



EarthSpark International: Project lessons and outcomes

Grantee:

EarthSpark International is a non-profit organisation that works to build clean, just energy systems and businesses that empower communities in Haiti and around the world. With their Haitian social enterprise, Enèji Pwòp, they build community scale microgrids and other solutions for energy access in Haiti.

Project:

EarthSpark received a grant from the GSMA Mobile for Humanitarian Innovation Fund to build two affordable solar microgrid systems in climate vulnerable communities in rural Haiti. Following regulatory issues and an earthquake in August 2021, the project pivoted to focus on supporting existing microgrids in Les Anglais and Tiburon. A distributed solar energy

storage system was also deployed to ensure resilient energy services to a health clinic and telco tower in the immediate aftermath of the earthquake and in the long term.

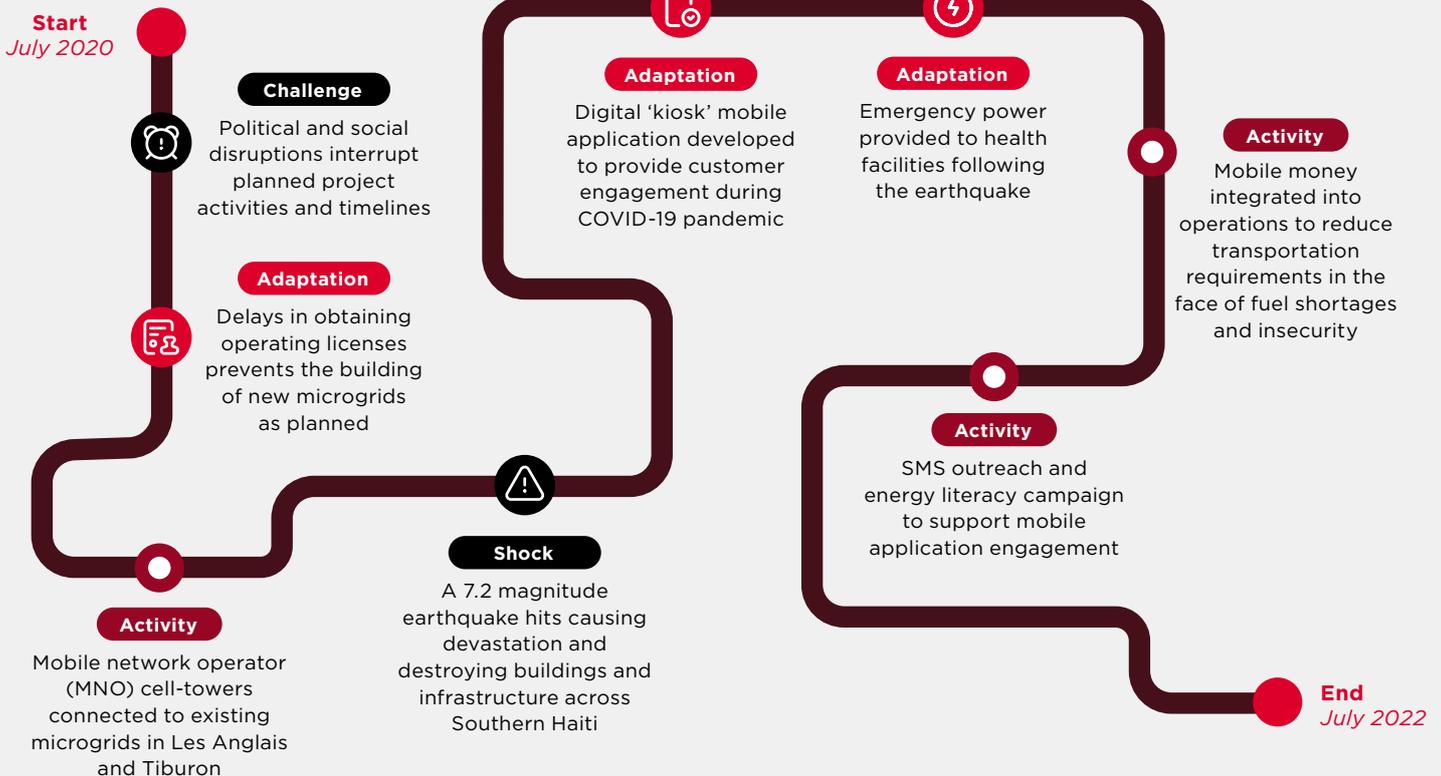
Grant details:

- July 2020 to April 2022
- Mobile for Humanitarian Innovation Fund grant of £300,000

Partners:

Digicel as technical partner for MonCash mobile money integration, SMS outreach and as key microgrid customer. Natcom as key microgrid customer. S2TEL as technical partner for digital kiosk app development.

Grant timeline: Key project events



Activity
Mobile network operator (MNO) cell-towers connected to existing microgrids in Les Anglais and Tiburon

Project background

With the majority of Haiti's rural population experiencing energy poverty, underserved communities are continuously exposed to vulnerabilities that threaten their resilience. Haiti's climate amplifies the nation's sociopolitical and environmental crises, creating and intensifying humanitarian events and internal displacement. Sustainable energy access sits at the nexus of many development pain points. Reliable energy systems can create economic opportunities and help prevent the displacement of communities. The GSMA funded project initially set out to build two new solar microgrids to provide clean, reliable, and affordable power for households and businesses in communities in Southern Haiti. By improving energy access and helping people learn about their energy consumption through energy literacy campaigns, the project also aimed to learn more about how clean energy can mitigate the risk of displacement due to climate shocks.

Project timeline details



Political and social unrest interrupt project activities

Haiti experienced a series of political and social disruptions during the grant period, including the assassination of the Haitian President in July 2021 and an earthquake in August 2021. Ongoing national protests, diesel shortages, increased gang activity and administrative delays all impacted the project's planned activities. Interrupted supply chains and disrupted logistics for procurement of project equipment caused planning complications, raised costs and delayed timelines for key project activities. This made Haiti an increasingly challenging environment to work in, increasing the need for EarthSpark to be adaptive and flexible in their planning.



Delayed operating licences for new grids

The project initially planned to build two new microgrid systems in addition to existing EarthSpark grids in Haiti. EarthSpark's operating microgrids were the first community-power grids to be approved under Haiti's new national regulatory body for the energy sector. The two planned microgrids required the approval of two new licences, however various factors resulted in protracted delays. When it became apparent that both new licenses might not be approved within the planned project period, EarthSpark and the GSMA agreed to shift funding to expand and strengthen the existing microgrids instead.



MNO cell-towers added to existing microgrids

As part of the new plan to expand and enhance the services of their existing microgrids, EarthSpark worked with two Haitian MNOs, Digicel and Natcom, to add their cell-towers to the solar grids in Les Anglais and Tiburon. Connecting and signing contracts with Digicel and Natcom provided EarthSpark with a new revenue stream, helping to improve the financial viability of the microgrids overall. The connections also improved the reliability of the MNOs as their cell-towers no longer relied on diesel generators and complicated fuel supply chains.



August 2021 earthquake

In August 2021 a 7.2 magnitude earthquake hit Southern Haiti causing widespread devastation. Thousands of people lost their lives and tens of thousands lost their homes and livelihoods. In the aftermath of the earthquake, vital community services and communication infrastructure became increasingly limited as damaged facilities were unable to source fuel for their backup electricity generators. The resulting loss of power caused severe difficulties for local services, including health clinics and hospitals, which were already struggling to meet the urgent needs of their communities.



Emergency power provided to health facilities

Following the earthquake, a health dispensary in Tiburon and a hospital in Les Anglais reached out to EarthSpark asking if they could help provide them with emergency power. Fortunately, EarthSpark’s microgrids in Tiburon and Les Anglais were able to continue delivering energy after the crisis. EarthSpark was able to connect the hospital to their existing microgrid in Les Anglais and installed a distributed solar battery storage system at the health dispensary in Tiburon to provide on-site power to their clinic. This enabled both facilities to continue providing lifesaving services to their communities.



Enèji Pwòp ‘kiosk’ mobile application

EarthSpark had initially planned to provide customer support, engagement, and energy literacy through traditional physical information kiosks. However, as concerns rose over the transmission of COVID-19, the team decided to change their approach to reduce the need for physical contact. EarthSpark worked with Haitian technical partner S2TEL to replace the traditional kiosks with a digital kiosk mobile application. The app enabled Enèji Pwòp customers with smartphones to have greater visibility and understanding of their electricity consumption and transactions. It also provided other customer support services while adhering to and promoting relevant social distancing protocols.



Mobile money integrated as microgrid payment option

Mobile money was seen as another opportunity to reduce personal contact and contact with cash in response to the COVID-19 pandemic. The project team worked closely with Digicel using their external expertise to help incorporate MonCash mobile money payments into their systems. Existing microgrid customers are now able to buy electricity credits through their smartphone, while Enèji Pwòp management can also pay their employees using the mobile money platform.



SMS outreach and energy literacy campaign

One challenge with the digital kiosk was the limited ownership of smartphones among the population in rural Haiti which meant not all Enèji Pwòp customers were able to access the app. The team supplemented the app with an SMS campaign paired with additional information available in print locally and on the Enèji Pwòp website to help build the capacity of customers without smartphones. EarthSpark again worked with Digicel to utilise their SMS outreach platform to conduct an energy literacy campaign focused on improving electricity safety, building awareness of energy efficiency, and promoting the new MonCash mobile money solution.

End of the grant

Although building two new microgrid systems was not possible, following their project pivot EarthSpark was able to achieve the following activities during the grant period:



3 MNO cell-towers

added to existing microgrids



2 health facilities

provided with ongoing power following the earthquake



200

new households and small businesses connected to the existing microgrids



2 new Telco customer contracts

signed with Digicel Haiti and Natcom



3,000

Enèji Pwòp customers received energy literacy SMS

Project outcomes and lessons



Outcome

Improved ongoing energy access for households and businesses

During the project EarthSpark expanded its existing microgrid services to an additional 200 households and small businesses in Les Anglais and Tiburon, providing clean and reliable energy to roughly 1,000 additional people. A satisfaction survey found that 76% of customers reported that their energy expenses decreased after joining the grids. Additionally, 93% of households felt that Enèji Pwòp was good or average value for money. Customers also indicated that they received a good quality service, with 90% reporting that Enèji Pwòp was able to meet their needs and 89% reporting little or no impact of blackouts on their businesses since joining the grids. By the end of the project EarthSpark also reported that they had an active waiting list of additional households and businesses wanting to be connected to their grids.

Outcome

Microgrids can make a tangible contribution to community resilience

The microgrids proved to be resilient following the 7.2 magnitude earthquake. The earthquake did not damage either system, and while the microgrid in Les Anglais was switched off for three hours to run safety checks the microgrid in Tiburon stayed active throughout. Communities in other regions were without power for several months to nearly a year, which emphasised how local, solar-powered microgrids can often better withstand natural disasters, fuel crises, and other challenges. By providing reliable energy to the cell-towers, EarthSpark enabled vital communication for the response efforts in the aftermath of the earthquake. By reacting to the immediate needs of the community, they were also able to provide emergency power to health facilities, enabling the continuation of life-saving services. The project made a tangible contribution to improving the resiliency of the communities as a whole by supporting critical healthcare and telecommunications services with reliable power and helping them move away from dependence on unreliable fuel supply chains.

"It's one of the best things to be able to work with a calm and serene mind. After hurricane Matthew the hospital had challenges that affected the quality of service... but today there is no more stress with Enèji Pwòp's 24/7 electricity service for the hospital, I couldn't be more delighted."

**- S-C. Jearmil Human Resources Manager,
Les Anglais Hospital and Health Center**

Outcome

Proof of concept for distributed solar storage solutions

EarthSpark installed a 16.2kWp/77kWh solar battery storage system directly on the Tiburon health clinic to provide microgrid-connected, on-site power. This allows the system at the health facility to switch into 'island mode' to continue powering the clinic as well as the neighbouring telecommunications tower as an emergency backup option. This was the first time EarthSpark had ever installed a 'distributed solar+storage' system, also called a 'Distributed Energy Resource' (DER) on one of its microgrids. Installing the DER at the Tiburon health facility provided proof of concept that distributed solar+storage solutions can be beneficially integrated in a larger microgrid. EarthSpark now considers DER solutions to be a key consideration in microgrid design, especially when they might need additional resiliency by 'islanding' for critical services such as telecommunications and healthcare.

Lesson

Improved financial viability for the microgrid model

The Les Anglais and Tiburon communities are located in some of the poorest rural communes in Haiti, creating a less secure financial model for building new microgrids. During the project EarthSpark was able to connect a total of three cell-towers of the national MNOs Digicel and Natcom across the microgrids. The addition of these customers improved the financial viability of the microgrid model. EarthSpark has since reported that revenue from MNOs now accounts for more than 20% of total grid revenues. By taking on larger and stable new customers Enèji Pwòp has not only improved the reliability of the telecommunications services to the local communities, but also improved the financial viability of the microgrid model moving forward.

Lesson

Use of mobile money is still limited among Enèji Pwòp customers

A survey of Enèji Pwòp customers however revealed that only 9% of households used MonCash to pay for the electricity service. The survey found that customers prefer to use cash. Many were not familiar with MonCash and others found it too complicated to use. One key challenge identified was customers entering the wrong information when trying to use the service which prevented their transactions from processing properly. EarthSpark responded to this by encouraging Enèji Pwòp staff to reach out to customers to help teach them the correct process. Once future grids create a minimum quantity of customers, Enèji Pwòp will be eligible for an easier, streamlined process that the team believes will lead to greater use of mobile money for service payments.

Conclusion

Adapting the project from developing new grids to expanding service in existing grids and deploying distributed solutions allowed the project to avoid difficult regulatory barriers and work within their existing operating licenses. Being flexible and responsive to the needs of the communities and tailoring specific solutions to support recovery and resiliency improved the impact of the project. This in turn helped the project to demonstrate the willingness of bigger businesses to pay for reliable microgrid electricity and has enhanced the model's financial viability. The overall process has yielded valuable technical learnings on the design and deployment of microgrid systems. With this experience, the project team has incorporated these new learnings into planning for future grids.



“Our collaboration with Enèji Pwòp totally improved the quality of service in the Les Anglais region, especially in the city centre”

- C. Anglade, Technical Director, Natcom

“Ultimately the microgrid service reduced [Digicel's] power incident callouts to site and minimised perennial fuel theft and improved the power availability.”

- G. Collins, Manager, Digicel Group

What's next for EarthSpark

Since the end of the grant, the EarthSpark team has continued to work proactively to refine their microgrid model as well as replicate it where possible. The new connections added as part of the GSMA project are still connected and actively consuming electricity from the microgrids. The DER solution deployed for the healthcare clinic in Tiburon has also continued to provide stable and reliable power, even in the rare occasions when the broader grid in Tiburon has lost power.

Based on the wider learnings from the project EarthSpark has been able to design a new research and development project, building software systems to manage distributed solar+storage throughout their future 100% renewable microgrids in Haiti. The team is now close to signing concessions with the Haitian government for not two but six new grids under the government's microgrid approval process.

Following the success of the model in Haiti EarthSpark worked with SunGate Solar in South Sudan to help set up and pilot the country's first community solar microgrid system. This new microgrid is now serving 131 small businesses and providing improved energy access to 500 community members in Wanyok, Northern South Sudan. This not only proves the replicability of their overall approach to developing solar microgrids but also demonstrates EarthSpark's ability to implement their solutions outside of the Haitian market.

Data sources

- GSMA grant reporting documents
- External Monitoring, Evaluation & Learning Report by The Research People
- EarthSpark Customer Satisfaction Survey conducted between February and June 2021 covering 59 households in Les Anglais and Tiburon who had been connected to the respective micro-grids for more than six months