

Towards A More Sustainable Palm Oil Industry

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Presentation Outline

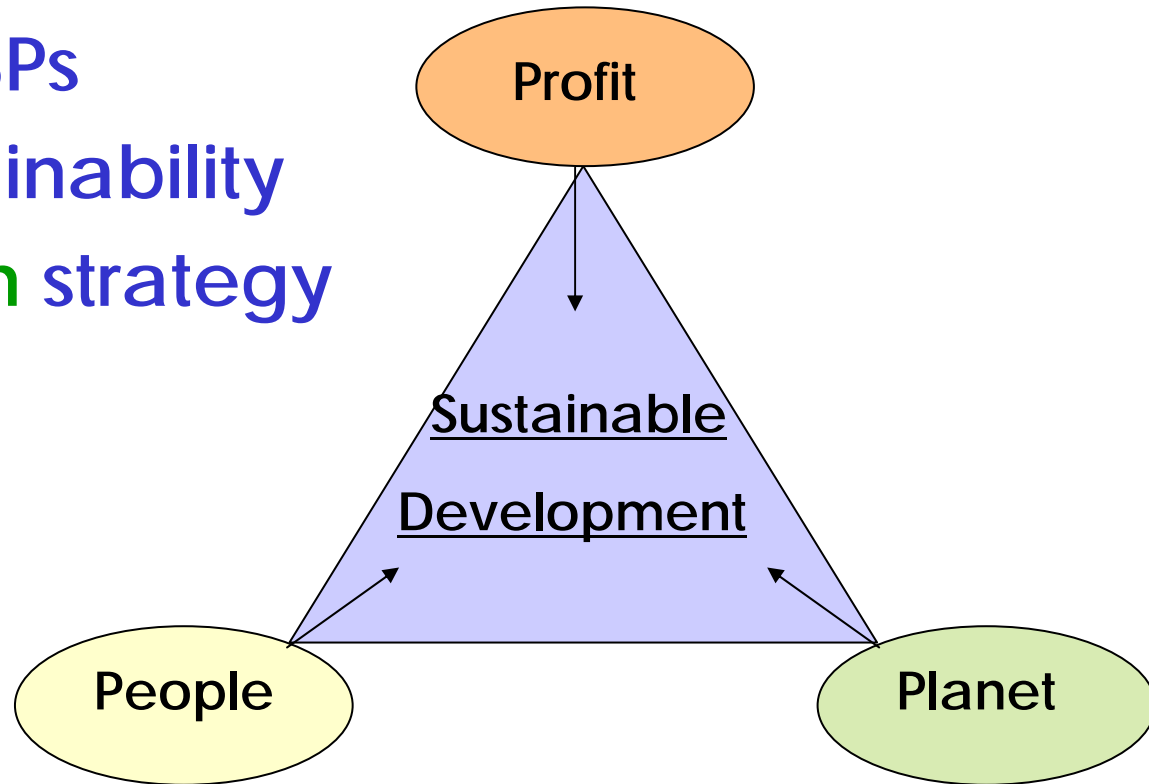


- The 3 Ps – Profit, People, Planet
- Waste Management and Utilisation
- Palm Oil Industry and Malaysian Socio-Economy
- Value Addition, Wealth Creation and Zero Emission
- Sustainable Palm Oil Industry... win-win-win
- Current Issues

The 3 Ps – Profit, People and Planet



- Merging the 3Ps
 - Towards sustainability
- >>> **win-win-win** strategy



Palm Oil Industry and Malaysian Socio-Economy



Facts and figures..

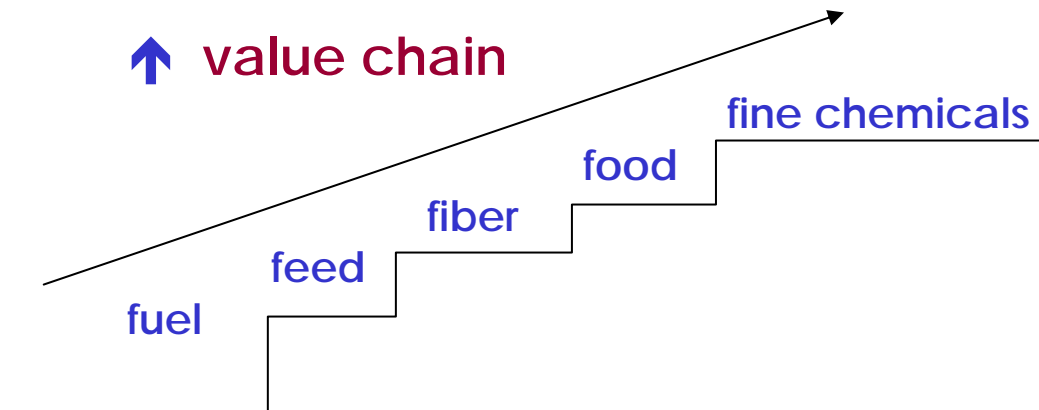
- Now 4 million hectares (~10% of Malaysia)
- (more than 50% of Malaysia is rainforest)
- (Malaysia is net carbon absorber/sink)
- (oil palm canopy is similar to rainforest)
- (oil palm is perennial crop, 25-30 years)
- 400 mills throughout Malaysia
- Highest oil yielding crop in the world
- Palm oil - Malaysia's gift to the world!
- Palm oil is the cheapest cooking oil
- Palm kernel oil is source for oleochemicals
- USD15 billion export in 2008
- More than 500,000 people employed
- Poverty alleviation
 - land ownership & stable income
 - >>> FELDA's success story (50 years!)
- Sustainable Development
 - 3Ps: Profit, People and Planet
 - challenge: "win-win-win" strategy
 - need to address the bigger picture



Adding Value to Palm Biomass

- Paradigm shift towards biomass
 - Not waste
 - Renewable
 - Sustainable
 - Under-utilised resource
- Uncertainties of biomass
 - Technological proven ?
 - Economically feasible ?
 - Quality and quantity ?
 - Availability & distribution ?

↑ value chain





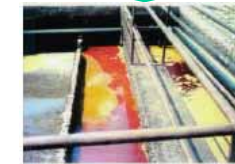
New Business and Products from Palm Biomass



Standardised biomass available
"business as usual"



Empty Fruit Bunch
16 million t/yr



Palm Oil Mill Effluent
50 million t/yr

"zero emission"
waste-to-wealth

+ water recycling

Bioplastic (PLA)
or Bioethanol

Compost



Fermentation in
bioreactors

Pre-treatment and
Saccharification

Sugars



Biomass Energy



Biogas, CH₄ (+ Biohydrogen)

Bio-acids



Bioplastic
(PHA)

Renewable Energy (1 MW) to Grid



Estimated Costs, RM (million)	
Biogas capture (ponds or tanks)	1.8
Downstream processing (gas scrubber & gas storage)	2.0
Gas engine @ 1000 kW	1.2
Total plant cost	5.0
Yearly maintenance and operation cost	0.5

Benefits and revenues generated :

- Internal office use and external lighting ("24/7")
>>> reduce diesel cost/usage during mill's non-operating hours
- Sale of green electricity to TNB @ RM0.25/kWh ~ RM 1 million/yr
- Aeration system to remove remaining BOD
increased POME treatment efficiency >>> water re-use >>> zero emission!
+ reduced land requirement (~70% of total mill area)
- Estimated sale of CER @ €10 per tonne CO₂ ~ RM 1 million/yr

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(Assumption: mill capacity of 60t FFB/hr and 320 days of operation)

Steam Co-Generation

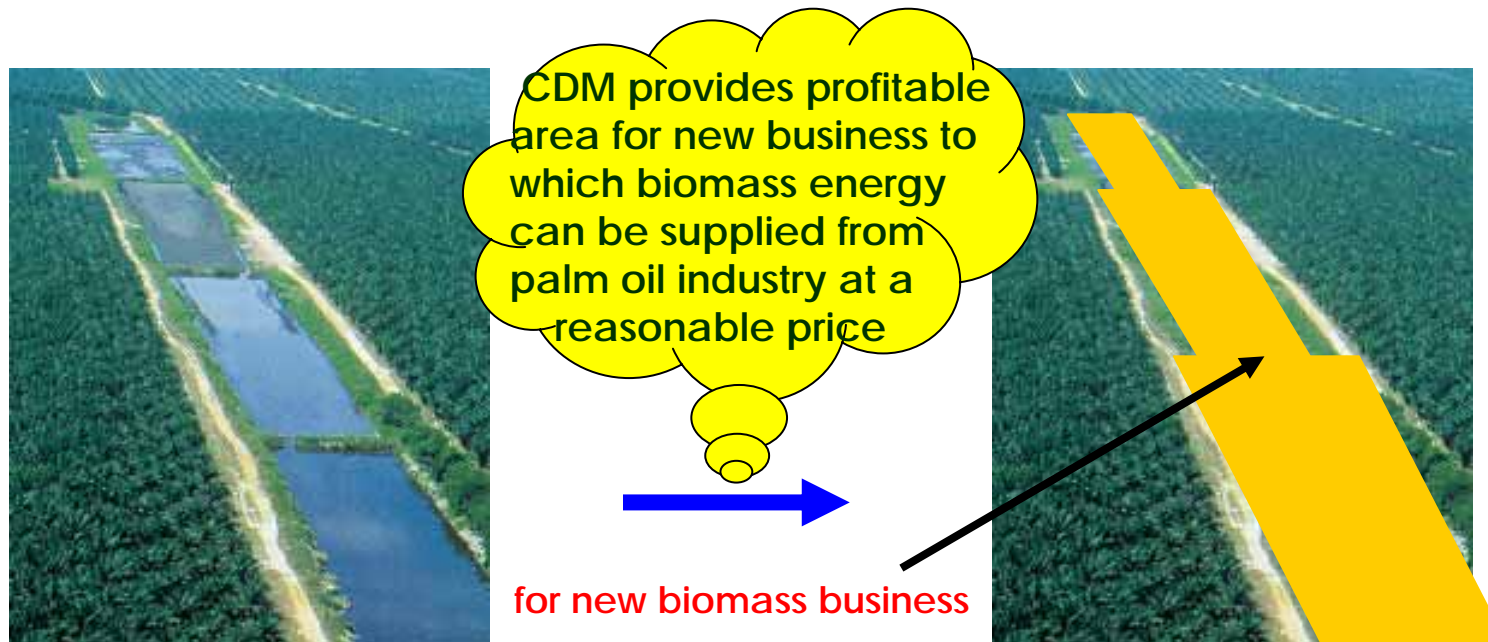


	Estimated Costs, RM (million)
Biogas capture (ponds or tanks)	1.8
Downstream processing, gas storage & boiler modifications	1.7
Total plant cost	3.5
Yearly maintenance and operation cost	0.3

Benefits and revenues generated :

- Additional income from palm kernel shell @ RM100/tonne
 - >>> reduce 50% shell usage inside the boilers
 - >>> potential revenue ~ RM 1 million/yr
- Reduce black smoke emission from boilers
 - >>> increase air quality/environmental benefits
- Estimated sale of CER @ €10 per tonne CO₂ ~ RM 1 million/yr

Towards Sustainable Development of Palm Oil Industry in Malaysia



CDM provides a complete methane fermentation system and change lagoon area into a profitable area.

CDM provides electricity from methane fermentation system for new business
>>> towards zero emission and **w2w!**

1. Reduction of greenhouse gases emission by sealing the lagoons.
2. Prevention of undesirable smell and water pollution by modern treatment (+ water recycling).
3. Local employment can be encouraged from new business.

Based on the economic growth in Malaysia, the development of new oil palm plantations in the tropical rainforest will soon be no longer feasible. In order to meet the increasing demand for palm oil in the future, palm oil industry must co-exist with other industries and people... >>> 3P (**Profit**, **People**, **Planet**)

Current Issues



- Palm oil is unhealthy oil?
- Palm oil is dirty oil?
- Palm oil is cruel oil?
- Carbon footprint
- Energy efficiency
- Water footprint
- Roundtable for Sustainable Palm Oil (RSPO)
- Land use change
- Life cycle assessment