PREPARING OUTER ISLAND SUSTAINABLE ELECTRICITY DEVELOPMENT PROJECT (POISED) IN THE MALDIVES

CASE STUDY - DECEMBER 2019

DEVELOPMENT CONTEXT

Although Maldives has universal energy access, in 2014 over 98 percent of its 141 MW installed capacity came from fossil fuels. At that time, the government spent over $555 million, or 20 percent of the GDP in diesel fuel imports. As a result of the overreliance on fossil fuels, the country was extremely vulnerable to global fuel hikes and had one of the highest electricity prices in South Asia.

POISED PROJECT

The 'Preparing Outer Island Sustainable Electricity Development Project' (POISED) was designed to help the Maldives shift toward greater energy self-sufficiency and minimize emissions and exposure to global petroleum price volatility. It aims to facilitate the installation of solar-PV-battery diesel hybrid systems, meeting up to 30 percent of the daytime peak load demand in about 160 medium and small outer islands with approximately 21 MW in total solar power capacity and an annual electricity output of 27.6 GWh. This includes installing energy management and control systems, increasing energy storage capacity, and improving distribution networks in all project locations. POISED includes battery systems and storage to support the solar intermittency.

POISED was declared effective in 2015, and is expected to be completed in December 2020. The solar-PV-battery diesel hybrid systems that POISED is promoting, are expected to displace a large portion of diesel used in generator sets. The project is expected to improve the quality of life of island communities with benefits, such as less noise and better air quality through the use of renewable energy and more efficient diesel generator systems, employment opportunities during project construction, microenterprise development opportunities through productive energy use, and the eventual reduction of electricity rates as a result of diesel savings.

There are two main power utilities in Maldives FENAKA and STELCO, responsible for electricity generation and distribution. FENAKA operates in 150 islands and serves about 40 percent of the population. Most POISED components are under implementation in outer islands serviced by FENAKA. POISED is also geared to improve the financial management, asset mapping, Energy Resource Planning systems and financial sustainability of these two utility companies.

DELIVERY CHALLENGES AND SOLUTIONS

As the program was under implementation, three key delivery challenges presented, becoming limiting factors for the project's success. The Project Management Unit (PMU) and Asian Development Bank (ADB) were able to find solutions and adjust project implementation in order to overcome these challenges.

Reticence towards Renewable Energy: Prior to the POISED project implementation, there had been some previous experiences within the renewable energy sector in the Maldives that raised some reticence towards the implementation of a new renewable energy project. ADB, together with funding from other agencies, such as JICA or World Bank, supported pilot renewable energy projects in the Maldives, which helped improve the local population and government's perception of renewable energy. Additionally, the POISED project also supported other awareness-raising initiatives on renewable energy and field demonstrations to explain the benefits of renewable energy, show proof of concept, and raise awareness about solar-PV-battery diesel hybrid systems.

PREPARING OUTER ISLAND SUSTAINABLE ELECTRICITY DEVELOPMENT PROJECT (POISED)

PROJECT COST
$129 million

FUNDERS
CIF, ADB, EU, EIB, JFJCM

IMPLEMENTING AGENCY
Ministry of Environment, Government of Maldives

PROJECT DURATION
2015-2020

COUNTRY SERVED
The Republic of Maldives

Constraints in Finance: POISED represented an unprecedented effort to mobilize nearly $129 million (through a concessional combination of grant and loans) to help develop a program that could meaningfully address the issue of fossil fuel imports for electricity generation, while making a financially-sound case for renewable energy. While the project was under implementation, one loan of US$10 million did not materialize, as it was re-allocated for other national priorities, and a US$50 million loan was put on hold for over a year. To overcome this challenge, the PMU managed to find new funding resources, which were mobilized to cover for these loans, including additional finance from the ADB and a grant from the European Union. The PMU showed flexibility in project design and adaptive management to ensure project implementation is shielded from situations that could compromise effectiveness.

Limited knowledge and Capacity: There was limited local knowledge among foreign contractors hired to install the solar-PV-battery diesel hybrid and limited technical capacity among local operators hired to maintain them. Foreign contractors won project's international competitive bidding, based on technical and financial criteria. Although these contractors partnered with local sub-contractors, there were cases of unfamiliarity with the local context, such as logistics and geographical constraints of bringing all installation materials to the outer islands and language barriers.

Also, operators hired in the outer islands to maintain the new solar-PV-battery diesel hybrid systems installed during the first phase of POISED indicated the need for additional hands-on training to operate the grid. Once flagged, the PMU offered more comprehensive training and used the experience to strengthen operator training in subsequent phases of the project. The PMU and FENAKA offered a three-day hands-on training course in the local language for operators. And building upon this success, a more comprehensive training program was developed while all the signals and instructions were translated into English for easier management and problem solving.

ACHIEVEMENTS

While it is still underway, POISED has already proven to be a successful pioneer experience in Maldives. Not only has it achieved fuel savings of up to 28 percent (in the first phase of islands) where new solar-PV-battery diesel hybrid systems have been installed, but also it has generated important lessons on recognizing and overcoming implementation challenges with speed and flexibility.

The POISED project is the first large-scale solar PV initiative— and largest energy sector intervention in the Maldives —in the outer islands, and a proof of concept that investing in renewable energy is financially sound. The project also shows how investing in renewable energy can help Maldives move away from fossil fuels and secure a sustainable future, while helping de-risk renewable energy investments.

CONCLUSIONS AND LESSONS LEARNT

The POISED project is an example of an unprecedented effort in the Maldives to reduce specific diesel consumption and mobilize financing for renewable energy investments and energy efficiency. It was undertaken in challenging circumstances over 2015-2020 and has demonstrated significant progress despite the adversities it encountered. The POISED project and the Maldives' SREP Investment Plan, demonstrate the economic feasibility and growth potential of solar PV systems. These experiences and challenges offer lessons for the installation of solar-PV-battery diesel hybrid systems in other countries, especially for small island countries. Key lessons drawn from the project include:

- **Having a phased approach improves project performance.** This allowed the PMU to identify problems, learn from them and adjust project planning for the next phases.
- **Adaptative project management and a proactive approach to implementation solutions are critical.** By being adaptive and proactive, the PMU were able to quickly recognize challenges, finding solutions and adapting them as needed.
- **Tailored and hands on capacity building is crucial for the project success.** Operator training should be hands-on to foster problem solving and should be conducted on site and in the local language.
- **Securing funding.** It is important to put in place strong loan agreements to ensure that ready projects are not delayed due to lack of available financing.
- **Logistics in small island developing states should be thoroughly planned.** Foreign contractors should have a good understanding of the local context, and to the extent possible, partner with local companies to provide assistance on logistics.
- **Processes should be bundled.** In order to avoid delays, a turnkey contractor should perform tasks related to solar and energy storage installation as well as grid rehabilitation and connection.

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