Australian Government

Department of Industry and Science

Energy White Paper

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Disclaimer

This report should be attributed as '2015 Energy White Paper'.

Energy White Paper

April 2015

Minister's foreword

Australia is a growing energy superpower.

Our energy sector underpins our economy, secures our standard of living and drives our international competitiveness. It also underwrites our stature in the global economy.

Australia's competitive edge in the field is two-fold: firstly it comes from the abundance and diversity of our energy sources, but it is also based on our recognition of the need to maximise the returns on our natural advantages.

In the decades ahead, our actions to build on our energy strengths and fully grasp the opportunities of our energy-rich continent will be increasingly critical to a strong and productive economy. We must do this by boosting our energy productivity and capitalising on new technologies.

Australia's focus must be on productivity both in developing our resources and in the way we use energy. A National Energy Productivity Plan will provide opportunities to deliver substantial energy savings and support our goals in a global and transitioning energy market.

Reliable and competitively priced energy supports our business competitiveness, lowers the cost of living and grows exports.

Within the next five years, our yearly export earnings from energy resources are projected to reach $114 billion, delivering more jobs, higher incomes and a higher standard of living for all Australians.

Australia is endowed with vast energy resources. We have had decades of readily available and low-cost energy to meet domestic and export demand. However, the energy landscape is changing. Strong growth in global demand, rapid developments in technological innovation and greater integration into world markets continue to influence how we generate, use and export energy. Production costs are also rising, against a backdrop of increasing supply competition and commodity price volatility.

This complex environment presents Australia with unprecedented opportunities and challenges. With the right policy settings, we can negotiate a path towards maintaining our energy sector's competitive advantage, lowering business and household costs, and getting the most out of the sector's vital contribution to Australia's economic growth and long–term energy security.

The Government has abolished the carbon and mining taxes, relieving businesses and households of the associated costs. We have also commenced priority energy market reforms for more competition and consumer choice, and improved business conditions.

This Energy White Paper brings together these and new actions to provide a consistent and integrated national energy policy.

Our guiding principle is that markets should be left to operate freely, without unnecessary government intervention. Competition, productivity and investment will deliver reliable and cost competitive energy to households and business.

Through the Council of Australian Governments Energy Council, the Australian Government will continue to lead work with the states and territories on a consistent national energy market that promotes consumer choice and encourages investment in energy resources development.

As well as prioritising reforms now, this White Paper will guide future decisions in what is now a very dynamic sector.

Strengthening the policy settings for Australia's energy sector is necessary in a changing energy marketplace and I am confident the framework provided in this White Paper will help Australia reaffirm its position as an energy superpower.

HON IAN MACFARLANE MP
MINISTER FOR INDUSTRY AND SCIENCE

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Introduction

"The Government through its Economic Action Strategy is refocusing government, revitalising Australia's businesses and entrepreneurial drive, and equipping our economy for the challenges ahead, to prevent Australia's economy from drifting."

Industry Innovation and Competitiveness Agenda, 14 October 2014

Introduction

The Australian Government committed to prepare a new Energy White Paper on coming to government to provide an integrated Australian energy policy framework. Australia's energy policy will be consistent with the Government's vision for economic reform and future competitiveness of Australian businesses in international markets through:

- a lower cost, business friendly environment with less regulation, lower taxes and more competition
- a more skilled labour force
- better economic infrastructure
- policy that fosters innovation and entrepreneurship.

Vision for the energy sector

Competitively priced and reliable energy supply to households, business and international markets through:

- **competition** that will improve consumer choice and put downward pressure on prices
- the more **productive use of energy** to lower costs, improve energy use and stimulate economic growth
- **investment** to encourage innovation and energy resources development to grow jobs and exports.

Australia has a wealth of energy resources, which is the basis of Australia's growing stature as a global energy superpower. Australian energy products and services must be delivered to households, business and international markets reliably and cost effectively so Australia can take full advantage of these natural endowments.

Energy resources exports have provided major benefits to the Australian community and the economy, particularly since the early 2000s. Within the next five years, Australia's yearly export earnings from energy resources commodities are projected to reach $114 billion (Department of Industry and Science 2015a). This will deliver more jobs, higher incomes and a higher standard of living for all Australians.

International markets for energy resources and energy and mining services are highly competitive. Foreign investment is an important source of capital in energy markets and Australia has been, and will continue to be, a beneficiary. Australia must be a productive, cost competitive and reliable energy supplier if we are to secure private sector investment in energy resources developments to increase exports. Investment is needed in exploration, infrastructure, innovation and skills to maintain a robust energy sector and sustain our energy security.

The Australian Government has taken action to improve business conditions and will continue to look for reform opportunities to create an enabling environment for business, including better streamlining of regulation. Unnecessary and burdensome regulation, high labour costs and business uncertainty through unpredictable policy or inappropriate taxes create risk and contribute to Australia losing investment to other resource-rich countries. In many cases, reform will require a collaborative effort with state and territory governments.

The Australian Government is also supporting the development of the energy resources sector through the $188.5 million Industry Growth Centres Initiative, and the $476 million Industry Skills Fund.

While Australian electricity prices have risen sharply in recent years, they are now moderating in most jurisdictions. The Australian Energy Market Commission (AEMC) expects residential electricity prices to fall in 2014–15 in most jurisdictions following the removal of the carbon tax. Over 2015–16 and 2016–17, prices are expected to show modest declines or be stable across most states and territories because of subdued wholesale energy costs and lower network prices (AEMC 2014).

Despite cost reductions from the removal of the carbon tax, gas prices are rising as they move toward parity with an international price. This is due to Australia's increasing links to international gas markets and rising domestic production costs.

These price movements bring into sharp focus the role of energy markets in delivering economic growth from our natural resources. Given the dynamism of international energy markets and the Australian economy, the best way to ensure energy supply at the lowest possible cost is to build more competitive energy markets. Market structures must remove the regulations and distortions that discourage competition between suppliers, make it easier for buyers and sellers to participate, and give them access to better market information.

The Australian Government is committed to energy market reform to drive competition and innovation. Unnecessary government intervention that pushes up energy costs and hinders the markets in driving costs down will be avoided.

A key to better market outcomes is to limit the role of government in markets. For over a decade, the Australian Government has championed reforms that enhance the independent institutional governance of Australian energy markets. While this work is continuing, there is significant unfinished business. The ownership of energy assets by some state and territory governments is in conflict with this market reform agenda, particularly where asset owners have a regulatory role and are less efficient. The evidence is that privately owned energy assets are more productive (AER 2014a). The Australian Government is committed to encouraging the states and territories to free up capital to invest in additional economic infrastructure through privatising state and territory-owned assets under the Asset Recycling Initiative.

Consumers are increasingly taking greater control of their energy costs, particularly electricity costs. However, more flexible tariffs and giving consumers better access to information on energy use would further support consumers in managing their energy costs. Minimising cross-subsidies between consumers and providing effective price signals will also support the productive use of energy. The Australian Government supports action to reform network tariffs, deregulate retail electricity pricing and deploy more advanced meters that will provide consumers with access to new tariffs and demand-side services. Deregulation enables innovative new business opportunities such as competitive metering and demand management services.

The energy market reforms outlined in this White Paper to increase consumer choice will contribute to increasing Australia's energy productivity. Investment in new technologies also helps to improve energy productivity. Improved energy productivity can reduce household and business energy costs and encourage economic growth.

Australia has committed to a Direct Action Plan on climate policy. Its centrepiece is the Emissions Reduction Fund (ERF) to help reduce Australia's greenhouse gas emissions by 5 per cent on 2000 emissions by 2020. An ongoing commitment to a Renewable Energy Target (RET) that delivers 20 per cent of Australia's energy needs by 2020 will be part of meeting this target. The ERF will also encourage investment in more efficient generation, new technologies and energy productivity that will contribute to meeting longer-term climate change emissions targets.

Energy technologies and markets can change quickly. The rapid uptake of rooftop solar systems is a good example. While policy should create stable market conditions, it should also encourage innovation and ensure there are no unnecessary regulatory barriers to the cost competitive entry and exit of energy technologies. New technologies typically have the advantage of emitting lower levels of greenhouse gases than older technologies. Turnover in energy generation plant, and appliances and equipment can help reduce emissions, but should occur on a commercial basis and follow a least cost pathway to consumers.

The Australian Government's goal is to foster robust and efficient energy markets that benefit consumers and encourage investment by being responsive to inevitable changes in energy demand and supply, and the energy market environment generally.

The Australian Government continues to monitor and identify emerging risks to energy supplies, including relevant non-market security issues, through the periodic National Energy Security Assessment (NESA). The next NESA is due in mid–2015. The NESA takes a forward-looking view of emerging risks confronting Australia's energy supply, including changes in macroeconomic conditions such as global oil price volatility. It also considers physical disruptions to the energy supply chain, such as natural disasters and geopolitical uncertainty in key oil producing regions.

Better coordination and periodic public reporting on the combined effect of the NESA and the Australian Energy Technology Assessment, Australian Energy Resource Assessment, Australian Liquid Fuels Technology Assessment and infrastructure reviews will give a regular and improved outlook for energy supply. This will help energy markets better respond to emerging issues and keep operating efficiently.

The principles set out in this White Paper guide a coherent and integrated policy framework and rationale for actions that addresses current challenges. The principles and policy framework are robust, resilient and long-lasting. They will guide future decision-making, providing consistency, stability and predictability in addressing any future challenges.

The Australian Government's priorities

INCREASING COMPETITION TO KEEP PRICES DOWN

The Australian Government's priorities in energy market reform are the:

- implementation of priority energy market reforms agreed by the Council of Australian Governments Energy Council
- rollout of cost-reflective tariffs to reduce cross-subsidies between consumers and drive better uptake of enabling technologies (particularly advanced metering) that allow consumers to respond to price signals
- further development of market frameworks to encourage innovative products and services that give consumers more choice in managing bills and support greater competition
- privatisation of state-owned electricity assets to increase productivity and competition
- further development of the national wholesale gas market to increase the liquidity and transparency of gas trading, and increase pipeline access
- better regulation and facilitation of the responsible development of unconventional gas resources
- assessment of whether there is adequate competition in the wholesale gas market
- provision of reliable and competitively priced liquid fuel supply.

INCREASING ENERGY PRODUCTIVITY TO PROMOTE GROWTH

To increase national energy productivity, the Australian Government will:

- develop a National Energy Productivity Plan that provides national action in cooperation with the states and territories and industry, covering the built environment, equipment and appliances, and vehicles
- improve national energy productivity by up to 40 per cent by 2030.

INVESTING IN AUSTRALIA'S ENERGY FUTURE

To secure investment in the energy sector, the Australian Government will:

- further improve workforce productivity and reform the vocational education and training system so that it is focused on delivering the skills that employers need from their employees
- streamline the approval and regulation of energy resources projects
- better coordinate and improve accessibility of geoscience and environmental data and use information for industry-led community engagement on resource project approvals
- enhance support for supply chains, value adding and export growth through Growth Centres and Austrade
- attract and facilitate foreign direct investment into Australia's resources and energy sector
- ensure a technology-neutral policy and regulatory framework to support new energy sources and enable change, innovation and transformative technologies
- maintain a better energy outlook and regular reporting to the Australian community
- prioritise research to support technology development, in line with Australia's competitive advantages and energy challenges.

CHAPTER 1

Increasing competition *to keep prices down*

On 30 June 2004, the Council of Australian Governments (COAG) entered into the Australian Energy Market Agreement to give effect to the National Electricity Law and National Gas Law with the objective of promoting:

- ***"efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity"***
  National Electricity Law
- ***"efficient investment in, and efficient operation and use of natural gas services for the long term interest of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas"***
  National Gas Law

Australian Energy Market Agreement, 30 June 2004

Increasing competition to keep prices down

The Australian Government is prioritising energy market reforms for more competition and consumer choice

Effective competition is the best way to deliver the energy products and services that consumers want at the lowest possible cost. Efficient markets give consumers choice in how they source and use their energy, whether they are households, small business or major industrial users, and enable suppliers to respond to those choices. The Australian Government places a high priority on energy market reforms that increase competition among energy suppliers and between energy suppliers and consumers.

Consumers should have easy access to information to encourage the productive use of energy. Better information helps consumers engage with energy providers more effectively and enables them to make informed choices about their energy use. Technological change and innovative pricing are already providing consumers with greater choice in energy products and services.

Investors and consumers need consistent and stable energy market policy and regulatory settings to give them confidence in their market decisions. The electricity market reforms that are underway need to be completed. An important area for reform is the further development of a liquid wholesale gas market that provides market signals for investment in additional supply through price transparency. The ability of Australia's liquid fuel markets to provide reliable supply needs to be monitored. The bodies that govern energy markets also need to be reviewed to ensure they are functioning effectively in a changing policy environment.

Privatisation and greater competition drive innovation and productivity

Unnecessary regulatory barriers and subsidies distort energy markets, shielding competition and diluting price signals[1]. Further privatisation and greater competition are needed to drive innovation and productivity. A more transparent and flexible national energy market, particularly for gas, will help relieve consumer uncertainty about supply availability and pricing and improve price competition.

While strong and effective markets are the cornerstone of the national energy policy framework, some parts of the energy supply system, such as networks, are natural monopolies. These elements must be regulated in a way that is consistent with the competitive market framework within which they operate. Network revenue determinations by regulators are an example. Regulation should generally encourage competition and consumer choice, not stifle it. Where regulation is needed, it should not be burdensome to the point where the costs outweigh the benefits.

Policy interventions in the market framework should not be used to force market outcomes beyond the reliable and competitively priced supply of energy. They should allow markets to operate efficiently for competitive outcomes, while providing consumer protection. Interventions, such as the RET and solar feed-in-tariffs, can distort market signals and cause unintended disruptions to competitive energy markets.

Some of the required changes to regulation can be made directly by the Australian Government, but in most instances will rely on cooperative action by all state and territory jurisdictions. While there is diversity in decision-making across jurisdictions,

the goal should always be harmonised national regulation within the objectives of the national electricity and gas market legislation. This will benefit both energy suppliers and consumers who operate across jurisdictional borders.

Working on energy market reforms with the states and territories through the Council of Australian Governments (COAG) Energy Council (**Attachment 1**) is key to increased competition. A consistent national energy market will remove the costs consumers pay to support different jurisdictional regulatory environments, improve reliability and introduce more competition to lower costs.

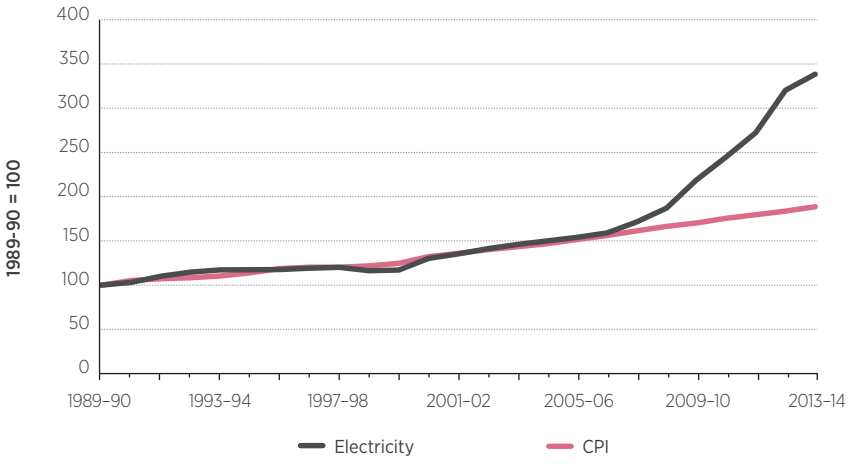
A consistent national energy market will lower regulatory costs, improving reliability and introducing more competition

Electricity

Price trends

Electricity prices have increased sharply in recent years, with household electricity prices rising by around 50 per cent nationally during 2010–2013 (ABS 2014). This price rise mainly reflects investment in poles and wires to ensure reliable supply to customers, especially during periods of peak demand. The carbon tax and other environmental policies, such as feed-in-tariffs, also inflated prices.

Figure 1: National retail electricity price index, 1989–90 to 2013–14



Source: ABS 2014

Network costs are the single largest component of the cost of supplying electricity. The significant investments by networks to replace ageing network infrastructure and meet peak demand (for example, as the number of air conditioning units increased) added to the total network cost. However, total demand has been falling since around 2009 due to factors such as structural changes in the economy, improved building efficiency and operations, and wide use of more efficient appliances.

Changes to the permitted rates of return for network investments, removal of the carbon tax, and lower wholesale prices are stabilising retail prices

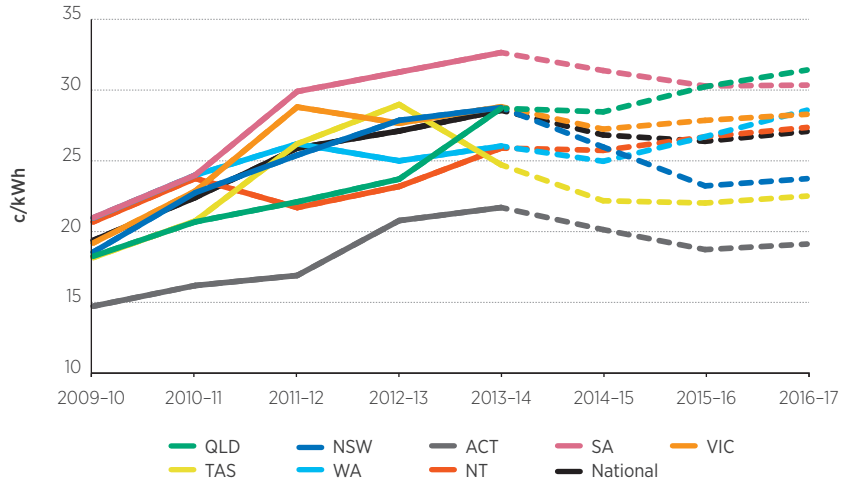
Encouraging privatisation of state and territory electricity assets as part of the $5 billion Asset Recycling Initiative

Further privatisation of energy assets and increased competition will supply energy to households and business as cost effectively as possible

This means there is greater network cost to recover from a smaller quantity of electricity. This has resulted in significant increases in the cost per unit of electricity sold.

The repeal of the carbon tax in 2014 removed a cost impost on consumers. The recent slowdown in network investment, changes to the rules determining permitted rates of return for those investments, and lower wholesale prices are expected to result in modest declines or stable retail prices across most jurisdictions over coming years (AEMC 2014).

Figure 2: Trends in retail electricity prices by jurisdiction, 2008–09 to 2013–14 and forecasts to 2016–17



Source: AEMC 2010, 2011, 2013a, 2013b, 2014

Note: Prices are expressed as nominal cents per kilowatt hour (c/kWh) values and are exclusive of GST.

The significant set of changes made in 2012 to the rules and tools available to the Australian Energy Regulator (AER) for setting network prices is now starting to deliver results (COAG Energy Council 2014a). The most recent draft (revenue) determinations by the AER propose to reduce retail prices markedly (AER 2014b). The determinations and associated new 'benchmarking' reports have highlighted significant opportunities for continuing improvements by network businesses. Progress among the states and territories in moving toward effective levels of competition and deregulation of electricity retail pricing is also contributing to improved price competition.

Further privatisation of energy assets and increasing competition will enable energy to be supplied to households and businesses as cost effectively as possible. Allowing new supply and technologies to enter energy markets on a commercial basis will also increase competition. The Australian Government is committed to encouraging states and territories to free up capital to invest in additional economic infrastructure through privatising state and territory-owned energy assets under the Asset Recycling Initiative[2] (The Commonwealth of Australia 2014b).

Cross-subsidies and cost-reflective tariffs

Many stakeholders believe the greatest priority for electricity market reform should be to reduce consumer cross-subsidies as part of the effort to give them greater power to manage their energy use. Cost-reflective tariffs, or the cost of supply at time of use, apply price signals to move use away from the more expensive peak use times. These tariffs minimise cross-subsidies between consumers arising from different use patterns, particularly those that place more demand on network capacity at peak times.

Cost-reflective tariffs improve price signals to reduce expensive peak demand and reduce network costs

Support for cost-reflective tariffs is often dependent on the parallel rollout of consumer education, better metering and policies that target customers experiencing hardship, like community service obligations. Other stakeholders oppose the removal of the current two-part tariff structures (fixed connection charge and variable consumption charge). They believe cost-reflective tariffs will unfairly affect some users who are unable to change their energy use pattern in response to price signals. However, the evidence suggests that most consumers will gain from these tariffs.

The Australian Government is committed to cost-reflective tariffs. Consumers should be charged according to the actual costs of their energy use, including the costs of delivering energy at the time they use it and the full value of a permanent connection to a reliable energy supply. The most variable elements of cost relate to the wholesale price of electricity at the time of use, and building the maximum (peak) capacity needed in the electricity network. Using electricity at peak times places the greatest pressure on network capacity. Charging for the actual costs of electricity used, at the time of use, will send price signals to consumers that encourage a shift from using electricity at peak times when it costs the most to deliver. Peak use has been constant over time, despite the overall reductions in demand, and this is in large part due to the rapid uptake of air conditioners.

To maintain reliability in supply, networks must have the capacity to cope with this peak pressure. The scale of peak demand therefore influences network costs, which is around half of the total electricity bill (AEMC 2014). Price signals that reduce peak demand reduce the need to increase network capacity, ultimately placing downward pressure on consumer prices.

Case study: An example of cross-subsidies in air conditioning based on a representative consumer in one Victorian network area

NERA Consulting has demonstrated in a case study of air conditioners that large air conditioner consumers are subsidised by non air conditioner consumers. The real cost of air conditioner use in peak times is $1,000 a year due to higher network investment.

Higher network investment is needed to ensure the network can continue to reliably meet the higher electricity demand during peak times. The networks recover the cost of the higher investment over their network regulatory period (typically around five years) by increasing the annual network prices for all consumers, not just the air conditioner consumer.

In the NERA example, the air conditioner consumer's bill will increase by $300 a year, due to the extra air conditioner electricity usage and the higher annual network prices. However, the remaining $700 a year is recovered by the networks by spreading this extra cost over all other consumers in the form of higher annual network prices.

Source: NERA 2014

Cost-reflective tariffs minimise cross-subsidies between consumers

In recent years, there has been unprecedented growth of distributed generation on the network, with consumers generating their own electricity, mostly in the form of rooftop solar photovoltaic (PV) panels. Initially this was supported through highly subsidised feed-in-tariffs in different jurisdictions and enhanced small-scale technology certificates under the RET, which were aimed at supporting the uptake of renewable energy. However, rapid reductions in PV prices, combined with higher electricity prices, have led to ongoing popularity and the growth in consumers generating their own electricity (Department of the Prime Minister and Cabinet 2014). Support has moved away from 'premium' tariffs to 'fair and reasonable' feed-in-tariffs and small-scale technology certificates. If energy storage (battery) costs continue to reduce, some consumers with their own generation may choose to disconnect from the network to avoid network fees altogether.

Consumers without distributed generation currently subsidise those with distributed generation. Distributed generators use less total electricity from the network and pay less, while still using the infrastructure for reliable supply, especially in locations where their output is low in periods when peak demand is high. For example, a recent analysis commissioned by the AEMC found the average South Australian household with north-facing PV installed under existing flat network tariffs is being subsidised by consumers without solar PV by around $117 a year (NERA 2014).

Case study: Solar PV cross-subsidies

NERA analysis indicates that the reduction in electricity demand from solar PV owners will result in lower required network investment. However, while the solar PV owner's electricity bill will decrease by $202 a year because of lower electricity use, the reduction in overall network costs from the lower required investment is only a saving of $85 a year. Therefore, the networks recover the difference of $117 a year by increasing network prices for all other consumers. This subsidy is on top of feed-in-tariffs and small-scale technology certificates that distributed generation owners may receive. Over time prices may increase if aggregated demand continues to drop (in part due to ongoing take-up of distributed generation) and peak demand remains resilient, requiring networks to develop further capacity.

Source: NERA 2014

Improved information gives consumers greater ability to manage and control their energy costs

Price signals and advanced metering

Price signals need to be complemented by the consumer's ability to understand and respond to those signals. A more cost-reflective tariff arrangement is one where prices are based on the cost to supply electricity at the time it is used, which requires advanced household electricity meters (smart meters or, at a minimum, interval meters that track usage over time). Effective and timely consumer access to their own data from these meters (either directly or through an authorised agent) is critical to enable a more sophisticated response to cost-reflective tariffs and help consumers select the best services for their needs. Access to a consumer's consumption profile must be readily available (for example, online) and accessible, if authorised by the consumer, to service providers and third parties to support consumer decision-making.

Some stakeholders support a mandated rollout of advanced meters. Advanced meters allow consumers to gain the full benefits of demand-side measures, such as cost-reflective tariffs and energy efficiency technologies, to manage their energy use. Other stakeholders assert that metering should be at a customer's choice because some

customers will be unable to change their use patterns in response to information on their energy use from a meter and associated price signals from cost-reflective pricing. The Australian Government supports competitive and voluntary metering services, where the benefits exceed the costs, because they will drive the efficient rollout of advanced meters, based on the value they provide to consumers and market participants.

Case study: Smart meters

Smart meters offer more functions than are possible with traditional meters. A smart meter measures electricity use continuously and records consumption every half hour while a traditional meter only measures total energy consumption. A smart meter provides secure communication capabilities, can work with different household technologies such as online portals and in-home displays, and is required to support technologies that report information on particular appliances. Smart meters support the development of innovative products and services, such as load management, which can help consumers manage their bills. This is different to a traditional meter, which only measures the total consumption between any two points in time. Smart meters come in different types and models, feature digital displays in place of a dial, and are similar in size to a traditional meter.

	SMART METER	TRADITIONAL METER
DATA STORAGE	Stores electricity consumed every half an hour	No data storage
METER READING	Data is automatically transmitted to the metering company	A meter reader physically comes to your home or business to record the information and send it to the metering company
TRACKING ELECTRICITY USE	Digital data of energy consumption and time of use can be provided in near-real time	Electricity use can only be tracked by either waiting for your quarterly bill or reading your household meter
OUTAGE DETECTION	Automated outage detection allows distribution companies to restore power quicker than traditional meters	No outage detection, meaning distribution companies cannot react as quickly
CONNECTIONS & DISCONNECTIONS	Connections and disconnections are faster as they're managed remotely	Connections and disconnections must be done manually, slowing down the process when you move house or change energy retailers

Source: Origin Energy 2014

The Australian Government supports a market-driven approach to demand response arrangements for large energy users that gives them options to effectively respond to cost-reflective price signals and manage their costs. The Government also supports greater competition and choice in how energy users can respond to high wholesale price signals.

The Australian Government supports demand response arrangements to help large energy users manage their costs

Under a demand response mechanism, consumers participating in the wholesale market would be able to make the decision to continue consumption or reduce their consumption by a certain amount in response to high spot prices. They would be paid according to the amount of 'demand response' delivered to the market, which is

calculated as the difference between their estimated 'baseline consumption' and their actual metered consumption for the demand response interval. While it would mainly assist large electricity users initially, in the future it could be adapted to demand responses from residential consumers who have the appropriate metering technology in place.

Customers can make significant savings to their annual energy costs, by finding the market offers that best suit their needs

Product choice

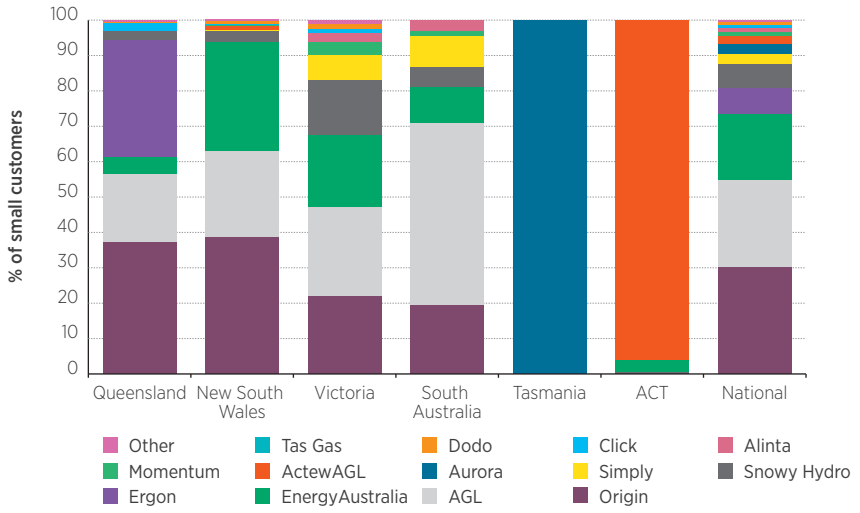
In jurisdictions where 'market offer' retail electricity contracts are available, customers can make significant savings to their annual energy costs, 5–16 per cent according to AEMC estimates, by shopping around for the energy retailer and product that best suit their needs (AEMC 2013). Shopping around for a market retail contract or 'switching' between offers can be a sign of healthy market competition. Victoria continues to have a high overall proportion of customers switching between energy products. In 2013–14, Victoria recorded the highest ever rate of switching in both electricity (31 per cent of customers) and gas (28 per cent) (AER 2014b). The AER has identified that this is due to the availability of more choice of energy retailers, a more diverse range of contract offers and generally lower switching costs.

Case study: Switching in the Victorian market

Victoria is the preferred market for retailers to develop new products and services due to high levels of customer engagement and the additional options for innovation brought about by the availability of smart meters. Conservative estimates show that customers on an average 'standing offer' regulated electricity plan in Victoria could have saved at least $220 a year if they had changed to an average ' market offer' plan available in June 2014. Additional savings could be made if a customer switched to the best advertised offer or negotiated a lower price than advertised. Once Victoria applies the National Energy Customer Framework and harmonises completely with national energy consumer protection laws, competition in the Victorian market will improve further, noting the benefits resulting from streamlined regulation.

Source: AER 2014c

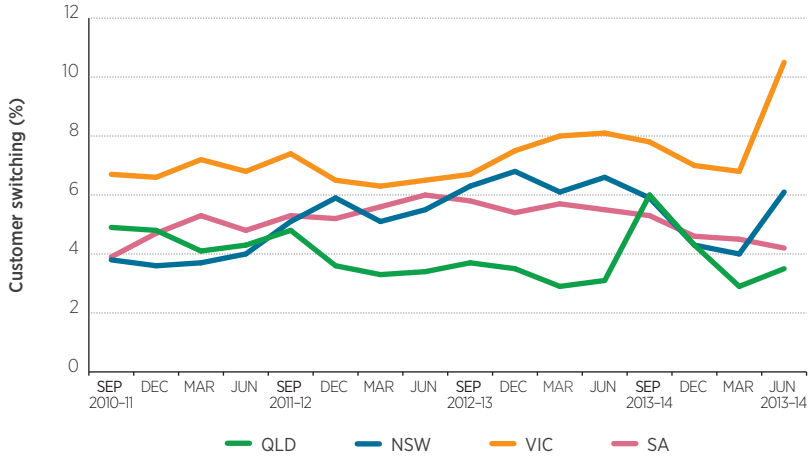
Figure 3: National Electricity Market retail competition



Source: AER 2014b

Switching activity in New South Wales and South Australia has also been steadily rising, with rates in 2012–13 the highest recorded in each state for both electricity and gas. Other states are in the process of making the transition to increased competition. Queensland's switching rates have been lower than the states with retail price deregulation. Queensland is taking steps to improve retail market competition and plans to deregulate retail electricity prices for South East Queensland customers on 1 July 2015, as well as introducing a supporting consumer education campaign to help small customers become more confident and active market participants (McArdle, M 2014).

Figure 4: Electricity customer switching rates by jurisdiction



Source: AER 2014c

Not all consumers will want, or be able, to take advantage of a more contestable market. However, the National Energy Retail Law and Rules (which apply in New South Wales, South Australia, Tasmania, Australian Capital Territory and, from 1 July 2015, Queensland) provide for the basic or standard market retail contracts to deliver maximum choice and necessary basic protections to all energy consumers. The National Energy Customer Framework (NECF) provides important protections to consumers in hardship, including rules on customer repayment plans and connection and disconnection requirements (COAG Energy Council 2014b). Considering that tariff reform will impact on different customer groups in different ways, industry and consumer advocates are already exploring how community service obligations should respond to changed tariff design (ACOSS 2014).

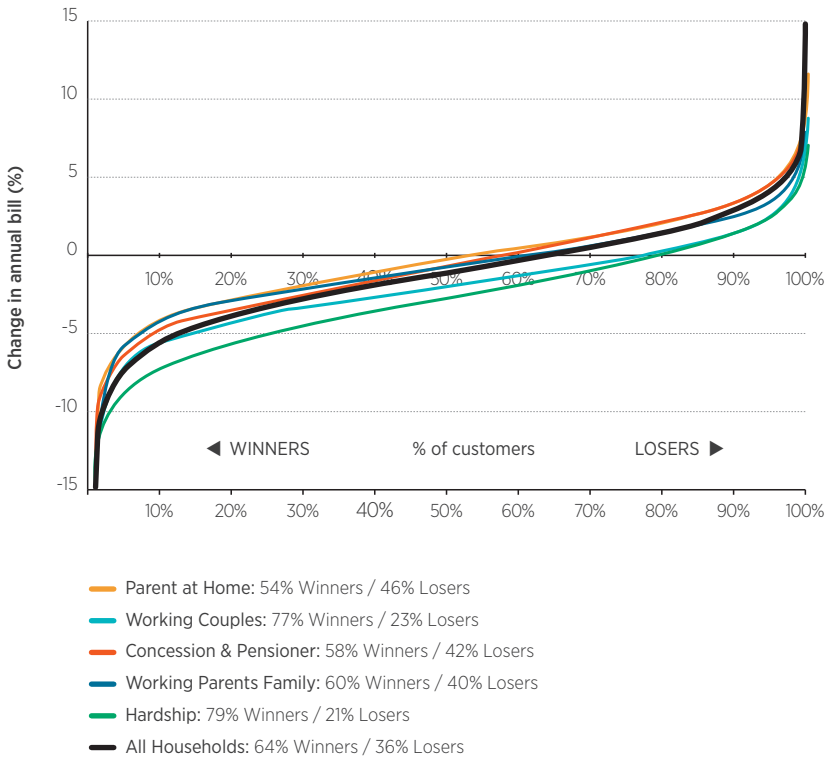
Not all consumers will want, or be able, to take advantage of a more contestable market

Case study: Impacts of cost-reflective pricing

Research from NERA Consulting, HoustonKemp and AGL Energy shows that more than 60 per cent of electricity customers would pay lower charges in the longer run with cost-reflective pricing. Two groups of electricity customers in particular are expected to benefit from cost-reflective prices. They are vulnerable customers (as their energy use is typically spread more outside peak times) and business customers that can reduce their electricity use during peak times.

AGL research found that about 80 per cent of consumers in a hardship program would pay lower charges in the long run under cost-reflective pricing.

Source: NERA 2014, HoustonKemp 2014, Simshauser P & Downer, D 2014



Source: Simshauser P & Downer, D 2014

Consumers should be empowered to make better choices to manage their energy costs

Consumers should be empowered to make better choices to manage their energy costs and use. The Australian Government will work with state and territory governments and industry to achieve this goal, including through improving decision-making tools and information. The establishment of Energy Consumers Australia to increase consumer advocacy on national energy market matters of interest to residential and small business consumers is an important step in empowering consumers (COAG Energy Council 2014c).

Gas

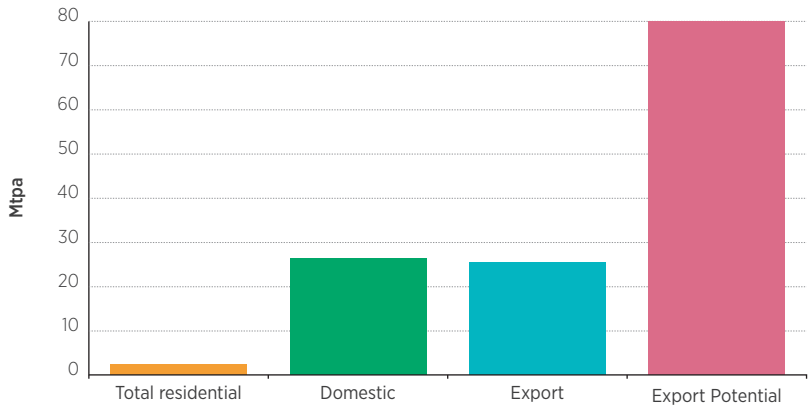
Price trends

Australia's gas markets are changing rapidly. The eastern Australian market, until now a domestic market, has commenced exports of liquefied natural gas (LNG). Supply now needs to meet domestic and international demand and domestic prices are naturally moving toward parity with higher international prices. This export industry, underpinned by foreign investment, provides an enormous opportunity for the nation's economy[3].

The LNG export industry provides an enormous opportunity for the national economy

The new LNG export industry in Queensland has brought over $63 billion in direct investment in LNG projects, generated 30,000 construction jobs and is projected to keep at least 12,000 ongoing jobs from 2020, including direct employment and through contractors (BREE & Department of Industry 2014 and Energy Skills Queensland 2013).

Figure 5: Gas use and export 2012–13 and export potential in 2018



Source: BREE 2014c

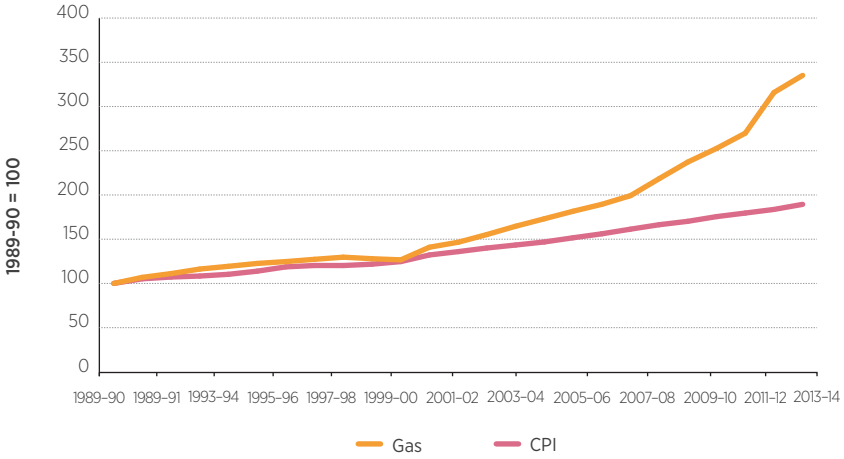
Gas supply

The eastern Australian gas market is increasingly reliant on coal seam gas and shale gas as existing conventional resources become depleted (BREE & Department of Industry 2014). Some states have unnecessary regulatory and planning barriers and moratoriums that prevent much-needed supply. These barriers are increasing the risk of potential near-term supply tightness on the east coast and increasing prices[4].

Rising wholesale gas prices and uncertainty around the rate of change in the market are directly affecting contracting activity of the industrial and manufacturing sectors. Uncertainty around the supply response, together with a lack of market mechanisms to assist price discovery and risk management, is exacerbating these problems[5]. This also affects the supply to retailers, who pass these costs onto smaller customers. Over the past 10 years, the retail price of gas for households has increased by 8 per cent a year. This is significantly faster than the rate of inflation (BREE 2014a). Increasing supply and improving market function are key to easing these price pressures, but continued movement towards parity with higher international prices are nonetheless inevitable.

Increasing supply is the best way to ease price pressure but continued higher parity prices are nonetheless inevitable

Figure 6: Retail household gas price index, 1989–90 to 2013–14



Source: ABS 2014

Unnecessary regulatory impediments that hinder the development of resources should be removed. The availability of market information should be improved to encourage appropriate and timely supply responses. The development of and investment in new and additional gas supply sources should be determined by market signals.

Governments and industry need to work together on innovative strategies to improve transparency and competition and, therefore, gas market function. These settings will encourage technical innovation and investment, including by international companies.

Ongoing reforms in the gas market aim to improve the transparency of market information. A competitive retail market will provide small customers with greater choice. However, switching levels will remain lower in gas than electricity in all jurisdictions, reflecting the lower number of retail suppliers in the gas market. Large users will have access to enhanced options for self-supply and shipment.

Gas market reform

The Australian Government is committed to a future liquid wholesale gas market

The gas market has traditionally relied on long-term contracts between suppliers and customers. Early trading markets have emerged, trading largely in any short-term excess supply. The rapid transition in the domestic market emphasises the importance of a range of current and proposed reform activities.

Case study: Wallumbilla Hub

In March 2014, the COAG Energy Council, through the Australian Energy Market Operator, established the Wallumbilla gas supply hub to increase transparency and competition in Australia's eastern gas markets.

The hub is a voluntary market that supports the efficient trade and movement of gas so that market participants can better manage the financial risk associated with exposure to variable gas prices. The hub is an online portal with centralised trading, settlement, and clearing facilities to enable large gas users, generators, retailers and producers to manage their daily and future gas requirements.

The hub will foster the entry of more participants in the market, increase competition, and set a transparent price signal for market participants.

In December 2014, the COAG Energy Council announced its Australian Gas Market Vision to support change, facilitate innovation and increase choice for participants in a national gas market (COAG Energy Council 2014d). The Energy Council seeks a future liquid wholesale gas market that provides market signals for investment in additional supply through price transparency. Future gas markets should have clear and transparent prices and enable market participants to trade gas more readily between different locations. A market with a transparently traded gas price, which is suitably liquid and robust, will allow participants to manage their variable demand and risk[6].

The Australian Government supports the establishment of conditions for access to transmission pipelines that facilitate a more liquid trading market

Producers, consumers and trading markets need to be connected to the appropriate infrastructure to readily trade between locations and arbitrage trading opportunities. Removing unnecessary regulatory barriers and promoting the interconnectedness in Australian gas markets will reduce market complexity and cost and enable gas supply to flow to its highest value end use. The Australian Government supports the establishment of conditions for access to transmission pipelines that facilitate a more liquid trading market for the Australian wholesale gas market, while pursuing greater consistency and harmonisation in jurisdictional approaches to gas supply and market development. The Energy Council will also submit a rule change proposal to the AEMC in 2015 to enable the trading of excess pipeline capacity.

While there is merit in having market stability from a clear and comprehensive longer-term vision for Australian gas markets, tightness in supply, whether real or perceived, will potentially destabilise local gas markets. States and territories have ultimate responsibility for resources developments within their jurisdictions that can bring on supply[7].

Reliability of gas supply

The Energy Council has rejected the need for national interventions, such as national gas reservation, as a solution to pressures in the eastern gas market. The Energy Council believes there are opportunities to improve the function of the gas market and remove impediments to supply.

The West Australian and Queensland Governments have policies that support the reservation of gas for supply to domestic users. The Queensland Government does not currently apply this policy. The Australian Government does not have a domestic gas reservation policy for its offshore resources or national export controls on LNG.

A number of stakeholders have called for a gas reservation policy in eastern Australia. They believe that linking Australia's domestic gas market to the export market has distorted the domestic market, creating an inefficient allocation of resources and potentially a market failure. They are concerned that without a reservation policy, the domestic market will be supplied with gas at a much higher internationally linked price that is not based on the cost of production.

The Australian Government and the COAG Energy Council have rejected the need for national interventions such as gas reservation

Some large industrial gas users believe that making cheaper gas available for domestic use will benefit the economy more than if the gas was exported. Other stakeholders, particularly gas developers, believe the Australian Government's focus should be on measures to improve supply. Reserving gas, they argue, will not make gas cheaper or quicker to develop; in fact, it might discourage the investment needed to make new supply available.

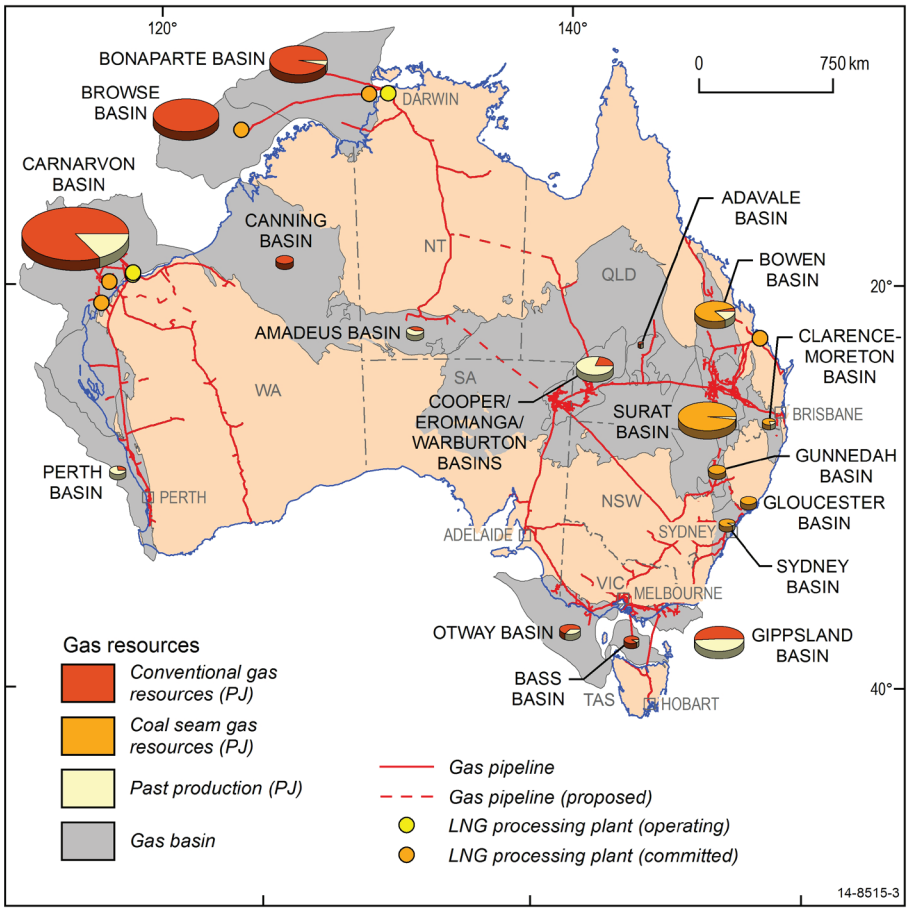
Competition amongst gas producers and additional supply is the best response to high prices

Gas reservation is not supported by the Australian Government. Reservation would have negative consequences for the economy. Requiring a proportion of gas production to be reserved for the domestic market would act as a tax on the production of LNG. This would reduce profits from gas production, leading to fewer economic benefits that would not be offset by gains in other sectors of the economy. Less profitable gas production would attract less investment, resulting in reduced gas supply in the longer-term.

Gas reservation is effectively a subsidy to domestic gas users. Artificially low domestic prices do not encourage gas users to use gas more efficiently or encourage innovation in the use of alternative fuels and processes. Ongoing investment in infrastructure that may not be required if users found alternatives to gas or used gas more efficiently is not efficient investment.

The Australian Government believes that having diverse suppliers and encouraging additional supply are the best responses to high prices. Accordingly, the Australian Government supports the efforts of the Northern Territory Government to facilitate expansion of the gas pipeline network to connect the east coast to the Northern Territory. Such a link could help build a more integrated, resilient and diverse national energy market and provide gas users with access to multiple alternative sources of gas supply.

Figure 7: Gas basins—development opportunities



Source: GA and BREE 2014, Australian energy resource assessment.
Note: Proposed pipeline routes are indicative only.

The COAG Energy Council also supports the work the Northern Territory Government is doing to establish a competitive process for the private sector to bring forward proposals for the construction and operation of a pipeline to connect the northern and eastern gas markets. The Energy Council agrees that connecting these gas markets is the next step to developing a national gas grid and will contribute to developing a more national and competitive domestic gas market, which will help improve supply security.

Stakeholders are also concerned about whether Australia would be able to respond adequately to a short-term disruption to gas supply. Australia has well-established structures to deal with emergency disruptions to gas. The National Gas Emergency Response Advisory Committee (NGERAC) provides advice to the Australian Government and state and territory energy ministers on efficient and effective responses to major natural gas supply shortages. NGERAC will convene when an incident has the potential to lead to a major natural gas supply shortage that threatens system security or essential services and requires curtailment of use and/or a multi-jurisdictional (government) response. A Memorandum of Understanding (MoU) on the national gas emergency response protocol underpins the NGERAC and ensures that natural gas supply interruptions are managed in a nationally consistent manner[8].

Transport fuels

Price trends

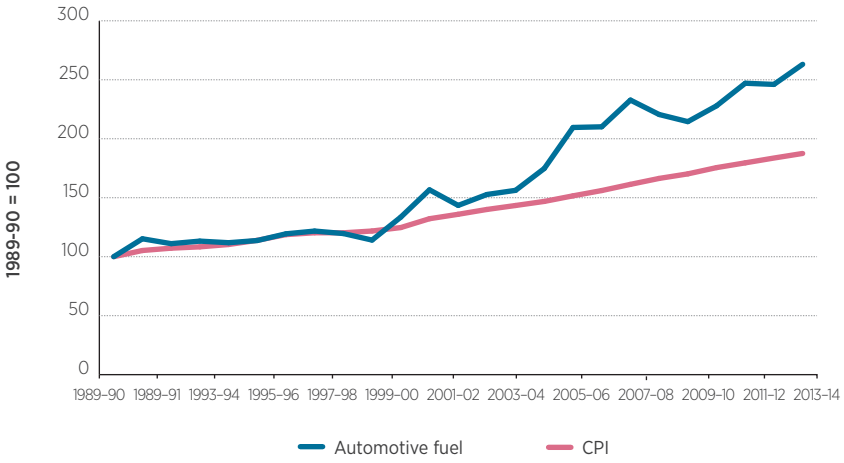
Fuel prices change with international oil prices, value of the Australian dollar, global competition and pricing decisions by wholesalers and retailers

The price of transport fuel affects consumer decisions around fuel consumption and types of fuel consumed. International prices of crude oil largely drive international refined petrol prices, including Singapore petrol prices. Australian wholesale petrol and diesel prices closely follow movements in Singapore petrol prices because around 43 per cent of Australia's imports of refined petroleum products come from Singapore (BREE 2014a).

Changes in the value of the Australian dollar, relative to the United States (US) dollar, also affect domestic retail prices because international prices are expressed in US dollars. Other factors that influence fuel prices are the levels of competition in local areas and pricing decisions by wholesalers and retailers. In terms of market share, the retail fuel market in Australia includes supermarkets (48 per cent), large independent retail chains (19 per cent) and branded refiners and wholesalers (33 per cent) (ACCC 2014).

Petrol and diesel make up around three quarters of transport fuel used in Australia. After taking into account inflation, petrol and diesel prices have fluctuated in recent years. Average prices peaked in 2007–08, declining until 2009–10. Prices grew slightly in 2013–14 (BREE 2014a).

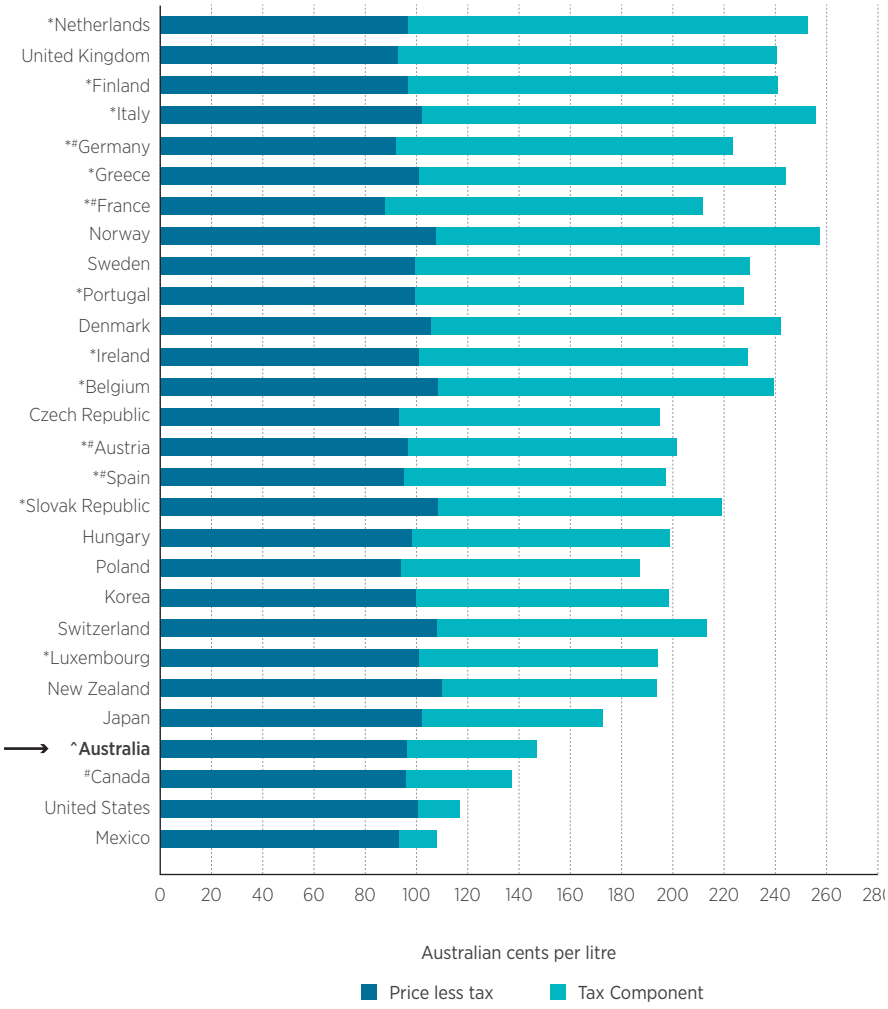
Figure 8: Retail automotive fuel price index



Source: ABS 2014

The Australian Competition and Consumer Commission (ACCC) has consistently reported that Australian petrol prices are lower than many countries in the Organisation for Economic Co-operation and Development (OECD). The ACCC monitors retail fuel prices in Australia to publish information about fuel price movements for consumers[9]. This monitoring allows the ACCC to investigate issues of concern and take action to protect consumers against misleading and anti-competitive conduct by fuel retailers if it finds sufficient evidence[10].

Figure 9: Petrol prices and taxes in OECD countries



* *country reporting in Euro*
\# *December Quarter prices and taxes*
^ *weighted based on state sales volumetric data*

Source: BREE 2014c

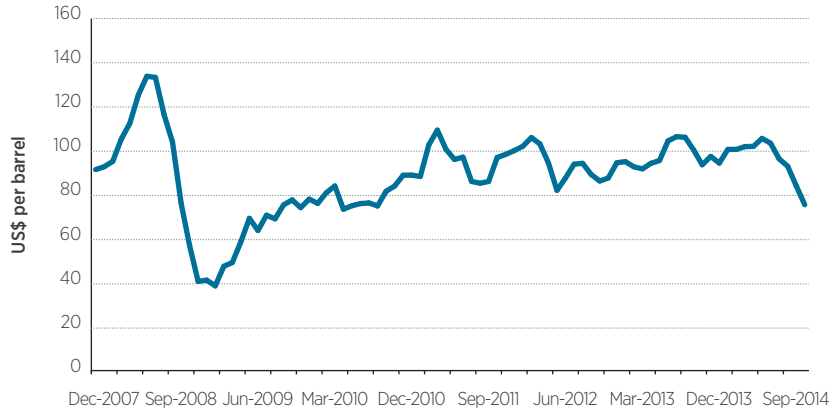
Australian petrol prices are amongst the lowest of OECD countries

Over the past five years, petrol prices have been relatively stable and increasing in line with consumption growth associated with economic recovery, as well as continued growing oil demand from emerging economies. There was a fall in prices in mid-2012, which was associated with increased uncertainty over the European debt crisis. Prices increased into late 2013—the price of the West-Texas Intermediate (WTI) that year averaged US$98 a barrel—as disruptions in a number of oil-producing economies reduced supply. In the period since, strong growth in supply from new sources, particularly in the US, has placed downward pressure on prices (BREE 2014a).

World oil prices have fallen dramatically in latter half of 2014 and early 2015 and, if sustained, could impact investment in Australia's oil exploration and development

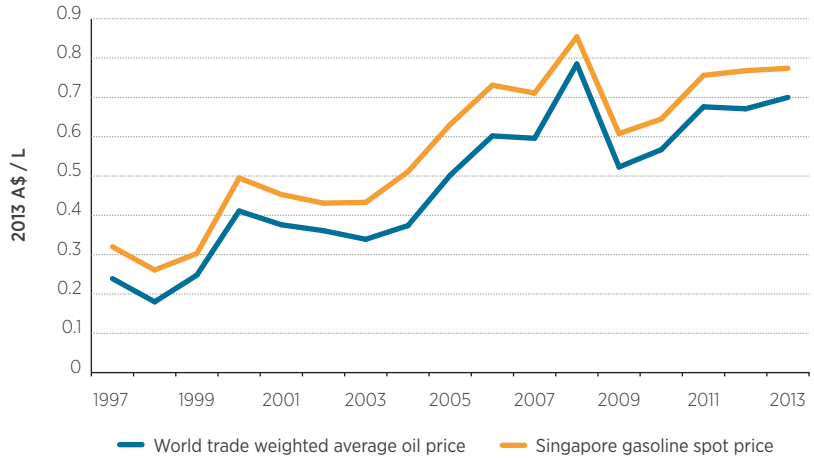
World oil prices have fallen dramatically in the latter half of 2014 and early 2015, possibly because of low demand as a result of weak economic activity. More oil supplies are also available because of the increase in US oil production and oil producing countries maintaining production levels. If sustained, this drop in world oil prices could have an impact on investment in oil and gas exploration and development in Australia.

Figure 10: International crude oil price movements (West-Texas Intermediate)



Source: US Energy Information Administration 2015

Figure 11: Petrol price indicators

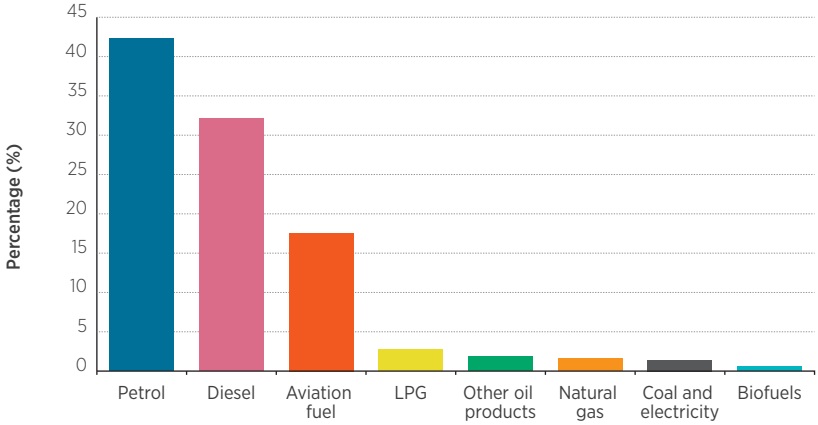


Source: BREE 2014a

Consumption

Energy consumption in the transport sector has been growing over the past 40 years, largely reflecting economic and population growth. Road transport is the dominant means of transport for goods and passengers in Australia. It has consistently accounted for around three quarters of transport energy use. The share of air transport has increased steadily over the same period, largely reflecting increased activity and popularity.

Figure 12: Energy consumption in the transport sector, share of fuel, 2012–13 (%)



Source: BREE 2014a

Petrol, diesel and aviation fuel are the dominant transport fuels, accounting for over 90 per cent of transport energy use in 2012–13. The share of petrol in the transport fuel mix has decreased slowly over recent decades, outstripped by growth in diesel and aviation fuel. This reflects fuel switching and increased demand for diesel, particularly associated with mining activities and increased air transport activity. Alternative transport fuels accounted for 5 per cent of energy consumption in 2012–13, comprising liquefied petroleum gas (LPG) (2.7 per cent), natural gas (1.6 per cent) and biofuels (0.6 per cent) (BREE 2014a).

Alternative fuels

Alternative transport fuels, including biofuels, ethanol, gaseous fuels (LNG, compressed natural gas or CNG and LPG), already contribute to diversity in the fuel supply. Despite government assistance to producers and importers over the last decade, including mandates, alternative transport fuels have struggled to gain a foothold in the domestic liquid fuel market.

Since 2003–04, it has been Australian Government policy to base excise and excise-equivalent customs duty rates for transport fuels on their energy content. This principle ensures that fuels are taxed fairly and transparently, with competitive neutrality between fuels[11].

The introduction and phasing in of excise on gaseous fuels with a 50 per cent discount on the full energy content rate was legislated in 2011. In the 2014–15 Budget, the Government announced that it would apply the energy content-based excise with a 50 per cent discount to biofuels and re-establish twice-yearly indexation on fuels excise, based on the consumer price index (The Commonwealth of Australia 2014a).

Future fuels such as shale oil, hydrogen and synthetic fuels have the potential to contribute to Australia's future transport fuel mix, but are unlikely to be cost competitive in the short-term.

A critical precursor to turning this situation around is increased consumer acceptance of alternative fuels and production of cost competitive alternative fuels without ongoing assistance. Strengthening the alternative transport fuels sector to gain a larger market share will only occur through successful integration into the broader fuels market.

Reliability of transport fuel supply

Supply reliability is maintained through the depth, liquidity and diversity of international crude and fuel markets

Australia imports around 80 per cent of the crude oil it refines into liquid fuels and around 44 per cent of the refined liquid fuels used in Australia (BREE 2014a).

Australia exports around 75 per cent of its oil production. Most of Australia's oil production occurs off the north-west coast of Western Australia, which is closer to Asian refineries than the domestic refineries on the east coast. It is therefore more profitable to export. With declining east coast production, domestic refineries on the east coast now mostly rely on imported feedstock. In addition to costs, crude grades produced in Australia are generally not as well suited for use by Australian refineries as those from other countries (BREE 2014a).

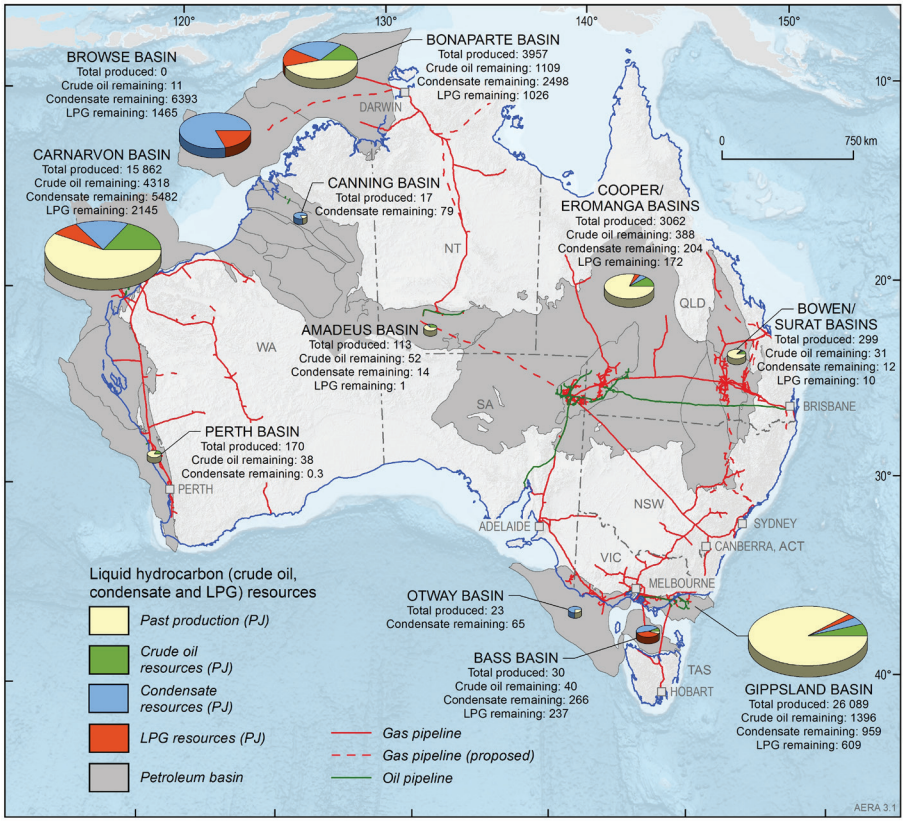
The number of domestic refineries has reduced from six in 2012 to four in 2015 due to closures. This reflects the comparative disadvantages of Australian refineries, including ageing, small size and labour and construction costs. Refinery capacity has declined from 38.4 gigalitres in 2010–11 to 34.2 gigalitres in 2013–14. Substantial increases in refining capacity in Asia have placed pressure on Australian refineries over recent years and this is expected to continue (BREE 2014a).

The present market approach has provided a diversity of supply that has delivered minimal disruption to Australia's fuel supplies over many years. Opportunities remain to grow Australia's liquid fuel supplies in the long-term, with new discoveries being made, including the discovery of oil in the Canning Basin in 2014.

Australia's liquid fuel supplies could grow in the long term through new oil discoveries

The Australian Government considers that supply reliability will be maintained because of the depth, liquidity and diversity of international crude and fuel markets, combined with the existing Australian stockholding and at-sea tanker arrangements of commercial companies. Security of supply will continue to be monitored through the periodic NESA review. Additionally, emergency response arrangements and capacity will continue to be tested regularly to ensure preparedness. The 2011 NESA concluded there was sufficient global oil production and refining capacity to supply the Australian market to 2035, even with declining domestic refining capacity. The Government will consider and release a new NESA by mid-2015[12].

Figure 13: Oil sources—opportunities to grow Australia's liquid fuel supply



Australian crude oil, condensate and naturally-occurring LPG resources, infrastructure, past production and remaining resources
LPG = liquefied petroleum gas
Source: Geoscience Australia and BREE 2014a

Despite its view on security of supply and longstanding contribution to global energy security as a major net energy exporter, Australia's current oil stockholdings do not meet its obligations under the International Energy Agency (IEA) treaty (IEA 2014b). Current estimates are that meeting the IEA obligations would require an investment of several billion dollars in stocks and storage infrastructure over a decade. A decision on how to address this compliance issue will be made by the Government in 2015.

Market governance

Australia's largest electricity market, the National Electricity Market (NEM), supplies Queensland, New South Wales, the Australian Capital Territory, Victoria, South Australia and Tasmania. The three institutions that oversee and operate this market are the national regulator (Australian Energy Regulator- AER), the rule maker and market development body (Australian Energy Market Commission- AEMC) and the operator (Australian Energy Market Operator- AEMO).

The South West Interconnected System and North West Interconnected System supply most of the electricity demand in Western Australia. The Darwin Katherine Interconnected System supplies most of the electricity demand in the Northern Territory. Australia also has several smaller grids to service regional and remote areas that are not

connected to these main systems. There are also some communities entirely off the grid using stand-alone energy generation systems. At this stage, the electricity systems in Western Australia and the Northern Territory operate independently and there is little prospect of interconnection with the eastern states' systems due to the distances and costs involved (AEMO does provide gas retail contract and market administration services in Western Australia, via the Retail Energy Market Company- REMCo).

The COAG Energy Council leads national energy market reform and development. The Energy Council is the key mechanism to achieve national harmonisation in energy policy and regulation for suppliers and consumers with cross-jurisdictional boundaries. Australia needs to present a consistent national approach to international investment, as well as the export and import of energy-related products and services. While each jurisdiction maintains decision-making powers and, in many cases, ownership of electricity assets, strategic and harmonised national action relies upon direction and agreement of the Energy Council.

It is critical that the Energy Council operates effectively as energy markets evolve. The Australian Government will seek the development of a clearly prioritised Energy Council work programme that reinvigorates the commitment to a genuinely national energy market.

As energy markets evolve, there is a need to ensure they are working as efficiently as possible

In 2015, the Energy Council will review the governance of the NEM, including the governance arrangements of the three energy market bodies: AER, AEMO and AEMC. The review will examine the broad energy market institutional structure created by COAG, as well as the legislative framework that establishes and assigns functions to the institutions. COAG will also review the effectiveness of the Energy Council itself periodically.

The Australian Government believes the timeliness of the Energy Council's response to change can be improved

The Australian Government believes the timeliness of the Energy Council's response to change can be improved. The energy market bodies must be able to respond more quickly, particularly to a more aggressive work programme of the Energy Council, including dealing more quickly with proposed rule changes.

Where the Australian Government believes a timely rule change is in the interests of consumers, it will consider submitting rule change requests directly to the AEMC to expedite the process after consulting with the jurisdictions.

There needs to be a continuing commitment to genuinely national energy market arrangements

There needs to be a continuing commitment to genuinely national energy market arrangements. Actions by jurisdictions that inhibit the capacity of retailers to compete across borders are inconsistent with the intention of the NEM and increase the regulatory burden for all market participants and ultimately raise costs for consumers.

An example is the National Energy Consumer Framework (NECF). No jurisdiction has accepted the NECF in full without variation. The existence of multiple consumer protection regimes creates barriers to entry, for example, increased regulatory, administrative and compliance cost, for retailers wishing to expand their operations across borders. While some variations may have been considered necessary, the negative impacts on competition should be carefully considered against the perceived benefits.

Box 1:

Australian Government activities to increase energy market competition

1. Reviewing competition laws and policy to ensure they continue to be a significant driver of productivity improvements, that current laws are working as intended and that they are effective for all businesses, big and small. The **Competition Policy Review** will examine the current laws and the broader competition framework to increase productivity and efficiency in markets, drive benefits to ease cost of living pressures and raise living standards for all Australians.
2. Encouraging privatisation of state and territory electricity assets through the **Asset Recycling Initiative**. In May 2014, all states and territories signed up to a National Partnership Agreement. Under the agreement, money from public asset sales, including electricity generation, transmission and retail businesses, will be recycled for productivity-enhancing infrastructure such as new roads, ports, and rail projects. The sales and long-term leases will leverage a further 15 per cent federal funding to June 2019, if the sale proceeds are reinvested into new infrastructure. States and territories were given two years to reach agreement with the Australian Government on the assets sold and projects undertaken. The incentive payments will only be available for five years through to 30 June 2019.
3. Working with states and territories to **facilitate the approval of priority gas projects** through improved cooperation on, and access to, pre-competitive geo-scientific information, and improved coordination, transparency and accountability of both offshore and onshore gas exploration licence approval processes.
4. Preparing a strategy to support the **responsible development of the CSG** industry and other unconventional gas resources.
5. Responding to concerns expressed by industrial gas users about market transparency and price discovery in the gas market by **commissioning an ACCC inquiry**. The inquiry will look into the effectiveness of competition in the gas market, particularly upstream.
6. **Improving gas market information** and efficiency of outcomes through regular updates on Australia's gas markets, including aggregated information on upstream activity, and CSG well drilling schedules and production rates where possible.
7. Working with states and territories, and with industry and leading experts (including Australia's science agencies) to develop a set of actions that **promote community confidence and engagement** on resources projects by:
   - improving local community engagement including through promotion of leading practice approaches
   - transparency of regulatory processes and data sharing
   - facilitating coexistence of resources and energy development and other land uses to encourage the growth of multi industry regional communities
   - improving public communication to address misinformation around the risks and impacts associated with resources development.

8. Reviewing the **National Gas Emergency Response Protocol Memorandum of Understanding** to ensure that natural gas supply interruptions are managed in a nationally consistent manner, for consideration by the COAG Energy Council in 2015–16.
9. **Routine monitoring of Australian unleaded petrol, diesel and LPG prices** through the ACCC and providing information to the public, including market reports.
10. **ACCC monitoring of prices, costs and profits** under direction of the Australian Government, relating to the supply of unleaded petroleum products in the Australian petroleum industry for three years until December 2017, and to report every quarter to the Australian Government.
11. Continuing to apply **energy content-based fuel excise** (and excise-equivalent customs duty rates) to all transport fuels, with a 50 per cent discount to gaseous fuels and biofuels. The Government will also re-establish twice-yearly indexation on fuels excise, based on the consumer price index (CPI) where every dollar raised by the increases will be linked by law to the road building budget to ensure that there is a stable and growing source of funds to support long-term investment in Australia's roads.
12. Monitoring Australia's energy security through the **National Energy Security Assessment** (NESA). The next NESA is planned for 2015. The NESA is a forward-looking assessment of the adequate, reliable and competitively priced delivery of Australia's liquid fuel, gas and electricity to consumers. It identifies and analyses the vulnerabilities and main factors challenging the delivery of energy to end users.

CHAPTER 2

Increasing energy productivity *to promote growth*

"... along with capital and labour, energy is a critical contributor to productivity and we need to get smarter about energy if we're going to keep up with our competitors."

The Australian Chamber of Commerce and Industry, 12 December 2014

Increasing energy productivity to promote growth

Improved energy productivity will reduce household and business energy costs and increase national productivity and competitiveness

Improved energy productivity will reduce household and business energy costs and encourage economic growth. Energy productivity aims to lower the ratio of energy costs to the value of output received from the use of that energy. Energy productivity can be improved through energy market reforms such as increased competition and cost-reflective pricing that are aimed at lowering costs as well as energy efficiency measures.

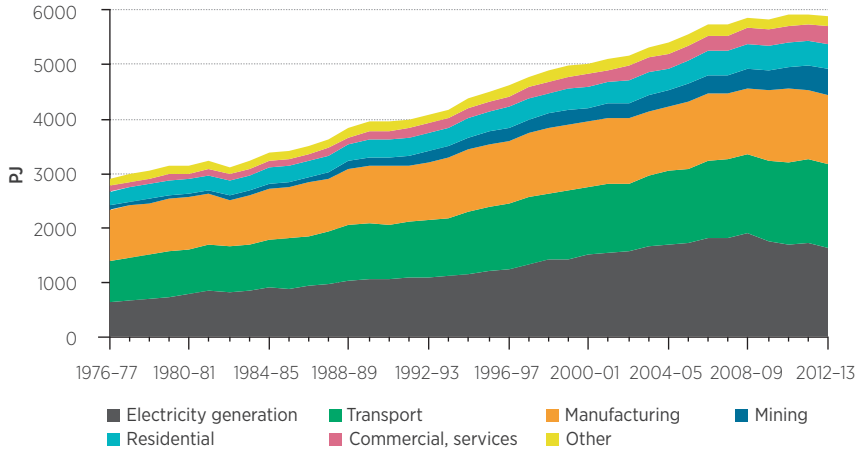
The productive use of energy can lower energy costs by improving both the output and benefit received per unit of energy consumed. The more productive use of energy can delay the need for new energy supply infrastructure, which in turn relieves the need for price increases to recover that investment.

Increasing Australia's energy productivity relies on the energy market reforms outlined in Chapter 1, particularly those that increase choice in energy services. Increased competition and flexible tariff structures provide this choice. Choice needs to be complemented by equipping consumers with appropriate information and decision-making tools to select the services that benefit them (for example, ensuring they select the best tariff to save them money, rather than one that might increase their bills). There are significant barriers to the timely access to and sharing of consumers' own data, particularly in developing new systems to support smart meters. There is a role for Government to ensure energy consumers have access to the information and tools they need to make informed choices. Other barriers, such as split incentives (for example, in cases where building owners may be less motivated to make improvements than their tenants who pay for the energy consumed) will also need to be addressed.

Improvements in energy productivity can be achieved through a range of more effective choices, including better buildings; vehicle fuel efficiency; efficient equipment and appliances; and action by governments, small-to-medium enterprises (SMEs) and large industry[1]. Energy productivity can also improve through consumer choice that reduces the costs of sourcing and delivering energy, such as switching to more cost-effective fuels or reducing peak demand. New technologies can help improve energy productivity. Chapter 3 outlines how investment in new technologies is being encouraged.

Figure 14 shows national energy consumption by sector. The extent to which energy productivity can be improved will vary by sector, but the overall scale of consumption also indicates the extent to which gains can be made in each sector. In the five years to 2011 over 164 petajoules of energy savings potential was identified for Australia's industrial sector. This represented 2.7 per cent of Australia's total energy use (equivalent to the energy use of 3.3 million Australian households and their cars for a year). The identified savings opportunities with a payback period of four years or less equate to possible annual net financial benefits of over $1.2 billion (Department of Industry 2013).

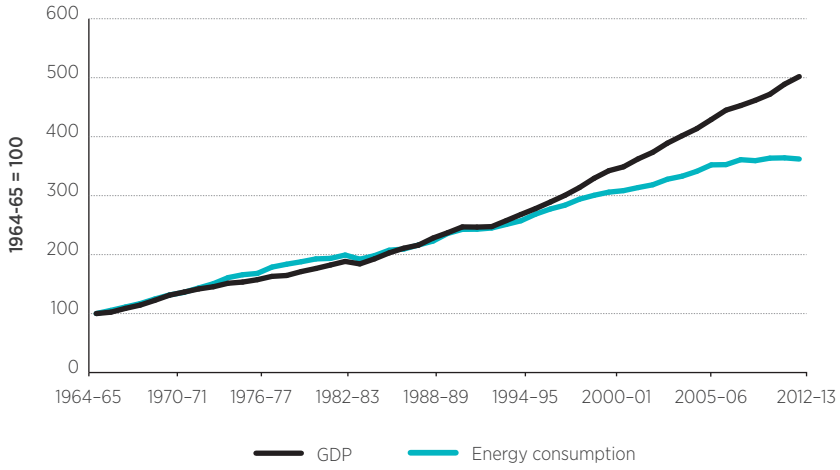
Figure 14: National primary energy consumption by sector



Source: BREE 2014a

Figure 15 shows that since the mid-1990s the rate of economic growth (as GDP) exceeds the growth in energy use.

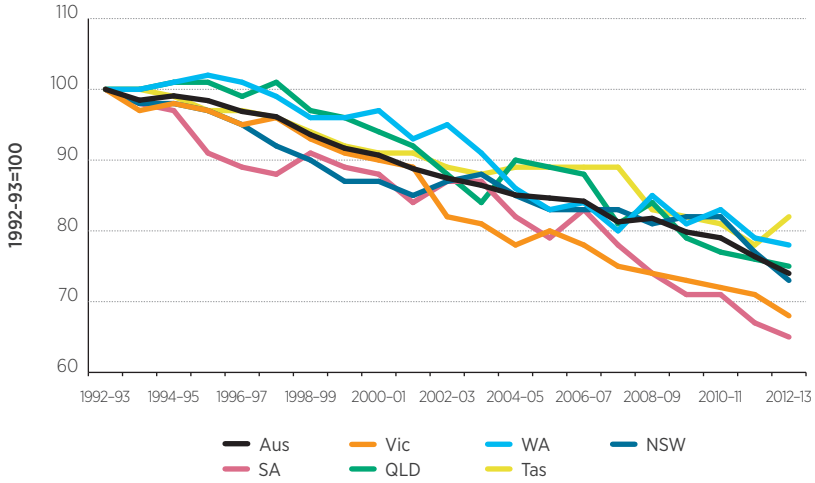
Figure 15: Annual growth in Australia's energy consumption 1964–65 to 2012–13



Source: BREE 2014a

This trend in reduced energy intensity is across all states (Figure 16).

Figure 16: Energy intensity across jurisdictions



Source: BREE 2014a

Australia's energy productivity, as measured by the ratio of real GDP to primary energy consumption, has improved at an average rate of 1.6 per cent a year from 2000–01 to 2012–13. Improvements in energy productivity are due to changes in the structure of the economy to less energy-intensive sectors, such as the commercial and services sector, relative to energy-intensive sectors like manufacturing. Other factors that have contributed to this positive outcome are improved energy efficiency and fuel switching. The level of renewable electricity generation has also played a role.

From 2014–15 to 2049–50, Australia's primary energy consumption is projected to grow at the rate of 1 per cent a year and GDP is expected to grow at 2.7 per cent a year. This means Australia's energy productivity could improve by around 1.7 per cent a year, or over 25 per cent by 2030, under business as usual.

Improved energy productivity can assist with Australia's emissions reduction task

Improved energy productivity can help reduce emissions and assist Australia's emissions reduction efforts. The stationary energy sector produces 51 per cent of Australia's emissions and the transport sector 16 per cent (Department of Environment 2014). The link between energy productivity and emissions reduction is highlighted by projects supported under the ERF that will help contribute to energy productivity (Department of Environment 2015b). Approved and draft methodologies under the ERF already cover transport, building and industrial processes and many projects in these sectors will improve energy productivity.

The Clean Energy Finance Corporation invests in projects that use a commercial approach to overcoming market barriers and mobilising investment in renewable energy, as well as low emissions and energy efficiency technologies. The Australian Government has announced that it will abolish this agency, but will maintain a commitment to existing projects.

The Australian Government led the development of the G20 Energy Efficiency Action in 2014, which will support international collaborative action on the efficiency and emissions performance of vehicles (particularly heavy duty vehicles), networked devices, buildings, industrial processes, and electricity generation[2]. It will also work on financing for energy efficiency projects. Australia also supports international collaboration on energy efficiency through the International Partnership on Energy Efficiency Cooperation, the IEA, and the Asia Pacific Economic Cooperation group.

Coordinated action

The COAG Energy Council has agreed to a concerted effort and coordinated policy framework to improve national energy productivity. Coordination is particularly important because of the diverse activities that contribute to energy productivity and the need for complementary effort by all levels of government, business and households.

The Australian Government will lead the development of a National Energy Productivity Plan. In addition to coordinating national action, this plan will provide a focal point for stimulating action that increases awareness about the benefits of improved energy productivity. It will recognise the roles played by stakeholders, such as the Australian Government, the states and territories, local governments, industry and households. Each measure in the plan will be delivered by the most appropriate stakeholder or through collaborative action.

The Australian Government will lead coordinated action to improve national energy productivity

A national energy productivity improvement target could highlight the combined outcomes of diverse energy productivity actions. A target will be determined as part of the development of the National Energy Productivity Plan. A national improvement target of up to 40 per cent by 2030 is achievable, but will require contributions from a broad range of sectors and actions, both regulated and voluntary. Opportunities for further improvements in industry will be largely voluntary action as major energy users respond to energy price signals.

A national target could be up to 40 per cent improvement by 2030

Determining the actual energy productivity target should be done concurrently with the emissions reduction target. This will enable energy productivity targets to be aligned with the emissions reduction effort, recognising the important contribution of energy productivity to least cost emissions reduction.

The following sections outline how actions in various sectors will combine to form the coordinated policy approach of the National Energy Productivity Plan, along with the energy market reforms and technology innovation outlined in this White Paper.

Buildings

Information on building management allows occupants to get the best energy performance from their buildings

Whether residential or commercial, the energy productivity of buildings (generally the amenity provided for the amount of energy used) is determined by the thermal properties of the building shell, the way the building is managed and the appliances used in it. This section deals with the building shell and management. Appliances are considered in a separate section.

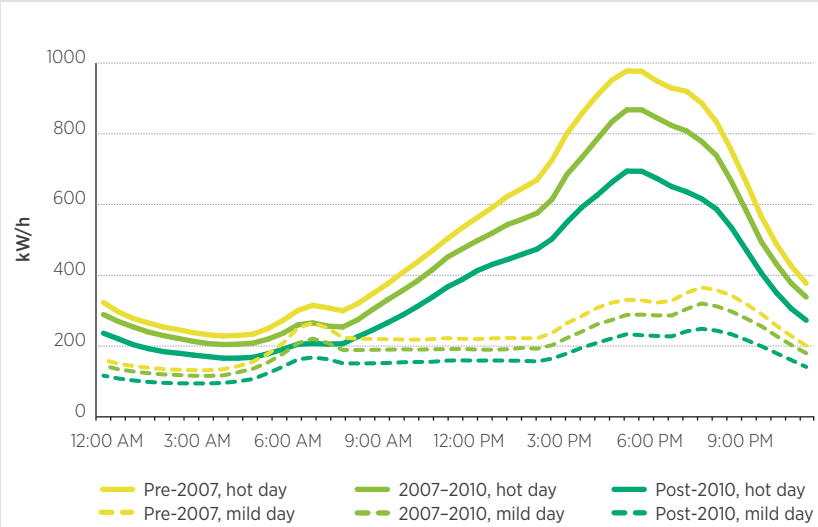
The quality of new buildings typically exceeds that of older building stock. Given the long-lived nature of buildings, the overall improvement in quality relies on that of new buildings and the retrofit of existing buildings. The quality of new buildings is determined under the National Construction Code. This code sets the minimum standards (for example, star ratings) to be achieved, which can be measured by tools accredited by the Nationwide House Energy Rating Scheme or NatHERS (residential) (Department of Industry and Science 2015b) or by using other methods[3]. Monitoring is principally around compliance with approved plans.

Improvements in new building quality can be achieved by both higher standards and improved compliance with standards. Standards are set cooperatively with the states and territories, while compliance is a state and territory responsibility, often devolved to local government. The Australian Government will continue to work with states and territories to maintain an appropriate level of minimum standards and encourage the strengthening of assessment of compliance with these standards.

The Commercial Building Disclosure Program uses the National Australian Built Environment Ratings System (NABERS) assessment tool to determine the energy rating of commercial office buildings for mandatory disclosure at point of sale or lease[4].

Information on building management allows occupants to get the best energy performance from their buildings. Information sources, such as the Australian Government's websites Your Energy Savings, Energy Efficiency Exchange and YourHome, will be continually updated and improved to provide this information (Department of Industry and Science 2015c, 2015d, 2015e). Information on improving energy management systems allows industry and business of all sizes to enhance their energy productivity through more efficient and productive operations. The Energy Efficiency Exchange website, a joint initiative of the Australian and state and territory governments, provides this information. It will be updated and improved regularly to ensure the information meets the requirements of often time-poor energy managers.

Case study: Effects of more energy efficient houses and appliances



Source: BREE 2014a

In 2006 and 2010 energy efficiency standards were increased for new homes. Houses built after 2010 use around 30 per cent less electricity than houses built before 2007. This is true for both average days and peak demand days. Since 2006, energy efficiency standards have increasingly improved and more efficient household appliances have been adopted.

Appliances and equipment

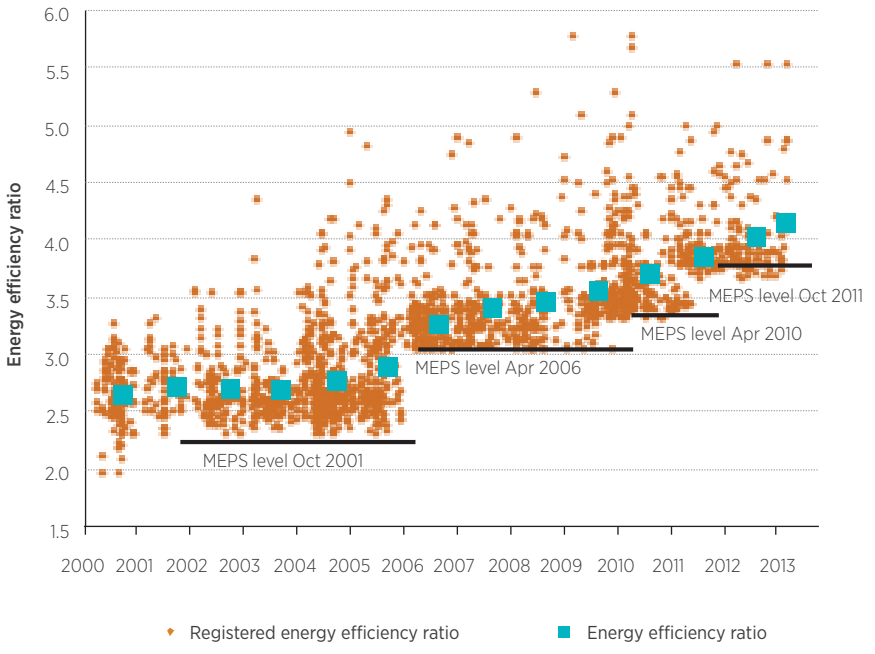
Leading products could be recognised through product labelling or an industry awards scheme

The three principal means of improving the energy productivity of appliances are labelling to inform consumers, minimum energy performance standards and recognition of highest performing products. There are minimum energy performance and labelling (star rating) programmes in place under the *Greenhouse and Energy Minimum Standards (GEMS) Act 2012*. The continuous improvement in labelling and minimum energy performance standards (MEPS) under GEMS will continue[5].

Leading products could be recognised through product labelling or an industry awards scheme to give consumers information on high-performing products. Further options will be considered during the development of the National Energy Productivity Plan.

Case study: Efficiency of new air conditioners

Air conditioners today are around one-third more efficient than a decade ago. During this time, Minimum Energy Performance Standards (MEPS) were introduced.



Source: BREE 2014a

Vehicles

There are two interrelated issues when considering ways to improve overall fuel efficiency outcomes, namely the technologies and tools for improving vehicle fuel efficiency, and whether these technologies and tools are complementary with the quality or type of fuel that is available in Australia and Australian driving conditions.

Australia currently has vehicle emissions (pollutants) standards that address the air quality impacts of some emissions. This does not include carbon dioxide (CO_2) emissions. Australia also has fuel quality standards that set limits on toxic pollutants, including the sulfur content of the fuel. Australia's standards for sulfur content in diesel are at world's best practice, but sulfur standards in petrol may have the impact of inhibiting the use of some technologies used elsewhere to improve vehicle fuel efficiency.

Australia does not have vehicle fuel efficiency standards. Stakeholders have competing views on issues associated with introducing such standards. For example, some stakeholders claim that Australia's fuel quality (specifically high sulfur content of petrol) impacts on the ability to meet a potential vehicle fuel efficiency standard, as well as a vehicle emissions (pollutants) standard. Others argue there are readily available vehicle technologies (such as improved transmission systems, lightweight materials, and hybrid and electric vehicles) that would improve vehicle fuel efficiency (and hence CO_2 emissions) irrespective of fuel quality.

Figure 17: Trends in composite energy intensity indicators in the transport sector

Source: Department of Industry & BITRE 2014
Note: These trends in energy intensity do not imply any weighting of energy consumption by sector.

The Australian Government restricts the ability for an individual to import a vehicle to Australia. Around 98 per cent of imported vehicles are new vehicles imported by manufacturers and their dealer networks. The Productivity Commission has recommended to the Australian Government that restrictions on vehicle imports be relaxed to increase competition and consumer choice (Productivity Commission 2014). Increasing the availability of a broader range of models not available in Australia could also help improve the fuel efficiency of the Australian vehicle fleet[6].

Fuel efficiency savings for commercial operators can be achieved by driver behaviour, data analysis, load management, vehicle choice and proper maintenance

In addition to improved vehicle technologies, significant fuel efficiency savings for commercial transport operators can be achieved through changing driver behaviour, collecting and analysing fuel consumption data, planning more efficient routes, better load management, purchasing vehicles appropriate for their use and properly maintaining vehicles. The Energy Efficiency Exchange website provides information on these energy efficiency opportunities for medium and large energy using companies. The Green Vehicle Guide website provides advice for residential motorists on improving their fuel efficiency (Department of Infrastructure and Regional Development 2014).

Fuel is typically the highest operating cost for commercial road freight operators, followed by wages and tyres. The road freight sector operates in a very competitive business environment, so small improvements in fuel efficiency or changes in fuel costs can have a significant impact on profit and competitiveness (Department of Industry and Science 2015d).

A number of investigations into opportunities to move to increased use of gaseous fuels in heavy vehicles (such as LPG, LNG and CNG) have been undertaken recently (Clark, R 2014). In general, these have found that greater transport efficiency would be achieved with the use of gaseous fuels. However, these fuels need to address low levels of consumer acceptance, cost of conversions and limited refuelling infrastructure. Large capital investment in infrastructure is required to challenge the market dominance of established fuel sources.

Case study: Improving heavy vehicle fuel efficiency

Linfox, a large privately owned supply chain solutions company, has an internal Eco Drive program to improve its fuel efficiency through changing driver behaviour, using route modelling software to help drivers take the most efficient route to their destination, and looking at improving the aerodynamics of its vehicles to reduce wind resistance. Trials have demonstrated energy savings of up to 14 per cent.

Source: Department of Industry and Science 2015d, accessed http://eex.gov.au/case-study/linfox-eco-driver-training

Data

Access to and use of energy productivity data continue to be hindered by fragmentation in its collection and management. The organisations holding relevant data include various state and territory government agencies, Australian Government departments, the Australian Bureau of Agricultural and Resource Economics and Sciences, the Commonwealth Scientific and Industrial Research Organisation, Geoscience Australia, the Australian Bureau of Statistics, and the energy market bodies (AER, AEMO and AEMC). Energy market service providers, including networks and retailers, also hold data.

A better coordinated data platform on energy use will help understand and forecast changes in energy demand

A better coordinated platform for energy use data would support better decision-making (planning, policy and market development) by policy makers, researchers, business and individuals. Existing forecasting and planning processes, based on limited data and in the face of structural change, have increasingly struggled to accurately estimate changing energy use trends. Ongoing changes driven by new technologies and demand-side services reinforce the need to better understand energy use trends. For example, in the 2000s forecasts of electricity demand in the NEM failed to anticipate electricity demand plateauing, then falling, even as it was happening. Missing the fall in demand led to overinvestment in network infrastructure, resulting in higher electricity prices for consumers.

Recent efforts to improve forecasting and planning have been hampered by the fact that existing data sets are spread across many data custodians, both government and industry, and are difficult to access and aggregate. The Australian Government will coordinate data aggregation to build a greater understanding of how energy use and trends at the micro, individual consumer level relates to (and adds up to) energy use and trends at the macro, economy-wide level. The data will inform the development of policies, programmes and effective business planning to improve Australia's energy productivity.

As well as collating existing data, the data platform needs to be maintained by better coordination of data collection, analysis and communication, and the development of advanced analytic tools and modelling[7].

Box 2:

Australian Government activities to increase energy productivity

1. Developing a **National Energy Productivity Plan**, including:
   - an energy productivity target
   - market reform to improve consumer choice and lower energy costs
   - information provision and encouraging voluntary action
   - market and regulatory measures.
2. Working with other G20 countries to develop better approaches to energy efficiency through the **G20 Energy Efficiency Action Plan**. The Action Plan will support collaborative action on the efficiency and emissions performance of vehicles, particularly heavy duty vehicles, networked devices, buildings, industrial processes, and electricity generation, as well as work on financing for energy efficiency.
3. The Australian Government will lead further development of the **NatHERS tool** and investigate use of a NatHERS-based tool for voluntary use at point of sale or lease of existing residential buildings. This will allow the market to find the best way to achieve energy reductions.
4. The Australian Government will lead work with states and territories to continuously improve the use, scope and accuracy of the **NABERS tool** for assessing the energy rating of commercial buildings.
5. Continuing to improve the energy productivity of appliances sold in Australia through the ***Greenhouse and Energy Minimum Standards (GEMS) Act 2012***. The GEMS Act prescribes Minimum Energy Performance Standards (MEPS) and energy star rating labelling. This program is currently under review to find implementation improvements.
6. Considering, through the **review of the *Motor Vehicle Standards Act 1989***, options to ease restrictions on the importation of vehicles while ensuring that vehicle safety, environmental performance and consumer protection are maintained. Increasing the availability of a range of models not currently available in Australia could help to improve the fuel efficiency of the Australian vehicle fleet.
7. Development of the National Energy Productivity Plan will be aided by **early action to address the fragmentation of data** and enable more robust analysis. Early action to consolidate lessons from current and past programmes will provide the evidence base for the policy development and target determination in the plan.

CHAPTER 3

Investing *in Australia's energy future*

"The Government is determined to restore the policy settings that make Australia an attractive investment destination. This is particularly important for the energy sector, where we cannot afford to be complacent in the face of significant competition from other energy exporting nations."

Minister for Industry and Science, the Hon Ian Macfarlane MP, 23 September 2014

Investing in Australia's energy future

Energy resources investment

Maintaining a strong pipeline of energy resources investment

Energy resources exports will continue to underpin the Australian economy

Australia's energy sector underpins a modern economy and a high national standard of living. The sector accounted for 7 per cent of GDP and $71.5 billion in export earnings in 2013–14. Energy-related industries also employed around 170,000 people over the same period and provided significant infrastructure investments (BREE 2014a).

Australia is among the world's largest exporters of LNG, coal and uranium. With the right policy settings, our importance to global energy markets will continue to grow, particularly to meet the increasing demand for energy from Asia. Australia has the potential to reap substantial economic gains in meeting future global energy demand, which is expected to increase by over one-third by 2040 (IEA 2014a).

In 2012, fossil fuels accounted for 15.5 terawatt hours (TWh) or 68 per cent of global electricity generation. The IEA, under its New Policies Scenario, expects this to increase to 22.2 TWh or 55 per cent of global generation by 2040. Nuclear power is also expected to grow from 11 per cent to 12 per cent of global generation over the same period (IEA 2014a).

Figure 18: Australia's energy trade, 2012–13

Source: BREE 2014a
Note: ORF = Other refinery feedstock

Ongoing access to large volumes of coal and gas will also underpin our energy generation mix for some decades, but these fuels will be increasingly exposed to competition from renewable energy.

Energy resources exports are integral to maintaining a strong national economy, but the international environment in which the Australian energy industry operates is complex and continually evolving. Australia cannot take its position as a major supplier of resources to the world for granted.

Australia's competitiveness as an energy producer has declined over the last decade for a number of reasons. Many of the underlying causes are common to both renewable energy projects producing energy for the domestic market and resource extraction projects producing export product. For example, many major extraction projects in the past decade resulted in an explosion in wage and material costs.

Australia's attractiveness as an investment destination is influenced by many factors. Recent improvements in labour productivity and streamlined project approvals are now contributing to more efficient production of Australia's energy resources. However, anti-development activism against both fossil fuel and renewable projects is a continuing challenge for resources development. Divestment campaigns targeting shareholdings in coal, oil and gas resources are a new challenge.

Inappropriate taxes and regulation such as the carbon tax and the Minerals Resource Rent Tax have been repealed, enabling the investment and innovation needed to create jobs and wealth.

The Australian Government is committed to providing an attractive regulatory and policy environment to maximise investment interest, including foreign direct investment. Access to international capital, skilled workers, and goods and services will help improve the operation and products of Australia's exporters and domestically focused businesses alike. The Industry Innovation and Competitiveness Agenda will provide a lower cost, business-friendly environment with less regulation, lower taxes and more competition; a more skilled labour force; better economic infrastructure; and policy that fosters innovation and entrepreneurship (The Commonwealth of Australia 2014c)[1]. This will improve the business environment and help companies as they refocus on improving the productivity of their capital investments in a competitive global environment. Further reductions in costs will allow Australia to continue to compete for sales in global markets, attract investment to maximise project developments and supply, and keep downward pressure on domestic energy prices[2].

Investing in skills and workforce productivity

In April 2014, the COAG Industry and Skills Council made a commitment to ensuring industry has the skilled workforce and operating environment it needs to boost the nation's productivity and increase international competitiveness. To achieve this, Ministers agreed to six objectives for the reform of the Vocational Education and Training (VET) system and the Australian Government has delivered early results in a number of key priority areas.

Tertiary education is central to Australia's economic growth, to business productivity and to employment outcomes. A strong and prosperous economy that delivers the jobs Australians want requires a well-functioning tertiary system that delivers the skills needed. Australia's tertiary systems are highly regarded internationally, with many countries seeking to emulate the VET system of nationally recognised qualifications and purpose-built training facilities, particularly those facilities established to train the oil and gas workforce.

As Australia moves towards a more diverse energy mix, it is critical to ensure that entities in Australia's energy markets have the skills needed to cost effectively implement and operate new energy technologies[3].

The Resources Sector Skills Needs report, released in December 2013 (AWPA 2013), provides an integrated approach to workforce development to supply skills for resources projects through both training and skilled migration initiatives.

The change from the construction to the production phase of major resources projects will affect job numbers and required skills. The number of construction jobs will decrease and the production phase workforce will increase. While some skills are common across both phases, the majority are not. The change is expected to be most acute in the oil and gas sector because of the highly skilled and experienced nature of the workforce required. To maintain this industry's high safety standards, the workforce, even new recruits into oil and gas, not only need the skills and knowledge to understand the operation and the job role but years of experience in these roles or a relevant trade.

Softening of the labour market has eased widespread shortages. In addition, entities, particularly those in the oil and gas sector, are being proactive about future skills needs and they have been working closely with education and training providers to ensure the system has the capacity to deliver the workforce required.

Some energy resources companies are also developing partnerships with education and training providers and setting up purpose-built training and quality arrangements. As a result, employees receive nationally recognised qualifications and skill sets and the training being provided is specifically designed to meet the needs of both industry generally, as well as specific companies. This has long-term benefits for the whole sector through improved workforce mobility.

Some energy resources companies have chosen to supplement nationally recognised training for their employees by developing training programmes focused on enterprise-specific skilling needs. They indicate that this targeted training is critical to their business outcomes. In addition, some training providers are offering students add-on training that is not part of an existing qualification but is a known skill need of industry. This raises the question as to whether the current structure and content of training packages within the nationally recognised training system are still fit for purpose in responding to emerging areas of skills needs. This issue is currently being considered as part of the Government's review of Training Packages and Accredited Courses.

The Australian Government's $476 million Industry Skills Fund will help Australian industry access training and support services, as well as develop innovative training solutions[4]. This will help ensure Australia has the highly skilled workforce it needs to adapt to new business growth opportunities, rapid technological change and market-driven structural adjustment (Department of Industry and Science 2015f).

The Australian Government is establishing the $476 million Industry Skills Fund to enable Australia to have the skilled workforce it needs

Some stakeholders have expressed concern about loosening the regulation of the temporary work (skilled) visa (subclass 457), arguing the programme requires much greater monitoring and enforcement to minimise abuse. They note the labour market testing requirement is essential in ensuring that temporary foreign labour is used for genuine skills shortages.

Other stakeholders support measures to make it easier to employ workers on such visas because they believe labour market testing imposes unnecessary costs on business and a flexible approach is critical for delivering projects and productivity. They have called for improved flexibility of the programme to assist in mitigating the current skills shortages. In 2014, the Australian Government commissioned an independent review into integrity in the 457 programme and the reforms recommended by this review will be implemented by the end of 2015–16[5].

The Australian Government has introduced reforms into the Parliament to ensure negotiations for greenfields agreements to cover new projects, including new energy resources projects, are timely and undertaken in good faith. The reforms will apply good faith bargaining requirements to negotiations and introduce an optional three-month negotiation period, after which the employer can seek approval of the greenfields agreement from the Fair Work Commission[6].

There has been unprecedented capital investment and growth in the energy resources sector over the past decade. The sector is transitioning as major investment projects move from the construction phase to a less labour and capital-intensive production phase (Deloitte Access Economics 2013). However, there remains a need to address productivity in construction activity in the resources sector[7].

Investing in Indigenous opportunities

Indigenous job seekers should be better linked to workforce opportunities

Resources projects offer great opportunity to regional and remote business, with good potential for Indigenous participation[8]. On 1 July 2015, the Australian Government will implement a reformed Remote Jobs and Communities Program (RJCP) to end passive welfare by engaging job seekers in activities that help get them a job and benefit their community. Key RJCP reforms include expanded Work for the Dole programme arrangements and a demand-driven employment model to give providers and employers incentives to place job seekers in ongoing employment. Up to $25 million a year will be available to establish and develop social enterprises and small businesses in remote communities that provide employment or enhanced work-like experiences for job seekers.

There is opportunity to address the workforce supply issues in the energy sector by better linking the sector to Indigenous job seekers. The Vocational Training and Employment Centres (VTECs) model, for example, links real employment opportunities to job-specific training for Indigenous job seekers. The energy sector could easily be assisted by this or similar demand-driven models. To support real and sustainable jobs for Indigenous Australians, support may also be provided through the Indigenous Advancement Strategy: Jobs, Land and Economy Programme for activities that support employment outcomes for Indigenous job seekers[9].

A 2005 MoU on Indigenous Employment and Enterprise Development between the Australian Government and the Minerals Council of Australia has contributed to developing self-sustaining and prosperous Indigenous communities in resources regions. This has enabled individuals to create and take up employment and business opportunities. The Australian Government, in collaboration with industry and Indigenous stakeholders, will continue to encourage Indigenous business opportunities in the procurement supply chain and promote Indigenous business development.

Case study: 'Getting it Right: Indigenous enterprise success in the resource sector'

In September 2014, the Australian Government, in collaboration with the Minerals Council of Australia, released the booklet *Getting it Right: Indigenous enterprise success in the resource sector*. Produced as one of the activities under the MoU on Indigenous Employment and Enterprise Development between the Australian Government and the Minerals Council of Australia, this handbook aims to:

- inspire more Indigenous people and enterprises to establish business relationships with resources companies and operations by showcasing a number of Indigenous SME success stories in the procurement supply chain of the resources sector
- encourage more resources companies and operations to engage Indigenous enterprises in their procurement chains
- demonstrate the critical success factors that have formed the foundation of the successful Indigenous enterprises.

Investing in deregulation and streamlining

Red tape and its cost to business can be reduced by streamlining approvals and regulation

Major projects sometimes need more than 70 different primary and secondary approvals, licences, permits and authorisations. The Australian Government believes one-stop shops for environmental approvals to remove duplication in environmental approvals processes will reduce both the cost and time it takes to assess projects. Work is already underway to confer certain regulatory powers in some jurisdictional waters to the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA). The Australian Government supports this approach in all state and territory waters[10].

There is also work underway to ensure that the offshore oil and gas resource management framework for Commonwealth waters continues to support efficient, innovative and cost-effective commercial exploration and development consistent with the national interest[11].

Differences in standards between Australia and its global trading partners for sectors such as industrial chemicals and equipment often lead to cost and delays in sourcing materials for energy resources projects. Where appropriate, harmonising Australian standards with credible international standards by accrediting endorsed international standards will reduce duplication and inconsistency.

Investing in information

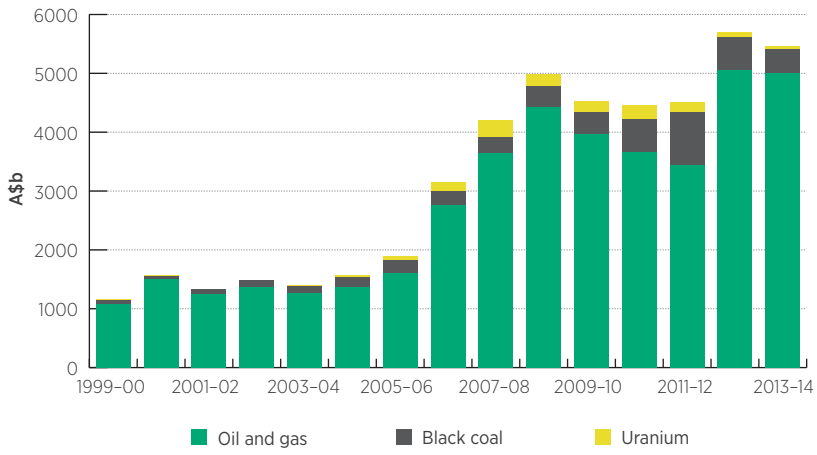
Energy resources, technologies and services are also highly dependent on the information sciences. Pre-competitive geoscience and environmental information, mapping and monitoring energy sources, the cost and uptake of technologies and the identification of supply risks are critical to ongoing energy resources development.

The availability of pre-competitive geoscience information helps position Australia in attracting investment. It helps encourage exploration and the opening up of new resources in new locations and for new sources.

The Australian Government is committed to providing high-quality pre-competitive geoscience information to encourage the exploration and development of energy resources.

Investing in pre-competitive geoscience encourages exploration and investment

Figure 19: Australia's energy exploration expenditure



Source: BREE 2014a

The availability of environmental information helps speed up the environmental assessment process and assure stakeholders that approval decisions are being taken on the basis of sound and authoritative information. Publicly available information therefore helps project proponents by reducing cost and the time taken for assessments. The use of transparent and independent information in the assessment process will help reduce stakeholder concern about the potential impact of projects[12].

Improving energy outlook capability will provide a forward looking view of threats and opportunities

Australia needs to be able to respond quickly to major changes in the way we produce, transport and use energy resources and energy. The need to change could come from a breakthrough in the cost or availability of disruptive technology. It could also result from better monitoring to anticipate changes in consumer demand or resources availability.

Some of the most significant impacts on Australia's energy markets in recent years have come from international developments, such as the rise of unconventional gas production in advanced economies such as the US, the falling oil price in the latter half of 2014 and early 2015 and the decline in nuclear power in Japan. Such developments have the potential to substantially realign global energy markets over the next few years. A better outlook capability will help with early identification of potential change[13].

Investing in community engagement

Public concern can be addressed through trusted, independent and reliable information

Addressing stakeholder concern is becoming increasingly important for resources projects. Local communities can be major beneficiaries of responsible resources development. Securing social licence to operate is an increasingly significant issue as regulators respond to public concern in ways that reflect public disquiet rather than taking an objective science-based approach.

This is most obvious in the development of coal seam gas (CSG) resources. Some stakeholders argue the Australian Government should retain project approval rights for environmental issues, in addition to state approvals. Other stakeholders support the streamlining of environmental approvals for CSG. They argue that decisions about CSG should be based on evidence and more effort should be invested in engaging with the community about project impacts. The Australian Government is committed to achieving co-existence outcomes that balance the need for new gas development with the rights of landholders and the integrity of prime agricultural land and water resources. The gas supply strategy the Government is developing with stakeholders will inform communities and facilitate the responsible development of gas resources.

Better engagement with affected communities should be a priority for energy resources project developers. There is also a role for government in providing robust and transparent information so these communities can take confidence in the evidence base being used in decision-making. The Australian Government is assisting in this regard through the work of national science institutions such as the CSIRO, the Bureau of Meteorology and Geoscience Australia. The Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development provides scientific advice to decision makers on the impact that CSG and large coal mining developments may have on Australia's water resources. The Australian Government also funds bioregional assessments and other research (Department of Environment 2015a)[14].

Investing in new energy sources and technologies

Australia's energy future should enable the rapid adoption of new energy supply technologies, improvements in existing technologies and new energy sources that will help enhance economic development, productivity and affordability. Many such technologies will also reduce the emissions intensity of the current generation fleet.

Australia's energy system should be capable of rapid adoption of new technologies and energy sources

Innovation to deliver reliable, low cost, sustainable energy will help Australia maintain a leading position in the export of energy resources and services in a highly cost competitive global market. Adoption of new technologies should be a priority in the whole energy value chain, from exploration and development through to end use.

Australia is a world leader in many areas of emerging energy supply technology, but it does not need to lead the development of every energy supply technology suitable for deployment here. There are many areas where no local research and development is required for Australia to apply new technologies as they do not need either further development or adaption to Australian conditions. For others, where there is a need, targeted research and development can provide better outcomes.

Case study: Pushing the boundaries on solar

Research and development of solar technologies is progressing rapidly and Australia is at the forefront. Researchers at the University of New South Wales (UNSW), with funding support from the Australian Government, converted over 40 per cent of the sunlight hitting a solar installation into electricity, building on their previous record. Australia is also at the forefront of solar thermal technologies. Australian researchers at CSIRO, in partnership with Spanish company Abengoa Solar, have generated the hottest pressurised "supercritical" steam ever produced using energy from the sun to drive a modern, highly efficient steam turbine. This accomplishment moves solar thermal energy a step closer to being able to compete with fossil fuels.

Australia must have the right environment to support the early adoption of a proven solution developed elsewhere. This includes targeting the right global collaborations, building skills, preparing the regulatory system and paying any additional costs of fitting a new technology to Australian conditions. The introduction of new technologies will require Australia's energy sector to be open and attractive to domestic and international investment[15].

Figure 20: Schematic example of Australia's energy research investment prioritisation approach

		Uniqueness of the issue solved	
		Common globally	**Priority for Australia**
Australia's natural advantage	**Minor**	**EXIT** Example: methane hydrates	**CONSIDER** Example: remote distributed generation such as solar-diesel hybrid
	Major	**CONTRIBUTE** Example: Low emissions fossil fuel technologies	**FOCUS** Example: Cost competitive extraction techniques of "hot and deep" shale gas in the Cooper basin

Australia needs to better focus government investment on supporting emerging energy technologies, rather than continue to provide assistance in an ad-hoc manner through a wide variety of programme managers. The Australian Government currently supports a portfolio of organisations and activities to deliver on innovation in the energy sector, including through universities and national scientific organisations.

Direct Australian Government support for energy technology research and development and deployment (RD&D) will increasingly be provided on a technology-neutral basis. A more coordinated approach would allow for better prioritisation of activity in new energy technologies where there are local issues to solve, areas where Australia has a natural resources advantage and where we have industry capability to commercialise our research.

Prioritising investment where there are local issues to solve or where Australia has a competitive advantage

Australia's RD&D investment should focus on new energy technologies, improvements in existing technologies and new energy sources that will help enhance economic development, productivity and affordability. Many such technologies will also reduce emissions. Careful investment decisions and real choices are needed to maximise the benefit from the successful development and deployment of a new technology.

Innovation in extracting or utilising our abundant energy resources so they can be used domestically at least cost is a priority. Innovation in areas where technology change will assist Australia's export advantage should also be a priority. For example, as one of the world's largest exporters of fossil fuels, it is in Australia's national interest to contribute to the development of low emissions technologies globally. Without commercially available and cost competitive low emissions fossil fuel technologies, there is a growing long-term risk for our fossil fuel export industry in an emissions constrained future.

Industry and government collaboration

Governments, by their nature, are slower to advance new technologies than companies with commercial drivers to get new products to market. Governments tend to target funding at the early stages of research and development because the private sector has difficulty in capturing all the benefits from early-stage research. Industry investment in later stages supports the development of technologies. Industry investment signals a technology's potential and industry applicability.

The Australian Government is committed to working with industry and researchers to ensure the $9.2 billion that is invested annually in science and research is targeted to deliver the best outcomes for the nation, as well as improve commercial outcomes and practical benefits. Australia has a global reputation for producing high quality scientific research, but lags behind international competitors on measures of translating that research into commercial outcomes. Commercial outcomes include the ability to capture the spillover benefits of research and technology development.

The rate of collaboration between Australian businesses and researchers is comparatively low. Australia ranks 29th and 30th out of 30 OECD countries on the proportion of large businesses and SMEs collaborating with higher education and public research institutes on innovation (Department of Education & Department of Industry 2014).

The recently established Commonwealth Science Council will advise the Government on areas of national strength and current and future capability[16]. It will help find ways to improve connections between government, research organisations, universities and business. This will better translate science and research into commercial outcomes. Energy, resources and transport are among the priority areas considered by the Council.

The Council agreed that further consultation on science and research priorities, and the practical challenges underpinning them, should be undertaken for consideration at its next meeting in 2015.

The process to develop the priorities will take into account areas of research excellence, industrial strength, global trends, comparative advantage and Australia's interests and needs. Research to support the energy and resources sector should include the development of reliable, low cost, sustainable energy supplies and enhance the long-term viability of Australia's resources industries.

The Industry Innovation and Competitiveness Agenda sets out the Australian Government's new direction on industry policy to boost productivity and competitiveness. It creates Growth Centres in five high-growth industries, including oil, gas and energy resources, and mining equipment, technology and services.

The Oil, Gas and Energy Resources Growth Centre and the Mining Equipment, Technology and Services Growth Centre will be industry-led. They will foster better use by industry of Australia's world-class researchers so that the community sees stronger commercial returns from the Government's annual investment in research. They will promote the innovation required to increase global competitiveness and productivity and deregulation reform.

The Australian Government's Entrepreneurs' Infrastructure Program supports industry in a range of areas, including improving the capability of small business, such as by connecting them to the research sector (Department of Industry and Science 2015g). Innovative small business better supports supply chains for energy resources projects[17].

The Australian Government will establish research priorities to deliver the best commercial outcomes for its $9.2 billion annual investment

Implementing the $188.5 million Industry Growth Centres Initiative to lift the competitiveness and productivity of the oil, gas and energy resources sector

Competitiveness and commercial returns will be increased through Industry Growth Centres

Investing in promoting Australia's capabilities

Products and services exports will be grown through active promotion in overseas markets

International engagement is integral to Australia's ongoing prosperity and a vital element of the Government's vision for enabling growth and productivity for globally competitive industries. Open and transparent global energy markets are the best means of promoting Australia's economic interests.

Capitalising on the benefits of energy resources exports requires active promotion in overseas markets, with benefits flowing directly through participation in the projects, and indirectly through supply chains. The promotion of investment into Australia and Australian investment internationally is one of the four pillars of Australia's economic diplomacy policy[18].

The Australian Government's enhancement of economic diplomacy directly supports the prosperity of Australians by liberalising trade, boosting economic growth, encouraging investment and assisting business. Economic diplomacy uses our international diplomatic assets to advance Australia's prosperity and global prosperity, based on four key pillars:

1. promoting trade—pursing trade liberalisation through bilateral, regional and global trade agreements that open up new markets for Australian exporters and sustain a strong, rules-based architecture for global trade
2. encouraging growth—supporting global growth, including by using Australia's aid programme and other measures to promote economic reform and infrastructure, and through regional and global economic cooperation forums
3. attracting investment—promoting investment into Australia and Australian investment internationally
4. supporting Australian business—advancing the interests of Australian business overseas, developing a stronger private sector in our region, and promoting Australian tourism.

The Australian Government recognises the importance of inward foreign investment to the resources and energy sector and Austrade, working with the states and territories, has identified the industry as one of its five national investment priorities. Investment is targeted into new exploration and development opportunities, as well as into gaps in supply chains, where new entrants often bring technologies and skills that assist in driving productivity improvements across the industry. Investment into energy efficiency and renewable energy projects is also a target of Austrade, including identifying opportunities where renewable energy solutions can be applied to and assist mining projects through the provision of off-grid power solutions that will drive productivity gains.

Working through Austrade's extensive off-shore network, critical markets for investment into Australia's resources and energy sector include Western Europe, the US, China, India, Japan and Republic of Korea. The recruitment of Senior Investment Specialists across all priority sectors has recently added commercial experience and acumen to Austrade's investment attraction efforts.

The Australian Government has taken steps to help grow energy resources exports, including free trade agreements with Japan, the Republic of Korea and China, and regional cooperative efforts through the Trans Pacific Partnership Agreement.

Australia's future electricity mix

Australia's large quantities of traditional energy resources provide low cost, predictable and reliable power for Australia and the world. However, the use of fossil fuels in generating electricity from the current infrastructure contributes over one third of Australia's total greenhouse gas emissions.

Australia also has world-class solar, wind and geothermal resources and good potential across a range of other renewable energy sources and emerging transport fuels. Changes in Australia's energy mix can emerge quickly, with the most recent example being the rapid uptake of solar PV. Australia needs to take advantage of new technologies that can contribute to the reliable and affordable supply of energy. New energy sources and technologies can increase the flexibility and sustainability of the energy system, as well as help lower emissions and provide potential export opportunities. However, the cost competiveness of new technologies typically improves as production efficiencies evolve. Ongoing product improvements also typically follow product maturity. Prematurely forcing new technologies in the energy market through policy interventions runs the risk of early adoption coming at a higher cost and lower efficiency than if that product found its way into the market on a competitive basis.

The Australian Government will maintain stable, predictable and technology-neutral policy settings

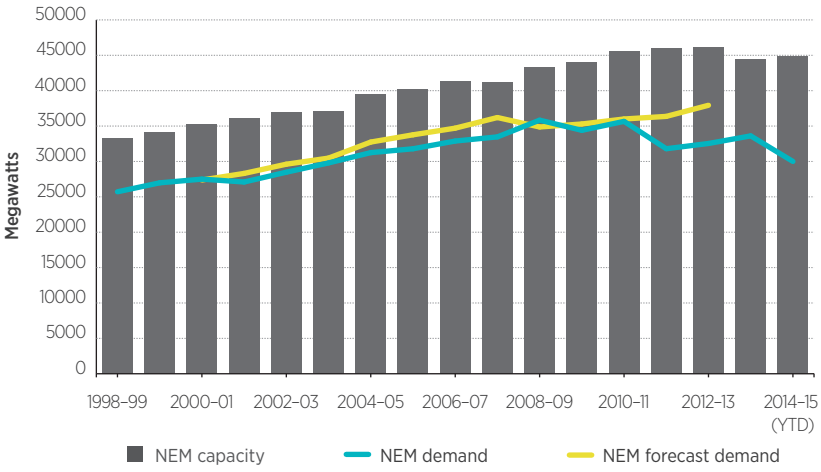
AEMO estimates that Australia has a major oversupply of electricity generation capacity (AEMO 2014). The largest proportion of our power is generated by coal-fired power stations, with around three quarters of these plants operating beyond their original design life. Some will require either costly refurbishment investment or decommissioning over the coming two decades (CPCU 2014) but AEMO estimates that new generation capacity is not needed before 2023–24.

The entry and exit of generation capacity should occur within the market framework established for the NEM

Policy frameworks that create barriers to exit and keep unprofitable generation supply in the market can have the effect of deterring investment in new, more efficient and lower emissions plants. Once these plants retire or electricity demand increases sufficiently, Australia will need investment in new generation assets.

The energy market has proven to be a robust mechanism for driving efficient outcomes and is the appropriate mechanism to signal the timing of decommissioning of generation. Energy market rules have been developed to allow generators to enter and exit the market. Some stakeholders believe government should provide incentives for generator exit if it becomes clear that the normal forces of supply and demand are not sufficient to restore equilibrium. Others argue this is not government's role as competition from emerging technologies is a normal business risk and generation owners make commercial decisions based on long-term expectations of rates of return.

Figure 21: National Electricity Market capacity and demand



Source: AER 2015

The Australian Government will not be pursuing policies to "pay" for exit of surplus generation capacity

The Australian Government will not be pursuing policies to "pay" for exit of surplus generation capacity. This could unfairly shift costs onto either consumers or taxpayers. The COAG Energy Council supported this position in December 2014.

The low wholesale prices from oversupply and the amount of generation capacity temporarily mothballed without any permanent closure have implications for the future uptake of new technologies and sources. The Energy Council will consider whether there are any material non-market barriers to orderly exit and permanent closure. The regular assessment by AEMO of overall system reliability will determine whether retention of commercially marginal generation assets poses a risk to network reliability.

Investment decisions on future generation assets, including choice of technology, are best made by industry, given its insights into market needs. The Australian Government will seek to maintain stable and predictable policy settings across the range of areas that affect such investment decisions, while taking a technology-neutral approach.

Low emissions fossil fuel

The commercial availability of low emission technologies would support global efforts to reduce greenhouse gas emissions

Electricity produced from fossil fuels, particularly coal, is expected to continue to play a vital role in providing low cost energy around the world until the cost of renewable power becomes more competitive (IEA 2014a).

Investment support for low emissions technologies is important to Australia as a major user of coal-fired power and can aid international development efforts that help economic growth in developing countries by using coal and gas while limiting emissions.

Industrial processes that rely on the combustion of fossil fuel are responsible for a significant proportion of Australia's CO_2 emissions. If the CO_2 can be captured before it is released to the atmosphere it can either be utilised in other products or permanently stored in deep geological formations. Australia has worked closely with other countries which rely heavily on fossil fuels to investigate opportunities to utilise CO_2 in products such as carbonated drinks and plastics or to enhance the growth of oil-rich algae in solar bioreactors to produce biofuel. While these processes are promising, there is no commercial CO_2 re-use in Australia, largely reflecting the high cost of capturing the CO_2 from a flue gas stream.

Currently, geological storage is the only way to permanently remove large amounts of CO_2 from the atmosphere. The capacity to store CO_2 will be critical to Australia's continued reliance on coal-fired power stations and our capacity to reduce emissions from our LNG sector. It will also open up the opportunity to create a new export market for Australian brown coal, helping us make the most of one of Australia's competitive advantages. Brown coal is readily converted to a range of fuels, including briquettes, synthetic diesel and hydrogen, but many of these processes are emissions intensive.

In Australia, the focus of Australian Government investment will be on ensuring Australia has the capacity to permanently store CO_2 in deep geological formations where necessary. Australia's first operating carbon capture and storage (CCS) project, Chevron's Gorgon LNG project, aims to begin storing approximately 3.4–4 megatonnes of CO_2 underground each year from 2016. The Gorgon project will be the world's largest CO_2 storage project. Australia is set to be largely an early adopter of carbon capture technology. We have invested significantly in driving global approaches to lowering the cost of capture through the Global Carbon Capture and Storage Institute and the IEA.

The Australian Government is also investing in reducing methane emissions from coal mining and Australian-developed technology is leading the way in converting methane to energy[19].

The Australian black coal industry is the only industry in the world to voluntarily put a levy on production to fund work related to the demonstration of low emissions coal technology solutions. The COAL21 Fund has committed more than $300 million to demonstration projects to reduce emissions from coal mining and coal combustion through CCS (MCA 2014b). In October 2014, the coal industry established the Low Emissions Technologies for Fossil Fuels Leadership Roundtable to focus on reducing carbon emissions from the use of fossil fuels (MCA 2014a). This will bring together the coal, oil and gas, and power generation industries, research organisations, the Australian and state governments and the Global CCS Institute to consider the next stages in the development of low emissions technologies for fossil fuels.

The increased use of high efficiency, low emissions (HELE) coal combustion technology will be important in making fossil fuels more sustainable. Increasing the efficiency of coal-fired power stations by 1 per cent reduces CO_2 emissions by 2 to 3 per cent (MCA 2014c). HELE technology is commercially available and should be part of global efforts to reduce greenhouse gas emissions. However, HELE technology is more expensive than other technologies. It is critical that developing countries have access to finance options that encourage the uptake of world best coal-fired power stations. Recent decisions by the World Bank, European Investment Bank and the European Bank for Reconstruction and Development to limit investment in coal-fired power plants limit the ability of countries to access finance for least cost and low emissions energy technologies.

Renewable energy

The policy of encouraging investment in renewable energy through the RET in a period of weak demand has contributed to Australia's excess generation capacity. However, renewable energy is an important part of Australia's diverse energy mix and the Australian Government is committed to supporting a sustainable renewable energy sector. The Australian Government remains committed to a RET that allows sustainable growth in both small- and large-scale renewables so that 20 per cent of Australia's electricity demand in 2020 comes from renewable sources. Support for household solar

The Australian Government is providing over $1 billion toward the research, development and demonstration of renewable energy projects

systems under the RET should not be changed; pressure on energy intensive trade exposed sectors should be reduced to provide support for Australian jobs; and the requirement to review the RET every two years should be removed to give much needed clarity to the renewable energy sector. This policy recognises the unanticipated reduction in electricity demand and strikes a balance between the ongoing development of renewable energy and disruption to electricity markets.

In addition to the RET support for small- and large-scale renewables, the Australian Government is providing over $1 billion toward the research, development and demonstration of renewable energy projects. The Australian Renewable Energy Agency (ARENA) was established as a statutory entity to make renewable energy solutions more affordable and increase the amount of renewable energy used in Australia. It has currently committed over $1 billion to more than 200 projects. The Clean Energy Finance Corporation invests in projects that use a commercial approach to overcoming market barriers and mobilising investment in renewable energy, energy efficiency and low emissions technologies. The Australian Government has announced that it will abolish these agencies, but maintain a commitment to existing projects.

The development of cost-effective energy storage could bring about a paradigm change in the way Australia produces, transports and consumes energy. The most profound effect will be in renewable energy, as storage can help overcome current limitations of intermittency in generation. With Australia's long, thin electricity grid and large share of remote power generators, Australia could benefit significantly from major advances in storage technologies. As affordable storage develops, it is important that Australia's existing regulatory framework can accommodate this change.

The Future Grid Forum work led by CSIRO and adopted by the Energy Council helps anticipate the potential challenges facing the sector and enables the 'stress testing' of regulatory impacts. The growth of disruptive technologies and advances in energy storage (including electric vehicles), combined with greater consumer engagement through demand response and self-generation, could have major implications for electricity markets. Networks may need to adapt from the generator-to-customer transport system of the past to acting more as trading platforms between distributed energy users and producers.

Nuclear energy

Nuclear energy technology continues to develop at both the large-scale plant level and through small modular reactors. The construction or operation of nuclear energy plants in Australia cannot be approved under either the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) or the *Australian Radiation Protection and Nuclear Safety Act 1998* (the ARPANS Act). The safety standards for nuclear technology and the safety systems and regulation of nuclear power are continually improving.

Some stakeholders are opposed to nuclear energy in Australia because it is costly in comparison to renewable technologies, requires significant amounts of water and brings with it the problem of disposing of radioactive waste. Other sections of the community support a local nuclear industry. They argue nuclear power provides adequate, affordable and reliable energy, in addition to having significant environmental benefits and public health advantages over other existing baseload technologies. They note it is a mature and innovative industrial sector globally, which has significantly improved safety and operational efficiency.

Australia has regulations for the Lucas Heights research nuclear reactor in New South Wales and radioactive waste management. These regulations also cover the physical protection and International Atomic Energy Agency (IAEA) safeguards on nuclear material, equipment and activities. The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) regulates the safe and secure use of radiation sources by Australian Government entities. The Australian Safeguards and Non-proliferation Office (ASNO) regulates the physical protection and IAEA safeguards requirements on nuclear material, equipment and activities. The Australian Nuclear Science and Technology Organisation is responsible for delivering specialised advice, scientific services and products to government, industry, academia and other research organisations. Ongoing investment in the nuclear regulatory framework and further development of Australia's nuclear knowledge and skills will underpin future regulatory capability, if required.

The Australian Government will consider the outcomes of the South Australian Royal Commission into its future involvement in the nuclear fuel cycle including the mining, enrichment, energy and storage phases for the peaceful use of nuclear energy. The Royal Commission will allow for a considered and informed community discussion on nuclear industries and energy, examining the opportunities and the risks[20].

Australia's future transport energy mix

Unlike electricity and gas, Australia is increasingly dependent on imported transport fuels. While developments in alternative fuel technologies continue, alternative fuels are not yet cost competitive. This is mainly because of the cost of converting vehicles, consumer appetite, and for renewable fuels, the cost and alternative use of inputs to produce the fuel as well as barriers to using supply chain infrastructure. So long as these issues remain, alternative fuels will not be able to gain significant market share in the transport fuels market. Consistent with approaches elsewhere in the energy sector, the Australian Government prefers to not intervene in a way that promotes one technology over another or forces technologies that are not cost competitive into the market at a cost to consumers or taxpayers.

The Australian Government's preference is not to intervene in a way that promotes one technology or fuel source over another

Alternative fuel sources for cars that are showing promise include hydrogen, the development of which could add value to Australia's brown coal resources or use our abundant solar resources. Research continues to reduce the challenges to hydrogen becoming commercially viable as an alternative transport fuel.

Research has also sought to advance alternative fuels for aviation; however, there are feedstock and infrastructure challenges. For example, in Australia there is not enough existing feedstock or refining infrastructure for a biofuel-powered airline industry. Despite these barriers, biofuels remain a transport fuel opportunity in Australia.

Electric vehicles are commercially available in Australia and have the potential to be a more mainstream transport option. They have a number of advantages over conventional vehicles that can be realised if their upfront cost continues to come down and infrastructure (range) challenges can be overcome. Electric vehicles have lower running costs, environmental benefits and can assist with managing demand on the electricity system if consumers are provided with an incentive to charge outside of peak energy use times. Charging electric vehicles at off-peak times improves the utilisation of electricity infrastructure by increasing demand on the electricity grid at these times. Batteries in electric vehicles could also be used as a storage device to meet household demand or demand on the electricity grid through feeding back to the grid at peak times.

Box 3:

Australian Government activities to increase investment

1. Implementing the **Industry Innovation and Competitiveness Agenda**, including establishing and supporting the Oil, Gas and Energy Resources, and the Mining Equipment, Technology and Services Growth Centres. These Growth Centres will be established from early 2015 to encourage business research collaboration, reduce excessive regulation, improve workforce skills, strengthen global supply chain linkages, and improve commercialisation outcomes.
2. To improve investor confidence, particularly at a time of increased volatility in commodity prices, the Australian Government will develop a comprehensive **National Resources Development Strategy**.
3. Reforming the **Vocational Education and Training (VET) system** to ensure Australian businesses have the workforce they need to remain internationally competitive and innovative by:
   - ensuring the VET system is focused on delivering the skills that employers need from their employees
   - lifting the quality of both training providers and the courses they deliver
   - providing better information for students and employers about the relative value and quality of training options
   - removing red-tape and unnecessary regulatory burden from the system
   - providing effective incentives and subsidies that are targeted to employment outcomes.
4. Implementing the **$476 million Industry Skills Fund** to help Australian industry access training and support services, and develop innovative training solutions so Australia will have the highly skilled workforce it needs to adapt to new business growth opportunities, rapid technological change and market driven structural adjustment. In particular the Fund will prioritise the training needs of oil, gas and energy resources, and mining equipment, technology and services small to medium enterprises.
5. Acting on the recommendations of the review into integrity in the subclass 457 visa programme to ensure the programme is more flexible for employers whilst maintaining programme integrity. Improve **migration agreement processing** by:
   - streamlining negotiation provisions
   - publishing guidelines for greater transparency and certainty
   - using application forms to lead businesses more easily through requirements
   - introducing better consistency in requirements (training thresholds, for example) across the temporary skilled migration pathways.
6. Reforming enterprise agreement negotiations for new business development and investment projects, including resources projects, so negotiations do not unduly delay or jeopardise these projects. **Productivity Commission inquiry into the workplace relations framework** to ensure Australia's workplace relations system and its impact on the economy, productivity and jobs is equipped for the future.

7. Improving labour productivity in the building and construction industry, including re-establishing the **Australian Building and Construction Commission** to improve the enforcement of workplace relations laws and increase productivity on Australia's building and construction projects, whether onshore or offshore.
8. Ensuring leading practice **Indigenous and community engagement** in a range of contexts is illustrated and guide future mutually beneficial partnerships, by reviewing and releasing in late 2015 the Working with Indigenous Communities Handbook in collaboration with industry, research, academic and community representatives under the Leading Practice Sustainable Development Program. Review the **Working in Partnerships initiative** to ensure it continues to build effective long-term relationships and encourages wider adoption of best practice and solutions in relationships between the mining industry, services industries, and communities including Indigenous communities.
9. Delivering the reformed **Remote Jobs and Communities Program** from July 2015 to engage job seekers in activities that help them get a job and benefit their community. Deliver the **Indigenous Advancement Strategy**, which includes the Jobs, Land and Economy Programme to get adults into work, foster Indigenous business and help Indigenous people to produce economic and social benefits from effective use of their land, particularly in remote areas.
10. Continuing to work with state and territory governments to reduce duplication in the approval processes on land and coastal waters through a **'one-stop shop'** for environmental approvals. Continuing to work with states and territories on a **National Review of Environmental Regulation** to identify unworkable, contradictory and incompatible environmental regulation.
11. Reviewing the **offshore oil and gas resource management framework** applying in Commonwealth waters to ensure it continues to support efficient, innovative and cost-effective commercial exploration and development consistent with the national interest.
12. Supporting conversion of data from **environmental information systems**, services, and tools into objective-based information and knowledge to enhance exploration and the opening up of new resources, reduce time and cost associated with approvals, and assure stakeholders that approval decision are being taken on the basis of sound and authoritative information.
13. Improving the coordination of energy sector reporting to produce regular **energy 'outlooks'** to give a more forward-looking view of resources availability, energy technology assessments and threats and opportunities to security of supply.
14. Strengthening the science underpinning regulatory decisions on the water-related impacts of CSG and large coal mining development through the **Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development** that provides advice to Australian Government and state and territory regulators. Funding **bioregional assessments** and other research to better understand the potential impacts of coal seam gas and large coal mining developments on water resources and water-related assets.
15. Supporting **international engagement** on energy technology to shape international energy policy on strategic energy technology topics to support global growth and Australia's trade and investment objectives. This engagement should ensure that

international agreements do not impose barriers on the development and deployment of, or the trade in, energy technology.

16. Implementing **science and research priorities**, including energy and resources, that will drive investment in areas that are of immediate and critical importance to Australia. This will take into account areas of research excellence, industrial strength, global trends, comparative advantage and Australia's interests and needs. Research under the energy and resources priority will support the development of reliable, low cost, sustainable energy supplies and enhance the long-term viability of Australia's resources industries. Implementing the **Commonwealth Science Council** to focus science as the catalyst for industry growth and efforts to further capitalise on our areas of competitive strength, foster stronger links between business and science and boost the commercial returns from Australia's extensive research portfolio.
17. Implementing the **$484.2 million Entrepreneurs' Infrastructure Programme** to provide Australian energy companies with an avenue for structural and strategic support to capitalise on growth opportunities within the sector.
18. Capitalising on the benefits of energy resources exports through leveraging and growing our **economic diplomacy efforts** of:
    - promoting new market access into North Asia from recent Free Trade Agreements with Japan and South Korea
    - implementing recently concluded Free Trade Agreement with China and capitalising on preferential access into the Chinese market
    - committing to conclude a Free Trade Agreement with India
    - delegations of senior Australian business leaders accompanying significant prime ministerial and ministerial trips overseas
    - taking a true "Team Australia" approach working hand in hand with state and territory governments to attract investment through identifying the resources and energy sector as one of five National Investment Priorities
    - profiling resources and energy through Austrade to promote, attract and facilitate investment opportunities in the Australian energy and resources sectors consistent with the Resources and Energy National Investment Priority
    - appointing a Senior Investment Specialist in Austrade to facilitate resources and energy investment
    - implementing the Trade and Investment Policy Advisory Council consisting of 20 experts in their respective fields to offer the Australian Government insight and expertise across the five National Investment Priorities
    - supporting export related services to help Australian exporters and investors access overseas markets through the Export Finance and Insurance Corporation (EFIC). In addition EFIC will support SME suppliers that are integral to an Australian resources-export project.
19. Supporting **research and development, demonstration and pre-commercial deployment** of renewable energy technology as well as carbon capture and storage and technology to convert fugitive methane emissions to energy. Supporting bilateral partnerships on **technology innovation** such as the Australia China Joint Coordination Group on Clean Coal Technology.
20. The Australian Government will **monitor international developments** on nuclear energy and will continue to work with the states and territories on improving the regulation of nuclear industries. Improvements include responding to technical developments and the **streamlining and removal of any unnecessary regulation**.

CHAPTER 4

Stimulating change

Stimulating change

The Energy White Paper is central to the Australian Government's economic reform agenda for a strong and prosperous national economy. Used productively, reliable and affordable energy supports business competitiveness, lowers the cost of living and grows export income.

Australia's energy markets have been established to encourage competition and, generally, allow commercial decisions to determine entry and exit from the market. Reforms are needed to create greater competition and drive innovation and productivity. There is no 'silver bullet' to achieve the change needed in the energy sector. Coherent and constructive market reform and properly integrated polices will give industry and consumers confidence in energy policy.

The Australian Government can undertake some reforms directly, using information and influencing or policy levers such as incentive payments, regulation and taxation. The Government will only seek to intervene where necessary. The successful implementation of many of these reforms must be driven or supported by cooperative action involving states and territories and, in many cases, industry.

The Australian Government has already initiated a comprehensive range of actions to put downward pressure on electricity and gas prices and increase Australia's future competitiveness as a global supplier of energy resources:

- The $5 billion Asset Recycling Initiative will encourage the states and territories to free up capital to invest in additional economic infrastructure through privatising state and territory-owned assets.
- The $188.5 million Industry Growth Centres will lift competitiveness and productivity by focusing on areas of competitive strength, including the oil, gas and energy resources sector and the mining equipment, technology and services sector.
- The $476 million Industry Skills Fund will enable Australia to have the highly skilled workforce needed to adapt to new business growth opportunities, rapid technological change and market-driven structural adjustment. The fund will prioritise the training needs of oil, gas and energy resources, and mining equipment, technology and services SMEs.
- The $484.2 million Entrepreneurs' Infrastructure Programme will provide Australian companies with structural and strategic support to capitalise on growth opportunities.

Other specific activities that the Australian Government has already announced are set out at the end of each chapter.

The Australian Government will accelerate the contribution of the energy sector to Australia's economic wellbeing by developing a National Energy Productivity Plan to increase Australia's national energy productivity by up to 40 per cent by 2030.

The COAG Energy Council, chaired by the Australian Government, is responsible for pursuing priority issues of national significance and key reforms in the energy and resources sectors. The growing engagement of industry with the Energy Council helps build industry cooperation, without which energy market reform would be more difficult, if not impossible.

The Australian Government has led a reinvigoration of the Energy Council agenda in gas and electricity market reforms. In December 2014 the Energy Council committed to address emerging challenges in the key areas of:

- reducing investment uncertainty in generation
- securing the benefits of technological change through supportive networks
- enhancing a national approach to retail issues
- improving energy use decisions through a national energy productivity framework
- accelerating gas market transformation and resources sector productivity and development.

These issues are all critical to delivering the Australian Government's vision for the energy sector. The Australian Government will lead a collaborative process during 2015–16 to prioritise and deliver ambitious responses to the challenges considered by the Energy Council in the development, supply and use of energy. The Australian Government is according the highest priority to the reforms set out in **Attachment 1**.

ATTACHMENT 1

Australian Government COAG Energy Council priorities for 2015

Australian Government COAG Energy Council priorities for 2015

The Australian Government is committed to driving timely COAG energy market reforms in 2015. The Australian Government has been working closely with states and territories and other stakeholders to reinvigorate and prioritise this reform agenda, including proposing focus areas that require action in 2015.

1. Deliver reforms agreed by the Energy Council in December 2014 (www.scer.gov.au). This includes working closely with states and territories and the energy market institutions to clearly prioritise and provide clear timelines and accountabilities around these reforms.
2. Reduce investor uncertainty, particularly for investors in electricity generation, as a priority. The Australian Government will not pursue policies to "pay" for exit of surplus generation capacity but will work closely on early introduction of wholesale market information and monitoring of reliability. The Australian Government will continue to place a high priority on work to bring responsible changes to the RET to deliver that certainty.
3. Deliver by the end of 2015, concrete steps for the Energy Council and industry to roll out network tariff reform, and complete important strategy work about necessary changes to network regulation due to changing network business models. To ensure the current regulatory provisions are flexible and robust in light of emerging opportunities, new technologies, potentially changing customer expectations and declining demand, the Australian Government will respond to the outcomes of the Council's current 'scenario testing' of regulatory provisions to deliver regulation as an enabler and not a barrier to network change.
4. Lower the regulatory burden for energy businesses and market participants by continuing to advocate for consistent national laws. This will focus on seeking commitment to clear timelines for implementation of the National Electricity Customer Framework, and progressing a review of options to better harmonise national energy laws and lower costs of businesses operating across jurisdictions.
5. Increase opportunities for households and businesses to take control of their energy costs, by seeking agreement, by the end of 2015, to consistent national approaches to the way consumers interact with energy markets, and improve tools for empowering and engaging consumers in relation to their energy use and costs.
6. Build off the analysis of the Eastern Australian Domestic Gas Market Study to deliver the vision agreed with the Energy Council for gas markets. In particular, accelerate the development of a more liquid wholesale gas market, through supporting targeted analysis, by the AEMC by the end of 2015, of refinements to the trading hubs which could enhance price discovery and risk management. The Australian Government will also lead the development of a plan to reduce impediments to responsible development of gas supply, leveraging off our science and research base to better coordinate and inform stakeholders on the development of the industry.

7. Drive improvements to energy market governance by providing secretariat and support services to enable the independent COAG Review of Governance Arrangements for Energy Markets to be completed before the end of the year. The Australian Government will also respond to the outcomes of the independent review of competition policy as they may apply to the energy regulatory governance arrangements.
8. Lead work with the states and territories through the Energy Council to develop the Council's national energy productivity framework in a way which is complementary to the Australian Government's National Energy Productivity Plan. Agreement to the policy framework and the role of states and territories will be sought at the mid-2015 Energy Council meeting, with adoption of the Energy Council's framework for energy productivity including proposed measures at the end 2015 meeting.
9. Provide world class geoscience information as an essential element to attract commercial exploration. Improving Australia's mineral and energy resources knowledge base through the work of Geoscience Australia and counterpart state and territory geoscience agencies is a priority. This will include reducing barriers to investment in exploration by implementing the recommendations of the Productivity Commission's Report into Mineral and Energy Exploration.
10. Identify opportunities to enhance use of non-proprietary information through greater public access and eliminating duplicative survey and collection effort. Resources exploration and development generates a wealth of information on Australia's mineral and energy resources natural environment, our cultural and social heritage and on health and safety outcomes. These improvements could significantly reduce costs for business while also improving the quality of public understanding and debate, building on the strong reputation of independent data providers such as the CSIRO.
11. Tackle unnecessary approvals processes by identifying further opportunities to streamline or remove unnecessary regulation that impedes mineral and energy resources development, including greater use of strategic/regional assessments; pursuing nationally consistent offshore regulatory frameworks; and identifying opportunities to collaborate on approaches to implementing mine safety regulatory requirements to improve consistency.
12. Ensure regulatory and policy frameworks and baseline information supports development of new mineral and energy resources opportunities, particularly natural gas from tight and shale rock formations, less common minerals and rare earths.
13. Proactively improve community engagement and understanding of the mineral and energy resources sector. This includes sharing leading practice approaches and case studies to improve community engagement and facilitating coexistence of resources development and other land uses in regions with strong resources potential.

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