

# **WASTE-TO-ENERGY (WTE)**

## **A Look at Renewable Energy for Low Carbon Cities**

**Prof Mohd Hamdan Ahmad & BK Sinha**

Malaysia Green Building Council (malaysiaGBC)

# WASTE-TO-ENERGY (WTE)

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### WHAT IS LOW CARBON SOCIETY?



A society that **consumes sustainable and relatively low carbon energy** in order to avoid adverse climate change.

Low Carbon Society (LCS) will **adopt a lifestyle** that consume **energy efficiently**, makes more use of **renewable energy**, **less dependence on fossil fuel** and **practice 3Rs** (reduce, reuse, recycle), in their everyday life .

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### RENEWABLE ENERGY ALTERNATIVES



MSW TO WTE ALTERNATIVE

<https://depositphotos.com/84356272/stock-illustration-electricity-generation-plans-and-sources.html>



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### WASTE IN MALAYSIA

The average Malaysian throws away **1.64 kg** of waste daily, compared to the worldwide average of **1.2 kg**



Malaysia's waste production will increase **65%** to 17,000 tonnes per day by **2020**



#### Points to ponder

→ KL residents generate **3,500 tonnes** of rubbish per day



> This could fill Petronas Twin Towers in **40 days**

> It would take **30 days** to fill the 28ha site of TRX to the height of **2m**

Tun Razak Exchange

→ KL residents illegally dumped **23,000 tonnes** of rubbish in the past five years



→ Alam Flora collects **130 tonnes** of fat, oil and grease from KL drains per day



→ It costs about RM**325mil** a year to collect and dispose waste



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- Sanitary landfill alone would not be able to cope with future demand and waste generation.
- WTE plant can be 'positive' solution



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- Govt targets six waste-to-energy plants by 2021
- WTE system is cleaner, more productive and economical than conventional landfill that requires a large area of land.
- pilot WTE plant project at the Sungai Udang landfill will then be followed by the implementation of the same system at the landfills in Bukit Payung, Terengganu; Seelong, Johor; Samling, Selangor and Jabor, Pahang.
- Melaka government had reportedly planned to build RM3.6 million WTE plant on a 3.84-hectare site to address the problem of waste disposal in the state.
- The WTE facility is expected to receive 1,000 tonnes of solid waste daily and is capable of producing up to 25-megawatt of green energy to provide electricity to 25,000 households around the area.

*July 03, 2020 - Minister of Housing and Local Government Zuraida Kamaruddin*

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### WHY WTE?



### HOW WTE?



- Lifespan of a normal landfill was about seven years but the WTE could last about 20 years.
- Investment for the normal landfill with the WTE, the cost would be about 10 times higher.

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### POTENTIAL OF WTE

#### WHAT IS OUR WASTES' INTRINSIC ENERGY?

The variety of wastes we throw in a regular bin actually has the energy to power **265 LED light bulbs** for 1 hour



Garden  
**3 LED**  
light bulbs

Food  
**144 LED**  
light bulbs

Plastic  
**91 LED**  
light bulbs

Textile  
**7 LED**  
light bulbs

Paper  
**20 LED**  
light bulbs



WORLDWIDE  
ENVIRONMENT

Source:

1. Menipura, Nirmala - Application of Waste to Energy Concept Based on Experimental and Model Predictions of Calorific Values for Enhancing the Environment of Kandy City
2. JPSPN - Survey on Solid Waste Composition, Characteristics & Existing Practice of Solid Waste Recycling in Malaysia

#### A COMPARISON OF **DIOXIN** EMISSIONS

**0.001**  
ngTEQ/Nm<sup>3</sup>  
WASTE-TO-ENERGY (WtE)

**0.060**  
ngTEQ/Nm<sup>3</sup>  
WOOD COMBUSTION

**0.098**  
ngTEQ/Nm<sup>3</sup>  
TRUCKS ENGINE

**0.140**  
ngTEQ/Nm<sup>3</sup>  
CIGARETTE SMOKE

**0.150**  
ngTEQ/Nm<sup>3</sup>  
NATURAL GAS HEATING

**0.843**  
ngTEQ/Nm<sup>3</sup>  
COAL STOVE

WtE emission is  
**100 to 140**  
times lower than  
engine and  
smoking!

\*The unit ngTEQ/Nm<sup>3</sup> is expressed as nanograms of toxic equivalence quotients per normal cubic meter

Source: The MVV Energie CZ Website

WORLDWIDE  
ENVIRONMENT

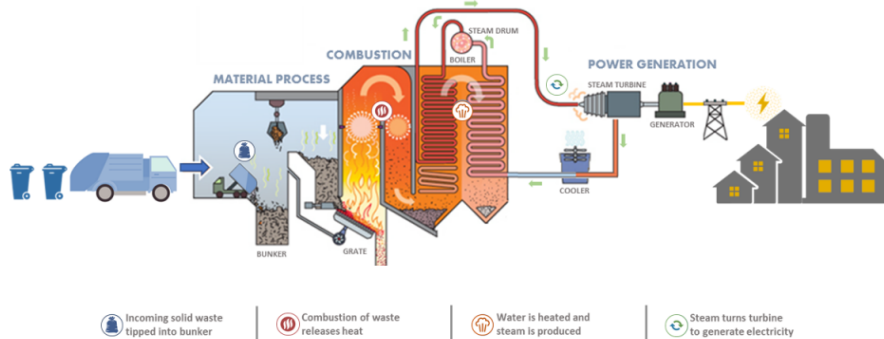


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WORLDWIDE  
ENVIRONMENT

### TURNING WASTE INTO ENERGY



**WTE PLANT** is a waste processing facility which converts solid waste into heat, steam and electricity

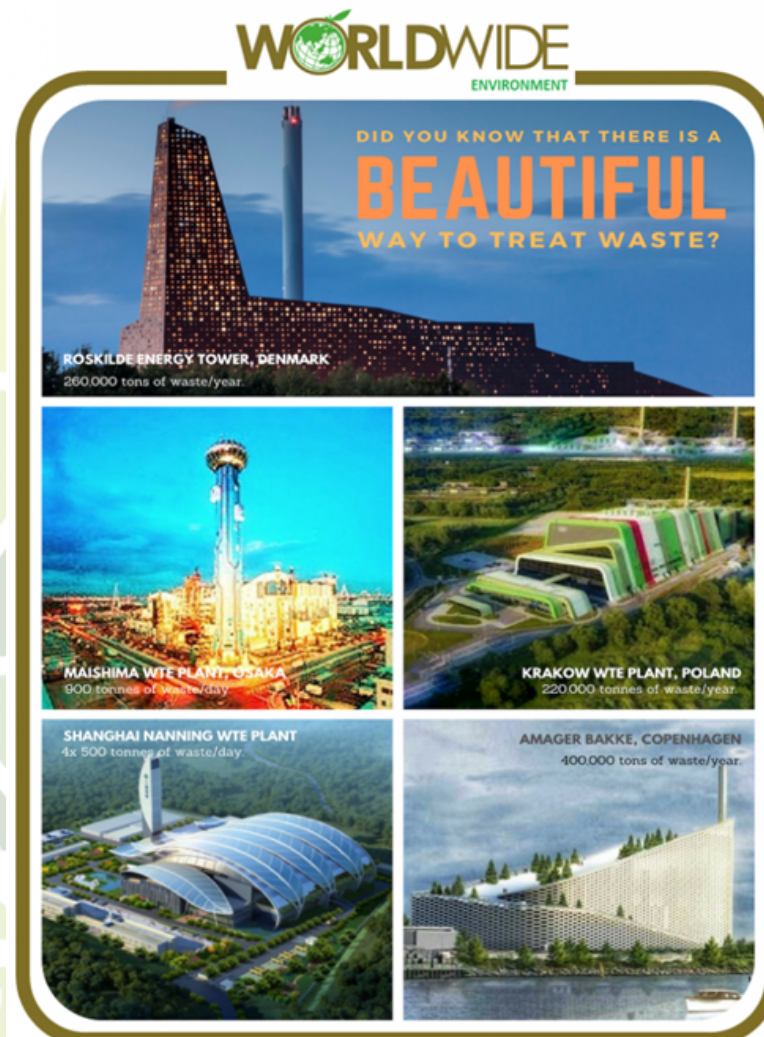
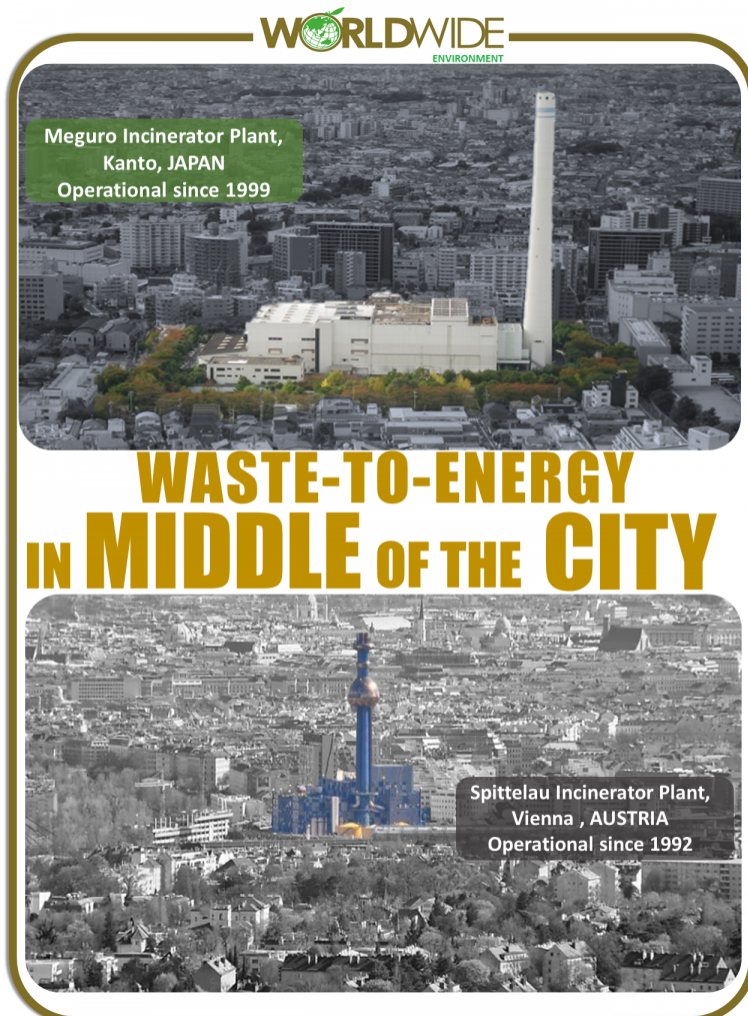
### WtE BOTTOM ASH BENEFICIAL USE



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### EXAMPLE OF WTE PLANTS



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### Thermal Waste Incinerators & Future WTE in Malaysia

Pulau Langkawi, Kedah



100 Tan Sehari

Cameron Highland, Pahang



40 Tan Sehari

Pulau Pangkor, Perak



20 Tan Sehari

Pulau Tioman, Pahang



15 Tan Sehari

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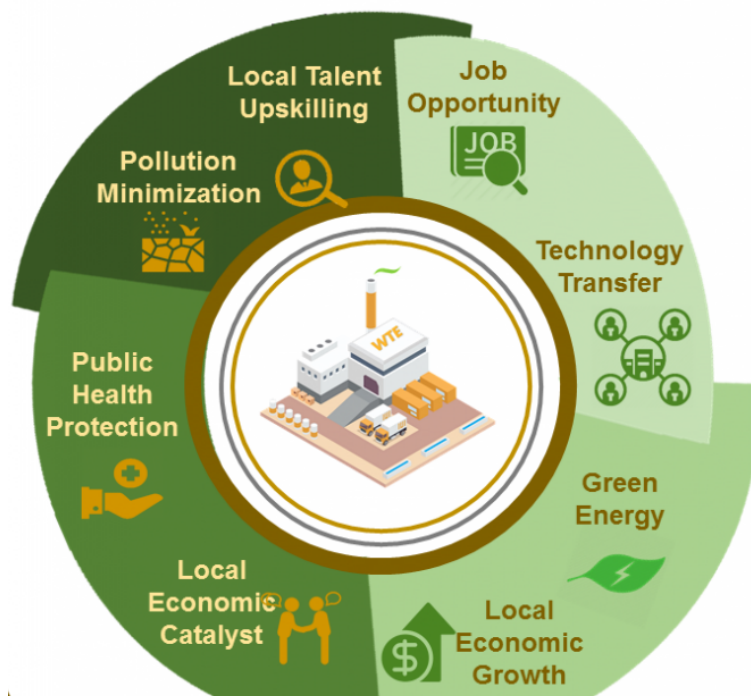


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### BENEFIT & CHALLENGES

#### HOW WASTE-to-ENERGY BENEFITS LOCAL COMMUNITY



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### CHALLENGES OF WTE



# WASTE-TO-ENERGY (WTE)

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Thank You! Terima Kasih! 谢谢! धन्यवाद!

malaysiaGBC