



MINERALS COUNCIL OF AUSTRALIA

SUBMISSION ON THE ISSUES PAPER TO INFORM THE DEVELOPMENT OF AN ENERGY WHITE PAPER

FEBRUARY 2014

EXECUTIVE SUMMARY

1. Australia must regain its advantage as a low cost energy producer

Low cost, reliable energy has been a critical element of the international competitiveness of Australian industry and the living standards of households for several decades. The central role of low cost reliable coal in electricity generation has been the primary contributor to this competitive edge.

But this advantage has been lost, with electricity prices now amongst the highest in the developed world, substantially due to ill-judged policy interventions. High energy costs represent a substantial burden on Australian households and industry, including the mining sector which accounted for 13.5 per cent of final energy consumption in 2011-12.¹

These policy mistakes should be reversed including by:

- Urgent repeal of the carbon tax, which should lead to an immediate 9 per cent decrease in energy costs.²
- The phasing out of the Renewable Energy Target, which represents a \$20 to \$30 billion subsidy to the renewable sector by 2030, with the cost borne by industrial users and households.³

The Government should also recognise that costly efforts to change the energy mix ignore the substantial gains in low emissions technologies from traditional energy sources. Australia does not have to choose between coal and a low emissions future.

The roadmap to a low emissions coal future is increasingly clear. New technology coal plants, including ultra-supercritical coal plants, are achieving CO₂ emissions reductions of 30 to 40 per cent compared with the existing fleet of mostly subcritical plants.⁴ Substantial progress is also being made in the development and deployment of carbon capture and storage (CCS) around the world and should remain a central element of Australia's medium term energy vision. CCS offers potential for a baseload low emissions solution that is competitive with intermittent renewable generation. The coal industry remains committed to a continuing partnership with Government aimed at the deployment of CCS technologies in Australia as part of its contribution to economic growth, energy security and sustainable development.

All baseload options should be on the table

As part of a medium term plan to keep energy costs down and CO₂ emissions levels lower, Australia should also seek to fully capitalise on its rich natural endowment in all baseload energy sources, including uranium.

- As part of the broader debate about energy policy, the Government should reconsider the blanket prohibition on the use of nuclear energy.

2. Australia's competitive position as a global energy exporter is under threat

Australia's coal and uranium exports are a major contributor to Australia's export effort and broader national economy. The outlook for both sectors is strong.

¹ Bureau of Resources and Energy Economics, *2013 Australia Energy update*, Table 5, pg. 7.

² Scott Gregson, Group General Manager, Enforcement Group, Australian Competition and Consumer Commission, *Proof Committee Hansard*, 26 November 2013, p. 40.

³ The Hon. Martin Ferguson AM MP, Minister for Resources, Energy and Tourism, correspondence to the Hon. John Murphy MP, 19 March 2012; address to the inaugural National Carbon Capture and Storage conference, November 2011.

⁴ Supercritical and ultra-supercritical plants operate at much higher temperatures than conventional (subcritical) plants.

World electricity demand is forecast to grow 69 per cent over the next two decades. Total coal-fired generation capacity is expected to increase by 76 per cent and nuclear power 51 per cent in the period to 2035. In the developing world, the projected increases are even larger: power generation will grow 130 per cent and coal-fired generation by 123 per cent.⁵

Australia is well placed to meet a significant share of this demand if it regains its competitive edge. Over recent years, Australia's competitiveness as an energy producer has faltered under the burden of a wide range of new cost burdens. To regain our competitive edge, the adoption of a broad, and integrated policy agenda is necessary, including the following steps:

- An urgent and sustained effort to lower energy costs, as spelt out in Section 1 above
- A national compact aimed at an ambitious and concerted deregulation agenda across all sectors and levels of government
- Stable and consistent taxation and foreign investment frameworks, including the repeal of the Minerals Resource Rent Tax
- Streamlining and simplification of project and environmental approvals including:
 - Removal of the "water trigger" for large coal mining and gas projects on the east coast
 - removing or streamlining regulatory restrictions on uranium mining
- A vigilant approach to the removal of residual protectionist barriers that impose costs on export and import-competing industries
- Workplace relations reforms that promote and reward productivity gains
- Targeted support for research and development and commercialisation of innovation
- Removal of costly government intervention into project development and procurement; and
- Removal of structural obstacles to minerals and energy exploration

3. Australia must play its part in ending global energy poverty

Nearly half the world's population has limited or no access to energy.

Australia should become a leading advocate for efforts to close the energy poverty gap as soon as possible and no later than 2030.

In particular, the Australian Government should use its chairing role of the Group of Twenty Nations (G20) meetings in 2014 to secure a renewed global commitment to end global energy poverty.

Australia should also seek to reverse the recent World Bank move to limit financing of coal-fired power generation projects in poor nations to "rare circumstances".⁶

As a major coal and uranium producing nation, Australia must also play a constructive role in contributing to regional and global energy security.

⁵ International Energy Agency, *World Economic Outlook 2013*, Paris November 2013, Chapter 5. Figures compare 2011 with 2035 under the Agency's "New Policies Scenario" which is predicated on existing international commitments on emissions controls being delivered.

⁶ World Bank, *Energy Sector Directions Paper*, produced for the World Bank's Group Executive board meeting, July 2013. <http://documents.worldbank.org/curated/en/2013/07/18016002/>.

1. THE IMPORTANCE OF LOW COST ENERGY TO AUSTRALIAN INDUSTRY AND HOUSEHOLDS

Summary points

Low cost energy, built on coal-fired power generation, has been an essential element of Australia's comparative advantage.

This economic edge has been lost, due to costly policy interventions including the carbon tax and the Renewable Energy Target. Both should be repealed.

Australia does not have to choose between coal and a low emissions future. New coal generation technologies are reducing CO₂ emissions by 25-30 per cent and carbon capture and storage offers the prospect of low emissions over the medium term.

Nuclear power should be considered on its merits, and the blanket prohibition removed as part of a fresh public debate.

Over many decades, Australian householders' living standards have been built on access to low cost reliable coal-fired energy, with residential electricity costs traditionally amongst the lowest in the developed world.

Similarly, the competitiveness of Australia's manufacturing sector – including the metals and minerals processing sector – has been built on low cost, reliable energy sourced from Australia's coal endowment.

This comparative advantage has been lost

Key contributors to Australia's economic strength and household living standards are now under threat.

- Australian households now pay among the highest electricity costs in the developed world. Household electricity prices have increased by more than 110 per cent in the last five years, and are projected to increase another 7 per cent in 2014-15.⁷
- Australian business account for some 70 per cent of total electricity use in Australia. In the last five years, electricity prices for business have increased by almost 80 per cent.
- Australian exporting and import-competing companies now face electricity costs more than 80 per cent higher than in 2005. Australia's most important commodity exporting sector faces an annual carbon tax burden of \$1 billion that none of its competitors abroad confronts.

Energy is of significant importance to Australia's largest export industry. The mining sector used 13.5 per cent (536 PJ) of total Australian final energy consumption (3962 PJ) in 2011-12.⁸ As most mining takes place in remote locations, it is the predominant user of off-grid energy, consuming, 77 per cent (12,202 GWh) of the total off-grid electricity used.⁹ Grid electricity only accounts for 15 per cent of total energy consumption, with gas accounting for 52 per cent and diesel, 28 per cent.¹⁰ Mining

⁷ Australian Energy Markets Commission, *Electricity price trends final report*, March 2013

⁸ BREE, *2013 Australia Energy update*, Table 5, pg 7. <http://www.bree.gov.au/sites/default/files/files/publications/aes/2013-australian-energy-statistics.pdf>

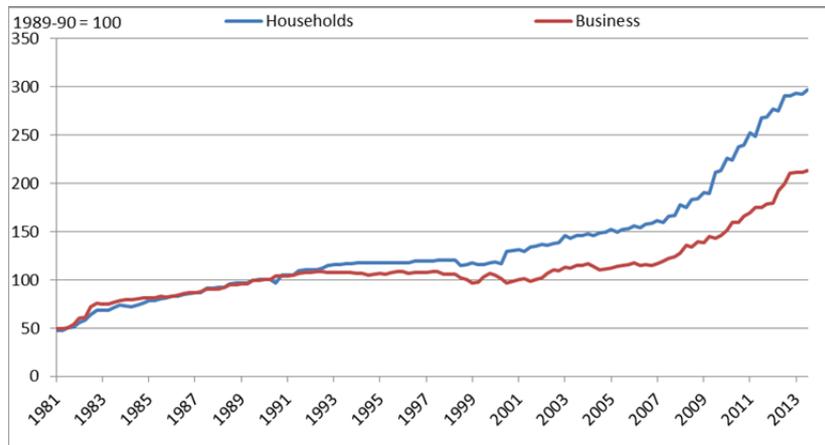
⁹ BREE, *Resources and Energy Quarterly Sept 2013*, Table 1, pg. 111.

<http://bree.slicedlabs.com.au/sites/default/files/files/publications/req/req-2013-09.pdf>

¹⁰ Australian Bureau of Agricultural and Resource Economics, cited in GHD, *Briefing for MCA members on low emissions energy options for mining operations*, 2009.

generation plants often supply to local communities such as in the Northern Territory where 25 per cent of the supply comes from mining plant.¹¹

Chart 1: Electricity price indices for households and businesses, Australia 1981-2013



Source: ABS

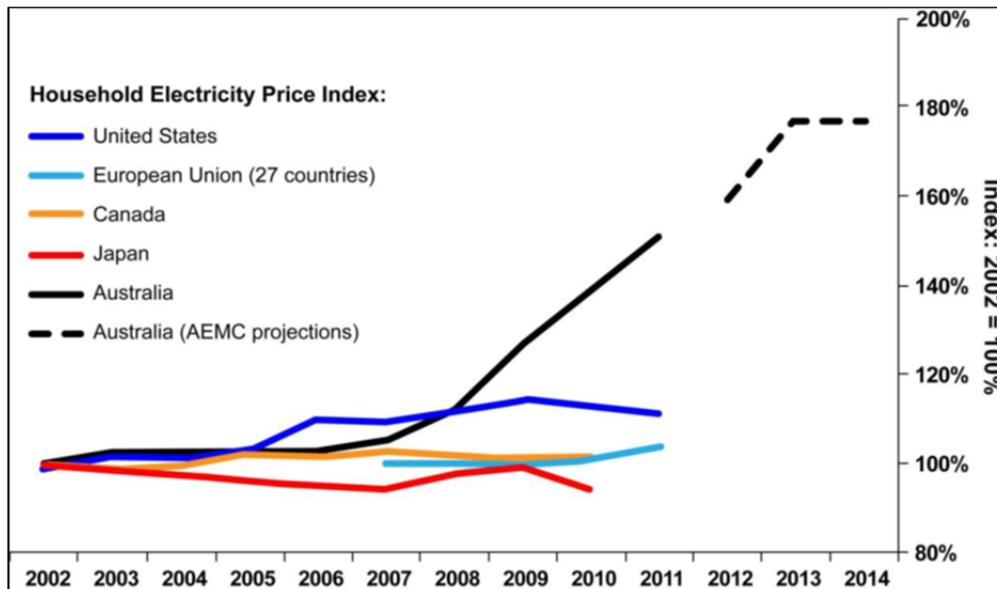
The majority of these cost increases are the result of policy interventions

These price increases are largely a function of deliberate policy decisions.

The carbon pricing scheme, the Renewable Energy Target (RET) and a range of other energy policy interventions at the federal and state government level are imposing steadily higher electricity costs on households and businesses.

No other country has adopted such a unilateral assault on its comparative advantage.

Chart 2: Household electricity prices, selected economies



Source: Energy Users Association of Australia

¹¹ MCA calculation from Electricity Supply Association of Australia, *Electricity, Gas Australia 2011*, Melbourne, 2011.

The carbon tax has been a major contributor to energy price increases

The adoption of the carbon tax – the world’s largest and only economy-wide carbon pricing scheme – has contributed to substantial increases in electricity prices for households and Australian businesses. The carbon tax accounted for 16 per cent of the electricity bill for a typical large industrial user in New South Wales in 2012-13. In 2013-14, the carbon tax added an estimated \$6.4 billion to the nation’s tax bill (equivalent to a 10 per cent increase in company tax revenue).¹²

The carbon tax equivalent reduction in the Fuel Tax Credit scheme imposed a direct cost on more than 75,000 small, medium and large businesses across the economy; not just 400 “big polluters”. For the coal sector, the carbon tax imposed an \$800 million burden on so-called fugitive emissions, making Australia the only country in the world to impose a carbon impost. (Such emissions are excluded from the European Union’s Emissions Trading Scheme).

For the mining sector, the combined costs of direct carbon liability, higher fuel costs and pass-through of carbon costs on gas and electricity have imposed an additional burden of approximately \$1.3 billion to \$1.6 billion a year.

The Renewable Energy Target is also a major burden on household and industrial users of energy

The RET has proved to be an inefficient and expensive form of infant industry assistance. The direct costs of the scheme are estimated at \$1.52 billion in 2011 and \$1.607 billion in 2012.¹³ Over the life of the scheme, in its present form, the RET and related support measures will involve a transfer of between \$20 billion and \$30 billion from energy users to selected technologies.¹⁴

The Climate Change Authority has conceded that the cost of the RET is borne by fossil fuel generators and consumers, with low-income households particularly disadvantaged.¹⁵

Both the carbon tax and RET contradict the key objective of the National Electricity Market (NEM) “to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to ... price, quality, safety, reliability, and security of supply of electricity”.

Energy market reforms should be accelerated

Stalled progress on energy market reform threatens the efficient operation of the east coast NEM and gas markets. Barriers on access to resources, particularly in New South Wales, have further distorted emerging east coast gas markets. Reservation policies on the west coast are distorting long term investment decisions. A lack of investment has also hampered the smooth operation of the Northern Territory domestic market.

Market rules on return on investment for regulated transmission distribution infrastructure, coupled with ongoing state ownership of assets are contributing to higher electricity costs as is the requirement for networks to cater for intermittent, subsidised, non-dispatchable generation sources.

Poor regulatory approaches act as a disincentive to further investment, which in turn may result in a shortfall in necessary capacity. Retail price regulation raises the risk of inefficient and non-transparent cross-subsidies which ultimately distort expansion and upgrade decisions. It also imposes a significant disincentive to efficient investment.

¹² Commonwealth Economic Statement 2013-14, Table 7, p 35.

¹³ Centre for International Economics, *The Renewable Energy Target: how it works and what it costs*, September 2013.

¹⁴ The Hon. Martin Ferguson AM MP, Minister for Resources Energy and Tourism, correspondence to the Hon John Murphy MP, 19 March 2012; address to the inaugural National Carbon Capture and Storage Conference, November 2011.

¹⁵ Climate Change Authority, *Renewable Energy Target Review: Final Report*, December 2012, pp. ix, 23.

While energy markets have matured compared with two decades ago, the stalling of reforms mean transparency for households and industrial users is less than is needed for efficient, liquid markets. This is discussed further in Appendix 2.

Further burdens on the energy sector should be avoided

Competitiveness and stability in tax regimes are particularly important for capital intensive industries such as mining which make large, multi-decade investment decisions, with long lead times before the generation of cash flows. The investment economics of projects are assessed based on the overall tax burden. Recent tax changes to impose fuel excise on off-road mining, restrict access to the R&D Tax Incentive and tightening of the thin capitalisation regime have increased uncertainty in long standing tax arrangements and impacted on the competitiveness of Australia's business tax system.

Proposals from the Australian Greens to add further to mining industry costs by increasing tax through a change in the Fuel Tax Credit would only worsen Australia's competitiveness and should be resisted. (See Box i)

Box (i) Fuel Tax Credits are not a subsidy

Fuel Tax Credits partially or fully offset the excise on fuel used by businesses to produce goods and services. This economy-wide scheme is based on the same tax principle underpinning the GST which is to avoid taxes on business inputs which would distort investment and production decisions.

As a result of the Clean Energy Future package, mining is currently disadvantaged under the Fuel Tax Credits scheme. Whereas a credit of more than 38 cents per litre is available for diesel used off-road in sectors such as agriculture, the current credit for diesel used in mining is less than 32 cents due to a specified "carbon charge". Consistent with plans to remove the carbon tax, the Government's legislation to repeal the carbon tax includes full reinstatement of Fuel Tax Credits for diesel fuel used off-road.

Claims that Fuel Tax Credits represent a "subsidy" to the mining industry have been rejected categorically by Treasury:

"Fuel Tax Credits are not a subsidy for fuel use, but a mechanism to reduce or remove the incidence of excise or duty levied on the fuel used by businesses off road or in heavy on road vehicles.

... the purpose of this scheme is not to subsidise fossil fuels but rather to avoid the incidence of a consumption tax on certain business inputs. This is consistent with Australia's tax system generally and is similar to the treatment of GST on business inputs."¹⁶

Australia does not have to choose between coal and a low emissions future

Coal will remain a low cost source of baseload energy in Australia for decades to come.

The roadmap to a low emissions coal future is increasingly clear. New technology coal plants, including ultra-supercritical coal plants, are achieving CO₂ emissions reductions of up to 30 per cent compared with the existing fleet. According to the International Energy Agency (IEA), current state-of-the-art technology operating under ultra-supercritical steam conditions can achieve net efficiencies of

¹⁶ Treasury, FOI Document 19, "AFR Article: G20 commitment to fossil fuel subsidies"; Document 7, Draft response Ministerial to an Australian Conservation Foundation letter, April 2012.
<http://www.treasury.gov.au/~media/Treasury/Freedom%20of%20Information/Disclosure%20Log/2012/G20%20commitments%20on%20fossil%20fuel%20subsidies/Downloads/Document%207.ashx>

up to 46 per cent. If the 550 GW of new coal-fired generating capacity added between 2000 and 2011 had been ultra-supercritical, then cumulative greenhouse gas emissions over that period would have been reduced by nearly 2 Gt (8 per cent).¹⁷

In the IEA's core "New Policies Scenario" for energy deployment and emissions reduction, the average efficiency of coal-fired generation worldwide improves from 36 per cent to 40 per cent between 2011 and 2035 as old plants, based on subcritical technology, are retired and increasingly replaced by supercritical and other higher efficiency technologies, such as ultra-supercritical, integrated gasification combined-cycle and combined heat and power plants.¹⁸

Substantial progress is also being made in the development and deployment of carbon capture and storage (CCS) around the world and should remain a central element of Australia's medium term energy vision. CCS offers both a near-zero emissions solution as well as the promise of keeping energy costs competitive. The coal industry remains committed to a continuing partnership with Government aimed at the deployment of CCS technologies in Australia. More detailed information on a roadmap for low emissions coal technologies can be found in Appendix 1.

"To achieve CO₂ intensity factors that are consistent with halving CO₂ emissions by 2050, deployment of CCS is essential. CCS offers the potential to reduce CO₂ emissions to less than 100 g/kWh. ... recent demonstration projects show that CCS is technically viable and, in fact, essential to achieving long-term CO₂ reduction targets."¹⁹

International Energy Agency, 2013

The strong demand for coal – and its ability to produce baseload energy at lower emissions – underlines the strong outlook for the commodity. Efforts by the anti-coal movement to suggest that coal will be left as a "stranded asset" are lacking in substance. (See Box ii)

Box (ii) Coal – a sound investment

The finance sector has been subjected to a concerted campaign by anti-mining activists over the past three years designed to undermine the attractiveness of Australian coal as a sound investment. Using incomplete analysis, the campaign suggests that the vast majority of the world's coal reserves will have to remain "in the ground" in order to meet global carbon emissions reduction targets. Coal companies with these reserves would therefore hold "stranded assets".

The campaign overlooks advice that fossil fuels will continue to satisfy most of the world's growing energy demand and, in so doing, lift billions of people out of abject poverty no matter what climate change policies are in place. The IEA assesses that that demand for energy, particularly from the Asian region, will be so strong that in 2035 some 75 per cent of energy will be derived from fossil fuels (today it is 81 per cent).

The so-called Carbon Tracker models used by activists which assert to reveal misleading valuations, typically have no economic content. They fail to recognise that the application of a predetermined carbon budget constraint would alter the global pattern of fossil fuel production and consumption and thereby change the incentives for miners to explore and develop new fossil fuel resources, including coal. Some nations may do less, but others more in meeting the demand. These models wrongly

¹⁷ International Energy Agency, [Tracking Clean Energy Progress 2013: IEA input to the Clean Energy Ministerial](#), Paris, 17 April 2013, p. 50.

¹⁸ IEA, *WEO 2013*, op. cit., p. 182. Supercritical and ultra-supercritical plants operate at much higher temperatures than conventional generation plants that run off pulverised coal. IGCC plants convert pulverised coal into syngas which is used to run turbines

¹⁹ IEA, *Technology Roadmap: high-efficiency, low-emission coal-fired power generation*, 2012, p 5 and p 6.

assume that all prospective fossil fuel resources around the world are equally likely to be developed.

Listed fossil fuel companies must continuously disclose their exploration results, resources and reserves – a rigorous standard of transparency in which the Australian mining industry is a world leader. There is no evidence that asymmetric information is masking speculative overvaluations, or that investors are collectively misconstruing the outcomes of global climate change negotiations.

As Alan Oxley and Jeffery Rae of ITS Global suggest, these reports cannot be regarded as a serious analysis of the financial risks associated with fossil fuel assets:

“Rather, it is an anti-development polemic aimed at pressuring institutional investors to divest their shareholdings in resource companies, even though it would reduce the financial well-being of their clients. Such mischievous strategies are being resorted to precisely because governments continue to eschew the draconian prescriptions of activists, and fossil fuels continue to underpin global growth and development.”

Nuclear power – an option to be considered on its merits

Australia stands out amongst its peers with its legal prohibition of nuclear power. The potential to address energy security and climate change through nuclear power is recognised globally. Total lifecycle emissions associated with nuclear energy,²⁰ are comparable to and often lower than wind, and hydro.

A real national discussion on the suitability or otherwise of a nuclear power industry in Australia is required. Any subsequent legislative changes would not remove the Commonwealth’s international obligations or environmental regulation responsibility for the nuclear power industry.

While the legislative ban remains, there can be no genuine and thorough exploration of the true economics of nuclear power generation in Australia, no genuine and thorough proposals from alternative reactor technology providers (such as small-scale, remote power plants) and no genuine and thorough engagement with potential site host communities.

²⁰ Professor Manfred Lenzen, *Current state of development of electricity-generating technologies – a literature review*, Sydney University, June 2009.

2. AUSTRALIA'S COMPETITIVE POSITION AS A GLOBAL ENERGY EXPORTER IS UNDER THREAT

Summary points

Energy exports, including coal and uranium, are a major contributor to Australia's economy and living standards.

The outlook for global energy demand is strong, and Australia is well placed to meet this demand, if it regains its competitive edge.

Action is required to remove a range of policy impediments to energy export growth. These include the removal of the MRRT, duplicative project approvals processes, counterproductive red tape and the productivity restraints engendered by the Fair Work Act.

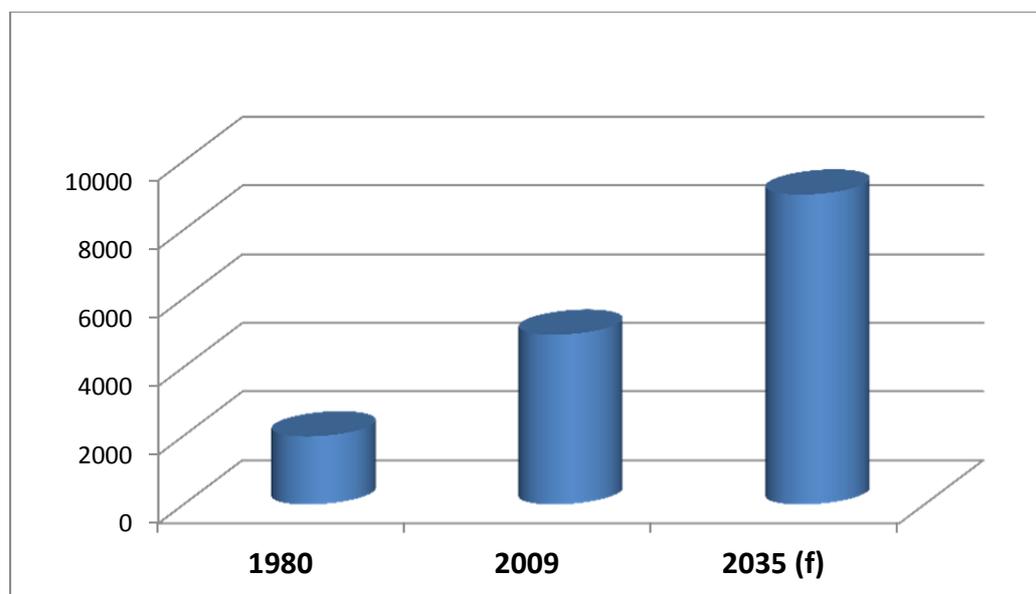
Australia's energy exports have been an important contributor to national wealth. This contribution has grown strongly in recent years, with exports rising from \$24 billion in 2007 to more than \$70 billion today. Despite increasing competition, Australia continues to be the world's largest coal exporter accounting for one quarter of total world coal exports.

Uranium exports have doubled in the past decade rising from \$364 million to \$739 million in 2012-13.

The outlook for global energy demand is strong

Since 1970, the demand for power has more than quadrupled from 5,200 to 22,550 TWh with much of this incremental demand being met by coal. Over the next 20 years, demand will increase to more than 40,000 TWh and coal is projected to provide nearly 40 per cent of global power.

Chart 3: Past and future global electricity generation (GW capacity), 1980 - 2035



Source: International Energy Agency

Higher incomes and better access to energy mean that people living in cities consume more energy. In China, for instance, the World Bank concludes that urban dwellers use 3.6 times more energy than their rural counterparts.

Global demand for energy is expected to continue to expand by at least 35 per cent (and as high as 46 per cent) over the next 20 years according to the IEA.

- Coal will continue to underpin the economic growth and development of Asia.
- Almost half the world’s population lives within the Asian region.
- Demand for coal and uranium will continue to grow significantly across the Asian region over the next 20 years.
- Asian nations look to Australia to provide security in energy supplies.

As a premium supplier of energy minerals (coal and uranium), Australia makes an important contribution to this global growth and to regional stability.

The role of coal

“The importance of coal in the global energy mix is now the highest since 1971. It remains the backbone of electricity generation and has been the fuel underpinning the rapid industrialization of emerging economies, helping to raise living standards and lift hundreds of millions of people out of poverty.”

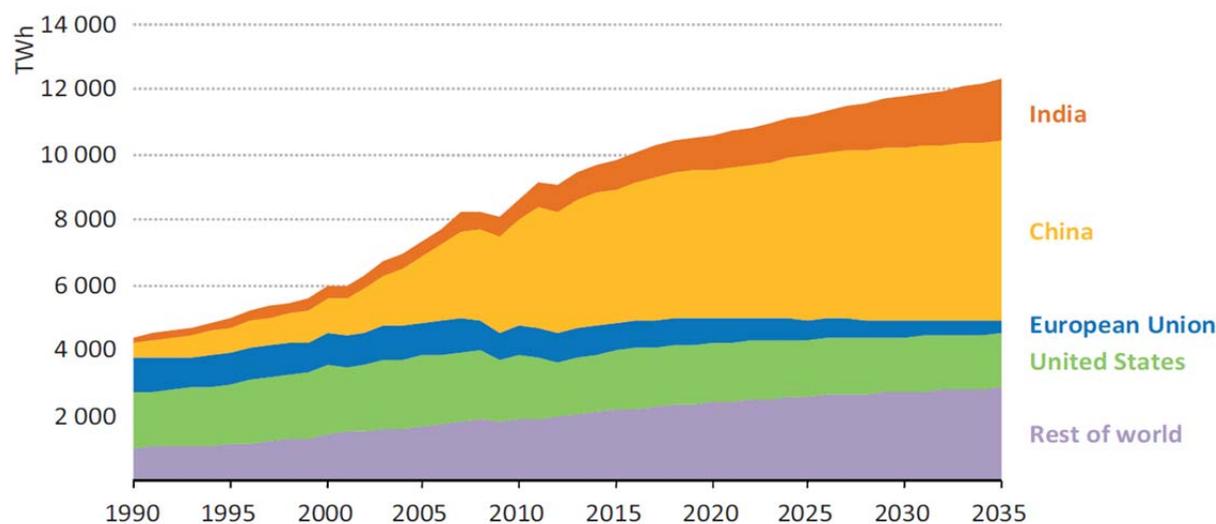
Fatih Birol, Chief Economist, International Energy Agency, 2013

Between 1990–2010, coal-based generation nearly doubled from 4,426 to 8,697 TWh to account for 41 per cent of all electricity supply.

During the present decade, coal power will increase by an additional 3,361 TWh – more than gas, nuclear, solar and wind combined.

The IEA predicts that by 2035, on its mid-range “New Policies Scenario” electricity demand will have increased by two-thirds, with coal growing at 1.2 per cent a year to remain the largest fuel source for electricity generation (40 per cent).

Chart 4: Coal-fired electricity generation by region, 1990 to 2035



Source: International Energy Agency

China's coal demand

China is the world's second largest economy but it is still at a relatively early stage of development with a long way to go to catch up with per-capita living standards in major advanced economies.

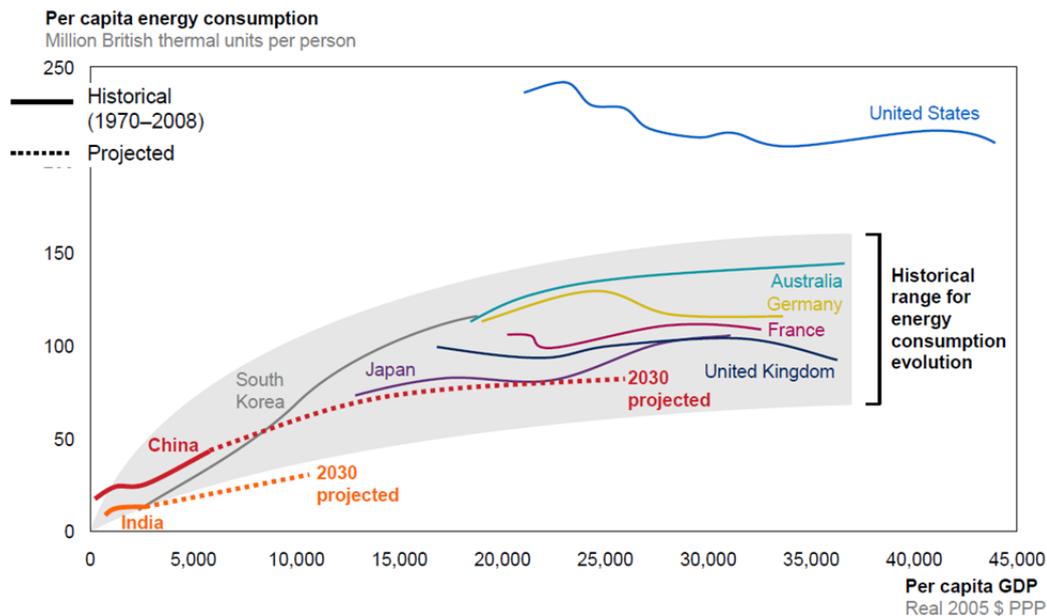
Population growth, together with the urbanisation of another 250 million people by 2025, will stimulate robust demand for both minerals and energy for decades to come.²¹

- Coal presently accounts for 80 per cent of China's electricity output. The nation has adopted a goal of reducing this proportion to 65 per cent by 2017, however rising energy demand means this will simply cause a deceleration of the growth in of coal use, not a fall.
- The IEA still sees coal demand rising 14 per cent by 2035 under this new policy scenario.
- Use of coal with higher calorific value, lower sulphur and lower ash content – such as Australian black coal – and replacement of inefficient electricity and heating plants with new higher efficiency generators are likely to see more demand from Australia.

Similarly, metallurgical coal demand is expected to grow strongly – 3.5 per cent per annum for the next five years and 3 per cent per year after that.

According to McKinsey, China's energy consumption per capita is currently equivalent to those levels seen in South Korea and Singapore in the late 1980s. McKinsey projects that by 2030, China will reach an energy intensity achieved by those economies in the late 1990s.²² (Chart 5)

Chart 5: Energy consumption intensities for selected economies, historical and projected



Notwithstanding moderating coal demand over the longer term, the IEA estimates that China's coal consumption will grow by 13.5 per cent between 2011 and 2020, to reach more than 3 billion tonnes of coal equivalent (over 4 billion tonnes by volume, depending on the energy content of the product).

²¹ Refer to Mark Gresswell, [The Resurgence of Coal: Facts and Drivers](#), Presentation to Singapore International Energy Week, Singapore, 31 October 2013, slides 14, 16 and 18.

²² McKinsey & Company, [Resource Revolution: Tracking global commodity markets](#), Trends Survey 2013, September 2013, p. 14f.

This growth – driven largely by electricity demand – is expected to exceed that of the rest of the world put together.²³

China is not just the world's largest consumer of coal, it is also the world's largest producer and importer of coal.

- In the IEA's projections to 2035, "China continues to import substantial amounts of coal, remaining a strong force in global coal markets."²⁴
- China's net imports of coal peak before 2020 but stay above or around 2012 levels for the remainder of the outlook.²⁵

Like the IEA, the Australian Bureau of Resource and Energy Economics (BREE) projects that China's consumption and importation of thermal coal will decelerate, but not contract.

- China's imports of thermal coal are projected to increase at an average rate of 3.2 per cent a year between 2014 and 2018, reaching 281 million tonnes in 2018.
- While Japan remains the primary destination for Australia's thermal coal exports (75 million tonnes in 2012), the majority of additional tonnage is going to China (34 million tonnes in 2012, a 73 per cent increase relative to 2011).²⁶

India's coal demand

India demand is expected to double by 2035, having doubled over the past five years.

With a GDP per capita that is only 3 per cent of the US, India is arguably 20 years behind China in terms of development. Moreover, India has a young population – 60 per cent under the age of 35 – and is forecast to overtake China as the most populous nation by around 2020. India is also set to urbanise 200 million people by 2020.²⁷

According to the IEA, India has doubled its coal use between 2000 and 2011 and the IEA expects its coal demand to double again by 2035 overtaking the US as the second largest coal consumer soon after 2020.

- The IEA projects that India's imports will more than triple by 2035 overtaking those of Japan and the EU before 2020, and those of China soon after, to make India the world's largest coal importer.²⁸

India's electricity consumption per capita is very low: less than 1 MWh, compared to 7 MWh for Germany and nearly 14 MWh for the US.²⁹

- The IEA projects that 147 million people in India will still have no access to electricity in 2030. This suggests that there is considerable future demand growth for electricity and thermal coal.

India has a large service-based sector, unusual for a developing country. This is largely due to Western outsourcing and the growth in IT services. As India industrialises, its services sector will become a smaller part of the economy, while the agricultural and manufacturing sectors will grow in

²³ IEA, *WEO 2013*, op. cit., pp. 62, 145f.

²⁴ *ibid.*, p. 146.

²⁵ *ibid.*, p. 151.

²⁶ Bureau of Resources and Energy Economics, [Resources and Energy Quarterly – September Quarter 2013](#), Canberra, 1 October 2013, pp. 32, 34.

²⁷ Gresswell, op. cit., slides 14-16.

²⁸ IEA, *WEO 2013*, op. cit., pp. 151, 163f.

²⁹ Gresswell, op. cit., slide 14.

relative terms. This will result in higher energy intensity per unit of GDP and higher consumption of coal and other minerals.³⁰

Japan's coal demand

While thermal coal use is changing, coal-fired generation will continue to be an important fuel source in Japan sustaining demand. Coal demand is expected to increase by 1.3 per cent to 2018, mostly from increased use in power generation.

Japan, the world's second largest metallurgical coal consumer, is projected to increase demand by 4.4 per cent over the coming five years.

- Coal accounted for 29 per cent of power generation in Japan in 2012. In the IEA "New Policies Scenario", demand for coal is expected to remain constant till 2030 before declining slightly, by 5 per cent in real terms, though still providing 25 per cent of power generation.
- Under the same scenario, Japan's coal power generation capacity would decline slightly by 1 GW to total 46 GW in 2035, as compared with 47 GW in 2011. This capacity change is net of 9 GW additional and 10 GW retired coal-fired generation capacity.

Other Asian demand

The ten economies belonging to the Association of Southeast Asian Nations (ASEAN) are embarking on the same process of coal-fired electrification as China and India.

The IEA projects that demand for electricity in ASEAN will double between 2011 and 2035 and that coal use will triple in the same period.

- Demand for coal in ASEAN is set to grow at 4.8 per cent a year – the fastest growth rate of any major coal consuming region or country – and ASEAN's coal consumption will exceed that of the EU by 2030.
- The IEA expects Australia and Indonesia to be the biggest beneficiaries of increasing international trade in coal.³¹

Uranium demand will also grow

Total world consumption is expected to grow at an annual rate of 5 per cent over the next five years, with 75 new reactors projected to start operation by 2018.

- China alone has 28 plants under construction and a further nine under consideration.
- India is building six additional generators with three others planned by 2018. Uranium consumption was estimated to increase 9 per cent in 2013 with 13 reactors commencing operations.

By 2035, nuclear power will account for 10 per cent of electricity generation, a slightly lower proportion of total generation than today but an increase of 50 per cent in absolute terms.

BREE predicts that the combination of reliable baseload power, relatively cheap operating costs and low carbon emissions profile will see "substantial expansion in nuclear power generating capacity, particularly in emerging economies".³²

³⁰ Ibid., slide 17.

³¹ IEA, *WEO 2013*, op.cit., pp. 151, 166.

³² Bureau of Resources and Energy Economics, *Resources and Energy Quarterly*, March 2013, p 47.

The global uranium industry is well established and competitive. The Canadian Government has moved ahead of Australia to open up sales to India. The Greenland Parliament has reversed a decade's long ban on uranium mining. Africa is increasingly gaining attention from global operators at the expense of Australia.

Australia is well placed to meet this demand, if it regains its competitive edge

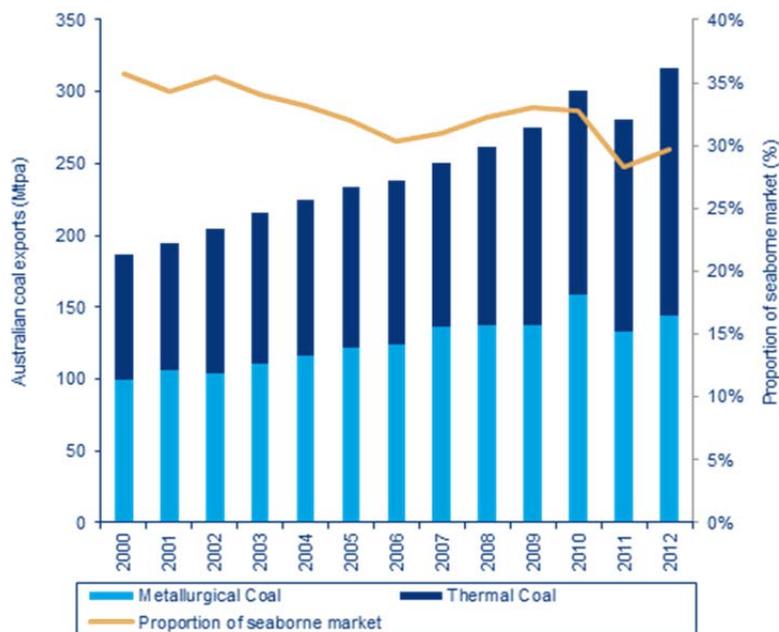
Australia could enjoy an increase in export revenue of \$121 billion a year by 2035 simply by maintaining market share in major commodities according to work by Port Jackson Partners.

- This would be a 65 per cent increase on 2010 revenues and a doubling of the export contribution on 2006.

Unfortunately, Australia faces a “burning platform” – a structural cost competitiveness problem which threatens future growth and investment. This has seen stagnation or loss of market share, declining productivity, high capital and operational costs and the emergence of strong overseas rivals.

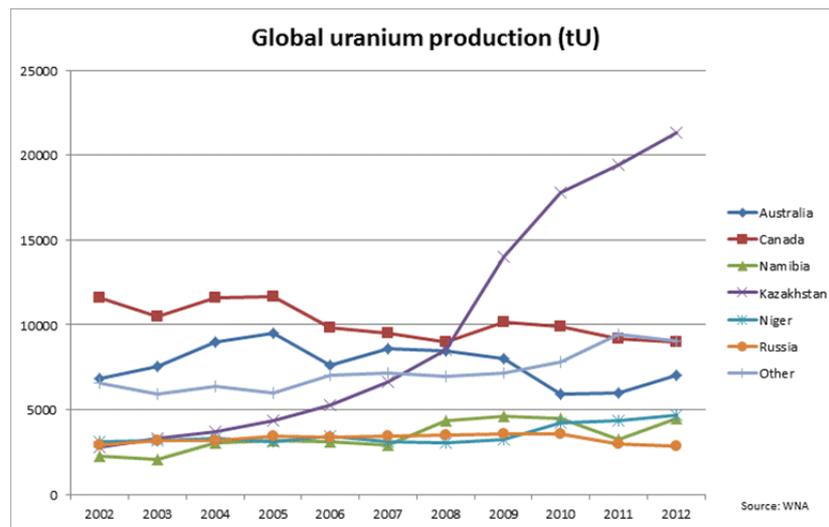
- For thermal coal, the loss of competitiveness has seen market share drop by 19 per cent since 2000, down to 21 per cent. (Chart 6)
- In uranium, Australia has about one-third of the world's low cost uranium deposits but only about 11 per cent of the world's uranium market. High costs and lengthy approval processes create a trade disadvantage for Australia at a time when competitors such as Kazakhstan are seeking to supply 30 per cent of the market. (Chart 7)

Chart 6: Historical Australian coal exports, 2000-2012



Source: Wood Mackenzie 7 May 2013

Chart 7: Global uranium production



Source: World Nuclear Association

Action is required to remove a range of policy impediments to energy export growth

Australia is well placed to meet a significant share of this demand if it regains its competitive edge. Over recent years, Australia's competitiveness as an energy producer has faltered under the burden of a wide range of new cost burdens. To regain our competitive edge, the adoption of a broad and integrated policy agenda is necessary.

Lower energy and carbon prices

There should be an urgent and sustained effort to lower energy costs as spelt out in Section 1 above.

Repeal the MRRT

The MRRT is an unnecessary, extra layer of taxation (and bureaucratic compliance) on top of company tax and royalties.

Australian coal producers already face among the highest effective tax rate in the world.³³

- The coal and iron ore industries were among the highest taxed industries in Australia before the introduction of the MRRT with an average tax ratio in excess of 40 per cent over the five years from 2006-07.
- The mining industry has contributed an estimated \$117 billion in company tax and royalty revenues since 2006-07.
- In addition to \$21 billion in company tax and royalties paid in 2011-12, the minerals industry spent more than \$34 billion on community projects and with local businesses.

Remove and streamline regulatory restrictions on uranium mining

Additional and unnecessary regulatory oversight of the uranium sector should be streamlined. The uranium industry is well governed under the regulatory framework that applies to mining generally. Additional laws are in place to manage radiation protection and establish export controls. Beyond

³³ Goldman Sachs, *Resource nationalism poses a big threat to miners*, January 2013.

these radiation management principles and export controls, the uranium industry does not require special legislative treatment. The discriminatory treatment of the uranium industry under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), state mining laws and transport laws should be brought to an end.

- **Nuclear actions definition** – Some activities currently captured under the nuclear actions “trigger” including uranium mining and milling, rehabilitation and decommissioning, carry no additional environmental risk than the mining of other commodities. Despite mythology to the contrary, the radiological risk to the environment from uranium mining is very low. The occupational radiation hazard is very low, less than in most other industries which utilise radiation sources, and is amenable to control through well established and routine occupational hygiene practices. Finally, uranium mining and milling are not “nuclear” activities as there is no possibility of a fission reaction occurring.
 - Consideration should be given to removing these activities from the definition of nuclear actions
 - Activities with impacts on other Matters of National Environmental Significance such as World Heritage Areas or threatened species would still require referral under the EPBC Act similar to any other resources development.
- **Legal restriction on the use of approvals bilaterals for nuclear matters** – Amendment to the EPBC Act is required to ensure that nuclear actions can be integrated into the Commonwealth/state bilateral agreements on assessments and approvals in line with the Government’s commitment to delivering a “one-stop shop” on environmental approvals. With respect to the environmental approvals for uranium mining operations and related activities, the MCA considers that:
 - All states/territories should have responsibility for undertaking environmental assessment and approvals under the terms of the bilateral agreements and in line with agreed accreditation standards
 - States/territories should seek to consolidate all jurisdictional approval processes into a single co-ordinated process
 - States should issue a consolidated set of conditions, incorporating all intra-government and inter-government requirements
 - States should administer any offsetting requirements under the project conditions
- **Uranium transportation** - The efficient safe transportation of uranium oxide concentrates suffers from both uneven application of rules in different states and the Northern Territory and unjustified restrictions in some jurisdictions.
 - At present uranium oxide concentrates in Australia are only mined in South Australia and the Northern Territory, and product is shipped through Adelaide or Darwin.
 - The Western Australian Government has overturned its ban on uranium mining, with several projects under consideration, however, shipping uranium oxide concentrates out of Western Australia remains prohibited.
 - Queensland and New South Wales have overturned bans on exploration and mining, and exploration respectively, but also continue to prohibit shipping of product out of their container ports.
 - Victoria retains a complete ban on exploration, mining and transportation.

The transportation restrictions for uranium oxide concentrates in Australia are anachronistic. The product’s qualities are well known and it is safely transported around the world on container vessels and trucks.

- Uranium oxide concentrates are packed into specific drums and then sealed before being placed in purpose built, sealed containers at mine sites, trucked on main roads and shipped in and out of main ports. As Radioactive Material, it is classified as a Dangerous Good (Class 7, under the Australian Dangerous Goods Code and the International Maritime Dangerous Goods code). Other Class 7 rated goods include medical isotopes which are regularly transported through all major capital cities in Australia to and from hospitals.
- Australia has exported more than 11,000 containers over the past 30 years without transport incident. It is clearly as safe to transport uranium oxide concentrates through all Australia's main container ports as it is through Adelaide and Darwin.
- Due to its Class 7 nature, shipping lines must be accredited and equipped to carry the material. Contracted shipping vessels are fit for purpose.

There is no scientific basis for this discriminatory treatment within Australia. Indeed such anomalous treatment undermines Australia's uranium trade as it raises unnecessary safety concerns at transit and receiving ports.

Reform project approvals

The minerals industry supports the proposed one-stop shop approach to environmental approvals.

Longer term, further streamlining should be explored whereby the Commonwealth's role is limited to oversight and enforcement with assessment and approvals processes devolved to the states/territories.

Remove industry development burdens

The misguided bureaucratic intervention in local purchasing decisions through the *Australian Jobs Act 2013* should be wound back.

The Act, and recent industry policy debates, have been founded on a mistaken premise about the scale of Australian industry participation in minerals projects. According to the Western Australian Government, during the first nine months of 2012, the local content of operating projects' contracts worth \$15 billion was 95 per cent; for expansion contracts worth \$21 billion, the equivalent figure was 84 per cent.

The Act creates a more interventionist policy approach, notably through the expansion of Australian Industry Participation (AIP). AIPs increase reporting requirements and introduce new obligations on companies with large projects, including the need to employ a dedicated officer to implement them and to report to an external authority on their implementation.

The Act requires that plans be provided to a third party (the Australian Industry Participation Authority) before projects have completed full internal due diligence and fiduciary responsibility requirements.

This is both impractical and potentially at odds with continuous disclosure obligations. Time and resources diverted to dealing with such obligations distract from core challenges of cost competitiveness, productivity and innovation.

Support exploration

Australia's exploration expenditure has fallen noticeably since 2012 and trends suggest a longer term decline in the share of global exploration expenditure in Australia.

The Productivity Commission has highlighted rising costs and lower productivity as factors, along with a long list of unnecessary regulatory burdens.³⁴

Taxation policy relating to exploration has been marked by uncertainty and incoherence in recent years. The Australian Government is urged to resist measures (including those announced in the 2013 Budget) to curtail legitimate deductions for exploration expenditure.

The MCA welcomes the Coalition Government's recognition of the need to reinvigorate Australia's exploration effort and looks forward to the introduction of legislation to implement the proposed Exploration Development Incentive.

Identification of potential minerals values should be incorporated early in the process of defining a conservation area or in designating other land use and applied across exploration and development.

Remove constraints on building a skilled workforce

The minerals industry continues to face skills shortages in key areas notwithstanding weaker industry conditions over recent times.

The industry seeks an active partnership with government to deliver an uninterrupted, sustainable education and training pathway to increase workforce participation, workforce diversity and workforce skills.

The industry remains concerned about chronic underfunding of minerals-related higher education courses in Australia. Industry-led training in the Vocational Education and Training (VET) sector remains a key priority. The minerals industry itself spends some 5.5 per cent of payroll on training (more than \$1.15 billion in 2011-12), much of it private, non-accredited company training.

Minerals-related higher education courses in Australia continue to be chronically underfunded. New graduates in geoscience between 2010 and 2015 are forecast to meet less than 20 per cent of new and replacement demand. In mining engineering, the figure is 40 per cent.

The MCA, through its Minerals Tertiary Education Council (MTEC), has directly invested more than \$35 million over the past decade into 16 Australian partner universities to deliver core disciplines. Without this industry support, many schools and departments would have closed, leaving Australia without the capacity to teach and deliver its own high quality graduates.

There needs to be broader recognition that labour mobility is important to the success of Australia's mining industry. Strategies such as Fly-in, Fly-out arrangements and an effective skilled migration program provide the flexibility that allows Australia to secure major resource investments.

Support productive workplaces

Restrictive workplace relations laws need reform.

Laws and regulations governing workplace relations should help to foster direct relationships, providing employers and employees with the instruments to best suit their needs based on a platform of mutual respect, shared purpose and accountability.

The minerals industry seeks a framework of workplace law and regulation that promotes cooperative and productive workplaces, recognising that a genuine, sustainable safety net and appropriate protections against exploitation or discriminatory conduct are important elements of such a framework.

³⁴ Productivity Commission, *Mineral and Energy Resource Exploration*, Draft Inquiry Report, Canberra, May 2013.

Support innovation

Inequitable and arbitrary rules have undermined research and development policy, particularly in the resources sector.

Mining (including oil and gas) is a major contributor to investment in R&D in Australia. Mining R&D expenditure was \$4.1 billion in 2011-12 (22 per cent of total business R&D expenditure), the second largest industry share behind manufacturing.

Moves by the previous government to restrict access to R&D support for the mining sector, through measures such as introducing a bias against production-based trials, undermined a key component of the industry's practice of integrating research, development and deployment.

Further measures that will undermine the attractiveness of R&D investment are contained in the *Tax Laws Amendment (Research and Development) Bill 2013* which is before the Parliament. The bill:

- Limits access to the R&D Tax Incentive to companies with assessable income below \$20 billion.
- Reduces Australia's competitiveness to attract R&D business investment.
- Introduces unnecessary complexity into the R&D Tax Incentive.
- Underestimates the economic impact of R&D expenditure by large companies and multinationals in Australia.

3. AUSTRALIA MUST PLAY ITS PART IN ENDING GLOBAL ENERGY POVERTY AND LIFTING LIVING STANDARDS

Summary points

Nearly half the world's population has limited or no access to energy.

Australia should become a leading advocate for efforts to close the energy access gap as soon as possible and no later than 2030.

In particular, the Australian Government should use its chairing role at the G20 meetings in 2014 to secure a renewed global commitment to end global energy poverty.

Australia should also seek to reverse the recent World Bank move to limit financing of coal-fired power generation projects in poor nations to "rare circumstances".

As a major coal and uranium producing nation, Australia must play a constructive role in contributing to regional and global energy security.

Australia should lead efforts to end global energy poverty and enhance energy security

Australia should use its participation in a range of global bodies to be a leading advocate for a global solution to the problem of energy poverty.

Nearly half the world's population has no or limited access to energy. An estimated 1.3 billion people have no access to energy at all.

The consequences are not difficult to contemplate. Without energy there is no path out of poverty. This is no revelation. In 1930, the *New York Times* noted that "nothing in modern life so raises the standard of living of high and low income groups as the use of electricity".³⁵

The task to close this gap is great. The IEA has estimated that new power generation in poor nations must average \$34 billion annually over the period to 2030.³⁶

By definition, this investment it must be done at least cost. While all energy sources will be needed, the world's cheapest, most versatile and abundant fuel – coal – must (and will inevitably) be a major part of the solution to global energy poverty. In this vein, a recent working group report to the International Energy Agency concluded that world energy consumption trends showed that "coal is playing a pivotal role in keeping energy affordable".³⁷

Global policy on access to energy is moving in the wrong direction

Despite this, in recent times, international financial institutions (and some bilateral aid donors) have bowed to pressure from environmental groups to restrict aid funding to coal-fired generation projects in poor nations.

The World Bank, for example, is pushing ahead with a policy that will restrict funding support for coal-fired generation plants in poor countries except in "rare circumstances". This is despite the fact that one billion Africans now use roughly the same amount of electricity as 34 million Canadians. 90 million children in sub-Saharan Africa go to schools without electricity. In Malawi and Uganda as many as 9 out of 10 people lack access to regular electricity. Yet the global institution tasked with

³⁵ Cited by Professor Emeritus Dr Frank Clemente, Energy-facts.org, Pennsylvania, 2011.

³⁶ IEA, *Energy for all: Financing access for the poor*, A special excerpt of the World Energy Outlook 2011, Copenhagen, 2011.

³⁷ Coal Industry Advisory Board, *The Global Value of Coal*, Paris, 2012, p 29.

reducing poverty and hardship has decided to ration poor nations' access to the cheapest and most abundant energy source available.

Moreover, the policy will be counterproductive. It will fail to reduce CO₂ emissions and may even have the opposite effect. This point has been made by senior members of the World Bank itself. Former World Bank Economist, Justin Lin wrote in 2009 that "because coal is often cheap and abundant and the need for electricity is so great coal plants are going to be built with or without our support. Without our [World Bank] support, it is the cheaper, dirtier type of coal plants that will proliferate".³⁸

Moreover, continued consumption of coal and lower greenhouse gas emissions are not mutually exclusive goals. With the construction of new more efficient generation capacity, average emissions from coal-fired plants are falling. According to the IEA, modern coal-fired plants are producing 30-40 per cent fewer CO₂ emissions than the average for existing coal fleet.

Uranium has also a key role to play in ensuring the growth of developing nations. Nuclear power output is expected to increase 50 per cent over the next two decades with China accounting for one-third of that increase. BREE predicts that combination of reliable baseload power, relatively cheap operating costs and low carbon emissions profile will see "substantial expansion in nuclear power generating capacity, particularly in emerging economies".³⁹

At the moment there are 435 active nuclear reactors in the world with a capacity of 375 GW.⁴⁰ More than 80 per cent of this is in OECD countries. Though the share of non-OECD countries is low currently, the bulk of future growth in nuclear reactor capacity (about 80 per cent) is in non-OECD countries.

Recommendations

The Australian Government should undertake two related steps.

- The Australian Government should use its leadership of the G20 in 2014 to add much-needed impetus to the push to end global energy poverty by 2030.
- The Australian Government should work urgently to overturn the World Bank's restriction on funding for coal-fired electricity generation projects in poor nations.

³⁸ World Bank, website, climatechangeblog.worldbank.org/why-coal, March 2, 2009.

³⁹ Bureau of Resources and Energy Economics, *Resources and Energy Quarterly*, March 2013, p 47.

⁴⁰ World Nuclear Association.

4. SUMMARY OF RECOMMENDATIONS

The *Energy White Paper Discussion Paper* poses a number of questions around seven broad themes. The following table outlines the MCA's view of the priorities the Commonwealth should pursue under each of the themes. Further development of these policies can also be found in the Minerals Council of Australia's 2014-15 Pre-Budget Submission.

<p>The security of energy supply</p>	<ul style="list-style-type: none"> • Energy needs will continue to grow, with all sources of energy – particularly coal and uranium – contributing to the dual tasks of energy security and climate change management. • Australia can contribute to regional stability by providing energy security through the reliable supply of premium products.
<p>Regulatory reform and the role of Government</p>	<ul style="list-style-type: none"> • Governments should pursue a rigorous deregulation agenda by: <ul style="list-style-type: none"> ○ Developing a new compact on business regulation with an explicit focus on improving productivity, cost competitiveness and enterprise flexibility ○ The Commonwealth providing a mandate to the Productivity Commission to inform the compact's work program, including through "deep benchmarking" of Australia's international competitiveness: <ul style="list-style-type: none"> ▪ including tasking Treasury with the task of extending this benchmarking to cross-country analysis of industry-level productivity comparisons. • Domestic energy markets must be further reformed, private sector investment encouraged and markets deregulated with more transparency and a renewed focus on the interest of energy consumers. • The ban on nuclear power in Australia should be removed. • The Renewable Energy Target should be removed.
<p>Growth and investment</p>	<ul style="list-style-type: none"> • The Commonwealth should continue to work together and state with relevant stakeholders to develop a long-term strategic approach to regional land use planning and access. • Bilateral agreements (assessments and approvals) should be extended to all states and territories to reduce compliance costs and delays in approval processes. • Governments should effectively resource the COAG commitment to a comprehensive regulatory reform process, particularly focused on improving red tape reduction and duplication associated with project approval processes and related monitoring and reporting requirements, in line with the findings of the Productivity Commission Review. • Governments should together re-align the EPBC Act in order to fill existing gaps in strategic natural resource management planning; provide businesses with longer term certainty about areas for investment (with reduced risk); reduce regulatory overlap; and provide more consistent and appropriate service delivery from the Commonwealth in biodiversity protection. • Governments should develop with industry and stakeholders a Geographic Information System.

	<ul style="list-style-type: none"> • The invocation of the nuclear actions under the EPBC Act should be rationalised. • Unnecessary and uncompetitive constraints on the transportation of uranium oxide concentrate should be removed.
<p>Trade and international relations</p>	<ul style="list-style-type: none"> • Government should work with industry to develop a roadmap for a step change in mining and minerals-related innovation. • The shortfall of tertiary and technical graduates should be urgently addressed: <ul style="list-style-type: none"> ○ Ensuring programs encourage an openness to innovation – including encouraging cross-disciplinary approaches along the value chain and supportive of the social licence to operate ○ Retaining graduates in Australian centres of excellence and attracting offshore talent. • Changes to R&D Tax Incentive arrangements which exclude production-based development rules in order to re-incentivise commercial application of new technologies should be reversed. • A home-grown, innovative services cluster should be promoted by catalysing growth through initiatives including: <ul style="list-style-type: none"> ○ Facilitating access to capital markets ○ Identifying and retaining Australian innovation leaders needed to seed a new cluster ○ Encouraging entrepreneurial risk-taking. • Publicly funded basic research programs should be reviewed, including CSIRO’s activities, for appropriateness and applicability (such as strengthening Australian Research Council linkage grants) including: <ul style="list-style-type: none"> ○ Exploring easier and more efficient intellectual property transfer between publicly-funded research and entrepreneurs. • The <i>Australian Jobs Act 2013</i> should be repealed and the operation of the Enhanced Project By-law Scheme streamlined. • The Government should ensure the taxation system encourages foreign investment and the ability of Australian companies to invest offshore. • The Victorian market assessment should be completed and proceed to a coal allocation. • Pre-competitive research and development programs should continue to demonstrate technologies to extract value from the brown coal. • Development of Victorian export capacity through access to transport corridors and port facilities should be facilitated.
<p>Workforce productivity</p>	<ul style="list-style-type: none"> • The Commonwealth should move promptly to develop workplace legislative reforms based on commitments to: <ul style="list-style-type: none"> ○ Ensure union right of entry provisions are in line with earlier rules

	<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Provide for genuine access to flexibility by ensuring IFAs cannot be restricted in an enterprise agreement and ensure that the notice period to terminate an IFA is extended to 13 weeks. ○ Create realistic timeframes for greenfield agreements ○ Re-establish the Australian Building and Construction Commission • The Government should commission a full review of the <i>Fair Work Act</i> by the Productivity Commission. • The Government should commit to industry-led training in principle and practice via an expansion of the National Workforce Development Fund, where the training funds are linked to real workplaces outcomes and puts in the hands of the employer rather than the training provider. • The Government should recognise the need for improved quality in the VET system, supporting outputs-based, market-driven regulatory solutions rather than heavy-handed regulatory approaches. • “Disciplines of national interest” (mining engineering, metallurgy and minerals geoscience) with associated small enrolments and high teaching cost should be viable under any higher education funding model. • Labour mobility should be recognised as a crucial element in allocating resources efficiently and: <ul style="list-style-type: none"> ○ Employers and employees enabled to make the choice to undertake mutually convenient geographic labour mobility arrangements in the form of Long Distance Commuting and skilled migration. ○ Recent legislative changes to the <i>Migration Act</i> putting restrictions on the use of 457 temporary visas reversed, particularly labour market testing – otherwise, ensures accompanying regulations are as “light touch” as possible.
<p>Driving energy productivity</p>	<ul style="list-style-type: none"> • The Energy White Paper should work in synch with the development of the Direct Action plan to ensure policy consistency. • In the area of energy productivity, policymakers should be aware that the Australian minerals industry, which has improved its energy intensity in many areas over recent years is facing new operational challenges such as declining ore grades and deeper deposits as it seeks to expand.⁴¹

⁴¹ For a more detailed discussion of energy productivity see S. Schnittger and B. Fisher, *A review of estimates of the potential gains under the Energy Efficiency Opportunity and National Energy Savings Initiative: A critique of the ClimateWorks methodology*, a report prepared for the Minerals Council of Australia, November 2013.

Alternative and emerging energy sources and technologies

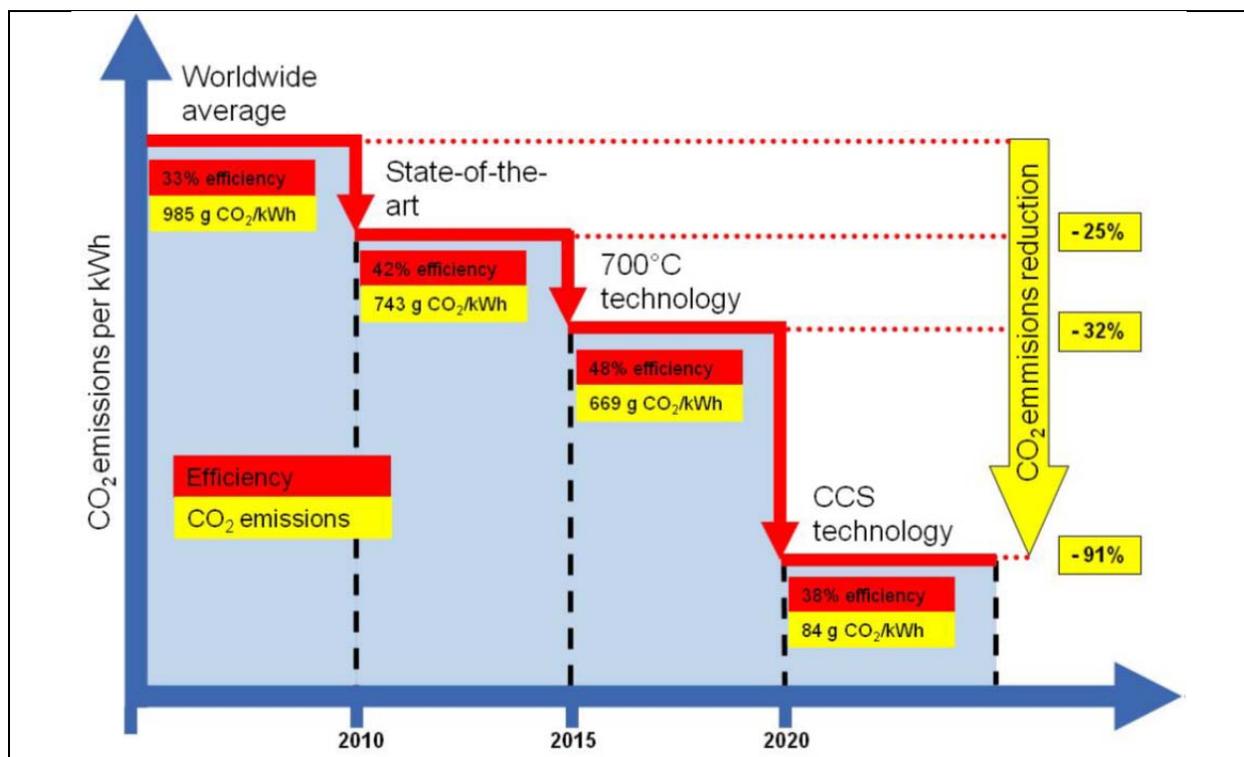
- The Energy White Paper should commit to the development of a National Carbon Capture and Storage (CCS) Strategy.
 - This would involve developing a technology-neutral, comprehensive technology road map which includes aligning the different initiatives and proposals regarding CCS in Australia with the international R&D and demonstration efforts. The roadmap would cover R&D, pilot and demonstration projects, commercial-scale projects and regulations.
- The EWP should recognise that the challenges in developing and demonstrating low emissions technologies, including CCS and renewables, are similar to those encountered by other “step-change” or revolutionary technologies and warrant tailored support to address identified market failures.
- The EWP should also recommend the commitment of long term funding for the ongoing mapping and development of national CO₂ storage infrastructure to meet Australia’s evolving long term requirements.
- A real national discussion on the suitability or otherwise of a nuclear power industry in Australia is required. The Commonwealth should still retain legislative oversight even if the prohibition on nuclear energy as enshrined in the *Australian Radiation Protection and Nuclear Safety Act* and EPBC Act are removed.

APPENDIX 1 – THE HIGH EFFICIENCY LOW EMISSIONS ROAD MAP

Step 1: Improving power plant thermal efficiency while providing meaningful reductions in CO₂ emissions

The average thermal efficiency of coal-fuelled power plants is 33 per cent, which is substantially below the state-of-the-art rate of 42 per cent (Chart 8). This efficiency varies across the major coal-using countries from under 30 per cent to 45 per cent. Such differences arise due to the age of the plant, coal quality and impurity profiles (e.g. ash, sulphur and moisture content and physical and chemical “rank” properties), operating conditions, maintenance practices and application of new and improved technologies.

Chart 8: Increased thermodynamic efficiency reduces the amount of CO₂ generated per unit of plant output.



Source: IEA Insights Series (2013), *21st Century coal: advanced technology and global energy solutions*, report for the Coal Industry Advisory Board, p 20; based on information from RWE AG.

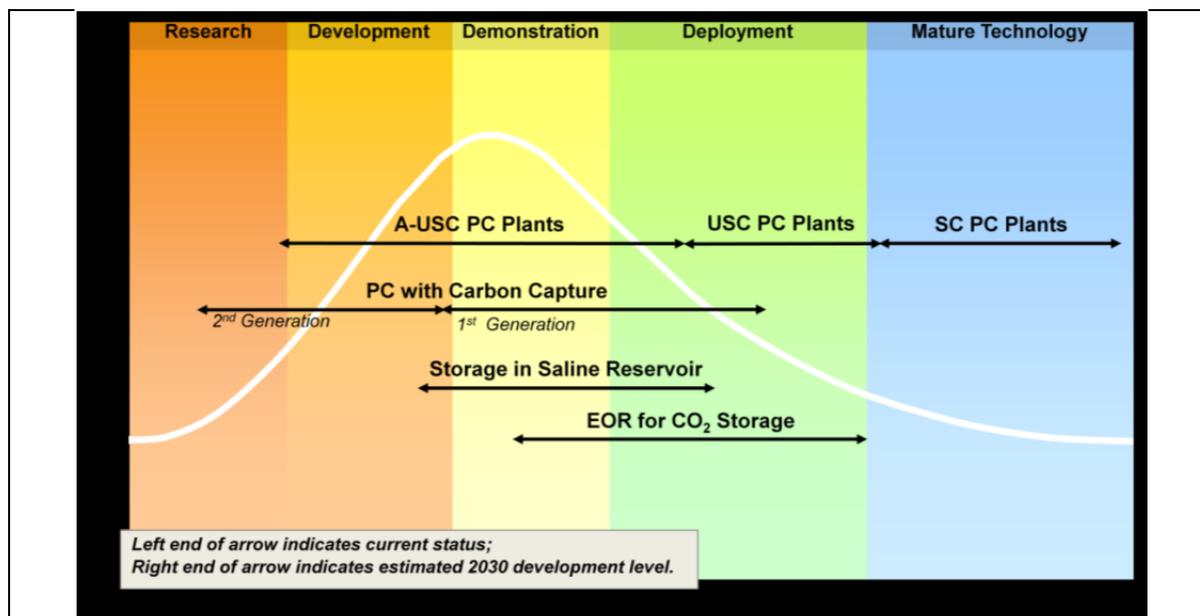
Note: The figure shows CO₂ reductions at coal-fuelled stream-electric power plants from higher efficiency / CCS technologies (hard coal, 26 GJ/kg HHV, North Sea cooling water).

As illustrated in Chart 8, improvements in thermal efficiency following implementation of technology advances reduce CO₂ emissions while improving generation efficiency. This means that substantial CO₂ savings can be made by renovating old plants or replacing them by more efficient ones. In fact, increasing the efficiency of coal-fired power plants by 1 per cent reduces CO₂ emissions by between 2 and 3 per cent.

The IEA estimates that advanced coal technologies, including supercritical (SC), ultrasupercritical (USC) and integrated gasification combined cycle (IGCC) plants, could deliver 7 per cent of the necessary CO₂ emissions cuts in the power sector through to 2050. This is just as much as the estimated contribution of solar photovoltaics (PV) and slightly less than the potential contribution of

wind turbines. CCS could deliver almost one third of the entire mitigation effort needed in the power sector.⁴²

Chart 9: The importance of early deployment of advanced coal technologies



Source: IEA Insights Series (2013), *21st Century coal: advanced technology and global energy solutions*, report for the Coal Industry Advisory Board, p 22; based on data from the Electric Power Research Institute.

List of acronyms: A-USC PC is advanced ultra-supercritical pulverised coal; USC PC is ultra-supercritical pulverised coal; SC PC is supercritical pulverised coal; EOR is enhanced oil recovery aimed at boosting oil recovery above an average of about 40 per cent by injecting CO₂.

As illustrated by Chart 9, some advanced coal power technologies are relatively mature, but many are still in the development phase. Technologies are particularly vulnerable during this period. For example, first-of-a-kind project cost estimates often increase over time as more information is assembled about the scale-up and application challenges. To maintain momentum during this critical phase, it is essential that there is a clear pathway to future cost reduction.

Step 2: Advancing CCS technologies to commercial scale

According to the IEA, current state-of-the-art technology operating under ultra-supercritical steam conditions can achieve net efficiencies of up to 46 per cent. If the 550 GW of new coal-fired generating capacity added between 2000 and 2011 had been ultra-supercritical, then cumulative greenhouse gas emissions over that period would have been reduced by nearly 2 Gt (8 per cent).⁴³

In the IEA's core "New Policies Scenario", the average efficiency of coal-fired generation worldwide improves from 36 per cent to 40 per cent between 2011 and 2035 as old plants, based on subcritical technology, are retired and increasingly replaced by supercritical and other higher efficiency technologies. More than half (55 per cent) of total emission savings in the IEA's core scenario come from efficiency improvements across all sectors in the global economy. In particular, efficiency gains in power plants, transmission and distribution, refineries and oil and gas extraction are responsible for around 7 per cent of emission savings in 2035. CCS remains nascent in this scenario.⁴⁴

⁴² World Coal Association, *Coal Matters 3: coal and electricity generation*, 2012, p 2.

⁴³ International Energy Agency, [Tracking Clean Energy Progress 2013: IEA input to the Clean Energy Ministerial](#), Paris, 17 April 2013, p. 50.

⁴⁴ International Energy Agency, *World Energy Outlook 2013*, pp. 36, 182, 260.

The role of CCS becomes more critical under other scenarios for greater emissions reductions such as the IEA's "450 Scenario", which assumes new policy actions consistent with a 50 per cent chance of limiting the long-term average increase in global temperature to 2°C. Here, CCS is projected to account for nearly 60 per cent of total coal-fired electricity generation in 2035. The IEA argues that a 2°C target "puts into sharp focus the need to increase the adoption of technologies such as CCS rapidly and at scale" and estimates that CCS could reduce the cost of decarbonising the power sector by \$1 trillion between now and 2035.⁴⁵

The challenge for CCS is not to prove the feasibility of its constituent technologies, but to deploy integrated large-scale projects at a cost that is commercially competitive. While the same commercial challenge faces all low emissions technologies, CCS does have the advantage of being applicable to any large source of CO₂ emissions. CCS can be applied to power generation (from coal, gas, diesel, fuel oil or biomass), production of industrial goods (such as iron and steel, cement and fertiliser), coal-to-liquids processes, oil refining and natural gas processing. CCS also has the advantage of being independent of the weather.

As illustrated in Chart 9 above, CCS, the only technology capable of achieving the necessary deep cuts, can reduce CO₂ emissions by 80 to 90 per cent. These technologies will also be required for other fossil fuel generation, including gas, and other industrial plant.

An important relationship between plant efficiency and the need for CCS needs to be emphasised. Compared to a subcritical plant with an efficiency of 35 per cent, an ultra-supercritical coal plant of the same size with an efficiency of 45 per cent requires about 25 per cent less CO₂ capture. Consequently, for the same net electrical output, higher-efficiency plants require CCS units with smaller capacity; hence, high efficiency plants have lower operating costs for CCS.

It follows that Step 1 involving deploying high-efficiency, low emissions technologies to increase plant efficiency is important to subsequently reduce the eventual cost of CO₂ abatement in Step 2.

⁴⁵ Ibid., pp. 37, 141, 182.

APPENDIX 2 – ENERGY MARKET REFORM

The minerals industry supports an open, competitive and integrated NEM, vibrant regional markets (Western Australia and the Northern Territory) and more mature and robust gas markets but is concerned that the timetable for full implementation of national energy market reforms has slipped. Poor regulatory approaches act as a disincentive to further investment, which in turn may result in a shortfall in necessary capacity. Retail price regulation raises the risk of inefficient cross-subsidies which ultimately distort expansion and upgrade decisions and impose a significant chill on investment.

Security and reliability are crucial for large baseload users such as aluminium smelters. From this perspective, consumers need an active contract market with:

- Vibrant and accessible wholesale markets in which the power price reflects the efficient long-run cost of the generation mix so all consumers get the benefit of amortised generation assets
- Risk sharing on fuel costs with active financial markets enabling consumers to hedge this risk if they wish
- A price for monopoly transmission and distribution services which reflects the efficient level of provision based on comparable productivity benchmarks
- A high level of grid security and reliability
- A carbon cost which reflects the actual carbon intensity of the relevant generation portfolio so that there is no windfall profit to owners of low carbon power when a carbon price increases overall power prices.

Transparency of prices is a key driver of competition, but has diminished over the past two decades at the retail level. Previously, state-owned enterprises provided more information which in turn was published by industry associations. The regulatory process, whereby providers seek price levels from regulators, is lop-sided as it is difficult for consumers to mobilise and provide the technical and market information needed to make an alternative case.

Large consumers should not carry the bill for market regulation. In a competitive global environment, capacity to pay is diminished, particularly where overseas competitors do not face the same price and carbon imposts on their energy supplies.

Demand side measures

Creating greater flexibility in electricity markets, such as scope for firms to vary their demand at peak times and thus remove pressure on the network as a whole, is an important consideration for the Energy White Paper.

Industry would urge caution though on the expectations of reductions from large energy users. While the potential for gains seem promising, in practice these expectations are not easily realised.

The Australian Energy Markets Operator (AEMO) has suggested that a 6 to 8 per cent reduction in demand is possible.

However the Energy Supply Association of Australia and the National Generators Forum have noted that international experience shows significant difference between potential and actual demand response.⁴⁶ In a submission to the AEMO they note demand reduction varies between markets, but generally represents a small fraction of peak demand, far lower than the 6 to 8 per cent suggested by AEMO.

⁴⁶ Sabine Schnittger and Stephen Beare, *Economic implications of the proposed Demand Response Mechanism: Report for the Energy Supply Association of Australia and the National Generators Forum*, SFS Economics, 2009.

In four of five US markets, for example, the share of peak demand reduction was between 0.5 per cent and 1.6 per cent in 2009. The exception was the New England wholesale market, where the share of reduction was 4.4 per cent.

While having unutilised capacity takes cost pressure off networks, from the perspective of the minerals sector users, there are only small savings likely even at the most generous discount rates.

Box (iii) Roadmap case study - China

China is making considerable effort to improve its coal-fired power plant efficiencies and lower the associated greenhouse gas emissions. Various studies have shown that, under current and planned policies, China's absolute CO₂ emissions will continue to rise although at a decreasing rate. With further introduction of advanced coal technologies, emissions could reach a plateau by about 2030. After that CCS will be required if emissions are subsequently to decline.⁴⁷

So, alongside its short to medium term strategic approach to establish ever cleaner coal technologies, China is also developing various CCS systems that can be deployed when the time is deemed appropriate. Thus according to Andrew Minchener, general manager of IEA's Clean Coal Centre:

*"From a technical perspective, China is well positioned to move forward from the industrial pilot-scale trials towards demonstrations of various CO₂ capture and utilisation/storage options, and discussions are underway with various multi-lateral donors."*⁴⁸

The future of CCS will depend on developing technologies that reduce its energy penalty and cost, particularly by testing and gaining operational experience on large-scale, demonstration projects.

Programs to demonstrate large-scale, integrated CCS on coal-fired power units are being developed in many countries, including China and North America. Some commercial scale demonstration of CCS is expected in North America in the coming year, and other places by the 2020s with broader deployment from 2030-35 onwards. Australia is well-placed to contribute to, and benefit from, this development.

⁴⁷ Andrew Minchener, "Clean coal – new global challenges and potential opportunities", *Energy World*, December, 2012, pp. 14 to 16, based on the 2012 Robens Coal Science Lecture, Institute of Physics, London.

⁴⁸ Ibid p 16.

APPENDIX 3 - NEW OPPORTUNITIES FOR BROWN COAL

Victoria has an estimated 430 billion tonnes of brown coal located predominately in the Gippsland Basin the second largest endowment of brown coal. Coal seams in the Latrobe Valley region have an estimated measured resource of 65 billion tonnes. Approximately 33 million tonnes is considered economically viable.

Following privatisation of the State Electricity Commission of Victoria in the late 1990s, a portion of the resource around existing coal mines was reserved for future extraction due to its strategic value to the State. This 13 billion tonnes of coal is yet to be allocated to prospective developers, however the Victorian Government is currently undertaking a market assessment to confirm interest in the resource.

Brown coal ranges from half to two-thirds water and, along with its high reactivity, export opportunities have been limited. Over the past decade, significant advances in drying, gasification, liquefaction and chemical conversion technologies have been made opening up the possibility for export of a range of materials⁴⁹ derived from brown coal, including:

- **Dried bulk coal** - to compete directly in black coal markets as an energy and feedstock resource
- **Solid fuels** - char, coke, pure carbon
- **Fischer Tropsch Liquids** - diesel, naphtha, waxes, fuel, gas, LPG
- **Methanol derivatives** - fuel cells, chemicals (MTBE, acetic acid), formaldehyde, diesel, transport fuel, propylene/polypropylene, acrylic acid/acrylates, ethylene/propylene, fuel, DME
- **Ammonia derivative** - fertilisers (urea)

The export potential can only be realised however if the products can be delivered to the market. Some of the products will be valuable for domestic consumption i.e. fertiliser, chemical feedstocks, liquid fuels; as well as in great demand globally.

To enable export, significant infrastructure development is required, both upgrading of onshore assets such as roads and rail, as well as establishment of a new deep water port. Industry has undertaken extensive research into transport and logistics needs to realise the export potential of Victoria's brown coal and it is now critical that the Commonwealth and state governments work with industry to ensure that policy, planning and regulatory regimes are aligned with timeframes for development of the coal.

⁴⁹ Source: <http://www.energyandresources.vic.gov.au/earth-resources/coal/fact-sheet-brown-coal-victoria>