

Energy

A new core product for the palm oil sector ?!

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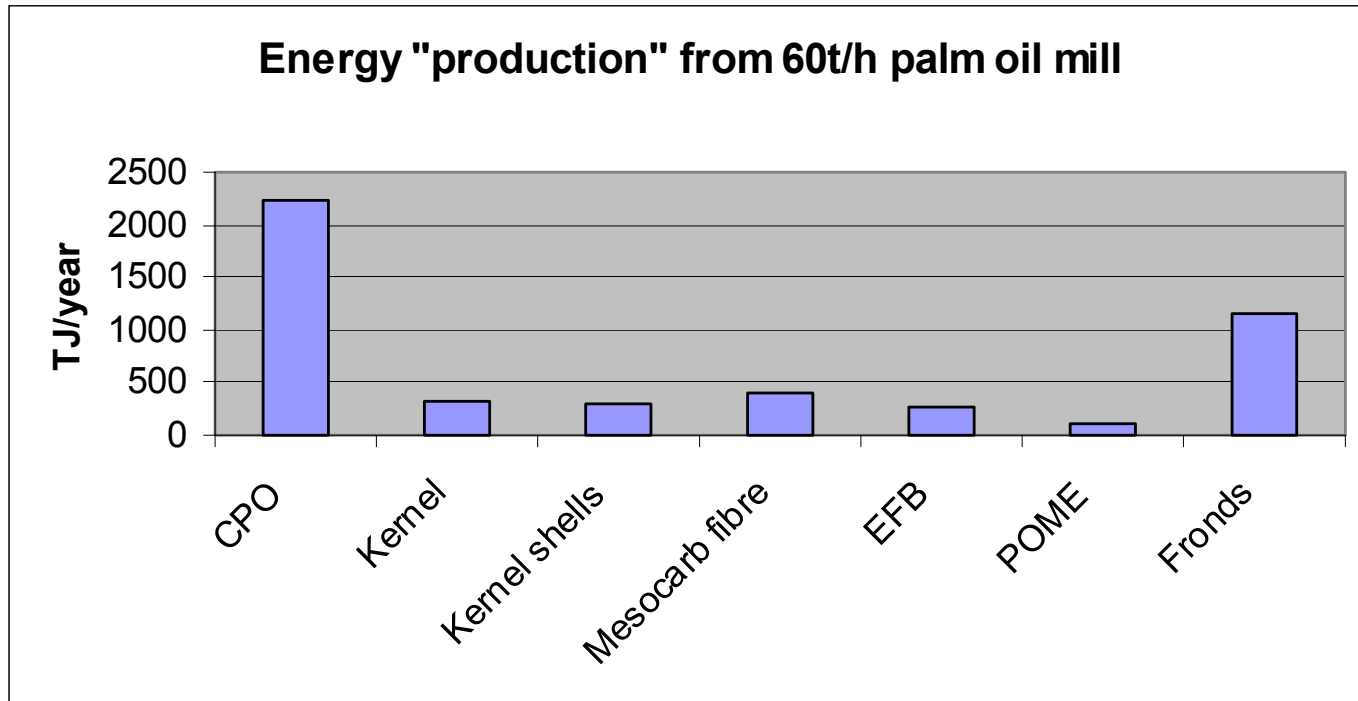
Out line of the presentation

- Palm oil sector seen from an energy perspective
- Palm oil sector as supplier of transport fuel
- Options for increased value from non-oil products
- What's in it economically ?
- - And how to get on?

Renewable Energy and Energy Efficiency

- Start in March 2003
- Placed in Economic Planning Unit working with background analysis for Ninth Malaysia Plan
- Input: 47 man month international consultants + 66 man month local
- Financed by Danida

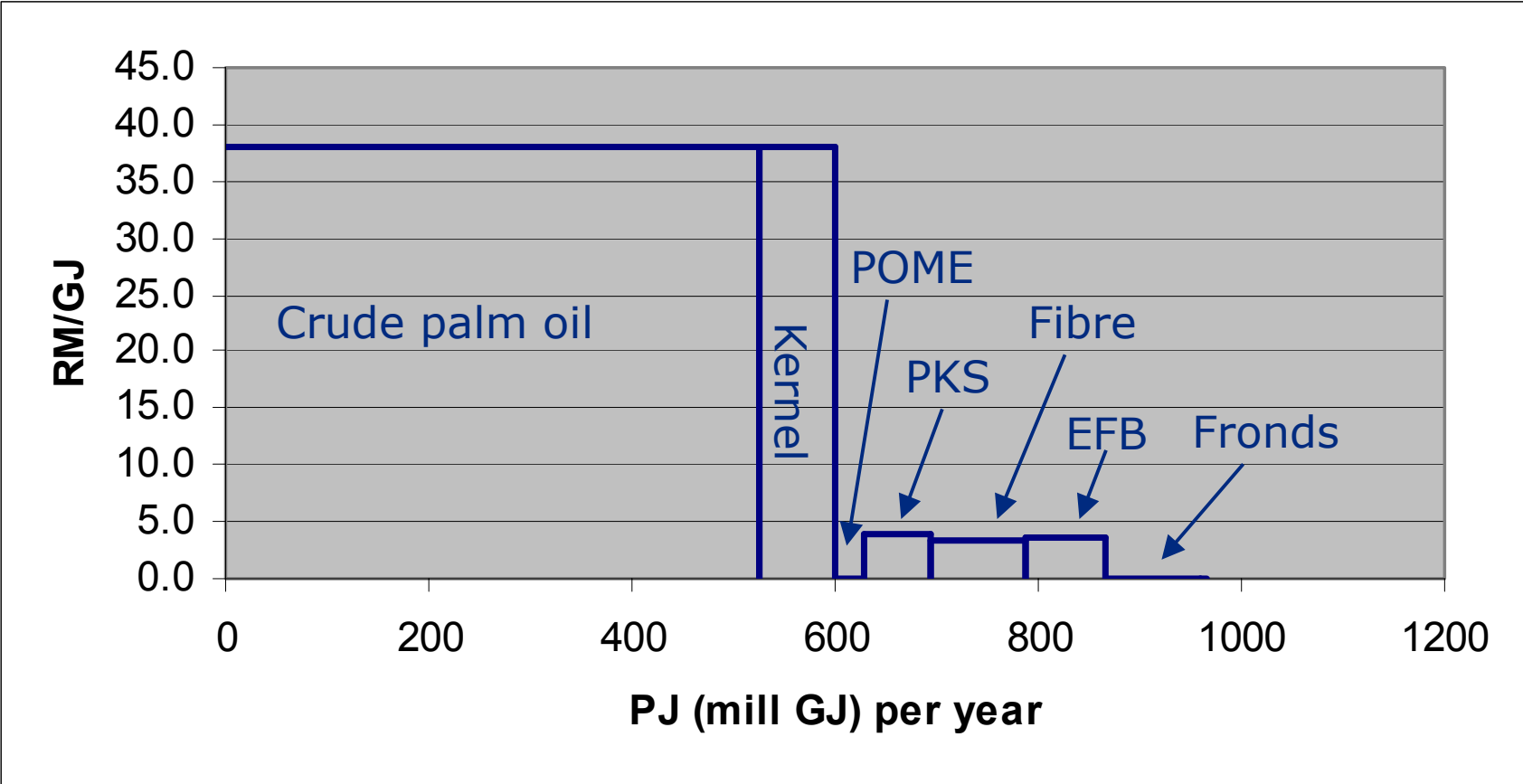
Palm oil products seen as energy



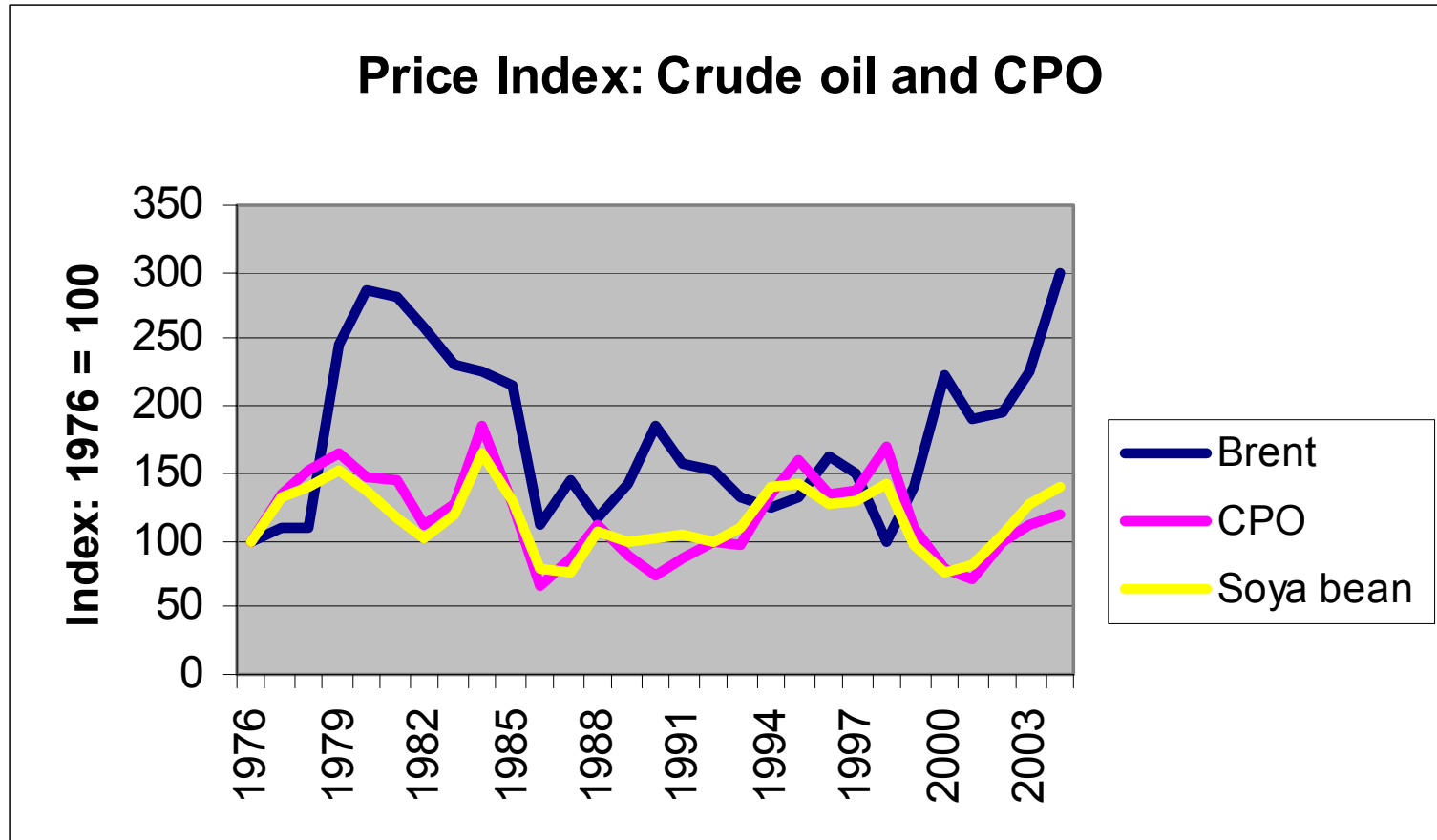
Total "energy" from Palm Oil Sector : 953 PJ

Total energy supply in Malaysia: 2359 PJ

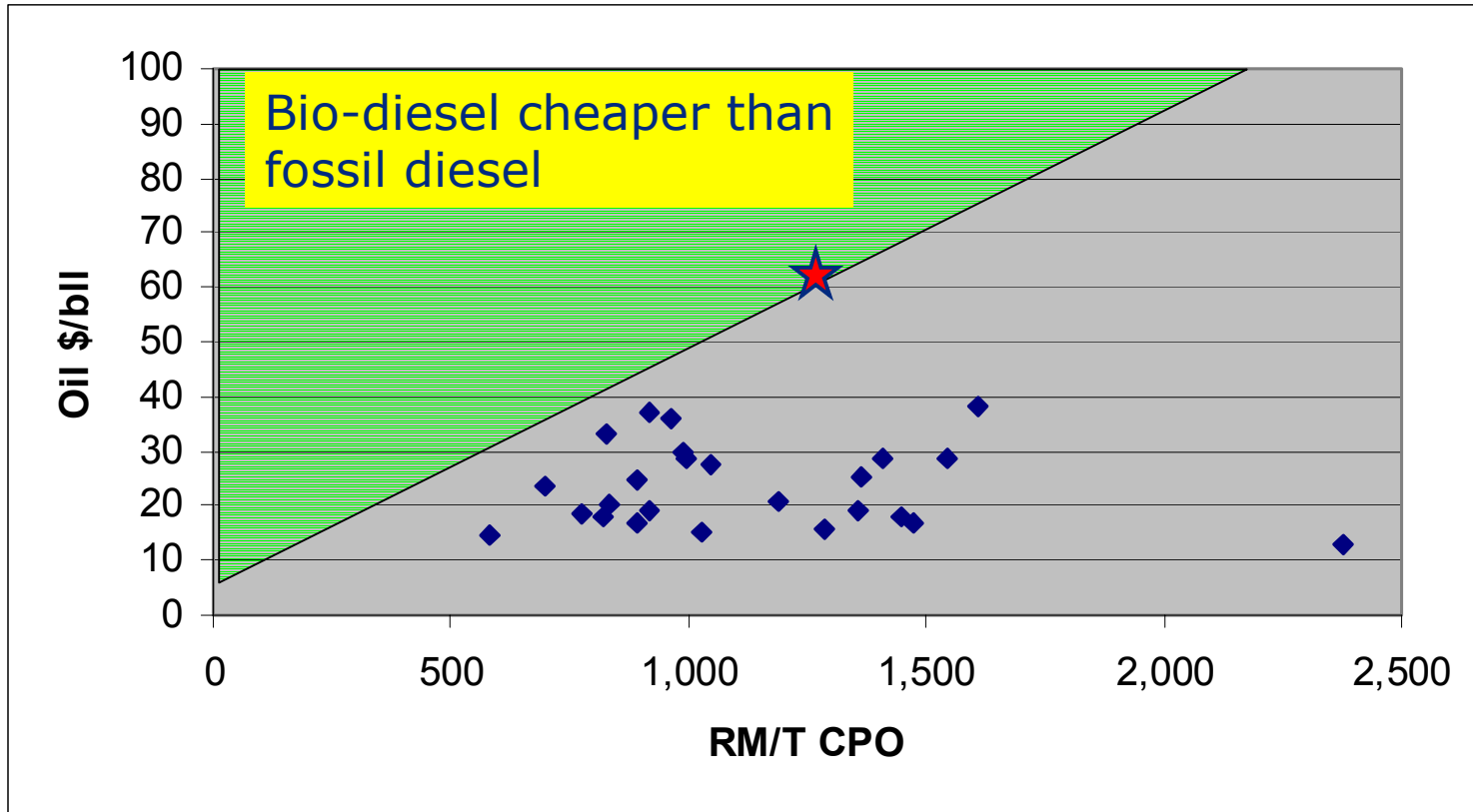
Value per GJ – conventional use



Looking for a new price determinant



Bio-diesel: Conventional wisdom or new world ?



CDM creates a monetary value of environmental improvement

- CDM is a new commodity
- CDM transforms reductions in emissions of CO₂ and methane into a cash-flow
- The CDM approval mechanism creates Certified Emission Reduction (CER) after national and international approval
- CERs can be sold on the spot-market or on forward contracts - in some cases an upfront payment can be negotiated
- Buyers are very active today with a total commitment of more than 1 billion USD from governments and private companies

Options for optimisation

Type	Status (Present use)	Vision (Possible future uses)	Possible contribution from CDM
Palm Kernel Shell (PKS)	Local energy production with low efficiency	Export as a valuable fuel i.e. replacing coal in industry and power stations Or Use for high efficient CHP at the mill	Increase the value of bio-fuel replacing coal
Fibre	Local energy production with low efficiency	Export as a valuable fuel i.e. replacing coal in industry and power stations Or Use for high efficient CHP at the mill	Increase the value of bio-fuel replacing coal

Options for optimisation (2)

Type	Status (Present use)	Vision (Possible future uses)	Possible contribution from CDM
Empty Fruit Bunches (EFB)	Mulching as fertiliser and/or waste product	Local energy production with high efficiency and possibility of sale of electricity Or Pre-treatment to higher quality fuel for sale Or Non-energy-uses as raw material in i.e. fibre production	Increase the value of electricity sold to the grid or for off-grid consumption
Palm Oil Mill Effluent (POME)	Treated in open ponds to reduce organic content before discharge to river	Local biogas production and use for on-site electricity production Or Local biogas production for sale as fuel	High value from avoided methane emissions from anaerobic ponds and possible increase in the value of electricity sold to the grid or for off-grid consumption

Case study 1 – Impact of CDM for POME

- Mill with capacity of 40 ton of Fresh Fruit Bunches per hour
- Power generated will be connected to the grid
- Contribution CDM is 6-10 sen/ KWh
- Impact of CDM is different per technology used

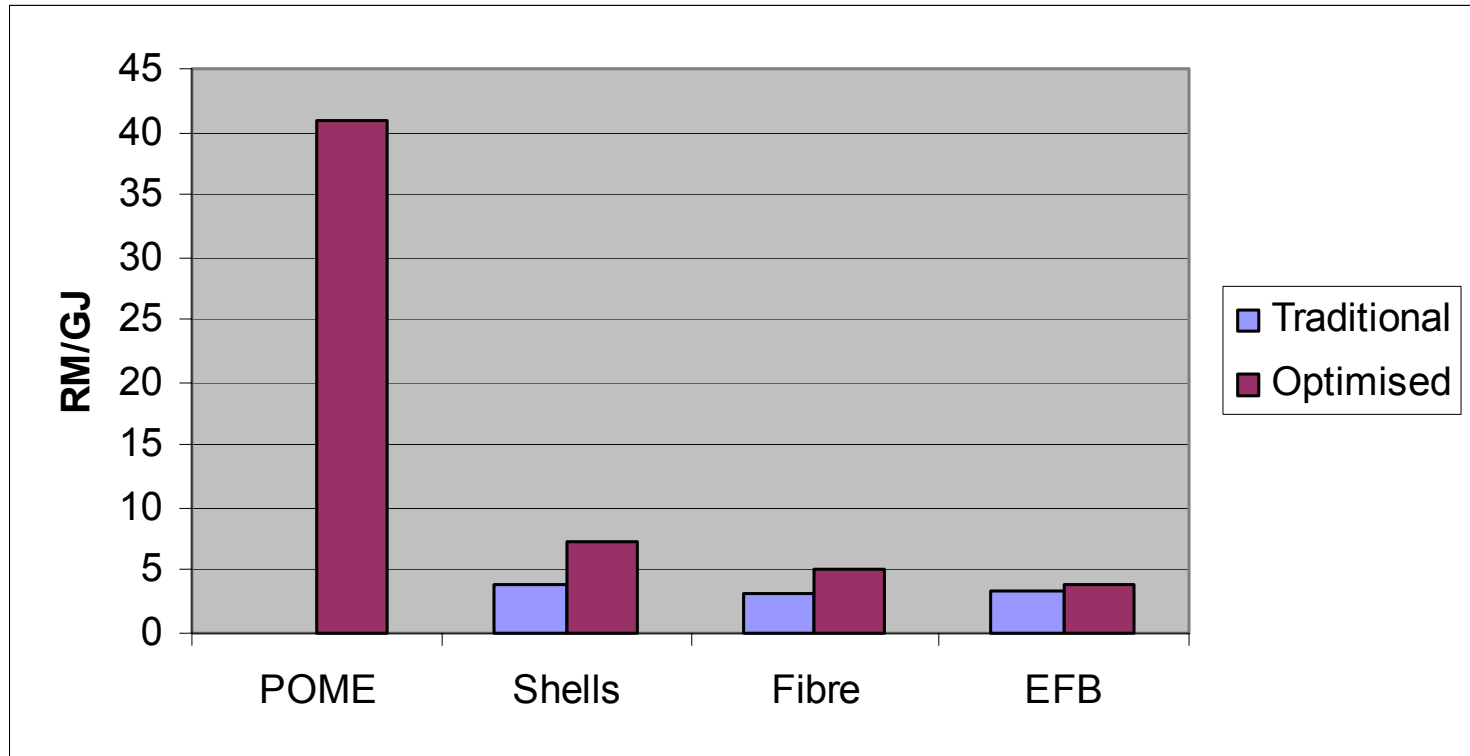
<i>Technology Option</i>	<i>Capital cost (RM)</i>	<i>O & M cost (RM)</i>	<i>IRR without CDM (%)</i>	<i>IRR with CDM (%)</i>
<i>Power and Heat Generation (Gas Turbine)</i>	13,341,000	355,230/yr	5.8	11.0
<i>Power and Heat Generation (Gas Engine)</i>	11,435,000	303,130/yr	9.6	15.0
<i>Power Generation (Gas Engine)</i>	10,067,000	262,090/yr	7.6	13.7

Case study 2 – Impact CDM on CHP project

- CHP technology used at a palm oil mill
- Power generated will be connected to the grid and partly used for on site consumption
- Project displaces power from grid connected fuel plants and biomass used for heat generation (e.g. no CERs related to heat)
- Contribution CDM is 1.1 sen/ KWh

<i>Technology Option</i>	<i>Capital cost (RM)</i>	<i>O & M cost (RM)</i>	<i>IRR without CDM (%)</i>	<i>IRR with CDM (%)</i>
<i>Power and Heat Generation 6 MW</i>	19,500,000	1,800,000	0.2%	1.5%
<i>Power and Heat Generation 14 MW (10 MW for the grid)</i>	40,000,000	3,100,000	16.3%	18.3%

Increased value of energy products



Increased value for 60 t/hour mill

● Total extra value

- From energy: 4.9 mill RM/year
- From CERs: 1.4 mill RM/year
- Total: 6.3 mill RM/year

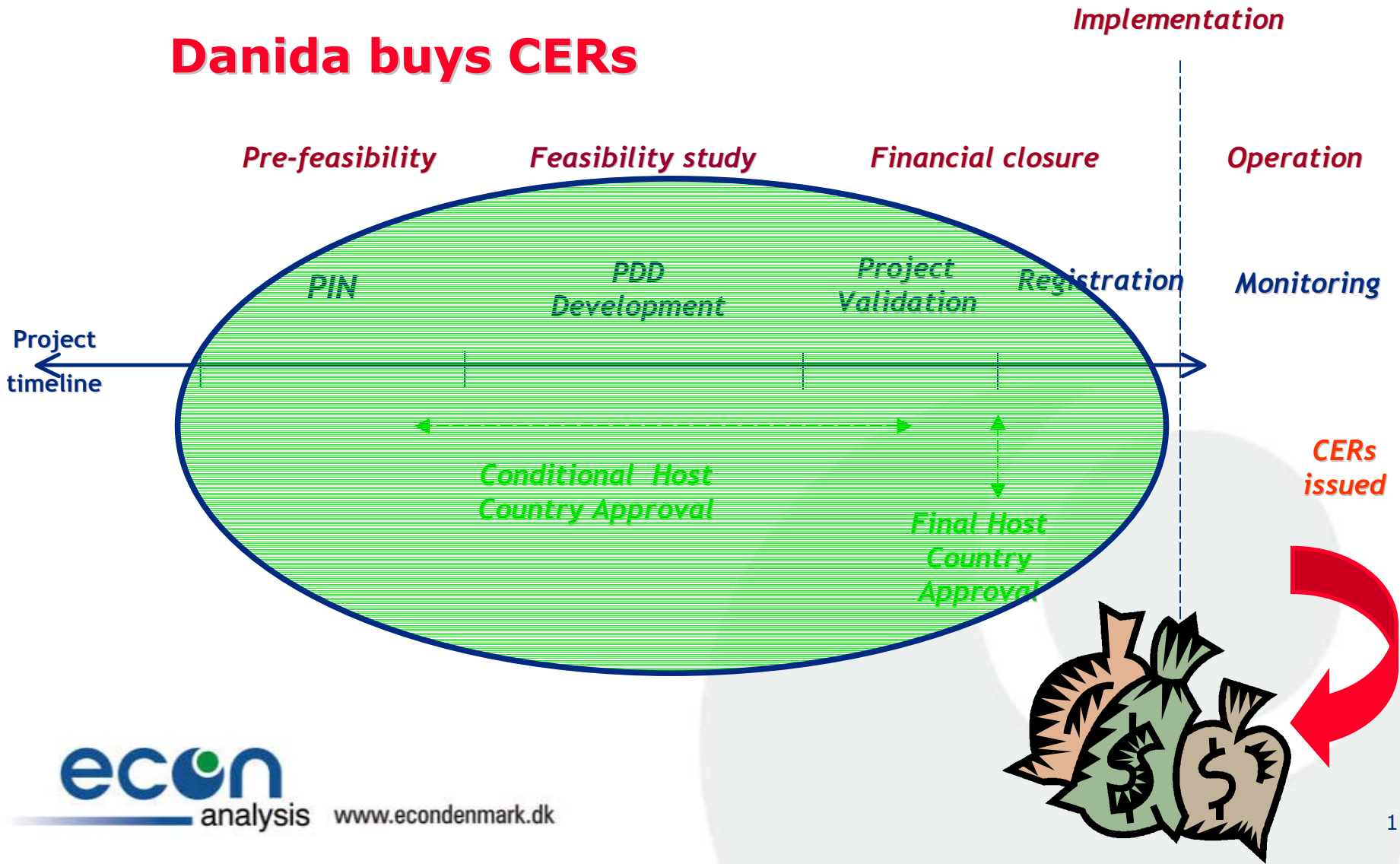
● Extra value pr ton CPO

- 111 RM/ton CPO

How to develop a CDM project?

Danida Project Development Facility

Danida buys CERs





**ECON Carbon –
a company in the ECON Group**



Services

screen project pipelines for potential climate change projects
assist project owners with CDM and JI project development
facilitate transactions of carbon credits
can offer services on a no-cure-no-pay basis

Focus areas:

- Russia: wastewater, gas leaks, flaring, power and heat
- Flaring in developing countries: Algeria, Iran, Nigeria, other west Africa
- South East Asia: Malaysia, Indonesia, Thailand
- Southern Africa: South Africa, Mozambique, Zambia

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Thank you

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