Hial - biofuels for chp plants - reduced emissions and cost reduction in the combustion of high alkali biofuels (HIAL)

Fact Sheet

Project Information

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<td>ENK5-CT-2001-00517</td>
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<td>1 December 2001</td>
<td>30 November 2004</td>
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Funded under
FP5-EESD

Overall budget
€ 2 871 770

EU contribution
€ 1 809 251

Coordinated by
FORSCHUNGSZENTRUM
JUELICH GMBH

Germany

Objective

Objectives and problems to be solved:
The scientific objective of this proposal is to understand the influence of fuel composition and combustion conditions on the release of alkali metals, S and Cl to the gas phase considering different combustion systems. The technical objective of this proposal is to apply the understanding of the alkali chemistry to develop primary measures for grate firing to achieve SO2 emissions below 200 mg/Nm3 without the need for installation of flue gas desulphurisation unit (FGD). This can be carried out by improved capture of SO2 in the bottom and fly ash by changing the operational parameters. Moreover, this understanding is the necessary prerequisite for a suppression of alkali induced corrosion attack allowing an increase in the reliability of
operation and an increase of the straw share in co-combustion processes.

Description of work:
The work of the project is carried out in three work packages.
In work package WP-1 (Sampling and characterisation) different kinds of straw from different European countries will be sampled and characterised by chemical and thermal analysis.
In work package WP-2 (Combustion Chemistry and Release) the combustion chemistry and the release of alkali metals, S and Cl will be investigated. This work package is the main work package and it includes most of the experimental work. The release of the alkali metals, S and Cl will be investigated by bench scale experiments using modern mass spectrometric techniques and different kinds of combustion technique (fixed bed, fluidised-bed and suspension combustion) with and without coal co-combustion. The industrial partners of the project will give their experience based on the operation of full-scale power plants into this work package. The results obtained by fundamental mass spectrometric release measurements and the bench scale combustion experiments will be used to develop qualitative models predicting the release of alkali metals, S and Cl for different fuels and combustion conditions.
In work package WP-3 (Commercial application) full-scale tests on existing straw-fired CHP plants will be carried out at the end of the project. This work package implements the R&D results for commercial use. The results will be directly used in existing straw-fired plants and for the development of new straw-fired CHP plants that are characterised by a high efficiency and low costs for the energy production.

Expected Results and Exploitation Plans:
A clear understanding of the complex release chemistry of K, Na, S, and Cl in different combustion systems will be elaborated. Primary low cost measures to lower the SO2 emissions of existing straw fired plants in Europe will result. Exploitation of results is ascertained by the two industrial companies involved in the project since they have high interest in investments in new HIAL fuel fired CHP plants if attractive economies can be provided. The project increases the competitive strength of the European industry in a field of increasing importance due to the environmental constraints. This will then result in wide market opportunities within Europe and globally.

Programme(s)

Topic(s)

Funding Scheme
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