



**BIOMASS UTILIZATION IN HOT AIR
GENERATOR FOR SPRAY DRYING
APPLICATION**

BRIEF OVERVIEW

EXCOM PRESENTATION

10.01.2003

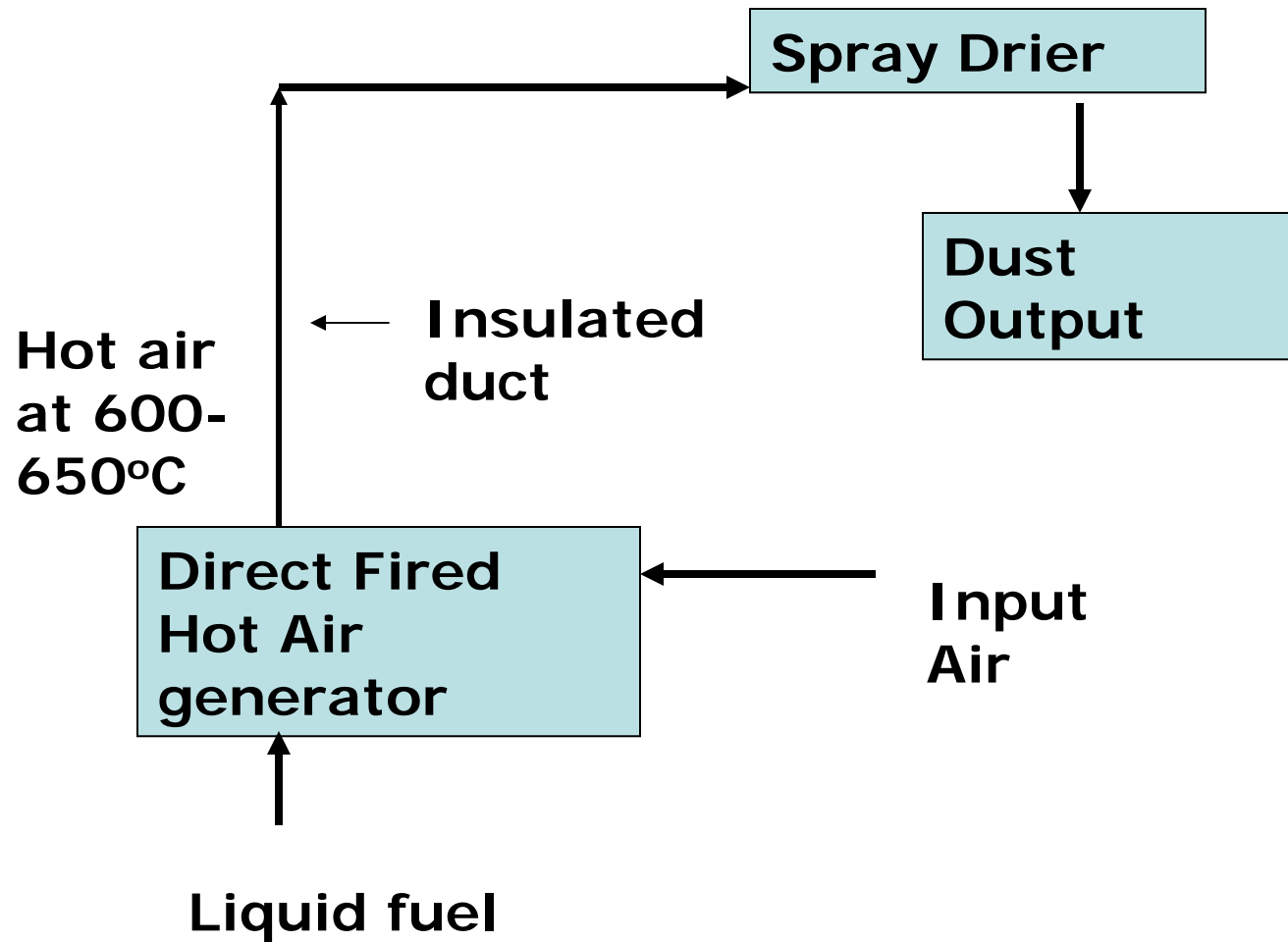
Energy Management Initiative

Liquid fuel based hot air generation

Present system

- Presently, hot air is generated using furnace oil fired hot air generator.
- Hot air generated is transported to the spray drier through insulated duct at a temperature of 600 °C.

Diagrammatic representation of present system



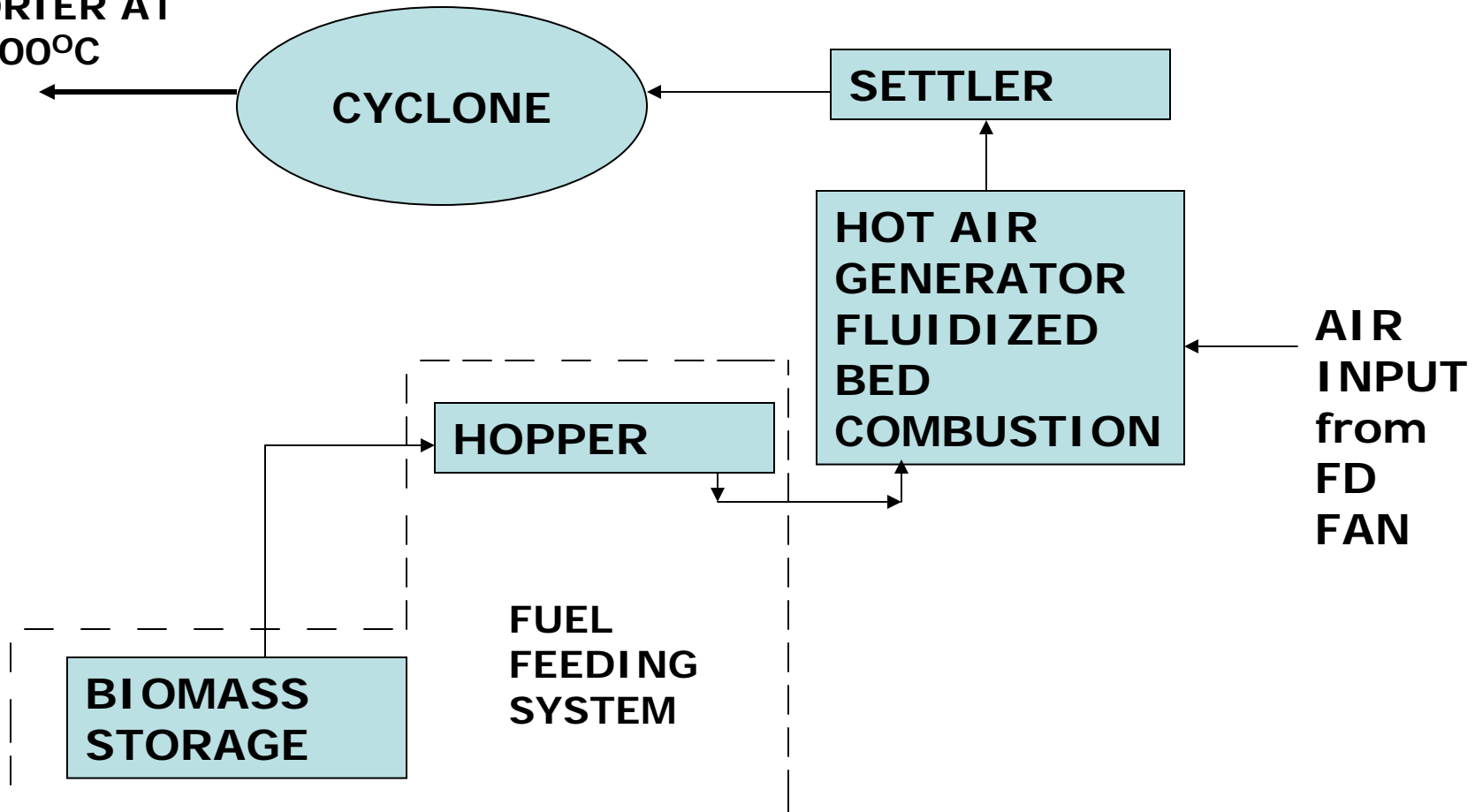
BIOMASS BASED HOT AIR GENERATION

Salient Features

- Use of Fluidized Bed Combustion (FBC) for combustion which has a higher efficiency than other conventional furnaces.
- Low production of NO_x, SO_x & Suspended particulate matter due to efficient & cleaner generation of hot air.

Diagrammatic representation of biomass based system

CLEAN HOT AIR
UTILISATION
FOR SPRAY
DRIER AT
600°C



Fuel Options

- Use coal as fuel
 - abundantly available
 - cheap and proven sources of energy
 - Minimum price fluctuation
 - Small deviation from standard properties
- Use renewable biomass as a fuel
 - not a proven source of energy
 - availability concern
 - seasonal variation
 - variation in fuel properties
 - costlier than coal

Advantage of biomass over coal

- Promotion of green and environment friendly technologies.
- Availability of carbon credits for using renewable biomass through CDM route which will compensate incremental fuel cost due to use of renewable biomass.

Carbon price

- As per market feedback current price of carbon \$ 3.5/ ton (2002)
- Expected price over \$ 15 /ton by 2005-06 onwards
- Price may further increase due to supply demand gaps.

Carbon Economics

PARAMETERS	COAL BASED HOT AIR GENERATION	BIOMASS BASED HOT AIR GENERATION
CARBON DIOXIDE EMISSIONS PER KG OF FUEL COMBUSTED (kg of CO ₂ /kg of fuel)	1.72	0
FUTURISTIC PRICE OF 1 TON OF CO ₂ EMISSION REDUCTION (Rs./tCO ₂)	0	675
CARBON CREDIT BENEFIT (Rs/Kg of fuel)	0	1161
COST OF FUEL (Rs/tonne)	2000	2050
SPECIFIC FUEL CONSUMPTION (kg/kg of coal)	1	1.5
COST OF FUEL (Rs/Tonnes of coal equivalent)	2000	3075
NET COST OF FUEL (Rs/tonne)	2000	1914

Clean Development Mechanism (CDM)

- The Clean Development Mechanism (CDM), provided under Article 12 of the Kyoto Protocol, enables developing countries to participate in joint greenhouse gas (GHG) mitigation projects. Under this Protocol, Annex I countries (developed countries and economies in transition) are required to reduce GHG emissions to below their 1990 levels.
- The CDM enables these countries to meet their reduction commitments in a flexible and cost-effective manner. It allows public or private sector entities in Annex I countries to invest in GHG mitigation projects in developing countries. In return the investing parties receive credits or certified emission reductions (CERs) which they can use to meet their targets under the Kyoto Protocol.
- While investors profit from CDM projects by obtaining reductions at costs lower than in their own countries, the gains to the developing country host parties are in the form of finance, technology, and sustainable development benefits.

The basic rules for the functioning of the CDM were agreed on at the seventh Conference of Parties (COP-7) to the UNFCCC held in Marrakesh, Morocco in October-November 2001. Projects starting in the year 2000 are eligible to earn CERs if they lead to "real, measurable, and long-term" GHG reductions, which are additional to any that would occur in the absence of the CDM project. This includes afforestation and reforestation projects, which lead to the sequestration of carbon dioxide.

<http://envfor.nic.in/cc/cdm.htm>

CDM contd

- At COP-7, it was decided that the following types of projects would qualify for fast-track approval procedures:
 1. Renewable energy projects with output capacity up to 15 MW
 2. Energy efficiency improvement projects which reduce energy consumption on the supply and/or demand side by up to 15 GWh annually.
 3. Other project activities that both reduce emissions by sources and directly emit less than 15 kt CO₂ equivalent annually.

The CDM will be supervised by an executive board, and a share of the proceeds from project activities will be used to assist developing countries in meeting the costs of adaptation to climate change.

CDM : India's Initiative

- India ratified Kyoto Protocol on Aug.2002
- Conference of parties (COP) organized in New Delhi (23.10.02- 01.11.02)

Conclusion

- We need to go ahead with biomass based HAG for spray dryer application.
- Revenue earned through CDM will help us to offset the technological risk associated with the project as well it will help us to overcome additional cost incurred due to use of biomass as fuel.