MEDIA RELEASE

6 November 2015

$5 million for Two Energy Technology Projects at Pulau Ubin

The Energy Market Authority (EMA) has awarded $5 million to two projects under Phase 2 of the Pulau Ubin Micro-grid Test-bed. These two projects will leverage the existing micro-grid infrastructure to pilot a range of innovative, near-to-market energy technologies in the areas of energy storage, energy analytics and grid asset management.

2.   The two projects are:

A. Energy Storage (ATEN Pte Ltd and Power Automation Pte Ltd)

This project will pilot various types of batteries, controlled by a centralised energy management system, to better understand energy storage technologies and their performance in Singapore's hot and humid environment.

B. Real-time Monitoring of Micro-grid's Performance (Berkeley Education Alliance for Research in Singapore, BEARS)

This project involves developing a sensor system capable of online, real-time monitoring of the micro-grid's performance.

(Please refer to Annexes A and B for details of the two projects.)

3.   On how these projects will help Singapore, Mr Ng Wai Choong, Chief Executive of EMA said, "We hope to understand how different technologies in energy storage can support the integration of intermittent solar energy into Singapore's grid while maintaining grid stability. We are also keen to explore how energy analytics and innovative sensors can further enhance the efficiency and resilience of Singapore's power system".

4.   ATEN Pte Ltd, a local enterprise with growing interest in renewable energy integration projects, is collaborating with Power Automation Pte Ltd, a local power system integrator, on the energy storage project. Mr Stanley Seah, Executive Director of ATEN Pte Ltd, said, "We are excited to be given the opportunity to test out energy storage technologies such sodium-ion, zinc-air and lithium-ion batteries in a tropical climate. Heat and humidity will impact battery's performance. Our project will help to shed light on ways to mitigate tropical climate constraints and enhance battery's performance".

5.   Prof Tseng King Jet, the other award recipient from BEARS, said, "We will be test-bedding a variety of innovative sensors as part of our project. Based on our sensor network, we hope to enhance the overall stability of the micro-grid by recommending pre-emptive measures through analysis of the information collected in real-time. With this, micro-grid maintenance can be carried out more efficiently and effectively".

6.   Phase 1 of the test-bed, launched in October 2013, saw a micro-grid built at the jetty area of Pulau Ubin. Over 30 business owners and residents there are now enjoying cost competitive, clean and reliable supply of electricity from the micro-grid. A Request-for-Proposal for Phase 2 was launched in August 2014 for technologies that could be test-bedded using the micro-grid. The proposals received were subjected to assessment by an evaluation panel of experts through a two-stage competitive process.

7.   More information about the Pulau Ubin Micro-grid Test-bed can be found at http://www.ema.gov.sg/Pulau_Ubin_Micro-grid_Test_Bed.aspx.

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About the Energy Market Authority

The Energy Market Authority is a statutory board under the Ministry of Trade and Industry. Our main goals are to ensure a reliable and secure energy supply, promote effective competition in the energy market and develop a dynamic energy sector in Singapore. Through our work, the EMA seeks to forge a progressive energy landscape for sustained growth.

Pulau Ubin Micro-grid Test-bed

About the Test-bed

The Pulau Ubin Micro-grid Test-bed aims to assess the impact of intermittent solar energy on grid operations. Insights from the Test-bed will prepare Singapore for a future where solar energy forms a more significant portion of our energy mix.
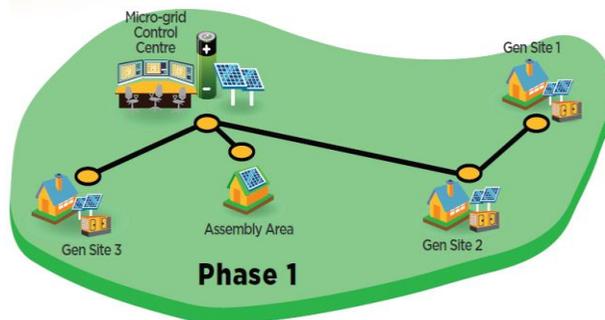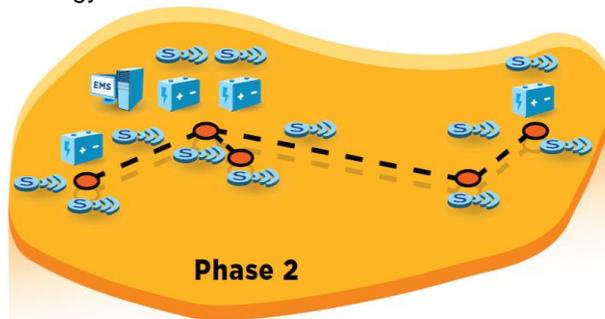
Phase 1 of the Test-bed

Phase 1 was completed and launched in October 2013, and now provides electricity to more than 30 end-users at the jetty area of Pulau Ubin.

Phase 2 of the Test-bed

Phase 2 leverages the Phase 1 infrastructure and provides companies and research organisations with a 'plug-and-play' platform to develop and pilot energy technologies that are relevant to our power grid. Technologies test-bedded include:

- Advanced energy storage solutions and energy management system to enhance grid resilience and optimise grid operations
- Sensor network for real-time health monitoring of major grid assets
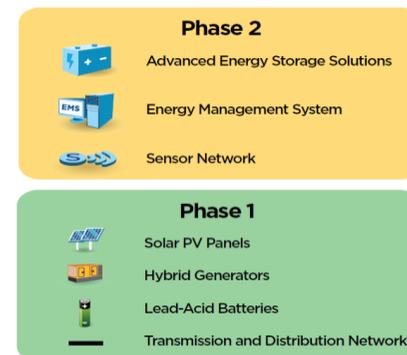
Projects Awarded Funding under Phase 2 of the Pulau Ubin Micro-grid Test-bed

Project 1

Project Title: Characterisation of Batteries for Grid Applications

Host Institution: ATEN Pte Ltd

Project Background:
Solar energy is the primary energy source for the Pulau Ubin Micro-grid Test-bed. In Singapore, the deployment of solar photovoltaic (PV) is expected to increase significantly in the future. While solar energy is clean, its intermittent nature may impact the stability of our power system.

This project will pilot various battery technologies (e.g. sodium-ion, zinc-air and lithium-ion), controlled by a centralised energy management system, to mitigate the impact of intermittent solar energy generation. Automatic load-shedding strategies will also be implemented to enhance the overall resilience of the micro-grid.

Outcomes and Benefits:
The project will provide a better understanding of energy storage technologies that are most suitable for Singapore's hot and humid environment. It will also help us prepare for a future where solar energy forms a more significant portion of our energy mix.

Team Leader:

Mr Stanley Seah, Executive Director of ATEN Pte Ltd, has about 20 years of industry experience in electrical engineering. He has been involved with the design, supply and installation of electrical systems, including renewable energy systems (such as solar PV), in Singapore and the region.

Team Member:
Mr Kerk See Gim, Power Automation Pte Ltd

Project 2

Project Title: Online Real-time Condition Monitoring and Health Prognosis of Power Grids in the Built-Environment with Distributed Generation and Energy Storage Components

Host Institution: Berkeley Education Alliance for Research in Singapore (BEARS)

Project Background:
Real-time access to grid assets' health status will allow the grid operator to plan and carry out maintenance regime in an optimal and pre-emptive manner.

This project will use a variety of sensors to collect real-time information from the micro-grid. For example, novel sensors that can detect rapid and minute power flow changes will be deployed at various locations of the micro-grid to monitor the power flow quality of the micro-grid in real-time. A set of prognostic algorithms will also be developed from the data collected, to better predict the health status of major grid assets in real-time.

Outcomes and Benefits:
The project aims to develop a sensor system capable of monitoring the power flow quality, and real-time health status of all major grid assets, which will help to enhance the overall resilience of Singapore's power system.

Team Leader:

Prof Tseng King Jet has over 25 years of power engineering research experience and was the Head of Power Engineering in Nanyang Technological University from 2008 – 2014. He is currently the programme leader for Electrical Power and Control Systems in the Rolls-Royce@NTU Corporate Lab, focusing on the design, integration, condition monitoring and prognosis of aircraft and marine power systems. He is also one of the co-leaders of the SinBerBEST programme at BEARS, focusing on the design and control of building power distribution systems for energy efficiency.

Team Members:
Prof Sanjib Kumar Panda, BEARS
Prof Costas Spanos, BEARS