

BIOMASS SUPPORTING COAL

New Opportunities for Chinese PowerGenerators, Fuel Suppliers

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KYOTO TREATY per 16-02-2005

- Target: global reduction of CO2 emissions e.g. by using renewable fuels in stead of fossil fuels
- Countries like EU, Russia, Japan are committed e.g. EU by 2020 20% less emissions than 1990
- Countries like China, India and Brazil have signed the treaty but have no(t yet) obligations
- UN Clean Development Mechanism Program allows creation of (tradeable) CER's, Certified Emission Reductions, through reduction projects in countries like CHINA
- COPENHAGEN 2009 accord limits temperature rise and increases commitment of CHINA

EU RENEWABLES TARGETS

- renewable sources are:
BIOMASS, hydro, wind, solar, geothermal
- original aim: reduce dependence of fossile fuels
- EU CLIMATE PLAN January 2008
Targets per 2020:
 - 20% CO2 emission reduction on 1990 levels
 - 20% of total energy to be sustainable
 - Carbon Capture and Storage (CCS)
in new power plants burning fossil fuels

BIOMASS abundant in RESIDUES

from

- trees and wood
- crops, plants and fruits
- animals incl. manure
- paper and packaging
- household and garden
- construction and demolition

BIOMASS , some examples

- rest products of crops like sugar cane and rice
- olive cake
- coconut shells
- palm kernel shells and expellers
- woodchips and saw dust pellets
- (used) fats
- animal bone meal
- cow manure and chicken litter
- special crops like elephant grass

BIOMASS, combustion techniques

- FIRING in specific boiler
- COFIRING with coal in boiler or on fluidised bed; pre-treatment by blending or separate grinding
- GASIFICATION and burning the gas in coal or gas boiler
- BURNING in cement kiln

NW EUROPE BIOMASS PRICING

Price level 2010 of imported biomass per ton CIF Rotterdam

Bagasse pellets	16 GJ/t	\$ 12/GJ	\$ 190
Rice husks	16 GJ/t	11/GJ	175
Wood pellets	17 GJ/t	10/GJ	170
Wood chips (domestic)	9 GJ/t	8/GJ	70
Palm & olive products	16 GJ/t	8/GJ	130
COAL, march 2010	25 GJ/t	\$ 3/GJ	\$ 75

DRIVERS of BIOMASS for POWER

Key: BIOMASS generally considered CO2 NEUTRAL
(Drivers may differ per country, per generator)

- general EU legislation/targets
- national legislation/targets/voluntary agreements
- avoiding penalties when exceeding emission allocations, minimum 'green' obligations or voluntary agreements
- national subsidies
- supply of 'green electricity' to customers opting for that
- reducing dependence of fossil fuels
- building green image
- developing new technologies incl. selling knowhow

NW EUROPE 2009 x 1 mt

POWER GENERATION from SOLID FUELS

coal biomass % total mass

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BELGIUM	4	1.2	23%
DENMARK	6	1.5	20%
NETHERLANDS	8	1.5	16%
UK	40	1.6	4%

NW EUROPE PROSPECTS x 1mt

	wood products	other	total
2009 real	6	3	9
2012 potential	8	5	13
2015 potential	12	6	18

Potential figures assume legislation in favour of cofiring in UK and Germany.

CHINA and CLIMATE

- CHINA signed KYOTO protocol in 1998
- CHINA ratified KYOTO protocol in 2002
- CHINA not obliged to reduce emissions
- CHINA signed “COPENHAGEN” in 2010
- CHINA will help limit temperature rise to 2 centigrades this century

Worldwide CO2 EMISSIONS 2008

country	tons per inhabitant	% of total
CHINA	5	22
USA	18	18
India	2	6
Russia	11	5
Japan	10	4
Germany	9	2

CHINA STEAM COAL x 1 mt

International trade	2008	2009
Exports	42	22
Imports	33	82
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Balance	+9	-60

CHINA and CDM

UN Clean Development Mechanism Projects

Registered late 2009 total world	1800
Biggest in the world: CHINA	652 36%
of which	
hydro	324
wind	139
waste heat	65
methane	42
biomass	14
other	68

BIOMASS in CHINA x 1 mt

- crop straw (ao corn, rice, sugar, cotton) 600
- agriculture waste (ao peanut, rice chuck) 200
- domestic waste 150 mt, 70% organic 100
- forest and fruit tree branches 100
- live stock manure if not used as fertilizer pm
- energy crops (eg jatropha) large potential pm

Source: China Ministry of Agriculture

BIOMASS in CHINA, CHALLENGES

- identifying the opportunities
- organising the collection
- pelletising the product (where possible)
- optimising the transport
- avoiding competition food – energy !

CHINA Legislation and Planning

- RENEWABLE ENERGY LAW per 2006:
 - economic incentives for BIOMASS ENERGY
 - .natural plants rejects
 - .urban and rural organic waste
 - .energy crops: herbage and wood plants
- 11th FIVE YEAR PLAN; target 2010
 - 5500 MW biomass power generation

POWER Generators, Opportunities

- feed domestic BIOMASS together with coal into existing coal boilers
 - and/or burn biomass in dedicated power plant
 - by doing so reduce CO₂ emissions
 - relieve growing coal needs/ reduce imports
 - potentially reduce fuel costs
 - create and sell CER's (value \$ 10-20/t)
- ACT before you are forced to....

FUEL Suppliers, Opportunities

- enter biomass market
- develop creative logistics
- create new products like
15/85 biomass/coal blend

ACT before you are forced to....

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