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State of the art in carbon dioxide capture and storage in the UK: An experts' review

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ARTICLE INFO

Article history:
Received 8 March 2007
Received in revised form
9 May 2007
Accepted 16 May 2007
Published on line 21 June 2007

Keywords:
Delphi survey
Stakeholder and expert opinion

ABSTRACT

This paper presents results from the first round of an extensive on-line Delphi survey of experts in the field of carbon dioxide capture and storage (CCS). Questions related to key drivers of energy technology in the UK, capture and engineering, CO_2 transport, storage, risks and leakage, monitoring and remediation, costs and economics, incentives, regulation, international context. The survey has constructed a comprehensive picture of expert opinion on the current status of CCS in the UK from across the CCS and related energy supply community. The results contribute to understanding how large-scale deployment of CCS might be realised in the UK and the challenges associated therein. The survey revealed that key barriers to implementation of CCS are currently a lack of long-term policy framework in the UK and costs. There remain aspects of the process that require further investigation but until the technology is adopted on a commercial scale, in the context of a commitment to significant reductions in CO_2 emissions across all demand sectors, it is neither possible nor appropriate to predict the details of how the process will evolve.

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1. Introduction

As the case for urgent and large-scale reductions in CO_2 emissions grows within both scientific and political dialogues (IPCC, 2005; Schellnhuber et al., 2006; Stern, 2006), the application of carbon dioxide capture and geological storage (CCS) becomes increasingly relevant. CCS technologies provide the potential to make large-scale cuts in atmospheric CO_2 emissions without wholesale restructuring of the electricity supply system (IEA, 2004; IPCC, 2005). Although, ultimately, a fully decarbonised energy system is likely to be required in order to avoid dangerous climate change (Anderson et al., 2005), CCS could make a significant contribution to securing deep cuts in CO_2 in the short- to medium-term as alternative supply and demand measures are developed. The approach is attracting increasing political attention, but how soon could CCS be deployed at a commercial scale in the UK and what are the key uncertainties and barriers to its implementation? This paper describes the first stage of a Delphi process in which key experts in areas related to CCS technology and its application have been consulted regarding a broad range of technical and non-technical issues.

This paper describes the first phase of a two-phase Delphi process. It begins with a brief description of the Delphi process and how it has been applied here, followed by a description of the results generated during the first phase. We conclude with a brief summary and discussion of the implications of these results to the UK.

2. The Delphi approach

The Delphi method was developed in the 1950s by the RAND corporation (Dalkey and Helmer, 1963) as a method for

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doi:10.1016/S1750-5836(07)00073-4