

BUNDLING 5 CPO MILLS FOR RECYCLING POME TO GAS – ER - ELECTRICITY



MAY 25, 2004

GOETTINGEN UNIVERSITY, GERMANY

2006/9/27

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ROAD MAP

BACKGROUND CC AND DEVELOPMENT :
AIJ AS EMBRYO OF CDM

1. KYOTO PROTOCOL
2. MARRAKECH ACCORDS
3. CER MARKET SHARE
4. POTENTIAL CER SUPPLIER
5. EST TRANSFER
6. BUNDLING CPO MILL
7. CDM PROJECT EXAMPLE
8. CONCLUSIONS

ACTIVITIES IMPLEMENTED JOINTLY (AIJ)

- LEARNING – BY – DOING :
 1. SOLAR PV IN NTT
 2. WASTE HEAT CEMENT PLANT RECYCLING IN WEST SUMATRA
 3. HYBRID ENERGY IN PAPUA ISLAND
 4. WASTE TO ENERGY AT PAPER MILL IN BEKASI WEST JAVA



BERLIN MANDATE

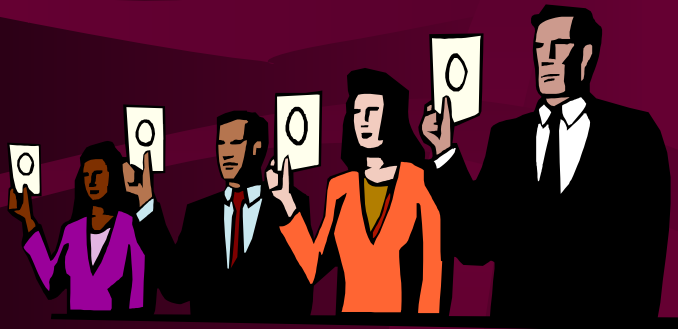
KYOTO PROTOCOL

- ESTABLISHED ON DECEMBER 11, 1997 AND EFFECTIVE ON 16 FEBRUARY 2005
- IMPLEMENTATION DELAY DUE TO USA WITHDRAWAL
- ART. 12 – CDM ARRANGEMENT



FLEXIBLE MECHANISM

MARRAKECH ACCORDS



USA ONLY AS OBSERVER

- ESTABLISHED NOVEMBER 10, 2001 WITHOUT USA INVOLVEMENT
- DECISION 17 / CP. 7 IS CDM's SOP
- OFFERING NON - ANNEX 1 TO SUBMIT CDM PROJECT PROPOSAL TO EB – CDM IN BONN

SHIFTING FROM ENVIRONMENTAL ISSUES TO FINANCIAL ISSUES

- AS LONG AS CLIMATE CHANGE IS WEIGHTED AS ENVIRONMENTAL ISSUES, INDUSTRIES RELUCTANT FOLLOW
- MIS - PERCEPTION ON ENVIRONMENTAL ISSUES AS COST - FACTOR ONLY.



CDM IS PROFITABLE FOR INDUSTRY & COUNTRY

CER MARKET SHARE

- 2 % OR 20 – 30 MILLION TONS DURING FIRST COMMITMENT (2008 – 2012)
- CURRENT CER PRICE IN EU MARKET US\$ 10 PER TON CO₂

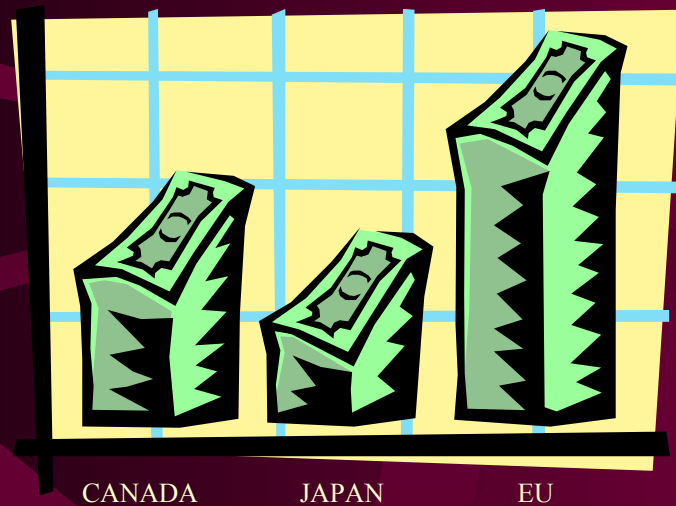
PROBABLE SELLING PRICE US\$ 9.80



UPPER LIMIT US\$ 19 AND
LOWER LIMIT US\$ 3, /TON

COLOMBIA's NSS

CURRENT DEMAND CER



- POTENTIAL CER BUYERS :

1. CANADA 600
2. JAPAN 227
3. EU 690

TOTAL 1,517

UNIT : MILLION TON

CO₂

ONE BILLION TONS CER PROJECT

BUDGET ON CER AND ERU

COUNTRY AND MULTI LATERAL	BUDGET
1. WORLD BANK	US\$ 200 MILL.
2. EU COUNTRIES	“ 1,115 MILL.
3. JAPAN	“ 140 MILL
4. PRIVATE SECTOR	“ 100 MILL
TOTAL	US\$ 1,575 MILL

BUYERS IN JAPAN



WE NEED BADLY

1. ELECTRIC POWER
2. OIL COMPANIES
3. CHEMICAL COMPANIES
4. GENERAL CONSTRUCTION / ENGINEERING
5. TRADING HOUSES (SOGO – SOSHA)

MARKET PRICE TREND

- CURRENT PENALTY IN EU UNTIL END 2007 IS EURO 40 / TON CO₂
- JANUARY 23, 2005 MARKET PRICE IN EU ONLY EURO 7.05. NOW INCREASING TO EURO 16 (US\$ 20.50) / TON CO₂ (AUGUST 31, 2006)



COMMENCING JANUARY 1, 2008

POTENTIAL CER SUPPLIER

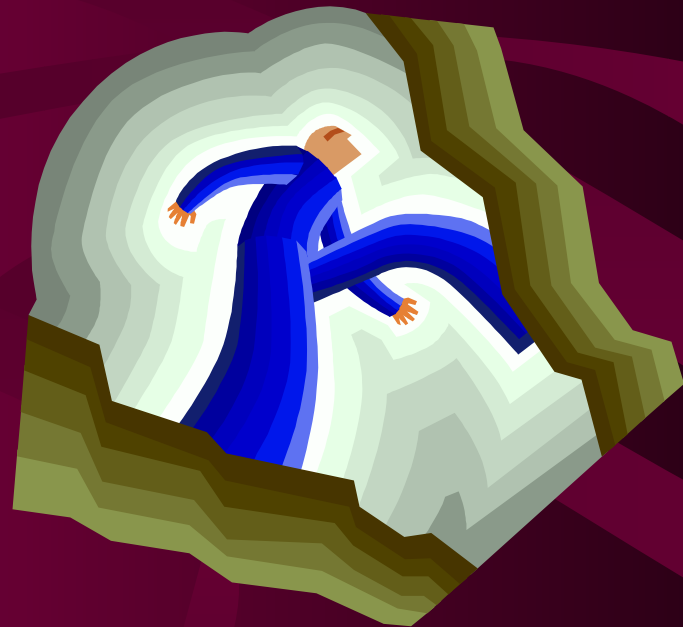


GOOD QUALITY ASSURANCE

- PLENTY SOURCES FROM BOTH SECTOR
 1. FORESTRY
 2. ENERGY :
 - 2.1. RENEWABLE
 - 2.2. ENERGY EFFICIENCY
 - 2.3. FUEL SWITCHING
 - 2.4. TRANSPORTATION
 - 2.5. FUGITIVE EMISSION
 - 2.6. WASTE DISPOSAL AND HANDLING

METHANE KICK MAY INCREASE IRR CDM

- METHANE GAS DERIVED FROM BIOMASS HAS GWP 21 FOLDS CO_2
- PRICE OF 1 TON METHANE GAS = 21 FOLDS CO_2
- RESULT : INCREASING CDM IRR UNTIL 2 – 7%



SOURCE : HEISTER – WB. 2002

EST TRANSFER



- PRECONDITIONS LAID DOWN :
 1. ENERGY PRICE
 2. ENERGY SALES POSSIBILITY
 3. FINANCIAL POSSIBILITY
 4. INVESTMENT GRANTS
 5. INTENSIVE FARMING

DENMARK'S BIOGAS PLANT

DESCRIPTIONS	QUANTITY AND UNIT
1. TOTAL FEEDSTOCK	401 M ³ / DAY
2. MANURE PORTION	84 %
3. ORG. WASTE PORT.	16 %
4. DIGESTION TEMP.	53 ° C
5. HRT	12 DAYS
6. GAS PRODUCTION	11,800 M ³ . / DAY
7. GAS UTILIZATION	CHP

DENMARK > < INDONESIA

- DENMARK :
- BIOGAS YIELD =
30 – 35 M³ / M³
FEEDSTOCK
- FEEDSTOCK
TRANSPORTATION
COST = 35 – 50 %
OPERATING COST
- TRUCK TANK
- INDONESIA :
- BIOGAS YIELD =
26.5 M³ / M³
FEEDSTOCK
- FEEDSTOCK
TRANSPORTION
COST = NIL
- PIPING SYSTEM

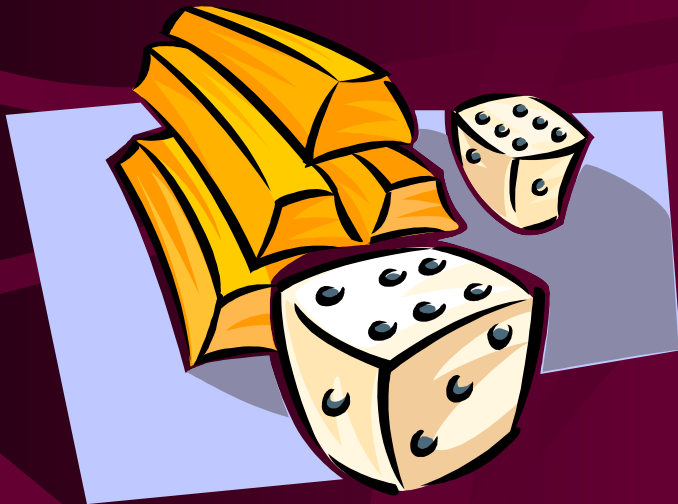
EXAMPLE BUNDLING OF CEMENT PLANTS

- CER YIELD 0.7 – 1 MILLION TON CO₂ PER YEAR
- TRANSACTION COST VERY LOW
- ABATEMENT COST AT – LEAST COST.
- MORE ATTRACTIVE TO INVESTOR AND PROJECT DEVELOPER



PROVEN FUEL SWITCHING

BUNDLING OF FIVE CPO MILLS



- CER YIELD = 230,000 TONS PER YEAR
- TOTAL ELECTRICITY GENERATED = 5 MW
- LBG YIELD = 5,475 TONS PER YEAR
- INVESTMENT AT LBG PLANT SUGGESTED BY THIRD PARTY

INVESTMENT = US\$ 15 MILLIONS

INDONESIA PROVEN EXAMPLE CDM PROJECT

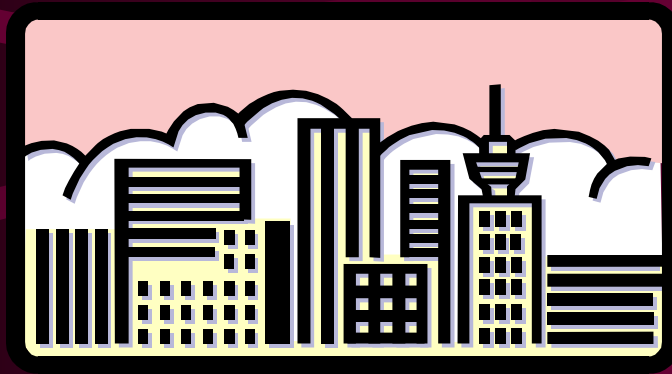
- PT. INDOCEMENT
- FUEL SWITCHING FROM COAL TO BIOMASS IN KILN (CO - FIRING)
- PROPOSAL WAS SUBMITTED IN 2003.
- FIRST CER DELIVERY HAS DONE IN 2006
- CER PRICE ONLY US \$ 3 – 5 PER TON CO₂

PLENTY US\$



ALL-RISKS FREE

EACH CPO MILL MAIN AND BY - PRODUCTS



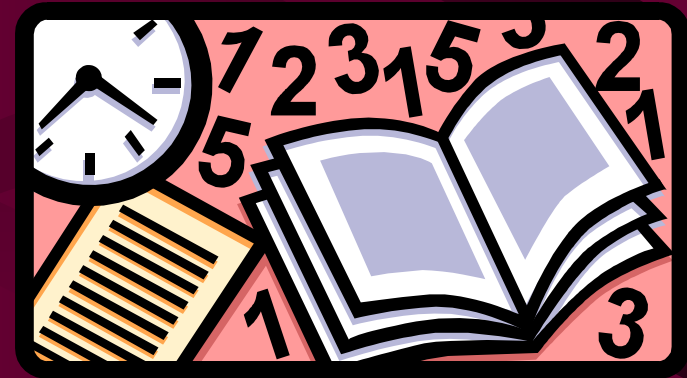
CAPACITY 1,000 TONS FFB / DAY

- CRUDE PALM OIL (CPO) = 220 TONS
- SOLID WASTE = 400 TONS (FIBER, SHELL, EFB)
- WASTEWATER (POME) = 800 M³
- DAILY OUTPUT

FFB = FRESH FRUIT BUNCHES

BIOGAS EQUIVALENT TO FUEL OIL AND ITS CALORIFIC VALUE

- EACH M^3 IS EQUIVALENT TO 0.6 LITER FUEL OIL
- CALORIFIC VALUE : 5,000 KCAL / M^3
- EQUIVALENT TO 6 KILOWATT HOURS ELECTRICITY



WWW.VOLVOCARS.DE

LIQUEFIED BIO GAS (LBG)

MY KITCHEN IS CLEANER



LPG EFFICIENCY : 40 –60%

- HOUSEHOLDS AND TRANSPORTATION
- GOI's PROGRAM TO REPLACE KEROSENE STOVE BY GAS STOVE
- LPG : KEROSENE RATIO = 0.57 : 1 (KG & LITER)
- CONSUMPTION : 0.8 M³ PER DAY x CAPITA
- EFFICIENCY : 30 – 40%

FUEL CELL FOR LAPTOP AND CELLULAR PHONE

- FUEL CELL IS FUTURE PRIMARY ENERGY TO REPLACE LITHIUM BATTERY
- NO ADAPTOR NEEDED DURING TRAVELLING
- LAPTOP BATTERY MAY EXPLODE



THANK YOU

- THIS FLOWER

IS YOURS.

- DECISION BEING
CDM FOLLOWER

IS YOURS

