

FACTSHEET ON THE EXPRESSION OF INTEREST (EOI) TO DESIGN, BUILD AND OPERATE AN INTELLIGENT MICRO-GRID INFRASTRUCTURE WITH CLEAN & RENEWABLE ENERGY TECHNOLOGIES FOR PULAU UBIN

Background

1. Pulau Ubin is an island north east of Singapore with a land area of around 10 km² (see [Figure 1](#)). Currently, Pulau Ubin is home to about 100 villagers, and the island has evolved to an adventure getaway with well-preserved natural habitat managed by the National Parks Board. There are also a few small businesses, resorts and training camps operated by the Outward Bound Singapore and National Police Cadets Corps. Pulau Ubin's current annual electricity consumption is around 2,500 MWh per annum with maximum demand estimated at 1.7 MW.

Figure 1: Location of Pulau Ubin



2. Pulau Ubin currently does not draw electricity from the main power grid. All the island's inhabitants generate electricity using their own diesel generators, which are not only pollutive but also unreliable. However, it is not economical to lay power transmission cables from mainland Singapore to Pulau Ubin due to its modest energy demand.

3. With the view of addressing this situation, the Energy Market Authority (EMA) is inviting interested companies to design, build and operate an intelligent micro-grid¹ infrastructure on Pulau Ubin to supply electricity using clean and renewable energy resources and to facilitate test-bedding of close-to-market clean and renewable energy technologies.
4. Many renewable energy generation technologies, such as solar photovoltaic and wind, are dependent on the weather conditions and their generation outputs are intermittent. It is therefore necessary to have an intelligent control system in the micro-grid that could ensure the reliability and quality of electricity supply.

Objectives

5. Through this project, EMA seeks to achieve several objectives:
 - i. First, provide a test-bed for an intelligent micro-grid infrastructure with distributed generation from clean and renewable energy resources;
 - ii. Second, provide electricity to the residents of Pulau Ubin in a way that is not only reliable and cost competitive, but also cleaner than the existing diesel generators on the island; and
 - iii. Third, build local capabilities in the area of smart grid design, system integration and the management of intermittent renewable energy sources, which can be incorporated into subsequent upgrades of our main electricity grid.

Implementation Concept

6. The EMA had previously engaged a consultant to conduct a feasibility study on clean and renewable energy for the entire island. The study proposed to start by implementing the micro-grid infrastructure at the island's jetty area, which is approximately one-fifth the size of the whole island and where most of the businesses and residents are located.
7. The current annual consumption at the jetty area is about 460 MWh with a maximum demand of about 150kW.
8. Current loads at the jetty area include the offices of the National Parks Board, the Police Coast Guard Office, the Ubin Lodge, the Singtel mobile base station, and a small number of residential premises and businesses such as restaurants and bicycle hire shops.

¹ A micro-grid is essentially a miniature electricity grid, which is used to supply electricity to a geographical area of limited size. The proposed micro-grid on Pulau Ubin will have to incorporate 'intelligent' systems, which can manage the intermittent nature of renewable energy systems and provide a reliable and steady flow of energy to its users.

9. Peripheral areas around the jetty such as the resort development and camping sites may be included in the project, although this will depend on the electricity demand and the specific needs of the existing tenants there.
10. Possible solutions include solar photovoltaic on buildings, concentrated solar power, micro wind turbines and generators running on biofuels.

Expression of Interest (EOI) for Project Developer

11. The EMA is launching an Expression of Interest (EOI) exercise on 20 November 2009 for interested companies to provide inputs, feedback and suggestions on the project concept. The exercise is designed to work towards selecting a developer and operator to design, build and operate an intelligent micro-grid infrastructure with clean and renewable energy technologies on Pulau Ubin. The closing date for the EOI submission is 18 December 2009. Interested parties can access the EOI at www.gebiz.gov.sg.
12. Companies shortlisted from this EOI process will be invited to submit proposals at the Request for Proposals stage scheduled in the first quarter of 2010.

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