

OBJECTIVES

The aim of the project is to evaluate the technical and economic feasibility of retrofitting UK coal-fired power plants with advanced supercritical boiler/turbine technology (ASC) and carbon dioxide capture. The specific objectives are:

- To establish optimum retrofit solutions for a reference power plant typical of the majority of UK coal fleet (500MWe and larger).
- To determine the relative benefits of alternative approaches to the possible staging of retrofits for the short-term or the long-term.
- To review the applicability of the optimum retrofit solutions for a range of UK power plant sites and to indicate the variances arising due to site conditions.

SUMMARY

The recent government Energy White Paper recognises the role which coal-fired generation plays with regard to security of electricity supplies but identifies the reduction of carbon dioxide emissions as an imperative. Two complementary approaches to carbon dioxide reduction can be considered for retrofit to existing power plants. These are the improvement of cycle efficiency by retrofit of advanced supercritical boiler/turbine technology and the capture and storage of carbon dioxide. The candidate capture technologies for pulverised coal are Amine Scrubbing and Oxyfuel Firing.

It is proposed to carry out a series of technical and economic studies which will allow Generators and the DTI to determine the conditions under which Carbon Management retrofits to existing coal-fired power plants will be viable, to determine if a retrofit can be carried out in stages, and to identify the requirements for further Research, Development and Demonstration.



Figure 1. Ratcliffe Power Station (4 x 500MWe Sets), UK, E.ON UK

The project complements a series of projects (IEA GHG Programme and EU FP6 ENCAP and CASTOR) being carried out in parallel on new-built Advanced Supercritical Coal Fired Plant with Amine Scrubbing or Oxyfuel firing.

The project will contribute directly to the Priority targets of the programme's 4th Call, namely "Carbon Management" "Improvement in plant efficiency through retrofit of advanced pf plant technology in the UK" and "CO₂ removal systems combined with advanced pf plant". There is a large potential market for ASC BT Retrofits to existing plant globally if the cost can be reduced to less than the benefits from fuel savings in fuel and carbon "taxes". Mitsui Babcock's ASC boiler technology and Alstom's turbine modifications offer significant competitive advantage. If CO₂ capture and storage becomes economic or mandatory the routes being studied are likely to be the most economic options for existing plant, and the project consortium members would be well positioned to exploit the opportunities in the UK, mainland Europe, USA/Canada and China/Asia Pacific.

Further information on the Cleaner Fossil Fuels Programme, and copies of publications, can be obtained from:

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COST

The total cost of the project is £1 260 000 with the Department of Trade and Industry contributing £819 000.

DURATION

24 months - December 2004 to January 2006

LEAD CONTRACTOR

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