Chapter 1

Background

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CHAPTER 1

Background

The Association of Southeast Asian Nations (ASEAN) and East Asia region has been experiencing a rapid growth in urbanisation in the last few years which is likely to continue for some time. In particular, the increase in urbanisation has been remarkable, among others, in China, Indonesia, the Philippines, Thailand, and Viet Nam. Such growth has seen overall energy demand rise, driven by the increase in energy for the power sector and the transport sector (Kutani, 2013). The total primary energy demand in the ASEAN region is projected to increase by 80 percent by 2040 (IEA, 2015).

Energy efficiency and conservation (EEC) has been given top priority in the Energy White Paper (2014) of Brunei Darussalam, and this has further been stressed no less by the decree of the Sultan of Brunei Darussalam at the United Nations 2014 Climate Summit held in New York. In his speech, he stated that the country is targeting to reduce total primary energy consumption by 63 percent from its 2009 baseline. One path towards energy sustainability is a low-carbon path to energy security. The introduction of low-carbon or energy technologies in the town planning of Brunei to boost energy efficiency and reduce fossil energy use is vital to manage rapidly growing energy consumption levels in urban areas to achieve a more secure and sustainable energy future for the country. The concept here is called the eco town.

1.1. Concept of an Eco Town

An eco town (or eco city) is generally a settlement modelled on the principles of environmental sustainability, with the goal to reduce and eliminate carbon emissions through application of energy efficiency and of renewable energy resources. In the ASEAN context, the settlement can be scaled to any size in reference based on the geographical, social, and economic features of each ASEAN economy which seeks to develop a concrete low-energy development plan irrespective of its size, characteristics, and type of development (greenfield or brownfield development).

The origin of the eco town concept emerged when Urban Ecology was established in 1975 by Richard Register and others to rebuild cities or towns in balance with nature. Specifically, the non-profit organisation aims to plant and harvest fruit trees on streets, to develop solar-powered greenhouses, to establish energy-related regulations, and to promote bicycles, pedestrian walking, as well as using buses as an alternative to private automobiles (Register, 1994). Urban Ecology (1996) states that any city or town that is eco-friendly follows 10 principles (Devuyst et al., 2001):

1. Create compact, diverse, green, safe, pleasant, and vital mixed-use communities around main transport facilities.

2. Establish transport infrastructure that promotes foot walking, cycling, and use of efficient automobiles.
3. Restore damaged urban environments, especially creeks, shorelines, ridgelines, and wetlands.
4. Establish housing that is affordable, safe, and community-friendly.
5. Create improved opportunities for all, especially women, people with disabilities, and minorities.
6. Support local agriculture, urban greening projects, and community gardening.
7. Promote recycling and use of innovative technologies and conserve resources while reducing pollution and hazardous wastes.
8. Collaborate with businesses to support eco-related activities while discouraging pollution, waste, and the use and production of hazardous materials.
9. Promote voluntary simplicity and discourage excessive consumption of material goods.
10. Increase public awareness on the local environment and bioregion through community projects and programmes.

For the last 20 years or so, however, the dimensions of an eco town have been generalised to include:

- sustainable development
- sustainable urban development
- community economic development
- appropriate technology
- bioregionalism
- social ecology
- green movement and green cities/communities.

1.2. Objectives

The objectives of this study are as follows:

- To encourage the creation of low-energy and energy-efficient smart communities in urban development plans, and to share best practices in making such communities a reality and possible even to less developed countries in the region.
- To learn from a particular eco town in the region as the base case for Brunei to build on and to be able to replicate it in other countries in the region, for example, Cambodia, the Lao People's Democratic Republic, and Myanmar according to their respective economic

capability.

- To provide capacity building, lessons learnt, and references specifically for policymakers and regulators in South East Asian countries who would like to consider a similar model to achieve their respective national overall energy reduction targets.
- To establish a methodology that can be easily replicated in other countries in the region.

The study will look into three main areas that will potentially achieve those aims, mainly through a combination of individual modelling and analysis and in an integrated approach:

- building technologies
- transport
- smart grids.

1.3. Overview of Temburong District

The district of Temburong is located at the eastern edge of Brunei but is separated from the remainder of the country by the Malaysian state of Sarawak and the South China Sea to the north. Known as the Green Jewel of Brunei, the district is home to the country's most extensive forest area, of which 500 square kilometres in the south is still pristine (Hadi, Sarini, and Noorhijrah, 2011).

The district comprises five provinces: Bangar, Bokok, Amo, Batu Apoi, and Labu. Bangar is the main urban centre within the district as it contains Bangar town, which is the capital town with the most significant development.

Although Temburong is the second largest district within Brunei Darussalam, its population was just 8,900 in 2015, which equates to about 2.2 percent of the whole population of Brunei Darussalam (DEPD, 2015). This can be attributed to underdevelopment, especially in certain areas in the central and southern parts which are characterised by mountainous terrain and river catchments. The northern region is mostly low-lying which makes it prone to tidal flooding. The district's development has therefore concentrated around central Temburong which has access to river valleys and the main road system.

Currently, access to Temburong from the other districts is either by speedboat or by road vehicle, although the latter involved going through multiple border crossings which takes several hours. In order to smoothen the access, the Government of Brunei Darussalam has begun the construction of a bridge linking Temburong and other districts. The bridge, which is anticipated to reduce the travel time to about 20 minutes between the districts, will foster further development in commercial and industrial areas to attract residents from other districts as well as tourists. The bridge is slated for completion in 2019.

Electricity is supplied through a transmission network from a 12-megawatt (MW) diesel power station situated at Belingus village, about 5 kilometres away from Bangar town. The power station currently supplies an average of 34,300 megawatt-hours (MWh) of electricity per year,

corresponding to an average diesel consumption of 10.46 million litres per year. As the population is envisaged to grow, the demand for electricity will increase, which would have economic and environmental impacts, and improvement in efficiency and a switch to cleaner energy would be an important policy for the government.

1.4. Bangar Town: A Potential Eco Town Model

The Government of Brunei Darussalam has devised the Temburong District Master Plan (2006–2025), which includes strategies for the expansion of Bangar town (Town and Country Planning Department, 2010). The key strategies include an enhanced commercial area building in the centre of Bangar town, expansion of Temburong Industrial Estate, expansion of the residential area within Bangar, and identification of land for development of a tertiary education campus.

The Ministry of Development has raised the possibility of establishing a smart town or eco town in the district with the aim to reduce the carbon footprint via the application of green technology. The Energy and Industry Department of the Prime Minister's Office recently announced plans to replace the Belingus diesel power station with a solar power plant in 2019. This was announced during the High-Level Signing Ceremony of the Paris Agreement in New York in April 2016. The fact that Bangar town is the only town in the district makes it the ideal candidate for an eco town model. Furthermore, the town is still relatively small and compact and hence the potential for expansion is very significant.

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