AUSTRALIAN UPSTREAM OIL AND GAS INDUSTRY

State of the industry 2010

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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

State of the industry 2010 is the third annual implementation report for the Australian Upstream Oil and Gas Industry Strategy. It provides an overview of Australia's oil and gas industry, highlighting recent developments, changes in the operating environment and key trends. This report also reviews factors limiting the industry's performance and actions being taken to address the impediments to growth identified in the strategy's initial report, *Platform for Prosperity*, published in 2007.

Prepared by APPEA with the assistance of the Australian and state and territory governments, Geoscience Australia, CSIRO and other major stakeholders, *Platform for Prosperity* identified the opportunities and challenges facing the Australian oil and gas industry, the issues that could prevent the opportunities from being fully realised and changes that could be adopted by governments, the industry and other stakeholders to address those issues. It shared a vision for the future of the industry and targets for the industry to aspire to over the ten years to 2017.

State of the industry 2010 updates the Upstream Oil and Gas Industry Strategy to take account of changes in the industry and externally since 2007. A review of the strategy's high value-adding priorities and options has resulted in a number of changes.

Firstly, the priority around improving and better coordinating research and development has been considered and actions completed. The conclusion was reached that the fundamental linkages between the industry and researchers and associated funding mechanisms are working efficiently and there are no major shortcomings or market failures in the way that research is organised and funded that could prevent the strategy's targets from being achieved.

Secondly, the original priority relating to environmental and safety management has been split into two priorities in recognition of the importance and distinct nature of each of these areas.

Finally, the 65 options proposed in *Platform for Prosperity* have been reviewed and reduced to 22 options. Those that have been implemented or require no further action have been deleted, some duplication of actions has been removed and in other cases options have been grouped under a common strategic theme. In particular, the priorities for safety and environmental management now relate specifically to actions led by industry to improve performance in these areas. All related regulatory and approvals issues now fall within the regulation and approvals priority.

This report reviews the updated high value-adding priorities and options and reports on progress towards their implementation. It provides an updated advocacy blueprint for the upstream oil and gas industry.

Further information about the Upstream Oil and Gas Industry Strategy and copies of this and previous reports are available on the APPEA website: www.appea.com.au

Contents

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
- LNG production capacity increases from 20 million tonnes a year in 2008 to at least 50 million tonnes a year
- natural gas use for industrial purposes and as a competitive feedstock for resources processing doubles
- in a competitive electricity market, 70 per cent of all new electricity generation capacity installed in Australia is gas fired.

Benefits to Australia

- A potential quantum improvement in the balance of trade – an extra $20 billion a year by 2017.
- Lower greenhouse gas emissions – 180 million tonnes per annum of carbon dioxide equivalent avoided globally by 2017 (equivalent to more than one quarter of Australia's projected greenhouse gas emissions in 2017).
- Greater energy supply security.
- Increased revenue to governments – billions of dollars a year. A single new LNG project for example, could pay $40 billion (nominal dollars) in tax and royalties over a typical project life.
- A more skilled workforce and increased employment in the oil and gas sector and service industries (up to 52,000 new jobs at the peak).
- Increased regional development, particularly in Western Australia, Queensland and the Northern Territory.
- Reduced water usage in electricity generation – gas-fired electricity uses one half to one sixth the water needed for coal-fired electricity.

1 Summary

Governments in consultation with the industry have the opportunity to put in place a policy framework that will trigger a step-change increase in oil and gas exploration and development activity in Australia, delivering substantial economic and environmental benefits.

With a number of government reviews and white papers completed, or nearing completion, the building blocks are now in place to enable this coordinated policy framework to be established. Some elements are being advanced including a concerted effort by state and national governments to improve approvals and regulatory processes. However, action must not be further delayed on this and the other high value-adding priorities identified in *Platform for Prosperity* and reviewed below. Competition for markets and capital is intense and investors' perceptions of Australia's competitive position can change quickly.

Action across a broad front by the industry and governments is needed if Australia is to take full advantage of current market opportunities and maximise the returns from its oil and gas resources.

Table 1: Key Industry Statistics, 2009–10

		Value	Change on previous year
Value of Production 2008–09		$28.3 billion	-4.4 per cent
Taxes and Royalties 2008–09		$8.8 billion	+7.5 per cent
Direct employment		20,000	
Petroleum Trade	Exports	$19.0 billion	-8.1 per cent
	Imports	$27.6 billion	-8.2 per cent
	Balance of trade	-$8.6 billion deficit	+$0.8 billion
Production	Oil, condensate and LPG	176 boe	-2.8 per cent
	LNG	18.7 mt	+7.4 per cent
	Conventional gas	794 bcf	-1.3 per cent
	Coal seam gas	184 bcf	+29 per cent
Exploration	Wells drilled 2009	71	-32 per cent
	Metres drilled 2009	188,700	-28 per cent
	Expenditure	$3.5 billion	-8.3 per cent

1 Figures are for the financial year 2009–10 unless otherwise indicated. 2 Exploration wells drilled and metres drilled exclude CSG. Expenditure includes CSG.

Sources: APPEA 2010, ABARE–BRS 2010e, EnergyQuest 2010, ABS 2010

The strategy's high value-adding priorities for action are:

- an increased industry-led focus on environmental and safety management
- an improved fiscal framework for gas projects that provides internationally competitive company tax depreciation terms for capital expenditure
- an improved framework for exploration including tax incentives and innovative licensing arrangements to attract greater exploration to Australia's large but mostly unexplored frontier areas
- removal of impediments and market distortions that discourage the greater use of gas by Australian and overseas customers and prevent Australia from harnessing the full environmental benefits of gas
- reform of Australia's approvals and regulatory regime for petroleum exploration, development and operations to improve efficiency, consistency and transparency and reduce approvals timelines and uncertainty
- development and implementation of a national petroleum skills and vocational training plan by the industry and governments to meet the future skilled labour requirements of the industry.

Progress since 2007

Figure 1 illustrates the progress achieved to date in implementing the Upstream Oil and Gas Industry Strategy's high value-adding priorities and the impact or significance of the contribution that implementation of each priority could make towards industry growth and achievement of the strategy targets. Since 2007 moderate progress has been achieved in most of the strategy's high value-adding priorities.

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

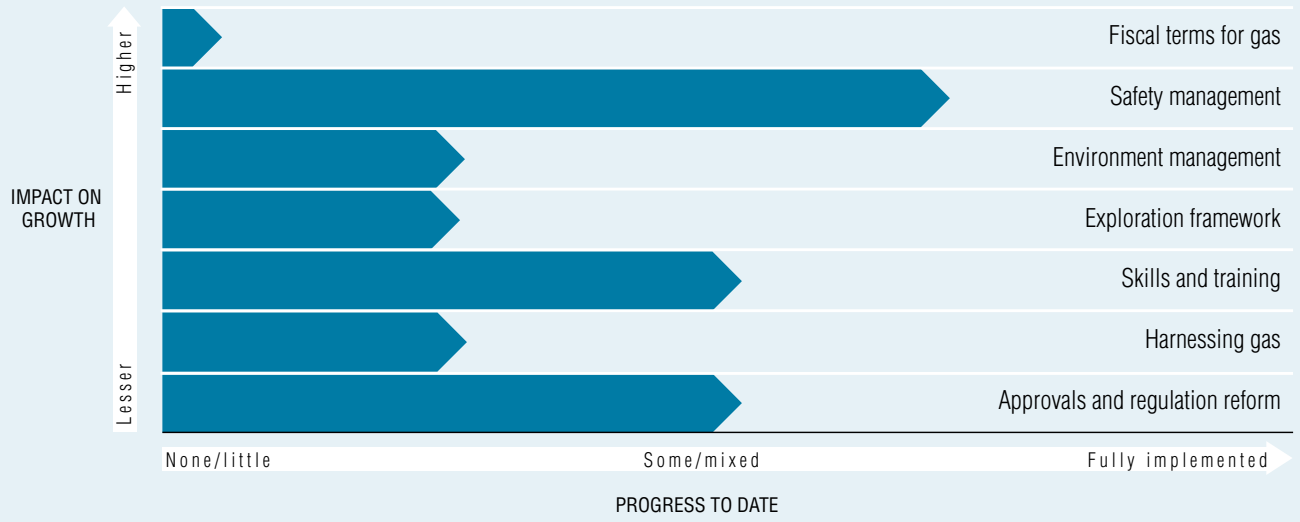
Environment and safety management are among the strategy's highest impact priorities in that high standards of performance by the industry are essential to the maintenance of community support and for the achievement of the strategy's growth targets.

Good progress is being made in both areas, particularly in regard to safety where a range of new initiatives driven by a high level commitment by industry leaders are yielding a broad, whole-of-workforce focus on safety.

However, several recent incidents in Australia and overseas have significantly damaged the industry's reputation and confidence in its ability to provide secure supplies of energy while operating in environmentally sensitive areas. An explosion and fire at the Varanus Island gas plant in 2008 severely disrupted gas supplies to Western Australia for around six months. Oil spills resulting from drilling activities in the Timor Sea (in the Montara field) and Gulf of Mexico (the Macondo well) in August 2009 and April 2010 respectively are likely to have major long-term impacts on the industry and lead to significant regulatory and operational changes, perhaps on a scale similar to the safety management changes introduced following the Piper Alpha disaster in 1988.

If the strategy targets are to be achieved, the industry will need to improve its safety and environmental performance with a particular focus on process safety, including drilling operations and the integrity of ageing facilities. The industry has already taken a number of actions and is developing a new collaborative strategy for securing a whole of industry commitment to, and intense focus on, both personal and process safety. A strong commitment to these and other measures by industry and governments will be needed to rebuild community confidence in the industry.

Figure 1: Impact of high value-adding priorities and progress towards implementation



An improved fiscal framework for gas projects

Royalties

Another major development this year has been the announcement of proposals to extend profits-based resource taxes from offshore petroleum to onshore petroleum and to parts of the minerals sector.

The upstream oil and gas industry supports measures to improve the efficiency and transparency of taxes and royalties applying to its operations. Over the ten years to 2008–09 tax and royalty payments by the upstream oil and gas industry totaled $58.6 billion and throughout this period consistently accounted for around half of the industry's pre-tax profits. The need for the community to obtain an appropriate return for the exploitation of its natural resources is acknowledged. The Petroleum Resource Rent Tax (PRRT) has, since its introduction to most of Australia's offshore waters in the 1980s, encouraged exploration and development while making a significant contribution to government revenue ($2.1 billion in 2008–09).

Extension of the PRRT to onshore areas as announced by the Australian Government in July 2010, could yield similar benefits although administrative costs could be significant due to the larger number and diversity of onshore projects. In the event that PRRT is extended, the overall fiscal burden on projects should not be increased and an exemption or tax-free threshold should apply to small projects. Care should also be taken to ensure that not only are offshore and onshore projects treated equitably but also that the tax burden on gas is not greater than that applying to competing fuels, particularly coal when used for electricity generation. At a time when the nation is seeking to reduce its greenhouse gas emissions, it would be counterproductive to apply a higher tax rate to gas than coal when gas-fired electricity results in around half the greenhouse gas emissions of electricity generated from coal.

Company Tax

Of all of the options proposed by *Platform for Prosperity*, the one that could make the greatest contribution to achieving the strategy targets and objective of maximising the value of Australia's oil and gas resources to the Australian people, and the one that could be implemented at little or no long-term cost to government revenue, is the option to introduce better fiscal terms for gas projects. The current income tax provisions, particularly depreciation write-off periods that are much longer than those applying to LNG projects overseas, are having a distortionary impact on the economics of gas projects and reducing Australia's competitiveness for gas industry investment. This has been the subject of numerous studies and submissions over many years culminating in a government decision to refer the matter for consideration by the National Review of Taxation. It is disappointing therefore that the review's report released in May 2010 failed to acknowledge the impact of these provisions on competitiveness. The industry remains of the view that this issue still needs to be addressed by the Australian Government.

At a time when governments are seeking ways to return budgets to surplus and spend more on social and economic infrastructure, this is one measure which if implemented, could provide a major part of the solution. The petroleum industry contributed $8.8 billion in taxes and royalties in 2008–09 and achievement of the strategy's targets would see this figure increase rapidly. A typical LNG project for example, could generate $40 billion in taxes and royalties over the project life. Australia currently has two operating LNG projects and another two under construction but at least another 13 major projects and expansions (plus several smaller projects) are being considered for development. Addressing impediments to their competitiveness, including improved company tax terms, could deliver very substantial returns—not just in government revenue but also in jobs, economic activity and national income.

An improved framework for exploration

It is disappointing that the government's 2007 election commitment to encourage exploration by introducing a flow-through share scheme was not progressed and that the subsequent proposal announced in May 2010 to introduce an exploration rebate was abandoned. With only 15 per cent of Australia's offshore basins and 35 per cent of onshore basins under permit, with Australia's oil production rapidly declining and concern in some jurisdictions about long-term gas supply security, more needs to be done to incentivise exploration, particularly in frontier areas. Some measures are being discussed with industry but these and others need to be agreed and introduced as a priority by the incoming government.

Harnessing the environmental benefits of gas

While community and political awareness of the environmental benefits of gas has increased, policy measures such as the expanded Renewable Energy Target (RET) continue to be introduced which disadvantage gas in favour of other higher-cost energy sources and reduce the competitiveness of Australia's LNG industry. Little has been done to address tax-induced distortions in the energy market which constrain gas industry growth. Extension of the PRRT to onshore gas projects when coupled with the introduction of a Minerals Resource Rent Tax (MRRT), would if implemented as proposed, not eliminate the tax disadvantage faced by gas over coal.

Domestic gas markets

In the eastern states market, the rapid growth of low-cost coal seam gas (CSG) and the ability of suppliers to incrementally increase supply to meet demand means that price rises have been modest and prices are still well below those in most other parts of the world (see Figure 3 in section 2.3).

In Western Australia a cyclical shortage of spare supply capacity has triggered a surge in gas prices for new, short-term contracts but a number of new domestic gas projects are under construction or are being proposed for development over the next three to six years. Provided there is sufficient customer demand, WA's gas supply capacity could increase by more than 50 per cent by 2015 and double within ten years. Competitive market pricing will be critical since upstream petroleum development costs have doubled over the past five years and the next generation of developments includes gas fields that are more remote, have lower liquids content and have higher levels of impurities.

A Strategic Energy Initiative by the WA Government and review of gas prices by the WA Parliament, both scheduled to be completed

by the end of February 2011, need to focus on policies and actions to increase gas market competition and remove impediments to gas industry investment. Proposals for greater government intervention would have the perverse effect of reducing competition and investment.

Gas exports

International competition for markets and capital to underwrite new LNG projects is increasing due to a combination of a GFC-induced slowdown in international gas demand coinciding with rapid increases in US shale gas production and global LNG production capacity leading to reduced gas prices. Ongoing uncertainty about the pace of economic recovery in the US, sovereign debt problems in Europe and an anti-inflationary slowing of demand in China are also impacting on customers' willingness to commit to new long-term LNG contracts.

Global LNG production capacity increased by an unprecedented 49 million tonnes per annum (mtpa) or 25 per cent in 2009. A further 11 mtpa of capacity was commissioned in the first four months of 2010 and another 42 mtpa now under construction is expected to be commissioned by the end of 2013. That is a more than 50 per cent increase in global LNG production capacity in just five years (2008–13) although the build up in sales may take a little longer due to delays in start-ups and maintenance shutdowns.

These figures do not include the Gorgon project which will add another 15 mtpa from 2014. Australia has at last another 90 mtpa of capacity under consideration for development and a number of other countries are also planning to expand capacity or develop new LNG industries of their own (such as PNG).

An unexpected boom in unconventional gas production in the USA and Canada since 2006–07 has transformed the North American gas market and drastically reduced its need for LNG imports. This has freed up gas for other markets with some 15 million tonnes of LNG being diverted from the Atlantic to the Pacific markets in 2008.

At the same time as US shale gas production and global liquefaction capacity has been experiencing unprecedented growth, gas demand has been weak. Global gas consumption fell by 3 per cent in 2009, the biggest ever decline recorded by the International Energy Agency *(IEA 2010)*. The IEA believes that a global gas glut has been created that will take some years to overcome particularly in the Atlantic (Europe–North America) market.

Analysts expect LNG consumption in the Asia–Pacific region to rebound first and increase by around 50 per cent (60 mtpa) by 2020. However, if all the proposed projects are added together, potential supply growth to the Asia–Pacific region could be two to three times larger than projected demand growth. Therefore not all projects will proceed and while Australia can offer diversity of supply and stability, Australian projects are disadvantaged by high costs, long approvals and development timelines and a more onerous tax regime. Those projects able to secure development approvals quickly will be best placed to attract customers and investment capital. Hence, urgent action is needed to address the impediments to investment identified in the Upstream Oil and Gas Industry Strategy.

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

Reviews of approvals processes and regulation nationally and within some states, have recommended a large number of major reforms. Many of these have been agreed by governments and some changes have been implemented. However, there is still much to be done to effectively implement all of the changes proposed and needed to create an internationally competitive and efficient approvals regime. This includes the implementation of a more integrated and efficient national approach to petroleum regulation, improvements to environmental assessment processes including the operation of the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* and state processes, reforms to native title and aboriginal heritage processes and changes to work health and safety legislation.

While there has been considerable activity within government and the industry in this area, the regulatory burden on industry has not diminished and the step change improvement in approvals and regulatory processes envisaged by the Upstream Oil and Gas Industry Strategy has yet to be achieved.

Implementing a national petroleum skills and vocational training plan

Some progress has been made with the development and implementation of initiatives to address the growing skills shortages. Awareness of the issue has increased and industry and governments are responding with national and state governments for example, initiating inquiries and developing plans to improve training delivery and skilled labour availability. However, without further action and the implementation of proposed measures, skills shortages still have the potential to significantly constrain industry growth.

2 Key developments

2.1 Montara and Macondo (Gulf of Mexico) oil spills

Of all events and developments of recent years, the oil spills from the Montara and Macondo wells could prove to have the greatest long-term consequences for the upstream oil and gas industry.

Locally and globally these incidents have caused considerable damage to government and community perceptions of the industry and their willingness to allow its continued operation in environmentally sensitive areas. Considerable time and effort will be required to restore the industry's image and its licence to operate, and to regain the confidence of the community. Significant regulatory changes and changes to industry practice are likely, perhaps similar in scale and extent to the changes to safety regulation and management introduced after the Piper Alpha disaster in 1988.

As a result of advances in technology, well blowouts are now very rare. Prior to 2009, Australia had not experienced such an incident since the drilling of a well in Bass Strait in 1984. Since that time, the industry has successfully drilled around 1500 offshore wells.

The uncontrolled release of hydrocarbons from the Montara field began on 21 August 2009 as a result of a failure in the integrity of a well being drilled for PTTEP Australasia by the West Atlas drilling rig operated by Atlas Drilling. The well was located in a remote area between northern Australia and Timor Leste, around 250 km north of the Kimberley coast and 690 km west of Darwin. Immediately after commencement of the release all 69 personnel onboard the rig were safely evacuated. A fire broke out on the facility on 1 November and the fire was extinguished and hydrocarbon flow brought under control on 3 November. The operator estimated that around 400 barrels a day of oil escaped from the well. The long-term environmental impacts are still being assessed although in August 2010 the WA EPA reported that it had found no evidence of oil contamination of water, sand or oysters along the Kimberley coast.

Once the well had been brought under control the Minister for Resources and Energy established a Commission of Inquiry to investigate the causes of the incident, its management and environmental impacts and make recommendations on prevention and mitigation measures including regulatory changes. After receiving submissions and conducting public hearings the inquiry provided its report to the Minister in June 2010. At the time of *State of the industry 2010* going to print, that report had not been publicly released.

On 20 April 2010 an explosion on the Deepwater Horizon rig drilling the Macondo well in the Gulf of Mexico on behalf of BP resulted in the death of 11 workers and North America's worst-ever oil spill. The well, in around 2 km of water, leaked oil for 106 days before it was finally plugged. The National Oceanic and Atmospheric Administration estimated that around 4.9 million barrels of oil escaped from the well and that the vast majority of this had evaporated, dispersed or been burned, skimmed or recovered from the wellhead. Even so, significant volumes of oil reached the Gulf of Mexico coastline, damaging the coastal environment and the economies of coastal communities.

Even before the Macondo well had been capped, and causes of the well blowout determined, the US Government imposed a moratorium on deep water drilling and flagged tighter regulatory control over the offshore industry.

While the Montara Inquiry report is yet to be released, a great deal of information about the Montara and Macondo incidents has been made available. This is enabling the Australian oil and gas industry to take immediate action. Companies have set up multi-disciplinary task forces to carry out in-depth reviews of the design, integrity and operations of all wells, their communication and verification protocols and emergency response preparedness. These reviews have included an examination of blowout contingency plans and detailed analysis of critical rig equipment and verified preventative maintenance requirements and integrity assessments. Oil spill response exercises have been conducted in the field and the industry's Australian Marine Oil Spill Centre has reviewed and upgraded its capabilities.

The capacity for cross-industry collaboration and for companies to share expertise and equipment is also being expanded. A drilling industry workshop in August 2010 identified key areas for further work and, through APPEA, the industry is establishing a taskforce to coordinate a response to the Montara incident. The Australian Drilling Steering Committee and Emergency Management Steering Committee have been formed to proactively identify and implement cross-industry learnings arising from the Montara and Macondo incidents. The industry recognises the damage to its reputation caused by these incidents, and that it must demonstrate to government and the community that real action is being taken to ensure that such incidents do not recur, or if they do, that they are well-managed and their impacts minimal.

2.2 The global financial crisis and the world economy

The flow-on effects from the global financial crisis (GFC)—which began in late 2007 and accelerated during 2008—are continuing to evolve and impact on the world economy. The initial phase of banking collapses and bank bailouts by governments had a major impact on the availability of risk capital and its cost. The plunge in sharemarkets and commodity prices (including gas and oil) spread the pain from banking and finance to virtually every sector of the economy. Recession hit the US, UK and most European countries.

During the second half of 2009 equity markets rebounded strongly and equity capital raisings started to recover although debt lending continued to be tightly constrained. The US economy commenced a slow recovery from recession although US unemployment remains high at around 9.5 per cent. China recovered quickly from a mild downturn in its economy, resulting in a partial recovery in commodity prices and enabling Australia to escape the worst of the GFC relatively unscathed. The Australian Government's deficit and public debt levels increased as a result of stimulus spending programs and a slowdown in economic activity, but nowhere near to the same degree as most other developed economies, particularly the US, UK, Japan and much of Europe. Australia's banking sector is still strong (and privately-owned) and economic growth is strong, due largely to the quick resumption of China's growth and demand for resources.

To date, the two significant outcomes from the GFC of significance to Australia have been the decline of the US dollar and shift in the global balance of economic power towards China. While many western economies have high debt levels and low growth, China has recovered quickly and has embarked on a strategy of using its large cash reserves to increase its long-term security of supply of raw materials and energy. Soon after 2025, China is expected to overtake the US as the world's biggest spender on oil and gas imports *(IEA 2009)*. Chinese companies are cashed up and together with state-owned companies in other developing countries, are increasing their investment in resources in Australia and countries in Africa and elsewhere. These companies are often willing to accept greater risk and lower returns in return for resource security of supply.

While the global economy has improved since the dark days of 2008-09, new risks have emerged which at different times have a lesser or greater impact on investor confidence. These include: uncertainty over the pace of economic recovery in the US; a possible second phase in the debt crisis stemming from high sovereign debt levels in Greece and a number of other European countries; and the flow-on effects from macro-economic policy changes in China. Ongoing uncertainties such as these inevitably have an impact on commodities demand and investment, including global energy demand and investment in Australia's petroleum industry.

2.3 Implications for the Australian oil and gas industry

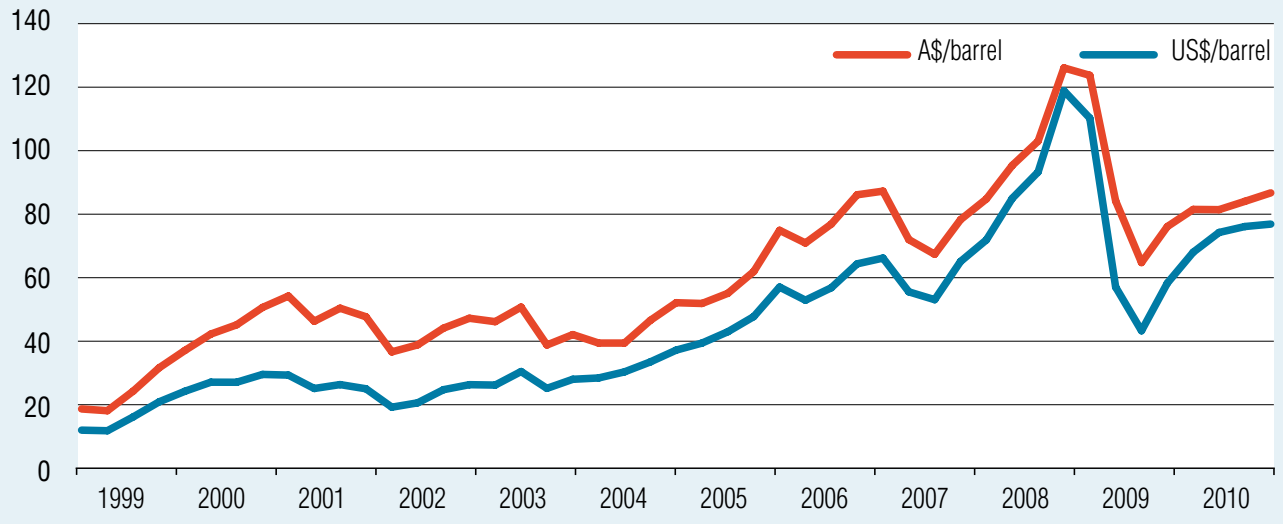
Prices

World oil prices fell from a daily peak of around US$150 per barrel in July 2008 to a low approaching US$30 per barrel in early 2009. On a quarterly basis, average trade-weighted prices fell from US$119 per barrel in the 2008 June quarter to US$40 per barrel in the first quarter of 2009. Since then prices have partially recovered and mostly traded in the range of US$70-85 per barrel (see Figure 2).

Gas prices in major overseas markets followed a similar path downwards but have generally not recovered to the same degree. In the US for example, Henry Hub prices fell from US$13-14 per million btu (Mmbtu) in mid-2008 to a low of US$1.85 per Mmbtu in September 2009. Over most of the past year prices have varied between US$3-6 per Mmbtu (one Mmbtu is equivalent to 1.055 gigajoules (GJ)).

Low oil and gas prices have also contributed to lower LNG prices with the slowdown in the global economy also reducing short-term LNG demand. As indicated in Figure 3, gas prices in Australia have for many years been well below those in other major gas markets and average prices have not varied greatly.

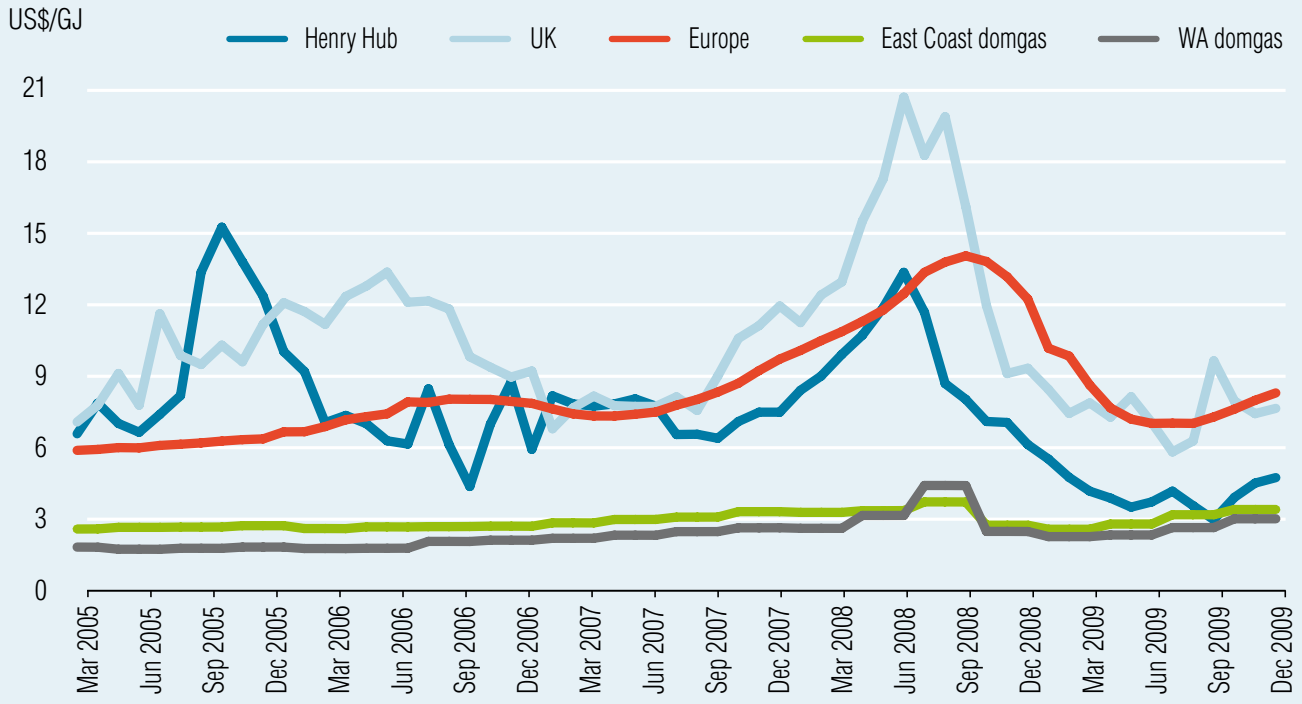
Figure 2: World trade-weighted oil prices, 1999 to 2010



Source: ABARE-BRS 2010e

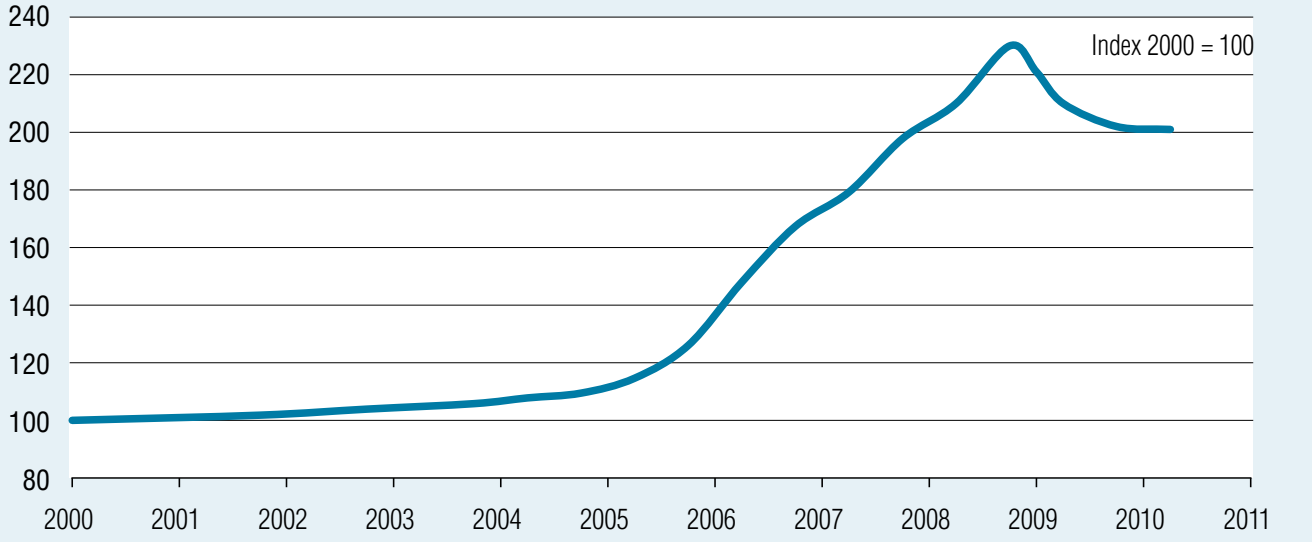
In the eastern states market the rapid growth of low-cost CSG production is maintaining downwards pressure on prices. In Western Australia, offshore construction costs and the development of fields that are more remote, have lower liquids content and higher levels of impurities are placing upwards pressure on gas prices. Calls by some gas customers for greater government intervention in the market have increased but should be resisted since the maintenance of a competitive market is critical to the ongoing attraction of new investment. In any case, the GFC and other factors such as rising costs have resulted in the deferral of a number of gas-intensive industrial projects, so projections of WA's gas demand growth have been revised downwards from the unrealistic scenarios of a few years ago.

Figure 3: Average natural gas prices, March 2005 to December 2009



Source: Argus Monthly LNG, EnergyQuest, and WA DMP

Figure 4: Upstream capital costs index, 2000 to 2010



Source: IHS CERA 2010

Costs

As previously reported, and as illustrated in Figure 4, industry costs have increased rapidly over recent years. Lower oil and gas prices and the slow down in world economic activity during 2009 provided some relief from cost increases. However, the benefit for Australian projects may be short-lived as public infrastructure investment and private investment (particularly in resources) rebounds and skilled labour shortages re-emerge.

Another source of rapidly rising costs are charges, fees and/or increased operating expenses that arise directly as a result of government actions or decisions. The trend towards full cost recovery for regulatory and other services has grown, including through increases in licensing fees, the funding of regulators (such as the National Offshore Petroleum Safety Authority or NOPSA) and security-related requirements. Approvals costs have also risen, while obligations such as greenhouse gas reporting commitments and the funding of services such as the various medical evacuation services in WA and Queensland have largely been met by industry. In the latter case, these services provide benefits to the wider community. There is also a trend for government agencies to source direct financial contributions from project licensees to fund the provision of services, such as safety inspectors.

This push towards full cost recovery for regulatory and other services to industry is likely to continue as governments seek to return budgets to surpluses. However, this will undermine competitiveness if costs are not shared appropriately, with contributions from government reflecting benefits derived by others and the wider community. Greater contributions from industry should also be matched by obligations on regulators to improve accountability, efficiency and reduce duplication. Industry should not be required to fund multiple regulatory bodies providing overlapping services, but doing little to deliver better safety, environmental and other outcomes.

Following the initial slump in commodity and equity markets in 2008, many companies in the oil and gas industry—large and small—responded by cutting exploration budgets and other expenditure to conserve cash. While oil and gas prices have recovered to a degree, the flow-on effects of the GFC—reduced availability of risk capital for exploration and long-life, low-return projects and uncertainty around future global economic growth impacting commodity demand and prices—are continuing. The pressure to conserve cash is therefore still very evident.

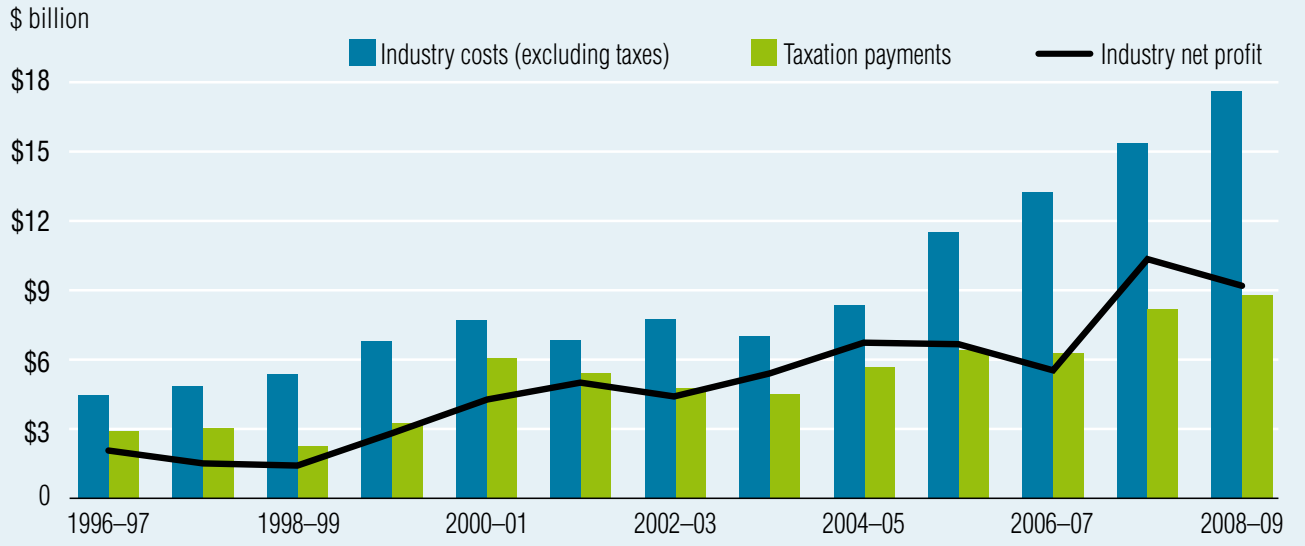
Uncertainty around changes to resource taxation with the suggested Resource Super Profits Tax (RSPT) and proposals to extend the PRRT to onshore areas (but apply a more concessional MRRT to coal and iron ore) is also adversely affecting new investments decisions.

Profitability

The May 2010 announcement of these changes to resources taxation triggered considerable debate around whether the resources sector, including the oil and gas industry, was contributing enough taxation revenue to the community for the exploitation of its non-renewable resources. As indicated in Figure 5, over the past decade taxation payments by the upstream oil and gas industry have increased as oil prices have increased and have consistently accounted for around half of the industry's pre-tax profits. That is, taxation payments have on average been just as much as net profits after tax. In 2008–09, taxation payments increased to a record $8.8 billion while net profits (after tax) declined to $9.2 billion.

If the government feels that tax revenues did not increase fast enough as oil prices rose, then the same could be said by investors in the industry, since net profits have increased (decreased) in parallel with tax revenues. The culprit is not higher 'super' profits but rising costs of operations and increased levels of investment to maintain production. Of course, a big proportion of those costs are on the purchase of goods and services from Australian suppliers. Net profits are also used to provide a return to debt providers and shareholders as well as to fund new projects. In determining what should constitute an appropriate level of taxation, it needs to be remembered that taxes are not the only way in which the community benefits from the oil and gas industry. Increasing the tax take would reduce the ability of the industry to generate these other community benefits.

Figure 5: Upstream oil and gas industry financial performance, 1996–97 to 2007–08



Source: APPEA 2010

Described as a one project economic stimulus package, the A$43 billion Gorgon project is expected to lead Australia out of a GFC-induced economic slowdown and generate major long-term benefits for the nation.

"Gorgon will be an important pillar of the Australian economy for the next 40 years. We anticipate A$33 billion will be spent on Australian goods and services with flow-on effects cascading throughout the Western Australian economy", said Mr Roy Krzywosinski, Chevron Australia Managing Director, 14 September 2009.

Modelling by ACIL Tasman suggests that the project will support 10,000 jobs during construction and over a 30 year life, boost Australian GDP by A$64 billion and generate A$40 billion in revenue for the WA and Australian governments.

Chevron Australia 2009

2.4 Industry activity

During 2009 a degree of optimism emerged that the size and potential of Australia's gas industry had finally caught the attention of the community, the media and governments. Several factors contributed to the increased profile of the gas industry:

- the September 2009 announcement of the go-ahead for the $43 billion Gorgon project at a time when most economic news was negative (a 'one-project stimulus package'), drew attention to the spin-off benefits for Australian industry and the generation of large, long-term tax revenues for government (see inset)
- suggestions that Gorgon could just be the first of many LNG projects and that Australia could become one of the world's largest LNG producers
- increased community interest and political debate about climate change and carbon abatement measures, and the emergence of a general recognition within the media and governments of the low-carbon emission benefits of gas
- regular reports of new gas discoveries (particularly in the offshore Carnarvon and Browse basins) and increasing CSG reserves and their potential for development
- growing debate about how Australia's gas resources should be used and how governments can best achieve long-term gas supply security within Australia
- while the Varanus Island gas plant explosion and oil leak from the Montara field resulted in significant adverse environmental and economic consequences, these incidents did generate greater community awareness of the industry and of its importance to meeting everyday energy needs.

Over recent years Australia's oil and gas industry has also developed greater depth and diversity. Many more overseas investors, both independent oil companies and state-owned companies, have been attracted to Australia. Gas prospectivity is a major attraction, not just for conventional gas but also for unconventional gas in the form of CSG in particular, and potentially tight gas (gas in low-permeability reservoirs) and shale gas. Steps being taken to address impediments to investment (such as reforms to approvals processes as recommended by the Productivity Commission and improved access to pre-competitive geoscience data, particularly from the *Offshore Energy Security Program* conducted by Geoscience Australia) are also attractive to investors. Australia's stable economic, political and fiscal system has long been regarded as a major competitive advantage, although this could be put at risk by changes to resource taxation proposed earlier this year and still under discussion.

The CSG industry has continued to grow rapidly both in supplying the eastern states gas market and in firming up the reserves needed to underpin several large new CSG to LNG (CSG–LNG) projects. The Australian and Queensland Governments have been working with project proponents to provide the policy framework needed to enable these large projects to proceed, the first examples in the world of CSG being used to fuel export LNG projects. Oil and gas majors have acquired equity in these projects—providing financial, technical and marketing capabilities—and projects are being rapidly progressed. Despite the uncertainty created by proposed tax changes, at least two of these projects are planning to make investment decisions by the end of 2010. As indicated in the inset, these projects, like their counterparts in the west, generate large long-term economic and tax-revenue benefits for Australia.

The domestic gas industry in Western Australia is also expanding. Projects under construction or actively being marketed and proposed for development are capable of almost doubling WA's gas supply capacity by 2020 (see section 3.3 for details). The pace of capacity growth will be determined by customers' preparedness to sign up to long-term contracts at prices that will enable new gas projects to be economically developed. The WA Government has assisted by broadening gas quality specifications for the Dampier to Bunbury Natural Gas Pipeline to enable a greater range of projects with varying gas specifications to utilise the pipeline and by encouraging the development of tight gas fields in the Perth Basin.

The Northern Territory is also seeking to rapidly expand its gas industry. The 3.7 mtpa Darwin LNG plant operated by ConocoPhillips could be expanded to process gas from one of many gas discoveries in the Bonaparte Basin or Timor Sea. Inpex Corporation is planning a second LNG plant for Darwin to process gas from the Ichthys field 850 km away. In September 2009, ENI Australia delivered its first gas to Darwin from the Blacktip gas project in the offshore Bonaparte Basin. The gas is being transported via the 280 km Bonaparte gas pipeline for use in generating electricity for Darwin.

Development of a CSG–LNG industry would generate large economic benefits for Queensland and the nation. Modelling suggests that the development of projects over the next decade with a combined capacity of 28 mtpa would:

- **increase national GDP by 0.10 per cent or $1034 million (in 2005–06 dollars)**
- **raise Australia's standard of living (as measured by final household consumption expenditure) by 0.13 per cent or $815 million (2005–06 dollars)**
- **increase Queensland's Gross State Product by 1.0 per cent or $3,056 million (2005–06 dollars)**
- **provide over 18,000 direct and indirect jobs within Queensland**
- **generate $850 million (in 2008 dollars) a year in royalties to the state government once capacity reaches 28 mtpa in 2021.**

MMA 2009

2.5 Policy framework

The framework of government policies and programs affecting the oil and gas industry is undergoing a period of significant change following numerous recently completed policy and program reviews by the Australian and state governments. In some cases governments are considering recommendations from these reviews or have already begun to implement them. Recent reviews or other significant policy changes include:

- the National Review of Taxation chaired by Dr Ken Henry AC with the report and the government's initial response released in May 2010 and resource taxation elements subsequently modified in July 2010
- an independent review into safety regulation of the offshore petroleum industry commissioned by the Australian and West Australian Governments conducted during the first half of 2009
- the Montara Commission of Inquiry, investigating the causes and consequences from a well blowout and oil spill in the Timor Sea during the latter part of 2009, provided its report to the Australian Government in June 2010
- the government's decision in April 2010 to defer further consideration of the Carbon Pollution Reduction Scheme (CPRS) until 2012 and in the meantime pursue other measures for achieving its emissions reduction targets
- the final report of the Productivity Commission review of the regulatory burden on the upstream petroleum sector was released in April 2009 and the implementation of its recommendations is underway
- a report by the independent review of the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* undertaken by an expert panel chaired by Dr Allan Hawke AC, was released in December 2009
- several reviews initiated by the West Australian and Queensland Governments of approvals processes and areas of regulation relevant to the resources industry
- the commencement of a Strategic Energy Initiative by the West Australian Government to develop a long-term policy framework for the WA energy industry with a final report expected to be completed in February 2011
- in September 2009 the Queensland Government released a *Blueprint for Queensland's LNG Industry* that provides a policy framework for the development of the state's CSG–LNG industry
- national harmonisation of occupational health and safety regulation with a model *Work Health and Safety (WHS) Act* and regulations scheduled to commence on 1 January 2012
- the July 2010 report by the National Resources Sector Employment Taskforce on the skilled labour requirements of the resources sector and how these could be met
- the release in June 2010 of a WA Workforce Development Plan to guide workforce development and training in WA
- the Review of Australian Higher Education chaired by Professor Denise Bradley AC with a report released in December 2008
- development of a national Energy White Paper remains on the agenda but has been delayed by the finalisation of policy positions on the CPRS and National Review of Taxation.

These processes provide the opportunity for governments to develop a coordinated and consistent policy framework for the oil and gas industry which could go a long way towards achieving the targets set out in the Upstream Oil and Gas Industry Strategy.

Positive steps have already been taken in a number of areas including national and state initiatives to address skills shortages and increase training opportunities and improvements to approvals processes and regulation. Other regulatory changes recommended by the Productivity Commission and Montara Commission are being considered through the Ministerial Council on Mineral and Petroleum Resources (MCMPR).

A number of challenges are still to be addressed and reform outcomes implemented. Over recent years for example, there has been a trend towards increasing Commonwealth involvement in environmental approvals thereby increasing rather than reducing the degree of duplication between Commonwealth and state approvals processes. The Hawke report recommends a number of solutions, which if adopted in part or in full, would streamline environmental approvals across a range of industry sectors.

Changes to the industrial relations framework embodied in the *Fair Work Act 2009*, are contributing to a resurgence of work stoppages and union militancy resulting in higher costs, project delays and increased project risk (including for example, two rounds of illegal

strike action at the Pluto project and a series of strikes by maritime workers on vessels servicing the offshore oil and gas industry). This followed a long period of relative stability under a regime which enabled employers and employees to work together to achieve mutually beneficial workplace outcomes.

Uncertainty about greenhouse gas policy and abatement measures continues following the deferral of the CPRS earlier this year. A greater reliance on natural gas needs to become the centrepiece of Australia's greenhouse policy if large-scale, cost-effective emission reductions are to be achieved. This will require an efficient and effective national policy that puts a price on carbon and avoids the introduction of high-cost, uncoordinated approaches nationally and among state and territory jurisdictions. Unfortunately, the main measure introduced to date, the expanded Renewable Energy Target (RET), is disadvantaging other low-emissions energy sources such as gas and is likely to be a high-cost method for reducing greenhouse gas emissions.

The tax reform processes arising out of the National Review of Taxation need to be focused on enhancing Australia's international competitiveness with reforms implemented in close consultation with industry. Distortions in the fiscal burden between different commodities (for example gas versus coal) must be avoided.

Measures for incentivising exploration, particularly in Australia's frontier areas, need to be revisited and further developed in consultation with industry.

It is also disappointing that tax impediments to investment in the gas industry, particularly Australia's relatively uncompetitive income tax depreciation regime, have not been addressed. This and other factors detracting from Australia's competitiveness for oil and gas investment, need to be picked up by the national Energy White Paper. Since the commencement of the White Paper process over two years ago, governments and the energy industry have contributed significant resources towards the development of a long-term policy framework for Australia's energy sector. The Australian Energy Resource Assessment (AERA), released in March 2010 as part of the Energy White Paper process, has provided a comprehensive stocktake of the magnitude and use of Australia's energy resources. However, the White Paper itself needs to be completed to provide investors with greater clarity and certainty. It could provide the vehicle for pulling together all of the initiatives and policy settings in all of the policy areas, including measures proposed in the Upstream Oil and Gas Industry Strategy, for addressing impediments to competitiveness and growth.

Some of the recommendations from the Bradley review of higher education could lead to greater support in disciplines relevant to the oil and gas industry. Progress to date towards the implementation of those recommendations has been limited perhaps due in part to the budgetary constraints created by the GFC. However, a long-term approach is needed to investment in this crucial area of education.

The industry has welcomed a number of policy initiatives by the Queensland Government that have been developed in consultation with the industry. A new land access framework will provide greater certainty to landholders and other title holders. Separate reviews of tenure and environmental approvals processes have identified significant reforms aimed at reducing the number of approval processes and their complexity.

Queensland's *Blueprint for the LNG Industry* released in September 2009 and subsequent announcements about the Queensland gas market have been welcomed. In particular, the decision to address concerns about domestic gas supply security by appointing a Queensland Gas Commissioner, initiating a Queensland *Annual Gas Market Review* report and moving to establish a Brisbane hub for the gas Short-Term Trading Market (STTM), provides greater certainty for investors and will lead to more efficient, lower cost outcomes than alternative proposals for increased market intervention. A government commitment to maintain the existing royalty rate at 10 per cent of the wellhead value was also supported by industry.

Likewise the policy framework being developed for the WA energy sector, through the Strategic Energy Initiative (*Energy 2031*), needs to focus on those measures which will attract investment and increase competition and energy supply security over the long term. It should not be used to justify interventions in the gas market to correct perceived short-term fluctuations in the balance between gas demand and supply. Such actions would actually have the perverse effect of discouraging investment and gas market growth in the long term.

3 Progress towards targets

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.

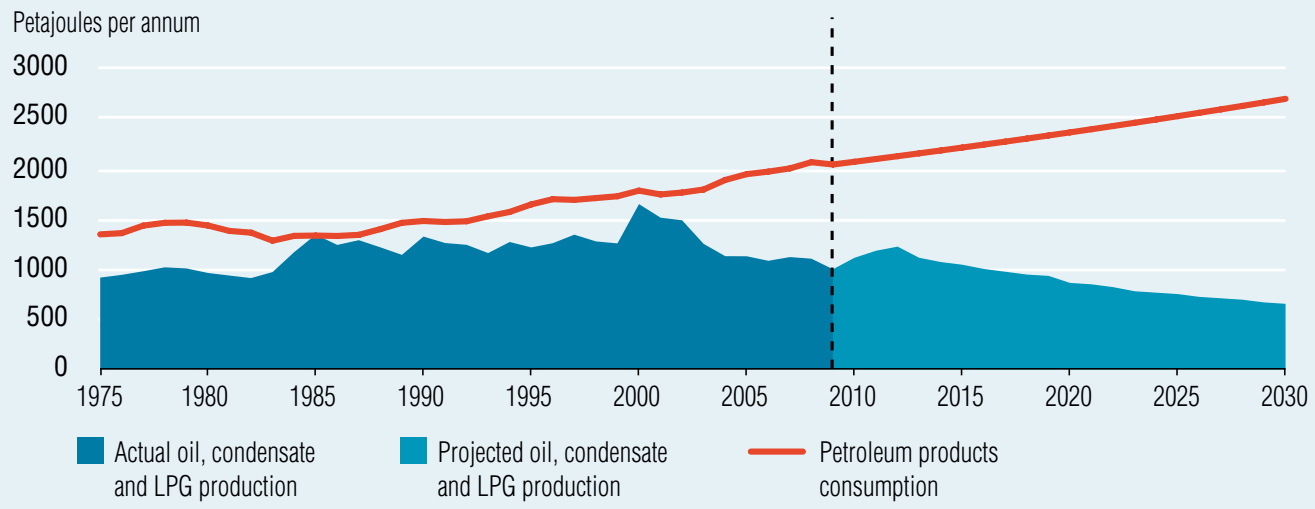
3.1 Liquids production

Australia's production of oil, condensate and naturally occurring LPG as a proportion of petroleum products consumption, increased from 54.9 per cent in 2006 to 55.9 per cent in 2007. However, the ratio has since declined to 53.4 per cent in 2008 and 48.9 per cent in 2009. The rate of new oil field developments has not been sufficient to offset declining production from established fields and keep pace with Australia's increasing liquids consumption. As indicated in Figure 6, liquids production declined by 7.8 per cent over the period from 2006–09 while consumption grew by 4.8 per cent.

In 2009, Australia's oil production fell by 22 per cent to 94.2 million barrels, the lowest rate of production since 1973, while condensate production increased by 19 per cent to a record 57.6 million barrels. LPG production declined by 6 per cent to 24.9 million barrels *(APPEA 2010)*.

Note that the target has been modified to include the production of naturally occurring LPG so as to provide a more complete comparison of petroleum liquids production with liquids consumption. Units of measurement in Figure 6 have also changed from barrels to petajoules (PJ) to better reflect differences in the energy content between products. These changes have reduced the production to consumption ratio in the base year (2006) from 57 per cent (as noted in previous strategy reports) to 55 per cent.

Figure 6: Australia's actual and projected liquid fuels production and consumption, 1975 to 2030



Source: APPEA 2010, ABARE 2010a, ABARE-BRS 2010d

New projects

No new major oil or gas/condensate projects with a capacity of at least 30,000 barrels a day (kbd) of liquids production were commissioned during 2009. However, two projects located in waters to the north of Exmouth commenced production in early 2010:

- The Van Gogh fields developed by Apache Energy and Inpex, costing A$658 million and with a production capacity of 63 kbd.
- The Pyrenees project developed by BHP Billiton and Apache Energy, costing A$2 billion and with an oil production capacity of 96 kbd and capable of reinjecting 60 million cubic feet (mcf) per day of gas for future recovery. The Pyrenees fields of Crosby, Ravensworth and Stickle have estimated recoverable oil reserves of 80–120 million barrels.

Oil production by the North West Shelf Project is expected to recover and field life will be extended when the Okha floating, production, storage and offtake vessel replaces the ageing Cossack Pioneer in early 2011. The A$1.8 billion North West Shelf Oil Redevelopment Project will extend the production life of the Cossack, Wanaea, Lambert and Hermes fields to beyond 2020.

Also under construction and planned to start-up in 2011 are two smaller gas/liquids projects in the offshore Gippsland–Otway region:

- Stage 1 of the Kipper project being developed by Esso Australia, BHP Billiton and Santos, costing US$1.1 billion, with capacities of 30 PJ a year of gas and 10 kbd of condensate.
- The Turrum project being developed by ExxonMobil and BHP Billiton, costing US$1.25 billion to produce up to 11 kbd of condensate and from 2015, 75 PJ a year of gas.

Future development options for the Basker–Manta–Gummy (BMG) project in the Bass Strait and in production since December 2006, are also under review following an unexpected downgrading of remaining reserves. In early 2010 the project operator, Roc Oil, announced that as a result of new reservoir modelling studies, remaining proved and probable reserves were being reduced by more than 80 per cent (from 18 million barrels to 3.1 million barrels).

The reserves to production (R/P) ratio (for Australian crude oil) has been relatively steady at around seven to ten years since the 1980s. However, it must be recognised that both production volumes and reserves have declined markedly in recent years. To date, around 80 per cent of the crude oil reserves discovered in Australia have been produced.

page 52, AERA 2010

Technical and financing difficulties have held back the development of two other liquids projects:

- the Montara oil project in the Timor Sea operated by PTTEP has been delayed as a result of the drilling and oil spill incident on the West Atlas rig during September–October 2009
- the Crux liquids project in the Timor Sea, operated by Nexus Energy, has all approvals in place so is ready to proceed subject to the finalisation of financing arrangements. Nexus Energy has stated that it is aiming to achieve a commercial outcome for the project by the end of 2010 with first liquids in 2013.

Beyond these projects, there is little on the horizon to help maintain Australia's oil production. There have been no major oil discoveries for many years and no new major projects (with reserves of 100 million barrels or more) are being planned. Therefore, oil production at least over the medium term and potentially beyond, is expected to steadily decline unless substantially more oil is discovered. As noted in *Platform for Prosperity*, it is Australia's large but mostly unexplored frontier areas that hold the greatest promise of such discoveries.

Increasing reliance on condensate production

Australia's demonstrated condensate resources are now almost twice as large as its crude oil resources—2750 million barrels compared to 1431 million barrels at 1 January 2009 *(page 52, AERA 2010)*. Most of these condensate resources are contained in a small number of large 'wet gas' fields in the Carnarvon, Browse and Bonaparte basins. The North West Shelf Project was the first to access some of these fields but from 2015, condensate production could step up as each new LNG project is commissioned.

In addition to 12.8 trillion cubic feet (tcf) of gas, the Ichthys field contains 527 million barrels of condensate which if developed as planned, could add 100 kbd to Australia's liquids production. Fields underpinning the Browse LNG development in the Kimberley are estimated to contain 360 million barrels of condensate (plus 13.3 tcf of gas) and from 2016 Timor Leste and Australia could be sharing revenues from the 5.1 tcf of gas and 226 million barrels of condensate underpinning the Sunrise project.

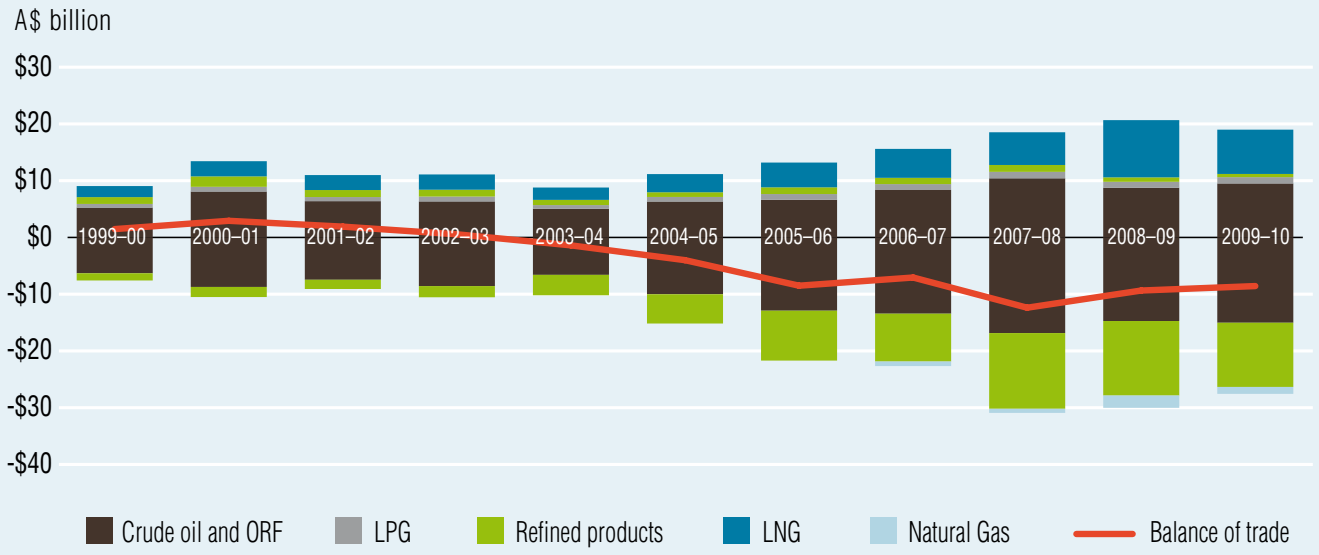
Condensate production from these projects could offset at least a part of, but probably not all, of the expected decline in oil production over the next decade. Although the reserves are large, condensate is co-produced with gas so production would be spread over a much longer period (typically several decades). Production will also only occur as the associated LNG projects are developed so delays to those will result in delays to any condensate-led recovery in Australia's liquids production.

Nor do all large gas fields enjoy the benefit of being liquids rich. The Gorgon project for example, has relatively dry gas and is expected to produce only around 22 kbd of condensate once the three LNG trains and domestic gas plant are operating at full capacity. Io-Jansz and Scarborough in the Carnarvon Basin are dry gas fields and there are no associated liquids with CSG produced for the proposed LNG projects in Queensland.

Petroleum trade balance

Declining liquids production over the past decade has been the main contributor to Australia's increasing petroleum trade deficit (Figure 7). Lower oil prices delivered an improved petroleum trade balance in 2009–10 with a deficit of $8.6 billion, compared to the record $12.4 billion recorded in 2007–08. However, unless major new oil fields are discovered and developed, the trend in Australia's petroleum trade is likely to be one of increasing deficits. Growth in LNG exports alone will not be sufficient to offset the rapidly increasing oil import bill.

Figure 7: Australia's petroleum trade, 1999–00 to 2009–10



Source: ABARE-BRS 2010e

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

3.2 LNG capacity

Australia's LNG production capacity is set to increase from 19.5 million tonnes per annum (mtpa) in 2010 to 38.8 mtpa from 2014 (Figure 8).

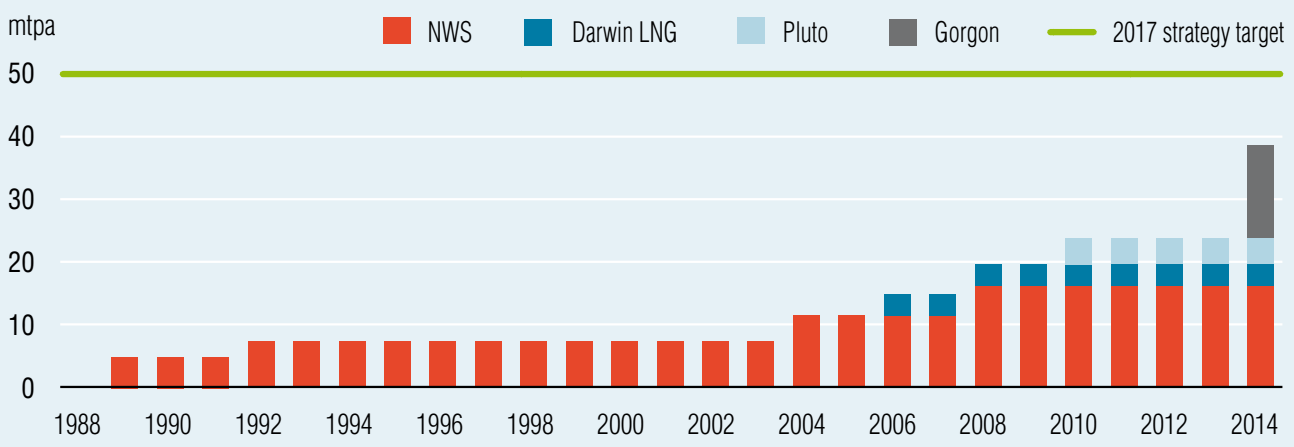
In addition to the 19.3 mtpa of capacity currently under construction (Pluto 4.3 mtpa and Gorgon 15 mtpa), at least 13 new projects and expansions, with a combined initial capacity of more than 90 mtpa, are being considered for development (Table 2). This comprises an expansion of the Pluto project, eight new LNG projects in Australia's north-west and four proposed CSG-LNG projects in Queensland. Not included in these figures are several other less advanced smaller projects being proposed for development in the north west, Queensland and onshore New South Wales.

Included among the north-west projects are three proposals for floating LNG (FLNG) whereby the gas is extracted, processed and exported offshore at or near the gas field, rather than being piped to shore for processing. This technology has been under development for many years and is being increasingly considered as a viable option for developing gas fields that would otherwise be too small or too remote to be commercial. In July 2009 Shell signed an agreement with Technip and Samsung for the design, construction and installation of multiple FLNG facilities over a period of up to 15 years. The first of these vessels is to be used to develop the Prelude and Concerto gas discoveries located 475 km north of Broome and containing around 2 tcf of gas. A vessel construction contract was awarded to Korea's Samsung Heavy Industries in April 2010.

Further to the north in the Bonaparte Basin, joint venturers in the Sunrise LNG project have agreed on Shell's FLNG technology as the preferred processing option for gas from the Greater Sunrise area. GDF Suez (one of Europe's leading energy companies), in partnership with Santos, is also planning a FLNG project to develop several small gas fields. Not included in the table are two other Timor Sea FLNG projects being proposed by Flex LNG and PTTEP.

The LNG projects being proposed in Queensland will be the first CSG-LNG projects in the world. A major point of differentiation from conventional LNG projects is that gas will be extracted from a large number of wells drilled into deep coal seams in the onshore Bowen and Surat basins, gathered via a network of pipelines and transported by pipeline to the LNG plant. Before being taken over by Shell and PetroChina, Arrow Energy for example had plans to drill 450 wells over an 18 month period using 16 drilling rigs and by 2012 develop a 467 km CSG pipeline to Gladstone. These projects face a different set of engineering challenges to conventional LNG projects based on large offshore gas fields requiring a relatively small number of wells.

Figure 8: Australia's LNG production capacity (existing and under construction)



As indicated in Table 2, most of the projects are targeting a final investment decision (marking the commencement of construction) in 2010 or 2011 with first gas production during the period 2013–16. However, it is far from certain that any of these projects will proceed within the timetables being proposed. Access to markets and finance will be key determinants, both of which have become more difficult as a result of the GFC, slowdown in global economic growth and changes in some of the world's largest gas markets. Projects are also likely to face increasing cost pressures as skilled labour shortages again re-emerge and as construction activity in this and other industries increases.

Table 2: Proposed major Australian LNG projects and expansions

Project	Participants	Location	Targeted FID	Targeted start-up	LNG Capacity (mtpa)	Capital cost
North-west conventional gas projects:						
Pluto 2 and 3	Woodside Energy	Carnarvon Basin, Burrup Peninsula	2011	2013 and 2014	2 x 4.3	na
Wheatstone LNG	Chevron, Apache Energy, Kufpec	Carnarvon Basin, Onslow	2nd half 2011	2016	8.6	US$17.8b
Ichthys	Inpex, Total	Browse Basin, Darwin	2011	2016	8.4	US$20b
Browse LNG	Woodside Energy, BP, BHP Billiton, Chevron, Shell	Browse Basin	2012	2016	12	na
Sunrise	Woodside Energy, Shell, ConocoPhillips, Osaka Gas	Bonaparte Basin (floating LNG)	2012	2016	4	na
Prelude	Shell	Browse Basin (floating LNG)	2011	2016	3.5	US$5b
Scarborough Gas	ExxonMobil, BHP Billiton	Carnarvon Basin, Onslow	na	na	6	na
Bonaparte	GDF Suez Santos	Bonaparte Basin (floating LNG)	2013	2017	2	na
Tassie Shoal LNG and Methanol Project	Methanol Australia, Air Products and Chemicals	Timor Sea	na	na	3 mtpa LNG 2 x 1.75mtpa methanol	na
Queensland CSG to LNG projects:						
Gladstone LNG	Santos, Petronas	Gladstone	2010	2014	3.5 initially 10 ultimately	$A7.7b (inc 1 train)
Curtis LNG	BG Group	Gladstone	Late 2010	2014	7.4 initially 12 ultimately	$A8b
Australia Pacific LNG	Origin, ConocoPhillips	Gladstone	Late 2010	2014–15	7–8 initially, 14–16 ultimately	$A35b (inc 4 trains)
CS CSG	Shell, PetroChina	Gladstone	2011	2014	16	na

Source: ABARE 2010c

Unprecedented capacity growth globally

Finding sufficient gas customers to sign the long-term gas supply contracts needed to underwrite high-cost LNG projects is set to become increasingly difficult. In its *2010 Medium Term Oil and Gas Markets* (MTOGM) review, the IEA stated that the world currently has a glut of gas which will take some time to be eliminated. World gas demand fell by an unprecedented 3 per cent in 2009, the biggest decline since the 1970s. According to the IEA's annual gas statistics, world gas demand has fallen only twice, in 1975 and 1992, and never by more than 1 per cent. Gas demand in India and China will continue to grow strongly but OECD gas demand is expected to recover only slowly, with an expected return to 2008 levels by about 2012. At the same time two revolutions have occurred in gas supply, namely a 50 per cent increase in world LNG production capacity over five years plus a revolution in North American gas production.

An unexpected boom in unconventional gas production in the USA and Canada since 2006–07 has transformed the gas market outlook in North America with flow-on effects to other parts of the world. New technology has enabled shale gas to be developed at a cost of US$3–5 per Mmbtu which, combined with reduced demand, led to a steep drop in US gas prices from US$13–14 per Mmbtu in mid-2008 to a low of US$1.85 per Mmbtu in mid September 2009. Moreover this is a large gas resource that can deliver low-cost gas for decades to come. The IEA predicts that the share of unconventional gas in total US gas production will rise from over 50 per cent in 2008 to nearly 60 per cent in 2030. Unconventional gas output worldwide is expected to increase by over 70 per cent to account for 15 per cent of total gas production in 2030, compared to 12 per cent in 2007 *(page 12, IEA 2009)*.

As well as reducing gas prices, the rapid growth in unconventional gas production in North America has dramatically reduced the previously bullish projections for LNG imports into the US. In 2005, the IEA expected US LNG imports to reach around 38 million tonnes in 2008 and over 50 million tonnes in 2010. However, US LNG imports fell to less than 8 million tonnes in 2008, less than half the level of 2007. Imports recovered slightly to around 10 million tonnes in 2009, still only utilising around 10 per cent of the USA's regasification capacity *(IEA 2010)* and future growth is expected to be significantly less than was previously envisaged.

The rise of unconventional gas in North America has had regional and global consequences, and raises the question of whether such a revolution is possible outside the United States. Many countries, including Australia, China, India, European and Latin American countries, are investigating their unconventional gas potential. While prospects look quite good in Australia, which already produces some unconventional gas, and Asia, the effective development of unconventional gas in Europe, MENA (Middle East and North Africa) or Latin America will face more challenges.

page 181, IEA 2010

Reduced US demand for LNG has freed up gas for other markets, with some 15 million tonnes of LNG being diverted from the Atlantic to the Pacific markets in 2008. This added further pressure on Pacific LNG prices, already declining as a result of recession-induced falls in demand and markedly lower oil prices.

A rapidly increasing LNG supply base is also having a major impact on the world LNG market. In 2009 global LNG capacity increased by a massive 49 mtpa or 25 per cent and a further 11 mtpa of capacity was brought on-line during January to April 2010. This is expected to continue with projects currently under construction expected to take the world's LNG production capacity to 299 mtpa in 2013, a more than 50 per cent increase on capacity at the end of 2008 (see Table 3).

Growth in world liquefaction capacity includes a more than doubling of Qatar's capacity from 29 mtpa at the end of 2008 to 77 mtpa in 2012. By 2015, projects currently underway will take Australia's LNG production capacity to around 39 mtpa whereas Qatar's will rise to 121 mtpa. The IEA has suggested that Qatar's capacity could rise to as much as 165 mtpa by 2030 if the current moratorium on new export projects is lifted.

Nor are Australia and Qatar the only countries seeking to expand their LNG businesses. As indicated in Table 3, of the 15 countries with an LNG industry at the end of 2008, seven have expansion programs underway. In addition, four new countries will commence LNG exports by 2013.

Table 3: Natural gas liquefaction capacity

Country	Capacity end 2008	Under construction	Capacity end 2013
Producers currently expanding			
Algeria	21	9	30
Australia[1]	20	4	24
Equatorial Guinea	1	2	3
Indonesia	28	7	35
Malaysia	23	1	24
Nigeria	18	5	23
Qatar	29	48	77
Producers not currently expanding			
Brunei	7	0	7
Egypt	12	0	12
Libya	1	0	1
Norway	4	0	4
Oman	11	0	11
Trinidad and Tobago	15	0	15
United Arab Emirates	6	0	6
United States	1	0	1
New producers			
Angola	0	5	5
Peru	0	4	4
Russia	0	10	10
Yemen	0	7	7
World	**197**	**102**	**299**

1 Adjusted to include NWS Train 5 in end-2008 capacity.

Source: IEA 2009

By then, a fifth new producer, PNG may also be about to enter the LNG business with projects including:

- the PNG LNG project operated by ExxonMobil and including Santos and Oil Search as partners, is currently under construction following a final investment decision in December 2009. It is a two train project with capacity of 6.6 mtpa, costing US$15 billion and expected to commence production in 2014
- the Liquid Niugini Gas Project being proposed by InterOil Corporation and Pacific LNG with an initial 5 mtpa train to commence production in 2014 or 2015
- several smaller project proposals including Liquefied Natural Gas Ltd's plan for a 1.3 mtpa LNG plant, proposals by Flex LNG (a Norwegian FLNG specialist) to develop a 1.5 mtpa FLNG project and opportunities being pursued by an Indian consortium (Petronet LNG) and Eni SpA.

The IEA cautions that not all of the growth in capacity will immediately translate into higher sales as in the past many start-up delays have been observed as well as unplanned outages among existing as well as new plants. Hence a more gradual but still very significant increase in LNG trade is anticipated during the period 2010–15 *(page 169, IEA 2010)*.

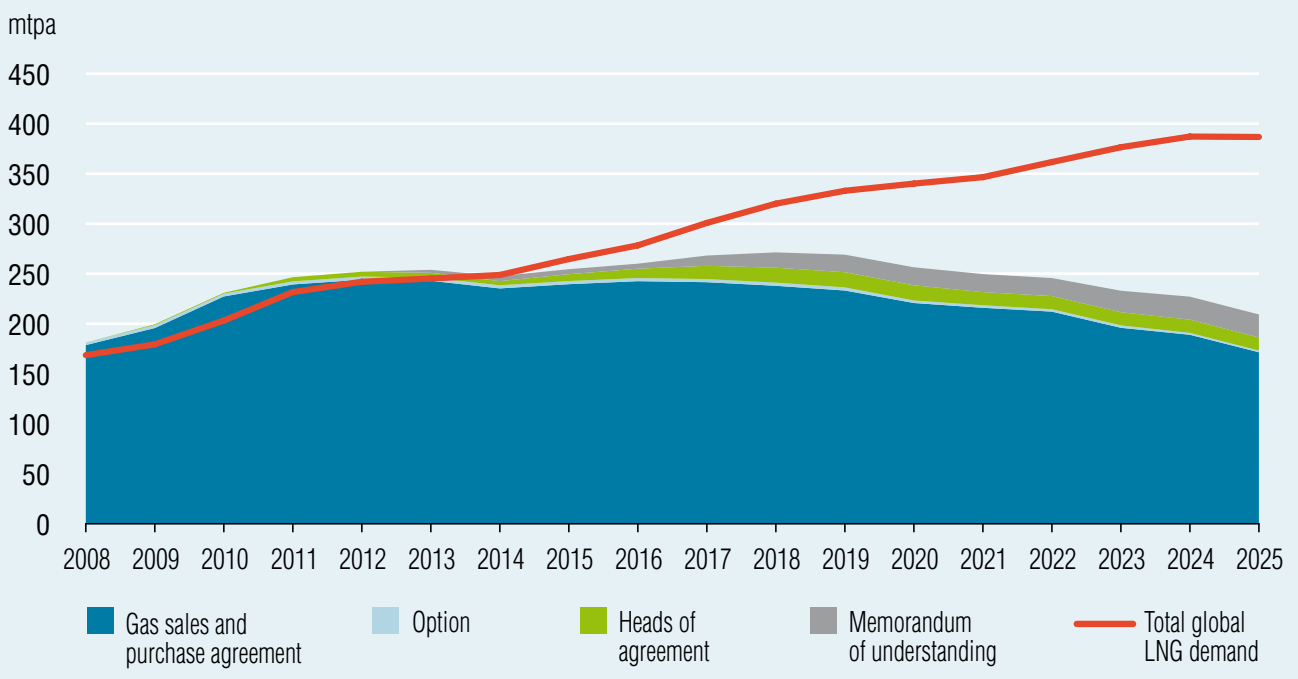
Reduced demand growth

At the same time as unconventional gas production and LNG supply are growing rapidly, projections of global LNG demand growth have been substantially revised downwards as a result of the slowdown in the world economy. The IEA suggests that the most daunting question faced by the gas industry is the duration of the gas glut and how it will play out in different markets, perhaps disappearing within a few years in Asia but lingering until at least 2015 in the Atlantic basin and Europe in particular *(page 142, IEA 2010)*.

In the 2009 *World Energy Outlook* (IEA 2009) the IEA estimated that in the period 2012–15 the utilisation rate of the world's inter-regional gas pipelines and liquefaction capacity will drop to around 73 per cent. This equates to 200 billion cubic metres a year of spare gas production capacity. Pipeline gas will be most affected but LNG producers may be forced to accept lower prices for uncontracted spare capacity sold on the spot market.

Beyond this period, analysts start to see a gap emerge between increasing LNG demand and LNG capacity currently in place or under construction. As indicated in Figure 9, Wood Mackenzie has estimated that global LNG demand will increase from 203 mtpa in 2010 to 340 mtpa in 2020. While demand and supply capacity are closely matched over the next few years, uncontracted demand (the difference between expected demand and currently contracted supply) begins to increase rapidly after 2014 to reach around 90 mtpa in 2020 and more than double that by 2025. At the APPEA Conference in May 2010, Shell stated that it expected global LNG demand to grow to between 350 and 400 million tonnes a year by 2020. In the Asia Pacific market alone, demand is expected to increase from 120 mtpa in 2010 to around 180 mtpa in 2020, about 60 mtpa of which is as yet uncontracted.

Figure 9: Global LNG demand and contracted supply, 2008 to 2025



Source: Wood Mackenzie (LNG Tool August 2010)

Sliding spot prices for LNG could also increase the pressure on gas exporters and marketers in Europe and Asia–Pacific to move away from, or to adjust, the formal linkages between gas and oil prices in long-term contracts.

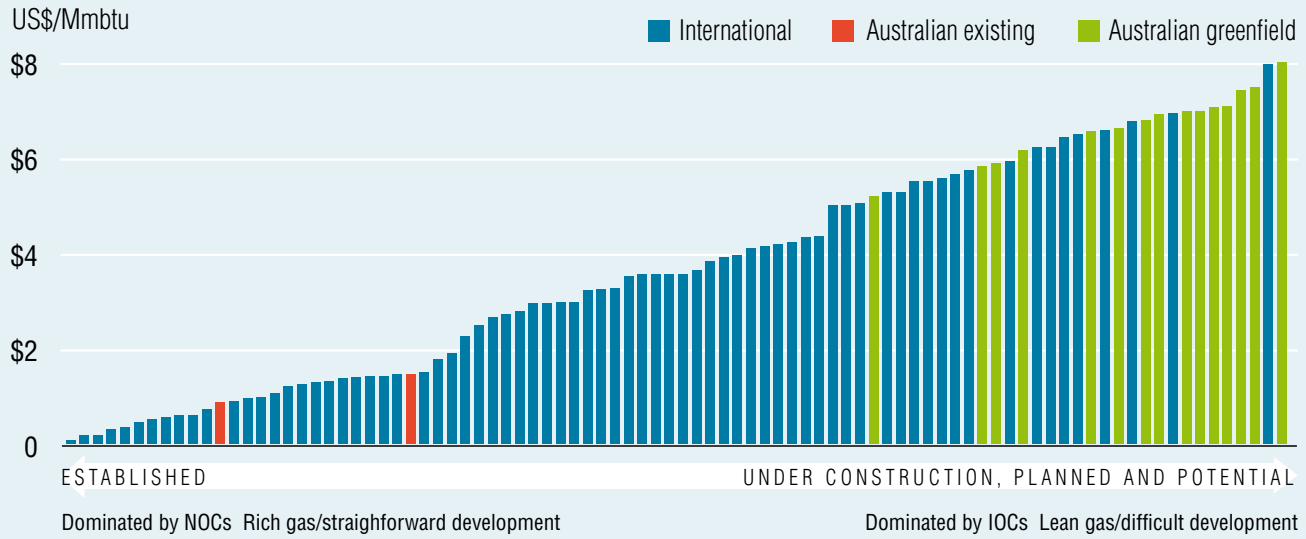
Executive Summary, IEA 2009

Australia's competitive position

As indicated in Figure 10, most of the new LNG projects being proposed for development in Australia are relatively high cost, compared to other operating and proposed projects around the world. Qatar in particular, presents a major challenge to Australia's LNG growth aspirations. Qatar has much larger gas resources (the North Field alone is estimated to contain 883 tcf of gas) and much lower costs than Australia which enables it to undercut Australia's relatively high-cost projects. Many of Qatar's contracts also have the flexibility to redirect cargoes originally destined for the Atlantic Basin to the most attractive markets, should demand growth weaken or unconventional gas production continue to rapidly increase in the North American and European markets. This means that Qatar could significantly increase its presence in the Asia Pacific market so it poses a real threat to Australian projects yet to secure customers.

In conclusion, Australia has plenty of LNG project proposals which should enable the 50 mtpa by 2017 target to be exceeded. However, Australian projects are not only competing amongst themselves for LNG markets, capital, skilled labour and construction capability but also face strong competition from lower-cost projects overseas.

Figure 10: Liquefied natural gas project cost profile, 2010



Proposed Australian project expansions (Pluto and Darwin LNG expansions) are excluded and Australian projects under construction (Pluto and Gorgon) are classified as greenfield.

For existing projects the unit cost calculation depreciates capital expenditure, so for older projects (after ten years) only operating costs are taken into account.

Source: IHS CERA August 2010

By 2017, natural gas use for industrial purposes and as a competitive feedstock for resources processing doubles.

3.3 Industrial gas usage

On current indications, this target is unlikely to be met. The GFC induced slowdown in the Australian and global economies has reduced gas demand growth in some sections of the Australian gas market, with for example, a number of gas-intensive mining or processing projects in WA being deferred. The uncertain impact of the possible resource taxation reforms could also be undermining investor confidence in these types of projects.

Gas consumption in Australia's manufacturing industry declined by 3.6 per cent in 2008–09 (to 400.0 PJ) and was 1.1 per cent lower than in 2005–06 (404.5 PJ). Just over half of the gas consumed in manufacturing is used in the production of basic non-ferrous metals and basic chemicals. Over the four-year period to 2008–09, gas consumption in the production of basic non-ferrous metals has fluctuated around 138 PJ. However, gas consumption in the production of basic chemicals declined by 13 per cent in 2008–09 to be 11 per cent lower than in 2005–06. Gas consumption in the production of iron and steel has also fallen heavily (20 per cent over one year and 15 per cent over four years). The only sector to record significant growth in gas consumption since 2005–06 has been the cement industry with 30 per cent growth to 2008–09 (although still 1.6 per cent less than in 2007–08). This is a relatively small sector accounting for just 24.3PJ or six per cent of manufacturing gas consumption in 2008–09 *(ABARE-BRS 2010d)*.

The inability to achieve rates of growth consistent with the target is due to a lack of gas demand growth, not constraints on gas supply. Supply capacity and diversity in the eastern states market has increased as a result of the rapid expansion of the CSG industry and producers of both conventional gas and CSG are keen to capture new customers. In the west, supply is set to rapidly increase as new projects are developed.

WA domestic gas production capacity is expected to increase by more than 50 per cent by 2015 as three new gas projects now under construction are progressively brought into production (see Figure 11). Towards the end of 2011 Apache Energy is expected to commission the Devil Creek Development Project with a production capcity of around 200 terajoules per day (TJ/d). In 2013, BHP Billiton and Apache Energy expect to commence gas production from the offshore Macedon field processed through a gas plant being constructed near Onslow. This plant will also have a capacity of around 200 TJ/d. Another two years later (in 2015), Chevron is expected to commission a new 150 TJ/d domestic gas plant as part of the Gorgon project, with plans to expand capacity to 300 TJ/d by 2020.

These three projects will greatly enhance WA's domestic gas supply security by increasing the number of major gas production hubs in the state from the two now operating (Varanus Island and the North West Shelf Project) to five.

Other new sources of gas supply are also being planned subject to customer demand:

- Chevron Australia is proposing that the Wheatstone LNG project include a domestic gas plant with a capacity of 200 TJ/d commencing production in 2016.
- Woodside's Pluto project could start supplying gas to the domestic market later this decade if economic to do so, following an evaluation to be conducted after the commencement of Pluto's LNG exports.
- Market forces are also encouraging a range of innovative supply solutions. The Warro Gas Field Development for example, has seen Latent Petroleum Limited and Alcoa form a joint venture to appraise and develop the Warro gas field north of Perth. A range of other onshore 'tight gas' fields are being actively appraised and onshore exploration is taking place in the Canning Basin (again with support from Alcoa). Rapid growth in the production of CSG in eastern Australia and shale gas in the US is also triggering interest in WA's CSG and shale gas potential with several drilling programs now underway or being planned.

Given all of these opportunities, Western Australia's gas plant capacity could double within the next ten years if there are enough customers willing to sign up to long-term contracts to support the required investment in new projects and suppliers are able to maintain production from currently installed capacity.

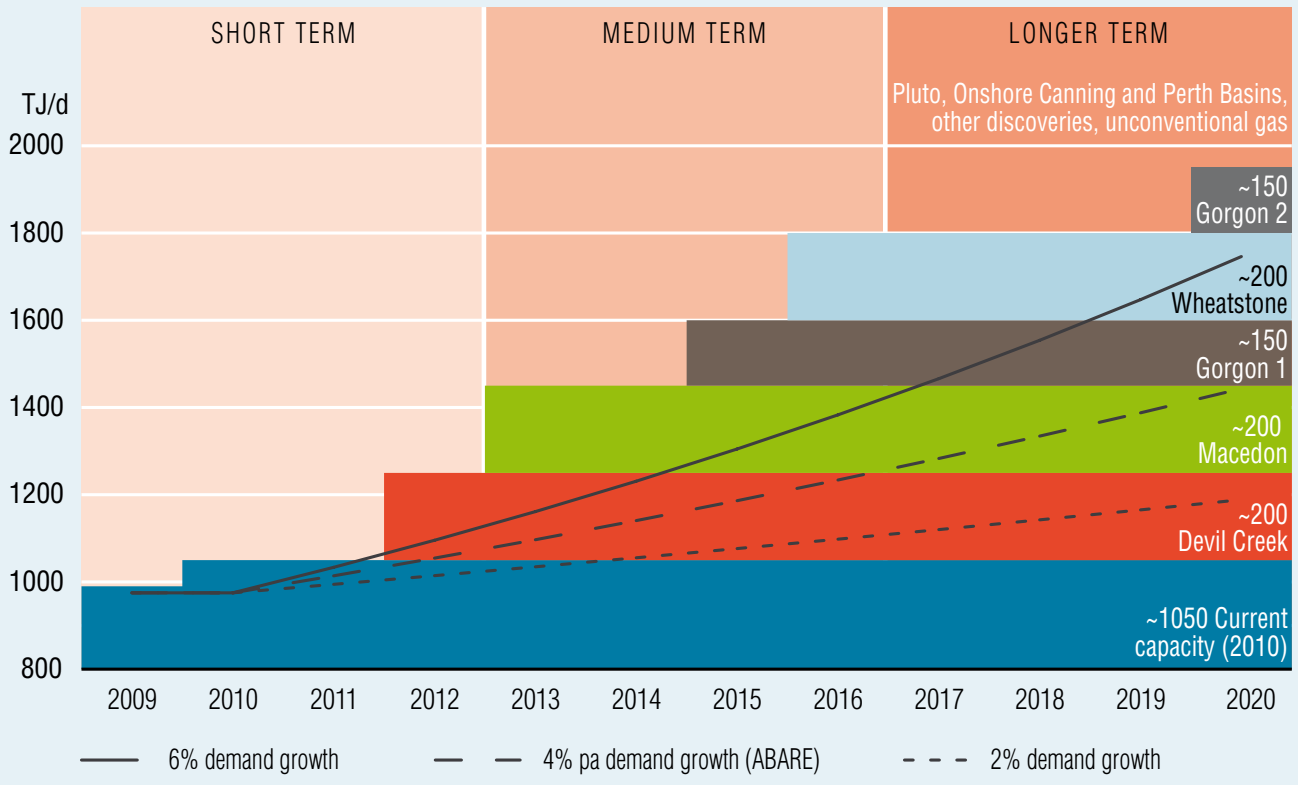
The large CSG reserves in Queensland and New South Wales are capable of being incrementally developed to meet much of the growing demand for gas in the eastern states market. CSG production has grown rapidly over the past decade, from under 20 PJ in 2000 to 184 PJ in 2009 including growth of 25 per cent in 2009 *(APPEA 2010)*.

A number of conventional gas projects in the eastern states are also under construction or are at advanced stages of planning *(page 123, AERA 2010)*:

- the Longtom project in the Bass Strait, costing A$300 million and operated by Nexus Energy, commenced production in October 2009 at an initial rate of around 68 TJ/d
- the Henry gas project in the offshore Otway Basin (A$275 million, Santos/AWE/Mitsui) commenced production in February 2010 with a capacity of 30 TJ/d
- Stage 1 of the Kipper gas/liquids project and the Turrum gas/liquids project are scheduled to commence gas production in 2011 and 2015 respectively (see section 3.1 above).

At a less advanced stage of planning, Stage 2 of the Kipper project could provide an additional 74 TJ/d of capacity from 2015. However, the future of the Basker-Manta-Gummy gas project proposed by Roc Oil and Beach Energy is under review following a major downgrading of reserves earlier this year.

Figure 11: Projected WA gas plant capacity and gas demand, 2009 to 2030



Source: DMP, ABARE

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

3.4 Gas-fired electricity generation

As noted previously, the achievement of this target hinges on the development of a competitive electricity and gas market without tax- and subsidy-related distortions (as proposed in option 6.5, section 4.6 of this report). Without that, it will not be possible to achieve the goal of 70 per cent of all new generation capacity installed in Australia over the decade to 2017 being gas fired.

Over recent years a number of reforms have been implemented to improve the competitiveness of Australia's electricity and gas markets. Public utilities in several states have been privatised, prices deregulated (to a degree) and markets opened up to greater supply competition. A gas Short-Term Trading Market (STTM) commenced operation in Adelaide and Sydney on 1 September 2010 (in addition to the Victorian market that has been in operation since 1999) and an additional Brisbane hub is to be added to the STTM in 2011. The Queensland Government has also initiated an *Annual Gas Market Review* process to analyse the operation of the gas market in Queensland.

Some policies continue to limit the penetration of gas in electricity generation. The expanded RET, whereby 20 per cent of all electricity generation is to be sourced from renewables by 2020, is likely to competitively disadvantage stand-alone gas-fired generation. Paradoxically, under increased pressure to offset the higher costs of renewable energy, electricity generators are likely to maintain or even increase lower-cost but high emissions-intensity coal-fired generation.

The proposed introduction of a MRRT on coal and extension of the PRRT to onshore gas could also perpetuate the current tax distortion between fuels whereby gas used for electricity generation and other domestic purposes is taxed at a higher rate than coal. Government should be moving towards removing distortions.

Restrictions on where gas from large, high-cost offshore gas fields off the coast of Western Australia can be marketed reduce the viability of those projects. Hence in the long run, they reduce investment and supply competition in the West Australian domestic gas market, including competition in electricity generation.

While the following analysis of electricity generation projects commissioned over recent years may provide some indication of progress towards the target, the main focus of attention needs to be on eliminating market distortions and impediments to investment.

Generation capacity commissioned since 2007

Energy Supply Association of Australia figures indicate that 9842 MW of electricity generation capacity has been commissioned in Australia since 2007 or is currently under construction and is due to be commissioned by 2012 (*ESAA 2010*). Of this, 12.2 per cent is coal fired, 66.7 per cent gas fired, 20.8 per cent utilises renewable forms of energy (mostly wind plus some hydro) and 0.3 per cent oil products. *State of the Industry 2009* reported that the gas-fired share to early 2009 was 63 per cent so the utilisation of gas in new generating capacity is increasing and is approaching the strategy's 70 per cent target.

Will the target be achieved and sustained? A listing of electricity generation projects published by the Australian Bureau of Agricultural and Resource Economics (ABARE) in May 2010 (*ABARE 2010b*) casts doubt on this since only five of the 15 'advanced' projects (committed or under construction) are gas fired (one using CSG and four using conventional gas). These account for 57 per cent of the total capacity of Australia's advanced electricity generation projects and comprise:

- Origin Energy's Darling Downs Power Station in Queensland with a capacity of 630 megawatts (MW) and scheduled to be completed by the end of 2010 at a cost of $951 million (including a gas pipeline)
- Origin Energy's Mortlake Stage 1 project in Victoria with a capacity of 550 MW and expected to start-up in late 2010 at a cost of $640 million
- Verve Energy's refurbishment of the Kwinana Power Station in Western Australia resulting in the installation of 200 MW of gas-fired capacity with an expected start-up date of late 2011, costing $263 million
- Perth Energy's 120 MW Kwinana Swift project which started operations in August 2010 and cost $130 million
- NT Power and Water Corporation's Owen Springs project due to start-up this year with a capacity of 33 MW and cost of $126 million.

Gas projects are less dominant in ABARE's listing of less advanced projects (still undergoing feasibility study or not subject to a definite decision on development). Of the 127 less advanced projects, 32 (or 25 per cent) are based on conventional gas or CSG. These

account for 36 per cent of the potential capacity from all less advanced projects, well short of the strategy's 70 per cent target.

Nine renewable energy projects account for 34 per cent of the total capacity of Australia's advanced projects. In the future, renewable energy projects could match or exceed the contribution made by gas with 82 less advanced renewables projects being proposed, accounting for 39 per cent of total potential capacity (compared to the potential gas share of 36 per cent). Of these, 72 are wind farms.

The significant number of proposed wind powered electricity projects, in part, reflects the RET and the cost competitiveness of wind relative to other less mature renewable energy technologies.

ABARE 2010b

Assuming no change in load factors, increases in the amount of electricity generated from gas could be used to approximate the growth in gas-fired generation capacity. Energy projections published by the ABARE *(ABARE 2010a)* suggest that 75 per cent of the additional electricity generated in Australia in 2029–30, compared to 2007–08, will be generated from gas. Total electricity generation is projected to rise by 119 terawatt hours (TWh) from 247 TWh in 2007–08 to 366 TWh in 2029–30. Gas-fired generation is expected to increase by 89 TWh (from 46 TWh to 135 TWh). ABARE's projections if realised, suggest that the strategy's 70 per cent target could be achievable over a longer period. However, the dominance of renewables projects in ABARE's major project listings suggests that this is unlikely to be achieved in the short term.

4 Progress on high value-adding priorities

This part of the report reviews progress towards implementing options for addressing the strategy's high value-adding priorities. During 2009 the priorities and options were reviewed in light of changes within the industry and the external environment since the publication of *Platform for Prosperity* in 2007. There are still seven high value-adding priorities but the list has been modified in two ways.

Firstly, the priority around improving and better coordinating research and development has been considered and actions completed. The conclusion was reached that the fundamental linkages between the industry and researchers and associated funding mechanisms are working efficiently and there are no major shortcomings or market failures in the way that research is organised and funded that could prevent the strategy's targets from being achieved. Issues and incremental changes to policies and/or programs around petroleum research will continue to arise but these should be able to be addressed through established consultative mechanisms and processes. Hence, this priority has been deleted from further consideration within the Upstream Oil and Gas Industry Strategy.

Secondly, the original priority relating to environmental and safety management has been split into two priorities in recognition of the importance and distinct nature of each of these areas.

The 65 options in *Platform for Prosperity* have been reviewed and reduced to 22 options. Those that have been implemented or require no further action have been deleted, some duplication of actions has been removed and in other cases options have been grouped under a common strategic theme. This rationalisation of options makes it possible to consider progress on all of them rather than just on a subset of 'key options' as occurred in previous implementation reports.

Another significant administrative change is that all of the regulatory aspects of safety and environmental management are now covered by options within the priority related to improving regulatory and approvals processes. Previously, environmental regulation for example was divided between the two priorities related to regulation and environmental management which created a degree of duplication and confusion. Now all related regulatory and approvals issues are covered by the regulation and approvals priority. The priorities related to environmental management and safety management relate specifically to actions led by industry to improve industry performance in those areas. These may be supported by or be undertaken in concert with governments (and may result in changes to regulation or approvals processes), but are primarily driven by a desire to improve performance.

Each of the following sections begins by re-stating the objective for that priority followed by the revised options for achieving it. A brief background section reviews and updates evidence about the importance of the priority and need for change followed by a summary of steps taken so far towards the implementation of the proposed options. Each section then concludes with some thoughts on how the options and priority are likely to move forward in the year ahead.

4.1 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 information on the industry's safety and health experience and performance is accurate and clearly understood by all relevant stakeholders.

KEY OPTIONS

1.1 The CEO Safety Leadership Forum established in 2007 demonstrates high level commitment and direction to safety management, continues to assess and implement new opportunities and strategies for improving safety performance and responds to changes in risks and performance (such as the current need for a greater focus on process safety and the integrity of ageing facilities).

1.2 Develop multiple levels and forms of data collection and information sharing across the industry including annual safety performance benchmarking, improvements to the APPEA safety alert system and more targeted communication methods.

1.3 Work with contractors to ensure that high standards of safety performance and management are maintained across all elements of the workforce, particularly as gas-related construction activity increases to potentially unprecedented levels.

BACKGROUND

Platform for Prosperity noted that the industry must provide a safe working environment if it is to maintain community support and attract and retain the workers needed to sustain growth and meet the strategy's production targets.

The Australian upstream oil and gas industry has a strong commitment to safety and has long been one of the best safety performers of any industry in Australia. Figure 12 compares safety performance in terms of the number of injuries sustained per million hours worked.

As indicated in Figure 13, the performance of the Australian petroleum industry has improved over time with lost time injuries per million hours worked falling from 3.46 in 1996 to 1.22 in 2009.

Statistics published by NOPSA indicate that injury and accident rates again declined during the first half of 2010 *(NOPSA 2010)*. However, the number of accidents and dangerous occurrences recorded for the first six months of 2010 (15 and 178 respectively) is 13 per cent higher than the previous six months (July to December 2009). In particular, the dangerous occurrence rate (dangerous occurrences per million hours worked) increased markedly during the first half of 2010 for the following incident categories: unplanned events, gas releases and damage to safety-critical equipment. The rate of uncontrolled gas releases almost doubled with 20 gas releases occurring during this six-month period, three of which involved substantial quantities of gas (more than 300 kilograms). Uncontrolled hydrocarbon releases are of particular concern due to their potential ignition.

The safety performance of the Australian oil and gas industry has also not matched that of many other countries. As indicated in Figure 14, in 2009 the total recordable injury rate in Australia among APPEA member companies was 6.00 injuries per million hours worked while the global average for this industry was 1.75. The global figure is based on a survey undertaken by the International Association of Oil and Gas Producers (OGP) and responses by 43 of its member companies with operations in 102 countries.

Figure 12: Safety performance across selected industries in Australia, 2007–08

Source: APPEA 2010, NOSI

The industry needs to continue to have a constant focus on safety and reduce the frequency of incidents by:

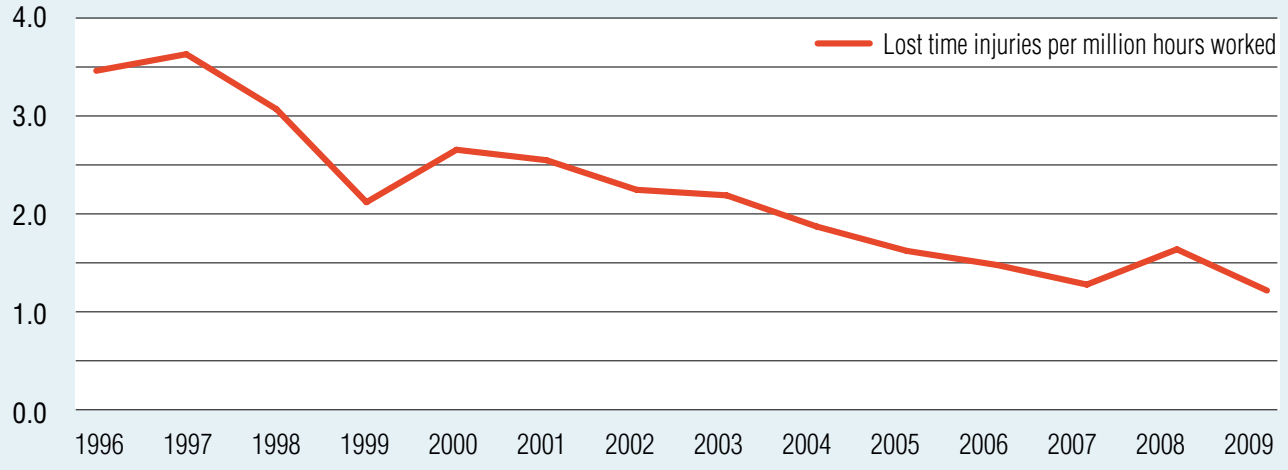
- maintaining a strong, high-level commitment to identifying and addressing factors that detract from safety performance and to developing and implementing new collaborative safety initiatives (option 1.1)
- ensuring that contractors have the same commitment to performance and improvement and are fully engaged in developing solutions (option 1.3)
- further expanding the repertoire of methods used to collect data and share experiences about safety performance and management (option 1.2).

Further improvement is possible and necessary to ensure that, regardless of any unexpected events, all members of the workforce end the working day uninjured. It is fortunate that the disruption to gas supplies from Varanus Island and the oil leak from the West Atlas rig did not result in any serious injuries, but it is clear that more needs to be done to ensure that serious near-miss incidents such as these do not keep occurring.

New challenges continue to arise. The operations of the onshore CSG industry for example are quite different to those of the offshore conventional gas industry. Whereas offshore fields are generally accessed from a small number of high-flow wells, coal seam fields release gas at much lower rates and require a large number of wells to be drilled and connected via an extensive pipeline network. Hundreds of wells may be needed to support a large scale CSG–LNG project and the number of CSG drilling operators has grown rapidly to prove up the reserves needed for the variety of projects being proposed. The industry has a role to play in helping CSG drilling operators develop and implement safety procedures and approaches to safety management that are to the same standard as applies in the conventional gas industry.

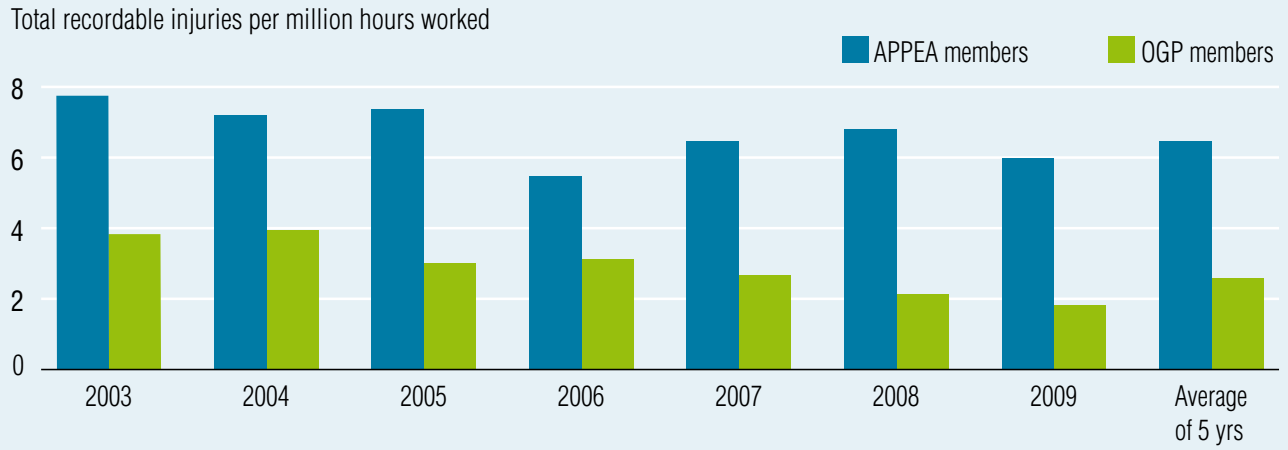
Also as the level of construction activity in the industry increases, particularly the construction of new LNG projects or expansions, so too does the risk of injury. As indicated in Figure 12, the injury rate in the construction industry has on average been considerably higher than that in the oil and gas industry. The figures for APPEA members included in the above diagrams include the construction of oil and gas facilities, so increasing levels of construction activity could result in higher rates of injury for the petroleum industry. Project proponents need to work with construction contractors to bring them up to the same safety standards and levels of performance as apply to oil and gas workers.

Figure 13: Australian upstream oil and gas safety performance, 1996 to 2009



Source: APPEA 2010

Figure 14: International comparison of petroleum industry safety, 2003 to 2009



Source: APPEA 2010, OGP

ACTION TO DATE

The CEO Safety Leadership Forum established in August 2007 has continued to provide a high level focus on the importance of safety management and options for improving the industry's safety performance. Key areas of attention over the past three years have included:

- a desire to better understand and influence the international standards applying to the oil and gas industry, including an International Standards Workshop held in Perth in February 2009
- joint activities with NOPSA including a joint Facility Integrity Workshop held in July 2009 and a workshop on Asset Integrity-Ageing Facilities to be held later this year
- the development and trial (in 2009) of three leading indicators of safety performance and commencement of work on a new potential leading indicator based on a measurement of safety culture
- the development of a Standard of Competence for Offshore Oil and Gas Construction Supervisors that covers competencies required, training methods, models for assessment and industry-wide recognition of assessment outcomes. The definition phase has been completed and the project is now moving into the development phase with funding and technical support from industry
- introduction of a requirement on operators to report high-potential incidents and an electronic system for sharing information to assist in the development of strategies for preventing major incidents
- support for other opportunities for networking and information sharing about safety, including APPEA's annual Oil and Gas Safety Conference, which has generally attracted about 400 delegates from all levels and parts of the industry
- avenues for further increasing participation in, and commitment to, safety management across all levels of the workforce such as the annual Stand Together for Safety event introduced in 2009
- improved training programs such as the development of a Common Safety Training Program (CSTP) for new entrants to the industry
- development of a Collaborative Safety Strategy that integrates the broad range of safety work that is currently undertaken into a common and highly-targeted approach based on risk.

Stand Together for Safety is a 'stop work' safety event that provides a designated time for executives and senior managers to talk about safety issues directly with frontline workers and to identify ways in which managers, supervisors and employees of oil and gas companies and their contractors can work together to bring about significant and sustained improvement. Feedback from the 2009 event indicated that it was an excellent opportunity for open dialogue, direct interaction with senior management and reinforcement of a common commitment to safety across all levels and all companies. In 2010, more than 22,000 workers in the industry participated and a website was established to enable participants to share ideas, success stories and other outcomes.

Since April 2010, completion of the CSTP has been a formal requirement for employment in the industry. The CSTP requires all new workers to complete industry approved training and demonstrate critical safety behaviours in their workplace to earn a 'Common Safety Training Card'. The timing of this initiative is vital, as over 20,000 new employees are anticipated to join the industry over the next few years. It will provide participants with a consistent set of foundation safety skills and ensure everyone understands and demonstrates required standards of safety performance.

In addition to the national CEOs Group, a Leadership Group of Chief Executives from the Queensland CSG industry was established in 2009 to drive improved safety performance in the CSG industry. Key focus areas for the group include emergency response capabilities, vehicle safety, common safety training, legislative clarity and fitness for work issues including fatigue and drug and alcohol standards.

WAY FORWARD

In addition to the industry-led initiatives arising out of the Montara and Macondo incidents outlined in section 2.1, priority will also be given to the development and implementation of the new Collaborative Safety Strategy referred to above. This will include new safety priorities and targets and new technical working groups with clear work plans and goals. This will be driven by the CEO Safety Leadership Forum with the aim of securing a whole of industry commitment to and intense focus on both personal and process safety.

A new Search and Rescue Working Group is also being established to review the industry's research and rescue capacity and to examine and make recommendations on the potential for additional collaborative initiatives and standards setting.

Recent major initiatives such as the Stand Together for Safety event and CSTP should be continued so as to fully engage the industry and generate lasting safety performance benefits.

In Queensland, key areas of focus by the CSG CEOs Leadership Group will continue to be progressed with new priorities added as work is completed.

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

OBJECTIVE

To achieve further improvement in environmental performance across the industry, thereby strengthening the ongoing case for regulatory reform and continued access to resources.

KEY OPTIONS

2.1 Develop and implement opportunities for reducing the industry's impact on the environment and improving management processes including:

- further development of the suite of precautions to prevent oil spills and techniques for minimising the consequences of a spill should one occur
- continuing research into the effects of sound exposure on marine mammals and development of management practices for seismic acquisition
- government policies and legislation to enable the CSG industry to effectively manage the production and potential re-use of water in an economically sustainable manner.

2.2 Industry to further develop and implement opportunities for research and information sharing:

- a commitment to environmental research and practices that do not simply meet but exceed statutory requirements
- providing mechanisms to ensure that all APPEA members have access to information, resources and environmental innovations to further improve their environmental performance
- fostering an accurate understanding of the industry's real (not perceived) environmental performance through annual collection and reporting of industry environment performance data.

BACKGROUND

The oil and gas industry recognises that a strong commitment to environmental performance is a key pre-requisite to increasing community and government awareness of the industry's performance and values and to achieving the strategy's production targets. As stated in *Platform for Prosperity*, the industry 'is committed to maintaining world-class environmental performance during all phases of its operations, seeking to continually improve its performance and achieve positive environmental outcomes'. Subsequent implementation reports have documented steps taken by the industry towards that goal including new areas of environmental research, the development of guidelines for seismic activity and an updated Code of Environmental Practice.

However, one or two high-profile incidents can overshadow the many positive achievements being made across the industry. As noted in section 2.1 above, the Montara and Macondo incidents have significantly reduced government and community confidence in the ability of the industry to operate safely in sensitive environments. The industry has already responded at a number of levels and in many ways and the findings from the Montara Commission of Inquiry and learnings from the Macondo incident will further guide industry and government responses.

Many of the CSG fields in Queensland and New South Wales also generate co-produced water. This will increase as the CSG industry expands to supply gas to LNG projects on the coast as well as meeting growth in domestic gas demand. Landholders in south-east Queensland are concerned about the impact of the CSG industry operations on farming activities and water tables. The industry is committed to working with landholders to minimise the environmental impacts of drilling and construction activities and disruption to farming activities.

ACTION TO DATE

Over recent years the industry has given a high priority to better understanding and minimising the impact of sound exposure and seismic acquisition on marine mammals. A workshop of scientists was held in April 2009 and research into the hearing sensitivity of baleen whales, cumulative impacts and avoidance behaviour is continuing. As research continues, the industry undertakes a range of mitigation strategies including timing seismic exploration to avoid peak migration periods and adopting a whale exclusion zone when implementing soft-start procedures.

The upstream industry is actively participating in the Joint Industry Programme on E&P Sound and Marine Life which is about to commence a major study of the behavioural response of humpback whales to the sound generated by seismic sources. This is a $10 million research project that includes a number of Australian researchers in partnership with global marine sound and whale experts. The results will be used to guide the design and management of seismic surveys and mitigation procedures, will support the industry's ongoing case for access to marine areas and will demonstrate that petroleum operations can co-exist with ever-growing whale populations.

The industry has also been proactive in the adoption of other marine protection measures including the development of a new national guidance for managing biofouling. Developed by the Department of Agriculture, Fisheries and Forestry in consultation with APPEA, the guidance aims to minimise the risk of marine species and pests being translocated to and around Australia via biofouling on vessel hulls and in niche areas, sea chests or internal sea water systems. It is planned to complement the guidance with a vessel risk assessment system ahead of new legislative requirements making the guidance compulsory in 2011.

Geoscience Australia is working with oil and gas companies to archive environmental data and to use company data to build regional bathymetry and biodiversity maps that can be used for marine zone management.

The CSG industry has been working with the Queensland Government to determine how best to manage the large volumes of water that are often co-produced with gas. Origin Energy is currently building a second reverse osmosis water treatment plant to enable CSG water to be beneficially used (see the inset box). The government has signalled a move away from evaporation ponds, so the water extracted by the industry will either be injected back underground or beneficially used, for example in irrigation or stock watering.

With support from the Australian and New South Wales Governments, the industry has commissioned a study to collate quality data to assist in identifying any risks associated with mining and CSG development on water resources. The scope of the study is to be the whole of the Namoi Catchment in northern NSW.

Over the past two years the industry has continued to improve practices resulting in further improvements to its environmental performance. In 2008 APPEA launched an updated Code of Environmental Practice (the code) representing the latest edition since it was first released in 1977. The continual evolution of the code reflects changes in environmental challenges, community concerns and government policy making. The code covers planning for the full life-cycle of oil and gas project developments from surveys through to de-commissioning.

Origin Energy's reverse osmosis water treatment plant

Origin Energy is investing in the long-term management of both natural gas and water resources through its award winning reverse osmosis water treatment plant at the Spring Gully gas processing facility near Roma in south-west Queensland.

The $20 million state-of-the-art plant uses cutting edge water management and treatment technology to purify and desalinate water produced as part of the coal seam gas (CSG) extraction process and has the capacity to treat up to 12 million litres of water per day—equivalent to the daily water use of around 65,000 people.

Extracted water has a higher salt content and is generally unsuitable for consumption or use in agriculture. However, after reverse osmosis treatment, it is being used to irrigate nearby cereal crops as well as a large scale Pongamia plantation to be used in an exciting new biofuel trial.

A second reverse osmosis treatment plant at the Talinga gas processing facility near Chinchilla is currently in the advanced stages of commissioning. When completed, the plant will provide capacity to treat 20 million litres per day with scope to expand to 40 million litres per day.

Both plants and associated pipe networks represent a commitment to date of $97.5 million in converting water produced as part of CSG operations into a valuable, usable resource.

Protecting the environment on Barrow Island

The Gorgon Project's gas processing facilities on Barrow Island are being constructed within a 300 hectare ground disturbance limit, representing 1.3 per cent of the island's uncleared land mass. The island is home to a number of plant and animal species which have become rare or extinct on the Australian mainland and since 1967 the island has also been home to a producing oil field operated by Chevron. The island's biodiversity has been protected and will continue to be protected during the construction and operation of the Gorgon Project. Measures include the development of an extensive quarantine management system, the most comprehensive of its kind in the world, and innovative approaches to minimising land disturbance.

A Carbon Dioxide Seismic Baseline Survey was completed in 2009 as part of the Gorgon Joint Venture's $2 billion investment in the world's largest commercial-scale carbon dioxide injection facility. Through the use of helicopters and specially designed trucks and drilling rigs total ground disturbance was less than 19 hectares, compared with a normal disturbance area of 250 to 300 hectares of land for such surveys. Quarantine challenges associated with the importation of thousands of tonnes of survey equipment were also met by the enforcement of stringent quarantine requirements and the use of new equipment and redesigned packaging to reduce contamination risks and allow easier inspection.

The history of the code reflects the oil and gas industry's long-term commitment to environmental excellence. The code, to be adopted by all APPEA member companies, focuses on four key areas:

- complete and comprehensive environmental risk assessment
- making best use of technology and management practices to minimise environmental impacts
- stakeholder consultation
- achieving a corporate culture of continuous improvement and environmental awareness.

The industry believes maintaining a strong commitment to rigorous environmental research and focusing on evidence based policy will deliver economic and environmental benefits. Over the past three years alone, the industry has invested tens of millions of dollars to undertake dozens of new environmental studies, generating a wide range of research. These included studies on sound and other potential impacts on whales, turtles and other marine life as well as impact studies on fauna and flora, and studies on the effects of fluids and new technologies. Such project-related research generates wider community benefits by increasing scientific knowledge and understanding of the Australian environment.

Spillcon 2010, an international conference on the prevention and management of oil spills, was held in Melbourne in April 2010. It provided the opportunity for members of the Australian upstream industry and international operators to share experiences and learnings in this area.

WAY FORWARD

Environmental management priorities will continue to be directed towards enhancing the industry's environmental management reputation and social licence to operate. Aside from the regulatory aspects, the industry will need to proactively respond to the findings of the Montara Commission of Inquiry, the findings of the Independent Review of Offshore Safety Regulation and learnings from the Macondo incident to change procedures and take the actions necessary to achieving a sustained improvement to its environmental performance and reputation.

These could range from a reconsideration of oil spill response procedures, to approaches to the assessments and management of spills, communication protocols and the need for additional research in areas such as blowout prevention and subsea oil collection.

A greater effort is also needed to educate governments and the community about the industry's commitment to environmental management and performance. Over the past decade the industry has spent hundreds of millions of dollars on environmental baseline research, impact assessments and flora and fauna monitoring and research studies. It is one of Australia's largest supporters of environmental research but this is not widely recognised outside of the industry. More needs to be done to inform the community about this work and the very considerable efforts made by oil and gas companies to understand and protect the sensitive environments in which they operate.

One option that may be considered is the publication of an independent research publication that draws together all of the research and investigations by members of the industry and assesses the environmental impacts of oil and gas development on the marine environment. This would update similar research compendiums published in the mid-1990s and provide an independent, peer-reviewed assessment of the industry's environmental performance and ability to responsibly manage environmental impacts. It would also help companies avoid duplication and better target their research efforts and provide regulators with an independent reference.

The CSG industry will need to continue to consult stakeholders and landowners about the environmental impacts of CSG activity. Debate needs to be based on sound scientific research such as the Namoi Water Study now underway.

Priority will also be given to the identification and management of cooperative Australian research projects between industry and the Australian Government to bridge the gap in scientific opinion regarding the impacts of seismic exploration on whales and other marine species.

The industry will continue to investigate collaborative options for critical incident preparedness and response such as a mutual aid agreement or an industry response management group led by APPEA.

4.3 An improved framework for exploration

OBJECTIVE

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

OPTIONS

3.1 Increase public investment in onshore pre-competitive geoscience initiatives and maintain offshore programs so as to stimulate greater interest in frontier areas.

3.2 Develop and implement a package of measures for increasing frontier exploration. Measures could include:

- improved fiscal terms such as:
  - a 175 per cent company tax deduction for exploration expenses incurred in frontier areas and a broader definition of 'frontier' so as to increase the availability of incentives to a greater number of areas
  - introduction of a system of flow-through shares
- shorter timelines for releasing acreage and other licensing mechanisms that will encourage petroleum exploration in remote and frontier areas
- improved state/territory incentives for onshore frontier exploration.

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

- streamlined and expedited native title processes
- development of marine planning areas which minimise cost impacts on the industry and provide for continued exploration and production in prospective petroleum provinces.

3.4 Improved coordination of geoscientific data management systems among the various public institutions through the:

- adoption of common data management standards across all jurisdictions
- establishment of a national virtual geoscience library for the management of, and access to, petroleum data in all jurisdictions.

BACKGROUND

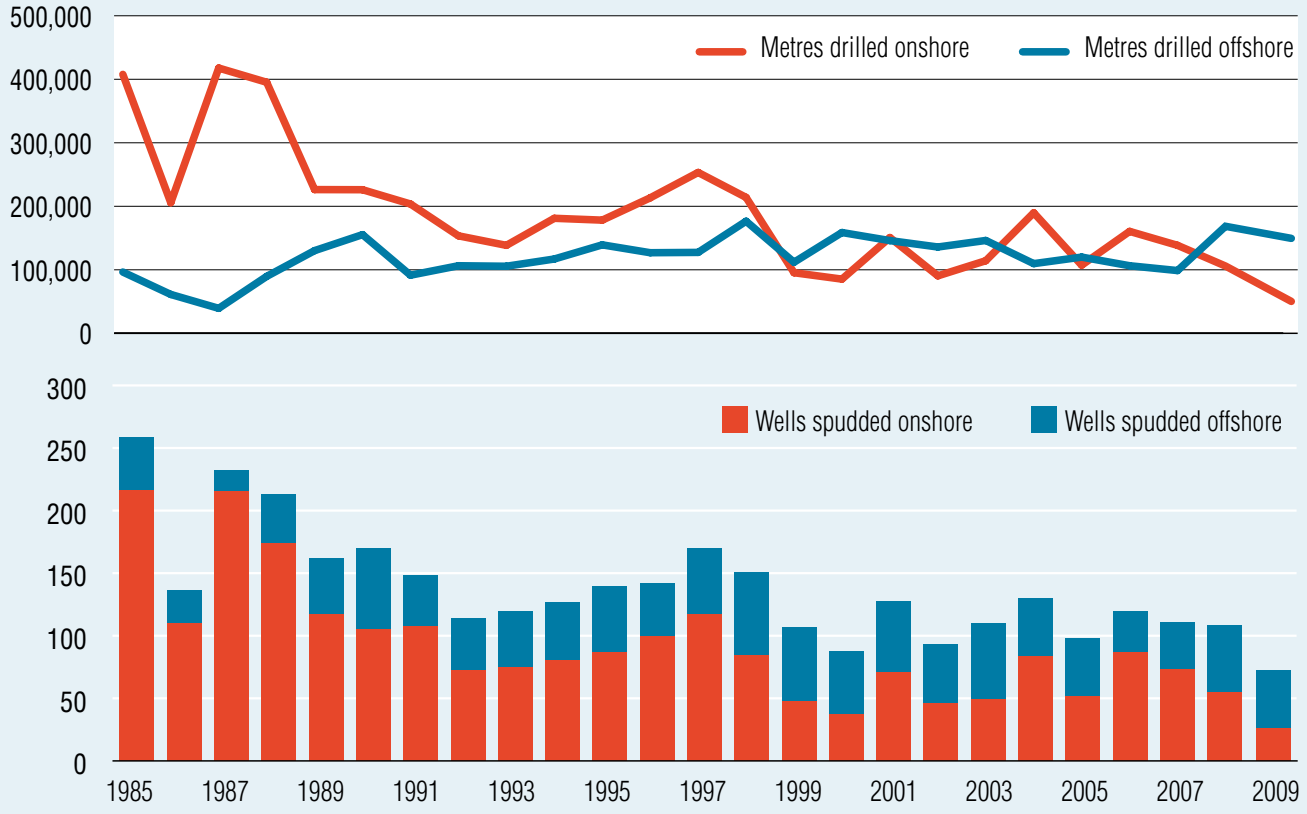
One of the strategy objectives is to ensure that the value of Australia's oil and gas resources to the Australian people is maximised. However, this can never be achieved while we still have such a poor understanding of the hydrocarbon potential of most of Australia's sedimentary basins. Only 27 per cent of Australia's petroleum basins are covered by petroleum titles – 18 per cent of offshore basins within Australia's economic exclusion zone and 35 per cent for onshore basins. While this is a welcome increase on the coverage rates of 20, 17 and 26 per cent respectively that applied in 2007 and were reported in *Platform for Prosperity*, it is still not enough.

Furthermore, in April 2008 the United Nations Convention on the Law of the Sea (UNCLOS) confirmed an additional 2.56 million square kilometres of extended continental shelf around the Australian mainland and its island external territories. Significant parts of this new marine jurisdiction (such as the outer parts of the Exmouth, Wallaby and Naturaliste plateaus, the South Tasman Rise and areas on the Lord Howe Rise) are underlain by potentially prospective basins. If these are included in the calculations, the area of offshore basins under permit is reduced to 15 per cent.

As indicated in Figure 15, petroleum exploration activity has not increased in recent years. Higher spending on exploration has been largely driven by rising costs, not higher levels of drilling or seismic acquisition. The number of exploration wells drilled onshore declined again in 2009 (as it has every year since 2006) due in part to the GFC-induced reduction in capital availability and fall in oil prices in 2008.

The main factor driving offshore exploration activity over recent years has been the increased market interest in gas and with rising gas prices (locally and globally), increased opportunities for commercialising gas discoveries. This has attracted a growing number of independent and national oil companies not previously active in Australia, to take up offshore acreage and commit to large exploration programs. US major Hess Corporation for example, has almost completed a 16-well campaign in a permit acquired in 2007 adjacent to the greater Gorgon area. Eleven of the first 14 exploration wells yielded new gas discoveries. National oil companies to recently commence or increase petroleum exploration in Australia include the China National Offshore Oil Corporation (CNOOC) exploring in the Bonaparte Basin, Thailand's national oil company PTTEP focusing on the Timor Sea and the Brazilian state-owned petroleum company, Petrobras, which has farmed into an exploration permit and potential LNG project on the North-West Shelf.

Figure 15: Exploration for conventional oil and gas, well spudded and metres drilled, 1985 to 2009



Source: APPEA 2010

Companies with an established Australian presence, including Apache Energy, Chevron, Woodside Energy, Shell and ConocoPhillips have also embarked on significant new offshore exploration programs over the past year or two. These are generally targeted at finding additional resources close to previous discoveries so as to improve the economics of proposed new projects such as the proposed Wheatstone LNG project and an expansion of the Pluto LNG project.

While the increased interest and activity around known provinces is welcome, exploration in frontier areas continues to remain at very low levels (see Table 4). With little or no previous exploration activity, these areas hold the greatest promise of finding a major new petroleum province. However, exploration is deterred by high costs and risks and greater remoteness from markets and infrastructure.

Reducing the risk of frontier exploration through the acquisition of pre-competitive geophysical and geological data was a core objective of Geoscience Australia's *Offshore Energy Security Program*. This data collection and analysis program, developed in consultation with the oil and gas industry, has resulted in industry investment in exploration in the Bremer Sub-basin in the Great Australian Bight, the Arafura Basin and the offshore Canning Basin and the opening up of the Great Australian Bight (2009 acreage release), Mentelle Basin (2010 acreage release) and Perth Basin (2011 planned acreage release). Even with pre-competitive work, exploration in frontier areas is high risk and incremental. Although industry has acquired new seismic and other geophysical data as part of active frontier work programs no wells have yet been drilled within these frontier basins.

Table 4: Exploration wells drilled, 1996 to 2009

	Offshore		Onshore
Year	Frontier	Immature	Frontier
1996	1	2	2
1997	0	6	5
1998	0	15	5
1999	0	11	3
2000	1	15	2
2001	1	14	1
2002	2	4	1
2003	4	7	1
2004	1	6	3
2005	2	3	4
2006	1	7	1
2007	0	14	4
2008	3	18	4
2009	1	17	4
Total	**17**	**139**	**40**

Source: Geoscience Australia, unpub. data.

EXPLORATION TARGETS

Therefore little progress is being made towards the exploration targets proposed in *Platform for Prosperity*, to achieve by 2017 a three-to-fourfold increase in frontier well drilling, a doubling of oil reserves and discovery of at least one new petroleum province.

Australia also has some way to go before becoming one of the top five most attractive investment locations globally for oil and gas exploration and development investment. The *2010 Global Petroleum Survey* released in June 2010 by the Fraser Institute in North America collated responses from 645 individuals working in 364 companies responsible for more than 60 per cent (US$161 billion) of the industry's expenditure globally on petroleum exploration and development in 2009. Respondents provided scores for 133 jurisdictions against each of 17 factors affecting investment decisions which were then aggregated to form a composite index. Since 2009 the survey has provided results for onshore areas in each of the Australian states and the Northern Territory, offshore Australia and the Joint Petroleum Development Area. Rankings for 2009 and 2010 are provided in Table 5 with, in both years, South Australia considered to have the least barriers to investment of all Australian jurisdictions.

The ranking of Australia's onshore jurisdictions has improved considerably since the 2009 survey. Offshore Australia and all states except Queensland and New South Wales are now considered to be in the top quartile for having the least barriers to investment.

Good progress is being achieved towards increasing Australia's gas resources. Geoscience Australia has estimated that in 2008, Australia's economic demonstrated resources (EDR) and sub-economic demonstrated resources (SDR) of conventional gas were 164 tcf. In addition there is a possible 20 tcf of inferred conventional gas resources in recently discovered fields and other fields not booked as part of EDR and SDR *(page 95, AERA 2010)*.

Estimates of Australia's unconventional gas resources—CSG, tight gas and shale gas—are also increasing rapidly. Geoscience Australia estimates Australia to have total identified resources of CSG of around 153 tcf and others have estimated that total in-ground potential CSG resources could be in excess of 250 tcf *(page 97, AERA 2010)*.

Table 5: Jurisdictional rankings according to barriers to investment

Jurisdiction	2010 rank out of 133 jurisdictions	2009 rank out of 143 jurisdictions
Offshore Australia	31	N/A
Onshore South Australia	14	17
Onshore Northern Territory	16	32
Onshore Victoria	20	57
Onshore Western Australia	21	56
Onshore Tasmania	23	44
Onshore Queensland	34	49
Onshore New South Wales	40	62

Source: Fraser Institute 2010

Similarities in geological settings between shale gas prospective areas in the USA and Australia are also generating considerable interest. One company—Beach Energy—has estimated that the Cooper Basin could contain 200 tcf of shale gas resources while AWE is assessing the shale gas potential of the onshore Perth Basin and New Standard Energy is looking closely at the Canning Basin.

The Perth Basin also holds interest for tight gas with gas resources in the Warro field estimated to exceed 5 tcf. Nationally, tight gas resources could total around 20tcf *(page 98, AERA 2010)*.

South Australia is also considered to have significant unconventional gas resource potential with companies actively exploring for CSG, shale gas and tight gas.

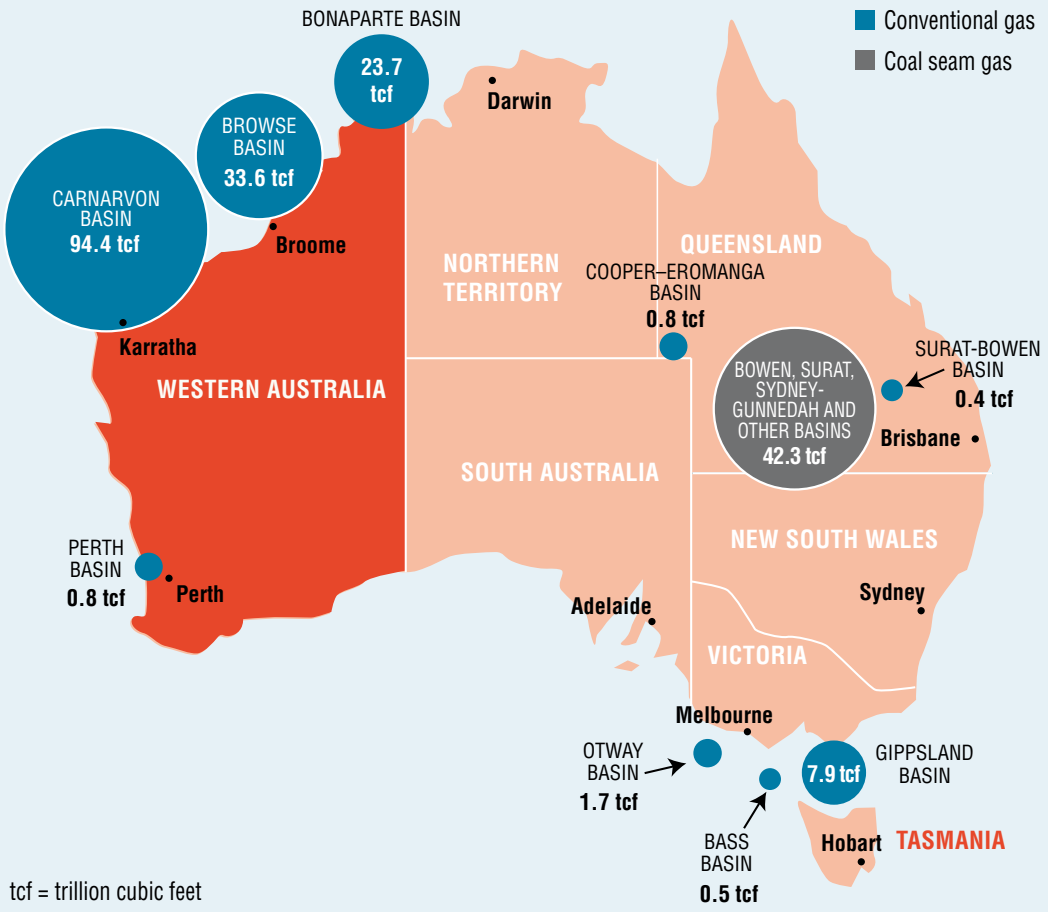
As indicated in Figure 16, most of Australia's conventional gas resources are located in the north-west whereas to date most CSG discoveries and developments have been in Queensland and New South Wales.

Increasing global demand for gas and interest in Australia's gas potential has resulted in a number of conventional gas discoveries, particularly in the Carnarvon, Browse and Bonaparte basins. Discoveries over the past two years include:

- Thebe gas field in the Carnarvon Basin discovered by BHP Billiton in April 2008
- the Martell gas field discovered by Woodside and Hess Exploration in February 2009
- a series of gas discoveries in waters adjacent to the greater Gorgon area by Hess Corporation during 2008–10
- Shell's discovery of the Concerto gas field in the Browse Basin in August 2009
- the Burnside gas field (Browse Basin) also discovered in August 2009 this time by Santos
- Several discoveries by Chevron including Kentish Knock (August 2009) and Brederode (August 2010) in the Exmouth Plateau, and Achilles (October 2009), Satyr (December 2009), Yellowglen (January 2010), Sappho(July 2010) and Acme (August 2010) in the greater Gorgon area
- Woodside discoveries Alaric (August 2010) in the Exmouth Plateau and Eris (November 2009), Noblige (January 2010) and Larson Deep (August 2010) in the greater Pluto area.

In the Perth Basin, AWE and Origin Energy discovered the Redback South gas field in September 2009 and Empire Oil and Gas discovered gas in its Gingin West-1 well. Redback South recorded one of the highest ever gas flow rates for an Australian onshore well and is currently being developed for sale to the West Australian electricity supplier Synergy.

Figure 16: Australia's economic and sub-economic demonstrated gas resources as at 1 January 2009



Source: AERA 2010

Exploration in Australia's south-east is continuing to yield useful discoveries. Esso and BHP Billiton discovered oil and gas in the South East Remora-1 well in the Bass Strait and AWE's Trefoil-2 well in the Bass Basin yielded gas (both in April 2010).

These discoveries are likely to add to future estimates of Australia's gas reserves as further studies and appraisal drilling are completed.

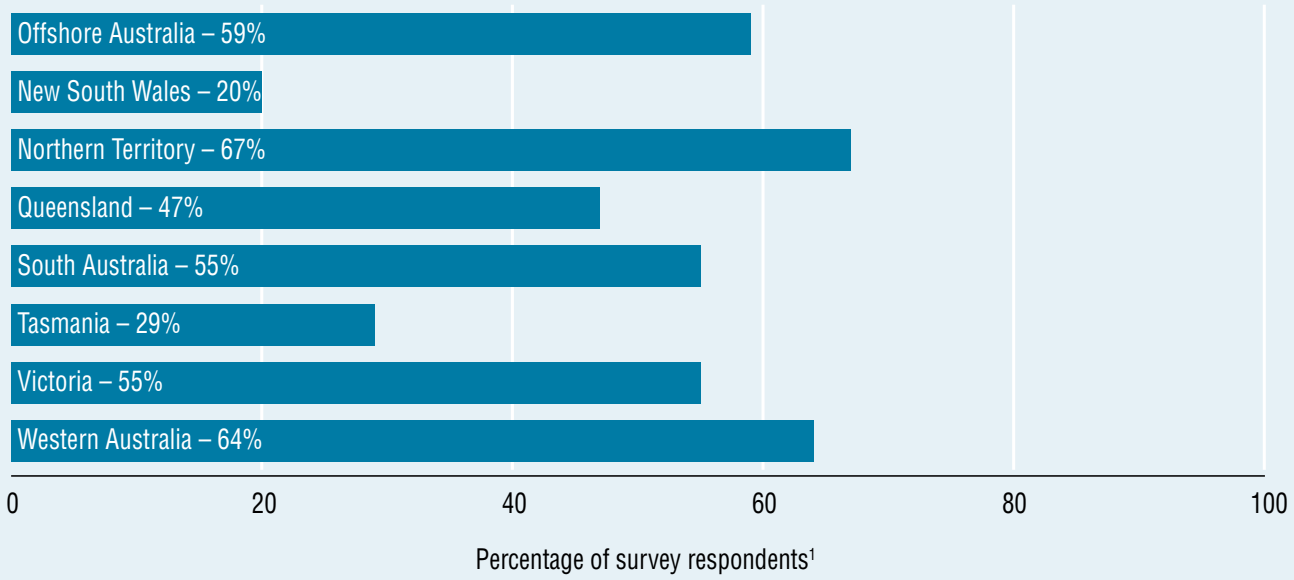
To summarise, while a healthy level of exploration activity is occurring around established petroleum provinces and in the CSG fields in the Sydney–Gunnedah, Clarence–Moreton, Gloucester, Bowen and Surat basins, more needs to be done to encourage exploration in the large parts of Australia that are only lightly explored or not explored at all. A more innovative and effective package of measures than has been available to date is needed to help reduce the high costs and risks of frontier exploration if the wealth creation potential of those areas is to be adequately assessed. Innovations in access to acreage and licensing are part of the solution but as many other jurisdictions have found, fiscal incentives provide the greatest attraction and can make a big difference to industry interest and activity in targeted areas.

The aftermath of the GFC continues to limit the amount and cost of capital available for high-risk activities like frontier exploration. Therefore, the need for a mechanism by which small explorers can pass through exploration tax deductions to investors is now even greater than when *Platform for Prosperity* was developed.

Governments can also improve Australia's competitiveness for petroleum exploration in frontier areas through their support for pre-competitive geoscience research and the provision of basic geo-scientific data (options 3.1 and 3.4). Surveys such as the *Global Petroleum Survey* indicate that this is an important consideration by petroleum companies when deciding on where to explore. The extent and availability of Australia's geological database is well regarded with most respondents to the *2010 Global Petroleum Survey* indicating that the availability of geological data encourages investment in most Australian jurisdictions (with the exception of New South Wales and Tasmania, see Figure 17). However, many other jurisdictions, also rate well on this criterion with 21 jurisdictions in North America, six in UK–Europe and New Zealand also considered to have geological databases that encourage investment by 50 per cent or more of survey respondents.

Access to acreage in an efficient and timely manner is also an important consideration for explorers considering investment destinations. Lengthy and uncertain timelines involved in native title and Aboriginal heritage processes continue to impede onshore exploration activity in some jurisdictions. In offshore areas, a staged and adaptive approach to the development of Marine Planning Areas (MPAs) is needed to enable levels of protection to be progressively assessed and where necessary revised, based on assessments of petroleum prospectivity and environmental values (option 3.3).

Figure 17: Availability of geological data encourages investment



1 Percentage of survey respondents who consider that the quality of a jurisdiction's geological database encourages investment in that jurisdiction.

Source: Fraser Institute 2010

ACTION TO DATE

Discussions between the industry and government on a portfolio of incentives to attract higher levels of exploration to frontier areas have continued. Measures under discussion include those proposed in option 3.2 and the need for change has been promoted through a variety of policy review processes including the development of the Energy White Paper and the National Review of Taxation.

Progress has been made on one of the measures proposed in option 3.2 with changes to the licensing system to encourage increased exploration in frontier and remote basins developed and under discussion with government.

The Designated Frontier Area incentive delivered through the PRRT system was last offered at the release of the 2009 offshore acreage and has since been discontinued. It had been of marginal benefit and its continuation was not supported by the National Review of Taxation on the grounds that 'the concession does not appear to correct any market failure'. However, the industry continues to maintain that Australia does not offer an attractive fiscal regime for high-cost, high-risk exploration in geographically and geologically remote areas. It is disappointing therefore that a follow-on fiscal measure to encourage greater frontier exploration, such as a 175 per cent tax deduction as proposed in option 3.2, was not included in either the government's response to the National Review of Taxation or the 2010–11 budget.

Despite considerable discussion and exchange of information on the need for a flow-through share scheme to enable small explorers to realise value from exploration deductions, such a scheme has not been introduced. A Resource Exploration Rebate proposed as part of the government's initial response to the National Review of Taxation, has also been withdrawn. This together with the need for a broad fiscal measure for encouraging exploration in high-cost, high-risk frontier areas need to be further considered.

Options for stimulating increased onshore exploration are also under discussion with the WA Government. A five-year Exploration Incentive Scheme was introduced in early 2009, royalty concessions have been introduced for tight gas fields and other mechanisms for encouraging the search for oil and gas in WA's vast interior are being considered. New discoveries and increased onshore gas production would add to WA's gas supply diversity and yield substantial benefits for the state.

New South Wales has had a long standing incentive model of a five-year royalty holiday on onshore petroleum production and has continuously funded several geoscience programs since 1995. These have attracted explorers to the state as evidenced by high levels of CSG acreage uptake and exploration activity.

Development of a national virtual geoscience library and data repository (option 3.4) commenced around two years ago and is nearing completion. Geoscience Australia has developed a Virtual Data Room (VDR) that provides easier access to pre-competitive data in a single application. This will make data transfer live and instant and remove the need for resource-intensive physical data transfers. The VDR along with its data repository continue to be the two main areas of investment in pre-competitive data by Geoscience Australia.

The development and adoption of common data management standards across all jurisdictions is being progressed through the Petroleum Data Management Group operating under the umbrella of the MCMPR.

Discussions around the possibility of extending the use of Indigenous Land Use Agreements (ILUAs) in all jurisdictions are continuing. This has received varying degrees of government support dependent primarily on their respective legislative frameworks to undertake the leadership role in proactively resolving negotiations. The Land Access Working Group reporting to the MCMPR held an Industry Workshop

in April 2010 and work is continuing on ways to clarify and simplify the native title process impacting mainly on onshore operations.

A draft Marine Planning Area (MPA) network for offshore south-west Australia is expected to be released in late 2010 with draft MPAs for the north and north-west to follow in early 2011. In discussions around MPAs, fisheries, carbon capture and storage (CCS) and other new and overlapping titles regimes, the industry has sought to achieve adequate recognition of its activities and access systems based on the principles of multiple and sequential land use.

The oil and gas industry has also been providing input into other policy developments which affect, or could affect, land access. These include WA Government consideration of the titles system for underground coal gasification and processes for improving the administration of the Aboriginal Heritage Act's register of places and objects. The industry is also working with the WA fishing industry to address concerns about the impact of its operations on fish stocks.

In response to community concern about the impact of various forms of development on quality agricultural land, the Queensland Government is developing a Strategic Cropping Land policy with the aim of ensuring that development does not lead to permanent alienation or diminished productivity of such land. While the impact on the CSG industry may not be as significant as for open cut coal mining, since the majority of petroleum activities do not permanently alienate land and farming and petroleum can co-exist, it is likely that more stringent requirements will be placed on CSG activities on land identified as strategic cropping land. Some activities associated with CSG (such as produced water storages and the development of signification infrastructure) are likely to not be permitted on strategic cropping land.

Another positive initiative in Queensland has been the development of a Land Access Strategy, to provide greater certainty to landholders and gas explorers (see section 4.4 for further details).

In support of the possible development of a gas export industry based on unconventional gas, the South Australian Government has convened a roundtable with industry to assess the adequacy of supply chain infrastructure and technology. Information emanating from this roundtable will inform industry strategies and government policies.

WAY FORWARD

Further discussion and work is needed towards defining and implementing measures for encouraging frontier exploration including innovations in the titling system, increased geoscience funding and a company-tax based fiscal incentive.

Other recommendations from the National Review of Taxation affecting the petroleum exploration industry need to be addressed by government including a formal rejection of a suggestion that cash bidding be considered as the means for allocating all resources exploration permits. In recent years all permits have been allocated on the basis of the work program bidding principle which has served Australia well in the past.

The case for continuing investment by the Australian, state and Northern Territory governments in pre-competitive geoscience needs to be maintained. Continued investment by Geoscience Australia will be needed to maintain and expand its data repository and its VDR, including data published by the states and Northern Territory.

Although funding for the Australian Government's Offshore Energy Security Program lapses in June 2011, Geoscience Australia's programs supporting pre-competitive regional studies underpinning offshore acreage releases, and data archiving and access to information submitted under the Offshore Petroleum and Greenhouse Gas Storage Act (and its predecessor Acts), need to continue.

A government review of Geoscience Australia is expected to commence in the near future and be completed by mid 2011. The industry will need to input into the review and provide evidence of the importance of the agency's work for attracting petroleum exploration investment and the need for ongoing public funding at levels at least similar too, if not greater than, has been provided in recent years.

A more consistent and sustained effort is also needed by the states and Northern Territory to stimulate exploration. Programs within the states and NT such as the Plan for Accelerating Exploration (PACE) in South Australia, Smart Exploration in Queensland and New Frontiers Initiative in NSW need to be maintained and the Exploration Incentive Scheme in Western Australia expanded to better incentivise onshore petroleum exploration.

The industry will continue to work with governments to streamline and improve the transparency and efficiency of native title and cultural heritage processes. It is intended to progress the conjunctive ILUA and template agreement model through the MCMPR's Land Access Working Group.

To maintain access to resources, the industry will also need to continue to provide input to stakeholder consultations as the Marine Planning process moves forward and as draft MPA's are released in late 2010–early 2011.

As CSG exploration continues and gas production infrastructure is installed, the CSG sector will continue to work with governments and other stakeholders to minimise the impacts of its activities on landholders and the environment and to maintain a supportive policy framework for development.

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

OBJECTIVE

To reform numerous aspects of the approvals and regulatory framework to:

- **enhance Australia's international competitiveness for petroleum exploration and development**
- **provide shorter and predictable approval times**
- **be transparent and have objectives-based processes**
- **ensure uniformity across jurisdictions**
- **eliminate duplication.**

KEY OPTIONS

4.1 In consultation with industry, jurisdictions should consider and implement recommendations from the Productivity Commission's *Review of the Regulatory Burden on the Upstream Petroleum (Oil and Gas) Sector*. Changes should aim to achieve a more efficient, consistent, whole-of-government, cross-jurisdictional approach to approvals processes, regulation and policy development for the Australian oil and gas industry with:

- guidelines and rules for assessment agreed nationally and jurisdiction-specific requirements based on agreed guidelines
- the early engagement of all stakeholders and development of policies and regulations based on a robust risk assessment of industry activities and the best available science (an extension of the model of the Environment Assessors Forum to other forms of regulation should be considered)
- further consideration of options for the regulatory structure, including a national offshore petroleum regulator as recommended by the Productivity Commission.

Quickly implement those changes which could deliver real and tangible improvements to the regulatory framework, including:

- simplifying and streamlining regulations under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006*
- establishing a lead agency for petroleum approvals in each state and territory
- adoption by all jurisdictions of major project facilitation and expedited approvals processes for projects of state and national significance
- streamlining environmental approvals with day-to-day regulation delegated to designated authorities
- enhancing the role and effectiveness of the Environmental Assessors Forum
- introducing transparent policy principles for environmental offsets
- harmonisation of safety regulation and standards and their interpretation across states and territories.

4.2 In consultation with industry, the Australian, state and territory governments implement recommendations from other reviews of legislation, regulation and approvals processes applying to the petroleum or resources industries.

BACKGROUND

Platform for Prosperity identified inefficient approvals processes and regulation as one of the biggest impediments to ongoing investment in oil and gas exploration and production in Australia. The report noted that:

- the length and complexity of the multi-jurisdictional approvals regime is contributing to an international perception that Australia is a difficult place to invest in oil and gas exploration and development
- the multi-jurisdictional nature of oil and gas projects is creating potentially hundreds of approvals being required and therefore hundreds of opportunities for a development proposal to be delayed
- inconsistent regulations and administrative processes between jurisdictions are adding to costs and uncertainty.

As in previous years, the *2010 Global Petroleum Survey* confirmed that the processes for dealing with disputed land claims, uncertainty concerning protected areas, environmental regulation and the cost of regulatory compliance are widely viewed by members of the global petroleum industry as being significant deterrents to investment in Australia (Table 6). Half of respondents considered disputed land claims to be a mild or strong deterrent to investment in onshore Western Australia and the Northern Territory. A similar proportion also views uncertainty concerning protected areas and environmental regulation as deterrents to investment in offshore Australia and

Table 6: Deterrents to investment in offshore Australia and onshore Australian jurisdictions

Jurisdiction	Cost of Regulatory Compliance		Environmental Regulation		Uncertainty Concerning Protected Areas		Disputed Land Claims	
	World ranking[1]	Per cent[2]	World ranking[1]	Per cent[2]	World ranking[1]	Per cent[2]	World ranking[1]	Per cent[2]
Offshore Australia	48	28	86	35	100	47	75	26
New South Wales	72	36	98	42	116	54	84	30
Northern Territory	18	16	34	23	98	45	114	50
Queensland	53	29	75	32	111	53	87	31
South Australia	16	16	56	28	67	34	42	15
Tasmania	36	25	71	30	78	36	36	14
Victoria	42	27	72	32	60	31	50	18
Western Australia	15	15	44	25	94	44	113	50

1 Ranking out of 133 jurisdictions

2 Percentage of the 645 respondents who considered this criterion to be a mild or strong deterrent to investment or would not invest at all due to this criterion.

Source: Fraser Institute 2010

Since the great mineral and energy developments of the 1960s and 1970s, political attitudes about environmental matters and indigenous issues have powerfully evolved. They have had major impacts on approvals processes, but on a piecemeal basis. Little, if any, serious thought appears to have been given at the level of government policy, to the cumulative effects of these impacts.

The insertion of these considerations into the process has vastly increased cost, delay and uncertainty. This disruption has not only been a great frustration to very large international enterprises, which have the geographical spread of projects, the cash flow and expertise, to cope, but has had a most serious effect on small and medium sized companies, which lack the financial resources, (and thus the time), to endure labyrinthine procedures and delays which can continue for years. It should also be noted that the nimbleness and urgency of these companies and individual prospectors, constitutes the 'engine' of exploration.

p1, IWG 2009

onshore jurisdictions such as New South Wales, the Northern Territory, Queensland and Western Australia. The figures for cost of regulatory compliance are generally better but still a long way from world's best practice with more than one quarter of respondents regarding this factor as a deterrent to investment in offshore Australia and several onshore jurisdictions.

To address these and other concerns about approvals processes and regulation, *Platform for Prosperity* recommended the Productivity Commission (PC) be commissioned to review Australia's regulatory system for petroleum activities. Several options for improving cross-jurisdictional consistency for approvals and policy development were also proposed, including consideration of a national regulatory authority.

These were all considered by the PC which released its final report on 30 April 2009. A number of others reviews of regulation and approvals processes have been undertaken or are currently underway within some of the states. Therefore, the strategy's options in this area have been substantially re-drafted to reflect this shift from initiating reviews to the development and implementation of changes.

ACTION TO DATE

Productivity Commission review

The PC's *Review of the Regulatory Burden on the Upstream Petroleum (Oil and Gas) Sector* was commissioned in April 2008 and a final report released in April 2009. The Commission's recommendations were wide ranging and included measures to:

- improve cross-jurisdictional approvals processes
- improve consistency by enhancing the role of the Environment Assessors Forum
- streamline heritage processes
- develop transparent policy principles for environmental offsets
- review legislation to ensure it complies with best practice principles
- clarify the role of government
- develop improved approvals tracking systems
- establish a lead agency in each of the states and territories
- establish a new national offshore petroleum regulator.

In response to the release of the report, the industry requested that priority be given to the implementation of seven changes that could be implemented quickly and deliver real and tangible improvements to the regulatory framework. These are included in option 4.1 above.

To consider the Commission's recommendations and to develop an implementation plan and process, the government referred the report to the MCMPR. The MCMPR established a working group comprising representatives of the Commonwealth, states, Northern Territory and industry which has met regularly to discuss implementation of the Commission's recommendations, particularly those related to the establishment of a national offshore petroleum regulator (NOPR).

On 15 December 2009, the MCMPR agreed responses to 25 of the 30 recommendations in the Commission's review but could not reach consensus on the remaining five recommendations related to the establishment of a NOPR. The NOPR model proposed by the PC raised some concerns requiring further more detailed analysis and consideration of alternative models. The Australian Government's preferred model for regulatory reform is for the safety of people, the integrity of facilities, the protection of the environment, and day-to-day operations be regulated in an integrated manner. Resource management issues, including titles administration, should be regulated separately.

The MCMPR also decided to defer its consideration of a national offshore regulator until the report from the Montara Commission of Inquiry is completed and its recommendations considered. This has resulted in changes arising out of the PC review taking longer to agree and implement than originally anticipated. However, given the significance of the changes being proposed it is important that all aspects are fully considered and institutional arrangements for offshore petroleum regulation developed which achieve the objectives of improving efficiency and eliminating inconsistencies and duplication. The institutional and administrative arrangements for petroleum regulation need to be agreed and finalised before many of the PC's other process-related recommendations can be considered.

Review of the EPBC Act

In October 2008 the government commissioned an independent review of the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* to be undertaken by an expert panel chaired by Dr Allan Hawke AC. Following a public consultation process, an interim report was released in June 2009 and following further consultation, a final report was provided to the Minister on 30 October 2009 and released in December 2009. The report concluded that the legislation needed a major overhaul and modernisation since the Act was broadly written resulting in increasing complexity and duplication.

The report's 71 recommendations included the creation of a new Environment Act to simplify and streamline procedures under the current legislation and the establishment of an independent Environment Commission to advise the Minister on whether to approve projects. The report also endorsed the use of bilateral agreements between the Commonwealth and each of the states and territories to avoid the need for multiple environmental assessment processes and effectively devolve responsibility for EPBC Act approvals to those jurisdictions. This is being progressed through the Council of Australian Governments and is an initiative which is strongly supported by the oil and gas industry. However, the government has yet to respond to many of the reviews other recommendations, including those which could significantly improve the efficiency and transparency of environmental assessment processes.

Streamlined petroleum regulations

In response to a 2007 report by the Department of Resources, Energy and Tourism, consolidated regulations under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* have been progressively developed and introduced. Revised environment regulations and safety regulations were introduced in December 2009 and January 2010 respectively while resource management regulations are expected to finalised by the end of 2010. The revised regulations have removed a number of areas of duplication, streamlined processes and reduced the compliance burden on the industry and on regulators.

Approvals reviews in Western Australia:

Over the past three years a number of independent and internal reviews of approvals processes and regulation have been commissioned by the West Australian Government. These included:

- a report in 2008 by the West Australian Auditor General into *Improving Resource Project Approvals*
- a review of WA's environmental impact assessment processes commissioned in February 2008 and completed in March 2009 and undertaken by a reference group chaired by Dr Paul Vogel
- a review of native vegetation clearing legislation completed in April 2009 by an expert committee chaired by Associate Professor Garry Middle
- a review of approvals process for the mining and petroleum industries initiated by the Minister for Mines and Petroleum in November 2008 and conducted by an Industry Working Group chaired by the Hon. Peter Jones AM.

The Working Group's report, released by the WA Government in August 2009, contained 15 recommendations to improve mining and petroleum approvals processes including:

- establishment of a natural resources agency and a stand-alone role for the Environment Protection Authority
- establishment of a single decision making authority for all mining and petroleum proposals
- establishment of an independent approvals reform office to assist relevant Ministers drive approvals reform
- reforms to native title and Aboriginal heritage processes, certain sections of the *Environmental Protection Act 1986* and the administration of environmental offsets.

In response, the WA Government established several consultative groups to consider the recommendations from these reviews and report to government on implementation processes and legislative reforms. An Environmental Stakeholder Advisory Committee (ESAC) chaired by Dr Bernard Bowen AM and comprising representatives

from conservation and industry groups was formed to provide advice to the Minister for the Environment on reform within the environment portfolio. A Stakeholder Reference Group provides a forum for the exchange of views and information and a Shared Environmental Assessment Knowledge Taskforce (SEAK) chaired by Dr Paul Vogel aims to develop and implement a model for delivering improved environmental data management and knowledge building.

On the advice of these groups a number of significant changes have been introduced by the West Australian Government. A new lead agency framework and legislative changes to implement the Review's recommendations concerning appeals and delegations were announced by the Minister for Mines and Petroleum in October 2009. An independent Office of the Environmental Protection Authority (EPA) with its own staff, budget, management and administrative capability has been created and agencies are also introducing online tracking systems. Improvements to the environmental impact assessment process have also been announced including greater consultation on conditions and the introduction of outcome-based conditions, use of risk-based assessments, greater rigour and consistency in the scoping phase and commitment to timelines. These have been welcomed by the industry. Reform efforts need to be accelerated in other areas such as native vegetation, to improve administrative efficiency, transparency and to reduce duplication and approvals timelines.

Approvals and regulation reform in Queensland

The Queensland Government undertook an internal review of approvals process and released a report *Streamlining Project Approvals: Mining and Petroleum Tenure Approval Process*. The report made a number of recommendations regarding environmental and land access approval, information systems and government resourcing. A government-appointed industry working party then reviewed the report and provided an industry perspective on reforming exploration and development approvals. Its report, focusing on three key themes of timeliness, consistency and transparency, included case studies from mining and petroleum companies and made recommendations to improve the efficiency of approvals in Queensland.

Another key government initiative has been the establishment of a new framework for land access. The framework was developed by an industry–government Land Access Working Group and comprises a single land access code of conduct that must be complied with as a condition of tenure, entry notice requirements for low-impact activities, a requirement for a conduct and compensation agreement to be reached with landholders prior to commencement of activities having a significant impact, and new provisions for negotiation and dispute resolution. In addition, the government is developing a standard Conduct and Compensation Agreement for use by companies and landholders in negotiations. The framework provides improved rights for landholders in negotiations about access and compensation, as intended by government, but also contains a number of features that will ensure a reasonable outcome for tenure holders.

Legislation was passed by Parliament on 19 August 2010 and the new framework is expected to commence before the end of 2010.

The Queensland Government has finalised all the key aspects of its CSG water management policy and issued guidelines for the beneficial use of CSG water. Guidelines for the development of CSG environmental management plans and standard environmental conditions for CSG have also been released.

The Queensland Department of Environment and Resource Management (DERM) has also commenced an initiative to identify and implement measures that streamline and reduce the regulatory burden on business. DERM has identified six initiatives, including reducing the number of approvals, reducing complexity of the approval process and reducing delays in granting approvals.

Model *Work Health and Safety Act*

As part of an initiative of the Council of Australian Governments, Safe Work Australia is developing model work health and safety laws. A model *Work Health and Safety (WHS) Act* has been agreed by Australian and state government ministers and the regulations are currently being drafted. Once the legislation is finalised, each jurisdiction will go through the process of enacting legislation, with the intention of having mirror laws enacted in each jurisdiction. This initiative, if effectively implemented, should enhance productivity and increase consistency with other laws and processes operating within each jurisdiction.

Independent review of offshore safety regulation

Following the disruption to gas production from Varanus Island during the second half of 2008, the Australian and West Australian Governments initiated a joint independent inquiry into safety regulation of the offshore petroleum industry. Two reports, titled *Better Practice and the Effectiveness of NOPSA* and *Marine Issues* were produced and released by the West Australian Government in July 2009.

The reports recommended a number of changes to clarify responsibilities and improve regulatory oversight of safety in the offshore industry. The industry supported many of these recommendations particularly those aimed at providing greater clarity around regulatory coverage and administrative arrangements and to bring operations such as pipelines and well operations within the NOPSA regime. The industry also pointed to complexities and inconsistencies in the regulation of activities in coastal waters and onshore areas and the need for these to be addressed by the national, state and territory resources departments.

The governments' response to the two reports was released in May 2010. It confirmed ongoing government support for the safety case regime and set out a strategy for implementing the reports recommendations. Discussions are also continuing around the regulation of projects with a pipeline to shore and a proposed extension of NOPSA's jurisdiction to the nearest valve on the mainland above the shore crossing.

Montara Commission of Inquiry

Petroleum regulatory arrangements may also be changed as a result of recommendations made by the Montara Commission of Inquiry referred to in section 2.1 above.

WAY FORWARD

As noted above, a number of major inquiries nationally and in Western Australia in particular, into approvals processes and regulation of the petroleum industry have been completed over the past two years. These have produced a large number of recommendations for significant change with the potential to greatly improve regulatory efficiency while still ensuring the industry meets or exceeds the communities expectations for environmental and safety performance. A number of processes for assessing and implementing these recommendations have been initiated and some early changes have been implemented. However, there is still a long way to go and much more to be gained so 2011 will be a critical year in the reform process. It is essential that despite the diversity of interests among governments and other stakeholders and complexity of many of the issues, the reform momentum be maintained and the pace of change accelerated.

To this end, priority needs to be given to the finalisation and implementation of administrative and institutional changes arising out of the PC's recommendations for a national offshore petroleum regulator. The final model needs to be consistent with the overarching objectives of reducing duplication and the number of overlapping regulatory agencies and approvals processes. Once that framework is established, attention then needs to turn to the implementation of the PC's many other specific recommendations for improving regulations and approvals processes.

Reforms will need to be progressed through the MCMPR and Council of Australian Governments. Priority should be given to those changes proposed in option 4.1 that can yield the greatest benefit and can be implemented quickly.

Reforms to the EPBC Act and the national environmental assessment process resulting from the Hawke review should also not be allowed to drop by the wayside. Significant gains in efficiency and transparency are possible and an implementation process, based on a cooperative approach between governments, industry and other stakeholders, needs to be developed and progressed. The role of the Environment Assessors Forum should continue to be strengthened (as recommended by the PC).

Revised seismic guidelines introduced in 2008 and more recent conditions on seismic activity may at times be restricting industry operations for no beneficial environmental outcome. These will continue to be monitored and discussed with regulators.

Implementation of all of the consolidated *Offshore Petroleum and Greenhouse Gas Storage Act* 2006 regulations is expected to be completed by the end of 2010. Legislation to strengthen the ability of NOPSA to provide oversight of the structural integrity of all facilities (including pipelines), wells and well-related equipment is expected to be reintroduced to the Australian Parliament later this year. The Bill introduced earlier this year lapsed when Parliament was prorogued for the election.

A major priority in the year ahead will be the consideration and implementation of regulatory reforms recommended by the Montara Commission of Inquiry. Governments and the industry will need to work together to ensure that changes improve regulatory efficiency and transparency and are effective at supporting the industry's efforts to improve safety and environmental performance.

Model regulations for implementing the *Workplace Health and Safety (WHS) Act* have yet to be finalised. Drafts are expected to be available for public comment in late 2010 and the industry will need to assess their impact on onshore oil and gas operations in particular.

However, much still remains to be done in completing the reform process to state approvals and regulation proposed by the reviews in Western Australia. A good start has been made but again the momentum needs to be maintained even as the complexity and sensitivity around proposed changes increases. Industry will need to remain actively involved in the various consultative groups such as the EPA Stakeholders Reference Group and continue to provide input and submissions on specific areas such as the EPA's environmental impact assessment guidelines. WA's land clearing approvals system needs to be streamlined and timeframes reduced.

The West Australian Minister for Mining and Petroleum has also established a Ministerial Advisory Panel to provide advice on legislative reform for mining and petroleum safety, including a consideration of the impact of national occupational health and safety harmonisation and the introduction of full cost recovery from the WA petroleum industry.

In Queensland, the industry and government will need to work together to further define and implement reforms identified in the reviews of tenure processes and environmental regulation.

4.5 An improved fiscal framework for gas projects

OBJECTIVE

To remove the competitive disadvantage facing investors in Australian gas projects resulting from atypically long depreciation write-off periods for company tax.

OPTIONS

5.1 Implement key adjustments to the company tax regime to reduce the distortionary impact of income tax on the economics of gas projects. Under the existing provisions, gas developments generally incur a tax liability prior to generating a risk-adjusted return on invested funds. Reform could be achieved through the application of a five-year write-off under the depreciation regime. Such a reform would also have the opportunity of achieving significant greenhouse-related benefits by encouraging the development of a suite of new gas-based projects.

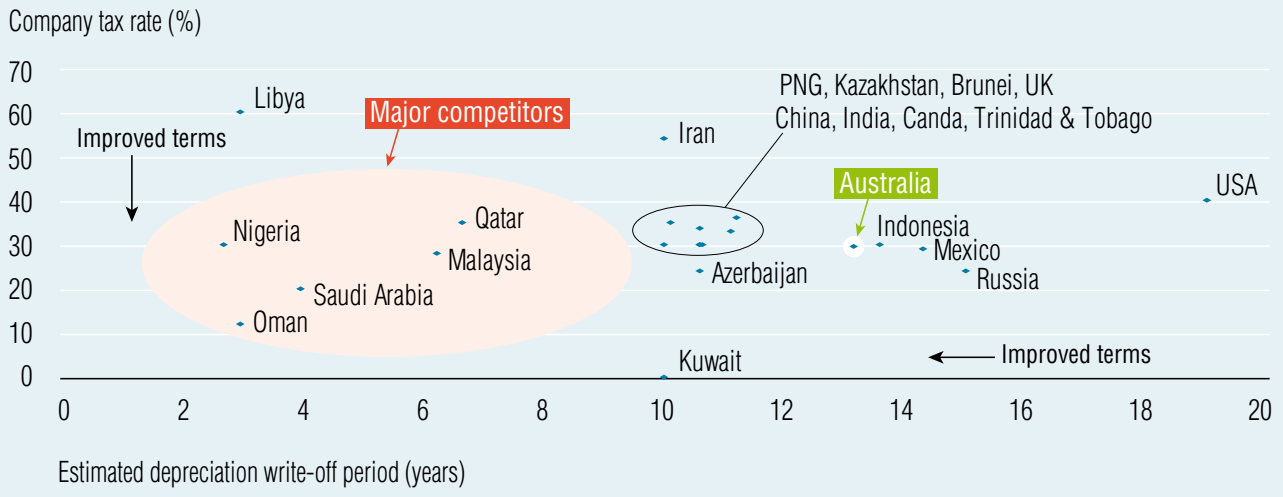
BACKGROUND

As can be seen from Table 3 in section 3.2, Australia is not competing with OECD countries for investment in multi-billion dollar gas projects. It is competing with countries in the Middle East, Africa and Asia - all non-OECD countries with substantially lower construction costs, generally lower tax rates and in almost all cases, much more capital-friendly depreciation terms for gas projects. Most international comparisons of Australia's tax terms conclude that Australia's company tax rate compares favourably with rates applying to most OECD countries. However, that is the wrong comparison to be making when looking at the gas industry. The comparison needs to be made with non-OECD countries with large gas resources and competing with Australia for large amounts of gas development capital, long-term sales contracts on international gas markets and new investment in downstream gas-based processing industries. When the comparison is made with these countries, the tax terms applying to highly capital-intensive gas projects in Australia compare very poorly indeed.

Platform for Prosperity illustrated this quite clearly and Australia's poor ranking on tax terms has not improved at all since that time (see Figure 18). Average depreciation write-off periods for gas project investment in Australia of more than 13 years are much longer than the three-to-ten-year write-off periods available to our strongest overseas competitors, including Qatar and Oman.

The 2010 edition of a global analysis of business taxation undertaken by PricewaterhouseCoopers, confirmed previous findings referred to in *State of the industry 2009* that Australia's total tax take as a percentage of commercial profits compares poorly with other major gas-producing countries. As in the 2009 study, out of 15 gas-producing countries only Algeria had a higher tax take than Australia. The world's biggest LNG producer, Qatar, had the best tax terms among gas producers and was ranked fifth out of all of the 183 countries included in the study. By comparison Australia's total tax rate was ranked 127th at 48.0 per cent *(PWC 2010)*.

Figure 18: Company tax and depreciation comparison for gas projects



Source: Derived from data provided by KPMG

This is a significant disadvantage for Australian gas projects to overcome—affecting export projects as well as projects aimed at supplying the Australian gas market at internationally competitive prices. Higher costs and higher taxes make it considerably more difficult to capture new sales contracts on export markets and entice new gas-based processing industries to Australia. Modelling reported in *Platform for Prosperity* indicated that a shift to a five-year income tax depreciation regime for a typical two train, 10 mtpa LNG project, would increase the project net present value (NPV) by $540 million or almost 20 per cent. Failure to provide even a five-year depreciation regime is giving our competitors an enormous head start in the race for customers and capital. Australia has other significant disadvantages like higher construction and labour costs that add to the problem and are difficult to remedy. However, taxation is one area that is directly within the ability of governments to influence.

Nor is it the case that the gas industry is seeking special treatment compared to other parts of the Australian economy. Rather, it is seeking to remove an inherent bias in Australia's income tax system against capital-intensive industries. Costs incurred within non capital-intensive sectors (for example, those associated with the finance, retail or services sectors) are generally capable of being deducted relatively quickly, while those that are more capital intensive in nature (such as within the infrastructure and resource development sectors) are generally deductible over extended periods. A dollar spent on operating related activities can be more tax effective than a dollar spent on capital, thereby favouring industries that are non capital-intensive in nature. The distortion created by longer write-off periods is made even worse by only being able to commence deductions when an asset is installed ready for use. For large gas projects, expenditures can be incurred up to five years prior to the commencement of physical production (the Gorgon project for example commenced construction in 2009 but will not commence production until 2014). Apart from wages, the biggest costs incurred by an IT company would typically be computer equipment and software but these can either be written off immediately or over four years or less.

Nor is it the case that the proposed changes to depreciation for gas projects will be costly to government revenue or cost far more than the projects are worth. Bringing forward depreciation deductions merely amounts to a rescheduling of tax receipts. The total value in dollar of the day terms is unchanged and even in NPV terms, the cost to government revenue is much less than the benefit received by gas project investors (since the cost of capital for governments is much less than that available to investors in long-life, low-return gas projects).

As demonstrated by the North West Shelf project and other modelling studies (see section 2.4), gas projects are great generators of large, long-term and predictable revenue streams for governments—$40 billion over the life of a typical two train LNG project or around $1.5 billion a year on average according to the modelling in *Platform for Prosperity*. This does not include the taxes that would be paid by employees and companies providing goods and services during the construction and operation of the project.

This is not a new problem for Australian gas projects. The abolition of accelerated depreciation in 1999 made an already uncompetitive income tax regime for gas projects much worse. For new investment in these types of capital-intensive, low-return projects, changes in depreciation terms have a far greater impact on project economics than changes in the company tax rate. Depreciation deductions provide a more immediate benefit for investors since they reduce tax payments early in the project life. This has a greater impact on project NPV than reductions in the company tax rate since tax payments are largest later in the project life and hence are more heavily discounted.

The negative impact of the 1999 changes has been well documented through numerous studies, and was acknowledged by the government when in 2002 it introduced effective life caps of 15 and 20 years for certain oil and gas industry assets. This provided some relief but did not fully address the problem as pointed out by a subsequent government report to the MCMPR.

So for more than a decade the gas industry has been perplexed as to why successive governments have not acted to address this major impediment to the competitiveness of an industry which could make such a large contribution to national wealth creation, employment, energy security and greenhouse gas abatement (domestically and globally).

Studies and industry participants have also pointed to the need for a major increase in investment in energy production and infrastructure over coming years. In November 2009 the Asia Pacific Energy

Over the period 1989–2009 the North West Shelf Project is estimated to have increased (in 2008–09 dollars):

- **Australia's Gross Domestic Product by $70 billion**
- **Western Australia's Gross State Product by $90 billion**
- **Australian household consumption by more than $40 billion.**

Over the next 10 years (to 2019), annual contributions to GDP, GSP and household consumption are estimated to average $7 billion, $8 billion and $4 billion a year respectively.

Annual taxation payments to the Commonwealth (including a share of petroleum royalties) are estimated to be approaching $4 billion and approximately $0.9 billion to WA state and local governments.

The project has also contributed around $300 million to infrastructure and services in the Karratha region. Over three decades, the project has fostered the development of a thriving petroleum services hub in Perth, which is expanding into new markets and technologies, and supporting a growing petroleum industry both here and overseas.

ACIL Tasman, 2009.

Research Centre released projections of investment needed to meet Australia's growing energy requirements, from extraction to distribution, to 2030. These included a requirement for some US$180 to US$235 billion (in 2006 dollars) to be invested in Australia's natural gas production, transportation and distribution *(page 32, AERA 2010)*. More favourable tax terms for gas projects would provide a major incentive for investment and help maintain internationally competitive gas prices for Australian industry and households.

...the changes to Australian corporate taxation announced in the 1999 Business tax reforms reduced corporate tax rates at the expense of the accelerated depreciation system for assets. This reduced depreciation allowances and consequently the financial attractiveness of long-life projects, including infrastructure projects, relative to other investments.

MCMPR 2006.

ACTION TO DATE

The upstream industry has continued to highlight the need for more competitive fiscal terms for gas projects, including submissions and representations to processes such as the National Review of Taxation, the inquiry by the Senate Select Committee on Fuel and Energy and the development of the Energy White Paper.

Despite pre-election commitments to review the fiscal terms applying to gas projects and energy-intensive processing industries, neither the National Review of Taxation nor the government's initial response to it, have acknowledged the need for reform in this area or established a process whereby reform could be further considered.

The government's decision to not proceed with the RSPT has been welcomed. However, other proposed taxation reforms could create new tax distortions and impose significant administrative costs due to the large number and diversity of onshore oil and gas projects. When considering the possible extension of the existing profits-based offshore regime to cover all petroleum projects, a case exists for exempting small projects due to increased compliance costs. Care should also be taken to ensure that not only are offshore and onshore projects treated equitably but also that the tax burden on gas is not greater than that applying to competing fuels, particularly coal. At a time when the nation is seeking to reduce its greenhouse gas emissions, it would be counterproductive to apply a higher tax rate to gas than coal when gas-fired electricity results in around half the greenhouse gas emissions of electricity generated from coal. These factors need to be considered in any review of the fiscal framework that applies to oil and gas activities.

WAY FORWARD

Ever since the abolition of accelerated depreciation in 1999, the oil and gas industry has repeated its concern about the company tax capital depreciation terms applying to gas projects and their impact on the international competitiveness of Australia's gas industry. These concerns have been substantiated by numerous independent studies and government reports. It is time therefore, for the government to take action since the opportunity for major growth in Australia's LNG industry is with us now.

The changes being proposed are very specific to just one industry sector and would have no impact on tax revenues for a number of years. The long-term impact on government revenue would be positive as a result of increased gas industry investment and the fact that changes to depreciation terms do not alter the total value of depreciation deductions over a project's life (in dollar of the day terms).

Governments need to work closely with industry in assessing and implementing any resource taxation reforms so that changes result in a more economically efficient, transparent and internationally competitive tax system that encourages investment and does not disadvantage one fuel source over another.

Depreciation changes for gas projects could be included in a package of measures for increasing energy investment and supply security and reducing Australia's growth in greenhouse gas emissions. It could be announced jointly with the eventual release of the previously proposed Energy White Paper or other greenhouse or energy policy measures.

4.6 Harnessing the environmental benefits of gas

OBJECTIVE

To maximise the contribution that gas could make to reducing Australian and global greenhouse gas emissions.

KEY OPTIONS

6.1 Australian, state and territory governments develop a more consistent national approach to greenhouse policies and programs and, to the maximum extent possible, develop common approaches in consultation with industry that:

- maintain the international competitiveness of Australian industry
- encourage least-cost abatement and the use of commercially viable technologies to reduce emissions
- stimulate technological innovation for economic long-term solutions
- streamline existing regulatory frameworks for managing greenhouse gases into an overarching national framework
- share the burden of adjustment equitably across the economy in a way that confers no unfair competitive advantages or disadvantages to particular industry sectors
- ensure that regulatory instruments such as conditions on project approvals do not impose a cost on industry not borne by overseas competitors
- maintain flexibility for example, to adjust policies with advances in science and technology
- do not place 'early movers' at a disadvantage, including members of the oil and gas industry that have already implemented a range of voluntary emission abatement actions.

6.2 Ensure the national greenhouse gas emission reporting system introduced in July 2008 operates efficiently at least cost to industry and replaces all state- and territory-based reporting systems.

6.3 Maintain support for ongoing international negotiations directed at achieving a global policy response covering all major emitters, all greenhouse gases, all sources of emissions and all sequestration modes.

6.4 Introduce a national carbon pricing mechanism that facilitates least-cost abatement but does not impose a 'net cost' on the export gas industry until such time as overseas competitors are subject to a similar impost.

6.5 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.

6.6 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.

BACKGROUND

As noted in section 2.4 above, considerable progress has been made in promoting the environmental benefits of gas and the much larger contribution it could be making to reducing Australian and global greenhouse gas emissions. Compared to when *Platform for Prosperity* was released three years ago, there is now a much greater awareness of the potential role of gas among our political leaders and within the media and the general community.

Gas is part of the global solution to climate change and Australian gas exports play a significant role in helping reduce global greenhouse gas emissions when it displaces higher carbon emitting fuels such as coal. The Australian LNG industry is well positioned to grow that role.

Depending on the technology used, electricity generated from natural gas has 50 to 70 per cent less greenhouse gas emissions than an existing coal-fired power station. For every tonne of greenhouse gas emissions generated by the production of LNG in Australia, between 4.5 and 9 tonnes of emissions are avoided in the Asia–Pacific region when this gas is substituted for coal in electricity generation. Achievement of the *Platform for Prosperity* targets for LNG production and Australian gas consumption could reduce global greenhouse gas emissions by around 180 mtpa CO_2-e by 2017 compared with a coal alternative.

Power generation makes up 35 per cent of Australia's carbon emissions and 81 per cent of Australia's electricity is generated from coal *(ESAA 2009)*. Hence the replacement over time of Australia's coal-fired generation capacity with gas-fired plant would go a long way to enabling Australia to achieve its emissions reductions targets. If as coal-fired generation is decommissioned, electricity demand between now and 2050 was to be met by a combination of 20 per cent renewable energy and 80 per cent gas, Australia's carbon emissions from electricity generation would fall by around 20 per cent even while doubling the amount of electricity generated.

This would be equivalent to almost 10 per cent of the 60 per cent reduction in greenhouse gas emissions that the Australian Government is seeking to achieve by 2050 *(APPEA 2009)*.

Yet coal and renewable energy programs continue to attract increasing amounts of government funding and support while gas is increasingly disadvantaged by a range of tax- and subsidy-related distortions. Proposed changes to resource taxation could if implemented, perpetuate rather than eliminate the tax differential between gas and coal, thereby discouraging the use of gas despite its lower greenhouse emissions.

The expanded RET introduced in August 2009 mandates that 20 per cent of Australia's electricity supply or at least 45,000 gigawatt hours should come from renewable energy by 2020. This represents an almost fivefold increase in the previous Mandatory Renewable Energy Target (MRET) of 9500 GWh.

To help meet that target the government established a $500 million Renewable Energy Fund in 2008. In November 2009, grants totalling $235 million to four renewables projects to deliver just under 80 megawatts (MW) of new renewable power were announced.

The May 2009 budget included a $4.5 billion Clean Energy Initiative (CEI) to support the research, development and demonstration of low emission technologies including carbon capture and storage (CCS) and solar power and to establish a new renewable energy promotion agency (Renewables Australia). The CEI aims to support the construction of 1000 MW of low emission fossil fuel generation and 1000 MW of solar power with commissioning to commence in 2015. The CEI budget includes:

- $1.5 billion for Solar Flagships
- $2.4 billion for CCS Flagships
- $100 million a year for the Global Carbon and Storage Institute
- the $100 million Australian Solar Institute
- the $235 million Renewable Energy Demonstration Program
- the $50 million Geothermal Drilling Program
- the $15 million Second Generation Biofuels Program
- nearly $570 million for the Australian Centre for Renewable Energy.

Assisting the coal industry, the government has established a National Low Emissions Coal Initiative (NLECI) to accelerate the development and deployment of technologies that will reduce emissions from coal use. The government is providing $400 million over eight years to support the NLECI with grants of $295 million to six projects announced in the 2008–09 budget.

In the 2010 budget speech, the Treasurer stated that the government had to that point committed support of over $10 billion to energy efficiency, renewables and clean coal programs. In addition he announced the establishment of a new Renewable Energy Future Fund, with funding of $652 million over the next four years, to support renewable energy projects and the development and deployment of low emissions technologies.

It is up to governments to assess whether the broader long-term, public benefit from supporting new technologies and 'infant industries' outweighs the up-front cost to taxpayers. However, markets are distorted and national welfare is reduced when such support extends to the construction of commercial-scale facilities operating in direct competition with other non-subsidised market participants (including gas-fired electricity generators).

Modelling by AGL for example, indicated that the expanded RET would by 2020 approximately halve the growth in gas demand for electricity generation, compared to projected growth under the original MRET *(AGL 2009)*. The expanded RET drives the uptake of renewable generation at the expense of higher gas volume, base load, combined cycle generation. It could have the perverse effect of crowding out investment in low emission gas-fired generation in favour of higher emission, but lower cost, coal-fired generation as generators seek to minimise costs from the 80 per cent of generation not covered by the RET. The RET could also divert development to lower gas volume, less efficient open cycle gas turbines capable of switching on and off for peak load generation and as back-up power for wind generation. That is, less investment in the most greenhouse efficient form of gas-fired generation and more investment in the least efficient form compared to a situation without the RET. This is at odds with this strategy's objective of maximising the greenhouse benefits of gas and with government and community aspirations to cost-effectively reduce Australia's greenhouse gas emissions.

As well as the elimination of such distortions, *Platform for Prosperity* proposed the introduction of a market mechanism to place a price on carbon in a way that does not increase costs for trade-exposed industries. Despite modifications during the course of its development, the CPRS proposed by the Australian Government would still have imposed costs on Australian LNG producers not borne by any of its overseas competitors. If implemented, it would have had the perverse effect of discouraging investment in the industry that is best placed to deliver large reductions in Australian and global greenhouse gas emissions. This or any other carbon abatement scheme that may be proposed in the future should not place added costs on Australian LNG projects until our competitors and customers are faced with similar costs.

ACTION TO DATE

The oil and gas industry, through APPEA, has continued to actively contribute to the development of government policies and programs for reducing the growth in Australia's greenhouse gas emissions. The proposed CPRS would if it had been implemented, been one of the most significant changes to Australia's economic and investment framework for many decades so it was important that this industry was actively involved in the discussion about how it would operate and how the greenhouse gas abatement potential of Australia's gas resources could be realised.

The Prime Minister announced on 27 April 2010 a delay to the implementation timetable for the proposed domestic emissions trading scheme. He stated that implementation of the scheme will be delayed until after the conclusion of the current Kyoto commitment

period which finishes at the end of 2012. The government would then assess the implications of the CPRS based on commitments entered into by the rest of the international community. The Prime Minister also announced that a Prime Ministerial Task Group would report by June 2010 on other options, including new energy efficiency measures. A report was provided to the Government but has not been released.

If and when a domestic emissions trading scheme or alternative carbon pricing mechanism is introduced, it will again be important to ensure that it is applied in a way that does not competitively disadvantage Australia's LNG industry relative to its international competitors.

On 29 November 2008 COAG endorsed a set of principles for jurisdictions to review and streamline their existing climate change mitigation measures, with the aim of achieving a coherent and streamlined set of climate change measures. Reviews have been completed in NSW, Queensland, Victoria and at the national level, with reviews expected in other jurisdictions. Progress across jurisdictions has been mixed, with some streamlining achieved, but more is required to achieve a truly coordinated national policy approach. The industry is concerned that the COAG agreement could be undermined by practices such as the application of ad hoc and duplicative conditions on project approvals.

The *National Greenhouse and Energy Reporting Act 2007* (NGER) introduced a single national framework for reporting and dissemination of information related to greenhouse emissions, greenhouse gas projects, energy consumption and energy production for corporations. It provides the necessary framework for Australia to meet its international reporting obligations, while streamlining the reporting requirements for corporations by reducing duplication across national, state and territory government agencies. Since the completion of the first reporting period under the Act a number of technical suggestions have been accepted for inclusion in the *NGERs Measurement Determination 2008* and a number of clarifications and refinements to the legislation have been proposed. The draft amendments have been released for public consultation and the amended regulation should be finalised in late 2010.

Impediments to gas market growth have also been raised in submissions and workshops associated with other review processes including the development of the Energy White Paper and an inquiry by the Senate Select Committee on Fuel and Energy.

APPEA's *Natural Gas Positive Energy* campaign, launched in August 2009, aims to further increase government and community understanding of the benefits of gas and the role it could play in reducing greenhouse gas emissions.

The Gas Market Leaders Group, an industry/government body formed by the Ministerial Council on Energy and now an advisory group to the Australian Energy Market Operator, has continued to advise governments on gas market reforms in Australia. Outcomes during 2010 included the further development of the gas market bulletin board, the commencement of the STTM in Sydney and Adelaide on 1 September 2010 and the announcement of a Brisbane hub to be established during 2011.

The industry has contributed to several government processes for developing measures to increase gas supply security and to the ongoing work of the National Gas Emergency Response Advisory Committee. This includes the establishment of a Gas Emergency Management Communications Protocol to facilitate the exchange of information between government and industry during a cross-jurisdictional gas emergency.

West Australian policy developments

In January 2009, the WA Government established an industry/government Gas Supply and Emergency Management Committee (GSEMC) to review the security of Western Australia's gas supplies and processes for managing any future gas supply disruptions. The GSEMC's report to the WA Government, released in October 2009, recommended a number of measures for cost-effectively minimising the impact of a gas supply disruption in WA. These included increased dual fuel capability within WA's electricity generation system, provision of additional gas storage and implementation of a Gas Bulletin Board and Gas Statement of Opportunities.

Notably, the GSEMC did not endorse calls from the DomGas Alliance, representing large industrial customers, for increased government intervention in the market to artificially increase supply or reduce gas prices. Instead the GSEMC noted that 'as in the past, security levels will fluctuate—high when new gas developments with spare or expansion capacity are commissioned and decline over time as this capacity is absorbed and the next project is commissioned'. Also that 'the Devil Creek gas plant will increase WA's gas supply capacity by more than 20 per cent and other projects are under pressure to proceed as quickly as possible subject to the agreement of commercial terms with firm buyers' *(page 7, GSEMC 2009)*.

The WA Government has taken several other steps towards enhancing gas supply security and encouraging increased gas exploration and development investment. In July 2009 the Minister for Mines and Petroleum announced that the royalty rate for gas produced from tight gas fields would be halved to 5 per cent. In November 2009 the WA Parliament passed The *Gas Supply (Gas Quality Specifications) Act 2009* to enable gas producers to supply leaner quality gas to transmission pipelines in Western Australia. This will encourage the development of gas fields that were previously unable to economically meet the delivery specifications applying to WA's pipeline network.

Also in November 2009 the WA Government announced the development of a Strategic Energy Initiative (SEI), a policy framework to deliver secure, reliable, competitive and cleaner energy. Consultations and workshops have been held throughout 2010 and the SEI's report is scheduled for completion in February 2011. APPEA's submission to the *Issues Paper* released in December 2009 focused on the need for the SEI to be based on a long-term vision for WA's energy industry and a set of policy principles by which changes to government policies and measures could be assessed. Energy sources should be allowed to compete on their respective merits to produce the most cost-competitive energy mix and inefficient

intervention in the market aimed at shifting supply or demand, influencing prices or providing other forms of subsidy or protection, should be avoided. On that basis, and given the emergence of multiple new domestic gas supply proposals, the WA Government's gas reservation policy should be withdrawn. Instead, the SEI could provide a focal point for government agencies in consultation with industry, to address a range of impediments to investment in the energy sector such as inefficient approvals and regulatory processes and skilled labour shortages.

In addition to the SEI, in April 2010 the WA Parliament commissioned the Legislative Assembly's Economics and Industry Standing Committee to investigate the price of gas in Western Australia compared to gas prices in Victoria and international LNG prices. The industry and APPEA have again provided submissions along the lines of those to the SEI and also noting the very different characteristics and structure of the West Australian, Victorian and international LNG markets. The committee is scheduled to report by 28 February 2011.

Queensland policy developments

The Queensland Government, on 20 August 2009, launched its *ClimateQ: towards a greener Queensland* policy, that:

- made the approval of new coal-fired power stations conditional on meeting criteria relating to greenhouse gas emissions
- identified gas as a key fuel source for reducing the greenhouse gas emissions intensity of generating electricity, while emerging renewable energy sources and CCS technologies are being developed
- expanded the Queensland Gas Scheme to require that Queensland electricity retailers and large electricity users source at least 15 per cent of their electricity from gas-fired generators in 2010 (previously 13 per cent) with the provision to increase it to 18 per cent by 2020.

Queensland has also taken a number of steps to increase long-term gas supply security and encourage increased investment in gas production, both for domestic and export markets. A *Blueprint for LNG Industry Development* policy statement was released in September 2009 and two months later, following consultation with industry, measures for enhancing future domestic gas supply security were announced. These included a decision to establish an *Annual Gas Market Review* process to analyse the operation of the Queensland Gas Market and the appointment of a Gas Commissioner to provide a focal point for LNG industry development and for industries seeking to secure gas contracts within Queensland.

Significantly, the Queensland Government rejected an option to require a percentage of gas from all fields to be 'reserved' for the domestic market. Such a restriction, if implemented, could have seriously constrained growth in the Queensland gas industry by making it much harder for the proposed CSG–LNG projects to secure the reserves and finance needed to underwrite long-term, high-cost production infrastructure.

Northern Territory policy developments

The *Northern Territory Climate Change Policy* released on 18 December 2009 noted the Territory is well placed to assist the world in addressing climate change through the ongoing development of natural gas fields offshore from the NT. The policy committed the Territory Government to foster growth of the LNG sector in the Northern Territory for the opportunities it presents to the Territory and its important environmental benefits. The policy also noted that the imposition of project-specific or state-based regimes on LNG projects would be a backward step that would produce sub-standard environmental outcomes.

WAY FORWARD

The industry will need to continue to input into a number of policy development processes and reviews at national and state/territory levels. These include:

- consideration of any alternative greenhouse gas abatement and energy efficiency measures to replace the CPRS
- modifications to the CPRS or development of an alternative carbon pricing mechanism to take effect post 2012
- finalisation of the Energy White Paper or other national energy policy statements that may be proposed
- WA's SEI (due in early 2011) and the WA Parliamentary inquiry into gas prices (to report by 28 February 2011)
- continuing liaison with the Department of Climate Change and Energy Efficiency to improve the NGERs legislation and reporting systems to reduce the administrative burden on industry.

Input will also need to be provided on other greenhouse and gas market policy issues as opportunities arise. The currently proposed changes to resources taxation, including extension of the PRRT to onshore areas and introduction of a MRRT on coal, may provide a mechanism for addressing anomalies in the royalty treatment of coal and gas.

A core policy position and understanding about the role of governments needs to underpin all of these discussions and processes. Namely, that governments can best enhance gas supply security and achieve competitive gas prices by addressing impediments to gas supply investment and competitive markets and by withdrawing from interventions in competitive markets.

4.7 Implementing a national petroleum skills and vocational training plan

OBJECTIVE

An appropriately skilled workforce is available to support the growth of the Australian oil and gas industry.

KEY OPTIONS

7.1 Identify and better understand the industry's current and future skills and training requirements.

7.2 Develop and implement strategies for increasing the size and capability of the industry's workforce through:

- national, across industry strategic workforce planning
- key skill pool development
- a focus on key pathways to employment such as cadetships, apprenticeships, traineeships and graduate programs
- increased participation from under-represented groups including indigenous, female and mature-age workers.

7.3 Improve understanding of the industry's employment opportunities (among schools, career advisers, undergraduates and other elements of the Australian workforce).

7.4 Influence governments to ensure regulatory, legislative and funding environments that facilitate the development and retention of the required skills for the industry in Australia, including through appropriate levels of skilled migration.

BACKGROUND

Platform for Prosperity identified long-term shortages of skilled labour as a major impediment to industry growth and the realisation of the strategy's targets. In the years prior to the onset of the GFC in 2008, increasing resource sector activity resulted in shortages of professionals (particularly in engineering and geoscience) and technicians (particularly in oil and gas plant process operations and maintenance). Shortages were expected to get worse as investment in this and other industries increased and as older workers retire (in 2009 it was reported that in some operational areas up to 50 per cent of staff are due to retire within five years). The downturn in the world economy during 2008 and 2009 provided some short-term relief but economic recovery and a return to strong commodities demand during 2010 has again increased skilled labour demand and raised fears about the longer-term impact of skilled labour shortages on the growth of this and other industry sectors.

Hence the four-pronged strategy to addressing skills shortages proposed by *Platform for Prosperity* is still just as applicable as in 2007 and its further development and implementation still warrants the same high priority. That is a focus on:

- gaining a better understanding of the extent and nature of skills shortages and future trends
- better resource planning and greater investment in training
- improving community understanding of the industry and its attractiveness to potential employees
- working with governments to ensure that education and training budgets are directed to areas of greatest need.

The onset of the GFC during 2008 led to a period where it seemed as if the pressure created by labour shortages might lessen or at least be deferred as companies moved to reduce exploration and development activity in the face of lower product prices and reduced availability of capital. Workforces were not significantly reduced as had occurred in previous periods of low oil prices but neither were they generally increased as companies waited to see how the GFC would play out and what would be the longer-term effect on oil and gas markets and investment. However, once the Gorgon joint venturers agreed in September 2009 to proceed with their $43 billion project and as over the following months, the economic outlook for Australia and Asia (particularly China) rapidly improved, it quickly became apparent that skills shortages have re-emerged as a major issue that could constrain the industry's long-term growth.

In November 2009, as WA's unemployment rate fell from 5.7 to 5.0 per cent, the WA Chamber of Commerce and Industry forecast that on current projections, the state could be facing a labour shortfall of 150,000 workers within seven years. By that time an extra 400,000 workers will be needed to support the state's projected growth.

Hence, skills, education and training continue to be a key priority within the Upstream Oil and Gas Industry Strategy.

ACTION TO DATE

In the initial years following the release of *Platform for Prosperity*, the main focus was on developing and implementing new or expanded training programs and strategies for increasing participation in the oil and gas industry by under-represented groups (particularly among women and indigenous groups). A range of new training courses, vocational programs and industry promotional activities were introduced and have been progressively extended to key centres throughout the country. These are described in more detail in the 2008 and 2009 implementation reports.

Since mid 2009 a shift in priorities and emphasis has occurred in recognition of the need for a more strategic approach based on a better understanding of the extent and nature of potential skills shortages/gaps that may emerge as a result of expanding LNG and CSG sectors, and competition for those skills from other mining and infrastructure projects across Australia. The focus of this new strategic approach is on identifying the skills needs of the oil and gas industry, and on improving the understanding of these skills needs amongst a wide range of stakeholders and audiences. These include young people, women and non traditional sources of skills supply, career advisors, governments, training providers and others.

The industry's approach in this area will be guided by work undertaken by the National Resources Sector Employment Taskforce. Chaired by the Hon Gary Gray AO MP (former Parliamentary Secretary for Western and Northern Australia) and including representation from unions and the resources industry (including APPEA), the taskforce was 'charged with developing a comprehensive workforce plan to assess skill needs and deliver the large number of skilled workers required in the resources sector over the next five years'. The terms of reference for the taskforce included the following deliverables:

- analysis of resources sector labour and skills needs on a national basis over the next five years
- analysis of the expected supply of skilled labour from domestic and skilled migration sources
- analysis of the education and training sector's capability to meet the needs
- recommendations to address the gaps
- templates to assist companies develop effective skills and workforce plans.

A key issue confronting the taskforce was the uncertainty surrounding the extent and nature of future resources development activity and the need therefore to develop strategies that would be robust but yet flexible enough to be adapted or modified to changing circumstances. Another challenge facing the taskforce was the need to differentiate between the construction phases of projects, and the short-term demands they create, and the longer-term (up to ten years and beyond) work needed to develop operational skills. While action is needed to address skills shortages in both areas, each presents different challenges requiring different approaches.

As well as providing input through its membership of the taskforce, APPEA provided a written submission in April 2010 emphasising the need to better understand the nature and extent of skills shortages before defining solutions. The submission also outlined oil and gas industry initiatives and commented on the appropriate role for governments including programs that could be conducted in partnership with industry and/or other parties. The taskforce's report released in July 2010 included the following key findings and recommendations.

Key findings on the demand and supply of labour and skills:

- the number of short-term construction jobs is likely to peak at around 45,000 during 2012 and 2013 with strong jobs growth for technicians and trades people and machinery operators and drivers
- projected shortfall of 35,800 tradespersons for the resources sector over the period 2010 to 2015 (including construction workers)
- projected shortfall of 1700 mining and petroleum engineers over the period 2010 to 2015
- the number of new jobs in gas operations will be between 1800 and 3200 with strong jobs growth for drillers (Queensland only), operators, electrical trade and mechanical technicians
- the taskforce considers it likely there will be two to four new LNG trains operating in Queensland by 2015 and four to six new trains in WA, creating between1200 and 2500 professional and trade jobs in operations in Queensland and between 600 and 700 in WA
- replacement demand in gas operations could be around 2000 persons per annum, including approximately 500 retirements
- between 2005 and 2009, WA and Queensland increased their output of apprentices and trainees to meet the increased demand for skills
- in the average case scenario, the supply of technicians and trades people in WA will grow by 5 per cent to 2015, and this is unlikely to be sufficient to meet demand
- the net supply of electrical tradespersons is expected to grow more slowly in WA than in other states and this is of particular concern given the demand for electrical tradespersons is expected to increase from 2012.

Key recommendations include:

- resources companies to provide a workforce impact statement using a standard template to outline the workforce needs of projects (costing $40 million or more) at the same time as they apply to the relevant state or territory government for project approval, recommended as 'an information requirement' not a further approval requirement
- a national strategy to improve language, literacy and numeracy skills of job seekers
- regional workforce plans to manage the impacts of major resources projects on local communities
- urgent measures to address affordable housing and community infrastructure
- alternative apprenticeship models

- a national strategy for attraction and retention of women in the resources and construction sector
- increasing transparency and access to resources industry jobs advice.

In addition to this national approach, state governments have also recognised the pending threat to growth posed by skills shortages so have reorganised and increased their commitments to vocational training and education. Western Australia and Queensland have been particularly active with initiatives in Western Australia including:

- the creation of a new Resources Industry Training Council to better access high-level industry advice from the resources sector on its skills and training needs
- establishment of a new WA Department of Training and Workforce Development to build, attract and retain a skilled workforce to meet the economic needs of WA
- development of a *WA Workforce Development Plan* to guide workforce development policy and training delivery, including measures to:
  - assess labour market demand and supply on an industry and regional basis
  - identify skill and labour shortages
  - enhance attraction and retention of skilled workers
  - increase participation in the workforce
  - achieve whole-of-government coordination
  - make targeted use of migration
  - support comprehensive career development
  - enhance the training and workforce development culture of organisations
  - develop strategies and actions to address key issues and gaps including access to flexible and relevant apprenticeships for groups with strong links to the workplace and measures to increase completion rates.

In Queensland, the CSG industry and Energy Skills Queensland have formed a CSG-LNG Taskforce to work with the Queensland Government and other key stakeholders to ensure the availability of a competent and sustainable workforce to support the current and future development of CSG-LNG industry. A CSG-LNG Workforce and Competency Development Plan has been developed around four strategies for skills attraction, skills development, skilling systems and skills sustainability. The taskforce will use the plan to identify and prioritise tactics and programs for implementing these strategies and meeting the skilled labour requirements of the CSG-LNG industry.

South Australia is also seeking to increase its presence in the provision of educational services for the oil and gas sector. In April 2010 the University College of London (UCL), with support from Santos and the South Australian Government, opened a UCL School of Energy and Resources in Adelaide. The school is offering a variety of executive courses including Australia's first master's degree for professionals in energy and resources.

The industry is currently considering a proposal by Adelaide University's Australian School of Petroleum for it and the University of New South Wales and Curtin University to develop a stronger, coordinated tertiary education program to produce larger numbers of better qualified petroleum professionals.

The industry has been working with the Department of Immigration and Citizenship (DIAC) to ensure that skilled migration programs meet the industry's needs and that companies are aware of options available to them to access those schemes to meet short- or long-term skilled labour requirements. The temporary and permanent skilled visa programs have been recently changed to make the migration system more 'demand driven' with greater emphasis placed on the role of employer sponsorship. The skilled occupation list applying to independent migrants has also been updated to more closely match the needs of the economy.

WAY FORWARD

The oil and gas industry will need to maintain its involvement in a number of ongoing programs and interactions with government and training organisations including:

- contribution to collection of up-to-date and comprehensive data and information on skills and labour needs for construction and operational phases of projects, including economic modelling
- provision of up to date education material about the oil and gas industry and on industry career pathways to schools (including through curriculum initiatives), universities, students, career advisers and other stakeholders
- development and implementation of initiatives by government that improve the uptake of mathematics and science subjects and literacy skills for school students right through their school life
- collaboration with the tertiary sector on initiatives to improve access to and quality of petroleum engineering and other professional qualifications relevant to the oil and gas industry
- provision of advice to training providers on the industry's skills/training requirements, development of collaborative partnerships between training providers and industry on training/skills, and development of opportunities for the career development of industry professionals in training and assessment
- liaison with the Department of Immigration to continue to improve understanding of the skilled migration needs of the industry, and to improve skilled and temporary migration programs to enable skilled migrants to be brought to Australia in a timely and efficient manner.

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6 Abbreviations

ABARE	Australian Bureau of Agricultural and Resource Economics
AERA	Australian Energy Resource Assessment
bcf	billion cubic feet
boe	barrels of oil equivalent
btu	British thermal units
CCS	carbon capture and storage
CEI	Clean Energy Initiative
CNOOC	China National Offshore Oil Corporation
CO_2-e	carbon dioxide equivalent
CPRS	Carbon Pollution Reduction Scheme
CSG	coal seam gas
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSTP	Common Safety Training Program
EDR	economic demonstrated resources
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FLNG	floating liquefied natural gas
GDP	gross domestic product
GFC	global financial crisis
GJ	gigajoules (10^9 joules)
GSEMC	Gas Supply and Emergency Management Committee
IEA	International Energy Agency
ILUA	Indigenous Land Use Agreement
kbd	thousands of barrels a day
LNG	liquefied natural gas
MCMPR	Ministerial Council on Mineral and Petroleum Resources
MPA	marine planning area

MRET	Mandatory Renewable Energy Target
MRRT	Mineral Resource Rent Tax
Mmbtu	millions of BTU
mtpa	million tonnes per annum
MW	megawatts
NGER	*National Greenhouse and Energy Reporting Act 2007*
NLECI	National Low Emissions Coal Initiative
NOPSA	National Offshore Petroleum Safety Authority
NPV	net present value
OECD	Organisation for Economic Cooperation and Development
OGP	International Association of Oil and Gas Producers
PC	Productivity Commission
PJ	petajoules (10^{15} joules)
PACE	Plan for Accelerating Exploration
PRRT	Petroleum Resource Rent Tax
PTTEP	PTT Exploration and Production Australasia
RET	Renewable Energy Target
RSPT	Resource Super Profits Tax
SDR	Sub-economic demonstrated resources
SEI	Strategic Energy Initiative
STTM	Short-Term Trading Market
tcf	trillion cubic feet
TJ	terajoules (10^{12} joules)
TJ/d	terajoules per day
TWh	terawatt hours
VDR	virtual data room

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