Schlumberger

Schlumberger Carbon Services (SCS)
Level 23,
HWT Tower,
40 City Road,
Southgate,
VIC 3006

8th April 2009

The Secretary,
Senate Select Committee on Climate Policy,
PO Box 6100,
Parliament House,
Canberra ACT 2600

By email: climate.sen@aph.gov.au

Dear Secretary,

Re: Senate Select Committee on Climate Policy

Please find attached our submission in regards to the terms of reference to the Senate Select Committee on Climate Policy. We have focused heavily on 'Carbon Capture & Storage' (CCS) as this is where our expertise lies and, indeed, where the bulk of the emissions reductions in Australia have to come from, given the importance of coal, both as the primary fossil fuel for electricity generation and key export earner. We believe the transition to a low carbon economy offers massive opportunities for the future economic growth of Australia and agree with the conclusions of both the Stern and Garnaut reports, in that the ultimate costs to the economy and society will increase dramatically the longer we delay in taking action.

I would like to give an introduction to Schlumberger and our involvement in CCS to date which will put perspective on some of our comments later on.

Schlumberger and Carbon Capture & Storage

Schlumberger is the world's leading oilfield services company supplying technology, information solutions and integrated project management that optimize reservoir performance for customers working in the oil and gas industry. Founded in 1926, today, the company is truly international and employs more than 80,000 people of over 140 nationalities working in approximately 80 countries. The technological lead comes from a sustained and heavy investment in R&D. In 2007 we invested US$728M in R&D. Not being a hydrocarbon producer nor a power generator, our emissions footprint is relatively small but we have introduced a number of initiatives internally to minimize this footprint further. I would like to emphasize that Schlumberger never has, and never will take equity or production sharing contracts in oil and gas fields. We are a service company to the oil and gas industries.

Schlumberger Carbon Services is a new business unit of Schlumberger and is separate from the Oilfield Services divisions of Schlumberger. All comments contained herein reflect the views of Schlumberger Carbon Services.

Since the mid 1990s, Schlumberger has been involved in geological carbon storage projects, providing services for subsurface characterisation and monitoring, whilst also dedicating specific research and

development efforts towards technology. We remain at the industry forefront, in part, from our current and active involvement in numerous international forums and organizations dedicated to reducing atmospheric CO2. We are represented at the Carbon Sequestration Leadership Forum (CSLF) and are active members of the International Energy Agency Greenhouse Gas R&D Program (IEA-GHG), and the European Technology Platform on Zero Emission Fossil Fuel Power Plants (ZEP) European Working Groups. We have also been, and continue to be, heavily involved in the CRC for Greenhouse Gas Technologies (CO2CRC) and the Otway Basin Pilot Project. With Otway, and in the EU FP6 project, CO2SINK, we are involved now, in 2009, in sequestering CO2 safely (albeit in an R&D setting), in onshore formations in Victoria and Germany respectively. We have also signed up as Foundation Members of the Global Carbon Capture and Storage Institute (GCCSI).

Demonstration projects

Schlumberger is also involved in larger scale demonstration projects, integrating all the components of the chain: CO_2 capture at the source (power plant or factory), transport, and storage.

Callide Oxy-fuel Project, Queensland, Australia

This demonstration project involves conversion of an existing 30 megawatt (MW) unit at Callide A (currently underway) and capture of CO_2. The second stage of the project will commence in 2010 and is expected to continue for up to 5 years. It will involve the injection and storage of ~50,000 tonnes of captured CO_2 in saline aquifers or depleted oil/gas fields. Schlumberger is a partner in the Callide project consortium and will project manage the CO_2 storage elements. Other consortium members include CS Energy, XSTRATA, IHI, JPOWER, JCOAL, the Australian Coal Association, and the CO2CRC. The project will cost A$205M and is funded through the Australian Government's LETDF, the Australian Coal Association's COAL21 Fund, as well as funding provided by the Japanese Government and other participants.

Illinois Project, USA

The United States Department of Energy has recently awarded the Midwest Geological Sequestration Consortium (MGSC) a contract to begin a large-scale CCS project in Decatur, Illinois—the first of its kind in North America wherein an unprecedented amount of 'non oil and gas related' CO_2 will be stored in a saline formation. The Illinois State Geological Survey is responsible for the project and has brought in two major partners—Schlumberger and Archer Daniels Midland—to execute it.
As a primary partner, Schlumberger Carbon Services will manage the complete design, construction, and operation of the storage portion of this project, using oilfield subsurface evaluation and integrated project management techniques.
As a method to reduce greenhouse gas emissions, one million tonnes of CO_2 currently bound for the atmosphere will be captured from an Archer Daniels Midland ethanol plant and, over a period of 3 years, will be injected into the Mount Simon formation—a geological structure spanning the states of Illinois, Kentucky, Indiana, and Ohio The project is designed to test and demonstrate the ability of a geologic formation to safely, permanently, and economically store considerable amounts of CO_2. This project will help to establish design and safety regulations for future CCS projects.

Our comments relating specifically to the terms of reference are as listed overleaf.

Comments

a) Choice of Emissions Trading as the central policy to reduce carbon pollution

We believe emissions trading must be established as a rational market based mechanism to reduce carbon pollution, bearing in mind that the mistakes of the European Emissions Trading Scheme (ETS) should not be repeated. However, we must also recognise that a market based system cannot be expected to fully support the introduction of new technologies such as carbon capture and storage (CCS). We strongly believe that CCS is ready for deployment at scale now. There are technological aspects of the CCS process that will be fine tuned during implementation but, fundamentally, technology is not the issue here. Amendments to the 'Offshore Petroleum Act' enabling CO2 storage have already passed into legislation and the first offshore acreage has been released which only leaves economics as the missing link in bringing CCS to commercial viability.

The ability to import permits from abroad, where there has been a wholesale collapse in the carbon price, increases investment risk in new large scale CCS projects. The importation and capping of the Australian ETS price, effectively defers any new investment decisions around deployment of low emission technologies as the dominant strategy would be to source and bank externally sourced credits.

We want to emphasize that today, in 2009, large CCS projects are happening, albeit with strong Government support. GE and Schlumberger have aligned to offer full scale Integrated Gasification Combined Cycle (IGCC) with CCS. 630MW IGCC units are being built and commissioned in the US (Duke Energy, Indiana). At the same time, Mitsubishi Heavy Industries (MHI), a world leader in post combustion capture (PCC) technology has recently signed a FFED (front end engineering and design) agreement with Gassnova in Norway to develop a 3,000 tonne **per day** post combustion capture (PCC) unit for a 420MW gas fired power station, this gives around 1 million tonnes per year of CO2 ready for injection. (http://www.mhi.co.jp/en/news/story/0808201251.html). Oxy-fuel is also being trialed both in Australia and Europe and we have every confidence in its success.

We believe that major international companies such as GE and MHI will be in a position to offer performance guarantees for their capture equipment which bodes well for large scale commercial implementation of CCS.

However, for the foreseeable future, the absence of clear, high carbon price signals means that the 'stand-alone' economics for such CCS projects remain poor. The GCCSI will play a key role in enabling large CCS projects but Australia, through the CPRS, can do more and sooner, by expanding the Mandatory Renewable Energy Target from purely renewables to low emissions technologies including CCS.

Ultimately, the policy instrument chosen to reduce emissions must be adaptable to link to the other trading schemes worldwide. As the ultimate goal of any scheme is to move the economy, over a period of 10-20 years to a low carbon intensity (wholesale decarbonisation), there must be sufficient incentive to invest in low carbon technologies, preferably driven by a defined (and aggressive) CO2 target trajectory. Any compensation system, to affected industries, must be 'one-off' and directed to low emission technologies as opposed to a direct incentive to maintain 'business as usual'. We would like to see a more aggressive 2020 reductions target in line with what the US has recently proposed.

b) the relative contributions to overall emission reduction targets from complementary measures such as renewable energy feed-in laws, energy efficiency and the protection or development of terrestrial carbon stores such as native forests and soils;

These complementary measures will play a key role in achieving emissions reductions going forward and must be properly incentivized but not at the expense of one another. We also note that many of the 'bio-sequestration' projects will have problems with verification and monitoring of carbon captured and stored. Energy efficiency is perhaps the easiest policy problem to solve through setting of national targets for commercial and domestic households. Voluntary offsets must be recognized and accounted for towards the national emissions reduction target.

We note the Government's commitment to 20% energy supply from renewables through the MRET scheme. We would like to see CCS included under the MRET in order to provide direct incentives into invest in CCS. This position has previously been advocated by the Australian Coal Association and **we would urge the Federal Government to give serious consideration in allowing CCS be included under the MRET scheme** and perhaps raising the MRET target beyond 20%. Technology risks still exist in many of the proposed renewable energies, particularly geothermal.

An alternative means of directly supporting the implementation would be to mirror the proposed incentive given to CCS by the European Commission for the next stage of their ETS. Recent work commissioned by the CO2CRC is quoted below on exactly this point.

"EU ETS includes a provision to provide 60 million allowances from the new entrants reserve that shall be reserved until 31 December 2015 to be given to the first 12 facilities which have begun to commercially capture and store CO2 emissions before this date and which are based anywhere in the EU, or in third countries that have ratified the international agreement on climate change. The 12 pilot projects are to be determined by the Commission before 1 January 2013. In effect CCS sequestered emissions would be double credited under this arrangement. The source entity would have its emissions liability reduced and the CCS project would gain an emissions credit for each tonne sequestered."

(Reference: "CCS in the Carbon Pollution Reduction Scheme - briefing on the issues and implications for CCS" Allen Consulting 2008 Briefing Paper for the CRC for Greenhouse Gas Technologies p 5)

c) whether the Government's Carbon Pollution Reduction Scheme is environmentally effective, in particular, with regard to the adequacy or otherwise of the Government's 2020 and 2050 greenhouse gas emission reduction targets in avoiding dangerous climate change;

This question is one that can only properly be answered in hindsight. We would make the comments that the scheme appears to be all things to all people. Some of the more cynical commentators have labeled it as 'no polluter left behind' (http://newmatilda.com/2008/07/17/no-polluter-left-behind). Australia can lead the world in the deployment of CCS, and arguably should do so, given the importance of coal as an export earner and primary fuel source. For the sake of future generations, we have to hope that the CPRS will be environmentally effective.

We strongly believe that the Australian ETS must not repeat the mistakes made in Europe, where permits were over-allocated, leading to a crash in the carbon price in 2006 and windfall profits for those recipients of the free permits with limited emissions reductions. We do not, *per se,* have an issue with compensation for assets that could be significantly disadvantaged under the ETS, **provided** any compensation is used to implement technologies that can reduce the emissions growing forward. If the compensation flows back to

the bottom line then little has been achieved other than a net transfer of wealth from the taxpayer to a private enterprise. Indeed, we would further argue that the issue of climate change is not new and that the Boards of many of these exposed companies should have been dealing with this issue long before now. That said, the limited incentives available up to now, have not provided enough reward for early movers to engage in decarbonisation.

We also note that the Australian Coal Association has strongly supported CCS through its $1 billion COAL21 Fund. The generation industry has not been so forthcoming in being as proactive around the development and implementation of lower emission technologies.

d) an appropriate mechanism for determining what a fair and equitable contribution to the global emission reduction effort would be;

This could be argued in two ways. One would be to say that Australia, as a nation, is responsible for only 2% of worldwide emissions or that on a per capita basis, Australia is one of the highest emitters. We would urge the Government to look at the opportunity to build new industries and skills around the low carbon economy and the 'first mover advantages' that would come from an aggressive approach to emissions reductions. By doing so, Australia can lead the effort in the Asia Pacific region for the implementation of emissions reductions technologies and policies.

e) whether the design of the proposed scheme will send appropriate investment signals for green collar jobs, research and development, and the manufacturing and service industries, taking into account permit allocation, leakage, compensation mechanisms and additionality issues; and

It is likely that the current importation of credits and capping mechanisms will only encourage innovation in the financial 'green collar' jobs as opposed to aiding implementation of large scale projects.

We do not believe the Government has fully recognized the importance of CCS in reducing Australia's emissions going forward. Nor do we believe that the Government appreciates the scale of CCS needed within the next 20-30 years. We, essentially, are developing a new carbon storage industry which, by 2050, will need to be equivalent in scale to what the oil and gas industry is today. This is also within a sector, the oil and gas industry, that is undergoing extremely strong growth, *and one that offers immediate economic benefit through the sale of hydrocarbons.* Schlumberger, like all other companies in the oil and gas industry, faces competition for its resources and indeed, Schlumberger Carbon Services, only exists through the support of the senior management that sees Carbon as a strategically important, though highly speculative, business going forward.

We would recommend the Government adopts a model for CCS similar to the US DOE Regional Partnership Project and utilize a means of rewarding early movers into CCS with direct assistance through grants and/or tax benefits. This has to be done on a larger scale with direct assistance upwards of $100M+. The GCCSI can be an important means through which CCS projects can be accelerated but this acceleration will come at a cost that may appear unpalatable.

The US Government has recently revised the FutureGen program to covers cost of adding CCS or 50% of the total project cost. This Federal program of US$1.3 billion is direct economic assistance to the implementation of CCS and covers deployment at industrial scales. This initiative, along with the third round of the Clean Coal Power Initiative, is aimed at **commercial-scale CCS and multiple projects.** The US recognizes that direct incentives are needed to produce early commercial deployment.

CCS may always be a 'cost-plus' technology

We fully agree with one of the conclusions reached by the World Resources Institute Report ("Capturing King Coal: Deploying Carbon Capture and Storage Systems in the US at Scale" 2008 (http://www.wri.org/publication/capturing-king-coal)

"CCS will always be a cost-plus exercise where significant political will is required. CCS deployment will be a function of how policy impacts the power producers' cash flows and in turn how this impacts their least cost compliance strategies. The current policy discussion does not rise to the challenge; a carbon price alone is likely insufficient. **If CCS is only one compliance strategy among other options, capital will be deployed to the least cost-compliance option**." (p32) (**Bold emphasis our own)**

This report also emphasizes our point that no Government in the world has recognized the scale of the problem and the scale of the solution that must be implemented.

"Scale is a major issue. CCS is a complex system of separate and individual processes that need to be installed and operated to capture, compress, transport, inject, and store CO2. Meanwhile the quantities of CO2 involved are enormous. So much supporting infrastructure in the form of dedicated transport pipes and sequestration facilities would be needed that deploying CCS systems at "wedge" scale amounts to a transformation of our entire energy infrastructure. The likelihood of such a transformation taking place in less than a few decades, without aggressive policy shifts not yet evidently forthcoming, is slim." (p32, ibid)

We would urge the Federal Government to make a strong commitment away from the 'business-as-usual' concept for future power generation. The US Investment Banks, Citi, JPMorgan & Morgan Stanley through their *Carbon Principles* have indicated that carbon liabilities are a key decision making factor in investment decisions. It can be expected that all project financiers will start to include carbon liabilities in their investment due diligence processes. The Federal and State Governments, by making a commitment to *no new coal fired power stations being built without CCS'*, could help drive CCS implementation.

f) any related matter.

No further comments.

Conclusion

In conclusion, we recognize that the Government has an extremely difficult task in designing an effective emissions trading scheme that will allow both emissions reduction and economic growth. We strongly believe that CCS can offer a solution to both these goals for Australia by allowing the continued use of coal as the primary fossil fuel and export commodity but also as a means of building a new manufacturing skill base around the expertise required to implement CCS on a large scale. However, to do this will require specific incentives designed to enable CCS implementation, similar to the commitment the US and EU Governments have made.

A carbon price alone, especially in the early years of the scheme, will not be enough to bring in large scale CCS. We urge the Government to consider adopting specific measures designed to bring CCS to scale, either through allocation of credits as in the case of the EU or through direct project assistance as in the case of the US FutureGen program. The Obama administration has committed some US$3.4Bn for CCS demonstration projects in the latest stimulus package, recognizing that it can be a growth engine for jobs and exports in the transition to a lower carbon economy. The GCCSI can play an important role in CCS commercialization but not in isolation from broader Government engagement.

Schlumberger

I would be pleased to expand on any of our comments and look forward to the next stage in the development of the climate policy.

Yours sincerely,

Geoffrey Ingram
Corporate and External Affairs,
Schlumberger Carbon Services Australia,
Phone: 03 9674 7126
Email: gingram@slb.com