Submission

No 28

INQUIRY INTO THE ECONOMICS OF ENERGY GENERATION

Organisation: Australian Coal Association and NSW Minerals Council Ltd.

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Date Received: 27/02/2012

AUSTRALIAN COAL ASSOCIATION

NEW SOUTH WALES MINERALS COUNCIL LTD
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24 February 2012

Mr Jonathan O'Dea MP
Chair, Legislative Assembly Public Accounts Committee
Parliament of New South Wales
Macquarie Street
SYDNEY NSW 2000

Dear Mr O'Dea

Inquiry into the Economics of Energy Generation

The Australian Coal Association and the NSW Minerals Council welcome the opportunity to provide a submission to this inquiry. The ACA represents Australia's black coal industry. Its members are responsible for over 95% of Australia's and NSW's coal exports and supply coal for domestic power generation and industrial processes such as steel and cement manufacturing. The NSWMC is the peak industry association representing the State's $20 billion minerals industry.

The attached joint submission makes the following key points:

- The coal industry's significance to NSW is not just as its largest export earner. It is also a cornerstone of the state economy underpinning competitively priced and reliable electricity. In 2010-11, the coal industry contributed $1.2 billion to the State's Budget through royalties, generated $14 billion in export revenue and directly employed over 21,000 people with a further 85,000 employed indirectly, many in regional areas.
- The rational course for government is to take account of the State's natural coal endowment. While economic considerations cannot be the only concern of the Government in forming policy positions, it is important to understand that policies affecting the coal industry will have significant, economy-wide impacts that will impact on the people of NSW, not just those in mining regions.
- Two key issues have dominated energy policy discussions over the past few years: the increasing burden of the delivered cost of electricity on consumers; and increased concern with the production of electricity from fossil fuels, particularly coal and gas. The NSW energy security debate needs a reality check as there are no easy solutions to these interdependent issues.
- The coal industry welcomes the farsighted approach of the current state government to addressing these challenges through the initiation of this inquiry, the creation of Coal Innovation NSW and its Strategic Regional Land Use Policy and complementary initiatives.
- Coal-fired power is the principal source of base-load electricity in NSW and in the National Energy Market. While federal government modelling points to a decline in the share of coal-fired generation in the power supply mix, coal will still be the largest single source of NSW's power in 2034-35. Policy approaches need to recognise that coal remains the most competitive baseload option for NSW and its continued use will help to ameliorate projected electricity price increases.
- There are no easy solutions when it comes to meeting future electricity needs. State policymaking needs to be open to the potential benefits of all new/emerging low emissions technologies and to have a clear appreciation of all their attributes.
- Looking beyond 2020 and given the huge coal resource available to NSW, the need for enhanced development of carbon capture and storage (CCS) is clear and the present state of RD&D for this technology needs review and enhancement. A target of having commercial scale CCS demonstrations in Australia from 2020 makes great sense in the light of recent federal government analysis.

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Recommendations

1. The Committee should recommend an approach to NSW electricity generation policy settings based on open markets, transparency, reliability and economic efficiency principles. Such an approach will provide competitive outcomes that will best serve the interests of NSW. Any support for particular fuels or technologies should be based on established market failures.
2. The Committee should underline the importance of the NSW Government presenting a clear energy strategy for the next 10, 20 and 25 years. This energy strategy should:
   - provide an effective policy approach to assessing when new baseload power is needed in the State, whether the Government plans to have any role in such generation and how, if a stronger renewable energy contribution is projected, the intermittency and reliability challenges associated with this contribution will be addressed;
   - build on current government sponsored programs and initiatives in Australia to develop demonstrations of low emissions coal technologies given their strategic importance to NSW both in terms of domestic electricity generation and future coal exports; and
   - work with other east coast governments to ensure that the most efficient power system is developed.
3. Locating storage sites for CO_2 sequestration is fundamental to the deployment of CCS technology in NSW, whether coal or gas is being used for new generation, and should be a focus of the Coal Innovation NSW work program.
4. The Government should take a leadership role in providing the facts so there is sound discussion on complex issues such as land use. Implementation of the NSW Strategic Regional Land Use Policy is an excellent opportunity for the Government to provide clear, impartial information about mining and exploration, to increase public confidence in the Government's oversight of the industry and reduce unwarranted concerns.
5. Government policies must not unnecessarily sterilise coal resources or burden industry with unnecessary delays and costs.

The ACA and NSWMC would be pleased to appear before the Public Accounts Committee to elaborate on the positions set out in the attached submission.

Yours sincerely

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cc The Hon Chris Hartcher, MP, Minister for Resources and Energy

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SUBMISSION TO THE PUBLIC ACCOUNTS COMMITTEE INQUIRY INTO THE ECONOMICS OF ENERGY GENERATION

FEBRUARY 2012

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1 THE IMPORTANCE OF THIS INQUIRY TO THE NSW COAL INDUSTRY

This submission is provided jointly by the Australian Coal Association (ACA) and the NSW Minerals Council (NSWMC). The ACA represents Australia's black coal industry. Its members are responsible for over 95% of Australia's and NSW's coal exports and supply coal for domestic power generation and steel and cement manufacture. The NSWMC is the peak industry association representing the State's $20 billion minerals industry.

The NSW coal industry sees this inquiry as both important and timely. It comes at a time of increased focus on: Australia's electricity generation, transmission and distribution markets; the delivered cost of energy to consumers; the need to encourage low emissions generation technologies; and even greater scrutiny of coal mining, coal seam gas recovery and wind farming by society.

The coal industry welcomes the farsighted approach of the current state government in addressing these challenges. This includes the initiation of this Inquiry, the creation of Coal Innovation NSW and its Strategic Regional Land Use Policy and complementary initiatives.

1.1 The Inquiry's Terms of Reference are highly appropriate

The NSW generation sector faces three major challenges. Firstly, from July 2012 Australia will have a carbon emissions price increasing the cost of electricity. Secondly, mandated schemes for renewable technologies are raising prices because while they provide greenhouse gas emission benefits this comes at a high cost.[1] Thirdly, there have been significant increases in transmission and distribution network costs with more inevitable. That is due to the need to meet increased consumption, to cope with rising peak demand, to satisfy government reliability requirements and to replace aging asset infrastructure.

There has already been a 35% real price increase in electricity over the past four years. For the same three reasons noted above households and businesses can expect further substantial increases in prices to at least 2020.[2]

The terms of reference for the inquiry are timely given the importance of these challenges and the Australian Government's current Energy White Paper process. They are also therefore welcome as they focus on the economics of NSW energy generation. Clearly economic considerations cannot be the only concern of government in forming energy policy settings. That is appropriate if it leads to outcomes that are desirable. However, it should be borne in mind that those settings also impact the coal industry as both a major provider of fuel for electricity generation and a significant energy consumer. Government policy should therefore be designed to ensure the industry is not burdened with unnecessary delays and costs. The approach should effectively manage the potential impacts of growth on communities and the environment while enabling the NSW community to reap the benefits of its coal resources.

1.2 The intersection between energy security and environment policies

The ACA and the NSWMC accept the science of climate change and acknowledge that the utilisation of coal for energy and industrial production contributes to anthropogenic greenhouse gas emissions. Whilst NSW and Australia are committed to emissions reductions, global energy requirements will grow considerably as global populations increase and developing nations become more prosperous.

The International Energy Agency [3] projects that coal will continue to be the major source of world electricity for the foreseeable future. In its central "new policy scenario", the Agency

[1] The Productivity Commission (2011), *Carbon Emission Policies in Key Economies,* found "The relative cost effectiveness of price-based approaches is illustrated for Australia by stylised modelling that suggests that the abatement from existing policies for electricity could have been achieved at a fraction of the cost." (p XIV)

[2] Rod Sims, *Energy market outlook*, presentation to the Multi-Party Climate Change Committee, 11 November 2010. The CEO of Origin Energy in an address to CEDA in April 2010 said end-user bills were expected to triple by 2020 as a result of network charges surging, fuel prices rising and decarbonisation policies. Edwin O'Young, (*The Outlook for Retail Electricity Prices*, Powering Australia Conference, September 2011) projects electricity prices doubling between 2011 and 2017.

projects that by 2035 renewable energy will grow from 19% to 31% of world electricity generation. Even in this carbon constrained scenario, coal remains the world's main fuel source for electricity. This is mainly due to the projected increase in demand for coal by China, India and other developing economies as they seek to industrialise, improve health standards and reduce poverty. NSW is well-placed to meet a proportion of the expected growth in this demand.

Given that significant greenhouse gas emissions come from the generation industry, both here and overseas, reducing emissions from the utilisation of coal and gas will play an important role in addressing climate change globally.

The rate at which NSW can reduce greenhouse gas emissions without major power disruption will be influenced by the rate at which the generation industry can demonstrate and deploy low emissions coal technologies. If emission reduction efforts get in front of industry's ability to develop and adopt new low emissions coal technologies the effect will simply be to handicap the NSW economy and impact living standards with little effect on global emissions.

For that reason the coal industry congratulates the NSW Government on its decision to establish Coal Innovation NSW, which includes representatives of the coal industry, research institutes and the NSW Government. The Council will advise the Government on matters relating to low emissions coal technologies and make recommendations regarding appropriate funding and research opportunities from the Coal Innovation NSW Fund. Both the ACA and NSWMC are represented on the Council.

2 THE IMPORTANCE OF THE NSW COAL INDUSTRY

Coal has played a fundamental role in the NSW economy for many decades. It is NSW's most important export and provides 89% of the State's electricity generation. In 2010-11, NSW's 63 coal mines added $1.2 billion to the State's budget through royalties, generated $14 billion in export revenue and directly employed around 21,000 people and a further 85,000 indirectly – mostly in regional areas.[4] With over 44% of Australia's economic demonstrated coal resources and an estimated $17 billion in planned coal mine and infrastructure investment between now and 2016, coal promises to be a major source of NSW's economic prosperity for many decades to come.

Coal is not just an export industry. It also provides industry and the NSW community with secure, reliable and relatively affordable energy. Coal also underpins a traditional source of NSW's comparative advantage and employment in energy-intensive manufacturing with 70% of electricity demand used by business compared to 30% by residences.[5]

NSW has 44% of Australia's economic demonstrated resources of black coal (measured in terms of energy content) but only small proven gas reserves and no proven uranium reserves.[6] In order to develop this resource significant investment has been made in world class rail and port infrastructure. This investment benefits other industries and helps create further employment. It includes the Hunter Valley coal rail network/Port of Newcastle coal chains, the largest coal export operation in the world, and the Port Kembla coal chains, including rail corridors from both the Western and Southern coal fields.

Substantial growth in coal production is projected out to 2015 and beyond. For example, the Australian Rail Track Corporation[7] reports that indicative contractual nominations by producers for export coal demand from the Hunter Valley are to grow by 60% over the period 2011-2015. This will require substantial new investment in port and rail infrastructure. Beyond that the Bureau of Resource and Energy Economics (BREE) reports there are further

[3] *World energy outlook 2011*, p 175 and p 178.

[4] Table 1 in the Statistical Appendix. Indirect coal industry employment includes people in small businesses supplying the industry and in the State's significant financial services, construction, process engineering, electricity generation, transport and personal services industries.

[5] Table 3 in the Statistical Appendix.

[6] Table 2 in the Statistical Appendix.

[7] ARTC (2011), *2011-2020 Hunter Valley Corridor Capacity Strategy Consultation Document*.

significant coal development opportunities which to proceed would require complementary infrastructure investment. [8]

The scope for coal industry growth over the next 25 years clearly depends on a number of factors including:

- the geological nature and geographic location of NSW's coal reserves;
- macroeconomic factors affecting demand and competing supply sources; and
- NSW's political and regulatory environment.

The importance of the regulatory environment in influencing the course of industry growth and development should not be underestimated. An annual survey of mining executives shows, on average, 60% of investment decision-making is attributed to a jurisdiction's mineral potential with regulatory factors making up the remaining 40%.[9]

The rational course for government is to take account of natural endowments in developing policy positions. While economic considerations cannot be the only concern of the Government in forming policy positions, it is important to understand that policies affecting the coal industry will have significant, economy-wide impacts that will impact on the people of NSW, not just those in mining regions. Section 6 of this submission reviews aspects of NSW's comprehensive regulatory framework and strict regulatory supervision and suggests some areas where it could be improved.

3 THE ONGOING IMPORTANCE OF COAL IN THE ENERGY MIX IN AUSTRALIA AND OVERSEAS

3.1 Australia's energy mix

Black and brown coal currently account for around 56% of generation capacity in Australia's National Electricity Market (NEM). However, **coal-fired baseload plants supply around 78% of the total output**. Victoria (with 91% of principal electricity generation based on coal), New South Wales (89%) and Queensland (82%) rely on coal more heavily than do the other jurisdictions.[10]

When account is also taken of net purchases of electricity from Queensland and Victoria (averaging around 10% of NSW's electricity requirements over the past decade), NSW consumption of electricity is based on close to 90% black and brown coal electricity generation.

According to the Australian Competition and Consumer Commission gas fired generation accounted for around 21% of NEM capacity in 2010-11 but supplied only around 12% of output.[11] This is because it is used as intermediate and peaking plant rather than baseload generation. Tightening supply conditions led to an increase in generation investment in the three years to 30 June 2011 with over 4,700 MW of new capacity added — predominantly gas fired generation in Queensland and NSW. Most new investment in other regions over the past decade has been in gas peaking plant.[12]

Looking out to 2030 coal is projected to have an important ongoing role in domestic electricity generation notwithstanding a fall in its market share.[13] Moreover, in an environment where retail power bills are a "white hot" issue with consumers, even under renewed fuel supply contracts between miners and generators coal will remain the most affordable form of electricity available in NSW over the next decade, allowing for a carbon price. In the longer

[8] In *Australian energy projections to 2034-35*, December 2011, BREE projects coal production will continue to grow at 2.8% a year to the end of the projection period of 2034-35.

[9] Fraser Institute's annual survey of mining and exploration executives' perceptions of mining jurisdictions worldwide.

[10] Energy Supply Association of Australia, *Electricity Gas Australia 2011*, Table 2.6.

[11] Australian Energy Regulator, *State of the energy market 2011*, Australian Competition and Consumer Commission, page 27.

[12] Ibid.

[13] Geoscience Australia's and the Australian Bureau of Agricultural and Resource Economics' *Australian Energy Resource Assessment.*

term the development of cost-effective low emissions coal technologies, notably carbon capture and storage, will be critical to maintaining coal's sustainability in electricity generation.

3.2 International trends

According to the International Energy Agency (IEA) coal and lignite account for about 27% of world total primary energy demand.[14] The IEA projects energy demand to grow at an average annual rate of 1.3% to 2035 based on the IEA's new policy scenario. Even with a change in policy settings to a goal of 450 parts per million of CO_2 equivalent, fossil fuels are projected to remain the dominant energy source in 2035. China alone is expected to add 600 gigawatts of new coal-fired power generation to 2035, more than the combined current capacity of the United States, Europe and Japan.[15]

Coal will also remain important in the USA. Their Energy Information Administration's current Reference Case has coal's share in the US energy mix dropping from 45% in 2010 to 39% in 2035 as the nation turns more to natural gas and renewable fuels.[16]

Current levels of global energy demand arise in an environment where 1.3 billion people (one fifth of the global population) do not have access to electricity.[17] Approximately 800 million people without access to electricity are located in developing Asian countries. The United Nation's Millennium Goal of eradicating extreme poverty by 2015 requires an additional 395 million people to be provided with access to electricity.

Australia is the world's number one coal exporter. In 2009, 262 Mt of hard coal were exported from Australia, out of total world net exports of 836 Mt.[18] NSW produced 140 Mt of saleable coal in 2009, which means the State contributes approximately 2% of total world hard coal production. As the global coal market is extremely competitive if coal is not sourced from NSW – where it is tightly regulated – it will simply be replaced with coal from competitors such as Indonesia, Colombia, Canada, USA and South Africa. Any suggestion that this would lead to a reduction in greenhouse gas emissions is flawed as there will be no benefit to global emissions but significant economic loss to NSW. This again underlines the point that rational policy approaches should inform development of the State's natural endowment.

4 NSW ENERGY REQUIREMENTS AND PLANNED INVESTMENTS

4.1 NSW energy requirements

NSW is an energy intensive economy with electricity demand concentrated in manufacturing. Even so, electricity demand by industrial, commercial and public sector customers is relatively constant. This means peak demand growth, which determines the State's overall electricity requirements, is largely driven by the residential sector where the penetration of air-conditioning and high energy appliances are important drivers of residential demand growth.

The Australian Energy Market Operator's 2011 *Electricity Statement of Opportunities* (ESOO) provides an outlook for the supply-demand balance between 2011 and 2021. It indicates the Low Reserve Condition (LRC) point, when further investment in NEM generation may be needed to maintain electricity supply reliability. Thus the ESOO provides a broad analysis of investment opportunities for generation and demand-side investment.

The AEMO has modelled the point when NSW will reach its LRC. The latest estimate by AEMO is for a possible shortfall in 2018-19 of between 190 and 365 MW. This LRC timing has moved out by one year compared with the AEMO calculation in 2010.[19] Market analysts consider it unlikely it will be brought back by one or two years given the global growth outlook.

[14] IEA, *Key World Energy Statistics 2011, p 74.*

[15] IEA, *World Energy Outlook 2010*

[16] US Energy Information Administration, *Annual Energy Outlook 2012 Early Release Overview*, 23 January 2012.

[17] IEA World Energy Outlook 2011, OCED/ IEA (2010), *Energy Poverty: How to make modern energy access universal* and OECD/IEA (2012), and OECD/IEA (2012), *The Global Value of Coal*, Coal Industry Advisory Board Working Paper.

[18] IEA, *Key World Energy Statistics 2010*.

[19] Commonwealth Minister for Resources and Energy (2011), *Investment Reference Group Report*, April.

Delta Electricity[20] in its submission to this Inquiry suggests the 2018-19 LRC point is conservative. Based on other assumptions included in AEMO's study, Delta Electricity suggests this point will not be reached until the 2020s. Either way the requirement for new capacity will be more than met provided private sector proposals come to fruition.

A recent study by Ernst and Young for the Australian Energy Market Commission[21] provides another insight into the State's new investment requirements. The study concludes that, if current trends are maintained, NSW's peak demand is forecast to increase from 14,595 MW in 2010-11 to 16,000 MW in 2020-21 and to 20,380 MW in 2029-30.[22] Taking into account operational efficiencies of the aged NSW baseload generators, this suggests NSW will require access to additional electricity generation of the order of 1,500 – 2,000 MW to meet peak load demand at the end of the decade.

Current uncertainty (including around carbon pricing) is impeding investment in new generation in the NEM. This uncertainty is expected to continue for some time. When combined with tight global capital costs, this means raising the required investment funds will be a significant challenge for investors. It takes 4-6 years to proceed from concept to power generation operation. That could be even longer depending on the fuel involved and the impact of new planning/environmental regulations. **This suggests investments need to be committed very soon so that finance and approvals to proceed can be finalised.**

4.2 NSW energy generation investment

There has been limited investment in generation in NSW over the past 18 months. However, according to BREE a number of significant gas projects are planned amounting to over 3,000 MW and with expected start-ups around 2014.[23] Given the above Ernst and Young assessment of electricity peaking demand requirements, if a sufficient number of these gas projects proceed then there will be sufficient investment in new generation assets in NSW to 2020. These proposals though are mainly Open Cycle Gas Turbine (OCGT) peaking plants. **So their generation output will be more costly than coal baseload plant. In addition, the environmental performance of OCGT is not much better than supercritical, black coal technology**.[24]

Other options for generation are:

- **Wind**: The NSW Government released draft planning regulations on wind farms in December proposing more rigorous requirements on planning approvals. This is thought to impact some 28 wind farm prospects to various degrees. Their total capacity is about 3,500 MW however due to intermittency issues the ability of this generation source to defer the NSW LRC point is limited.[25] Even if wind grows 10 to 12-fold in the NEM as projected, it will still be contributing barely a third of the electricity produced from black coal in 2034-35 and much less than that in 2020.
- **Geothermal and solar**: geothermal technology along with solar power are projected to still be niche contributors even two decades from now.
- **Nuclear**: while nuclear power supplies baseload energy it is not a realistic option for NSW politically and would take a minimum of ten years to develop even if it were given the green light.
- **Increased imports from Queensland/Victoria**: NSW is already a substantial net importer of electricity from Queensland and Victoria.[26] Given the increase in projected

[20] Submission to the current inquiry, p 8.

[21] TransGrid. New South Wales *Annual Planning Report 2011*, 2 July 2011.

[22] Ernst and Young (2011), *Rationality and drivers for DSP in the electricity market – demand and supply of electricity*, Australian Energy Market Commission Power of Choice review. This finding is broadly in line with projections by the Energy Supply Association of Australia in its Yearbook (July 2011).

[23] BREE's *Major Electricity Generation Projects*, November 2011.

[24] See WorleyParsons (2011), *Greenhouse Gas Emissions Study of Australian CSG and LNG*, Australian Petroleum Production and Exploration Association, pages 18 and 22. www.appea.com.au/publications/climate-change-publications.html

[25] As explained in the 2011 ESOO Executive Briefing (page 12), "Wind generation typically has a capacity factor (the percentage of the installed capacity that is available on average) of between 25 percent and 40 percent. ….This means that while wind generation may be used effectively to meet regional energy requirements (reducing the need for energy driven investments), it cannot be used to the same extent when meeting capacity requirements."

[26] Table 3 in the Statistical Appendix.

electricity demand, Powerlink and TransGrid have announced they intend to commence formal consultation on an upgrade of around 25% in the transfer capacity shortly. Larger interconnectors have been examined but the AEMO advises they are expensive and not currently justified. They may be economic after 2020.[27] It may be conceivable to take advantage of the Surat Basin developments. But this appears to be an expensive option and would compete with electricity requirements for the growing Queensland market.[28] Piping more gas from Queensland is another possibility but once again represents an expensive option relative to coal given east coast gas prices are expected to move to export parity over time.

With the imposition of a carbon price from 1 July 2012 the purchase of more Victorian brown coal electricity becomes more uncertain given the pressure on the viability of one or more brown coal generators. A reduction in the available brown coal generation fleet could lead to replacement generation based on gas in Western Victoria. That would involve more costly generation than low-cost, coal baseload supply.

In summary, the above discussion suggests the requirement for new capacity over the next 8 to 10 years will be met provided adequate private sector generation investment occurs. However, the NSW Government needs to have a well thought out strategic plan, with actions, so that NSW does not operate in semi-crisis mode and to ensure adequate capacity is available to meet all eventualities (eg a failure at one of the older coal-fired plants reducing local supply availability). Such a strategic approach must also guard against ad hoc interventions by government in the energy market that risk producing sub-optimal outcomes.

The coal industry therefore recommends the strategic plan is based on a principled approach to energy policy. Such an approach emphasises open markets, transparency, reliability and economic efficiency. Provision of government support should be based on addressing established market failures.

Such a principled approach does not diminish the important role governments have in setting policy and creating an institutional and regulatory framework within which the market economy operates. It emphasises that markets deliver more competitive outcomes than approaches designed to foster specific, mandated solutions. It also recognises that competitively priced energy should reflect the cost of supply within an overall level of demand, with the price generated in a competitive and efficient market.

Recommendation 1:

> The Committee should recommend an approach to NSW electricity generation policy settings based on open markets, transparency, reliability and economic efficiency principles. Such an approach will provide competitive outcomes that will best serve the interests of NSW. Any support for particular fuels or technologies should be based on established market failures.

5 THE POTENTIAL FOR AND BARRIERS TO THE DEVELOPMENT OF ALTERNATIVE FORMS OF ENERGY GENERATION

5.1 Reality check: there are no easy solutions

The reality is there are no easy solutions when it comes to meeting future electricity needs. The development of all energy options faces real challenges:

- **Policy approaches need to be realistic in considering baseload electricity options**. Currently nuclear is not an option and baseload options are restricted to coal, gas and hydro.
- **Coal** faces challenges with public acceptance, even more stringent planning and environmental approvals and challenges to reduce greenhouse gas emissions (particularly in the utilisation of coal in generating electricity).

[27] Submission to the current inquiry, page 3.

[28] Queensland's electricity demand is projected to grow at an average annual rate of 4.3% from 2011-12 to 2020-21: the fastest of all National Energy Market (NEM) States.

- **Gas** also faces challenges to reduce greenhouse gas emissions, public acceptance of coal seam gas and the likelihood of escalating cost with a move to export parity pricing.
- **Geothermal** is yet to be proven at commercial scale, and would require significant new transmission investments and addressing some environmental challenges.
- **Wind** faces more stringent approval requirements, public acceptance issues and the cost of additional investment in back-up generation to address intermittency concerns.
- **Solar** also faces intermittency, scale and cost challenges.
- **Hydroelectricity** – with a long history of development in Tasmania and the Snowy Mountains Scheme in NSW, hydro delivers the majority of Australia's renewable energy. However, there are only limited opportunities here (eg small hydro-generators on streams, in town water supplies and other places where there are regular water flows)**.**

The Committee's Inquiry provides an opportunity to have a balanced debate on the energy choices available to the State. All forms of energy bring environmental issues which must be considered and appropriately balanced in any fuel choice made. Thus it is important to demand consistency in the arguments used for and against energy sources and work against these evolving into a "good" versus a "bad" argument, where renewables are perceived as inherently "good" and fossil fuels as inherently "bad". Such an approach recognises the true long term role of fossil fuels (gas and coal with carbon capture and storage) as a vital balancing fuel to support a world with an increasing amount of renewable but intermittent energy.

5.2 Carbon Capture and Storage: a key low emissions technology for NSW

5.2.1 CCS has broad application in the economy

Looking out to 2035, Australia's coal and natural gas export revenues are projected to exceed $2 trillion.[29] NSW is well-positioned to benefit from this unprecedented economic dividend. According to the IEA, "Widespread deployment of more efficient coal-fired power plants and carbon capture and storage (CCS) technology could boost the long-term prospects for coal"[30]. In other words, if successful, CCS deployment would bolster NSW's export prospects even further as future coal demand will be shaped by the uptake of CCS in a carbon-constrained world.

CCS is an important part of the portfolio of options for NSW and Australia. The potential contribution of CCS to meeting Australia's emission-reduction targets was acknowledged in federal Treasury's modelling of the Australian Government's Clean Energy Future Plan. Treasury found that **CCS applied to coal and gas could account for around 30% of Australia's electricity mix by 2050**.

That modelling tells only part of the story, however, as it did not consider the role of CCS beyond the electricity sector. In order for the world to limit the rise in average global temperatures to 2^{o}C CCS will also need to be applied in other areas including:

- iron and steel manufacturing and other industrial processes
- emissions from gas liquefaction[31] and
- the production of coal-to-liquids and gas-to-liquids.

5.2.2 The Australian black coal industry's $1 Billion COAL21 Fund

The NSW Government recently recognised the strategic importance of developing and deploying low emissions coal (including CCS) technologies through the establishment of Coal Innovation NSW. This important initiative complements the Australian black coal industry's $1

[29] International Energy Agency (2011), *2011 World Energy Outlook Presentation* by Dr Fatih Birol, Brisbane 13 Dec 2011 www.energyalliance.com.au/

[30] International Energy Agency (2011), *2011 World Energy Outlook p 43.*

[31] According to Ross Garnaut (2011), *Climate Change Review - Update Paper Seven: Low emissions technology and the innovation challenge*, applying CCS here alone "could make a substantial contribution to Australia's mitigation effort" (p 18).

Billion COAL21 Fund – the world's first voluntary industry fund to support CCS demonstration and deployment.

The industry is committed to supporting the development and deployment of CCS in NSW. Under the COAL21 Fund the coal industry is currently partnering with the NSW Government in two major CCS projects:

1. the NSW Storage Program ($18.1 million) and
2. the Delta Post-Combustion Capture Project ($50 million).

The industry is also investing in national projects of direct benefit to NSW, including $75 million over seven years for CCS research and development through Australian National Low Emissions Coal Research Ltd.[32]

5.2.3 CCS offers a cost competitive option to meet electricity demand growth

Given the challenges to the economics of electricity generation discussed in Section 1, CCS offers a cost-competitive option for NSW to meet electricity demand growth in an environmentally sustainable way while continuing to utilise its abundant coal reserves. For example, the Electric Power Research Institute (EPRI) undertook a study of the cost of various technologies in Australia in 2030 for the Australian Government. As can be seen from Chart 1 **EPRI ranked CCS among the lowest cost portfolio options**.

Chart 1: Electric Power Research Institute Technology Ranking, 2030

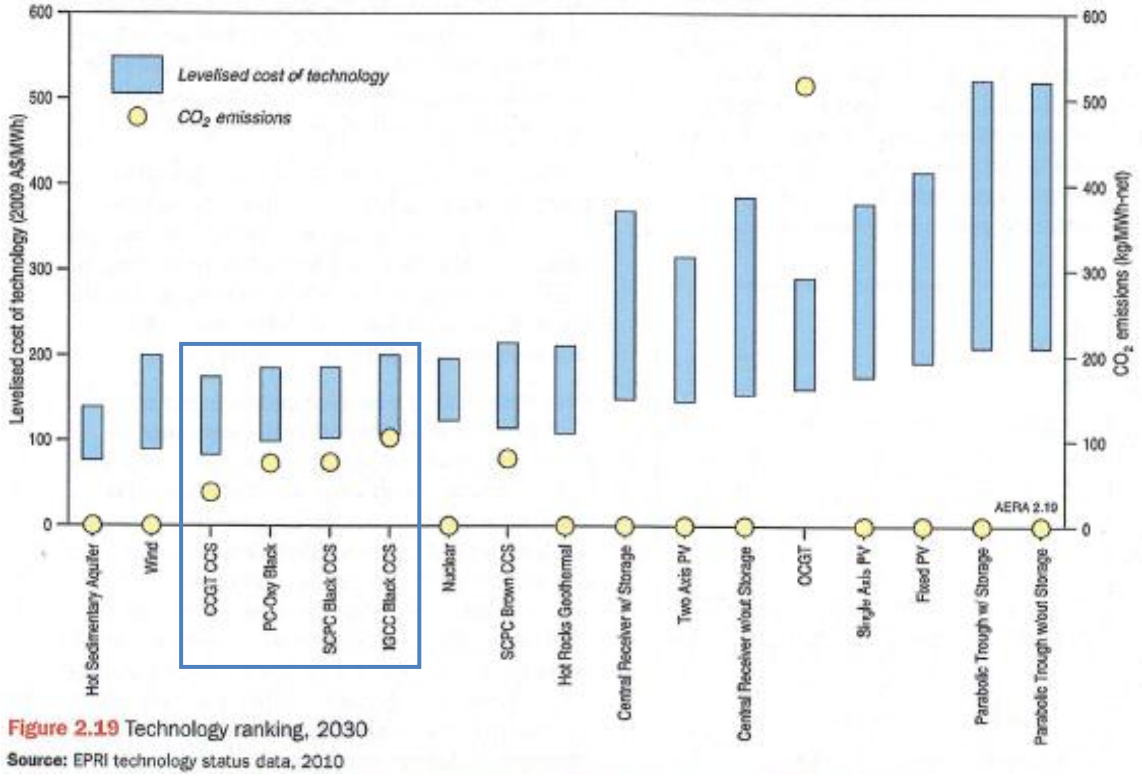

Figure 2.19 Technology ranking, 2030

Source: EPRI technology status data, 2010

As pointed out by the Garnaut *Climate Change Review* (2008) and the Wilkins *Strategic Review of Australian Government Climate Change Programs (2008)*, private companies are likely to have insufficient incentives to justify the costs associated with being the first mover in demonstrating various CCS technologies. For this reason Recommendation 6.4 of the Wilkins Report proposed that government should commit serious and substantial funding to demonstrate CCS (preferably with black coal given that this is NSW's and Queensland's major export).

[32] Table 4 in the Statistical Appendix provides further details.

Recommendation 2

The Committee should underline the importance of the NSW Government presenting a clear energy strategy for the next 10, 20 and 25 years. This energy strategy should:

- provide an effective policy approach to assessing when new baseload power is needed in the State, whether the Government plans to have any role in such generation and how, if a stronger renewable energy contribution is projected, the intermittency and reliability challenges associated with this contribution will be addressed;
- build on current government sponsored programs and initiatives in Australia to develop demonstrations of low emissions coal technologies given their strategic importance to NSW both in terms of domestic electricity generation and future coal exports; and
- work with other east coast governments to ensure that the most efficient power system is developed.

5.2.4 CO_2 storage

NSW is currently underexplored for storage opportunities. The industry has prioritised storage exploration and identification as part of its approach to integrated CCS project development and is planning to invest $18 million in the NSW pre-competitive storage program. The importance of this early exploration program was highlighted in the 2009 Carbon Storage Taskforce report,[33] which assessed that NSW basins were "relatively unexplored" and "considerable additional data" would be required to confirm the potential of sites such as the Darling basin. The exploration program follows on from the successful drilling managed by the NSW Geological Survey near Munmorah, Vales Point and Merriwa.

Recommendation 3

Locating storage sites for CO_2 sequestration is fundamental to the deployment of CCS technology in NSW, whether coal or gas is being used for new generation, and should be a focus of the Coal Innovation NSW work program.

6. COAL MINING, ECONOMIC GROWTH AND LONG-RUN ENERGY SECURITY

This section assesses a number of policy related issues that directly impact coal mining and the industry's efficiency and effectiveness in providing coal for domestic electricity generation.

Mines and associated infrastructure have long lead times and require detailed planning to ensure finance, equipment, staff and contractors are available when the project commences. Uncertainty around the planning approvals process and increasing pressures on the industry's social licence to operate makes this planning extremely difficult and jeopardises a consistent and certain supply of coal.

6.1 Land use conflicts and the NSW Government's approach to strategic regional land use

Mining in NSW often takes place on top of, next to and underneath multiple alternative land uses. Land use planning is a complex issue which requires balancing of what's good for the social fabric and prosperity of local communities, while also generating produce and wealth for NSW.

The NSW mining industry, along with other industries and the community, has long been calling for regional strategic land use planning to provide greater clarity for all land users. The NSW Government is in the process of finalizing its Strategic Regional Land Use Policy. It is important that these plans consider all environmental, social and economic factors so that the best overall outcomes are achieved for the State as a whole. The following principles should be applied:

[33] *National Carbon Mapping and Infrastructure Plan – Australia* report to the Minister for Resources and Energy, September 2009.

- **Land use decisions should be based on economic, social and environmental evidence**. It should not be assumed that particular land uses are incompatible or that one land use is more suitable than another. No single land use should have the right of veto over another
- **Rigorous strategic land use assessment will help provide a sound scientific basis for assessing projects on a case by case basis**. It will provide certainty to stakeholders about current and future development in an area, minimise land use conflicts and identify economic, environmental and social opportunities. There should be no automatic assumption that certain land uses are incompatible, however it should be recognised that not all land is suitable for all land uses. Blanket bans on certain types of development should not be implemented
- **Prescriptive "buffer zones" around land uses, from which exploration or mining is excluded, is inappropriate**. Exploration is required to determine the nature and extent of mineral resources. This information can then be used to determine whether it is in a State's best interests to extract these resources, taking into account the economic, environmental and social aspects of the particular proposal. Prescriptive buffer zones do not consider these factors in detail, which could result in significant downside to the state from sterilised resources without any corresponding benefits.

6.2 Reforms to the planning approval framework

The mining industry is the most heavily regulated industry in NSW. There are ~~over~~ 570 pieces of legislation, regulations, guidelines and codes of practice that regulate the industry. The regulatory framework has developed in a piecemeal fashion over many years. This has created a complex and inefficient system where multiple agencies have overlapping responsibilities and duplicative assessment and administrative requirements.

The NSW Government has initiated the Planning System Review. It is vital to the energy security of NSW that the development of coal mining projects is assessed without delay and with a consistent whole of government approach. While the planning system must necessarily balance the impacts of projects on individuals and the environment with the needs of the people of the state, it is imperative that the system does this in a way that provides certainty and efficiency. In order to ensure the orderly and consistent assessment of coal mining projects the planning system must provide for the following:

- **A hierarchy of assessment tracks, that correspond to the level of assessment** including; at the lowest level, a track for exempt and complying development, where minimal assessment is required; a track for the modification of approved projects; and a track for the assessment of state significant development, including coal mining, by the NSW Government
- **A whole of government approach** to state significant development assessment which consolidates and streamlines all approvals under the lead agency – the Department of Planning and Infrastructure
- **The promotion of an efficient development process** through the objects of the Planning Act and the adoption of statutory time frames and performance measures for government agencies.

6.3 Industry's performance

The growth of the mining industry has led to community concerns about the impacts of mining on other land users and communities. As the industry expands within existing mining areas and moves into new areas, local communities are understandably anxious about what impact this could have on their lifestyles.

The industry acknowledges the community's concerns about cumulative impacts. The industry shares those concerns and acknowledges that it must manage its collective impact on the community particularly its environmental performance. Some initiatives being undertaken include:

- **Upper Hunter Air Quality Monitoring Network** – The coal and power generation industries have jointly funded the Upper Hunter Air Quality Monitoring Network to gain a better picture of regional air quality in the Upper Hunter
- **Best practice dust management reviews** – The industry will be reviewing operational dust management procedures in light of a recent review of best practice dust management measures commissioned by the Government
- **Research into dust emissions from haul roads** – The coal industry is funding research into the use of dust suppressants on haul roads to determine the most effective suppressants under different conditions
- **Aboriginal heritage** – The industry has funded the Upper Hunter Cultural Heritage Trust, which provides the funding for strategic programs relating to Aboriginal cultural heritage
- **Namoi Catchment Water Study** – The industry is providing $3 million in funding to undertake the regional water study, which will provide information for all stakeholders about water resources in the area and the potential impacts of coal and gas development
- **Community engagement** – NSWMC is undertaking the Upper Hunter Mining Dialogue, an innovative project which shifts the industry's focus beyond the boundaries of individual mines to look at the footprint of the whole industry in the Upper Hunter and its collective impacts. The Dialogue involves understanding the community's concerns and working with the community to develop solutions
- **Exploration practices** – The industry has developed guidance material for explorers in NSW to assist with the implementation of appropriate environmental management and community engagement practices during the exploration process.

6.4 Communication

Some of the community concern about the potential impacts of mining and competing land use stem from a range of misleading information being spread including:

- **Extent of exploration and mining in NSW** – suggestions that exploration, mining and petroleum titles cover 70% of the State give the misleading impression that exploration, mining and petroleum extraction have the potential to dominate land use in NSW. In actual fact, the mining footprint is 0.1% of NSW's total land area, while agriculture uses 76%
- **Property rights** – Claims that landholders have no property rights when it comes to exploration and mining are incorrect. In terms of exploration, the landholder's agreement is required to access their land. In coming to the agreement landholders have the right to negotiate the terms of access to their land as well as compensation for any damage. In terms of mining, landholders have extensive rights to veto the granting of mining leases, receive compensation for damage, and have the ultimate right of refusal to sell their property to mining companies
- **Food security** – It is not clear what evidence has been used to support claims that competition for land from mining in NSW poses a significant threat to domestic or international food security. Australia produces enough food to feed 60 million people and the total mining industry only uses 0.1% of NSW"s land mass, an extremely small proportion of land throughout NSW. There are many other threats to the agricultural industry such as residential development, an aging workforce, declining research and development, pests and disease, and a declining number of agricultural graduates
- **Industry regulation** – Claims that the industry is unregulated are wrong. The inability of Government to communicate and explain the rigour of the approval and ongoing compliance framework for mining has led to a lack of public confidence in the system.

Recommendations 4 and 5

4. The Government should take a leadership role in providing the facts so there is sound discussion on complex issues such as land use. Implementation of the NSW Strategic Regional Land Use Policy is an excellent opportunity for the Government to provide clear, impartial information about mining and exploration, to increase public confidence in the Government's oversight of the industry and reduce unwarranted concerns.

5. Government policies must not unnecessarily sterilise coal resources or burden industry with unnecessary delays and costs.

STATISTICAL APPENDIX

Table 1: NSW black coal saleable production, exports, royalties and employment

	2006-07	2007-08	2008-09	2009-10	2010-11
Black coal saleable production (Mt)	131.33	135.15	138.46	145.37	156.87
Exports ($ Billion)	6.2	8.2	17.1	11.2	14.1
Royalties ($ Billion)	0.4	0.5	1.2	0.9	1.2 (e)
Direct employment (No.)	13,392	15,387	16,914	19,109	21,126

Sources: Coal Services Pty Ltd, NSW Trade and Investment – Mineral Resources

Table 2: NSW non-renewable energy resources and recoverable black coal, December 2008

Energy resource	Economic Demonstrated Resources (EDR) (PJ)
Black coal	390,519
Coal seam gas	2,983
Natural gas	12
Condensate	0
Crude oil	0
Liquefied Petroleum Gas	0
Oil shale	0
Uranium	0

Resources	NSW PJ	% of Australia
EDR	390,519	44.2
Sub-EDR	68,942	42.3
Inferred	747,900	50.9
Total	1,207,360	48.0
	Mt	
EDR	15,680	40.0
Sub-EDR	>3,000	37.0
Inferred	30,300	45.5

Sources: Coal: Department of Resources, Energy and Tourism/Geoscience Australia (2010), Australian Energy Resource Assessment, Fig 5.14 and Tables 5.5 and 5.6. Gas: NSW Parliamentary Library (2011), *Key Issues in Energy,* Background Paper No 4.

Table 3: NSW and ACT principal electricity generation: GWh by fuel source, 2009-10

Fuel type	Principal Generation	%
Black coal	64,388.2	91.4
Natural gas	3,920.2	5.6
Hydro	1,679.3	2.4
Wind	410.7	0.6
Biofuels	7.5	0
Oil Products	0.8	0
Total generation	70,406.7	100
		% change
Energy sent out	65,268.7	-4.1
Energy purchased from IPPs, non-grid and embedded generation	5,727.7	
Net imports via Qld & Vic interconnectors [(a)]	7,797.0	33.3
Trade losses	176.8	15.8
Total Available Energy	78,616.5	0.6

Source: Energy Supply Association of Australia, *Electricity Gas Australia 2011,* Table 2.5 and 2.6.

Note: (a) Victoria and Queensland are the only net electricity exporters in the National Energy Market.

Table 4: COAL21 project funding commitments (December 2011)

	Project	Funding Commitment
Queensland	ZeroGen IGCC with CCS	$41.3m
	Wandoan Power Project	$14.3m
	Callide Oxyfuel Project	$67.9m
	Qld Geostorage Initiative	$20.0m
New South Wales	NSW Storage	$18.1m
	Delta PCC (Scoping & Delivery)	$9.4m
	Remainder of PCC Commitment	$40.6m
National	ANLEC Research Ltd	$75.0m
	CO2CRC and Otway Project	$2.7m
	NewGenCoal Communications	$7.8m
	TOTAL	**$297.1m**