



Australian Government  
Department of Industry

# Energy White Paper

## ISSUES PAPER

to inform preparation of a White Paper

December 2013

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## Executive Summary

Australia's plentiful energy resources, well-developed transmission and distribution infrastructure, open energy markets and improving energy productivity provide a solid basis for continued high living standards and a growing economy. Ongoing reforms are needed to address cost-of-living pressures and improve small, medium and large business competitiveness, ensure growth in energy exports and encourage investment.

The Australian Government will deliver an Energy White Paper in 2014 as part of a broader package of Government reforms. The Energy White Paper will set out an integrated and coherent Australian Government position on energy policy.

This Issues Paper is the beginning of consultation on the Energy White Paper that will be developed by the Department of Industry. It outlines the scope of the Energy White Paper, maps links to other related policy and regulatory developments, and seeks comment on issues to be considered in a Green Paper that will outline possible policy approaches.

Energy policy needs to underpin the day-to-day reliability, longer term security and the cost of energy in an efficient and competitive market. The Energy White Paper will consider the supply and use of Australia's energy resources to deliver security of supply, increases in new energy sources to ease demand/supply constraints, regulatory reform to put downward pressure on prices, and improved energy productivity. Downward pressure on prices will help relieve cost-of-living pressures and improve business competitiveness.

Energy policy should remove unnecessary barriers to continued investment in exploration, production, distribution and end use systems to meet demand and support Australia's economic growth. The Government is exploring measures to support investment and growth in the energy and resources sectors, including:

- regulatory reform;
- workforce productivity;
- the development of both traditional and new energy sources; and
- maximising export opportunities for energy commodities, products, technologies and services.

The energy sector faces some challenges; among them implementing reform and reducing costs in an environment that has seen a decline in electricity use, and a tightening gas supply balance on the east coast. Australia's resources sector is in a period of significant growth and change as the investment boom of the previous decade peaks. However, as major projects are completed, the coal and LNG sectors will experience a large-scale ramp-up in production capacity. The economic impact of this transition is expected to be felt most over the next two to three years.

Australia's energy and resources sectors have supported national economic prosperity through trade. There are significant further investment opportunities that can be captured under the right business conditions. The Government recognises the importance of improved workforce and energy productivity coupled with technology uptake to maintain international competitiveness. Further investment will create employment opportunities, particularly for Indigenous communities in remote and regional areas.

Reforms that could reduce the regulatory burden on business and maintain appropriate levels of disclosure and transparency in energy and related markets include:

- the reform of electricity and gas markets to improve efficiency and user choice;
- the development of a more flexible and informed trading environment for gas markets;

- encouraging productivity and market efficiency by continued privatisation of state and territory owned energy assets and businesses; and
- streamlined environmental approvals and creation of a one-stop-shop approach to help navigate other approval and licensing requirements.

The Government has committed to finalising the energy market reforms endorsed by the Council of Australian Governments (COAG) to ensure that consumers pay no more than is necessary for a reliable and secure supply of electricity. Reforms will put downward pressure on domestic energy prices by enabling the community's demand for energy services to be met by the lowest cost combination of supply and demand-side action, including moves to increase energy efficiency.

Existing energy efficiency measures include labelling, minimum standards, development of energy management systems, capacity building and demonstration programs. There is scope to support further improvements in energy efficiency while reducing regulatory burden and reducing costs for consumers. The Government will consider the current suite of energy efficiency and demand-side measures, particularly those targeting peak usage and improving consumer information, and ways these could be enhanced with a low regulatory regime.

Australia remains committed to reducing carbon emissions by five per cent by 2020 (against 2000 levels). The Government will consider measures to encourage the deployment of renewable energy as well as low-emission technologies that allow Australia to continue to utilise our abundant coal and gas resources. In addition to improving fuel efficiency in the transport sector, there is also potential to increase the use of alternative fuels.

The Government is seeking submissions from stakeholders parties on the issues outlined in this paper.

## **Process for making submissions**

The Government is developing an Energy White Paper, which will outline a coherent, integrated and efficient regulatory and policy framework, stimulating sustainable growth, building community confidence in environmental safeguards and growing investment in the energy sector.

This Issues Paper encourages individuals and organisations to contribute to this process by making submissions, which are due by **Friday 7 February 2014**.

Submissions can be made:

### **Online:**

<http://www.ewp.industry.gov.au>

### **By email:**

EWP@industry.gov.au

### **By mail:**

Energy White Paper Taskforce  
Department of Industry  
GPO Box 1564  
CANBERRA ACT 2601

## **Publication of submissions:**

Submissions will ordinarily be available for public review at <http://www.ewp.industry.gov.au/>, unless you request otherwise.

Please indicate clearly on the front of your submission if you wish it to be treated as confidential, either in full or part.

The Australian Government reserves the right to refuse to publish submissions, or parts of submissions, which contain offensive language, potentially defamatory material or copyright infringing material.

A request may be made under the *Freedom of Information Act 1982 (Cth)* for a submission marked confidential to be made available. Such requests will be determined in accordance with provisions under that Act.

Contact information, other than your name and organisation (if applicable) will not be published. Your name and organisation (if applicable) or state will be included on the Energy White Paper website to identify your submission.

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## Contents

<b>1.</b>	<b>The Energy White Paper – Terms of Reference and Process.....</b>	<b>3</b>
<b>2.</b>	<b>The Security of Energy Supplies .....</b>	<b>11</b>
<b>3.</b>	<b>Regulatory Reform and Role of Government .....</b>	<b>15</b>
<b>4.</b>	<b>Growth and Investment.....</b>	<b>19</b>
<b>5.</b>	<b>Trade and International Relations.....</b>	<b>23</b>
<b>6.</b>	<b>Workforce Productivity .....</b>	<b>27</b>
<b>7.</b>	<b>Driving Energy Productivity.....</b>	<b>31</b>
<b>8.</b>	<b>Alternative and Emerging Energy Sources and Technology.....</b>	<b>35</b>

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## 1. The Energy White Paper – Terms of Reference and Process

*Australia's abundance of primary energy resources will continue to underpin high living standards and a strong economy.*

Australia has significant reserves of primary energy<sup>1</sup> resources including coal, gas, wind, solar, biomass, geothermal, wave and tidal, and uranium and thorium. This abundance underpins Australia's position as a major exporter of energy resources and products. Efficient and cost-effective domestic supply, use and export of energy related products make a major contribution to the health of the Australian economy and high living standards.

The distance of much of these resources from geographically dispersed population centres, export facilities and markets presents challenges in extraction, product creation and distribution<sup>2</sup>. To overcome these challenges Australia needs efficiencies at all levels, including regulation, infrastructure, production, distribution and use of energy. This Issues Paper is intended to launch a dialogue on how the Government can frame energy policy to meet these challenges.

*Ongoing investment in the energy sector is essential and will be obtained under clear energy policy settings conducive to that end.*

Australia's total domestic primary energy consumption is dominated by coal, petroleum and gas. The share of black and brown coal in the energy mix has declined over the past three years, primarily from substitution of gas and renewable energy for electricity generation. In 2011–12, coal represented around 34 per cent of the energy mix, less than petroleum products (39 per cent). The share of gas in Australian energy consumption has increased over the past 30 years and is currently around 23 per cent. The share of renewables in Australia's total energy mix has remained largely constant over the last decade (around four per cent of total energy), though it has increased from around eight per cent to over nine per cent for electricity generation over the same period<sup>3</sup>.

Energy consumption in Australia is dominated by small numbers of large businesses. The 300 largest energy users consume 56 per cent of primary energy. Other businesses consume 26 per cent and households 17 per cent (**Figure 1**).

*The Energy White Paper will set out an integrated and coherent Australian Government position on energy policy.*

The energy sector is dynamic, yet industry must make long-term investment decisions. Against this background it is important that Government energy policy and regulatory settings are reviewed in light of emerging challenges to deliver robust, evidence-based energy policies. This demands that the Government maintain the data and analytic capability to develop evidence-based policy and keep markets informed. Maintaining market stability and sustainability is important to give confidence for long-term investment and innovation, both for energy suppliers and users.

The challenge of supplying and using energy in a way that puts downward pressure on energy costs to help business competitiveness, ease household cost-of-living pressure, and grow energy exports is considered in the following sections.

In addition to ongoing efficient market function and reliable supply, the uptake of lower emissions energy technologies and sources, and the more efficient use of energy, also require appropriate policy settings.

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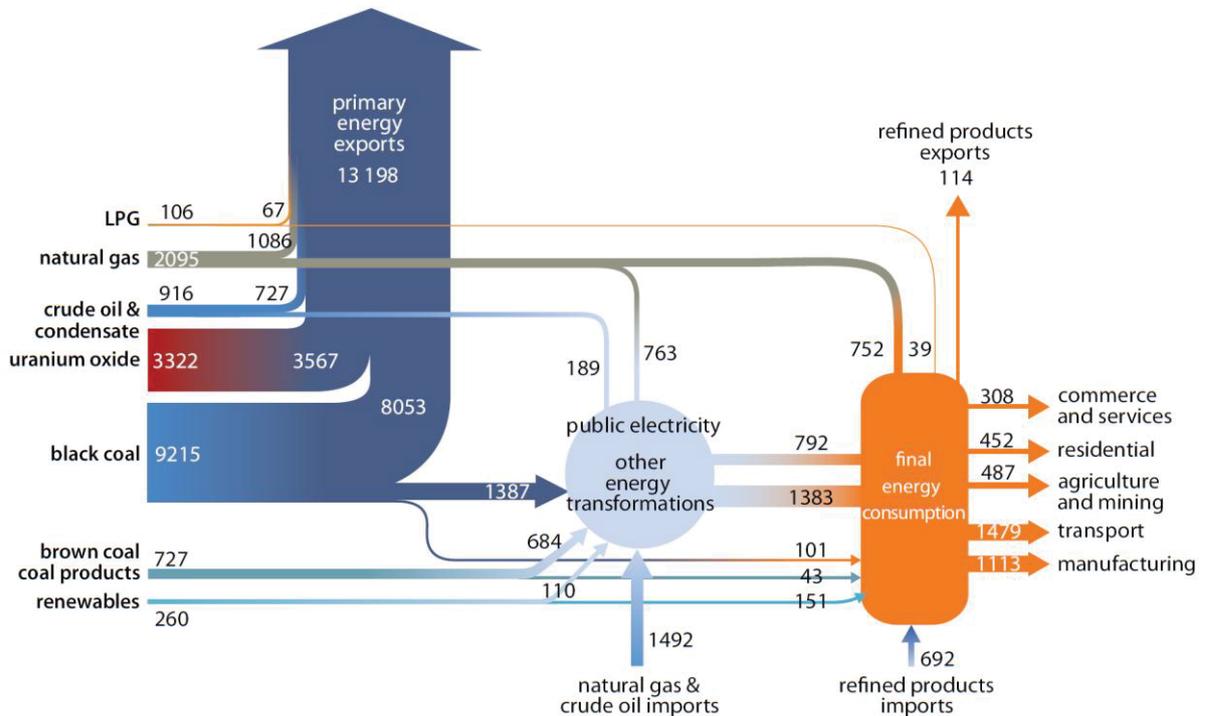
<sup>1</sup> Primary energy consumption refers to the direct use at the source, or supply to users without transformation, of crude energy—that is, energy that has not been subjected to any conversion or transformation process.

<sup>2</sup> The use of the term 'distribution' in this paper relates to the transfer of energy from where it is produced to where it is used. When used in electricity and gas sectors, this term should be taken to mean both transmission and distribution networks.

<sup>3</sup> BREE Australian Energy Statistics Data 2013.

<http://www.bree.gov.au/publications/aes-2013.html>

**Figure 1: Australia’s energy flows, 2010–11 (PJ)**



Source: BREE 2013, Energy in Australia.

This Issues Paper outlines the scope of the Energy White Paper, maps links to other related policy reviews, and seeks comment on issues to be considered in a Green Paper that will outline possible policy approaches. The White Paper will be conducted within the established Terms of Reference (**Box 1**).

### **Box 1: The Energy White Paper – Terms of Reference**

The Australian Government has committed to a set of signature economy-wide reforms to grow the economy while addressing rising business and household costs. The Australian Government is committed to working closely with industry and state and territory governments in the development of an integrated, coherent national energy policy.

Australia's energy production, distribution and use are undergoing major transformations, including changes in our domestic and international markets; our primary energy resources and generation technologies; and in how consumers source and use energy. Priority outcomes for the Government include addressing cost-of-living pressures and business competitiveness, with both requiring competitive pricing, productive and efficient use of energy and reform of regulation.

Securing our long-term domestic energy needs, maintaining international competitiveness while meeting international obligations, and growing our export base are fundamental to a strong economy. Growing exports of energy products will bring benefits to Australia, but add to competition for Australian energy resources and link domestic energy prices more closely to international markets. These challenges will require flexible and efficient energy markets.

This Energy White Paper will outline a coherent, integrated and efficient regulatory and policy framework, stimulating sustainable growth, building community confidence in environmental safeguards and growing investment in the energy sector. This will maintain downward pressure on costs while delivering greater certainty and security in supply. Complementing Direct Action, the Energy White Paper will also consider lower emissions energy and the more productive and efficient use of energy.

The Energy White Paper will consider:

- policy and regulatory reform to secure reliable, competitively and transparently priced energy for a growing population and productive economy, including the efficiency and effectiveness of regulatory bodies;
- the appropriate role for government in the energy sector;
- opportunities to drive the more productive and efficient use of energy;
- energy related distribution infrastructure to deliver efficient national markets;
- alternative transport fuel sources;
- workforce issues, including national skills development needs;
- emerging energy technologies and new energy sources; and
- future growth in exports of energy products, including our world leading services industries.

The Energy White Paper will be led by the Department of Industry. An Issues Paper will be released by mid December 2013 to initiate consultation. A Green Paper will be released for consultation in May 2014. The Energy White Paper will be completed in September 2014.

*The Energy White Paper is part of a broader package of Government reforms.*

The White Paper is being undertaken within a broader package of Government reforms, such as lowering pressure on energy prices by abolishing the carbon tax and streamlining business regulation. The policy framework adopted will set the nation on a pathway to achieving longer term goals such as improved energy efficiency and lower emissions energy production. Other linked processes (**Box 2**) will run parallel to the development of the White Paper, and as appropriate will be integrated into the White Paper.

Ongoing Government and industry reports will continue to inform and influence policy direction. This includes the Bureau of Resources and Energy Economics (BREE) energy and technology assessments, market forecasts and operational performance reporting<sup>4</sup>, Geoscience Australia's resources assessment<sup>5</sup> and other policy and regulatory updates like the National Energy Security Assessment<sup>6</sup>. This analysis monitors changes and identifies emerging challenges, and supports transparent and well-informed energy markets.

**Box 2: Additional processes relevant to the Energy White Paper**

- Repeal of Carbon Tax and Mining Tax
- Renewable Energy Target (RET) Review
- East Coast Gas Strategy to 2020
- Direct Action Plan (including Emissions Reduction Fund)
- Review of Competition Laws and Policy
- Agricultural Competitiveness White Paper
- Northern Australia White Paper
- Productivity Commission reports and inquiries
- Vocational education and training (VET) Reform
- Five Year Offshore Petroleum Exploration Acreage Release Strategy

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<sup>4</sup> Australian Energy Market Operator's (AEMO) National Electricity Forecasting Report, Electricity Statement of Opportunities, Gas Statement of Opportunities, the National Transmission Network Development Plan, Energy Adequacy Assessment Projection, Market Event reports; the Australian Energy Regulator's (AER) State of the Energy Market and Market Performance reports; and the Economic Regulatory Authority of Western Australia's Annual Performance Report.

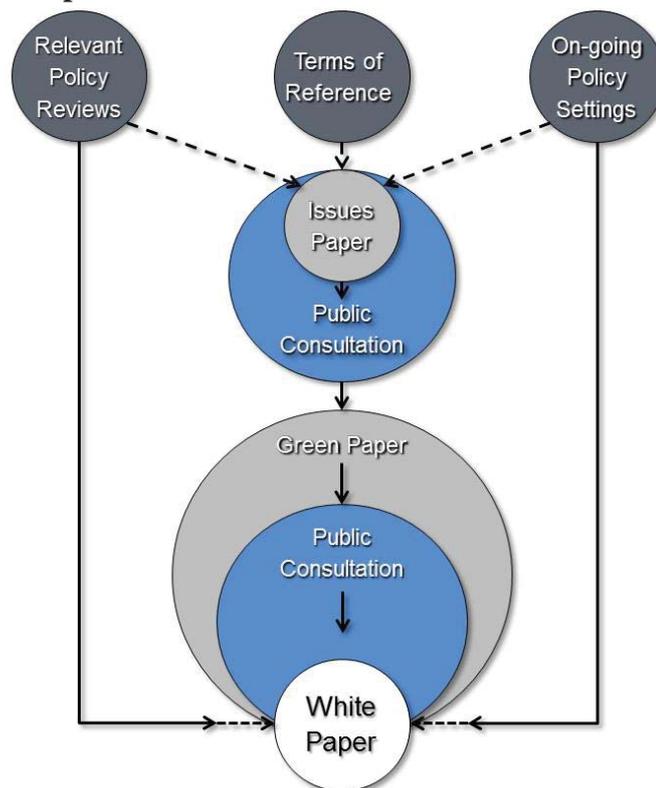
<sup>5</sup> Geoscience Australia, Australian Energy Resource Assessment (2010)

[https://www.ga.gov.au/products/servlet/controller?event=GEOCAT\\_DETAILS&catno=70142](https://www.ga.gov.au/products/servlet/controller?event=GEOCAT_DETAILS&catno=70142)

<sup>6</sup> Department of Resources, Energy and Tourism, 2011 National Energy Security Assessment (NESA)

[http://www.ret.gov.au/energy/energy\\_security/national\\_energy\\_security\\_assessment/Pages/NationalEnergySecurityAssessment.aspx](http://www.ret.gov.au/energy/energy_security/national_energy_security_assessment/Pages/NationalEnergySecurityAssessment.aspx)

**Figure 2: Energy White Paper Process**



There are three phases in the development of the White Paper

1. The Issues Paper—provides an overview of the identified issues of interest to the Government and outlines questions to prompt discussion and input from stakeholders.
2. The Green Paper— using submissions on the Issues Paper, will assess the issues and possible policy approaches. The Green Paper may also flag the Government’s position on policy issues to seek input from stakeholders. The Green Paper will be released in May 2014.
3. The White Paper—will present the Government’s strategic direction and policy commitments to maintain downward pressure on costs while delivering greater certainty and security in supply. The White Paper will be released in September 2014.

The release of this Issues Paper provides the first opportunity for stakeholders to make submissions. Key dates for this process are outlined in **Table 1** and information on how to make a submission is provided on Page iii. A summary of the main issues is in **Table 2** and the identified questions of interest to the Government are provided in **Box 3** and stakeholders are invited to raise other relevant matters.

**Table 1: Key dates for White Paper process**

Announcement of Terms of Reference	5 December 2013
Due date for submissions on Issues Paper	7 February 2014
Release of Green Paper	May 2014
Release of White Paper	September 2014

**Table 2: Issues Snapshot**

<b>The Security of Energy Supplies</b>	
<ul style="list-style-type: none"> <li>• Ensuring reliability and long-term energy security</li> <li>• International agreements and emergency response measures</li> </ul>	<ul style="list-style-type: none"> <li>• Addressing infrastructure and supply constraints and barriers to emerging energy sources</li> <li>• Increasing transparency in market conditions</li> </ul>
<b>Regulatory Reform and Role of Government</b>	
<ul style="list-style-type: none"> <li>• Reducing unnecessary regulatory burden on business</li> <li>• Streamline project approvals while maintaining environmental safeguards</li> </ul>	<ul style="list-style-type: none"> <li>• Greater price transparency</li> <li>• Improving market competition</li> </ul>
<b>Growth and Investment</b>	
<ul style="list-style-type: none"> <li>• Supporting growth</li> <li>• Encouraging investment</li> </ul>	<ul style="list-style-type: none"> <li>• Reducing costs and barriers</li> <li>• Community engagement</li> </ul>
<b>Trade and International Relations</b>	
<ul style="list-style-type: none"> <li>• Growing export markets including value-added products and services</li> <li>• Attracting foreign investment</li> </ul>	<ul style="list-style-type: none"> <li>• Encouraging open and transparent international energy markets</li> <li>• Enhancing energy supply security</li> </ul>
<b>Workforce Productivity</b>	
<ul style="list-style-type: none"> <li>• Increasing workforce productivity</li> <li>• Addressing skills shortages</li> </ul>	<ul style="list-style-type: none"> <li>• Addressing long-term training and skills development needs</li> <li>• Building skills for emerging and alternative<sup>7</sup> energy technologies</li> </ul>
<b>Driving Energy Productivity</b>	
<ul style="list-style-type: none"> <li>• Supporting energy productivity</li> <li>• Maximising social and economic benefits</li> </ul>	<ul style="list-style-type: none"> <li>• Encouraging demand-side participation and energy efficiency to reduce peak energy use</li> <li>• Increase energy efficiency within the transport sector</li> </ul>
<b>Alternative and Emerging Energy Sources and Technology</b>	
<ul style="list-style-type: none"> <li>• Encouraging competitive renewable, low-emission technologies and alternative energy sources</li> <li>• Supporting research and development for emerging technologies</li> </ul>	<ul style="list-style-type: none"> <li>• Encouraging use of competitive alternative transport fuels and electric and biofuel vehicles</li> </ul>

<sup>7</sup> when used in this paper in reference to energy sources, fuels and technologies, the word ‘alternative’ makes no inference about whether serving an existing role, or having future potential.

### **Box 3: Summary of questions for consideration**

#### **The Security of Energy Supplies**

The Government seeks comment on:

- ways community expectations can be better understood and reflected in reliability standards;
- the value of developing fuel reserves to meet Australia’s international oil security obligations, and augment domestic security;
- ways to increase new gas sources to meet demand and measures to enhance transparency in market conditions; and
- issues relating to the regulation of energy infrastructure.

#### **Regulatory Reform and Role of Government**

The Government seeks comment on:

- priority issues, barriers or gaps within the COAG energy market reform agenda;
- possible approaches and impacts of review of tariff structures including fixed network costs, further time-of-use based electricity tariffs and the use of smart meters;
- possible measures to promote greater price transparency in gas markets; and
- areas where further privatisation of government-owned assets would contribute to more effective regulatory frameworks and better outcomes for consumers.

#### **Growth and Investment**

The Government seeks comment on:

- commercial or market initiatives that could enhance growth and investment in the energy and resources sectors;
- areas where approvals processes could be further streamlined while maintaining proper environmental and social safeguards;
- further ways that regulatory burdens could be reduced while maintaining appropriate levels of disclosure and transparency in energy markets; and
- the impacts of variable land access policy and ways the community could be better informed and engaged on development in the energy sector.

#### **Trade and International Relations**

The Government seeks comment on:

- how to grow the export of value-added energy products and services;
- ways to remove unnecessary barriers to continued foreign investment in Australia’s energy sector;
- ways to strengthen support for access to export markets; and
- ways to support business to maximise export opportunities for Australia's energy commodities, products, technologies and services, including the value of Australia’s participation in the variety of international forums.

#### **Workforce Productivity**

The Government seeks comment on:

- the nature of any current skills shortages being experienced and how these could be addressed by and with industry;
- the capacity of industry and education sector-led programs to meet long-term training and skills development needs of the energy and resources sectors; and
- specific long-term training and skills development needs for alternative transport fuel, renewable energy, energy management and other clean energy industries.

### **Driving Energy Productivity**

The Government seeks comment on:

- the current suite of energy efficiency measures, ways these could be enhanced to provide greater energy efficiency or possible new measures that would enhance energy productivity;
- the use of demand-side participation measures to encourage energy productivity and reduce peak energy use; and
- measures to increase energy use efficiency in the transport sector.

### **Alternative and Emerging Energy Sources and Technology**

The Government seeks comment on:

- ways to encourage a lower emissions energy supply that avoids market distortion or causes increased energy prices;
- the need to review existing network tariff structures in the face of rapidly growing deployment of grid-backed-up distributed energy systems, to ensure proper distribution of costs;
- additional cost-effective means, beyond current mandatory targets and grants, to encourage further development of renewable and other alternative energy sources and their effective integration within the wider energy market;
- how the uptake of high efficiency low emissions intensity electricity generation can be progressed;
- any barriers to increased uptake of LPG in private and commercial vehicles and CNG and LNG in the heavy vehicle fleet; and
- any barriers to the increased uptake of electric vehicles and advanced biofuels.

## 2. The Security of Energy Supplies

*Electricity price rises have impacted on households and business. Regulatory reform could put downward pressure on prices.*

The security of energy supplies includes day-to-day reliability and the ability to meet the ongoing needs of consumers, from households to business, industrial and institutional users. In part, security can be met by diversity in supply, however, switching energy sources may not always be a technically viable or available solution. Switching may also be inconsistent with other commercial realities or government policy goals.

An oversupply in electricity markets has been created by current trends of lower electricity consumption and increased generation from renewable energy, especially large-scale wind farms. Ensuring consumers pay no more than necessary for reliable and secure energy supplies becomes more challenging against this background of declining energy consumption and growth in new sources.

By international standards Australia enjoys relatively low electricity prices, but upward price movements over recent years have impacted all consumers<sup>8</sup>. The Australian Bureau of Statistics estimates that household electricity prices have risen 59 per cent over the past four years<sup>9</sup>. This is mainly due to the significant investment required for new and ageing network infrastructure to ensure supply reliability. The carbon tax and green energy schemes, such as the Renewable Energy Target and state feed-in tariffs, have also had significant impact.

The current energy market reform package will go some way to ensuring future network revenues more closely reflect actual demand conditions and the value consumers place on reliability of supply. However, greater emphasis could be given to a number of areas. In its 2013 Electricity Network Regulatory Frameworks Report the Productivity Commission found that current jurisdictionally-based reliability standards for distribution and transmission networks are not set efficiently and often bear little relationship to the value customers place on them<sup>10</sup>.

Ensuring reliability requirements reflect the value attributed to those services by consumers is a priority for the Government, as well as for state and territory governments. Through COAG and its then Standing Council on Energy and Resources<sup>11</sup> jurisdictions agreed in principle to adopt a national framework and methodology for setting distribution and transmission reliability obligations. The new Standing Council on Energy will consider the approach to introducing a national reliability standards framework.

*The Government seeks comment on ways community expectations can be better understood and reflected in reliability standards.*

*Australia has a growing use of imported refined liquid fuels and a diversity of sources provides for security of supply.*

The security of liquid fuels needs to be considered in the context of Australia's increasing dependence on liquid fuel imports as demand grows, and both domestic crude production and refining declines. Liquid fuel imports are sourced from a diversity of suppliers under stable market arrangements resulting in a high degree of confidence in Australia's liquid fuel security.

<sup>8</sup> BREE 2012, *Energy in Australia 2012*

<sup>9</sup> Australian Bureau of Statistics (ABS) (Sept 09–Sept 2013) *Consumer Price Index for electricity* (cat. no. 6401.0)

<sup>10</sup> Productivity Commission 2013, *Electricity Network Regulatory Frameworks*, Report No. 62, Canberra. <http://www.pc.gov.au/projects/inquiry/electricity/report>

<sup>11</sup> In December 2014 a Standing Council on Energy replaced the Standing Council on Energy and Resources.

The 1974 agreement on the International Energy Program (Treaty) commits International Energy Agency (IEA) members to hold stocks and contribute oil to the global market during a declared IEA emergency action. Australia relies solely on the commercial stockholding of industry to meet its treaty obligation and is the only IEA member to do so. This approach was previously sufficient to meet the required stockholding as, since joining the IEA in 1979, Australia has been a relatively minor net importer and an occasional net oil exporter. However, continually declining indigenous production and increasing demand have put pressure on Australia's IEA commitments. According to current projections, Australia may average below 60 days next year, and 45 days by 2024.

The 2011 National Energy Security Assessment concluded there is sufficient global oil production and refining capacity to supply the Australian market to 2035, even with declining domestic refining capacity. Energy security would remain stable whether Australia imports finished products or crude oil, noting around 80 per cent of refinery feedstock is imported<sup>12</sup>.

Australia's liquid fuel supply security will depend in part on the efficiency of Australia's liquid fuel infrastructure, the structure and operation of the Asian market and the role of the Singapore trading hub. Australia's liquid fuels vulnerability is related to logistical considerations. As long as the global refining sector has surplus capacity, price movements will ensure refined products reach consumers.

Given the high proportion of imported crude used in domestic refineries, policy that supports domestic refineries would likely make only a marginal impact on energy security, while being economically very costly to either the taxpayer and/or fuel consumer. Similarly, there is a high cost to invest in strategic reserve stocks of fuel to protect against the long run risk of sudden severe disruption to global trade. This cost would need to be met by either increased fuel prices or the diversion of public funds.

The building of strategic reserve stocks to maintain compliance with the IEA treaty would add around 40 extra days of forecast daily consumption cover over the next decade. A build program for this significant level of stockholding via either Government-funded stockholding, Government-funded ticketing for overseas stocks, or legislated mandatory industry stockholdings (funded by passing costs onto consumers) requires an estimated \$6.8 billion investment to provide both stock and storage infrastructure.

Opportunities remain to grow Australia's liquid fuel supplies with new oil discoveries in both proven areas and in under-explored frontier basins, such as the deep-water Great Australian Bight. Liquids associated with new shale gas developments and light tight oil may add further oil resources in the future.

*The Government seeks comment on the value of developing fuel reserves to meet Australia's international oil security obligations, and augment domestic security.*

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<sup>12</sup> Department of Resources, Energy and Tourism, *2011 National Energy Security Assessment*  
[http://www.ret.gov.au/energy/energy\\_security/national\\_energy\\_security\\_assessment/Pages/NationalEnergySecurityAssessment.aspx](http://www.ret.gov.au/energy/energy_security/national_energy_security_assessment/Pages/NationalEnergySecurityAssessment.aspx)

*Growing international demand and potential shortages of low-cost east coast gas could be partially resolved through CSG expansion.*

The picture for gas security presents some challenges on the east coast. New opportunities in export markets are driving a boom in coal seam gas (CSG) development, however, rising costs of production and the fact LNG projects put a higher value on gas will inevitably drive up prices. Bringing on CSG for LNG at the scale currently seen in Australia is unprecedented.

While resources in the ground are sufficient to meet both export and domestic demand, the timeline for proving up and extracting these resources is critical. The need to develop CSG resources as LNG trains come online is particularly important in terms of resources dedicated to exports and those to supply domestic markets. Small delays in CSG development or changes in export facility timing are therefore significant for assessments of price and availability.

Continuing tight supply in the domestic market is one factor causing rising gas prices and making price discovery increasingly difficult. The supply response is driven by complex technical and commercial factors, ranging from how acreage is released and awarded, how actively it is explored and developed, to how competitively it is marketed.

Untapped CSG reserves in NSW could partially ease medium-term east coast gas pressures if current planning impediments are addressed urgently. The opaque nature of gas markets makes forming expectations on price and managing risk challenging, and has fuelled debate about domestic gas security. Removing barriers that may limit a supply response and improving the market's ability to operate in a more dynamic environment are increasingly important to addressing these challenges. There is also the potential to develop Australia's onshore tight and shale gas reserves. Preliminary work on these resources is underway, mostly in Western Australia, Queensland, South Australia and the Northern Territory, with continued exploration and developing technology projected to unlock further resources.

*The Government seeks comment on ways to increase new gas sources to meet demand and measures to enhance transparency in market conditions.*

*Efficient infrastructure is needed to ensure the reliable transfer of energy products to domestic consumers and export markets.*

The process from the extraction and generation of energy resources to their eventual domestic consumption or export relies heavily on a variety of forms of infrastructure. Infrastructure used ranges from dedicated electricity 'poles and wires' and gas pipelines to transport infrastructure such as air, road, rail and ports. Risks and trends in the security of the electricity, gas and liquid fuel supply chains are collectively analysed at a national level through the regular publication of the National Energy Security Assessment, with the next due to be published in late 2014.

Investment in maintaining the dedicated energy network infrastructure has been a major contributor to increased energy prices. While state governments traditionally had strong ownership of electricity networks, structural reform has implemented the principles of a competitive market as a precursor to transferring these assets to the private sector. There is already private ownership in some parts of the network, with a strong private ownership of gas network infrastructure. The adoption of smart grid technology offers the prospect of more reliable network performance and lower cost, but will require further investment. The National Electricity Law and National Gas Law have provided the regulatory framework governing these networks. The Australian Energy Market Commission sets rules under these laws that are enforced by the Australian Energy Regulator.

*The Government seeks comment on issues relating to the regulation of energy infrastructure.*

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### 3. Regulatory Reform and Role of Government

*The Government is considering reforming electricity markets and pricing to improve user choice through consumer information and cost reflective tariff structures.*

The Government is rigorously reviewing the efficiency of regulation in Australia. Inefficient regulation has a negative impact on business with consequences including the deferral or deterrence of investment and reduced productivity and competitiveness. The consequence may be pass-through costs putting upward pressure on the prices faced by consumers. In the energy market sector this will include ensuring market transparency and reviewing electricity tariff structures.

Government roles in the energy sector vary, from project approver and operational regulator to being an owner of assets. Governments coordinate their roles principally through the Standing Council on Energy, which has commenced a reform agenda focusing particularly on electricity markets. The issues being addressed by the Standing Council on Energy are broadly consistent with the issues identified in the 2013 Productivity Commission Inquiry Report Electricity Network Regulatory Frameworks<sup>13</sup>.

The National Electricity Market is regulated under the general purview of the National Electricity Law and the National Energy Retail Law as applied by the Australian Energy Regulator, the Australian Energy Market Commission and the Australian Energy Market Operator. The energy market bodies are scheduled for review in 2014. The Government will also continue to coordinate Australia's national measurement system to underpin the equitable and efficient operation of energy markets.

COAG endorsed comprehensive energy market reforms in December 2012, with a goal to ensure energy consumers do not pay more than necessary for a reliable and secure supply of electricity in the national electricity market. The COAG reform package, which will progress energy market reform to support investment and market outcomes in the longer term interests of consumers, is based on four key areas. These are strengthening regulation, empowering consumers, enhancing competition and innovation, and ensuring balanced network investment.

*The Government seeks comment on priority issues, barriers or gaps within the COAG energy market reform agenda.*

*The Government is reviewing the Renewable Energy Target and considering issues where tariff structures do not reflect the true cost of supply.*

The Government is considering two additional issues that impact on the electricity market. The first is the review of the Renewable Energy Target. The results of the review will be integrated into the White Paper. The second is a response to emerging issues in the electricity sector where tariff structures may not fully reflect actual costs of supply. Specifically, the Government will look into whether additional regulatory reforms are required to appropriately allocate costs and benefits between the network businesses, network users and consumers.

Significantly, by the end of 2013 more than a third of small energy users across Australia will have access to some form of smart metering. The increased information available for energy users will enable greater innovation and competition in energy retail markets, flexible and cost-reflective pricing opportunities, and options to manage supply. Ongoing reforms, including those from the Power of Choice

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<sup>13</sup> Productivity Commission 2013, *Electricity Network Regulatory Frameworks*, Report No. 62, Canberra. <http://www.pc.gov.au/projects/inquiry/electricity/report>

review<sup>14</sup>, are necessary to manage these new services and maximise benefits for consumers.

In particular, effective information tools will empower consumers to cut their energy bills and choose the best new services to improve their energy efficiency.

*The Government seeks comment on possible approaches and impacts of review of tariff structures including fixed network costs, further time-of-use based electricity tariffs and the use of smart meters.*

*The Government favours the development of a more flexible and informed trading environment for gas markets.*

Gas markets do not operate in the same regulated way as electricity markets. Australia's gas markets are dominated by long-term bilateral and commercially confidential contracts that are good for managing risks, but limit transparency and liquidity.

Australia's gas markets have evolved considerably over the past two decades. Several reviews have highlighted the importance of setting the broader gas market reform agenda to take on the challenges of improving the market's function. This is not a trivial exercise given the current complexity and limited transparency of gas markets and will require a clear strategy to be developed following engagement with stakeholders and further technical analysis. This should be framed against a long-term vision for market direction.

Exploring additional reforms to promote market transparency could help inform decisions by market participants, policy makers and regulators. Transparency will facilitate competition, improve the commercial and regulatory environment for infrastructure, and promote good governance and an accountable reform agenda.

The Standing Council on Energy and Resources agreed in December 2012 to an Australian Gas Market Development Plan<sup>15</sup> that incorporated new initiatives to pursue the two policy principles of ensuring supply can respond flexibly to market conditions and promoting market development. Work on the Plan is ongoing.

Several recent reviews of the east coast gas market have been undertaken to inform policy in the face of this uncertainty in ongoing supply and cost. The reviews, including Victoria's Gas Market Taskforce Report<sup>16</sup>, the Australian Energy Market Commission's Gas Market Scoping Study<sup>17</sup>, the Government's Eastern Australian Domestic Gas Market Study<sup>18</sup> and the 2013 Gas Statement of Opportunities<sup>19</sup> have all highlighted similar issues around the need for market transparency and increased supply in response to growing demand to put downward pressure on prices.

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<sup>14</sup> AEMC 2012, *Power of choice review - giving consumers options in the way they use electricity*, Final Report, 30 November 2012, Sydney. <http://www.aemc.gov.au/market-reviews/open/power-of-choice-update-page.html>

<sup>15</sup> Standing Council on Energy and Resources 2012, Gas Market Development Plan. <http://scer.govspace.gov.au/files/2012/12/Gas-Market-Development-Plan-Summary.pdf>

<sup>16</sup> Victorian Gas Market Taskforce. Final Report and Recommendations October 2013. <http://www.energyandresources.vic.gov.au/about-us/publications/Gas-Market-Taskforce-report>

<sup>17</sup> K Lowe Consulting. *Gas Market Scoping Study: A report for the AEMC* July 2013. <http://www.aemc.gov.au/market-reviews/completed/gas-market-scoping-study.html>

<sup>18</sup> Australian Government. Study on the Eastern Australian Domestic Gas Market Terms of Reference. [http://www.ret.gov.au/energy/energy\\_markets/gas\\_market\\_development/Pages/GasMarketDevelopment.aspx](http://www.ret.gov.au/energy/energy_markets/gas_market_development/Pages/GasMarketDevelopment.aspx)

<sup>19</sup> Australian Energy Market Operator (AEMO), *Gas Statement of Opportunities 2013* <http://www.aemo.com.au/Gas/Planning/Gas-Statement-of-Opportunities>

The Government commissioned the Eastern Australia Gas Market Study to address information gaps surrounding the outlook for supply and demand. The Study will inform the Eastern Australia Gas Supply Strategy to 2020.

*The Government is seeking comment on possible measures to promote greater price transparency in gas markets.*

*The Government seeks to encourage market competition, including by continued privatisation of state and territory owned energy assets and businesses.*

While active regulators in energy markets, state and territory governments also often own generation, transmission and distribution network assets and retail businesses. Recognising the potentially conflicting roles and potential efficiencies of private sector operation, most state and territory governments have started to prepare for asset privatisation by implementing the principles of a competitive market. The Government will encourage Standing Council on Energy members to pursue privatisation initiatives.

*The Government is seeking comment on areas where further privatisation of government-owned assets would contribute to more effective regulatory frameworks and better outcomes for consumers.*

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#### 4. Growth and Investment

*The Government supports growth in the energy sector, and seeks to remove unnecessary barriers to continued investment that will deliver economic prosperity and a high standard of living.*

Australia's resources sector is in a period of significant growth and change as the investment boom of the previous decade peaks. However, as major projects are completed, the coal and LNG sectors will experience a large-scale ramp-up in production capacity. The economic impact of this transition is expected to be felt most over the next two to three years as Australia's economic growth slows ahead of increased revenues from significant new production.

The current phase of the commodity price cycle, with declining prices of most commodities over the past 12–18 months, is presenting challenges for investment in energy and resources projects. Investment in the energy and resources sectors is expected to decline over the medium-term. However, with over 250 projects still in the planning stage, there is the potential for a rebound in investment over this period in the right commercial and market conditions.

Focus should also be given to the efficient discovery and orderly development of a multi-decade energy and resource projects pipeline. Geoscience Australia maps Australia's energy resources, including fossil fuels and renewables<sup>20</sup>. Pre-competitive geoscience information can provide the key data to change perceptions of prospectivity thus encouraging exploration and discovery.

A strategic approach to managing Australia's offshore petroleum resources is required to accelerate and enhance resource development and optimise sectoral investment and competitiveness.

*The Government is committed to reducing costs to maintain a competitive position for the Australian energy and resources sectors.*

The Government is facilitating a more targeted and proactive approach to the release of offshore acreage through a five-year offshore petroleum exploration acreage release strategy. The strategy aims to outline a way forward for offshore exploration acreage releases taking into account the progress in industry activity, technology, regional geological understanding and the investment environment. These elements will ensure that Australia continues to remain an attractive destination for explorers to sustainably develop Australia's natural resources.

Higher costs are becoming harder to absorb, even with the deployment of new technology. Cost reductions and consolidation is occurring with a number of older high cost operations ceasing or scaling back production. Adopting new approaches to business models and operating processes will drive increased competitiveness and sustainability.

There is significant opportunity for Australian business to re-orient towards developing intellectual property and value-added products. This includes proactively exploring opportunities for research and development, collaboration and investment.

Industry leadership in fostering a business culture that supports and facilitates innovation and sustainability, and collaborates with government and the community is fundamental for growth and development. Collaboration increases investment, builds a critical mass and increases the spread of knowledge between businesses in the sector. This improves the industry's capacity to translate investments in research and science into commercial and economic results.

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<sup>20</sup> Geoscience Australia, Australian Energy Resource Assessment (2010)  
[https://www.ga.gov.au/products/servlet/controller?event=GEOCAT\\_DETAILS&catno=70142](https://www.ga.gov.au/products/servlet/controller?event=GEOCAT_DETAILS&catno=70142)

*The Government seeks comment on commercial or market initiatives that could enhance growth and investment in the energy and resources sectors.*

*The Government is looking at ways to streamline project approval processes while maintaining environmental safeguards.*

The Productivity Commission has reported to the Government on major project development assessment processes<sup>21</sup>. The Government has identified duplication in planning and environmental approvals as an unnecessary regulatory burden on project development. Required approvals may relate to land acquisition, use and access, planning, marine reserves, environmental regulations and offsets, Indigenous and non-Indigenous heritage, native title and public health and safety. Major projects sometimes need more than 70 different primary and secondary approvals, licenses, permits and authorisations<sup>22</sup>.

The Government is seeking to streamline regulation through cross-accreditation processes. Cross-accreditation allows a single approvals process to meet the requirements of other regulatory instruments provided that the requirements of both are met. An example of a streamlining process is the proposed accreditation of the National Offshore Petroleum Safety and Environmental Management Authority under the Commonwealth *Environmental Protection and Biodiversity Conservation Act (1999)*. The Government will work with state and territory governments on streamlining the approvals processes. The Government will maintain appropriate environmental safeguards, including particular consideration of impacts on Indigenous communities.

To relieve the need for each project proponent to develop environmental baseline data for each individual impact assessment, the Government could introduce efficiencies such as creating a repository of data sourced from the public domain or existing industry submissions. The repository could have the same positive impact that pre-competitive geosciences assessment has had in encouraging investment.

*The Government seeks comment on areas where approvals processes could be further streamlined while maintaining proper environmental safeguards.*

*The Government is working to reduce unnecessary regulatory burden on business.*

The Government will also reduce the regulatory burden being incurred by business more generally, such as inefficient or unnecessary compliance and reporting regimes. Reducing regulatory burden is balanced by the need for transparent and robust information to inform energy policy development. The Government considers it important to identify unnecessary regulatory burdens that do not provide a net benefit for the economy, consistent with best practice regulation. The Government will deliver a one-stop-shop to help business navigate licensing and other regulatory processes.

The adoption of new technologies and energy sources (for example CSG) has the potential to outpace the capacity of authorities to develop and implement the corresponding regulatory frameworks. Rates of adoption should be monitored and appropriate regulatory responses developed that meet community expectations and do not impede industry development.

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<sup>21</sup> Productivity Commission 2013, Major Project Development Assessment Processes, Research Report [http://www.pc.gov.au/data/assets/pdf\\_file/0015/130353/major-projects.pdf](http://www.pc.gov.au/data/assets/pdf_file/0015/130353/major-projects.pdf)

<sup>22</sup> Productivity Commission 2013, Major Project Development Assessment Processes, Draft Research Report, Canberra. <http://www.pc.gov.au/projects/study/major-projects/draft>

*The Government seeks comment on further ways that regulatory burdens could be reduced while maintaining appropriate levels of disclosure and transparency in energy markets.*

*The Government is committed to public disclosure on the development of energy resources.*

The community environment in which energy and resource companies operate has changed significantly. A “social licence to operate” has become increasingly important for energy-related resource development, energy production and transmission. While reducing the quantity of regulation, the Government is committed to delivering confidence in the approvals process. Communities expect to be fully engaged on the social economic and environmental dimensions of projects.

Without a social licence, public opposition has been a prominent factor in delaying or adding substantial cost to both traditional and renewable energy projects. This is a particular factor in the inability to progress CSG projects in NSW.

The Standing Council on Energy and Resources adopted a multiple land use framework<sup>23</sup> and a harmonised framework for CSG regulation, but this has not delivered a nationally consistent framework for land access because of an inconsistent overlay of additional regulation.

*The Government seeks comment on the impacts of variable land access policy and ways the community could be better informed and engaged on development in the energy sector.*

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<sup>23</sup> Multiple Land Use Framework  
<http://www.scer.gov.au/workstreams/land-access/mluf/>

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## 5. Trade and International Relations

*The Government recognises the economic importance of Australia's primary and value-added energy products and services.*

The energy and resources sectors' strong reputation and commitment to excellence have enabled Australia to secure access to key economies and global markets, particularly in Asia. Around two thirds of our energy production is exported, which in addition to boosting export revenue, further enhances Australia's prosperity by creating new export markets for our services sector.

Strong global commodity demand and the consequential upward pressure on prices have contributed to Australia's economic prosperity. However, the Government and industry are aware of the importance of cost-competitiveness for our trading partners. Other challenges facing our energy sector include a slower rate of economic development in Asia, the changing environment of global energy supply and demand balances, and international and national commitments to reduce greenhouse gas emissions and improve energy efficiency.

Australia's continued economic prosperity will be enhanced by our ability to influence international energy and resources issues, value-add to existing and emerging energy markets with products and services, and ensure continued and improved access to domestic and international energy and resources transport routes. Maintaining Australia's global competitiveness is unlikely to be achieved by reliance on off-the-shelf solutions. Developing and commercialising new technologies will provide export opportunities.

The mining equipment, technology and services (METS) sector comprises firms that provide specialised support and solutions to the mining and minerals industry. Spanning manufacturing to engineering and professional services companies, it is a highly diverse sector in size and scope. In 2011–12, Australian exploration and other mining support services totalled \$17.4 billion and employed 50,000 people<sup>24</sup>. The METS sector is estimated to comprise between 1,200–1,500 companies in Australia<sup>25</sup>.

The industry has identified the most significant challenge for METS companies as finding and retaining skilled, experienced, affordable staff given a lack of engineering, technical and management skills, mainly in regional areas. In addition, the sector is concerned about a high Australian dollar, the cost of doing business, cheap imports, and retention of customers over the long-term. METS companies are globally focused with 55 per cent<sup>25</sup> exporting mainly to the Asia-Pacific.

While Australia is value-adding to its gas resources by conversion to LNG for export, there is minimal conversion of coal resources, particularly the substantial brown coal reserves, to higher value products for export.

The low mining cost and other properties of Victorian brown coals such as its high reactivity, low ash content and low sulphur content make it potentially attractive for the production of export-quality upgraded brown coal, coal-to-liquids (CTL) and coke products for use in steelmaking. The Government has been working with the Victorian Government on technologies to address some of the key challenges to realising brown coal export potential.

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<sup>24</sup> ABS 84150DO001\_201112 Mining Operations, Australia, 2011–12

<sup>25</sup> AusMine, Australia's New Driver for Growth – Mining Equipment Technology and Services  
<http://www.austmine.com.au/Industry-Survey>

*The Government seeks comment on ways to grow the export of value-added energy products and services.*

*The Government welcomes foreign investment in the energy sector and will continue to ensure Australia remains an attractive destination for energy investment.*

Significant ongoing investment in Australia's production capacity and supply infrastructure is needed to ensure a continuation of the economic benefits derived from our energy and resources sectors. Such investment will increase market share through competitive and reliable supply.

Australia has world-class energy and resources sectors that attract investment from around the globe. The Government welcomes foreign investment that is in our national interest. Foreign investment boosts economic growth by developing competitive industries, accessing global value chains, creating jobs, increasing exports, and providing access to new technology, technical and management skills and overseas markets. In Australia businesses can expect a supportive framework including a stable and efficient regulatory environment, intellectual property protection, a highly skilled and multi-lingual workforce, and a strong culture of innovation.

*The Government seeks comment on ways it can remove unnecessary barriers to continued foreign investment in Australia's energy sector.*

*The Government will use international engagement to encourage open and transparent market operations.*

Global resources and energy security is best served through open, transparent and effective markets and investment frameworks, with minimal government intervention. Australia's international energy engagement policy objectives include:

- promoting the development of global rules and standards that encourage free and fair trade in efficient and transparent energy markets;
- encouraging the transparent and appropriate application of property rights and taxation regimes; and
- promoting energy efficiency and the development of lower emissions technologies.

Efficient energy markets promote diversification of energy sources and technologies, and result in more robust supply chains. This is consistent with Australian and regional energy security objectives. Efficient markets also promote appropriately timed, sized and located investment in production and supply capacity, in turn delivering long-term price stability and supply security, which is critical to maintaining access to affordable and reliable energy services.

*The Government seeks comment on ways it can strengthen support for access to export markets.*

*The Government participates in multilateral and bilateral forums to maximise export opportunities and drive regional energy security.*

Australia's energy focused international engagement is informed by, and is capable of responding to, a rapidly changing international environment. The Government works with industry and foreign governments to maximise export opportunities for Australia's energy commodities, products, technologies and services, and to enhance domestic and regional energy security.

The Government is currently negotiating a number of Free Trade Agreements (FTAs) that will support export opportunities for Australian energy commodities, products, technologies and services. These include FTAs with Australia's major resource and energy export destinations such as China and Japan, as well as the multi-party Trade in Services Agreement. Together with the conclusion of the Australia–Korea FTA in

December 2013, Australia's involvement in these trade agreements supports stronger trade and investment in Australia's energy and resources sectors, including in related services.

Australia's engagement with the World Trade Organization (WTO) provides further opportunities to support Australia's energy sector. The WTO sets rules in diverse areas both at and behind the border, such as customs procedures, import licensing, technical regulations, intellectual property, services and investment. WTO Committees also serve as an important forum for transparency regarding commercial and regulatory developments in world markets.

Australia's multilateral engagement on energy policy is given effect through a number of forums including the APEC Energy Working Group, Clean Energy Ministerial, East Asia Summit Energy Cooperation Taskforce, G20 Energy Sustainability Working Group, International Energy Agency, International Energy Forum, International Partnership for Energy Efficiency Cooperation and the International Renewable Energy Agency. Bilateral matters are progressed through a suite of bilateral minerals and energy cooperation agreements.

Regular bilateral discussions, particularly with major Asian markets, involve strong industry, state and territory representation and provide a forum to:

- facilitate the exchange of information to gain a mutual understanding of energy and mineral resource policies and issues in respective countries;
- promote trade and investment to enhance bilateral cooperation; and
- stimulate bilateral commercial relationships for the benefit of Australia and trading partners.

As one of the world's largest producers of uranium, Australia has a leadership role in ensuring the sustainable development and responsible use of this globally important energy resource. Consequently, the Government's policy is that uranium exploration and mining will only be approved subject to stringent environmental and safety requirements in line with world's best practice.

Australian policy ensures that Australian uranium can only be sold to countries committed to peaceful uses of nuclear energy. Negotiations are currently underway on a Nuclear Cooperation Agreement with India to enable sales of uranium for power generation purposes, providing opportunities for development and expansion of uranium projects.

*The Government seeks comment on ways to support business to maximise export opportunities for Australia's energy commodities, products, technologies and services including the value of Australia's participation in the variety of international forums.*

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## 6. Workforce Productivity

*The Government recognises the importance of improved workforce productivity to maintain international competitiveness as the energy resources investment cycle moves to a production phase.*

From 2004 to 2011, soaring demand stretched global supply capacity in almost all major commodities and led to the greatest investment boom in Australia's history. Australia's resources sector is in transition as the investment boom peaks and major projects are completed, and there is a large-scale ramp-up of production in iron ore, coal and LNG.

Workforce issues have been a pressure point, in particular through rising labour costs and conditions, and accessing and retaining sufficient skilled and semi-skilled workers. These pressures have been exacerbated in part by the rapid expansion of the energy and resources sectors, which has fuelled demand for workers. In some cases cost blow-outs have followed explicit management choices to place a greater premium on project completion rather than cost management. These costs are becoming harder to absorb, even with the deployment of new technology.

A flexible and responsive vocational education and training program and industry connected university training will be needed to help meet ongoing industry demand. In instances where peak workforce needs are not being met from the Australian labour market, skilled migration may be necessary to ease capacity constraints and ensure future jobs for Australians can be realised.

The Government recognises the importance of the Temporary Work (Skilled) 457 Visa allowing business-sponsored workers to come to Australia for up to four years. Australia's temporary skilled migration program is an uncapped, demand-driven, sponsored visa. The number of visas granted will depend on the number of vacancies that cannot be filled by local labour. Recent reforms include a requirement that employers advertise a position in Australia before hiring offshore workers.

*The Government seeks comment on the nature of any current skills shortages being experienced and how these could be addressed by and with industry.*

*The Government notes that an increasing demand for highly skilled workers has been identified.*

An assessment of workforce demand by the Australian Workforce and Productivity Agency's (AWPA) Resources Sector Skill Needs Report for 2012<sup>26</sup>, was developed in consultation with industry and state and territory governments, and identified an increasing demand for skilled workers.

AWPA anticipates significant annual employment growth of 11 per cent in the Oil and Gas Operations sector from 2012 to 2017, as many of the major LNG projects currently under construction move into their production phase. This would take employment from 16,700 workers in 2012 to 28,100 in 2017. AWPA has specifically identified barriers to LNG operator training, including the limited capacity at domestic training facilities.

The rapid shift from construction to production will increase demand for specialist operators including roles that require particular experience. It will be challenging to source many of these experienced workers domestically, which could impact on productivity.

A range of government and industry initiatives address potential skills shortages in LNG as well as the broader resources industry. This includes initiatives to up-skill

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<sup>26</sup> Australian Workforce and Productivity Agency 2012 report on resources sector skill needs  
<http://www.awpa.gov.au/publications/documents/Resources%20Sector%20Skill%20Needs%20-%202012.pdf>

existing workers, train new employees and lift workers' literacy levels to enable them to achieve higher qualifications in their workplaces. There are also initiatives to enhance apprenticeship completion rates.

Industry-led initiatives have helped engage and retain more women and Indigenous Australians in the sector, and increased the employment of local people at remote work sites. It is important that Indigenous Australians are considered in the context of employment opportunities, especially in remote and regional communities. The Government has identified Indigenous issues as a key policy focus, including employment opportunities.

Universities and industry have established closer links under the National Resources Sector Workforce Strategy<sup>27</sup>, working collaboratively to improve industry engagement for engineering students and creating para-professional roles and courses for engineers and geo-scientists, facilitating a more flexible yet targeted approach to engineering work.

Industry is also implementing training initiatives designed to address projected shortages, particularly the demand for highly skilled technical positions. The establishment of Perth, Western Australia, as a centre for excellence in floating LNG (FLNG) will provide professional leadership, management and technical education relevant to the FLNG industry.

If the projected demand for more and higher qualifications in the sector is to be met, industry will need effective workforce development. The sector requires a significantly expanded workforce that is able to perform increasingly complex tasks. Enterprise training is vital for ensuring constant upgrading of workers' skills, and training new workers and displaced workers from related sectors.

A challenging range of strategic, operation and business skills are needed to drive growth in the energy sector. Industry leaders will have a major influence on the culture and attitudes of the energy workforce. This includes the scientific research capacity and entrepreneurial capabilities to develop and commercialise new technologies as well as engineering and practical skills to install and operate equipment and facilities.

*The Government seeks comment on the capacity of industry and education sector-led programs to meet the long-term training and skills development needs of the energy and resources sectors.*

*The Government recognises the need to develop the skills needed to encourage the development of alternative energy technologies.*

Along with the workforce needs of the resources sector, Australia needs workers with skills relating to energy management, including clean energy and energy efficiency. The need for energy management skills is being driven by policy responses designed to improve the productivity and competitiveness of industry, to address increasing energy prices, and achieve Australia's goal of a five per cent reduction in greenhouse gas emissions by 2020.

In 2009, the Clean Energy Council (CEC) carried out a survey of renewable energy training. Key findings of the CEC survey included too few university and TAFE

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<sup>27</sup> National Resources Sector Workforce Strategy  
<http://www.innovation.gov.au/skills/SkillsTrainingAndWorkforceDevelopment/NationalResourcesSectorWorkforceStrategy/Pages/default.aspx>

courses covering renewable energy technologies, the need for flexible delivery of accredited courses that could be used toward a diploma or Masters degree, a lack of management training for technical staff and a need for more qualified trainers.

E-Oz Energy Skills Australia has committed to a review of the Energy Supply Industry and Gas Supply Industry training system components. This review will ensure skills are available to meet the demand for labour in establishing, operating and maintaining gas-fired power generation systems.

An expanded and evolving energy industry will have implications for our education system and our scientific research base. A broad range of skills will be needed in policy and regulatory fields, engineering and construction, and basic research. Skills will also be required in areas including health and safety, and science and technology appropriate for specific industrial demands.

Energy management skills are needed to establish systems in companies to identify and evaluate energy efficiency opportunities. This includes skills needed to design, construct, operate and maintain energy efficient buildings and facilities. Limited access to energy efficiency skills within corporations can be a significant barrier to achieving energy efficiency improvements. Industry prefers customised on-the-job training, which could be integrated into a company's corporate culture and systems, rather than off site, accredited training provided through the formal tertiary education system (both vocational education and training and universities).

*The Government seeks comment on specific long-term training and skills development needs for alternative transport fuels, renewable energy, energy management and other clean energy industries.*

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## 7. Driving Energy Productivity

*Government activities to promote energy efficiency respond to the specific opportunities in different sectors.*

Energy is an enabler of improved productivity and competitiveness within the Australian economy. Energy efficiency allows more to be done with the same or less energy, which delivers significant benefits including energy cost savings, better resource utilisation and improved production efficiencies. Reliable information that properly establishes the cost-benefit position of energy efficiency measures is important in encouraging widespread uptake.

Energy efficiency can reduce peak demand through the use of more efficient equipment. Peak demand requires costly investment in transmission and distribution infrastructure, the cost of which is passed on to consumers. It is estimated that 25 per cent of retail electricity costs is accounted for by peak demand that occurs for less than 40 hours per year. Reduction in peak demand can therefore have a significant impact on energy prices.

Energy efficiency also allows for more productive use of Australia's finite energy resources. It can remove energy waste, increasing the amount of energy available for value-adding tasks. For example, if Australia's natural gas resources are used to heat poorly insulated homes with inefficient gas heaters they are not available to support industrial processes.

While the benefits of energy efficiency are well recognised, its role in driving productivity improvements is often overshadowed by the more traditional focus on labour and capital productivity. However, rising energy prices have seen energy efficiency emerge as an increasingly important enabler of economic growth. For example, a one per cent improvement in energy efficiency would boost gross domestic product (GDP) by 0.1 of a percentage point (a four per cent increase on existing GDP) and generate an additional \$8 billion by 2020<sup>28</sup>. The opportunities for energy efficiency improvements extend across all sectors and include industrial, commercial buildings, small businesses and households.

Approaches to help consumers reduce energy consumption vary. Several measures are in place to drive energy efficiency in different sectors of the economy including energy efficiency standards, labelling and information programs, energy performance disclosure, demonstration and grant programs.

Large industrial energy users, including electricity generators, account for over 50 per cent of Australia's energy use<sup>29</sup>. Activities to assist these large energy users to improve their energy efficiency outcomes therefore have a commensurately large impact on Australia's energy intensity profile. Between 2006 and 2011, large energy users reported energy savings of over five per cent, representing almost one and a half per cent of Australia's total energy use, and delivering net financial savings of over \$800 million per year<sup>29</sup>.

The 300 largest energy using corporations in Australia are currently required to improve their understanding of the energy they use and the opportunities that exist to extract the most value from that energy<sup>30</sup>. These actions help reduce energy waste and minimise the cost of energy across the business.

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<sup>28</sup> Vivid Economics, *Energy efficiency and economic growth* (April 2013)

<sup>29</sup> Energy Efficiency Opportunities Program, *The First Five Years: 2006–11* – Overview

<sup>30</sup> *Energy Efficiency Opportunities Act 2006*

The challenge is how best to facilitate industrial energy efficiency outcomes in a manner consistent with the needs of business, and in a manner that minimises unnecessary regulatory, reporting and compliance obligations. Government effort may be best directed at those businesses that still need assistance in identifying ways to reduce energy costs. Corporations that have embedded energy efficiency practices into their business could be recognised for that, and could encourage other corporations to do the same.

In the residential and commercial sectors, minimum energy performance standards for buildings, appliances and equipment as well as information on energy efficient technologies and practices are important in informing consumers. In transport, fuel quality standards, and fuel economy disclosure help to improve efficiency. There are opportunities to raise performance standards utilising existing legislation, with minimum cost to the economy but with an overall benefit to the economy.

Commercial buildings account for around eight per cent of Australia's total energy consumption<sup>31</sup>, with the largest commercial users being retail spaces, stand-alone office buildings, education facilities, hotels and hospitals. Most of the energy consumed is for heating and cooling, followed by lighting and then appliances. There are market incentives for premium grade commercial buildings to exceed minimum efficiency standards to meet the growing demand for sustainable buildings. Minimum building standards are set under the National Construction Code. Large office buildings disclose their energy performance when sold or leased while the use of voluntary rating tools for other commercial building types is growing.

Minimum building standards also apply to residential buildings where space heating, hot water systems and lighting are the three largest energy uses. Building shell, appliances and building energy use management all have significant opportunity for energy efficiency. Consumers are increasingly seeking reliable, practical information on how to improve the energy performance of their homes.

Minimum energy efficiency standards for industrial, commercial and residential equipment are regulated under the Greenhouse and Energy Minimum Standards legislation<sup>32</sup>. These standards have delivered significant reductions in energy use across all sectors.

In addition to the potential energy efficiencies in the built environment, industrial processes and more efficient appliances and equipment, there is opportunity to improve energy use efficiency in the transport sector, particularly through improved logistics and driver training. More efficient energy use would drive cost reductions and improve business competitiveness.

Energy efficiency measures driven by government action have delivered significant economic benefits. Between 2006 and 2011, large energy users reported cumulative energy savings of over \$1.5 billion. The cumulative benefit to businesses and households from appliance standards and labelling between 2000 and 2012 is estimated to be over \$8 billion. Modern houses built to enhanced energy efficiency standards and with efficient appliances use up to 30 per cent less energy at peak and base times relative to houses built 10 years ago. However, further opportunities remain if they can be cost effectively delivered.

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<sup>31</sup> BREE *Australian Energy Update* 2013.

<http://www.bree.gov.au/documents/publications/aes/2013-Australian-energy-statistics.pdf>

<sup>32</sup> *Greenhouse and Energy Minimum Standards Act 2012*

These benefits have been delivered without evidence of any significant increase in required upfront investments. A review of the Government's Equipment Energy Efficiency Program in 2011 found no evidence that the real price of appliances increased at all as a result of the rise in energy efficiency. For example, refrigerators and freezers have fallen in price by around 50 per cent while the energy efficiency of these appliances has improved by around 60 per cent since the mid-1970s. In commercial buildings, investment in more efficient building fabrics can reduce the required investment in heating and cooling plant and equipment. Recent analysis shows that, due to greater transparency in information provision, more efficient office buildings are yielding higher returns as these buildings are future-proofed against changes in energy prices. In residential buildings, current popular designs can increase their energy efficiency by one star while also reducing operating cost by two per cent.

*The Government seeks comment on the current suite of energy efficiency measures, ways these could be enhanced to provide greater energy efficiency or possible new measures that would enhance energy productivity.*

*The Government acknowledges the potential of demand-side participation measure to enhance energy efficiency and smooth peaks in usage.*

Demand-side participation efforts can help energy consumers reduce their costs by providing more choices for the efficient consumption of energy. This can include more effective signals to reduce system congestion, increasing the utility of energy infrastructure and reducing costs and prices for all users. Demand-side participation can be enhanced through a number of means, including consumer information on energy consumption to support decision making (for example, smart meters, access to better personalised usage information and tools like smart apps and labelling and disclosure requirements on energy equipment). Other methods include pricing (for example, cost-reflective, time varying or critical peak pricing in tariff structures) and supply intervention (for example, direct load control to limit unneeded use at critical peak times).

Market frameworks can also assist large energy users to improve energy planning and access third party energy services that can help to reduce their energy costs. These can include aggregators of demand management, network support contracts and other forms of flexible tariff arrangements. Distributed generation such as cogeneration and trigeneration may also provide cost-effective strategies for efficient energy use. In response to the Power of Choice review, the Standing Council on Energy and Resources initiated a range of reforms to enhance demand-side participation.

*The Government seeks comment on the use of demand-side participation measures to encourage energy productivity and reduce peak energy use.*

*The Government encourages the changes in behaviour and uptake of technology to improve transport energy efficiency.*

In addition to potential energy efficiencies in the built environment, industrial processes, and appliances, opportunities exist to improve transport sector energy efficiency. More efficient energy use would drive cost reductions and improve business competitiveness.

Possible approaches to achieving these improvements include changing attitudes and behaviours toward efficient fuel use, incentives for technological innovation and investment in more efficient modes of transport. Many simple management processes, such as improved logistics, have yielded significant fuel savings in the heavy vehicle industry.

*The Government seeks comment on measures to increase energy use efficiency in the transport sector.*



## 8. Alternative and Emerging Energy Sources and Technology

*The Government seeks to encourage the deployment of renewable energy and other low-emission technologies in a way that avoids market distortion or triggers energy price increases.*

Australia's domestic energy mix is changing, albeit incrementally and from a stable long-term base. Coal remains a key fuel at 34 per cent of total energy consumption and around 69 per cent of electricity generation<sup>33</sup>. Petroleum based fuels, predominantly for transport, are the other major class of fuels accounting for 39 per cent of consumption. Gas accounts for 23 per cent of Australia's total energy consumption with considerable potential for further growth. The rise of coal seam gas and shale gas and oil has been transformative here and around the world.

Renewable energy produces more than nine per cent of Australia's electricity supply with wind and solar photovoltaic growing rapidly to become significant sources of power<sup>34</sup>. The costs of these renewable technologies have fallen considerably<sup>34</sup>. Other renewable technologies, including solar thermal, marine and geothermal are being developed and may enter the Australian market over time.

The primary instruments used by the Government to encourage the uptake and development of renewable energy are the legislated Renewable Energy Target and the financial assistance offered by various funding sources.

To the extent that the current generation capacity is replaced by lower emissions forms of generation and energy efficiency improves, network costs will remain static and a significant component of electricity prices. This is to meet reliability standards and to provide a regulated rate of return on the existing asset base. Policy that encourages low-emissions sources in a manner that does not lead to increased price pressures, risks surety of supply or reduces investment certainty for long-return investments will be challenging. The review of the Renewable Energy Target will inform policy development on this issue.

A move to lower emissions energy, in part achieved through energy productivity and renewable energy, will need to lower emissions from both current and alternative energy sources and technologies. The IEA forecasts<sup>35</sup> that fossil fuels will continue to provide a significant share of global stationary energy generation, which is largely driven by economic growth in emerging economies such as China and India. This means there will be a need to continue to develop lower emissions fossil fuel technologies such as carbon capture and storage (CCS) and take-up various high efficiency low emissions production techniques. With environmental considerations constraining the further development of hydro-electric sources, nuclear technologies continue to present an option for future reliable energy that can be readily dispatched into the market.

*The Government seeks comment on ways to encourage a lower emissions energy supply that avoids market distortion or causes increased energy prices.*

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<sup>33</sup> BREE 2013, *Energy in Australia 2013*, Canberra, May  
<http://www.bree.gov.au/documents/publications/energy-in-aust/BREE-EnergyInAustralia-2013.pdf>

<sup>34</sup> Australian Energy Technology Assessment 2012  
<http://www.bree.gov.au/publications/aeta.html>

<sup>35</sup> International Energy Agency, *World Energy Outlook 2013*  
<http://www.iea.org/Textbase/nppdf/stud/13/weo2013.pdf>

*The Government wants to see a fair distribution of the costs and benefits of electricity networks.*

The growth in large-scale wind farms and rooftop solar photovoltaic has in part been driven by the current Renewable Energy Target. The Renewable Energy Target mandates that a 20 per cent share of estimated electricity comes from accredited renewable sources in 2020. This target is set in absolute terms in gigawatt hours (41,850 in the year 2020). The Government will review the Renewable Energy Target, in large part to consider the impact of the policy on electricity prices, as overall demand for electricity has declined.

As technology availability and costs continue to improve, consumers are changing their interaction with electricity networks. Historical network tariffs, which are primarily consumption-based, no longer reflect the value consumers receive from networks, nor the costs they may impose on a shared grid. For example, residential consumers with solar photovoltaic generation no longer rely on their network as the sole supplier of their electricity, but rather value the reliability the network provides at times in which their own generation is not sufficient to satisfy their demand requirements. In regard to costs, consumers with large air-conditioning loads may place greater costs on networks than they pay in their consumption-based tariffs. In addressing these issues, the transition to cost-reflective network tariffs needs to be both fair and efficient.

*The Government seeks comment on the need to review existing network tariff structures in the face of rapidly growing deployment of grid-backed-up distributed energy systems, to ensure proper distribution of costs.*

*The Government supports the development of renewable and alternative energy sources.*

In addition to wind and solar power systems, there is growing use of cogeneration and trigeneration, and bioenergy, with geothermal, wave and tidal being actively developed.

National policies on nuclear energy vary around the world, for example, as Germany seeks the closure of its nuclear energy capacity, the United Kingdom has recently announced the development of significant new nuclear capability to replace existing plants.

A growing area of global interest is in the use of small modular reactors, which have the potential to reduce the cost uncertainties and construction timeframes associated with current generation reactor designs. These reactors could be factory built, highly standardised and even used in locations without advanced infrastructure. The smaller size of the reactors may allow for more flexible deployment, making nuclear electricity available to isolated areas or countries with small or distributed electricity grid systems that cannot support conventional large-scale nuclear power.

Policies to encourage uptake of low-emissions energy technologies have potential to distort the market or impact on reliability at very high levels of penetration. Policies to drive this transition must have parameters that minimise costs and market distortions.

The innovative new technologies associated with the scale-up of renewable energy generation and efficient use of renewable energy pose scientific and engineering challenges. Fully meeting these challenges will require investment in skills, expertise, infrastructure, research and development. The adoption of emerging technologies will be aided by service providers and testing laboratories.

Due to the success of a range of renewable policy measures and accompanying cost reductions for technologies such as wind and solar photovoltaics, renewables are reaching high penetration levels in a number of locations in Australia. In addition to

the network tariff issues raised above, this rapid expansion of distributed generation presents a range of other issues for network and distribution operators, including:

- the need to balance generation with load;
- constraints on infrastructure; and
- maintaining stability and reliability in the system.

*The Government seeks comment on additional cost-effective means, beyond current mandatory targets and grants, to encourage further development of renewable and other alternative energy sources and their effective integration within the wider energy market.*

*The Government sees the potential for low emissions intensity electricity generation.*

CCS technology has been demonstrated in a range of applications globally and from 2015, the Gorgon CCS project in Western Australia will become the world's largest carbon dioxide sequestration project. The Government supports programs in CCS, and in High Efficiency Low Emissions (HELE) coal combustion technologies. CCS potential has been demonstrated but obstacles to commercial deployment remain.

HELE coal technologies offer great potential to make significant emissions reduction gains in the electricity generation sector. Technologies such as Super Critical and Ultra Super Critical coal combustion and integrated gasification combined cycle technologies deliver thermal efficiencies much higher than the majority of Australia's existing coal-fired power fleet. More advanced HELE technologies offer the potential for combustion efficiencies and emissions reductions.

*The Government seeks comment on how the uptake of high efficiency low emissions intensity electricity generation can be progressed.*

*The Government encourages the use of LPG, CNG and LNG in road transport.*

Transport represents about 38 per cent of national energy usage<sup>36</sup>. Changes in energy sources offer the potential to increase the productivity of this energy use and reduce reliance on petroleum-based liquid fuels. The Government has several measures in place to encourage the efficient use of petroleum-based liquid fuels including fuel quality and fuel economy disclosure.

The most common alternative fuel is LPG, used mostly in passenger cars with an established and growing refuelling infrastructure. The Government has assisted transition through rebates for new car purchases with LPG systems and conversion of used vehicles to LPG, with the scheme due to cease on 30 June 2014. LPG is being transitioned into the fuel taxation arrangements, by incrementally phasing in excise levels up to 12.5 cents per litre from 1 July 2015. This is around half of the level that it would be if taxed fully on the basis of energy content.

Both compressed natural gas (CNG) and LNG present options for heavy vehicle use. Networked refuelling infrastructure, such as that being developed along the Hume transport corridor in NSW, will encourage uptake. The availability of new vehicle CNG/LNG motors and costs of retrofit (in the order of \$110,000 per vehicle<sup>37</sup>), combined with limited refuelling infrastructure, has limited uptake. LNG and CNG are being transitioned into the fuel taxation arrangements, by incrementally phasing in excise levels up to 26.13 cents per litre from 1 July 2015.

<sup>36</sup> BREE 2013, *Energy in Australia 2013*, Canberra, May  
<http://www.bree.gov.au/documents/publications/energy-in-aust/BREE-EnergyInAustralia-2013.pdf>

<sup>37</sup> Department of Resources, Energy and Tourism, *Strategic Framework for Alternative Transport Fuels 2011*.

*The Government seeks comment on any barriers to increased uptake of LPG in private and commercial vehicles and CNG and LNG in the heavy vehicle fleet.*

*The Government welcomes the development and deployment of electric and biofuel powered vehicles.*

Hybrid electric cars are becoming increasingly efficient and cost competitive in the market. However the widespread adoption of fully electric vehicles is presently very limited due to high upfront capital costs, battery storage constraints, lack of vehicle recharging infrastructure, electricity grid integration challenges and capacity constraints and consumer performance uncertainty.

Biofuels are expected to play a role in Australia's future fuel mix, particularly for light passenger cars. In the longer term, advanced biofuels could become part of the fuel mix in the commercial vehicle and aviation sectors. A moratorium exists on changes to fuel taxation arrangements for ethanol, biodiesel, renewable diesel and methanol. Support currently includes the Ethanol Production Grants Program and the Energy Grants (Cleaner Fuels) Scheme for domestic production of ethanol and the domestic production and import of biodiesel and renewable diesel.

*The Government seeks comment on any barriers to the increased uptake of electric vehicles and advanced biofuels.*



