Department of Industry

Energy White Paper Issues Paper

Santos Submission | February 2014

Santos

We have the energy.

Table of Contents

Executive Summary

A proudly Australian company, Santos is a leader of the Australian natural gas industry, with 60 years of responsible gas exploration and production across the nation, including almost 20 years of coal seam gas (CSG) operations in Queensland.

This submission responds to the Energy Whitepaper Issues Paper outlining that natural gas has a significant role to play now and into the future in meeting Australia's energy needs and as a driver of prosperity through the development of a world-ranking export industry.

Australia is a nation blessed with abundant energy resources, including coal, natural gas and uranium. It also offers attractive conditions for the development of large scale renewable energy, including wind, solar and geothermal.

Santos supports a robust regulatory framework that underpins the safe and sustainable exploration and development of Australia's valuable and abundant reserves of gas for the benefit of all Australians. It is important that the regulatory framework provides community confidence but, in doing so, additional processes and compliance costs do not unnecessarily delay the development of the industry. Australia is already a high cost country in which to develop energy projects and adding further costs will exacerbate this and jeopardise the economic, environmental and energy security benefits it can deliver.

With regard to gas market development Santos strongly believes that price and volume interventions are not in the long-term interests of consumers or the economy as a whole, as these interventions prevent the timely investment in energy projects and in infrastructure required for stable and competitive energy supply.

A number of measures have been undertaken in recent times by the Standing Committee for Energy and Resources (SCER) to increase transparency in the gas market. The best method to further enhance transparency is to establish pipeline capacity trading as part of the Wallumbilla gas supply hub and create a central body for the development of gas market reforms

The growth of LNG projects in Australia continues to drive significant investment growth. The four major approved CSG to LNG projects in Queensland alone represent investments of over $60 billion. Together, they have seen the creation of 27,000 new direct and indirect jobs. This does not include jobs created in areas such as housing and services, which provides a massive boost to the economy, particularly within regional communities.

Australian LNG projects also provide the size and pace of development necessary to support the domestic gas market. LNG development provides opportunities for domestic gas supply, as has been the case in Western Australia since the 1980s. The current growth in LNG is creating strong interest in onshore Australian exploration for coal seam gas, tight gas and shale gas, which is also likely to lead to new domestic gas developments.

In order to be able to continue to attract investment in Australian energy infrastructure, we must remain a competitive and attractive destination for investment given the international competition for increasingly scarce capital. A transparent and stable policy framework is a key element of maintaining an attractive investment climate.

Australia has abundant and diverse natural gas resources capable of meeting domestic demand. The costs of extracting, processing and distributing the abundant natural gas resources in Australia are increasing. While resources are abundant, they are not low cost and the full extent of resources can only be commercialised by sale into the market at a price that reflects these costs. The United States experience shows that encouraging exploration and investment in projects of sufficient scale provides efficiencies and puts downward pressure on prices.

Natural gas is the fuel that will grow Australia's economy, enhance Australia's energy security and help meet the future energy demands of the energy-hungry Asian region.

About this submission

This submission responds directly to each of the key issues raised in the Issues Paper that are relevant to Santos' operations. There is no response to the section Driving Energy productivity as it relates directly to the operation of the electricity sector, which Santos is not directly involved in.

About Santos Limited

Company profile

A proudly Australian company, Santos is a leader of the Australian natural gas industry, with more than 60 years of responsible gas exploration and production across the nation, including almost 20 years of coal seam gas (CSG) operations in Queensland. Santos has been involved in CSG exploration in the north-west of NSW since 2008 and is the only company with significant CSG interests in both Queensland and NSW. Since its establishment as an oil and gas company in South Australia in 1954, Santos has a long track record of working productively with rural communities.

In Australia, Santos has operations in every major petroleum province and has the largest exploration portfolio by area of any company. Santos has also assembled a large, well-situated acreage position in Asia.

Santos is one of Australia's largest domestic gas producers, supplying natural gas to all mainland Australian states and territories, ethane to Sydney, and oil and other liquids to domestic and international customers.

The Cooper Basin oil and gas field in north-eastern South Australia and south-west Queensland, which Santos and its joint venture partners discovered and developed, is one of Australia's largest onshore resources projects. More than $8 billion has been invested to date in the Basin.

Santos' market capitalisation of approximately $13 billion makes it one of Australia's top 20 listed companies.

Security of Energy Supplies

Key points:

- Without gas market intervention, gas supply will continue to be brought on to meet market demand
- Supply of gas will need to be at prices that reflect the cost of exploration and development
- Stable regulatory environments are essential for new large scale gas developments to occur

Santos remains confident about the future health of the upstream gas industry and the potential for gas to power future economic growth throughout Australia. We encourage the development of a market which is based on the market principles of supply and demand and free from artificial policy intervention. Preservation of an efficient market place, including competitively priced gas, will ensure that the industry's supply side dynamic will respond effectively to the anticipated increase in demand, both from the emergence of the LNG industry in Gladstone and increasing domestic demand for gas in a carbon-constrained economy.

Santos continues to see the domestic market as a substantial demand source and intends to continue to develop reserves across our portfolio to serve that market. However, like all natural resource development, the lowest cost reserves have been exploited first and incremental development will be at higher development costs. Consequently the supply of gas will need to be at prices that reflect the cost of exploration and development.

Investor confidence and commercial support for major resources projects is critical to their success. The heavy capital cost of natural gas development has meant that the industry traditionally relies on joint ventures arrangements to deliver such projects. Joint venture partners are typically other oil and gas exploration and production companies, but institutional investors and gas customers can be other sources of financial partnering to fund significant investment projects. Investors and partners will only join projects they are confident will be supported by a stable regulatory framework and broader public policy.

The same is true for potential purchasers of the gas major projects will deliver. These projects require the commercial certainty that secure long-term off-take agreements provide. Again, customers will not enter into supply contracts with projects they are not confident will proceed.

It is generally the case internationally that major oil and gas projects are developed with the strong support of the sovereign government, and in federal systems that support is evident at both state and national levels.

Infrastructure and supply constraints

Barriers to expansion of network supply are inextricably linked to the availability and certainty of upstream gas supply.

Prior to 2009, gas from the Cooper Basin in South Australia and the Gippsland Basin in Victoria provided gas to NSW. The commissioning of the QSN Link, connecting the South-West Queensland Pipeline (SWQP) to Moomba in 2009, enabled gas to flow also from Queensland to NSW and effectively caused the East Coast gas market to become fully interconnected. In recent years, CSG from eastern Queensland has augmented supply to NSW and the other southern states.

Figure 1: Eastern Australian committed and proposed gas supply facilities and transmission pipeline systems (2012 AEMO GSOO)

From the commencement of the first Queensland LNG shipment in 2014, Queensland supply is unlikely to continue to flow to the southern states, as it is expected that any remaining gas supply available in the state will be absorbed by LNG demand.

With existing gas reserves from the Cooper Basin fully committed to the end of 2016 and already over 95% contracted thereafter, remaining discovered and proved uncontracted gas in the Cooper Basin falls dramatically short of the current NSW supply levels. Moreover, South Australia and Queensland are likely to look to meet their own gas supply needs from Cooper Basin and Queensland CSG supply respectively ahead of demands from NSW.

Thus despite adequate pipeline capacity available for supply from the Cooper Basin and/or Queensland into NSW, there is less certainty adequate gas supply will be available from these historical supply sources from 2015 and in particular post-2016 when historical contracts expire. Therefore with limited proven options for replacing current Cooper Basin and/or Queensland gas supply and Victorian supply unable to increase significantly in the near term, NSW must act now to secure alternative gas supply sources.

Gas network operators by their very nature are incentivised to expand their networks to capture expanding and incremental business. However, network operators and for that matter energy retailers are only willing to invest in the necessary capital infrastructure provided that they have a high level of certainty of utilisation and therefore economic return against the asset. Utilisation of new-build gas networks extending out to regional centres is thus underpinned by certainty and reliability of upstream supply of gas.

Santos contends that a major impediment to the development of gas network services is the uncertainty attached to security of supply.

NSW - A case in point

Based on 2012 consumption, NSW has an annual gas demand of ~160 PJ[1]. Daily gas usage varies according to factors such as electricity demand calling for gas fired power generation and climatic seasonal factors such as heating and air conditioning but usually fluctuates on a seasonal basis between lows of 300 TJ/d in summer and peaking over 600 TJ/d in winter with Figure 2 illustrating the fluctuations on a monthly basis over the past 4 years

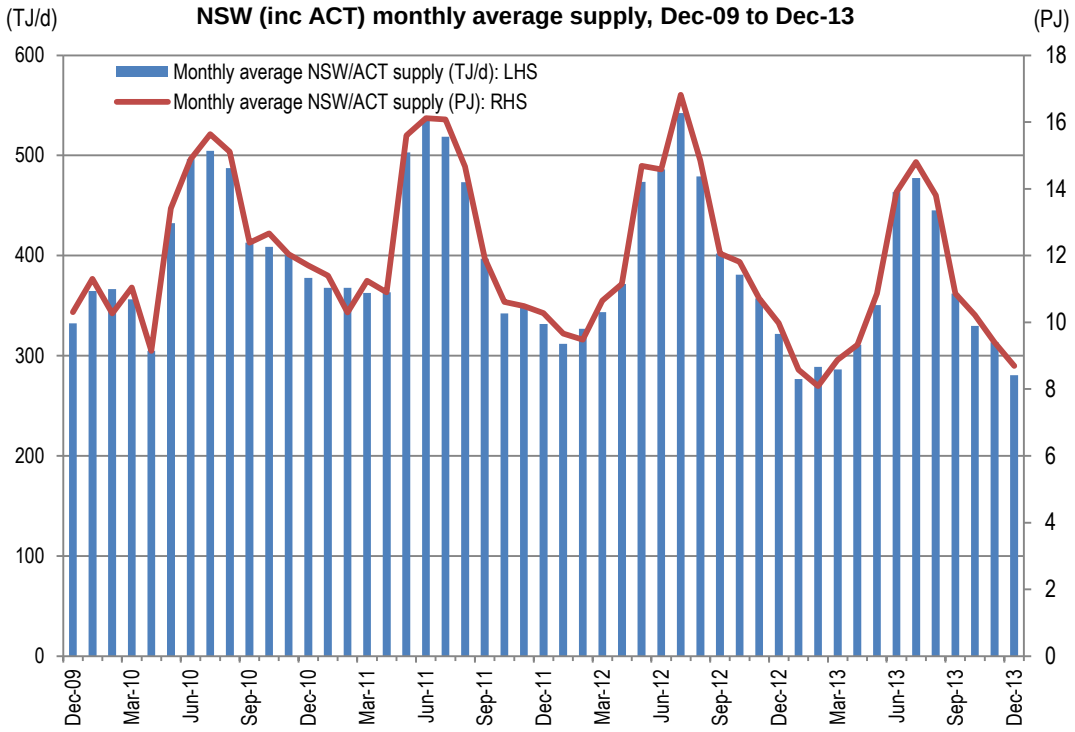

Figure 2: NSW (inc ACT) monthly average supply, Dec-09 to Apr-13

[1] Source: Energy Quest

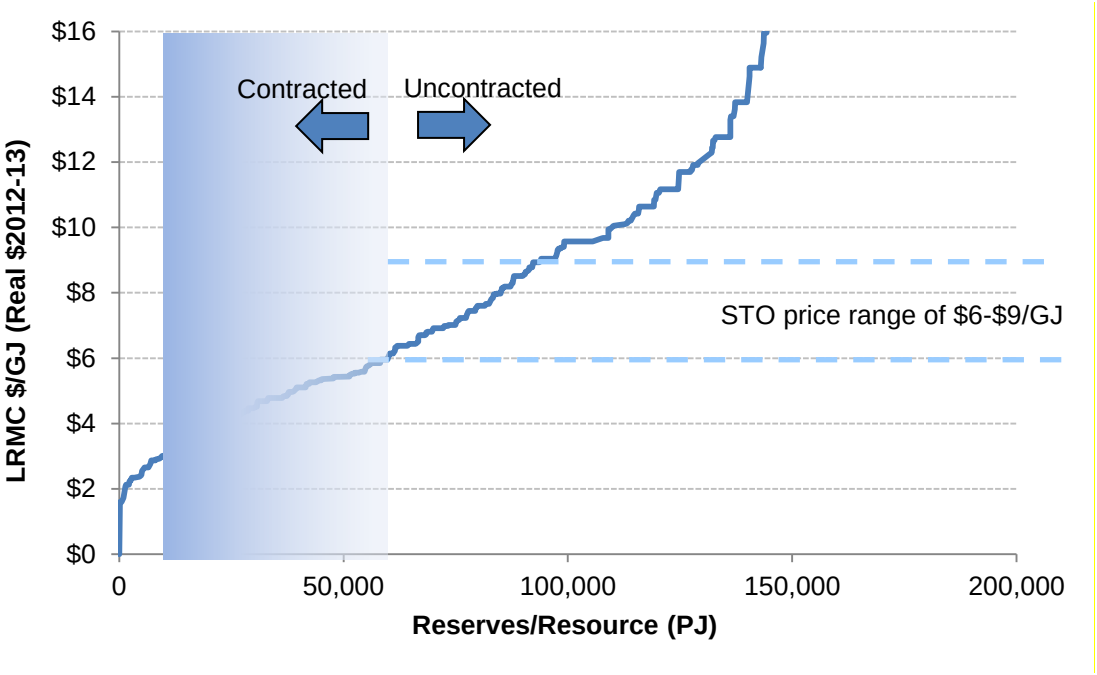

Figure 3: Eastern Australia Gas Supply Costs[2]

The combined discovery of vast reserves and resources, in particular CSG in Queensland and the development of an LNG industry to unlock these higher cost reserves and resources (Figure3) radically transformed the East Coast gas market to the point where CSG reserves now dominate the reserves balance (Figure 4).

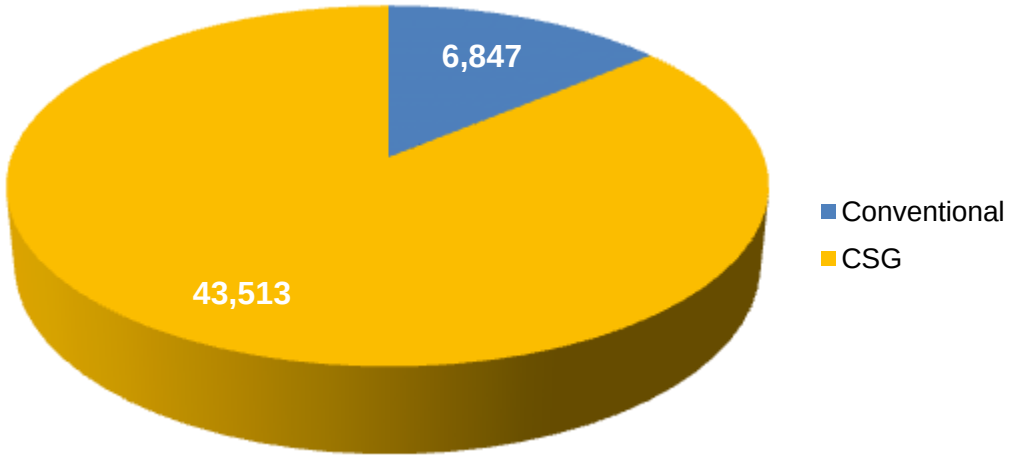

Figure 4: Natural Gas & Ethane 2P Reserves in Eastern Australia[3]

The ability to book reserves relies on an economic test. A producer must prove that they can be found, developed and sold economically to be permitted to claim them as reserves. The development of the LNG industry has enabled the upstream gas industry in Eastern Australia, in particular Cooper Basin and Queensland CSG producers, to identify and develop substantial reserves of gas that would otherwise not have been developed.

[2] Fuel cost projections, natural gas and coal outlooks for AEMO modelling (December 2011)

[3] Source: EnergyQuest February 2013 Quarterly Report

Many gas industry commentators forecast a large amount of early production or "ramp gas" in the lead up to the commissioning of the Queensland LNG projects and further postulated that the market would be "long" with ramp gas, causing many customers to hold off recontracting with the aim of securing cheap ramp gas. This is not how the project development has played out.

In the absence of new gas supply contracts or commitments from the southern states, producers proceeded to find customers in Queensland to underpin their upstream developments, largely contracting their reserves to LNG projects, but also contracting with Queensland industrial customers. Reserves, gas processing capacity and transmission pipeline capacity have now been dedicated to delivering that gas.

For NSW, this results in no or limited gas supply being available out of Queensland from 2015 and existing proven gas reserves from the Cooper Basin fully committed to end 2016 and already over 95% contracted thereafter. Specifically, up to 390 TJ/d[4] of existing Moomba gas processing capacity is already committed to deliver gas to states other than NSW post-2016[5,6] and well into the next decade. The potential impact on NSW daily demand is illustrated in Figure 5, where it highlights that up to 56% of NSW supply days are exposed from 2015.

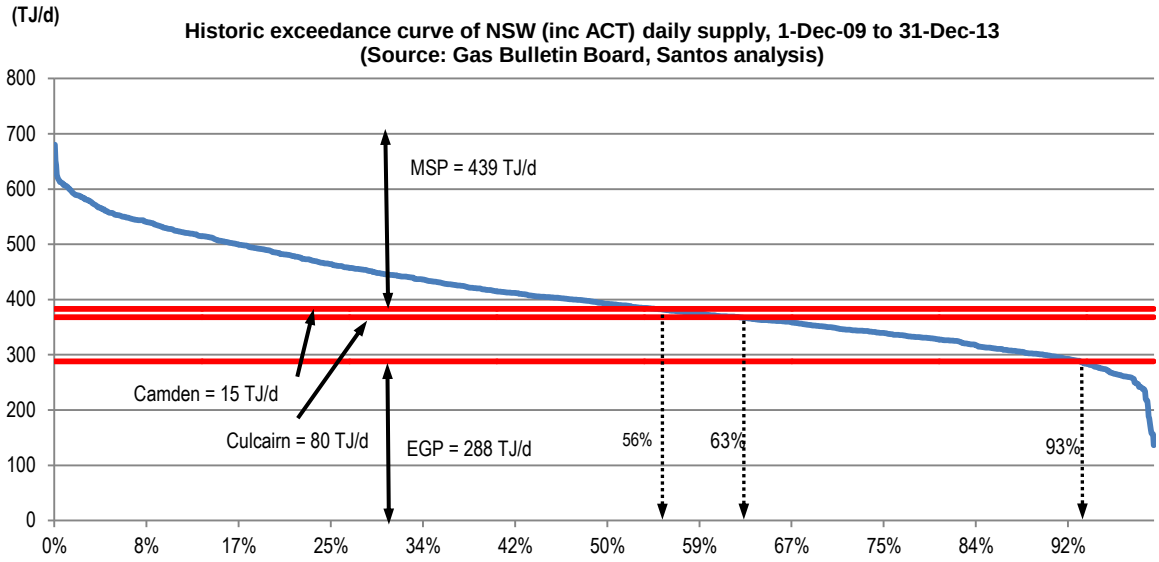

Figure 5: Exposure of NSW supply days from 2015/post-2016

Coupled with the changing Eastern Australian supply-demand dynamics, NSW has a looming uncontracted gas position, the timing of which directly coincides with the commencement of the Queensland LNG projects. Figure 6 illustrates the breakdown and timing of NSW's uncontracted gas position. Put simply, NSW needs to act now to identify and secure new sources of gas to maintain current levels of demand, let alone to underpin growth.

[4] Source: 2012 AEMO GSOO

[5] Santos, Origin and Delhi (Beach Energy) are joint venture partners in the Moomba gas processing facility and associated upstream developments and have either contracted or allocated the majority of their equity shares of gas to their respective gas supply portfolios.

[6] http://www.beachenergy.com.au/IRM/Company/ShowPage.aspx/PDFs/2934-16785602/BeachsignsmajorgassalesagreementwithOriginEnergy

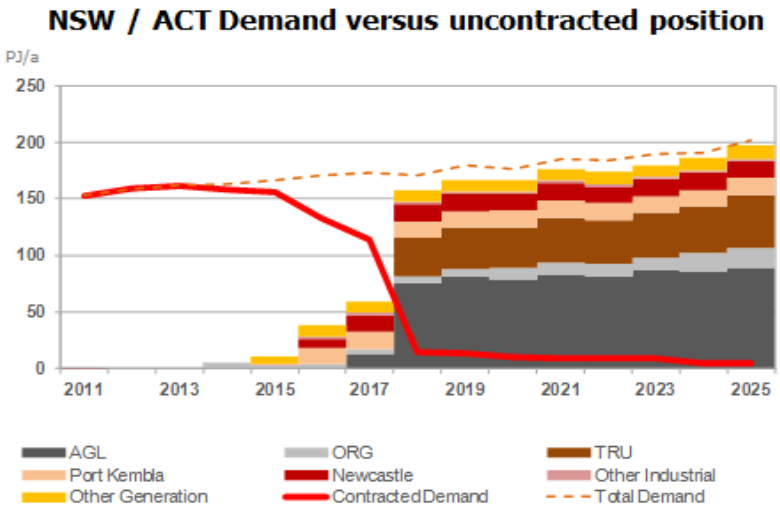

Figure 6: NSW (inc ACT) demand versus uncontracted position (source: Core Energy)

Critically, likely decrease in supply from the Cooper Basin and Queensland will by its very nature result in a lessening of competition as downstream markets and retailers have fewer wholesale gas supply choices. If NSW does not develop or source a competitive alternate supply, Victorian suppliers into NSW would have an opportunity to extract higher prices. Moreover NSW is now critically exposed to the deliverability constraints of Victoria.

Consequently this means when significant amounts of Cooper Basin gas processing and supply capacity becomes unavailable to the southern markets from 2015, the Victorian system will not have sufficient remaining existing capacity to 'step-up' and supply NSW on peak days. In the absence of the development of new upstream supply, this will lead to supply shortages and higher prices for consumers from 2015 and severely post-2016.

Retail, commercial and many small industrial customers would be hit hard by higher gas prices, typically having little practical option to switch to other energy sources – with much of this gas demand being price inelastic. Large industrial customers and some smaller industrial users are likely to cut their use of gas when faced with higher gas prices, which could result in slow economic activity and associated employment.

Of the over 3.5 million people employed in NSW[7], Santos analysis estimates over 15,000 are employed by large industrial customers[8] that are dependent on gas supply as a critical business input, with more than 2 million estimated to be employed by companies that may have high change over costs to use alternative forms of energy.

Downstream customers in NSW are therefore faced with two unpalatable realities in coming years:

1. The reduction in wholesale gas supply and choices into NSW, with wholesale gas supply largely limited to Victorian suppliers and the dominant supply position of the Gippsland Basin JV, exposing wholesale customers (energy retailers and large industrial customers) to higher prices, thereby resulting in high prices for downstream customers; and

2. The simple inability of the transmission pipeline system from Victoria to supply the NSW market with enough gas for peak days, resulting in rolling "gas outs" or gas demand load shedding in periods of consecutive days of peak gas demand.

An obvious solution to these two issues is for NSW to actively progress the development of its own indigenous natural gas resources.

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[7] ABS labour force status, April 2013 (http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/081FC24D44CE0B57CA257B65001489B9/$File/62020_apr%202013.pdf)

[8] Santos estimates of direct and indirect employment for a non-exhaustive list of specific large industrial sites in NSW referencing publically available material

Gas Market development

Santos believes government interventions such as supply and price regulation of gas markets will have long term negative consequences. Fundamentally they have the potential to impose additional uncertainty, regulatory costs, risk on producers and ultimately result in the stifling of upstream supply. It is important to recognise that these policies sit alongside a raft of other regulations that upstream gas developers are required to navigate. In essence these non-market interventions are an implicit (or in some cases explicit) subsidy provided to other industries. The overall effects of these interventions act as an additional burden and consequent disincentive to upstream gas development. Interventionist policies risk upstream explorers and developers seeking alternate opportunities free of such risks.

Economic theory is very clear about the negative economic consequences of price controls over the medium to long term. The fact that such controls would have a negative impact on the overall Australian economy is indisputable. However the magnitude and precise circumstances leading to these negative effects are far less predictable.

As it currently stands Santos does not believe it can be demonstrated that market failure has occurred or is likely to occur in the near future. This is because throughout Eastern Australia there remains substantial uncontracted reserves and numerous willing sellers competing to execute sales with a number of contracts having been signed in the last six months. In addition these contracts are not just with the LNG participants but with buyers that are recognising that the marginal cost of gas has risen and are similarly shaping their cost structures to absorb this new price.

In terms of options to increase transparency within the gas market it is worth recapping on what is already in place. As currently drafted the SCER terms of reference are sufficiently broad for the management of the energy and resources of the Commonwealth, State and Territory Governments of Australia. There are significant gas market reforms already implemented or underway by the SCER, which include:

- an annual gas industry planning report, the Gas Statement Of Opportunities (GSOO);
- the establishment of a short-term trading market (STTM) in Adelaide, Sydney and Brisbane; and
- the development of a wholesale gas trading hub at Wallumbilla.

These gas market developments are administered and/or operated by the Australian Energy Market Operator (AEMO).

Santos is supportive of the structure of the Wallumbilla gas trading hub and with further work believes the hub will achieve the necessary trading transparency that some gas users believe the market currently lacks. As currently structured the Wallumbilla gas supply hub will focus on the trading of gas only. However, transparency in the availability and traded price of gas is only half of the equation. To provide greater transparency AEMO could consider establishing pipeline capacity trading as part of the Wallumbilla gas hub. Transparency in the available unused capacity in pipelines as well as a right to bid to the holder of that capacity (coupled with an obligation to sell) for its use will contribute to a more transparent and liquid market for gas supply. The outcome enables suppliers or users to complete and deliver a gas purchase. Linking the platform used for gas trades with pipeline capacity trades would simplify the process for gas buyers looking to secure supply whilst maintaining a level playing field for all potential suppliers, thus deepening and making more liquid the transparent market in gas.

Where the misalignment in values arises is that the SCER members are still driven by their own jurisdictions political agendas. This has resulted in each of the individual jurisdictions implementing regulation or policies that have little consistency across borders which can often result in duplication of regulatory processes and procedures with no value added to the end result.

In order to encourage stakeholder engagement, Santos believes that making the SCER the central body for gas market reforms would limit the amount of reviews being conducted. This would allow all market participants to be involved in the development of gas market reforms. It would also help replace the current model whereby each jurisdiction implements changes to policies or regulations, sometimes with limited or no consultation period.

The Western Australian situation

The key question in the West Australian context is whether the current domestic gas reservation policy is effective in increasing gas supply to the market? Santos which exclusively produces gas for the domestic market in Western Australia, finds the lack of transparency around the commerciality test process feeds market uncertainty on the timing of likely production.

The recent IES Study on the Australian Domestic Gas Market identifies the clunky effect of the current reservation policy. The recently released WA GSOO weighs into the debate by suggesting that unless the North West Shelf maintains supply at existing levels, the market will be short and hence maintaining a level of reservation for them is necessary.

What these assessments ignore is the role of the existing infrastructure that has been developed absent a reservation obligation such as Varanus Island, Devil's Creek, and Macedon. Combined with the rising cost of developments and operations, the reservation overlay makes it difficult for companies like Santos which would otherwise develop and bring additional reserves to market, to do so with any certainty. That is, will the future market price sustain the cost of development, given the lead time required to invest? The danger is that the perception, real or otherwise, that large increments of gas will be forced into the market at prices subsidised by LNG or liquids sales will defer or stop companies like ours, focused on domestic gas in WA, from pursuing the exploration and development of those smaller and closer to shore gas fields more suited to domestic supply.

Another consideration is the risk that market interference poses in the development of the potentially significant shale and tight gas resources in WA. There is potentially twice as much shale and tight gas in WA as the state's current conventional reserves and this represents a big opportunity for WA in terms of energy security. The risk is given the embryonic stage of development and the many challenges to developing this supply, including infrastructure, any intervention in the market that leads to an artificial suppression of prices may be enough to halt the development before it gets going. The United States is a great example of how a thriving industry and a free market can unlock gas supply and reduce gas prices. An initial peak in prices led to producers deploying more rigs, generating more gas and investing in infrastructure; a free market allowed for competition that drove prices back down and the effect has been to positively change the energy security outlook for the US.

Recommendations:

- Government intervention in the gas market should only be implemented with clear demonstration of gas market failure
- The establishment of pipeline capacity trading as part of the Wallumbilla gas supply hub
- Creation of a central body for the development of gas market reforms

Regulatory Reform and Role of Government

Key Points:

- Private sector investor confidence is significantly affected where there is an uncertain regulatory environment.
- Uncertain investment climate delays critical infrastructure projects to the economic detriment of Australia.
- The debate over the benefits versus risks of energy development in Australia has become distorted and requires rebalancing.

Santos supports a robust regulatory framework that enables the sustainable and safe exploration and development of Australia's valuable and abundant reserves of gas for the benefit of all Australians. It is important that the regulatory framework provides community confidence but, that in doing so, additional processes and compliance costs do not unnecessarily delay the development of the industry and the economic, environmental and energy security benefits it can deliver.

The effect of extended regulatory uncertainty on investor confidence should not be underestimated.

For example, in the past 18 months the CSG industry in NSW has been exposed to a number of new State and Commonwealth regulations including:

- Amendments to the Mining SEPP – some small scale exploration now subject to State Significant Development requirements adding significant assessment times to minor exploration projects;
- Installing a Land & Water Commissioner dealing with land access issues;
- Codes of Practice for Hydraulic Fracturing and Well Integrity and the soon to be finalised Code of Practice for Land Access;
- New water sharing plans and requirement to obtain Water Access Licences for saline water in deep coal seams;
- Aquifer Interference Policy requirements;
- Agricultural Impact Statements required for all exploration and production activities;
- Comprehensive community consultation guidelines;
- Strategic Regional Land Use Plan – including the Gateway & site verification processes for State Significant Development;
- CSG exclusion zones CSG around residential areas & critical industry clusters;
- New investigation and enforcement powers under the Petroleum (Onshore) Act;
- Requiring an Environment Protection Licence for all CSG exploration and production activities;
- Installing the NSW Environment Protection Authority as the lead regulator for environment and health issues for CSG;
- NSW Chief Scientist review of the CSG industry which has yet to assist in drawing any conclusions on the industry;
- Referral of all significant CSG and mining applications to the Commonwealth Independent Expert Scientific Committee; and
- The water "trigger" in the Environment Protection and Biodiversity Conservation Act for CSG activity for both exploration and production activities, resulting in duplications between State and Commonwealth water assessments.

Some of these regulatory changes were installed without any consultation with, or advance warning for industry. Furthermore, there are instances where the precise detail of the new regulation had not been formulated at the time of its announcement, as well as no clear understanding of what, if any transition arrangements would apply.

In addition to the uncertainty, the new regulation has resulted in new layers of duplication, particularly between the State and Commonwealth Governments. For example, the water trigger under the EPBC Act will result in direct duplication of the NSW Governments assessment of water impacts.

The effect of the continued changing regulatory environment and duplication in NSW has been:

- Lack of investment certainty – there is greatly increased risk associated with investment in the CSG industry in NSW because of the uncertainty around the rules;
- Industry losing momentum – over the past two years there has been virtually no ability for the CSG industry to undertake substantial work in NSW to improve the understanding of potential natural gas resources in NSW; and
- Substantial additional resource and time cost often for no clear environmental benefit – both understanding the new rules and then ensuring compliance has added substantial additional resource and time costs to the CSG industry, often with little if any additional environmental benefit.

To be clear, Santos is supportive of undertaking the appropriate environmental studies and assessments as required by the Commonwealth and State Governments. While Santos understands the need for Governments to install sensible environmental regulation, there is also a responsibility to ensure a stable and predictable regulatory environment exists that allows industry to invest with confidence.

In addition to the lengthy, often duplicated and complex assessment process, the time and risk to develop a project can be further increased by the prevalence of third party review provisions. Third party reviews can occur at both State and Commonwealth levels. Where there has been a rigorous and transparent assessment process, often involving independent bodies, Santos believes there should not be the ability to reconsider the merits of an approval process unless the law has not been applied correctly.

The following recommendations focus on "*areas where approvals processes could be further streamlined while maintaining proper environmental and social safeguards*"

Recommendations:

- Remove any duplication of environmental assessment between Commonwealth and State Governments;
- Enhance the proposed single or "one stop shop" assessment process combining both Commonwealth and State Government statutory processes, and have it coordinated by a single State or Commonwealth Agency;
- Tailor assessment processes to the level of risk. That is exploration activities should not be subject to the same level of regulatory burden as production activities;
- Where there has been a rigorous and transparent assessment process, third party reviews of decisions should only be able to occur where the law has not been applied correctly.

Growth and Investment, Trade and International Relations

Key point:

- The McKinsey Paper (Extending the LNG boom) shows the importance of cooperation between industry and policy makers. Even if all the individual measures are implemented, it may still not be enough to guarantee the next wave of LNG investment.

Global energy projections

Energy trends are broadly in line with economic trends – hence the high economic growth rates in Asia are being matched with a similarly fast growing energy demand. Recent estimates see global energy demand growing by more than a third between now and 2030 and almost all of that growth will come from emerging economies such as China and India.

Urbanisation is a key driver of Asia's demand for energy. As rural communities migrate to urban centres and cities and have access to gas and power, the demand for televisions, air conditioners and other appliances in turn drives a steep increase in the demand for energy.

How this increase in energy demand is met is one of the biggest challenges facing the region and will be dependent on Asia's choices about its fuel mix.

The role of gas

Gas has an important role to play in this context. It is, after all, a lower carbon alternative – offering less than half the carbon emissions intensity of coal.

Natural gas is also the cleanest burning fossil fuel – gas-fired power plants greatly reduce emissions of pollutants like sulphur dioxide, nitrogen oxides and particulates. Within Asia, these pollutants are becoming an increasing concern in large urban centres.

It is this low environmental impact, low carbon advantage, together with the need for diversity of supply that have combined to see expectations for the global use of gas to grow over the 20 years.

All forms of gas supply will be required by individual economies for diversity of supply and energy security reasons and will be met from a combination of domestic production, pipeline imports and LNG imports.

The role for Australia

An abundance of natural resources means that Australia's future is very much linked to the pace and scale of economic and societal change taking place in the Asian region.

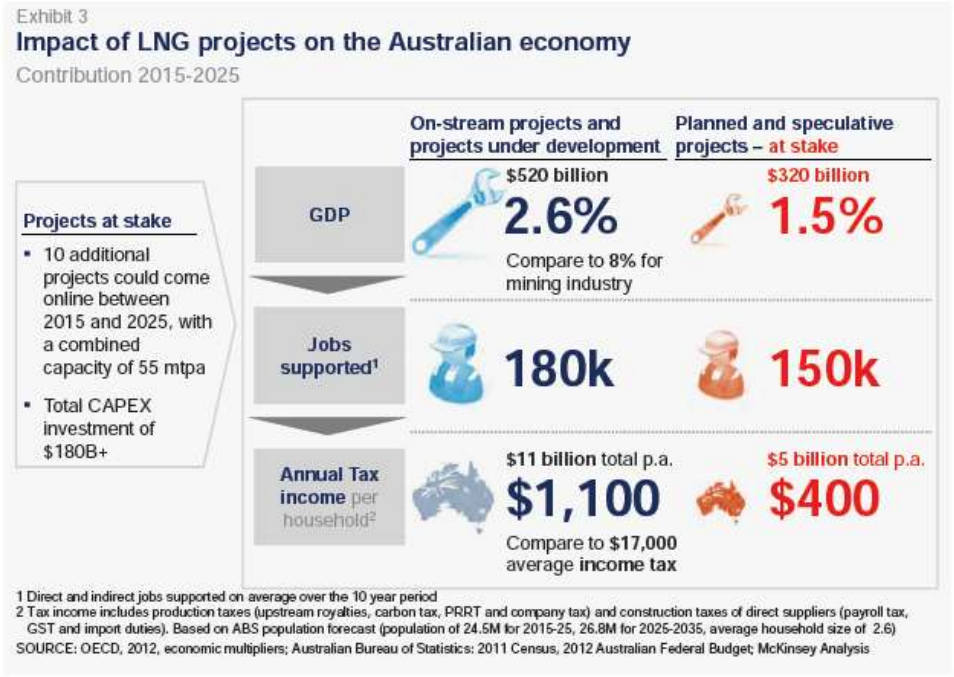
With seven LNG projects worth around $180 billion currently under construction in Australia's west, north, and east - the oil and gas industry is now a significant generator of wealth for all Australians, delivering more than 100,000 full time jobs in 2012 and accounting for more than one third of all business investment[9].

Australia benefits a lot from LNG projects. In the McKinsey Paper, Extending the LNG boom: Improving Australian LNG productivity and competitiveness, it shows that 63 percent of revenues from gas sales remain in Australia for a conventional gas project and that for an unconventional gas to LNG projects, 69 percent of revenues remain in Australia.

[9] Source: Advancing Australia: Harnessing our comparative energy advantage, Deloitte Access Economics

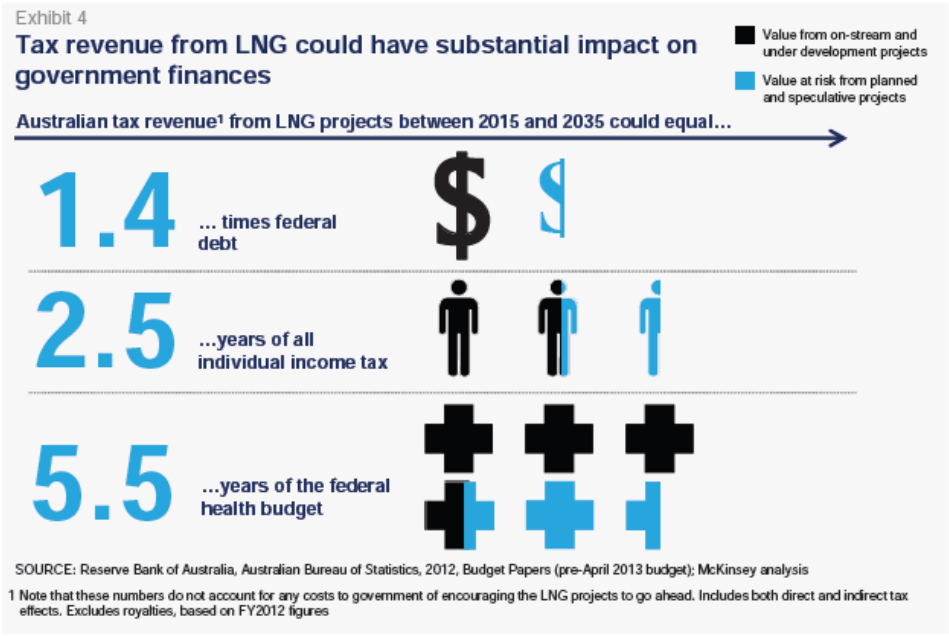
This is to the advantage of all the beneficiaries of the revenue flows, and indeed of the beneficiaries of the tax system, including workers, communities, local suppliers and investors[10].

Existing and committed projects in Australia are expected to contribute A$520 billion to the economy over 2015 to 2025. These projects will add 2.6 percent to Australian GDP, or A$5,500 per household per year, support 180,000 jobs and increase the tax take by A$11 billion or A$1,100 per household (average nominal annual contribution 2015 to 2025)[11].



12

In an environment where budgets will come under increasing pressure, the potential for sizeable tax revenues make actions now more compelling.



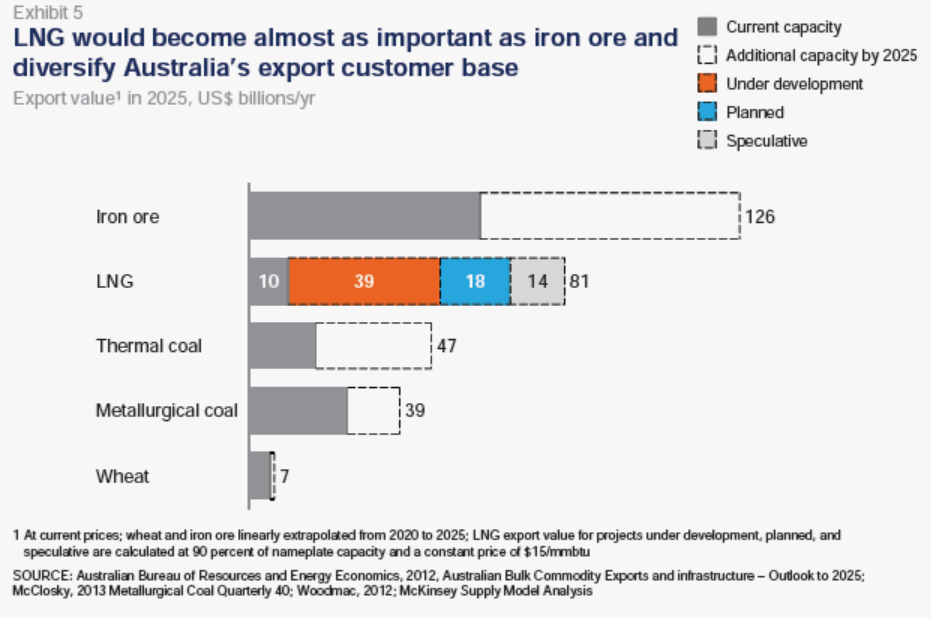
13

[10] Source: Extending the LNG boom: Improving Australian LNG productivity and competitiveness- McKinsey

[11] Source: Extending the LNG boom: Improving Australian LNG productivity and competitiveness- McKinsey

[12] Source: Extending the LNG boom: Improving Australian LNG productivity and competitiveness- McKinsey

The relative importance of the LNG market to Australia's trade in commodities by 2025, relative to other large Australian exports is shown below.



14

Competition and costs

Many projects remain on the drawing board, representing an investment exceeding $180 billion. Realising these would benefit the entire nation; as GDP would increase by 1.5 percent, about 150,000 jobs would be created, and tax revenues created equivalent to nearly half the total federal debt[15]

The market for capital is a global one, and investors both domestic and foreign will always seek to obtain the best return for their investment and gas once thought stranded either due to the lack of technology or infrastructure is now finding a market – through LNG.

As Asia seeks to increase its security of supply and diversify its supply sources for LNG, we are of course seeing the emergence of new suppliers including Canada, East Africa and the US. In Canada at least 5 projects are on the drawing board, in Mozambique a development is being rapidly advanced that would consist initially of four trains and with significant expansion possible. And despite deliberations over the politics of exporting gas in the US, we know that the Sabine Pass project has two trains under construction and with buyers signed up for cargos.

In this competitive environment, the cost of building new LNG projects in Australia has increased significantly over the past decade and is now around 20-30% higher than that of the global competition (based on an integrated project combining both upstream and downstream investment)[16].

Australia's challenge is to remain competitive and to successfully attract the next wave of LNG investment.

This gap can only be addressed by increasing productivity in the sector. The big drivers of productivity are the outputs that can be achieved by labour employed and capital invested. Labour costs account for slightly less than half of all costs of conventional LNG plant costs, where the cost of equipment and materials is about a third. The biggest drivers to improve productivity are to reduce the time needed to build a new LNG plant, and to reduce the costs of doing so. These in turn are driven by the efficiency of the supply chain, the tax and regulatory regime, and the cost and productivity of labour in Australia[17].

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[13] Source: Extending the LNG boom: Improving Australian LNG productivity and competitiveness- McKinsey

[14] Source: Extending the LNG boom: Improving Australian LNG productivity and competitiveness- McKinsey

[15] Source: Extending the LNG boom: Improving Australian LNG productivity and competitiveness- McKinsey

[16] Source: Extending the LNG boom: Improving Australian LNG productivity and competitiveness- McKinsey

[17] Source: Extending the LNG boom: Improving Australian LNG productivity and competitiveness- McKinsey

Industry must take a concerted and collaborative approach to improving our efficiency and delivering gains in productivity. We must also prioritize efforts to collaborate, to share infrastructure, and to deliver economies of scale.

Policymakers must understand how legal and policy uncertainty can negatively affect business and deliver sound regulatory and tax policies to support confidence in sustained investments over the long-term horizon. These policies should not be impacted by the near-term ups and downs of commodity prices.

Brownfield expansion and new technology

Brownfield expansion and new floating LNG technology provide viable options for meeting the cost challenge and to secure the next wave of LNG investment in Australia[18]. Brownfields are developed by operators expanding their own fields or third parties collaborating with existing facilities. They can reduce costs through the sharing of infrastructure, shared maintenance and operations, replicating existing plant designs and reduced approval time.

Roughly 80 percent of remaining major gas basins with more than 5 tcf of 2P reserves can potentially be served by re-using existing infrastructure[19].

The first FLNG project globally will be in Australia: 'Prelude', which is currently being built, and first gas is expected in 2016. More projects are likely: FLNG has been cited as a serious candidate for the Greater Sunrise, Bonaparte, Scarborough, and Browse projects

Constructing an FLNG plant as opposed to a traditional onshore LNG facility could reduce landed cost by roughly $1–1.4/mmbtu (Exhibit 12), including impact on government revenues and other costs; assuming a 2-train 8-mtpa development and cost of capital of 7.8% over 40 years life of field)

Recommendations:

- Santos recommends a more cooperative position between industry and government to deliver the next wave of investment and the economic benefits they will bring for Australia.
- The recommendations Santos has made throughout this paper would help to underpin delivery of the next wave of investment and would include more collaboration within the industry through brownfield expansion and new FLNG technology

[18] Source: Extending the LNG boom: Improving Australian LNG productivity and competitiveness- McKinsey

[19] Source: Extending the LNG boom: Improving Australian LNG productivity and competitiveness- McKinsey

Workforce Productivity

Key points:

- There are key skill sets and occupations that are critical for a functional and flexible oil and gas industry.
- The drivers for demand for specific roles revolve around levels of experience and depth of knowledge, the length and cost of training and education, the low completion rates of training and education and labour mobility.
- The length of time required to complete an apprenticeship in an instrument/electrical trade is considerable, resulting in low completion rates.

There are key skill sets and occupations that are critical for a functional and flexible oil and gas industry. Current skill shortages exist in the following occupations:

- Experienced drillers and assistant drillers;
- Instrument/electrical technicians;
- Geologists, geoscientists and geophysicists;
- Engineers – specifically experienced electrical, production and mechanical engineers, and graduate petroleum engineers.

The drivers for demand for specific roles revolve around levels of experience and depth of knowledge, the length and cost of training and education, the low completion rates of training and education and labour mobility.

Engineering roles require a Bachelor's degree and above, and it is the combination of formal qualifications, graduate programmes and experience required for experienced positions which results in the skill shortage.

Geology, geoscience and geophysicist positions mostly require a Master's degree in addition to an undergraduate science degree. The significant length of time to qualification impacts upon the supply of labour within these occupations.

The length of time required to complete an apprenticeship in an instrument/electrical trade is considerable, resulting in low completion rates.

Additionally, the CSG drilling industry is relatively new to Australia, which means it is difficult to source suitably experienced drillers for the positions available. Labour mobility within this skill set is also an issue, which is impacted by immigration requirements.

The current skills shortages may be addressed by both government and industry in the following ways:

- Government to provide greater access to flexible training funding to help offset the high cost of training, and the increasing requirement for workers to be trained in new technology. Funding needs to cover training in courses which provide Cert IV and above qualifications. This training fund could also include the development of training materials to encourage industry collaboration and participation in knowledge sharing e.g. LNG training package.

- Government to support employment and training programs for Aboriginal and Torres Strait Islander people and traditional owner groups to increase local employment opportunities and reduce industry's reliance on non-resident workers.

- Greater support is needed from government to build TAFE capability, including flexibility in industrial relations law to enable TAFEs and other registered training organisations to attract and retain highly skilled staff.

- Initiatives involving industry and education to increase female participation in trades and tertiary education required for these roles.

The industry will need to attract more people into the relevant resources-related professions and trades to meet long term demand. Specifically, the question to be answered is how to make these occupations and the courses that lead to them more attractive to prospective students.

More needs to be done to attract students to studying science, technology, engineering and mathematics subjects in primary and secondary schools. Mathematics and sciences need to be made more relevant to daily life and teachers and career advisers should also make students aware or the consequences of not choosing to study mathematics and science subjects in upper secondary schools.

Teachers at both the secondary and tertiary level also require additional professional development across the science, technology, engineering and mathematics subject areas. Many teachers do not have any practical experience gained from the resources sector to impart to students. Increasing the ability of schools and universities to attract and retain highly skilled and experienced teachers at the secondary and tertiary level should assist in increasing the level of student interest in these areas.

Greater support also needs to be provided to apprenticeship and traineeship programmes. Generally, public sector trainers in the vocational education and training sector have limited up-to-date technology for training, which means that resources companies have developed in-house training programmes which are costly and inefficient across the industry.

It is also important that a continued focus is placed upon attracting individuals to apprenticeships and traineeships, especially women and Aboriginal and Torres Strait Islanders, who are typically in the minority of apprentices and trainees recruited by industry.

Females continue to be under-represented in trades and technical studies and programs and it is important for the Government to consider impactful, workable initiatives to encourage a sustained increase in female participation in the industry.

Recommendations:

- Government to provide greater access to flexible training funding to help offset the high cost of training, and the increasing requirement for workers to be trained in new technology. Funding needs to cover training in courses which provide Cert IV and above qualifications. This training fund could also include the development of training materials to encourage industry collaboration and participation in knowledge sharing e.g. LNG training package.
- Government to support employment and training programs for Aboriginal and Torres Strait Islander people and traditional owner groups to increase local employment opportunities and reduce industry's reliance on non-resident workers.
- Greater support is needed from government to build TAFE capability, including flexibility in industrial relations law to enable TAFEs and other registered training organisations to attract and retain highly skilled staff.
- Initiatives involving industry and education to increase female participation in trades and tertiary education required for these roles.

Alternative and Emerging Energy Sources and Technology

Key point:

- Transparent and reflective energy prices are the most appropriate mechanism to ensure energy is being used efficiently.

Energy Efficiency

The Energy White Paper Issues Paper makes multiple references to energy productivity and energy efficiency. These terms can mean different things and shouldn't be confused with energy intensity. Metrics such as energy use per GDP should be avoided. For example lower priced electricity may drive more energy intensive industries but that does not mean they are inefficient within their sector.

Historically, Australia's low energy prices have provided a competitive advantage for a range of industries. There are many variables that will influence industrial business efficiency. Providing a stable policy environment is the central lever.

Recently, many groups have cited increasing energy costs as the single biggest driver for adoption of energy efficiency measures. However, these measures themselves are not without cost.

A number of reports have cited barriers to the uptake of energy efficiency opportunities. However, the veracity of this data should be reviewed. A consultative forum for dialogue between government and industry to better understand how industry manages energy and what energy efficiency opportunities exist would facilitate this.

Credible data is required to inform policy development and any energy efficiency policy must be considered in light of the existing framework to avoid over duplication and unnecessary regulatory burden for industry.

The Energy Efficiency Opportunities (***EEO***) Program was introduced in 2006 to address a gap in the regulatory and policy framework. Eight years on, the EEO Program has served its original purpose and its continued efficacy must be reassessed in light of Australia's current regulatory and policy mix, which has evolved significantly and now includes (among others) the Renewable Energy Target scheme and the Direct Action Plan.

The Issues Paper (p 32) includes a claim in support of the EEO Program that " *energy efficiency measures driven by government action have delivered significant economic benefits. Between 2006 and 2011, large energy users reported cumulative energy savings of over $1.5 billion*". This statement mistakenly assumes a causative link between the mandatory reporting requirements of the EEO Program and the activities undertaken by industry to reduce energy usage.

The main driver for energy efficiency actions undertaken by business is not compliance with a reporting obligation but rather is the cost of energy. The EEO Program is in the most part an administrative program that requires the detailed documentation of decisions that would otherwise have been made in the ordinary course of business. This administrative burden diverts valuable industry resources from more constructive project based work.

Direct Action Plan

It is vital that Australia's national energy and climate change policy approach, and therefore the design of the Direct Action Plan reflects the enormous economic and greenhouse benefit that can flow from a prosperous and vibrant upstream gas industry.

Broadly, Santos supports the creation of a well-designed emissions reduction incentive scheme. However, there are a number of technical issues to be addressed during the Green/White Paper process to ensure that the scheme works effectively, creates genuine abatement opportunities and is administratively efficient for industry and government.

The DAP should be viewed as Australia's national and long term response to reducing emissions. The plan should be designed to facilitate emissions reductions across all sectors of the Australian economy. The implementation of the plan should be done in parallel with a review of existing policies, streamlining these to reduce unnecessary red tape on industry (and government resources).

Detailed consultation with industry is required, particularly with regard to business as usual baselines and thresholds. Where possible this policy should leverage existing facility based data such as that provided under the National Greenhouse and Energy Reporting System.

Renewable Energy

The policy objective of the renewable energy target (RET) should be clearly defined. Clearly it is not to deliver lowest cost carbon abatement, but it has provided significant support to the emerging renewable energy industry (existing technologies).

A review of the RET is scheduled for mid-2014 and a number of important policy decisions will need to be reviewed – these can best be considered in light of clearly defined scheme objectives.

Key variables for consideration are the scheme target and end-date, with careful consideration given to the market implications of adjusting these variables. A detailed schedule and policy framework for the phasing out of the scheme should be outlined.

Emissions intensive trade exposed industries, such as LNG, are eligible for partial exemption certificates from the full costs of the RET in recognition of the inability of these industries to pass on these costs. However, any additional cost imposed places Australian industry at a disadvantage to our competitors. The scope of these certificates should be extended to provide greater coverage for trade exposed industries. Further, the supplementary permit definition for LNG under the Clean Energy Act should be retained and apply to the RET partial exemption certificates.

Recommendations:

- Detailed consultation is required prior to the implementation of any new energy, renewable or carbon related policy/programs and should be considered with the rationalisation of existing policies.
- A detailed cost benefit analysis impact should be conducted to review the benefit of any new schemes and review existing schemes to ensure Australia remains a competitive place to do business