markets. Acknowledging that continuation of oil imports was beyond STP's economic and fiscal capacity, an emergency situation was declared by the Government (Presidential Decree 3/20, 17 March 2020). To accelerate the introduction of RE power systems in STP, a "special transitional regime" was approved (Decree-Law 1/2020) to fast-track the development of several RE projects (47 MW solar and 12 MW biomass) identified in the Resolution of the Council of Ministers No. 29/2019, under a Power Purchase Agreement (PPA) with EMAE. Yet, given EMAE's weak financial position and STP's high indebtedness, the private sector considered counterpart risk as too high; no PPA has been signed so far. In this contest, one can mention that STP's initial NDC already proposed adding 26 MW of RE capacity to the national system.[7]

7. The electricity tariffs in STP are not cost-reflective and EMAE is estimated to incur in a loss of about US$ 0.07 per kWh sold. The last tariff update dates to 2007. EMAE's customer base in 2017 was 43,642 connections (37,205 households and 6,437 other categories). There are 14 tariff categories, including: the lowest tariff of 6.9 US$ct/kWh $\leqslant$ 100 kWh/month); commercial customers and services (15.7 US$ct/kWh); while public entities are charged the highest tariff of 40.3 US$ct/kWh. On average tariff is 22.4 US$ct/kWh.[8] In practice, public entities not always pay the invoiced electricity consumed by them. A 2017 ESMAP study[9] of household energy use in STP revealed that only 60% of the population can afford to pay for the service, not in the least because customers must pay a high upfront connection fee. Wiring and appliance costs are another barrier. The study did not assess electricity access and consumption by the commercial and industrial sector. As a result of the constrained supply due to (i) lagging generating capacity; (ii) high technical losses[10]; (iii) high commercial losses (unbilled electricity); and (iv) poor affordability; there is a large suppressed electricity demand in the country (equivalent to a 24 MW capacity deficit).

8. Prohibitive fuel costs and lagging maintenance and repair (including a lack of spare parts for EMAE power plants) translate into a decline of available generation power (estimated at about 20 MW, while actual demand is around 31 MW). As a result grid power supply becomes increasingly compromised with frequent outages. In the absence of a grid status monitoring infrastructure, common industry standard indicators such as SAIFI and SAIDI[11], have not been determined. Importantly, fuel consumption by thermal generators is not logged either.

9. The World Bank Power Sector Recovery Project (PRSP) in STP[12] offers a package of measures to restore existing generation capacity and improve overall transparency, including monitoring of the generation and T&D assets and the introduction of electricity consumption meters for large customers. The Least-Cost Power Development Plan (LCDP), also developed with World Bank support, provides guidance to the Government for

[5] Plano de Acção Nacional das Energias Renovávies (PANER) para São Tomé e Príncipe, p.8

[6] Arrears were above US$ 155 million in 2017 (about 1/3 of GDP), according to IMF IMF 2018 Article IV Consultation Document.

[7] As follows: isolated hydropower (1 MW); on-grid hydropower (9MW + 4 MW), solar PV systems (12 MW). Total investment cost was estimated at USD 59.2M (STP INDC, 2015).

[8] The Sao Tome Dobra (STN) is pegged to the euro (EUR) at a rate of 24.5 STN per EUR.

[9] Sao Tomé and Principe - Beyond Connections, Energy Access Diagnostic Report based on the Multi-Tier Framework, ESMAP/World Bank, June 2019. Note: The initial scope covered household, commercial, and industrial customers; however the final report is limited to households.

[10] About 33% according to EMAE (2019). Source, PANER, p.5.

[11] SAIFI = System Average Interruption Frequency Index; SAIDI = System Average Interruption Duration Index.

[12] World Bank Project P157096.

rolling out new (RE) capacity in function of long-term costs. Under the GoSTP's Green Energy Acceleration Plan, DGRNE recently announced the preparation of an Integrated Resource Plan (IRP) to: (i) update the LCDP, (ii) update the planned generation mix including mini hydro and solar PV; (iii) carry out technical studies on the integration of variable RE (VRE) generators; (iv) assess T&D upgrade needs; and (v) assess technical needs for electricity storage and integration with transport sector.[13]

10. Another important assistance programme is the Energy Transition and Institutional Support Programme (ETISP) implemented by the African Development Bank (AfDB). Its objective is to promote green growth and a sustainable electricity system. The ETISP pursues: (i) initiating the energy transition toward RE sources; (ii) institutional support while strengthening financial governance and the business climate; and (iii) supporting the GoSTP in implementing the ETISP and building institutional capacity. The ETISP is oriented towards financing of urgent grid reinforcement and maintenance works on existing thermal plants, the rehabilitation of the Papagaio hydropower plant (<1MW) and the hybridization of Santo Amaro thermal power plant with solar PV. As related to energy, ETISP will further support implementation of an Energy Efficiency (EE) programme.[14] ETISP provides the critical funding to GoSTP to invest in RE capacity and start cutting unsustainable fuel expenditures. Recently, scenarios for long-term electricity planning were developed under the Sao Tome Green Energy Acceleration Plan, funded by AfDB.[15] Key drivers behind demand growth are: GDP growth, improved grid supply by reduced losses thereby diminishing suppressed demand, and electric vehicle penetration.

11. UNDP is a key partner to strengthen STP's energy sector through the GEF-5 project "Promotion of Environmentally Sustainable and Climate-Resilient Hydroelectric Electricity through an Integrated Approach in Sao Tome and Principe" (PIMS 4602), operationally closed in April 2022. Private sector investment was found unlikely under the existing market scenario[16] in 2016 and the project focused on creating an enabling environment for investment. Supported by the UNDP DREI conceptual basis, the main results are: (i) development of legal and technical framework to enable the energy transition and to foster private investment in renewable energies; (ii) four feasibility studies for the main sites identified by the LCDP for micro-hydro production (5.2 MW) and one complete feasibility and technical study for a solar plant in Santo Amaro (2.2 MW).

12. Other results from this project include; (iii) five Integrated Watershed Management Plans of Rivers Abade, Manuel Jorge and Io Grande in São Tome and Rivers Papagaio and Banzu in Principe; (iv) full feasibility and socio-environmental studies and tender documents for micro hydropower plant in Principe (0.6 MW) to be built with AfDB funding; (v) Sustainable Land and Forestry Management practices on more than 250-ha; 12 technicians trained as trainers and more than 500 farmers trained and practicing; (vi) national training plan for the energy transition and implementation of 20% of the training contemplated by this plan; (vii) first solar PV plant in STP for hybridization of Santo Amaro thermal power plant, in partnership with AfDB and UNIDO; and (viii) first rooftop solar PV system providing energy to the MIRN compound.

13. The United Nations Industrial Development Organisation (UNIDO) implements the GEF-funded Strategic Program to promote RE and EE investments in the electricity sector of STP.[17] The project pursues GHG emission

[13] https://www.clbrief.com/sao-tome-seeks-consultants-for-green-energy-acceleration-plan/

[14] ETISP implementation started in 2020 and will last 4 years. Technical assistance was further provided under the AfDB/SEFA ML-0024 Sao Tome e Prinicipe Mini-hydropwer projects support programme (July 2018 - December 2021).

[15] Presentation 14 February 2022, by iED Consultants, for the Government of STP.

[16] The UNDP Project's Mid-term Review concisely depicts the challenge for a private operator: "this (…) will require, at this moment, investments in the network, dispatch, counting and marketing systems and, also, conjunctural costs of context as a guarantee of payment." Source: https://erc.undp.org/evaluation/documents/download/15152

[17] UNIDO Project 150124, GEF ID 9897. GEF grant US$1,575,571, approved in 2019. Executing partners are MIRN, APAP, and the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE). The Project started in 2017 and will run until May 2023. https://open.unido.org/projects/ST/projects/150124

reductions and domestic value creation through the uptake of inclusive RE and EE technology markets in STP. The programme envisions, among others, the following: (1) sustainable policies with RE and EE targets; conducive legislation, standards and incentives; (2) RE/EE status report; Geographic Information System (GIS) for mapping of RE resources and high-impact sites; (3) National Sustainable Energy Investment Plan (NSEIP); establishment of Financing Facility; (4) demonstration of feasibility of innovative RE/EE investment projects; (5) improved qualification, certification and accreditation framework; enhanced capacities in public institutions; and (6) online training shared across lusophone countries in the region; support to national RE associations; capacity building, training, and awareness raising. Significant outputs include the National EE Action Plan (PANEE) and the National RE Action Plan (PANER), both delivered in December 2021.

14. Bilateral partners include the lusophone community, notably Portugal, Angola, Brazil and Cabo Verde. Active is also France and more recently ties with China are intensified. the Lusophone Renewable Energy Association (ALER) promotes south-south capacity building and knowledge exchange between Portuguese-speaking countries in Africa. [18]

15. STP has a good offer of RE sources, notably hydropower and solar energy (PV). Solar PV potential is good, on average about 4 kWh/kWp per day; wind power is modest (below 260 W/m^2).[19] Hydropower potential is driven by abundant rainfall in combination with the mountainous orography, in particular on Sao Tome island. There are over 50 river basins and 223 water courses. A 2008 study identified 34 hydropower plants in the range 500-6,000 kW. Of these, 14 plants were prioritized, 31 MW in total.[20] On Principe island 4 plants were identified, the largest one being Papagaio (1,090 kW). Currently only the Contador power plant (900 kW, on Contador river) is operational. This plant is being rehabilitated with funding from the World Bank/European Investment Bank (WB/EIB) PRSP. Papagaio is supported by UNDP/GEF and the AfDB. Two other plants (Guegue and Agostinho Neto) were targeted for recuperation by a private company under the Transitional Decree. However, in 2023, Guegue is dilapidated and Agostinho neto was rehabilitated but non-operational to this day. A 2.2 MWp solar PV plant is under development for hybridization of the Santo Amaro diesel plant, in two phases: (1) 500 kWp by UNDP already injecting to the grid since November 2022; (2) 1,640 kWp by AfDB under construction, UNIDO also provides financial support for upgrading the local substation.

16. As related to the end-user market, a characterization of final energy uses in the commercial and industrial sectors has not been made yet. Electricity generation for self-supply is allowed in STP and is common practice in the form of diesel gensets (among those who can afford this). STP has recently approved a framework of incentives for RE equipment[21] (and EE appliances), although its application is still hindered. In fact, substantial upfront taxes, duties, and levies that were applied to the import of goods, including for energy purposes (exemptions are possible however, such as for EMAE). It is expected that this new regime of tax exemptions in fully rolled out in 2024. The overall context is demonstrated by STP's poor performance in ease of doing business, ranking 170th among 190 economies.[22] There are plans for gradual integration of the Economic Community of Central African States (ECCAS) enabling a free market for goods and services, but these processes are lengthy.[23] A Value Added Tax (VAT) system is in place since June 2023. Small businesses are not encouraged to formalize, and are characterized by low competitiveness, little investment capacity, and poor access to credits. The tertiary sector represents 60% of GDP and is largely informal. The primary and secondary sectors each make up 20% of GDP. The tourism sector includes larger hotels and is the formalize largest electricity consumer (41% of total). Industry accounts for 13.3% of GDP; there is no heavy industry in the country.

[18] Aler Relatorio 2020, https://www.aler-renovaveis.org/
[19] www.irena.org/IRENADocuments/Statistical_Profiles/Africa/Sao%20Tome%20and%20Principe_Africa_RE_SP.pdf
[20] Study by CECI Engineering Consultants. Source: ALER Relatorio 2020.
[21] Lei 4/2023 which exempts the import of equipment and accessories for PV systems
[22] https://tradingeconomics.com/sao-tome-and-principe/ease-of-doing-business
[23] Aler Relatorio 2020, p.69.

However the potential for energy supply to drive transformative processes and add local value in the agri-food sector, is evident.[24]

17. The PANEE highlights the large potential to reduce final electricity use from air conditioners, replacement of incandescent bulbs and compact fluorescent lamps (CFLs) by LED lights. As a primary step, PANEE envisions a detailed mapping of EE potential in STP. Measures to reduce primary energy losses include loss reduction in the electric grid system (currently 33%) and the introduction of efficient cooking stoves (non-electric). Energy saving potential in manufacturing and agri-food businesses is acknowledged but research is needed.

18. The PANEE has the ambition to achieve energy savings of 8.7% (2030) and 12.9% (2050) as follows: (i) bring down technical and non-technical losses in the electricity sector to 8% by 2050; (ii) EE public lighting and household lighting implying the substitution of over 600,000 inefficient lamps by LED; as well as the introduction of EE labelling for appliances[25]; (iii) replacement of 39,600 traditional stoves by improved solid-fuel devices; the progressive adoption of LPG and (to lesser extent) kerosene; and the introduction, in the longer term, of alternative technologies including solar cooking and electricity; and (iv) the substitution of 1,000 cars by fuel-efficient models and electric mobility, targeting 12,000 electric vehicles. The plan identifies supportive measures as related to regulation and the introduction of financing mechanisms. Importantly, the PANEE envisions the establishment of an EE department within DGRNE, technical capacity building, awareness raising, skills for EE and energy conservation projects, etc.[26] Worthwhile mentioning are measures to accelerate the introduction of smart grids and the massive adoption of intelligent meters.[27]

19. So far, the supply of RE products in the market is very low. In addition, STP's banking sector is very small and its financial system weak. Currently, the supply side can be characterized as dormant: retailers and installation companies exist but gain little experience, while long stock throughput times and low sales volumes translate into higher than necessary prices.

Table 1. Policy context for renewable energy minigrids in São Tomé and Príncipe

Policy / planning document		Name	Relevance
Sector Policies	Strategic Vision / Development Plan	2030 São Tomé and Príncipe Transformation Agenda (2015)	2030 Transformation Agenda and the SDGs.
		National Development Plan 2017 - 2021 (2017)	National Development Plan 2017 – 2021 (PND 2017-2021) for operational implementation of the STP 2030 Transformation Agenda and the SDGs.
		Major Plan Options for 2019 (2018)	Investment Plan 2019
	National energy policies and plans	Least Cost Development Plan (2018)	Electricity generation investment targeting 57% (2028) and to 53% (2030).
		National Energy Efficiency Action Plan	National EE action plan targeting grid losses, conversion efficiencies in generation, and foster targets for universal access by 2020 and 2030.

[24] PANER, p.5. This document provides some more insight: "The private sector is limited to some small and medium enterprises in domains such as bakeries, beer brewery, alcholic beverages made from local products (rum), palm oil, natural juice from local fruits, mineral water, paints, coco oil soap, construction materials (blocks), small metal pieces, wood processing, small boat construction, energy production, and furniture."
[25] EE standards and labels are foreseen to be introduced as follows: (2022) refrigerators and freezers; air conditioners; lighting; (2030) washing machines; other appliances to be identified. PANEE, p.38.
[26] The Project collaborates with the Centre for Renewable Energy and Industrial Maintenance of Cabo Verde (CERMI) as a strategic partner for training in the region. See: https://dgrne.org/pt-pt/reuniao-com-delegacao-de-cermi-cabo-verde.
[27] PANEE, Measure M26, p. 43. Pages 41-36 provide a full list of the planned actions.

Policy / planning document		Name	Relevance
		National Renewable Energy Action Plan;	National Plan for achieving at least 50% RE by 2030.
	National policies and plans concerning environment and climate change sector	National Adaptation to Climate Change Action Plan (2006);	National adaptation plan
		Proposal for State of Preparedness Measures (2014)	National readiness plan.
		Third National Communication under the UNFCCC (2019)	Third national communication.
		Nationally Determined Contributions	National determined contribution.
	Territorial planning policies and plans	National Territorial Planning plan for the Territory of Sao Tomé e Príncipe (PNOT), 2018	National spatial planning diagnostics and plan
	Regional policies	ECCAS/CEMAC White Paper on Energy (2015);	Common view on integration and human and sustainable development of Central Africa by 2030, including access to modern energy.
		ECCAS Regional Energy Policy Strategic Document (2014).	Strategy towards regional energy policy and market in the region.
Legislation	Overall legislation	Constitution of the Republic Law No. 1/2003	National Constitution of Sao Tome and Principe
		Administrative Policy Division, Law No. 5/1980	Law on the Administrative Policy Division (Law No. 5/1980).
		Decree-Law No. 1/2019 of 30 January	Organic Law defining the XVII Constitutional Government
		Law No. 4/2010, of 18 June, PAS	Law defining the efficiencies Political-Administrative Statute of Principe Island.
Laws	Energy Sector Laws and bylaws	Decree-Law No. 26/2014, RJSE - Regime Jurídico do Sector Eléctrico	Legal framework of the electricity sector.
		Decree-Law No. 26/2014	Decree-Law No. 26/2014 governs electricity supply tariffs and billing of the service.
		Decree- Law No. 1/2020 of 17 February	Establishes special regime for acquisition RE electricity for EMAE.
		AGER Resolution No. 1/2016, assisted by EMAE Order No. 7/2016, of 27 October	EMAE's Customer Ombudsman System.
		Quality of Service Regulation (Resolution No. 020/CA/2017 of 29 December	Establishes the technical and commercial quality of service obligations by the national electricity system services.
		Decree-Law No. 15/2019	Regulation of Regulatory Fees for the electricity sector
	Concessional Regime for minigrids	Article 53	Allowing entities in isolated location not connected to the national and below 150 kVA, to qualify for authorization to operate a local grid.
	Environmental legislation (pertinent to the energy sector)	Decree-Law No. 10/1999	Legal framework for the environment.
		Decree-Law No. 37/1999	The Environmental Impact Evaluation (EIE) Regime, approved by Decree-Law No. 37/1999.
Cross-cutting policy and regulation	Fiscal policy	Corporate Income Tax Code, approved by Law No. 16/2008 Personal Income Tax Code, approved by Law No. 17/2008)	Legislation governing tax and duty obligations of companies. Activities in the energy sector are subject to a 5% tax rate on the supply of services which is levied on the value of the supply of services and is payable by the final consumer, which is a common practice of the only electricity

Policy / planning document		Name	Relevance
		Stamp Duty Regulation, approved by Decree- Law No. 7/2005 Consumption Tax, approved by Decree-Law No. 9/2005	supply company, EMAE. There is no Value Added Tax (VAT).
	Customs	Harmonized Commodity Description and Coding System (Decree-Law No. 1/2000, of 28 January, with subsequent amendments, Decree No. 12/2009, of 24 June) Community Integration Contribution of 0.4% (Decree-Law No. 23/2005 of 28 November)	Regulation and taxation schemes for imported goods.
	Public-Private Partnerships Law or Framework	Investment Code (approved by Decree-Law No.19/2016 of 17 November)	The Code refers all incentives and benefits to the Tax Benefits Code (Article 21)

Barriers and risks to renewable energy minigrid development in STP:

20. During the PPG and based on the Derisking Renewable Energy Investment (DREI) Methodology developed by UNDP, the following key barriers, and risks to expansion of minigrids in the country were evaluated. Information sources were stakeholder consultations, inception workshop and desk review.

DREI Risk Category	Description/Underlying Barriers	Risk Level	Comments
1. Energy market risk	*Policy & regulatory framework, market access, competition and grid expansion:* Upgrades and reforms to the STP electricity sector are underway, including the creation of AGER as the regulator. However, the market still largely works as a single-utility model, with EMAE as the sole buyer and operator of the grid system and most of the generating power. The isolated diesel grids in the south, operated by EMAE, are now being interconnected. Plans for RE and EE development have recently been adopted. The current sector model does not foresee MG systems nor independent (private) companies, but non-utility grids (below 150 kW) can apply for authorization.	High	Recent PANER and PANEE approved.
	Market understanding and outlook: The sector's main problem is adequate and reliable supply. Latent demand and current peak demand (40 MW) greatly outmatch generation (19 MW), and transmission infrastructure and dispatch systems need further upgrades. Investment in Generation, Transmission and Distribution (GT&D) is taking place with MDB funding, but it will take long time for end-users to have the benefits of	Medium	One may expect that STP sector entities are not familiarized with innovative approaches and concepts.

DREI Risk Category	Description/Underlying Barriers	Risk Level	Comments
	(Tier 5 supply)[28]. Moreover, it will cater the wealthier social / economic strata as poor people lack income to afford Tier-5 consumption level and connect informally, or do not connect to the grid at all (in rural areas). ESCO-like services to rationalize electricity use and implement EE solutions (including RE capacity behind the meter) are not receiving due interest, and their market is small. A DESCO approach/grid-tied MG (behind and before the meter) has not been considered yet in STP and would require further regulation.		
	Tariff and competing subsidies: Electricity Tariffs are regulated per customer type. In the absence of enforced quality standards and with intermittent supply, there is no clear relation between price and service. A revised tariff scheme has been prepared by AGER with World Bank support but has not been adopted by the Government yet. For sustainable operation of the system, including minigrids, the tariffs must cover OPEX as a minimum or be complemented through subsidies or performance-based revenues.	Medium	The quality criterion puts into question the price/ service relation for MG and EMAE.
	Technical standards: Technical standards for MG are not in place in STP. Government nor EMAE has experience so far with the application of international industry standards in MG tenders; STP can borrow on expertise in other countries under MLF programmes. It is not clear how customer's internal installations (household or commercial) are verified for acceptance by EMAE, and how the impact of irregular connections on grid supply and stability, is controlled.	Medium	Technical standards should consider the local tropical climate conditions and risks of natural disaster such as flooding.
	Data availability on electricity and energy end-uses: Quantitative information on electricity end-use is very limited as such information, even at aggregated level, was measured at only few points in the grid system. Recently, World Bank upgrades incorporate status measurements at substations and transformers. Smart meters are being introduced enabling measurement of consumption patterns among EMAE customers in the coming years.[29] An analysis of energy demands (including suppressed demand) for electricity and other energy sources, for households according to socio-economic profile and geographic locations, has not been made. The lack of data is a barrier for the identification of opportunities for fuel switching, and to understand people's preferences and choices (such as fuel stacking). In order to decarbonize STP's energy sector, the Government would need to adopt a holistic view on energy end-uses beyond electricity supply. This would require new competences and methodologies which may not be available in the sector.	Medium	For MG operators and ESCOs understanding end-user needs and consumption are at the heart of the business model.
2. Social Acceptance risk	*Awareness of MG/RE systems:* Solar panels and electric appliances are not new to STP but are considered out of reach by poor people and the lower middle-class.	Low	Differentiation of the message plus outreach in function of socio-

[28] Tier-5 acces is the highest level of electricity access in the ESMAP Multi-Tier Framework for Measuring Access to Electricity. By offering almost 24-hour supply and not more than 3 disruptions per week (less than 2 hours in total) and adequate voltage quality, it allows businesses to operate continuously. Unit energy costs are relatively low, offering a standard consumption pattern at a cost typically less than 5% of household income. For more details see: https://mtfenergyaccess.esmap.org/methodology/electricity.

[29] WB Energy Sector Recovery Project, August 2020. https://www.afap.st/phocadownload/Extension_Deadline_Procurement_Notice_Metering_Solution.pdf

DREI Risk Category	Description/Underlying Barriers	Risk Level	Comments
	Energy cost issues and the urgency to save energy and reduce oil imports are in the daily news but more support is needed to transform this awareness into operational action.		economic target group can increase effectiveness of awareness campaigns.
	Willingness to pay for adequate (MG) electricity service: Experience in other countries shows that people are willing to pay more for a better service. Often, people manage to monetarize part of the benefits enabling them effectively to pay a higher bill and attain a higher quality of life. In STP, many rural people use very little electricity making MG not cost-effective, their main energy demand being heat and mechanical power. These may be served by PV lantern and cell phone charging schemes. Informal connections are common in the utility-served area with many customers not paying for the service (commercial losses are estimated at 25%). In these areas, it will be challenging to change the attitude and make people aware that the services come at a cost.	High/medium	Pay-as-you-go meters can accompany customers during their demand growth process.
	Electricity tariff setting: While people tend to accept cost-reflective tariffs as these imply an improvement to their baseline, regulated tariffs can create an acceptance barrier. The tariff structure then translates into a social, and political risk, often generating a status quo. In STP, the most likely scenario is a differentiated, but geographically uniform tariff model for the entire country. This would imply cross-subsidies between customer groups and financial injections (operational cost subsidies) for financial sustainability.	Medium	
	Social stigmatization: In many countries and cultures, technologies have a status-bias which means that offering anything below the nominal solution (i.e. full grid power) is rejected. This attitude may impede offering solutions such as below Tier-4 electricity, SHS, low-voltage grids, small appliances, etcetera. More information is needed to assess this risk for the context of STP.	Medium	Positive communication highlighting the obtained benefits.
3. Hardware Risk	*SIDS equipment market barriers:* Small market volumes and high transport costs lead to high costs of imported equipment. In STP, this is exacerbated by complex import requirements, duties and levies. Global supply chain issues due to petrol price increase and post covid economy recovery as per 2022, may cause suppliers to ignore small markets such as STP, moreover if the business environment is unattractive.	High	Require tax and duty exemptions for energy equipment and services.
	MG hardware quality and performance risk: Although technically mature, imported MG hardware should be treated as capital goods with extended supplier responsibility, service contracting, engineering, procurement and construction (EPC) contracting to control hardware risks. The PPG mission found many assets in a deteriorated state or no longer functional. Given the harsh climate conditions and poor maintenance culture and resources, caution is needed to ensure long-term technical sustainability.	High	Check whether simplified technologies can be applied. Identify and elaborate an appropriate product philosophy and ensure continuity. External supervision can help mitigate this risk.
	Appliances to promote electricity demand: Quality electric appliances target high-end market with poor-quality equipment targeting majority population. Product warrantees are minimal with little options for enforcement. Technical standards and EE standards for electric appliances are work in progress.	Medium	Eligible appliances can be delivered to the market under approved financing schemes. Electric bicycles and scooters may be

DREI Risk Category	Description/Underlying Barriers	Risk Level	Comments
	This leads to higher costs for the final energy service and may undermine customers' confidence in case of malfunction. Given low per capita electricity use, the market for electric appliances in STP is underdeveloped.		considered as a productive use (delivery services).
4. Digital Risk	*Digital system design and delivery capacities:* Cooperation partners including UNIDO are pushing forward GIS tools for RE planning. World Bank is assisting in implementing control systems (SCADA) in T&D infrastructure, and smart meters are being procured through AfDB. Yet, a local ecosystem for (functional) design and for maintaining such systems in STP, is not in place. There is a substantial risk that such systems may become degraded over time.	Medium	Experience from other sectors can help strengthen management schemes.
	Data management and purview: Public sector capacities for planning and sector purview in STP face barriers due to organizational weaknesses, staffing, tools and financial resources. A multi-sectorial approach to planning may allow for more effective use of people, competences, and digital infrastructure for planning, including planning for resilience. However, this requires political buy-in and a positive attitude towards the exchange of information between government bodies.	High	A high-level dialogue can take a cross-sectorial approach.
	SIDS limitations: The size of STP may prove too small to set up effective digital systems and data management processes. The Government may consider collaborating in regional organizations with countries facing similar problems to create economies of scale and leverage competences and funding.	Medium	Options include ECOWAS and PALOP (African Countries of Portuguese Official Language)
5. Labor Risk	*SIDS labor market constraints:* Being a SIDS, STP faces systemic challenges to source sufficient and well-prepared human resources to develop, operate and maintain MGs. Due to low average salaries in STP, skilled individuals may migrate to find work in other countries.	Medium	Opportunities for cooperation exist in the regional context.
	Technical and professional skills: Operation and maintenance of MG systems requires fast responses to maintain service standards. There is currently no culture, nor capacity, to keep service quality up to standards. There is no strong track record in organizing electricity supply to ensure that qualified staff, materials including spare parts, logistics and oversight are in place when required. The MG operator needs to combine a broad skill set.	Medium	Digital technologies and Responses remote monitoring can support preventive O&M.
6. Developer Risk	*Public sector expertise and track record:* The utility EMAE has implemented some (of the order of 5) isolated grids in STP and owns the assets. These systems are now being integrated into one, island-wide, grid system in Sao Tome, and a separate system on the island of Principe. The utility being technically and financially overstretched, and with the demand center of gravity in the urban areas (Sao Tome) and large consumers (public facilities), it is unlikely EMAE can free up resources to address the presently underserved population.	High	End-users are aware that service delivered by EMAE is not up to standard.
	Private sector expertise and track record: Private minigrids do currently not exist in STP. Technology suppliers are involved in programs to restore and expand GT&D infrastructure (large PV, existent hydropower), which are larger-volume contracts with reduced risk profiles. A retail market exists for small RE equipment (SHS), appliances and back-up systems (battery Uninterrupted Power Supply). The market for integrated energy solutions for larger clients (e.g., by ESCO's) is limited to specific customers, including some tourist facilities	Medium	Installations are essentially understood as self-supply or IPP

DREI Risk Category	Description/Underlying Barriers	Risk Level	Comments
	(eco-lodges). There is no experience with the ESCO business model and notably, these clients are equity driven. Similarly, the operation of a distribution grid under a minigrid model has not been pioneered in STP.		
	Business model risks: Given the small customer potential for MG in STP, developers face great challenges to become financially sustainable (even with CAPEX subsidized). This makes MG businesses in most cases unattractive for investors. Given poor purchase capacity among the general population, value creation at community level is critical to reduce the gap between service costs and service revenues. A local anchor tenant can improve financial sustainability and subsidize other consumers during MG growth phase.	High	Guarantees are required to secure a positive cash flow over time.
	Ownership risk: Under the utility monopoly and imminent grid arrival, autonomous (private or community) MGs cannot sensibly use their assets as collateral. An alternative scenario can be that the assets are public property and leased to the MG operator. However, there is little experience with outsourced services in the electricity sector and associated contract modalities (such as performance contracting).	Medium	
7. End-user Credit Risk	*Income level and collateral:* The majority of the population is not credit worthy as a result of poor purchase capacity and absence of collateral. More wealthy customers are found very reluctant to assume bank loans and finance their assets entirely from their equity. Income levels in rural areas are very low,	Medium	A differentiated approach, including low-cost schemes is required. Opportunities exist for introducing digital money for small-scale agricultural production.
	Financial products tailored to energy supply and services: Credit lines from commercial banks (BISTP) are available in the country. There are no tools (such as credit score cards) to assess end-users' ability to pay for electricity services and required appliances. For productive uses, financiers in STP do not accept the value of future production units (e.g., agricultural produce, workshop items, services) as collateral for lending, or they lack the knowledge and tools for proper assessment.	Medium	
8. Financing Risk	*Country and sector risks and limitations:* The utility-driven grid expansion process makes the time horizon for MGs highly uncertain thereby deterring private investors and lenders. Given STPs small population, minigrids face challenges to transit the "valley of death" and become financially sustainable. A specific financing risk in STP is the counterpart risk with the utility EMAE.	High	Diversification of the service offered by a MG operator could improve overall business.
	Business model and track record: Minigrids lack a track record in STP which translates into a high perceived risk concerning both technical performance and a proven business model.	High	Positive experiences can reduce perceived risk.
	Domestic investment and commercial banks: National financial institutions are small and not prepared to approve loans to private developers. Project proposals submitted in recent years recur to international financiers and programs, not to the local bank sector. Government spending is backed up by multilateral and bilateral development banks and funds. The local sector has limited capacity to assess applications for energy systems by customers, beyond standard consumer credit lines.	Medium	Local banks will likely play a minor role in the near term.
9. Currency Risk	*Exchange rate risk:* The national currency Sao Tome (nova) Dobra STN is pegged to the Euro (1 EUR = 24.5 STN). As such the exchange rate risk is the same as	Medium	Mitigation measures include: short payback times; contracts in hard

DREI Risk Category	Description/Underlying Barriers	Risk Level	Comments
	for USD to EUR. However, government may decide to devaluate the STN during the Project's time horizon or the lifetime of energy assets.		currency; hedging of currency risk.
	Political risk: The country is relatively stable and responsive to the recommendations issued by its multilateral partners.	Low	
10. Sovereign Risk	The negative fiscal and commercial balance undermines STP's ability to take new loans to finance additional debt. The sovereign risk can be mitigated by the international lending community (e.g., IMF, IDA) offering STP a protected status. Without such status, Government may become forced to devaluate the STN and cut public spending including on energy services and infrastructure.	High	

III. Strategy

The Africa Minigrids Program (AMP)

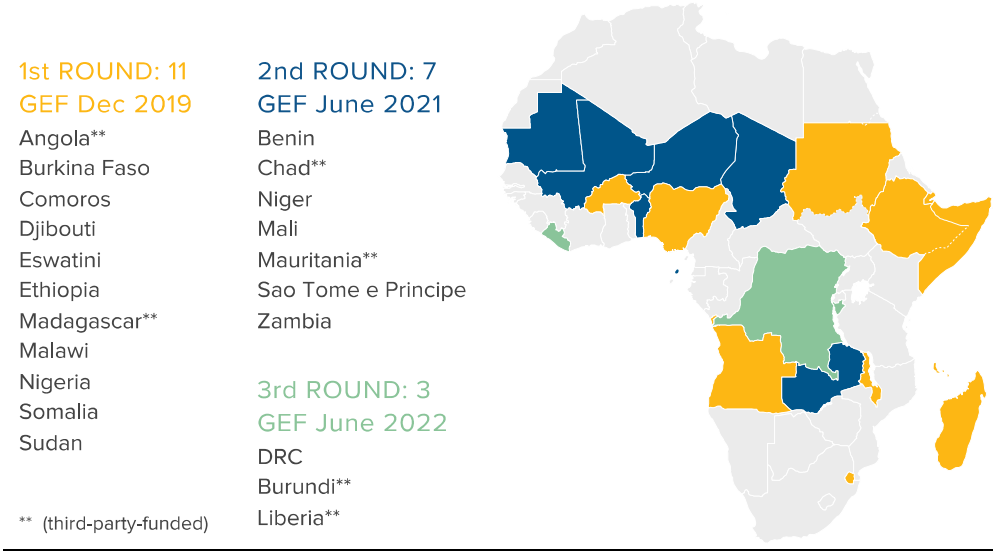
21. Programmatic approach. This project is part of the broader **Africa Minigrids program (AMP)**, a regional technical assistance program with the objective of supporting access to clean energy by increasing the financial viability and promoting scaled-up commercial investment in renewable minigrids, with a focus on cost-reduction levers and innovative business models. The programmatic approach aims to achieve greater impact by creating new minigrid markets across the African continent, which, in aggregate, will create scale and momentum, attracting private sector interest and investment. It will also allow for a broader sharing of knowledge and good practice and create economies of scale in providing program services.

22. Program design. As shown in **Figure 3** below, AMP is comprised of two main elements: (i) a **Regional Project**, acting as the knowledge, advocacy and coordinating platform of the Program; and (ii) a cohort of an initial **21 AMP National Projects** that share a common approach, seeking to reduce minigrid costs via four country-level components: (i) policy and regulations, (ii) business model innovation with private sector, (iii) scaled-up financing and (iv) digital, knowledge management and M&E.

Figure 1. Africa Minigrids Program's Architecture

23. The program is initially supporting three rounds of national projects, totaling 23[30] in number, which together host an estimated total of **396 million people without electricity**,[31] or more than two thirds out of the 587 million total people without access to electricity in Africa. The initial AMP participating countries are shown in Figure 2 below.

Figure 2. Africa Minigrids Program's participating countries list and map[32]



24. Program's Theory of Change (ToC). This project will follow the AMP Theory of Change (ToC), developed in the Program Framework Document (PFD) and set out in **Figure 3** below. This TOC is premised on a baseline context where, while good progress is being made, several risks and barriers are driving high financing costs (equity and debt) and reducing the competitiveness of minigrids with respect to fossil-fuel based alternatives. All else being equal, the need for higher returns that reflect these risks translates into higher energy prices that, in turn, adversely affect affordability for the end-user, or require larger subsidy requirements for rural electrification programs. As a result, renewable energy minigrids do not get financed and built at scale. By focusing on cost-reduction levers and innovative business models, the project can improve the financial viability of renewable energy minigrids which in turn can accelerate and scale up their adoption as part of the effort towards achieving universal energy access. When renewable energy minigrids are more competitive, private capital and commercial financing will then flow, resulting in various program benefits: investment at scale, GHG emission reductions, and electrification and lower tariffs for end-users.

[30] A first round of 11 national projects approved at the concept stage in the GEF December 2019 work programme (Angola, Burkina Faso, Comoros, Djibouti, Ethiopia, Eswatini, Madagascar, Malawi, Nigeria, Somalia and Sudan). A second round of 7 national projects have been approved at the concept stage in the GEF June 2021 work programme (Benin, Chad, Niger, Mali, Mauritania, Sao Tome & Principe, and Zambia).). A third round of 3 national projects (Burundi, DRC, Liberia) have been approved at the concept stage in the GEF June 2022 work programme.
[31] IEA (20212, Tracking SDG7: The Energy Progress Report, 2022, IEA, Paris https://www.iea.org/reports/tracking-sdg7-the-energy-progress-report-2022.
[32] The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations or UNDP concerning the legal status of any country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries.

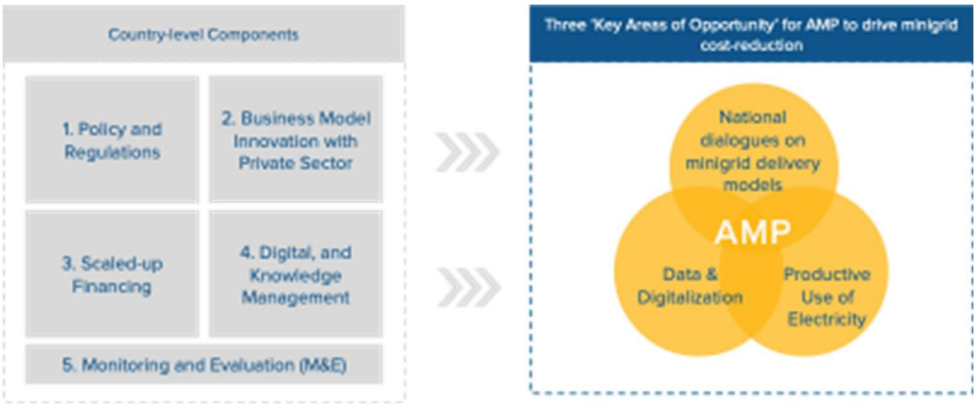
Figure 3. Africa Minigrids Program's Theory of Change

25. Alignment with GEF focal areas. The proposed strategy is aligned with the GEF Strategic Focal Areas CCM-1-1 "Promote innovation and technology transfer for sustainable energy breakthroughs for de-centralized renewable power with energy storage", and CCM-1-3 "Promote innovation and technology transfer for sustainable energy breakthroughs for accelerating energy efficiency adoption".

26. UNDP's Derisking Renewable Energy Investment (DREI). The Program's TOC draws on UNDP's Derisking Renewable Energy Investment (DREI) Framework by focusing on cost reduction levers across the themes of policy and regulation, business model innovation and private sector, innovative finance, as well as digitalization that can be employed to reduce risk (e.g. policy derisking), compensate for risk (e.g. financial incentives) or transfer risk (e.g. financial derisking). DREI is an innovative, quantitative framework to support policy makers to cost-efficiently promote private investment in renewable energy. In late 2018, UNDP expanded the DREI framework to include solar PV-battery minigrids, releasing open-source analytic and financial modelling tools to track investment risks, financing costs, and to support the private sector and policymakers in modelling levelized costs, tariffs and subsidies for minigrids. As regards AMP, UNDP's DREI framework will be applied either qualitatively and quantitatively at various points in the project cycle, both at the national level in each country, and then aggregated into regional knowledge products by the AMP Regional Project and disseminated widely. The DREI framework, both at the national and regional level (in aggregate), will act as the program's mechanism to harvest and disseminate data on changes in the financing costs, hard and soft costs, and resulting costs for minigrids.

27. Program's 'Key Areas of Opportunity'. The AMP has adopted a common architecture of four key components - a combination of enabling policy and regulations, business model innovation with private sector involvement, innovative financing and digital innovation - as the levers to lower investment risks, thereby reducing financing, hardware and soft costs while increasing revenues and improving system efficiencies. Within this architecture, AMP will emphasize - and seek to develop comparative advantages - in three 'key areas of opportunity': (i) an emphasis on advancing national dialogues on minigrid delivery models, (ii) promoting productive uses of electricity, and (iii) leveraging data and digital solutions for minigrid cost-reduction. Collectively these three areas can guide AMP's overall direction, creating a niche identity for the program. This approach, illustrated below in Figure 4, is structured to advance the program objectives of cost-reduction and innovation for minigrids and give effect to the TOC. The way in which this project will address these areas of opportunity is described in detail further below.

Figure 4. AMP's Key Areas of Opportunity



28. *National dialogues on minigrid delivery models*. A delivery model (refer concept in Box 1) that is suitable to country expectations and context for minigrids has proven critical to establish an enabling and attractive investment environment for minigrids. Equally, a delivery model that has not been defined or is consistent with the national context, will be a certain impediment to scaled-up investment. An important focus of the AMP is therefore to encourage a national dialogue between key stakeholders in support of a suitable delivery model being defined.

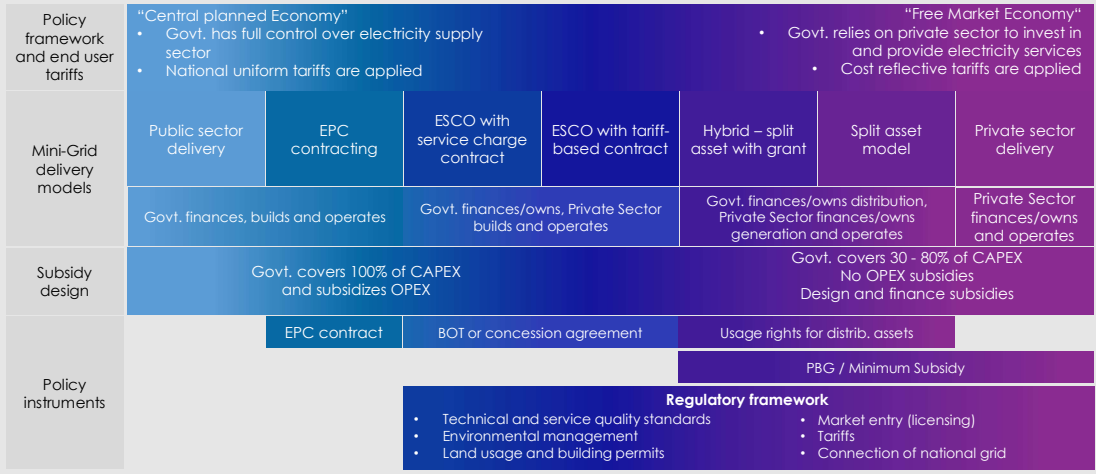
Box 1. The Concept of a Minigrid Delivery Model

The concept of a minigrid 'delivery model' is a key concept for the AMP. This text box seeks to set out a common understanding of the concept and its importance to the national projects and overall program.

Definition: A minigrid delivery model, determined by the national government, is the cornerstone of a country's over-arching minigrid regulatory framework. It defines who finances, builds, owns and who operates and maintains the minigrids. Where applicable, it seeks to engage the private sector. A minigrid delivery model is closely associated to other key components of a minigrid framework, including tariff structures/mechanisms and subsidy levels/mechanisms.

In each country, identifying one (or more) delivery models will provide a framework for all sector stakeholders to plan for the longer term, particularly with regard to mobilizing private investment as one of the main objectives of the project. Figure 5 below describes the spectrum of design options for delivery models, across a number of different elements (ownership, policies, finance etc.)

Figure 5. Conceptual outline of minigrid delivery models



Source: JAKOB SCHMIDT-REINDAHL, Mini-grids Policy Expert, INENSUS

This decision-making process around identifying a delivery model is complex and countries will be encouraged to establish a national dialogue for this purpose, involving all relevant stakeholders to varying degrees (different ministries such as energy, finance, health and environment, local authorities, the public, the media, the beneficiary communities, utilities, the private sector, and other key stakeholders) in order to build a national consensus on the basis of which large-scale deployment of mini-grids can be accelerated and have a sustainable impact.

29. *Digitalisation (digital solutions and tools) and harnessing the data opportunity.* The emergence of minigrids as a viable solution to electrify remote and isolated communities relies strongly on digital tools and solutions[33]. Digital technologies and solutions are fundamental to enabling off-grid electrification and offer significant potential to lower minigrid costs, reduce risks, and address barriers to scale. Many of the opportunities around digitalization are related to leveraging the large amount of data generated by minigrid projects to surface insights, learning and optimization. Data is a tremendously valuable asset in the minigrid sector that remains underutilized. The programmatic approach allows the AMP to make an impactful contribution to growing a data asset and harmonized digitalisation in the sector. Employing digital integration as catalyst for the minigrid sector reflects the UNDP digital transformation strategy that initiated a comprehensive process of connecting knowledge within the organisation and across networks, creating opportunities, improving operational

[33] Solutions are commonly grouped into four categories: (i) digital planning, (ii) digital operations, (iii) digital aggregation platforms, and (iv) digital payments.

efficiencies and building and maintaining partnerships and alliances. It also echoes the broader UN data-driven strategy and commitment to advance global "data action" with insight, impact and integrity.

Box 2: Digitalization and Minigrids

Digital opportunity for minigrids Figure 6 below shows different categories of digital solutions in the minigrid sector: (i) digital planning, (ii) digital operations, (iii) digital aggregation platforms, and (iv) digital payments. In common to all these is the potential of digital technologies – whether used by policy makers, financiers or minigrid developers - to lower minigrid costs, reduce risks, and address barriers to scale.

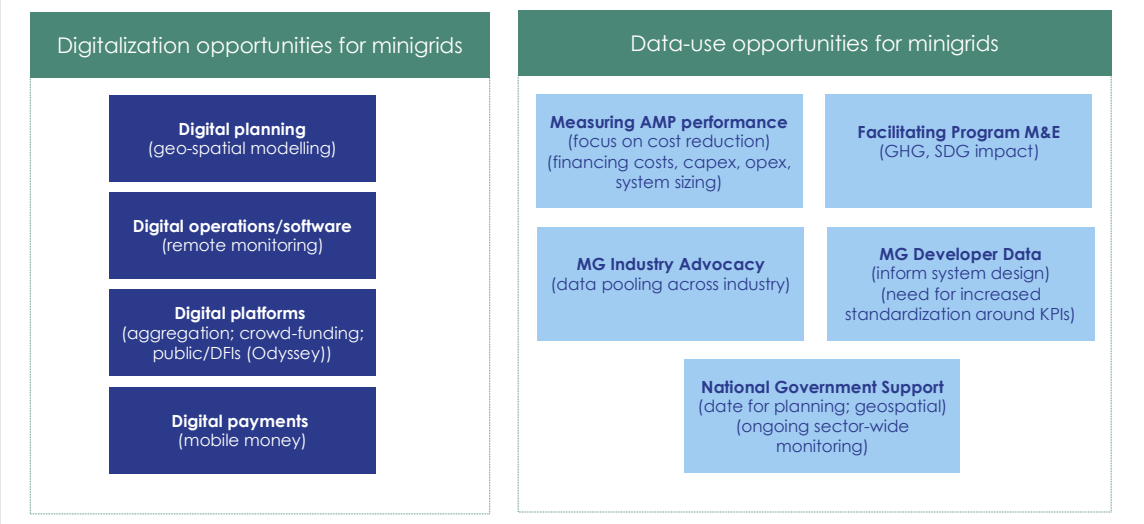


Figure 6. Digital and data opportunities for minigrids in the AMP

Data use opportunity for minigrids. Many opportunities around digitalization are related to leveraging the large amount of data generated by minigrid projects to surface actionable insights, learning and optimization to consolidate business models and technical solutions for scaling-up minigrids. For instance, the use of operational performance information from existing systems to forecast demand and design future minigrids can help avoid a very common pitfall of many minigrid systems which are significantly oversized and hence not financially viable.

Opportunities across the Program, and with the AMP regional project. The AMP provides a unique opportunity to develop a single set of metrics and guidelines for data collection, and use them to collect data from minigrid investment pilots across different national projects which the AMP Regional Project can then aggregate, derive insights from, and systematically disseminate knowledge with participating AMP countries and with the broader minigrids sector in Africa. At the same time, the link between the regional project and the total of eighteen (18) national child projects provides a unique 'distribution channel' opportunity across Africa for AMP to mainstream the use of digital tools and solutions for minigrids cost-reduction and scale-up.

30. *Productive uses of energy (PUE)*. While PUEs are widely recognized as a key element to improve the viability and sustainability of minigrids, the AMP focus is uniquely tailored, taking a deliberate, integrated approach across a broad ambit of the Sustainable Development Goals (SDGs)[34]. With the benefit of global experience and

[34] As described by SEforAll, access to energy is not the end in itself, but a means to many ends. Reliable and affordable energy is needed to improve living standards, increase rural incomes, support delivery of health and

best practices, the AMP pursues solutions where productive uses are embedded in agricultural value chains or around which economic activity can be anchored. The AMP's emphasis on energizing agricultural production is based on the demonstrated impacts and amplified benefits resulting from (i) improved product quality and increased yields, (ii) contributions to value addition, (iii) increased value retention within the rural communities, and (iv) contributions to socio-economic developmental objectives for rural areas, which in turn has a positive effect on the minigrid revenue model. Further recognizing that these multiple benefits cannot be assumed with energy access, but depend on wider development programmes, the AMP approach combines the delivery of electricity infrastructure with innovative business models and various interventions aimed at encouraging economic activity, support business development and stimulate rural economic transformation with an emphasis on improved wellness, empowering women and youth as well as ensuring sound social and environmental stewardship.

31. Minigrid investment pilots' contribution to the Program's Theory of Change (TOC). National Projects include funds under Component 2 (Business model innovation and private sector) for supporting minigrid investment pilots seeking to demonstrate innovative business models and cost-reduction opportunities. Minigrid pilots have a key role within AMP by contributing to demonstrate cost-reduction which can be leveraged to improve the financial viability of renewable energy minigrids. Minigrid pilots are aligned with one or more of the three key areas of opportunity mentioned above by demonstrating: (i) a particular delivery model or elements of a delivery model around which the government wishes to build capacity and engage with minigrid developers; (ii) productive uses of electricity and their potential to reduce costs and enable minigrid development at scale; and/or (iii) opportunities around digitalization and the use of data for minigrid cost reduction. Feedback loops to other national project activities (e.g. national dialogues, capacity building) and with the AMP Regional Project (e.g. Community of Practice) are intended to actively disseminate the learnings from the pilots to inform both the policy and regulatory environment as well technical capacity building.

AMP National Project in São Tomé and Príncipe (STP)

32. The STP child project follows the common theory of change developed in the AMP Program Framework Document (PFD), which is premised on a baseline context in which several risks and barriers are driving high financing costs (equity and debt), which translate into higher energy prices that adversely affect affordability for the end-user and demand for tariff subsidies for rural electrification which governments may not be able to sustain in the long run. By focusing on cost-reduction levers and innovative business models, the AMP aims to improve the economy and financial viability of RE minigrids. With RE minigrids becoming more competitive, risks for private investors reduce and private capital and commercial financing flow in, resulting in investment at scale, accelerated electrification with associated GHG emission reductions, and lower tariffs for end-users. Specifically, the AMP envisions and seeks to develop comparative advantages in three 'key areas of opportunity': (i) advancing national dialogues on minigrid delivery models, (ii) promoting productive uses of electricity, and (iii) leveraging data and digital solutions for minigrid cost-reduction.

33. The Project's objective is: "To support access to clean energy by increasing technical and financial feasibility and by promoting scaled-up commercial investment, in low-carbon minigrids in São Tomé and Príncipe, with a focus on cost-reduction levers and innovative business models." Specifically, the STP project aims to increase

educational services, and improve gender and social inequality. It also enables access to clean cooking technologies and fuels – essential to reducing indoor air pollution and associated health risks. https://www.seforall.org/sites/default/files/Beyond-Connections-Introducing-Multi-Tier-Framework-for-Tracking-Energy-Access.pdf

the supply of adequate, reliable, affordable, low-carbon electricity for unserved and underserved communities in STP, with a focus on productive end-users[35].

34. The Project will follow a two-pronged approach by: (1) fostering dialogue and building a conducive regulatory framework for grid-tied and isolated minigrid electricity delivery models in STP; and (2) accelerating the market off-take of low-carbon electricity technologies including minigrid solutions and small-scale generation systems and energy-efficient electric appliances.

35. Through its focus on value creation from electricity inputs, the Project's Theory of Change is to transform the current, vicious cycle of low productivity and poor electricity service which makes the electricity service unsustainable, into a virtuous cycle, in which: (1) improved electricity services enable higher productivity, which in turn: (2) triggers increased demand and: (3) generates the necessary revenues (increase in purchase capacity) to sustain the electricity service.

Minigrid Delivery Model(s) in Sao Tome and Principe

36. As minigrids have so far not been considered in Sao Tome and Principe's energy sector framework, key elements for devising a mini-grid delivery model are presently undefined. The island is small and the utility EMAE has the ambition to reach 100% coverage by 2030. Financially supported by World Bank, European Investment Bank, and African Development Bank, investment is ongoing to upgrade the country's generation and T&D infrastructure.

37. Managerial, technical, and operational constraints however make 100% main grid coverage unlikely to happen in the medium future. As such, a discussion has started towards the adoption of alternative schemes, including minigrids, distributed (embedded) power systems at end-user premises, and demand-side management. Parallel to this discussion, is the urgent need to reduce dependency on fossil fuel imports due to intermittent supplies and prohibitive market price levels (as of Q2, 2022). In practice, an enhanced operational model is welcomed as a way to mitigate current weaknesses. A firewall between politics and electricity sector operations is also needed to combat commercial losses and implement sound business practices.

38. At this stage, it is not defined whether minigrids can be 100% private, or mixed-capital. Similar conclusions can be drawn for weak grid areas, which could be operated as an embedded (grid-tied) minigrid. Regulation into this direction (e.g., smart grids) is identified as a priority action in the PANEE. The Energy Services Company (ESCO) model could be an appropriate delivery model to attract private sector participation.

[35] Indicatively: small businesses (from micro to SME) with commercial, agri-food, and manufacturing activities. Tourism is a large commercial sector. Public services may also be considered as a productive use (social/human capital).

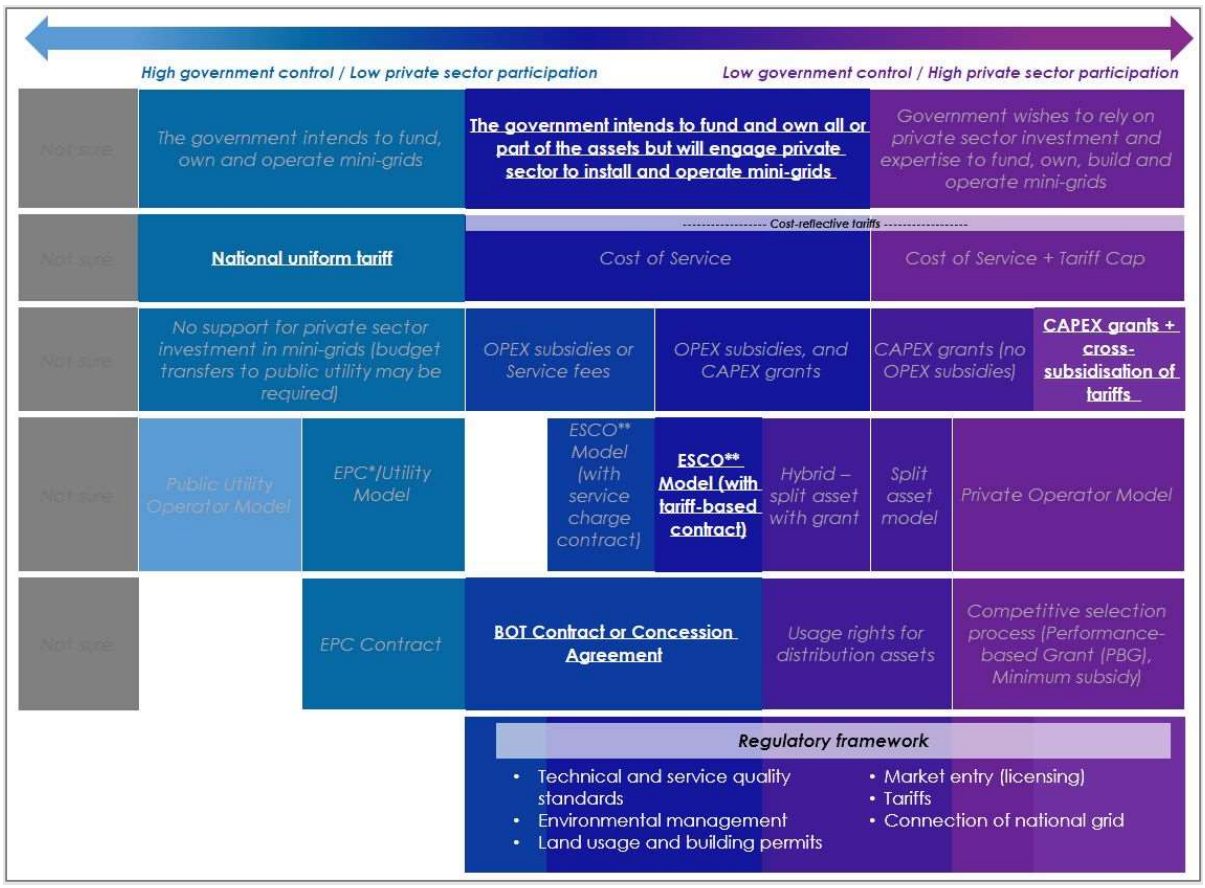


Figure 7 Preliminary identification of Minigrid delivery model for Sao Tome and Principe (Figure and methodology from: Jakob Schmidt-Reindahl, INENSUS)..

Current Status Minigrid Delivery Models in Sao Tome and Principe

Error! Reference source not found. summarizes the key aspects of the minigrid delivery model in Sao Tome and Principe based on the current policy and regulatory framework.

Table 2 Current status of minigrid delivery models in Sao Tome and Principe.

Aspect	Current Status
Ownership and Operation	Budgetary limitations make sector development reliant on concessional funding. Policy for private sector participation is in place for production (IPP) and in progress for distributed power systems by consumers (such as net metering). The utility's management issues are acknowledged but so far third parties are not allowed to operate the grid (or parts thereof. The small size of STP in combination with very low income levels makes it a less attractive market for private sector, which will unlikely invest in grid infrastructure due to high asset exposure. Financial guarantees (alongside evolving sector policy) are required to absorb these risks, which can only be provided by the State backed up by its financiers.
Tariff mechanisms	Not defined for minigrids. Currently, differentiated tariffs are applied according to customer type; these are uniform for the entire territory. The tariffs were last updated in 2007 and are not cost-reflective. With World Bank assistance, AGER developed a new scheme (2020) including a social "lifeline" level and progressive unit cost in function of the energy consumed. However, this has not been adopted by the Government. Social acceptance is a serious concern, especially in a context in which some groups of customers are reluctant to pay the electricity bill and no counter measures are taken, while others connect informally, undermining system reliability and general public's willingness to pay for utility service. For prospective minigrid operators, this situation is challenging. Given its small size, a geographically differentiated tariff is not likely as this may lead to inequalities in energy costs for productive customers putting those in rural areas in a disadvantaged position.
Subsidy mechanisms	Not defined. With a geographically uniform tariff, cross-subsidies will be in place. Currently, sector investment is back by high concessional funding from multilateral banks (grants). CAPEX subsidies can be expanded to minigrids and distributed power systems (such a rooftop PV integrated into a local minigrid model).
Regulation	Not defined. Sao Tome and Principe does not have a policy for off-grid electrification, neither a delimitation of areas that are foreseen to remain unserved by the main grid. The utility EMAE still acts as the de facto monopolist including sector planning but a gradual shift of sector governance has started. Electrification challenges in the country are a combination of unserved (officially 13% of population) and underserved affecting large sectors of the population (due to weak distribution grids, insufficent generation capacity, and high technical and commercial losses). The isolated, utility diesel grids in the country are affected by fuel availability and costs, and management issues.

39. The AMP envisions three types of pilots: (i) Greenfield minigrids, (ii) Hybridization of existing or planned diesel minigrids, and (iii) A productive use overlay to an existing or planned minigrid. The Project Preparation Phase has identified three (3) minigrid schemes as highly relevant for Sao Tome and Principe. In STP, the productive use overlay is not directly pursued but energy supplies for creating economic and social value is a key aspect of all proposed pilot types. The identified minigrid schemes serve as reference to design minigrid pilots under the Project, as outlined in Table 3. Each scheme serves a different category of end-users (market niches), involves

different technological solutions, and has different potential for replication. Importantly, each scheme has associated risk and the overall risk profile varies.

Table 3. Minigrid pilot types pursued by the project.

Type of pilot	Description	Scenario without project (baseline)	Use of GEF funds
Hybridization of existing or planned diesel minigrids (rural population)	"Minigrid Scheme 1: Hybridization of existing, isolated, utility diesel-grid with RE generation, MG management model and payment scheme." The population size is typically between 1,000 and 3,000 people per community. The Minigrids Pilot Plan would further document the justification (if any) of hybridizing instead of replacing existing minigrids for sites	Diesel-only minigrid system with intermittent service.	GEF funding will not be used to finance interventions to hybridize existing minigrids where the diesel capacity is increased. In no cases will GEF funding ever be invested in fossil fuel power generation assets. The GEF funds will go towards adding PV-capacity to the existing diesel minigrid and progressively phasing out the legacy diesel plants, alongside upgrading of distribution grids, implementation of metering service and adequate business operations
Grid-tied minigrids based on distributed RE generation (urban/peri-urban population)	"Minigrid Scheme 2: Embedded distributed power generation by private commercial "prosumers" to strengthen weak utility grid." Typically, grid distribution areas of 5,000 to 10,000 people with about 100 "prosumers" are targeted.	Existent Intermittent utility grid service.	GEF funds and co-finance will be used as CAPEX subsidy for eligible RE/EE proposals by "prosumers" in targeted grid areas.
Greenfield minigrids (rural population)	"Minigrid Scheme 3: RE-based MG in small, remote, off-grid community with public service anchor tenant, following MG management model and payment scheme." The population size is typically between 30 and 150 people per community.	Without access to basic electricity service.	GEF funds will be used for developing one or more minigrids (microgrids or solar PV lantern schemes) and finance CAPEX (alongside co-finance).
A productive use overlay to an existing or planned minigrid	This type is not pursued explicitly in Sao Tome and Principe. However, productive use of electricity is specifically targeted in Schemes 2 and 3.	-	-

40. These pilot proposals are conceptually defined. Hence, no specific site has been selected as yet. The viability of each, including compliance with UNDP and GEF safeguards as well as technical and economic feasibility, needs to be further assessed, after which the Project will support implementation of one or more of these business cases. Detailed assessment, including the collection of additional information, shall take place during the Project (Component 2). The PPG mission has performed an initial analysis of the Strengths, Weaknesses, Opportunities and Threats (SWOT) of these cases, which is attached to the Prodoc as Annex 22. A summary of the findings is presented in the table below. This analysis can serve as a basis for for further analysis and for drafting the Minigrid Pilot Plan. The following paragraphs describe the purpose for the proposed Minigrid Schemes, their background context, and a table summarizing the SWOT findings.

41. Minigrid Scheme 1 (isolated grids): The baseline situation is the public utility which is is the prevailing business model for public electricity supply in STP, both the main grid, and the three isolated grids in the South targeted by Minigrid Scheme 1. The purpose of Minigrid Scheme 1 is to re-constitute these isolated grids as RE-powered minigrids that are managed and operated sustainably in accordance with the AMP's principles and safeguards.

The existing diesel plant may not be relocated, but diesel back-up is foreseen to be phased out. The GEF funding will not be used to finance interventions to hybridize existing minigrids where the diesel capacity is increased. In no cases will GEF funding ever be invested in fossil fuel power generation assets

42. User willingness to pay is partly mapped. In some areas, bad attitudes have been created due to unenforced payment collection, causing the population to view the electricity service as a "right for free". Simplifying matters, the lowest income strata refrain from accessing the electricity grid. This is less of an issue of tariff affordability, but rather of the prohibitively high connection fee with EMAE and of a lack lack of savings and access to credits for house-wiring and appliances (as per ESMAP 2017).

43. The isolated grids in the South already have productive uses of electricity in place, such as small commerce, refrigeration etc. As mentioned, current utility supply is intermittent but cheap (low tariff with payments often not charged due to irregulatities). Hence, people take benefit to obtain cash income but they do not invest to grow further or improve. More dynamic and wealthy entrepreneurs also exist. These demand quality, for example for ecolodges targeting (foreign) tourists; they don't view interconnection to the isolated grids nearby as a viable solution for their needs. Owners invest over 100,000 US$ (all equity) in autonomous PV-battery systems to ensure adequate service levels to satisfy customer requirements. The investment is recuperated through the revenue stream from tourism. These entrepreneurs are a minority group who has own capital.

Table 4 Summary SWOT analysis for isolated minigrids (South of Sao Tome).

Minigrid Scheme 1 (isolated grids) - Summary SWOT analysis	
Strengths	Weaknesses
• Model builds on existing isolated utility diesel grid. • Model fits into current sector framework. • Utility infrastructure is in place. • Power production can be based on IPP model. • Sizeable populations (>200 households).	• Quality of technical installations is below business standards. • Electricity service is seen as a right rather than a needed service that comes at a cost. • Few drivers in the community to promote economic growth and resulting demand.
Opportunities	Threats
• Technology exists to replace/complement diesel supply and outdated grids by RE (PV) generation. • Smart meters and PAYG schemes are feasible where data communication is in place. • If community buy-in is ensured, people may become responsible consumers who pay for the service. • Model provides a template for shaping a decentralized, resilient, low-carbon grid for STP.	• Little incentive for people to move to paid service. • Main grid is being extended to interconnect the isolated grids in the South. • Technological maturity cannot be taken for granted. • Low local cash income levels.

44. Minigrid Scheme 2 (grid-tied minigrids): This scheme essentially works towards the establishment of grid-tied "smart grids", which are contemplated in the PANER. The AMP aims to pilot a series of RE/EE investments (co-investment with end-users), in which there is no direct role for the utility. Ideally, the Project pursues a fully decentralized local grid, behind the connection point (transformer) managed as a sustainable minigrid. Such a model is not yet allowed by law as the utility EMAE has the monopoly. Hence, the Project will need to adjust the ambition level to what is legally possible while pushing forward specific regulation for operationalization of the PANER. This scheme aims mobilizing SME and sizeable households with capacity and willingness to invest to ensure high-quality supply meeting their needs.

45. Productive uses are an inherent driver for this scheme. SME that already has access to utility power, is interested in RE-based supply to secure grid quality as an enabler for critical processes (ideally as part of a local smart grid). These include restaurants and ice makers, barbers and beauty parlors, small manufacturing workshops and repair shops (welding). This group requires an ESMAP Tier 4/5 quality which is currently not

offered by the utility, whose supply is cheap but erratic – which is an impediment for STP's SME sector to grow and invest. Relevant mentioning is that metering of the service is now advancing thanks to AfDB support programs.

Table 5 Summary SWOT analysis for grid-tied RE minigrids for businesses in urban areas.

Minigrid Scheme 2 (grid-tied minigrids) - Summary SWOT analysis	
Strengths	Weaknesses
• Embedded systems are scalable and replicable. • Large consumers using diesel generators can transit to PV systems. • Potential market of smaller businesses exists. • Benefits of electricity self-supply to cover utility outages is well understood. • Model mobilizes private capital and has a low risk profile.	• Supply market is not developed: few models and high costs. • Technical lifetimes of batteries and controllers is questioned by customers. • Small businesses lack capital for investment. • The utility network is in poor conditions for interconnection and minigrid management model.
Opportunities	Threats
• Newer grid areas with appropriate technical conditions may be found to deploy this model. • Model can serve as a platform for working towards a smart grid. • Ambition levels can be scaled up in time. • Opportunities for high-value employment and new services.	• Subsidies may increase prices rather than promoting a more competitive market. • Small businesses may not have roof space for PV or do not own their workspace. • Supportive regulation (PANEE) may not be adopted by the Government. • Little experience in STP with digital technologies.

46. Minigrid Scheme 3 (micro-grids): This concerns small-scale microgrids/PV lantern schemes, built around a community service such as a health centre. Simplifying matters, the lowest income strata refrain from accessing the electricity grid. This is less of an issue of tariff affordability, but rather of the prohibitively high connection fee with EMAE and of a lack lack of savings and access to credits for house-wiring and appliances (as per ESMAP 2017). Lighting is the prime electricity service need, enabling women to sell food and drinks after dusk. Appliances such as blenders and refrigerators would widen the possibilities for preparing and storing food and drinks. However, water pumping and purification of water are mentioned as the most urgent services (to prevent health problems). The rationale for the AMP is to ensure sustainable management practices including billing schemes, and foster cost-reduction drivers. This scheme will largely rely on grant funding from GoSTP or development partners.

Table 6 Summary SWOT analysis micro-grids supplying basic services to rural communities.

Minigrid Scheme 3 (micro-grids) – Summary SWOT analysis	
Strengths	Weaknesses
• Standard minigrid model for AMP. • Apparent positive attitude towards basic electric services supply (and other basic services). • Significant replication potential. • PAYG schemes can be implemented. • Physical (i.e. wired) minigrid is not needed for small system (PV lanterns).	• Country lacks policy framework for this type of communities. • Public procurement and financing not prepared for long-term service contracts. • Sector policies to strengthen economies and social tissue in rural areas, are weak. • Very low income levels are a barrier for financial sustainability. • Small cash flows make these projects unattractive for commercial businesses.

Opportunities	Threats
• Multiple minigrids could be operated (supervised) by one responsible entity (company) according to AMP model. • A basic utilty services model (basic electricity, clean water, waste management) can be developed under a governance framework outside the main electricity sector. • Funding from other sectors can be mobilized.	• Lack of continued support may lead to abandonment of systems. • Procurement model enabling long-term service contracts may not be feasible. • Independent fiscalization of delivered equipment and services should be in place. • Technical sustainability cannot be taken for granted in the absence of a robust O&M approach.

47. Notably, Minigrid Scheme 1 appears complex due to a legacy of management flaws (including no-enforcement of payment collection). If, and only if, management is brought up to minigrid industry standards, the Project will support this scheme. The preferred business model in that case would be a private operation (on behalf of the Government). Yet, additional sector regulation is required to enable such model. In this respect, UNDP takes a position to join STP's development partners to foster sector dialogue and induce the envisioned changes (many of them already laid out in the PANER and PANEE, funded by the UNIDO/GEF Project and recently adopted by GoSTP.) Once under execution, the STP Project shall further assess impact and risks, and decide which Schemes are most relevant and feasible to be pursued. Adaptive management will be applied to implement one or more of the proposed schemes to meet the targets set in the Results Framework.

48. The AMP's overarching principles apply to each of these Minigrid Schemes, ensuring that an investor/operator modality is in place with responsibility to ensure service quality over the established lifetime. Solid project design and approval by the Project Board shall warrant sustainable operation during lifetime at three levels:

49. - Project level: by following a due diligence approach towards technical and financial sustainability (robust assumptions as related to cost aspects, revenue streams, appropriateness of technical specifications, compliance, system integration and O&M. This, alongside enforcement of social and environmental standards and safeguards. Among other aspects, special attention shall be given to tropicalization of solar panels, batteries, controllers and connectors, given the hot and humid climate in the country.

50. - Minigrid governance level: by putting in place an appropriate ownership/operator model, anchored through long-term contractual agreements. For Scheme 1 (isolated minigrids), asset ownership is presumably public (EMAE) but other options will be assessed; for Scheme 2 (grid-tied RE systems), assets will be held by private sector; for Scheme 3 (micro-grids), a dedicated private, or possibly community-based entity is foreseen to own the system. In all cases, operation shall be according to sound business principles allowing a surplus for re-investment and expansion of the service. Mixed-capital ventures through public-private partnerships will be encouraged.

51. - Sector framework level: by assisting GoSTP and its partners to put in place a conducive framework for minigrids and other decentralized energy systems in STP. Given the AMP's limited time horizon (4 years), the Project cannot warrant that legislation and agreements enabling minigrids (specifically the pilots) will be respected over lifetime of the investment. A political risk exists that cannot be ignored. This is mitigated by UNDP's long-term commitment enabling it to maintain a constructive dialogue with policy makers in support of building a low-carbon, resilient power sector in STP.

AMP Minigrid Pilot key principles and Regional Project service offering

52. The AMP aims to implement minigrid pilots in all participating countries to collect operational data for fact-finding and extracting lessons towards strengthening of the business model and the attainment of cost reductions. The pilots provide an opportunity for governments and other stakeholders for learning-by-doing, especially in the less advanced markets. Specifically, the pilot provides a test case to start using digital management and tendering systems. To allow a comparison or results, the AMP has set a series of principles that shall be followed by all countries during preparation and execution of the minigrid pilots.

53. Minigrid Pilots Plan and key principles for minigrid pilot implementation: At the project preparation stage, considerable initial consultations, analysis and planning have been performed to advance the design of the minigrid pilots. This is described in the section directly below (Section IV) and associated annexes, and is to be read together with AMP's Key principles for minigrid pilot implementation (set out in **Box 3Box 3** below). With regards to precise specifications and components of minigrid pilots, the **Project shall, in Year 1, produce a full Minigrid Pilot Plan for STP** (see output 2.1). This Plan will notably detail the approach to implement the pilots and ensure alignment with the AMP key principles, as well as to keep it responsive to national priorities as formalized during Year 1. The Plan will be reviewed and cleared by UNDP (STP CO and BPPS NCE) and shared with the Project Board.

Box 3: Key principles for minigrid pilot implementation

- **Principle 1. Digital platforms**. The use of digital platforms is a central element of the overall AMP and digital strategy for the project. With digital platforms emerging as critical enabler for procurement and operation of cost-effective and viable minigrids, using a digital platform for pilot projects provides an opportunity to build capacity of key stakeholders in using this facility which can then set the foundation for later using digital platforms for sector-wide, including large-scale tenders or results based financing programs. Digital platform software can manage the selection, Monitoring and Evaluation (M&E) and payments of pilots including capacity building of the Implementation Partner, Project Management Unit and minigrid developers.
- **Principle 2. Productive use: third party ownership model**. For pilots that will financially support the purchase of productive use equipment using an allocation under the GEF INV, it is required that the project will only provide its support via a third-party ownership model, as opposed to a self-ownership model. In the third-party ownership model, the minigrid asset owner purchases and owns the productive use equipment, and leases it back to the end-user as part of an "energy as a service" offer.
- **Principle 3. Clear methodological basis for additionality for calculating the level of (GEF INV and/or UNDP TRAC)/financial support for capital expenditures (CAPEX).** Grant funding for the pilots must be based on the principle of minimal concessionality of allocated CAPEX subsidy. Suitable methodologies for calculating the level of GEF investment support can be on the basis of achieving: (i) Levelised Cost of Electricity (LCOE) parity with a diesel mini-grid, (ii) LCOE parity with pre-existing residential tariffs; or (ii) LCOEs based on the willingness to pay of the end-users (via surveys etc). During implementation, the AMP regional project may provide updated guidance on suitable minimal concessionality methodologies.
- **Principle 4. Minigrid pilot data sharing**. Pilot beneficiaries (e.g. minigrid operators) receiving support from the project are required to share data on minigrid performance with the national and regional project. Specific terms and conditions for data-sharing and how best to operationalize the commitment and its adoption by the beneficiaries will be defined and agreed upon with minigrid operators during project implementation, with support from the AMP Regional Project.
- **Principle 5. Compliance with UNDP Social and Environmental Safeguards and Gender requirements**. Pilot projects receiving project funding are required to comply with all relevant national legislation and standards, as well as UNDP standards as pertaining to SES safeguards and gender equity. To this purpose, the Environmental Safeguards Management Framework (ESMF) and gender action plan are part of this ProDoc (Annexes 10 and 11). The ESMF provides a mandatory framework for developing the Environmental and Social management Plans (ESMP) for pilot projects. A critical aspect of the ESMF is the obligation for environmentally sound management of replaced equipment, including batteries, inverters and solar panels, after their usage. The responsible handling of waste, including recycling of batteries and other equipment, shall be clearly documented, budgeted and monitored in compliance with national and UNDP safeguards requirements.
- **Principle 6. Financial sustainability.** The business and delivery models of the pilots will be determined during project implementation as part of the minigrid pilot plan. A core principle to be upheld will be to that all business models ensure the full financial sustainability of the minigrid pilot for the entirety of its asset lifetime, including the maintenance, operation and replacement of key equipment such as batteries and inverters. These maintenance, operation and financial sustainability considerations will be evaluated, and must be in place, before the provision of any GEF INV to a minigrid pilot.
- **Principle 7. Private sector involvement.** Where possible, recognizing the private sector's entrepreneurship, efficiency and access to capital, private sector involvement in minigrids pilots will be encouraged. This may take a range of forms, from suppliers, to construction, to build own operate models.

54. Linkages to the AMP Regional Project: The project will align with the AMP Regional Project to facilitate knowledge sharing, learning, and synthesis of experiences from the AMP Regional Project to the STP child project and vice versa. The AMP Regional Project will make available best practices for regulation and policy design, innovative and inclusive business models, digitalization and finance, to all AMP beneficiary countries.

55. **Box 4** below provides a summary of the technical and operational support provided by the AMP Regional Project to the child projects. More details will be communicated at the STP project's Inception Workshop, including: areas of support and listing of firms and consultants under contract by the AMP Regional Project. The Regional Project will set up protocols for requesting and accessing expertise and communicate these with the participating child projects including Sao Tome and Principe.

Box 4: AMP Regional Project Indicative Service Offering

Digital, Knowledge management and monitoring and evaluation (M&E)

- **Knowledge building/sharing**. The regional project will curate, develop and share knowledge with the project on program's thematic areas (Policies and regulation, innovative business models, financing, digitalization).
- **Insight Briefs development and dissemination**. National projects will gather data and audio-visual content (video footage, photos, etc.) highlighting national project activities which will be the subject of an 'insight brief' to be developed and widely disseminated by the AMP Regional Project.
- **Communities of Practice**. One of the primary ways national project staff will interface with the regional project is via the 'Communities of Practice' (CoPs) and associated activities/platforms. While it is expected that many of the activities will be undertaken virtually (via internet-based platforms, webinars or digital platforms) it is also expected that the CoPs will include actual in-person workshops, meetings or training events that project staff will participate on.
- **Common M&E Framework/QAMF**. The AMP Regional Project will develop, with inputs from national projects, a Quality Assurance and Monitoring Framework (QAMF) for measuring, reporting and verification of the sustainable development impacts of all minigrid pilots supported by national projects, including GHG emission reductions.
- **Data aggregation platform**. The AMP Regional Project will deploy and use a web-based data management platform to aggregate data from all national project pilots based on the QAMF to track Results Framework indicators as well as program objectives, SDG impacts and GHG emission reductions.
- **Systematic data analytics and insights.** The regional project will harness data shared by the national projects to extract insights and learnings which will be disseminated across all national projects and within the broader minigrids ecosystem.

Technical and operational support for national projects' implementation

- **Access to specialized expert international consultants in selected areas hired, retained, contracted and paid for by the AMP regional project** and made available to all participating national project staff and selected beneficiaries on as needed basis. This support may range from virtual assistance to in-country missions.
- **Database of qualified international consultants and firms** provided for information purposes to the project in an effort to assist in identifying high-quality experts and firms who may be available for contracting by national governments under their own procurement rules and modalities.
- **Generic terms of reference (ToR)** for various standard activities will be provided to projects for information purposes.
- **Specialized advisory support for implementing UNDP's minigrid DREI analyses**. During project implementation, the UNDP DREI Core team, working with the regional project, will make available to national teams and consultants the resources and tools to conduct full quantitative DREI applications, and will provide ongoing support and quality assurance.
- **Operational support for national projects**. The AMP Regional Project will provide support to the project, on an ad-hoc and as-needed basis, through its PMU staff or by hiring or recommending subject matter experts, for the project to execute activities. Further details on specific support around M&E activities provided in Section VI (Monitoring and Evaluation Plan).

56. Linkages to post COVID-19 response: The COVID-19 pandemic presents what is undoubtedly one of the greatest challenges ever faced by the Planet. There have already been major consequences for the World's poor and

vulnerable, in terms of the direct impacts of the public health crisis on health and mortality, and indirect impacts on social, economic and political systems. The risk of a new pandemic remains, thus embedding the lessons learned from the COVID-19 pandemic is essential for any new initiative such as the African Minigrids Programme. Screening for risks, particularly in a rapidly changing and uncertain context such as a pandemic, needs to be constant to inform rapid response and decision making.

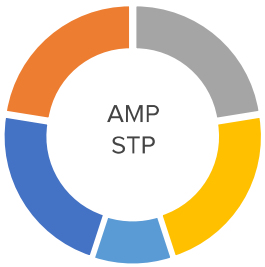
57. The overall approach of this programme in the context of a potential pandemic situation contemplates in the first place the assessment of the programme's relevance through three main questions, namely (i) the likeliness of a change in national priorities; (ii) the validity of original assumptions and theory of change in the programme with regards to vulnerable groups and drivers of change; and (iii) the need for UNDP to re-prioritize existing programming and rapidly deliver a new programme offer to help the country respond. Access to energy and in particular, access to clean energy and the promotion of scaled-up commercial investment in RE technologies, are expected to remain a priority even under a pandemic situation.

58. The AMP has identified opportunities for building back better and greener, offered by STP's COVID-19 SERP (Socio Economic Response Plan)[36], ensuring and sustaining a focus on the poorest and leaving no-one behind. In particular, Pillar 3 of the SERP offers an adequate canvas for the AMP since it includes areas of investment in which the AMP could leverage the potential of the use of solar energy, especially for productive uses. Areas that will be explored are the encouragement of business innovation utilising the untapped potential to maximise added value in the transformation of local product through the use of clean sources of energy; the promotion of labour-intensive public works mechanisms; the improvement of resilience of farmers/fishermen.

59. The AMP Project will also endeavour to trigger bottom-up adaptive innovation, establishing safeguard mechanisms with beneficiary communities and project stakeholders, with whom a more strategic and focused collaboration, especially with local and national actors, will be sought.

IV. RESULTS AND PARTNERSHIPS

60. Project components, outcomes, outputs and activities:



Component 1	Component 2	Component 3	Component 4	Component 5
Policy and Regulation	Business Model Innovation with Private Sector	Scaled-up Financing	Digital and Knowledge Management	Monitoring and Evaluation (M&E)
Targeted outputs per component				
Output 1.1. An inclusive national dialogue to identify minigrid delivery	Output 2.1. Minigrids pilot proposals prepared, evaluated and	Output 3.1. Design support for a financial facility for minigrids,	Output 4.1. A project digital strategy is developed and	Output 5.1. Inception workshop is conducted

[36] Socioeconomic Impact Assessment (SEIA) and Socioeconomic Response Plan (SERP) to COVID-19_UN_Sao Tome and Principe - March 2021.

Targeted outputs per component				
models is facilitated, clarifying priority interventions for an integrated approach to off-grid electrification.	selected through a competitive process, leading to cost-reduction in mini-grids.	distributed electricity grids and services.	implemented, including linkages to and following guidance from the AMP Regional Project.	and M&E plan is implemented.
Output 1.2. DREI techno-economic analyses carried out to propose most cost-effective basket of policy and financial de-risking instruments and contribute to AMP Flagship Report on Cost Reduction.	Output 2.2. Capacity of private sector and end-user groups strengthened for developing innovative, resilient minigrid business models.	Output 3.2. Domestic financial sector capacity-building on business and financing models for minigrids.	Output 4.2. A Minigrids Digital Platform implemented to track minigrid pilots, and to support minigrids scale-up and cost-reduction.	Output 5.2. Project Mid-Term Review is conducted.
Output 1.3. A mini-grid regulatory framework, including tariff model, tax regime, and settlement model for electricity transaction, is developed in close coordination with the authorities concerned and other development partners.	Output 2.3. Minigrids pilots fully designed, constructed and monitored, including productive uses and modular hardware and system design (INV).		Output 4.3.A Quality Assurance and Monitoring Framework (QAMF) is adopted.	Output 5.3. GEF Terminal Evaluation is conducted.
Output 1.4. Preparatory studies conducted for selected mini-grid sites to enhance sector planning and decision-making on a delivery model for minigrid development.			Output 4.4. Engage with regional project by participating in Communities of Practice and capturing and sharing of lessons learnt.	
Output 1.5. Domestication of quality standards for solar mini-grid components, and institutional capacity of national standards organizations/bureau strengthened.				
Output 1.6. Support provided to establish the environmental and social policies and plans to ensure mini-grid risks are properly handled.				
Output 1.7. Public programmes (apprenticeships, certificates, university programs) to develop competitive, skilled labor market in mini-grids.				

Component 1. Policy and Regulation

Outcome 1: Stakeholder ownership in a national minigrid delivery model is advanced, and appropriate policies and regulations are adopted to facilitate investment in low-carbon minigrids.

Output 1.1. An inclusive national dialogue to identify minigrid delivery models is facilitated, clarifying priority interventions for an integrated approach to off-grid electrification.

61. A dialogue on the future of STP's energy sector has already started between the Government, policy makers, and the country's development partners (including World Bank, AfDB, and UNDP). This has resulted in changes in the sector governance and market model. The dialogue is a continuous process focused currently on increasing installed electricity generating capacity, upgrading T&D infrastructure, reduction of technical losses, and reduction of commercial losses by the installation of (smart) meters at customers. The National Renewable Energy Plan (PANER) proposes an ambitious plan to add RE capacity to the national grid. Meanwhile, distribution grid expansion is expected to cover the entire country by 2030 reaching a 100% electrification coverage.

62. The AMP will contribute to this process addressing key issues regarding who finances, builds, owns and who operates and maintains minigrid solutions, and aspects including tariffs and subsidies. The AMP sets itself the goal to open up this dialogue to electricity service aspects including: (1) value creation from energy inputs; (2) quality and reliability in relation to actual needs, differentiated per user category); (3) affordability and willingness to pay; (4) energy efficiency and rational use of energy; and (5) active promotion of electricity demand among end-users, with gender considerations incorporated into all of the above. Ultimately, a virtuous cycle is pursued in which electricity creates value for consumers and economic output reaches the level to sustain its electricity supply chain. The minigrid solution offers a host of approaches, experiences and tools to enhance the current dialogue with the direct objective to accelerate the delivery of quality electricity to businesses and households in STP. As minigrids are scalable, an attractive proposition would be to start bringing electricity service up to standards in some identified, isolated or grid-tied areas, and develop a technically and financially robust business model. Based on this, one can seek replication or incorporation at upstream level.

63. The following activities are envisioned:

Activity 1.1.1. **Participate in national platform on distributed electricity delivery including minigrids.** Foster a national dialogue between Government, sector entities, local authorities, civil society, private sector, multilateral organizations, and other relevant stakeholders, including those focused on gender equality and environmental preservation, to identify appropriate minigrid delivery models and define key issues regarding who finances, builds, owns and who operates and maintains the minigrids.

Activity 1.1.2. **Provide inputs for dialogue and decision-making.** This is achieved through gap analyses, best practices, recommendations for delivery models, and expert advice on the implications of choices made taken for the overarching framework. Ensure a feedback loop between the dialogue and the experiences and preliminary results delivered by the Project.

Output 1.2. DREI techno-economic analyses carried out to propose most cost-effective basket of policy and financial de-risking instruments and contribute to AMP Flagship Report on Cost Reduction.

64. This output will assist the GoSTP to identify appropriate instruments for de-risking of investments in RE assets and related infrastructure. UNDP's Derisking Renewable Energy Investment (DREI) is a quantitative framework to support policy makers to promote investment in renewable energy. Since 2018 the DREI includes solar PV-battery minigrids to track investment risks and financing costs, and to model levelized energy costs (LCOE), tariffs and subsidies for minigrids. The AMP envisions the application, either qualitative or quantitatively, of the DREI framework at various points in the national (child) project cycle. The results will be aggregated and incorporated into knowledge products by the AMP Regional Project for wider dissemination.

65. The DREI framework delivers quantitative insight into financing costs and the impact of public instruments in lowering these costs. The financial model captures hardware and soft costs to determine the levelized cost of electricity (LCOE) of the technology being assessed. The DREI framework will be the AMP's mechanism to track and share information on MG costs and cost reductions.

66. This output entails the following activities:

Activity 1.2.1. **A full, quantitative DREI application will be conducted.** This activity is funded by the Project and will be performed during Project Year 1. Deliverables will include interviews, completed financial models,

and national reports/knowledge products. This national analysis will be will be funded by the national project. The AMP Regional Project will provide support for finalizing specific TORs, recommend qualified international consultants, and make available resources and tools (spreadsheet models) to conduct the DREI analysis. Initial TORs for these consultants are provided in Annex 20 and Annex 21 of this Project Document (ProDoc). The PMU will assemble a task team to perform the national DREI analysis including consultants, government stakeholders, and members of PMU. It is envisioned that the Project Technical Advisor (TA) will act as focal point for the DREI process in Sao Tome and Principe. With a view on capacity building in the country and mainstreaming of DREI recommendations, he/she will team up with the National MG/DREI expert hired by the Project.

Specific achievements expected from of the DREI analysis guiding the national dialogue. These include, but are not limited to: (1) policy and strategy for rural/underserved population; (2) regulation for minigrids and community basic services; (3) definition of business model and cost/tariff proposal; (4) adoption of technical standards for equipment and installation; (5) definition and establishment of guarantees for MG investors; (6) definition and establishment of incentives for investors and customers.

Activity 1.2.2. **Presentation findings DREI application.** The findings of the DREI analysis will be presented to the key national stakeholders involved in the dialogue platform (see Output 1.1) during the first half of Project Year 2. The DREI analysis will inform about a need for measures in the policy, regulatory and financial domains by the incumbent authorities. The results will be utilized by the PMU to recommend adaptive management measures for approval by the Project Board. These activities will be funded by the national project.

Activity 1.2.3. **Shared DREI results with Project the AMP Regional Project.** The findings and results will be shared with the Regional Project to feed into the flagship AMP Knowledge Product on DREI application towards reducing mini-grid cost levels (second half of Project Year 2). The Flagship Product provides a mechanism for south-south learning by disseminating the DREI findings and results across the AMP countries. The dissemination activities will encompass 3-4 round-table workshops with government, private sector and other key stakeholders, over a 12-month period. This activity will be funded by the AMP Regional Project.

Coordination with regional project on national DREI analysis update. In project year 4, a new iteration of the DREI analysis will be carried out for STP using updated figures for hardware, soft costs and financial parameters. The results will be presented as a brief Update Note (2-5 pages) reflecting the DREI national update and feed into the – equally updated - Flagship Knowledge Product, which will provide an end-of-program overview of the evolution of mini-grid costs across AMP countries. The AMP Regional Project will fund and execute the update of the DREI national analysis (a 'light quantitative DREI analysis') on behalf of the national STP project. In turn, the latter will: (i) facilitate the DREI updating exercise; (ii) disseminate the findings of the national DREI update note; (iii) collaborate with the AMP Regional Project to update the Flagship Product. [37]

Output 1.3. A mini-grid regulatory framework, including tariff model, tax regime, and settlement model for electricity transaction, is developed in close coordination with the authorities concerned and other development partners.

67. This output will enhance and complement work in progress under the baseline supported by STP's development partners. Rather than aiming at a full-fledged electricity market, the focus is on strengthening the legal basis for distributed power systems including grid-tied and isolated minigrids, and on building a more dynamic electricity market model enabling better utilization rates of installed generation capacity and grid

[37] As such two deliverables will be produced and funded by the AMP Regional Project – the full AMP DREI Flagship Knowledge Product report in Year 2, and the Update Note in Year 4.

infrastructure. Importantly, digital technologies are a critical for adequate system operation and the settlement of electric energy and power transaction among participating agents including the utility, independent power producers, and distributed entities as are minigrids, individual "prosumers", and smart grids. It will be important to establish a regulatory framework that offers men and women equitable opportunities to participate in electricity markets. This output specifically envisions supporting Minigrid Scheme 2 (Embedded Minigrids) which requires additional regulation and incentives, as Minigrid Scheme 1 (Isolated Grids) will expectedly be governed by the uniform utility tariff. Note that, for small communities, basic electricity services (MG Scheme 3) may well be regulated from another sector's perspective rather than the traditional electricity sector (for example Health or Education).

68. The following activities are envisioned:

Activity 1.3.1. **Definition in legal terms of minigrid concepts.** This activity pursues the legal definition of concepts and technologies relevant to distributed electricity networks including minigrids and smart grids, as a basis for further regulation. This activity will review definitions used in more advanced markets and adjust and adapt these to the STP context. Preparation of a compendium of legal definitions that will serve as a basis for further development of electricity code, financial and tax aspects, and legal aspects of minigrids.

Activity 1.3.2. **Assessment and recommendation of alternative tariff schemes for minigrids.** This output will ensure that the minigrid value proposition is considered in proposals for updating the tariff model as prepared by AGER (2020). Another aspect to be considered is the overall generation deficit in STP to meet current (and latent) demand. AGER proposed setting a progressive tariff to the energy contracted, which would serve as an incentive for demand side management and the use of EE appliances. For minigrids, one can extend this principle to the contracted power (kW). The impact of the tariff regime on women and low-income users, in particular, will be further explored.

Activity 1.3.3. **Assessment and recommendation of financial and tax incentives.** Favorable tax policies can mitigate the high CAPEX to some extent. Tax policy is a complex matter but, from a point of view of economic development, a tax system based on value added is preferable over upfront levies and import duties. Positive taxation models also provide an incentive to households and small businesses to become part of the formal economy. Gender and inclusiveness impacts of tax regimes will be examined, both for suppliers and users of electricity and electrical appliances.

Activity 1.3.4. **Modalities for interaction with the utility grid.** Assessment and recommendation of power transactions between the utility and distributed RE power systems, including minigrids and smart grids. In case of a grid-tied system, there exists the option to trade (sell or buy) electricity with the main grid. This requires an understanding of the value of the energy supplied at a certain moment as a basis for a methodology to define payments. One can depart from current regulation for power purchase agreements (PPA) or energy market regulation in other countries. Importantly, the assessment shall explore options for short-term transactions i.e., a higher granularity of the electricity market, which would enable a more effective use of installed capacity and T&D infrastructure.

Activity 1.3.5. **Assessment and recommendation of legal status of minigrids.** This includes a determination of their approval such as through licensing or authorization. The applicability of technical and liability standards and regulation, commercial law, customer protection and service aspects, penalties and arbitration mechanisms, and the ownership of assets. Minimum quality services and required additional services including progressive upgrading of the service and coverage. Reporting and auditing of minigrid performance, representation of customers in minigrid supervision, including grievance mechanisms. Gaining development consent for mini-grids will, to the extent possible, not disproportionately favor one gender over another. Legal dispositions and grievance mechanisms shall be designed in such a way to promote social and gender inclusiveness.

Output 1.4. Preparatory studies conducted for selected mini-grid sites to enhance sector planning and decision-making on a delivery model for minigrid development.

69. The following activities will be implemented resulting in the delivery of five (5) studies:

Activity 1.4.1. **Collection and validation of data sources.** This activity will collect and validate available information describing distribution grids, grid extension plans, distribution level demand profiles, geo-referential maps of population density, demographics and income levels including gender-breakdown, as well as relevant discrete consumers such as public buildings and facilities, industrial consumers, telecom towers, water pumps, factories, etc. Incorporation of data collected in GIS software tool. Evaluation and interpretation of geospatial analysis results and compilation of results in a report as input for sector planning and scoping of opportunities for minigrid electricity delivery.

Activity 1.4.2. **Research of socio-economic data for identified candidate mini-grid sites.** This includes current energy use, ability and willingness to pay, electricity consumption relevant discrete productive consumers (larger public and private consumers), and derivation of load profiles. Identification of distributed electricity generation needs, available main grid capacity, demand forecasts, need for energy storage, estimation of minigrid development costs, per site. Additional social overlays (e.g., the presence of female-headed households, daycares, social services, markets, etc.) may also be considered for analysis. Compilation of the findings into a portfolio of candidate areas for the potential application of isolated and/or grid-tied minigrid delivery models.

Activity 1.4.3. **Mapping of the market offer for minigrid solutions in** STP, covering: (i) national and interested foreign project developers and investors; (ii) installers of RE systems and ancillary equipment and services; (iii) contractors and suppliers of grid infrastructure equipment; and (iv) importers and retailers of productive and household electric appliances, machines, and tools (with special focus on efficient, affordable, and long-lasting equipment that serves the needs of both men and women). Application of a value chain analysis to characterize the supply chain, identify current gaps, as well as opportunities for adding local value (through, for example, maximization of local labor, use of local materials, assembly of components, civil engineering adapted to local conditions).

Activity 1.4.4. **Assessment of technical, managerial, social, and macro-economic aspects.** This activity will assess relevant aspects of distributed electricity delivery models including minigrids and identification of enabling conditions and constraints (SWOT analysis). Economic and financial cost and benefit analysis including opportunities for employment and value creation for women and men, avoided environmental externalities, and avoided social cost of unserved electricity. Preparation of a report detailing the specific business model for identified distributed electricity service models including minigrids. Specification of input data including cost figures, financial incentives such as subsidies, tax exemptions and concessional loans, and identification of parameter ranges allowing financial sustainability.

Activity 1.4.5. **Assessment of technology choices and sustainability of installed systems.** This activity concerns an independent field survey of installed energy systems in rural communities as input for defining a robust product philosophy and adequate technical standards. The survey shall determine why equipment installed in communities such as public lighting, water points, garbage collection points, electric wiring, are often found out of order. The reasons may be a matter of technical specifications and/or incompliance, improper installation, inadequate O&M practices, financial or capacity voids for delivering these, weak local ownership, lack of institutional continuity, among others. The purpose of this activity is to provide more insight to avoid repeating similar mistakes under the AMP program. Preparation of a report with findings and recommendations.

Activity 1.4.6. **Field survey and research into the nexus of (minigrid) electricity.** This activity aims to assess in more detail the nexus of electric energy supply and gender, health and sanitation, agri-food production, and climate resilience. Relevant questions include the potential, opportunities and barriers for fuel switch (electrification), for example, institutional cooking facilities (e.g., schools) and light-duty delivery vehicles; electricity-based technologies for water purification; processing and conservation of agricultural produce, storage of perishable food products; and systemic approach to (climate) risk management, electricity supply and resilience of critical services at community level. Preparation of a report with findings and recommendations.

Output 1.5. Domestication of quality standards for solar mini-grid components, and institutional capacity of national standards organizations/bureau strengthened.

70. This output envisions the definition of quality standards for eligible electric equipment and ancillary systems under public tender/procurement schemes and/or financial incentive schemes and financing programs. The scope of the equipment includes, indicatively: (i) small-scale solar-PV panels and controllers (<100-kW); (ii) battery energy storage systems (<250-kWh); (iii) PV/BESS devices for remote monitoring and data acquisition; (iv) electric appliances and lighting (residential and commercial application) including a selection of appliances most desired by female users; (v) AC/DC cabling, connectors, grounding and lightning protection; (vi) rack mountings, casings, containers; (vii) design and materials for civil works; (viii) supplier and installer certifications including ISO9000, ISO14000, and ILO conventions. The Project shall seek harmonization with common standards in the region while acknowledging applicable national standards. The consolidated standards will provide a basis for efficient procurement and quality assurance and contribute to compliance with relevant UNDP and GEF safeguards.

71. This output will, indicatively, entail the e following activities:

Activity 1.5.1. **Review and proposal of standards.** Review of existing international, regional and national standards for small-scale electric equipment and appliances, and identification of gaps. Proposition of consolidated standards for adoption by Government as mandatory or voluntary standards. For small grids, the Project will explore opportunities for simplified products standards to achieve cost reductions.

Activity 1.5.2. **In-country capacity building for compliance verification.** Strengthening of the capacity of national standard body in cooperation with international partners. This includes the identification of shortlisted, regional certified test laboratories for equipment verification, definition of procedures for compliance verification including field inspections. It further extends to making accessible relevant information on RE/EE and minigrid equipment to national customs officers.

Output 1.6. Support provided to establish the environmental and social policies and plans to ensure mini-grid risks are properly handled.

72. This output responds to the Project's Social and Environmental Screening Procedure (SESP, see Annex 5) by funding the social and environmental assessments and management activities stipulated in the SESP, including adaptation thereof to SESP updates and progressive insights. In this context, it is noted that Sao Tome and Principe currently has no effective system in place for waste collection, management, and disposal. This extends to electronic waste such as cell phones, batteries and fuels which are commonly littered or leaked into the environment. This context is challenging for the AMP project to meet environmental safeguards but is also an opportunity to induce positive changes.

73. The following activities will be carried out:

Activity 1.6.1. **Review and upgrading existing ESIA framework.** Review of the existing Environmental and Social Impact Assessment (ESIA) framework in STP for electricity and renewable energy projects. Development and proposal of standardized and/or simplified environmental and social procedures, including waste management and recycling procedures, mandatory to operators of mini-grids.

Activity 1.6.2. **Support for ESIA framework implementation.** Support to incumbent ministries and authorities to enhance institutional capacities, methodologies and tools for ESIA monitoring, including social impacts and environmental aspects of minigrids such as management and recycling of electronic waste.

Output 1.7. Public programmes (apprenticeships, certificates, university programs) to develop competitive, skilled labor market in mini-grids.

74. This output will enhance technical capacities for the design, installation, operation, and supervision of grid-tied, and isolated minigrids in STP. It will build on baseline activities to set up partnerships with foreign academic and vocational education institutes to make accessible relevant curricula to STP students.

Certification of specific technical and operational skills is considered important to offset technical (and thereby: liability) risks, while adding value for the student/employee. Given STP's small national market, this output shall aim at building capable human resources in the broader region of the ECCAS, and Lusophone community.

75. The following activities are identified under this output:

Activity 1.7.1. **Updating of national training plan for the energy transition and implementation of components thereof.** The existing national training programme for the energy transition (developed under the GEF Project PIMS 4602) will be reviewed, updated, and expanded as appropriate. Components of the training plan will be implemented through a specialized academic institution capable of understanding the context and adapting the curricula.

Activity 1.7.2. **Promotional activities targeting secondary schools, vocational schools and universities.** Possible activities include a student's competition on sustainable electricity supply including prize/award. Promotion and awareness raising campaigns by radio and internet to attract young people's attention, especially girls' and women's to energy supply challenges and build empowerment.

Activity 1.7.3. **Strengthening of the knowledge base and competences of Government partners in the field of distributed RE systems, minigrids and smart grids.** One modality is through the organization of training events and seminars/webinars on specific subjects, ensuring 50-50 gender balance at events. Another, potentially high-impact modality is by offering internship for male and female junior engineer(s) placed within relevant business units of AGER, DGRNE, or EMAE. This modality is expected to improve problem ownership and buy-in from national sector stakeholders.

Component 2. Business Model Innovation with Private Sector

Outcome 2: Innovative business models based on cost reduction are operationalized, with strengthened private sector participation in low-carbon/renewable energy minigrid development.

The following paragraphs describe the rational and approach followed for the three proposed minigrid schemes in Sao Tome and Principe.

Minigrid Scheme 1: Hybridization of existing, isolated, utility diesel-grid with RE generation, MG management model and payment scheme.

76. In the south of Sao Tome Island, there are three coastal villages currently supplied by a diesel system operated by the utility EMAE. The utility envisions to interconnect the area to the main grid and a transmission line is currently being built. However, it is recognized that the national grid system is too weak to deliver adequate service. In either case, the baseline situation would be a highly unreliable electricity service, and this will not improve in the foreseeable future.

77. A local minigrid has been identified as a solution to provide better quality electricity to the area. This should be based on renewable energy (RE) supply while conserving the diesel as back-up. Battery storage is an option but needs to be dimensioned. Other RE technologies may be added, as the local conditions for PV are modest. Overcast and high rainfall conditions are common and some mountainous valleys are shaded part of the day, while skies are much brighter near the coast.[38] The state of the existing distribution grid also needs to be assessed covering aspects such as: quality and cable gauge; informal household connections; load distribution, phase balance and reactive load; status and adequacy of grid protection, fuses, lightning protection, ground to

[38] One eco-resort owner in this area, who has installed an autonomous 50-kW PV-battery system, reported that power production was satisfactory.

earth; requirements for remote monitoring and control. Once interconnected, the minigrid may inject energy surpluses into the main grid. The most probable scenario is application of the utility tariff.

78. This scheme will be developed as a special pilot designated by MIRN and implemented by the Project. The Project will contract the assessments and studies for the minigrid and likely take charge of the procurement equipment and services.[39] The functional and technical specifications of the minigrid, and the performance criteria for the minigrid operation, are to be defined by the Project. The Project will draw on the AMP Regional Program to assess the options and, preferably, engage with candidate developers though a call for Expressions of Interest (EoI) in an early stage of the Project. To this purpose, the Project can contract a preliminary survey (prefeasibility study) to provide a common information basis to be made accessible for all interested parties.

79. At project termination equipment must be transferred, hence the minigrid will follow a Build-Operate-Transfer scheme. Asset ownership during Project time needs to be evaluated in detail, as well as the ultimate owner after transfer. A local RE power plant can be owned by a private entity (IPP), for which provisions already exist in the current legal framework. Local grid management and operation is still a utility monopoly, but with the sector regulatory framework evolving, a dedicated minigrid company (preferable) or the local community may become viable options in the future.

80. Application of the utility tariff is the most probable scenario. As tariffs are not cost-reflective, this would justify an annual OPEX subsidy to operate the minigrid (note that EMAE tariffs are equally subsidized). The minigrid model however would bring up-to-standard management, lower-cost operations, and clean and superior technology to the end-users. The exit strategy for such OPEX subsidy is to be defined and must be negotiated with GoSTP and its financiers. If OPEX subsidy is continued and demand growth is achieved, the minigrid operator can become financially sustainable (the situation strived for by AMP). The introduction of substantially higher tariffs in the future is another, probable scenario (subject to political decisions) which would reduce the need for OPEX subsidy. As this aspect cannot be controlled by the Project, this pilot scheme implies a substantial sustainability risk.

81. As a base case, the Project can subsidize up to 100% of CAPEX and cover the costs of monitoring and strengthening of local capacities. This, in the understanding that GoSTP lacks funding to this purpose. However, the Project will strive at leveraging 40% of CAPEX from co-finance partners (to be negotiated). The purpose and justification of GEF grant funding is to absorb risks of this early-market, first-of-a-kind minigrid deployment in STP. Derisking of the investment through GEF grant funding may also enable other financiers to offer financial instruments with a lower concessionality (e.g. soft loans) for this pilot and/or for replication of the scheme in other areas of the country.

Minigrid Scheme 2: Embedded distributed power generation by private commercial "prosumers"[40] to strengthen weak utility grid.

82. This scheme concerns an embedded minigrid in which multiple consumers (typically commercial establishments in the range 5-50 kW) implement RE generating capacity (typically rooftop solar PV systems) accompanied by EE measures to reduce their energy bill expenses and to mitigate utility grid disruptions. By

[39] As requested by GoSTP by LoA, motivated by the complexity of the procurement process. UNDP CO STP has positive experiences procuring solar PV systems for GoSTP through the UNDP Procurement Services Unit (PSU) in Copenhague, Denmark.

[40] The term "prosumer" is used to indicate "professional consumers" which are private enterprises and wealthier residential consumers interested to invest in energy generating systems for self-supply and sales of surplusses to the grid. These group is characterizes by substantial energy use, access to specific information and knowhow, and access to finance (equity and loans).

reducing the load on the weak utility grid, the utility-served area is expected to show improved quality, which can be verified from operational data and indicators (SAIFI, SAIDI).

83. A second objective of this scheme is to stimulate demand for small-scale RE generation, as well as EE equipment, in STP. Essentially, the Project envisions preparing a one or more Call for Proposals inviting this market segment to present investment proposals, which will be evaluated by the Project according to criteria laid out in the MPP, such as minimum technical and performance specifications for the hardware, payback time, expected energy savings and GHG emission reductions; and requested CAPEX subsidy for the investment. Work on applicable EE standards in STAP is already advancing with support from the UNIDO/GEF Project. Eligible proponents include end-users as well as project developers acting on behalf of them.

84. The STP Project foresees a CAPEX subsidy for awarded proposals, indicatively 35% from GEF and 65% from co-finance partners (MDBs), to be negotiated. The scheme can be continued or replicated post-project if parallel funding is available. Customers will be required to bring in own capital, the amount to be determined during detailed design of the scheme. Larger investors tend to be equity-driven but small companies may wish to recur to bank loans to complement equity. The scheme's terms can be differentiated according to the targeted customer category, tentatively offering CAPEX subsidies in the range of 30-60%. With soaring diesel prices and the expected tariff revision, the required CAPEX subsidies to reach break-even are expected to significantly lower during the Project's time horizon. Besides subsidies, the scheme is driven by private sector investment (i.e., mobilized from the end-users).

85. In order to become a "real" minigrid scheme, a phased approach is required dictated by progressive regulation of decentralized power systems in the utility's distribution grid. The immediate ambition level is to improve reliability and availability of electricity supply, enabling customers to operate their businesses more successfully and increase turnover (productive use). For some businesses, such as dairy processing or fisheries which rely on an uninterrupted cold chain, on-site power supply is critical. Currently, such business opportunities are either not pursued or protected by expensive diesel backup-power.

86. Towards Project finalization, it is expected that multiple distributed generators are in place, local grid performance parameters have improved, and customers receive financial stimuli to supply power and/or adjust demand. This scenario assumes that progress is made in the regulatory domain, including enabling of net metering and billing, for which proposals are currently being prepared. This ambition level further builds on the prioritization of regulation enabling smart grids in the National EE Plan (PANEE). In alignment with the key principles of the AMP and its digital component, all supported investments will be collectively monitored through a data acquisition system for data collection, sharing and analysis.

87. Management of this embedded minigrid can be through a dedicated entity assuming the role of smart grid operator, or a Virtual Power Plant business, among other options. This entity can be an association of the generators (members), and be shaped as a cooperative or a private company. It can also be a private company sourcing distributed power and creating value through the optimization of asset operations. Digital technologies are at the heart of this business model.

88. At all ambition levels, the embedded minigrid scheme is highly scalable and replicable can serve as a paradigm for a decentralized sector model. Importantly, it provides a platform for new business development adding value to the sector, and establish a new type of customer relations across the network. In this respect, this scheme is a strategic proposition to achieve profound and lasting impact in STP's power sector. The risk profile for this minigrid scheme is assessed as low (driven by private capital) but increases with the ambition level (policy and regulatory risks).

89. In alignment with the AMP, the collective system is monitored by a dedicated entity and data acquisition systems are in place for data sharing and analysis. With World Bank and AfDB financial support, a start has been made with upgrading STP's distribution grid, which is a technical enabler for this minigrid scheme. With these conditions in place, the sector can start experimenting with more advanced models allowing power and financial transactions, translating in an optimized use of installed assets thereby lowering unit energy costs.

Minigrid Scheme 3: RE-based MG in small, remote, off-grid community with public service anchor tenant, following MG management model and payment scheme.

90. Sao Tome hosts rural communities (officially: 13% of population) that are not interconnected to the main grid and for which grid extension is not cost-effective as loads are very small. The Project seeks to support off-grid minigrid ("microgrid") schemes. The majority of these communities lack access to electricity altogether, including modern cooking technologies and access to key public services (potable water, sanitation, and health services) which rely on electricity supply.

91. Local partners have advised that household income levels are very low. Many families have no access to electricity and those who could connect to the main grid often choose not to do so for financial reasons. The ESMAP[41] provides a diagnostic of the household energy access. In response, minigrid schemes based on the provision of PV lanterns and cell phone charging, around a community charge center may be more adapted to the local situation allowing financial sustainability. An opportunity exists by linking to health services as the anchor tenant (a productive user creating social value).

92. The management model can depart from the health center's O&M model, organized through a service contract with the supplier. By extending the contract, the operator is responsible for technical operation of the minigrid. Financial operation may be subcontracted to another party in charge of the billing infrastructure (Pay-as-you-Go), which would have overall responsibility for delivery of the service. Ideally, the entire microgrid shall be handed to one (commercial) operator based on a multi-stakeholder project design and consensus about its implementation.

93. The promotion of such microgrids in STP may well be pushed by sectors different to the traditional electricity sector (e.g., health, education, community development, agriculture), as primary focus is on the delivery of basic services rather electricity as a commodity. Given existing needs for, for example, potable water (water filters) and waste management, a combined service operator scheme for rural communities seems promising offering scale and efficiency gains. Specific, cost-based tariff models for PV lantern schemes can be assessed and proposed by the regulator (AGER). Small minigrids of this kind may also benefit from simplified technical specifications (thereby reducing CAPEX).

94. The identified microgrid scheme can benefit from off-the-shelf solutions for technology and management models to address a population segment in STP that would otherwise remain unserved. As such, this scheme has the potential to deliver strong positive impact in the economic, environmental, and social domain. Site visits by the PPG team indicated a generally positive attitude by the local population towards basic electricity supply and an acknowledgement of their basic needs including safe drinking water.[42] Refrigeration needs for medical care as well as (commercial) food and beverage storage area also acknowledged, which could be addressed through a community center.

95. The Project envisions developing and implementing one or more pilots in partnership with other sectors (e.g., health, education). GEF funding (indicatively 60%) will be complemented with co-finance resource from multilateral partners (to be negotiated). To ensure long-term sustainability, the Project will develop proposals to enable service contracts under public procurement (rather than focusing on the delivery of hardware). This provides an opportunity for incorporating performance criteria and/or enable the provision of additional services. Long-term contracts would allow operators to maintain the systems through preventive management and repair or replacement schemes, as appropriate, and collect payments. Remote monitoring shall be demanded in alignment with AMP principles.

[41] See footnote 9. Note that this study did not extend to productive uses.

[42] A site visit including interviews with the villagers was made to Santa Adelaide, on June 24, 2022. The findings were confirmed in an interview with the head of INPEAG on June 27. Obviously, a more systematic survey among this target group is required to draw firm conclusions.

Output 2.1. Minigrids pilot proposals prepared, evaluated and selected through a competitive process, leading to cost-reduction in mini-grids.

96. This output encompasses the scoping, design, technical specification, economic and financial analysis, assessment of social and environmental benefits, impacts, and applicable safeguards for proposed minigrid pilots (isolated and grid-tied), including the consolidation of envisioned business models and investment. The process will be led by the Technical Advisor assisted by an expert Project Engineer (hired with GEF funding) who will advise the procurement committee established by the Project and the Implementing Partner.

97. The key is to unlock private sector involvement is by improving the economics of minigrid services, the two key levers being cost reduction and increased revenues. As noted in the AMP Project design, the delivery model is not always clear in immature markets, which reflects the situation in STP. In this case, pilots will likely focus on showcasing technological solutions and demonstrating or probing mini-grid business and operational models. Cost reduction is assessed by optimalisation of equipment and adequate system sizing. In more mature markets, pilots will shift the focus towards testing developers' response to higher-level interventions such as fiscal/tax incentives and improved conditions minigrid investment.

98. The following activities are envisioned under this output:

Activity 2.1.1. **Develop a Minigrid Pilot Plan (MPP) for detailing and advancing the envisioned Project pilots.** The MPP shall describe the objective, scope, and project plan for implementing the envisioned minigrids, endorsed by the GoSTP. The MPP shall identify the involvement of public actors (EMAE), private actors (suppliers and operators), and end-users (households, businesses, community service suppliers such as water, health, education), both in general and site-specific. This activity should be completed by the end of Year 1. Support will be provided by the AMP Regional Project. The MPP will be technically reviewed and cleared by UNDP (CO and BPPS NCE), and then shared for formal approval by the Project Board. The information provided in Annex 22 can serve as a starting point for developing the MPP.

The MPP will adhere to the Minigrid pilot principles set out in Box 3 above. In addition, among other aspects, the MPP will cover: (1) objective for the pilots; (2) the delivery models to be demonstrated; (3) pilot type: greenfield/existing grid, productive uses or productive use overlays; (4) geo-spatial mapping, system sizing and covered end-users; (5) other site-specific assessments including SES, gender assessments, electronic and other waste management and disposal plans; (6) remote monitoring and data collection requirements at both functional and hardware level; (7) approach to leverage private and public co-financing to minimize the use of GEF investment grants, i.e. to strive at minimum concessionality; (8) assurance that GEF grant transfers are aligned with UNDP's policies and financial rules; (9) determination of the ownership of grid assets and formal agreement with contract parties; (10) ensure productive-use equipment is owned by a third party; (11) identification of any legal and moral liabilities and measures to address them; and (12) Identification and budgeting of needs for specific technical assistance, including assurance of operational performance, additional training, community outreach, to enhance pilot sustainability and impact.

Activity 2.1.2. **Establishment of a competitive contracting mechanism for selected minigrid pilots.** The STP Project envisions the demonstration of several minigrid models relevant to the country. Given the small market for individual players in STP, a full-fledged tender programme is probably not needed and neither cost-effective. For any minigrid model to work in STP, legislation, or ad-hoc decrees and contracts, must be in place first, allowing entities other than EMAE to access the (distribution) grid and perform services. Then, as a second step, minigrids can be either private/community-led; or initiated by the Government through a call for services and infrastructure. Both modalities may prove successful in STP. Under Component 1, the Project will assess these options in more detail and elaborate on the legal, regulatory, and commercial implications.

The Project team, in close dialogue with the Implementing Partner, will shape a customized, competitive process to select minigrid pilot developers. Options include a call for expression of interest, publication of an incentive model, or project partnership). A key question to be answered in

this respect is whether a proposed pilot is oriented towards technology demonstration, or is expected to be near-commercial. This determines the overall risk profile for the private partner and the commitment and time-horizon that can be demanded. The exit-strategy for each pilot must therefore be thought through in the MPP and consulted with the stakeholders. A partnership model may possibly work best in STP at this stage, both for private developers (operational cost benefits and technical assistance) and end-user communities and commercial "prosumers" (CAPEX subsidy and technical assistance). In any case, financial incentives - specifically of GEF grant funding - shall be transparent, gender-inclusive, equitable, fair, and avoid market distortions.

Activity 2.1.3. **Selection process, negotiations and contract awarding.** This activity concerns the execution of the selection process, negotiations, and awarding of contracts to one or more minigrid operators (and/or distributed electricity service companies. Relevant minigrid modalities in STP include: (1) operation of existing isolated grids by a dedicated operator: assets owned by EMAE, O&M, and commercialization is done by a third party (private, or public-private partnership), if possible maximizing local community, especially female, involvement in planning and maintenance; (2) operation and upgrading of identified distribution grid segments under a grid-tied mini-grid model; the scope of private sector services, asset ownership, and the introduction of distributed RE power sources into this grid, are to be defined; (3) organization of RE self-suppliers into a virtual power plant model with associated local grid upgrades, in which most assets will be private. Proposals will be evaluated by the Committee against the established criteria; the process will be followed by an independent auditor to ensure due diligence and transparency. The decisions must be ratified by UNDP.

Activity 2.1.4. **Monitoring of minigrids and distributed RE systems using a digital platform.** The AMP envisions the use of a digital tender platform across participating countries. In the case of STP, tender functionality is probably not required. However, tracking of installed minigrids is still needed including evaluation of performance. Opportunities exist to merge the requested functionality with baseline work on GIS-supported siting and localization of RE systems. The AMP will make available to this purpose, expertise in the domains legal and finance, engineering, and procurement.

Data generated by the pilot(s) will be collected using the digital platform, connecting directly to remote monitoring and smart metering equipment. Data that are not amenable to be collected remotely will be collected either by the mini-grid operator or some alternative way to be defined by the PMU. Data collected from the pilot(s) will be used at the project level to, among other purposes: (i) track the performance of the mini-grid systems in real-time; (ii) validate the underlying pilot(s) assumptions and business case; (iii) track performance enhancement in mini-grid capacity utilization; and (iv) generate insights and lessons learned to share with the AMP Regional Project. The data will be shared with the AMP Regional Project for aggregating and analyzing data across all child projects. The AMP Regional Project will use these data to: (i) generate insights and lessons learned; and (ii) inform the development of knowledge products, to be disseminated across countries participating in the AMP, and the broader mini-grid development community.

Box 5: Data sharing for minigrid pilots

Pilot beneficiaries (e.g. minigrid operators) receiving support from the project will be required to share minigrid performance data with the national project. Specific terms and conditions for data-sharing and how best to operationalize the commitment and its adoption by the beneficiaries will be defined and agreed upon with minigrid operators during project implementation, including details of what data can and cannot be used, based on consultations with industry stakeholders and with support from the AMP Regional Project.

The specifications around the data generation by the demonstration pilots supported by the project will consult and follow guidance/standards provided by the AMP Regional Project. A standardized Quality Assurance and Monitoring Framework (QAMF) for application in all minigrid pilots, as envisioned under Output 4.3, will be developed in Year 1 of the AMP Regional Project and disseminated to all national projects. A digital platform will be procured by the project (under Component 4, Output 4.2) to serve different purposes including: (1) run digitized tenders and administer grants (if considered by Government; and (2) managing all technical and financial data related to minigrid sites.

Through the implementation of this digital management platform, minigrid developers selected to implement minigrid pilots with support from the project will have access to a set of best-in-industry tools for analyzing minigrids (e.g. demand forecasting, system optimization, distribution network design, detailed financial modeling at the site and portfolio level). Similarly, as part of the roll-out of the data platform, minigrid developers (as well as key government and other stakeholders) will receive capacity-building and in-depth training to use analytical tools and data management technologies.

Activity 2.1.5. **Monitor pilot(s), collect and aggregate data shared by pilot(s).** Data generated by the pilot(s) will be collected using the digital platform, connecting directly to remote monitoring and smart metering equipment. Data that are not amenable to be collected by remote sensing will be collected either by the minigrid operator or some alternative way to be defined by the PMU supported by appropriate expertise.

Data collected from the pilot(s) will be used at the project level to, among other purposes: (i) track the performance of the mini-grid systems in real-time; (ii) validate the underlying pilot(s) assumptions and business case; (iii) track performance enhancement in minigrid capacity utilization; and (iv) generate insights and lessons learned to share with the AMP Regional Project. Also, data collected from pilot(s) will be shared with the AMP Regional Project for aggregating and analyzing data across all AMP national child projects. The regional project will use these data to: (i) generate insights and lessons learned; and (ii) inform the development of knowledge products, both to be disseminated across AMP participating countries and the broad minigrid sector.

Box 6: Indicative Specifications for Minigrid Pilots' Digital Hardware and Software

Indicative minimum requirements and costs references for hardware/software for data-sharing include the following:

Offering	Details
Hardware requirements per site	• Inverter monitoring (monitoring & control) • Distribution monitoring • Optional current transformers for energy meter if more than 10 kW (single phase) or 30 kW (three-phase) • 24V power supply • Various data cables and installation material • Optional: 24V backup battery • Optional: Cabinet for the complete monitoring system • Industrial internet router • Industrial or high quality Ethernet Switches
Hardware requirements per connection	• Smart meter

Output 2.2. Capacity of private sector and end-user groups strengthened for developing innovative, resilient minigrid business models.

99. Outreach activities to the private sector and end-user groups are envisioned to increase the quality of minigrid (pilot) proposals in STP. The following activities are envisioned:

Activity 2.2.1. **Support to national private sector for minigrid project development and design.** This includes training on the I use of GIS tools to identify and rank promising grid areas or communities, awareness on legal issues, implications of terrain constraints, access to other infrastructure (including the main grid, roads and telecommunication services), identification of productive energy users. Understanding and evaluation of energy demand, demand forecasts and local purchase capacity on financial viability. Opportunities for cost reduction including technology choices and level of electricity supply (Tier) offered. Determination of appropriate payment and tariff schemes and technologies including Pay-as-you-Go (PAYG) and smart meter functionality. Awareness of need for after-sales services, supply of (EE) appliances and equipment. Awareness on the need for financing schemes for project developers and end-users (see also Component 3).

Activity 2.2.2. **Support for proposal writing.** Workshops will be carried out to provide national private businesses and communities best practice regarding proposal and tender writing, and provide an overview of innovative business models relevant to the local context. Sharing of existing free tools, repositories of best practices examples and liaison with existing technical assistance providers, including the AfDB supported Green Mini-Grid Helpdesk and the ESMAP Mini Grid Design manual.

Activity 2.2.3. **Empowerment of end-users and communities.** This is pursued through awareness building, information campaigns, and ongoing needs analysis; and organization of communities for quality assurance and complaints handling. The Project will contribute to building civil society capacity to increase demand for adequate, affordable, and low-carbon electricity services in adherence to appropriate quality standards. Private sector associations CSOs including the Association for the Promotion of Renewable Energy and Sustainable Environment (APERAS) are effective channels for building momentum in the market and leveraging resources and know-how. Collaboration with women's associations can help integrate energy issues into their work and ensure the voices of their membership base contribute to the national dialogue.

Output 2.3. Minigrids pilots fully designed, constructed and monitored, including productive uses and modular hardware and system design (INV).

100. This output encompasses the deployment, operation and monitoring of the envisioned minigrid pilots. This entails communication with the energy users in the target area(s), prospection, drafting of detailed procurement plan, and preparation for equipment installations. In the context of STP, pilot preparatory work will include one part assigned to the public sector (DGRNE supported by the Project team) and another part to the awarded operator. Planning is critical, especially delivery times by equipment suppliers after contract award may be lengthy.

101. A second aspect is the need for accurate local electricity consumption figures (both current and growth forecast), as this is a risk factor for the operator. In pilot schemes in which a large consumer will act as the anchor load, this may be less of a problem. Equipment delivery and demand data shall be thought through carefully as part of the MPP can be informed by the DREI process. Moreover, the MPP shall think through the whole process including customs clearance, insurances, spatial planning and permitting issues, formal acceptance of deliveries, ownership of the assets for each of the envisioned pilots.

102. This output includes the following activities:

Activity 2.3.1. **Preparation and detailed engineering.** This activity concerns the preparation phase by the awarded developers/operators including detailed technical specification and engineering studies, procurement, civil works, project integration and management. The Project will provide support to these stakeholders through its Technical Advisor and Project Engineer to speed up processes with GoSTP, and to maintain close communication with local communities and beneficiaries. Budget is available for permitting processes and additional studies, as required. The Project Engineer will be in charge of process purview and be present during formal acceptance of equipment and works.

Activity 2.3.2. **Investment, installation, test and start-up of minigrid pilots.** Implementation of the infrastructure and equipment according to the MPP and the business model for each individual pilot, where possible utilizing unskilled and semi-skilled labor from men and women in the community as a means of getting male and female youth interesting in the minigrid sector through apprenticeships and casual employment. Socially recognized applications of electricity including public lighting, community entertainment, refrigeration and high-efficiency electric cooking, can be demonstrated and encouraged to build a sense of ownership, pride and care, contributing to long-term sustainability. GEF funds are available to reduce operator's financial risks through incentives informed by the DREI process. The funding will be targeted at demonstrating one or more pilots based on the described Minigrid Schemes 1, 2, and 3, through a tailored CAPEX subsidy. The feasibility, sustainability risk, and required subsidy level will be assessed in detail according to the minigrid design process to be laid out in the MPP. For each Minigrid Scheme, evaluation criteria, milestones, and go/no-go decision points will be defined. Long-term finance including OPEX subsidies or annual, performance-based payments, will be modelled through a sustainable finance and guarantee scheme (Component 3). To this purpose, the Project with support from UNDP will maintain a continuous dialogue with the GoSTP and the development partners, specifically the MDBs.

Activity 2.3.3. **Monitoring of the pilots installed.** Data generated by the pilot(s) will be collected using the digital platform, connecting directly to remote monitoring and smart metering equipment. Data that are not amenable to be collected by remote sensing will be collected either by the minigrid operator (e.g. through male and female staff or community liaisons) or some alternative way, to be defined in the contract. The Project will contribute to setting up monitoring systems, after with the minigrid operators shall bear the costs of data collection and sharing with the Project and the IP through the digital platform (see Component 4).

Component 3. Scaled-up Financing

Outcome 3: Financial sector actors are ready to invest in a pipeline of low-carbon minigrids and concessional financial mechanisms are in place to incentivize scaled-up investment.

103. This outcome addresses the challenges to sustain capital flows towards in minigrids and RE technologies in Sao Tome and Principe and foster investors' appetite in this sector. Public budgets for investment are heavily constrained as the country largely depends on concessional funding from its development partners for investment and recurrent expenditures. Given the very low-income level of most of STP's population, minigrid operators will require subsidized tariffs to cover operational costs. Long-term contracts have been identified as a de-risking measure to persuade minigrid operators to enter the market. Such contracts shall be backed up by financial guarantees. The Project will collaborate with STP's development partners to design and implement a long-term financial instrument to this purpose.

104. The market of private sector companies with capacity to invest in RE technologies is small and tends to rely on equity. Small companies (such as shops, small restaurants, hairdressers and beauty parlors, among others) however could benefit from reduced energy costs and increased reliability, but lack access to technology and capital. At least one commercial bank (BISTP) offers credit schemes for RE systems (e.g., solar panels) but appetite from the market is reportedly low. The Project will assess how current schemes can be approved and under which conditions the market would become more responsive.

Output 3.1. Design support for a financial facility for minigrids, distributed electricity grids and services.

105. This output aims to design a financial facility for decentralized electric energy services, to be established through multilateral agency coordination in STP and/or the region. This project will support through participation in high-level negotiation and design panels. Where possible, leverage of partners and funding is sought through the AMP Regional Programme thereby seeking economies of scale.

106. This output includes the following activities:

Activity 3.1.1. **Engagement with international finance community.** Local and international private sector players will be engaged to identify the key financial barriers, specifically entities with local knowledge such as the African Minigrid Developers Association (AMDA). An analysis of any legal implications of various funding models will be undertaken. Government stakeholders will be engaged to ascertain the political viability and interest.

Activity 3.1.2. **Proposal of financing mechanisms.** Integrated financing solutions involving public and private agents are more appropriately implemented through a second-tier bank or national development bank (in STP this role could be assumed by the Central Bank). Developer oriented products include: (i) loans for procurement of RE systems (PV and BESS systems), for minigrid developers and distributed energy service companies. End-user-oriented finance instruments can include: (ii) credits for EE appliances and small PV systems for end-users; (iii) loans for larger EE equipment such as HVAC, building upgrades and electrical systems, for commercial end-users as well as for energy service companies (ESCOs). Financing mechanisms will offer tailored products and services for female borrowers, who exhibit lower rates of financial inclusion and face gender-based barriers.

Output 3.2. Domestic financial sector capacity-building on business and financing models for minigrids.

107. This output encompasses promotion and targeted training for national financial sector entities to understand and implement RE/EE financing schemes for households and commercial sector. Links will be developed between financial institutions, national government agencies and international donors. The purpose of this will be to explore hybrid and innovative schemes focused on unlocking finance and reducing the costs of capital and risks. Examples might include donor programs creating first loss pools or currency hedging facilities.

108. This output includes the following activities:

Activity 3.2.1. **Engagement with national banking sector.** National financial institutions and lenders will be engaged and their capacity and interest for lending to the sector will be determined. Workshops and dialogues

will be conducted create awareness of the opportunities that exist with lending to the mini-grid industry and its end-users. Among other topics, the Project aims to trigger a discussion towards the identification of intelligent financing models for SME to reduce capital costs, for example related to product stocks held by domestic RE/EE suppliers.

Activity 3.2.2. **Targeted training of bank officers.** Training of male and female loan officers is envisioned to enhance understanding and appraisal of energy investments solicited by minigrid operators and end-users. In this context, the Project will encourage strengthening of partnerships in the region enabling local banks to pool resources. In collaboration with MDBs, the Project will explore synergies with related fields, including investment in productive uses (such as by rural banks), insurance policies and terms to mitigate loan risks, collateral terms, and mitigation policies to address climate risks.

Component 4. Digital and Knowledge Management

Outcome 4: Digitalization and data mainstreamed, across stakeholders, into local minigrid market development. Increased knowledge, awareness and network opportunities in the minigrid market and among stakeholders, including benefitting from linkages to international good practice.

109. Digital technologies and solutions are fundamental to enabling off-grid electrification. The viability of minigrids relies strongly on certain digital technologies including remote control and monitoring of minigrid operations and the collection of customers' payments, including the use of digital money. Digital solutions also have offer significant cost-reduction opportunities, thus contributing to the AMP's objectives. Opportunities around digitalization also relate to the analysis of data from minigrid projects to surface insights, learning and optimization ("big data").

110. The Regional Project seeks to make available specialized digital tools and solutions for the off-grid and minigrids sector in the participating countries, identify relevant cases, and assess value and social impact. The AMP will develop a data aggregation platform for the aggregation of data collected by the national child projects. This platform will use common data protocols and standardized approaches for data analytics and monitoring and evaluation of minigrid projects.

Output 4.1. A project digital strategy is developed and implemented, including linkages to and following guidance from the AMP Regional Project

111. This output entails the preparation of a digital strategy to improve minigrid scalability and oversight using specialized digital tools and solutions. To this purpose, the Regional Project will develop a comprehensive digital strategy, which will encompass all facets of how data and digitalization is mainstreamed and embedded across all regional AMP activities. This exercise involves consultations with UNDP energy staff working on parallel data and digitalization tools such as Kobo and Data4Minigrids, as well as RMI-supported platforms such as Electrifying Economies. The national projects shall develop their own specific digital strategy thereafter.

112. This output includes the following activities:

Activity 4.1.1. **Develop and implement the Project Digital Strategy.** All national child projects will develop a Digital Strategy for the project early in Year 1 which will be implemented thereafter. The Project Digital Strategy will be updated on an annual basis to reflect learnings from project implementation, guidance received from the AMP Regional Project on digital tools and solutions, and insights gained from minigrid pilot(s) data. Correlating male- and female-headed households (or business owners) with local connection rates (ratio connected to covered households) and consumption information (adjusted for household size) is envisioned.

Activity 4.1.2. **Develop recommendations for a national-level digital strategy for minigrid development.** Upon implementation of the project Digital Strategy and based on lessons learned around opportunities to leverage digital tools and solutions for minigrid sector development, all national child projects will develop a set of evidence-based recommendations for rolling out digital solutions for minigrids at the national level. These recommendations will be shared with key national stakeholders.

Output 4.2. A Minigrids Digital Platform implemented to track minigrid pilots, and to support minigrids scale-up and cost-reduction.

113. The implementation of the Minigrids Digital Platform is expected to result in improved project design and system optimization, reduced uncertainties and more transparency in contracting attracting better and more competitive offers. The Platform will serve various purposes. It will be used to concentrate and manage technical and financial data related to minigrid sites. By incorporating area information (e.g. demand forecasting, system optimization, distribution network design, inputs for financial modeling), from the project and access to best-in-industry digital tools for analyzing minigrids, it will assist project developers to build robust business models while reducing transaction costs. Minigrid developers (as well as key government and other stakeholders) will receive capacity-building and in-depth training to use analytical tools and data management technologies.

114. The Platform offers a series of benefits to the sector agencies (Implementing Partner) including: (i) validation and storage of data and characteristics of all distributed energy projects/programs at in a centralized database; (ii) interface for collection, management and aggregation of data from all minigrids and connected RE systems; (iii) possibility to run digitized tenders and administer grants (if considered by Government); (iv) performance verification of minigrids; (v) real-time monitoring and evaluation of electrification projects/programs; and (vi) advanced analytics of minigrid portfolios to generate critical insights.

115. The platform will be hosted by the DGRNE, which will provide office space and basic facilities to this purpose. The Digital Platform will be used to collect data generated by the pilots, connecting directly to remote monitoring and smart metering equipment (see Output 2.3). DGRNE has experience with digital support tools as it is in charge of operating a GIS platform for RE resource mapping and siting (funded through UNIDO). The design of the Digital Platform will include an assessment of DGRNE's business operations. The findings of this exercise will allow contribute to operational sustainability and cost-effectiveness of the system and inform adaptive management of the Project. The Procurement of the Platform includes on-site installation, configuration and hands-on training by the supplier.

116. This output includes the following activities:

Activity 4.2.1. **Develop Terms of Reference (TORs) for procuring a Minigrids Digital Platform.** The project will use standardized TOR provided by the AMP Regional Project and tailor them to the specific country/project needs. Box 6 provides indicative specifications for the Digital Platform which the AMP regional project will develop further into standardized TOR and the project PMU will tailor to the specific country/project needs.

Activity 4.2.2. **Procure Minigrids Digital Platform.** The project will procure a country-level mini-grids digital platform and set it up to enable (i) convening and capacity building for key stakeholders (public/private), (ii) collecting and managing technical and financial data related to minigrid pilot(s) based on the project's Quality Assurance and Monitoring Framework (QAMF), including linking to the AMP Regional Project, and (iii) acting as the mechanism for running digital tenders for minigrid developers/sites.

Activity 4.2.3. **Technical support and Training.** Configuration of the Digital Platform and training of DGRNE and project staff will be required at installation. Servicing and additional training is expectedly needed afterwards, specifically: (i) technical configuration of data communication modules once minigrid pilots are ready for data sharing; (ii) training on the use of data analysis and reporting modules; (iii) Q&A sessions and specific topics (webinar); and (iv) installation of software upgrades.

Box 7: Indicative Specifications for the Project's Digital Platform

The project digital platform will provide key functionality for the project in terms of acting as the (i) national digital convening platform for key stakeholders (public/private), (ii) providing ongoing data gathering and M&E on minigrids, including linking to the AMP regional project and (iii) acting as the mechanism for tenders for minigrid developers/sites.

Functionality	Details
National digital convening platform for key stakeholders	• Set up of a country-specific, web-based platform to manage all technical and financial data related to minigrid sites at the site and portfolio level • Single site register of minigrid sites, with geospatial views and technical/financial benchmarks for site assessment • Set of best-in-industry tools for analyzing minigrids, including demand forecasting, minigrid system design and optimization, and financial modeling • Capacity-building and in-depth training of key government and other stakeholders to use analytical tools and data management technologies
National monitoring and evaluation platform (remote monitoring & analytics)	• Direct integration with smart meters and remote monitoring systems for live data feeds and monitoring (with options to address lack of remote monitoring systems or other restrictions) • Big data analytics and customized reporting to calculate and report on standardized metrics for pilot performance, based on project QAMF • Quality assurance of data quality, accuracy, relevance, consistency • Interactive tools to analyze data, filter, and view at varying levels of granularity • All pilot-specific data can be rolled up into national view, and all country-specific data can be rolled-up into regional view
Financing platform for running tenders to select minigrid pilot beneficiaries	• Complete end-to-end management of e-tenders for mini-grids customized to specific project/pilot needs (e.g. customized technology solutions, customized workflow, customized KPIs for pilot monitoring) • Automated proposal analysis for quantitative proposal components • Remote verification of connections through smart meter integrations • Automated M&E analytics for all Results-Based Framework (RBF) program indicators (connections deployed, amounts paid, gender/environmental impact metrics, etc.)

Output 4.3. A Quality Assurance and Monitoring Framework (QAMF)[43] is adopted.

117. This output envisions putting into operation a framework for measuring, reporting and verification of the sustainable-development impact of the supported pilots, including GHG emission reductions. A standardized QAMF for all supported pilots will be developed in Year 1 of the regional project for dissemination to the child projects. This AMP-QAMF will build upon the minigrid Quality Assurance Framework (QAF), a set of technical and financial performance monitoring indicators, developed by the United States' National Renewable Energy Laboratory (NREL), the AfDB Sustainable Energy Fund for Africa (SEFA) and others, as well as data gathering, pooling and ongoing analytical work by UNDP's partners including RMI, Sustainable Energy for All (SE4All) and the African Minigrid Developers Association (AMDA).

118. This output includes the following activities:

Activity 4.3.1. **Inputs and feedback from the STP Project to the AMP Regional Project.** National project staff will provide inputs and feedback on the framework design, its operationalization and the required

[43] Also referred to in this document as a common M&E Framework.

adoption by the supported pilots minigrid operators. Concerns around data privacy or sensitive data shall be considered in this respect.

Activity 4.3.2. **Adoption of the standardized Quality Assurance and Monitoring Framework (QAMF).** National project staff will provide both inputs and feedback on the development of this framework and its operationalization. Concerns around data privacy or sensitive data on the part of minigrid operators will be considered and addressed in each case. The adoption of the QAMF shall be demanded in the contracts with minigrid operators and other beneficiaries of the STP Project. The purpose is to ensure that the AMP Regional Project can aggregate common data metrics and track a standardized set of key performance indicators across all minigrid pilots across all partner countries and report this data to the donor on a programmatic level.

Output 4.4. Engage with regional project by participating in Communities of Practice and capturing and sharing of lessons learnt.

119. The Communities of Practice (CoP) are supported by UNDP's partner in the AMP, the Rocky Mountains Institute (RMI). The COP will share knowledge and facilitate the development of solutions to common challenges within the African minigrid sector providing support to ministries, government agencies, and electric utilities, among others. The CoP will strengthen South-South cooperation and learning, drawing on the experiences of participating countries in minigrid cost reduction and deployment, with a focus on policy & regulations, finance, and new business models. The AMP's CoP will work closely with existing collaborative groups, including: (1) The Africa LEDS Partnership Africa Mini-Grids Community of Practice (AMGCOP), convened by SouthSouthNorth and the US National Renewable Energy Laboratory (NREL), with support from The German International Cooperation GIZ (since 2019); (2) The African Association for Rural Electrification (CLUB-ER), currently composed of 43 African national institutions (agencies, funds, regulators, departments of energy, utilities) from 32 African countries; and (3) The Mini-Grid Partnership, convened by SEforALL and chaired by the Africa Minigrid Developers Association.

120. The following activities are envisioned:

Activity 4.4.1. **Participate in AMP Communities of Practice (CoP).** One of the primary ways national 'child' project staff will interface with the regional project is via the 'Communities of Practice' (CoPs) and associated activities/platforms. While it is expected that many of the activities under the Regional Project Component #3 will be undertaken virtually (via internet-based platforms, webinars or digital platforms) it is also expected that the CoPs will include actual in-person workshops, meetings or training events.

Activity 4.4.2. **Sharing of research and lessons learned with the regional child project.** Research and lessons learned will be systematically shared with the regional project based on guidelines that will be defined by the regional project and shared at the project's Inception Workshop. Capacity building will be provided to the Project Management Unit to compile lessons learned and share knowledge effectively.

Activity 4.4.3. **Collaborate with the regional project on an Insight Brief.** Every child project is expected (in the course of the four-year implementation cycle) to collaborate with regional project staff on the development of at last 1 'insight brief' capturing (in an accessible format) selected key highlights from a successful national project activity. The 'insight brief' can cover any activity of the project and take the form of a written brief or video brief.

The regional project has budgeted resources for the production of 'insight briefs' but their quality will depend on content and data provided by the national project teams and stakeholders. In order to facilitate such collaboration each national project is required to hire a consultant or local firm to gather data and audio-visual content (video footage, photos, etc.) on the subject for the 'insight brief'. The information and data collected at the national level will be provided to the regional project staff who will utilize this content and produce an 'insight brief' according to a standardized communications format for all AMP knowledge products for external audiences. The 'insight brief' will be produced in

both the local/national language of the relevant national project as well as English for dissemination by the regional project to regional stakeholders and publishing on the AMP website.

i.

Component 5. Monitoring and Evaluation (M&E)

Outcome 5: Ensuring compliance with all mandatory monitoring and reporting requirements of the GEF.

121. This outcome will assist the Implementing Partner in establishing project oversight and monitoring systems, including the Project's Environmental and Social Management Framework (ESMF) and resulting Management Plans, the Gender Action Plan (GAP), the Mid-Term Review (MTR) and the GEF Terminal Evaluation (TE) of the Project. The Project's M&E Plan is built upon experiences during project preparation with a view on mitigating implementation and fiduciary risks

Output 5.1. Inception workshop is conducted and M&E plan is implemented.

122. This output will assist the IP during the start-up phase of the Project to operationalize management tools including the M&E Plan, understanding project risks and assumptions, use of the Risk Log, preparation of the first Annual Work Plan, streamlining of project implementation processes with GoSTP procedures, and documenting thereof in a Project Operations Manual (POM). Another task is finalization of the Terms of Reference of key project staff and consultancies in dialogue with UNDP and the IP. A short-term consultancy is envisioned to guide the IP through the inception phase to put the Project on track. This output includes the following activities:

Activity 5.1.1. **Conducting inception workshop and preparing report**. A project inception workshop held to officially launch the project and, among other aims, familiarize key stakeholders with the detailed project strategy, roles and responsibilities of the project team, and project planning instruments such as the Total Budget and Work Plan (Section IX), Multi-year Work Plan (Annex 4), Monitoring Plan (Section VI), and the Procurement Plan (Annex 11), among others. The national inception workshop will be carried at the beginning of project implementation within 60 days of signing the UNDP Project Document of this project. The workshop will be organized by the PMU with support from the IP, and planned with support from the AMP Regional Project staff. Staff from the AMP Regional Project PMU will participate either remotely or in-person in the Inception Workshop and will provide support to the project PMU to plan the workshop, and develop materials and content that will facilitate project planning activities including the template for the Inception Workshop Report. The Inception workshop report will be prepared by the PMU and submitted to UNDP within 60 days of signing the UNDP Project Document of this project.

Activity 5.1.2. **Ongoing project monitoring of Results Framework indicators**. As set out in the Monitoring and Evaluation Plan (Section VI), data on Results Framework Indicators will be systematically collected and analyzed to provide decision-makers, managers, and project stakeholders with: (i) information on progress in the achievement of agreed objectives and the use of allocated resources, and (ii) regular feedback on performance of projects and programs taking into account the external environment. Information from systematic monitoring serves as a critical input to ongoing PMU management decisions (adaptive management), evaluation, and learning.

The GEF Core indicators included in the Results Framework (Section V) as per this Project Document (Annex 16) will be used to monitor global environmental benefits and will be updated for reporting to the GEF prior to the project's evaluations. Namely, the mid-term review (MTR) and terminal evaluation (TE) described under Activity 5.2.1 and Activity 5.3.1 below.

Activity 5.1.3. **Ongoing project monitoring of key project plans**. The project is accompanied by various plans including Stakeholder Engagement Plan (Annex 8), mitigation plan for project risks (Risk Register in Annex 6), and Gender Action Plan (Annex 10). These plans will be reviewed according to the monitoring and evaluation requirements.

According to the project's social and environmental risk rating, there is a need to carry out continuous monitoring of the social and environmental safeguards as proposed in the Environmental Social

Management Framework (ESMF) and other SES frameworks/plans (Annex 9). The environmental and social management plan (ESMP) that will emanate from the application of the ESMF will also be monitored under this activity.

Activity 5.1.4. **Annual progress reporting**. Data collected by monitoring GEF Core indicators, Results Framework indicators, project plans and social and environmental safeguards will be used to prepare the annual Progress Implementation Report (PIR) to report to back to UNDP and/or GEF.

Output 5.2. Project Mid-Term Review is conducted.

Activity 5.2.1. **Conduct a Mid-term review (MTR) of the project**. An independent mid-term review (MTR) will take place at the half-way mark of project implementation and will be conducted according to guidance, rules and procedures for such evaluations established by UNDP and GEF as reflected in the UNDP Evaluation Guidance for GEF Financed Projects. The MTR will be made widely available to all project stakeholders in the relevant language.

Output 5.3. GEF Terminal Evaluation is conducted.

Activity 5.3.1. **Conduct a Terminal evaluation (TE) of the project.** An independent terminal evaluation (TE) will take place upon completion of all major project outputs and activities. The project's terminal GEF PIR along with the TE report and corresponding management response will serve as the final project report package. The final project report package shall be discussed with the Project Board during an end-of-project review meeting to discuss lessons learned and opportunities for scaling up.

123. Expected Results. The Project contributes to GEF-7 Core indicator 6: Greenhouse Gas Emissions Mitigated. Benefits include: (i) direct emissions reductions attributable to the minigrid pilot investments made during the project's implementation period, totaled over the lifetime of the investments (20 years) compared to the business-as-usual scenario, i.e. fossil-fuel-based mini-grid(s); and (ii) Indirect emissions reductions resulting from the increased uptake of minigrids for off-grid electrification of rural areas due to replication, scaling-up and market change, to which the Project has contributed by creating an enabling investment environment and facilitating subsequent investment flows. Annex 12 describes the methodology used to calculate the estimated GHG emission reductions. Note that 10% of the estimated GHG benefits from the child project are deducted and attributed to the AMP Regional Project, which reflects the direct contribution of the latter to the national projects.

124. As per Annex 12, the project is expected to bring about the direct commissioning of 0.7 MW in solar PV generation capacity and 1.0 MWh of battery storage. The lifetime greenhouse gas (GHG) emissions reduction from project activities, particularly investment in minigrid pilots, is estimated at approx. 20,500 metric tons of carbon dioxide equivalent (tCO2eq) (direct) and 5,500 tCO2eq (indirect). The number of direct beneficiaries is estimated at 21,800 people, of which at least 50% are women, as a result of 4,400 new and/or improved minigrid connections.

125. Partnerships: The Project is embedded in the AMP Regional Programme. As such, it will collaborate with 17 other countries which will collectively build a knowledge base concerning the implementation of minigrids in Africa. The STP child project has access to specific know-how and advice, and can draw on experiences from more advanced countries in the region. The support and interaction between the participating countries is tracked through the Results Framework of the Regional Programme.

126. STP's cooperation partners strive at coordinating programming under guidance of the GoSTP. In the energy sector, key partners include AfDB, World Bank, UNIDO, and IRENA who have several projects and programs in the country targeting the electricity sector. National entities involved are, besides the Implementing Partner, the utility EMAE and the regulator AGER. In the regional context, one can identify ECCAS, ECOWAS, ECREEE, and CERMI, as well as ALER for the community of Lusophone countries.

Table 7. Related initiatives by development partners, donors or other role-players in São Tomé e Príncipe

Partner name / Initiative	Description and contributions
African Development Bank	▪ Sao Tome and Principe – Energy Transition and Institutional Support Programme (ETISP). ADF Budget UA 10M). Board Approval 25 March 2020, currently under execution. It supports GoSTP in promoting green growth and the sustainable development of the country's power system, as well as strengthening public financial management and the business climate. ▪ The Sustainable Energy Fund for Africa (SEFA) is a multi-donor Special Fund managed by the African Development Bank. SEFA offers technical assistance and concessional finance instruments to remove market barriers, build a more robust pipeline of projects and improve the risk-return profile of individual investments.
World Bank	▪ STP Power Sector Recovery Project. (Project ID P169196). IDA Grant USD 12M equivalent. The project development objective is to increase renewable energy generation and improve the reliability of the electricity supply.
UNIDO	▪ Strategic Program to Promote Renewable Energy and Energy Efficiency Investments in the Electricity Sector of Sao Tome and Principe (GEF ID 9897); GEF Budget US$ 1,575,571. Approved 4 April 2019, currently under implementation. Enhanced GHG emission reduction and domestic value creation through the uptake of inclusive renewable energy and energy efficiency technology markets
IRENA	▪ IRENA has announced in 2022 its interest to include STP into its energy for health approach to deliver combined basic electric services to remote communities.[44]
UNDP (Parallel projects)	▪ Promotion of Environmentally Sustainable and Climate-Resilient Grid-Isolated and Grid-Based Hydroelectric Electricity Through an Integrated Approach in Sao Tome and Principe. GEF ID 5334). GEF Budget US$ 5,274,544. Approved 7 June 2015, currently operationally closed.
ALER	▪ The Lusophone Renewable Energy Association ALER is non-governmental development organization with the mission to promote renewable energies in Portuguese-speaking countries. ALER facilitates business opportunities by supporting the private sector and attracting financing and investment, by liaising with national and international authorities.[45]

127. Private sector's engagement in the project: The private sector consists of businesses that assume different roles in the minigrid and RE/EE value chain, including: (i) national equipment suppliers and installers; (ii) national RE project developers; (iii) international RE project developers with interest in STP market; (iv) prospective minigrid operators and ESCO's; (v) owners of distributed RE power systems ("prosumers"); (vi) maintenance and service companies; and (vii) private (national) banks offering lending to RE/EE sector.

128. Against the backdrop of STP's general context of a small, heavily indebted, island state, each group faces specific risks and barriers, many of which related to the absence of financial guarantees, exposure of assets, and high capital costs, which reduces appetite to enter the market under the current scenario. The PPG has initiated a dialogue with national private partners, which will be continued during project implementation through periodic consultations and workshops. The Project aims to implement one or more Calls for Proposals for the described minigrid schemes to directly engage the private sector.

    Co-financed activities. The partners who have provided letters of co-financing for this project are listed in Annex 13. No co-financing funds will be administered by UNDP. UNDP will monitor the realization of co-financing amounts the annual GEF PIRs and at MTR and TE. Risks that might impede co-financing and affect the Project shall be monitored, including risks that may affect the Project's safeguards as guided by the indebted

[44] See: https://www.irena.org/newsroom/expertinsights/2020/Nov/Sustainable-healthcare-and-energy-ecosystems-for-the-last-mile

[45] https://www.aler-renovaveis.org/en/about-us/aler/

ESMF (Annex 9). Additional risk management measures may be taken in case of potential reputational risks for UNDP.

Table 8. List of co-financed activities

Co-financing source	Co-financing type	Co-financing amount	Included in project results?	If yes, list the relevant outputs
Directorate-General Natural Resources and Energy (DGRNE) - National Government	In-kind	US$ 38,210	yes	Outcome 1; Outcome 4; Project Management
African Development Bank (AfDB) - Donor Agency	Grant	US$ 6,000,000	yes	Outcome 2
United Nations Development Programme (UNDP) – GEF Agency	Grant	US$ 50,000	Yes	Project Management

Risks*:*

129. The overall risk profile of the Project has been assessed as "substantial". Based on the risk categorization assigned to the various country projects and the associated environmental and social risks, the following procedures for screening, assessing and managing those risks must be undertaken during project implementation of each country project. (1) Screening of social and environmental risks and impacts and determining applicable social and environmental standards and requirements (including UNDP SES). The screening process utilizes UNDP's SESP and develops a specific screening procedure for the forthcoming type of sub-projects/activities. (2) Appropriate types of social and environmental assessment to identify, document and address potential social and environmental risks and impacts. (3) Preparing and approving time-bound action plans for avoiding, and where avoidance is not possible, reducing, mitigating, and managing adverse impacts, including development of specific management plans according to applicable policies and regulations, including UNDP's SES (i.e. Environmental and Social Management Plans which would be completed post-assessment).

130. Specifically, the SESP identified 14 risks, 3 of which assessed as "substantial", 10 as "moderate", and 1 as "low". The DREI framework identifies 10 main risk categories which indicate an overall high market risk for minigrid development (see Prodoc §20, table). Two more risk were added related to national ownership, coordination, and implementation capacities, which were rated as "moderate" if duly addressed. One category was added to handle COVID-19 risks. Social and environmental risks are primarily linked to human rights given the challenges to secure social inclusiveness and incorporate vulnerable people. Among other root causes, underlying factors include very low-income levels of rural people living in small communities which rely on subsistence farming and collection; undefined or absence of land tenure titles and associative structures enabling people to claim their rights; demographic pressure which may lead to local movements of people as a result of electrification, potentially separating them from their food sources.

131. While electricity supply is a socio-economic enabler, the nexus between productive uses and electricity supply needs to be further articulated – including according to gender. To address this risk, the Project design incorporates sustained community engagement during the preparation phase of the proposed pilots. This activity will draw upon country knowledge and positive experiences in other sectors (e.g., agricultural development) to make these available to the energy sector in STP.

132. Environmental risks are essentially two: (i) potential adverse impacts on biodiversity and habitat; and (ii) dispersal of electronic waste including batteries, into the environment. As related to the former, STP is a sensitive tropical island where human activity can lead to loss of species, soil erosion, and degradation of rivers and aquifers. Electrification will lead to increased human activity; adverse effects are mitigated by proper planning, avoiding specific areas such as natural parks altogether, and promote best practices including changes in attitude among local dwellers. The community engagement shall result in an appraisal of site-specific risk and determination of mitigation options.

133. As concerns the latter, the PPG observed that waste management practices in STP are still weak and often absent especially in rural areas. In particular non-degradable waste and objects (plastics, batteries, broken equipment and tools) are abandoned and become dispersed in the environment. The situation poses a challenge for the repair and end-of-life treatment of minigrid components including wiring and electric appliances. Increasing awareness of the local population and inducing a sense of ownership and responsibility is one line of action. A second one is the integration of electronic waste management into an Extended Supplier Responsibility (ESR) scheme. Among other options, such responsibility could be demanded from a minigrid operator under its contractual obligations.

134. For more details, reference is made to the ATLAS Risk Log, Annex 6.

Stakeholder engagement and south-south cooperation:

135. The PPG has identified the following core stakeholder categories: National Government (MIRN/DGRNE, MIRN/DGA, MPFEA); autonomous Government entities (AGER; INPIEG); public service providers (EMAE); private sector (installers, prospective operators, commercial banks; academia and training institutes (CFP, ISCVSM); civil society organizations (APERAS). Regional energy centers (ECREEE). The Stakeholder Engagement Plan is presented in Annex 8. This Plan will be used as a tool for reference and be further detailed during the Project's inception phase and updated annually. The Plan is a starting point for the design of the Project communication strategy and specific communication plans.

136. The project will contribute to UNDP's South-South Triangular Cooperation platform and facilitate dissemination through global ongoing South-South and global platforms, such as Africa Solutions Platform, the UN South-South Galaxy knowledge sharing platform and PANORAMA[46]. The project through the knowledge portal and other learning tools will make information, lessons learned, and practical experiences available for uptake to the UNDP's solution provider mechanism designed to leverage south-south exchange.

137. The Project will provide São Tomé & Príncipe experts and stakeholders with access to and integrated lessons from UNDP's South-South initiative thereby guided by the AMP Regional Programme. National professionals and students will be given opportunities to participate in internships building upon ongoing cooperation between DGRNE and the CERMI in Cabo Verde. In addition, to bring the voice of São Tomé & Príncipe to global and regional fora, the project will explore opportunities for meaningful participation by STP representatives in specific events related to minigrid deployment, rural energy technologies, environmental management and conservation, among others.

Gender equality and Women's Empowerment:

138. Women in STP experience a high degree of legal equality and gender gaps in human endowments (e.g. education and health) have closed significantly. They still, however, lag behind men in terms of economic empowerment (I.e., employment rates, wages, access to finance, asset levels, business size) and face discriminatory norms related to unpaid labor. Though female-headed households are more likely to have electricity access in STP, they also report connection cost as being a bigger barrier as compared to male-headed households. The project will adopt a participatory approach for maximum impact through the inclusion of all relevant social groups, including marginalized people (e.g. unemployed youth), with attention to participation and inclusion of women whilst respecting the norms, values and customs of targeted communities.

139. A Gender Analysis and ambitious Gender Action plan were prepared during the PPG that are included in Annex 10. The four key aspects of this plan are to: (1) boost women's participation in program elaboration and implementation; (2) ensure electrification efforts are meeting the needs of a wide range of male and female end-users; (3) ensure anchor clients on the whole reflect a balance of men's and women's interests; and (4) address affordability in way that is equitable for both men and women. There are two gender indicators in the project results framework, one that summarizes the degree of participation throughout and another that seeks

[46] https://panorama.solutions/en

to ensure that gender analysis and mainstreaming continue to happen throughout the research, design and learning activities that will be pursued as part of the program Specifically, this involves recruitment, setup of consultation platforms, streamlining of government agencies, engagement of decision-makers, training, empowerment, risk assessments, and livelihood activities, among others. More specific gender indicators and targets have been suggested in the Gender Action Plan for consideration by the PMU at a later date. The project will ensure that women are effectively involved by contracting a specialized national institution or firm for community development with proven expertise in gender and rural energy issues (Output 2.2).

Innovativeness, Sustainability and Potential for Scaling Up:

140. Innovation is at the core of the AMP Program given its focus on cost-reduction and enhanced business models to reduce minigrid cost to increase affordability of RE-based electricity. Business involvement is sought to access private capital to leverage public investment and grant funding. De-risking of RE investments in combination with cost reduction translates into lower financing costs for the investor and increases economic and financial sustainability. Hardware, project development, and operational cost reductions are sought through competitive selection of minigrid project proponents to set a trend towards lower unit energy costs (LCOE) in the region. The incorporation of productive energy uses provides opportunities for income generation in communities improving local capacity to pay for, and sustain, the service.

141. The focus on the utilization of digital technologies is another innovation of the AMP, harnessing the opportunities of digitalization for improved efficiencies, lower costs and risks, facilitate the flow of investment and revenue streams, and thereby contribute to sector development in the region. So far, the minigrid market has not fully exploited the potential of digital tools and solutions to accommodate multiple, decentralized and distributed 'data points' in the minigrid system. Finally, the regional approach enables national projects and implementation partners to engage, learn and share experiences and best practices as input for national and reginal policy agendas and programs.

142. Specifically, the STP project is innovative as it seeks to mainstream the concepts of minigrids into national electrification plans and articulate minigrid solutions in function of beneficiaries (off-grid, unserved, embedded), each of them with a distinct reality, background, and needs. Given the small scale of STP, the minigrid approach promises to deliver tangible and sustainable, low-carbon solutions that may serve as a paradigm towards a more decentralized, resilient electricity sector in the country. Synergies with other sectors, including small and medium enterprises, tourism, and public services (e.g., public health, water supply, and waste) are exploited to maximize impact and leverage funding from other sectors to cover investment and operational costs. As such, the STP Project seeks to produce value for the national economy, as well as financial returns on capital expenditures.

143. Social and economic sustainability is pursued based on a human rights approach to secure access to clean and affordable energy and related services. RE-powered minigrids have proven to be superior to conventional diesel grids in terms of energy costs, operability, and maintainability; and are environmentally superior. The STP Project aims to test and anchor the required boundary conditions for minigrids to actually deliver on this promise. These include: (a) thorough specification and testing of applied hardware, including a definition of the appropriate product choice striking a balance between hardware design, serviceability, repairability, replacement, and overall costs and support infrastructure; (b) social acceptance including local willingness to pay and care for installed equipment; (c) promotion of productive energy uses and access to finance for appliances and equipment by end-users; (d) integration of environmental protection aspects in the business model (such as waste collection). Given beneficiaries' very low-income levels, the Project seeks securing financial and operational sustainability through long-term service contracts under public procurement.

144. Potential for scaling up is significant at project level as well as strategically. Isolated minigrids in STP have limited potential for replication; more likely, the isolated grids as well as other utility grid areas are expected to evolve into grid-tied minigrids, with the potential to be operated as decentralized smart grids by a designated operator. The STP project envisions accelerating market uptake of distributed RE systems by customers seeking a more reliable and cheaper electricity supply. Sector policy and regulation enabling such scheme is in progress. Notwithstanding STP's high electrification rate, many small communities exist (at least 30 communities with

200 people) who would remain deprived from any electricity service in the medium future (10-20 years). The small minigrid ("microgrid") model including solar PV lantern/cell phone charging schemes around a community/health center, would be a valuable response to serve this market.

V. PROJECT RESULTS FRAMEWORK

This project will contribute to the following Sustainable Development Goal (s):

- SDG7: Ensure access to affordable, reliable, sustainable and modern energy for all
  - SDG 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services
  - SDG 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix
- SDG13: Take urgent action to combat climate change and its impacts;
- SDG5: Achieve gender equality and empower all women and girls.

This project will contribute to the following country outcome (UNDAF[47]/CPD[48], RPD[49]):

UNDAF outcome 3: Employment and competitiveness are assured by diversifying the economy and resilience to climate Change, improving the quality of life of poor and vulnerable populations and access to financial aid and markets by youth and women

CPD Output 3.3: Public and private institutions and rural communities are able to apply sustainability principles for better use of natural resources, biodiversity conservation and protection for inclusive growth.

	Objective and Outcome Indicators	Baseline	Mid-term Target	End of Project Target
Project Objective:	To support access to clean energy by increasing technical and financial feasibility and by promoting scaled-up commercial investment, in low-carbon minigrids in São Tomé and Príncipe, with a focus on cost-reduction levers and innovative business models.			
	Indicator 1: **Greenhouse gas emissions mitigated** (GEF 7 Core Indicator 6.2) Unit of measure: metric tons of carbon dioxide equivalent (tCO2e)	0 tCO2e (Project has not started)	0 tCO2e	Direct: 20,571 tCO2e Indirect: 5,472 tCO2e
	Indicator 2: **Number of direct beneficiaries benefitting from energy access via minigrids, disaggregated by gender and by customer segment (residential, social, commercial/productive use) as co-benefit of GEF investment** (GEF 7 Core Indicator 6.11) Unit of measure: number of people	0 people (Project has not started)	0 people	21,741 people (of which 50% women) ------- 21,350 people (residential) 76 people (social) 315 people (commercial/PUE) 21,741 people (total)
	Indicator 3: **Increase in installed solar PV capacity and battery storage** (GEF 7 Core Indicator 6.4) *Units of measure:* *MW (solar PV); MWh (battery storage)*	0 MW solar PV 0 MWh (BESS) (Project has not started)	0 MW solar PV 0 MWh (BESS)	Solar PV: 0.7 MW Battery storage:1.047 MWh

[47] United Nations Development Assistance Frameworks (UNDAF)
[48] Country Programme Document (CPD)
[49] Regional Programme Document (RPD)

	Indicator 4: **Local residents trained in different aspects of minigrid development and operation (e.g. sales, distribution, operations, management) disaggregated by gender.** Unit of measure: number of people	0 people (Project has not started)	Female: 10 [people] Male: 10 [people] Total: 20 [people]	Female: 20 [people] Male: 20 [people] Total: 40 [people]
Project Component 1	**Policy and Regulation**			
Outcome 1. Stakeholder ownership in a national minigrid delivery model is advanced, and appropriate policies and regulations are adopted to facilitate investment in low-carbon minigrids.	***Indicator 5:*** **A minigrid delivery model to enable minigrid development is endorsed/adopted by the national government through a consultative process involving key stakeholders (e.g. relevant ministries, local authorities, rural populations, private sector, media, etc.)** Unit of measure: binary (1/0)	0 (Project has not started)	0 (Multi-stakeholder, national dialogue platform on minigrid delivery models established and active.)	1 (At least one minigrid delivery model is identified and endorsed by the government through the work of the multi-stakeholder platform and dialogue.)
	Indicator 6: **Number of policy derisking instruments for minigrid investments - whose development has been supported by the project - are endorsed/adopted by the national government** Unit of measure: Number of policy derisking instruments	0 (no rural/off-grid electrification policy in place)	3 policy derisking instrument(s) adopted (1) policy and strategy for rural/underserved population; (2) regulation for minigrids and community basic services; (3) definition of business model and cost/tariff proposal.	6 policy derisking instrument(s) adopted (1) policy and strategy for rural/underserved population; (2) regulation for minigrids and community basic services; (3) definition of business model and cost/tariff proposal; (4) adoption of technical standards for equipment and installation; (5) definition and establishment of guarantees for MG investors; (6) definition and establishment of incentives for investors and customers.
Outputs to achieve Outcome 1	Output 1.1. An inclusive national dialogue to identify minigrid delivery models is facilitated, clarifying priority interventions for an integrated approach to off-grid electrification. Output 1.2. DREI techno-economic analyses carried out to propose most cost-effective basket of policy and financial de-risking instruments and contribute to AMP Flagship Report on Cost Reduction. Output 1.3. A mini-grid regulatory framework, including tariff model, tax regime, and settlement model for electricity transaction, is developed in close coordination with the authorities concerned and other development partners. Output 1.4. Preparatory studies conducted for selected mini-grid sites to enhance sector planning and decision-making on a delivery model for minigrid development. Output 1.5. Domestication of quality standards for solar mini-grid components, and institutional capacity of national standards organizations/bureau strengthened. Output 1.6. Support provided to establish the environmental and social policies and plans to ensure mini-grid risks are properly handled.			

	Output 1.7. Public programmes (apprenticeships, certificates, university programs) to develop competitive, skilled labor market in mini-grids.			
Project Component 2	**Business model innovation with private sector.**			
Outcome 2. Innovative business models based on cost reduction operationalized, with strengthened private sector participation in low-carbon/renewable energy minigrid development	***Indicator 7:*** **Minigrid pilots implemented that demonstrate a delivery model, cost-reduction measure(s) and/or productive use of electricity** Unit of measure: binary (1/0)	0 (Project has not started)	1 Minigrid Pilot Plan for advancing the minigrid pilots is developed, and cleared by UNDP and the Project Board. (1) Any project tendering process, as applicable, for minigrid pilots is launched. (1)	1 The Minigrid Pilot Plan has been successfully executed and the pilots are delivered, operational, and being monitored. (1)
	Indicator 8: Capacity of minigrid developers and/or operators is enhanced to implement innovative business models and incorporate cost-reduction levers in minigrid projects. Unit of measure: binary (1/0)	0 (The Project shall assess the baseline in Year 1)	1 Planned capacity building activities for year 1 and 2 are implemented. (1) The capacity of targeted recipients is assessed by survey towards the end of year 2. On a scale of 1 to 5, an average score of at least 2 is achieved. - 1 represents a low level of capacity - 5 represents a strong capacity to understand relevant issues and apply knowledge and skills to find effective solutions. (1)	1 Planned capacity building activities for year 3 and 4 are implemented. (1) The capacity of targeted recipients is assessed by survey towards the end of the project. On a scale of 1 to 5, an average score of at least 4 is achieved. - 1 represents a low level of capacity - 5 represents a strong capacity to understand relevant issues and apply knowledge and skills to find effective solutions. (1)
Outputs to achieve Outcome 2	Output 2.1. Minigrids pilot proposals prepared, evaluated and selected through a competitive process, leading to cost-reduction in mini-grids. Output 2.2. Capacity of private sector and end-user groups strengthened for developing innovative, resilient minigrid business models. Output 2.3. Minigrids pilots fully designed, constructed and monitored, including productive uses and modular hardware and system design (INV).			
Project Component 3	**Scaled-up financing**			
Outcome 3. Financial sector actors are ready to invest in a pipeline of low-carbon minigrids and concessional financial mechanisms are in	***Indicator 9:*** **Capacity of financial institutions is enhanced through training, knowledge sharing, and/or awareness raising events aimed at increasing the financial sector's capacity to evaluate investments in minigrids.**	0 (The Project shall assess the baseline in Year 1)	1 Planned capacity building activities for year 1 and 2 are implemented. (1)	1 Planned capacity building activities for year 3 and 4 are implemented. (1)

place to incentivize scaled-up investment.	Unit of measure: binary (1/0)		The capacity of targeted recipients is assessed by survey towards the end of year 2. On a scale of 1 to 5, an average score of at least 2 is achieved. - 1 represents a low level of capacity - 5 represents a strong capacity to understand relevant issues and apply knowledge and skills to find effective solutions. (1)	The capacity of targeted recipients is assessed by survey towards the end of the project. On a scale of 1 to 5, an average score of at least 4 is achieved. - 1 represents a low level of capacity - 5 represents a strong capacity to understand relevant issues and apply knowledge and skills to find effective solutions. (1)
	Indicator 10: **Number of government- or impact investor-supported financing mechanisms offering concessional finance for low-carbon minigrids.** Units of measure: binary (1/0)	0 (No financing mechanism in place)	1 At least one complementary funding instrument is designed and operational. (1)	1 At least one complementary funding instrument is designed and operational. (1)
Outputs to achieve Outcome 3	Output 3.1. Design support for a financial facility for minigrids, distributed electricity grids and services. Output 3.2. Domestic financial sector capacity-building on business and financing models for minigrids.			
Project Component 4	**Digital and Knowledge Management.**			
Outcome 4. Digitalization and data mainstreamed, across stakeholders, into local minigrid market development. Increased knowledge, awareness and network opportunities in the minigrid market and among stakeholders, including benefitting from linkages to international good practice.	***Indicator 11:*** **A project digital strategy is prepared and implemented by the PMU to contribute to project implementation and local minigrid market development.** Units of measure: binary (1/0)	0 (Project has not started)	1 The project digital strategy is developed and being implemented (1)	1 The project digital strategy is implemented. (1) Recommendations for rolling out digital solutions for minigrids at national level have been shared with key national stakeholders. (1)
	Indicator 12: **Number of minigrid pilots sharing data on minigrid performance with the regional project and other stakeholders following best practices and received from the AMP Regional Project.** Units of measure: binary (1/0)	0 (Project has not started)	1 The project's 'Minigrids Digital and Data Management Platform' is procured and operational, ready for data collection from the project's mini-grid pilot(s), and for data sharing with the AMP regional project's digital platform. (1)	1 100% of the planned minigrid pilots, as identified in the project's Minigrid Pilot Plan, are collecting and sharing data with the project's digital platform (1)
Outputs to achieve Outcome 4	Output 4.1. A project digital strategy is developed and implemented, including linkages to and following guidance from the AMP Regional Project. Output 4.2. A Minigrids Digital Platform implemented to track minigrid pilots, and to support minigrids scale-up and cost-reduction. Output 4.3.A Quality Assurance and Monitoring Framework (QAMF) is adopted.			

	Output 4.4. Engage with regional project by participating in Communities of Practice and capturing and sharing of lessons learnt.
Project Component 5	**Monitoring and Evaluation (M&E)**
Outcome 5. Ensuring compliance with all mandatory monitoring and reporting requirements of the GEF.	
Outputs to achieve Outcome 5	Output 5.1. Inception workshop is conducted and M&E plan is implemented. Output 5.2. Project Mid-Term Review is conducted. Output 5.3. GEF Terminal Evaluation is conducted.

VI. MONITORING AND EVALUATION (M&E) PLAN

145. Project-level monitoring and evaluation will be undertaken in compliance with UNDP requirements as outlined in the UNDP POPP (including guidance on GEF project revisions) and UNDP Evaluation Policy. **The UNDP Country Office is responsible for ensuring full compliance with all UNDP project M&E requirements including project monitoring, UNDP quality assurance requirements, quarterly risk management, and evaluation requirements.**

146. Additional mandatory GEF-specific M&E requirements will be undertaken in accordance with the GEF Monitoring Policy and the GEF Evaluation Policy and other relevant GEF policies[50]. The M&E plan and budget included below will guide the GEF-specific M&E activities to be undertaken by this project.

147. In addition to these mandatory UNDP and GEF M&E requirements, other M&E activities deemed necessary to support project-level adaptive management will be agreed – including during the Project Inception Workshop - and will be detailed in the Inception Report.

Minimum project monitoring and reporting requirements as required by the GEF:

148. Inception Workshop and Report: A project inception workshop will be held within 2 months from the First disbursement date, with the aim to:

    a. Familiarize key stakeholders with the detailed project strategy and discuss any changes that may have taken place in the overall context since the project idea was initially conceptualized that may influence its strategy and implementation.
    b. Discuss the roles and responsibilities of the project team, including reporting lines, stakeholder engagement strategies and conflict resolution mechanisms.
    c. Review the results framework and monitoring plan.
    d. Discuss reporting, monitoring and evaluation roles and responsibilities and finalize the M&E budget; identify national/regional institutes to be involved in project-level M&E; discuss the role of the GEF OFP and other stakeholders in project-level M&E.
    e. Update and review responsibilities for monitoring project strategies, including the risk log; SESP report, Social and Environmental Management Framework (where relevant) and other safeguard requirements; project grievance mechanisms; gender strategy; knowledge management strategy, and other relevant management strategies.
    f. Review financial reporting procedures and budget monitoring and other mandatory requirements and agree on the arrangements for the annual audit.
    g. Plan and schedule Project Board meetings and finalize the first-year annual work plan. Finalize the TOR of the Project Board.
    h. Formally launch the Project.

149. GEF Project Implementation Report (PIR): The annual GEF PIR covering the reporting period July (previous year) to June (current year) will be completed for each year of project implementation. UNDP will undertake quality assurance of the PIR before submission to the GEF. The PIR submitted to the GEF will be shared with the Project Board. UNDP will conduct a quality review of the PIR, and this quality review and feedback will be used to inform the preparation of the subsequent annual PIR.

150. GEF Core Indicators: The GEF Core indicators included as Annex 16 will be used to monitor global environmental benefits and will be updated for reporting to the GEF prior to MTR and TE. Note that the Project Team is responsible for updating the indicators' status. The updated monitoring data should be shared with MTR/TE consultants prior to required evaluation missions, so these can be used for subsequent ground truthing. The

[50] See https://www.thegef.org/gef/policies_guidelines

methodologies to be used in data collection have been defined by the GEF and are available on the GEF website. If relevant to the project: The required Protected Area Management Effectiveness Tracking Tool (METTs) have been prepared and the scores included in the GEF Core Indicators.

Box 8: GEF-7 Core Indicators

As reflected in the Results Framework, the project contributes to the following GEF-7 Core Indicators:

- **Core indicator 6: Greenhouse Gas Emissions Mitigated** captures the amount of GHG emissions expected to be avoided through the GEF project's investment in renewable energy minigrids. It should be measured above a baseline value. Mitigation benefits include:
  - **Direct emissions reductions** attributable to the investments made during the project's supervised implementation period, totaled over the respective lifetime of the investments.
  - **Indirect emissions reductions** that could result from a broader adoption of the outcomes of a GEF project plus longer-term emission reductions from behavioral change[1] in the post-project period. Broader adoption of a GEF project proceeds through several processes including sustaining, mainstreaming, replication, scaling-up and market change.
- **Context Sub-indicator 6.4: Increase in installed renewable energy capacity per technology** captures the increase in renewable energy generation or storage capacity and should be disaggregate by type of renewable energy technology (biomass, geothermal, ocean, small hydro, solar photovoltaic, solar thermal, wind power, and storage).
- **Core indicator 11: Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment** captures the total number of direct beneficiaries including the proportion of women beneficiaries. Direct beneficiaries are all individuals receiving targeted support from a given project.

151. Independent Mid-term Review (MTR): A Mid-Term Review will be conducted by 1 March, 2025 and completed no later than 24 months after CEO Endorsement. The terms of reference, the review process and the final MTR report will follow the standard UNDP templates and UNDP guidance for GEF-financed projects available on the UNDP Evaluation Resource Center (ERC). The evaluation will be 'independent, impartial and rigorous'. The evaluators that UNDP will hire to undertake the assignment will be independent from organizations that were involved in designing, executing or advising on the project to be evaluated. Equally, the evaluators should not be in a position where there may be the possibility of future contracts regarding the project under review. The GEF Operational Focal Point and other stakeholders will be actively involved and consulted during the evaluation process. Additional quality assurance support is available from the BPPS/NCE-VF Directorate. The final MTR report and MTR TOR will be publicly available in English and will be posted on the UNDP ERC by 1 June 2023. A management response to MTR recommendations will be posted in the ERC within six weeks of the MTR report's completion.

152. Terminal Evaluation (TE): An independent terminal evaluation (TE) will take place upon completion of all major project outputs and activities. The terms of reference, the evaluation process and the final TE report will follow the standard templates and guidance for GEF-financed projects available on the UNDP Evaluation Resource Center. TE should be completed 3 months before the estimated operational closure date, set from the signature of the ProDoc and according to the duration of the project. Provisions should be taken to complete the TE in due time to avoid delay in project closure. Therefore, TE must start no later than 6 months to the expected date of completion of the TE (or 9 months prior to the estimated operational closure date). The evaluation will be 'independent, impartial and rigorous'. The evaluators that UNDP will hire to undertake the assignment will be independent from organizations that were involved in designing, executing or advising on the project to be evaluated. Equally, the evaluators should not be in a position where there may be the possibility of future contracts regarding the project being evaluated. The GEF Operational Focal Point and other stakeholders will be actively involved and consulted during the terminal evaluation process. Additional quality assurance support is available from the BPPS/NCE-VF Directorate. The final TE report and TE TOR will be publicly available in English and posted on the UNDP ERC by 30 May 2027.). A management response to the TE recommendations will be posted to the ERC within six weeks of the TE report's completion.

153. Final Report: The project's terminal GEF PIR along with the terminal evaluation (TE) report and corresponding management response will serve as the final project report package. The final project report package shall be discussed with the Project Board during an end-of-project review meeting to discuss lesson learned and opportunities for scaling up.

154. Agreement on intellectual property rights and use of logo on the project's deliverables and disclosure of information**:** To accord proper acknowledgement to the GEF for providing grant funding, the GEF logo will appear together with the UNDP logo on all promotional materials, other written materials like publications developed by the project, and project hardware. Any citation on publications regarding projects funded by the GEF will also accord proper acknowledgement to the GEF. Information will be disclosed in accordance with relevant policies notably the UNDP Disclosure Policy[51] and the GEF policy on public involvement[52].

155. M&E linkages to the AMP Regional Project.

Box 9: M&E linkages to the AMP Regional Project

National AMP Projects will provide on an annual basis (and to the extent feasible if requested on an ad-hoc basis) the following M&E information to the AMP regional project staff:

- Standard reporting on all indicators in the results framework for aggregation and reporting to GEF (by the regional project) on the impacts of all participating national projects for the program as a whole; and
- Reporting on any and all additional Key Performance Indicators (KPIs) adopted by the project under the common M&E framework.

The **AMP Regional Project** will provide support and guidance to the AMP National Projects for conducting M&E activities as follows:

- **Ongoing project monitoring**. The AMP Regional Project PMU will:
    a. Develop a 'common monitoring and evaluation (M&E) framework' against which GHG emission reductions and broader SDG impacts and program objectives can be measured, and work closely with national child projects to ensure operationalization and harmonization.
    b. Provide support to National Project PMUs for updating 'key project planning instruments' at least on an annual basis as required to comply with UNDP project monitoring, quality assurance, and risk management requirements, and ensure adequate project planning and adaptive management. This may entail developing common templates for 'key project planning instruments'.
    c. Review and provide feedback on reports submitted by the national project PMUs seeking to continuously improve the quality and ease of reporting by national projects.
    d. Aggregate M&E data from all national projects, including Results Framework and all additional Key Performance Indicators (KPIs) adopted by the project under the common M&E framework, and report back to GEF at the program level.
- **Evaluations (MTR and TE)**. The AMP Regional Project PMU will:
    a. Make available to national projects standardized terms of reference for MTR and TE as well as a roster of vetted evaluation consultants.
    b. Review and provide feedback on terms of reference and draft evaluation reports shared by the project PMU to ensure project-level evaluation will be undertaken in compliance with UNDP requirements.
    c. Make themselves available for interviews and consultation in the context of national project mid-term and terminal evaluations.

[51] See http://www.undp.org/content/undp/en/home/operations/transparency/information_disclosurepolicy/
[52] See https://www.thegef.org/gef/policies_guidelines

Monitoring Plan: The project results, corresponding indicators and mid-term and end-of-project targets in the project results framework will be monitored by the Project Management Unit annually, and will be reported in the GEF PIR every year, and will be evaluated periodically during project implementation. If baseline data for some of the results indicators is not yet available, it will be collected during the first year of project implementation. Project risks, as outlined in the risk register, will be monitored quarterly.

Results Monitoring	Indicators	Mid-term Target	End of Project Target	Description of indicators and targets	Data source/Collection Methods[53]	Frequency	Responsible for data collection	Means of verification	Risks/ Assumptions
Project objective		To support access to clean energy by increasing technical and financial feasibility and by promoting scaled-up commercial investment, in low-carbon minigrids in São Tomé and Príncipe, with a focus on cost-reduction levers and innovative business models.							
Objective Indicators	**Indicator 1: Greenhouse gas emissions mitigated** Unit of measure: metric tons of carbon dioxide equivalent (tCO2e))	0 tCO2eq	Direct: 20,571 tCO2e Indirect: 5,472 tCO2e	Direct: refer to Annex 12. Indirect: refer to Annex 12. (Note that 10% of indirect GHG reductions STP are to be allocated to the AMP regional project.)	Baseline figures (diesel, present grid, if any) determined per MG site ex-ante Energy production figures via the digital platform. Site visits for verification and cross-correlation of data ex-post. Direct and indirect emissions reductions as per AMP Model, refer to Annex 12.	Annually Reported in the GEF PIR	PMU .	Minigrids Digital and Data Management Platform	<u>Assumptions</u> For assumptions and methodology used refer to Annex 12. Minigrid pilot operators share data via the digital platform <u>Risks</u> Development of the pilot projects delayed or not implemented.
	Indicator 2: Number of direct beneficiaries benefitting from energy access via minigrids,	0 people	21,741 people (of which 50% women) ------- 21,350 people (residential) 76 people (social)	Total number of direct beneficiaries from the minigrid pilots disaggregated by gender and by	Project reports Minigrid technical and commercial reports	Annually Reported in the GEF PIR	PMU .	Minigrids Digital and Data Management Platform.	<u>Assumptions</u> For assumptions and methodology used refer to Annex 12.

[53] Data collection methods should outline specific tools used to collect data and additional information as necessary to support monitoring. The PIR cannot be used as a source of verification.

Results Monitoring	Indicators	Mid-term Target	End of Project Target	Description of indicators and targets	Data source/Collection Methods[53]	Frequency	Responsible for data collection	Means of verification	Risks/ Assumptions
	disaggregated by gender and by customer segment (residential, social, commercial/productive use) as co-benefit of GEF investment Unit of measure: number of people		315 people (commercial/PUE) 21,741 people (total)	customer segment, as per Annex 12.				Periodic site visits. Interviews with customers.	<u>Risks</u> Minigrid coverage less than foreseen, limiting the number of direct beneficiaries. Development of the pilot projects delayed or not implemented.
	Indicator 3: Increase in installed solar PV capacity and battery storage Units of measure: MW (solar PV); MWh (battery storage)	0 MW (solar PV) 0 MWh (battery storage)	Solar PV: 0.7 MW Battery storage: 1.047 MWh	Installed PV capacity and battery storage capacity in the minigrid pilots.	Project reports. Minigrid technical specifications.	Annually Reported in the GEF PIR	PMU .	Minigrids Digital and Data Management Platform Periodic site visits.	<u>Assumptions</u> For assumptions and methodology used refer to Annex 12. <u>Risks</u> Development of the pilot projects delayed or not implemented.
	Indicator 4: Local residents trained in different aspects of minigrid development and operation (e.g. sales, distribution, operations, management) disaggregated by gender.	Female: 10 people Male: 10 people Total: 20 people	Female: 20 people Male: 20 people Total: 40 people	Number of people in country trained.	Records of training activities.	Annually Reported in the GEF PIR	PMU	Minigrids Digital and Data Management Platform. Interviews and appraisals by MTR/RE evaluators.	<u>Assumptions</u> A nascent market for minigrid development is present. <u>Risks</u> Local residents do respond weakly to get involved in minigrid development.

Results Monitoring	Indicators	Mid-term Target	End of Project Target	Description of indicators and targets	Data source/Collection Methods[53]	Frequency	Responsible for data collection	Means of verification	Risks/ Assumptions
	Unit of measure: number of people								
Project Outcome 1	**Indicator 5: A minigrid delivery model to enable minigrid development is endorsed/adopted by the national government through a consultative process involving key stakeholders (e.g. relevant ministries, local authorities, rural populations, private sector, media, etc.)** Unit of measure: binary (1/0)	Multi-stakeholder national dialogue platform on minigrid delivery models is established and active. (0)	At least one minigrid delivery model is identified and endorsed by the government through the work of the multi-stakeholder platform and dialogue. (1)	Binary indicator: target fulfilled (1) or not (0).	Project reports, Project Board minutes	Annually Reported in the GEF PIR	PMU	Official Government publications, Electricity sector publications and regulation.	Assumptions Minigrids are acknowledged as relevant and prioritized as such by Government and key stakeholders. Risks Policy making processes are slow or do not converge towards a suitable MG delivery model.
	Indicator 6: Number of policy derisking instruments for minigrid investments - whose development has been supported by the project - are endorsed/adopted by the national government	3 policy derisking instrument(s) adopted (1) policy and strategy for rural/underserved population; (2) regulation for minigrids and community basic services; (3) definition of business model	6 policy derisking instrument(s) adopted (1) policy and strategy for rural/underserved population; (2) regulation for minigrids and community basic services; (3) definition of business model and	Number (0-6) of endorsed/ adopted policy instruments.	Project reports, Project Board minutes	Annually Reported in the GEF PIR	PMU	Official Government publications, Electricity sector publications and regulation.	Assumptions Minigrids are acknowledged as relevant and prioritized as such by Government and key stakeholders. Risks Policy-making processes are slow or do not converge towards

Results Monitoring	Indicators	Mid-term Target	End of Project Target	Description of indicators and targets	Data source/Collection Methods[53]	Frequency	Responsible for data collection	Means of verification	Risks/ Assumptions
	Unit of measure: Number of policy derisking instruments.	and cost/tariff proposal	cost/tariff proposal; (4) adoption of technical standards for equipment and installation; (5) definition and establishment of guarantees for MG investors; (6) definition and establishment of incentives for investors and customers.						a suitable MG delivery model.
Project Outcome 2	**Indicator 7: Minigrid pilots implemented that demonstrate a delivery model, cost-reduction measure(s) and/or productive use of electricity** Unit of measure: binary (1/0)	Minigrid Pilot Plan for advancing the minigrid pilots is developed, and cleared by UNDP and the Project Board. (1) Any project tendering process, as applicable, for minigrid pilots is launched. (1)	The Minigrid Pilot Plan has been successfully executed and the pilots are delivered, operational, and being monitored. (1)	Binary indicator: target fulfilled (1) or not (0)	Minigrids Digital and Data Management Platform.	Annually Reported in the GEF PIR	PMU	Individual project technical reports. Energy contracts and metering data records. Expert site visits.	<u>Assumptions</u> The minigrid pilots can be implemented as planned. <u>Risks</u> Technical and social factors lead to under performance of minigrids pilots. Hardware price levels in the country are higher than expected. Main grid extension undermines the MG model.

Results Monitoring	Indicators	Mid-term Target	End of Project Target	Description of indicators and targets	Data source/Collection Methods[53]	Frequency	Responsible for data collection	Means of verification	Risks/ Assumptions
	Indicator 8: Capacity of minigrid developers and/or operators is enhanced to implement innovative business models and incorporate cost-reduction levers in minigrid projects. Unit of measure: binary (1/0)	Planned capacity building activities for year 1 and 2 are implemented. (1) The capacity of targeted recipients is assessed by survey towards the end of year 2. On a scale of 1 to 5, an average score of at least 2 is achieved[54] (1)	Planned capacity building activities for year 3 and 4 are implemented. (1) The capacity of targeted recipients is assessed by survey towards the end of the project. On a scale of 1 to 5, an average score of at least 4 is achieved (1)	Binary indicator: target fulfilled (1) or not (0)	Records of capacity building activities.	Annually Reported in the GEF PIR	PMU	Appraisals by PMU, MTR/RE evaluators. Publications by minigrid developers and operators.	<u>Assumptions</u> Minigrid developers demonstrate sustained interest in the market. <u>Risks</u> No specific risks identified.
Project Outcome 3	**Indicator 9: Capacity of financial institutions is enhanced through training, knowledge sharing, and/or awareness raising events aimed at increasing the financial sector's capacity to evaluate investments in minigrids.**	Planned capacity building activities for year 1 and 2 are implemented. (1) The capacity of targeted recipients is assessed by survey towards the end of year 2. On a scale of 1 to 5, an average	Planned capacity building activities for year 3 and 4 are implemented. (1) The capacity of targeted recipients is assessed by survey towards the end of the project. On a scale of 1 to 5, an average score of at least 4 is achieved.	Binary indicator: target fulfilled (1) or not (0)	Records of capacity building activities.	Annually Reported in the GEF PIR	PMU	Appraisals by PMU, MTR/RE evaluators. Publications by financial sector entities.	<u>Assumptions</u> Financial institutions demonstrate sustained interest in the market. <u>Risks</u> The financial sector in the country is very small and appetite among investors is traditionally low.

[54] As follows: 1 = lowest level of capacity; 5 = strongest capacity to understand relevant issues and apply knowledge and skills to find effective solutions.

Results Monitoring	Indicators	Mid-term Target	End of Project Target	Description of indicators and targets	Data source/Collection Methods[53]	Frequency	Responsible for data collection	Means of verification	Risks/ Assumptions
	Unit of measure: binary (1/0)	score of at least 2 is achieved.							
	Indicator 10: Number of government- or impact investor-supported financing mechanisms offering concessional finance for low-carbon minigrids. Units of measure: binary (1/0)	At least one complementary funding instrument is designed and operational. (1)	At least one complementary funding instrument is designed and operational. (1)	Binary indicator: target fulfilled (1) or not (0)	Publications by Government, development partners and local banks	Annually Reported in the GEF PIR	PMU, IP	Official publications by Government entities and development partners.	<u>Assumptions</u> Government and multilateral financiers demonstrate sustained interest in the market. <u>Risks</u> (1) Coordination between cooperation agencies, Government and multilateral financiers proves more sluggish than expected. (2) Country financial status proves an impediment for offering appropriate loan and guarantee instruments.
Project Outcome 4	**Indicator 11: A project digital strategy is prepared and implemented by the PMU to contribute to project implementation and**	The project digital strategy is developed and being implemented (1)	The project digital strategy is implemented. (1) Recommendations for rolling out digital solutions for minigrids at	Binary indicator: target fulfilled (1) or not (0)	Minigrids Digital and Data Management Platform	Annually Reported in the GEF PIR	PMU	Project reports. Physical implementation of Digital Platform.	<u>Assumptions</u> Government, stakeholders and private companies accept sharing information.

Results Monitoring	Indicators	Mid-term Target	End of Project Target	Description of indicators and targets	Data source/Collection Methods[53]	Frequency	Responsible for data collection	Means of verification	Risks/ Assumptions
	local minigrid market development. Units of measure: binary (1/0)		national level have been shared with key national stakeholders. (1)						Risks (1) Operation and management of the system may prove a burden to Government. (2) Stakeholders are reluctant to set up and share efficient data exchange protocols.
	Indicator 12: Number of minigrid pilots sharing data on minigrid performance with the regional project and other stakeholders following best practices and received from the AMP Regional Project. Units of measure: binary (1/0)	The project's 'Minigrids Digital and Data Management Platform' is procured and operational, ready for data collection from the project's mini-grid pilot(s), and for data sharing with the AMP regional project's digital platform. (1)	100% of the planned minigrid pilots, as identified in the project's Minigrid Pilot Plan, are collecting and sharing data with the project's digital platform (1)	Binary indicator: target fulfilled (1) or not (0)	Minigrids Digital and Data Management Platform	Quarterly The AMP regional project will aggregate data form all projects Reported in DO progress tab of the GEF PIR	PMU AMP Regional Project Manager will confirm ability to collect/ aggregate data form the project.	Examination of Digital Platform and data inputs from minigrid operators	Assumptions All planned minigrids are implemented. Government, stakeholders and private companies accept sharing information Risks Technical, managerial, and financial issues may come up, with Government and AMP lacking funding and/or specific skills to address these.
	Add indicators included in gender action plan, stakeholder engagement plan or other monitoring plans as needed.								

Results Monitoring	Indicators	Mid-term Target	End of Project Target	Description of indicators and targets	Data source/Collection Methods[53]	Frequency	Responsible for data collection	Means of verification	Risks/ Assumptions
Gender action plan	**Indicator 13: Gender balance in implementation activities**	No more than 70% either gender, cumulative	No more than 60% either gender, cumulative	Gender ratios, cumulative, of all program event attendance, training completion, apprenticeships, job creation, & proposal acceptance.	Record-keeping by program managers	Quarterly	PMU	Verification of written records, limited phone-based audits	Risks: One heavily attended workshop could skew the gender balance of smaller activities (like proposal support and apprenticeships)
	Indicator 14: Gender mainstreamed in program analyses and design activities	Gender mainstreamed in 100% of eligible activities in progress	Gender mainstreamed in 100% of eligible activities completed	Binary indicator (y/n) for whether gender was mainstreamed in each of the following when it was undertaken: National Dialog Discussions; DREI analysis; research & design activities under 1.3, 1.4, & 1.5; MG Pilot Plan; Selected roposals; Financing analysis and design; Digital Strategy; Insight Brief	Review of deliverables submitted	Annual	PMU	Review of deliverables	Risks: Cursory mentions of key words (e.g., "women," "gender") could be included in program deliverables to try and meet this target
Stakeholder engagement plan	**Indicator 15: Engagement with stakeholders**	Stakeholders are annually engaged as planned representing all relevant sectors	Stakeholders are annually engaged as planned representing all relevant sectors	Binary indicator: target fulfilled (1) or not (0)	Record-keeping by program managers	Quarterly	PMU	Verification of written records, limited phone-based audits	Risks: Stakeholder representation may be biased towards public sector and government

Results Monitoring	Indicators	Mid-term Target	End of Project Target	Description of indicators and targets	Data source/Collection Methods[53]	Frequency	Responsible for data collection	Means of verification	Risks/ Assumptions
									bodies, leaving end-users and vulnerable groups unheard.

Monitoring and Evaluation Budget for project execution		
GEF M&E requirements to be undertaken by Project Management Unit (PMU)	**Indicative costs (US$)**	**Time frame**
Inception Workshop and Report	US$ 12,000	Inception Workshop, within 2 months of First Disbursement
M&E required to report on progress made in reaching GEF core indicators and project results included in the project results framework	US$ 0	Annually, prior to MTR, and prior to TE
Preparation of the annual GEF Project Implementation Report (PIR)	US$ 0	Annually, between June-August
Monitoring all risks (Atlas risk log)	US$ 0	On-going
Monitoring of stakeholder engagement plan	US$ 0	On-going
Monitoring of ESMF and specific management plans	US$ 19,349	Annually before PIR and as requested
Monitoring of Gender Action plan	US$ 13,000	Annually before PIR and as requested
Supervision missions	US$ 0	As needed
Learning missions	US$ 0	As needed
Independent Mid-term Review (MTR)	US$ 19,000	1 February 2026
Independent Terminal Evaluation (TE)	US$ 22,000	15 November 2027
TOTAL indicative COST	**US$ 85,349**	

VII. GOVERNANCE AND MANAGEMENT ARRANGEMENTS

Section 1: General roles and responsibilities in the projects' governance mechanism

156. Implementing Partner: The Implementing Partner for this project is the Directorate-General Natural Resources and Energy (DGRNE). The Implementing Partner is a directorate of the Ministry of Infrastructure and Natural Resources (MIRN). The Implementing Partner is the entity to which the UNDP Administrator has entrusted the implementation of UNDP assistance specified in this signed project document along with the assumption of full responsibility and accountability for the effective use of UNDP resources and the delivery of outputs, as set forth in this document.

157. The Implementing Partner is responsible for executing this project. Specific tasks include:

- Project planning, coordination, management, monitoring, evaluation and reporting. This includes providing all required information and data necessary for timely, comprehensive and evidence-based project reporting, including results and financial data, as necessary. The Implementing Partner will strive to ensure project-level M&E is undertaken by national institutes and is aligned with national systems so that the data used and generated by the project supports national systems.
- Overseeing the management of project risks as included in this project document and new risks that may emerge during project implementation.
- Procurement of goods and services, including human resources.
- Financial management, including overseeing financial expenditures against project budgets.
- Approving and signing the multiyear workplan.
- Approving and signing the combined delivery report at the end of the year; and,
- Signing the financial report or the funding authorization and certificate of expenditures.

158. Project stakeholders and target groups: Describe how project target groups will be engaged in decision making for the project.

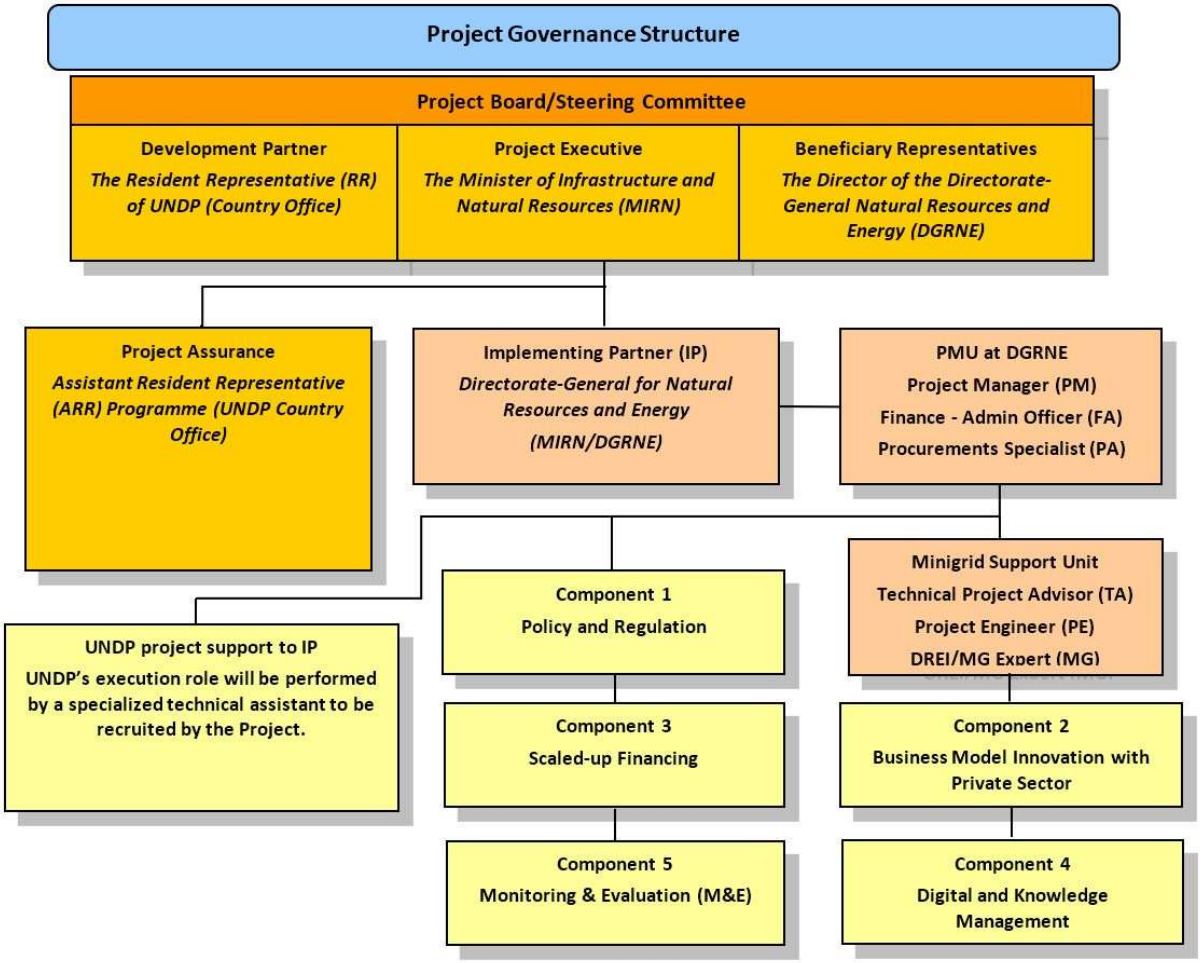
159. Government stakeholders, notably DGRNE, MIRN and AGER are invited to take seat in the Project Steering Committee. Policy, technical and regulatory, and financial and tax policy aspects of minigrids and its broader context of a transition towards RE sources, will be reviewed in dedicated working groups that derive from the national dialogue. The Project will establish a technical working unit for preparing and implementing the demonstration pilot which will be composed of: Project Technical Advisor (TA), Project Engineer (PE), national Project MG/DREI expert (ME), and designated staff of DGRNE. Representatives from beneficiaries, community development and gender experts, representatives of productive energy users will be invited and/or engaged with closely.

160. Other target groups include private sector representing equipment suppliers and installers, equipment off-takers ("prosumers") including on-grid small businesses, tourism accommodations such as eco-lodges, and small processing industries. The Project will make an ongoing effort to engage with these beneficiaries to ensure inclusiveness and pro-gender action when required. Periodic consultations and events are scheduled in preparation of minigrid designs and calls for proposals. Specific outputs are programmed to strengthen capacities among national project developers and end-users. Community development is included as a key activity to Directorate maximize relevance and appropriateness of developed MG solutions and ensure long-term (social) sustainability.

161. UNDP: UNDP is accountable to the GEF for the implementation of this project. This includes overseeing project execution undertaken by the Implementing Partner to ensure that the project is being carried out in accordance with UNDP and GEF policies and procedures and the standards and provisions outlined in the Delegation of Authority (DOA) letter for this project. **The UNDP GEF Executive Coordinator, in consultation with UNDP Bureaus and the Implementing Partner, retains the right to revoke the project DOA, suspend or cancel this GEF project.** UNDP is responsible for the Project Assurance function in the project governance structure and presents to the Project Board and attends Project Board meetings as a non-voting member.

162. A firewall will be maintained between the delivery of project oversight and quality assurance performed by UNDP and charged to the GEF Fee and any support to project execution performed by UNDP (as requested by and agreed to by both the Implementing Partner and GEF) and may be charged to the GEF project management costs (only if approved by GEF). The segregation of functions and firewall provisions for UNDP in this case is described in the next section.

Section 2: Project governance structure.



163. The UNDP Resident Representative (RR) assumes full responsibility and accountability for oversight and quality assurance of this Project and ensures its timely implementation in compliance with the GEF-specific requirements and UNDP's Programme and Operations Policies and Procedures (POPP), its Financial Regulations and Rules and Internal Control Framework. A representative of the UNDP Country Office will assume the assurance role and will present assurance findings to the Project Board, and therefore attends Project Board meetings as a non-voting member.

164. **UNDP project support**: The Implementing Partner and GEF OFP have requested UNDP to provide support services to the amount of USD 58,338.92 for the full duration of the project, and the GEF has agreed for UNDP to provide such execution support services and for the cost of these services to be charged to the project budget. The execution support services – whether financed from the project budget or other sources - have been set out in detail and agreed between UNDP Country Office and the Implementing Partner in a Letter of Agreement (LOA). This LOA is attached to this Project Document as Annex 2.

165. To ensure the strict independence required by the GEF and in accordance with the UNDP Internal Control Framework, these execution services will be delivered independent from the GEF-specific oversight and quality assurance services.

Section 3: Segregation of duties and firewalls vis-à-vis UNDP representation on the project board:

166. As noted in the Minimum Fiduciary Standards for GEF Partner Agencies, in cases where a GEF Partner Agency (i.e. UNDP) carries out both implementation oversight and execution of a project, the GEF Partner Agency (i.e. UNDP) must separate its project implementation oversight and execution duties, and describe in the relevant project document a: 1) Satisfactory institutional arrangement for the separation of implementation oversight and executing functions in different departments of the GEF Partner Agency; and 2) Clear lines of responsibility, reporting and accountability within the GEF Partner Agency between the project implementation oversight and execution functions.

167. In this case, UNDP's implementation oversight role in the Project – as represented in the Project Board and via the project assurance function – is performed by: Assistant Resident Representative Programme UNDP Sao Tome. UNDP's execution role in the project (as requested by the IP and approved by the GEF) will be performed by a specialized technical assistant to be recruited by the Project. This person must be different than the UNDP person performing the assurance function listed above and report to the Portfolio Manager UNDP Sao Tome.

Section 4: Roles and Responsiblities of the Project Organization Strucutre:

168. **Project Board:** All UNDP projects must be governed by a multi-stakeholder board or committee established to review performance based on monitoring and evaluation, and implementation issues to ensure quality delivery of results. The Project Board (also called the Project Steering Committee) is the most senior, dedicated oversight body for a project.

169. The two main (mandatory) roles of the project board are as follows:

1) **High-level oversight of the execution of the project by the Implementing Partner** (as explained in the "Provide Oversight" section of the POPP). This is the primary function of the project board and includes annual (and as-needed) assessments of any major risks to the project, and decisions/agreements on any management actions or remedial measures to address them effectively. The Project Board reviews evidence of project performance based on monitoring, evaluation and reporting, including progress reports, evaluations, risk logs and the combined delivery report. The Project Board is responsible for taking corrective action as needed to ensure the project achieves the desired results.
2) **Approval of strategic project execution decisions of the Implementing Partner** with a view to assess and manage risks, monitor and ensure the overall achievement of projected results and impacts and ensure long term sustainability of project execution decisions of the Implementing Partner (as explained in the "Manage Change" section of the POPP).

170. **Requirements to serve on the Project Board**:

- ✓ Agree to the Terms of Reference of the Board and the rules on protocols, quorum and minuting.
- ✓ Meet annually; at least once.
- ✓ Disclose any conflict of interest in performing the functions of a Project Board member and take all measures to avoid any real or perceived conflicts of interest. This disclosure must be documented and kept on record by UNDP.
- ✓ Discharge the functions of the Project Board in accordance with UNDP policies and procedures.
- ✓ Ensure highest levels of transparency and ensure Project Board meeting minutes are recorded and shared with project stakeholders.

171. **Responsibilities of the Project Board**:

- ✓ Consensus decision making:

- The project board provides overall isocharge guidance and direction to the project, ensuring it remains within any specified constraints, and providing overall oversight of the project implementation.
- Review project performance based on monitoring, evaluation and reporting, including progress reports, risk logs and the combined delivery report;
- The project board is responsible for making management decisions by consensus.
- In order to ensure UNDP's ultimate accountability, Project Board decisions should be made in accordance with standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international competition.
- In case consensus cannot be reached within the Board, the UNDP representative on the board will mediate to find consensus and, if this cannot be found, will take the final decision to ensure project implementation is not unduly delayed.

✓ Oversee project execution:
- Agree on project manager's tolerances as required, within the parameters outlined in the project document, and provide direction and advice for exceptional situations when the project manager's tolerances are exceeded.
- Appraise annual work plans prepared by the Implementing Partner for the Project; review combined delivery reports prior to certification by the implementing partner.
- Address any high-level project issues as raised by the project manager and project assurance;
- Advise on major and minor amendments to the project within the parameters set by UNDP and the donor and refer such proposed major and minor amendments to the UNDP BPPS Nature, Climate and Energy Executive Coordinator (and the GEF, as required by GEF policies);
- Provide high-level direction and recommendations to the project management unit to ensure that the agreed deliverables are produced satisfactorily and according to plans.
- Track and monitor co-financed activities and realisation of co-financing amounts of this project.
- Approve the Inception Report, GEF annual project implementation reports, mid-term review and terminal evaluation reports.
- Ensure commitment of human resources to support project implementation, arbitrating any issues within the project.

✓ Risk Management:
- Provide guidance on evolving or materialized project risks and agree on possible mitigation and management actions to address specific risks.
- Review and update the project risk register and associated management plans based on the information prepared by the Implementing Partner. This includes risks related that can be directly managed by this project, as well as contextual risks that may affect project delivery or continued UNDP compliance and reputation but are outside of the control of the project. For example, social and environmental risks associated with co-financed activities or activities taking place in the project's area of influence that have implications for the project.
- Address project-level grievances.

✓ Coordination:
- Ensure coordination between various donor and government-funded projects and programmes.
- Ensure coordination with various government agencies and their participation in project activities.

172. **Composition of the Project Board**: The composition of the Project Board must include individuals assigned to the following three roles:

1. **Project Executive:** This is an individual who represents ownership of the project and chairs (or co-chairs) the Project Board. The Executive usually is the senior national counterpart for nationally implemented projects (typically from the same entity as the Implementing Partner), and it must be UNDP for projects that are direct implementation (DIM). In exceptional cases, two individuals from different entities can co-share this role and/or co-chair the Project Board. If the project executive co-chairs the project board with

representatives of another category, it typically does so with a development partner representative. The Project Executive is: The Minister of Infrastructure and Natural Resources (MIRN).

2. **Beneficiary Representative(s):** Individuals or groups representing the interests of those groups of stakeholders who will ultimately benefit from the project. Their primary function within the board is to ensure the realization of project results from the perspective of project beneficiaries. Often representatives from civil society, industry associations, or other government entities benefiting from the project can fulfil this role. There can be multiple beneficiary representatives in a Project Board. The Beneficiary representative (s) is/are: The Director of Directorate-General Natural Resources and Energy (DGRNE).
3. **Development Partner(s):** Individuals or groups representing the interests of the parties concerned that provide funding, strategic guidance and/or technical expertise to the project. The Development Partner(s) is/are: Resident Representative, The Country Economist of the African Development Bank, and the Liaison Officer, World Bank.

173. **Project Assurance:** Project assurance is the responsibility of each project board member; however, UNDP has a distinct assurance role for all UNDP projects in carrying out objective and independent project oversight and monitoring functions. UNDP performs quality assurance and supports the Project Board (and Project Management Unit) by carrying out objective and independent project oversight and monitoring functions, including compliance with the risk management and social and environmental standards of UNDP. The Project Board cannot delegate any of its quality assurance responsibilities to the Project Manager. Project assurance is totally independent of project execution.

174. A designated representative of UNDP playing the project assurance role is expected to attend all board meetings and support board processes as a non-voting representative. It should be noted that while in certain cases UNDP's project assurance role across the project may encompass activities happening at several levels (e.g. global, regional), at least one UNDP representative playing that function must, as part of their duties, specifically attend board meeting and provide board members with the required documentation required to perform their duties. The UNDP representative playing the main project assurance function is/are: Aderito Santana, Assistant Resident Representative Programme.

175. **Project Management – Execution of the Project:** The Project Manager (PM) is the senior most representative of the Project Management Unit (PMU) and is responsible for the overall day-to-day management of the project on behalf of the Implementing Partner, including the mobilization of all project inputs, supervision over project staff, responsible parties, consultants and sub-contractors. The project manager typically presents key deliverables and documents to the board for their review and approval, including progress reports, annual work plans, adjustments to tolerance levels and risk registers. The roles and responsibilities of the PMU members are detailed in the Annex 7. The PMU will be hosted by the DGRNE.

    A designated representative of the PMU is expected to attend all board meetings and support board processes as a non-voting representative.

    The primary PMU representative attending board meetings is: Project Manager (PM).

VIII. FINANCIAL PLANNING AND MANAGEMENT

176. The total cost of the project is USD 14,056,559 This is financed through a GEF grant of USD 1,968,349 administered by UNDP, USD 50,000 in cash co-financing to be administered by UNDP and additional support of USD 6,038,210. UNDP, as the GEF Implementing Agency, is responsible for the oversight of the GEF resources and the cash co-financing transferred to UNDP bank account only.

177. **Co-financing**: The actual realization of project co-financing amounts will be monitored by the UNDP Country Office and the PMU on an annual basis in the GEF PIF and will be reported to the GEF during the mid-term review and terminal evaluation process as follows:

Table 9: Project Co-financing

Co-financing source	Co-financing type	Name of Co-financier	Investment Mobilized	Co-financing amount
Directorate General Natural Resources and Energy (DGRNE) - National Government	In-kind		Recurrent expenditures	US$ 38,210
African Development Bank (AfDB) - Donor Agency[55]	grant	African Development Bank (AfDB)	Investment mobilized	US$ 6,000,000
United Nations Development Programme (UNDP) – GEF Agency	grant	United Nations Development Programme (UNDP)	Investment mobilized	US$ 50,000
	Total			**US$ 6,088,210**

178. **Budget Revision and Tolerance**: As per UNDP POPP, the project board may agree with the project manager on a tolerance level for each detailed plan under the overall multi-year workplan. The agreed tolerance should be written in the project document or approved project board meeting minutes. It should normally not exceed 10 percent of the agreed annual budget at the activity level, but within the overall approved multi-year workplan at the activity level. Within the agreed tolerances, the project manager can operate without intervention from the project board. Restrictions apply as follows:

Should the following deviations occur, the Project Manager/IP through UNDP Country Office will seek the approval of the BPPS/NCE-VF team to ensure accurate reporting to the GEF. It is **strongly encouraged** to maintain the expenditures within the approved budget at the budgetary account and at the component level:

a) Budget reallocations must prove that the suggested changes in the budget will not lead to material changes in the results to be achieved by the project. A strong justification is required and will be approved on an exceptional basis. Budget re-allocations among the components (including PMC) of the approved Total Budget and Work Plans (TBWP) that represent a value greater than 10% of the total GEF grant.

[55] This concerns a USD 12 million grant from the African Development Bank through the African Development Fund (ADF) and Sustainable Energy Fund for Africa (SEFA) to fund the Energy Transition and institutional support (ETISP) which runs until 2025,

b) Introduction of new outputs/activities (i.e. budget items) that were not part of the agreed project document and TBWP that represent a value greater than 5% of the total GEF grant. The new budget items must be eligible as per the GEF and UNDP policies.
c) Project management cost (PMC): budget under PMC component is capped and cannot be increased.

UNDP is not in a position to increase the total budget above the amount approved by the donor, therefore any over-expenditure would have to be absorbed from non-GEF resources by the Implementing Partner (GEF Executing Entity).

179. **Project extensions:** The UNDP-BPPS-NCE team Executive Coordinator must approve all requests for extension of the Project Completion Date and for other milestone extensions with hard deadlines. All extensions impose additional time and cost burdens at all levels and the GEF project budget cannot be increased beyond its originally approved amount. A single extension may be granted on an exceptional basis and subject to the conditions and maximum durations set out in the UNDP POPP. The project management costs during the extension period must remain within the originally approved amount, and any increase in PMC costs shall be covered by non-GEF resources; the additional UNDP oversight costs during the extension period must be covered by non-GEF resources, in accordance with UNDP's policy as set out in UNDP POPP.

    For any extension request, UNDP CO and IP will consult and jointly present a clear plan indicating how and from which specific sources the additional oversight costs that will be incurred by UNDP will be covered during the extended period. The BPPS-NCE Executive Coordinator will consult the Regional Bureaux (RBX) and may reject the extension request if no (external co-financing by the IP or internal UNDP CO resources) can be identified.

    All extension requests, along with all supporting documentation, shall be submitted by the IP to the UNDP CO in line with the requirements and within the deadlines set out in the UNDP SOPs and policies in UNDP POPP.

180. **Audit:** The project will be audited as per UNDP Financial Regulations and Rules and applicable audit policies. Audit cycle and process must be discussed during the Inception workshop. If the Implementing Partner is an UN Agency, the project will be audited according to that Agencies applicable audit policies.**Transfer or disposal of assets**: In consultation with the Implementing Partner and other parties of the project, UNDP is responsible for deciding on the transfer or other disposal of assets. Transfer or disposal of assets is recommended to be reviewed and endorsed by the project board following UNDP rules and regulations. Assets may be transferred to the government for project activities managed by a national institution at any time during the life of a project, however **must be done before the operational closure date**. In all cases of transfer, a transfer document must be prepared and kept on file[56]. The transfer should be done before Project Management Unit complete their assignments.

181. **Completion Date**: The project completion date is the date of Project Document Signature plus project duration. This date can only be extended through a formal extension request. Prior to completion date, all UNDP-financed inputs must be provided and related activities for the Project completed. No activities, except for the final clearance of the Terminal Evaluation Report and the corresponding management response and the end-of-project review Project Board Meeting should take place after the Completion Date.

182. **Project Closure:** Project closure will be conducted as per UNDP requirements outlined in the UNDP POPP. All costs incurred to close the project must be included in the project closure budget and reported as final project commitments presented to the Project Board during the final project review. The only costs a project may incur following the final project review are those included in the project closure budget.

[56] See https://popp.undp.org/ https://popp-prod.acquia.undp.org/policy-page/close-and-transition.

- **Operational Closure**: **Operational closure must happen within 9 months from project completion date.** Prior to operational closure, the Terminal Evaluation must have been submitted and the corresponding TE management response and the end-of-project review Project Board meeting must have been completed. The Implementing Partner through a Project Board decision will notify the UNDP Country Office when operational closure has been completed. Before Operational Closure, the project must have completed the transfer or disposal of any equipment that is still the property of UNDP.
- **Financial Closure: Financial closure must happen within 6 months of operational closure or after the date of cancellation.** The project will be financially closed when the following conditions have been met: a) the project is operationally completed or has been cancelled; b) the Implementing Partner has reported all financial transactions to UNDP; c) UNDP has closed the accounts for the project; d) UNDP and the Implementing Partner have certified a final Combined Delivery Report (which serves as final budget revision).
  Between operational and financial closure, the implementing partner will identify and settle all financial obligations and prepare a final expenditure report. The UNDP Country Office will send the final signed closure documents including confirmation of final cumulative expenditure and unspent balance to BPPS/NCE for confirmation before the project will be financially closed in Quantum by the UNDP Country Office.

183. **Cancellation and Suspension:** All projects considering going through cancellation or suspension must follow UNDP and GEF requirements. Guidance can be found in the UNDP POPP (SOPs for management actions of Vertical Fund projects escalated to the Executive Coordinator and Guidance for GEF project revisions).

184. **Refund to GEF:** Should a refund of unspent funds to the GEF be necessary, this will be managed directly by the BPPS/NCE team Directorate in New York. No action is required by the UNDP Country Office on the actual refund from UNDP project to the GEF. Unspent project balance is not permitted to be transferred to any other projects.

IX. TOTAL BUDGET AND WORK PLAN

Total Budget and Work Plan			
Quantum Business Unit	UNDP- São Tomé and Príncipe (STP)		
Quantum Project ID:	00132379	Quantum Project Title:	African Minigrids Program STP-UNDP-STP-0013237
Quantum Award ID:	00132379.1	Quantum Award Title:	African Minigrids Program STP-UNDP-STP-0013237
UNDP-GEF PIMS No.	6657		
Implementing Partner	Directorate-General Natural Resources and Energy (DGRNE)		

Atlas Activity (GEF Component)	Atlas Implementing Agent	Atlas Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Account Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Total (USD)	See Budget Note:
COMPONENT 1 Policy and Regulation	**IP**	**62000**	**GEF Trustee**	71200	International Consultants	45,000	20,000	15,000	10,000	90,000	1
				71600	Travel	13,000	10,000	10,000	7,000	40,000	2
				71800	Contractual Services – Indiv ImpPtnr	34,000	18,000	18,000	18,000	88,000	3
				72100	Contractual Services – Companies	50,000	65,000	40,000	0	155,000	4
				72200	Equipment and Furniture	2,000	0	0	0	2,000	5
				72800	Information Technology Equipmt	3,000	0	0	0	3,000	6
				73400	O&M of Transport Equipment	1,000	4,000	4,000	3,000	12,000	7
				74200	Audio Visual & Print Prod Cost	3,000	2,000	2,000	2,000	9,000	8
				74500	Miscellaneous	1,000	1,000	1,000	1,000	4,000	9
				75700	Training and Learning Cost	4,000	3,000	2,000	1,000	10,000	10
					Total C1	**156,000**	**123,000**	**92,000**	**42,000**	**413,000**	
COMPONENT 2 Business Model Innovation with Private Sector	**IP**	**62000**	**GEF Trustee**	71200	International Consultants	10,000	40,000	65,000	20,000	135,000	11
				71600	Travel	10,000	10,000	12,000	3,000	35,000	12
				71800	Contractual Services – Indiv ImpPtnr	5,000	20,000	20,000	5,000	50,000	13
				72100	Contractual Services – Companies	0	40,000	44,000	0	84,000	14
				72200	Equipment and Furniture	0	1,000	0	0	1,000	15
				72300	Materials & Goods	0	200,000	400,000	140,000	740,000	16
				72800	Information Technology Equipmt	0	1,000	1,000		2,000	17

				73400	O&M of Transport Equipment	3,000	7,000	7,000	1,000	18,000	18
				74200	Audio Visual & Print Prod Cost	1,000	4,000	4,000	1,000	10,000	19
				74500	Miscellaneous	1,000	1,000	1,000	0	3,000	20
				75700	Training and Learning Cost	1,000	2,000	2,000	0	5,000	21
					Total C2	**31,000**	**326,000**	**556,000**	**170,000**	**1,083,000**	
COMPONENT 3 Scaled-up Financing	**IP**	**62000**	**GEF Trustee**	71200	International Consultants	0	5,000	10,000	5,000	20,000	22
				71600	Travel	1,000	3,000	5,000	1,000	10,000	23
				71800	Contractual Services – Indiv ImpPtnr	5,000	6,000	8,000	6,000	25,000	24
				72100	Contractual Services – Companies	0	0	25,000	0	25,000	25
				74200	Audio Visual & Print Prod Cost	0	0	1,000	0	1,000	26
				74500	Miscellaneous	0	0	1,000	0	1,000	27
				75700	Training and Learning Cost	0	0	5,000	0	5,000	28
					Total C3	**6,000**	**14,000**	**55,000**	**12,000**	**87,000**	
COMPONENT 4 Digital and Knowledge Management	**IP**	**62000**	**GEF Trustee**	71200	International Consultants	5,000	10,000	10,000	5,000	30,000	29
				71600	Travel	1,000	4,000	3,000	2,000	10,000	30
				71800	Contractual Services – Indiv ImpPtnr	0	10,000	5,000	5,000	20,000	31
				72200	Equipment and Furniture	0	1,000	0	0	1,000	32
				72800	Information Technology Equipmt	1,000	40,000	0	0	41,000	33
				73400	O&M of Transport Equipment	1,000	1,000	2,000	1,000	5,000	34
				74200	Audio Visual & Print Prod Cost	0	1,000	1,000	0	2,000	35
				74500	Miscellaneous	1,000	0	1,059	0	2,059	36
				75700	Training and Learning Cost	0	6,000	4,000	0	10,000	37
					Total C4	**9,000**	**73,000**	**26,059**	**13,000**	**121,059**	
COMPONENT 5 Monitoring and Evaluation	**IP**	**62000**	**GEF Trustee**	71200	International Consultants	16,349	22,000	5,000	25,000	68,349	38
				71300	Local Consultants	3,000	4,000	4,000	2,000	13,000	39
				71600	Travel	0	2,000	0	2,000	4,000	40
					Total C5	**19,349**	**28,000**	**9,000**	**29,000**	**85,349**	
PROJECT MANAGEMENT COST	**IP**	**62000**	**GEF Trustee**	71600	Travel	1,000	500	500	0	2,000	41
				71800	Contractual Services – Indiv ImpPtnr	24,396	23,000	23,000	23,000	93,396	42
				72200	Equipment and Furniture	1,206	0	0	0	1,206	43
				72800	Information Technology Equipmt	2,000	0	0	0	2,000	44
				74100	Professional Services	5,000	5,000	6,000	6,000	22,000	45
				74599	Project – Direct Costs	23,339	20,000	10,000	5,000	58,339	46
					sub-total PM (GEF)	**56,941**	**48,500**	**39,500**	**34,000**	**178,941**	

	UNDP	TRAC	UNDP	75700	Training and Learning Cost	10,000	20,000	15,000	5,000	50,000	47
					sub-total PM (UNDP)	10,000	20,000	15,000	5,000	50,000	
					Total PM	66,941	68,500	54,500	39,000	228,941	
				PROJECT TOTAL		288,290	632,500	792,559	305,000	2,018,349	

Summary of Funds:

	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Total (USD)
GEF grant administered by UNDP	278,290	612,500	777,559	300,000	1,968,349
Grant (cash) co-finance by GEF Agency: UNDP	10,000	20,000	15,000	5,000	50,000
DGRNE - National Government	9,553	9,553	9,553	9,551	US$ 38,210
AfDB - Donor Agency	0	1,500,000	2,000,000	3,000,000	US$ 6,000,000
TOTAL	**297,843**	**2,142,053**	**2,802,112**	**3,314,551**	**US$ 8,056,559**

Table 10: Budget Notes

Budget Note No.	Description
Component 1 (Total GEF Budget US$ 413,000)	
1	(50k$) One international rural electrification expert at P3-level for 3.5 year period to assume the role of Project Technical Advisor (TA) with responsibilities including: (i) support to the Executive (MIRN/DGRNE) for minigrid policy dialogue and regulation development; (ii) expertise for technical standard development; (iii) delivery of expertise on derisking strategies and technical backstopping to GoSTP stakeholders; (iv) drafting of Terms of Reference for consultancies and procurement of services; (v) quality assurance and overall supervision of contracted activities; (vi) engagement with AMP Regional Program partners for peer review of proposals, analysis of project approaches, and (vii) participation in AMP events in STP and abroad. (40k$) One contract with DREI International Consultant as per TOR made available by AMP Regional Program.
2	(40k$) International travel and DSA
3	(73k$) One national expert to assume the role of Project Manager (PM) combining technical and project management functions, with responsibilities including: (i) lead consultant to the Executive (MIRN/DGRNE) for minigrid policy dialogue and regulation development; (ii) engagement with GoSTP stakeholders, market actors and CSOs; (iii) drafting of Terms of Reference for consultancies and procurement of services; (iv) quality assurance and overall supervision of contracted activities; (vi) engagement with AMP Regional Program partners for peer review of proposals, analysis of project approaches, and (vii) participation in AMP events in STP and abroad; and (vii) compilation of proposals and presentations to stakeholders.

Budget Note No.	Description
	(15k$) One contract with national consultant to assume the role of Project MG / DREI Expert. Responsibilities include (i) participation in national DREI process with support of international DREI consultant and TA; (ii) participation in design and appraisal of technical standards; (iii) participation in stakeholder engagement and outreach activities; (iv) review of deliverables provided by contractors; and (v) reporting to TA and PM as requested.
4	(35k$) One contract with specialized consultancy firm or institution for design of minigrid regulatory instruments and advisory services. (50k$) One contract with specialized consultancy firm or institution for execution of minigrid baseline studies including socio-economic and environmental surveys. (35k$) One contract with specialized consultancy firm or institution for development of minigrid technical standards proposal as part of process driven by national stakeholders. (35k$) One contract with national vocational education institution to implement technical training programme.
5	(2k$) Office equipment for project consultants.
6	(3k$) 3 laptops, 2 monitors, printer, 2 digital cameras.
7	(12k$) Project vehicle operational costs.
8	(9k$) Media development costs, digital maps, technical standards printing costs, project publications.
9	(4k$) Supplies and communication costs.
10	(10k$) Organization of training events and seminars/webinars.
Component 2 (Total GEF Budget US$ 1,083,000)	
11	(75k$) International expert as Technical Advisor (TA) for: (i) team leader for minigrid pilot design and implementation in collaboration with IP and Project Engineer (PE); (ii) drafting of TOR for contracted services (studies related to feasibility analysis and ESIA); (iii) leading feasibility study process with PE, IP stakeholders and local communities; (iv) technical specification of minigrid equipment and systems; (v) drafting of TOR and supervision of contracted services; (vi) participation in procurement and supplier selection process; (vii) supervision of products, goods and services delivered by subcontractors; (vii) lead consultant for monitoring of pilots and analysis of operational data; (vii) responsible for ESMP monitoring and screening; (viii) identification of operational issues and initiation of remedial actions; (ix) identification of opportunities for enhancement and/or upscaling of the pilots; and (x) progress reporting to PSC. (60k$) One international expert to act as Project Engineer (PE) for: (i) technical design of minigrid pilots under supervision of TA; (ii) technical specification of minigrid equipment and systems; (ii) participation in procurement and supplier selection process; (iii) supervision of deliveries and installations; (iv) monitoring of pilot and analysis of operational data; (v) fact-finding for ESMP monitoring and screening; (vi) identification of operational issues and initiation of remedial actions; and (vii) identification of opportunities for enhancement and/or upscaling of the pilots.
12	(35k$) International travel and DSA

Budget Note No.	Description
13	(30k$) One national expert (PM) for (i) engagement with GoSTP stakeholders, market actors and CSOs; (ii) drafting of Terms of Reference for consultancies and procurement of services; (iii) quality assurance and overall supervision of contracted activities; (iv) engagement with AMP Regional Program partners for peer review of proposals, analysis of project approaches, (v) identification and reporting of operational issues and initiation of remedial actions; (vi) identification of opportunities for enhancement and/or upscaling of the pilots; (vii) progress reporting to PSC; and (viii) compilation of proposals and presentations to stakeholders. (20k$) One contract with national consultant (Project MG / DREI Expert) for: (i) participation in technical design of minigrid pilots with TA and PE; (ii) collection of site information for specification of minigrid equipment and systems; (iii) participation in procurement and supplier selection process; (iv) participation in supervision of deliveries and installations; (v) site visits for monitoring of pilots and verification of operational data; (vi) fact-finding for ESMP monitoring and screening; (vii) participation in appraisal of operational issues; and (vii) identification of opportunities for enhancement and/or upscaling of the pilots.
14	(34k$) One contract with specialized consultancy firm or institution for execution of site-specific studies for minigrid pilot development. (50k$) One contract with specialized national institution for design and execution of community development programme in communities targeted by minigrid pilots.
15	(1k$) Office equipment for project consultants.
16	(740k$) International procurement of minigrid equipment, ancillary works, support services, and data logger systems, as per technical specifications drafted by the Project team.
17	(2k$) Data communication equipment.
18	(18k$) Project vehicle operational costs.
19	(10k$) Media development costs, digital maps, technical design printing costs, project publications.
20	(3k$) Supplies and communication costs, insurances.
21	(5k$) Organization of training events.
Component 3 (Total GEF Budget US$ 87,000)	
22	(20k$) One international rural electrification as Project Technical Advisor (TA) with responsibilities including: (i) expertise and technical backstopping in minigrid financing models to GoSTP stakeholders; (ii) drafting of Terms of Reference for consultancies and procurement of services; (iii) quality assurance and overall supervision of contracted activities; (iv) engagement with AMP Regional Program partners for peer review of proposals, analysis of project approaches, and (v) participation in AMP events in STP and abroad.
23	(10k$) International travel and DSA
24	(25k$) One contract with national consultant as Project Manager (PM) for: (i) engagement with GoSTP stakeholders, market actors and CSOs; (ii) drafting of Terms of Reference for consultancies and procurement of services; (iii) quality assurance and overall supervision of contracted activities; (iv) engagement with AMP Regional Program partners for peer review of proposals, analysis of project approaches, and (v) participation in AMP events in STP and abroad.

Budget Note No.	Description
25	(25k$) One contract with specialized consultancy firm or institution for analysis of financial facility schemes and drafting of proposal for GoSTP and its partners.
26	(1k$) Media development costs, printing costs, project publications.
27	(1k$) Supplies and communication costs.
28	(5k$) Organization of training events and webinars.
Component 4 (Total GEF Budget US$ 121,059)	
29	(20k$) International expert as Technical Advisor (TA) for: (i) team leader for design and implementation of data acquisition system and protocols in close coordination with AMP Regional Programme; (ii) drafting of TOR for contracted services; (iii) functional and technical specification of minigrid data acquisition system; (iv) drafting of TOR and supervision of contracted services; (v) participation in procurement and supplier selection process; (vi) supervision and reception of products, goods and services delivered by subcontractors; and (vii) progress reporting to PSC. (10k$) One international expert to act as Project Engineer (PE) for: (i) design and implementation of data acquisition system under supervision of TA; (ii) technical specification of minigrid data acquisition system; (iii) drafting of TOR and supervision of contracted services; (iv) participation in procurement and supplier selection process; (v) participation in training events on data acquisition system configuration and operation; and (vi) supervision of products, goods and services delivered by subcontractors.
30	(10k$) International travel and DSA
31	(10k$) One contract with national consultant as Project Manager (PM) for: (i) engagement with GoSTP stakeholders, market actors and CSOs; (ii) drafting of Terms of Reference for consultancies and procurement of services; (iii) quality assurance and overall supervision of contracted activities; (iv) engagement with AMP Regional Program partners for peer review of proposals, analysis of project approaches, and (v) participation in AMP events in STP and abroad. (10k$) One contract with national consultant (Project MG / DREI Expert) for: (i) participation in design and implementation of data acquisition system under supervision of TA and PE; (ii) participation in functional and technical specification of minigrid data acquisition system; (iii) drafting of TOR and supervision of contracted services; (iv) participation in procurement and supplier selection process; (v) participation in training events on data acquisition system configuration and operation; and (vi) support for operation of system to GoSTP counterparts; and (vii) supervision of products, goods and services delivered by subcontractors.
32	(1k$) Office equipment for digital system accommodation.
33	(40k$) International procurement of minigrid data management and supervision system; (1k$) Procurement of ancillary devices and software.
34	(5k$) Project vehicle operational costs.
35	(2k$) Media and printing of manuals and protocols.
36	(2.059k$) Supplies, insurances and communication costs.

Budget Note No.	Description
37	(10k$) Organization of training events on digital system operation including webinars for minigrid operators I and other stakeholders.
Component 5 (Total GEF Budget US$ 85,349)	
38	(12k$) One international M&E expert to support the IP during the Project's inception phase including: (i) detailing Project M&E Plan including indicators and milestones; (ii) update the first annual work plan (AWP) and procurement plan; (iii) provide guidance to IP on roles and responsibilities; (iv) provide continuity for stakeholder engagement; and (v) support IW preparation process. (19.349 k$) One international Social and Environmental Safeguards Expert for: (i) periodic supervision of ESMF implementation; (ii) periodic SESP rescreening; and (iii) systematization of lessons learnt and recommendations for enhancement. (37k$) One independent international expert to conduct the Mid-Term Review; One independent international expert to conduct the GEF Terminal Evaluation.
39	(13k$) One national gender expert for: (i) periodic supervision of Gender Action Plan implementation; and (ii) identification of issues and recommendations for enhancement.
40	(4k$) International travel and DSA.
Project Management Costs (GEF Budget US$ 178,941; UNDP TRAC: US$ 50,000; Total US$ 228,941)	
41	(2k$) Costs of domestic travel (land travel, fuel, DSA).
42	(37.396k$) Contractual Services: Project Manager for project management activities, as per terms of reference. (28k$) Contractual services: Project Finance and Administrative Officer, as per Terms of Reference (3 years, 2/5 part-time). (28k$) Contractual services: Project Procurement Specialist, as per Terms of Reference (3 years, 2/5 part-time).
43	(1.206k$) Office equipment for PMU staff.
44	(2k$) 2 Laptops, printer, internet and I communication hardware and software for PMU staff.
45	(22k$) Professional services for annual auditing of project financial status, delivered outputs, and financial, asset and human resources management.
46	(58.339k$) Direct Project Costs as per LOA GEF-approved.
47	(50k$) Cost of capacity building and learning to support project execution.

X. LEGAL CONTEXT

185. This project document shall be the instrument referred to as such in Article 1 of the Standard Basic Assistance Agreement between the Government of the Democratic Republic of São Tomé and Príncipe and UNDP, signed on 26 March 1976. All references in the SBAA to "Executing Agency" shall be deemed to refer to "Implementing Partner."

186. This project will be implemented by the Directorate-General for Natural Resources and Energy (DGRNE) ("Implementing Partner") in accordance with its financial regulations, rules, practices and procedures only to the extent that they do not contravene the principles of the Financial Regulations and Rules of UNDP. Where the financial governance of an Implementing Partner does not provide the required guidance to ensure best value for money, fairness, integrity, transparency, and effective international competition, the financial governance of UNDP shall apply.

XI. RISK MANAGEMENT

Implementing Partner is a Government Entity (NIM)

187. Consistent with the Article III of the SBAA *[or the Supplemental Provisions to the Project Document]*, the responsibility for the safety and security of the Implementing Partner and its personnel and property, and of UNDP's property in the Implementing Partner's custody, rests with the Implementing Partner. To this end, the Implementing Partner shall:

    a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;

    b) assume all risks and liabilities related to the Implementing Partner's security, and the full implementation of the security plan.

188. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of the Implementing Partner's obligations under this Project Document.

189. The Implementing Partner agrees to undertake all reasonable efforts to ensure that no UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the United Nations Security Council Consolidated Sanctions List, and that no UNDP funds received pursuant to the Project Document are used for money laundering activities. The United Nations Security Council Consolidated Sanctions List can be accessed via https://www.un.org/securitycouncil/content/un-sc-consolidated-list.

190. The Implementing Partner acknowledges and agrees that UNDP will not tolerate sexual harassment and sexual exploitation and abuse of anyone by the Implementing Partner, and each of its responsible parties, their respective sub-recipients and other entities involved in Project implementation, either as contractors or subcontractors and their personnel, and any individuals performing services for them under the Project Document.

    (a) In the implementation of the activities under this Project Document, the Implementing Partner, and each of its sub-parties referred to above, shall comply with the standards of conduct set forth in the Secretary General's Bulletin ST/SGB/2003/13 of 9 October 2003, concerning "Special measures for protection from sexual exploitation and sexual abuse" ("SEA").

    (b) Moreover, and without limitation to the application of other regulations, rules, policies and procedures bearing upon the performance of the activities under this Project Document, in the implementation of activities, the Implementing Partner, and each of its sub-parties referred to above, shall not engage in any form of sexual harassment ("SH"). SH is defined as any unwelcome conduct of a sexual nature that might reasonably be expected or be perceived to cause offense or humiliation, when such conduct interferes with work, is made a condition of employment or creates an intimidating, hostile or offensive work environment. SH may occur in the workplace or in connection with work. While typically involving a pattern of conduct, SH may take the form of a single incident. In assessing the reasonableness of expectations or perceptions, the perspective of the person who is the target of the conduct shall be considered.

191. a) In the performance of the activities under this Project Document, the Implementing Partner shall (with respect to its own activities), and shall require from its sub-parties referred to in paragraph 4 (with respect to their activities) that they, have minimum standards and procedures in place, or a plan to develop and/or improve such standards and procedures in order to be able to take effective preventive and investigative action. These should include: policies on sexual harassment and sexual exploitation and abuse; policies on whistleblowing/protection against retaliation; and complaints, disciplinary and investigative mechanisms. In line with this, the Implementing Partner will and will require that such sub-parties will take all appropriate measures to:

    i. Prevent its employees, agents or any other persons engaged to perform any services under this Project Document, from engaging in SH or SEA;

    ii. Offer employees and associated personnel training on prevention and response to SH and SEA, where the Implementing Partner and its sub-parties referred to in paragraph 4 have not put in place its own training regarding the prevention of SH and SEA, the Implementing Partner and its sub-parties may use the training material available at UNDP;

    iii. Report and monitor allegations of SH and SEA of which the Implementing Partner and its sub-parties referred to in paragraph 4 have been informed or have otherwise become aware, and status thereof;

    iv. Refer victims/survivors of SH and SEA to safe and confidential victim assistance; and

    v. Promptly and confidentially, record and investigate any allegations credible enough to warrant an investigation of SH or SEA. The Implementing Partner shall advise UNDP of any such allegations received and investigations being conducted by itself or any of its sub-parties referred to in paragraph 4 with respect to their activities under the Project Document, and shall keep UNDP informed during the investigation by it or any of such sub-parties, to the extent that such notification (i) does not jeopardize the conduct of the investigation, including but not limited to the safety or security of persons, and/or (ii) is not in contravention of any laws applicable to it. Following the investigation, the Implementing Partner shall advise UNDP of any actions taken by it or any of the other entities further to the investigation.

b) The Implementing Partner shall establish that it has complied with the foregoing, to the satisfaction of UNDP, when requested by UNDP or any party acting on its behalf to provide such confirmation. Failure of the Implementing Partner, and each of its sub-parties referred to in paragraph 4, to comply of the foregoing, as determined by UNDP, shall be considered grounds for suspension or termination of the Project.

192. Social and environmental sustainability will be enhanced through application of the UNDP Social and Environmental Standards (http://www.undp.org/ses) and related Accountability Mechanism (http://www.undp.org/secu-srm).

193. The Implementing Partner shall: (a) conduct project and programme-related activities in a manner consistent with the UNDP Social and Environmental Standards, (b) implement any management or mitigation plan prepared for the project or programme to comply with such standards, and (c) engage in a constructive and timely manner to address any concerns and complaints raised through the Accountability Mechanism. UNDP will seek to ensure that communities and other project stakeholders are informed of and have access to the Accountability Mechanism.

194. All signatories to the Project Document shall cooperate in good faith with any exercise to evaluate any programme or project-related commitments or compliance with the UNDP Social and Environmental Standards. This includes providing access to project sites, relevant personnel, information, and documentation.

195. The Implementing Partner will take appropriate steps to prevent misuse of funds, fraud or corruption, by its officials, consultants, responsible parties, subcontractors and sub-recipients in implementing the project or using UNDP funds.

196. In the implementation of the activities under this Project Document, UNDP places reasonable reliance upon the Implementing Partner for it to apply its laws, regulations and processes, and applicable international laws regarding anti money laundering and countering the financing of terrorism, to ensure consistency with the principles of then in force the UNDP Anti-Money Laundering and Countering the Financing of Terrorism Policy.

197. The Implementing Partner will ensure that its financial management, anti-corruption, anti-fraud and anti-money laundering and countering the financing of terrorism policies are in place and enforced for all funding received from or through UNDP.

198. The requirements of the following documents, then in force at the time of signature of the Project Document, apply to the Implementing Partner: (a) UNDP Policy on Fraud and other Corrupt Practices and (b) UNDP Office of Audit and Investigations Investigation Guidelines. The Implementing Partner agrees to the requirements of the above documents, which are an integral part of this Project Document and are available online at www.undp.org.

199. In the event that an investigation is required, UNDP has the obligation to conduct investigations relating to any aspect of UNDP projects and programmes in accordance with UNDP's regulations, rules, policies and procedures. The Implementing Partner shall provide its full cooperation, including making available personnel, relevant documentation, and granting access to the Implementing Partner's (and its consultants', responsible parties', subcontractors' and sub-recipients') premises, for such purposes at reasonable times and on reasonable conditions as may be required for the purpose of an investigation. Should there be a limitation in meeting this obligation, UNDP shall consult with the Implementing Partner to find a solution.

200. The signatories to this Project Document will promptly inform one another in case of any incidence of inappropriate use of funds, or credible allegation of fraud or corruption with due confidentiality.

    Where the Implementing Partner becomes aware that a UNDP project or activity, in whole or in part, is the focus of investigation for alleged fraud/corruption, the Implementing Partner will inform the UNDP Resident Representative/Head of Office, who will promptly inform UNDP's Office of Audit and Investigations (OAI). The Implementing Partner shall provide regular updates to the head of UNDP in the country and OAI of the status of, and actions relating to, such investigation.

201. UNDP shall be entitled to a refund from the Implementing Partner of any funds provided that have been used inappropriately, including through fraud, corruption or other financial irregularity, or otherwise paid other than in accordance with the terms and conditions of the Project Document. Such amount may be deducted by UNDP from any payment due to the Implementing Partner under this or any other agreement. Recovery of such amount by UNDP shall not diminish or curtail the Implementing Partner's obligations under this Project Document.

    Where such funds have not been refunded to UNDP, the Implementing Partner agrees that donors to UNDP (including the Government) whose funding is the source, in whole or in part, of the funds for the activities under this Project Document, may seek recourse to the Implementing Partner for the recovery of any funds determined by UNDP to have been used inappropriately, including through fraud, corruption or other financial irregularity, or otherwise paid other than in accordance with the terms and conditions of the Project Document.

    Note: The term "Project Document" as used in this clause shall be deemed to include any relevant subsidiary agreement further to the Project Document, including those with responsible parties, subcontractors and sub-recipients.

202. Each contract issued by the Implementing Partner in connection with this Project Document shall include a provision representing that no fees, gratuities, rebates, gifts, commissions or other payments, other than those shown in the proposal, have been given, received, or promised in connection with the selection process or in contract execution, and that the recipient of funds from the Implementing Partner shall cooperate with any and all investigations and post-payment audits.

203. Should UNDP refer to the relevant national authorities for appropriate legal action any alleged wrongdoing relating to the project, the Government will ensure that the relevant national authorities shall actively investigate the same and take appropriate legal action against all individuals found to have participated in the wrongdoing, recover and return any recovered funds to UNDP.

204. The Implementing Partner shall ensure that all of its obligations set forth under this section entitled “Risk Management” are passed on to each responsible party, subcontractor and sub-recipient and that all the clauses under this section entitled “Risk Management Standard Clauses” are included, mutatis mutandis, in all sub-contracts or sub-agreements entered into further to this Project Document.

XII. MANDATORY ANNEXES

1. GEF Budget Template (available from BPPS NCE-VF)
2. GEF Execution Support Letter
3. Project Map and geospatial coordinates of the project area
4. Multiyear Workplan
5. Social and Environmental Screening Procedure (SESP)
6. UNDP Atlas Risk Register
7. Overview of technical consultancies/subcontracts
8. Stakeholder Engagement Plan
9. Environmental Social Management Framework (ESMF)
10. Gender Analysis and Gender Action Plan
11. Procurement Plan – for first year of implementation especially
12. GEF focal area specific annexes (e.g. METT, GHG calculations, target landscape profile, feasibility study, other technical reports)
13. Co-financing letters
14. Additional agreements: not applicable
15. Signed LOA between UNDP and IP requesting UNDP Support Services (if required on exceptional basis and authorized by the GEF)
16. GEF and/or LDCF/SCCF Core indicators (see template below)
17. GEF Taxonomy (see template below)
18. Partners Capacity Assessment Tool and HACT assessment
19. UNDP Project Quality Assurance Report (to be completed in UNDP online corporate planning system)
20. TOR International Consultant for a Full Derisking Renewable energy Investment (DREI) analysis in STP
21. TOR national Consultant for a Full Derisking Renewable energy Investment (DREI) analysis in STP
22. MiniGrid Schemes context and SWOT Analysis

Annex 1: GEF Budget Template

To be provided by MPSU after TBWP clearance.