HOUSE OF REPRESENTATIVES:

STANDING COMMITTEE ON SCIENCE AND INNOVATION

INQUIRY INTO GESOEQUESTRATION TECHNOLOGY

ORIGIN ENERGY SUBMISSION

18 August 2006

Inquiry into Geosequestration Technology

Origin Energy Submission

Background

Origin has a heritage of over 140 years of operating in Australia and is one of Australia's leading providers of energy and energy related products and services, with significant positions in exploration and production, power generation, retail and trading, as well as investments in and management of distribution networks. Origin has over 3000 employees, supplying natural gas, LPG and electricity to over 2.6 million customers throughout Australia, New Zealand and the near Pacific.

In upstream activities, Origin holds significant exploration and production interests. Origin produced 65.5PJ of gas and 2,187 kbbls of oil in 2004/5 and had 2P reserves totalling 2,220 PJe as at 30 June 2005. In June 2001, the company's strategy to locate and commercialise gas close to market led to the discovery of the large Thylacine and Geographe gas fields in the offshore Otway Basin, from which the first gas deliveries are expected in 2007. The BassGas Project, which will develop the Yolla gas field in Bass Strait, recently commenced production. Origin is also a key player in the Queensland coal seam gas industry, which has seen its market share grow from 2% in 2000 to over 40% in 2005.

Origin has been integrally involved in the CO2CRC's Otway Basin Pilot Project (OBPP). As operator of the on-shore Otway petroleum assets, Origin this year completed a transaction to transfer the CO2-rich Buttress field and the depleted Naylor gas field to the CO2CRC. This transaction allowed the project to proceed. Origin is also a member of the CO2CRC Joint Venture and holds a seat on the Board.

Origin has been active in the regulatory and legislative issues of "commercial" geosequestration, having submitted to the MCMPR's Regulatory Impact Statement consultation process[1] and more recently contributed to the process of formulating the proposed framework into legislation.

Origin believes major energy producers and consumers must acknowledge that we are now operating in an environment increasingly constrained in its ability to absorb greenhouse gases without unacceptable environmental impacts. Origin's greenhouse gas emissions, from electricity and gas production, transportation and customer use, represent about 9% of Australia's total energy emissions. Therefore, Origin has adopted a portfolio strategy to deliver energy services to our customers whilst meeting two objectives:

- To reduce the greenhouse gas intensity of our energy production and distribution
- To reduce the greenhouse gas intensity of customers' energy consumption

In order to meet demand and reduce the greenhouse intensity of energy, we believe that a diverse range of technologies must be deployed. The Australian Greenhouse Offices's future projection of greenhouse gas emissions suggests that current measures and technology options will not be sufficient to change the emissions trajectory. New technologies must be assessed, demonstrated and if viable, deployed. Origin considers geosequestration as a potentially important emerging technology for the mitigation of greenhouse gas emissions.

[1] http://www.isr.gov.au/content/sitemap.cfm?objectid=643977B1-B0D0-D18A-17D8C5AD1A31B179

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Science underpinning geosequestration technology

Origin understands that the Cooperative Research Centre for Greenhouse Gas Technologies (CO2CRC) has made a comprehensive submission to this Inquiry. The CO2CRC is internationally recognised for its leadership in this area, and therefore can be relied upon to provide an up to date and accurate overview of the science.

As an active explorer and producer of petroleum, Origin can comment that the technology used to store carbon dioxide in underground reservoirs has been used by the upstream industry for decades. As part of its normal operations, petroleum operators globally have:

- injected production water back into the reservoir from which it has been produced;
- stored "acid gas" (a mixture of H2S and CO2) produced from "sour" gas reservoirs;
- injected CO2 for the purposes of extracting additional hydrocarbons; and
- stored natural gas on a seasonal basis for use during peak periods.

It is integral to petroleum operations that the geology and geophysics of the sub-surface be well understood. The techniques used in the exploration (and in some cases storage) of hydrocarbons are the same techniques that can be used in the exploration for carbon sequestration opportunities. Storage sites would be "chosen carefully, designed for safe operation, and properly monitored"[2]. This careful, scientific and risk-based approach has underpinned all the existing research and commercial geosequestration projects currently underway globally.

Regulatory and approval issues

As noted above, Origin is actively involved in the policy development around an appropriate framework for geosequestration. Some of the key issues identified by the MCMPR are:

- the relationship between rights of existing petroleum title holders and prospecting geosequestration interests;
- a suitable monitoring and verification regime; and
- addressing long-term liability, given that storage periods are likely to be spanning centuries and possibly millennia.

Origin has observed that the Department of Industry, Tourism and Resources is undertaking a rigorous and consultative process to address these and other issues. We understand that the Australian Government is proposing to put forward legislation to Parliament early in 2007.

How best to position Australian industry to capture possible market applications

There is currently little impetus for investments in greenhouse gas mitigation technologies -- whether they be renewables, nuclear, geosequestration or gas-fired generation -- as there is no framework by which carbon will be valued in Australia. A carbon signal is an *essential* component of a regulatory framework to support the development of geosequestration in

[2] *Putting the Carbon Back*, Nature v442 10 August 2006

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Australia. Commercial deployment of this technology is likely to be delayed until a comprehensive framework that values greenhouse emissions is established.

While some commentators have suggested that the appropriate policy response to climate change is to "wait" for new technologies to arrive, it should be noted that in the case of geosequestration, the technology is already available and has been in use for decades. The question, then, is how to incentivise commercial projects.

Origin was involved in the Australian Business Roundtable on Climate Change[3] which called for early action to address the requirement to reduce greenhouse gas emissions. Among the recommendations was the call for the "design of a 'long, loud and legal' framework to establish a price signal", which involves setting a 2020 target for emissions and an emissions trading scheme to support it. The State Governments have this week published a Discussion Paper[4] on how this scheme might look. Central to the Roundtable's work is the conclusion that it is much more costly to wait for "new" technologies (such as geosequestration) rather than to act early. Waiting just increases the magnitude of the task and compresses the timeframe in which to achieve it.

This point is well recognised by many in the stationary energy sector. The Australian Financial Review reported today that "carbon capture and storage, the central plank of the federal government's climate-change strategy, would require an emissions-trading scheme as early as 2012, according to the Australian Coal Association".[5]

To illustrate how such a scheme might pull forward geosequestration projects, one could consider the Latrobe Valley CO2 Storage Assessment Study[6], a study undertaken by the CO2CRC in conjunction with Monash Energy. The study investigates the technical and economic potential of sequestering 2, 15 and 50 million tonnes per year of CO2 in the depleted oil and gas fields of the Gippsland Basin. These projects are significant in scale; by comparison, the current total annual CO2 output of the Latrobe Valley coal-fired generators is around 53 million tonnes, roughly 10% of Australia's entire greenhouse emissions. The cost of these projects is replicated in the table below:

Project	*15 million tonnes per year*	*50 million tonnes per year*
Capital Costs	$1,199 million	$3,861 million
Annual Operating Costs	$62-72 million	$204-277 million
Cost per tonne of CO2	$10.9/t	$10.5/t

The encouraging result from this study is that the cost of storage, at just above $10/t CO2, is low relative to other abatement technologies. Being low on the abatement cost curve, geosequestration is well-placed to compete in a carbon-constrained world[7]. However, the capital costs are significant; these are major projects. Origin sees it as self evident that none of this capital will be committed commercially without a return, and this return requires a value being placed on carbon. In fact, the value of carbon becomes the revenue stream of the geosequestration project. Without a value on carbon, there is no project.

[3] http://www.businessroundtable.com.au

[4] http://www.emissionstrading.net.au/key_documents/discussion_paper

[5] *No escaping CO2 trade*, AFR Friday 18 August 2006, p8

[6] http://www.co2crc.com.au/PUBFILES/OTHER05/LVCSA_FinalReport.pdf

[7] Note that the cost of capture needs to be added to these figures if to be considered against other abatement opportunities in the power generation sector. Carbon dioxide capture is acknowledged to be more technically challenging than storage, and costs are therefore considerably higher.

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An alternative approach to the valuation of carbon could be to regulate; that is, require all new coal-fired power stations to geosequester their output. Origin sees two, somewhat related, problems with this approach.

Firstly, it is more costly. While an emissions trading scheme draws out the least cost abatement to meet a given emission reduction target, a regulatory approach precludes other technologies (that may be cheaper) from competing in the market for abatement. This was illustrated by a recent ACIL Tasman paper[8] that showed the cost of banning coal-fired power stations to represent a cost of around $87/t CO2 in 2014 and $149/t in 2025. By comparison, the Roundtable's modelling showed emission reductions from an emissions trading scheme being achieved at below $40/t in the near-medium term (through to 2030).

Secondly, Origin contends that the regulatory approach would not provide sufficient certainty relative to a carbon price signal. Given that long term investments require sustained regulatory certainty, or risk stranded investment if regulations change, it is unclear whether a ban on coal-fired power stations without geosequestration would be sustainable policy in the longer term. Would the $1.2billion or $3.9billion in the above table be committed on the basis of such a ban? A market-based mechanism, such as emissions trading, is the more likely longer term policy approach, and has already been adopted internationally as the least cost way of meeting emission reductions at least cost.

Either an emissions trading scheme or the regulated approach would lift electricity prices. This reminds us that it is not the mechanism itself that pushes up prices, but the decision to reduce emissions, which require higher priced technologies in order to be achieved.

Conclusion

Geosequestration is an exciting technology and has huge potential to contribute to the global task of cutting greenhouse gas emissions to sustainable levels in order to avoid the effects of climate change. Australia is well-placed to play an active part in the technology, through industry, government and leadership in the science. However, its potential will never be realised without a policy change which places a value on carbon.

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[8] *Alternative outlooks for the NEM – a coal or gas fired future*; Paper delivered by Paul Breslin, CEO, ACIL Tasman to Australian Energy Summit, Sydney, 18 March 2005