

REDUCTION IN RESOURCES USE AND GHG EMISSIONS BY UTILISING THE BIOMASS WASTES IN THE MALAYSIAN OIL PALM INDUSTRY

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MALAYSIAN OIL PALM INDUSTRY

- The Malaysian oil palm industry contributes immensely to the nation's economy.
- Total export earnings of RM 64.59 billion in 2016.
- Land coverage of 5.74 million hectares.
- Agriculture based industry with huge amounts of biomass as wastes.
- What happens to these wastes?

Abundance of Oil Palm Biomass



AVAILABILITY OF THE VARIOUS WASTES IN 2016



12.12 MILLION
TONNES

**PRESSED MESOCARP
FIBRE**



19.90 MILLION
TONNES

EMPTY FRUIT BUNCH



6.06 MILLION
TONNES

PALM KERNEL SHELL



56.30 MILLION
TONNES

PALM OIL MILL EFFLUENT



USE OF BIOMASS IN THE BOILERS AT THE PALM OIL MILL

PALM KERNEL SHELL



GHG Savings:
2.0kgCO₂eq /kg PKS

CV: 20 MJ/kg
MC: 12 %
Displaces : 3.6kWh/ t PKS



EMPTY FRUIT BUNCH



GHG Savings:
1.2kgCO₂eq /kg EFB

CV: 18.88 MJ/kg
MC: 67 %
Displaces : 2.0kWh/ t EFB

PRESSED MESOCARP FIBRE



GHG Savings:
1.5kgCO₂eq /kg PMF

CV: 19 MJ/kg
MC: 37 %
Displaces : 2.5kWh/ t PMF

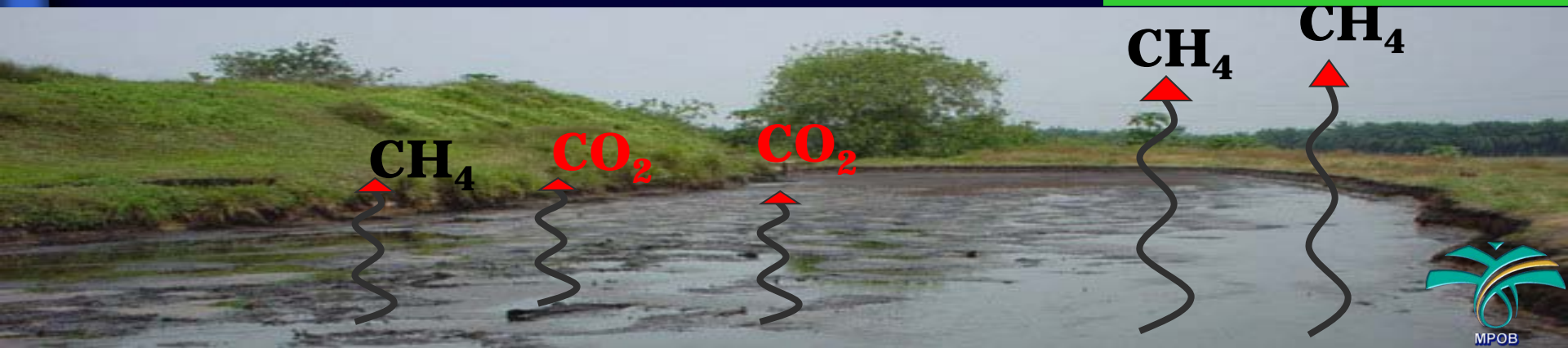


BIOGAS FROM PALM OIL MILL EFFLUENT

- It contains about 60-70 % Methane (CH_4), 30-40 % Carbon Dioxide (CO_2) and trace amount of Hydrogen Sulphide, (H_2S)
- Methane - a greenhouse gas (GHG), the global warming potential – 25 times higher than CO_2
- Potential yield: 1 m^3 of completely digested POME produces 28 -38 m^3 biogas
- CV of biogas : 20MJ/ m^3 biogas, Displaces 2.7 kWh/ m^3 non- renewable energy
- Economic Transformation Programme by Gov of Malaysia envisages all palm oil mills to capture biogas or methane avoidance



GHG Savings:
13.4 $\text{kgCO}_2\text{eq} / \text{m}^3$ biogas



EFB Mulching/ Fertiliser substitute

Normal application : 30.0 – 60.0 t /ha

1 tonne EFB Displaces :
Urea : 3.0 kg
Rock Phosphate : 0.4 kg
Muriate of Potash : 12.0 kg



GHG Savings:
3.3 kgCO₂eq /t EFB

CONCLUSIONS

- Utilisation of wastes converts waste to wealth
- Ultimately reduces use of resources
- Reduction in GHG emissions due to displacement of resources.





Thank You

