State of the industry 2012

The upstream oil
contributes signif
Australia's energy
jobs and wealth fo
this paper and the
on the upstream p
the importance of
sources cannot be
petroleum accoun
Australia's primar
coal 41% and ren
energy sources wi
share and in the lo
thermal energy, hy
nuclear energy ma
However, for at le
oil, gas and coal w
Australia's energy
oil and gas indust
significantly to m
energy needs as

A status report on *Platform for Prosperity*—a strategy for maximising the value of Australia's oil and gas resources

APPEA

AUSTRALIAN PETROLEUM PRODUCTION AND EXPLORATION ASSOCIATION

Preface

The global economy and the Australian oil and gas industry have experienced numerous changes and challenges over the five years since the development of the Upstream Oil and Gas Industry Strategy. Released in 2007, the strategy was set at a time of strong global economic growth driving increased demand for commodities, including energy, and rising energy prices. Australia's significant gas resources and largely untapped exploration potential in vast frontier areas offered exciting opportunities for the Australian oil and gas industry and considerable wealth for the Australian economy. However, the industry also faced some significant challenges threatening to prevent much of this potential being realised.

To help address these issues, the industry in consultation with governments developed the Upstream Oil and Gas Industry Strategy. The actions emanating from the strategy were based on seven major drivers for change. These included the need to better understand Australia's petroleum potential by increasing exploration in frontier areas and addressing the cost, skilled labour and regulatory impediments holding back growth in gas exports and domestic gas use.

Five years later, *State of the industry 2012* looks at changes in the local and global environment, progress towards capturing the opportunities for the industry and the opportunities and challenges it now confronts. As in previous *State of the industry* reports, various elements of the strategy—particularly the high value-adding priorities and key actions—have been reviewed and updated to reflect policy developments and changes in the industry and its operating environment. This report provides an update on progress towards the implementation of those priorities and actions.

More information about the strategy and copies of this and previous annual reviews are available on the APPEA website: www.appea.com.au

Upstream Oil and Gas Industry Strategy

OBJECTIVES

To ensure the value of Australia's oil and gas resources to the Australian people is maximised, petroleum energy security delivered and long-term sustainability of an Australian oil and gas industry assured.

VISION

In 2017 the upstream oil and gas industry is recognised as a vibrant, innovative, safe and responsible industry, producing reliable, clean energy and substantial wealth for Australia.

TARGETS

In the decade to 2017 oil, condensate and naturally occurring LPG production as a proportion of liquid fuels consumption is, on average, maintained at the 2006 level of 55 per cent or better.

Over the six-year period from 2006 to 2011 the ratio of petroleum liquids production to consumption within Australia has averaged 51.5 per cent. This is short of the strategy's 55 per cent target. The ratio has fallen to 44.6 per cent in 2011 from 53.9 per cent in 2010. Figure 2 on page 10 illustrates the growing gap between liquids production and consumption.

LNG production capacity increases from 20 million tonnes a year in 2008 to at least 50 million tonnes a year by 2017.

According to current construction schedules, Australia's LNG production capacity will increase to over 80 million tonnes per annum by 2017 (see Table 2 on page 6 for details). Much of the growth in Australia's gas industry over the last five years has been driven by strong demand in the Asia Pacific region, the quality of Australia's conventional and coal seam gas resources, the application of innovation and technology and the right economic incentives to support the size and scale of greenfields projects. Strong sustained growth of China and continued strong demand in Japan and Korea have supported world energy markets, including gas demand and gas prices. These factors have enabled the Australian gas industry to expand much more rapidly than was envisaged five years ago. What was considered to be an optimistic growth scenario at that time now looks conservative.

In a competitive market, 70 per cent of all new electricity generation capacity installed in Australia over the decade to 2017 is gas-fired.

A total of 13,199 megawatts of electricity generation capacity has been commissioned since 2007 or is currently under construction. Of this, 12.7 per cent is coal-fired, 54.7 per cent is gas-fired, 30.6 per cent use renewable forms of energy and 2.0 per cent use oil products (*ESAA 2012*). The renewables share of new capacity is increasing rapidly at the expense of gas due to the impact of the Renewable Energy Target. The comparable figures reported in *State of the industry 2011* were 12.6 per cent coal, 61.3 per cent gas, 24.8 per cent renewables and 1.3 per cent oil products. Factors inhibiting the growth of gas-fired generation are discussed in section 3.7 of this report.

Contents

Common abbreviations

CO_2-e	carbon dioxide equivalent
CSG	coal seam gas
GA	Geoscience Australia
kbd	thousands of barrels a day
mtpa	million tonnes per annum
NPV	net present value
OGP	International Association of Oil & Gas Producers
PRRT	Petroleum Resource Rent Tax
RET	Renewable Energy Target
tcf	trillion cubic feet
TJ/d	terajoules per day

1 Summary

The oil and gas industry is a major contributor to Australia's economic prosperity

Almost $200 billion is currently being invested in oil and gas projects including seven major LNG projects. According to economic modelling commissioned by APPEA and conducted by Deloitte Access Economics, this will increase Australian GDP by up to 2.2 per cent a year and require a construction workforce peaking at over 100,000 full-time equivalent jobs. By 2025, the construction and operation of these projects will add more than $260 billion (in net present value [NPV] terms) to Australian GDP and contribute between $6.3 billion and $7 billion a year in taxation revenue (*DAE 2012*).

Australia's upstream oil and gas industry has entered a period of unprecedented growth and transformation. The $193 billion of construction activity now underway is delivering large economic benefits to the nation. Gas supply to Australian industry and households is being increased and by 2017 Australia could overtake Qatar as the world's largest exporter of liquefied natural gas (LNG). Once operational, these projects will also help reduce the growth in Australian and global greenhouse gas emissions, improve Australia's energy security and increase the competitiveness of our energy markets. They will also provide a long-term boost to jobs and income for service industries and tax revenues for governments.

As these projects commence production, the oil and gas industry's value added is expected to more than double to around $65 billion by 2020, from $28 billion in 2011 (Table 1). Its share of Australian GDP will increase from 2.1 per cent in 2011 to 3.5 per cent in 2020 and 2.8 per cent in 2025. Taxation payments will increase to $12.8 billion in 2020 and total around $94 billion (NPV) by 2025.

Further phases of development will deliver additional benefits.

Further growth and economic benefits could come from the pipeline of future oil and gas investment yet to be committed. This includes brownfields expansions and new field developments for projects currently in operation or under construction as well as potential investment of at least another $100 billion in new greenfields projects. Oil and gas have a central role to play in the nation's prosperity.

Table 1 The economic contribution of the oil and gas industry

	NPV 2012–25	2011	2020	2025
Value added ($b)				
■ oil and gas production	420.0	28.3	64.7	60.1
■ exploration	9.1	1.1	0.8	1.1
Total value added, share of GDP (%)		2.1	3.5	2.8
Corporate tax payments ($b)	61.2	4.4	9.1	8.5
Production taxes ($b)	32.4	3.5	3.7	3.6
Total taxes ($b)	93.6	7.9	12.8	12.1

NPV: net present value at a 7% discount rate Source: DAE 2012

Strong Asian demand has driven growth

Much of the growth in Australia's gas industry over the last five years has been driven by strong demand in the Asia Pacific region, the quality of Australia's conventional and coal seam gas (CSG) resources, the application of innovation and technology and the right economic incentives to support the size and scale of greenfields projects. Strong sustained growth of China and continued strong demand in Japan and Korea have supported world energy markets, including gas demand and gas prices. These factors have enabled the Australian gas industry to expand much more rapidly than was envisaged five years ago. What was considered to be an optimistic growth scenario at that time now looks conservative.

International competitiveness: the major challenge

The major challenge to continued growth and the realisation of the full potential of Australia's oil and gas resources is maintaining Australia's international competitiveness in the face of growing global competition. A high cost local environment and the emergence of new LNG competitors in East Africa, North America and elsewhere will make it much harder to win market share and attract investment than has been the case over recent years.

The industry and governments must also do everything possible to ensure that projects under construction commence production in a timely manner while managing and minimising the risks to safety and the environment. Delays and cost overruns in current projects would have a far wider and longer-term impact on investment, jobs, tax revenues and returns to the community than just the immediate cost to project investors.

Some impacts on current and future investment, such as the high Australian dollar, are beyond the ability of industry to influence. However, other key challenges to competitiveness must be addressed. In particular, the industry and its suppliers need to work harder at constraining cost growth and to meeting skilled labour requirements. Industry is investing in technology and reducing costs through modularisation and innovative procurement processes. But there are critical policy areas (noted below) that require genuine reform.

Social licence must be strengthened

The industry must ensure that it has the ongoing support of the communities in which it operates and of the governments that represent those communities and regulate its activities. Failure to maintain a social licence to operate will result in the loss of future investment opportunities and the loss of major economic benefits for the nation. The industry and governments have increased their efforts to engage with local communities and these need to be maintained and extended.

APPEA's Principles of Conduct have been updated and will be implemented in 2013. APPEA members are expected to continuously strive to improve health, safety and environmental performance. People and the environment are to be protected through the responsible management of operations and their impacts, and by incorporating risk management strategies based on sound science.

The onshore industry is committed to leading practices in well integrity, water management and hydraulic fracturing and supporting regulatory outcomes based on sound scientific principles and assessment. The industry has worked with the Queensland and New South Wales Governments on the development of operational and land access provisions and codes. In Western Australia, an Industry Code of Practice for Hydraulic Fracturing aimed at achieving and maintaining high operational standards across the sector has been developed.

In the aftermath of Macondo and Montara incidents, the Australian offshore industry has worked closely with the Australian Government and the international oil and gas industry to ensure it has access to the world's best well incident prevention and response capability. This includes making arrangements for the acquisition of a Subsea First Response Toolkit (SFRT) to be located in Australia. It will contain specialised equipment to clean the well-head and surrounding area, including the seabed, and make it safe for a well capping device to be installed. The SFRT is planned for delivery in late 2013, ready for immediate mobilisation at the onset of a subsea well control event. The industry has also finalised a Mutual Aid Memorandum of Understanding for responding to offshore incidents, implemented a self-audit tool for well operations safety management systems, and supported the establishment of a single offshore regulator (National Offshore Petroleum Safety and Environmental Management Authority) for operational, safety and environmental matters.

Five major policy priorities are clear:

1 Provide stable and predictable fiscal settings: investment risks associated with long-term investment

Taxation settings must provide long-term financial stability while genuinely addressing impediments to competitiveness and distortions to investment. A stable, predictable and competitive taxation regime is essential to underpin the exploration and development investments required to maximise oil and gas production.

Three broad areas have a major impact on project economics and are of particular significance to the oil and gas industry: the operation of the Petroleum Resource Rent Tax (PRRT); the treatment of long-life capital-intensive projects and exploration costs within the company tax regime; and the levying of taxes on inputs to production. A Federal Court decision that would restrict deductibility of services expenditure for PRRT purposes represents a major departure from practice since the mid-1980's. As a result, the operation of the PRRT regime needs to be resolved expeditiously.

2 Increasing regulation is harming Australia's reputation and deterring investment.

Some reforms are being progressively introduced by some jurisdictions and new review processes have been initiated. Decisions by the Council of Australian Governments to establish a Taskforce on Regulatory Reform and a project to reduce duplication and double handling of environmental assessment and approval processes are welcomed.

However, regulatory uncertainty and costs are increasing rapidly and new requirements are constraining industry activity. This is most evident in the CSG sector in Australia's eastern states but is occurring across the industry. More must be done to reduce red and green tape, streamline approvals processes and eliminate duplicative and overlapping regulatory processes (between Australian Government departments and agencies and between the Australian and state/territory governments).

3 Deliver competitive, reliable, cleaner energy through the operation of open and competitive markets

The government's Energy White Paper establishes a solid policy framework to guide the long-term development of the industry. It clearly articulates the important role that Australian natural gas will play in delivering economic growth and energy security, both domestically and throughout our region. It recognises the critical importance of market-based energy policies and sends an important signal to investors in rejecting domestic gas reservation policies.

It now needs to be implemented as a wide-ranging reform agenda that addresses all of the major impediments to industry competitiveness and investment. This is a task that governments in collaboration with industry must pursue if the wealth generation potential of Australia's oil and gas resources is to be fully realised.

4 Viable labour markets are essential: mobility, flexibility, productivity

Finding and developing the skilled workforce and local industry supply capability needed to build and operate all of the projects now under construction is a major challenge. Governments, the training sector, suppliers and project proponents all need to contribute towards the development of the required capabilities.

The decline in labour productivity growth that Australia has experienced over recent years needs to be reversed. Falls in labour productivity in the resources sector will be arrested as projects now under construction commence production. However, low rates of productivity growth in the crucial construction sector will not automatically recover and need reform. Australia's high labour costs and lower labour productivity means the cost of construction work on remote Australian resources projects can be up to five times the cost of construction work on the US Gulf Coast. Construction costs for Australian LNG projects, in terms of dollars per installed tonne of capacity, are the highest in the world.

Elements of the *Fair Work Act 2009* are contributing to project delays and increases in costs. Further reforms to the Act beyond those announced in October are needed. Policies to encourage greater mobility of workers to the regional areas of Australia where the demand is greatest, continued access to overseas labour pools for shortages of skilled workers and increased investment in training and up-skilling of the workforce are critical.

5 Oil imports are increasing rapidly while much of Australia remains unexplored. Frontier exploration needs to be better incentivised.

It should not be forgotten that Australia's oil production is steadily declining. The growing gap between Australia's liquids production and consumption could be greatly reduced by attracting more exploration to the 70 per cent of our prospective basins that remain unexplored. Better fiscal and licensing terms are needed to attract exploration to high-risk, high-cost frontier areas.

2 Meeting the challenges of rapid growth

2.1 A changing international environment

As the consequences of the global financial crisis continue to wash through the world economy, the economic outlook remains uncertain. The US and Europe are facing an extended period of recession or low growth, dampening activity in China and its demand for Australia's commodity exports. Declining commodity prices are generating a domestic debate about whether the resources boom is over. In reality, high levels of resources investment followed by rising export volumes will sustain Australia's recent record of solid economic growth. Although well below their 2008 peak, world oil prices have held up and global energy demand, particularly for gas, is strong. Therefore despite increased global economic uncertainty, Australia's oil and gas industry is growing and faces a positive future. Opportunities capable of generating considerable wealth for Australia are still available although the challenges to capturing those opportunities have intensified.

Gas demand

Despite increased economic uncertainty, the outlook for global gas demand has not changed and remains strong. World gas consumption fell briefly in 2009 (by 2 per cent) but recovered quickly and is generally expected to grow at an average rate of around 2 per cent a year over the next two to three decades. The International Energy Agency (IEA) for example has projected world gas demand to grow at an average rate of 1.8 per cent a year to 2035 (*IEA 2012*) while BP expects growth of 2.1 per cent a year to 2030—nearly double the rate of aggregate energy demand growth (*BP 2012*).

The outlook for gas has been strengthened by a desire by many of the major economies, including China, to move to cleaner sources of energy with lower carbon emissions. The disaster at the Fukushima nuclear plant in March 2011 and subsequent reassessments of nuclear power by Japan and other countries also support long-term demand for gas.

Taking these factors into account, the IEA predicts that global gas demand could increase by more than 50 per cent between 2010 and 2035. Its share of the global energy mix could increase to 25 per cent in 2035 from 21 per cent today. Indigenous gas production and pipeline gas imports will not keep pace with demand so LNG trade is expected to grow strongly.

The world LNG market is expected to increase from 243 million tonnes per annum (mtpa) in 2011 to around 450 mtpa in 2025 with most of the increased production being shipped into Asia (*Woodside 2012*).

Therefore at least on the demand side, the outlook for the Australian LNG industry is positive.

Supply and prices

However, developments on the supply side of the LNG market pose challenges for the Australian LNG industry. In particular, there is increasing supply competition from other countries and high and rapidly increasing project development costs in Australia.

Platform for Prosperity addressed the potential supply competition from established LNG producers such as Qatar, Yemen, Oman, the United Arab Emirates, Malaysia, Brunei and Nigeria. Since that time Algeria, Angola and PNG have entered the LNG business with recent start-ups or projects under construction. Excitement is growing about a new LNG province in East Africa (Kenya, Mozambique and Tanzania) following recent large gas discoveries. It is estimated that around 100 trillion cubic feet (tcf) of recoverable gas reserves have been discovered in Mozambique and Tanzania since mid-2010. In Mozambique, US-based Anadarko has awarded front-end engineering and design contracts for a two train LNG plant, expandable to six trains, each with a capacity of 5 mtpa. Norway's Statoil is also proposing a Mozambique LNG project and has made large gas discoveries in offshore Tanzania.

All of these existing and possible new developments involve the liquefaction of conventional gas. However, a whole new source of competition is emerging as access to different forms of unconventional gas increases. Australia is leading the world in the conversion of this form of gas into LNG with three coal seam gas to LNG (CSG–LNG) projects under construction near Gladstone. Advances in drilling technology and a rapid increase in shale gas production have transformed the North American gas market. Instead of the US needing to import LNG as envisaged just a few years ago, it is about to become an LNG exporter following government approval of the Sabine Pass LNG terminal in Louisiana earlier this year. The project is planned to include up to four liquefaction trains capable of producing up to 20 mtpa of LNG.

There are differing views on how quickly LNG exports from the US could expand. A further seven export projects are currently proposed with a combined capacity of almost 80 mtpa. However, not all of these are likely to proceed (*BREE 2012b*). Three Canadian LNG projects with a combined capacity of 16 mtpa are also being considered. The most advanced of these is the Kitimat LNG project with an initial capacity of 6 mtpa. The IEA has suggested that LNG exports from North America could reach 26 mtpa by 2020 growing to around 30 mtpa by 2035. Other commentators have stated that US exports could reach 40 to 50 mtpa by 2025 or around 10 per cent of global LNG production (*Woodside 2012*).

Large unconventional gas resources have also been identified in other parts of the world including countries and regions close to the world's major gas consumers. Parts of Europe, North Africa, China, India and Russia are all thought to contain potentially large resources of unconventional gas. A significant uncertainty at this time is the extent and pace at which those resources may be able to be economically developed. The US shale gas industry enjoyed some

unique advantages such as ready access to markets, technology and infrastructure which enabled the industry to expand quickly. Growth may take longer elsewhere but the IEA has flagged the potential for rapidly increasing unconventional gas production in China to dampen the growth in its LNG imports post-2020.

The gas surplus in the US market and recessionary conditions in Europe have other flow-on effects. Traditional suppliers to the Atlantic market (Nigeria and Middle Eastern countries) and newcomers like Angola (5.2 mtpa capacity commencing production this year) are instead looking to the Asia Pacific market for growth. Over the past year Qatar's RasGas has signed LNG contracts with Korea and Taiwan, its first new long-term contracts with Asia since 2008.

Shifts of this nature, the entry of new LNG producers in North America and East Africa, and the potential rise of unconventional gas in the longer term, could have significant implications for the Australian LNG industry's prospects. With Australia likely to become the largest LNG supplier to Asia accounting for around 35 per cent of the market by 2017 (*BREE 2012a*), LNG buyers may seek to diversify their sources of supply and shift attention towards new projects elsewhere.

Trends in oil and gas prices will be another important factor. Lower economic growth in the US, Europe and potentially China, and political instability in the Middle East (including the UN embargo on Iranian oil exports), add to volatility and uncertainty about future oil and gas prices. Asian LNG prices could come under pressure from a variety of sources including large, low-cost East African projects, low-cost gas from the US and the development of indigenous sources of unconventional gas.

These changes in gas supply and pricing suggest that while the Australian LNG industry is undergoing a major expansion phase, securing the long-term contracts necessary for future growth may become much more difficult.

2.2 Local impact

From planning to building

The Australian gas industry has undergone a major transformation since 2007. Instead of planning a multitude of new gas projects many are being built or are in operation. Table 2 lists 15 major oil and gas projects under construction with capital costs totalling over $193 billion. These projects will expand Australia's domestic gas market and increase LNG production capacity from 16.3 mtpa in 2008 to around 86 mtpa in 2016.

In addition to supplying three new LNG projects (with a fourth moving towards an investment decision next year), the CSG industry has rapidly expanded its share of the eastern states gas market. In 2011–12, CSG producers (mainly in Queensland) supplied 35 per cent of the eastern states market compared to 15 per cent in 2006 (*EnergyQuest 2012*).

A number of conventional gas projects to supply the eastern states market are also under development. In Bass Strait the $1.7 billion Kipper gas project, being undertaken by Esso Australia, BHP Billiton and Santos, is expected to commence production in 2013 while the $2.6 billion Turrum Tuna oil and gas development, being undertaken by the Gippsland Basin Joint Venture (Esso Australia and BHP Billiton), is expected to commence production a year later. In the offshore Otway Basin, Origin Energy is assessing the viability of developing the Halladale and Black Watch gas fields.

Santos and a range of other companies are proving that the Cooper Basin's conventional gas resources are far from exhausted. Santos has commenced a major infill drilling program and expansion of its Moomba gas processing plant. Other operators such as Beach Energy, are successfully searching for oil and gas in previously under-explored parts of the basin.

The Western Australian domestic gas market has entered a period of unprecedented supply growth. The Devil Creek Gas Plant was commissioned in December 2011 and the Macedon gas project is expected to commence production next year. Domestic gas facilities are being included in the Gorgon and Wheatstone LNG projects due to commence production in 2015 and 2016 respectively. These four projects will deliver an 80 per cent increase in Western Australia's domestic gas supply capacity in just five years. They will also greatly enhance the state's gas supply security by increasing the number of gas supply hubs from two to six.

The North West Shelf Project is also investing heavily in new offshore fields and facilities to maintain gas production. The $5 billion North Rankin Redevelopment sanctioned in 2008 and expected to be completed in 2013, will access the remaining reserves in the North Rankin and Perseus fields. In December 2011, the North West Shelf Project sanctioned a $2.5 billion development of phase 1 of the Greater Western Flank project. This will involve developing the Goodwyn GH and Tidepole fields with production expected to commence in 2016.

Advancing Australia: Harnessing our Comparative Energy Advantage

The $193 billion of oil and gas projects now under construction is delivering a major economic boost across Australia. Modelling undertaken by Deloitte Access Economics for APPEA found that:

- oil and gas investment accounts for 35 per cent of all business investment in Australia (64 per cent if all currently proposed projects proceed)
- over the period to 2020 the sector's national economic contribution (value added) will double to around $65 billion per annum
- the oil and gas industry's contribution to GDP will increase from 2.1 per cent in 2011 to 3.5 per cent in 2020
- over the period 2012–25 the industry will pay $93.6 billion (in net present value terms) in corporate and production taxes
- from 2009 to 2017 projects will spend an average of $23 billion a year on capital outlays or about $210 billion in total
- in 2012 oil and gas investment and construction activity will increase national employment by 1.0 per cent and generate 103,000 (full-time equivalent) jobs nationally

DAE 2012

Table 2 Oil and gas projects under construction

Project	Company	Location	Estimated start-up	Capacity	Capital cost ($b)	Estimated construction jobs
CSG–LNG projects						
Australia Pacific LNG	Origin, ConocoPhillips, Sinopec	Gladstone, Qld	2015	9.0 mtpa	23.0	6000
Curtis Island LNG	BG, CNOOC	Gladstone, Qld	2014	8.5 mtpa	20.4	5000
Gladstone LNG	Santos, Petronas, Total, Kogas	Gladstone, Qld	2015	7.8 mtpa	18.0	5000
Conventional LNG						
Gorgon	Chevron, Shell, ExxonMobil	Barrow Is, WA	2015	15.6 mtpa 300 TJ/d domgas	43.0	7000
Wheatstone	Chevron, Apache, KUFPEK, Tokyo Electric, Shell	Onslow, WA	2016	8.9 mtpa 200 TJ/d domgas	29.0	5000
Ichthys	Inpex, Total	Darwin	2016	8.4 mtpa	34.0	3000
Prelude Floating LNG	Shell, Inpex, Korea Gas	Browse Basin	2016	3.6 mtpa	10.0	N/A
Other						
Montara (oil)	PTTEP	Browse Basin	2013	35 kbd	0.7	N/A
Kipper (gas)	Esso Australia, BHP Billiton, Santos		2013	82 TJ/d	1.7	
Tuna Turrum (oil & gas)	Esso Australia, BHP Billiton	Bass Strait	2014	210 TJ/d	2.6	N/A
Balnaves (oil & gas)	Apache, KUFPEC	Carnarvon Basin	2015	30 kbd	0.4	N/A
Coniston (oil)	Apache, Inpex	Carnarvon Basin	2013	22 kbd	0.5	N/A
Fletcher Finucane (oil)	Santos, KUFPEC, JF Nippon Oil & Gas	Carnarvon Basin	2013	15 kbd	0.5	N/A
Macedon (gas)	BHP Billiton, Apache	Onslow, WA	2013	200 TJ/d	1.5	N/A
North Rankin Redevelopment (gas & condensate)	Woodside, BP, BHP Billiton, Chevron, Shell, MIMI	Carnarvon Basin	2013	N/A	5.0	N/A
Greater Western Flank Phase 1 (gas & condensate)	Woodside, BP, BHP Billiton, Chevron, Shell, MIMI	Carnarvon Basin	2016	N/A	2.5	N/A

Source: DAE 2012, BREE 2012b

Gas resources

The growth in Australia's gas production infrastructure has been underpinned by a sustained increase in Australia's known gas reserves. Australia's economic demonstrated resources (EDR) of conventional gas have increased from around 80 tcf in 2007 to 103 tcf at the beginning of 2011. Adding resources considered to be potentially economic in the foreseeable future (subeconomic demonstrated resources or SDR) increases Australia's conventional gas resources base to 157 tcf (*GA & BREE 2012*).

Australia also has significant unconventional gas resources—CSG, tight gas and shale gas. CSG EDR has doubled in the last three years to 33 tcf (as at January 2012). Total identified resources of CSG (EDR, SDR and inferred resources) are estimated to be around 203 tcf and total identified tight gas resources are around 20 tcf.

Australia's shale gas resources (identified, potential and undiscovered) are also considered to be large but with a wide range of uncertainty as their development is just beginning. It is noted that the very large estimate of recoverable shale gas resources of about 396 tcf reported by the US Energy Information Administration in 2011 is based on limited data and little or no production history. Hence, this initial estimate is likely to contract (*GA & BREE 2012*).

The rapid growth of shale gas production in the US and advances in drilling technology are attracting considerable interest in the shale gas potential of a range of basins across Australia. These include the Cooper Basin, the Perth and Canning basins in Western Australia and the Amadeus, Georgina and Beetaloo basins in central Australia. Over the past two years the smaller Australian companies that commenced the initial work have been joined by

Table 3 Australia's gas resources

TRILLION CUBIC FEET

Resource category	Conventional gas	CSG	Tight gas	Shale gas	Total gas
EDR	103	33	-	-	**136**
SDR	54	60	-	2	**116**
Inferred	10	111	20	-	**141**
All identified resources	167	203	20	2	**392**
Potential in ground resources	Unknown	235	Unknown	396	**631**
Resources—identified, potential and undiscovered	167	235	20	396	**819**

Notes Conventional gas demonstrated resources as of January 2011. CSG demonstrated resources as of January 2012. CSG 2P and 2C resources are used as proxies for EDR and SDR respectively.

Source: BREE 2012c

a range of larger international oil and gas producers. The larger companies bring added financial and technical capability and experience in the development of unconventional gas resources elsewhere. Although it will take some years to understand the size and economic potential of these resources, early signs are encouraging. Santos commenced production from Australia's first commercial shale well (Moomba-191) in October 2012.

Australia's identified conventional and unconventional gas resources are in the order of 392 tcf, equal to 184 years of gas at current production rates.

2.3 Key challenges

Much of the growth in Australia's gas industry over the last five years has been driven by strong demand in the Asia Pacific region, the quality of Australia's conventional and CSG resources, the application of innovation and technology and the right economic incentives to support the size and scale of greenfields projects. Strong sustained growth of China and continued strong demand in Japan and Korea have supported world energy markets, including gas demand and gas prices. These factors have enabled the Australian gas industry to expand much more rapidly than was envisaged five years ago.

The major challenge to continued growth and the realisation of the full potential of Australia's oil and gas resources is maintaining Australia's international competitiveness in the face of growing global competition. A high-cost local environment and the emergence of new LNG competitors in East Africa, North America and elsewhere will make it much harder to win market share and attract investment than has been the case over recent years.

Community support

One of the biggest challenges confronting Australia's oil and gas industry is to ensure that it has the ongoing support of the communities in which it operates. Maintaining a social licence to operate is essential for the industry to continue to grow and generate large, long-term economic and energy benefits for the nation. Expansion into new areas is affecting a larger number of local communities and its use of new or unfamiliar technologies is raising questions about the environmental impacts of its activities.

The CSG industry in New South Wales and Queensland has attracted the most public and political attention. However, activities in the west such as exploration off the Exmouth coast and development near Broome, are also generating concern about the impacts on local communities and environments.

The industry and governments have taken a strategic approach to addressing community concerns including closer and more frequent community consultations, commissioning more detailed environmental research, increased industry transparency and tighter regulation of industry activities. These efforts appear to be easing concerns in some Queensland communities. However, they must become a normal part of doing business for the industry to maintain its social licence to operate.

Increased sovereign risk

Australia has historically been regarded as having relatively low sovereign risk. In a world of increasing political and economic uncertainty, that continues to be the case. However, investor surveys such as those undertaken by the Canadian-based Fraser Institute, indicate that international petroleum investors are reviewing and increasing their assessments of Australia's sovereign risk. Australia's reputation for fiscal stability and regulatory predictability is being eroded by various developments including:

- the introduction of carbon pricing in a way that reduces the competitiveness of Australia's LNG exporters
- increasingly complex and unpredictable approvals processes such as increased state government regulation of the CSG industry
- resistance to industrial relations reform and persistence with counter-productive approaches to industry assistance
- lack of progress on important economic reforms to improve productivity and industry competitiveness
- a poorly executed tax reform process and continuing uncertainty about other changes to the tax system which could significantly affect the oil and gas industry.

Securing future investment

With $193 billion worth of new projects under construction, Australia faces a major short-term challenge of critical importance to the long-term future of the industry. That is to do everything possible to ensure that all of these projects are developed in a timely manner. Failure to do so could have a three-fold effect on the industry and the contribution it makes to the Australian economy over the longer term.

First, cost overruns and delayed start-ups diminish the economics of high capital cost projects that take up to five years to build and start earning income. Returns to investors are reduced, as are tax payments to governments and other economic benefits generated over the project operating lives of 20 years or more.

Second, cost and timing overruns at this first, critical phase of industry expansion, could have a major impact on investor's willingness to commit further large amounts of capital to these projects. As with the North West Shelf Project, substantial ongoing investment in new field developments and infrastructure is needed to ensure that gas processing facilities continue to operate at capacity. Some of the LNG projects under construction are also considering expansion possibilities by adding extra LNG trains, using gas from further field developments or purchased from third parties. The Gorgon, Wheatstone and Pluto projects are planning 'brownfields' expansions and additional CSG–LNG trains are proposed in Queensland.

A third dimension to the longer-term investment pipeline, is the potential for a further $100 billion or more of investment in new greenfields LNG projects. These include:

- the Arrow Energy CSG–LNG project estimated to cost $15 billion and with a capacity of 8 mtpa
- Browse LNG (12 mtpa) in the Kimberley being planned by Woodside and its joint venturers
- the Sunrise LNG project (4 mtpa) in the Timor Sea also being planned by Woodside and its Joint Venture Partners
- a number of smaller LNG developments of remote fields in the Browse and Bonaparte basins (such as the GDF Suez/ Santos plan for floating LNG in the Bonaparte Basin and development of the Crux oil and gas resources by Shell and Nexus Energy).

Delays and cost overruns in the projects under construction could therefore have a far wider and longer-term effect on investment, jobs, tax revenues and returns to the community than just the immediate cost to the project investors.

Capacity building

Never before has a single country attempted the concurrent development of 14 LNG trains and associated plant and gas production infrastructure. In addition, other parts of the resources sector, particularly the coal and iron ore industries, are expanding rapidly through large capital investment programs. With each LNG project requiring around 5000 construction workers and creating many more jobs for suppliers and service providers, the demand on Australia's skilled labour workforce is far exceeding supply.

Consequently, increasing capacity building within the labour force and among contractors and suppliers is a major priority. Having the skilled workforce and local industry supply capability to build and operate these projects is of critical importance to the industry. Governments, the training sector, suppliers and project proponents all have a part to play in helping to build the required capability. A strategic and cooperative approach is needed if the challenges are to be successfully addressed.

Governments and the industry have invested more in training to increase capability over time. However, the period of peak labour demand for each project is relatively short and is approaching rapidly. The temporary use of overseas skilled labour is an efficient and necessary part of the solution.

In a similar fashion, the oil and gas industry and governments have been working for many years to improve the capability and competitiveness of Australian heavy engineering fabricators and suppliers of services and equipment. However, the highly specialised nature of critical parts of LNG trains (such as the heat exchangers, turbines and cryogenic piping) and other constraints on the competitiveness or capability of Australian suppliers, means a significant component of equipment and supplies will need to be imported. This has attracted controversy and calls for greater government regulation. However, a cooperative approach to improving competitiveness (including increased labour productivity) and to increasing the export capability of Australian suppliers would yield much larger, longer-lasting benefits.

Costs and productivity

Reducing costs and improving labour productivity are also critical to securing future investment. The cost of building and operating oil and gas projects has increased rapidly over recent years. Since 2005, average global upstream capital costs have doubled while operating costs have increased by 43 per cent (Figure 1).

Australia has not been immune from this trend and is further disadvantaged by the high costs of bringing exploration equipment from centres such as the Gulf of Mexico. Australia's labour costs (including allowances) for marine construction activities are higher than all of its LNG competitors and development costs have increased rapidly. Apache Energy for example compared the cost of two of its domestic gas field developments in offshore Western Australia, John Brookes and Reindeer. It found that although the infrastructure required to develop these two fields was remarkably similar in size and design, the capital cost to develop Reindeer, which produced first gas in 2011, was 2.5 times the capital cost to develop John Brookes, which produced first gas in 2005 (*Apache 2010*).

The downstream part of the industry has also been affected by rapid and wide-spread increases in Australia's construction and labour costs. International comparisons of LNG construction costs reported in previous *State of the industry* reports, indicate that Australian LNG projects are among the most expensive to develop.

A study undertaken for the Business Council of Australia (BCA) found that by 2013 about 30 per cent of Australia's economic activity will depend on the success of capital investments, making it the most investment-intensive economy in the OECD. However,

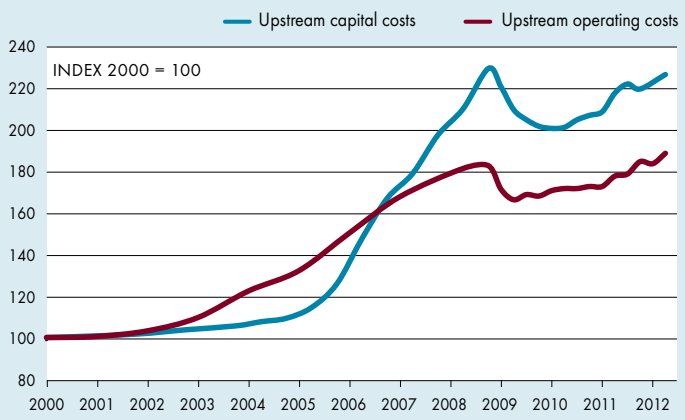
the study found that Australian resources projects are 40 per cent more expensive to develop than projects on the US Gulf Coast. Our oil and gas developments are particularly disadvantaged with Australian offshore platform and pipeline projects costing twice as much to develop as projects on the US Gulf Coast. Higher labour costs and lower labour productivity are significant contributing factors to Australia's higher cost base. Compared to US$68 per hour on the US Gulf Coast, construction wage rates in remote parts of Australia, such as Western Australia's north-west, are typically US$120 per hour (more than US$200 per hour if travel and accommodation costs are included). In Australia's remote areas, 60 per cent more hours are required than on the US Gulf Coast. This, plus higher labour costs, means the cost of construction work on remote Australian projects can be around five times the cost of construction work on the US Gulf Coast. That is, US$1 of construction work in Australia's remote areas would cost around US$0.20 on the US Gulf Coast (*BCA 2012*).

The BCA study identified six strategic priorities including the maintenance of open and competitive markets for labour, materials and equipment; reforming government approvals processes; capacity building and lifting workplace productivity.

Increasing government charges (including cost recovery levies) and taxation changes are also adding to the growth in industry costs. Recent changes to limit the scope of the Living Away From Home Allowance concession for example, add to labour costs and fail to recognise the essential nature of the industry's activities such as those associated with fly-in/fly-out operations.

Numerous other studies highlight the declining growth in Australia's productivity performance over the past decade. A series of biannual research reports by RMIT University show a steady decline in corporate satisfaction with industrial productivity. Over the six months to April 2012, just 52 per cent of employers considered they had high productivity levels compared to 70.8 per cent when the survey started in April 2010. The latest survey also found it is taking longer to finalise greenfields agreements for new resource projects and 19 per cent of projects have been stalled as a result of being unable to finalise an agreement with the unions (*RMIT 2012*).

Figure 1 Upstream cost indices: 2000 to 2012



...the Gorgon and Wheatstone projects have a capital cost of around $3 billion per million tonnes of annual capacity, while the Ichthys project has a cost of around $4 billion per million tonne of annual capacity (excluding liquids). These costs are the highest in the world and are attributed to high labour and other input costs and a high Australian dollar.

By comparison, the PNG LNG project in Papua New Guinea has a capital cost of US$2.3 billion per million tonnes of annual capacity, while the soon to be completed Angola LNG project in southern Africa had a cost of below US$1.7 billion per million tonnes of annual capacity.

BREE 2012c

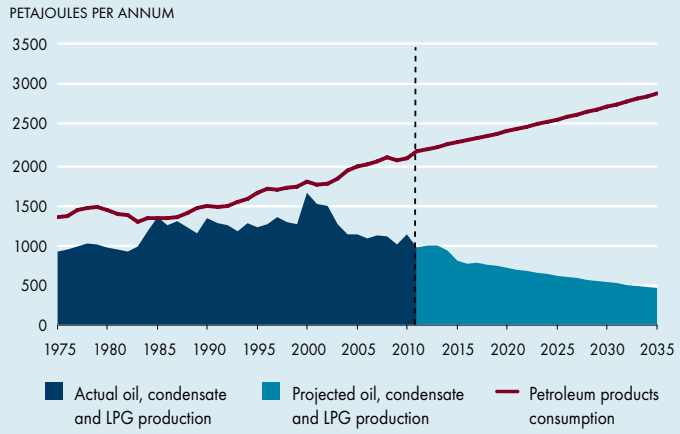
In July 2012, the Minister for Resources and Energy and the Minister for Regional Development warned that improvements in wages and conditions being applied in some projects were unsustainable and risked future investment. Business groups are calling for reform of the *Fair Work Act 2009* to improve labour market flexibility and enable productivity improvement initiatives to be introduced. These concerns were not adequately addressed in the review of the Act released in August or in the reforms announced by the government in October.

Regulation and approvals processes

Many studies, including work by the Productivity Commission and the BCA, highlight the costs of increasing government regulation and of duplicative and inefficient approvals processes. Over the past year the Australian oil and gas industry has seen the introduction of new offshore regulators governing titles, environment and safety management, the release of the Commonwealth Marine Reserves Network Proposal establishing 44 new marine parks covering more than a third of Australia's waters and the introduction of new state and commonwealth regulations and restrictions on the CSG industry.

Petroleum company executives and investors around the world believe the biggest barriers to investment in Australia are restrictions on access to resources and inefficient regulation and approvals processes. According to independent annual surveys by the Fraser Institute, the investment attractiveness of most Australian jurisdictions is declining. Of the 147 jurisdictions included in the 2012 survey, offshore Australia, the Northern Territory and all of the Australian states except for New South Wales fell into the second quintile in terms of their attractiveness for upstream petroleum investment. New South Wales was in the third quintile due to its restrictions on the CSG industry (*Fraser Institute 2012*).

Figure 2 Australia's actual and projected liquid fuels production and consumption: 1975 to 2035



Source: APPEA, BREE 2011, BREE 2012a

Gas market distortions

Investment risk and uncertainty is being increased by calls for more government intervention in domestic gas markets. A domestic gas reservation policy introduced in Western Australia in 2006 has in some quarters, been mistakenly credited with triggering increased investment in gas supply capacity. However, it is the growth in gas demand and increase in gas prices that have triggered the supply response in Western Australia. All the domestic gas policy has done is to reduce the attractiveness of investment in new LNG projects and increased uncertainty among other gas suppliers.

A group of large industrial gas consumers has been lobbying for the introduction of a national gas reservation policy and other policy changes that would effectively result in governments and/or gas producers subsidising their energy costs. To date, this approach has been rejected by the Australian and Queensland Governments. However, calls fo a national gas reservation policy persist and must continue to be rejected.

Little progress has been made towards removing energy subsidies and other distortions in the gas market (including differing levels of fuel taxation and retail price controls) identified by *Platform for Prosperity* in 2007. These are limiting the potential for gas to reduce the growth in Australia's greenhouse gas emissions and generate other significant environmental and economic benefits.

Declining liquids production and inadequate incentives for frontier exploration

Two of the drivers for change in *Platform for Prosperity* recognised the need to attract more frontier exploration and to reverse the decline in production of petroleum liquids (oil, condensate and naturally occurring LPG). While gas projects have attracted most of the attention in recent years, the growing and increasingly costly gap between Australia's liquids production and consumption should not be forgotten.

As indicated in Figure 2 there have been insufficient oil discoveries and developments to halt the downwards trend in Australia's liquids production. The growing production/consumption gap could be significantly reduced or avoided by encouraging more exploration in frontier areas. These have the greatest potential for containing another major new petroleum province. A good start has been made with new geoscientific research by Geoscience Australia and some state geological surveys leading to the award of titles in areas like the Bremer and Canning basins. However, the level of exploration activity in frontier areas is still low and needs to be better incentivised to reflect its high risks and costs.

Policy reforms to improve competitiveness

Oil and gas has a central role to play in the nation's prosperity. The economic benefits being generated by oil and gas industry growth are substantial with the potential for much more to come. The government's Energy White Paper establishes a solid policy framework to guide the long-term development of the industry. It now needs to be implemented as a wide-ranging reform agenda that addresses all of the major impediments to industry competitiveness and investment. This is a task that governments in collaboration with industry must pursue if the wealth generation potential of Australia's oil and gas resources is to be fully realised.

3 Progress on high value-adding priorities

3.1 Continuously improving safety performance and increasing community awareness of the industry's performance and values

OBJECTIVE

To continuously improve the safety performance of the oil and gas industry and ensure that the industry's commitment to excellence in safety performance is understood by all relevant stakeholders.

KEY ACTIONS

3.1.1 Led by the CEO Safety Leadership Forum, promote the attainment of high safety standards by APPEA members, contractors and service providers through benchmarking and sharing of good practice and lessons learnt.

3.1.2 Develop and roll-out collaborative initiatives to drive improvements in safety performance.

3.1.3 Provide the community, governments and key stakeholders with accurate and transparent information about the industry's safety performance.

BACKGROUND

The oil and gas industry has long recognised that a high standard of safety performance is critical to its long-term growth and sustainability. A demonstrated commitment to the health and safety of its workforce has a significant bearing on community perceptions of the industry and its social licence to operate.

Incidents such as the well blow-outs and oil spills from the Montara field in Australia's north-west in 2009 and the Macondo field in the Gulf of Mexico have a significant impact on not only those workers and companies directly involved but also on the local environment, local economies and the oil and gas industry as a whole. Broad community acceptance of the industry (its social licence to operate) is quickly and severely damaged by incidents such as these.

It is not only the big events that matter. Incidents of a lesser scale and impact or a breakdown in safety management processes can do just as much damage at the local level. Support for projects and respect for a company takes years to establish but can be quickly destroyed by just one or two poorly managed safety or environmental incidents.

Recognising the ethical and social imperative for maintaining a safe working environment, the Australian oil and gas industry established a CEO Safety Leadership Forum in 2007. The forum provides strong leadership on safety across all aspects of the oil and gas industry, including the rapidly growing CSG sector. It sponsors a number of new safety initiatives and programs.

PROGRESS TO DATE

APPEA Principles of Conduct

During 2012 APPEA updated its Principles of Conduct for member companies. Members are expected to continuously strive to improve health, safety and environmental performance.

People and the environment are to be protected through the responsible management of operations and their impacts, and by incorporating risk management strategies based on sound science. Members are also expected to engage constructively with government and industry to develop appropriate standards. The principles are proceeding through APPEA Board approval processes before being widely communicated. Commitment to the principles will be an expectation of APPEA membership.

Safety performance

Good progress on improving the industry's personal safety performance is being achieved. As indicated in Figure 3, lost time injuries per million hours worked have declined from 3.4 in 1996 to 0.8 in 2011.

However, Australia's safety performance still falls short of international standards based on reported personal injury statistics.

In 2011, the total recordable injury rate in Australia among APPEA member companies was 4.7 injuries per million hours worked, down from 5.2 injuries per million hours worked in 2010. The global average among members of the International Oil and Gas Producers Association (OGP) was 1.76 in 2011 (Figure 4).

Figure 3 Australian upstream oil and gas industry safety performance: 1996 to 2011

Source: APPEA

High levels of construction activity generated by the 15 projects referred to in section 2.2 and increasing onshore drilling could adversely affect the industry's personal safety performance. To address this increased risk exposure, the industry has introduced safety programs that encompass all drilling and construction contractors and their workforces.

Industry CEO Safety Leadership Forum

The CEO Safety Leadership Forum has led the development and implementation of a number of industry-wide safety initiatives. In particular, the forum has re-focussed the industry's safety programs for process safety and the prevention of major accident events. Process safety refers to the actions needed to prevent a loss of containment through for example, corrosion and other critical process failures that could result in major accidents with potentially multiple injuries or fatalities.

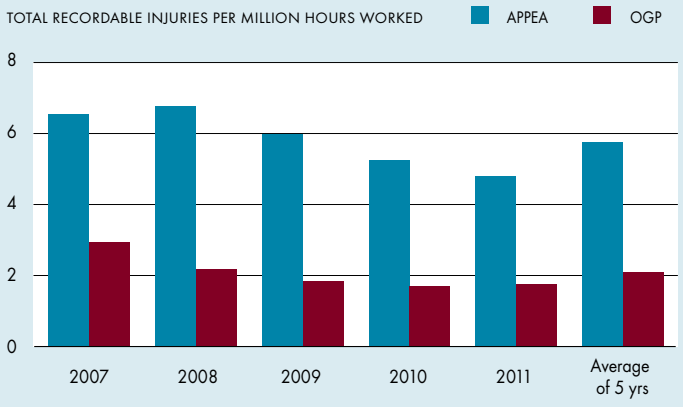
Process safety was the key topic for discussion during this year's Stand Together for Safety event, an annual program that provides a designated time for CEOs, executives, and senior managers to talk about safety issues directly with frontline workers. During May 2012, more than 38,000 workers in 57 companies participated in the event with discussions on the theme of 'Keeping it contained: What's your responsibility?'

New requirements for reporting process safety failures or 'loss of containment' incidents and high potential incidents have been introduced. Reporting consistency has been improved and information and lessons are shared across the industry.

Two major safety competency and safety culture initiatives have been developed and introduced for the offshore industry. The Common Safety Training Program (CSTP) applies to workers on offshore production and drilling facilities and requires a demonstration and assessment of defined safety behaviours in the workplace. All personnel working on offshore production facilities must have a CSTP card by 31 December 2012 and all personnel working on offshore drilling facilities must have a CSTP card by 30 June 2013. A related competency program, the Safe Supervisor Competence Program (SSCP), defines competency standards for offshore oil and gas construction supervisors.

Another key initiative has been the development of a vehicle safety program and good practice guide for use by operators, contractors and sub-contractors in the rapidly expanding onshore oil and gas industry. CSG operators are adopting a new CSG Logistics Safety Code of Practice and the industry leaders have established industry, operator and contractor forums in heavy road transportation and heavy plant to identify competency shortcomings and to develop joint programs.

Figure 4 International comparison of petroleum industry safety: 2007 to 2011



Source: APPEA, OGP

Offshore well integrity—prevention, preparedness and response

Following the Montara and Macondo incidents, the Australian oil and gas industry has been working closely with governments and overseas operators to improve well integrity, personnel competencies and response preparedness and capability in the event of loss of control of an offshore well.

The industry's spill response capability provided by the Australian Marine Oil Spill Centre (AMOSC), has expanded with increased investment in equipment and by doubling the size of its trained oil spill response team. AMOSC provides the surface response to an underwater hydrocarbon release, while a Subsea First Response Toolkit (SFRT) will assist with recovery activities below the sea surface. Funded by Australia's offshore operators, the SFRT will contain specialised equipment to clean the well-head and surrounding area, including the seabed, and make it safe for a well capping device to be installed. It will be ready for immediate mobilisation at the onset of a subsea well control event.

The Australian industry has also worked closely with the international oil and gas industry to ensure it has access to the world's best well incident prevention and response capability. The OGP Global Industry Response Group established a Subsea Well Response Project for example, which includes the development of a complete subsea response incident package of well capping equipment and SFRTs, for use anywhere in the world. Australia's SFRT is compatible with, and integrated into, the global package.

WAY FORWARD

The CEO Safety Leadership Forum is progressing the projects outlined above. The next phase in the process safety project for example, will require an industry framework to be established to manage integrity-related risk exposures in ageing facilities.

APPEA's Well Integrity Committee continues to provide a forum for sharing information and applying the lessons learnt from the Montara and Macondo incidents. It will develop a strong process safety program for well operations, including the development of competency frameworks for critical offshore well operations roles. The committee will also continue to work with the Australian Government to review and improve regulations applying to offshore well operations.

A range of events and programs will facilitate industry-wide communication and process improvement. These include another Stand Together for Safety program, APPEA's annual National Oil and Gas Safety Conference and the HSR and Safety Workforce Forum. The Conference enables industry practitioners to share practical and innovative safety and health solutions that have demonstrated applicability and relevance. The HSR Forum provides a supportive and unique environment for workforce representatives from across the industry to come together to network, develop skills and share workplace experiences, issues and solutions.

The Keil Centre and IChemE are working with the industry to run a professional development program in Australia for the process industries. The course will be held in 2013 and cover human factors in process safety, and health and safety generally.

3.2 Continuously improving environmental performance and increasing community awareness of the industry's performance and values

OBJECTIVE

To continuously improve the environmental performance of the oil and gas industry and ensure that the industry's commitment to excellence in environmental performance is understood by all relevant stakeholders.

KEY ACTIONS

3.2.1 Promote attainment of high standards of environmental performance through benchmarking and sharing of research, good practice and lessons learnt.

3.2.2 Develop and roll-out collaborative initiatives to improve industry's environmental management and reduce impacts on the environment.

3.2.3 Provide the community, governments and key stakeholders with accurate and transparent information about the industry's environmental performance.

BACKGROUND

In Australia, petroleum exploration and production operations are conducted in a wide and diverse range of environments—both marine and terrestrial. The industry aims to achieve sustainable development that helps meet the world's energy needs without compromising the environment for future generations.

The unprecedented transformation and growth of the Australian oil and gas industry in terms of new projects, new technologies and exploration and development activities in new areas, is accompanied by an increased commitment to high environmental standards and minimising environmental impacts.

A range of complex factors need to be managed including diverse stakeholder interests, changing environments, seasonal factors and weather patterns, social perceptions and values, and multiple layers of regulation. It is important to understand and manage risks, to communicate these risks to the community and, where appropriate, involve the community in risk management.

The environmental approvals for the Gorgon project, included requirements to comply with over 20 different environmental management plans. The Gorgon Joint Venture subsequently committed to conservation initiatives and undertakings worth approximately $150 million including $67.5 million on turtle conservation and intervention programs and $60 million for Net Conservation Benefits (unspecified).

Better outcomes are achieved when management and regulatory approaches are based on the best available science. This highlights the importance of research aimed at reducing scientific uncertainty and informing the community. Depending on the nature, size and potential environmental impact of an activity, a range of scientific studies determine the baseline conditions for all environmental values, such as fauna, flora, air quality and water. When developing environmental impact statements and management plans, environmental risks are identified and strategies for minimising those risks are evaluated. In some cases, where the environment is sensitive or the activity is complex, more detailed research may be commissioned from universities and other professionally qualified research organisations.

Failing to provide early and accurate information about the extent and nature of impacts and risks can undermine community confidence and support. This is evident in the CSG industry where different approaches to consultation and the provision of timely information have provided the opportunity for opposition groups to make unsubstantiated claims and create fear-based campaigns.

Recognising environmental performance and communication as a high value-adding priority, the industry strategy proposes three key actions to be implemented by members of the industry:

- to identify risks and implement strategies for reducing environmental impacts
- to work together collaboratively by sharing information and research
- to inform the community and regulators about what they are doing to understand, minimise and manage environmental risks.

PROGRESS TO DATE

The industry's commitment to high standards of environmental performance is reflected in the development of revised Principles of Conduct described in the previous section on safety. APPEA members are expected to conduct their activities in ways that protect the environment and incorporate risk management strategies into their operations. They are also expected to openly and effectively engage with communities, regulators, government, and other affected parties.

Consistent with the these principles, members of the Australian oil and gas industry directly fund significant scientific research programs to better understand and demonstrate a commitment to the Australian environment. Valued at millions of dollars each year, most of this work is undertaken collaboratively with academic researchers. It makes a substantial contribution to Australia's collection of scientific environmental data. One example is the Collaborative Environment Research Initiative (CERI), coordinated by APPEA, which provides a framework for companies to work together on environmental research topics that benefit the industry and community.

In late 2011, APPEA published a selection of environmental research projects undertaken in Australia and sponsored by petroleum companies over recent years (*APPEA 2011*). The *Environmental Research Compendium* summarises 49 research projects. It explains why and how each project was undertaken, and provides outcomes, findings and the industry implications. Studies include fauna (such as whales, sharks, turtles and dugongs), vegetation, currents and tides, marine and terrestrial habitats, water quality, marine noise and dredging. The compendium is a useful reference and has helped to increase understanding within the industry and among regulators and the community, about the industry's commitment to environmental research.

APPEA has also commissioned a much larger, two-year project that brings together a wealth of research on Australia's marine environment. The third edition of *Environmental implications of offshore oil and gas development in Australia* (Blue Book 3) will expand upon earlier compendiums of research published in 1994 and 2003. It will assist researchers, regulators and others with an interest in the marine environment by providing ready access to a wide range of recent marine research and data that covers the entire life cycle of offshore oil and gas activities. Blue Book 3 will also help to reduce duplication of research and identify areas for further work. To ensure transparency and objectivity, all of the research is peer reviewed by an independent scientific panel.

The Australian oil and gas industry also supports international research programs and collaborates with international organisations (such as the OGP and the Society of Petroleum Engineers) to access the world's best research and environmental management strategies. Programs include the Joint Industry Programme on E & P Sound and Marine Life which is studying the effect of seismic sound on marine life.

Woodside, on behalf of the Browse Joint Venture, engaged a private consulting firm, along with Charles Darwin University, to establish baseline marine turtle nesting activity at Sandy Islet, Scott Reef. This information was collected during seven surveys in 2006, 2008, and 2009. The studies describe the species and abundance of marine turtles present at the Islet, with a focus on collecting information about nesting locations, nesting success and hatching success. Results of the seven surveys indicated that the summer months from late November to February are the preferred breeding season of the green turtle, and the estimated nesting population (2008–09) was 779 females. This research also discovered that green turtles nesting at Scott Reef and Browse Island form a discrete management unit from the world's green turtle population and will greatly assist further understanding of the turtle population in this area.

APPEA 2011

Unconventional gas

The CSG industry is using a variety of approaches to increase community understanding of its operations and environmental impacts. In 2011, project representatives participated in 543 community meetings and briefings to provide factual information and respond to concerns on a face-to-face basis. Talkback radio, print and social media are being used and a new website (www.wewantcsg.com.au) includes fact sheets and answers to questions about issues such as water management and hydraulic fracturing.

Further environmental research is helping project operators, regulators and the community understand the effects of CSG development on water tables and other aspects of the environment. This includes research by the CSIRO through the Gas Industry Social and Environmental Research Alliance (GISERA). With initial funding of $14 million, CSIRO will study the impacts of CSG on agriculture, water, biodiversity, marine and communities.

A three-year study by the NSW Government into the effects of CSG production on water tables in the Namoi catchment area concluded the impact will not be significant.

The Queensland Water Commission's study of the impact of CSG projects in the Surat Basin made similar findings. It forecast that just 0.25 per cent of water bores outside the Walloons Coal Measures would be significantly affected by CSG operations. Proponents are required by law to remedy any adverse impacts.

CSG producers are also investigating and implementing options for using the water that is co-produced with gas. These include water treatment facilities and supplying water to agricultural producers. CSG wells are closely monitored to ensure that any minor gas leaks are quickly rectified and reported to regulators. Santos, for example, has established a 24 hour, seven day a week monitoring centre in Brisbane to provide video imaging and analyse data on the performance of wells and treatment plants in the Roma and Injune regions west of Brisbane.

In Western Australia the onshore gas industry has taken steps to lift environmental performance and increase community understanding. A Code of Practice for Hydraulic Fracturing aimed at achieving and maintaining high operational standards across the sector has been developed. Earlier this year, the Western Australian Minister for Mines and Petroleum launched APPEA's WA onshore gas information program (including a DVD, brochure and website: www.wa-onshoregas.info). Joint industry-government community forums took place in WA's mid-west region in June and October. A community workshop in the Canning–Kimberley region is also being planned.

The need for better communications strategies in other jurisdictions has also been recognised. Initial discussions have been held in South Australia and the Northern Territory and a formal mechanism for broad community engagement is being considered. This will inform the community and regulators about how risks are mitigated and managed, and facilitate the distribution of relevant information and the discussion of associated issues.

WAY FORWARD

The industry must increase its efforts to reduce environmental impacts, sponsor scientific research and provide accurate and timely information to external stakeholders. This will include:

- compiling the Blue Book 3 compendium of environmental research related to the offshore oil and gas industry
- supporting research programs such as the Collaborative Environment Research Initiative and the Joint Industry Program on E & P Sound and Marine Life, and projects assessing the environmental effects of CSG development
- promoting industry standards such as the Code of Practice for Hydraulic Fracturing and developing other benchmarks as appropriate
- developing information packages and communication strategies to respond to the concerns of local communities and individuals about the environmental impacts of oil and gas development.

3.3 Developing a productive and skilled workforce

OBJECTIVE

Access to a productive workforce through local skills development, increased national labour mobility, efficient skilled migration programs and a more flexible, market-based workplace relations system.

KEY ACTIONS

3.3.1 Inform the community and governments of the Australian oil and gas industry's labour and skills needs and the job opportunities created as a result of industry growth.

3.3.2 In partnership with governments, develop and implement strategies for increasing the size, capability and productivity of the industry's workforce including initiatives for maximising participation by Australians.

3.3.3 Influence governments to ensure regulatory, legislative and funding initiatives enhance workforce productivity and facilitate the development and retention of skills required by the oil and gas industry, including through efficient access to appropriate levels of skilled migration.

BACKGROUND

One of today's most prominent and controversial public debates is on the **availability**, **cost** and **productivity** of labour needed to support high levels of resources sector construction activity over the next five years.

Numerous surveys and studies point to the emergence of problems in each of these three factors. The Deloitte Access Economics report referred to in section 2.2 stated that access to sufficient skilled labour is a pivotal concern for the oil and gas industry. It states that improving labour mobility and flexibility is the key to improving labour productivity (*DAE 2012*).

Despite substantially increased government and industry investment in training, major skilled labour shortages are expected to develop as construction activity gathers pace in the resources sector. A recent APPEA-commissioned study estimated a peak construction workforce of 95,000 will be required by resources, energy and infrastructure projects under construction or being planned for development across northern Australia.

There is ample evidence that shortages of construction workers and professional staff such as engineers are bidding up wages, thereby adding to construction and project operating costs. A 2012 survey of global oil and gas salaries by recruitment agency Hays Oil & Gas estimated that average salaries for locally-sourced, permanent staff in the Australian oil and gas industry increased by 13 per cent in the previous year to US$164,000. Australian salaries were the second highest in the world after Norway, 32 per cent higher than the US and more than double the global average of US$80,458 per year (*Hays 2012*).

In a BCA study, Macromonitor estimates that labour costs in the Australian construction industry increased by 5.2 per cent a year from 2001 to 2006 and 7.0 per cent a year from 2006 to 2011. They are projected to rise by 5.8 per cent a year from 2011 to 2021, much more rapidly than other construction inputs (*BCA 2012*).

New oil and gas projects to generate up to 55,000 additional jobs

A report produced by Pitcrew Managements Consulting Services for APPEA considered the labour requirements over the next five years of 248 major resources, energy and infrastructure projects under construction or being planned for development across northern Australia (Western Australia, the Northern Territory and Queensland). The total capital expenditure for these 248 projects is estimated to be $527.1 billion of which $318.3 billion has been approved.

Construction labour demand is forecast to increase from 49,000 at the start of 2012 to a peak of 95,000 during 2014. An acute shortage of welders, fitters and electricians is expected with demand exceeding labour availability by more than 50 per cent during 2014 and 2015. Moderate to high shortages are also expected to be experienced in many other occupations including plant operators, carpenters, steel workers and construction and mining labourers.

Engineering demand is forecast to fluctuate between 20,000 and 25,000 until mid-2013 before peaking at 31,000 in late 2013. As more projects start production, the demand for operations labour will also increase. The additional operations workforce required by major resources and energy projects is forecast to increase from 16,000 in mid 2012 to 66,000 by the end of 2017.

The total workforce demand for oil and gas projects in northern Australia under construction or being planned, including construction, engineering and operations growth, is expected to increase from 20,000 in January 2012 to a peak of 55,000 in the second half of 2014. Projects currently under construction will require a peak workforce of around 45,000, more than double the size of their current workforce.

Pitcrew 2012

Australia's declining labour productivity has been widely reported and discussed over recent months. The BCA noted that:

> *... Australia's productivity performance has been sluggish over recent years. Since the mining boom began to intensify from 2003–04, Australia's multifactor productivity levels have in fact declined (rather than increased), as overall labour productivity growth has softened markedly.*

One of the contributing factors to this decline has been the high level of capital expenditure in the resources sector and time lag between investment and increased production. Consequently, labour productivity in the mining sector is estimated to have declined by 5.4 per cent a year between 2003–04 and 2007–08 and 8.6 per cent a year between 2007–08 and 2010–11.

However, productivity levels are expected to recover once new projects under construction commence production.

Of greater concern is the decline in productivity in other parts of the economy, particularly in the construction sector whose performance is crucial to the competitiveness and growth of our industry. Compared to an average rate of growth of 2.7 per cent a year from 1993–94 to 1998–99, labour productivity in construction has averaged just 0.7 per cent a year from 1998–99 to 2003–04, 0.8 per cent a year from 2003–04 to 2007–08 and 1.5 per cent a year from 2007–08 to 2010–11. Unlike the mining sector, construction sector productivity will not automatically recover as projects are completed unless a more pro-active reform agenda is adopted (*BCA 2012*).

PROGRESS TO DATE

Skills Development

A range of initiatives have been developed over recent years in an attempt to meet the long- and short-term needs of the oil and gas industry.

The Australian Government expanded its role and commitment to training through the creation of the Australian Workforce and Productivity Agency. Replacing Skills Australia, the agency aims to deliver practical industry-led workforce strategies to address labour shortages and help improve industry and workplace productivity. The agency will advise government on administering the $700 million National Workforce Development Fund expected to support the training of 250,000 Australian workers over four years.

Oil and gas companies and their suppliers and contractors continue to explore new avenues for meeting skilled labour requirements. Farstad Shipping for example, has established a $20 million offshore industry marine-simulated training centre in Perth, offering accredited courses related to offshore support vessels. Bechtel and MacMahons, among other companies, are trialling the National Apprenticeship Program (NAP). The program provides advanced entry into various trades for skilled and experienced Australian workers. APPEA is promoting the adoption of the NAP for plant process operators, including dual-trade qualifications that would allow construction workers to transition to operational roles.

Many major project developers are providing training, scholarships and employment programs for Indigenous Australians. In the Northern Territory for example, the Ichthys LNG project has contributed to the Larrakia Trade Training Centre which provides unique support to Indigenous students and teaches professional, practical skills such as electrical, automotive mechanics, metal fabrication, plumbing, civil and general construction, refrigeration and mining.

In Queensland, Origin Energy has implemented initiatives to promote Indigenous skill development and employment. These include school-based Indigenous traineeships, pre-vocational training in process plant operations for year 11 and 12 students and funded university placements. In Western Australia, Woodside supports Indigenous initiatives across health, heritage and the arts, and has programs in areas such as mentoring, leadership and education through its Reconciliation Action Plan.

The Australian gas industry is also looking to its workforce needs as projects under construction move into operations. It is estimated that over the next five to 10 years the LNG process operator workforce will need to increase six-fold, from around 500 to 3000. APPEA is working with the state, territory and Australian governments, members of the industry and training providers on strategies for meeting this requirement, including an expanded national role for the Perth-based Australian Centre for Energy and Process Technology (ACEPT).

ACEPT trains more than 800 students a year and is piloting an e-learning, real-time, remote-access process plant operator training system with Apache Energy and Honeywell. It is one of the few training facilities with the plant, equipment and expertise needed to meet industry standards. ACEPT takes a national and collaborative approach to service delivery. It recently finalised a Memorandum of Understanding with Charles Darwin University to expand its service to the Northern Territory. It is developing partnerships with education providers in Queensland to provide a more sustainable, national training capability for the oil and gas industry.

Late in 2011 a GLNG and Skills Tech Training Centre opened in Brisbane to help bridge the skills gap for tradespeople from other industries to gain fast-tracked employment on the Gladstone LNG project. Shell is re-training former Clyde oil refinery workers for the Prelude Floating LNG project. A further CSG–LNG operator training capacity, modelled on ACEPT in Perth but adapted to CSG, is being developed as a partnership between Central Queensland TAFE and the University of Central Queensland.

APPEA is a member of a collaborative, resources sector project to increase the participation of women in the industry. Managed by the Australian Mines and Metals Association and established with Australian Government funding, the Australian Women in Resources Alliance highlights the important role female workers will play in helping to increase the size and diversity of the sector's workforce. Women are under-represented in the resources sector, at around 15 per cent of the sector's workforce compared with 46 per cent nationally.

Skilled migration

Despite these and many other training initiatives by industry and governments, skilled labour still needs to be imported to meet the short- and longer-term requirements of Australia's relatively young industry.

The industry welcomed the signing of the first Enterprise Migration Agreement (EMA) between the Australian Government and the Roy Hill Mining operation in May 2012. This agreement acknowledged the need for large resource projects to engage overseas workers when there are critical skills shortages. EMAs are available to projects with capital expenditure over $2 billion and employing more than 1500 workers. A comprehensive training plan must also demonstrate how the project will equip Australians to meet future skills needs in the resources sector.

Despite this compulsory plan and the government's commitment to the program, unions and some members of the government opposed the EMA initiative. However, most acknowledged that without an ability to top up their construction workforce with overseas labour, some projects may not go ahead or become economically unviable due to higher wage costs and delayed construction schedules.

Productivity

Technological developments and increased training of the workforce will, over time, help improve Australia's labour productivity performance. Education reforms to promote the sciences and trades, and welfare and taxation reforms to reduce work disincentives, would also help to boost labour productivity over the longer term. However, elements of the industrial relations framework are creating an adversarial culture between business and the workforce, and are preventing management from introducing measures for lifting productivity.

In particular, provisions of the *Fair Work Act* 2009 require project proponents to negotiate greenfields agreements exclusively with employee organisations. This allows unions to insist on the inclusion of restrictive provisions such as the use of contractors and allowing unions right of entry (regardless of whether there are any members on that site). Not only do the provisions contradict the productivity objective referred to in the Object of the Act, they are contributing to project delays and cost increases that cannot be economically sustained. The *Fair Work Act Review* report released in August 2012 failed to adequately address industry's priorities in these areas.

Addressing these issues could deliver productivity improvements relatively quickly and help to secure the next phases of investment referred to earlier in this report.

My fear has always been ... once you insert a union into the process, you take away the ability or the willingness or enthusiasm of people to be innovative. People stand back and say, 'That's no longer my problem, I'll leave it for them to do'.

Michael Chaney, Chairman Woodside and National Australia Bank, *The Australian*, 17 July 2012.

Labour market flexibility is perhaps the most important determinant of productivity and if we lose our focus on productivity objectives, the Australian economy will suffer, investment capital will go elsewhere and we will see a return to the dark days of the 70s, and our competitive and comparative advantage will be squandered.

Argus 2012

WAY FORWARD

The industry, government and training providers must continue to invest in training and skills development programs to meet the industry's short-term construction needs as well as longer-term operational requirements. While there are many good examples of company initiatives in areas such as the training and recruitment of Indigenous Australians, more needs to be done to grow the pool of labour. An additional level of industry-wide collaboration is needed over and above company solutions.

Community awareness of the career opportunities provided by the oil and gas industry needs to be increased. Companies use a range of promotional tools and media, but more students must be encouraged into science, technology, engineering and mathematics (STEM) subjects at secondary and tertiary levels. Fostering interest among primary school students is also essential. Government and industry need to make greater efforts to engage future generations in STEM subjects. This would give young people the capacity to take up careers in the oil and gas sector and capitalise on the economic, social and intellectual benefits that it offers.

Incentives for workers in remote locations and impediments to workforce mobility need to be addressed. These include interstate differences in education systems and trade qualifications and licensing; disincentives in the welfare system; relocation costs such as stamp duty on housing; and limitations on the Living Away From Home Allowance.

3.4 More consistent and more efficient approvals and regulatory regime for petroleum exploration, development and operations

OBJECTIVE

To eliminate duplication and improve the efficiency and transparency of the approvals and regulatory framework governing oil and gas industry activities.

KEY ACTIONS

3.4.1 In consultation with industry, the Australian, state and territory governments implement recommendations from national and state-based reviews of legislation, regulation and approvals processes and progress other reforms aimed at eliminating duplication and increasing the efficiency, effectiveness and consistency of regulatory and approvals processes.

3.4.2 Ensure that access is maintained to all exploration opportunities in accordance with principles of balanced multiple and sequential marine and land use by measures that include:

- consistent, efficient and effective regulation and administration that is able to accommodate new information and understanding of resource potential, conservation values, environmental impacts and new technologies and management practices
- development of marine protected areas which maximise the sustainable use and protection of the marine environment, minimise the cost impacts on the industry and provide for continued exploration and production in prospective petroleum provinces.

BACKGROUND

As noted in section 2.3, inefficient and costly approvals processes and regulation are a major challenge to the growth of the Australian oil and gas industry and achieving the strategy objectives of wealth maximisation and long-term sustainability. Regulatory reform could improve regulatory efficiency, reduce project risk and yield significant cost savings for governments and industry without compromising standards of safety, environmental protection and resource management.

Conversely, increasing regulatory duplication, inefficiency and uncertainty are a major deterrent to investment. The Global Petroleum Survey captures the views of 623 petroleum industry managers in 529 companies which account for more than half of global upstream expenditure. It shows that Australia's regulatory performance is declining in absolute terms and in comparison to other jurisdictions around the world (*Fraser Institute 2012*). With more countries discovering more conventional and unconventional oil and gas resources than ever before, this trend needs to be reversed for Australia to continue to attract the investment needed to maintain and expand its petroleum industry.

A good start to regulatory reform has been made in some parts of the industry, particularly the regulation of activities in offshore waters and in some onshore jurisdictions such as Western Australia and South Australia. However, implementation of the new offshore environmental approvals regime has been difficult and resulted in extensive work program delays. Regulatory complexity, duplication and uncertainty in other parts of the industry—particularly in relation to the CSG industry in Queensland and New South Wales—have also increased markedly. There and elsewhere around the country, the industry and governments need to work together to identify and implement reforms that will enable the industry to grow while still addressing safety and environmental concerns and meeting the performance standards required by governments and the community.

Environmental approvals are usually subject to a range of conditions often requiring the development and approval of more specific management plans, the monitoring of performance and impacts, remedial action and investment in further environmental research or environment protection programs. For major projects these programs add tens of millions of dollars to already high project costs and significantly increase regulatory uncertainty.

For example, it took more than three years and a 13,500 page Environmental Impact Statement for commonwealth and state approval to be granted for the Santos GLNG Project. These approvals included 1200 strict conditions over the project's operations and requirements for further, extensive scientific work to be undertaken as the project proceeded.

PROGRESS TO DATE

Offshore regulation

Regulation of the offshore operations of Australia's oil and gas industry has undergone a major reform process over recent years. These reforms arose from recommendations by the Productivity Commission in its 2009 *Review of the Regulatory Burden on the Upstream Petroleum (Oil and Gas) Sector* and by the 2010 report of the Montara Commission of Inquiry. Two new national regulatory agencies were established on 1 January 2012. The National Offshore Petroleum Safety and Environmental Authority (NOPSEMA) regulates occupational health and safety, integrity of facilities and wells, environmental management and day-to-day operations of petroleum activities in commonwealth waters. The National Offshore Petroleum Titles Administrator (NOPTA) administers petroleum titles and data.

By assuming the responsibilities for offshore petroleum regulation previously held by state and territory designated authorities, the national agencies improved consistency and reduced duplication in offshore petroleum regulation.

The industry continues to support the objective of achieving sound regulatory oversight of industry environmental practices and the establishment of NOPSEMA as an effective offshore regulator. However, the management of the transition to NOPSEMA becoming the regulator of environmental management of the offshore industry has posed serious challenges for the industry. The substantive issue has been NOPSEMA's different expectations and approach to the implementation of offshore environmental regulations. Some companies have incurred substantial costs and delays with implications for pre-existing permits and work program commitments.

The government has also proceeded with other recommendations on regulatory reform from the Productivity Commission review and Montara inquiry. These include changes to environmental assessment processes under the *Environment Protection and Biodiversity and Conservation Act 1999* (EPBC Act).

Reform of the EPBC Act

The Australian Government is implementing changes to the EPBC Act as recommended in a review of the Act by Dr Allan Hawke AC in 2008–09. The reforms streamline regulation and build better cooperation between government, industry and communities while maintaining environmental safeguards. They includes mechanisms to streamline assessment processes, improve the use of regional and strategic approaches and bilateral agreements, revise publishing and transparency requirements, and develop better processes for listing endangered species, habitats and ecosystems. The recommendations were taken up by the Council of Australian Governments (COAG) in April 2012 when it agreed to ambitious reforms and a timetable for reducing duplication and double handling of environmental assessment and approval processes.

Some of the review's recommendations are of particular significance to the oil and gas industry. These include commonwealth accreditation of state and territory environmental assessment processes, the development of environmental risk and outcome-based standards, process improvements and removing unnecessary duplication. The industry is contributing to this work by providing examples of costly and inefficient processes and by identifying reform priorities.

Another industry priority is the development of a national approach to the application of environmental offsets to environmental approvals. Their use has increased over recent years and there is a lack of consistency among government policies on when they are required and how they are determined.

National harmonisation of OHS legislation

The state and territory governments are at different stages of changing their legislation and regulations to mirror the model *Work Health and Safety Act 2011* and associated regulations. The new harmonised approach must actually reduce administrative complexity and overlap without imposing additional costs and obligations that compromise the higher standards of safety management and regulation already applicable to the oil and gas industry. Whether this will be achieved remains to be seen as not all reforms are being adopted by all jurisdictions and their approaches vary.

Marine Protected Areas

In June 2012, the Australian Government released its final Commonwealth Marine Reserves Network Proposal. The proposal establishes 44 new marine parks covering more than one third of Australia's waters. The proposal was prepared in consultation with stakeholders including the oil and gas industry. During this process the industry supported flexible management and zoning arrangements that are regularly reviewed and can accommodate new information and understanding of resource potential, environmental impacts, new technologies and management practices. While specific areas may need to be set aside for single-purpose use, including conservation, this should not irrevocably rule out exploration and production activities given ongoing growth in energy demand and the likelihood of further advances in technology.

Under the government's proposal, petroleum exploration and development will not be permitted in Marine National Park Areas and Habitat Protection Zones, covering over 1.9 million square kilometres of commonwealth waters. In addition, a number of oil and gas titles are included in the 850,000 square kilometres of less restrictive Multiple Use Zones.

The industry is continuing to consult with government over the finalisation and implementation of the reserve proposals. It wants to ensure, for example, that management plans for multiple use zones do not impose an additional regulatory burden, increase compliance costs or apply unnecessary precautionary protection principles.

Approvals reform in Western Australia

Since the government's agency reforms of two to three years ago, the Western Australian Department of Mines and Petroleum has introduced incremental process changes to reduce timelines and improve transparency. These include quarterly reporting of approvals performance and online applications for petroleum approvals including Petroleum Environmental Proposals.

To identify and address potential shortcomings in the regulatory framework and build public confidence, the government commissioned Dr Tina Hunter of Bond University to undertake an independent assessment of the regulatory framework governing the onshore gas industry in Western Australia. Released in November 2011, the report found the department's existing processes are adequate to ensure the management of risk for matters related to the environment, workforce safety and resource management. The report also outlined ways to improve legal enforceability, transparency (by releasing approved Environment Management Plans), regulatory processes and compliance measures.

In response to the Hunter report, the Western Australian Government is introducing new regulations for unconventional gas operations. The main changes are requirements for quarterly reporting of discharges and emissions and the public disclosure of chemicals and other additives (the most detailed of any Australian jurisdiction). The government is consulting with the industry about implementation issues.

Similar initiatives to align shale and tight gas regulatory approaches have commenced in other jurisdictions, particularly in the Northern Territory and South Australia. South Australia is also developing a Roadmap for Unconventional Gas that includes a review of industry regulation and policy issues.

CSG regulation

The approvals and regulatory regime applying to the CSG industry in Australia's eastern states has continued to evolve as industry activity increases. In Queensland, regulatory oversight and community engagement was strengthened in April 2012 with the new Queensland GasFields Commission. Chaired by Mr John Cotter, the Commission has six other members from stakeholder groups including local government, agriculture, research organisations and the CSG industry.

In May 2012, a New South Wales parliamentary inquiry made 35 recommendations including measures to strengthen landholder's rights and extend the moratorium on hydraulic fracturing. In June the government announced three measures governing CSG activity:

- the appointment of a new Land and Water Commissioner to oversee the regulation of exploration on Strategic Regional Land and development of standardised land access agreements
- establishment of Regional Community Funds to invest in local infrastructure and services, funded by CSG operators and the government
- abolition of the five-year royalty holiday for new CSG projects.

In September, the government released the NSW Strategic Regional Land Use Plan, a regulatory regime aimed at ensuring a safe and secure gas industry for the state. While the plan does enable exploration activity and investment to start again, the regulations contain 27 elements that will increase costs and extend approvals timelines by up to three months.

Explorers in Victoria have also been severely affected by an August 2012 decision by the Victorian Government to place a hold on hydraulic fracturing approvals and on issuing new CSG exploration licences.

While the primary responsibility for regulating the onshore gas industry rests with the states and territories, the Australian Government is fostering a science-based, national approach to regulation. It provided $150 million for an Independent Expert Scientific Committee to oversee research and provide advice on the impacts of CSG and large coal mining projects on Australia's water resources. Victoria, Queensland, New South Wales and South Australia signed a National Partnership Agreement ensuring the advice of the committee is taken into account when making regulatory decisions. The Australian Government is also working with the states and territories, through the Standing Committee on Energy and Resources, to develop a more harmonised approach to CSG regulation.

Local content

As noted in section 2.3, capacity building, including the development of a larger and stronger oil and gas services sector, is important for the growth and competitiveness of the oil and gas industry. As the many projects under construction commence operation, the industry's annual spending on maintenance and new field developments will increase dramatically. This work typically has high levels of Australian content (80 per cent or more) and, in many situations, is most efficiently handled by local suppliers. As the industry grows, the capability and international competitiveness of service and equipment suppliers must grow with it. The industry and governments must work together to help the oil and gas services sector expand its local and export capabilities and address impediments to its competitiveness. These include many of the challenges facing the oil and gas industry itself, such as skilled labour shortages, rapidly increasing costs, low productivity and labour market restrictions.

The industry is working with the Resources Sector Supplier Advisory Forum established in 2011 and led by former Queensland Premier Mr Peter Beattie AC. The forum brings together representatives from resource companies, industry associations, unions, suppliers, universities and CSIRO to strengthen Australian industry participation in the resources sector. Improving the competitiveness of Australian suppliers will yield larger, longer-term benefits to the nation than imposing more regulation or prescribing local content levels. Such interventions are a form of business subsidy that would only reduce supplier competitiveness, increase costs and limit oil and gas investment. Changes to the Australian Industry Participation Plan and Enhanced Project By-Law Scheme processes introduced from 1 July 2012 increase transparency and scrutiny of the local procurement practices of major projects. Occasional calls for a more protectionist policy approach should be firmly rejected.

In August 2012, the Prime Minister's Manufacturing Taskforce released the Smarter Manufacturing for a Smarter Australia report. It recognised the need to increase the competitiveness of local suppliers and suggested that further work is needed to identify the areas in which local manufacturers and the petroleum industry can achieve shared goals.

WAY FORWARD

The industry will continue to work with the Australian, state and territory governments to improve the efficiency, predictability and transparency of approvals and regulatory processes including:

- implementing EPBC Act reforms including accreditation of state and territory government and NOPSEMA environmental assessment processes
- developing a national approach to environmental offsets
- ensuring that the Commonwealth Marine Reserves Network Proposal does not add an additional layer of regulation, restrictions or costs on oil and gas operators
- developing a best-practice, science-based approach to CSG regulation in all jurisdictions supported by independent research into its environmental impacts and increased community understanding and acceptance of the industry
- implementing further improvements to the full suite of state and territory processes affecting other parts of the onshore gas industry, including shale gas and tight gas
- ensuring local content policies and practices are directed at improving the capacity and competitiveness of Australian suppliers.

3.5 An improved framework for exploration

OBJECTIVE

To obtain a comprehensive understanding of Australia's petroleum resources particularly in onshore and offshore frontier areas with little or no exploration to date.

KEY ACTIONS

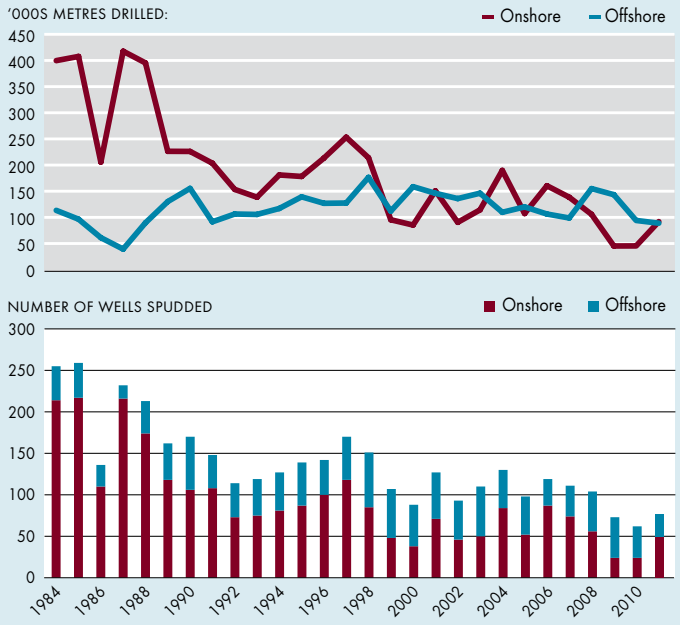
3.5.1 Develop and implement a package of measures for increasing onshore and offshore frontier exploration including improved fiscal terms and other incentives.

3.5.2 Improve the coordination of publicly funded geoscientific data management systems, increase public investment in onshore pre-competitive geoscience initiatives and, where appropriate, maintain offshore programs so as to stimulate greater interest in onshore and offshore frontier areas.

BACKGROUND

A diversified and active exploration industry is essential if Australia is to maximise the value of its petroleum resources and maintain a sustainable oil and gas industry. Diversity is crucial. Smaller exploration companies often make the initial discoveries that lead to bigger finds and large developments while larger players have the financial and technical capacity to support the most expensive, highest risk exploration in places such as the Great Australian Bight. It was a small Victorian company called Woodside that discovered the gas fields in the offshore Carnarvon and Browse Basins that now underpin the North West Shelf Project and the proposed Browse project. Other small exploration companies have become the mid-sized oil and gas producers now leading the development of Australia's unconventional gas resources. Their success has attracted investment by the larger independent oil and gas companies with the capacity to greatly expand exploration programs and develop high-cost infrastructure.

Figure 5 Exploration for conventional oil and gas, wells spudded and metres drilled: 1984 to 2011



Source: APPEA

Next year will mark the 60th anniversary of Australia's first oil discovery at Rough Range near Exmouth. The industry has grown rapidly since that time with petroleum exploration expenditure totalling $3.2 billion in 2011–12 (*ABS 2012*). However, as shown in Figure 5, much of the increase in expenditure is due to rising costs as petroleum exploration activity has declined since the 1980s. In 2011, the number of exploration wells commenced and metres drilled in offshore areas were the lowest for at least 20 years. Onshore activity increased only slightly from the record lows in 2010. Such low levels of exploration will not make meaningful inroads into the vast parts of Australia that remain unexplored.

Most exploration for conventional oil and gas is occurring in proven basins such as the Carnarvon, Gippsland, Cooper and Browse. However, the area covered by petroleum titles makes up only 30 per cent of Australia's prospective basins (8 per cent offshore and 41 per cent onshore). The remaining 70 per cent is yet to be explored. These frontier basins have the greatest potential for another major petroleum province capable of arresting the decline in Australia's liquids production or contributing to further growth in the gas industry.

Geoscience Australia (GA) and the state-based geological surveys make a valuable contribution by undertaking geological assessments of under-explored areas. These include the Millungera Basin, a covered basin in Queensland discovered by precompetitive onshore seismic data in 2007, the Western Australian part of the Amadeus Basin and the offshore Perth, Bremer and Bight basins. Consequently, in recent years governments have made more titles available in frontier areas. The industry has taken up most (but not all). Companies acquiring such permits typically commit to work programs involving further geological studies, seismic acquisitions and the potential drilling of a small number of wells. This is a good start, but much more could be done to better incentivise high-risk, high-cost exploration activity in those permits and in Australia's many other unexplored frontier areas.

Australia is a high-cost destination for exploration due, in part, to its distance from the world's major petroleum centres. As a result, the cost of mobilising drilling rigs and equipment is high. While Australia's prospectivity for gas is considered to be good,

exploration and development in frontier areas is disadvantaged by a lack of infrastructure and ready access to large markets. With few major oil discoveries over the past decade, Australia is considered to have low oil prospectivity. Therefore, an exploration program in one of Australia's frontier areas carries higher-than-average risks with longer lead times to production and lower-than-average returns, when compared to many other regions of the world. Other countries have successfully introduced carefully crafted fiscal and regulatory incentives to attract greater investment in frontier exploration. This type of capital is highly mobile so Australia needs to offer terms that are internationally competitive and help offset the higher cost and risk structure.

Platform for Prosperity and subsequent updates to the industry strategy proposed a number of measures for improving Australia's relative attractiveness for frontier exploration. These include fiscal measures such as a flow-through share scheme to increase the returns to investors in small exploration companies (and so increase the availability of equity capital) or an increased company tax deduction similar to the R&D tax concession. Mechanisms such as a Reconnaissance Licence have been discussed as a way of reducing costs and providing more attractive terms for offshore frontier exploration.

The industry strategy has also consistently emphasised the importance of continuing public investment in pre-competitive geoscience. The work undertaken by GA and the state geological surveys is one of Australia's most important competitive assets.

PROGRESS TO DATE

Frontier exploration

The industry's proposals for increasing the attractiveness of frontier exploration have been extensively discussed with governments directly, and through several policy review processes. However, none have been agreed and implemented. Meanwhile a limited fiscal incentive that was available through the PRRT system ended in 2009 and has not been replaced. A 2007 pre-election commitment to introduce a flow-through share scheme was subsumed into the broader tax reform process and subsequently over-turned, although the government promised to again consider the matter in 2015. Overall, little progress has been made over recent years.

Meanwhile the competition for global exploration investment is increasing with countries in Africa for example, actively seeking investment and offering good prospectivity and terms that encourage companies to quickly move discoveries into development.

Some proposed changes to Australia's offshore acreage allocation system under consideration by the Australian Government could further reduce Australia's competitiveness for high-risk, high-cost frontier exploration. Australia's current work program bidding system has worked well in attracting a diverse range of companies to Australia, including smaller companies prepared to explore in remote parts of basins and to progress and promote exploration with new technologies and techniques. It also provides another significant benefit to Australia. The knowledge and information gained through exploration is provided to GA and state geological surveys for use in further research and to assist government in acreage management and policy development. The gas-prone nature of Australia's offshore areas and long lead times to development for gas projects are also important factors. If the acreage allocation system is to be modified, it needs to be done in a way that maintains the industry's depth and diversity and enhances Australia's attractiveness for frontier exploration.

These considerations should guide policy development in other areas, including proposals to change the company tax regime that would remove a company's ability to immediately deduct its exploration costs. Removing the immediate deductibility of exploration costs would increase the after-tax cost of these activities and result in less exploration. Exploration programs with marginal economics will be less likely to proceed. The impact would fall most heavily on high-risk exploration (particularly in frontier areas). This is not consistent with objectives of increasing frontier exploration and maximising the returns from Australia's oil and gas resources.

The challenge for Australia's resources (including petroleum) exploration has been acknowledged by the Standing Committee on Energy and Resources, comprising the Minister for Resources and Energy and his state, territory and New Zealand counterparts. At its December 2011 meeting, Ministers agreed that:

> *...addressing Australia's declining share of international resource exploration expenditure remains a key priority on SCER's forward work plan. (SCER 2011)*

At the following meeting the standing committee agreed to:

> *...develop a National Exploration Strategy to address Australia's greenfields exploration challenge including a national Geoscience Research Initiative; a renewed commitment to pre-competitive geoscience in all jurisdictions; promoting Australia as a centre of excellence on exploration; geological survey, resources services and research. (SCER 2012)*

In September 2012, the government announced a Productivity Commission Inquiry into Non-financial Barriers to Exploration to assess the effectiveness and efficiency of exploration approvals systems and processes.

Pre-competitive geoscience

Several reviews and studies over recent years confirmed that geoscience data collection is a public good that warrants government investment and delivers substantial public benefits. Most recently, a *Strategic Review of Geoscience Australia* released by the Department of Finance and Regulation in May 2011 noted the 'strong, public good attributes' of GA's information products. Economic modelling illustrated the benefits to the economy from GA expenditure.

The services provided by GA and the state and territory geological surveys should continue to be publicly funded. The data products they provide help governments make informed policy decisions and are used by other government and non-government organisations in the management or use of land and marine environments.

Most of the state and territory geological surveys have maintained or expanded their research programs over recent years. In 2010, South Australia extended its Plan for Accelerating Exploration (PACE) program for another four years, including a focus on exploration for unconventional gas resources. Western Australia's Exploration Incentive Scheme supports investment in airborne surveys, drilling and geoscience data collection.

The industry has also sought to work with GA and the state and territory geological surveys to ensure that data can be provided in a consistent and efficient manner. Common data management standards and systems would greatly improve access and reduce costs. Progress with this program has been slow to date and needs to be accelerated.

WAY FORWARD

Priorities for the year ahead must continue to centre on increasing Australia's competitiveness for frontier exploration. The Review of Australia's Offshore Petroleum Exploration Policy needs to deliver genuine improvements to acreage management processes to make offshore exploration more attractive (particularly in frontier areas). It must secure long-term government funding for GA that recognises the 'public good' nature of its research.

The need for improved fiscal terms for frontier exploration requires further consideration. In the face of a high-cost structure, Australia must focus on remaining internationally competitive for high-cost, high-risk exploration. Given the vastness of Australia's under-explored basins and their significant resource potential, the short-term budgetary costs are outweighed by the benefits from increased petroleum development. Proposals to reduce deductions for exploration costs must be firmly rejected.

3.6 An improved fiscal framework for oil and gas projects

OBJECTIVE

To improve the international competitiveness of Australia's fiscal regime for oil and gas projects.

KEY ACTIONS

3.6.1 Identify and implement changes to the corporate and resource taxation regimes applying to oil and gas exploration and production that improve administration and efficiency and Australia's overall competiveness for oil and gas investment, including:

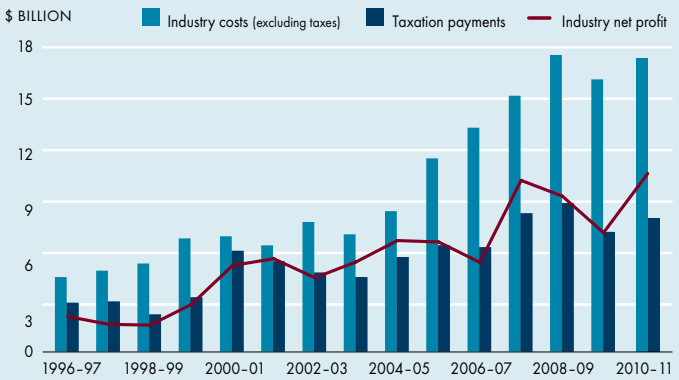
- enhancements and improvements to the Petroleum Resource Rent Tax (PRRT)
- adjustments to elements of the company tax regime to reduce their distorting impact on the economics of long-term capital intensive projects
- removal of all taxes on business inputs.

BACKGROUND

International investors regard the share of production or profits taken by governments as one of the most important factors influencing project economics and decisions about where to invest. As well as providing competitive fiscal terms for exploration, Australia needs to ensure the tax terms for petroleum developments are competitive, administratively efficient and stable. In Australia, oil and gas producers are subject to company tax, the full range of other state and Australian Government taxes applying to business generally, an increasing number and level of government fees and charges, and resource taxes. In some cases, multiple resource taxes apply. Over the past decade tax payments to governments have averaged almost one half (48 per cent) of the oil and gas industry's pre-tax profits (Figure 6).

Three broad areas are of particular significance to the oil and gas industry because of their potential impact on project economics. These relate to the operation of the PRRT, the treatment of long-life, capital-intensive projects within the company tax system and the levying of taxes on inputs to production.

Figure 6 Upstream oil and gas industry financial performance: 1996–97 to 2010–11



Source: APPEA

The PRRT regime that has applied to most offshore areas since the mid-1980s has elements of uncertainty and can impose significant compliance costs. Unresolved issues around the scope of deductible expenditure, the definition of exploration and the nature of excluded expenditure need to be addressed. Recent court decisions have also raised a number of concerns about the ability of the existing legislative framework to cater for the way the industry undertakes its day to day operations. Furthermore, the tax's complexity and cost (to the industry and to government) has increased significantly as a result of the government's decision to extend the regime to all onshore areas.

The onshore industry is very different to the offshore industry. It has a much larger number of licence areas and many more smaller projects and companies. For many of these companies, the implementation and compliance costs of PRRT are large compared to the amount of tax they pay. In addition, the PRRT is applied on top of the existing production-based system of excise and royalties.

> *... the extension of the PRRT (to onshore areas) is likely to impose considerable upfront and on-going costs on both the companies that will be subject to the PRRT and on the Australian Taxation Office which will be responsible for administering the legislation.*
>
> Parliamentary Library 2011

Due to its high capital intensity, investments in the oil and gas industry are influenced by the company tax depreciation regime. In Australia, the average period over which much of the capital invested in gas projects may be deducted is between 15 and 20 years. This is much longer than the three- to 10-year write-off periods available to overseas gas projects that compete with Australian projects for investment capital and gas customers. Improved depreciation terms for all capital-intensive projects would also increase Australia's competitiveness for many manufacturing industries, including gas-based processing such as chemicals and minerals processing.

Levying taxes on business inputs to production also reduces the efficiency of Australia's tax system and industry competitiveness. Introducing the GST and removing the wholesale sales tax were valuable reforms. However, there is still some way to go to remove all taxes on business inputs. In particular, changes to the system for providing tax credits for the off-road business use of fuel, such as those applying from 1 July 2012 as a result of the clean energy legislation, increase costs and reduce efficiency.

Import duties and tariffs on equipment used by the industry are also a tax on investment. These costs are, generally incurred at the front-end of projects and so have a disproportionate impact on project economics. The Tariff Concession Scheme and within it, the Enhanced Project By-Law Scheme (EPBS), are important mechanisms for obtaining duty relief for equipment imported for oil and gas projects. Broad access to these schemes needs to be maintained.

PROGRESS TO DATE

Petroleum Resource Rent Tax

The relatively recent extension of the PRRT to the North West Shelf Project and to onshore areas, including many smaller companies with limited resources, is likely to raise further technical and administrative issues with the tax. These and the outstanding interpretative and operational uncertainties related to the operation of the PRRT must be resolved as quickly as possible.

Company tax

The Australian Government established the Business Tax Working Group (BTWG) in October 2011 to canvass possible reforms to the business tax system. Priority was to be given to identifying possible changes to business taxation that could fully offset the cost of a reduction in the company tax rate. The working group's final report released in early November concluded that while there are benefits from a lower company tax rate it could not recommend a revenue-neutral package of reforms. It noted that preliminary modelling results reinforced some questions raised in consultations and submissions about whether, in theory, some combinations of base broadening and rate cutting could deliver a net economic benefit overall. Changes to depreciation arrangements for example, could have a significant impact on the after-tax return on investment, particularly where there is a long lead time before income is produced (for instance, gas pipelines).

The primary objective of tax reform should be to improve Australia's competiveness for investment. This will generate additional business activity which, over time, will generate increased tax revenue and improvements to productivity and incomes for all Australians. Tax reform should not merely aim to transfer benefits from one part of the business sector to another. The competitiveness of individual sectors such as oil and gas should not be sacrificed to pay for broad reforms such as a reduction in the company tax rate, particularly when the petroleum industry has already been subjected to a range of new taxes such as the carbon tax and extension of PRRT. It is essential that the existing depreciation provisions and the deductibility of exploration related costs are maintained in their current form.

Taxes on business inputs

The fuel tax credit for off-road business activities is inappropriately portrayed by some groups as an industry subsidy that should be abolished. The credit was reduced by 6.2 cents a litre from 1 July 2012. Although presented as a carbon reduction measure, the selective application of a net increase in fuel taxation for selected activities effectively makes it an increased tax on targeted business sectors. Any further reductions in the tax credit (or increases in net fuel tax rates) would add to the inefficiencies already created.

Also in effect since 1 July 2012 are changes to the policy framework governing the publication of Australian Industry Participation plans and access to import duty relief under the EPBS. The changes aim to increase transparency of local content levels for major projects. The continued availability of import duty relief for projects meeting the EPBS requirements has been welcomed by the industry. It is a critical recognition of the need to contain cost pressures and to maintain competitiveness.

WAY FORWARD

Business tax reform must be directed towards improving Australia's productivity and competitiveness for investment, thereby increasing economic activity and tax revenues. As one of Australia's largest and fastest growing industries, the oil and gas industry has the potential to make a much bigger long-term contribution to wealth creation. The Deloitte Access Economics modelling referred to in section 2.2, estimated that from 2012 to 2025 the industry will pay $93.6 billion (in net present value terms) in corporate and production taxes, based on currently committed capital investment. Further large investment in new projects and expansions is possible, and would provide much more revenue to governments. However, the provision of efficient and competitive taxation terms is a key enabler for these projects so the tax reform process must at least maintain, and preferably improve, the company tax depreciation arrangements for capital-intensive industries such as oil and gas.

Removing all taxes on business inputs to production should continue to be a priority within the tax reform process.

Outstanding issues affecting the PRRT regime (including those associated with recent court decisions) need to be resolved expeditiously and compliance costs must be reduced. As onshore companies become more familiar with the regime, options for simplifying and streamlining its administration may arise and should be considered. A review of the ATO's administration of the tax would also improve its compliance with the government's stated policies and objectives. Importantly, the regime must continue to reflect its original policy intent of being a tax on profits.

3.7 Harnessing the benefits of gas

OBJECTIVE

To maximise the contribution that gas makes to reducing Australian and global greenhouse gas emissions and to enhancing Australia's energy security.

KEY ACTIONS

3.7.1 Ensure that Australia develops a single national approach to regulating greenhouse gas emissions that reduces emissions at least cost to the Australian economy, maintains the competitiveness of Australia's export industries and is administratively efficient and stable. Mitigation measures inconsistent with this national approach should be removed.

3.7.2 Review and reform energy taxation and renewable energy programs so as to remove tax- and subsidy-related distortions and ensure competitive neutrality between gas and other fuels.

3.7.3 Remove market and other regulatory barriers to gas development and review other aspects of competition and regulatory policy to ensure that they support open, competitive and efficient markets and enhance Australia's energy security.

BACKGROUND

Increased use of Australia's large gas resources will deliver large economic, environmental and energy security benefits for the nation.

The use of gas to generate electricity in Australia and abroad can result in 50 to 70 per cent less greenhouse gas emissions than electricity generated from other fossil fuels. For every tonne of carbon dioxide associated with the production, export and consumption of Australian LNG, up to 9.5 tonnes of CO_2-e are avoided in customer countries when LNG is used in place of coal.

Unlike renewable energy forms, the technology exists now to significantly reduce Australia's greenhouse gas emissions through greater reliance on gas-fired electricity generation. It doesn't require expensive and high-risk government subsidies and can deliver much larger levels of abatement at a much lower cost. The high cost of renewable energy is widely documented. The Productivity Commission and government regulators estimate the Renewable Energy Target (RET) and state photovoltaic schemes cost up to $1043 per tonne of CO_2-e avoided.

Greater use of gas for power generation would deliver other environmental benefits such as reduced emissions of particulates and sulphur dioxide, and reduced water usage for power station cooling. Air-cooled technology allows gas-fired power stations to use less than three per cent of the water used by a typical water-cooled, coal-fired power station.

Gas generation also offers a high degree of supply security. Turbines are available 24 hours a day and can be quickly turned on or off to meet changes in demand. In contrast, most wind-fired capacity has to backed-up by other more reliable forms of generation. According to the Australian Energy Market Operator (AEMO) the average output of a wind farm is 29 to 32 per cent of installed capacity. Of this, the AEMO counts only a few per cent towards the capacity it must have on hand at all times to meet electricity demand.

Renewable Energy Target—extra cost for no benefit

A modelling study undertaken for APPEA by BAEconomics found that the RET operating in parallel with a carbon price substantially increases the cost of achieving emissions reduction targets. Compared to a standalone emissions trading scheme, the RET plus emissions trading will reduce Australian GDP by an additional $6.5 billion and reduce gas-fired electricity generation by 2313 gigawatt hours by 2020 without delivering any additional reduction in emissions.

BAEconomics 2012

Despite the significant economic, environmental and security benefits offered by gas, growth in Australia's gas market is being constrained by a range of market distortions. These include energy subsidy schemes such as the RET and state solar schemes, higher rates of resources taxation compared to that applying to coal, restrictions on gas and electricity prices, and other forms of government intervention in Australia's gas market. These distortions discourage new investment and the entry of new market participants. In turn, energy prices increase and supply diversity and security is reduced. For example, the Western Australian policy requiring gas to be reserved for the domestic market, not only reduces Australia's competitiveness for LNG investment but also increases market risk for onshore gas explorers and other gas suppliers to the domestic market. Renewable subsidies drive up the price of electricity and favour the development of less efficient open-cycle gas generation with higher carbon emissions.

PROGRESS TO DATE

Greenhouse policy

The introduction of carbon pricing in Australia from 1 July 2012 has reduced the competitiveness of Australia's LNG industry by imposing a large new cost not borne by overseas competitors. Australian LNG projects will be required to pay the tax on at least 34 per cent of their emissions in the first year, with the percentage increasing each year. This is further increasing Australia's already high-cost structure and further reducing the ability of Australian LNG projects to remain price competitive. In a domestic context, the carbon tax may improve the relative competitiveness of gas over coal-fired electricity generation.

With carbon pricing now the centre-piece of Australia's policy approach to greenhouse gas emissions, other legacy greenhouse policies and programs should be urgently reviewed. High-cost schemes and subsidies should be abolished.

The current review of the RET scheme, for example, should see it being phased out as soon as practical, particularly since on current projections, the scheme is likely to reach its 20 per cent target well before 2020.

In 2008, members of COAG agreed to review all of their other carbon reduction programs. However, according to the Productivity Commission, in June 2011 there were still around 230 emission-reduction policies in place around Australia. Some states have since started to review and wind back their expensive solar photovoltaic schemes.

In April 2012, COAG committed to a further review process. The cross-jurisdictional COAG Taskforce on Regulatory Reform was asked to identify reforms to rationalise carbon reduction and energy efficiency policies and programs that do not complement a carbon price; or are ineffective, inefficient or impose duplicative reporting requirements on business. The taskforce is due to report to COAG by April 2013.

The Energy Efficiency Opportunities Program should be discontinued as it duplicates rather than complements the carbon price mechanism. The practice of attaching greenhouse conditions to environmental approvals should be discontinued and such conditions should be removed from existing project approvals.

Energy White Paper

In November 2012, the Australian Government released an *Energy White Paper 2012—Australia's energy transformation* (*Australian Government 2012*). Under development since 2008, the white paper reviews Australia's energy needs and goals over the period to 2035 and defines a policy framework to guide the further development of Australia's energy sector. It identifies four priority areas for future action:

- delivering better energy market outcomes for consumers
- accelerating our clean energy transformation
- developing Australia's critical energy resources, particularly gas resources
- strengthening the resilience of Australia's energy policy framework.

The white paper takes a market-based approach to policy development, noting that:

> *Well-functioning energy markets ... are unarguably best placed to drive business innovation and produce sustainable, reliable and least-cost energy and climate change solutions* (page x).

This, and many of the actions proposed in the white paper, are welcomed by the oil and gas industry. These include further energy market reforms (such as retail price deregulation) and measures to support the development of Australia's offshore and onshore gas resources (such as the regulation and approvals review being conducted by COAG and the development of a national harmonised approach to CSG regulation).

The EWP acknowledges that Australia is a high-cost destination:

> *As a relatively high-cost producer, we must continue to improve our competitiveness to attract further investment and lock in a long-term pipeline of new exploration and development projects* (page 64).

However, the white paper's reform agenda does not address all of the impediments to competitiveness and growth facing Australia's energy sector, including a number of the issues raised in this report. The white paper acknowledges that other policy areas such as fiscal settings and climate change intersect closely with energy policy and that:

> *...it is important ... to ensure that they are delivering mutually supporting outcomes as efficiently as possible* (page 8).

However, there is no consideration as to whether fiscal, climate change and labour market policies, for example, are actually supportive of the white paper's objectives such as the development of Australia's gas resources, securing a long-term pipeline of investment and improved market efficiency. As implementation of the white paper's actions gains momentum, the opportunity should also be taken to broaden its remit to review and address all of the impediments to oil and gas competitiveness and investment. With a time frame to 2035, the white paper cannot be treated as a static document but must be able to accommodate new issues and challenges as they arise. This cannot be delayed until the next review of energy policy scheduled for 2016.

Strategic Energy Initiative 2031

In August 2012, the Western Australian Government released a major energy policy statement, *Strategic Energy Initiative 2031* (SEI 2031). Based on a set of market-based policy principles, SEI 2031 sets out a policy framework to guide and facilitate the development of Western Australia's energy industry. The outlook for the state's gas market is a prominent theme and a number of short- and long-term measures are proposed to increase investment in gas supply. While these measures are welcomed, any benefits could be undermined by keeping and strengthening the domestic gas reservation policy. In the long term, this policy will have the reverse effect of that intended by discouraging gas supply investment and reducing supply diversity and security.

The experience in Western Australia has reflected an unexpected surge in gas demand in the mid to late 2000s that led to increases in gas prices which have in turn generated an unprecedented wave of investment in gas projects. These investments will deliver an 80 per cent increase in WA's gas supply capacity within five years and increase the number of major supply hubs from two to six.

Eastern states gas market

The eastern states market has also entered a similar transition phase as it adjusts to the surge in gas demand driven largely by the opportunity to develop a CSG-based export industry. The supply response in the production of conventional and unconventional gas (including shale gas) is now gaining momentum.

Different views are expressed about the extent of illiquidity in the Queensland gas market leading some customers to again call for a gas reservation policy. However, the *2012 Queensland Gas Market Review* released in October pointed out that while most of the debate has focussed on gas reservation, other options—ranging from regulatory intervention to market facilitation—could encourage market participants to achieve balanced export and domestic market outcomes. It also noted that a wider, more informed debate is needed.

The Queensland Government has made it clear that it does not favour a reservation policy, a position welcomed by the gas industry. The industry remains committed to working with the government to increase awareness of developments in the gas market and to contributing to a wider, more informed debate on related policy matters. As with the Energy White Paper and SEI 2031, governments can most effectively help to increase gas supply by addressing impediments to industry competiveness and investment and by reducing—not increasing—market intervention and regulation.

The Australian Government has made clear its position that it does not support a national gas reservation policy. This is stated unambiguously in the Energy White Paper and in the government's response to the August 2012 report of the Prime Minister's Taskforce on Manufacturing. A similar position should be adopted by all states and territories in the interests of promoting investment, market efficiency and a nationally consistent energy policy framework.

WAY FORWARD

The oil and gas industry will need to keep working closely with Australian, state and territory governments on a range of greenhouse and energy policy issues, including:

- implementing and potentially refining the carbon pricing system
- reviewing the RET and other greenhouse policies and programs, leading to the abolition of non-complementary measures (including the practice of applying greenhouse conditions to environmental approvals)
- developing and implementing actions arising out of the Energy White Paper and SEI 2031
- monitoring adjustments in gas markets and implementing market-based rather than regulatory measures for improving competitiveness and investment.

References

ABS 2012, *Mineral and Petroleum Exploration, Australia, June 2012*, Australian Bureau of Statistics, Canberra, September.

Apache 2010, *Submission to the Economics and Industry Standing Committee Inquiry into Domestic Gas Prices*, Apache Energy, Perth, June.

APPEA 2011, *APPEA Environmental Research Compendium*, Canberra, November 2011.

Argus 2012, *What if our luck runs out?*, Speech to the Rotary Club of Melbourne, Mr D R Argus AC, Melbourne, February.

Australian Government 2012, *Energy White Paper 2012—Australia's energy transformation*, Department of Resources, Energy and Tourism, Canberra, 8 November.

BAEconomics 2012, *Implications of the RET for the Australian economy*, BAEconomics, Canberra, September.

BCA 2012, *Pipeline or Pipe Dream? Securing Australia's Investment Future*, Business Council of Australia, Canberra, June.

BP 2012, *Energy Outlook 2030*, BP, London, January.

BREE 2011, *Australian Energy Projections to 2034–35*, Bureau of Resources and Energy Economics, Canberra, December.

BREE 2012a, *Resources and Energy Quarterly*, various issues, Bureau of Resources and Energy Economics, Canberra.

BREE 2012b, *Australian bulk commodity exports and infrastructure—outlook to 2025*, Bureau of Resources and Energy Economics, Canberra, July.

BREE 2012c, *Gas Market Report July 2012*, Bureau of Resources and Energy Economics, Canberra, July.

DAE 2012, *Advancing Australia: Harnessing our comparative energy advantage*, Deloitte Access Economics, Canberra, June.

EnergyQuest 2012, *Energy Quarterly*, EnergyQuest, Adelaide, August.

ESAA 2012, *Electricity Gas Australia 2012*, Energy Supply Association of Australia, Canberra, July.

Fraser Institute 2012, *2012 Global Petroleum Survey*, Fraser Institute, Vancouver, June.

GA & BREE 2012, *Australian Gas Resource Assessment 2012*, Geoscience Australia and Bureau of Resources and Energy Economics, Canberra, May.

Hays 2012, *The oil and gas global salary guide 2012*, Hays Oil & Gas, Sydney, February.

IEA 2012, *Golden Rules for a Golden Age of Gas*, International Energy Agency, Paris, June.

IHS CERA 2012, IHS Cambridge Energy Research Associates, www.ihsindexes.com, Cambridge Mass., June.

Parliamentary Library 2011, *Bill Digest No. 86, 2011–12*, Canberra, December.

Pitcrew 2012, *Labour Market Report – Northern Australian Strategy*, Pitcrew Management Consulting Services, Perth, September.

RMIT 2012, *The AMMA Workplace Relations Research Project—A Survey Based Analysis, Fifth Report*. Dr Steven Kates, RMIT University, Melbourne, June.

SCER 2011, *Meeting Communique*, Standing Committee on Energy and Resources, Melbourne, 9 December.

SCER 2012, *Meeting Communique*, Standing Committee on Energy and Resources, Darwin, 8 June.

Woodside 2012, *2012 Investor Briefing*, Woodside, Perth, 28 May.

APPEA

www.appea.com.au

CANBERRA T +61 2 6247 0960
Level 10, 60 Marcus Clarke St
Canberra ACT 2600

BRISBANE T +61 7 3231 0500
Level 36, 32 Turbot St
Brisbane QLD 4000

PERTH T +61 8 9321 9775
Level 1, 190 St Georges Tce
Perth WA 6000

SYDNEY T +61 2 8241 1900
Level 8, The Christie Centre
3 Spring St, Sydney NSW 2000