Environmental and Economic Modelling of Power Generation

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9) Funding source(s):
- Industry

10) Partner organizations:
LENI, Laboratoire d'Energetique Industrielle - EPFL, Lausanne, Switzerland, www.epfl.ch

11) Short Summary: This modelling project identifies the risks and evaluates the business opportunities for power generation technology suppliers that arise from electricity market liberalisation, the Kyoto process, and rapidly increasing electricity demand in emerging Asian and Latin American markets.

12) Keywords: Energy Economics, Energy Technology, Engineering Sciences, Environmental and Resource Issues

13) Project description:

Power generation is facing major challenges in the next one or two decades regarding liberalisation of electricity markets in many countries, basic innovations in decentralised power generation, the Kyoto obligations favouring the use of natural gas, the Kyoto mechanisms, and fast increasing electricity demand in emerging countries of Asia and Latin America. Many experts expect a large potential for the fuel cell technology, a technology easy to scale in any size and havingvery high electrical efficiencies of more than 55% already now. Combining fuel cells withgas turbines could increase the electrical efficiency to more than 70%.

The emission reduction targets still require large efforts in the industrialised countries. Even with the use of domestic carbon sinks for the fulfilment of the Kyoto obligations the OECD countries apartfrom the USA will fall behind their emissions targets by 90 to 150 Mt of CO2. Actual forecasts for the growth of the electricity demand in Asia assume growth rates of more than 4% percent per annum, resulting in a doubling of the electricity consumption in the next twenty years. The project aims at evaluating these challenges to identify risks and business opportunities for a technology producer such as ALSTOM Power and at contributing to major research questions regarding techno-economic and policy analysis as well as related modelling activities of applied research carried out at the Swiss Federal Institutes of Technology (ETHs) in Zurich and Lausanne. The work contains a policy analysis, an evaluation of the impacts caused by the expected changes in the boundary conditions of energy use on power generation, and the use of various models. The market perspectives will be exemplified by analysing the situation and possible developments of a few typical countries in the OECD and in a developing country.

The research project is jointly conducted by CEPE (ETH Zurich), LENI (ETH Lausanne), and ALSTOM Power. The core research will be carried out within the context of two doctoral theses at both ETHs and supported by senior scientists of both research institutes and by joint tasks including activities of ALSTOM Power. The project aims at analysing the impacts of the liberalisation of energy markets, climate policies, technical innovations in decentralised power generation and fast growing markets on the generation technology. By the use of policy analysis, the evaluation of boundary conditions and various models, the project shall identify promising technological paths and markets for power generation technologies.

14) Popular description: no entry

15) Graphics: no entry

16) Publications: no entry

17) Links to important web pages: no entry