

# **5<sup>TH</sup> ASEAN SMART GRID CONGRESS**

**3-4 DECEMBER 2019**

**LE GRANDEUR PALM RESORT HOTEL, SENAI JOHOR, MALAYSIA**

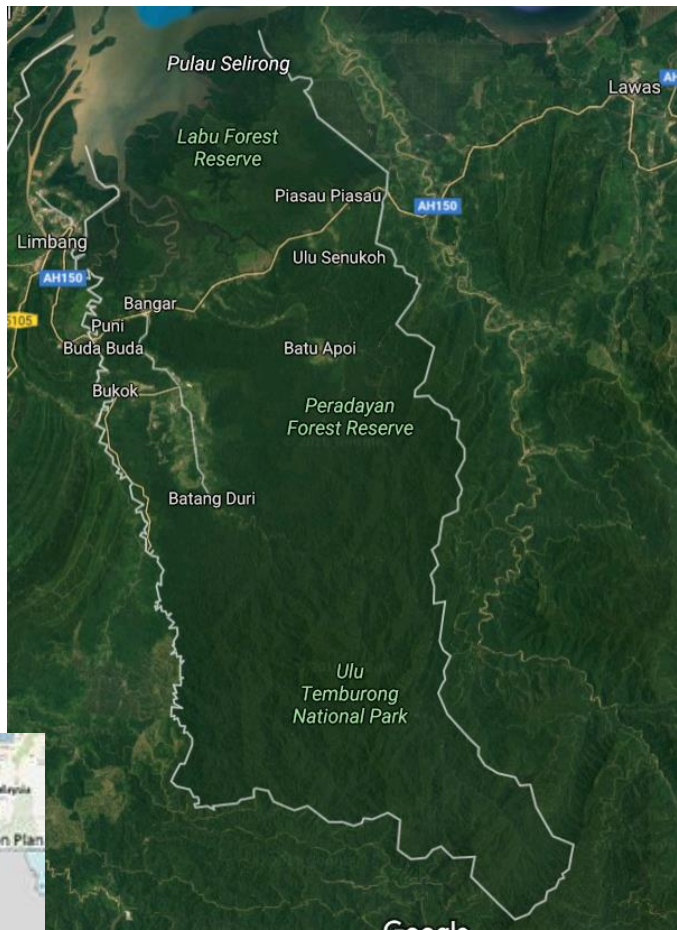
## **TEMBURONG MICROGRID AS POTENTIAL DEMONSTRATION FOR SMART MICROGRID**

**DR ROMEO PACUDAN**

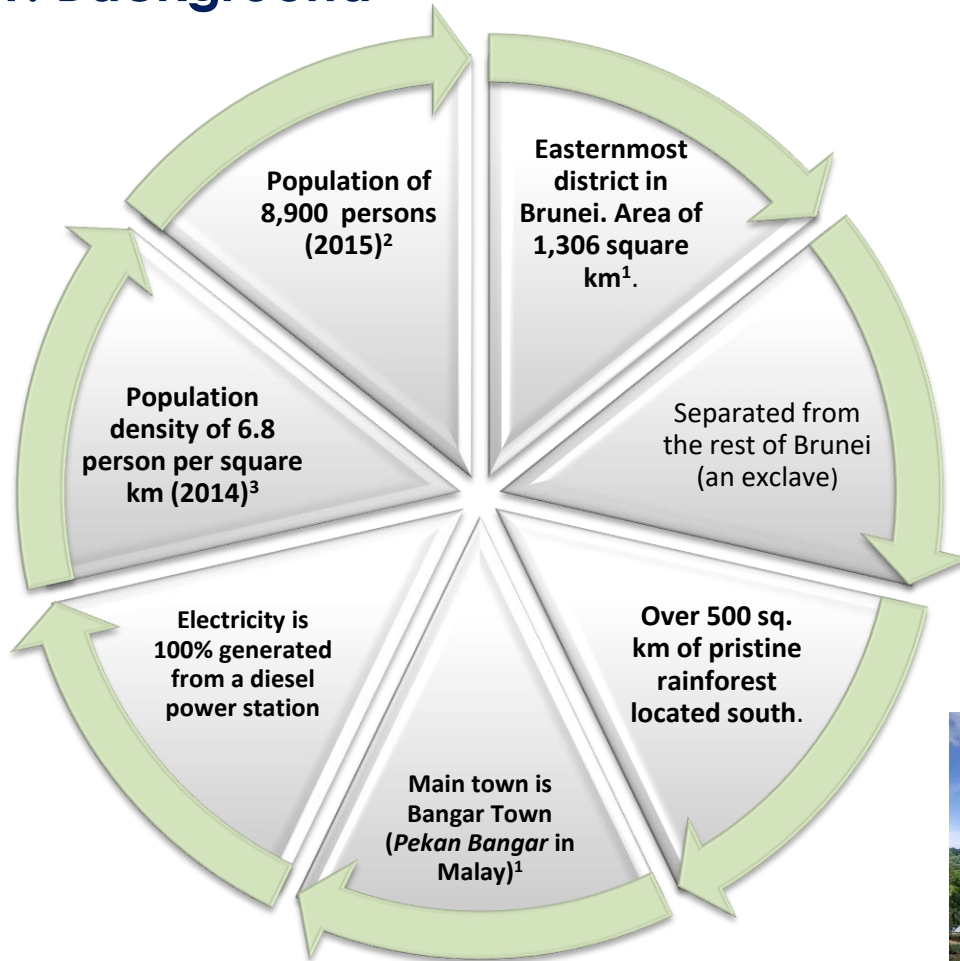
**INTERIM CEO AND CHIEF RESEARCHER, BRUNEI NATIONAL ENERGY  
RESEARCH INSTITUTE (BNERI)**

**ASSOCIATE PROFESSOR, UNIVERSITI BRUNEI DARUSSALAM**

# 1. Background



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**Bangar  
Town**

**Ulu  
Temburong  
National  
Park**



**Temburong  
Boat  
Terminal**

<sup>1</sup>Temburong District: Information Department, Prime Minister's Office, Second Edition, 2011

<sup>2</sup>Brunei Darussalam Key Indicators 2015, Release 2: Annual: Department of Economic Planning and Development, 2016

<sup>3</sup>Brunei Darussalam Statistical Yearbook 2014: Department of Economic Planning and Development, 2015



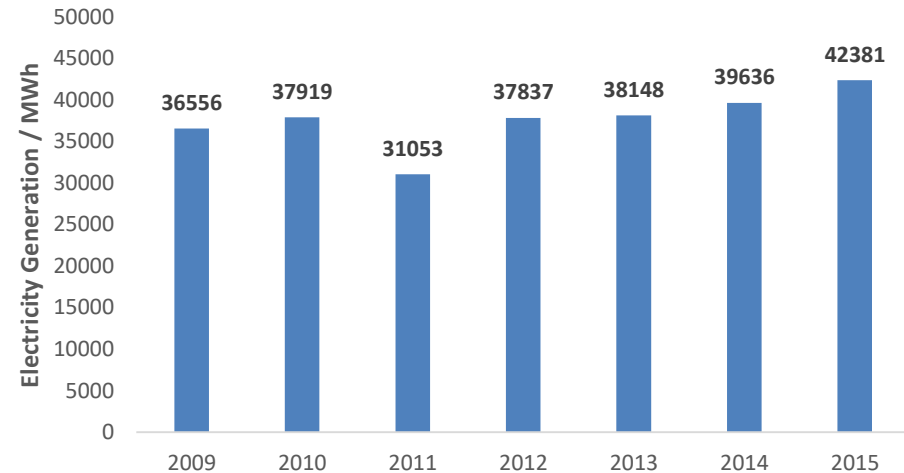
# 1. Background

- Electricity in Temburong is currently being supplied by a 12 MW diesel power station at Belingus village, about 5 to 6 km away from Pekan Bangar.
- Power station comprises four 4 MW-rated diesel engines, with three running simultaneously and one acting as a spare.
- A total of 42,381 MWh of electricity was supplied in 2015 consuming a total of 13.85 million litres of diesel fuel.

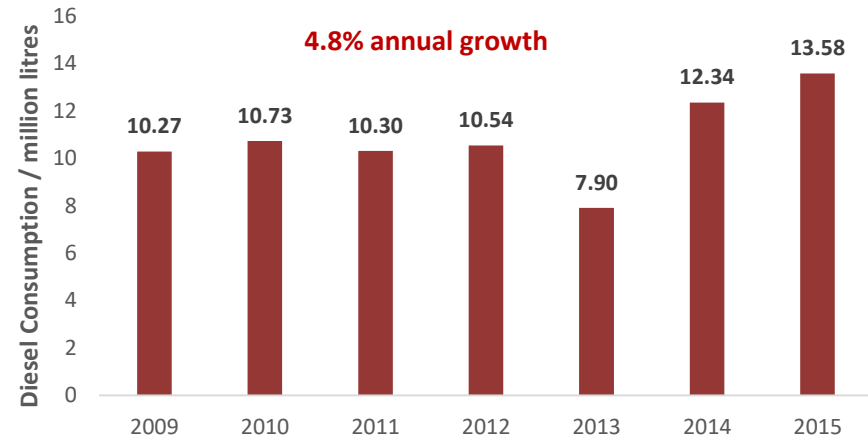


**Diesel engines of Belingus Power Station**

**Electricity Generation (MWh)**



**Diesel Consumption (million litres)**



Source: Department of Electrical Services (DES)

## **2. Smart Micro-grid in the Context of a Smart EcoTown**

### **Key Project Studies**

- 1. Development of Ecotown Model in ASEAN Region through Adoption of Energy Efficient Building Technologies, Smart Grid and Transportation. *Published as ERIA Research Project Report 2015, number 2.***
- 2. Simulation Study on Energy Mix for Power Generation in Temburong Eco Town. *Published as ERIA Research Project Report 2017, number 2.***
  - ***Normal demand: 12 MW (diesel) + 24 MWp (solar) + 78 MWh (storage)***
  - ***Eco demand: 12 MW (diesel) + 5 MWp (solar) + 48 MWh (storage)***
- 3. Formulation of Temburong Eco Town Master Plan in Brunei Darussalam. *Published as ERIA Research Project Report 2017 number 11.***
- 4. Temburong Solar and Battery Project. Berakas Power Management Company and Shell International. *Unpublished confidential document. 2017.***
  - ***5 MWp (solar PV) + 3 MW, 1.7 MWh (battery storage)***

## 2. Smart Micro-grid in the Context of a Smart EcoTown

### SWOT Analysis

	Helpful	Harmful
Internal origin	<p><b>【Strength】</b></p> <ul style="list-style-type: none"> <li>+Most of the area is in natural condition, without human intervention</li> <li>+Almost no serious destruction of nature</li> <li>+A lot of the land is unused and suitable for development</li> <li>+Tourism, such as ecotourism, is already established</li> <li>+Administrative centre in Bangar is controlled by central government</li> <li>+Connected with larger market of Malaysia by land</li> </ul>	<p><b>【Weakness】</b></p> <ul style="list-style-type: none"> <li>+Small population, with very few roads or other infrastructure</li> <li>+Accessibility is still very limited, with only Jalan Labu accessible by land or sea.</li> <li>+No major industry</li> </ul>
External origin	<p><b>【Opportunity】</b></p> <ul style="list-style-type: none"> <li>+Temburong Bridge, connecting with Bandar Seri Begawan, will be opened in 2020</li> <li>+Wawasan Brunei 2035 aims to reduce oil dependence, create new businesses, and assist small and medium-sized enterprises</li> <li>+Hydrogen manufacturing in Brunei has already started*</li> <li>+Closely related region to Heart of Borneo.</li> </ul>	<p><b>【Threat】</b></p> <ul style="list-style-type: none"> <li>+Uncontrolled development, caused by the increasing population, could affect the environment.</li> <li>+Climate change may have a significant impact</li> <li>+District might receive impact from Bandar Seri Begawan and Malaysia's cities in the flow of resident population, market, employment</li> <li>+Development may threaten local people's lifestyle</li> </ul>

# 2. Smart Micro-grid in the Context of a Smart EcoTown

## Proposal for a Carbon-Neutral City



### INDUSTRY in Temburong

ENERGY

MEDICAL / BIO SCIENCE

R&D

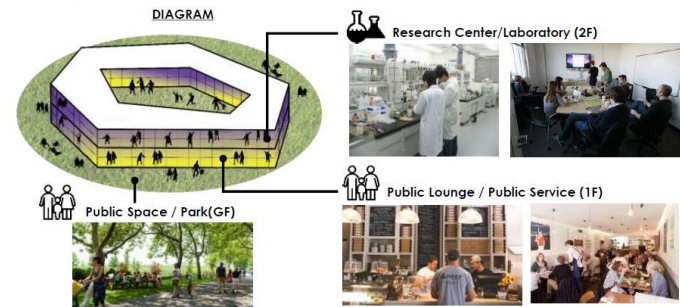
AGRICULTURE / HALAL FOOD

CONVENTION

SMALL START-UP AGENCY

NIKKEN

### LABORATORY × PUBLIC FACILITY



- Develop facilities and spaces mixed with research functions and public services as regional cores.
  - Create a gallery space of research activities open to the community in the part of the laboratory.
  - By establishing contact points between "R & D" and "Local life", we establish a co-creative relationship as shown below.
    - ☑R&D ; In the relationship with the community, we will create an environment where local problems can be found and fed back to R & D.
    - ☑Local life ; By touching research activities, we will make it a trigger to grasp local issues and initiatives as ourselves.
- Also, by implementing the research results there in "community life", we will realize an advanced lifestyle.

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### Approach Method 2

# Learning Tourism.

Not only “SIGHTSEEING”,  
But also “LEARNING” about  
BORNEO SUSTAINABLE FUTURE.

NIKKEN



Ulu Temburong  
National Park

+

Perdayan Forest  
Recreation Park

Visitor Center (Research Park)  
LUXURY RESORT Hotel, MICE  
Agriculture experience  
Islamic culture core  
Various activities and events  
in Jungle & River

### “SHOWCASE OF SMART TECH”



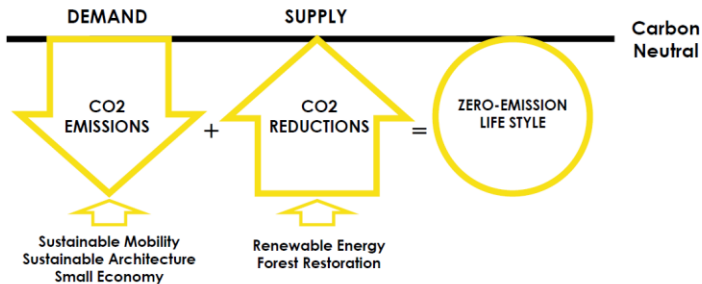


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## Proposal for a Carbon-Neutral City



Next-generation smart city  
= Small regional economy  
with balanced supply and demand



The concept of realization Eco Town in Brunei

Roadmap

(Matching with National strategy)

