

Good Practice Entry

Setting

ID-No:	
Title:	Cofiring in carbon power plant with agri-pellets
Type:	Cofiring
Country:	China
Location:	Northern China
Start date:	-
End date:	-
Technology Codes:	Coal combustion, combined heat and power, forestry and energy crops
Sector Codes:	Agricultural waste, Other agricultural waste combustion (including straw)

General description

Summary:

A new technology allows to pelletise mixed and humid biomass without (thermal) drying, so low energy pelletising of agricultural residues becomes possible. Pelletising is important for large biomass projects, where collection and transport costs become important, as it allows to obtain high energy density and good storability of the biomass.

Co-firing these pellets with coal in power plants is relatively easy, requiring low investments: 100 - 8 Euro/kW in the EU for the plant adaptation + investment for the agri-pellets plant. Indeed, one pelletiser of 10 ton/hour can contribute with a fraction (16.6 MWh) of a coal power plant 10% cofiring level for a 166 MWe capacity, thus, not too many pelletisers are needed to come to (for example) 10% of co-firing. These pelletisers can be located decentrally near rich biomass resources, while the pellets can be transported conveniently.

Therefore, it can lead to large scale projects, justifying overhead costs for CDM and a ROI benefits of at least 0.15.

The cooperation of T@W partners Huang Dongfeng and Future Camps will be very useful. Huang Dongfeng and Dai Weidi (Forestry Administration) will identify a coal power plant that is in a region with enough biomass production, in the north of China (so district heating can improve economics).

Aims:	CDM, co-firing agri-pellets in a coal power plant, district heating
Summary of Results:	A first positive comment of Chinese experts and of Future Camp
Financing:	Investors in ETS, possibly through Carbon Trade Platform
Feasibility Study:	ETA looking for cooperation with Future Camp and Chinese actor, financed by ETS investors in Italy or Germany.

Technical details

Technical details:

New pelletising technology, innovative in the sense that it is able to pelletise directly humid mixtures of most biomass and to dry mechanically the biomass at reasonable cost (considering the low cost that is required for power plant fuel).

Energy data

Energy data: 1 million ton/year of agri-pellets.

If the power plant has electrical efficiency = 0.4, then 1 ton of pellets corresponds with about 2 MWh of electrical energy, 1 million ton/y with 230 MW at 8760 hours/year. This means 10% cofiring for a large coal plant. This percentage is well practicable, because the max technical potential is about 25%.

Environmental data

Environmental data:

Depending on quality, 1 ton of pellets (18 MJ/kg) replaces more or less coal. Taking the highest quality (anthracite) to be prudent, the replaced amount is 0.6 ton or 1.54 ton of CO₂ is avoided for one ton of pellets. 1 ton of agri-pellets may have 10% less energy, avoiding 1.5 ton of CO₂.

CO₂: 1 million ton/y of agri-pellets will reduce emissions of CO₂ with 1.5 million ton/y

Economic data:

Economic data: 1.4 million ton/y at 15 Euro is 2.1 million Euro/y.

Capital cost:

Only the conversion of the boiler or the addition of pellet burners on it, at 5 Euro/kW and for 230 MW will cost 1.15 million Euro, appr. The value of the avoided CO₂. More calculations have to be made, but it must be considered that:

- Carbon has also a price (though it may be low in China);
- Transport of carbon (high operational cost) or of electrical energy (investment costs) is inevitable if the electricity or heat users are far from the coal mines, and will weigh up against the cost of biomass collection
- The value of avoided CO₂ will quickly rise and will probably be much higher at the time of realisation of this idea.
- Carbon combustion is costing the Chinese society already much in terms of health but also its economical impact.

Additional Information

Organisations:

China: ZERI, the Forest Agency (of Ms Wei Da), from our former contacts (visit of a scientific Chinese delegation to ETA in June 2005): the State Forestry Administration (Carbon Sequestration Management Office) and contacts involved in Sweet Sorghum plantations and research.

Germany: Future Camp

Italy: ETA

Belgium: European Biomass Industrial Association