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Electrification in Haiti

Deep-Dive Analysis

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Acronyms and abbreviations

AMACEH	Improving Electricity Access in Haiti program
ANARSE	National Regulatory Authority of the Energy Sector
BME	Bureau of Mines and Energy
CAPEX	Capital expenditures
CDB	Caribbean Development Bank
CEAC	Coteaux District Electric Cooperative
CTF	Clean Technology Fund
EDH	Electricité d'Haïti
EPC	Engineering, procurement, and construction
ERAF	Rural Electrification and Women's Empowerment project
EU	European Union
GDP	Gross Domestic Product
GoH	Government of Haiti
HH	Household
IRRP	Integrated Resource and Resilience Plan
IDA	International Development Association of the World Bank Group
IDB	Inter-American Development Bank
kWh	Kilowatt-hour
O&M	Operations and maintenance
OPEX	Operational expenditures
LV	Low voltage
MDE	Ministry of the Environment
MEF	Ministry of Economy and Finance
MTPTC	Ministry of Public Works, Transportation and Communication
NREL	National Renewable Energy Laboratory
OGEF	Off-Grid Electricity Fund
PHARES	Haitian Program for Access to Solar Energy for Rural Communities
PIEC	Indicative Electricity Coverage Expansion Plan
PNDSE	National Energy Sector Development Plan
PPP	Public-private partnership
PV	Photovoltaic
PUE	Productive use of energy
RBF	Results-based financing
RE	Renewable energy
RISE	Regulatory Indicators for Sustainable Energy
SHS	Solar home system
SREP	Scaling up renewable energy program
UAE	United Arab Emirates
UAE-CREF	UAE-Caribbean Renewable Energy Fund
USAID	United States Agency for International Development
USD	United States Dollar
UTE	Technical Execution Unit
WB	World Bank
WTP	Willingness to pay

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Current status of electrification and energy access in Haiti

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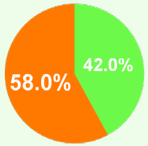
Haiti's electricity sector requires great measures to close the electricity access gap.

5.8 million people[1] without access to electricity, and millions more with minimal availability and reliability

11.5 million[2]

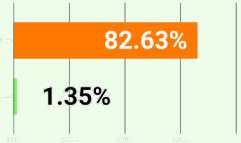
Total population*, with an urban/rural[3] split of:



*There is a current population growth rate of 1.1%,

49.3%[4]

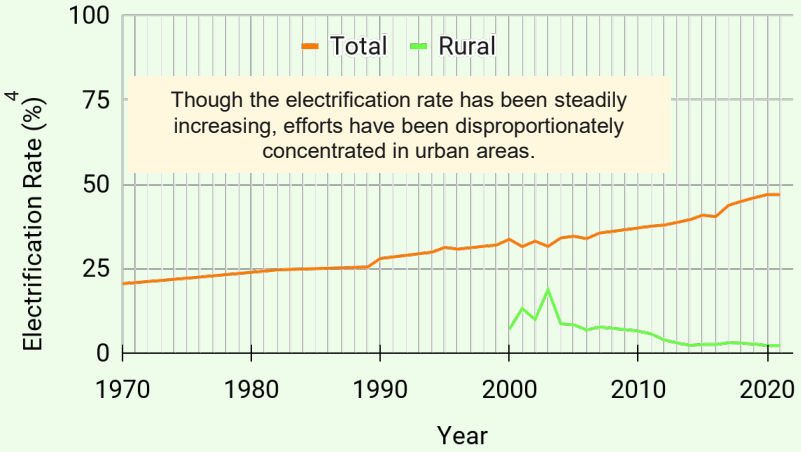
Total electrification rate, corresponding to **1.3 million households**[1] without electricity access.



urban/rural[4] electrification rate (%)

Residential electricity access by technology

Up to **three times** as many households using off-grid solutions as compared to grid-connected



Annual residential electricity demand per capita: **68 kWh**[5]

[1] Calculated based on population, electrification rate, and household size. [2] World Population Prospects 2022, UNDESA, 2022 [3] Population Data, OLADE, 2021 [4] Access to Electricity Database, IADB, 2021 [5] Haiti Country Profile, IEA, 2022.

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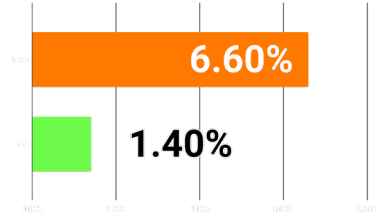
Haiti's electricity sector is reliant on imported fossil fuels and requires a major upgrade.

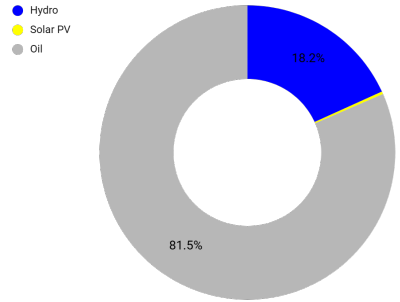
5%

Clean cooking access rate[1] - **2.5 million households** *without* access to clean cooking[1,2]

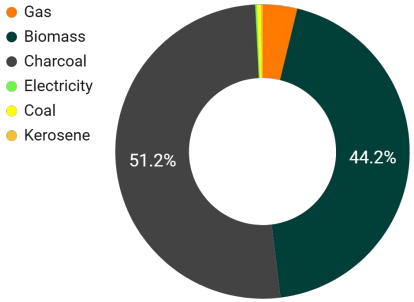


urban/rural clean cooking access rate (%)[1]

Electric grid mix[4]



Breakdown of primary cooking fuels[3]



Electricity reliability[5,6]

Less than **30%** of the installed capacity is producing electricity due to fuel shortages and/or lack of maintenance and repair.

Technical and non-technical losses sum up to **65%** of the power generated.

Total unmet demand for residential and commercial sectors is about **500 MW/day.**

[1]Tracking SDG7 - The Energy Progress Report, ESMAP, 2023. [2]World Population Prospects 2022, UNDESA, 2022. [3]Database: Cooking fuels and technologies (by specific fuel category), WHO, 2021. [4] Haiti Country Profile, IEA, 2022. [5]Haiti - Country Commercial Guide, US International Trade Organization, 2024. [6]Investment Plan for Haiti, Scaling-up Renewable Energy Program, 2015.

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Further context on Haiti's electricity sector

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GoH-owned utility EDH is the main provider of electricity services. The main grid is currently supplied only by a thermal-based IPP and Peligre hydropower plant.

Électricité d'Haïti - EDH[1]

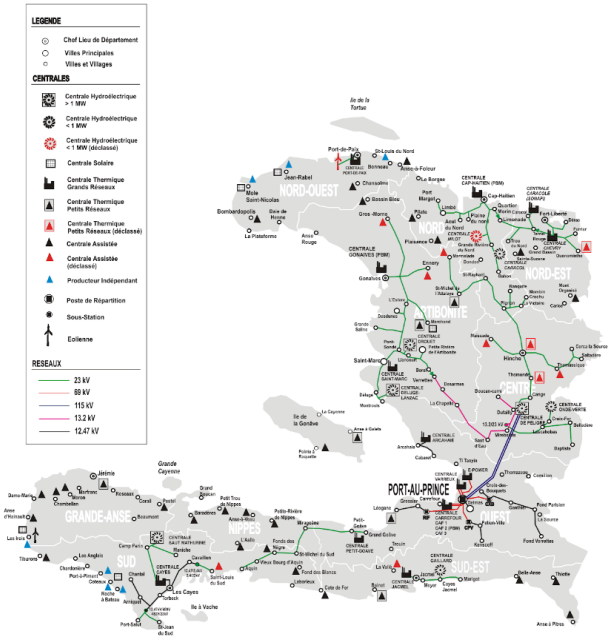
- Runs 10 separate unconnected distribution grids.
- Has recently mainly relied on hydropower plants to supply electricity for limited hours.

Independent Power Producers - IPPs[1,2,3,4]

- Until 2020, 4 IPPs operated in Haiti. Presently, E-Power is the only IPP in operation, with plans to rehabilitate production at Pétion-Bolivar-Marti (PBM) plants.
- Until recently, majority of Haiti's on-grid electricity production came from thermal sources - approximately one-third fueled with diesel and two-thirds with heavy fuel oil. Generation supply has since decreased significantly with hydro becoming the main source.

Private Generators[1]

- Self-generation via small generators has expanded significantly in response to the unreliable on-grid electricity supply.
- Though self-generation is more costly than on-grid service, it collectively produces more electricity than the national grid, with 500 MW of combined installed capacity.



Electricity grid, 2022[5]

[1] Haiti - Selected Issues, International Monetary Fund, 2020. [2] Haiti - Country Commercial Guide - Energy, US International Trade Administration, 2024. [3] Haiti-Mexico: Important round table on bilateral cooperation with Mexico, Haiti Libre, 2021. [4] IEA data, 2021. [5]Carte électrique, EDH, 2022

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Haiti's electricity sector has embraced an array of generation models

	EDH-owned isolated grids	Municipal diesel grids (public or private)	Municipal RE grids (public or private)	Self-generation	Private solar off-grid generation
Network type	**One main "interconnected" grid** serving Port-au-Prince, and **nine smaller isolated grids**	**30 smaller diesel-powered municipal grids** operated informally or under the Decentralization Law of 2006.	**Renewable energy grids** which operate in agreement with the municipalities; **must not exceed 2.5 MW**.	Generation for self consumption by **industries, businesses, and homes,** primarily using **gensets and solar PV.**	Selected homes equipped with **solar PV** system (the hub) are interconnected with neighboring homes (the spokes) to form a **mesh grid**.
Cost structure	273,000 active customers, and likely twice as many illegal connections	Tariffs below operation cost.	Approximating cost-reflective tariffs collected through smart pre-paid meters.	Fuels were highly subsidised until 2022, largely benefiting the richest demographic.	Innovative pay-as-you-go business models.
Quality of service	Outdated and poorly maintained distribution infrastructure	Inefficient operation of systems due to lack of funds for fuel and maintenance. Distribution networks are newer, relative to EDH's grid infrastructure.	Systems designed to meet demand but facing constraints to keep up with demand due to challenges in updating tariffs.	Systems designed to meet demand.	Systems designed to meet demand.

Source: Renewable Energy for all Project, World Bank, 2017; 2022-2023 Annual Report, ANARSE; Energy Subsidy Reform Facility (ESRF), ESMAP, 2017; Affordable Green Energy Lights Up Underserved Haiti Homes, Rockefeller Foundation, 2024

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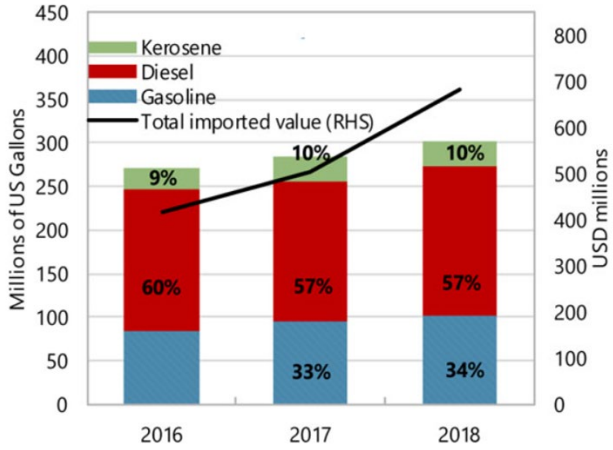
Losses of the state energy company together with energy subsidies have compromised fiscal sustainability in Haiti.

- In 2018, the average cost of electricity generation (both EDH-owned and purchased) was estimated at US $0.32 - 0.39/kWh, while the **average revenue was about one-third of the cost**.
- In 2019, **only 55% of the electricity generated was invoiced** due to challenges related to administration, invoicing, and illegal connections.
- Fuel **purchases are made in US dollars, while EDH revenues are collected in Haitian Gourdes**. In the past 5 years, Haitian Gourde has lost about 60% of its value against the US dollar.
- Shortfalls in EDH cost structure are covered by subsidies from the GoH. **In 2018, EDH's financial losses were about US$ 200 million annually**, equivalent to about 4% of the national budget. Further, almost 10% of GDP was spent on fuel imports.
- Subsidised fuels are mainly consumed by the wealthiest households. **Poor households receive about 1.6% of total subsidies**.



Evolution of Fuel Imports[1]

Sources: [1]Haiti - Selected Issues, International Monetary Fund, 2021; Assessment of Haiti's Electricity Sector, Boston University Institute for Sustainable Energy, 2018

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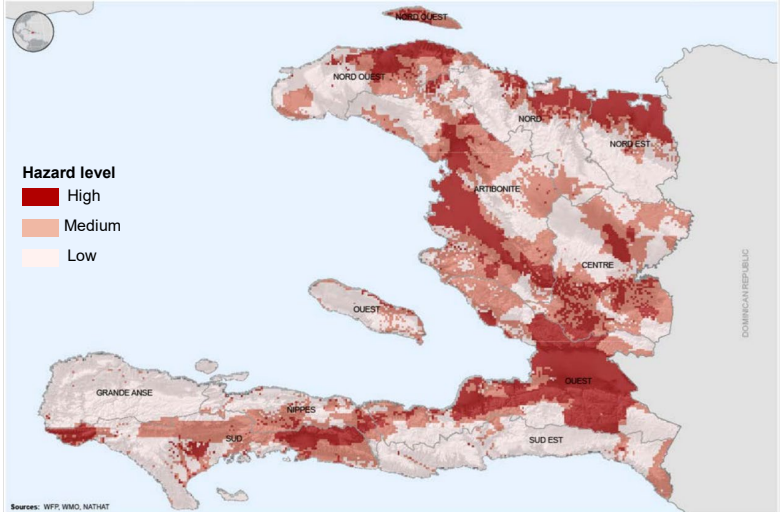
Haiti must overcome tremendous odds to improve its electricity access

- Haiti's geographic location and topography make it prone to natural disasters including **earthquakes, cyclones, floods, droughts and landslides**.
- **Over 96% of the population is exposed to at least two different types of hazards**, such as hurricanes, flooding and earthquakes; and climate change is expected to increase their frequency and severity.
- Haiti's **social and economic fragility** jeopardizes its efforts to strengthen its resilience towards these threats.
- The rough terrain, lack of reliable road infrastructure, and high flood risk increase the **challenge of transporting and installing RE solutions**.
- **Low customer density** reduces the economic viability of grid extensions.



Integrated Hazard Map, 2013 [1]

[1] Haiti: Integrated Hazard Map, OCHA, 2013. Other Sources: Haiti - Historical Hazards, WB, 2021; Haiti's path to building resilience to multiple disaster risks in a fragile context, ACP-EU Natural Disaster Risk Reduction Program, 2017.

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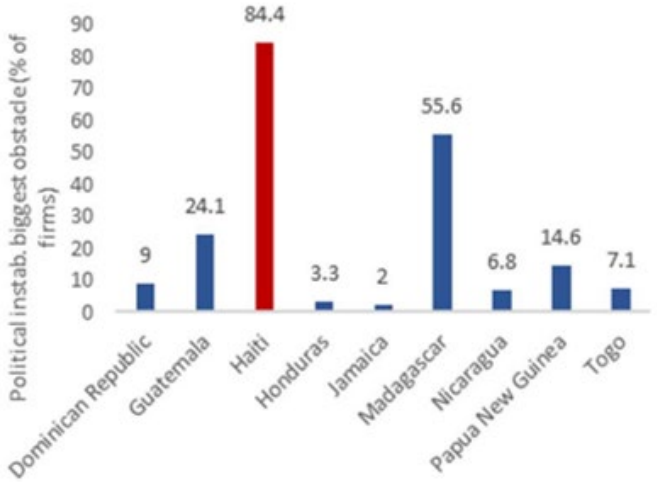
Political instability and insecurity hinders effective leadership and progress in the sector

- Haiti has experienced **over 20 changes in government since 1988**, disrupting long-term planning and implementation in the electricity sector and leading to extensive delays in updating national energy policy documents.
- **Energy infrastructure and fuel supply access points are often compromised** by ongoing political unrest and armed groups, with repeated fuel terminal blockades causing widespread fuel shortages and power outages.
- **Widespread insecurity** makes it difficult to implement energy projects, especially in rural areas.
- Private sector growth in the electricity sector is severely hampered by these challenges.
    - In 2019, 84.4% of Haitian firms indicated that **political instability was their biggest obstacle.**



% of firms (across sectors) considering political instability as their biggest challenge, World Bank Enterprise Surveys 2019

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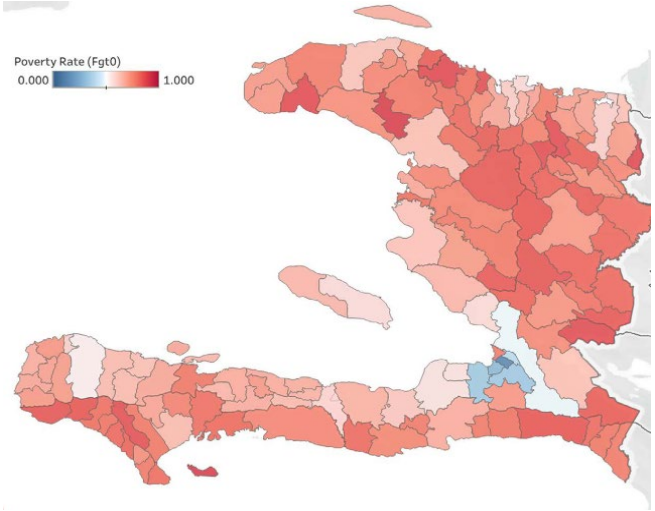
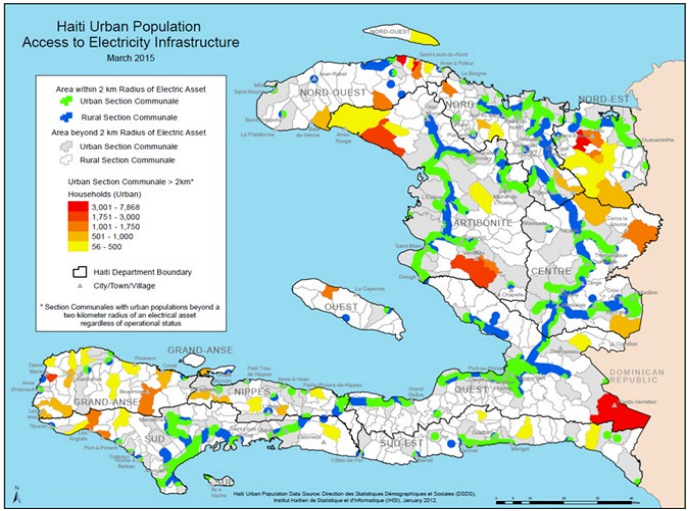
Haiti's economic and demographic context presents an opportunity to pursue innovative electricity access solutions



Poverty rate by commune[1]



Village grid potential[2]

- Elevated poverty rates are evenly widespread throughout most of Haiti's territory.
- Some of the poorest and most populated communes are far away from the existing grid infrastructure.
- Almost 74% of Haiti's territory (8 out of 10 departments) has a population density below 400 people/km^2.
- These conditions are driving the need for decentralized and reliable electrification solutions.

[1] Estimating and Forecasting Income Poverty and Inequality in Haiti Using Satellite Imagery and Mobile Phone Data, IDB, 2020. [2] Scaling up Renewable Energy Program (SREP), Ministere des Travaux Publics, Transports et Communications, 2015. Other sources: Haiti: Population density, MapAction, 2023

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Haiti’s electrification efforts to date

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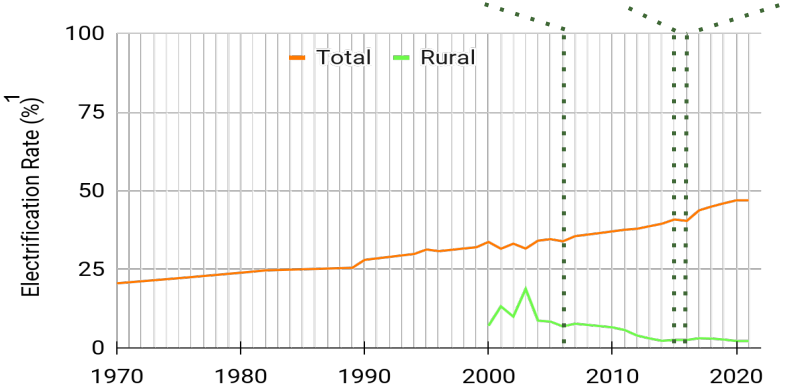
Electrification access has only marginally increased in Haiti over the past 50 years, with a dramatic disparity between urban and rural areas, despite several efforts.

Recent improvement in the rate of progress can be attributed to GoH efforts to foster private sector participation in the sector, starting in 2016, as well as to multiple programs and initiatives.

2006: National Energy Sector Development Plan (PNDSE) published

2015: SREP Investment Plan launched

2016: ANARSE established; power sector open to private investment



*Access rates may not be reliable due to improper data collection, lack of an updated & maintained database, and exclusion of informal connections. Rates vary significantly by source. Note that off-grid electricity is typically not accounted for in official statistics, although it is more widespread than grid connection in Haiti.

- In 1971, **the state-owned utility (EDH) was established**. Expansion of electricity access focused primarily on Port-au-Prince, while **rural areas were largely neglected**.
- The 2000s saw the large-scale emergence of off-grid solar technology in response to **unreliable grid services from EDH**. Projects were often funded by NGOs and multilaterals, with **little private sector participation**.
- Significant **damage to infrastructure** following the **earthquake** in 2010 intensified the need for sector reform.
- In 2016, the regulatory agency, ANARSE, was established to regulate & modernize the sector and facilitate private sector participation.

The difficulty in accelerating electricity access is reflected in that some of the most significant planning & programming efforts did not yield visible changes to the access trajectory:

- In 2006, the National Energy Sector Development Plan (**PNDSE**) was launched to increase the formal grid connection rate from 12.5% to 20% by 2013 and to maintain service for ≥ 12 hours/day in Port-au-Prince & other areas
- In 2015, the **SREP Investment Plan** (est. budget **US$149.5 million**) defined a comprehensive electricity access program to provide new or improved access to ~1M people (incl. 500k women) and 10k enterprises/public services.
  - Co-financed via three WB-funded projects: Renewable Energy for All, Modern Energy Services for All, **and Rebuilding Energy Infrastructure and Access**.
  - Aimed to enact an enabling policy and regulatory framework for clean energy and access.

[1] Access to Electricity Database, IADB, 2021

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Program spotlight: Renewable Energy for All Project

Who	MTPTC; WORLD BANK GROUP
What	Provide new or improved electricity service to homes (410,000 people, 50% women) and businesses/public services (4,500); Improve RISE score from 11 to 35
Where	Nationwide
When	2018 - present
Funding	SREP grant (USD $19.6 million), ESMAP grant (USD $2.9 million) and WB (IDA) grant (USD $24 million)
Technology	● Grid connected distributed RE ● RE mini-grids ● Standalone solar systems

Source: Project Paper on a Proposed Additional Grant for a Second Additional Financing for the Haiti Renewable Energy for All Project, September 2024

*see Annex X for summary of other key programs and initiatives

Successful Outcomes

As of September 2024, the project provided **107,000 people with first-time access to clean and reliable electricity via standalone solar systems and mesh grids**. Successful program elements include:

- Rehabilitation of the **1.5-MW mini hydro plant** in Drouet, Artibonite, improving electricity access to 53,000 households.
- Installation of **solar PV systems/storage of 1 MW/0.9 MWh** (cumulatively) in **5 priority hospitals**.
- Deployment of **0.8 MW** of off-grid distributed solar energy.
- Design and launch of the mini-grid program, PHARES, and development of a **mini-grid concession and tripartite agreements.**
- Concessions signed and subsidy committed for 3 mini-grid sites.
- Development of a **regulation for isolated mini-grids < 2.5 MW**.

Challenges

- **Insecurity and public order issues**: Gang activities and deteriorated security situation caused delays and cost overruns
- **Geographical challenges**: Remote locations only accessible via difficult terrain
- **Lack of access to reliable data:** Difficulty to access reliable data on generation and network infrastructures for grids targeted for RE projects
- **Institutional challenges:** EDH faces considerable technical, managerial, and financial challenges, leading to delays in implementation and significant off-taker risks for grid-connected RE projects
- **Limited Technical Capacity**: Lack of skilled labor at all levels from RE professionals to qualified technicians in rural areas. Difficulty attracting competent local and international companies to perform technical tasks.

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Program spotlight: Modern Energy Services for All

Who	MTPTC; WORLD BANK GROUP
What	Provide new or improved electricity services to 585,000 people (>50% women) in rural and peri-urban areas via financing & market development for off-grid solar companies; support strengthening regulatory framework
Where	Nationwide
When	2018 - present
Funding	CTF grant (USD $15.65 million)
Technology	Standalone solar and mini-grids

Source: Implementation Status & Results Report of the Modern Energy Services For All Project, April 2024

*see Annex X for summary of other key programs and initiatives

Successful Outcomes

As of October 2024, the project provided **269,992 people with new or improved electricity service** via standalone solar and mini-grid systems. Successful program elements include:

- Design and launch of the Off-Grid Electricity Fund (OGEF). **OGEF has provided financing to 8 off-grid solar energy companies**, all of which used the assistance to start and/or scale up their activities.
- **2.86 MW of solar PV capacity** installed, including solar home systems, solar lanterns, productive systems, and 3 meshed mini-grids for residential & productive uses in the agricultural zone of Artibonite
- USD $15.54 million of private and commercial financing leveraged through CTF funding

Challenges

- Remote, hard-to-reach locations resulting in **high distribution costs**
- **Initial budget for the OGEF fund** does not meet required capital investment
- **Challenges in leveraging local private sector financing** due to the lack of involvement of financial institutions in the off-grid industry
- Deterioration of purchasing power of potential customers
- Risk of **political interference** in the operations of the fund
- Political realities of Haiti **severely limit capacity to develop a clear regulatory framework** for municipal grids; project is not likely to achieve this objective
- Market spoilage by the penetration of **low quality products**. Only 86% of users report that systems are functioning according to the advertised performance.
- Lack of evidence on the energy access level provided by the off-grid systems deployed
- The program is significantly underperforming in its goal to create direct female jobs and female-headed micro enterprises.

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Program spotlight: Rural Electrification & Women Empowerment (ERAF)

Who	MTPTC, UNDP, ANARSE HAITI, Électricité d'Haïti
What	Solar PV mini-grid program, including support of women-led businesses and capacity building for community orgs with >40% women membership
Where	3 municipalities in the North-East department
When	2019 - 2023
Funding	Japanese Government grant (USD $5.49 million), UNDP grant (USD $816,000), GoH contribution (HTG 9,755,860)
Technology	Solar PV mini-grids

Successful Outcomes

The project built **3 mini-grids** for a cumulative **solar PV** capacity of **over 650 kW in three hard-to-reach municipalities of the North-East region** to provide electricity for the first time to close to 10,000 people. Successful program elements include:

- **Constructive collaboration** between government agencies, local authorities and private companies
- **Close coordination with regional branch of the Ministry of Public Works** for regular interventions to **maintain roads** in suitable condition to facilitate transport of equipment and materials from ports to construction sites
- **Capacity building program for 12 senior engineers** of government partners for the design and optimization of rural electrification
- **Capacity building program for 120 members of 30 grassroots community organizations** in the planning and development of community projects
- Secured USD $5 million grant from Caribbean Development Bank (CDB) for a **follow-on project to support the O&M phase of the mini-grids** (another USD 6.73 million contributed by GoH)

Challenges

- **Insecurity and public order issues**: Deteriorated security situation led to significant project delays and additional costs
- **Geographical challenges**: High logistical costs due to poor road infrastructure
- **Limited Technical Capacity**: Limited in-country skills and experience in development and operation of mini-grids
- **Data constraints:** Lack of reliable mini-grid operation data to support the design of a financial model for the new mini-grids fully financed by public funds.
- **Sustainable management risk**: Operation of the mini-grids not included in initial project scope; operators have yet to be recruited.

*see Annex X for summary of other key programs and initiatives

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Haiti’s future electrification plans

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Haiti's electrification vision and goals are captured in the **outdated** National Energy Sector Development Plan for 2007–17 (PNDSE), an Electricity Master Plan developed by the power utility in 2016 (but not officially endorsed), and the 2015 SREP Investment Plan.

What	PNDSE	Electricity Master Plan	SREP Investment Plan
Purpose	Provide policy makers with information to design appropriate policy and strategies to achieve sustainable development goals, including in the energy sector.	Establish plan to make EDH financially viable by gradually improving its technical, commercial, and financial performance and end subsidies from GoH.	A comprehensive program to initiate a transformation from the underdeveloped, unreliable, and expensive fossil fuel-based electricity generation mix to a modern and sustainable energy system relying on diverse sources of power.
Target areas	Countrywide	Countrywide	Countrywide with a focus on off-grid areas.
Technological Approach	Grid densification and extension	Grid extension with the promotion of LNG and renewable energy sources.	Use of renewable energy sources (mini-grids, standalone solar, and grid-connected RE)
Leading Agency	MTPTC (BME, EDH)	EDH	MTPTC
Implementation	Informed policies, strategies, and projects.	Informed policies, strategies, and projects	Informed the design and implementation of two projects led by MTPTC
Last published	2006	2017	2015

SREP: Scaling-Up Renewable Energy in Low Income Countries Program

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The National Regulatory Authority of the Energy Sector (ANARSE) is spearheading efforts to develop a new master plan to provide reliable electrification to 100% of Haitians with a lower carbon energy mix (solar, wind, biomass, hydro, geothermal and gas).

Objective	Publish a national plan for the development of Haiti's energy sector, which includes a new master plan for rural electrification.
Target areas	Countrywide
Approach	Leveraging a three-pronged approach: 1. Strengthening the metropolitan grid 2. Modernizing regional networks 3. Developing off-grid solutions
Leading Agency	ANARSE
Stakeholder Engagement	In cooperation with other stakeholders, including Energy Cell and UTE, the plan seeks to organize stakeholder contributions and feedback through working groups, as well as systematically collect and organize relevant data that will feed into the development of the strategic vision for this plan.
Last published	Under development

Source: ANARSE, direct communication, 2025

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Electricity Master Plan - EDH Financial Recovery Plan

TARGETS

Installation of 750 MW of additional generation capacity using renewable energy sources and LNG.

Development of homogeneous regional grids combining production and distribution networks to enable rural electrification and prepare a coherent electrical structure for an interconnected transmission grid.

An ambitious action plan is recommended to reduce technical and non-technical losses to 12% and 10% respectively.

The total investment required over the period of the plan (2016 - 2030) amounts to **US $2.432 billion**: US $232 million in distribution infrastructure and US $2.2 billion in generation.

Source: EDH Financial Recovery Plan, March 2017

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Least-cost geospatial analysis

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To support plans for operationalizing these targets, a **set of recommended approaches to universal electrification** was developed in 2024. The analysis identified unelectrified communities and suggested appropriate electrification modalities to provide service.

THE OBJECTIVE

To develop a least-cost approach to electricity access through 2035, including definition of technology type and assessing potential options for financing and procurement.

THE USE CASE

To inform relevant partners regarding optimized electrification options for universal access and creating a long-term national electrification strategy. Note that this plan is a modeling output based on a specific set of assumptions, *not* a government-endorsed roadmap.

Least cost geospatial analysis partners

Intended user

MTPTC

Contracting entity

THE WORLD BANK

Financing support

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Technical partners

IIT COMILLAS ICAI INSTITUTO DE INVESTIGACIÓN TECNOLÓGICA

we waya energy

tta Trama TecnoAmbiental

CASTALIA

illustreets

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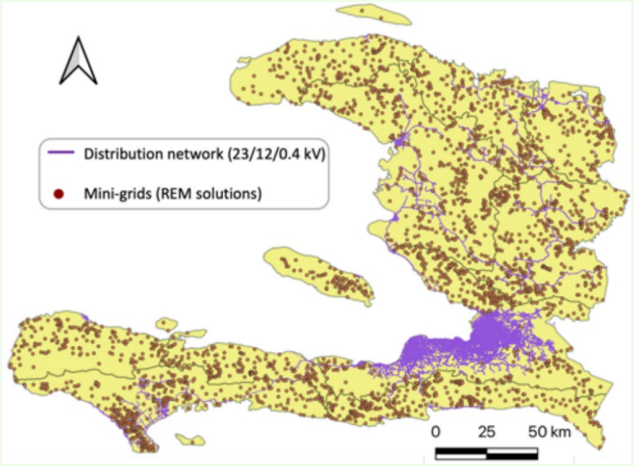
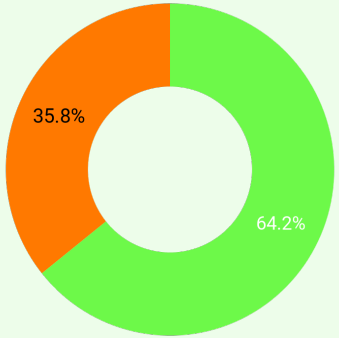
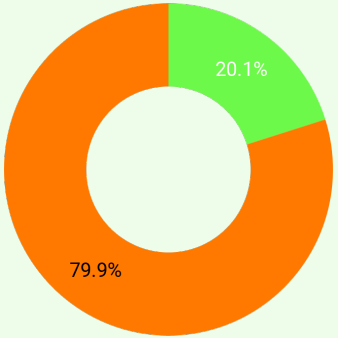
30% Grid Reliability Scenario: Under current grid reliability conditions, the plan recommends that all 1.27 million new connections to be made through mini-grids and standalone solar, at an estimated investment of USD $1.6 billion.



BREAKDOWN OF CLIENTS



TOTAL INVESTMENT



Mini grids
Standalone solar

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Least-cost plan for Haiti: funding needs by technology under 30% grid reliability

Note: Indicative costing is based on the reference scenario in the least cost plan, and makes several assumptions regarding the number and cost of connections. It is subject to revision based on adjusted scenarios and market price discovery.

Standalone

USD $320 million in investment to electrify 454,192 households:

- Investment per consumer is about USD $707.
- The cost of service is estimated at USD $1.22 /kWh.

Mini-grids

USD $1.27 billion in investment to electrify 817,512 households:

- Each mini-grid would have an average of 300 customers.
- Investments per consumer is about USD $1,555.
- The cost of service is estimated at USD $0.71/kWh.

Grid Extension

With current low grid reliability, estimated at 30%, grid extension **does not come out to be the least-cost option for any new unelectrified customer**.

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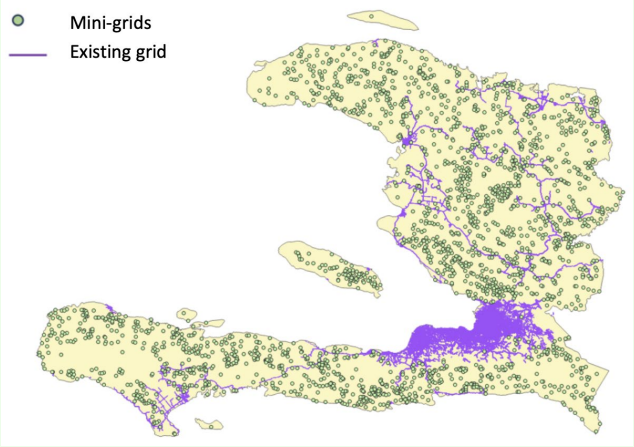
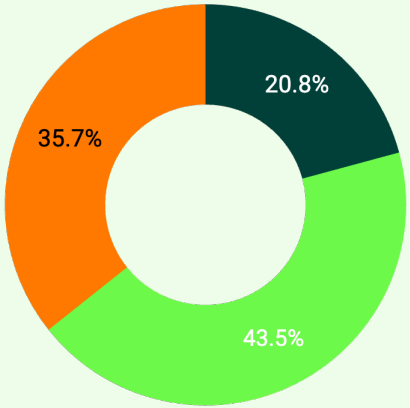
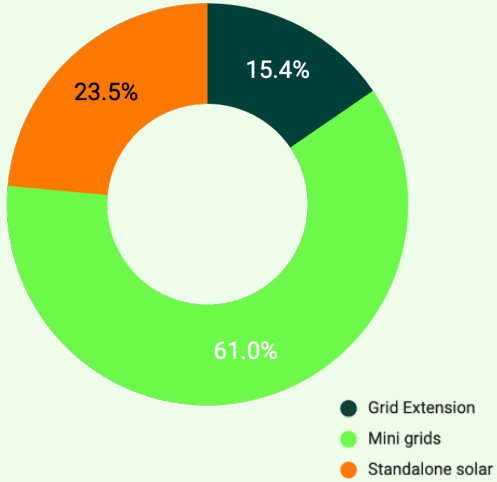
75% Grid Reliability Scenario: As grid reliability increases, it becomes economical to extend grid connections to unelectrified customers. Estimated investment goes down to $1.36 billion, without accounting for budget required to improve grid reliability.



BREAKDOWN OF CLIENTS



TOTAL INVESTMENT



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Least-cost plan for Haiti: funding needs by technology under 75% grid reliability

Note: Indicative costing is based on the reference scenario in the least cost plan, and makes several assumptions regarding the number and cost of connections. It is subject to revision based on adjusted scenarios and market price discovery.

Standalone

USD $320 million in investment to electrify 454,366 households:

- Investment per consumer is about USD $710.
- The cost of service is estimated at USD $1.2 /kWh.

Mini-grids

USD $830 million in investment to electrify 553,436 households:

- Each mini-grid would have an average of 240 customers.
- Investments per consumer is about USD $1,502.
- The cost of service is estimated at USD $0.73/kWh.

Grid Extension

USD $210 million in investment to electrify 264,622 households:

- Investments per customer is about USD $800.
- The cost of service is estimated at USD $0.75 /kWh.

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Key players in Haiti's electrification efforts

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Key Players: Government Partners for Mini-Grid and Standalone Solar Projects

Name	Description
MTPTC	The Ministry of Public Works, Transportation and Communications (Ministère des Travaux Publics, Transports et Communications; MTPTC) is the lead government agency for the energy sector in charge of energy sector policy, planning and development. Official oversight of energy access activities is handled by the offices of MTPTC mainly through the Energy Cell.
MEF	The Ministry of Economy and Finance (Ministère de l'Économie et des Finances; MEF) oversees the budgets of other ministries, agencies, and is charged with supervising other ministries' agreements with development partners.
ANARSE	The National Regulatory Authority of the Energy Sector (ANARSE), established by Presidential Decree on February 2016, has the mandate to promote the energy sector by regulating the production, operation, transmission, distribution, and marketing of electricity.
Energy Cell	MTPTC created the Energy Cell in 2012, to support energy sector development and oversee energy policy matters. Energy Cell is in charge of implementation of energy access projects and leads technical coordination with partners active in the sector.
OGEF - FDI	The Off-Grid Electricity Fund (OGEF) has been established in 2019 by MTPTC with support of World Bank to foster energy access expansion in off-grid areas. OGEF is co-managed by the Fonds de Développement Industrie (FDI) and Bamboo Capital Partners.
Regional and Local Governments	Regional and local governments facilitate local energy access projects, provide logistical support, and engage communities in the planning and management of energy services. Municipal governments are also responsible to identify needs and audit and report on households without access to electricity.

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Key Players: Development Partners for Mini-Grid and Standalone Solar Projects

Name	Description
WORLD BANK GROUP	The **World Bank** has financed multiple programs to improve electrification access via distributed rural energy (DRE). It has provided grants and technical assistance to support integration of RE to the grid and off-grid solutions, including solar home systems and mini-grids. Between 2018 and 2024, the World Bank provided over $60 million to support the development of distributed renewable energy projects aimed at expanding access to peri urban and rural areas, with a focus on solar energy systems in isolated regions.
IDB	The **IDB** has financed several energy projects in Haiti, focusing on enhancing electricity access, promoting renewable energy, and improving infrastructure. The ongoing AMACEH project is supporting the deployment of solar mini-grids in rural and peri urban areas. IDB Invest has provided loan financing to Sigora Haiti, one of the first private mini-grid developers in Haiti.
USAID NREL	**USAID** in collaboration with the National Renewable Energy Laboratory (NREL), is supporting initiatives to boost workforce skills, build strong regulatory frameworks, and deploy advanced renewable energy technologies. These initiatives aim to enhance local workforce capabilities and develop regulatory frameworks to improve energy access and reliability in Haiti.
Global Energy Alliance for People and Planet GEAPP	**GEAPP** has been supporting the development of a diverse, coordinated, and mature DRE sector in Haiti. GEAPP has been particularly focused on scaling the deployment of mesh grids in rural areas of the country and enhancing the income-generating potential of electrification by supporting the productive use of electricity.
PNUD	**UNDP** and the Haitian Government executed the Rural Electrification and Women's Empowerment (ERAF) project financed mainly by the Government of Japan. This project focused on providing reliable electricity to rural communities via mini-grids, thereby empowering women and supporting economic development.
CARIBBEAN DEVELOPMENT BANK	**CDB** approved in August 2024 a USD 5 million grant to improve electricity access in rural communities in Haiti. This project will support the operationalization of mini-grids built under the ERAF project.
Masdar مصدر	**Masdar**, the UAE's renewable energy company, is leading the development of a solar photovoltaic (PV) and battery hybrid mini-grid project in Dondon, Haiti as part of the UAE-Caribbean Renewable Energy Fund (UAE-CREF), a partnership between the Ministry of Foreign Affairs and International Cooperation (MoFAIC), the Abu Dhabi Fund for Development (ADFD), and Masdar.

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Key Players: Execution for Mini-Grid and Standalone Solar Projects

Name	Description
EarthSpark International	EarthSpark International (ESI) is operating 2 solar mini-grids in Haiti (Les Anglais with 580 connections and Tiburon with 346 connections). Under the PHARES program, ESI recently signed concession contracts with GoH for 6 sites covering more than 5,000 connections. ESI plans to develop 17 additional mini-grids in southern Haiti and has already secured financing from the Green Climate Fund - committed support up to a total of $9.9M.
Alina Enèji	Alina Enèji is a mesh grid developer established in 2021, implementing a pilot project in the Artibonite department using Okra Solar technology. Alina has reached over 3,500 connections and is expanding in the Artibonite and the North with financing support from OGEF, IDB Lab, and GEAPP. It plans to reach 8,500 connections in the mid term. Alina is also implementing an appliance financing pilot to support PUE and stimulate demand.
CEAC	CEAC (Coteaux District Electric Cooperative) is a cooperative managing a mini-grid in the South Department of Haiti providing electricity to 2040 connections in the 3 municipalities of the district. CEAC relies heavily on thermal generation (90% diesel vs 10% solar); its operations have been heavily impacted by the increase in fuel prices following the cancellation of subsidies in 2022. CEAC is seeking support to increase its share of PV generation.
SKDK	SKDK is a non-profit organization active in Carice since 2001 in education, energy, and community engagement. With funding from OIF, SKDK has built and is operating a mini-grid in the section of Bois Gamelle. SKDK has recently signed a concession contract with GoH to build and operate a mini-grid in Carice.
HER	Haiti Energies Renouvelables (HER) is a Haitian subsidiary created in 2014 by the French company VALOREM in partnership with the GLC group, a Haitian company. HER has been awarded concessions for two mini-grid sites. Negotiations are ongoing with GoH on the final terms of the concessions and subsidy financing.
Morgan Project	Developer formally selected via the PHARES program promoting a project to develop a micro utility in Tortuga Island to support productive use of energy in fisheries and agriculture with a vision to expand into a utility focusing on the North-West region.
Sigora	Sigora Haiti, a subsidiary of U.S.-based Sigora International, built its first mini-grid in Môle-Saint-Nicolas in northwestern Haiti in 2016 and has since expanded its operations to the municipalities of Bombardopolis, Jean Rabel and Savanne Mole, serving around 4,300 customers. Sigora secured a US$2.5 million investment from Electrifi in 2017 followed by a US$9.5 million investment from IDB Invest in 2019.

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Key Players: Execution for Mini-Grid and Standalone Solar Projects

Name	Description
ESG Group S.A. / EKOTEK	EKOTEK is a line of solar products distributed by ESG Group S.A., a Haitian company operating in Haiti and the Caribbean since 2003. ESG is one of the market leaders in Haiti supplying solar products, including lanterns and solar home systems meeting the internationally recognized VeraSol standard. ESG is among the off-grid solar companies who have received financing from OGEF in the forms of results-based-financing grants and working capital loans.
Palmis Enèji	Palmis Enèji is a Haitian company established in 2014 and stemmed out of a program launched by the French NGO Entrepreneur du Monde. Palmis Enèji provides both clean and modern lighting and cooking solutions via a network of over 180 distributors active in three regions in Haiti. Palmis Enèji has secured a grant and loan from OGEF in order to import more quality solar products into the Haitian market.
Solengy	Solengy is a Haitian company set up in 2007, which provides and installs integrated solar powered solutions for residential and C&I customers. It has developed in house a line of standard products assembled in Port au Prince. Solengy also launched a lease to own program in 2019 that increases the available market to those that cannot afford the upfront capital cost. Its customers include Heineken/Brana, Wingaz, Digicel, Hospital Medical Supply, Opti-Soins, and Montana Hotel. OGEF made a working capital loan to Solengy in August 2021.
Digital Kap	Digital Kap is a Haitian company set up in 2011, which provides solar products and installs integrated solar powered solutions to clients in Haiti. Digital Kap has recently expanded beyond Port au Prince, opening stores in Hinche and Cap-Haïtien with plans to open additional stores in the South region. In May 2022, OGEF has provided a loan to Digital Kap to accelerate its expansion plans.
Pigran Enèji	Pigran Enèji was established in March 2023 by the Institute of Science, Technology and Advanced Studies of Haiti (ISTEAH) to supply electricity via a mini-grid to the City of Knowledge and the population of Génipailler in the North of Haiti. The City of Knowledge is an initiative led by ISTEAH to foster an entrepreneurial ecosystem in northern Haiti by creating a hub for innovation and education. Pigran Enèji has recently signed a mini-grid concession contract with GoH under the PHARES program.
Haiti Green Solution	Haiti Green Solutions (HGS) was founded in 2019 with an initial focus on C&I and large residential installation segments. In 2022, HGS has entered into a partnership with ZOLA Electric and started the Zola Haiti project to distribute and finance quality and superior durability solar kits to low income households. HGS has received grants and a loan investment from OGEF.
Solar EPC	Several EPC companies provide and install integrated solar power solutions for residential and C&I customers in Haiti (e.g., Green Energy Solutions, LC Renewable, ELMECEN, ECEM, 121 Consulting, ENERSA, GENINOV, etc.)

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Key Players: Government Partners for Grid Extension Projects

Name	Description
EDH	EDH is the government-owned utility EDH and the main provider of electricity services in urban areas. It's the off-taker for IPP generation projects and leads procurement for grid extension projects.
Regional and Local Governments	Regional and local governments facilitate local energy access projects, provide logistical support, and engage communities in the planning and management of energy services. Municipal governments are also responsible to identify needs and audit and report on households without access to electricity.
MTPTC	The Ministry of Public Works, Transport, and Communications (MTPTC) is responsible for the overall planning, development, and management of Haiti's infrastructure, including the electricity grid. It acts as the main granting authority for energy-related projects, including those involving grid extension and Independent Power Producers (IPPs).
MEF	The Ministry of Economy and Finance (MEF) is responsible for allocating and managing funding from both the government and international donors to support energy infrastructure development. The ministry is also involved in evaluating the economic viability of energy projects and ensuring that these projects meet fiscal standards while remaining financially sustainable. MEF is sometimes involved as the authority responsible for granting concessions and ensuring the government will meet its financial obligations.
ANARSE	ANARSE is responsible for issuing operation rights[1] to energy operators, including IPPs and entities involved in grid extension projects. The agency has the mandate to set standards for service quality and reliability, to hold EDH and IPPs accountable for maintaining these standards, and to monitor the performance of energy operators to ensure compliance with contractual obligations and regulatory requirements. ANARSE also has to establish methodologies and processes to set, review and approve electricity tariffs.

[1] Operation rights cover all four energy segments: production, transportation, distribution, and marketing

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Key Players: Development Partners for Grid Extension Projects

Name	Description
WORLD BANK GROUP	Through various programs, the **World Bank** provided financial and technical assistance for Haiti's power sector in areas such as loss reduction, distribution grid rehabilitation and densification, and strengthening of the management and quality of services of EDH.
IDB Inter-American Development Bank	The **IDB** has supported the reform and transformation of Haiti's electricity sector through several investment operations in generation and T&D. Major operations include the rehabilitation of Peligre hydroelectric plant, rehabilitation of the Peligre transmission line, rehabilitation of the electricity distribution system in Port-au-Prince, and the integration of solar energy to the Caracol grid.
IFC International Finance Corporation WORLD BANK GROUP	**IFC** financed the 30 MW E-Power thermal plant commissioned in 2010, the first IFC infrastructure project in Haiti. IFC continues to explore opportunities to finance the development of on-grid and off-grid energy projects.
USAID	In 2019, USAID supported the Government of Haiti for the preparation and implementation of bidding processes to award concessions to private companies to modernize and expand three isolated grids currently managed by EDH. The processes were not conclusive.

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Key Players: Execution for Grid Extension Projects

Name	Description
E-POWER Un autre courant	Established in 2011, E-Power is an IPP that owns and operates a 30 MW HFO power plant selling electricity to EDH under a 15-year PPA. It's the first private-sector generation project in the country, selected on the basis of international tendering processes.
EPC companies	Local and international EPC companies will play a key role in the execution of grid extension projects both in generation and T&D.

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Risks and challenges for electrification in Haiti

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Cross-cutting Challenges (technology agnostic)

Regulatory & Institutional

Challenges	Key considerations going forward
• **The lack of a dedicated political institution** (a ministry, a commission, or a secretary) **for the energy sector** leaves MTPTC with too broad a scope of responsibility and hinders progress towards improving electricity access	• **Establish a ministry of energy** to provide clear leadership in the energy sector. This ministry should be responsible for **developing and aligning energy policies and projects** with national development goals. It would also **foster coordination** between the various stakeholders and **ensure continuity** from one administration to another.
• **Lack of a national electrification strategy or a comprehensive electrification plan** that specifies the integration of different access technologies	• Develop and officially adopt an **integrated electrification strategy/least-cost plan** that specifies universal access targets, implementation schedules, electrification modalities, and financing plans. This strategy should **leverage the existing least-cost geospatial analysis and other recent analytical work** to integrate grid, mini-grid, and standalone technologies.
• **Municipal and local authorities often lack the technical expertise, resources, and institutional capacity** to effectively plan, regulate, and manage energy projects.	• Provide **technical assistance directly to municipalities** to support with planning and governance responsibilities, as well as staffing needs.
• **High turnover of project implementation units and other government agencies** due to the energy crisis. This leads to a loss of institutional knowledge and disrupts the continuity of energy projects, resulting in delays and inefficiencies in project implementation. It also hinders long-term planning and sustainability of the energy sector.	• Establish a **staff retention strategy** adapted to the current context and work conditions. • Implement a **centralized knowledge repository** where key information, project documents, and institutional processes are stored and easily accessible to incoming staff to ensure continuity. • Create **capacity-building initiatives** and offer **regular training programs** to ensure that new hires are up-to-speed on ongoing projects and strategic objectives.
• **Lack of clarity on the process to secure land** for renewable energy and energy access projects.	• Provide technical support to the government to **define a regulatory process to facilitate land acquisition for energy projects** (incl. renewable and thermal generation, mini-grids). • Ensure that both **public and private sector players are well informed** of the regulation for land acquisition for energy projects and the institutional framework guiding the process.

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Cross-cutting Challenges (technology agnostic)

Economic (1/2)

Challenges	Key considerations going forward
• **Difficulty of doing business in Haiti** due to bureaucratic inefficiencies and limited adoption of modern technologies	• Create a **one-stop-shop for business registration and permits**. • **Simplify and standardize regulations for businesses** (e.g., reduce bureaucratic hurdles, consolidate permit and license application processes, and establish clear, streamlined guidelines for new businesses to follow). • Accelerate the **digitization of government services** related to business registration, licensing, and tax payments. • Adopt modern procurement methods (e-procurement) and e-signature for contracts.
• A weak financial system, high default risks, and political instability deter foreign and local investors. Financial institutions often **lack the capacity to provide long-term loans** for infrastructure projects, and there are **few mechanisms for businesses to raise equity**.	• Establish low-interest financing mechanisms through **government-backed credit lines and subsidies**. • Deploy **government or donor-backed risk mitigation tools** to help reduce perceived risks for national financial institutions. • **Streamline regulatory processes** and carry out awareness campaigns to increase market confidence, reduce financial barriers and support the growth of the energy sector.
• Investment in renewable energy projects is not attractive to many investors due to a **lack of fiscal incentives and customs clearance bottlenecks**, which extend project timelines and increase costs	• **Streamline the customs clearance process** by introducing faster and more transparent procedures, especially for renewable energy equipment. • Adopt **tax exemptions or reductions** (VAT, import duties) on key components for renewable energy and off-grid energy systems. • Provide **tax credits, subsidies, or other financial incentives** for companies that invest in renewable energy projects and off-grid systems.

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Cross-cutting Challenges (technology agnostic)

Economic (2/2)

Challenges	Key considerations going forward
• **Frequent devaluation of the gourde** increases the cost of imports, which are often priced in foreign currencies. In the past 5 years, the gourde has lost about 60% of its value against the U.S. dollar.	• Develop measures, such as **currency hedging or promotion or local investment**, to mitigate the impact of local currency devaluation on both project developers and consumers
• **Higher upfront cost** of renewable energy systems compared to traditional diesel-powered power plants	• Put into perspective the **drawbacks of Haiti's current dependency on diesel fuel,** namely having an electricity system that is unreliable and with little resilience, as well as spending a significant share of the national budget on fuel purchases. • Delineate **long-term gains from renewable energy systems,** including lower cost of electricity, increased energy autonomy, and improved reliability and resilience of the electricity grid.
• **Lack of affordable and accessible insurance** for infrastructure projects, due to Haiti's high risk profile.	• Collaborate with **international donors and development banks** to provide **grants or subsidies to cover part of the insurance costs**, making solar projects more financially feasible. • Establish **government-supported insurance schemes** or risk mitigation programs to lower premiums and provide coverage for renewable energy projects • **Foster partnerships between local insurers and international insurers** to create more accessible, customized coverage for renewable energy projects.

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Cross-cutting Challenges (technology agnostic)

Planning, Implementation & Operation

Challenges	Key considerations going forward
• **Frequent government transitions, weak institutional frameworks, gang violence, and political unrest disrupt** project planning and implementation. These conditions delay projects, create uncertainty for investors, and hinder the development of critical infrastructure. They are exacerbated by a lack of flexibility from funders to overcome these contextual challenges.	• Provide incentives, including **risk mitigation measures**, to promote private sector participation in the energy sector • Design robust programs that **minimize impact of public sector volatility** on projects • Consider that **project designs needs built-in flexibility** to account for potential delays, increases in costs, and other changes during implementation. • Promote **broader participation of local companies in project implementation** (e.g., as partners in a consortium or as subcontractors) to enable project activities to continue in cases where international companies cannot have missions in the country as expected • Strengthen **engagement with local communities and local authorities** throughout project development to minimize disruption. Community engagement should ideally be **led by the operators/developers**, particularly for mini-grids.
• **Haiti is often left behind** in favor of less challenging markets for energy access interventions in the LAC region and globally. Several programs initiated by multilateral institutions **haven't fully delivered on their objectives** due to challenges encountered with the country context.	• Develop initiatives to **promote targeted interventions for Haiti** and elevate the recommendations presented in this report. • Government should work with donors/development banks to design and implement **multiphase programs that foster multi-donor collaboration** and **divide complex projects** into a sequence of smaller operations. • Donors should set up or strengthen a **donor coordination platform** to ensure synergies. • A coordinated effort, such as the M300 campaign in Africa, would be transformational for Haiti.
• Sustainability of solar energy systems is limited by **lack of information, awareness, and gender-inclusive energy education**.	• Launch **national and local awareness campaigns** to inform the public about the environmental, economic, and social benefits of solar technology, as well as **behaviors to maximize its benefits**. • Establish **educational programs and workshops** that **specifically target women and girls** to encourage their participation in the solar energy sector.

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Standalone systems: Key Challenges

Technical & Operational

Challenges	Key considerations going forward
• Many target beneficiaries are in remote localities with **poor or no road access.**	• Subsidies and other financial support mechanisms must **account for high logistical and transportation costs** to reach remote communities, provider **greater support for the most difficult geographies**.
• **Limited internet and mobile coverage** in remote rural areas **hinders remote monitoring and payment models such as pay-as-you-go.**	• Promote an **integrated and synergetic** approach by combining energy projects with **mobile network and internet coverage expansion initiatives**. • Support alternative ways to handle payments and monitoring such as **hybrid systems combining the use of local agents and technology** or the use of **offline technologies such as SMS-based solutions** when feasible.
• **Lack of maintenance services** in remote regions can lead to early failure or malfunction of systems, resulting in poor reputation and mistrust of off-grid solar products	• Standalone solar companies should adopt **remote monitoring** to enable O&M support at limited cost where networks are available; when feasible, **partner with internet providers** to bolster network coverage. • Subsidies and other financing instruments should **include requirements for O&M and customer service support.** • Standalone solar distributors should **make sure end users are informed** enough to properly use their systems and to perform simple maintenance and troubleshooting tasks.
• Target communities have **few trained personnel or technicians** with the proper skills and experience to carry out technical and managerial tasks.	• Provide **training programs, train-the-trainer programs** and on-the-job training to the local pool of personnel. Leverage potential collaboration with **academic institutions and international partners** able to support with training programs in person or remotely. • Establish a **two-level maintenance system**: a local team for simple routines and easy-to-maintain equipment, and a specialized, centrally located service to handle complex issues across a district or a department. • Invest in supporting **professional trade schools and university programs** in rural areas. • Include opportunities for **internships and on-the job-training** for recent graduates and current students at **technical schools and universities** for donor-financed energy projects.

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Standalone systems: Key Challenges

Economic

Challenges	Key considerations going forward
• **Many rural households in Haiti face monetary poverty** that limits their ability to pay for electricity. Low income levels, combined with a **lack of access to regular employment and economic opportunities**, also result in **limited energy budgets** for these households. Urban households may face similar challenges to a lesser extent.	• Provide access to **smaller and more affordable solar home systems** that match the lower energy needs and consumption capacities of some rural households with the **possibility to upgrade** to higher tiers or service as their energy needs and ability to pay grow. • Promote the use of **energy-efficient appliances** to minimize consumption. • Provide **subsidies to reduce the initial cost** of solar systems for rural households, including targeted subsidies to the poorest households. • Work with **micro-finance institutions** to provide access to **credit for appliances**. • Promote access to **high-quality appliances** by following **internationally recognized standards**. This will reduce repair and replacement costs and maximize product lifespan.

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Standalone systems: Key Challenges

Planning, Regulatory & Monitoring

Challenges	Key considerations going forward
• **Lack of officially endorsed government plan or strategy for rural electrification** and off-grid energy access	• Government should publish a strategy with **clear, actionable goals for increasing rural and off-grid energy access** and provide long-term visibility for policy decisions and investment. • The rural electrification strategy should **clarify the long term role of programs such as OGEF and PHARES**. It should also limit changes to these programs' operational methods, as these methods took years to develop and are now understood and effectively implemented by both private and public stakeholders.
• **Lack of dedicated entity or funding mechanism** for rural electrification or promotion of off-grid solutions	• The government needs to **assign to an institution the specific mandate** to effectively address the country's significant energy access challenges, particularly in rural and underserved areas.
• The weak institutional capacity of EDH and limited investment in data systems leads to a **lack of accurate, reliable, and updated data on energy demand and consumer behavior**, impeding effective energy planning and service delivery. **EDH often does not report to the MTPTC** regarding its performance, although it is mandated to do so.	• Ensure **access to up-to-date and comprehensive data** related to energy needs, infrastructure, and demographics through a platform such as that developed for the **least-cost geospatial analysis**. • Collaborate with development partners, academic institutions, and research organizations and NGOs to **conduct joint data collection efforts** and **make the data available** to stakeholders.

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Mini-Grids: Key Challenges

Technical & Operational

Challenges	Key considerations going forward
• Building and operating mini-grids in remote areas presents significant challenges due to **logistical issues**, such as **transportation of equipment and materials** on sites, **access to spare parts**, and the **availability of technical expertise** locally.	• **Consider added costs resulting from logistical challenges when designing subsidy program** to scale up mini-grids • Leverage **collaboration with regional public authorities** to support with access road rehabilitation or construction and land preparation • Develop **technical training programs** to ensure availability of local labor
• **Limited internet and mobile coverage** in remote rural areas **hinders remote monitoring and payment models with smart metering or prepaid capabilities**	• Promote **integrated and synergetic approach** by combining energy projects with **mobile network and internet coverage expansion initiatives.** • Support alternative ways to handle payments and monitoring such as **hybrid systems combining the use of local agents and technology** or the use of **offline technologies such as SMS-based solutions** when feasible.
• **Limited access to reliable data on energy demand** leads to improperly dimensioned mini-grids	• **Facilitate access to results of recent ability and willingness to pay (WTP) studies** and expand the study to other areas as needed • **Integrate results of WTP studies and demand assessments into requirements for mini-grid design** while enabling **modular deployment** to meet potential increase in demand
• **Limited capacity of local companies,** including lack of technical expertise and limited experience managing complex infrastructure projects	• **Support local universities and trade schools** to equip technicians, engineers, and project developers with the technical expertise needed for the successful development, installation and operation of mini-grids.
• Lack of a clear plan for the **management, safe disposal and recycling of electrical waste**, posing environmental and health risks.	• Create a **comprehensive e-waste management plan.** • Develop **national regulations for proper disposal and recycling** of electrical equipment, aligned with international environmental and safety standards. • Launch **awareness campaigns** to educate the public and businesses about e-waste.

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Mini-Grids: Key Challenges

Economic

Challenges	Key considerations going forward
• There are several mini-grids in Haiti that are unoperational due to **lack of long-term O&M plans**.	• Ensure mini-grids are developed and built as part of projects and programs that **include both the construction and the operation phases**, ensuring long-term, sustainable management and operation. • **Avoid deployment of mini-grids as part of political or electoral initiatives** that do not prioritize long-term sustainability. • Identify and work with developers who can **take charge of O&M and payment collection for unoperational mini-grids**. • **Ensure a long-term strategy before building new projects.**
• **Many rural households in Haiti face monetary poverty** that limits their ability to pay for electricity. Low income levels, combined with a **lack of access to regular employment and economic opportunities**, also result in **limited energy budgets** for these households.	• Provide **financial support** to reduce the initial cost of connection. • Promote **flexible approach to meet the energy needs and consumption capacities of different types of consumers** with the possibility to upgrade to higher tiers or service as their energy needs and ability to pay grow. • Promote use of **energy-efficient appliances** that are affordable to end-users.
• **Low capacity utilization** can make it difficult to recoup investment in mini-grid installation and operation.	• Promote **productive use of energy** in areas served or to be served by mini-grids. • Provide or facilitate appliance financing for businesses and households. • Incentivize mini-grid developers to plan for PUE at the design stage of mini-grids.
• **High CAPEX and OPEX** limit the affordability and sustainability of energy projects	• Facilitate access to **subsidy and concessionary financing through programs such as PHARES and OGEF**. • Incentivize developers to develop **portfolio of projects** to take advantage of **economies of scale**.

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Mini-Grids: Key Challenges

Regulatory & Institutional

Challenges	Key considerations going forward
• **Lengthy and time-consuming process to award concessions or other** regulatory approvals for mini-grid projects	• **Streamline the process developed through PHARES** to accelerate approval and development of projects • **Simplify the approval process**, especially for smaller mini-grids with limited environmental impact. • Provide **technical assistance or capacity building** to non-energy stakeholders involved in the project approval process • **Finalize and enforce the mini-grid regulation** being developed by ANARSE
• **Mini-grid tariff scheme not clearly defined**	• The regulator should **adopt simple regulation for tariff approval and revision**. • Provide **technical assistance and capacity building** to the regulator.
• **Lack of provisions to address risks** such as arbitration, political force majeure, and main grid arrival	• Ensure mini-grid regulation or concession contracts are strengthened with **provisions covering arbitration, political risk, and compensation related to grid encroachment**.
• **Lack of coordination** amongst the different stakeholders, including ministries, municipal governments and other government agencies leads to inefficiencies in project planning and implementation, such as delays in customs clearance and land acquisition.	• Improve coordination through **open and transparent communication across stakeholders**, aligning efforts, and creating **centralized platforms** to consolidate all plans and data on existing infrastructure.
• **Lack of clear separation in the roles of key government agencies**. For example, the regulator and the ministry are both involved in energy project planning and execution.	• Ensure **clear definition and separation between the roles and responsibilities** of the ministry in charge of energy and the regulatory authority • Establish **formal mechanisms for collaboration** to streamline policy development and project implementation.

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Grid Extension: Key Challenges

Technical & Operational

Challenges	Key considerations going forward
• **Aging and damaged infrastructure, and no modern dispatching center** for real-time monitoring and control of electricity generation and distribution	• Plan the **repair, rehabilitation and upgrade** of existing electricity assets with **private sector participation** when possible • Design and install a **new and modern dispatching center**
• **EDH faces considerable technical and managerial challenges** such as high losses and difficulties paying for fuel, basic maintenance services, and other essential operating costs.	• **Support the reform of EDH** to address the technical and managerial challenges • Design a sustainable program to **promote private sector participation** in the management of grid infrastructures
• **Lack of qualified human resources** to support grid extension efforts	• Develop **training programs** for the staff required for grid expansion and operation • Design a **program to hire and retain competent staff**

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Grid Extensions: Key Challenges

Economic

Challenges	Key considerations going forward
• **EDH faces severe financial challenges**, including theft, billing & collection inefficiencies, and huge financial debt. Due to its current financial structures and inability to generate a positive cash flow, **EDH is unable to assume all its responsibilities as a national utility**. This makes electrification via grid extension impossible within the current system.	• **Reform** EDH financial management • Design and implement **loss reduction programs** • Promote an energy transition to reduce the dependence on fossil-fuel based electricity generation and **increase of the share of RE** • Take measures to **control costs** and **reduce overall operating expenses** • **Reduce payment arrears** by public institutions and other clients
• **Lack of investment** in grid infrastructure	• **Promote public and private investment** in grid infrastructure. One potential approach is to concession out existing regional grid infrastructure using a **build-own-operate-transfer (BOOT) model**.

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Grid Extensions: Key Challenges

Regulatory & Institutional

Challenges	Key considerations going forward
• **Lack of a clear regulatory framework** for EDH and grid operations	• ANARSE needs to **define and enforce** a clear regulatory framework for EDH and other grid operators.
• **Excessive bureaucracy** and political interference	• Promote measures to **limit political influence** in the management and operation of EDH • **Streamline the procurement process** to develop and implement grid infrastructure projects

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Annex: Other relevant programs (including future & early-stage)

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Program spotlight: Haitian Program for Access to Solar Energy for Rural Communities (PHARES)

Who	MTPTC · WORLD BANK GROUP · IDB
What	Umbrella program to increase access to RE mini-grids, developed and operated by private sector operators.
Where	Nationwide with focus on rural and peri-urban areas
When	2020 - present
Funding	Launched with support of IDB via AMACEH and WB via Renewable Energy for All
Technology	Renewable energy mini-grids

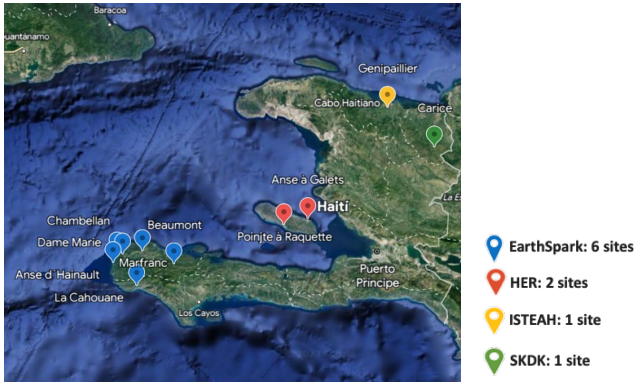
Source: Energy Cell, MTPTC

Key Results

PHARES
Programme Haïtien d'Accès des communautés Rurales à l'Energie Solaire

As of September 2024, **10 mini-grid concessions** had been awarded via PHARES for an **expected total of 10,000 connections**. Key results achieved include:

- More than **35 interested international and local developers** registered via the program's official platform (Odyssey)
- Two rounds of proposals completed, for a total of ~30,500 potential connections:
  - First round: proposals submitted by **6 developers** for a total of **37 sites**
  - Second round: proposals submitted by **4 developers** for a total of **6 sites**
- Over **5 MW** of cumulative PV generation capacity for the 10 concessions awarded
- Budget allocated for **subsidy** provided by PHARES



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Program spotlight: Improving Electricity Access in Haiti (AMACEH)

Who	MTPTC, IDB
What	Increase reliable electricity access that promotes economic development in Haiti; Promote PUE in agriculture; Strengthen the sector's governance
Where	Nationwide
When	2019 - present
Funding	IDB grant (USD $31.5 million), USAID grant (USD $6.5 million)
Technology	Grid-connected distributed RE RE mini-grids

Source: Proposal for non reimbursable financing for the project Improving Electricity Access in Haiti, November 2019

*see Annex X for summary of other key programs and initiatives

Successful Outcomes

The project will build the **first grid-connected solar PV system in Haiti** to foster the sustainable operation of **Caracol Industrial Park**. Successful program elements include:

- Selection of an EPC company to design, build, and operate a 13.4-MW solar power plant with 10-MWh battery storage.
- Concessions signed and subsidy committed for 4 mini-grid sites.
- The project leverages and promotes **donor coordination** in the energy sector.
- Capacity building and technical assistance provided to ANARSE and other government agencies.

Challenges

- **Difficulty attracting the participation of international companies** in tender processes due to risks associated with gang activities and deteriorated security situation. This also leads to offers of low quality.
- RE infrastructure **insurance coverage unavailable or very expensive**
- **Lack of experience** of implementing agencies with grid-connected solar PV project of the size financed by AMACEH
- Project **requires significant coordination** between a large number of government agencies involved in project implementation (MEF, MTPTC, ANARSE, Energy Cell, UTE, MDE)
- **Security challenges** exacerbated the gap in implementation capacity and the lack of coordination
- ANARSE is a new regulatory agency with **no prior experience regulating mini-grid and grid operators.** Among other gaps, there was no clear regulatory path for approval of concessions.
- **Limited in-country skills and experience** in deployment of large scale RE energy projects and development and operation of mini-grids

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Program spotlight: Haiti Rural Electrification Project (HREP)

Who	MTPTC, ANARSE HAITI, Masdar A MUBADALA COMPANY
What	Solar PV system to supply the Dondon mini-grid, which has an existing distribution network built by EDH.
Where	Dondon, Nord department
When	2019 - present
Funding	UAE-Caribbean Renewable Energy Fund (UAE-CREF) grant (USD $2.3 million).
Technology	RE energy mini-grid (785 kWp solar PV with 600 kVA/1151 kWh battery)

Successful Outcomes

The project was awarded an EPC contract for a **solar PV generation system to supply ~2,500 clients with reliable electricity in the town of Dondon**. Construction is expected to be completed in **Q2 2025**. Successful program elements include:

- **Knowledge transfer on solar PV project design and procurement** from the Masdar[1] team to the Energy Cell and ANARSE staff
- **Interagency collaboration** leveraging the strengths of the different agencies (EDH expertise in distribution grids, Energy Cell expertise in project management)
- **Lessons learned from other regional projects** financed by UAE-CREF in areas such as equipment sourcing are transferred by the Masdar team into the Haiti project.
- **On-the-job training and capacity building opportunities** for the local workforce.

Challenges

- **Insecurity and public order issues**: The deteriorated security situation led to project delays and added costs
- **Logistical challenges**: Customs clearance bottlenecks and poor road infrastructure, particularly near the construction site, led to transportation and construction delays.
- **Limited Technical Capacity**: Limited availability of skilled labor in the project area.
- **Sustainable management risk**: Operation of the mini-grid not included in the scope of the project.

[1]UAE's global renewable energy company

*see Annex X for summary of other key programs and initiatives