

Introduction

Terms of reference

- 1.1 On 21 June 2006, the Minister for Science and Education, the Hon Julie Bishop, referred to the House of Representatives Standing Committee on Science and Innovation an inquiry into the science and application of geosequestration technology.
- 1.2 Under the terms of reference, the Committee was asked to inquire and report on:
 - The science underpinning geosequestration technology;
 - The potential environmental and economic benefits and risks of such technology;
 - The skill base in Australia to advance the science of geosequestration technology;
 - Regulatory and approval issues governing geosequestration technology and trials; and
 - How to best position Australian industry to capture possible market applications.

Inquiry format

- 1.3 The inquiry was advertised in *The Australian* on 1 July 2006, *The Financial Review* on 5 July 2006, *R&DInfo* Newsletter on 11 July 2006, *EnviroInfo* Newsletter on 6 July 2006 and *New Scientist* on 22 July 2006. The Committee sought submissions from relevant Australian Government Ministers and from state and territory governments. In addition, invitations to make submissions were sent to a range of businesses, industry groups, academics and peak environmental bodies.
- 1.4 The Committee received 46 submissions. These are listed at Appendix A. Additional material relevant to the inquiry which was received as exhibits is listed at Appendix B.
- 1.5 The Committee held 10 public hearings in Canberra from 4 September 2006 to 26 March 2007. A list of hearings and witnesses is at Appendix C.
- 1.6 Appendix D lists principal power stations in Australia, noting their locations, operators, plant and fuel type, year of commissioning and capacity.

Terminology

- 1.7 The term geosequestration applies specifically to the injection of CO₂ into geological formations. For this reason, this inquiry has chosen to use the term Carbon Capture and Storage (CCS) instead of geosequestration. The term CCS has recently been widely adopted, as it encompasses all stages of the process, that is, the capture, transport, injection, storage and monitoring of carbon dioxide (CO₂).
- 1.8 Where possible, throughout the report, the Committee has endeavoured to refer to carbon dioxide (CO₂) or carbon dioxide equivalent (CO_{2-e}).
- 1.9 Throughout the report, mention is often made to a “carbon-constrained” world. This refers to a situation whereby there has been some intervention (voluntary or compulsory) to control or limit the amount of CO₂ released into the atmosphere. This constraint is referred to in terms of million tonnes of CO₂ or CO_{2-e} avoided. The Kyoto Protocol is the most widely recognised example of a “carbon-constrained” intervention.

- 1.10 In this report, the following electricity units and terms have been used:

A unit of power is referred to as a watt (W). Domestic electricity usage is typically measured in kilowatts (kW). The output of electricity generators is typically measured in megawatts (MW). For example:

- 1 kW = 1000W
- 1 MW = 1000 kW
- 1 gigawatt (GW) = 1000 MW

The size of a generator is referred to as its capacity (measured in MW) - that is, the generator's maximum electrical output.

A generator with a capacity of 1MW will power 10 000 100W light globes simultaneously. A 500MW generator has sufficient capacity to service more than 150 000 domestic electricity customers.

The consumption or generation of electricity can be measured in kilowatt-hours (kWh). An average household in Australia uses approximately 7,400 kWh of electricity a year. In 2005, Australia's power stations produced 248 billion kWh of electricity.

Structure of the report

- 1.11 The report has briefly looked at where geosequestration or CCS fits into the bigger picture of climate change.
- 1.12 Chapter 2 generally outlines the issues relating to climate change, coal and CCS, while Chapters 3 and 4 provide an outline and analysis of all the component parts that make up CCS.
- 1.13 Chapter 5 considers the environmental issues and the level of public awareness and support for the geological storage of CO₂.
- 1.14 Chapter 6 examines the economic benefits and costs of CCS. In particular, it compares the various costs per tonne of CO₂ avoided that have been estimated for the various technologies as well as providing an analysis of the costs attributed to capture, transport, injection and storage, monitoring and verification.

- 1.15 Chapter 7 discusses the issues that must be taken into consideration when drafting the necessary legislative and regulatory framework to enable stakeholders to undertake CCS in Australia.
- 1.16 The final chapter looks at a range of issues that will help position Australian companies to exploit potential market applications arising from the establishment of a CCS industry in Australia.