

Foreword

In 2015–2016, the Economic Research Institute for ASEAN and East Asia (ERIA) conducted a study on current and future available technologies of energy efficiency and conservation applying to buildings and road transport, as well as smart grid technologies to maximise penetration of renewable energy such as solar photovoltaic (PV) and wind (Phase 1 study). This year, ERIA applies the major outputs from the Phase 1 study to a specific area in the ASEAN region. It has selected Temburong District as an eco town, which is an ongoing project in Brunei Darussalam (Phase 2 study).

Under the Temburong district development plan, several types of building will be constructed in the district – office, mall, hotel, hospital, university, and residential apartment. Thus, ERIA assumed to apply two types of building technology: (i) ordinary technology and (ii) green technology or eco technology. Referring to the Malaysian building standard code, including the Green Building Index (GBI), ERIA estimated two electricity demands of the buildings: (i) normal township applying ordinary building energy intensity (BEI) and (ii) green township applying green BEI.

There is a diesel power station in Temburong that installs 4 units x 3 megawatts (MW) power generation system, which provides electricity to subscribers in the area. In addition, about 6MW solar PV system will be installed soon. After installation of the system, electricity generation by the diesel station will be reduced. However, once new buildings are constructed according to the Temburong district development plan, more solar PV will be needed. In 2015 and 2016, ERIA collected climate data – solar radiation and rainfall data – in Brunei Darussalam to check intermittency caused by PV system installation. In this regard, ERIA applied a dynamic simulation approach to check the intermittency under the combination of diesel power generation, solar PV system, and electricity storage. After the simulation, ERIA extracted the best capacity mix of diesel power, solar PV, and storage at minimum cost.

Eco town or smart city is an important concept for promoting energy efficiency and renewable energy in residential and commercial sectors, and there are many similar plans for this across the ASEAN region. ERIA will start the Phase 3 study to prepare a master plan for Temburong Eco Town using an engineering design company to be presented in a blueprint of the eco town, which includes clean electricity supply.

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