



Review of Climate Change Policies, Discussion Paper, March 2017

australian petroleum production & exploration association limited

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the voice of Australia's oil and gas industry

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1. Introduction

Since 1959, the Australian Petroleum Production & Exploration Association (APPEA) has been the peak national body representing the upstream oil and gas exploration and production industry. APPEA has around 60 member companies that explore for and produce Australia's oil and gas. In addition, APPEA's more than 140 associate member companies provide a wide range of goods and services to the industry. Further information about APPEA can be found on our website, at www.appea.com.au.

APPEA welcomes the opportunity to provide comment on the *Review of Climate Change Policies Discussion Paper*, released on 24 March 2017 (the Discussion Paper). APPEA's comments in this submission follow our preliminary comments provided to the Minister for the Environment and Energy in December 2016.

APPEA has been engaged in the greenhouse policy debate since the 1990s and has participated in every major consideration of national climate change policy approaches in Australia since that time.

APPEA is committed to working with governments as they develop policy responses to climate change, including through the 2017 Review. APPEA in February 2016 released a second edition of its *Climate Change Policy Principles* – a copy is at [Attachment 1](#)¹ – setting out the principles that APPEA considers should underpin Australia's policy response to climate change. These principles inform this submission in response to the Discussion Paper.

This submission also complements APPEA's recent submission² to the *Independent Review into the Future Security of the National Electricity Market Preliminary Report* and should be read in conjunction with that submission.

In addition to the APPEA submission, a number of APPEA members have made individual submissions to the Discussion Paper. This response should also be read in conjunction with submissions from individual APPEA members.

APPEA's submission addresses specific aspects of the Discussion Paper, focussing on those areas that are particularly important for the upstream oil and gas industry.

APPEA supports a national climate change policy that reduces greenhouse gas emissions at least cost and facilitates investment decisions consistent with an international price on carbon.

2. The Australian upstream oil and gas industry

Reliable, secure and competitively priced energy is crucial to our everyday lives in Australia. Oil and gas plays a key role in meeting many of our energy needs. Gas-fired electricity generation is a cost-effective technology which combines reliability and rapid ramp-up times to complement intermittent renewable energy technologies.

Gas is an indispensable fuel for many industrial processes and a critical feedstock for industry that often cannot be substituted in producing fertilisers, cleaners, polymers and refrigerants. A large part of the manufacturing sector uses natural gas to generate

¹ A copy of APPEA's *Climate Change Policy Principles* can also be found at www.appea.com.au/2016/02/appea-updates-climate-change-policy-principles.

² The APPEA submission is available at www.environment.gov.au/submissions/nem-review/australian-petroleum-production-and-exploration-association.pdf.

electricity, heat and steam for industries, including alumina refining, food and beverage manufacturing, and grocery production³.

Provided we have appropriate regulatory and policy settings, including through the outcomes of the Review, our abundant natural gas resources places Australia in an enviable position to deliver long-term, cleaner energy domestically and across the Asia-Pacific. Australia's liquefied natural gas (LNG) exports offer a cleaner energy source to a world with a steadily growing appetite for energy.

The stakes are high in realising the industry's full potential benefits.

However, future investment is not certain. The challenging market and increasingly challenging regulatory conditions facing the industry, both globally and in Australia, mean it is more important than ever to ensure the policy and regulatory framework facing the oil and gas industry in Australia remains competitive and encourages further exploration and development activity.

3. The key role natural gas plays in reducing global greenhouse gas emissions

Greater use of Australian natural gas – in the domestic market, and in Asia – can significantly reduce greenhouse gas emissions.

Gas has an essential role to play in reducing emissions. In the home, natural gas is a cleaner fuel compared to the National Electricity Market (NEM) average. Gas-fired generators can be rapidly started making them complementary with intermittent renewable energy. Exporting gas as LNG will allow our Asian trading partners to reduce the emissions from their economies⁴.

3.1 Natural gas: integral to a low carbon Australian economy

Australia could generate significant additional national economic, environmental and social benefits through greater use of its substantial natural gas resources.

Using more natural gas in Australia's power generation and resource processing would significantly enhance the nation's ability to meet increasing energy needs and reduce emissions.

These outcomes are possible because, as data on page 63 of the *Independent Review into the Future Security of the National Electricity Market Preliminary Report* (the Preliminary Report) shows⁵, available natural gas power generation technologies can reduce greenhouse gas emissions by 55 per cent compared to the NEM average, and by 68 per cent compared to current brown coal generation technologies and 61 per cent compared to current black coal generation technologies.

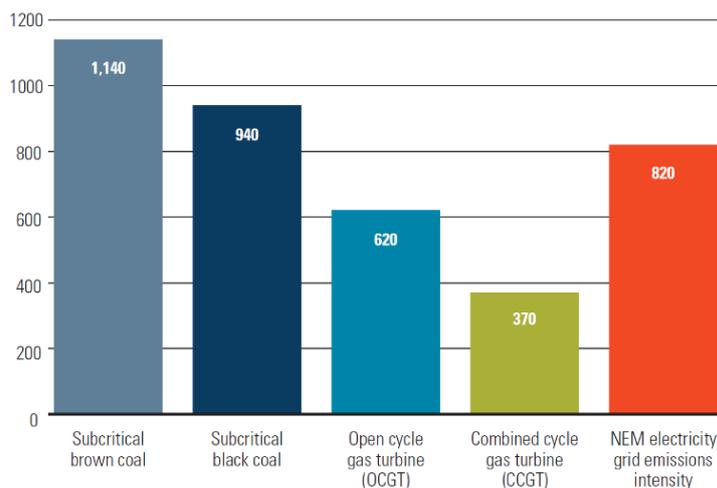
This is illustrated in Figure 1, which shows, using data from page 63 of the Preliminary Report, the significantly lower greenhouse gas emission associated with the use of gas-fired power generation compared to the use of other conventional fuels.

³ See www.appea.com.au/oil-gas-explained/benefits/gas-and-manufacturing.

⁴ See *Gas Vision 2050* for more information. *Gas Vision 2050* was developed by Australia's peak gas industry bodies and demonstrates how gas can continue to provide Australians with reliable and affordable energy in a low-carbon energy future. See www.appea.com.au/media_release/gas-vision-2050 and www.appea.com.au/wp-content/uploads/2017/03/GasVision2050_March2017.pdf for more information.

⁵ See www.environment.gov.au/energy/publications/energy-market-preliminary-report for more information.

Figure 1. Estimated Operating Emissions for New Power Stations (kg CO₂-e/MWh)



Source: Data from *Independent Review into the Future Security of the National Electricity Market Preliminary Report (2016)*.

In a similar way, the Australian Council of Learned Academies (ACOLA) in 2013⁶ found using gas to provide more baseload and peak electrical power generation in Australia – in scenarios of higher use of both renewables and gas – would deliver substantial emissions reductions. ACOLA found such an outcome would reduce the Australian electricity generation sector’s emissions by between 54-103 Mtpa CO₂-e (million tonnes per annum, carbon dioxide equivalent) by 2030 – a reduction of 27 per cent to 52 per cent from the base case of 197 Mtpa CO₂-e in 2012.

In addition, modelling conducted for the Climate Change Authority, in its research report *Policy options for Australia’s electricity supply sector*⁷, forecasts significant increases in gas-fired power generation to 2030 and growth through to 2050 (if carbon capture and storage (CCS) technology is widely deployed). This is shown in the following table, taken from the report.

Table 1. Share of Generation by Technology Type by Scenario, Economy-wide Modelling, 2030 and 2050

Scenario	2030				2050			
	Coal	Gas	Renewable	Other low emission	Coal	Gas	Renewable	Other low emission
Cap and trade (lump sum)	4%	37%	47%	12%	0%	8%	69%	24%
Cap and trade (tax cuts)	4%	38%	46%	13%	0%	8%	69%	23%
Emissions intensity scheme	3%	38%	47%	13%	0%	8%	68%	24%

Note: Rows may not sum up to 100 due to rounding. ‘Other low emission’ is gas CCS and nuclear (coal CCS was available but not deployed in any scenario).

Source: *Jacobs for the Climate Change Authority (2016)*.

⁶ See Australian Council of Learned Academies (2013), *Engineering Energy: Unconventional Gas Production*, June (available at acola.org.au/wp/project-6).

⁷ See www.climatechangeauthority.gov.au/reviews/special-review/special-review-electricity-research-report and www.climatechangeauthority.gov.au/sites/prod.climatechangeauthority.gov.au/files/files/SR%20Electricity%20research%20report/Electricity%20research%20report%20-%20for%20publication.pdf, page 89, for further information.

This table shows natural gas, under the policy options modelled for the Authority (cap and trade emissions trading schemes or an emissions intensity scheme) growing from current levels (of around 10.5 per cent) to 37 per cent in 2030 (and possibly as high as 49 per cent if “other low emission”, considered in the report as gas CCS and nuclear, is predominantly gas CCS) and 8 per cent in 2050 (but as high as 32 per cent if “other low emission”, considered in the report as gas CCS and nuclear, is predominantly gas CCS).

The potentially growing role of natural gas considered in these reports reflects the role gas could play as a lower emissions and cost effective generation technology, both in replacing coal-fired generation and in complementing the growth in renewable technologies.

Intermittent renewable energy requires “on call” electricity generation to manage falls in renewable output or peaks in demand. Gas-fired generation is a key technology capable of delivering that flexible response. As more renewable energy is integrated into the grid, this balancing role becomes more critical.

Experience in the United States demonstrates how quickly emissions from the generation sector can be cut by fuel switching. Data from the US Government Energy Information Administration (EIA)⁸ shows energy-related emissions in the US in the first six months of 2016 were at their lowest level since 1991, having fallen about 13 per cent from their peak in 2007. Amongst other reasons, this was possible because the US is developing its abundant natural gas resources.

More recently, the EIA found⁹ emissions from power generation fell by nearly 5 per cent. The EIA noted the fall in emissions can be attributed to:

... a significant reduction in coal use for electricity generation was offset by increased generation from natural gas and renewable sources. Renewables do not emit CO₂, and a shift towards natural gas from coal lowers CO₂ because natural gas has lower emissions per unit of energy than coal and because natural gas generators typically use less energy than coal plants to generate each kilowatthour of electricity.

We have a similar opportunity in Australia. If the industry is able to develop them, there are sufficient natural gas resources to underpin a historic shift to a lower emissions generation sector.

The increased use of natural gas also has several additional environmental benefits, such as:

- Reduced emissions of fine particulates.
- Reduced emissions of sulphur dioxide (an important contributor to smog and acid rain) and nitrogen oxides.
- Significantly lower demand for water for power station cooling.

Much greater use of Australia’s extensive gas resources will be crucial in meeting the challenge of significantly reducing global greenhouse gas emissions at least cost whilst enhancing Australia’s economic and export performance.

⁸ See www.eia.gov/todayinenergy/detail.php?id=28312 for more information.

⁹ See www.eia.gov/todayinenergy/detail.php?id=30712 for more information.

3.2 Natural gas: integral to low carbon economies in Asia

In considering Australia's climate change policy responses both in the period to 2030, and beyond, and Australia's existing and future contribution to **global** emissions reduction efforts, it is important to acknowledge the positive contribution Australia's LNG exports make now and will increasingly make to that global effort.

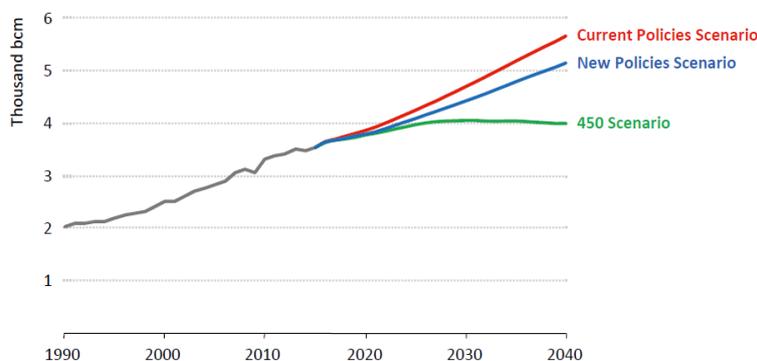
Australia's LNG industry is in a unique position to contribute substantially to the economic development of the nation and to reduce greenhouse gas emissions.

Australia's resources of natural gas and proximity to growing markets make us well-placed to meet the global climate change challenge while substantially contributing to Australia's economic growth.

While the demand for energy as part of the industrialisation of Asian economies is a key driver, the properties of natural gas as a lower emitting and cleaner burning fuel is also driving much of the international demand for LNG.

As the International Energy Agency (IEA) found in its *2016 World Energy Outlook* (2016 WEO)¹⁰, the use of natural gas is expected to grow consistently over the Outlook period (to 2040) under all scenarios. For example, in its 'New Policies Scenario' (the central scenario in the 2016 WEO) the IEA forecasts global natural gas demand to grow by nearly half over the Outlook period. The annual growth rate of 1.5 per cent means natural gas increases its share in global primary energy demand from 21 per cent today to 24 per cent in 2040. In the '450 Scenario'¹¹, gas use plateaus from the 2030s, but the IEA notes, as a clean and flexible fuel, gas still sees its share increasing.

Figure 2. 2016 WEO: World Natural Gas Demand by Scenario



Source: International Energy Agency (2016).

A 2008 (updated in 2011) study by WorleyParsons¹², for example, compares lifecycle greenhouse gas emissions of Australian LNG exports from the North West Shelf Project with Australian east coast black coal exports in terms of lifecycle greenhouse gas emissions: from extraction and processing in Australia through to an end use of combustion (using different power generation technologies) in China for power generation.

¹⁰ See www.iea.org/newsroom/news/2016/november/world-energy-outlook-2016.html for more information.

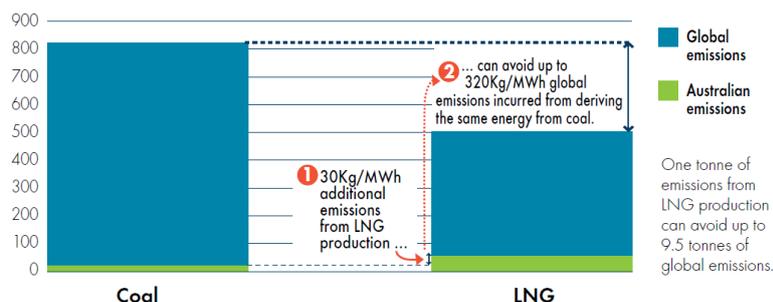
¹¹ Implementing the IEA '450 Scenario' would require increasing investments in energy production and distribution infrastructure, changes in consumer behaviour and lifestyles, and the imposition of a variety of policies. The IEA acknowledges the scale of this challenge, noting that the '450 Scenario' is not a prediction or forecast, but rather an illustration of a possible pathway that society could pursue to achieve its climate change goals.

¹² WorleyParsons (2008; 2011), *Greenhouse Gas Emissions Study of Australian LNG*, originally prepared August 2008; updated for public release, March 2011.

Figure 3 below is derived from data within the study, and shows that:

- For every tonne of CO₂-e emitted in LNG production within Australia, between 5.5 and 9.5 tonnes of emissions from the coal alternative can be avoided globally.
- LNG has a substantially lower greenhouse footprint associated with it compared to coal – not just in combustion emissions, but throughout its lifecycle.
- The lifecycle greenhouse intensity for LNG is about 50 per cent lower than that of coal.

Figure 3. Displacement of Coal by LNG (kg/MWh CO₂-e by Fuel Source)



Source: Derived from data in WorleyParsons (2008; 2011).

A similar 2011 WorleyParsons study¹³ considered lifecycle greenhouse gas emissions of Australian coal seam gas (CSG) to LNG (CSG→LNG) exports from projects in Queensland with Australian east coast black coal exports in terms of lifecycle greenhouse gas emissions: from extraction and processing in Australia through to an end use of combustion (using different power generation technologies) in China for power generation.

The study found that, in the case of CSG→LNG exports:

- For every tonne of CO₂-e emitted in LNG production within Australia, between 2.5 and 4.3 tonnes of emissions from the coal alternative can be avoided globally.
- Considering savings from a 30 year 10 million tonnes per year (Mtpa) CSG→LNG project, if CSG→LNG is combusted in a combined cycle gas turbine (CCGT) plant instead of a subcritical coal plant, the life cycle emissions are 42.7 Mt CO₂-e per annum, the annual savings 37.2 Mt CO₂-e and the project life savings 1,114 Mt CO₂-e¹⁴. For CSG→LNG combustion in a CCGT plant instead of a supercritical coal plant the annual savings and project life savings are 21.7 Mt CO₂-e and 652 Mt CO₂-e respectively.

In addition, and as noted above, burning gas instead of coal improves urban air quality. This is particularly important in many Asian countries that are importing Australian LNG or considering imports.

There are significant benefits to Australia and the world from the greater use of gas as a lower greenhouse gas emitting energy source.

Much greater use of Australia's extensive gas resources will be crucial in meeting the challenge of significantly reducing global greenhouse gas emissions at lowest possible cost whilst enhancing Australia's economic and export performance.

¹³ WorleyParsons (2011), *Greenhouse Gas Emissions Study of Australian CSG to LNG*, April.

¹⁴ This compares to total Australian annual emissions in 2015-16 of 536.5 Mt CO₂-e (see www.environment.gov.au/climate-change/greenhouse-gas-measurement/publications/quarterly-update-australias-national-greenhouse-gas-inventory-jun-2016).

It is therefore important that the Review recognise the vital role Australia's gas industry can play in reducing Australia's greenhouse gas emissions and the role Australian LNG exports can play in global greenhouse emissions reductions.

3.3 International competitiveness: the major challenge

The major challenge to the industry's continued growth is maintaining Australia's international competitiveness in the face of growing global competition. A high-cost local environment, growing policy and regulatory challenges, relatively low oil prices, and the emergence of new LNG competitors increases the level of competition Australia faces, as it seeks to win market share and attract investment.

The industry and our governments must do everything possible to ensure the projects that remain under construction, commence production in a timely and cost-effective manner and that Australia secures future oil and gas investment to supply to domestic and international needs¹⁵.

Some factors affecting existing and future investment, such as movements in the Australian dollar or oil prices, are beyond the ability of the Australian industry to influence. However, other key challenges must be addressed.

Australia's existing and any future climate change policies should be aimed at enhancing Australia's international competitiveness as a destination for oil and gas investments. They should not add to the cost burden facing the industry or detract from Australia's attractiveness as an investment destination.

With that in mind, APPEA endorses the statement on page 20 of the Discussion Paper, that

Climate change is a global issue requiring a global response. The pace at which other countries move on their commitments under the Paris Agreement and the effect this has on Australian businesses is an important consideration. It is necessary to consider the potential impacts on trade competitiveness associated with policies to achieve the 2030 target given the risk of unduly penalising Australian industry if our actions to reduce emissions are out of step with Australia's trade competitors.

4. Actions taken by the Australian upstream oil and gas industry to reduce emissions and to embed climate change considerations into decision-making

As noted above, one of the largest contributions Australia can and does make to reduce global greenhouse gas emissions is through the use of natural gas both domestically and through LNG exports to Asia.

Taken together, these actions have reduced global greenhouse gas emission by millions of tonnes per annum and as Australia's LNG exports grow, this positive contribution will also grow.

The Discussion Paper on page 22 asks "what are the opportunities and challenges of reducing emissions from the resource, manufacturing and waste sectors?"

¹⁵ For example, McKinsey & Co., in their March 2017 report, *Meeting east Australia's gas supply challenge*, found that there are sufficient undeveloped natural gas resources and efficiency opportunities to meet our future needs, but to turn those undeveloped natural gas resources into new supply, \$50 billion must be invested in the next 15 years. See www.appea.com.au/media_release/the-choice-for-state-governments-7-8-gas-or-12-gas and www.mckinsey.com/global-themes/asia-pacific/meeting-east-australias-gas-supply-challenge for more information.

4.1 The industry has a long history of measuring, reporting and taking actions to reduce its greenhouse gas emissions

The Australian upstream oil and gas industry has a long history of measuring, reporting and taking actions to reduce its greenhouse gas emissions¹⁶. Submissions from APPEA members provide a number of examples of actions companies have taken to reduce their emissions profile and to embed climate change considerations into company decision-making.

In addition to a commitment to the APPEA *Climate Change Policy Principles*, many APPEA member companies have corporate emissions reduction targets, place climate change issues at the forefront of their corporate sustainability reporting and use internal carbon prices as part of their assessment of investment decision-making.

As is evident from the environment impact statements or similar documents underpinning regulatory approval for projects, climate change considerations are a key feature of project design, development and execution for oil and gas projects, including each of the seven LNG projects that are under operation or nearing completion. Examples include:

- The Environmental Impact Statement (EIS) for the Australia Pacific LNG Project in Queensland¹⁷. Chapters 4, 14, 30 and 31 of the EIS provide, amongst other things, detailed assessments of the quantity of greenhouse gas emissions associated with the construction, operation and decommissioning of the Project's gas fields, pipeline and LNG facility, outline how greenhouse gas mitigation measures were incorporated into Project design and assess immediate and potential greenhouse gas emissions mitigation measures.
- The Environmental Impact Statement (EIS)/Environmental Review and Management Programme (ERMP) for the Wheatstone LNG Project¹⁸. Chapter 4 of the EIS/ERMP details, amongst other things, an estimate of the greenhouse gas emissions from the project, the way in which consideration was given as to how best to reduce greenhouse gas emissions from the project during the design phase and planned and possible future actions that may be undertaken to further reduce greenhouse gas emissions from the project.

Regulatory approvals at the Commonwealth and state levels in response to these environment impact statements or similar documents have included a range of greenhouse-related conditions.

For example, the Queensland *Coordinator-General's evaluation report for an environmental impact statement Gladstone Liquefied Natural Gas—GLNG project*¹⁹, included Condition 4 – Greenhouse Gas Emissions Strategy, which requires that

The proponent must develop and implement a greenhouse gas reduction strategy for the project. The strategy must include, but not be limited to, the company's

¹⁶ For example, the upstream oil and gas industry, through APPEA was one of only two industries to sign a Co-operative Agreement with the Government under the (former) Greenhouse Challenge program. Under that agreement, which ran from 1996 to 2007, the industry provided reports to the Government containing industry-wide data on greenhouse gas emissions (dating back to 1990) and outlining activities planned, in progress or completed by a member company that resulted in reductions in greenhouse gas emissions.

¹⁷ See www.aplng.com.au/about-us/compliance/eis.html for more information.

¹⁸ See www.chevronaustralia.com/our-businesses/wheatstone/environmental-approvals and [www.chevronaustralia.com/docs/default-source/default-document-library/wheatstone_draft_eis_erpmp_volume_i_\(chapters_1_to_6\)8F72DBF90E8D.pdf?sfvrsn=0](http://www.chevronaustralia.com/docs/default-source/default-document-library/wheatstone_draft_eis_erpmp_volume_i_(chapters_1_to_6)8F72DBF90E8D.pdf?sfvrsn=0) for more information.

¹⁹ See www.statedevelopment.qld.gov.au/resources/project/gladstone-liquefied-natural-gas/cg-report-gladstone-ing.pdf for more information. Similar, and in some cases more detailed, conditions were also placed on the APLNG and QCLG projects (see www.statedevelopment.qld.gov.au/resources/project/australia-pacific-lng/coordinator-generals-report.pdf (Condition 3) and www.statedevelopment.qld.gov.au/resources/project/queensland-curtis-liquefied-natural-gas-project/queensland-curtis-lng-project-cg-report.pdf (Condition 4) for more information).

policy on greenhouse gas emissions, an energy efficiency program, a continuous improvement program, better control systems and a CO₂ recovery plan. The strategy must be submitted to the Coordinator-General for approval within three months of the granting of the petroleum facilities licence for the LNG facility.

This means for these projects additional action to reduce emissions, over and above the significant range of actions already taken during the development of the projects, is unlikely to be cost-effective or technically feasible, at least in the short-term.

Looking forward, technical improvements and equipment upgrade opportunities may become available (as they have for other projects). Such opportunities are generally linked to capital investment cycles that can extend for a number of years.

Particular areas of focus in recent years have included²⁰ (but are not limited to):

- Carbon capture and storage (CCS), particularly geosequestration, opportunities.
- Actions to reduce venting and flaring.
- Emissions abatement through savannah fire management.

4.2 Carbon capture and storage (CCS), particularly geosequestration, opportunities

CCS, or greenhouse gas storage, is seen, particularly over the longer-term, as one of the pathways to the continued use of fossil fuels in a low-carbon economy²¹.

The global oil and gas industry is leading the world in the practical deployment of this technology²². Global examples include Norway's Statoil, which has developed large CCS projects at Sleipner West²³ and Snøhvit LNG²⁴. In Canada, Shell has developed the Quest CCS²⁵ project.

In Australia, the oil and gas industry has been at the leading edge of researching and deploying greenhouse gas storage technologies. The industry instigated significant research efforts into greenhouse gas storage in the late 1990s through the Australian Petroleum Cooperative Research Centre (which has continued through the CO₂CRC Limited). Since that time, several hundred million dollars has been invested in assessing large greenhouse storage projects.

That work, involving in many cases, millions of dollars in investments, has shown that in many cases, a range of barriers remain to making CCS a viable option for the majority of projects. These include cost, complexity along the value chain, availability of suitable storage sites and long-term liability issues. Policies which create a technology neutral approach, including for CCS could, over time, see more widespread deployment of this technology.

²⁰ Note, these are examples and do not seek to be comprehensive. As with the rest of this submission, these sections should be read in conjunction with submissions from members.

²¹ This is recognised by the Intergovernmental Panel on Climate Change in their Fifth Assessment Report. The *Climate Change 2014 Synthesis Report* (at ipcc.ch/report/ar5/index.shtml) notes, on page 24 "In the absence or under limited availability of mitigation technologies (such as bioenergy, CCS and their combination BECCS, nuclear, wind/solar), mitigation costs can increase substantially depending on the technology considered."

²² The Global Carbon Capture and Storage Institute (at www.globalccsinstitute.com/projects/large-scale-ccs-projects) lists 40 large scale CCS projects at various stages of development (operate, execute, define, evaluate and identify). Of these 40 projects, 29 are either natural gas processing-related or enhanced oil-recovery related.

²³ See www.statoil.com/en/what-we-do/new-energy-solutions/how-does-ccs-work-.html and www.globalccsinstitute.com/projects/sleipner%2%A0co2-storage-project for more information.

²⁴ See www.statoil.com/en/what-we-do/new-energy-solutions/how-does-ccs-work-.html and www.globalccsinstitute.com/projects/sn%C3%B8hvit-co2-storage-project for more information.

²⁵ See www.shell.ca/en_ca/about-us/projects-and-sites/quest-carbon-capture-and-storage-project.html and www.globalccsinstitute.com/projects/quest for more information.

When it commences, the Gorgon Carbon Dioxide Injection Project²⁶ will be the world's largest greenhouse gas mitigation project undertaken by industry. The Gorgon Carbon Dioxide Injection Project demonstrates, in a practical way, the industry's commitment to reducing emissions from its own operations.

4.3 Actions to reduce venting and flaring

Actions to reduce venting and flaring at facilities across the industry have for many years been a key feature of the industry's response to the need to reduce emissions.

Companies have no routine²⁷ venting and flaring policies in place, and many of these have been highlighted in EIS documents. In some cases, the requirements are backed by legislative and regulatory arrangements²⁸.

In addition, a number of LNG facilities have included a range of actions to reduce flaring. These include vapour recovery to reduce flaring of fugitive greenhouse gas emissions and leaks, by installing boil-off gas compression facilities to recover vapours generated from the LNG tanks and LNG export vessels during LNG loading. The recovery of gas during the ship loading process reduces greenhouse gas emissions associated with flaring this stream, and conserves gas²⁹.

More broadly, the industry is active in a range of international forums supporting actions to reduce venting and flaring. The industry, including in Australia, is involved in the Climate and Clean Air Coalition (CCAC)³⁰, which focuses on actions to reduce emission from methane, black carbon, and hydrofluorocarbons (HFCs). It does this by raising awareness of impacts and mitigation strategies, enhancing and developing new national and regional actions, including by identifying and overcoming barriers, increasing capacity, and mobilising support, promoting best practices and showcasing successful efforts and improving scientific understanding of impacts and mitigation strategies.

A number of APPEA members are also involved in the World Bank's Global Gas Flaring Reduction Partnership (GGFR), a public-private initiative comprising international and national oil companies, national and regional governments, and international institutions. GGFR works to increase use of natural gas associated with oil production by helping remove technical and regulatory barriers to flaring reduction, conducting research, disseminating best practices, and developing country-specific gas flaring reduction programs³¹.

4.4 Emissions abatement through savannah fire management

As part of its role at the forefront of the Australia's emission abatement efforts, the oil and gas industry has been a foundation partner in the innovative approach that lead to the establishment of a new savannah burning industry.

²⁶ See www.chevronaustralia.com/our-businesses/gorgon/carbon-dioxide-injection and www.globalccsinstitute.com/projects/gorgon-carbon-dioxide-injection-project for more information.

²⁷ To deal with process upsets, outside of the predicted normal parameters (for example, overpressure situations, caused by incidents such as power failures, instrument air failures or incorrect operating procedures), some flaring of waste gas or LNG may be required where this cannot be captured or retained within the process. These upsets are usually relatively short in duration.

²⁸ For example, subdivision 3, section 72 of the *Petroleum and Gas (Production and Safety) Act 2004* (Qld) places restrictions on flaring or venting. See page 100 at www.legislation.qld.gov.au/LEGISLTN/CURRENT/P/PetrolmGasA04.pdf for more information.

²⁹ See www.aplng.com.au/content/dam/aplng/compliance/eis/Volume_4/Vol_4_Chapter14_GreenhouseGas.pdf, page 25 for an example.

³⁰ See www.ccacoalition.org/en for more information.

³¹ See www.worldbank.org/en/programs/gasflaringreduction for more information. APPEA members BP, Chevron, Eni, ExxonMobil, Shell, Statoil and Total are GGFR members.

The Emissions Reduction Fund (ERF) Savannah Burning emissions avoidance methodology³², was pioneered by the West Arnhem Land Fire Abatement (WALFA) project³³, a collaboration between Darwin LNG, and the Djelk, Jayown, Warddeken, Mimal and Adjumarlall Indigenous rangers groups, Charles Darwin University and the Northern Territory Government.

Since its inception in 2006, WALFA has offset more than 1.5 Mt CO₂-e, making it one of the top ten carbon offset projects in Australia. It has been emulated by more than 40 other savannah burning projects across Northern Australia that collectively contribute about 13.8 Mt CO₂-e million tonnes of abatement in Australia; 7.3 per cent of total emissions reduction achieved by the ERF to date.

It has also resulted in the conservation of rainforest vegetation, protection of local wildlife and rock art sites, facilitated reinvigoration of cultural aspects of land management while supporting more than 300 Indigenous jobs per year over its 10 years of operation

5. Key issues to consider in the 2017 Review

In response to relevant sections of the Discussion Paper, this section highlights APPEA's views on some of the key issues under consideration during the 2017 Review.

The 2017 Review provides an important opportunity to bring together a comprehensive and integrated approach to climate and energy policy in Australia. The Review can, in particular, draw on the range of energy policy related reviews and work underway and can bring together that work to inform the role climate policy will play over the longer-term.

5.1 The Emissions Reduction Fund (ERF) Safeguard Mechanism

The operation of the ERF Safeguard Mechanism, outlined on page 21 of the Discussion Paper, is a key feature of Australia's climate change policy approach facing the oil and gas industry.

APPEA notes the mechanism only commenced on 1 July 2016 and the Review will have limited operational experience to draw on when considering the extent to which the mechanism is achieving its policy objectives.

That said, there are a number of issues to be considered during the 2017 Review.

5.1.1 Baseline setting – flexibility mechanisms

The Safeguard Mechanism's baseline setting provisions contain a number of 'flexibility mechanisms', such as the inherent emissions variability criteria (set out in section 25 of the *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015*)³⁴.

These provisions, which followed extensive consultation and consideration during 2014 and 2015, recognise the particular circumstances facing the oil and gas industry and the range of factors that influence the emissions profile of oil and gas developments, but which are not controlled by operators. The provisions, however:

- Have limits on their application:

³² The Carbon Credits (Carbon Farming Initiative – Emissions Abatement through Savanna Fire Management) Methodology Determination 2015 was made on 25 March 2015. See environment.gov.au/climate-change/emissions-reduction-fund/methods/savanna-burning for more information.

³³ See www.conocophillips.com.au/sustainable-development/Pages/WALFA.aspx for more information.

³⁴ See www.legislation.gov.au/Details/F2015L01637 for more information.

- To make use of these provisions, the relevant facility must satisfy all of the criteria set out in section 25(3) and, under section 25(4), the provisions only apply when the facility's covered emissions in respect of the first financial year to be covered by the calculated-emissions baseline determination have exceeded, or are reasonably expected to exceed, the baseline emissions number which would otherwise apply to the facility in that financial year.
- In addition, under section 25(7) the provisions are not available if a benchmark-emissions baseline determination (considered further below) has been made in relation to the facility.
 - This is notwithstanding the fact that the criteria to which section 25 relates – the inherent emissions variability arising as a result of the properties of the natural resource or natural gas reserve – will not “disappear” if a benchmark-emissions baseline determination is made.
- Are only in place for a limited period of time:
 - Under section 25(9) the calculated-emissions baseline determination to which the application relates is to commence on a 1 July up to and including 1 July 2024 and therefore does not apply after that time.
 - This is notwithstanding the fact that the criteria to which section 25 relates – the inherent emissions variability arising as a result of the properties of the natural resource or natural gas reserve – will not “disappear” after 1 July 2024.
 - Indeed, as was explained in 2015 during the consultation period for the Rule, there are a number of examples of natural gas projects that will experience an increase in emissions as a direct result of production moving into a new reservoir which has different properties from the existing reservoir, and that this change is known now and will take place after 1 July 2024.

The 2017 Review should recommend the expansion of these provisions and their maintenance as an enduring feature of the Safeguard Mechanism. The attractiveness of Australia for further investment in the oil and gas industry will be adversely affected if these provisions lapse.

5.1.2 Benchmark baseline setting concerns

The Discussion Paper notes on page 21 that

From 2020, baselines for new investments will be set with reference to Australian best practice.

APPEA's May 2016 submission³⁵ to the Department's *Emissions Reduction Fund: Safeguard Mechanism Emissions Intensity Benchmark Guidelines, April 2016* (the Draft Guidelines) identified a range of concerns with the approach to setting benchmark baselines proposed in the Draft Guidelines and the practical difficulties in implementing such an approach.

The approach proposed would be an impediment to future investment in the upstream oil and gas industry.

APPEA recommended in its May 2016 submission finalisation of these Guidelines be delayed until such time as these concerns have been accommodated and a more appropriate set of Guidelines developed.

³⁵ APPEA's submission is available at www.appea.com.au/wp-content/uploads/2016/08/APPEA-Submission-060516-Emissions-Reduction-Fund-Safeguard-mechanism-Emissions-Intensity-Benchmark-Guidelines-April-2016.pdf.

The 2017 Review provides an opportunity to reconsider the proposed approach and to work with industry to develop a more appropriate alternative.

For example, in its May 2016 submission, APPEA recommended that rather than using an emissions intensity-based approach, emissions baselines for new facilities and major expansions be determined from actual facility emissions data, once the facility has been fully commissioned and is operating under steady state conditions. A “leading indicator” approach to assessing leading practice, as set out in APPEA’s May 2016 submission, would be used to ensure these facilities were designed efficiently.

APPEA reiterates its May 2016 recommendations to the Department’s Draft Guidelines that:

- The finalisation of these Guidelines be delayed until such time as these concerns set out in APPEA’s May 2016 submission have been accommodated and a more appropriate set of Guidelines developed.
- A more appropriate set of Guidelines could determine emissions baselines for new facilities and major expansions from actual facility emissions data, once the facility has been fully commissioned and is operating under steady state conditions.
- A “leading indicator” approach to assessing best practice would be used to ensure these facilities were designed efficiently.

This would be a far more preferable approach to the approach proposed in the Draft Guidelines, which would represent a significant impediment to future investment in the upstream oil and gas industry.

5.1.3 Declining baselines

A number of stakeholders have raised the idea of introducing a declining baseline which would see established Safeguard Mechanism baselines decline (in some way) over time.

Such an approach will increase costs over time for facilities covered by the Safeguard Mechanism, raising both competitiveness and equity concerns as, amongst other things, they apply to only a relatively small subset of Australia’s emitters.

This is particularly the case for LNG exports, which are both trade-exposed and in many cases feature newly constructed facilities that, as was considered earlier, cannot be readily altered. For these facilities, a declining baseline represents a ‘tax on growth’ that will adversely affect their international competitiveness.

5.1.4 The treatment of trade-exposed industries

The treatment of trade-exposed industries, such as LNG, has not to date been a prominent feature of the ERF and the ERF Safeguard Mechanism.

However, any moves towards declining baselines or approaches that raise the costs faced by trade-exposed industries will require the introduction of provisions to provide an appropriate treatment of trade-exposed industries.

In this respect, APPEA’s *Climate Change Policy Principles* note:

In the event Australia takes action before comparable action is taken by the nations with which we compete, the Australian policy response should maintain the competitiveness of Australian trade-exposed industries, such as LNG, by minimising

the costs the industry faces in the absence of a carbon price being imposed on energy sources in customer countries and competitors.

APPEA has long recommended that measures to deal with this international policy distortion impacting on trade-exposed industries must be a central feature of any Australian climate change policy. In doing so, it is important to recall why this issue arises at all. The Paris Agreement represents a historic step forward in a global response to climate change, but there remain differential approaches to carbon policy across countries³⁶, which means there are consequent implications for industry competitiveness that arise from unilateral actions by any one Government³⁷.

It is also the case that many of our trade competitors are developing countries whose emissions will continue to grow in the medium-term and so we must ensure that our policy approach to climate change supports Australia's economic prosperity and the trade competitiveness of our industry.

The importance of this issue cannot be underestimated: any changes to Australia's climate change policy that impact adversely on trade-exposed industries, such as the introduction of declining baselines under the ERF Safeguard Mechanism, would be highly prejudicial to Australia's economic performance without a provision to preserve industry's international competitiveness.

As the world continues its shift to a preference for cleaner burning fuels, the substantial strategic value of Australia's natural gas assets can only increase. Realising the full economic and environmental potential of Australia's natural gas requires a commitment from both Government and industry to identifying and removing impediments to its development and not adding new ones.

As noted above, APPEA welcomes the recognition of the importance of this issue on page 20 of the Discussion Paper:

Climate change is a global issue requiring a global response. The pace at which other countries move on their commitments under the Paris Agreement and the effect this has on Australian businesses is an important consideration. It is necessary to consider the potential impacts on trade competitiveness associated with policies to achieve the 2030 target given the risk of unduly penalising Australian industry if our actions to reduce emissions are out of step with Australia's trade competitors.

5.1.5 Thresholds

While APPEA does not at this stage recommend thresholds for the ERF Safeguard Mechanism be lowered, APPEA does recommend the Review assess the benefits and costs of lowering the threshold for inclusion in the Safeguard Mechanism from the existing threshold, of 100,000 tonnes CO₂-e of direct emissions per year to, for example, 25,000 tonnes CO₂-e. A lower threshold may allow for a more equitable distribution of

³⁶ As an example, Qatar, the world's largest LNG exporter and a major competitor for Australia, both in terms of LNG exports and as an investment location for LNG development, has not ratified the Paris Agreement and, through its November 2015 Intended Nationally Determined Contribution (INDC, available at www4.unfccc.int/submissions/INDC/Published%20Documents/Qatar/1/Qatar%20INDCs%20Report%20-English.pdf) has no emissions reduction target and no plans for policies that would place a cost on its LNG production. Importantly, Qatar has embraced the role LNG plays in global greenhouse gas mitigation, noting on page 2 of its INDC "Qatar has been contributing indirectly to the global efforts to mitigate climate change by exporting Liquefied Natural Gas as a clean energy".

³⁷ This issue will be considered in more detail in a forthcoming report by the Centre for International Economics and the CM Group, *Trade competitiveness and international carbon policies*, which when finalised, will be shared with the Review by the Australian Industry Greenhouse Network.

emissions reduction efforts across the economy but may come at considerable regulatory and compliance cost.

5.2 Access to international markets

Access to international markets has been identified by the Government as a key area of focus for the 2017 Review and this is reflected on pages 31-32 of the Discussion Paper.

APPEA welcomes this proposal and supports its consideration as part of the Review. APPEA has long advocated the use of credible international permits/credits in order to meet any obligation under Australian laws to manage greenhouse gas emissions.

International carbon credits/permits can ensure the ERF drives low cost and effective emissions reductions both in Australia and across the region.

APPEA recommends emission baselines under the ERF Safeguard Mechanism to be assessed against 'net' emissions where offsets can include a range of credits (including access to credible international credits/permits). In addition, APPEA recommends the use of credible international credits/permits be allowed to meet any compliance obligation that may arise from the Safeguard Mechanism or other aspects of the ERF.

APPEA encourages Australia to play an active role in international negotiations around the Paris Agreement rules (particularly Article 6) that will underpin access to these credible credits/permits.

These proposals are consistent with the objective of achieving Australia's emissions reduction targets at lowest cost to the Australian economy.

5.3 The Emissions Reduction Fund

5.3.1 Barriers to greater participation in the ERF

There are a number of barriers that have prevented greater industry participation in the ERF. Changes to the ERF to remove/reduce these barriers should be a focus of the 2017 Review.

Key amongst these barriers are:

- Relatively short contract periods, which can prevent larger, longer-term and capital-intensive projects from seeking funding and contracts.
- The ERF's 'make good' provisions, which can raise the cost and risk of ERF participation to levels that prevent participation.

Both of these concerns were raised in 2013 and 2014, when the ERF was first being developed through the Green Paper/White Paper process³⁸, and remain relevant today.

APPEA was also involved in 2015 in consultation with the Department to develop the *Carbon Credits (Carbon Farming Initiative – Oil and Gas Fugitives) Methodology Determination 2015*, which was made on 4 August 2015³⁹. The Determination covers

³⁸ See, for example, APPEA's submission to the *Emissions Reduction Fund Green Paper*, available at www.environment.gov.au/submissions/emissions-reduction/green-paper/270-appea.pdf.

³⁹ See www.environment.gov.au/climate-change/emissions-reduction-fund/methods/oil-gas-fugitives and www.environment.gov.au/system/files/resources/f1997f9e-a2d1-4b5c-929b-861d6efeafd9/files/factsheet-oil-gas-fugitives-method.pdf for more information.

projects that reduce fugitive emissions from venting at oil and natural gas extraction, production, transport and processing facilities.

While the Determination was developed in consultation with the industry, it was noted at the time the administrative complexity of the proposed approach may be a barrier to its use. This has so far proven to be the case, with no projects coming forward to bid into an ERF Auction.

To encourage greater participation in the ERF, the 2017 Review should make recommendations to:

- Lengthen the potential contract period (by allowing, for example, allowing the duration of contracts to be a matter agreed between the Clean Energy Regulator and successful ERF Auction participants).
- Remove the 'make good' provisions (to recognise that an appropriately applied prequalification process removes the need for 'make good' provisions).
- Streamline administrative and method development processes.

5.3.2 *Longer-term arrangements, including funding*

In addition, if the ERF is to remain a key feature of Australia's climate change policy response, security around longer-term arrangements will be important. This includes funding arrangements and the need to consider increasing government funding through the Budget if larger emissions reductions are required⁴⁰.

5.4 The National Energy Productivity Plan (NEPP)

APPEA notes the statement on page 21 of the Discussion Paper that the NEPP committed to develop further measures to improve energy productivity in the industrial and resources sectors.

APPEA member companies have in place long-standing and pervasive energy management policies, systems and measurement indicators that form a core part of their operational performance. The industry has also over many years been a participant in numerous voluntary and mandatory energy productivity and energy productivity-related programs.

There are a range of powerful drivers for energy productivity that pervade the operations of the upstream oil and gas industry in Australia and the industry has a long history of reducing the energy intensity of its operations and increasing its energy productivity.

For example, in domestic gas processing plants and LNG export plants, fuel used to power various processes is often derived from the natural gas itself. Any gas used as an energy source at the facility cannot be sold to customers. Therefore, using natural gas to produce energy at the facility has a very direct opportunity cost – a unit of gas that can be saved through reducing energy use is a unit of gas that can then be sold. This driver, which pervades the initial design and ongoing operation of these facilities drives energy productivity actions throughout the facility.

⁴⁰ Consideration could also be given to allowing for the creation of 'credits' if a facility reduces baselines – to incentivise emissions reductions.

This was recognised by the Government in 2014 when it repealed the Energy Efficiency Opportunities (EEO) scheme. In doing so, the Government noted⁴¹

With energy productivity now core business for many Australian industries, industry is best placed to define the right processes and make decisions on how best to manage energy within their businesses ...

... The need for such a regulatory response to improve energy management is no longer required.

These points remain valid in 2017 and APPEA recommends the NEPP, in considering new measures (where opportunities may exist to improve energy productivity for appliances and buildings), not contemplate a return to an EEO-type scheme or similar scheme to apply to large businesses, particularly energy producers, such as the upstream oil and gas industry.

5.5 A long-term emissions reduction goal for Australia beyond 2030

As the Discussion Paper notes on page 9, in Australia's submission to the Paris process in August 2015, Australia committed to consider a potential long-term emissions reduction goal beyond 2030 and also committed to review existing targets every five years.

APPEA's view on setting emissions reduction targets, or reviewing existing targets, was set out in APPEA's April 2015 submission⁴² to the *Setting Australia's post-2020 target for greenhouse gas emissions: Issues Paper*.

In that submission, APPEA recommended that in setting Australia's emission reduction goals, including a longer-term goal beyond 2030, or reviewing existing targets, the key consideration is that Australia should make an equitable contribution, in accordance with its differentiated responsibilities and respective capability to global action, to reduce greenhouse gas emissions.

Australia should continue to engage the international community in pursuing identified and beneficial environmental outcomes through greenhouse gas emissions reduction action.

Given the global nature of climate change and economic activity, the international context is important when considering an appropriate emissions reduction target for Australia. The international context is also relevant to how Australia's economy will change over time, and can affect the competitiveness of Australian industry. This last issue is of particular importance, but is often overlooked in the public debate on international action.

A key area of focus for Australia's upstream oil and gas industry, particularly the export-focused LNG industry, is the action of Australia's trade competitors. One of the key factors to consider when assessing any changes to Australia's emissions reduction targets is the action – or inaction – of trade competitors.

The Centre for International Economics (CIE) report, *Understanding emissions reduction efforts* (included with the AIGN submission to the Task Force)⁴³, notes Australia's emission reduction target, or changes to an existing target, should be set with a clear understanding of the implications of the target for the Australian economy and industries. This

⁴¹ See www.aph.gov.au/Parliamentary_Business/Bills_Legislation/Bills_Search_Results/Result?bld=r5232 for more information.

⁴² See www.dpmc.gov.au/sites/default/files/unfccc-public-submissions/APPEA%20Submission%2C%20240415.pdf for a copy of the APPEA submission.

⁴³ A copy of the report is available at www.aign.net.au/file_download/1090/CIE+report+Understanding+emission+reduction+efforts+24+April+2015.pdf.

understanding should also be informed by comparing Australia's level of effort with the level of effort to reduce greenhouse gas emissions by other countries. The CIE finds that this relevant information is the amount of abatement the target requires (that is, the volume of emission reduction compared to a situation where there was no target) and the cost or impost of achieving that emissions reduction.

The report also finds the most appropriate measure of the level of 'effort' is the cost of climate policies to reach the proposed target. Climate change policies can impose costs through different means, but all policies that induce a change in behaviour effectively impose a cost by requiring a shift to less cost effective, but also less emission intensive, production.

The most significant concern associated with greater action to address climate change is the cost of taking such action. Costs of climate change mitigation are borne by trade-exposed industries where they are placed at a competitive disadvantage compared to competing industries in other countries, domestic consumers where the cost of addressing climate change is reflected in higher domestic prices and taxpayers where climate change policies are funded by the government.

As cost is the primary justification for limiting the extent of climate change mitigation, cost is clearly a relevant metric for assessing the level of 'effort' a country is making.

APPEA recommends that in considering any potential long-term emissions reduction goal for Australia beyond 2030, the Government establish a process similar to the 2015 UNFCCC Task Force process used to develop recommendations for Australia's emission reduction target to 2030.

An alternative approach would be to task the Productivity Commission to conduct a public inquiry into the target, or to review existing targets, before making recommendations to Government.

Whichever approach is used, such a process should include public consultation, and a complete analysis, including economic modelling, of the implications of the proposed target, or changes to any existing target, for Australia's economic and social conditions.

6. Other issues

There are a range of other issues that can form part of the 2017 Review and where positive action can be taken.

6.1 The treatment of LNG production in the Renewable Energy Target

An issue unresolved during the negotiations that led to amendments to the Renewable Energy Target (RET) in 2015 relates to the treatment of the definition of 'LNG production' (as a part of the treatment of trade-exposed industries under the RET).

The definition of LNG production included in the *Renewable Energy (Electricity) Regulations 2001* covers only the liquefaction process itself and not the entire LNG production process. The outcome of this inappropriately narrow definition is that significant costs are placed on trade-exposed LNG projects (those operating in eastern Australia) under the RET, with the arrangements still offering only a partial exemption rather than a full exemption.

This means that, for these projects, the policy aim outlined in the Second Reading Speech introducing the *Renewable Energy (Electricity) Amendment Bill 2015* to "... protect jobs in these industries and ensure they remain competitive" is not being met. It also means an

inconsistent approach now exists between LNG projects in eastern Australia (which will bear the costs of the inappropriately narrow definition) and projects in northern/western Australia (which are able to access the 'self-generation' provisions).

APPEA recommends the definition of LNG production used in the *Renewable Energy (Electricity) Regulations 2001* be amended to adopt a definition that covers the entire LNG production process. The 2017 Review provides an important opportunity to address this issue.

6.2 Streamlining of policy approaches

Recent years have seen a return to the costly hotch-potch of State and Territory as well as national climate change approaches that has historically characterised many aspects of Australia's greenhouse policy response.

In particular, the range of poorly coordinated and inconsistent State-based renewable energy targets is adding significant costs to the greenhouse gas emissions reduction task facing Australia.

A more sensible approach may be for State and Territory governments to take responsibility for climate change adaptation policy and strategy, while the Australian Government develops and implements a national greenhouse gas mitigation policy.

Noting the work that is underway through the COAG Energy Council, APPEA recommends the 2017 Review be accompanied by a program across all governments to remove the red tape and regulatory burden imposed by other greenhouse (or greenhouse-related) programs and policies across every Australian jurisdiction.

6.3 Research, development and deployment

APPEA recommends the Review consider the role of research into low-emissions technologies, and development and deployment of such technologies. APPEA believes that a pathway to reducing emissions considerably must be founded on a strong research, development and demonstration (RD&D) effort across a very wide range of opportunities. Government has a role to play in providing support for this RD&D effort.

This support should include amendment to the investment mandate of the Clean Energy Finance Corporation (CEFC) to remove the current prohibition on CEFC financing for CCS projects. Removing this prohibition would offer tangible support for this potentially important technology.

APPEA also looks forward to further engagement with the Department and with the CSIRO on the oil and gas technology assessments contained in the CSIRO's forthcoming *Low Emissions Technology Roadmap*.

7. Conclusions/Next Steps

Our abundant natural gas resources place Australia in an enviable position to maintain long-term, cleaner energy security domestically and internationally. Natural gas makes it possible for Australia to meet the world's growing energy needs over the coming decades while incorporating a strategy to curb emissions and address the risks posed by climate change.



APPEA will continue to participate in the 2017 Review and looks forward to ongoing consultation with the Government and the Department as the Review proceeds, ahead of its report to the Government in late 2017.



Climate change policy principles

Second edition: December 2015
Australian Petroleum Production & Exploration Association

APPEA has developed these climate change policy principles to assist policymakers in developing efficient and effective responses to deal with climate change.

APPEA supports a national climate change policy that delivers greenhouse gas emissions reductions at least cost and facilitates broad-based investment decisions consistent with an international price on carbon.

Climate policy must be fully integrated and consistent with policies in other areas – including energy, international trade, taxation, economic growth, population, and environmental and social responsibility.

Policy principles

1. International engagement is crucial.

Australia should continue to engage the international community to pursue environmentally effective and economically efficient climate change policies¹.

An international policy framework should:

- Promote international participation.
- Minimise the costs and distribute the international burden equitably.
- Be comprehensive in its coverage.
- Allow for the unrestricted flow of credible emissions units between international jurisdictions.
- Be underpinned by transparent reporting arrangements.

2. Climate change and energy policies must be integrated and harmonised.

Australia's policy response should seek to:

- Deliver lowest cost greenhouse gas emissions abatement through an appropriately designed mechanism that provides an economy-wide transparent price signal to shape business and consumer plans and investments. The mechanism should be efficient, have low compliance costs, and support international trade that recognises different national circumstances.
- Recognise and allow the use of the widest range of credible domestic and international offsets.
- Provide a level playing field for new entrants.
- Avoid penalising early movers who have previously implemented abatement measures.
- Support research into low-emissions technologies, and development and deployment of such technologies.

In the event Australia takes action before comparable action is taken by the nations with which we compete, the Australian policy response should maintain the competitiveness of Australian trade exposed industries, such as LNG, by minimising the costs the industry faces in the absence of a carbon price being imposed on energy sources in customer countries and competitors.

Policies inconsistent with the principles should be phased out and additional measures should only apply to sectors of the economy that are not covered by the price signal on greenhouse gas emissions.

3. Climate change adaptation strategies are necessary.

Australia must:

- Continue to support international and national modelling to provide location-specific climate change forecasts.
- Develop risk-management strategies to reflect likely impacts of climate variability.

4. Climate policy must not compromise national or global economic development or energy security.

Australia's policy response should recognise that:

- Increasing global population and urbanisation generate growing demand for energy.
- Secure energy supply is crucial for a strong modern economy and a healthy, vibrant society.
- Natural gas has a key role to play in the transition to a low-carbon economy – switching to gas could halve the emissions from the Australian electricity sector – and if solar and wind power are to deliver genuine emissions reductions they must have gas-fired back-up.

¹ Australia's contribution to the global climate change effort as set out here reflects the principle in Article 3.1 of the United Nations Framework Convention on Climate Change (UNFCCC) (see unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveg.pdf). In determining Australia's differentiated responsibilities and capabilities, consideration should be given to matters such as Australia's economic growth and structure, population growth, energy production and energy use.



Australian LNG exports can make an important contribution to reducing global greenhouse emissions intensity.

The global challenge

Throughout the world, policymakers are implementing a variety of regulatory responses to reduce greenhouse gas emissions and mitigate the risks of global climate change.

The Intergovernmental Panel on Climate Change (IPCC) found in its Fifth Assessment Report (AR5) that:

- The human influence on the climate system is clear.
- The more we disrupt our climate, the more we risk severe, pervasive and irreversible impacts.
- Humans can limit climate change and build a more prosperous, sustainable future.²

The multilateral United Nations Framework Convention on Climate Change (UNFCCC) has elicited a global commitment to holding the increase in the global average temperature to well below 2 degrees Celsius above pre-industrial levels and to pursuing efforts to limit the temperature increase to 1.5 degrees Celsius above pre-industrial levels.³

² IPCC (2014), Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland (available at www.ipcc.ch).

³ UNFCCC (2015), Adoption of the Paris Agreement, 12 December (available at unfccc.int/resource/docs/2015/cop21/eng/109r01.pdf).

APPEA's stance on climate change

Societies around the world will continue to face two major, interdependent challenges:

- Maintaining and expanding affordable, secure energy supplies to meet growing consumer demand.
- Addressing the social and ecological risks posed by rising greenhouse gas emissions and climate change.

Managing greenhouse gas emissions and meeting growing energy demand requires action by individuals, companies, and governments. Making genuine progress requires an integrated set of solutions. This includes increasing energy efficiency, advancing lower carbon energy technologies, and supporting effective national and international policies.

Reliable and competitively priced energy underpins economic growth and stability, and is crucial to raising living standards in both developing and advanced nations. Therefore, policies aimed at reducing greenhouse gas emissions must do so at the lowest possible cost.

Natural gas: integral to a low-carbon economy

Natural gas is a lower-carbon form of energy suitable for electricity generation, industry and households.

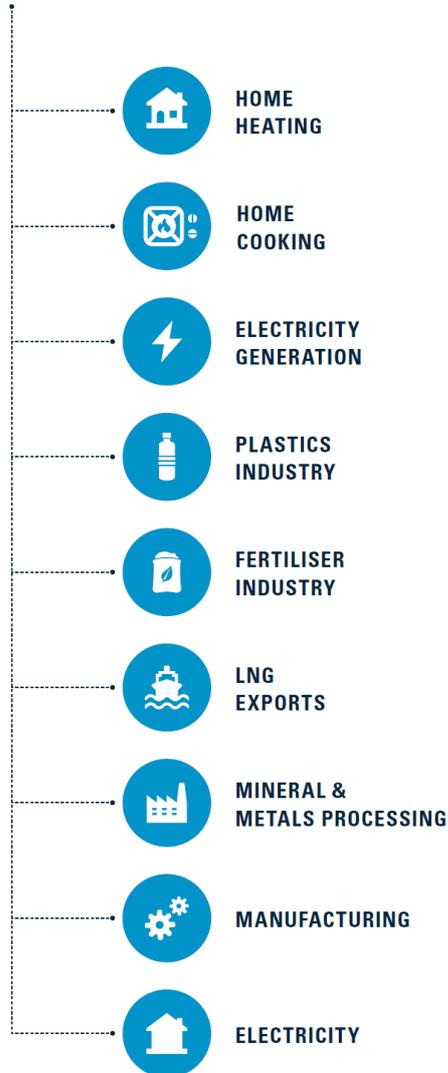
Increasing its use can deliver immediate and substantial carbon savings. Simply switching from coal to natural gas can reduce greenhouse gas emissions by 40-50% and by as much as 75% in some circumstances.⁴

Australia's gas industry, domestically and through our exports of liquefied natural gas (LNG), contributes substantially to the economic development of the nation and reduces global greenhouse gas emissions.

Natural gas is a highly flexible fuel:

- Natural gas is commonly used to generate electricity, heat and steam for industries, including alumina refining, food and beverage manufacturing, and grocery production.
- Natural gas is ideally suited as a complement to renewable electricity generation because gas generation plants can be rapidly turned on and off to respond to changes in intermittent generation from renewable sources.
- Natural gas is the fuel of choice in co-generation and tri-generation. These technologies can provide electricity, heating and cooling at very high thermal efficiencies approaching 80%.⁵
- Compressed natural gas and LNG are used in the transport sector, and this use can be expanded.
- Innovative technologies, such as natural gas fuel cells, have been developed that can provide electricity and heat requirements in applications ranging from a small house to a medium sized office or factory. These technologies can deliver thermal efficiencies as high as 85%.⁶
- Natural gas is also a critical feedstock for industry that often cannot be substituted in producing fertilisers, cleaners, polymers and refrigerants.

NATURAL GAS



⁴ Australian Council of Learned Academies (2013), Engineering Energy: Unconventional Gas Production, June (available at www.acola.org.au/index.php/projects/securing-australia-future/project-6). While the emissions benefit is lower when compared to ultra supercritical coal fired power generation, as the Council has noted "gas-fired electricity generation will generally replace existing coal-fired boilers that are less efficient subcritical facilities".

⁵ These technologies are already being deployed in commercial buildings in Australia (see www.urbanenergy.com.au/projects, www.originenergy.com.au/files/Origin_Coca_Cola_place_FactSheet.pdf, www.cityofsydney.nsw.gov.au/vision/towards-2030/sustainability/carbon-reduction/trigeneration and www.qantas.com.au/travel/airlines/electricity/global/en#power for examples).

⁶ Recently there have been significant advances in ceramic fuel cells that run on natural gas, with a range of commercial available products now on the market.

Reducing emissions

The Australian Council of Learned Academies has found using gas to provide more baseload and peak electrical power generation in Australia – in scenarios of higher use of both renewables and gas – would deliver substantial emissions reductions.

This would reduce the Australian electricity generation sector’s emissions by between 54 Mtpa-103 Mtpa CO₂-e (million tonnes per annum, carbon dioxide equivalent) by 2030 – a reduction of 27% to 52% from the base case of 197 Mtpa CO₂-e in 2012.

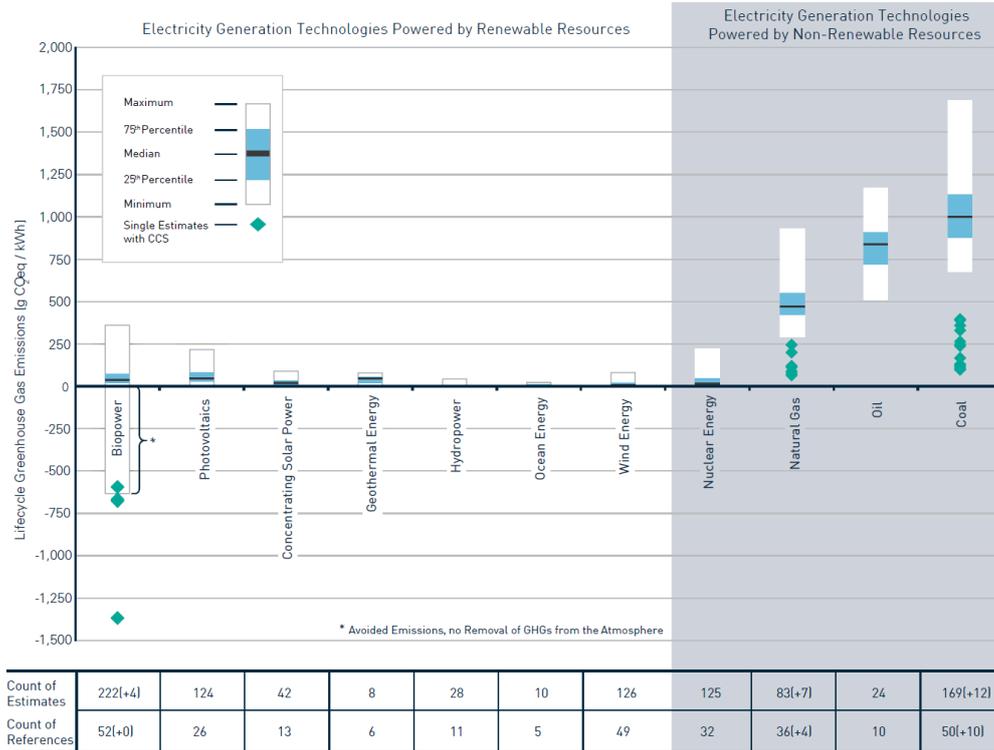
Other environmental benefits

Fuel switching would also have other benefits. Natural gas plants use much less water than coal-fired power and produce much lower levels of noxious substances such as sulphur dioxide, nitrogen oxides and fine particle emissions.

Burning gas instead of coal improves urban air quality. This is particularly important in many Asian countries that are importing Australian LNG or considering imports.

Baseload power is the level of generation needed to meet forecast minimum demands. Baseload power plants must run constantly and at predictable levels. Peaking power is power that can be brought online quickly in periods of peak demand. Intermittent power is any source of energy (such as solar and wind) that is not continuously available.

The range of life cycle emissions for electricity generation (tonne CO₂-e/MWh) from a range of energy sources



Source: IPCC (2011)

7 IPCC (2011), Summary for Policymakers. In: IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation [O. Edenhofer, R. Pichs-Madruga, Y. Sokona, K. Seyboth, P. Matschoss, S. Kadner, T. Zwickel, P. Eickemeier, G. Hansen, S. Schlömer, C. von Stechow (eds)], Cambridge University Press, Cambridge, UK and New York, NY, USA (available at srren.ipcc-wg3.de/report/IPCC_SRREN_SPM.pdf).

Australia has substantial natural gas resources. Natural gas offers a relatively low-cost emissions abatement opportunity. This means developing these resources can provide significant national environmental, economic and social benefits.



Carbon capture and storage (CCS)

Greenhouse gas storage is seen as one of the pathways to the continued use of fossil fuels in a low-carbon economy.

The global oil and gas industry is leading the world in the practical deployment of this technology. Norway's Statoil has developed large carbon capture and storage (CCS) projects at Sleipner and Snøhvit. In Canada, Shell has developed the Quest CCS project.

In Australia, the oil and gas industry has been at the leading edge of researching and deploying greenhouse gas storage technologies.

The industry instigated significant research efforts into greenhouse gas storage in the late 1990s through the Australian Petroleum Cooperative Research Centre (which has continued through the CO2CRC Limited).

Since that time, several hundred million dollars has been invested in assessing large greenhouse storage projects.

The Gorgon Carbon Dioxide Injection Project⁸ – soon to be commissioned – is the world's largest greenhouse gas mitigation project undertaken by industry.

⁸ See www.chevronaustralia.com/our-businesses/gorgon/carbon-dioxide-injection for more information.

APPEA supports a national climate change policy that delivers greenhouse gas emissions reductions at least cost and facilitates broad-based investment decisions consistent with there being an international price on carbon.

APPEA climate change policy: key points

1. International engagement is crucial.
2. Climate change and energy policies must be integrated and harmonised.
3. Climate change adaptation strategies are necessary.
4. Climate policy must not compromise national or global economic development or energy security.

APPEA and its members will continue to work with all of Australia's governments to:

- Support a national climate change policy response consistent with the policy principles outlined in this paper.
- Expand the use of natural gas in the domestic economy, with consequent reduction in the emissions intensity of the Australian economy, for example, in electricity generation and resource processing.
- Promote development of lower emissions technologies, such as high-efficiency electricity generation and greenhouse gas storage.
- Make Australia more attractive as an investment destination for LNG projects, so that Australian LNG can help Australia's trading partners reduce their greenhouse gas emissions, thereby contributing to a potential significant reduction in global emissions when compared to the use of higher-emitting fuels.

About APPEA

The Australian Petroleum Production & Exploration Association is the peak national body representing Australia's oil and gas exploration and production industry. APPEA has about 80 full member companies. These are oil and gas explorers and producers active in Australia. APPEA members account for an estimated 98 per cent of the nation's petroleum production. APPEA also represents more than 230 associate member companies that provide a wide range of goods and services to the upstream oil and gas industry.

APPEA works with Australian governments to help promote the development of the nation's oil and gas resources in a manner that maximises the return to the Australian industry and community. APPEA aims to secure regulatory and commercial conditions that enable member companies to operate safely, sustainably, and profitably. The Association also seeks to increase community and government understanding of the upstream petroleum industry by publishing information about the sector's activities and economic importance to the nation.

www.appea.com.au