

Xstrata Coal Queensland Pty Ltd & Ors v Friends of the Earth – Brisbane Co-Op Ltd & Ors
Expert Report to the Land Court by Jon Stanford

1. Experts Details & Qualifications

1.1 Name

My name is Jonathan Geoffrey Stanford.

1.2 Address

My business address is:

Director
Insight Economics Pty Ltd
530 Little Collins Street
Melbourne 3000

1.3 Qualifications and expertise

My area of expertise relates to the economic and public policy issues relevant to government strategies to address climate change as well as a strong understanding of Australia's resources and energy sector.

I am sufficiently expert to make this statement because I have had nearly 20 years experience in addressing the economic and policy issues surrounding climate change. Within government, I was involved in these issues as a senior official in the Department of the Prime Minister and Cabinet in the early to mid 1990s. In that position, I was Chair of the Commonwealth Government's inter-departmental committee on greenhouse policy issues and of the Intergovernmental Committee on Ecologically Sustainable Development. Since then, as a Director of two consultancy firms, Insight Economics and previously the Allen Consulting Group and as a founding partner in Deloitte Economics, I have undertaken a number of major assignments on greenhouse issues for the Commonwealth government, various State governments and private sector interests. These projects have mainly involved economic modelling of the likely impact of various possible policy initiatives to address climate change and an analysis of alternative policy approaches. Most recently, I spent over twelve months on a major project as Climate Change Adviser to the Northern Territory Chief Minister and his government more generally. Over the last few years, I have also contributed a number of articles on climate change policy issues to the opinion pages of *The Australian Financial Review* and addressed the issue in many conference presentations.

Annexure A to this report is my curriculum vitae, which sets out my professional qualifications.

2. Instructions

I have been instructed by Allens Arthur Robinson on behalf of Xstrata Coal Queensland Pty Ltd to formulate a report in response to the following questions:

1. What is the policy framework that has been adopted by the Australian and Queensland Governments to date in respect of the future development of the coal industry?
2. What is the policy framework that has been adopted by the Australian and Queensland Governments to date in respect of regulating greenhouse gas (GHG) emissions? More

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- specifically, what has been, and what currently is, the policy position of the Australian and Queensland Governments in regulating GHG emissions of individual coal mines?
3. Has refusing proposed coal mines on a case by case basis to avoid GHG emissions from the mining or use of coal from such mines been considered and, if so, what were the outcomes of those considerations? Would this be consistent with the policy framework?
 4. Have regulators refused to approve a proposed coal mine in order to avoid the GHG emissions from mining the coal at the proposed mine? Further, have regulators refused to approve a proposed coal mine to avoid the "downstream" GHG emissions, being the GHG emissions which may result from the use of coal from the relevant mine (ie burning of coal) by a third party who purchases coal? Would this be consistent with the policy framework? Are you aware of any Australian jurisdiction which has done this?
 5. What is the policy framework that has been adopted by the Australian and Queensland Governments to date in respect of the future development of the carbon capture and storage technologies?
 6. From an economic perspective, when will it be feasible to indefinitely capture and store GHG emissions produced by mining and the use of coal produced from an individual mine?
 7. Has refusing proposed coal mines on a case by case basis until such time as it is feasible to indefinitely capture and store the GHG emissions from the mining and use of coal from the proposed mine been considered and, if so, what were the outcomes of those considerations? Would this be consistent with the policy framework?
 8. Have regulators refused to approve a proposed coal mine until such time as it is feasible to indefinitely capture and store the GHG emissions from the mining and use of coal from the proposed mine? Would this be consistent with the policy framework? Are you aware of any Australian jurisdiction which has done this?
 9. From a policy and economic perspective, is refusing to approve proposed coal mines in Queensland or in Australia on a case by case basis an effective means for addressing environmental concerns that may be associated with GHG emissions and climate change? Can you set out the reasons for your view.
 10. What would be the economic impact on the Queensland coal industry if proposed coal mines were refused on a case by case basis. Further, what would be the economic impact on the Queensland coal industry if proposed coal mines were refused until such time as it is feasible to indefinitely capture and store the GHG emissions from the mining and use of coal from the proposed mine?
 11. What impact would it have on the Australian and Queensland economy if proposed coal mines were, on a case by case basis, refused generally or otherwise refused until such time as it is feasible to indefinitely capture and store the GHG emissions from the mining and use of coal from the proposed mine?
 12. Finally, can you provide comment, from a policy and economic perspective, on paragraphs 39 and 40 of the objection of Friends of the Earth Co-op Ltd that state there is a lack of need for thermal coal and that cost-effective base load electricity can be supplied from sources other than coal-fired power stations?
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3. Factual Information

In producing this report, I have relied on factual information from a large number of sources. I have referenced this material throughout Section 4 of this report.

4. Opinion and Findings

4.1 What is the policy framework that has been adopted by the Australian and Queensland Governments to date in respect of the future development of the coal industry?

Australia's coal industry makes a substantial contribution to living standards, both nationally and in the principal coal producing States, namely Queensland and New South Wales.¹ Both the Australian and Queensland governments support the continuing development of the coal industry.²

Australian governments, however, are very conscious that international measures to reduce greenhouse gas (GHG) emissions, while necessary and appropriate, represent a longer term threat to coal mining, Australia's largest export industry.³ For this reason they are highly supportive of measures to reduce the carbon footprint of coal from GHG emissions within Australia, particularly when it is combusted for the purposes of generating electricity. Both levels of government support research and development into more efficient ways of using coal ('clean coal') and into carbon capture and storage (CCS) technologies. The Australian Government, in particular, has provided a high level of support for this approach, including:

- Establishing the National Low Emissions Coal Council, which has produced a strategy for developing low emissions coal technologies⁴
- Establishing the Global CCS Institute, which now has a large number of government and private sector members internationally, and providing the bulk of the funding (initially around \$100 million per year, subsequently reduced in early 2011 after the Queensland floods)⁵
- Establishing the Carbon Capture and Storage Flagships program, directed towards funding demonstration projects primarily in the electricity generation industry.⁶

The Queensland Government is also supportive of the development of the coal industry, which, according to the Premier, contributes more than \$11 billion a year to the State's economy.⁷ Under its

¹ See, for example, Knights, Peter and Michael Hood (2009), *Coal and the Commonwealth*, Brisbane, University of Queensland, October, Chapter 4.

² In this report, references to coal should be interpreted as black coal.

³ See, for example, ABARE (2010), *Australian Energy Resource Assessment, 2010*, available at http://www.abare.gov.au/publications_html/energy/energy_10/ch_5.pdf

⁴ See Department of Resources, Energy and Tourism (2010), <http://www.ret.gov.au/resources/Documents/nleci/2010%20NLEC%20Strategy%20update%20paper.pdf>

⁵ See <http://www.globalccsinstitute.com/institute>

⁶ See: www.ret.gov.au/energy/Documents/cei/.../CCS_Fact_Sheet-June-2011.doc

CoalPlan 2030, the Government provides support for infrastructure to underpin the industry's expansion as well as contributing significant funds to R&D into ways of making the industry environmentally sustainable in the longer term.⁸ The government's aspirations for the industry are demonstrated in Exhibit 1 below, representing an extract from a media statement by the Queensland Premier.

EXHIBIT 1: EXPANSION OF THE QUEENSLAND COAL INDUSTRY

Queensland's coal exports could almost double by 2030, Premier Anna Bligh said today while officially opening the \$780 million expansion to Gladstone's R G Tanna Terminal.

"Growth has been impressive - rising from 200,000 tonnes in 1960 to now where export capacity is about 200 million tonnes a year," said Ms Bligh.

"This milestone expected to be hit in the next 18 months and there are forecasts it will hit 370 million tonnes in 20 years," she said.

In praising the Gladstone Ports Corporation for its efforts she told coal companies, as well as buyers and traders from Japan, India and Korea, that the State Government was working with industry searching for clean coal solutions.

"The State and the coal companies, through our Clean Coal Council, are putting our money where our mouth is to ensure a green solution is found. It will be," she said.

"This must happen to sustain the industry and its jobs, to protect the environment and to shore up the State's long-term."

The Premier said that the future for the State's coal exports looked bright.

"There is a \$15 billion Coal Infrastructure Plan to cope with increased demand. There are 28 advanced coal projects in CQ alone with 17 new mines and 11 expansions under active consideration.

"Presently there are 40 operating mines throughout State.

"In the next five years the potential capital investment in CQ coal projects is of the order of \$11.5 billion with a further \$9 billion on coal transport infrastructure," she said.

Source: Media Statement, Premier of Queensland, 9 July 2008.

4.2 What is the policy framework that has been adopted by the Australian and Queensland Governments to date in respect of regulating greenhouse gas (GHG) emissions? More specifically, what has been, and what currently is, the policy position of the Australian and Queensland Governments in regulating GHG emissions of individual coal mines?

Greenhouse gas emissions reporting policy framework

Australia's obligations under the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol require the Australian Government to measure and report its GHG emissions on a regular basis. The principal difference between the UNFCCC and Kyoto

⁷The Hon. Anna Bligh, Media Statement, *New 20-year plan charts course for Queensland's coal industry*, 24 November 2010.

⁸ See www.dip.qld.gov.au/coal-plan as well as *Surat Basin Future Directions Statement* (February 2010) at <http://203.210.126.185/dsdweb/v4/apps/web/secure/docs/4187.pdf>; *A Sustainable Futures Framework for Queensland Mining Towns* (February 2007) at http://www.dlqp.qld.gov.au/resources/planning/planning/sustainable_futures_framework.pdf and summary at http://www.dlqp.qld.gov.au/resources/planning/planning/framework_qld_mining_towns_summary.pdf

Protocol accounting relates to the treatment of the land use, land use change and forestry activities. The UNFCCC inventory also includes reporting of indirect GHGs for which global warming potentials are not available. It does not require the reporting by the national government concerned of third party (Scope 3) emissions that occur in other countries as a result of the use of some material exported from the first country. For example, Australia is not required to measure and report the emissions that occur in other national jurisdictions as a result of the combustion of coal exported from Queensland; that is the responsibility of the country that imports and uses the coal.⁹

Under the Kyoto Protocol, to which Australia acceded in 2008, Australia has committed to constrain its average annual GHG emissions in the period 2008-12 to a level not more than eight per cent above the level in 1990.¹⁰ Australia's accession to the UNFCCC and the Kyoto Protocol is also binding on Australian States.

In terms of the collection and reporting of GHG emissions data, from 2008-09 the system transitioned to new arrangements with increased reliance on the data obtained under the *National Greenhouse and Energy Reporting Act 2007*. This Act introduced mandatory reporting for businesses that produce emissions above defined thresholds. The objectives of the NGER Act, as stated in the legislation, are to:

- inform government policy and the Australian public
- help meet Australia's international reporting obligations
- assist Commonwealth, state and territory government programs and activities
- avoid the duplication of similar reporting requirements in the states and territories
- underpin the introduction of an emissions trading scheme.¹¹

Under the Act, "A registered corporation must, in accordance with this section and in respect of each financial year mentioned in subsection (2), provide a report to the Greenhouse and Energy Data Officer relating to the:

- (a) greenhouse gas emissions; and
- (b) energy production; and
- (c) energy consumption,

from the operation of facilities under the operational control of the corporation and entities that are members of the corporation's group, during that financial year."¹²

The legislation, which is clearly framed to conform with international protocols and conventions, therefore requires entities to report their Scope 1 (direct) emissions as well as Scope 2 (consumption

⁹ Department of Climate Change and Energy Efficiency, <http://www.climatechange.gov.au/en/publications/greenhouse-acctg/national-inventory-report-2009.aspx>

¹⁰ Department of Climate Change and Energy Efficiency, <http://www.climatechange.gov.au/~media/publications/greenhouse-acctg/unfccc-report.pdf>

¹¹ Department of Climate Change and Energy Efficiency, <http://www.climatechange.gov.au/reporting>

¹² Commonwealth of Australia, *National Greenhouse and Energy Reporting Act 2007*, Section 19.

of energy) emissions. They are not required to report Scope 3 emissions, which refer to the use to which their product is put by a third party, over which they have little or no control.

Australian government emission reduction policy framework

Both the Australian and Queensland governments are committed to reducing GHG emissions within their respective jurisdictions.

The Australian Government has established a target, supported by the Opposition, of reducing emissions by five per cent (or in the case of the Government up to 25 per cent if other nations make comparable commitments) below 2000 levels by 2020. The Government has also established a longer term target of reducing the nation's emissions by 60 per cent by 2050.¹³

The Australian Government has stated that the main instrument for reducing emissions on a national basis will be a market based mechanism to operate from July 2012. Although the details have yet to be announced, it appears that initially this will take the form of a carbon tax, which will be replaced, probably after three years, by an emissions trading scheme (ETS). The Australian Government supports a market mechanism because, in principle, it should provide the most efficient means of reducing emissions at the lowest cost to the community.¹⁴

The Australian Government has also mandated that 20 per cent of the nation's electricity will be produced from renewable sources by 2020 (the Renewable Energy Target, or RET). In addition, there are a number of government programs designed to promote cleaner energy and energy efficiency, including:

- The *Clean Energy Initiative*, directed towards investing \$4.5 billion in developing cleaner sources of energy from processes such as harnessing geothermal power, improving the efficiency of solar and reducing the costs of CCS
- The *Renewable Energy Bonus Scheme*, to promote the use of renewable energy by households
- Improving energy efficiency, through programs such as *Clean Business Australia* and the *National Strategy on Energy Efficiency*
- The *Skills for the Carbon Challenge* program, to improve skills in the workforce in the areas of green technologies and sustainability.¹⁵

¹³ See Department of Climate Change and Energy Efficiency, <http://www.climatechange.gov.au/en/government/reduce/national-targets.aspx>

¹⁴ See, for example, Department of Climate Change and Energy Efficiency <http://www.climatechange.gov.au/government/initiatives/cprs/carbon-price-design/overview.aspx>

¹⁵ For details of all these policies see Australian Government (2011), Department of Climate Change and Energy Efficiency, *What the Government is Doing – Reducing Australia's Emissions*, www.climatechange.gov.au

Queensland Government emission reduction policy framework

The Queensland Government endorses the longer term national target of reducing emissions by 60 per cent from 2050, but has also proposed “a target to reduce by one-third Queenslanders’ carbon footprint by 2020”.¹⁶

The Queensland Government’s policy framework is contained in *ClimateQ: towards a greener Queensland*, released in August 2009. This contained \$196 million in spending commitments to address the State’s vulnerability to climate change and reduce emissions in key sectors of the economy.

According to the Queensland Government’s Office of Climate Change, “*ClimateQ*’s 39 initiatives are designed to:

- Lower the cost to households and businesses of becoming cleaner and greener
- Support emerging technologies and industries that will help Queensland transition to a carbon-constrained economy
- Protect and replenish Queensland’s natural wonders that are vital to the productive future of key industries such as agriculture and tourism
- Prioritise practical adaptation solutions, research and information to help communities adapt and respond to the impacts of climate change.”¹⁷

Within the *ClimateQ* strategy framework, the Queensland Government has also announced new rules for developing new coal fired power generators. In future “no new coal fired power station will be approved in Queensland unless: (a) it uses world’s best practice low emission technology in order to achieve the lowest possible level of emissions, and (b) it is CCS ready and will retrofit that technology within five years of CCS being proven on a commercial scale.”¹⁸

Regulation of emissions from individual coal mines

As discussed above, under the *National Greenhouse and Energy Reporting Act 2007*, most coal mines will be required to report their Scope 1 emissions (GHG emissions directly related to their activities) and their consumption of energy (which approximately accords with Scope 2 emissions). They are not required to report Scope 3 emissions, which encompass emissions from burning the coal by a third party.

With the exception of the reporting requirements neither the Australian nor the Queensland Governments specifically regulate emissions from individual coal mines. In the context of the environmental impact statements (EIS) generally required of new major investment projects such as coal mines, however, the developers are expected to provide details of their strategies in regard to addressing GHG emissions. In Queensland, the EIS is assessed by the Coordinator General, who makes a recommendation to the Minister, under the *State Development and Public Works*

¹⁶ Queensland Government (2011), Office of Climate Change, *Queensland’s Climate Change Strategy*, page 1.

¹⁷ *Ibid.*

¹⁸ Queensland Government (2011), Office of Climate Change, *Conditions for new coal-fired electricity generation*, page 1.

Organisation Act 1971, as to whether the project should be approved on environmental grounds.¹⁹ Under the *Environment Protection and Biodiversity Conservation Act 1999* the Commonwealth also has the power to approve and disapprove projects that are deemed "controlled actions".²⁰

Under these State and Commonwealth laws, as a condition of approving the project, government may require the developer to utilise best practice processes so as to constrain emissions of GHGs from the project. It should be emphasised, however, that these policy approaches apply to all major resource projects. As far as I am aware, no Australian government singles out the coal industry for treatment different to other industries in terms of regulating its GHG emissions. Such an approach would be inconsistent with a policy framework relying, on the one hand, on a broad, market driven mechanism and, on the other, on measures to encourage renewable energy as well as energy conservation and efficiency.

4.3 Has refusing proposed coal mines on a case by case basis to avoid GHG emissions from the mining or use of coal from such mines been considered and, if so, what were the outcomes of those considerations? Would this be consistent with the policy framework?

With the exception noted below, in light of the privileged nature of Cabinet deliberations, I cannot say whether or not any Australian government has ever considered prohibiting the development of new coal mines on the basis of their potential GHG emissions. However, given the supportive policy stance on the part of all Australian Governments towards resource development and export-oriented projects, including coal mining, I consider this to be most unlikely.

There is one exception to this, regarding the brown coal industry. In 2005, the Victorian Government executed a deed with the owners of the Hazelwood power station under which the company was permitted to mine additional brown coal for use in the power station in return for agreeing to reduce GHG emissions per MWh of electricity produced.²¹

In the case of Hazelwood, there were some issues specific to that power station. First of all, it combusted brown coal with emissions of around 1.6 tonnes of GHGs per MWh of generation and is reported to be "the dirtiest power station in the world".²² This compares with average emissions from even a less than state-of-the-art black coal power station of less than one tonne. Even with the investment in cleaner technology required under the deed with the Victorian government, emissions of CO₂ would still be over one tonne/MWh. Secondly, the Scope 3 emissions from the use of the brown coal occurred within the Victorian Government's jurisdiction. Finally, no emission reduction requirement was imposed on the Scope 1 and Scope 2 emissions from the mining of the brown coal.

¹⁹ See, eg, The Coordinator-General, *Wandoan Coal Project: Coordinator-General's evaluation report on the environmental impact statement*, November 2010.

²⁰ See: www.environment.gov.au/epbc/

²¹ www.legislation.vic.gov.au/domino/Web_Notes/newmedia.nsf/798c8b072d117a01ca256c8c0019bb01/ce988ef03b5c71d4ca25707500082f68!OpenDocument

²² <http://www.wwf.org.au/articles/feature34/>

Since neither the Queensland nor Australian Governments have a policy of requiring individual projects to reduce their emissions, such an approach would not be consistent with the policy framework of both Governments in terms of their policy framework for addressing climate change as described under 4.2 above. It would also be inconsistent with their policies to support the growth of the coal industry more generally, which are directed towards supporting the development of technologies to reduce the carbon footprint arising from the use of coal.²³ This is demonstrated by the response of both governments when, in May 2011, Greens Senator Christine Milne called for a ban on all new coal mines and on extensions to existing mines. In response, Queensland Premier Anna Bligh called such an approach “radical and extreme” and “not a sensible solution”. She said she would continue to approve new mines “because the State needs them”.²⁴ Federal Resources Minister Martin Ferguson also rejected the notion of a ban and said it would “destroy jobs and export revenue”.²⁵

More recently, Greens’ leader Senator Bob Brown suggested on the ABC *Insiders* program (26 June 2011) that the ultimate aim of Australia’s climate change policy had to be to close down the coal industry. This was quickly responded to by the Prime Minister, who stated that “I’ve said we will work with the coal industry so it has got a future, and we will do that. I’m very determined to do that and to support the employment of people who work in the coal industry”.²⁶

4.4 Have regulators refused to approve a proposed coal mine in order to avoid the GHG emissions from mining the coal at the proposed mine? Further, have regulators refused to approve a proposed coal mine to avoid the “downstream” GHG emissions, being the GHG emissions which may result from the use of coal from the relevant mine (ie burning of coal) by a third party who purchases coal? Would this be consistent with the policy framework? Are you aware of any Australian jurisdiction which has done this?

To my knowledge, no Australian regulator has refused to approve a new coal mine in order to avoid GHG emissions, including “downstream” or Scope 3 emissions.²⁷

In my opinion, seeking to regulate third party emissions from the combustion of coal even within the jurisdiction of domestic governments would be inconsistent with the policy approach towards reducing emissions adopted by the Queensland and Australian governments. Such a ‘command and control’ approach is inconsistent with the use of a market mechanism that, as described in response to 4.2 above. It is also inconsistent with the policy approach to developing the black coal industry as described under 4.1 above.

²³ See response to question 4.1 above and, for example, The Hon. Anna Bligh, Media Statement, *New 20-year plan charts course for Queensland’s coal industry*, 24 November 2010.

²⁴ Online report by Jessica Marszalek, *ninemsn*, 25 May 2011.

²⁵ Online report by *Australian Bulk Handling Review*, 25 May 2011.

²⁶ Sid Maher, “Gillard slams Bob Brown on future of coal industry”, *The Australian*, 28 June 2011.

²⁷ www.legislation.vic.gov.au/domino/Web_Notes/newmedia.nsf/798c8b072d117a01ca256c8c0019bb01/ce988ef03b5c71d4ca25707500082f68!OpenDocument

Seeking to regulate downstream, or Scope 3 emissions, in another jurisdiction overseas would also appear to be contrary to international convention. As described under 4.2 above, under the various rules and conventions developed under the auspices of the United Nations Framework Convention on Climate Change, each sovereign nation is responsible for its own GHG emissions.

4.5 What is the policy framework that has been adopted by the Australian and Queensland Governments to date in respect of the future development of the carbon capture and storage technologies?

As discussed and referenced in Section 4.1 above, in light of the importance of the coal industry to Australia's and Queensland's economy, both the Australian and Queensland governments have adopted policies to support the development of carbon capture and storage technologies.

Australian Government CCS policy framework

In 2009, the Australian Government established the Global CCS Institute, with an international mandate to support CCS projects and, in particular, to help support the development of at least 20 commercial scale CCS projects around the world by 2020 (see Exhibit 2).

EXHIBIT 2: THE GLOBAL CCS INSTITUTE

ABOUT THE GLOBAL CCS INSTITUTE

WHO WE ARE

Announced by the Australian Government in September 2008, the Global CCS Institute was formally launched in April 2009. It became a legal entity in June 2009 when it was incorporated under the Australian Corporations Act 2001 as a public company and began operating independently as of July 2009. The Institute is a not-for-profit entity, funded by guarantee, and owned by its Members, with the Australian Government initially committing AUD150 million annual funding to the organization for a four-year period.

WHAT WE DO

The Institute works collaboratively to build and share the expertise necessary to ensure that carbon capture and storage (CCS) can make a significant impact on reducing the world's greenhouse gas emissions.

HOW WE DO IT

The Institute conducts projects around the world to address issues and learn from each other to accelerate the deployment of CCS projects through:

1. **Sharing knowledge**
 - Collecting information to create a central repository for CCS knowledge.
 - Analysis and disseminating information in all knowledge papers and build capacity.
2. **Fact-based advocacy**
 - Using facts to inform and influence domestic and international carbon policies.
 - Supporting the commercialisation of CCS by advancing the understanding of appropriate funding and financing solutions and risk regimes.
 - Increasing the awareness of the benefits of CCS and the role it plays within a portfolio of low carbon technologies.
3. **Assessing projects**
 - Bridging knowledge gaps between demonstration efforts.
 - Developing project-specific solutions, particularly amongst early movers.

Source: Global CCS Institute website, accessed July 2011.

The Australian Government has also introduced the *Carbon Capture and Storage Flagships Program*, designed to accelerate the development and demonstration of CCS technologies. The

program promotes the wider dissemination of CCS technologies by supporting a small number of demonstration projects that capture CO₂ emissions from industrial processes and safely store CO₂ underground in stable geological formations to mitigate global warming. The program is designed to support the construction of two to four commercial scale CCS projects with an electricity generating capacity of 1000 MW or equivalent size for other industrial processes. The CCS Flagships program is part of the Government's expanded \$5 billion Clean Energy Initiative and builds on the National Low Emissions Coal Initiative.²⁸

Queensland Government CCS policy framework

The main way in which the Queensland Government is supporting CCS is under the *Coal 21* initiative.²⁹ The State Government is contributing \$300 million to a \$900 million fund (with the coal industry contributing \$600 million) over ten years for the development and deployment of low emissions coal technologies with CCS.

There are a range of CCS projects currently under development in Queensland with government support, including:

- The *ZeroGen* project, involving the Integrated Gasification and Combined Cycle (IGCC) process with CCS
- The *Callide Oxyfuel* project
- The *Tarong Energy Post-combustion Carbon Capture* (PCC) project.

Further details of the Queensland Government's support for CCS may be found in the State Government's *CoalPlan 2030*.³⁰

4.6 From an economic perspective, when will it be feasible to indefinitely capture and store GHG emissions produced by mining and the use of coal produced from an individual mine?

In responding to this question, it is important to bear in mind that while a certain technology may be *technically* feasible (that is, it has been demonstrated that it is technically possible to capture and store CO₂), it will not necessarily be *commercially* feasible (that is, possible to employ on a commercial basis that generates an acceptable profit).

CCS and fugitive emissions from coal mining

In terms of the capture and storage of fugitive emissions produced from open cut mining of coal, I have asked the Global CCS Institute when this may be possible. They have responded that, as far as they are aware, this is currently not technically feasible nor is it being actively contemplated.

²⁸ See Department of Resources, Energy and Tourism (2010), <http://www.ret.gov.au/resources/Documents/nleci/2010%20NLEC%20Strategy%20update%20paper.pdf> and www.ret.gov.au/resources/resources_programs/nleci/council/Pages/NationalLowEmissionsCoalCouncil.aspx

²⁹ http://www.australiancoal.com.au/resources.ashx/FurtherReadings/7/DocumentFile/08A442E6335ECC015E53EB6F9AA97866/Low_Emissions_Coal_Technologies_brief.pdf

³⁰ <http://www.dlqp.qld.gov.au/resources/plan/coal-plan-2030.pdf>, page 9.

CCS and emissions from the combustion of coal

Capturing most of the carbon emissions from the combustion of coal in power generators and storing the CO₂ underground is now technically feasible, but still costly and therefore, in the absence of a commensurately high carbon price, not economically feasible.³¹ The focus of research and development in relation to CCS is currently on its application to industrial processes and electricity generation. In regard to the former, the commerciality of CCS will depend on technological development to reduce the cost, and on the carbon price. As to the economics of CCS for coal-fired or gas-fired power generation, because of the difficulty of predicting the pace and extent of technological advances and future carbon prices, nobody can say with any certainty if or when the technology will be commercially feasible. For example, Melbourne University's Zero Carbon Australia Stationary Energy Plan, states that "Carbon capture and storage (CCS) is similarly an unproven technology, that is not expected to be commercially available within the [2020] timeframe. It is also not a zero-emissions solution, as even should it be demonstrated at scale, proposed projects are not expected to capture 100% of fossil fuel plant emissions."³²

Even if the carbon price reaches very high levels, for example, in order to be commercially viable the cost of electricity generated using CCS processes would still need to be competitive with other low to zero emissions base load technologies, such as nuclear power, geothermal and gas combined cycle. The commerciality of CCS for power generation, therefore, depends on a number of variables, including:

- The carbon price
- The cost of alternative base load technologies such as natural gas and nuclear power (and the community's willingness to employ it)
- Success in driving down the costs of carbon capture, which are still relatively high
- Uncertainty over which party will assume the contingent liability for possible CO₂ leaks from underground reservoirs, with the outcome having the potential to raise costs substantially.

Recent studies show that in the US, for example, where CCS technologies are estimated to be less costly than if deployed in Europe and Japan, it would require a wholesale electricity price of between US\$120 and \$150/MWh to justify the investment. Such an electricity price would need to reflect a very high carbon price and is currently not contemplated. By comparison, another relatively low emissions technology, namely Combined Cycle Gas Turbine (CCGT), would need an electricity price less than half this level to make it commercially viable in the US.³³

The Global CCS Institute itself suggests that there are significant risks to the development of CCS projects as is shown in Exhibit 3.

³¹ Global CCS Institute, *The Global Status of CCS: 2010*, March 2011, Canberra.

³² http://www.energy.unimelb.edu.au/uploads/ZCA2020_Stationary_Energy_Report_v1.pdf, page 5

³³ Global CCS Institute, *The Global Status of CCS: 2010*, March 2011, Canberra, page 11.

EXHIBIT 3: RISKS AND UNCERTAINTIES FACING INVESTORS IN CCS

	RISK	DESCRIPTION	IMPLICATION
Execution risks	Technology/construction risk	<ul style="list-style-type: none"> Risks associated with PDM, including integration, construction (delays, cost overruns) and performance risks across capture, transport and storage 	<ul style="list-style-type: none"> Projects may cost more or deliver less than expected Investment not willing to accept risk
	Contractual and integration risk	<ul style="list-style-type: none"> Viability of each element often dependent on the successful implementation of the others Lack of precedent for complicated contractual agreements 	<ul style="list-style-type: none"> Delay in PDM projects due to 'chicken-and-egg' problem
Operating environment uncertainties	Uncertainty around CCS policy	<ul style="list-style-type: none"> Uncertainty around CO₂ and electricity price development given lack of clear long term government policy Potential changes to long term legislative/regulatory regimes on carbon/CCS 	<ul style="list-style-type: none"> Investments unable to find a return on investment to any level of confidence
	Debasement risks	<ul style="list-style-type: none"> Lower cost of abatement options become available, making CCS relatively uneconomical 	<ul style="list-style-type: none"> Investment value may be written down if risk materialises
Long tail risks	CO ₂ storage risk	<ul style="list-style-type: none"> Liability potentially spanning hundreds of years Considered to be low risk of incident, but with very large consequences 	<ul style="list-style-type: none"> Investments reluctant to take on potentially long-term liability

1. The table above is the subject of the 2010 paper by the Global CCS Institute, *Financial and Commercial Workstream, Discussion Paper, May, page 16*.

Source: Global CCS Institute (2010), *Financial and Commercial Workstream, Discussion Paper, May, page 16*.

In short, at this stage CCS for fugitive emissions from open cut coal mines is not technically feasible. CCS for coal-fired electricity generation is technically feasible but not currently an economic or commercial proposition. In my opinion, the eventual deployment of CCS is essential to the future of the coal industry globally, but there is no indication as to when (or if) the technology will become a feasible commercial proposition.

4.7 Has refusing proposed coal mines on a case by case basis until such time as it is feasible to indefinitely capture and store the GHG emissions from the mining and use of coal from the proposed mine been considered and, if so, what were the outcomes of those considerations? Would this be consistent with the policy framework?

As far as I am aware, there has never been any consideration of imposing such a condition on a proposed coal mine. First, according to the Global CCS Institute, which has expertise in regard to CCS technologies, at present there is no prospect of capturing and sequestering fugitive emissions from open cut coal mining. Secondly, while it is technically (but not yet commercially) feasible to capture and store a substantial proportion of emissions from coal-fired electricity generation, for most Queensland coal mining projects such emissions will generally be the responsibility of third parties overseas who are customers of the entity concerned.³⁴ Attempting to impose a CCS condition on

³⁴ For data on exports of coal from Queensland, see the *CoalPlan*, <http://www.dlqp.qld.gov.au/resources/plan/coal-plan-2030.pdf>, page 10.

overseas customers would be likely merely to drive them to buy their coal from some other supplier in another country that did not seek to impose such a restriction.

As described under 4.2 above, the Australian Government's policy framework for reducing emissions is based on the imposition of a market-based mechanism that does not discriminate between those industries to which it is applied. The application of a conditional ban on certain industries such as coal does not fit into such a framework. Equally, such an approach would be inconsistent with the policy approach of the Queensland Government, which is directed towards increasing energy efficiency, encouraging the use of renewables, while at the same time supporting the development of the coal industry over the longer term as described in the *CoalPlan 2030*. Both Governments are supporting the development of CCS but do not have a policy of mandating its use before it is commercially feasible.

4.8 Have regulators refused to approve a proposed coal mine until such time as it is feasible to indefinitely capture and store the GHG emissions from the mining and use of coal from the proposed mine? Would this be consistent with the policy framework? Are you aware of any Australian jurisdiction which has done this?

As far as I am aware, no government, anywhere in the world including in Australia, has refused to approve a proposed coal mine until CCS is feasible. For the reasons put forward under 4.6 and 4.7 above, such an approach is not technically possible for fugitive emissions from open cut coal mining and it would be inconsistent with the Australian and Queensland Governments' policy framework, including their approach to supporting the development of CCS.

In terms of the use of the coal, under international conventions, including the Kyoto Protocol, governments are responsible for reporting GHG emissions that are produced within their jurisdiction but not for those that occur in other jurisdictions (see 4.2 above). In this context, for example, the Queensland Government has imposed a CCS condition (that it must be 'CCS ready') on approving any new coal-fired electricity generator in Queensland.³⁵ It would be contrary to international convention, however, were the Australian or Queensland Government to seek to impose such a mandate on, say, Chinese power stations using Queensland coal.

4.9 From a policy and economic perspective, is refusing to approve proposed coal mines in Queensland or in Australia on a case by case basis an effective means for addressing environmental concerns that may be associated with GHG emissions and climate change? Can you set out the reasons for your view.

Refusing to approve proposed new coal mines, either on a general or a case by case basis, would be neither an efficient nor effective means of addressing environmental concerns associated with GHG emissions and climate change.

³⁵ Queensland Government (2011), Office of Climate Change, *Conditions for new coal-fired electricity generation*, page 1.

In principle, a market mechanism, as proposed by the Australian Government, is the most efficient means of reducing emissions because it allows market participants to choose the cheapest abatement options — according to the Department of Climate Change and Energy Efficiency, under a market based policy “the effect would be that Australia would meet its carbon pollution targets at the lowest overall cost”.³⁶ A policy of not approving individual coal mines (or coal mines in general), on the other hand, would contradict this policy by implying that government knows that this constitutes a more efficient approach than the market can deliver. In the absence of such a ‘command and control’ approach, once a carbon price is introduced, the market will determine whether or not any individual coal mine should go ahead, taking full account of the impact of the carbon price.

In terms of the effectiveness of an approach based on refusing mines, it would almost certainly be quite ineffective and possibly even be counter-productive because of carbon leakage. Coal is a commodity for which there is a high and growing demand in the world economy, as is evidenced by the considerable increase in its price in recent years. Global reserves of coal are very substantial and, in contrast to resources such as uranium, where Australia accounts for a major share of global reserves, Australia only has around six per cent of the world’s black coal reserves. In addition, despite being the world’s largest coal exporting country, Australia ranks fourth in coal production, accounting for six per cent of the global total.³⁷ If Australian governments take action effectively to reduce the supply of coal, therefore, there is no evidence at all that this would constrain global production of the commodity. Global demand for coal will not change as a result of Australia’s actions and the requirements of the market could readily be supplied from somewhere else.

The impact on global GHG emissions of action to constrain the supply of Australian coal, therefore, would be negligible since the emissions would merely occur somewhere else.

4.10 What would be the economic impact on the Queensland coal industry if proposed coal mines were refused on a case by case basis? Further, what would be the economic impact on the Queensland coal industry if proposed coal mines were refused until such time as it is feasible to indefinitely capture and store the GHG emissions from the mining and use of coal from the proposed mine?

In the short run, a policy of refusing approvals for new mines may have little immediate impact on the coal industry except in terms of its growth. Existing mines would continue to produce, to provide jobs and to export most of their production. But in the longer term such a policy approach could very well, in my opinion, lead to the decline of the industry in Queensland and, if applied in other Australian jurisdictions, in Australia more generally. Most of the companies that have major investments in the coal sector in Australia are transnational enterprises with a portfolio of global investment opportunities and the capacity to develop new coal projects virtually anywhere in the world. If the policy environment for investing in coal turns negative in Australia, new investment will occur elsewhere and the coal industry in Queensland and Australia more generally will decline.

³⁶ <http://www.climatechange.gov.au/government/initiatives/cprs/carbon-price-design/overview.aspx>

³⁷ ABARE, *Australian Energy Resource Assessment 2010*, *op. cit.*, page 137.

A similar outcome could be expected if CCS-related conditions were attached to the approvals of new mines. Investors would understand that it is likely that the capture and storage of fugitive emissions from open cut mines will not become feasible in the foreseeable future. They would also consider that seeking to impose a CCS condition on buyers in terms of the combustion of Australian coal would be likely to discourage customers in overseas jurisdictions from purchasing Australian coal. In my opinion, most overseas utilities would see the possible employment of CCS processes to be a commercial matter for them, rather than a matter to be mandated by the supplier, and a decision they would take in the context of the climate change policies applied by their host government. If Australian exporters attempted to impose a CCS condition onto them, they would be most likely to switch their custom to other suppliers who did not mandate the manner in which they should use their coal.

Overall, the application of a policy to deny approvals to individual mines on the grounds of third party emissions would be likely to have a substantial negative impact on investment in the industry in the jurisdictions where the policy was applied. In my opinion, this would apply not just to investment in new mines and extensions, but a loss of confidence in the government's support for the industry could well lead to a disinclination to invest in the existing industry in that jurisdiction so as to maintain its productive capacity. Investors in the industry may well see policies such as the ones described above as a precursor to a gradual phase-out of the industry. In such circumstances, safeguarding shareholder value in the companies concerned may well dictate a measured exit strategy from the industry, which could well contain, as one of its key elements, minimising future capital spending.

The coal mining industry is currently growing strongly in Australia and is attracting major investment. Yet, in the context of climate change, questions are increasingly being raised as to the industry's legitimacy. The concept of a 'legitimacy gap' reflects a discrepancy between an organisation's actions and the community's expectations of the organisation. According to Langer, legitimacy gaps can threaten an organization's image and reputation, and ultimately its existence as a legitimate member of the business community and society.³⁸ This could be highly relevant to the consequences for the Australian coal industry if it feels its legitimacy is under question, particularly in an era when corporations place greater emphasis on their obligations in terms of corporate social responsibility than in the past. If any industry feels it lacks government or community support, it may very well reduce its investment in Australia in favour of some other country which is more supportive of its activities.

In this context, it should be noted that while the Australian coal industry has exhibited strong growth, in *relative* terms it may already be in decline. According to the Australian Coal Association, world coal production has increased by 66 per cent since 2000 while production in Australia has increased by 40 per cent. This compares with an increase in production over the same period of 141 per cent in China, 91 per cent in Colombia and a very high 319 per cent in Indonesia.³⁹ Although Australia is still the world's leading coal exporting country, its share of the world coal trade fell from 30 per cent in

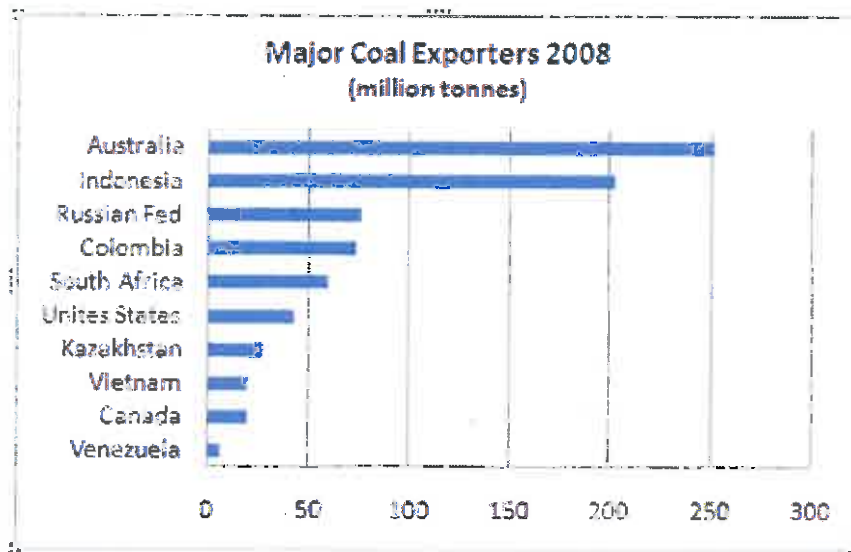
³⁸ Langer, Roy (2008), "Legitimacy Gap Theory", in W. Donsbach (ed), *The International Encyclopaedia of Communication*, vol. 6, Blackwell Publishing Ltd, pages 2687-2688.

³⁹ Ralph Hillman, Executive Director, Australian Coal Association, Address to National Press Club, Canberra, 6 July 2011, page 3.

2000 to 26.7 per cent in 2008.⁴⁰ On present trends, Australia could be overtaken by Indonesia as a coal exporter in the next few years.

Other countries certainly have the capacity to take over coal production displaced from the Australian industry as a consequence of policy-driven carbon leakage or a wider decline in activity. According to ABARE, both Indonesia and Mongolia have the capacity to increase their exports substantially.⁴¹ As may be seen from Exhibit 4, the next four coal exporting countries after Australia in the international league tables are Indonesia, Russia, Colombia and South Africa. In none of these countries, as far as I am aware, is there any significant questioning of the role of the coal industry. In my opinion, these countries have less rigorous approvals processes for new projects, less of an emphasis on environmental protection and lower labour costs than Australia. The relative competitiveness of the Australian industry will also not have been supported by the recent and sustained appreciation of the Australian dollar.

EXHIBIT 4: MAJOR COAL EXPORTING COUNTRIES, 2008



Source: Key World Energy Statistics 2009, International Energy Agency.

In light of their support for the future development of the Australian coal industry, as cited above, Governments will be wary of taking actions that will increase the industry's costs in Australia or of allowing regulators to impose conditions that will discourage investment in the industry. As discussed above, this will not be likely to produce any beneficial environmental outcomes in terms of climate change or pollution more generally.

4.11 What impact would it have on the Australian and Queensland economy if proposed coal mines were, on a case by case basis, refused generally or otherwise refused until such time as it is feasible to indefinitely capture and

⁴⁰ Davidson, Sinclair and Ashton De Silva (2011), *Costing the Greens' Economic Policies, Mining*, www.mineralscouncil.com.au/file_upload/files/reports/Costing_of_The_Greens_mining_policies.pdf, page 3.

⁴¹ ABARE, *Australian Energy Resource Assessment 2010, op. cit.*, page 151.

store the GHG emissions from the mining and use of coal from the proposed mine?

This question needs to be addressed in the context of the economic significance of the coal industry to the Australian and Queensland economies.

Coal and the Australian economy

Over the last decade the world price of coal has increased substantially and this is a major factor contributing to the rise in Australia's terms of trade, which have risen to a historically high level, giving rise to a considerable increase in Australian incomes.⁴² In response to the increase in global demand for coal, reflected in higher prices, the coal industry is expanding rapidly. With iron ore and LNG, the industry lies at the heart of Australia's resources boom, which is projected to underpin growth in the Australian economy for at least the next decade and be a major contributor to wealth and job creation.⁴³

Not only does the coal industry make a significant contribution to the Australian economy and to the community's wealth, this contribution has increased in recent years as the industry has grown at a rapid rate. According to the Australian Coal Association (ACA), the industry's contribution to Australia's Gross Domestic Product (GDP) increased from around one per cent in the mid-1990s to around 3.5 per cent in 2008-09.⁴⁴ At end-June 2009, 37,074 persons were directly employed in the coal industry in Australia, over half of them in Queensland. The industry also pays high wages: according to the ACA, "the average coalmining wage is \$122,000 compared with the average in manufacturing of \$54,000".⁴⁵ Investment in the industry is substantial, with projects committed or under construction in coal mining and coal infrastructure being valued at \$10.6 billion at end-April 2010. In 2008-09, royalties paid by the industry more than doubled to \$4.5 billion.⁴⁶ Coal is one of only two commodities included in the Australian Government's proposed Minerals Resource Rent Tax and the industry is likely therefore to make a further contribution to tax revenue in the future.

In 2008-09, Australian exports of black coal amounted to 262 million tonnes with a value of \$54.7 billion (up from \$24.4 billion – or 124 per cent – in 2007-08). The importance of coal exports to Australia's trade account is shown in Exhibit 5. The data show that coal is Australia's most important export industry by a large margin, with the value of coal exports in 2008-09 being greater than that of the next two export industries – iron ore and gold – combined. It is also notable that the growth in the value of coal exports in 2008-09 was greater than that for iron ore. While some of this growth reflects

⁴² See for example, Glenn Stevens, Reserve Bank of Australia, Remarks at the Victoria University Public Conference, *The Resources Boom: Understanding National and Regional Implications*, Melbourne - 23 February 2011.

⁴³ See, for example, Glenn Stevens, Reserve Bank of Australia, *The Challenge of Prosperity*, Address to the Committee for Economic Development of Australia (CEDA) Annual Dinner Melbourne - 29 November 2010 and Knights, Peter and Michael Hood (2009), *op. cit.*

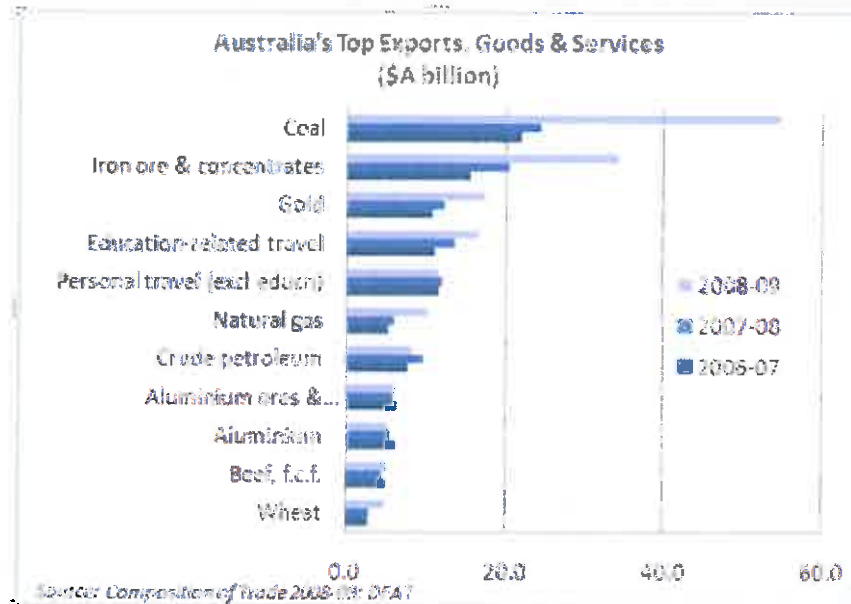
⁴⁴ Ralph Hillman, *op. cit.*, page 2.

⁴⁵ *Ibid*, page 3.

⁴⁶ Australian Coal Association, *Black Coal Statistical Summary, Australia, 2010*.

higher volumes, much of it is the result of higher prices (as reflected in the rise in Australia's terms of trade).⁴⁷

EXHIBIT 5: AUSTRALIA'S MAJOR EXPORT INDUSTRIES, 2008-09



Source: Australian Coal Association, http://www.australiancoal.com.au/the-australian-coal-industry_coal-exports.aspx

Coal and the Queensland economy

From producing around 200,000 tonnes of coal in 1960, the Queensland coal industry produced nearly one thousand times that in 2009, at 195 million tonnes. Coal exports from Queensland, at 168 million tonnes, represented about 20 per cent of the global coal trade. The industry generated over \$3 billion in royalties to the Queensland Government in 2008-09, accounting for around nine per cent of State Government revenue in that year.⁴⁸

While the mining industry generally is not a large employer of labour, the coal industry is an exception — it employed just over 19,000 persons directly in Queensland in 2009.⁴⁹ Its impact on total employment would be much larger because of the large number of companies that supply goods and services to the industry. A study by the University of Queensland estimated that in 2006-07 around 73,000 jobs in the State were indirectly created by the activities of the coal industry.⁵⁰ If we accept this estimate as correct and then factor in the industry's growth since the modelling was undertaken, the implication is that today over 100,000 jobs in Queensland are directly or indirectly

⁴⁷ Queensland Government (2010), *CoalPlan 2030*, page 22.

⁴⁸ Data collected by Six Degrees from official sources and published at www.sixdegrees.org.au/content/queenslands-coal-industry-overview

⁴⁹ Australian Coal Association, *Black Coal Statistical Summary, Australia, 2010*.

⁵⁰ Knights, Peter and Michael Hood (2009), *Coal and the Commonwealth*, Brisbane, University of Queensland, October, page 60.

dependent on the coal industry. This figure is set to increase strongly in the future if the coal industry grows as it is projected to do. This employment growth is particularly important because much of it will occur in non-metropolitan regions, where there are often fewer alternative employment opportunities than in the city.

The University of Queensland study, using the Monash Multi-Regional Forecasting (MMRF) economic model, showed that in 2008 as a result of the activities of the coal industry household disposable income in Queensland was nearly seven per cent higher than it otherwise would have been.⁵¹ This is a relatively high figure for the impact of a single industry and demonstrates how the economic benefits of coal mining are both very substantial and diffused throughout the whole Queensland economy.

Implications of refusing new mines or making them conditional on CCS

As I have shown above, the coal industry makes a major contribution to the Queensland and Australian economies. It is projected to grow strongly in the coming decade, with a consequent beneficial impact on job creation, incomes and wealth.⁵² Taxation revenue from the industry will also grow strongly — royalty payments doubled in one year to 2008-09 and will soon be supplemented by the MRRT if passed by the Australian Parliament.

On the surface, the refusal of new mining applications on a case by case basis, or making approval conditional on CCS, would merely slow the growth of the industry. This alone, however, would have significant consequences in terms of reducing the projected benefits to the Australian community of the industry's growth. But, as suggested in response to Question 4.10 above, the industry is already in relative decline as against some of its rivals overseas. In such circumstances, it is difficult to try to curtail any industry's growth without investors seeing this as a signal that the legitimacy of the industry is under question and the government does not welcome further investment.

4.12 Finally, can you provide comment, from a policy and economic perspective, on paragraphs 39 and 40 of the objection of Friends of the Earth Co-op Ltd that state there is a lack of need for thermal coal and that cost-effective base load electricity can be supplied from sources other than coal-fired power stations?

In this context, the objection of Friends of the Earth Co-Op Ltd to the Wandoan mine relies, in part, on two contentions.

A lack of need for thermal coal?

First, it is stated in the objection that "current supplies of thermal coal are sufficient to meet current needs and allow a transition away from coal-fired power stations" (Para.39).

There would appear to be little evidence for this contention. Indeed, as discussed in Sections 4.10 and 4.11 above, global demand for coal has grown rapidly, with an increase in world production of 66

⁵¹ *Ibid*, page 6.

⁵² See, eg. ABARE (2010), *Australian Energy Resource Assessment, 2010, op. cit.*, Chapter 5.

per cent since 2000. Even with this substantial increase in production, the rise in the price of thermal coal in this century suggests that demand for the commodity has yet to be matched by increased supplies. According to the US Department of Energy, the world price for traded coal increased from around US\$30.00 per short ton in 2000 to about US\$150.00 per short ton as of September 2008. Since then, the global financial crisis saw a decline in the price of coal, but even so the current price is around US\$80 per short ton, representing an increase of over 160 per cent in eleven years.⁵³

As may be seen in Exhibit 6, global demand for coal is projected by the International Energy Agency (IEA) to grow by 1.9 per cent a year to 2030, with all of the growth coming from non-OECD countries. Much of this growth reflects increased demand for thermal coal for the purposes of generating electricity.

EXHIBIT 6: PROJECTED GLOBAL COAL DEMAND TO 2030

	unit	2007	2030
OECD	PJ	48 483	46 180
Share of total	%	36.4	22.6
Average annual growth	%	-	-0.2
Non-OECD	PJ	84 825	158 429
Share of total	%	63.6	77.4
Average annual growth	%	-	2.8
World	PJ	133 308	204 609
Share of total	%	100.0	100.0
Average annual growth	%	-	1.9

Source: International Energy Agency, presented in ABARE (2010), *op. cit.*, Chapter 5, page 140.

Cost-effective base load power from renewables?

The second contention in the objection relevant to this question is that “cost-effective base load electricity can be supplied from sources other than coal-fired power stations, such as concentrated solar thermal power stations with thermal storage”(Para. 40). Apart from questions as to their cost-effectiveness, however, most sources of renewable energy, with the exceptions of hydro and geothermal which are not widely available, are unable to supply base load (continuous) power because of their interruptibility.⁵⁴ This restriction also applies to CST. While solar thermal technologies are developing rapidly and storage of electricity overnight is possible; nevertheless, this

⁵³ US Department of Energy, http://www.eia.gov/coal/news_markets/

⁵⁴ See, for example, Deloitte (2010), *Energy Security 2010-20, Overcoming Investor Uncertainty*, page 43, available at http://www.deloitte.com/view/en_AU/au/industries/energy-resources/f1b5ce7edad79210VgnVCM200000bb42f00aRCRD.htm; and Robert Bryce (2010), *Power Hungry*, Public Affairs, New York.

still means that, if it is cloudy the next morning or thereafter, the power supply from CST cannot be relied upon.

In addition to the fact that CST is still ultimately an interruptible source of energy and so not suited to supply base load power, its costs are substantially higher than coal and likely to be so in the foreseeable future. This is shown in Exhibit 7 below, which contains recent cost estimates of alternative power generation technologies from the Australian Energy Market Operator (AEMO) and published by the University of Melbourne. These estimates suggest that, in Australia, the levelised cost of electricity supplied by CST is over four times the cost of power produced by black coal.⁵⁵ As the data in the table show, other renewable technologies are also substantially more costly than electricity produced from coal.

EXHIBIT 7: LEVELISED COST OF ELECTRICITY (LCOE), 2010-11

Technology	LCOE (A\$/MWh)
Pulverised Black Coal	80
Solar Photovoltaic	380
Concentrated Solar Thermal	320
Wind	170

Source: University of Melbourne, Melbourne Energy Institute, *Renewable Energy Technology Cost Review*, May 2011; Insight Economics estimates.

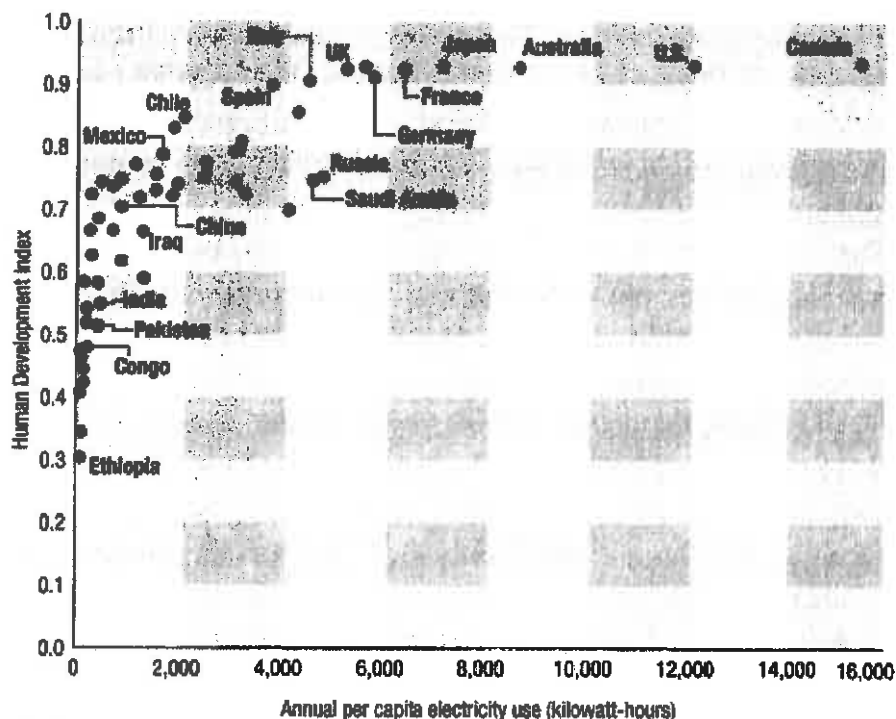
In my understanding, Wandoan coal will almost all be exported, some of it to developing countries. There is a high correlation between the consumption of energy and human development (see Exhibit 8 below). One essential condition for people emerging from a subsistence level existence is access to supplies of affordable energy. There are many millions of such people around the world and it seems reasonable to assume that the need to address climate change would not be a front of mind priority either for these households or for their governments. Access to affordable energy would not only improve their living standards directly but also support the industrialisation they need to obtain paid employment and raise their incomes and consumption.

There are some very complex ethical issues involved, including concepts of equity between developed and developing countries and between current and future generations, if people living in richer countries suggest to people currently living in poverty that they should not be allowed to have access to relatively cheap electricity but instead should pay much more in order to use renewable energy. These can be considered in the context of the Copenhagen Consensus, in which a group of economists, many of them Nobel Prize winners, attach priorities to various pressing global issues, including those relating to health, welfare generally and the environment. While acknowledging that anthropogenic global warming is a fact and is of major concern, the Consensus has generally been

⁵⁵ University of Melbourne, Melbourne Energy Institute, *Renewable Energy Technology Cost Review*, May 2011.

that for the majority of the global community, compared with other pressing issues, addressing climate change was not one of the main priorities.⁵⁶

EXHIBIT 8: POWER CONSUMPTION AND THE HUMAN DEVELOPMENT INDEX



Source: Robert Bryce (2010), *Power Hungry*, Public Affairs, New York, page 61.

Overall, two main points emerge from this discussion. First of all, renewable technologies are generally a much more expensive way of generating electricity than coal. Secondly, in light of the strong correlation between energy consumption and human development, in my opinion it ill behoves people in rich countries to try to prevent people in developing countries seeking to emerge from a subsistence level existence from gaining access to affordable energy.

5. Summary of Opinion and Findings⁵⁷

My findings suggest that regulating the coal industry so as to restrict the development of new mines in the manner proposed in the objection would give rise to no benefit and, indeed, to a considerable cost to the Australian and Queensland communities.

The Australian coal industry, much of which is located in Queensland, lies at the heart of the current resources boom that is having a profound positive effect on Australian incomes and the community's living standards. Not only is Australia the pre-eminent coal exporting country in the world, but coal

⁵⁶ See www.copenhagenconsensus.com/CCC%20Home%20Page.aspx

⁵⁷ I have not provided references in this summary. The summary is based on the opinion provided in Section 4 above, where references are provided for the findings referred to in this section.

provides more export income for Australians than any other commodity or industry. Export income allows Australians to import goods and services, like cars and overseas holidays, which make a material contribution to improving living standards.

The combustion of coal provides the cheapest and most efficient means of generating electricity. Around the world, there is a strong correlation between energy consumption and living standards and access to affordable energy lies at the heart of the rapid emergence from poverty of people in developing economies, particularly in China and India. An increase in energy costs could have a substantial deleterious effect on the ability of governments in developing countries to help their people emerge from poverty.

Yet the combustion of coal results in the emissions of GHGs, which, on the basis of the overwhelming weight of scientific opinion, lead to higher carbon concentrations in the atmosphere and ultimately climate change.

These issues lie at the heart of the matter under consideration in this case. Would it be in the public interest to prohibit the development of coal mines in Queensland on a case by case basis, or to delay their development until it became feasible to capture and sequester the GHGs emitted first by the mining operations and then by the combustion by a third party of the coal produced?

In my opinion, not only would it be contrary to the Australian and Queensland Governments' policy framework to take the action sought in the objection, it would not be in the public interest to do so. There are several reasons for this:

- In policy terms, both the Australian and Queensland Governments support the continuing development of the coal industry because of the substantial economic benefits it provides to the community
- The principal climate change policy of the Australian Government is now to put a price on carbon, which will allow the market to determine where emissions cuts are made – an alternative command and control approach that discriminates against selected industries (such as coal mining) would be inimical to and inconsistent with such a policy
- The policy approach to climate change of the Queensland Government and the supplementary policies of the Australian Government involve supporting the development of renewable energy, encouraging energy efficiency and subsidising R&D into greenhouse friendly technologies – again, discriminating against selected industries such as coal would appear to be contrary to this approach
- In addressing climate change, Australian governments seek to avoid carbon leakage – there is no benefit to Australians when investment is driven offshore since it leads to a loss of economic activity and jobs in Australia with no offsetting benefit in terms of climate change since the emissions that would have occurred in Australia are merely transferred overseas
- The development of carbon capture and storage (CCS) technologies at a commercially feasible cost offers the means to ensure the survival of the Australian coal industry in the longer term, but they are not commercially feasible yet

-
- Similarly, renewable energy is not yet able to provide a **cost-effective** substitute to fossil fuels as a means of generating base load power.

Overall, the measures proposed in the objection are inconsistent with current government policy. If implemented, they would have a negative impact on living standards in Queensland and Australia more generally. There would be no offsetting material benefit in terms of reducing global GHG emissions because they would merely be transferred overseas.

6. Additional Information Required

I am satisfied that I have had access to all the information I need to reach a reliable conclusion.

7. Expert's Statement

I confirm the following:

- (a) the factual matters stated in this report are, as far as I know, true;
- (b) I have made all enquiries that I consider appropriate;
- (c) the opinions stated in this report are genuinely held by me;
- (d) the report contains reference to all matters I consider significant; and
- (e) I understand my duty to the court and have complied with the duty.



Jonathan Geoffrey Stanford
Director
Insight Economics Pty Ltd

8 July 2011

Annexure A: Curriculum Vitae for Jonathan Geoffrey Stanford

Jon Stanford

Curriculum vitae



Director

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Expertise

Since taking up a career as a consultant in the mid-1990s, Jon Stanford has developed a strong practice in economics and policy issues related to climate change, energy, the resources sector, industry development and defence. In this period, Jon was a Director of the Allen Consulting Group for over ten years before leaving to establish a new firm, Insight Economics, with four other consultants. From 2006-09 Jon was a Partner with Deloitte and helped to establish their new economics practice. With three colleagues, he has now re-formed Insight Economics as a small, specialist consultancy focussing on public policy and corporate strategy.

Throughout his consulting career, Jon has worked closely with two economic modelling agencies: the Centre of Policy Studies at Monash University and, for energy market modelling, McLennan Magasanik Associates (now part of SKM).

Before becoming a consultant, Jon Stanford had a significant career with the Australian Public Service working in areas that involved economics and public policy. His final position was as head of the Industry, Resources and Environment Division in the Prime Minister's Department.

Jon has regularly contributed articles to the op ed pages of the *Australian Financial Review*.

Consulting career

Climate change

While in government, Jon was Chair of the Australian Government's inter-departmental committee on greenhouse and Chair of the Inter-governmental Committee on Ecologically Sustainable Development. Since then, he has developed a strong practice in the economics and public policy aspects of climate change. He has analysed the appropriate public policy responses and modelled the economic impact of possible policies for a number of clients, including the Commonwealth and State

governments and industry groups. A major report on emissions trading, undertaken ten years ago for the Victorian Government, was the first attempt in Australia to model the economic impact of measures to address climate change.

Recent climate change projects include:

- Major project for the Commonwealth government that included climate change modelling.
- Several projects for the Global Carbon Capture and Storage Institute, including drafting a paper to be presented by Lord Stern, a member of the Institute's International Advisory Board (2010-11).
- Major assignment for the Northern Territory Government assisting in developing a climate change strategy for the Territory and advising the Chief Minister on climate change policy (2008-09).
- Assessments for two jurisdictions on the complementarity of existing climate change programs with the Rudd government's proposed Carbon Pollution Reduction Scheme (2008-09).
- Project for a State government to assess proposed carbon emissions limits for a major resources project (2009).
- A major report for the Victorian Government, *The Greenhouse Challenge for Energy* (2005)
- Undertook the research and modelling underpinning a report by the Australian Business Roundtable on deep cuts to greenhouse gas emissions (2006).
- Significant work for the National Emissions Trading Taskforce (NETT) in 2006.

Over the last few years, Jon has contributed a number of articles on greenhouse policy to the opinion pages of *The Australian Financial Review*. He has also acted as an expert witness and has regularly addressed conferences on the issue.

Energy and resources

Following on from his responsibilities in energy and competition policy in the Department of the Prime Minister and Cabinet, in the late-1990s, Jon was Chair of the Council for Australian Governments' Gas Reform Implementation Group, which developed and implemented the National Gas Code. This group included all nine Australian governments, the gas industry, gas users, the ACCC and the National Competition Council. While there were different views, the Group was highly successful in that the details of the National Gas Code were finalised in a relatively short period of time and the Code has not been significantly revised subsequently.

More recently Jon has directed a number of energy related projects including:

- A review of the options for base load electricity generation in Australia with a carbon constraint (2010).
- Assisting a State/Territory Government develop a renewable energy strategy (2009).
- A major report for the Australian Uranium Association on prospects for the uranium industry in the light of the international climate change response.
- A report for the Commonwealth Government on regulatory impediments to the further development of the uranium industry (2007).

Economic modelling: impact of major projects

Working with the Centre of Policy Studies at Monash University, Jon has undertaken a number of economic modelling projects to estimate the economic impact of major investment projects. These include

- A project for Gunns Ltd on a proposed pulp mill at Bell Bay
- Significant work for Woodside on several LNG projects.

- A project for BHP Billiton to estimate the economic impact of the proposed Olympic Dam expansion.
- A major project for the Western Australian Government to examine the economic, social and strategic aspects of the Gorgon JV's proposal to build a LNG processing plant on Barrow Island.
- A project for Rio Tinto estimating the economic impact of the HIsmelt project
- A recent project for Qenos Ltd estimating the impact of a proposed new investment project.

Industry development

Much of Jon's public service career was concerned with industry development policy. In recent years, as a consultant, he has directed:

- A very substantial project for the automotive companies in the Philippines to examine the potential for the industry to participate in regional global supply chains and to design a policy framework to sustain the industry in the future.
- A project for a major Australian player in the motor vehicle industry on future business strategies.
- An assignment for Hawker de Havilland in relation to its involvement in the Boeing 787 project.

Defence

Jon has had a long interest in defence issues. In recent years he has directed several projects related to defence, including:

- Assisting the Defence Materiel Organisation to draft the Strategic Sector Plan for the defence aerospace industry.
- A project for the Victorian Government on building the Air Warfare Destroyers.
- An assignment for an Australian defence company on participation in the F-35 (Joint Strike Fighter) project.
- A project on defence shipbuilding policy.
- A project for the Victorian Government on defence industry policy.
- An assignment for the governments of Victoria, Queensland and Western Australia on building the Landing Ships, Helicopter Dock.

Program reviews

Jon Stanford has also undertaken some important program reviews, including evaluations of:

- Government regulation of the uranium industry
- The Greenhouse Challenge program
- Programs to support the export of education services
- The Overseas Projects Corporation of Victoria Ltd.

Public Service career

Before becoming a consultant, Jon Stanford had a significant career with the Australian Public Service in Canberra.

Jon's final position with government was as head of the Industries, Resources and Environment Division in the Department of the Prime Minister and Cabinet. In that position he was responsible for coordinating competition policy across the Commonwealth Government and in the CoAG process. He was also, *inter alia*, Chair of the CoAG working groups on gas reform and water reform and Chair of the Inter-governmental Committee on Ecologically Sustainable Development. Within the Commonwealth Government, he chaired the standing inter-departmental committee on Greenhouse.

The position also involved briefing the Prime Minister on energy, resources and manufacturing industry issues, as well as communications policy. Jon was Chair of the major crisis response group. He played a significant role in drafting various economic statements, including *Working Nation*.

Before his period in PM&C and after an early career in the forbears to the Productivity Commission, in the early 1990s, Jon worked in the industry portfolio. He was Director of the Bureau of Industry Economics, a relatively independent government agency that undertook policy-oriented research for the then Minister, Senator John Button. He then became head of the Policy Division.

Professional and academic qualifications

Jon was born in England and studied Economics at the University of Manchester before migrating to Australia. In the 1980s, he won a Public Service scholarship to undertake a two year MBA program at London Business School. In the early '90s, Jon spent a year in London as the Public Service Fellow at the Sir Robert Menzies Centre for Australian Studies at the University of London. In that position, he edited a book on industry policy, launched by Senator Button.

Jon Stanford's academic qualifications are as follows:

1. MBA, London Business School
2. Master's degree in Economics, University of Manchester
3. BA (Economics), 2A Honours, University of Manchester