



# Opportunities for Gas Based Cogeneration in Malaysia

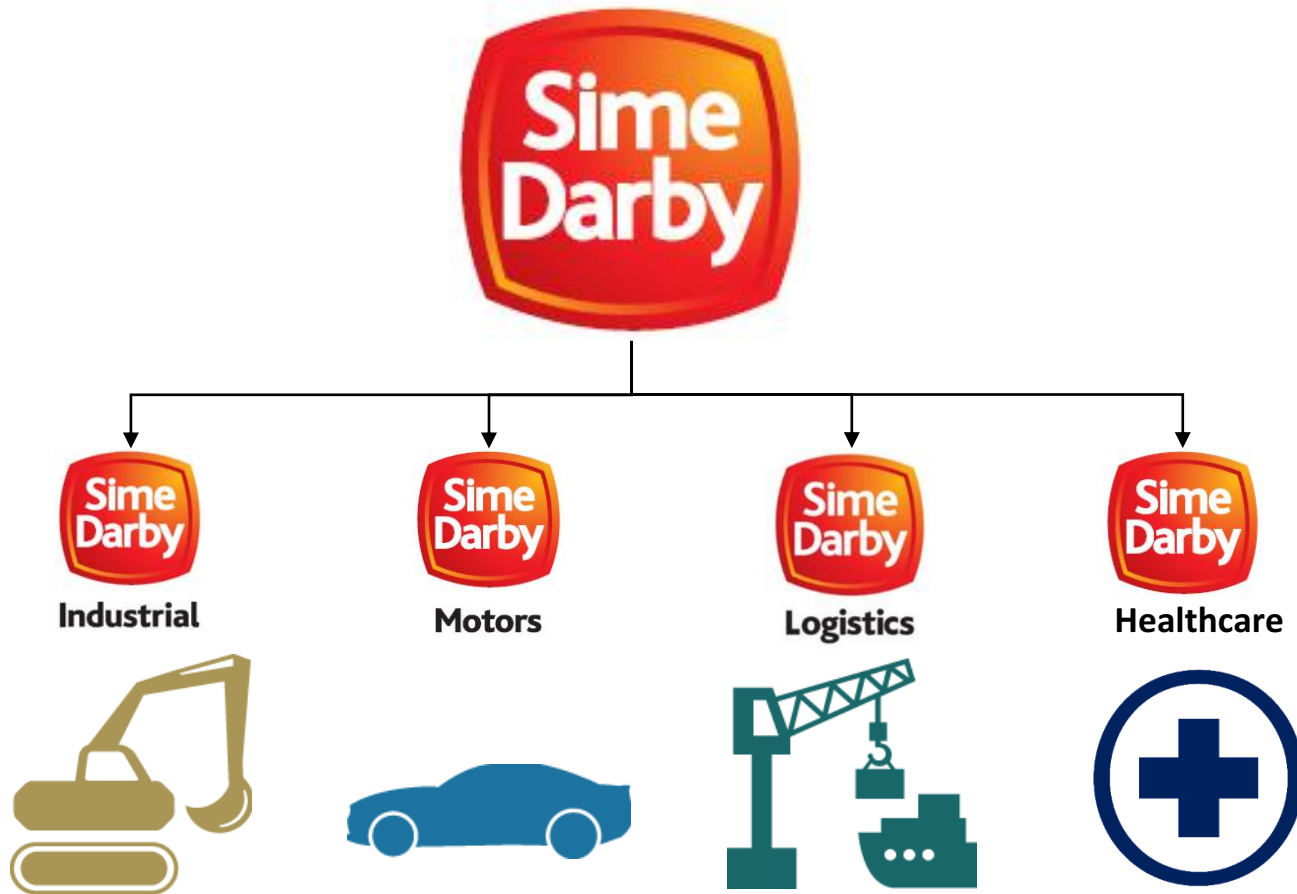
by  
Dr Lim Daw Yuen

Sime Darby Energy Solutions Sdn. Bhd.  
10<sup>th</sup> May 2022



Developing  
Sustainable  
Futures

Industrial





# Sime Darby Berhad

## Who We Are at a Glance



Industrial



Ranked **#3** for BMW dealers in the world



Ranked **#2** as a Cat dealers globally



**4** ports in China



**6** hospitals in Malaysia & Indonesia



### FY20 Financial Snapshot



**Revenue**  
RM36.9bn



**PBIT**  
RM1,407mil



**PATAMI**  
RM820mil



**Shareholders' Funds**  
RM15.0bn

Industrial

**8,147**

Staff Strength

Motors

**11,767**

Staff Strength

Logistics

**785**

Staff Strength

GHO

**121**

Staff Strength

Others

**100**

Staff Strength

(1) Geographical footprint defined as locations in which Sime Darby Berhad has assets or employees, and includes JV's operations (i.e. Ramsay Sime Darby Health Care operates in Indonesia); (2) As at 30 June 2020. Includes Group Head Office, Industrial, Motors, Logistics and other businesses. Excludes employees of Ramsay Sime Darby Health Care.

# Sime Darby Industrial Malaysia

*Brands that We Represent*



Industrial



Industrial

## Cat Dealer Operations

Tractors Malaysia



Malaysia, Brunei



SEM  
SEM



SITECH

## Energy Services



Tractors Petroleum Services



Sime Darby Energy Solutions



Sime Darby Electropack



Sime Darby Joy Industries

## Allied Group



Mecomb Group



Associated Equipment  
New Holland



Sime Darby Material Handling



Chubb &  
Sime Surveillance



Industrial

### Energy Services

#### Tractors Petroleum Services

- Offers **power generation** solutions and Maintenance, Repair and Overhaul (**MRO**) services for rotating equipment in the oil & gas sector, including **Electrical & instrumentation**
- **Full Service Maintenance (FSM)** for Petronas NGV Stations.



#### Sime Darby Energy Solutions

- Offers **EPCC Solutions** for **Cogeneration System**.
- **Long Term Service Agreement**



#### Sime Darby Joy Industries

- Designs and manufactures **heat exchangers, radiators, and Process Equipment Modules**



#### Sime Darby Electropack

- Packaging business for **generator sets Perkins**



# Sime Darby Energy Solutions

## The Background



**>23 Year's  
experience** in COGEN



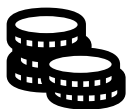
**The Solutions** in the  
Energy Industry



**34** Skilled Employees



**49 Projects  
executed** since 2005



**~ RM 80 Mil** Annual  
Turnover



Maintaining **67 MW** of  
COGEN Plant

- Sime Darby Energy Solutions Sdn Bhd (SDES) is an established **Engineering, Procurement, Construction & Commissioning (EPCC)** contractor primarily for the cogeneration plant.
- After sales support and **long-term service agreement (LTSA)** provider for gas turbine and gas engine.
- Strategic partnership with Kawasaki.
- SDES offers comprehensive and sustainable engineering solutions of the highest standards.



# Overview

# CURRENT ISSUES in Malaysia

## Utility Cost

- **Uncertainty of Fuel Price (Natural Gas)**
- **Uncertainty of Electricity Price (with imbalance cost pass through - ICPT)**

## Green House Gas Emission (GHG)

- **Liability for carbon emission**
- **Potential carbon tax**

## Energy Efficiency & Conservation Act

- **Implementation of EECA in Malaysia soon**

## Grid Supplier

- **Charge Top-Up & Standby**



# Energy Utilization - COGEN System

FUEL GAS

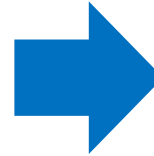


DISTRIBUTION

## Cogeneration Plant



**ELECTRICITY**



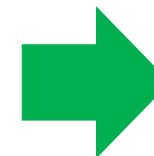
INDUSTRIAL FACTORY



**STEAM /  
HOT WATER**

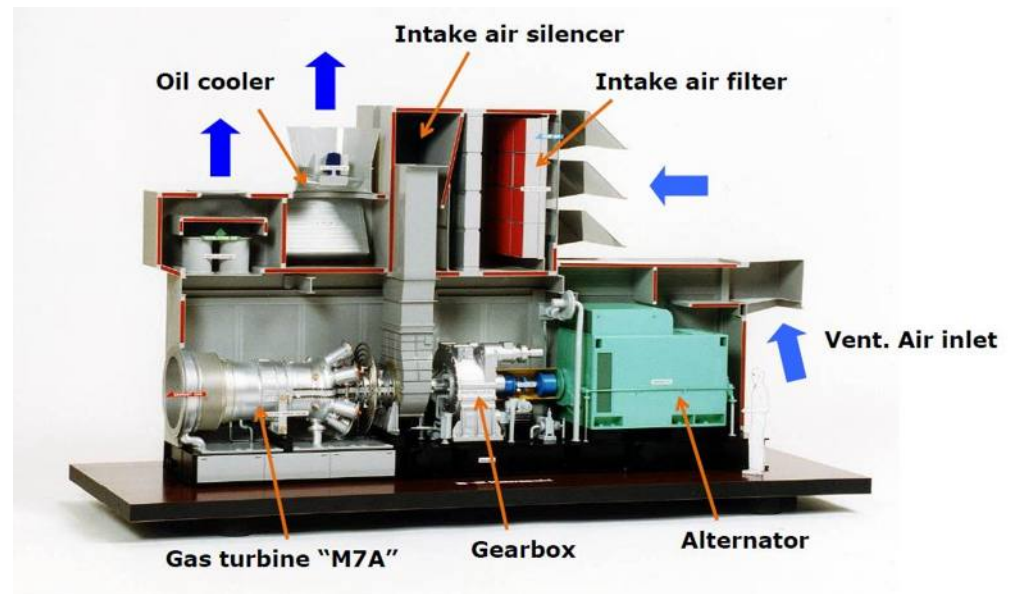
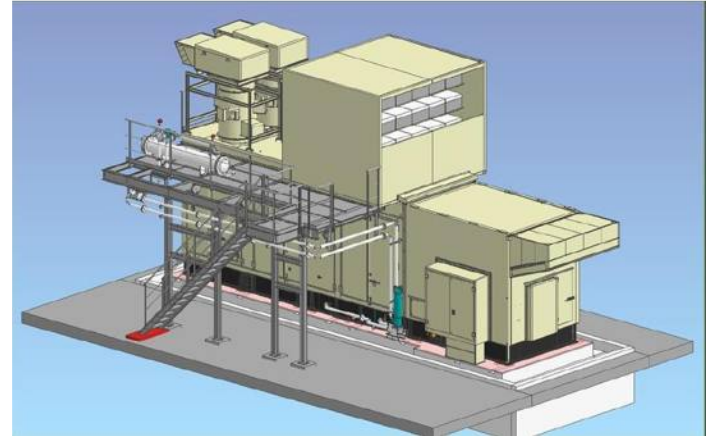


**CHILLED WATER**



**Commercial Property**

# Gas Turbine



**Range 2MW to 30MW**

# Gas Engine

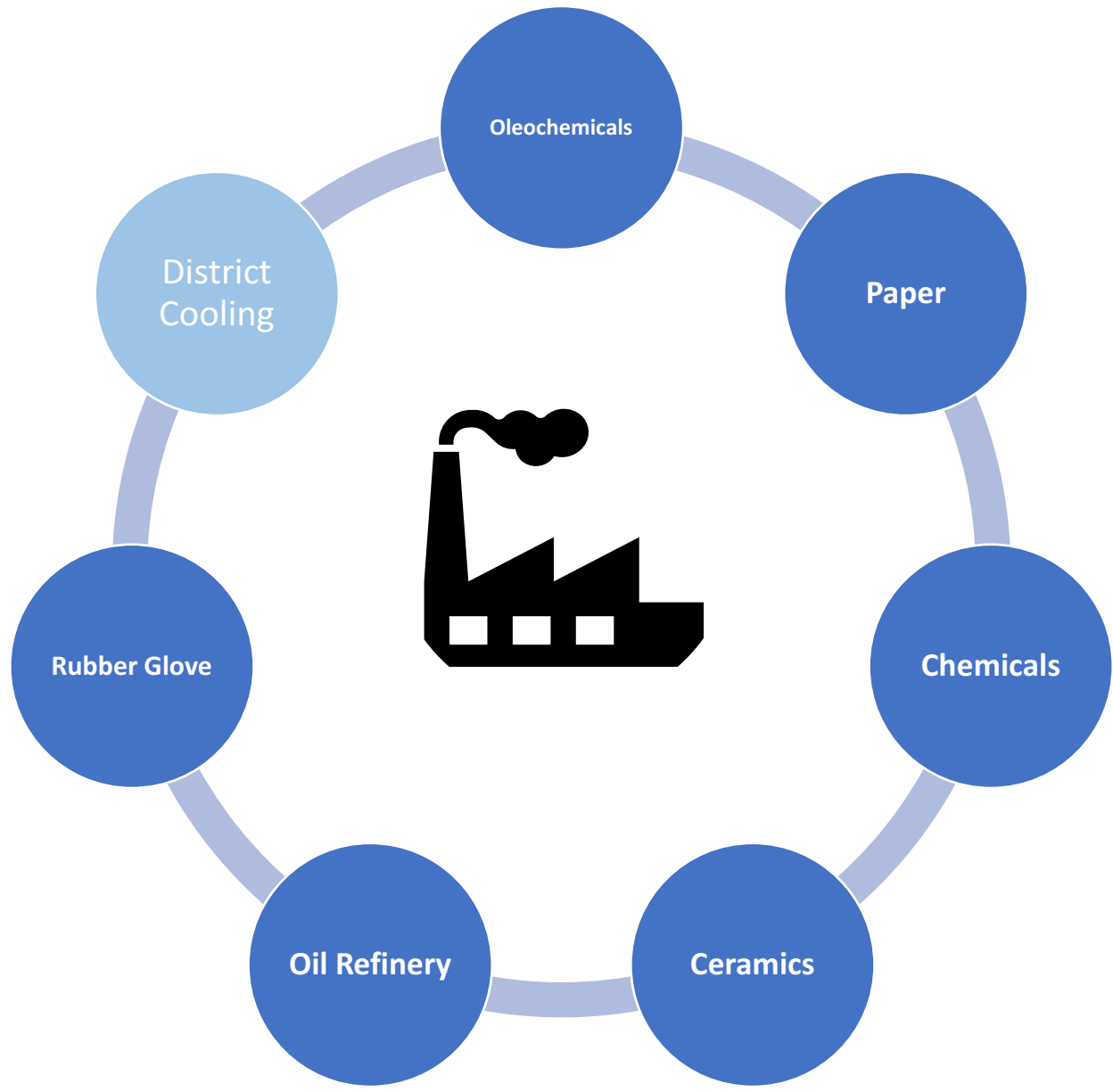


*Range 5.2MW & 7.8MW*



# **Application**

**Wide applications in Malaysia (installed)**



***Note: Potential 400MW (source: SDES)***

33KV/22KV/11KV TIE-IN

STEAM/HOT WATER/ CHILLED WATER TIE IN

NATURAL GAS  
SUPPLY TIE-IN

SPACE for  
COGEN

COGEN PLANT  
CONSTRUCTION

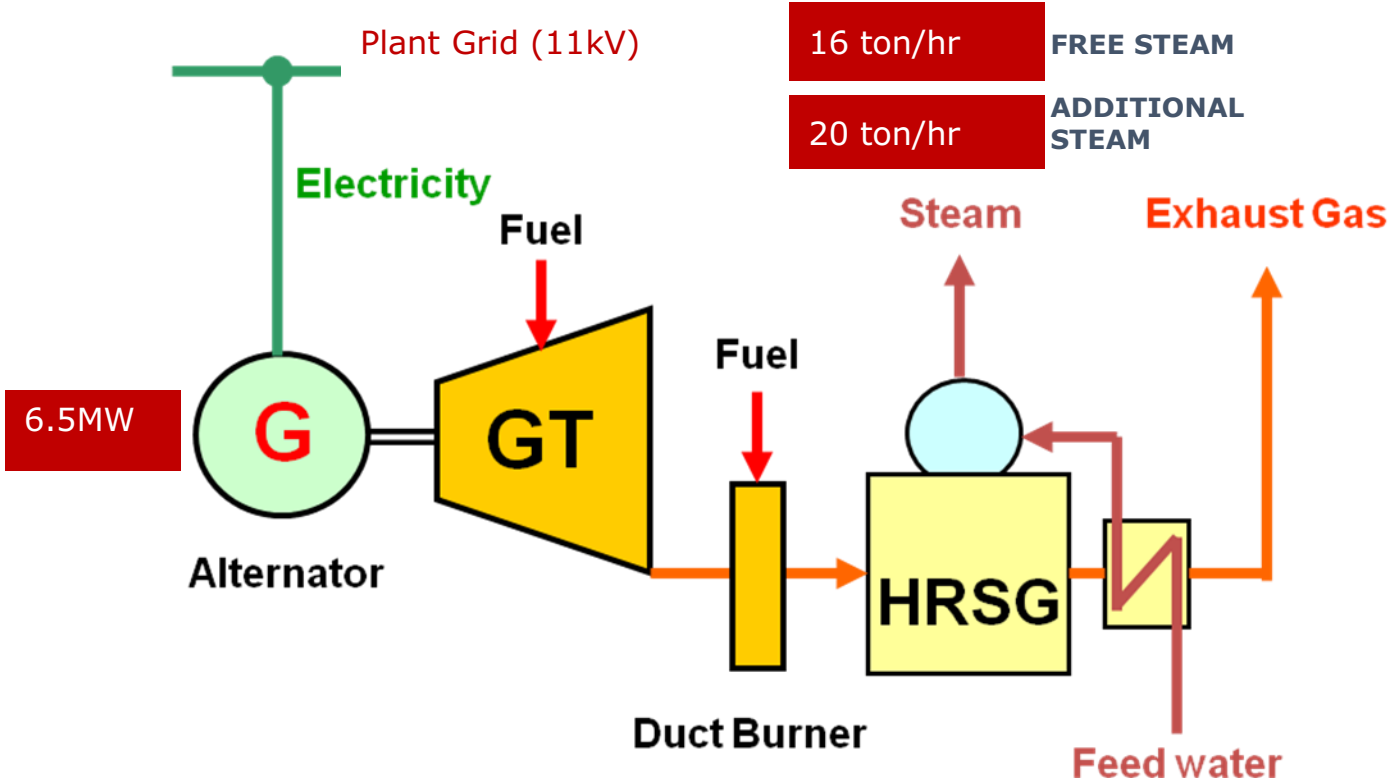
OPERATION &  
MAINTENANCE

Authority

POWER & HEAT BALANCE



**Sample Process – One Unit of 6.5MW GTG Cogeneration with TNB Parallel Import**

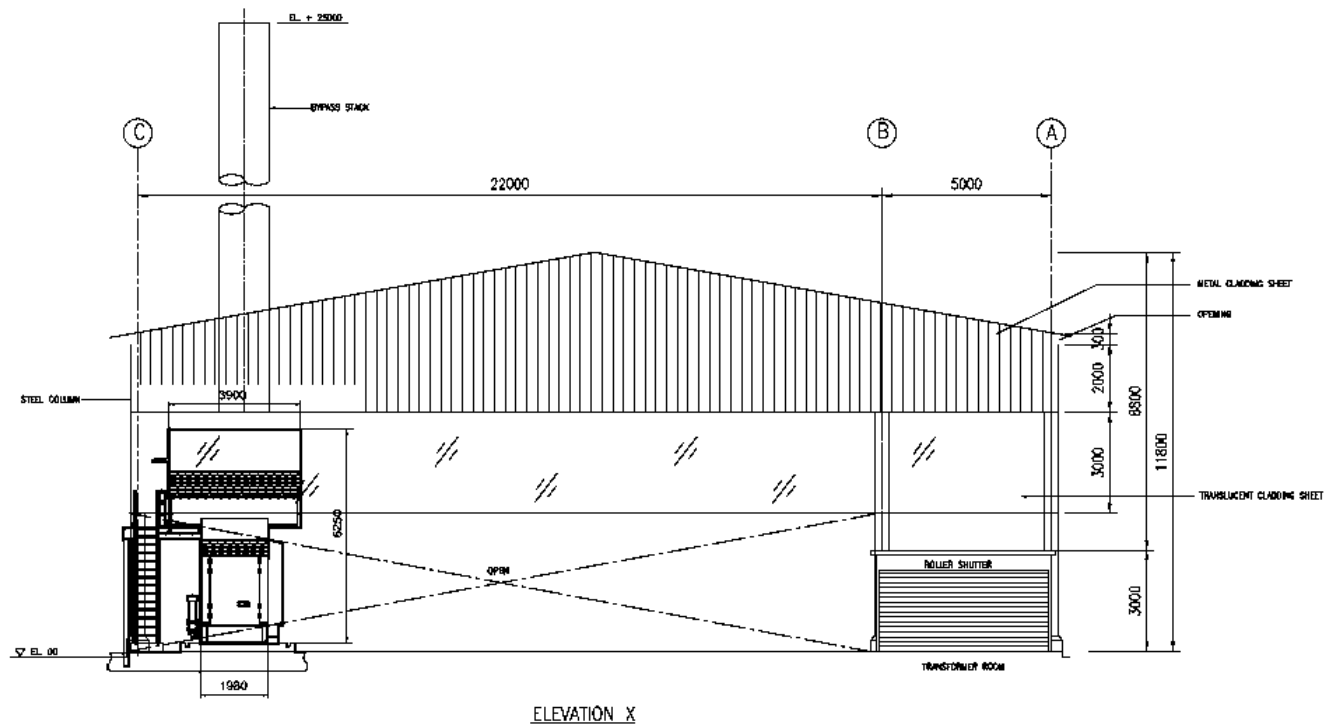


1 x GTG Output @ ISO Rating	7800	kW
1 x GTG Output @ 32° C (Gross)	6540	kW
1 x HRSG Unfired Steam Output (Gross)	16.9	tph

# Oleochemicals

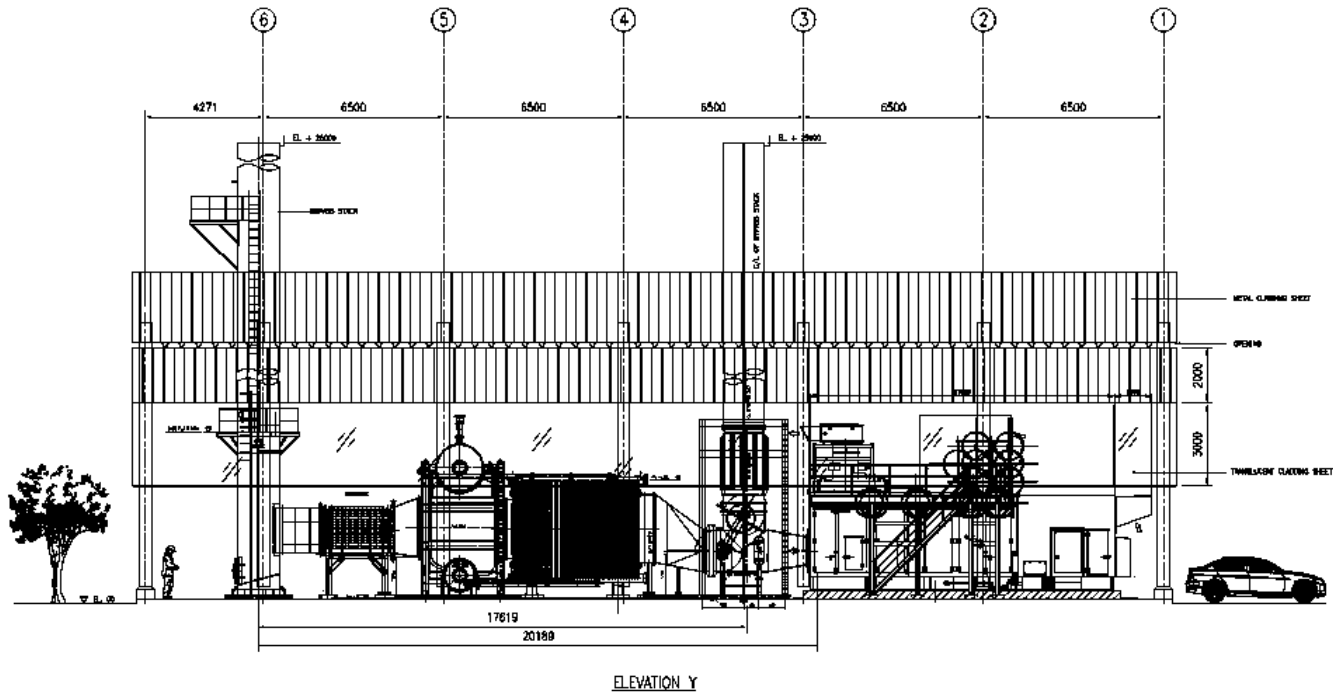
- 6.5MW Gas Turbine COGEN
- 35 ton-hr of Saturated Steam at 17barG
- Fresh firing at 35 ton-hr





ELEVATION GRID A-C (sample)





ELEVATION GRID 1-6 (sample)



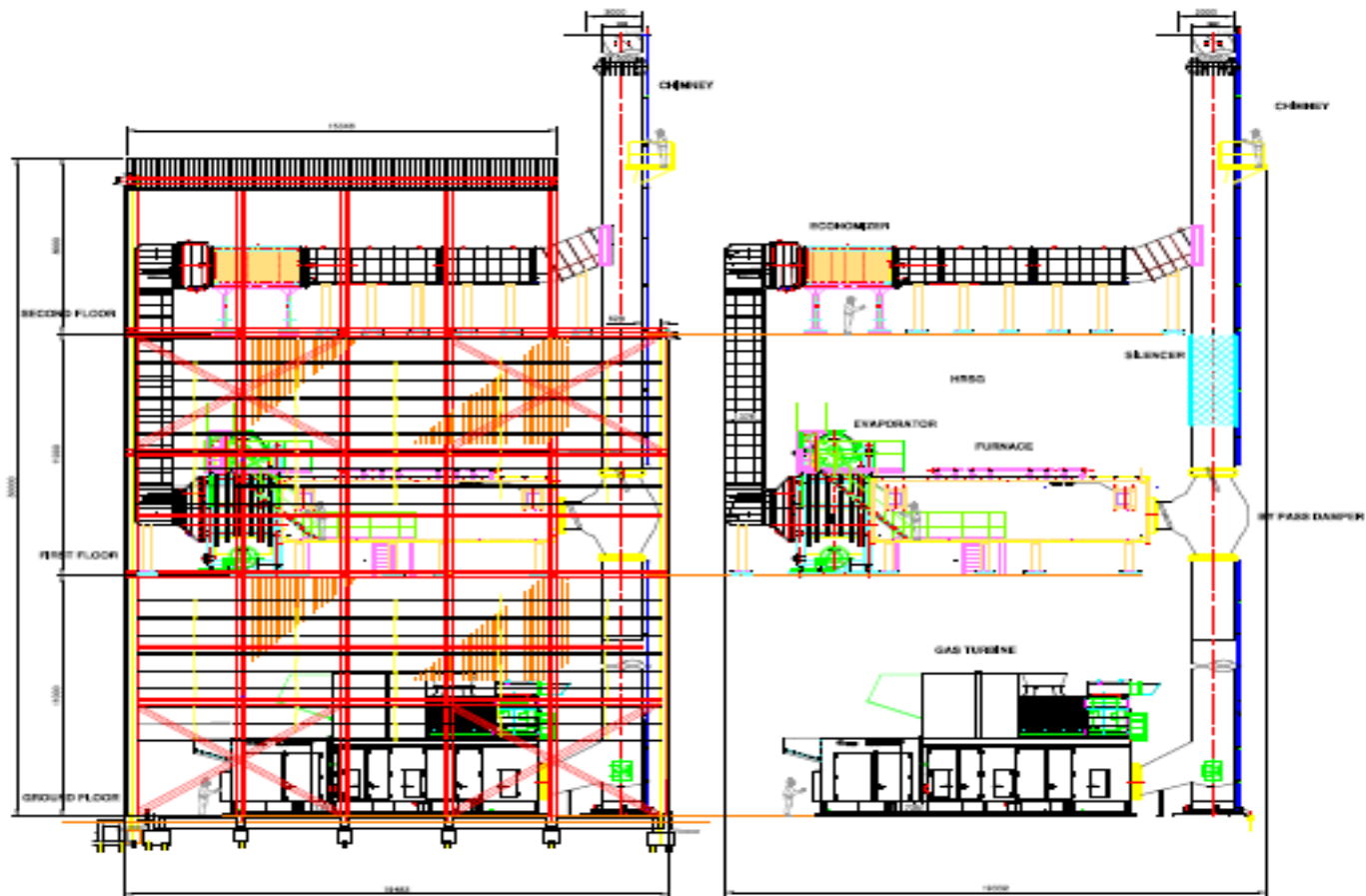
***Pasir Gudang, 2019***



# Double Storey Design

- 6.5MW Gas Turbine COGEN
- 42 ton-hr of Saturated Steam at 17barG

# FEASIBILITY ASSESSMENT – EXAMPLE (DOUBLE STOREY)



# Chemicals

- 2 x 5.2MW Gas Engine COGEN
- 4 ton-hr of Saturated Steam at 17barG
- 320 ton-hr of Chilled Water
- Hot water generation





# COGEN Estimated Saving (By Make & Model of Prime Mover)

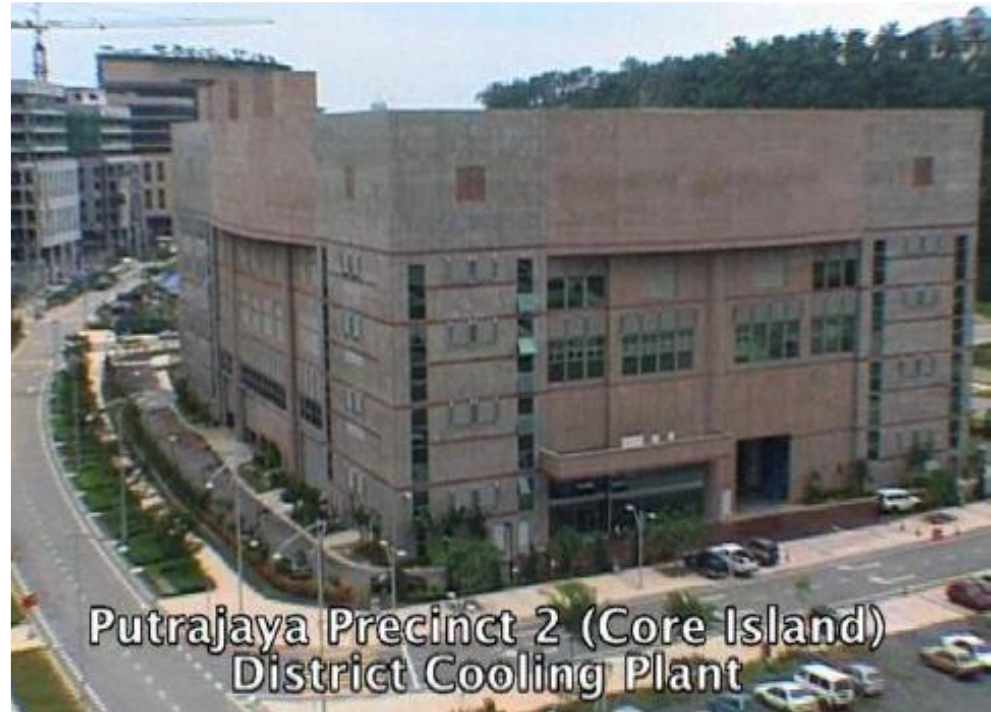
Description		Estimated Savings (Simple Recovery)		Estimated Payback, Years
	Output, MW			
Gas Turbine	2.3	RM	1,937,062	5.2
	3.7	RM	3,990,553	4.6
	6.5	RM	7,970,042	3.3
	15.7	RM	19,660,042	3.1
Gas Engine	5.2	RM	3,824,266	4.9
	7.8	RM	5,663,248	5.0

Note: Above is based on Electricity @RM0.380/kWhr;  
Gas Tariff: RM33.45/MMBtu  
Without Investment Tax Allowance (ITA) or incentive

For Gas Price above  
RM42/MMBTU, only 5MW  
above GTG COGEN is feasible

# District Cooling

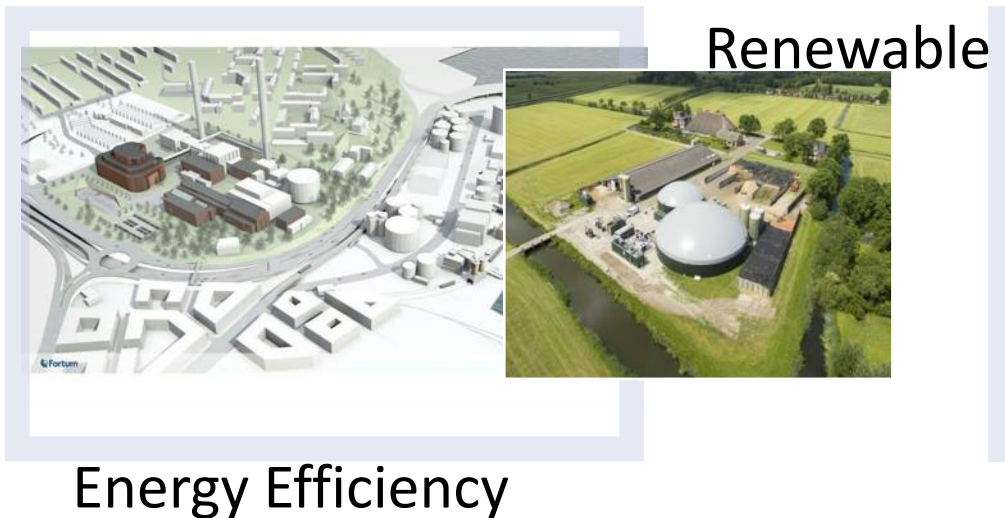
- 2 x 5.3 MW Gas Turbine COGEN
- 33,000RT Chilled Water underground distribution in Precinct 2
- Steam at 28tph, 7barG



# **Opportunities of COGEN**

# Future merge

Beneficial use of local energy resources (particularly through the use of waste, biogas etc.), providing a transition to a low-carbon future



# Way Forward : Green In – Green Out

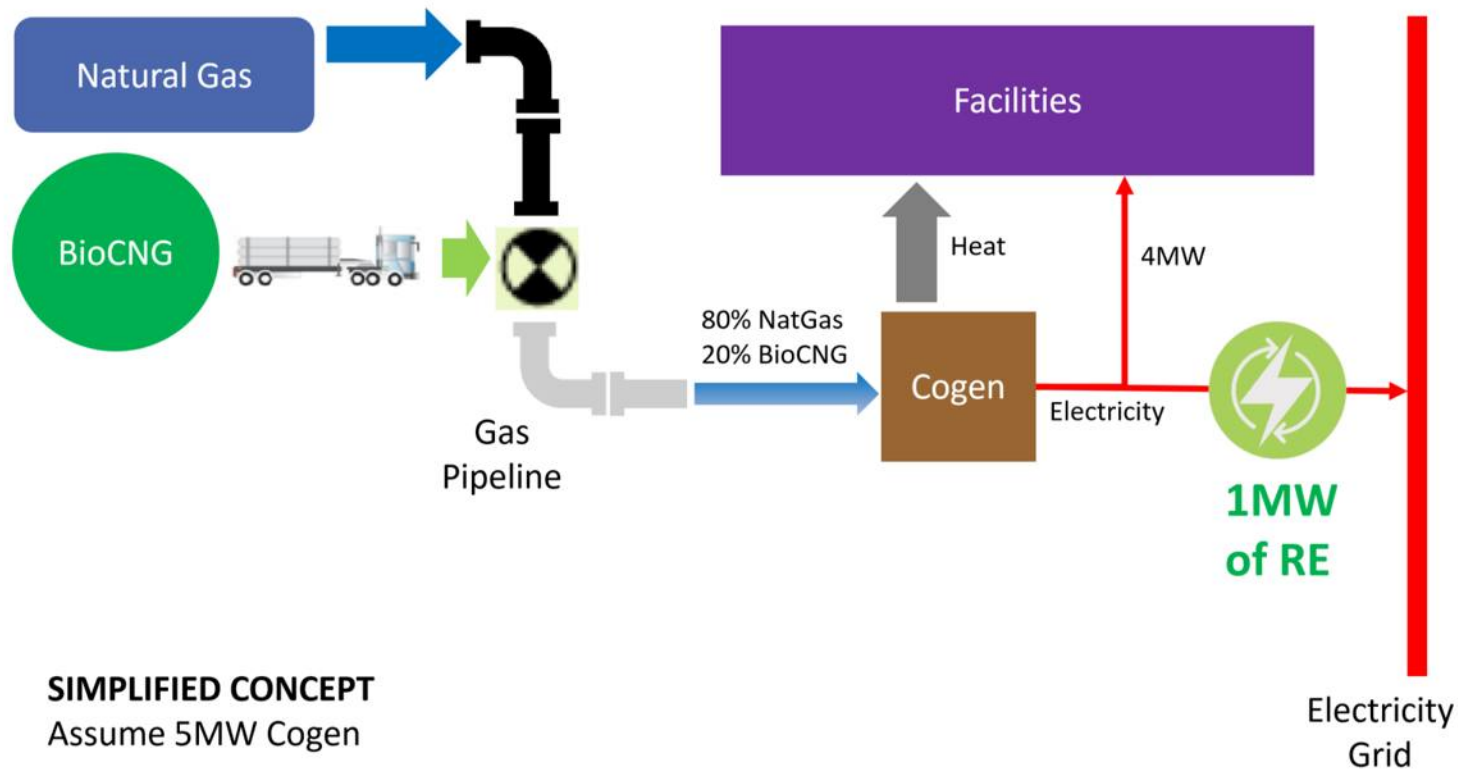


Industrial

Open 17

#NaturalGas - Fueling a sustainable future

## RE from BioCNG

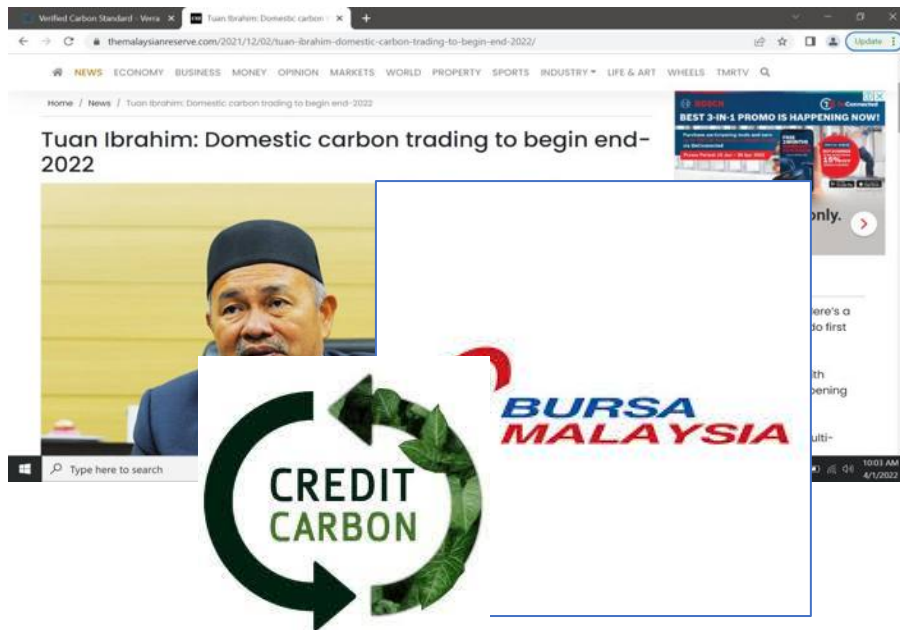


Source: Malaysia Gas Association



# Incentive

## Voluntary Carbon Trading Program by Malaysia Stock Exchange



- ✓ Bursa informed that they plan to regulate active trading/exchange at end 2022
- ✓ Carbon trading further boost COGEN application, and with renewable gas as opportunity

# Incentive

Malaysia Government promotes Energy Conservation (MIDA) for Incentive Tax Allowance (ITA)



**Note: Until End 2023**

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**Thank you**