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The Santos logo is displayed in a bold, blue, serif font.

**TO:** Company Announcements Office  
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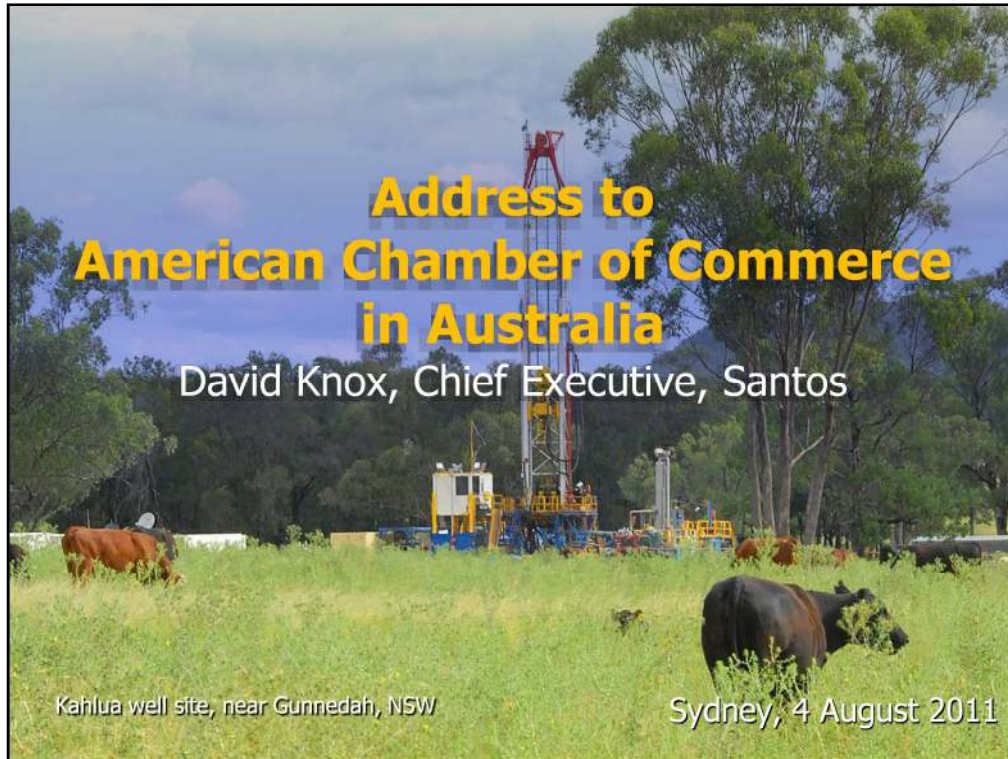
**FROM:** Company Secretary

**DATE:** 4 August 2011

**SUBJECT: ADDRESS BY DAVID KNOX  
TO THE AMERICAN CHAMBER OF COMMERCE IN AUSTRALIA**

Please find attached an address by David Knox, Chief Executive Officer and Managing Director, presented to the American Chamber of Commerce in Australia (AMCHAM) on Thursday 4 August 2011.

**David Lim**  
Company Secretary



- Welcome, acknowledgements
- I'd like to thank AmCham for the opportunity to speak to you today.
- The Chamber's continuing leadership in facilitating events such as today is an important contribution to open and ongoing dialogue on key issues.

## The Fuel for the Future



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I'd like to start by showing you something I hope you have already seen.

[Play Santos TV Commercial]

That commercial has been running on TV stations in Queensland and NSW – and nationally on Sky News – for a couple of months. The commercial shows Mr Col Maunder on his farm near Wallumbilla in Queensland – it's a farm where we are working together to produce coal seam gas.

Advertising represents a significant step out for Santos – a company with a proud track record of safe and reliable delivery of natural gas to Australians for over 50 years – but a company which has not traditionally sought the spot light.

We are doing this because we know the community wants more information.

They are understandably concerned about the impacts of the growing coal seam gas business.

These concerns centre on two key themes:

- The impact of CSG on traditional agriculture; and
- The impacts on water – both the quality and quantity of water available for other uses.

I'm going to address both these concerns today – but also address the context in which these issues are being considered and the real choices we must make about securing a clean energy future and maintaining strong regional – and national – economies.

# What is Coal Seam Gas?

## Definition

- Natural gas extracted from coal seams
- Typically 98% methane, <2% inert gas, low or no CO<sub>2</sub>

## Key Facts

- Known coal exists from Townsville to Sydney (2000km)
- Target zones are 500-1,200m below surface
- Production process is simply removal of water and transportation
- CSG already accounts for 70% of Queensland's gas production



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- Firstly let's start with a very basic question.
- What is coal seam gas?
  - Put simply, coal seam gas is natural gas found in coal seams. It is no different from natural gas found in limestones or sandstones – though the method of extraction does vary.
  - Coal seam gas has been produced in Queensland for the past 20 years, and it now accounts for 70% of that state's gas production.
  - Coal seam gas is often referred to as unconventional gas. It is, in fact, identical to natural gas and is used for exactly the same purposes.
  - Coal seam gas is an odourless and colourless gas. In eastern Australia it is abundant in coal structures extending from Sydney to Townsville.
  - Coal seam gas is produced by drilling a well into a coal seam and releasing the gas by pumping out the water which, in turn, lowers the pressure down the well, allowing the gas to flow to the surface for transport to market.

# Global energy demand grows

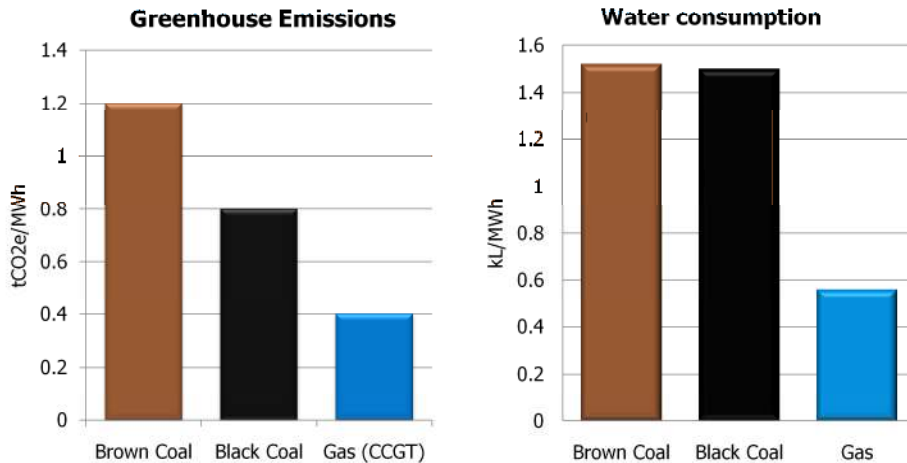
.... in a carbon-constrained world



- Australia's abundant resources of natural gas , both conventional and unconventional, represent a real competitive advantage for our nation in an energy-hungry, carbon-constrained world.
- I like this view of the world at night – it rather starkly shows those countries with strong economies and secure energy supplies.
- It also highlights that India and China, two of the most densely populated countries, will need more energy.
- As economies grow and wealth is shared, lights will burn brighter all around the world.
- Delivering this energy while managing the carbon equation is a challenge for everybody.
- In our neighbourhood, the lights will burn brighter in Asia as the region's economies continue to grow.
- Forecasts show that from 2007 to 2035:
  - Asia is expected to account for 48% of global population growth
  - And, a remarkable 64% of growth in primary energy consumption
- One stark measure is that China is building one gigawatt of power generation capacity every week.
- Australia is indeed fortunate that our natural gas resources gives us an abundant available energy source to replace high-carbon coal at home and the opportunity to bolster our economy by developing those resources in the form of Liquefied Natural Gas for export to our Asian neighbours ...

## Gas provides clean, sustainable energy

### Greenhouse and water intensity of baseload power generation options



Source: Adapted from National Greenhouse Accounts. National Water Commission 2009, Water & the Electricity Generation Industry, Implications for Use

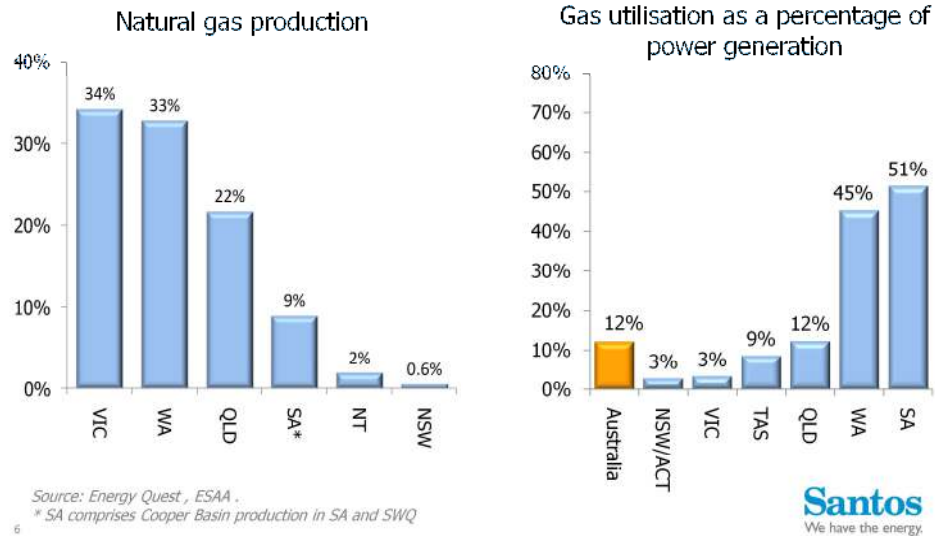
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- The carbon equation is fairly simple. New baseload gas power stations produce less than 0.4 tonnes of CO<sub>2</sub> per megawatt hour. That's less than half the emissions associated with black-coal fired power – or less than a third of the emissions from brown coal stations.
- Of course, carbon emissions are not the only environmental consideration in power generation. In Australia, in particular, water usage is a critical factor.
- When making decisions about future baseload power, water intensity must be considered.
- Gas uses a fraction of the water required by all other baseload alternatives.
- You hear a lot about water in the coal seam gas debate. The fact is that CSG can assist Australia in meeting its water challenge – both through making new supplies of water available for beneficial use and if more gas is used to generate electricity, dramatically reducing the water used in power generation.
- Natural gas has a major role to play in:
  - Reducing carbon emissions and boosting energy security both here and overseas
  - Generating significant export and domestic revenue; and
  - Maintaining our competitive advantage in energy

# Australian gas production

NSW is only the Australian mainland state without any significant local production of natural gas



- If natural gas is Australia's next comparative advantage in energy, it is notable that NSW has been the only Australian mainland state without any significant gas production.
- That, combined with the state's abundant coal resources, has seen NSW become very dependent on coal-fired power, and consequently it has the highest emissions from electricity of all mainland states except Victoria, where the reliance on power from brown coal drives high emissions.
- Now, the development of an integrated gas market in all of eastern Australia, means that NSW has reliable gas supplies from the Cooper Basin and Bass Strait.
- But the fact remains that the development of a significant new natural gas business in this state would give NSW greater optionality in maintaining secure energy supplies in a world where carbon emissions matter.

## CSG: A new industry in regional Australia

- Queensland CSG industry
  - >\$50 billion investment
  - 18,000 new jobs
- Economic benefits of GLNG
  - \$2 billion already invested in Queensland
  - 2,000 jobs already created
  - 6,000 new jobs in total, including 1,000 ongoing
  - \$40 billion in Federal taxes
  - \$6 billion in State revenues



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- Managing the transition to a lower carbon footprint is fraught with challenges – as the debate over the Federal Government’s proposed carbon tax highlights.
- The economic impact is appropriately paramount among Australians’ concerns as they contemplate this transition.
- In addition to the environmental advantages, coal seam gas extraction represents significant new jobs and investment in regional and rural areas of Queensland and potentially New South Wales.
- The three major approved coal seam gas projects in Queensland represent investments of over \$50 billion in that state. Together they will see the creation of 18,000 direct new jobs.
- Employment by Santos has grown six-fold in Queensland over the past six years, and today there are over 2,000 people working on our project. In total, the Santos GLNG project will create 6,000 direct, new, jobs – 5,000 new jobs during development and 1,000 new, permanent jobs once full production is reached.
- Initial economic impact assessments show that Santos’ projects in New South Wales will create at least 1,000 new direct jobs here.



## CSG in NSW: Economic benefits

- NSW CSG industry
  - Multi-billion dollar investment
  - > 1,000 new jobs
- Economic benefits of NSW CSG
  - \$1.5 billion already invested
  - Significant gas production for first time
  - A low carbon alternative to traditional dependence on coal



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- It is true that it is early days in the development of the coal seam gas business in New South Wales.
- So far, Santos has drilled about 25 wells over the last three years in seeking to prove the extent of the gas available for future development. Over the next three years, upon completing our proposed acquisition of Eastern Star Gas, we will drill an additional 50 wells – and invest about \$500 million in doing so.
- Beyond that our investment could be much more significant – but even if the development of Santos’ coal seam gas business in New South Wales was a third of the size of our Queensland project, \$2 billion would be added to New South Wales state revenues and over a 1,000 direct jobs would be created. Of course the knock-on effects of this investment would create thousands of additional jobs within the community and other industries.
- But we also know we will not be able to proceed with this investment without strong community and government support – and we won’t receive that unless we can address the concerns we are all hearing so much about at the moment.
- At Santos, we have a strong track record in the Queensland CSG industry and we intend to apply these learnings and practices in NSW.
- And, we support strong regulation of CSG activities to ensure the best practices are adopted by all companies in the industry.
- We have demonstrated that it is possible for farming and the CSG industry to co-exist and support each other.

## Working alongside agriculture



Well site at Kahlua, north-west of Gunnedah, NSW

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- We are very committed that our activities will be developed in a strong partnership with agriculture.
- The two core concerns farmers have about coal seam gas are: the impact on water and the impact on land use.
- Let me begin with land use.
- This photograph shows a pilot well drill site near Gunnedah. It is evident here that farming continues alongside our operations – it is a demonstration of the low impact of CSG exploration and that our industry can co-exist with agriculture.
- Of course, we ensure landholders are compensated for access to their land, and any disruption to farming activity.
- We respect that landholders typically prefer their commercial negotiations to remain confidential, but there has also been a lot of discussion over the amount of compensation paid to farmers – and the perceived “secrecy” of these arrangements.
- As a guide, I can say that we typically pay a landowner \$5,000 to drill a well on their land, with an ongoing annual payment of \$1,500 per well. Additional compensation is paid for road access, pipelines or any other infrastructure.
- From our perspective, these arrangements are only confidential if the farmer wants them to be so.

## Core hole site during drilling



Well site at Brawboy, Gunnedah Basin, NSW

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- Santos' existing operations show that agriculture and natural gas extraction can co-exist successfully.
- The surface footprint of coal seam gas extraction is generally relatively small and temporary in nature. The exception to this is access roads and infrastructure such as treatment and compressor stations, and centralised water treatment facilities.
- This image shows a core hole drill site at Brawboy, in the Gunnedah Basin. The site would appear like this for about two months.

## The same site during rehabilitation...



Well site at Brawboy, Gunnedah Basin, NSW

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- Immediately after the drilling operation is complete, the rig moves to another location and rehabilitation of the site begins.
- This image shows the Brawboy site about six weeks after drilling was completed.

## The same corehole 6 months later...



Well site at Brawboy, Gunnedah Basin, NSW

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- Six months later, it was only the additional fencing the landholder chose to retain that gave any indication that coal seam gas drilling had taken place.
- This is but one example of how we rehabilitate our drill sites.
- While we are on agricultural land, every reasonable attempt is made to ensure that surface facilities are generally located in areas that are not visible from public roads, or homesteads, and away from the more intensively used areas of the property.

## Coal seam gas production



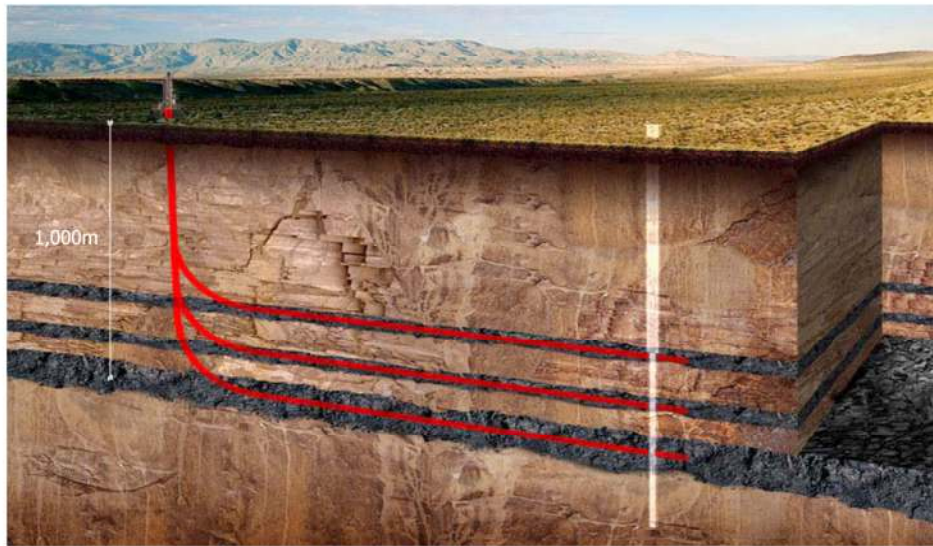
Production well at Coxon Creek, Queensland

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- Once a well is brought into production it has a very small footprint.
- This well in our Queensland operations is typical of the size of the footprint in which we would occupy.
- Wells typically operate in this condition for up to 20 years – during which time they require occasional access for monitoring and maintenance.
- After the well's productive phase is over, all facilities are removed and the land is completely rehabilitated.

## Technology reducing our impact



Source: Eastern Star Gas

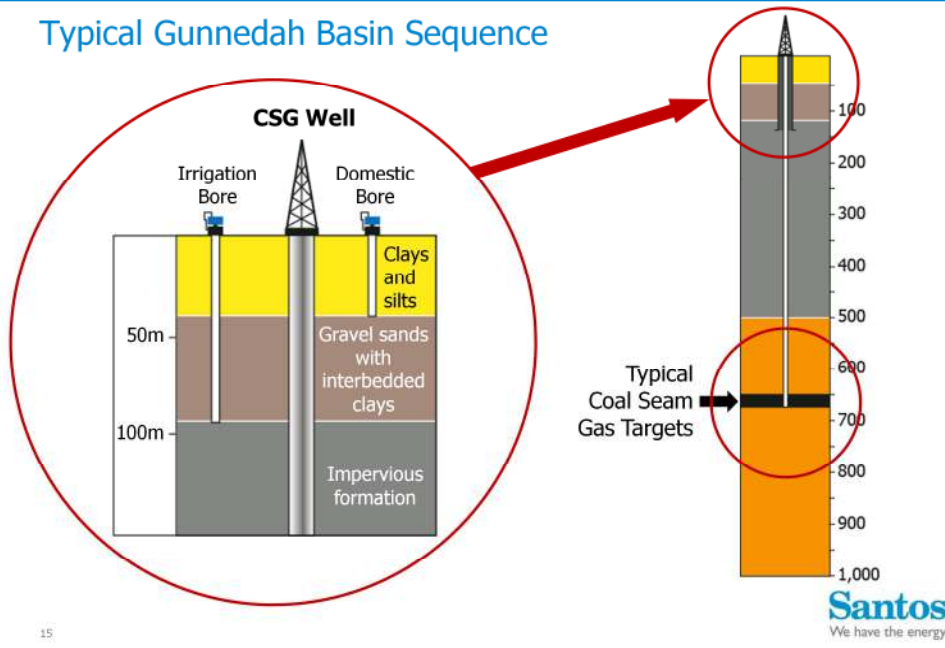
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- The impact on existing land use is further reduced by new drilling techniques which have been developed to allow multiple drill holes to be drilled from the same drill pad.
- This diagram shows that horizontal wells can be drilled approximately 2km in each direction from the drill pad.
- We can create multiple wells, drilled to the desired location, from one single pad requiring only one cleared area, one access road and one pipeline route.
- This, of course, reduces the number of drill pads and drill locations, and minimises the environmental footprint.
- Horizontal drilling will also reduce the need to stimulate gas flows by use of hydraulic fracturing – a process commonly known as “fracking” and recently demonised by opponents of our industry.
- Fracking involves pumping water and sand, and a small amount of other compounds, down a well to open passageways into the coal seam.
- Materials used in the fracturing process include about 99% water and sand, as well as about 1% of a range of compounds which are not specific to the CSG industry and have many common uses such as in swimming pools, toothpaste, detergents and soap.
- Hydraulic fracturing is a proven and safe technique to increase the efficiency of certain wells.
- But I’m not asking you to just trust me.
- At Santos, we understand the concerns and we are committed to working with government to put in place the necessary regulations to ensure this process is performed safely.

# CSG target depths and aquifers

## Typical Gunnedah Basin Sequence



- Let's now take a look at water.
- The first key point is to understand the coal seams we target are hundreds of metres below the aquifers that farmers and other water users rely on.
- This chart illustrates where we find coal seam gas and how we can ensure protection of groundwater.
- The shallow domestic bores in the Gunnedah Basin are used to extract water from formations less than 100 metres below the ground.
- Coal seam gas is extracted from the coal seams at average depths of around 500 metres, down to around 1000 metres. There is no connectivity between these formations and water does not flow from one formation to the other – and it is critical to our success that no connectivity is created.
- The water drawn from our coal seam gas wells is coming from a completely separate source than all water drawn from domestic and irrigation bores in the Gunnedah Basin.



## Well integrity



Typical corehole well – two layers of steel casing and pressure tested cement.

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The coal seam gas business production model is simply unsuccessful if we don't control well flows to avoid any connectivity between the water aquifer and the coal seam gas formation.

Our wells are up to 30cm in diameter, are drilled and are lined with steel casing which is cemented to the side of the hole.

This serves to isolate any aquifers that are intersected.

In addition to the well casing shown here, another layer of cement is placed between the outer steel casing and the surrounding rock.

The coal seam gas wells Santos constructs are designed to deliver natural gas safely and efficiently to the surface.

Our wells are:

- Designed to isolate water and hydrocarbon formations;
- They are regularly monitored and pressure tested; and
- Once production has finished, they are isolated and filled with cement.

## Beneficial water use



Fairview forage irrigation project, Queensland

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I'd like to take a closer look at issues surrounding the management of water extracted from coal seams to enable the production of CSG.

We recognise that water is one of, if not the most important community issue associated with the development of the CSG industry.

However it is an issue where a lot of highly emotive and inaccurate claims have been made. It's important to get the water usage into perspective.

Our groundwater impact assessments in Queensland have been reviewed by both state and federal governments as part of the environmental approvals process. Both governments concluded that with appropriate management, groundwater impacts will be minimal.

By way of example, in 14 years of commercial coal seam gas production in the Fairview field there has been no change in aquifer levels.

Santos' CSG operations produce water which is treated and then used for agriculture and town use. We have made significant investments in reverse osmosis water treatment to ensure water produced can be beneficially used.

For example, we are using water from our gas production to recharge the Roma aquifer in a project with the CSIRO. We are also using treated water from our operations to irrigate millions of indigenous eucalypts – and as this photo shows, for forage crops .

In New South Wales, the potential re-use options for the Gunnedah region are still being investigated. But there is a real possibility that treated, reusable water can be used to restock aquifers that have been depleted over the years by agricultural, industrial and town use.

## How much water?

### Annual water use in Namoi Catchment Area



Traditional water use  
540 GL



Produced CSG water  
5 GL

18 Source: Murray Darling Basin Commission, Santos modelling

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- As I have said, the production of CSG does require the extraction of water, not from shallow aquifers, but from deep coal seams, hundreds of metres below the water farmers, towns and other businesses use.
- In Namoi Catchment area, NSW , the Murray Darling Basin Commission estimates the average annual water use by all users (the majority in agriculture) is 540 GL – that’s a little more than all the water in Sydney Harbour.
- We forecast the average annual water production by Santos will be around 5 GL – less than 1% of the traditional water use.
- These figures are based on initial modelling, and more studies will be done before environmental approvals are finalized – but it is clear the CSG industry’s rate of water extraction is dwarfed by traditional users, and importantly, we are not extracting the same water supply that farmers and residents use.

## Our Actions Speak for Us

- One of Australia's largest gas producers, Santos has a 50-year track record of safe, sustainable operations
- We are committed to working with local landholders and contributing to communities
- We will work in partnership with agriculture for sustainable resource management



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In summary...

The production of natural gas from coal seams in regional Queensland and New South Wales provides the opportunity to establish a significant new industry in these areas, bringing billions of dollars of investment and generating thousands of jobs – while in no way compromising their vital roles as agriculture producers.

Santos has been a leader of the Australian gas industry for more than half a century.

The foundations of the company are built on respectful relationships with landholders, responsible stewardship of the environment and water resources and enduring partnerships with our host communities.

We accept we are responsible for ensuring that our operations are safe, sustainable, reliable and meet the demanding standards that the community expects.

Santos is absolutely committed to developing our coal seam gas business to co-exist with agriculture. We acknowledge the genuine concerns the community holds about the expansion of the CSG industry – and we know we will not be successful unless those concerns are addressed.

We certainly do not take community or the government support for granted.

We know that through our actions we must earn that support every day.

We are absolutely committed to doing so.

Thank you.

## Disclaimer & Important Notice

This presentation contains forward looking statements that are subject to risk factors associated with the oil and gas industry. It is believed that the expectations reflected in these statements are reasonable, but they may be affected by a range of variables which could cause actual results or trends to differ materially, including but not limited to: price fluctuations, actual demand, currency fluctuations, geotechnical factors, drilling and production results, gas commercialisation, development progress, operating results, engineering estimates, reserve estimates, loss of market, industry competition, environmental risks, physical risks, legislative, fiscal and regulatory developments, economic and financial markets conditions in various countries, approvals and cost estimates.

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