

Executive summary

1 Overview

Energy is fundamental to our modern economy and society, and access to secure, reliable and competitively priced energy has been a cornerstone of Australia's economic and social development. In this context, it is critical that energy policy continues to strike an appropriate balance in delivering energy security, facilitating economic development and meeting clean energy goals.

Australia is a large continent with a small population and an open economy, and ensuring that our energy markets deliver efficiency to minimise costs for consumers while also providing a commercially attractive environment for investment remains the core challenge. This required investment – much of which will be sourced from foreign capital – is necessary to deliver energy security and provide the technological transformation we expect to see in the energy sector in the decades ahead.

A lot has changed in Australia and globally since the last Energy White Paper was released in 2004 and energy policy and energy supply strategy and management has never been more complicated. Continued strong growth in Asian economies has seen the value of our annual energy exports rise from \$24 billion to around \$69 billion. We have undertaken further key reforms in our domestic energy markets and have now legislated a carbon pricing mechanism that will drive a long-term transformation to cleaner sources of energy. Technological advances and strong international gas prices have unlocked major new coal seam gas reserves on Australia's east coast and new offshore gas developments in Western Australia – this has broadened our energy possibilities and will significantly alter our east coast gas and electricity markets.

In recent years Australia has entered a new phase of investment in its energy supply sector as we expand and replace our current energy infrastructure – particularly our ageing electricity networks – largely to meet reliability standards and support growing peak demand. This has seen energy prices rise, with retail electricity price increases of 40 per cent in the last three years – and further sustained increases are likely for the rest of this decade.

The outlook for Australia's energy security to 2030 is considered to be generally robust and positive. However, there are possible risks and the energy sector faces an unprecedented set of challenges.

The need for new investment and rising costs of production mean that the era of cheap energy is over, and energy policy must be mindful of the impact that this will have on consumers, both residential and commercial – and particularly vulnerable consumers.

However, governments cannot artificially hold energy costs below costs of supply. If we are to maintain investment and promote the efficient use of energy, then prices must reflect the cost of supply in a competitive market. Interventions to manipulate or suppress efficient pricing outcomes will have detrimental investment and supply consequences that are not in the long-term interests of consumers. Our markets and energy policies must ensure efficiency so that we achieve our investment and transformation requirements at minimal cost to consumers.

Large-scale investment must be delivered to meet the growing demand for energy – particularly peak electricity demand – while at the same time seeking to achieve reductions in our greenhouse gas emissions and improve energy productivity. This must be done in a way that supports continued national competitiveness, economic growth and the aspirations of the Australian people.

Over the next two decades, we expect to see significant growth in gas-fired electricity generation in response to carbon pricing signals along with a continued expansion in wind energy and other renewable energy technologies as they become increasingly commercially viable.

Demand for petroleum fuels will continue to be strong, although this will be increasingly met by a growing level of imported product through well-established and proven supply chains. Australian refineries will face continued pressure from international competitors and there may be further reductions in Australia's domestic refining capacity.

The introduction of a carbon price along with complementary measures to address non-market barriers will also further drive the uptake of economically sensible energy efficiency opportunities. Industry and commercial operations account for 83 per cent of Australia's total energy use and households make up the remaining 17 per cent.¹ This is important when thinking about where the opportunities are to improve energy efficiency. The Australian Government's Energy Efficiency Opportunities program has made significant gains in industrial energy efficiency outcomes.

Achieving our clean energy ambitions will require the global community to successfully develop, adapt, commercialise and deploy new technologies and processes across a range of energy applications. This will include not just energy generation but also transport, energy storage, grid management, building design and more efficient end-use technologies.

For Australia the scale of investment required to deliver these goals is very large – it has been estimated that as much as \$240 billion might be needed by 2030 in the domestic electricity and gas sectors alone² – and this will place further sustained pressure on energy prices.

The timing of this new investment in energy, combined with the introduction of carbon pricing and the strong demand for energy in rapidly expanding Asia-Pacific markets, presents Australia with a unique window of opportunity to lock in a stronger and more efficient foundation for our long-term energy future.

The Australian Government continues to support the fundamental role of the market in delivering our energy future. In this context, all levels of government must seize the opportunity to set a clearer path for better-functioning energy markets by addressing a set of critical reform issues. These include:

- privatising government-owned energy assets – continued government ownership of energy businesses is impeding greater competition and efficiency, and reduces market confidence by creating uncertainty and risk for private sector investors
- fully deregulating retail energy prices where effective competition exists – this is an important reform that is needed to further stimulate business innovation and improve customer outcomes and empowerment, recognising that social policy frameworks are the most appropriate mechanism to support vulnerable consumers
- implementing an improved energy productivity (demand side) framework (including ensuring that investment incentives are appropriate) to efficiently reduce peak-demand growth and provide an enhanced set of options for consumers to better manage their energy use and costs

¹ Department of Resources, Energy and Tourism, *Continuing opportunities: Energy Efficiency Opportunities (EEO) program – 2010 report*, RET, Canberra, 2011.

² Investment Reference Group, *Report to the Commonwealth Minister for Resources and Energy*, Department of Resources, Energy and Tourism, 2011.

- completing the transition to truly national energy markets – more work can be undertaken to extend the national energy market governance arrangements and principles to cover all Australian electricity and gas markets
- further gas market monitoring to better inform government decision-making, and continued consideration of policy settings to ensure that objectives are being delivered, given the growing importance of gas in our energy future – particularly as a result of the increasing use of gas for electricity generation and the increasing impact that developments in gas and electricity markets can have on each other
- reviewing the current set of non-complementary policy interventions from all levels of government that were made in the absence of a carbon price which are adding unnecessary costs to energy bills and creating investment-distorting complexities in energy markets, and further agreeing not to introduce new measures that are non-complementary.

In addition to addressing market reform issues, governments collectively also need to:

- actively monitor energy policy settings on a predictable timetable and refine them as necessary to ensure that our frameworks are delivering necessary efficient investment and meeting the demands and requirements of the community
- ensure that our energy resources are developed in accordance with best practice, including safe and effective environmental conditions and local community engagement
- actively work with industry and the skills and education sectors to develop the necessary skilled workforce and infrastructure to meet Australia’s future energy needs and export opportunities
- continue to actively work with industry and the research community given the critical role technology will have in the transformation of our energy sector – which necessarily involves public and private collaboration domestically and internationally to achieve the technological breakthroughs required to meet our goals. The government, through its publicly funded activities, can play an important role in deepening our understanding around new technologies and in promoting the sharing of non-proprietary knowledge
- promote the deepening of knowledge and understanding of our energy resource base, energy resource sector developments and technology developments to improve policy-making and leverage private sector activity.

Energy policy is never finished or complete and it is necessary to periodically assess and refine policy to ensure that it remains appropriate in changing circumstances. As we further enter a period of transition, we must be prepared to respond if outcomes are not being realised as intended. Ensuring that our markets and settings are resilient and robust to both foreseeable and unforeseeable events is an important role for government, and establishing a predictable timeline for delivering future reviews of national energy policy strategy and national energy security is important in this respect.

If Australia is to cement its role as the leading exporter of energy and energy services in our region, as well as further develop our domestic energy systems, we must also demonstrate that we can safely and sustainably exploit our conventional and unconventional energy resources. There is a growing need to build further community support, understanding and engagement around critical energy sources such as coal seam gas and geothermal as well as build support and understanding of important technologies, including carbon capture and storage.

Finally, Australia must have a mature debate about our energy sector and implications of different decisions. This means there must be a deeper community engagement in energy policy issues and outcomes. This includes ensuring that consumers have appropriate understanding and awareness of energy issues (energy literacy) to empower them to engage and participate in energy markets. Making more information accessible to households and businesses on the nature of energy costs and the options that exist to manage these costs is a critical component in improving energy use productivity. Again, building community support for new technologies and energy sources is fundamental if we are to develop the options we need to meet our climate change and energy security objectives.

2 A policy framework for the future

The draft Energy White Paper provides a review of Australia's future energy needs to 2030 (and in some cases beyond) and defines a comprehensive strategic policy framework to guide the further development of Australia's energy sector.

In doing so it consciously builds on the success of past energy-related policies and forms a key part of the Australian Government's national productivity agenda. It also integrates and complements many of the elements in the government's Clean Energy Future package.

The draft Energy White Paper policy framework is based on the following core energy objective: to build a secure, resilient and efficient energy system³ that:

- provides accessible, reliable and competitively priced energy for all Australians
- enhances Australia's domestic and export growth potential
- delivers clean and sustainable energy.⁴

This executive summary outlines the major forces shaping Australia's energy future, the current context in which energy policy is developed and the key challenges that can be expected over the coming decades. The final section provides greater detail on the four identified priority areas that the government believes will strengthen Australia's ability to fully realise its future energy potential. These priority areas are:

- strengthening the resilience of Australia's energy policy framework
- reinvigorating the energy market reform agenda (markets and energy productivity)
- developing Australia's critical energy resources – particularly Australia's gas resources
- accelerating clean energy outcomes.

³ For the purposes of the draft Energy White Paper, the term 'energy system' is defined inclusively to encompass the production, supply and use of energy as well as associated services.

⁴ The term 'clean and sustainable energy' refers to sources of energy, technologies or processes that produce lower or zero greenhouse gas emissions relative to conventional counterparts and that meet appropriate social, environmental, health and safety standards.

3 The forces that shape our energy future

It is well recognised that the coming decades present enormous energy opportunities and also very genuine challenges for Australia's energy sector.

As the world's ninth-largest energy producer, Australia has abundant renewable and non-renewable energy resources, and both our current energy security situation and our future outlook are robust and positive.

At current rates of depletion, Australia has many decades worth of known gas and uranium reserves, and at least a century of coal. Our remaining oil reserves are more limited but could be supplemented through new discoveries and technological advances including enhanced extraction techniques or coal-to-liquids or gas-to-liquids. In the decades to come we need clean energy technology breakthroughs to allow us to commercially exploit our clean energy resources in the form of wind, solar, ocean and geothermal energy, along with carbon capture and storage technologies.

The Bureau of Resources and Energy Economics projects that Australia's energy production will more than double – primarily due to strong export demand – over the period to 2035, while primary energy consumption will rise by 30 per cent and electricity generation by almost 42 per cent over the same period.⁵

While Australia's production of energy and energy resources is booming, the continuing challenges of rising energy prices along with finding cost-effective ways for Australia to reduce its greenhouse gas emissions are confronting consumers, energy providers and governments alike. Society is also placing increasing demands on the energy system through an expanding economy coupled with rising wealth and demand for energy-consuming appliances. These factors combined create a set of policy challenges that will test our markets and energy systems in the coming decades.

Growing energy demand in our region will provide even greater opportunity

The world's population has now reached seven billion and the energy requirements of larger industrialising and more urbanised populations will continue to drive strong growth in energy demand. By 2035 the International Energy Agency projects that global energy demand will grow by around 40 per cent – and 90 per cent of this growth will occur in developing economies, particularly China and India.⁶

Australia is well placed to export into these markets, given our expanding energy and resources sector and proximity to Asia. Australia is currently the world's largest coal exporter, third-largest uranium producer and in future years will be the world's second-largest liquefied natural gas (LNG) exporter, and these exports will continue to support improved living standards for billions of people in our region.

Australian coal production is expected to continue its strong growth over the course of the decade and beyond. This will largely be to meet export opportunities in our region.

⁵ BREE, *Australian energy projections 2034–35*, BREE, Canberra, 2011.

⁶ International Energy Agency, *World energy outlook 2011*, IEA, Paris, 2011.

The prospects for the Australian uranium industry are also positive, with the Bureau of Resources and Energy Economics forecasting average annual output growth of around 4 per cent to 2035.⁷ This reflects the continued expansion of nuclear power in rapidly developing economies. The opening of new markets in Russia, the United Arab Emirates and potentially India will further add to these prospects.

The need to improve long-term energy security in many countries, along with the need to reduce greenhouse gas emissions, is mobilising a major global effort to expand and diversify the energy mix through greater clean energy technology development and deployment – the possibilities of which stand to fundamentally change the way the world generates and uses energy in the future.

In this context, gas will be a growing source of energy both domestically and internationally.

Australia's unconventional gas resources bring the promise of extensive economic opportunities for both regional areas and Australia collectively. To facilitate this development, concerns held in some parts of the community about the industry's development need to be addressed through sound and consistent regulation based on scientific data and community engagement. The development of these resources will have major implications for Australia's east coast gas market, and the east coast gas market outcomes will be an important 'swing factor' in determining electricity generation investment outcomes.

The Australian Government's recent decision to establish a new Independent Expert Scientific Committee (and associated new National Partnership Agreement) to provide scientific advice to governments on coal seam gas and large coal mining projects that have a significant impact on water, are important steps in seeking to address community concerns.

Market-based approaches are critical to future success

The Australian Government is committed to delivering Australia's energy needs and goals through competitive and well-regulated markets. Australia has been well served by two decades of continuous micro-economic reform in key energy markets.

Energy markets, working in tandem with interfacing markets, such as carbon, renewable energy certificates, water and importantly financial markets, are unarguably best placed to produce sustainable, reliable and least-cost energy solutions.

A market-based approach provides a flexible and robust framework that is capable of adjustment in response to rapidly changing market or technology circumstances.

A period of transition

Australia's energy markets are entering a period of major transition. The introduction of carbon pricing reforms, the emergence of new energy sources and technologies, and growing linkages between domestic and international energy markets, particularly in the case of gas and coal, will lead to the emergence of new dynamics and competitive forces. End-use demand patterns are also changing with changes in economic structure and lifestyle.

⁷ BREE, *Australian energy projections to 2034–35*.

Already we are seeing energy prices increase, and new business models will emerge along with new market opportunities. Retailers and industry more generally – along with government – have an important role to play in educating consumers and offering innovative products to help meet consumer needs – particularly if demand-side products can be offered to help reduce peak load.

Australia's electricity generation fleet will respond to these changing market conditions and diversify. While conventional coal-fired electricity accounts for 75 per cent of generation today and gas around 15 per cent, by the middle of the century this balance is projected to change significantly and gas could expand to up to 44 per cent. By 2050 – assuming technological breakthroughs – most of Australia's conventional coal-fired power generation could have been replaced.⁸ Carbon capture and storage for coal- and gas-fired generation, like other potential baseload technologies such as geothermal and large-scale solar, could play a major role in our long-term energy mix.

The pace and nature of this transformation will be determined through the interaction of carbon and energy prices in the market, with commercial outcomes driven by the ability of emerging technologies to establish reliability and cost-competitiveness. Ultimately, the most commercially reliable and least-cost technologies will succeed.

The need for an informed debate

Australia must have a mature and informed ongoing public dialogue on its energy future.

As a society we face potentially difficult choices in the years to come about the pace of effort we wish to sustain and the price we are willing to pay – particularly in driving the transition to clean energy and reducing our greenhouse gas emissions.

This dialogue should also include a continued and informed consideration of the technology and energy options we use to meet our energy and environmental goals, and the trade-offs and costs involved with each.

Recent analysis by the International Energy Agency (IEA) estimated that around 80 per cent of the world's allowable carbon dioxide emissions budget under a 450 parts per million (or 2°C global warming) scenario is already locked in through existing capital stock (such as power plants, factories and buildings). The IEA emphasises that solutions must be found from a portfolio of technologies and fuels, and that the world cannot afford to limit options if we are to meet increasingly urgent climate goals.⁹

Similarly, much of Australia's energy infrastructure is locked in and will only be transformed over time, but we are fortunate in having gas, carbon capture and storage, and renewable options to aid us in the transition to a cleaner future. All credible analysis supports the need for a portfolio approach drawing on the most effective options across the economy. Suggestions that Australia should aggressively move exclusively to one or two renewable energy technologies to supply its energy are neither feasible nor realistic.

It is a fact that the more we limit our options, the higher will be the cost and the risks of meeting our clean energy and emissions reduction goals.

⁸ Treasury, *Strong growth, low pollution: modelling a carbon price*, Treasury, Canberra, 2011; ABARES, *Australian energy statistics*, ABARES, Canberra, 2011.

⁹ International Energy Agency, *World energy outlook 2011*.

Research, demonstration and deployment of commercial-scale geothermal energy, solar power and carbon capture and storage are being supported by government, and commercialising these technologies will require significant investment from industry – both in Australia and other countries. If these efforts do not prove successful, Australia may need to consider other options that can deliver safe and cost-effective outcomes. Given the lead times for introducing new large-scale technologies, such decision points may be needed by later this decade or in the early 2020s.

Dialogue about Australia’s energy future will be informed by science and economic analysis to build a stronger social consensus about the directions we wish to take and tools we adopt to get there. This will underpin longer-lasting outcomes and promote investor and consumer confidence in future social and policy direction.

4 Australian energy policy in context

The context in which energy policy is developed and implemented continues to evolve, and much has happened domestically and internationally since the last Energy White Paper was released in 2004. The energy policy framework outlined in this draft Energy White Paper responds to these changes to ensure that Australia’s energy policy can robustly manage future challenges.

Our principal energy markets (liquid fuels, electricity and gas) are different, and the role of government in shaping future developments in each market varies.

Australia’s liquid fuel markets are different to other energy markets in that they are part of a globally integrated supply chain with mature and well-functioning structures. In this sense, there is less of a role for government in the further development of these markets. However, the Australian Government still has an important regulatory role in this sector and in responding to policy pressures over time.

In contrast, Australia’s electricity and gas markets have historically developed in response to significant government direction. The past two decades have seen major reforms driven by state and territory governments working in cooperation with the Commonwealth. A major outcome of these reforms has been the move away from state-owned vertically integrated energy utilities to the formation of competitive national market structures and institutions with significant private sector participation and investment – including significant foreign investment.

Energy regulation and policy development is very much a shared responsibility between the Commonwealth and states and territories. Building effective national outcomes requires all Australian governments to approach these issues from a collaborative perspective, and our success in building an effective and efficient energy base confirms a substantial track record of achievement in this area.

International factors

As a key part of Australia’s modern open economy, our energy sector is increasingly interconnected with global markets and systems. This means that events in another part of the world often have consequences for our energy markets and consumers.

Global economic and financial market uncertainty, an energy resources boom and a commitment to reduce global greenhouse gas emissions are all having a major impact on our energy future.

We are experiencing a period of economic and financial volatility in Europe and other key markets, and it is uncertain how long these conditions will continue. This has resulted in a tightening in investment markets and reduced access to finance – including refinancing – for energy sector investments with exposure to real and perceived risk.

Despite this, growth in rapidly industrialising economies continues to drive a global resources and energy boom. Expectations about Chinese economic growth continue to be the most influential factor in forecasting global energy consumption – for example, China is now the world’s largest energy consumer (19 per cent) and represents 47 per cent of global coal consumption.¹⁰

Australia, as one of only three OECD net energy exporters, is playing a key role in meeting global energy needs – a role that looks set to continue in the period ahead.

Since the last Energy White Paper was released there have been significant increases in energy commodity prices – for instance, oil prices increased from US\$45 per barrel in 2004 to US\$110 in 2011¹¹ – and the value of our energy exports has increased dramatically. Australia’s coal exports increased from \$17 billion in 2004–05 to \$43 billion in 2010–11. Similarly, LNG exports have almost trebled from \$3.2 billion to \$10.5 billion and uranium exports increased from \$475 million to \$610 million (peaking at \$990 million in 2008–09).¹²

While these events unfold, countries continue to look for ways to reduce greenhouse gas emissions. There is international recognition that addressing climate change is a first-order challenge, and reaching a binding and effective international agreement on emissions reduction targets remains a critical goal.

Looking ahead, there will also almost certainly be new international developments that we cannot foresee from today’s vantage point. Australia’s energy markets and policy frameworks need to be resilient and regularly assessed and refined in order to respond to a broad range of risks.

Domestic factors

Domestically there have also been major changes since 2004. Most significantly from a consumer perspective, energy costs have risen in real terms, particularly for petrol and electricity.

There is now bipartisan support for an unconditional national greenhouse gas emissions target of 5 per cent below 2000 levels by 2020, as well as a continuing bipartisan commitment to a Renewable Energy Target of 20 per cent by 2020. However, Australia’s delay in moving to carbon pricing has resulted in numerous ad hoc state, territory and federal climate change initiatives with many (sometimes conflicting) objectives, including emissions abatement, energy efficiency and renewable energy deployment.

Government support, along with significant reductions in production costs, has resulted in an increased deployment of technologies such as solar photovoltaic systems and wind turbines. The development in other less mature clean energy technologies, such as geothermal, ocean and carbon capture and storage, has been more challenging.

¹⁰ International Energy Agency, *World energy outlook 2011*.

¹¹ International Energy Agency, *World energy outlook 2011*.

¹² BREE, *Resources and energy quarterly: September quarter 2011*, BREE, Canberra, 2011.

Past uncertainty over the introduction of a carbon price and the impact of various climate change interventions has affected investment decisions in a number of energy and downstream industries – including delivery of baseload electricity projects in recent times. The need to manage risk and market exposure has led to a growing trend of vertical integration (the ‘gen-tailer’ model).

Important institutional reforms have progressed, including through the establishment of the Australian Energy Market Commission, the Australian Energy Regulator and the Australian Energy Market Operator, and the passage of the National Energy Customer Framework legislation.

Australia’s energy networks have undergone their first round of determinations with the Australian Energy Regulator. Our supply infrastructure has met reliability and other performance requirements, but increased investment to upgrade and replace ageing assets has seen networks accounting for the biggest share of the increased cost of supplying electricity.

Rising energy costs due to a range of factors is now a critical concern for households and businesses alike. Consumer use of energy-intensive appliances has increased sharply – for example, the number of air conditioners installed in the last five years has grown by 1.7 million or around 36 per cent – and has led to rising peak demand, which is contributing to the increasing cost of electricity.

Price deregulation remains a major unfinished energy market reform – only the state of Victoria has fully deregulated its retail tariffs.

Victoria is also the only state to mandate a statewide roll-out of smart meters. Other jurisdictions will look to lessons learned from Victoria in assessing whether to follow suit.

The supply disruptions at Varanus Island in 2008 and the Montara oil spill in 2009 are also reminders of the importance of continuous improvement with respect to safety and the integrity of facilities. Lessons from these incidents will be important as Australia develops its offshore gas reserves and hosts the world’s first floating LNG facility. Steps have also been taken to harmonise state and territory laws, particularly with respect to safety in the energy supply industry, and the expansion of the National Offshore Petroleum Safety Authority to include environmental management and to become the National Offshore Petroleum Safety and Environmental Management Authority from 1 January 2012. Likewise, the National Offshore Petroleum Titles Administrator will be established from 1 January 2012.

Australia’s liquid fuel import dependency has increased over recent years. Likewise, Australia has smaller and older refineries compared to regional competitors. In mid-2011 Shell announced a decision to close the Clyde refinery in the years ahead and convert it to an import-receiving facility.

Recent years have also seen a significant expansion in Australia’s coal seam gas industry, including sanctioning of three coal seam gas-to-LNG projects – representing collective investment of \$45 billion. Sound scientific knowledge to engage and inform the public will be important as this industry delivers its projects.

5 The key challenges in our energy future

Australia's energy sector may face a number of market, capital and technological challenges in the years ahead. Principally, energy prices are rising, and both the scope of the technological transformation sought and the scale of the investment task are unprecedented.

Energy policy is never settled and must be regularly monitored, assessed and refined to ensure that it continues to meet a range of challenges – both existing and emerging.

Scale of investment

A large and sustained level of investment will be required in Australia's energy sector in the period to 2030 and beyond. This investment is necessary to provide reliability of supply to meet our energy security needs while also supporting the transition to clean energy.

There are several credible estimates that illustrate the likely sum of capital that is needed. The Investment Reference Group reported projections from the Australian Energy Market Operator's 2010 National Transmission Network Development Plan which suggested that between \$72 billion and \$82 billion in new generation and transmission could be needed in the National Electricity Market by 2030. The Investment Reference Group also estimated that an additional \$140 billion could be needed in shared electricity transmission (\$24 billion), distribution networks (\$120 billion) and additional gas production and transmission required to support gas for electricity generation (\$18 billion) in the same period – a total of around \$240 billion.¹³

Similarly, the Australian Treasury has forecast that in the presence of a carbon price, more than \$200 billion will need to be spent in new generation capacity to 2050. This comprises around \$50 to \$60 billion in gas-fired capacity, \$100 billion on renewables and \$45 to \$65 billion in coal, primarily carbon capture and storage technology.¹⁴

Australia has already begun to meet this investment task, with a capital expenditure of over \$10 billion a year being recorded since 2007.¹⁵ This has been dominated by network capacity replacement and augmentation and has resulted in substantial electricity price rises. Given projected requirements, it is likely that this heightened investment will be maintained through the remainder of the decade.

While aggregate numbers appear (and are) daunting, it should be remembered that this call on capital will be split across a range of different components of the market (generation, networks and gas infrastructure), each with different risk and return profiles, and is within the capabilities of Australian and international capital markets to support if investment settings are appropriate and stable.

¹³ Investment Reference Group report.

¹⁴ Treasury, *Strong growth, low pollution*.

¹⁵ P Simshauser and A Catt, *Dividend policy, energy utilities and the investment megacycle*, AGL Applied Economic and Policy Research, working paper 28, June 2011.

Markets will be tested

Nonetheless, the scale of transformation in the energy sector is enormous by historical standards. For example, only around \$12 billion has been invested in new electricity generation since 1998, compared to the approximately \$80 billion that could be required over the next two decades. Until the 1990s, investment in the electricity generation sector was predominantly delivered by state government-owned vertically integrated utilities. The withdrawal of government from the market means the private sector will be called on to deliver future investment, and the market is largely untested at delivering investment at the scale required in the period ahead.

Our ability to deliver this investment will critically depend on access to finance and capital. Given the relatively small pool of Australian investors with deep experience in delivering greenfield electricity generation investments, it is likely that a significant proportion of this required capital – debt and equity – will need to be sourced from overseas. While network investment has different risk and return characteristics to generation investment, network investment is also likely to be sourced from a mixture of domestic and foreign capital.

The footloose and competitive nature of foreign capital emphasises the need for Australia to maintain attractive and stable investment and policy frameworks. This includes ensuring that energy markets provide the opportunity for commercial returns.

In addition, further investment will also be required in Australia's liquid fuels sector to maintain refinery performance and expand import infrastructure. These will be commercial decisions that take into account Australia's relative competitiveness against projects in Asia and other key markets.

It is also important to note that carbon pricing may pose additional challenges to Australia's energy sector through the significant transformational investment task required, and by changing the economics of different generation technologies. The lack of bipartisanship around carbon pricing policy is also a significant concern to investors in electricity generation and to downstream energy users and emissions-intensive industries.

External factors are impacting the market

The introduction of a range of policies – such as the bipartisan expanded Renewable Energy Target, state-based feed-in tariffs and white certificate or similar energy efficiency schemes – are impacting Australia's energy markets and (by design) affecting decisions about investment in new generation capacity.

Continued government ownership of electricity generation assets, as well as the ongoing potential for further intervention, make attracting investment more difficult than it otherwise would be. Furthermore, retail price regulation can also reduce incentives for new competition and innovation.

The combined effect of external factors is significantly adding to the complexity and risk in investment decisions and distorting market outcomes, both intentionally and unintentionally. While retrospectively changing these measures may not in most instances be practical or even desirable, given that investments have been made on the basis of existing policy, the implementation of carbon pricing is an opportunity to ensure that no further market-distorting non-complementary interventions are made and that current measures are reviewed against the Council of Australian Governments (COAG) complementarity principles for climate change mitigation measures.

In this context, the Australian Government has decided not to proceed with the introduction of an emissions standard or carbon capture and storage standard for future coal-fired generation investment. An emissions standard is unnecessary in the presence of carbon pricing. Similarly, a carbon capture and storage standard would impose unnecessary regulatory and administrative costs and would be difficult to implement until a greater understanding of carbon capture and storage requirements is available. The government also considers such regulatory interventions to be inconsistent with a market-based approach to reducing greenhouse gas emissions.

Managing energy market participant risks

The growing complexities in the dynamics of Australia's energy markets mean that it is important that participants can effectively manage their exposures and risk. This is done through a variety of mechanisms in market design, financial instruments and business strategies.

A properly functioning forward contract market is essential to the smooth functioning of Australia's electricity sector and helps participants manage risk. However, overall levels of exposure and risk resulting from financial transactions are not well understood. Improving understanding of prudential positions and forward contract market positions may help inform government and energy market institutions, including in assessing whether there is a need for additional policies or measures to reduce risks of contagion and the spread of systemic risk.

One mechanism businesses use to reduce risk is vertical integration. Vertical integration is now spreading from the downstream electricity sector – generation and retail – to upstream, with vertical integration of positions in the electricity and upstream gas markets. It is important for all participants that the wholesale and contract markets are deep and liquid, and that new entrants have incentives to enter each of the market sectors – retail, generation, and gas exploration and production.

Bringing new technologies to market

Our ability to commercially deploy clean energy technologies such as solar or carbon capture and storage at scale – and integrate these technologies into our network – will be a significant factor in Australia's success in reducing domestic emissions.

While clean energy outcomes have enormous potential, they are far from predetermined and the success of individual technologies hinges on addressing current technical, social and cost issues. The challenge and scale of the clean energy transformation should not be underestimated. For example, the Australian Treasury has forecast that under carbon pricing, some 260 terawatt hours of clean energy generation could be delivered by 2050.¹⁶ Taking into account current clean energy generation, this would equate to the average annual output of around an additional 43 new 750 megawatt hour coal-fired power stations – a significant investment task.

Australia is a relatively modest and open market by world standards and we will remain largely a technology taker. Given the commercial reality that almost all technology breakthroughs that are likely to be deployed at scale in the future will be at least in part manufactured outside of Australia, we should also seek to leverage other global technological developments so that Australian consumers have access to a larger range of lower-cost outcomes.

¹⁶ Treasury, *Strong growth, low pollution*.

Deepening and broadening the knowledge base around new technologies and new energy sources is critical to efforts to accelerate clean energy outcomes. The Australian Government, through its clean energy programs, will encourage public dissemination of lessons learned and other non-proprietary information to ensure maximum value is obtained from public funds.

Our future success in large part will entail research, development, adaptation, demonstration and commercialisation of clean energy technologies. Initiatives such as the Australian Renewable Energy Agency, the Carbon Capture and Storage Flagships Program and the Clean Energy Finance Corporation will be essential to realising this.

Working to accelerate the commercialisation of key technologies – as the Australian Government is doing – is critical so that markets have access to an earlier and wider set of options. This can reduce the potential future cost of technology lock-in. We will also benefit from earlier understanding around key technologies so that policy-makers and business can plan ahead and adjust if required.

Managing the growth in peak demand and improving energy productivity

Australia's electricity demand continues to rise, although overall growth appears to have been slower in recent years. However, this growth is not uniform and changing load profiles and increased use of domestic appliances such as air conditioners have resulted in peak demand rising significantly faster than average demand. Between 1998 and 2010 the number of households in Brisbane rose by 35 per cent, while peak electricity demand increased over the same period by 104 per cent.¹⁷

This means that capacity is being built and capital spent that may be used only a handful of times each year. It is estimated that 25 per cent of retail electricity costs are derived from peak events that occur over a period of less than 40 hours per year¹⁸ – clearly this is an inefficient utilisation of capital with resulting consequences for energy bills.

This growth is driven by a range of factors, including inefficient uniform pricing structures that do not reflect the true cost of energy choices. This results in some consumers paying more than they should, and effectively cross-subsidising those who are driving the growth in peak demand.

As an example of how significant this can be, it is estimated that the installation of a 2 kilowatt (electrical input) reverse-cycle air conditioner costs a consumer around (on average) \$1500 yet imposes costs on the energy system as a whole of up to \$7000 when adding to peak demand.¹⁹ The \$7000 system-wide cost must then be spread across all other customers.

Efficiently managing and reducing growth in peak demand to increase capital utilisation is an important objective. This can be achieved either through pricing signals or through direct regulation.

If market signals are to be better utilised to reduce growth in peak demand, we must ensure greater consumer engagement with the energy sector. The importance of this was emphasised in the recent deployment of smart meters in Victoria. Proper consumer engagement and community acceptance

¹⁷ P Simshauser, T Nelson, T and Doan, 'The boomerang paradox, part 1: how a nation's wealth is creating energy poverty', *The Electricity Journal*, vol. 24, no. 1, 2011 p. 72.

¹⁸ R Fraser, 'Demand side management', paper presented at the Australian Institute of Energy symposium, NSW's Electricity Future 2020 (and beyond): What will it look like and how do we get there?, 24 May 2010, Sydney.

¹⁹ Department of Employment, Economic Development and Innovation, *Queensland Energy Management Plan*, Queensland Government, Brisbane, 2011.

is critical if large-scale deployment is to be implemented or if the community is to accept changes in tariff structures.

Smart meters can lead to greater efficiencies in network management and underpin more competitive market outcomes. They are a facilitative tool that can provide information and opportunity for consumers to have a greater say in their energy choices. Finding the right deployment model is essential.

There are also other demand-side opportunities that do not require smart meter deployment that governments can collectively pursue.

Further efforts to address non-market barriers to the uptake of energy efficiency opportunities for businesses and households are also an important complement to carbon and energy price signals. While carbon and energy prices will drive the uptake of these outcomes, other measures such as improving energy information, applying cost-effective minimum performance standards and increasing energy literacy across consumers can all contribute to improving energy efficiency and productivity outcomes.

In the context of consumer engagement, it is important to recognise the varying abilities of different consumers to access programs and information, and understand that communication may need to occur through a range of channels.

Energy costs are rising

Australia's energy costs have increased over recent years and this trend is expected to continue through this decade. Increasing electricity costs are predominantly due to network investment, and hence it is important to ensure that our energy network regulatory regime – the result of earlier reforms – delivers optimal outcomes. There are existing processes to ensure that the network regulatory regime settings are appropriate.

Global oil prices have increased due to strong demand and rising costs of production. Domestic gas prices have also increased for similar reasons.

While energy remains a small to modest proportion of average household income (around 2.6 per cent)²⁰ and business expenditures (typically less than a few per cent for most non-energy-intensive businesses), future increases will place pressure on the affordability of energy for a range of less well-off consumers and for energy-intensive businesses.

There is no easy or simple fix to this issue. If we are to maintain investment and promote the efficient use of energy, prices must reflect the cost of supply in a competitive market. Interventions to manipulate or suppress efficient pricing outcomes will have detrimental investment and supply consequences that are not in the long-term interests of consumers. While energy prices are a challenge, it should also be recognised that it is energy prices that send signals to investors to ensure that capacity is delivered to maintain reliability.

Energy demand – particularly electricity demand – is driven by the choices consumers make about their energy use. Current regulated electricity pricing structures can encourage inefficient patterns of use and unfairly distribute costs across consumers. They also significantly reduce the incentive for innovative consumer tariffs and technologies that allow for better management of energy use and

²⁰ Australian Bureau of Statistics, *Household expenditure survey, Australia, 2009–10*, cat no. 6530.0, ABS, Canberra, 2011.

costs. This means that the less well-off, who generally do not run multiple air conditioners and television sets, are cross-subsidising those consumers who do.

While politically challenging, this further stage of market reform must be addressed to reduce inefficient energy use and growth in peak.

Managing risks – a broader government perspective

There are a range of risks that will need to be closely monitored. Specifically, some of the key strategic risks identified in the draft Energy White Paper include:

- the nature and timeframe of the international response to climate change
- unforeseen geopolitical or economic developments that reshape or disrupt international energy or capital markets
- the importance of optimal electricity and gas investment for least-cost energy delivery
- a failure to commercialise key technologies in a timely fashion
- a confluence of these outcomes which interact to produce unanticipated sharp increases in delivered energy costs.

The Australian Government has in place a range of mechanisms to manage the impact of many of these possible events. However, there is a need to continually monitor developments and refine policy as necessary. To manage this, the government recognises that the inherent resilience of Australia's policy framework can be improved. This includes providing for well-signalled and more predictable reviews of key energy policy settings to ensure that Australia remains on track with respect to its energy policy goals, as well as ensure that key policy, market or physical risks have been identified and that there are effective mechanisms and processes that can anticipate or respond to them.

Resource development challenges

Australia must ensure that we are positioned to develop our energy resources – for use both domestically and to meet growing regional demand in Asia.

Bringing on further economic development requires us to remain an attractive destination for foreign capital, and maintain an exploration pipeline to ensure that discoveries of new energy resources are made.

Strong terms of trade and significant growth in Australia's resources and energy sectors – while of overall benefit to our community – will also place strains on our economy. Policies such as the extension of the Petroleum Resource Rent Tax and the introduction of the Minerals Resource Rent Tax are designed to share the benefits of high commodity prices throughout the broader community as well as support investment in necessary infrastructure.

Access to infrastructure such as rail and port facilities as well as housing and other supporting facilities is critical in ensuring that Australia remains a reliable supplier of energy resources into the future. This is a shared responsibility between industry and governments at all levels. Recent investments and reforms are addressing previous infrastructure constraints and it will be important that future emerging issues are identified and addressed in a timely fashion.

The growth and transformation of Australia's energy industries will also create new employment opportunities and demand for skills in a wide range of areas. Meeting these needs will come through a combination of education and training, improving workforce participation and mobility, and utilising skilled migration. The Australian Government is working with the education and training sector and business groups to implement initiatives in these areas to address short-term constraints and improve long-term capacity.

The energy and resources sectors also play a significant role in creating long-lasting opportunities for Indigenous people and communities by creating jobs and providing valuable income. This is particularly important in remote and very remote areas of Australia. Industry, government and Indigenous communities are working successfully together to ensure that these opportunities create deep and long-lasting benefits.

There is also an important role for governments in ensuring that regulatory frameworks provide for transparent, sustainable and safe development, particularly where multi-resource use and co-development exist.

Reflecting the need to ensure best practice, the Australian Government is seeking to achieve harmonisation and best practice of state-based regulatory responsibilities with respect to the coal seam gas industry. Governments are also working through the COAG ministerial-level Standing Council on Energy and Resources to develop a national framework for multiple land use that can promote national consistency and transparency in land access and use.

The importance of gas

Gas will have a critical role to play as the world moves to reduce greenhouse gas emissions. Access to competitively priced gas offers Australia and other countries a lower-emissions alternative that can provide energy security, particularly while other technologies have yet to successfully commercialise.

By 2050, gas could account for 44 per cent of Australia's electricity supply²¹ – nearly triple the 15 per cent it accounted for in 2009-10.²²

To meet demand, there is a need for timely and competitive upstream gas development matched with efficient investment in downstream processing, and in transmission and distribution capacity.

Recent years have seen significant capital committed to Australian LNG projects – around \$140 billion to increase our LNG export capacity by 50 million tonnes per annum from our current 20 million tonnes per annum. Of this, \$45 billion was committed to coal seam gas-to-LNG projects on Australia's east coast.

The development of an east coast coal seam gas-to-LNG industry will affect the east coast gas market – it will support further domestic gas development and also introduce additional competition for our gas resources. However, these new dynamics have yet to mature and there are market risks. Community concerns about the potential impacts of coal seam gas developments must also be addressed.

²¹ Australian Treasury, *Strong growth, low pollution*

²² ABARES, *Australian energy statistics*, Table O.

It is important that there is better public information and understanding around gas market developments. The Australian Government will closely monitor the development of upstream and downstream markets to ensure that competitive supplies to domestic and export markets are being maintained.

There is an important role for the Australian Government to work with the states and territories to both promote further upstream and downstream market development that can help bring on gas projects, and undertake further work to better understand gas market developments and dynamics – particularly given the increased interrelationship between gas and electricity markets.

The Australian Government strongly encourages further reform to the Western Australian gas market to ensure that it becomes a more mature and competitive market.

Liquid fuels

Australia is heavily dependent on imports of both refined petroleum products and crude oil (which is refined in Australian refineries) to meet our liquid fuel demand. The majority of our current crude oil production is exported due to the higher-value uses it has in other markets.

Australia's liquid fuel import dependency has increased over recent years. Likewise, Australia has smaller and older refineries compared to regional competitors. In mid-2011 Shell announced a decision to close the Clyde refinery in the years ahead and convert it to an import-receiving facility.

Australia is linked into well-established global supply chains to meet our liquid fuel needs and import dependency itself does not imply an energy security threat. At least until the middle of this decade it is forecast that there will be a surplus of refining capacity in the Asian region; however, Australia should continue to monitor market developments.

New alternative transport fuels have future potential to complement conventional fuel stocks, particularly if oil prices continue to rise. While this will be market driven and will emerge over time, it makes sense to examine market or regulatory barriers that might impede commercial outcomes.

Sustainability

The production, supply and end use of energy intersects with the natural and human environment in many ways and it is critical to the ongoing viability of our energy resources and energy supply sectors that they operate in a manner that is safe and sustainable. Key issues in this regard include ensuring that energy production and generation projects efficiently manage their impacts on water resources and the natural environment more broadly.

The regulation of new industries such as coal seam gas should be consistent and based on sound scientific information regarding potential impacts. This includes impacts on human health and safety as well as environmental impacts such as air and water quality. Better understanding of Australia's groundwater resources and the impact of energy-related developments and other human activities is increasingly important.

Environmental regulation must also be effective and efficient in terms of both outcomes and its administration. In this context, the Australian Government has recently announced a set of major reforms to the operation of the *Environment Protection and Biodiversity Conservation Act 1999* to improve its effectiveness and streamline administration. These include developing a more strategic approach through regional planning and approvals as well as developing cooperative national

standards and guidelines to harmonise approaches between jurisdictions and foster cooperation with all stakeholders.

The government is working closely with industry to implement these reforms.

Community engagement

As energy-related projects become increasingly prevalent and new technologies and practices are developed, it is critical that proponents of energy infrastructure and energy projects properly engage at an early stage with local communities. Early and effective engagement should ensure that communities are properly informed and that risks and costs are appropriately managed.

The significant expansion of the coal seam gas and wind energy industries has recently shown the growing pains that can occur in our energy sector and highlight the importance of building local and general support with the community.

6 Priority actions for Australia's energy future

Taking the opportunities and challenges discussed above into account, the draft Energy White Paper proposes four priority action areas for national energy policy that the Australian Government believes should be addressed to enhance Australia's ability to realise its energy potential. These are:

- strengthening the resilience of Australia's energy policy framework
- reinvigorating the energy market reform agenda
- developing Australia's critical energy resources – particularly Australia's gas resources
- accelerating clean energy outcomes.

Strengthening the resilience of Australia's energy policy framework

The Australian Government recognises that there are substantial changes underway in Australian and global energy markets. Strengthening the resilience of our energy policy frameworks through regular and predictable strategic assessment of key policy settings will provide policy-makers and business with a better ability to anticipate and respond to emerging risks or changing circumstances, and also ensure that our energy policy frameworks remain appropriate over time.

An improved and more transparent information base on energy resources, technologies and fuels, including their comparative costs and commercial maturity, is an important complement and input into the policy process. It will enhance our ability to evaluate future energy pathways over time and promote a more informed public dialogue.

The Australian Government will strengthen the resilience of Australia's energy policy framework by:

- institutionalising a regular four-yearly review of national energy policy strategy beginning in 2016 – this will provide an opportunity to assess overall progress in meeting our national energy goals and identify emerging risks or changing circumstances and consider appropriate responses
- undertaking biennial National Energy Security Assessments from 2014 with a revised analytical and quantitative methodology to provide for a more systematic and integrated understanding of key relationships between the energy sector and other areas of the economy

- undertaking a National Energy Risk Preparedness Audit across the energy sector as part of the National Energy Security Assessment process, to test the appropriateness and effectiveness of response mechanisms to manage critical risks to the energy sector
- improving Australia’s energy information base, including through:
 - biennial publication from 2014 of the Australian Energy Resource Assessment and the Australian Energy Technology Assessment
 - expanding the scope of the Australian Energy Technology Assessment to specifically cover liquid fuel technologies
 - as part of the 2014 National Energy Security Assessment process, assess Australia’s liquid fuel vulnerabilities – this will cover the liquid fuel supply chain, including import and refining infrastructure and critical supply linkages
 - lead work, in consultation with industry, to improve the quality of the Australian Petroleum Statistics
 - enhancing the quality and timeliness of public information on Australia’s conventional and unconventional gas reserves and projected market developments, which will help inform policy development
 - annual publication of the Australian Energy Market Commission’s report on trends in future electricity prices
 - undertaking a road-mapping exercise to improve the scope and alignment of Australian energy data collection.

Reinvigorating the energy market reform agenda

Past energy market reforms have provided a strong foundation in building competitive national energy markets. However, several major areas have yet to be completed and the Australian Government wants to now move to the next stage of energy market reform. Rising cost pressures and the challenge of transforming energy markets mean we need to tackle outstanding issues in addition to those currently underway.

The National Electricity Market has delivered reliability and efficiency to date. Regulatory stability is important and the government is not proposing to pursue change of the current energy-only market design of the National Electricity Market. However, the government recognises that the National Electricity Market’s ability to deliver the significant investment challenge ahead will be tested and market settings must be regularly monitored to ensure that objectives are being met. This should also include further analysis by government and market bodies to anticipate emerging technology and market developments.

The next stage of reform should focus on improving the productivity and operation of energy markets, ensuring that appropriate incentives are in place to support efficient network and supply investment outcomes, and providing consumers with a more accessible and comprehensive range of options to manage their energy use.

In a modern and diverse economy such as Australia’s, there is no compelling rationale for continuing government ownership of energy assets. Such ownership can create inherent competitive tensions

in markets, discourage private investment and reduce incentives for business innovation or more efficient operation.

Similarly, implementing reforms to more efficiently manage the continuing growth in peak demand to increase capital utilisation is important so that we do not generate unnecessary costs. Retail pricing reforms along with appropriate network incentive regimes can not only provide incentives for more efficient energy use, they are also the key to unlocking greater innovation and competition in energy management technologies and consumer products.

The Australian Government will therefore work with the states and territories through established COAG ministerial councils to pursue:

- completion of agreed commitments on retail price deregulation, and with respect to energy prices:
 - ensuring that social safety nets take into account the impact of rising energy costs (including carbon costs) and that institutional and regulatory frameworks maintain consumer protections
 - helping to further empower consumers, recognising that jurisdictions that pursue retail price deregulation should also ensure appropriate support for consumer engagement, in terms of both advocacy and market participation
 - ensuring that the drivers of cost increases are transparently reported and better understood by consumers
 - continuing to review and test regulatory frameworks to ensure they are delivering outcomes for the long-term interests of consumers
- promotion of greater competition and business efficiencies, including through further asset privatisation
- promotion of greater network efficiency and productivity – including looking at whether some services currently provided by networks on a monopoly basis could alternatively be opened up to competition
- development and implementation of better demand-side reforms (including development of a smart meter framework and review of barriers to distributed generation)
- assessment of the lessons from smart meter deployments to inform the role that smart meters may play in our energy system, including consideration of appropriate deployment models
- further exploration of potential measures to reduce growth in peak demand (including possible regulatory measures, market measures and enhanced consumer education)
- development of regulatory settings that support increased innovation by energy retailers in terms of tariff design and consumer engagement
- further development of Australia's gas markets to improve transparency and trading opportunities, and further Commonwealth-led work to better monitor market dynamics to assess whether policy settings are delivering required outcomes given the growing use of gas for electricity generation

- support for further reforms to the Western Australian gas market to ensure that it becomes a more mature and competitive market
- completion of the transition to truly national energy markets – specifically by undertaking more work to explore extending the national energy market governance arrangements and principles to cover all Australian electricity and gas markets. Ensuring national harmonisation also includes reviewing and removing unnecessary jurisdictional derogations
- consistent with the agreed COAG complementarity principles for climate change mitigation measures, agreement from all Australian governments to a review of existing non-complementary measures, and agreement not to introduce new measures that are inconsistent with these principles.

In taking forward this agenda, the Australian Government remains firmly committed to the energy market development and reform actions and activities currently underway through the COAG Standing Council on Energy and Resources, and related processes.

Developing Australia’s critical energy resources – particularly Australia’s gas resources

Competition among nations for investment and market share in key energy exports markets is growing, with many new suppliers seeking to take advantage of strong demand. To remain competitive, Australia must maintain and improve its standing as a reliable energy supplier.

There are ongoing tensions between export and domestic demand for key energy resources. Analysis shows that in particular, natural gas is likely to have a critical role to play in our future economic development, both as a source of enormous export income and in our domestic energy system as a proven large-scale lower-emissions source of energy for electricity and other end uses. Gas stands to play a pivotal role as we move to reduce our greenhouse gas emissions.

Recognising that in many cases export opportunities provide an important backbone for domestic market development, the Australian Government will actively work to promote market and policy settings that provide appropriate investment incentives to bring on export and domestic development. This must also continue to balance the needs of commercial development with ensuring an appropriate and fair return to the Australian community.

There is also an important role for government in ensuring that energy resource developments, such as coal seam gas, are safe and sustainable. In this context, the Australian Government is working with states and territories to harmonise the coal seam gas regulatory regime and has already moved to implement as a priority important offshore regulatory reforms – including the establishment of the National Offshore Petroleum Safety and Environmental Management Authority and the National Offshore Petroleum Titles Administrator, and enhanced incident prevention and response capabilities.

Long-lasting and mutually beneficial solutions must also be found to address emerging resource co-development conflicts. This will take a concerted cooperative effort from all governments, and particularly from project developers and relevant industries in developing best-practice approaches and engaging with local communities. This must be supported by the best available science and analysis as well as effective and efficient regulation.

The Australian Government will advance these goals by:

- pursuing an active approach to the development of its offshore gas resources, including through:
 - updating offshore retention lease arrangements to improve transparency; allow third-party comment on the commerciality of developing particular fields; ensure that reserves are not ‘warehoused’ indefinitely; and provide certainty of gas supply over long timeframes, including for highly capital-intensive LNG projects
 - ensuring, through the application of retention lease and production licence approval arrangements, that offshore gas project design and development are providing the best returns they can for the Australian community within a commercial framework, including through appropriate consideration of domestic gas opportunities
 - specifically, having greater regard to the potential for projects to supply the domestic gas market when considering granting a production licence
 - examining the possible introduction of cash bidding for offshore areas of high prospectivity
- advancing national consistency and transparency with regard to multiple land use resources projects through the development of a national framework for multiple land use under the Standing Council on Energy and Resources
- working with the resources and other industry sectors to deliver announced reforms to the operation and administration of the *Environment Protection and Biodiversity Conservation Act 1999*, including providing for more strategic planning and assessment
- establishing a new Independent Expert Scientific Committee (and associated new National Partnership Agreement) to provide scientific advice to governments on coal seam gas and large coal mining projects that have a significant impact on water
- working with states and territories through the Standing Council on Energy and Resources to cooperatively progress a more harmonised approach to the regulation of the coal seam gas industry
- undertaking, through Geoscience Australia, further work to establish a more rigorous understanding of the aquifers across jurisdictions and across basins, their connectivity, and how groundwater pressures in connected aquifers are likely to be affected by the cumulative impacts of coal seam gas production
- assessing and reporting on infrastructure requirements for bulk resource commodities such as coal, LNG and iron ore, and providing updates at regular intervals.

Accelerating clean energy outcomes

The pace of Australia’s clean energy transformation will be determined through the interaction of carbon, renewable energy certificate and energy prices in the market, with commercial outcomes driven by the ability of emerging technologies to establish commercial reliability and competitive cost. The complementary incentives from the carbon price and Renewable Energy Target are intended to bring forward the deployment of renewable energy in Australia – driving around \$20 billion of investment in renewable energy in the period to 2020. The introduction of a carbon price can assist in efficiently delivering the Renewable Energy Target.

Beyond the renewable energy technologies that are currently mature, accelerating the pace of commercialisation for new clean energy technologies is critical if the market is to be provided with an earlier set of deployment options that could reduce the longer-term cost of meeting of national greenhouse gas abatement goals.

The Australian Government has committed up to \$17 billion in funding to support the development, commercialisation and deployment of clean energy technologies. This includes the establishment of the Australian Renewable Energy Agency and the Clean Energy Finance Corporation, as well as support for large-scale carbon capture and storage demonstration.

Within the government's policy framework and existing funding that has been committed, there remains a need to continue to identify and address potential market gaps or barriers to efficient uptake of clean energy solutions. This might include identifying and addressing issues relating to network connection and integration, as well as ensuring that there are appropriate regulatory standards to support uptake.

In this context, the Australian Government will work to accelerate clean energy outcomes by:

- expediting implementation of its clean energy programs to ensure continued support for innovation and commercialisation, including establishing the Australian Renewable Energy Agency by July 2012 and the Clean Energy Finance Corporation from 2013–14, and continuing to progress carbon capture and storage initiatives
 - progress in achieving energy outcomes, including clean energy outcomes, will be assessed as part of the proposed four-yearly strategic energy policy review process
 - the government has announced that the scheduled review of the Renewable Energy Target scheme by the Climate Change Authority will occur in the second half of 2012 and every two years after that
- monitoring the impacts of increased levels of intermittent generation on network stability, in particular the need for any consequent new requirements on the structure and operation of networks
- working with other jurisdictions to identify opportunities to harmonise micro-generation feed-in tariffs, so that they do not impose an unjustifiable burden on electricity consumers, either through cross-subsidy mechanisms or their impact on the Small-scale Renewable Energy Scheme
- continuing to seek opportunities to develop collaborations with state and territory governments, business and the research community. This will include ensuring that government support is best targeted at technologies that offer Australia the greatest potential benefits, and recognising the need to maintain a long-term and consistent policy approach to support
- continuing to engage in international clean energy processes and partnerships to promote clean energy technology development and deployment through enhanced knowledge sharing, leveraging international effort and building market capability
- identifying the need for nationally consistent and supportive regulatory arrangements for new clean energy technologies and working with states and territories to promote efficient uptake.

7 Engagement and consultation process

The draft Energy White Paper has been developed as a basis for consultation on the future directions and priorities for Australian energy policy. Written public submissions are invited from interested readers by no later than 16 March 2012. This process will be supported by a series of open information sessions to be held in state and territory capital cities.

Further details on the submission and consultation processes are available at www.energywhitepaper.ret.gov.au.