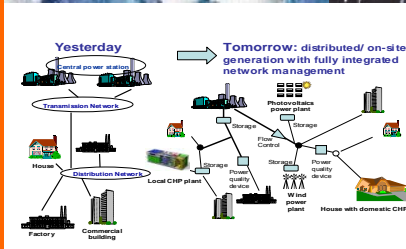


Asian CDM /Sustainable Energy Markets

European cogeneration
expertise and the
Asian markets



Thomas BOUQUET
COGEN Europe

Business opportunities for Sustainable
Energy Technologies in Asia Conference
10 March, 2007, Copenhagen, Denmark



European Cogeneration Technology



- Europe has been using CHP technology widely, and it now accounts for **10% of the EU's electricity production.**
- Europe is **home to most CHP manufacturers**, with worldwide exports
- European cogeneration technology is suitable for **all types of applications**, from large-scale centralised installations providing heat and electricity to large industrial sites and exporting electricity to the grid all the way to small-scale applications
- Cogeneration technologies are adapted to **all types of fuels**, from fossil fuels (coal, oil, natural gas) to renewables, including local fuels such as palm oil.



Asian markets opportunities



From outdated technologies...

To efficient ones !





Typical opportunities in SE Asia



Example: Thailand's sugar mills

Current situation

Very low efficiencies + inefficient use of bagasse

What could be done

State of the art facilities = bagasse surplus (after own el & heat consumption)

Bagasse surplus = $\pm 8\%$ of Thai electricity production in 2005

Note: total installed electrical capacity in Thailand in 2005 was 26,372 MW

Is this being done?

NOWHERE NEAR REALISING THE FULL POTENTIAL



CDM: a supportive framework...



Basics:

- Any project that can demonstrate that it **achieves GHG emission reductions** is eligible under the CDM (under a few key conditions).
- A project will receive a **stream of CERs** (certified emission reductions) commensurate with the amount of GHG emission reductions obtained.
- A project will generate CERs over EITHER a single 10-year period OR a renewable 7-year period
- CDM projects can be of **virtually any size** and small-scale projects enjoy simplified administrative procedures, can be bundled and /or follow a programmatic approach

Value of CERs:

- A function of the stage of the project and
- A function of the price of European Allowances (EUAs)

[source: Reuters Carbon Community, 6 March 2008]

<u>ECX - EUAs</u>	<u>06-Mar</u>
Dec 08	€21.35
Dec 09	€21.89
Dec 10	€22.62
<u>Reuters CER Index</u>	
Dec 08	€15.73
Dec 09	€15.31
08-12 Strip	€15.44
<u>Exchange CERs</u>	
Nord Pool - Dec08	€15.70
CCX - Dec08	\$24.02

Sources: ECX, Nord Pool, CCX

Note: CDM stands for 'Clean Development Mechanism' and projects generate Certified Emissions Reductions that can be used by companies for compliance under the EU ETS and by countries to meet their Kyoto commitments.



...which requires expertise



3 types of CDM projects:

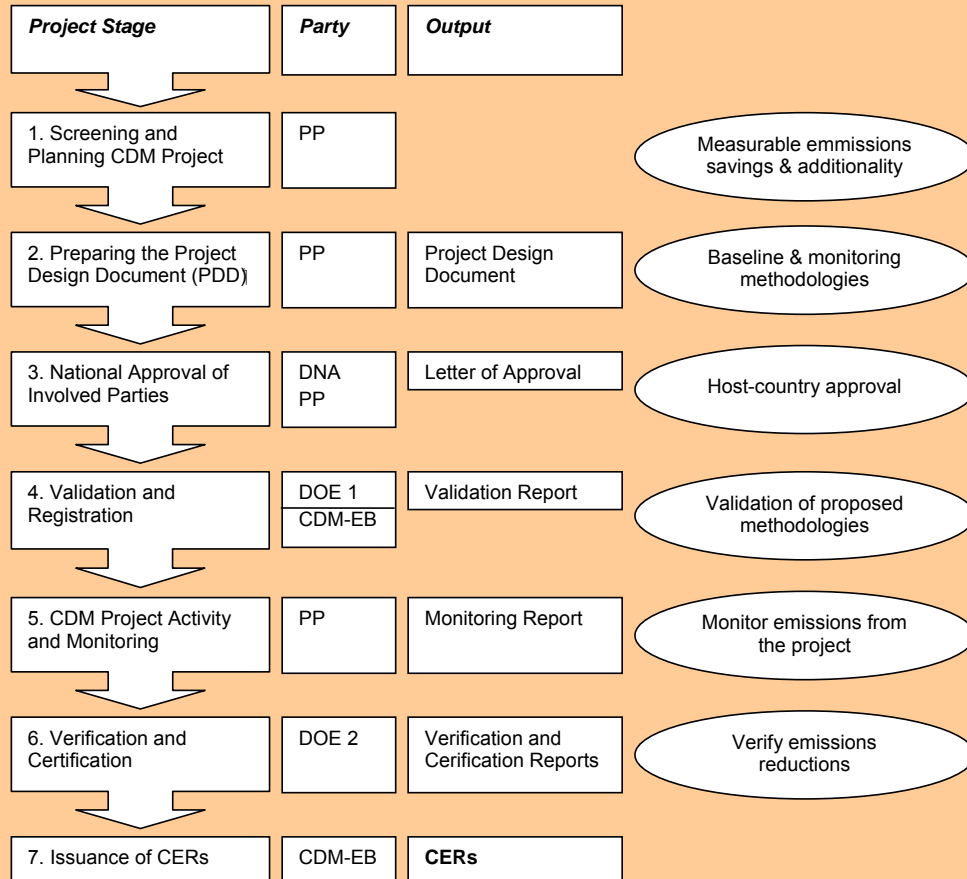
- Renewable Energy Projects (Type I)
 - I-A Electricity generation by the user
 - I-B Mechanical energy for the user
 - I-C Thermal energy for the user
 - I-D Renewable electricity generation for a grid
- Energy Efficiency Improvement Projects (Type II)
 - E.g. supply side and demand side energy efficiency improvements and fuel-switching
- Other Projects (Type III)
 - E.g. methane recovery projects

CHP projects are usually Type-1 projects

Long lead times / Consultancy-type work / necessary to build strong local ties / Monitoring throughout life of project



CDM Project Cycle



Each stage is Key.

Setting up a CDM project requires expertise !



Key methodologies



The nomenclature of CDM methodologies distinguishes between several types of methodologies applicable to CHP projects:

- AM: Approved methodologies for CDM projects
- ACM: Approved consolidated methodologies
- AMS: Approved small-scale methodologies

Note: methodologies are revised replaced by other methodologies.

Examples:

AM0014 - Natural gas-based package cogeneration

Note: cogeneration systems must be owned by third party

AM0032 - Waste gas or waste heat based cogeneration systems

AMS-I.D. - Grid connected renewable electricity generation

Note: applicable to biomass cogeneration systems with a 45 MWth total output upper limit.



A win-win situation



➤ **Project hosts** have an opportunity to attract project developers and financial backing.

This allows them to implement investments in new processes, revamp their production apparatus and make efficiency gain and financial gains

Project developers (also project origination) can develop their activities in the region and get a fraction of the CER stream (no cost to host) or the host can retain ownership of the CERs and pay for the investments using own equity or through a bank loan

Manufacturers: opportunity to repower/upgrade sites that are often old and inefficient: an untapped market

Makes sustainable economic development a reality !



CHP and CDM?



As of the 15th of January 2007 out of a total of 489 registered projects, an estimated 70 were cogeneration projects

Most CDM CHP project are **relatively small-scale** as rely on locally sourced fuels.

Most of the CDM cogeneration projects are located in **India** and **Brazil**.

Fuels used:

- risk husk

- bagasse

- biomass residues

- palm oil (Malaysia, Thailand)

Initially:

- most CHP projects registered were biomass-fired applications in small food manufacturing

Now:

- More diversity

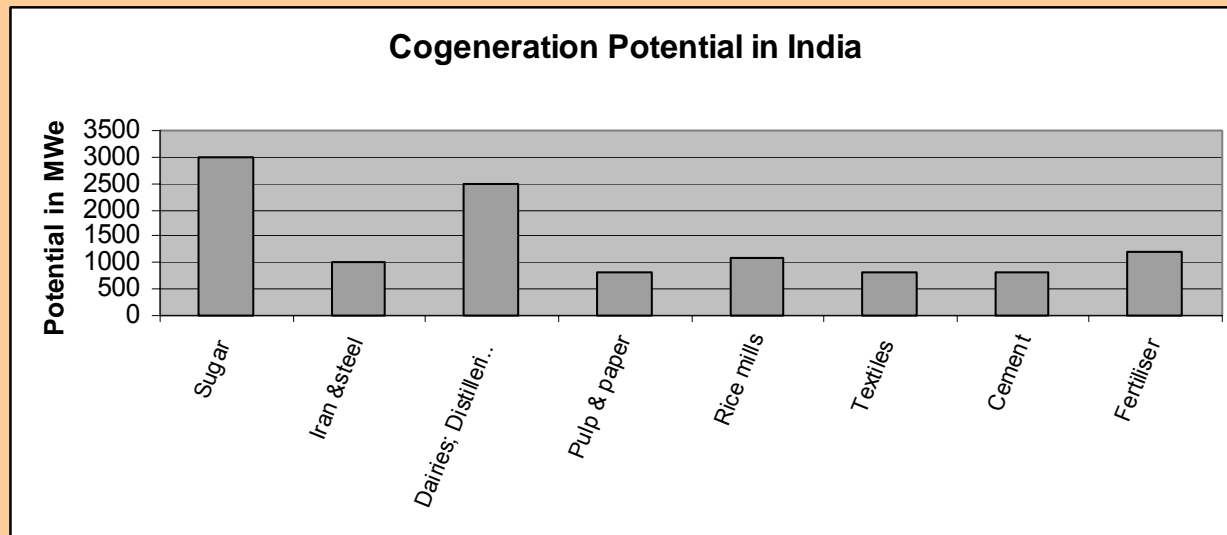
- other biomass cogeneration projects

- Waste heat project are starting to develop

CDM CHP projects in India



- Cogeneration facilities: 16% of total installed capacity (18.7 GWe), and 12.1% of the country's electricity.
- Mostly found in food manufacturing sector (sugar)
- Total potential for cogeneration is estimated at 20,000 MWe, most of which is in the food processing sector.





Impact of European ETS



Proposal for revised ETS Directive COM(2008)16
Includes section on 'Linking' with ETSes in third countries.
Currently, (2008-2012): 1400 million tonnes of 'Kyoto' credits
allowed to enter (i.e. 280 million per year)

[Reminder: EU ETS accounts for approx. 1.9 billion tonnes of CO2 allowances per year]

Push towards use of "high quality CERs" but with cap based
on amounts of unsued CERs from 2008-2012 period.
This cap will be lifted depending on result of international
agreement on emissions

- ➔ No impact on *prospects* in Asia
- ➔ A *potential* big impact on future value to European companies under the ETS



SUSTAINABLE ENERGY



TECHNOLOGY AT WORK

Thank you !

Thomas.bouquet@cogeneurope.eu

www.cogeneurope.eu

www.setatwork.eu