

Koh Jik ReCharge

Project Factsheet



Koh Jik is a peaceful fisherman's village located off the east coast of Thailand. A short 40-minute boat ride takes visitors to the island, home to 400 inhabitants known for their strong community spirit. Rarely visited by tourists, the island offers a scene and experience unlike any other. The island has no connection to Thailand's main grid, -- a truly off-grid community -- but is electrified by their own micro-grid powered by renewable energy.

ReCharge Project

Koh Jik community has been fully reliant on their micro-grid system to provide electricity access for the past 14 years. The system is getting old and critical system components, such as the batteries, are coming to their end of life. Without action, the community is gradually losing reliable 24/7 access to electricity and is increasing the use of unsustainable diesel to meet their daily energy needs.

The ReCharge project aims to restore and improve the system on Koh Jik by replacing existing failing lead acid batteries with lithium-ion packs, in addition to implementing an automatic control system and network connected digital meters.

ReCharge is a one year project starting from June 2018. The project is implemented by 2nd year students as part of

Objectives:

- Re-design and optimize the system for suitable renewable energy share
- Deployment of state-of-the-art technologies and automatic control systems
- Implementation of tariff and payment system to ensure long term financial sustainability

the European Institute of Innovation & Technology (EIT) master's programme.

The project is currently seeking project partners to finance the upgrade of the system. The total project cost is estimated to be between 200 000 – 250 000 USD and the project is open to grant funding and/or financing from private companies.

Koh Jik History

Koh Jik once used to be a lively trading hub for small-medium sized fishing boats sailing the Gulf of Thailand. The people of Koh Jik live in the tradition of a local fisherman's village. It now receives occasional tourists who seek to escape the chaos of Bangkok.

The island is situated in Chanthaburi Province, Thailand and has a land area of approximately 1.12 km².

Location: <https://goo.gl/maps/6dCjpsxxNr32>

Project Background

Koh Jik is only a few kilometers away from the nearest mainland but no grid connection was ever installed, mainly due to the lack of financial feasibility for the utility to invest in the cables to deliver power to 400 people. This is the fate of many dozens of islands in Thailand and would have been the same for Koh Jik if not for the micro-grid that was installed to electrify the island in 2004.

A 10 million Thai Baht (THB), or approx. 310 000 USD, grant was given by the Ministry of Energy to a consortium of Thai universities to build a micro-grid with 7.5 kW PV, 10 kW wind, 50 kW diesel generation and 302 kWh battery storage. It was one of the first electrification pilot projects that employed renewables. The system received a major upgrade in 2014 that saw 40 kW of PV added to accommodate for growth of electricity demand.

Current Status

The main components of the current micro-grid consist of:

Component	Size	Status
Solar PV	40 kW	Operational
Lead-acid Batteries	240 kWh	Degraded
Diesel Generator	50 kW	Degraded
Wind Turbine	10 kW	Not Operational
Automatic Control System	-	Not Operational

The system was designed so that daytime load (~10 kW) is met by PV, diesel generator covers evening peak demand (~20 kW) from 6pm-10pm, leaving the rest of the night to be supplied by batteries. Due to degraded lead-acid batteries, the island now goes dark from 3am-5am.

Since the micro-grid has been in place for a long time, the inhabitants have adapted to using power and have a stable consumption profile. The main electrical appliances that can be found on this island are: fans, lighting, refrigerators, radio and water pumps. To prevent overloading the system, the community agrees on prohibiting the use of air conditioning in all buildings/houses even though temperature can reach 35-40°C.

A unique element of the Koh Jik micro-grid is that it is fully community operated and maintained since its installation. Koh Jik Energy Service Company (Koh Jik ESCo) was formed to be the community structure responsible for O&M, setting tariffs and collect electricity payments from all households. The ReCharge project will be working closely with Koh Jik ESCo to upgrade the system and ensure that long-term operations is sustained.

Project Timeline

The ReCharge project runs from June 2018 to May 2019. The project is split into 4 major phases:

Phase	Duration
Planning and Design	June – Sept. 2018
Project Funding	July – Sept. 2018
Procurement & Construction	Nov. 2018 - Feb. 2019
Monitoring and Reporting	Feb. – May 2019

Team

The Koh Jik ReCharge project is implemented by a team of 2nd year master's students undertaking the European Institute of Innovation & Technology (EIT) SELECT master's programme. The team is composed of 11 engineers and scientists from 9 different countries combining diverse international work, research and study experience.

Partners

Academic partners include:



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