

# Universiti Malaya's Journey to a Carbon-Neutral Campus with ESG and SDG initiatives

Presented by:

**Ir. Dr. Khairunnisa Hasikin**

Senior Lecturer, Faculty of Engineering, Universiti Malaya

Fellow, Universiti Malaya Sustainable Development Centre, Universiti Malaya



Session 1: 23<sup>rd</sup> August 2023



MATRADE Hall,  
MATRADE Exhibition & Convention Centre





To transform UM into a **model city campus** in advancing sustainable, green and carbon-neutral lifestyle and innovation



UM Walking the talk

**STEWARDSHIP**

Green & Sustainability Ranking



Action-oriented Research

**RESEARCH & INNOVATION**

**UM Living Labs @ UMSDC**

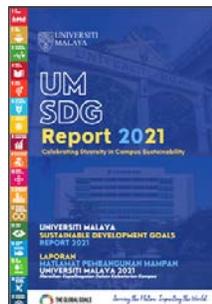


Inspire, Be Inspired

**CULTURE**

Green Culture @UM

UM Campus Sustainability Scorecard



# CONGRATULATIONS UNIVERSITI MALAYA!



Overall performance

**66th in the World**

**3rd in Asia**

**1st in Malaysia**

in QS World University Rankings:  
Sustainability 2023

700 GLOBAL INSTITUTIONS

9 MALAYSIAN INSTITUTIONS

In South East Asia:

**#1 Most Environmentally Sustainable Institution**

**#2 Most Socially Sustainable Institution**



@um.sustainability



@UniMalayaSDC



UM Sustainability

http://

<https://sustainability.um.edu.my>



Activate Windows  
Go to Settings to activate Windows



UNIVERSITI  
MALAYA



*Congratulations*

## ACHIEVEMENTS



**100%**  
Water  
Management  
Initiatives



**100%**  
Waste  
Management  
Initiatives



**90%**  
Setting &  
Infrastructure  
Initiatives



**97%**  
Education &  
Research  
(Sustainability)  
Initiatives



**79%**  
Transportation  
Management  
Initiatives



**59%**  
Energy &  
Climate Change  
Initiatives



**BEST  
WATER  
MANAGEMENT  
IN MALAYSIA**



**BEST  
WASTE  
MANAGEMENT  
IN MALAYSIA**



**BEST SETTING &  
INFRASTRUCTURE  
INITIATIVES  
IN MALAYSIA**

# UM Living Lab + Green Culture @ UMSDC

UM working together with partner cities, stakeholders and communities to be well placed in SDG, ESG and Carbon Neutral commitments and reputations

Internal LL grant to address  
UM's Circular Economy  
ambitions

**Circular  
Economy  
Living Labs Grant**

Internal LL grant to address  
UM Carbon Neutral Target  
by 2050

**Carbon  
Neutral  
Living Labs Grant**

Internal LL grant to  
address  
UM Eco-campus  
Blueprint

**Eco-campus  
Living Labs Grant**

Internal grant

Together  
with other  
research  
programmes  
in UM,  
become  
feeders for

Matching grant to address  
broader urban sustainability  
issues



Internal grant matched with external  
funding



Enculturation of green, low-carbon and sustainability values, skills and lifestyles among staff, students and connected communities

(Building a community with more passion for sustainability oriented lifestyle, research and engagement)

# Universities have a critical role in the achievement of the SDGs



## How do the SDGs help universities?

- Create increased demand for SDG related education
- Provide a comprehensive and globally accepted definition of a responsible university
- Offer a framework for demonstrating impact
- Create new funding streams
- Support collaboration with new external and internal partners

Knowledge

Learning

Demonstration

Impact

Collaboration



## How do universities help the SDGs?

- Provide knowledge, innovations and solutions to the SDGs
- Create current and future SDG implementers
- Demonstrate how to support, adopt and implement SDGs in governance, operations and culture
- Develop cross-sectoral leadership to guide the SDG response



## Universities are:

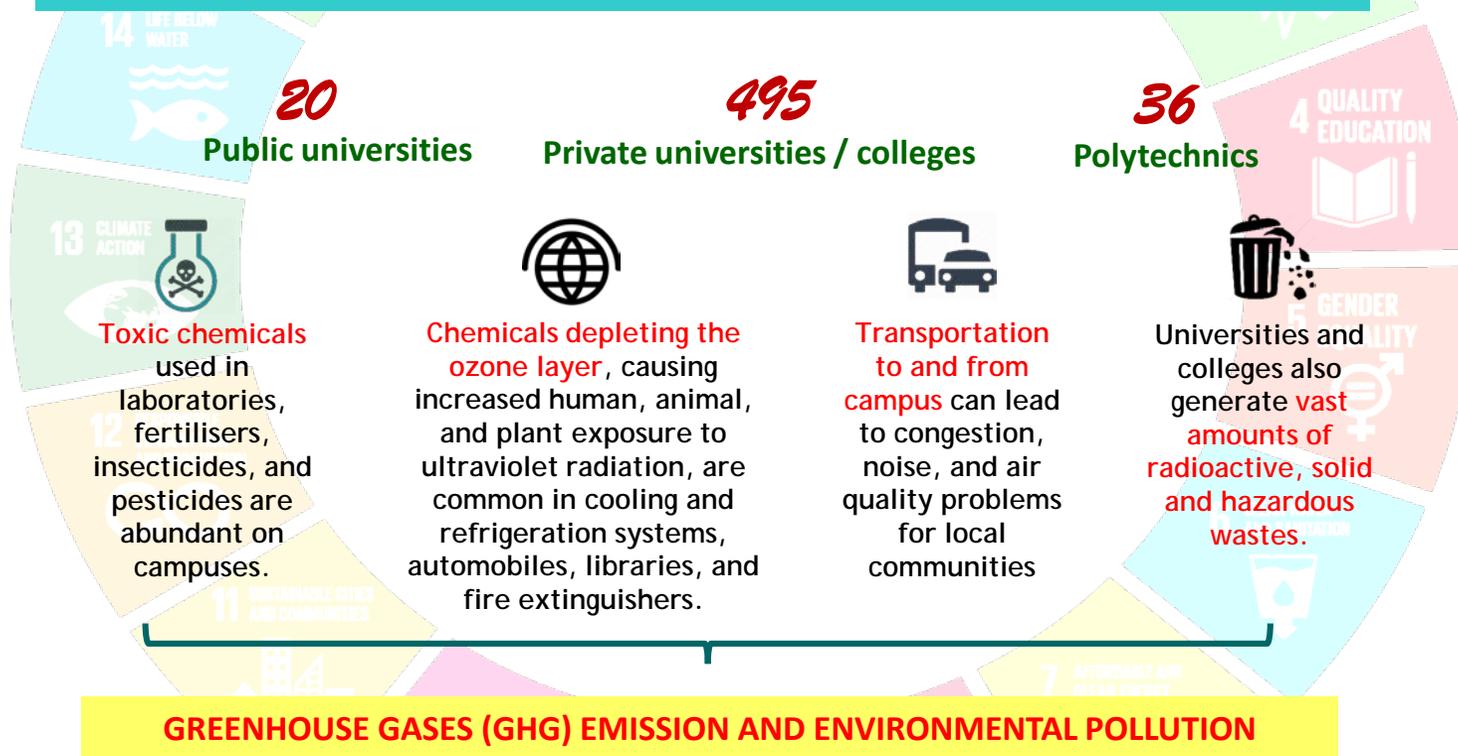
1. **Positioned ideally within society,**
2. **Universities helm the responsibility and credibility in the creation and dissemination of knowledge, and**
3. **Drivers of global and local agendas for the benefits of the society**

## Hence, UM should be at the forefront in implementing SDGs on the ground:

1. **To reduce footprint:** economic, social, and environmental burdens
2. **To optimize the use of (limited) resources / funding:** sharing resources and facilities
3. **To go beyond Business-as-Usual** (operations, governance, and culture) by closing all the gaps – promoting **Circular Economy model**
4. **To give emphasis on impactful initiatives that benefit the society**
5. **To partner and network** with internal and external partners

## LOCAL INSTITUTES OF HIGHER LEARNING'S IMPACT TO THE ENVIRONMENT

### Greening of Campus. Why is it Important?



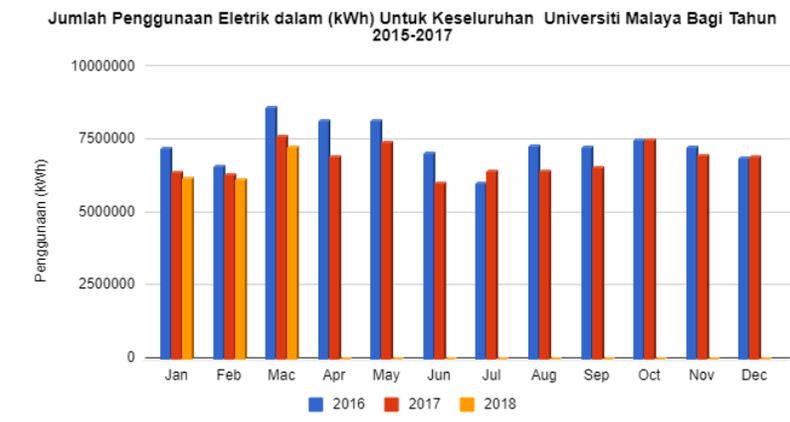
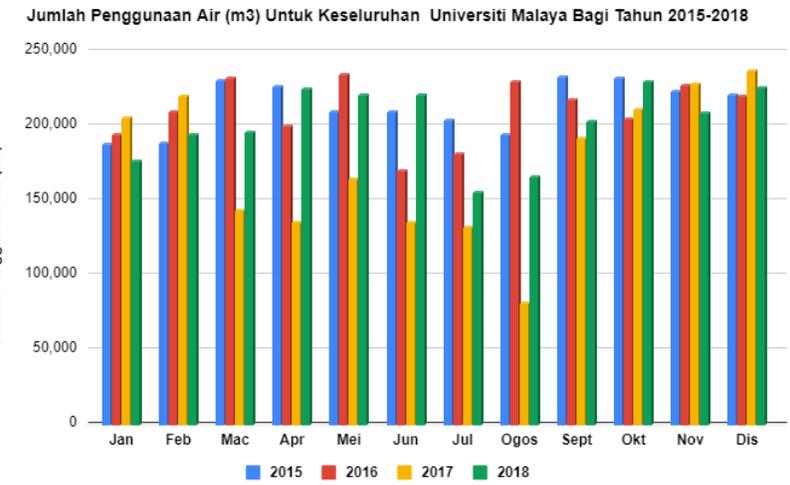
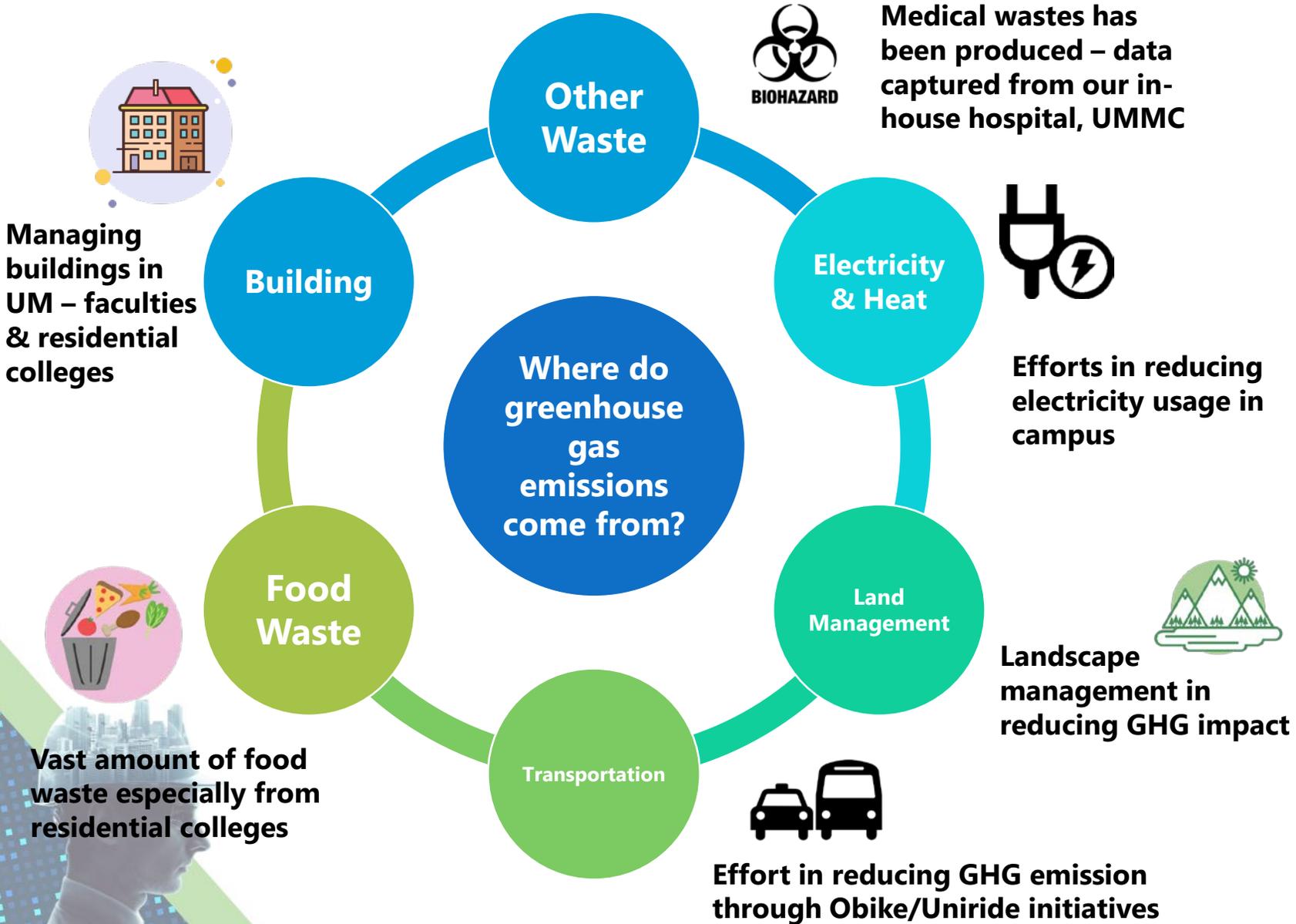
### GREENHOUSE GASES (GHG) EMISSION AND ENVIRONMENTAL POLLUTION

Source:

<http://eprints.lse.ac.uk/18893/1/Overcoming%20barriers%20to%20campus%20greening%28Isero%29.pdf>



# Greenhouse Gas Emissions in UM Campus

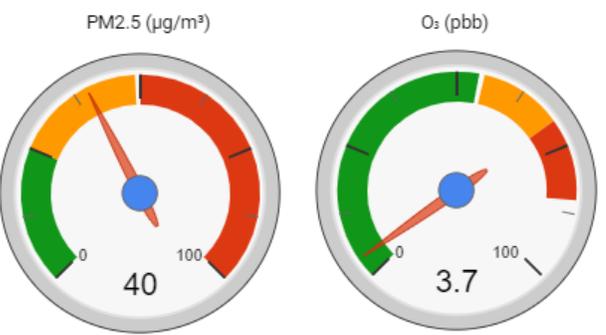




## Artificial Intelligence (AI) Assisted Greenhouse Gases Emission Monitoring: Towards Achieving Carbon Neutral Campus

Last Hour data as compared to average data

PM2.5 ( $\mu\text{g}/\text{m}^3$ ) <b>40</b> ↑ 23.02	CO <sub>2</sub> (ppm) <b>191</b> ↓ -220.85	O <sub>3</sub> (mg/m <sup>3</sup> ) <b>7.8</b> ↓ -21.03	NO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ ) <b>98</b> ↑ 40.21	CH <sub>4</sub> (ppm) <b>291</b> ↑ 77.4	Humidity (%) <b>82.4</b> ↑ 9.52	Temperature (°C) <b>29.1</b> ↓ -1.91
--	--	---	--	---	---------------------------------------	--



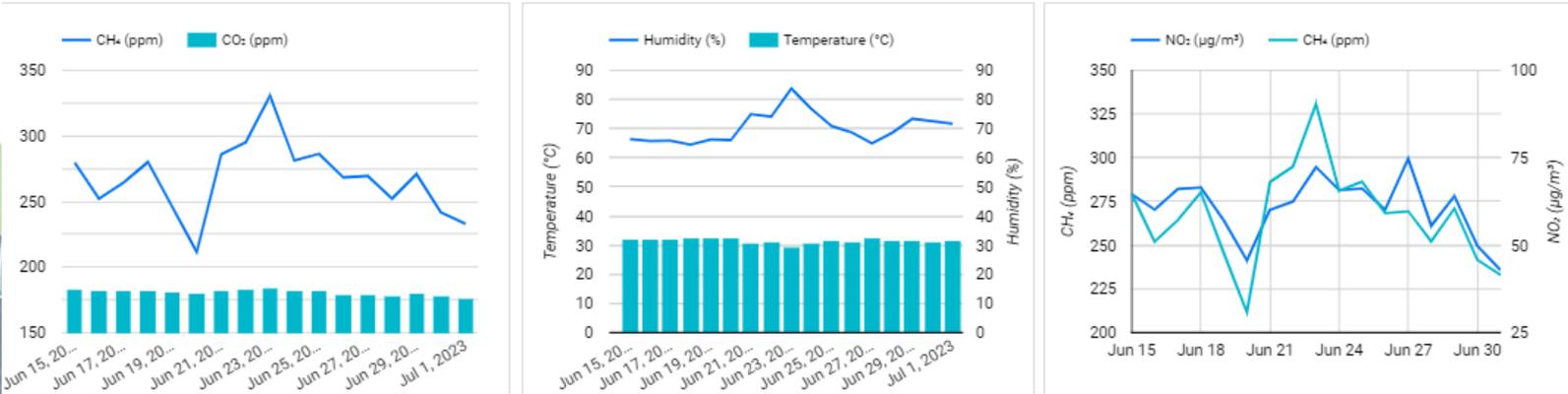
Equivalent to greenhouse gas emission from

- 0.34 petrol-powered vehicles driven for a year
- 6,224.98 km driven by an average petrol-powered vehicle

Equivalent to greenhouse gas emission avoided by

- 522.094 kg of waste recycled instead of landfilled
- 0.07458 garbage trucks of waste recycled instead of landfilled
- 65.31827 trash bags of waste recycled instead of landfilled
- 0.03400 incandescent lamps switched to LEDs

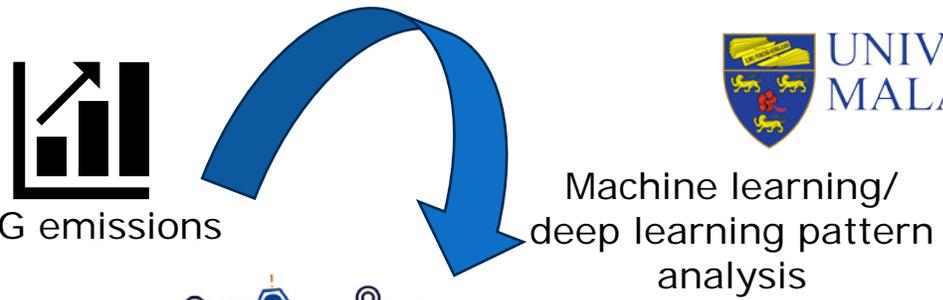
Daily Air Quality Data averaged



Real time data collection & monitoring



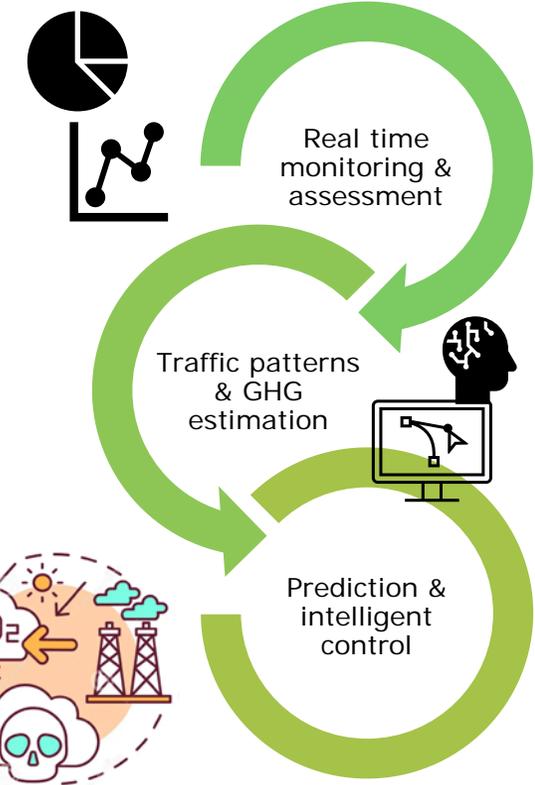
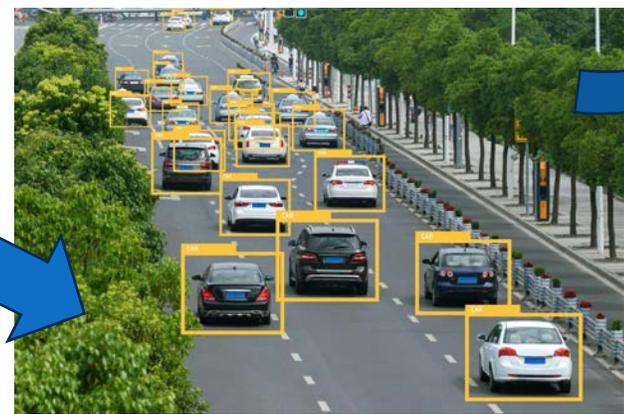
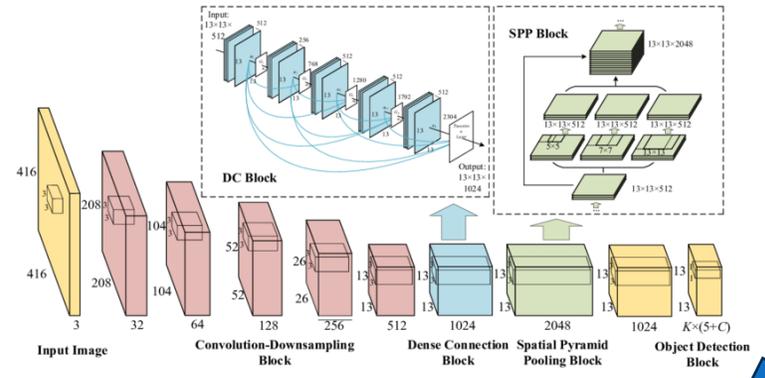
- Awareness & smart intervention
- Smart solution to reduce air pollution & CO2 emissions



GHG emissions

Data driven  
decision making

Video  
surveillance  
camera



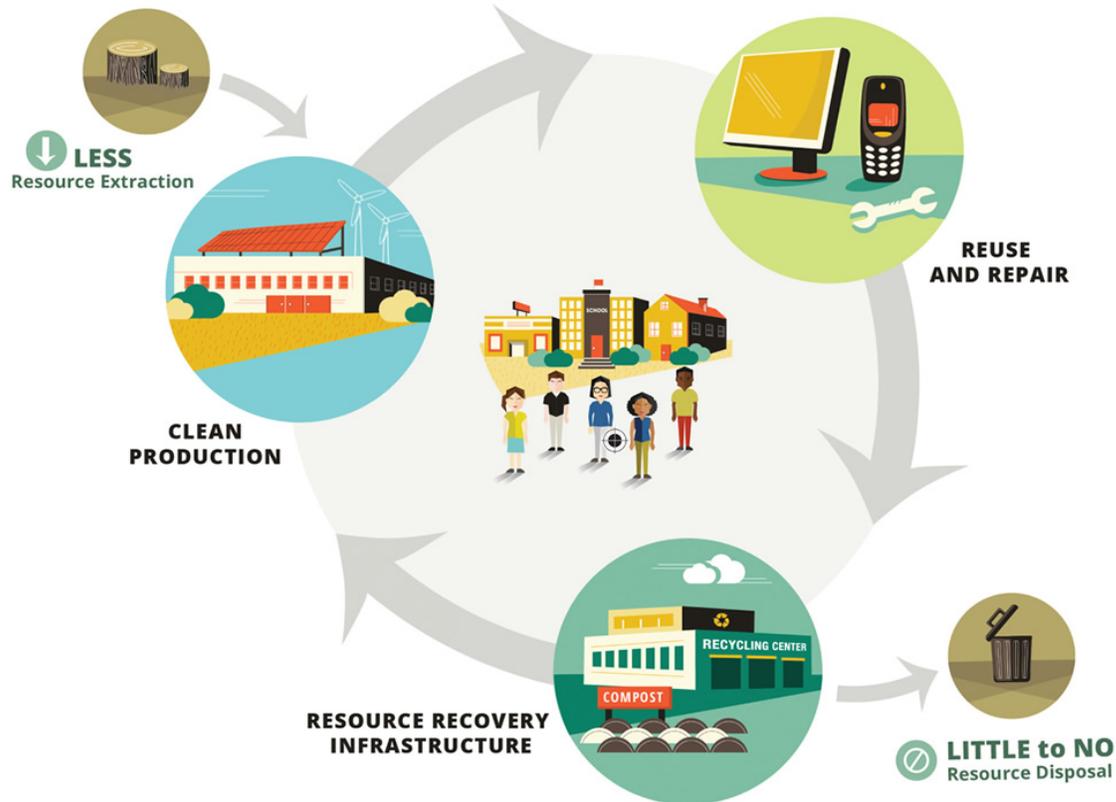
**Data driven Greenhouse Gas Emissions and Intelligent Vehicle Detection  
for Carbon-Neutral Urban Development**

# UM Zero Waste Campaign



To achieve a campus with zero waste to landfill with the development of integrated and sustainable waste management model

## Thriving Zero Waste Community



### '18th RECYCLING & BUYBACK PROGRAM' IMPACT (JULY 2023)

- 1006.5 kg** Total waste recycled by UM community
- RM 415.39** Income generation from the sale of recyclables
- 2,205kg CO<sub>2</sub>-eq** carbon emission avoided in June 2023 which equivalent to:
  - 105 of matured Pine trees that absorb CO<sub>2</sub> in 1 year!
  - OR
  - 955 Liter consumption of petrol!
  - OR
  - 5,954 kWh consumption of electricity!

Organized by: In collaboration with:

### UM ZWC ORGANIC GARDEN

Available now!

Organic Bird's Eye Chilli (Cili Api Organik)  
**RM5.00/0.5kg**

Available now!

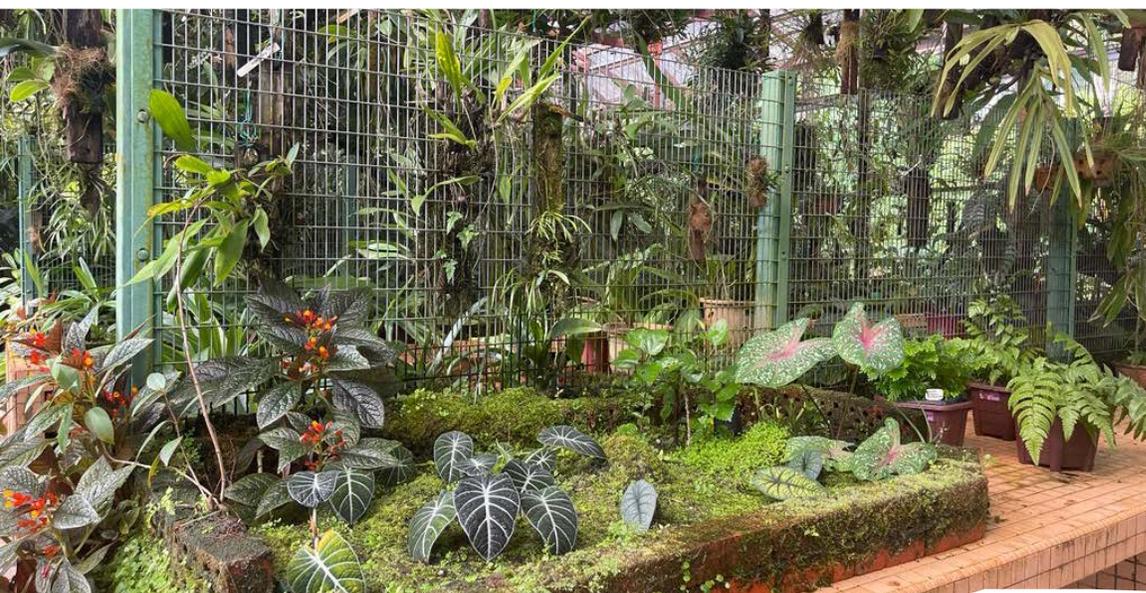
Organic White Spinach (Bayam Putih Organik)  
**RM2.50/1kg**

Healthily grown with the use of 100% UM ZWC Organic Compost.

**Refreshingly ORGANIC. Good for you and the Earth. Let's go ORGANIC!**

**CONTACT US**  
UM Sustainability & Living Labs Secretariat: 05-79674655  
Hisyam: 011-16944702  
Mai: 011-55440310  
or  
Visit Universiti Malaysia Zero Waste Campaign (ZWC), 50005 Kuala Lumpur.

# The Rimba Project



# The Rimba Project



#RHBtouchhearts Biodiversity Conservation with Rimba Project – 19 August 2023



# The Rimba Project

## Rimba Ilmu Botanical Garden

- Established in 1974, occupies an area of 80 hectares
- Living collections over 1,600 species
- Old rubber plantings, plant species from other part of tropical Asia, the Pacific Island, Australia, South America, Africa & Madagascar

Kompleks Perdanasiswa (KPS) Cooling System



Dewan Tunku Canselor Cooling System



Botanical Garden



Using recycle water from rainwater to water the plants around campus & water-cooling systems

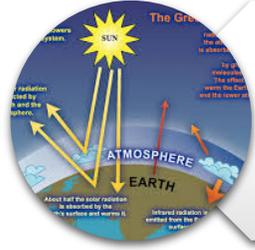
Musolah Academy Islamic Studies



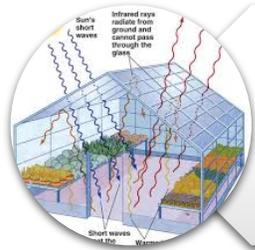
The rainwater is recycled for the use of ablutions (Muslims) at Academy Islamic Studies Mosque. The rainwater will undergo few stages of water treatment such as sand filtration and UV filtration before flow to tap.



# Moving Forward



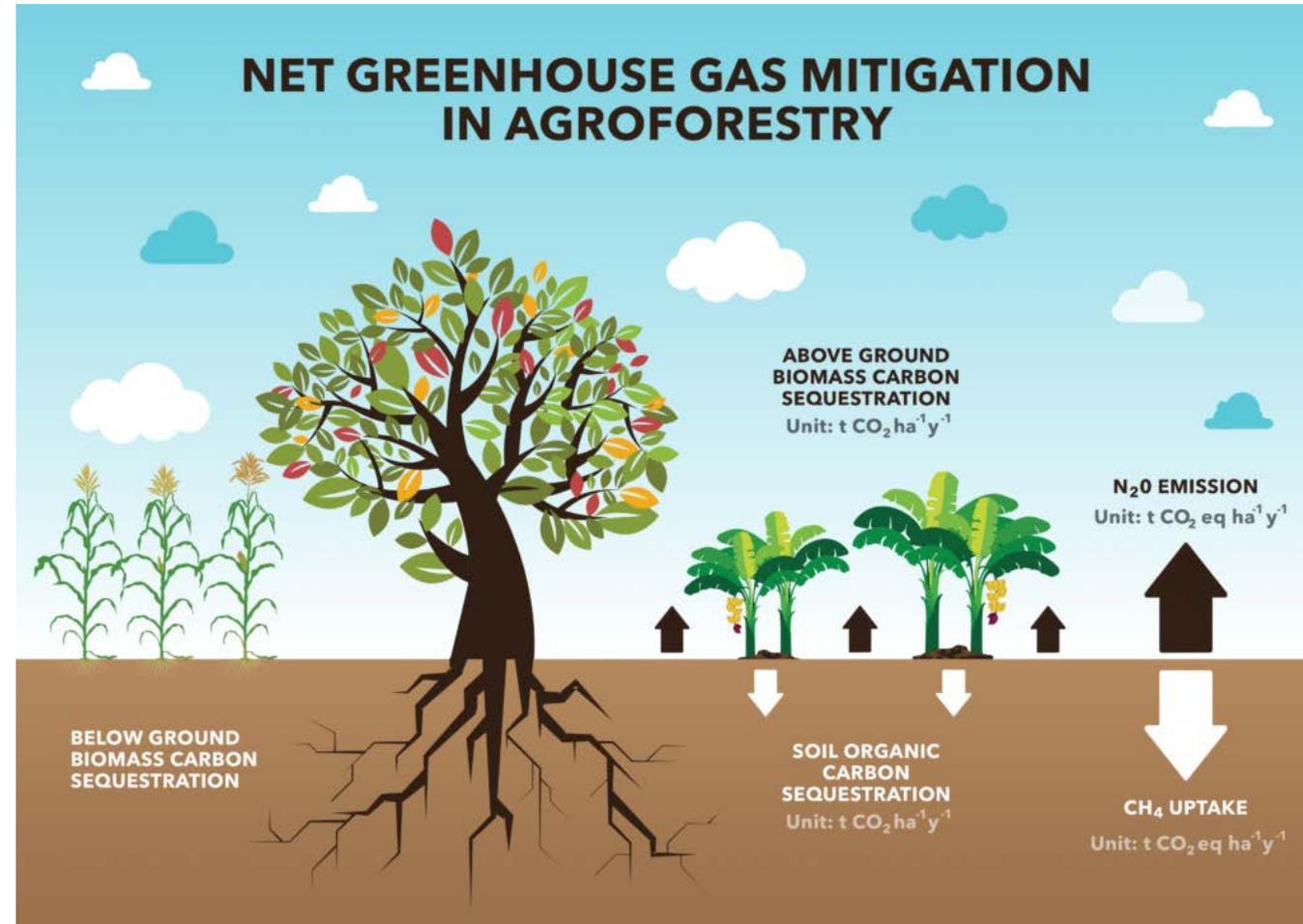
Reducing global energy use



Development of low-carbon or non-carbon emitting new energy



Absorbing and fixing CO<sub>2</sub> from the source or atmosphere



# SUSTAINABILITY APPROACHES



**Sustainable  
Development**



**Participatory**



**Living  
Document**

**Shared  
Responsibility**



**Precautionary  
Principle**



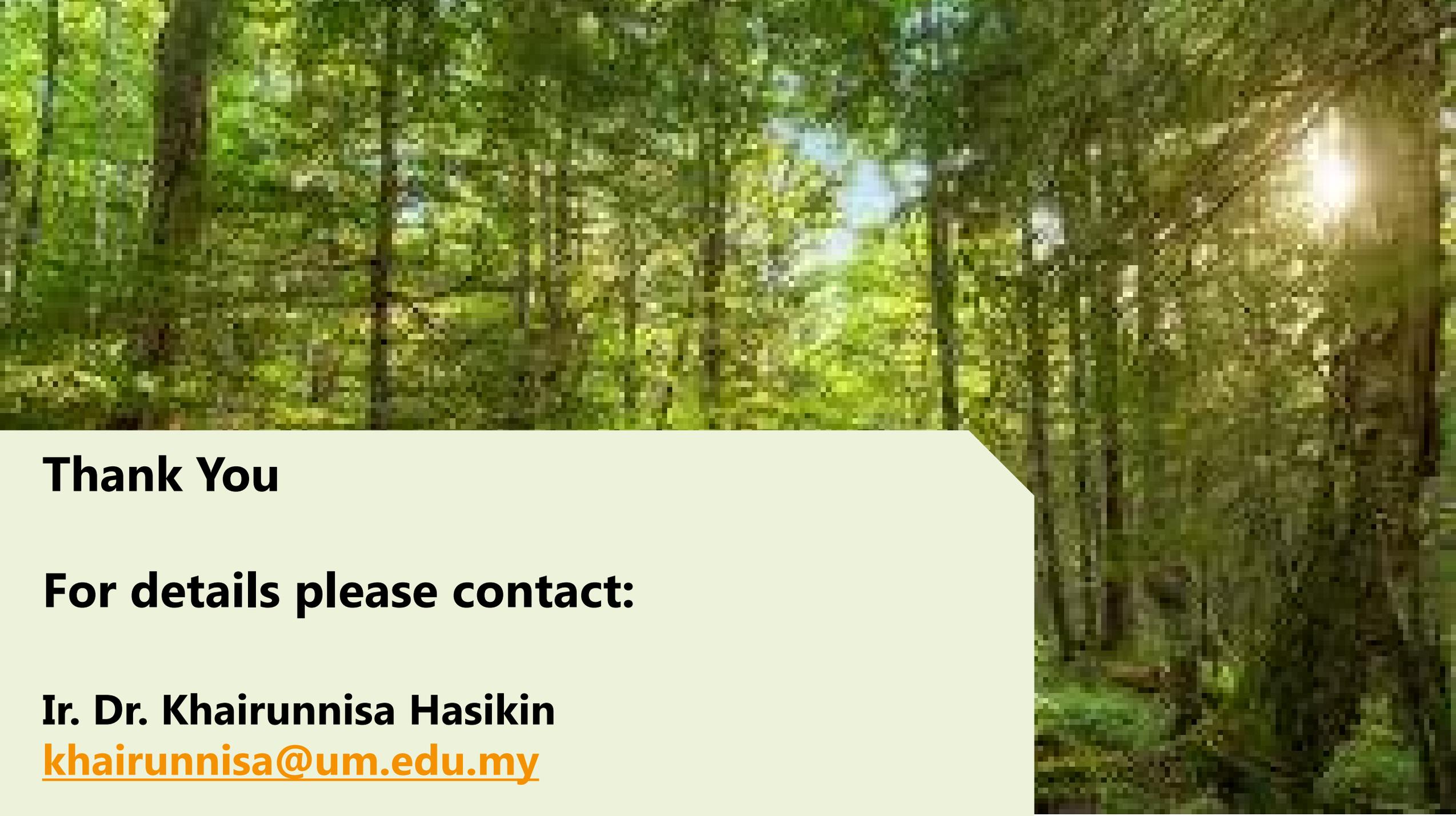
**Good Governance**





# Q & A



A photograph of a dense forest with tall, thin trees and a thick canopy of green leaves. Sunlight is streaming through the trees from the upper right, creating a bright, hazy glow and illuminating the scene. The overall atmosphere is peaceful and natural.

**Thank You**

**For details please contact:**

**Ir. Dr. Khairunnisa Hasikin**  
**[khairunnisa@um.edu.my](mailto:khairunnisa@um.edu.my)**



# THANK YOU



*“Committed To Engineering Excellence”*

**BOARD OF ENGINEERS MALAYSIA**

Tingkat 11 & 17, Blok F Ibu Pejabat JKR

Jalan Sultan Salahuddin, 50580 Kuala Lumpur

<http://www.bem.org.my>

[enquiry@bem.org.my](mailto:enquiry@bem.org.my) or [complaint@bem.org.my](mailto:complaint@bem.org.my).

Tel: 03-26912090; Fax: 03-26925017

