Submission
No 337

INQUIRY INTO COAL SEAM GAS

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Organisation: Santos

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NSW Legislative Council General Purpose Standing Committee #5:

Inquiry into Coal Seam Gas

Santos Submission | September 2011

Santos
We have the energy.

"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."

DAVID KNOX

SANTOS CHIEF EXECUTIVE AND MANAGING DIRECTOR

SPEECH TO AMERICAN CHAMBER OF COMMERCE IN AUSTRALIA

SYDNEY, 4 AUGUST 2011

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Executive Summary

Santos is pleased to contribute to the Legislative Council General Purpose Standing Committee No. 5 inquiry into the environmental, economic and social impacts of Coal Seam Gas (CSG) activities, including exploration and commercial extraction activities, allowable under the Petroleum (Onshore) Act 1991 (NSW) (the Petroleum Act).

A proudly Australian company, Santos is a leader of the Australian natural gas industry, with more than 50 years of responsible gas exploration and production across the nation, including more than fifteen years of CSG operations in Queensland.

Santos has already invested around one billion dollars in prospective NSW CSG areas and in addition the Company has plans to invest more than a billion dollars over the next three years. This investment reflects Santos' confidence in the quality of the NSW CSG resources based on the Company's experience in Queensland CSG operations over the last 15 years.

At present Santos' activities in NSW are limited to exploration and appraisal with development and production works being several years off. Santos will work with Government, using the information we gather through exploration, to help plan for a viable CSG industry in NSW that productively co-exists with agriculture and which contributes substantial economic benefit to the State and key rural communities.

Santos commits to undertaking the full environmental assessment processes in accordance with State and federal laws, before progressing each stage of its CSG development.

A summary of Santos' response to the terms of reference is as follows:

1. The environmental and health impact of CSG activities

Gas fired power stations can replace higher carbon dioxide emitting coal fired power stations

Energy security has long been a major competitive advantage for Australia, and a key to our ongoing economic development and prosperity. Using natural gas to generate electricity can deliver significant reductions in Australia's CO_2 emissions from power generation, whilst ensuring energy security for Australia's economic well-being. Natural gas can fuel baseload, shoulder and peak capacity. A proven and established technology, combined cycle gas turbine (CCGT) plants emit less than half the CO_2 emissions of black coal and less than a third the CO_2 emissions of brown coal. Furthermore, CCGT plants use less than one third of the water needed by coal fired baseload generators while generating competitively priced electricity.

In addition, gas is a vital enabler of intermittent, renewable energy technologies such as wind and solar. As the energy mix between renewable and fossil fuels changes, natural gas can quickly and reliably maintain energy supply.

Natural Gas from coal seams is safe and environmentally sustainable

Coal seam gas is natural gas (predominantly methane) extracted from coal seams. As an end-use commodity, it is identical to natural gas and is used for exactly the same purposes. CSG is produced by drilling a well into a coal seam and releasing the gas by removing water from the coal seam which, in turn, reduces the pressure in the coal seam allowing the gas to flow to the surface. It is crucial to the successful economic operation of CSG fields that Santos isolates the coal seam aquifer from any other aquifers. This is because if water from other aquifers enters the coal seam, then the pressure cannot be lowered sufficiently to release the gas. Hence, there is a natural alignment of interest between the CSG producers and the users of other aquifers.

Natural gas from coal seams has been produced from the Santo's Fairview field in Queensland since 1995. This field currently produces about 125TJ/day which is about a quarter of Queensland's annual average daily use. This natural gas has been safely fueling industry and homes and has done so with no environmental harm or adverse impact on surrounding agricultural activity.

NSW has a rigorous Legislative Approval process

When operating in NSW, Santos is required to assess its projects and seek approvals under a well defined framework of Commonwealth and State legislation including the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*, the *Environmental Planning and Assessment Act 1979 (NSW* ; approvals for the extraction and use of ground water and surface water and disposal of the extracted water; obtaining petroleum tenements under the Petroleum Act including dealing with all necessary native title issues and processes and land access agreements with the landowners, the *Protection of the Environment Operations Act 1997 (NSW)*, and other regulatory approvals including indigenous and non-indigenous consents.

A key part of this approval process is the preparation of a Review of Environmental Factors (REF) that identifies and defines management plans for all aspects of CSG operations that may have an impact on public health or the environment.

Santos' summarised views on the matters requested by the Committee are:

- Santos' CSG drilling techniques are proven to be effective as demonstrated over many years of operation in Queensland. These techniques are applied in NSW to separate all surface aquifers from other groundwater systems. In Santos wells, the surface aquifers are separated by at least 100 metres of sedimentary and volcanic rocks and isolated by steel casing and pressure tested cement.

  In preparation for future appraisal and production activities, Santos has commenced an extensive scientific program to ensure there is no adverse impact on valuable water resources. To date this has included an initial assessment of the groundwater regime, initiation of a baseline survey of water bores in the area and contribution to the Namoi Catchment Water Study. A comprehensive water management Study has also been initiated to cover off all future water related matters. This Study will include a Water Demand Assessment, Regional Groundwater Impact Assessment including regional bore inventory, groundwater vulnerability mapping, Managed Aquifer Recharge Feasibility Study and Risk Assessment, Land Subsidence (Displacement) Study, Brine Options Scoping Study and commencement of Environmental Monitoring.

  There is already sufficient data to allow our exploration and appraisal program over the next three years to proceed safely and that program will help produce sufficient data for regulators and the community on which to base production approvals.

  Santos modeling, that is based on the scientific reviews completed to date, indicates that our future CSG project could remove an average of about 5GL/annum from the coal seams. To put this into context, agriculture, town water and other uses extract about 540GL/annum from rivers and shallow aquifers in the Namoi Catchment area within which the Santos CSG developments will take place. The water that Santos extracts does not come from these shallow aquifers but from the far deeper coal seams. The extracted coal seam water will be treated in reverse osmosis plants that will produce water that can be utilised for irrigation, town water and other uses in the area. In other words, Santos' CSG operations will produce – not reduce – water available for agriculture in the areas in which we operate. It is intended to dispose of brine produced by re-injecting into deep saline aquifers or into licensed disposal facilities through approved and monitored processes.

  Additionally, Santos will seek independent scientific peer review of these studies and their conclusions.

- Santos uses only approved additives in its drilling operations and all drill cuttings and fluids are removed from the site after completion of the wells.

- Fracturing techniques are highly localised and designed to only affect the targeted coal seams. Properly conducted the fracturing techniques do not cause cross contamination of aquifers and especially not of those which are separated from the coal seams by several hundreds of metres of rock, as is the case with Santos' NSW acreage. Fracturing is conducted to improve the efficiency of gas production from wells. This

technique reduces the number of wells required and in turn reduces the surface footprint. Santos has not used hydraulic fracturing techniques in its NSW operations.

- Natural Gas extracted from CSG wells and transported to market provides the source of revenue from our CSG operations. Hence, all effort is made to reduce or eliminate any escape of gas. As a result the level of fugitive emissions in CSG production is extremely low.

2. The economic and social implications of CSG activities

Santos' CSG projects will have a significant benefit to the NSW economy

Initial economic impact assessments show that Santos' projects in NSW will create substantial benefits in a similar way to Queensland. The three major approved CSG projects in Queensland represent investments of over $50 billion in that State. Together they will see the creation of 18,000 direct new jobs and make a major contribution to the Queensland economy.

Santos' investment in its NSW projects will create local jobs and enhance the local community

Where possible Santos seeks to employ and train local people for our operations. This policy creates opportunities for local residents and young people to work in their local area. Santos has an office in Gunnedah that is staffed by people who live in the local community. Santos supplements this local workforce with people who travel to and from the sites as needed. Santos' objective is to establish and maintain accommodation for these people in a way that blends in with the local community.

In addition, Santos recognises that it has a responsibility as a member of the local community to contribute to the enhancement of the local areas. Santos has a long record of providing funding for local initiative that benefits all of the community, such as to hospitals, roads and sponsorships.

Santos actively seeks to establish long term, mutually beneficial relationships with the community and landowners who are affected by our operations.

Santos understands that without sound relationships with landowners (and the broader community), it will not be able to successfully develop or operate its CSG business in NSW. Our approach is to seek negotiated outcomes with landowners in a manner that builds the foundations for a long term relationship. Furthermore, Santos agrees that landowners should be properly compensated for loss of productive land and amenity impact. To date Santos has established almost 500 negotiated agreements with landowners across Queensland and 40 in NSW. None of these has involved court action.

NSW will receive billions of dollars in royalties from the future CSG industry

As NSW production increases, the CSG industry will pay significant royalties, providing strong financial benefits to the people of NSW from the production of this valuable resource. Santos' preliminary estimates show that royalties over the life of a major CSG project will run to several billions of dollars. The benefits for Government finances from development of the CSG industry will clearly be substantial.

Water produced during CSG production can be put to beneficial use

Treated water from CSG production can be used for agriculture (irrigation, stock water) or recharge of aquifers. The amount of water produced from future Santos CSG projects, for example, is estimated to be sufficient to provide a new source of irrigation for more than 500 hectares of crops.

CSG production has a minimal impact on agricultural areas

The process for extracting CSG has a very minor impact on the land and associated agricultural production. It is estimated that the surface impact over the life cycles of a project is only around one percent of the total area in which the CSG fields operate.

Unlike other extractive industries, disruption to the surface during CSG production is very small and ultimately fully rehabilitated once operations are completed. Importantly it must be understood that at the end of the production process the coal seam remains intact, the production wells are decommissioned and the site fully rehabilitated.

3. The role of CSG in meeting the future energy needs of NSW

CSG will be a crucial fuel source for NSW as the Australian and NSW energy sector transitions to a lower carbon footprint. It is the only technically and economically viable alternative to coal to maintain energy security while reducing carbon emissions. The importance of gas is reinforced in the Australian Energy Market Regulator's (AEMO) Annual 2011 Electricity Statement of opportunities (ESOO). The 2011 ESOO reports publicly announced projects in NSW comprising up to 5,820MW of gas fired generation, 6,600MW of wind and 350MW of solar.

At present the industry is in an exploration phase with only very limited production. Only about six percent of gas used in NSW comes from domestic gas production and most of this is from CSG. However, the CSG industry in NSW has the potential to grow rapidly and to a substantial size. Initially the gas produced would be to supply a greater share of the domestic market, and then potentially for export.

NSW has well established and effective electricity and gas markets. Both markets have evolved over the last decade through substantial investment in generation, electricity transmission and gas pipeline infrastructure. In the evolution to a cleaner energy footprint new generation capacity in Australia and NSW has been dominated by wind renewable technologies and gas fired generation. As outlined above, this trend will continue with gas playing a crucial role in complementing renewable generation. Therefore, continued investment in NSW CSG developments is required to ensure the security of the NSW gas and electricity markets. Furthermore, investment and development will also facilitate gas and electricity competition.

4. The interaction of the Act with other legislation and regulations, including the Land Acquisition (Just Terms Compensation) Act 1991

Santos considers that the existing regulatory regime is substantial and has provided an appropriate basis for controlling and monitoring Santos' CSG exploration and appraisal activities in NSW. That said, some review of the regime is warranted to ensure that the CSG industry in NSW continues to have up to date and effective regulation as it progresses through to larger scale development and production. In this context Santos fully supports the various initiatives of the NSW Government to review the current regulatory regime.

Based on our experience in Queensland, Santos would strongly encourage the introduction of a process which coordinates the varied reviews underway and then the approvals and monitoring requirements which would flow from that whole of government approval process.

5. The impact similar industries have had in other jurisdictions

Santos is in a position to convey the positive impact that our operations have had in Queensland. In Queensland Santos has received environmental approval to proceed with a world class project at Gladstone in joint venture with the global energy companies Total, Petronas and Kogas.

The emergence of the Queensland CSG industry as a world class industry is characterized by:

- An estimated 4,300 jobs in the local Surat region alone.
- In 2010, Santos invested $504 million with 1,044 Queensland suppliers. Around half of those were with regional suppliers.
- Royalties from the Santos' Queensland operations are estimated to exceed $6 billion to the Queensland Government over 25 years of the life of the Santos GLNG project.
- Santos is already producing about 125TJ/day of CSG that is being used in Queensland and southern gas markets. A proportion of that gas is already fueling lower greenhouse gas emitting gas fired power stations.

- Santos' operations are already producing water for beneficial use in agriculture and recharge of the aquifers that supply Roma.

NSW has an opportunity to obtain significant employment, economic, environmental and community benefit from this Industry as is already occurring in Queensland.

Santos looks forward to the opportunity to appear at a hearing of the NSW Legislative Council General Purpose Committee #5 inquiry into CSG.

Introduction

Santos is pleased to assist the NSW Legislative Council General Purpose Committee #5 to examine the economic, social and environmental impacts of Coal Seam Gas (CSG).

This submission reflects the current situation in regard to the ownership of Eastern Star Gas (ESG). Should ESG cease to be an independent listed company, Santos will consider making a supplementary submission in regard to any outstanding issues.

Santos has made similar public submissions recently to the Senate Rural Affairs and Transport References Committee inquiry into mining CSG; Senate Environment, Communications and the Arts Reference Committee inquiry into the impact of mining on the Murray Darling Basin; and the Senate Select Committee into Agriculture and Related Industries inquiry into food production.

About Santos

Santos is an Australian oil and gas exploration and production company with operations in every major Australian petroleum province, as well as interests in Asia including Indonesia, Papua New Guinea and Vietnam. Santos is Australia's largest onshore domestic gas producer, supplying sales gas to all mainland Australian states and territories, ethane to Sydney, and oil and other liquids to domestic and international customers. Santos has CSG interests in both Queensland and NSW.

The Cooper Basin oil and gas field in south-west Queensland and north-eastern South Australia, 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 this Basin.

In Australia, Santos has one of the largest exploration portfolios by area of any company and it also has assembled a large, well-situated acreage position in Asia.

FAST FACTS

- ✓ Australian owned.
- ✓ More than 50 years gas exploration experience.
- ✓ Operations in every major Australian hydrocarbon province.
- ✓ More than 15 years of CSG operations in Queensland.

Santos' market capitalisation makes it one of Australia's top 25 listed companies. A proudly Australian company, Santos is a leader of the Australian natural gas industry, with more than 50 years of responsible gas exploration and production across the nation, including more than 15 years of coal CSG operations in Queensland. Natural gas from coal seams has been produced from Santo's Fairview field in Queensland since 1995. This field currently produces about 125J/day, safely fueling industry and homes and has done so with no environmental harm or adverse impact on surrounding agricultural activity.

Environment

The use of natural gas as an energy source has several well documented environmental benefits including:

- significantly lower levels of greenhouse gas emissions than coal fired electricity;
- significantly lower water requirements than other alternatives for power supply;
- minimal production of solid wastes requiring subsequent disposal; and
- lower resource extraction footprint and resultant impacts on local habitats and ecosystems.

Santos has a strong record for environmental, health and safety management. Santos also recognises the potential for environmental and safety impacts if proper safeguards and procedures are not implemented.

A key requirement for Santos is to implement environmental best practice to minimise the risk of environmental harm. To achieve this, Santos continually undertakes detailed assessments to identify and manage environmental risk.

All projects are subject to rigorous environmental assessment prior to seeking Approval, including but not limited to detailed assessments of potential impacts on

- conservation values,
- environmental and amenity values,
- water resources,
- social values,
- agricultural production,
- historic heritage, and
- aboriginal heritage.

This is enhanced by a sound Government regulatory regime, which Santos actively supports, and ongoing monitoring for compliance and performance.

Santos is committed to the conservation of environmental values for the benefit of future generations. Santos' environmental vision is 'we will lighten the footprint of our activities'. This includes producing energy with a lower greenhouse intensity and increasing the beneficial use of formation water on a smaller land-use footprint.

Safety

A focus on safety is one of Santos' values, which is clearly defined by its vision that 'we all go home without injury or illness'. Santos has developed a culture of safety and believes there is no job so important that it cannot be done safely.

Santos has a company-wide Environment, Health and Safety Management System (EHSMS), under which employees and contractors have specific responsibilities for establishing and maintaining a safe working environment that benefits both them and the communities in which Santos operates.

FAST FACTS

- ✓ Priority on environmental performance and safety.
- ✓ We all go home without injury or illness.
- ✓ Every Santos field employee and contractor undergoes compulsory field inductions before commencing work onsite.
- ✓ Visitors must undertake a general awareness safety induction before attending a site.

The EHSMS provides a structured framework for effective environmental and safety practice across all of Santos' activities and operations. The system, based on the ISO 14001 and AS 4801 standards, has been designed to ensure consistent standards for all employees and contractors. It incorporates industry best practice and includes 18 management standards and more than 30 hazard standards.

Broader natural gas industry precautions are applied and include strict requirements around such things as clothing, materials and the types of equipment used.

The Company's safety systems, procedures and practices are continually improved through feedback, discussion, hazard analysis and risk management processes, incident/near miss reporting and investigation, auditing and drills.

Every Santos field employee and contractor undergoes comprehensive field inductions before commencing any work on site. Visitors must also undertake a general awareness safety induction before attending site, and the community is informed about how to manage potential hazards associated with Santos' operations.

Santos employs a strict pre-qualification process for contractors, which involves an assessment of their past incident and safety performance and auditing of their EHS management system. If their environmental and safety management systems and performance are not consistent with those of Santos, the Company does not engage them.

As part of Santos' third party verification process, the Company undertakes regular safety audits of well and operational sites. Santos personnel are contractually obligated to report any recordable safety incident or near miss. All incidents and near misses are investigated.

Over the past five years Santos has delivered a significant improvement in safety, in both what the Company calls personnel safety and process safety. The total injury rate, comprising injuries requiring medical treatment or resulting in lost, restricted time from work, has fallen by 60 percent inclusive of all employees and contractors and is approaching leading performance in the oil and gas industry.

Sustainability

For Santos, sustainability means supplying energy for the future, and positive outcomes for shareholders, employees, business partners and the communities in which it operates.

To achieve these objectives, Santos has a three-year strategic sustainability plan, which is built upon three key themes:

1. Understanding stakeholder expectations.
2. Driving sustainability performance in existing operations.
3. Integrating sustainability into the company's transformational growth strategy.

Santos' sustainability framework enables better business decisions through the consideration of a comprehensive suite of indicators beyond traditional economic measures. These measures are assessed and measured on an annual basis and an annual Sustainability Report is published by Santos.[1]

Santos aims to build enduring relationships with the communities in which we operate. This includes clear and open engagement about our activities, and providing meaningful support to areas such as health, education, the environment, young people, indigenous culture and the arts.

Without this type of relationship focus the necessary interactions between the community and the Company will not deliver the possible benefits to either party. Santos is very proud of its long record of positive community engagement and sees it as the key to having a successful CSG Project in NSW.

Santos and Eastern Star Gas

Santos announced on 18 July, 2011[2], that it had reached binding agreements to acquire Eastern Star Gas Limited (ESG).

The acquisition of ESG will be conducted via a recommended Scheme of Arrangement (Scheme) under which ESG shareholders will receive 0.06803 Santos shares for every one ESG share held. The Directors of ESG have recommended in favour of Santos.

The transaction is expected to close by early November 2011. Until the transaction is complete ESG remains an independent listed company.

[1] Copies are available from http://www.santos.com/sustainability-at-santos/2010-sustainability-report.aspx
[2] Santos to acquire 100 percent of Eastern Star Gas http://www.santos.com/Archive/NewsDetail.aspx?p=121&id=1273

Energy in New South Wales

New South Wales is centrally located in the highly competitive National Electricity Market (NEM). NSW is interconnected to other States via electricity transmission for export and import and also connected to the Snowy system that provides electricity peaking generation support.

The NEM is also one of the most efficient electricity wholesale markets in the world at providing a least cost dispatch of generation plant to match customer load. It is relevant that the market structure has facilitated significant investment in electricity generation and transmission infrastructure since the commencement of the NEM in 1998. This includes 3,000 MW of coal fired generation, 7,400 MW of gas fired generation and 1,750 MW of renewable generation. Of this investment 150 MW of coal fired generation, 1,800 MW of gas fired generation and 170 MW of renewable generation has been installed in NSW during the same time period.

The Australian Energy Market Operator 2011 Electricity Statement of Opportunities identifies that additional capacity in NSW is not needed until around FY2018/19. The growth in electricity demand has been slowing with the 2011 ESOO forecast energy demand growth rate 0.1% lower than the 2010 forecast[3].

New South Wales now has 1,980 MW of gas fired generation representing 12 percent of the total installed capacity which produced six percent of the States' electricity supply in FY2009/2010.

The mix of generation in the NEM is in transition driven by requirements to meet Government policy outcomes such as the Federal Mandatory Renewable Energy Target (MRET) introduced in 2001, complementary state based schemes (NSW Greenhouse Gas Abatement Scheme (GGAS) and the Queensland 13 percent Gas Target). These Policies have promoted a rapid increase in renewable generation (mainly wind) in Victoria, SA and Tasmania and to a lesser proportion NSW. Initially this new renewable generation displaced existing thermal generation. However as the capacity of wind generation increased and demand continued to grow, new fast start gas fired peaking plant has become economic to meet the demand and to complement renewable generation (for example, when the wind doesn't blow).

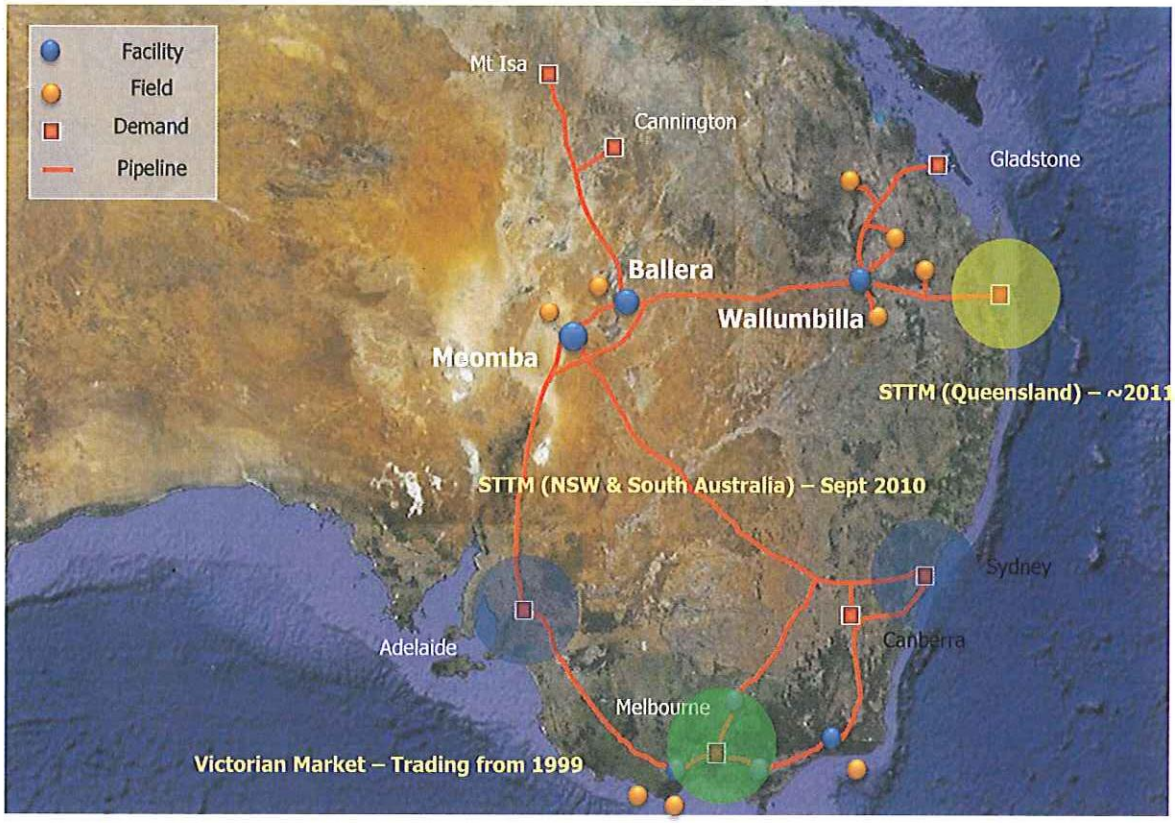
Since 2001, 4,300MW of gas fired peaking generation capacity has been added to the NEM. This trend of increasing renewable generation and complementary gas fired generation is expected to continue and increase as more intermittent renewable capacity is commissioned to meet the MRET targets. 1,500 MW of new gas fired baseload generation has also been added to the NEM in the last ten years. Additional baseload gas fired generation will be needed to meet future demand and to replace coal fired power stations that are de-commissioned in response to the financial impact of the carbon reduction regimes.

As the importance of gas for peaking and baseload generation continues to grow in the future so to will it be equally important for NSW to ensure competitive and secure supplies of gas.

As shown in the Figure 1 below, the NSW gas market has evolved and strengthened through investment in pipeline infrastructure and upstream gas resources. The Sydney Short Term Trading Market (STTM), which commenced in 2010, is now a key gas hub that connects with and trades gas from the major established gas producing regions of the Victoria, the Cooper Basin and more recently Queensland via the Queensland-NSW Interconnect. The Sydney STTM gas hub facilitates multi gas basis competition and strengthens security of supply through market mechanisms.

[3] Australian Energy Market Operator 2011 Electricity Statement of Opportunities 30th August 2011.

Figure 1. East Coast Gas Market Overview.



In 2010 the vast majority of gas used in NSW was sourced from gas regions in other States. As shown in Figure 2, the growth of CSG reserves in Queensland have risen dramatically following an intense period of investment in exploration and appraisal over the last 10 years or so. These reserves now provide a sound basis for secure supply of gas to Queensland and have enabled the creation of a $50 billion LNG industry in that State.

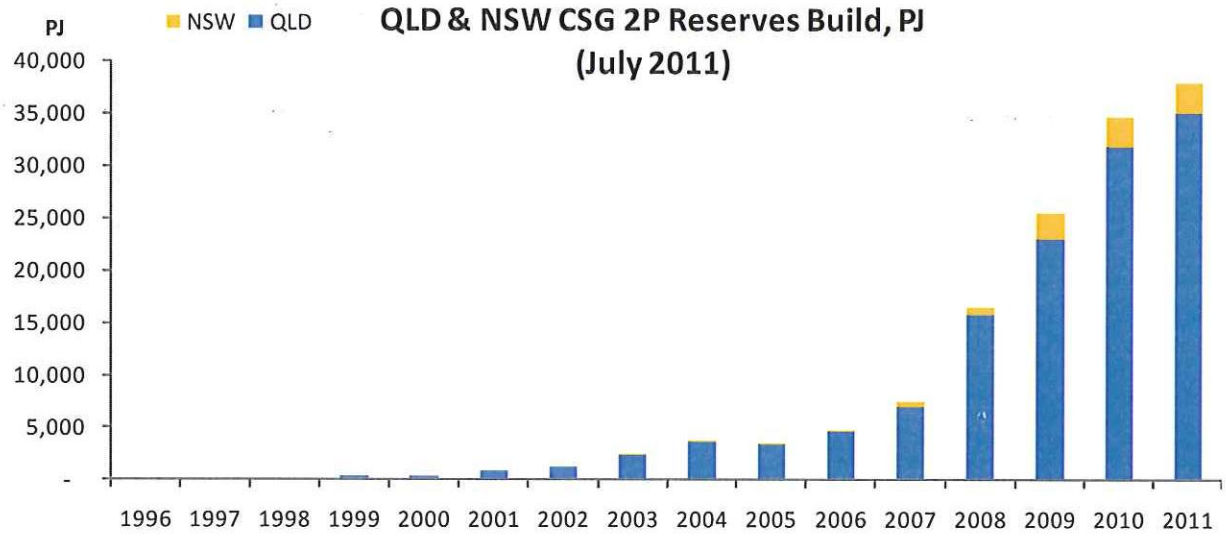


Figure 2: Queensland & NSW CSG 2P Reserves Build (PJ), Source: RLMS, Queensland DEEDI, Energy Quest.

Similarly New South Wales has the opportunity to substantially improve its gas reserves through supporting further investment in upstream CSG resources and related infrastructure. Santos considers that there is significant potential to build on the existing CSG reserves in the licence areas in which it holds an interest in the Gunnedah Basin. To date, Santos has invested around one billion dollars on CSG in NSW and plans to invest an additional one billion dollars over the next three years.

Future development of CSG from the Gunnedah Basin will also require investment in pipeline infrastructure to transport the gas to the Sydney and other markets. The new infrastructure associated with the development of the Gunnedah Basin CSG reserves together with the addition of a new source of gas will improve the security of the closely related and established NSW gas and electricity markets. In addition, the new infrastructure and development of new gas sources will enhance competition and the operation of the established gas and electricity markets to the benefit of NSW energy users.

The Role of Natural Gas

Coal Seam Gas is natural gas

Coal seam gas is natural gas extracted from coal seams. Typically, CSG consists of 98 percent methane with less than two percent inert gas and no petroleum liquids. Methane is odourless and colourless. CSG is produced by drilling a well into a coal seam and removing the water which, in turn, reduces the pressure thus allowing gas in the coal seams to be extracted and collected. As an end-use commodity, it is identical to natural gas and is used for exactly the same purposes, and is a low emission alternative to coal in electricity generation.

FAST FACTS

- ✓ Coal Seam Gas is natural gas.
- ✓ Natural gas is a low emission alternative to coal.

Methane is non-toxic and is a commonly occurring gas. Methane accounts for 20 percent of Australia's green house gas emissions, of which nearly half is emitted by agricultural animals, compared to four percent from Australia's entire natural gas industry. To provide some context, an adult cow emits 72-113 kg of methane annually.

Methane fugitives from natural gas are less than one percent of Australia's emissions.

The CSG industry is not new and today more than 70 percent of the gas produced in Queensland is CSG.

Gas is a transitional fuel and complements renewable energy technologies

While some forms of renewable energy are less carbon intensive than natural gas, gas will also play an important role in complementing intermittent, renewable energy technologies such as wind and solar to replace some coal fired baseload and peaking capacity.

FAST FACTS

- ✓ Gas is a vital enabler of renewable energy technologies.
- ✓ Gas in increasingly competitive with electricity generation from coal.

In this way, gas is critical as a complementary energy source to support the expansion of the renewable energy sector. For example, the Australian Government has recently committed $464 million towards the Solar Dawn project to be built near Chinchilla in Queensland. At 250MW, it will be the world's largest solar thermal power plant – but it will be gas hybrid. Without the gas boiler back-up system, the plant would not be able to provide reliable, baseload power.

This demonstrates that the expansion of gas supply in Australia is a key part of reducing domestic greenhouse gas emissions, as well as building a cleaner energy future for the Asia Pacific region. As a facilitator of the development of renewable technology, gas has a critical role to play. Gas is becoming increasingly competitive with electricity generation from coal (especially following the

introduction of carbon pricing) whereas renewable electricity generation remains up to three times more expensive. A full, immediate shift to renewable power generation would be impractical on technological grounds and an extremely high cost solution at this time to the challenge of reducing greenhouse gas emissions.

Lowering greenhouse gas emissions in Australia and Asia

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

Using gas to generate electricity can deliver significant reductions in Australia's CO_2 emissions from power generation, whilst ensuring energy security for Australia's economic well being. Gas can fuel baseload, shoulder and peak capacity. A proven and established technology, gas fuelled combined cycle gas turbine (CCGT) plants emit less than half the CO_2 emissions of black coal and less than a third the CO_2 emissions of brown coal, and use less than one third of the water needed by coal fired base load generators, while generating competitively priced energy.

FAST FACTS

- ✓ Gas can deliver energy security to Australia.
- ✓ Gas is the cleanest of the fossil fuel alternatives emitting less than half the CO_2 of black coal.
- ✓ The world's largest LNG-importing markets are in geographic proximity to Australia.
- ✓ Exporting LNG to nearby markets will lower greenhouse gas emissions in the Asia/Pacific region.

Exporting gas as LNG also assists to reduce Asia/Pacific regional CO_2 emissions by displacing more polluting fuels, whilst also contributing to the economic development of Australia and the economic growth of Australia's regional and rural communities.

Asia/Pacific LNG imports account for over 60 percent of global LNG demand, giving Australian LNG suppliers a natural advantage in terms of geography with considerably shorter shipping distance to these markets. Energy consultants Wood Mackenzie are predicting that demand from LNG-importing countries will continue to grow. Global demand is expected to be over 220 million tonnes this year, growing to around 340 million tonnes by 2020. Demand from Asia Pacific LNG importers is expected to grow from around 140 million tonnes this year to over 220 million tonnes in 2020[4]. There is a clear opportunity for CSG from Queensland and NSW to fulfil part of this demand.

Australia's gas consumption is projected to rise by 3.4 percent a year, with total primary demand for natural gas projected to more than double to reach 2575 petajoules by 2029-30[5].

Global primary energy demand continues to rise, with Asia a major driver. Between 2007 and 2030, global energy demand is expected to increase by 40 percent, an annual average rate of increase of 1.5 percent (International Energy Agency, WEO 2009)[6]. Simultaneously, there is increased pressure to find less carbon-intensive energy solutions in an increasingly carbon-constrained world.

Lowering greenhouse gas emissions in New South Wales

Santos estimates that meeting the federal 20% renewable target would require a reduction in NSW emissions from power generation by the equivalent of 13 million tonnes of carbon dioxide. If combined cycle gas turbine replaced coal for NSW power generation this would reduce carbon dioxide emissions by 43 million tonnes while maintaining current levels of power production. In a combined scenario, where electricity generation is fuelled 80% from gas and 20% from renewables the emissions would reduce by around 48 million tonnes of carbon dioxide.

[4] Wood Mackenzie, Global LNG Service 2011.

[5] ABARE 2010, Australia Energy Projections to 2029-30

[6] ABARE 2010, Australia Energy Resource Assessment

Coal Seam Gas in New South Wales

Shape & potential size of the CSG industry in New South Wales

It is estimated that there are almost 38,000 PJ[7] of 2P CSG reserves in eastern Australia. Of this, Queensland has around 35,000 PJ and NSW about 2,900 PJ. The CSG industry in NSW is at a relatively early stage in comparison with Queensland; however, the NSW CSG industry has the potential to expand substantially provided sufficient investment occurs in exploration, appraisal and production.

We recognise that to move forward it will be important to maintain the confidence of the NSW community that we can operate safely and sustainably through productive co-existence with the State's important agricultural industry. However for the CSG industry to achieve its true potential for NSW, it will also require substantial capital investment, which of course depends on appropriate and cost effective regulation and support by Government in particular.

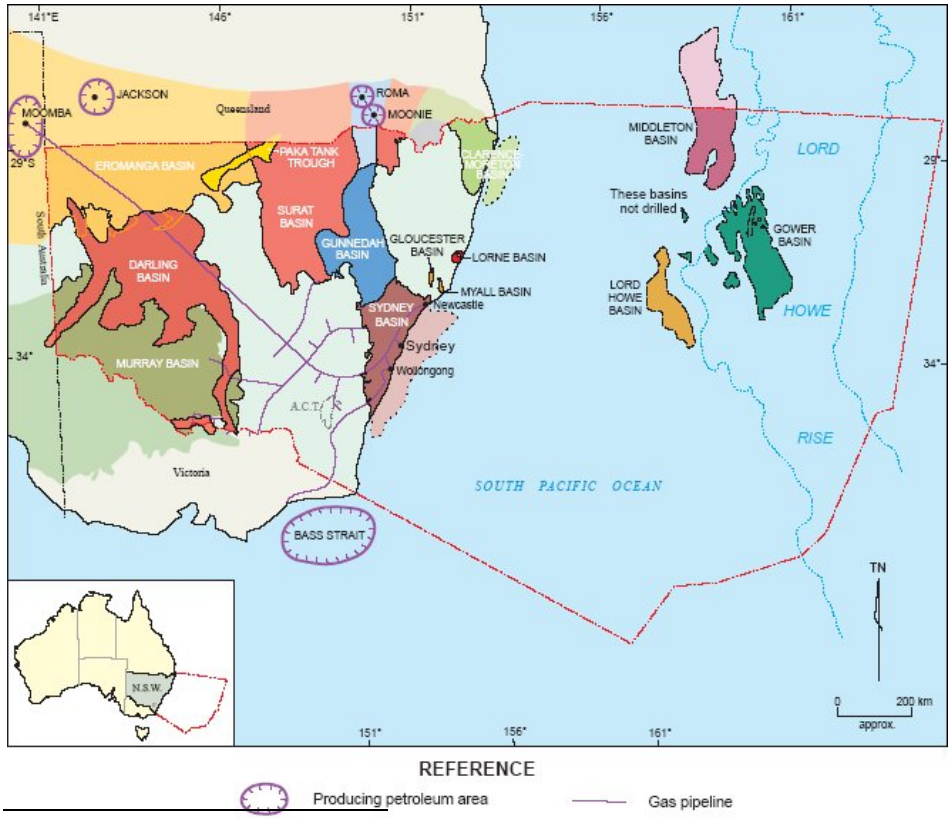
Gas from CSG developments will supply domestic markets initially, and provided that commercial quantities of gas are proven, supply may also extend to export LNG markets.

Development of the CSG industry in NSW is dependent upon:

- continued community license to operate;
- adoption of operational best practices by whole the industry;
- proven resources; and
- appropriate and cost effective regulation and support by Government.

While the Gunnedah Basin is not the only area of NSW being explored for CSG, the basin is the sole focus of Santos' activities.

Below: Principal sedimentary basins in NSW[8]



[7] Various sources: RLMS, Queensland DEEDI, EnergyQuest, Company reports.
[8] http://www.dpi.nsw.gov.au/minerals/resources/petroleum/map

NSW CSG Regulatory Context and Direction

The development of producing CSG fields is required to be undertaken in stages:

- The first stage involves exploration activities within the PEL areas. The exploration activities involve drilling core holes and pilot wells. Santos' activities in the Gunnedah Basin are at this stage.
- The second stage involves appraisal activities which involve operating the pilot wells to appraise the gas producing potential of the area. This stage may involve converting single pilot wells into multiple pilot wells in a similar location. Note that some of the activities undertaken by ESG are at this stage of development.
- The third stage involves the production of CSG and transport of the gas for sale into the domestic or international market. This stage involves the establishment of a significant number of production wells, water treatment plants, power supplies, water management facilities, gathering and transmission pipelines and other infrastructure.

The carrying out of activities by Santos at each stage of the CSG development requires assessment and approvals under Commonwealth and State legislation. The key areas of approvals which need to be considered are:

- *Environment Protection and Biodiversity Conservation Act 1999* – referral and approval under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) where the action is likely to have a significant impact on a matter of national environmental significance;
- *Native Title Act 1993* – negotiated outcomes with traditional owners in areas where Native Title exists;
- Planning – assessment and approval by REF or EIS under the *Environmental Planning and Assessment Act 1979 (NSW) (EP&A Act)*. Approvals under the EP&A Act are subject to judicial review in the Land and Environment Court by third party objectors;
- Water Act and Water Management Act – approvals for the extraction and use of ground water and surface water and disposal of the extracted water;
- Land Access - access agreements with the landowner utilising the procedures under the *Petroleum Act*;
- petroleum tenements under the *Petroleum Act* including dealing with all necessary native title issues and processes;
- Environment Protection – licence from the Office of Environment and Heritage under the *Protection of the Environment Operations Act 1997 (NSW);* and
- Other regulatory approvals including indigenous and non-indigenous consents.

A number of State and Federal reviews are currently underway that have an impact on the development of the CSG industry in NSW. The following reviews are relevant:

- Review of EPBC Act – the Commonwealth Government announced on 24 August 2011 reform proposals for the EPBC Act. The proposals are contained in the document "Reforming National Environmental Law – An Overview" (2011);
- Planning – the NSW Government has recently:
    - enacted changes to the assessment and approval of major projects in NSW. Part 3A of the EP&A Act is being repealed and replaced by a new process for state significant development under Part 4 and state significant infrastructure under Part 5; and
    - announced that it will review the EP&A Act with the intention of introducing a new planning and assessment regime to Parliament within the next 18 months.
- Water – the following processes are under review:
    - Murray Darling Basin Plan – the Murray Darling Basin Authority is presently developing the Murray Darling Basin Plan under the *Water Act 2007 (Cth).* The development of

CSG fields in the Gunnedah Basin which falls within the area of the Murray Darling Basin;

- o Water Sharing Plans – the NSW Government has prepared draft water sharing plans under the *Water Management Act 2000 (NSW)* which apply to the Gunnedah Basin. The draft water sharing plans will be significant and important documents for the ability for the project to proceed as they will determine the extent to which ground water can be extracted for the CSG field developments;

- Legislation Review – the NSW Government has recently made changes to the exemptions available for holders of petroleum tenements under the *Petroleum Act* when undertaking petroleum exploration activities. The Government has also enacted legislation requiring aquifer interference approvals for petroleum activities and is presently developing guidelines for the administration of the approvals requirements;
- The NSW Government recently introduced the Aquifer Interference Regulation as one part of the Draft Aquifer Interference Policy being development by the Department of Primary Industries; and
- Land Access – the NSW Government is presently developing a Strategic Regional Land Use Policy which has the potential to impact on the land access arrangements for CSG fields.

The existing regulatory regime in NSW is substantial and has provided an appropriate regulatory basis for controlling and monitoring Santos' CSG exploration and appraisal activities in NSW. The various reviews of the regulatory regime, through the initiatives outlined above, are important to ensure that the CSG industry in NSW has effective regulation as it progresses through the various stages of development and production.

The range of approvals needed to allow CSG projects to proceed involves a number of Departments and a number of Ministers who have to issue licences, permits, authorities, with separate timeframes and conditions. These approvals are often interrelated and interdependent and can be contradictory if there is not a whole of Government approach to the proposed project.

Based on the Company's experience in Queensland, Santos would strongly encourage the introduction of a process which coordinates these varied approvals. This process could include, for example:

- An Environmental Impact Statement covering all the environmental, agricultural, social, and economic impacts of the project. This could also include commitments from the proponent to mitigate those impacts. These mitigation plans should be prepared and exposed for public comment. Government Departments could also be required to make their submissions to the centralised process.
- All conditions and approvals could be coordinated and prepared as a single report and Government can decide on balance whether the project should proceed.
- The regulations should also be administered to ensure all participants operate by the same standards in terms of consistency of approach and reporting of compliance.

Santos has considerable experience with working with Government and Regulators in Queensland and we will work cooperatively with the NSW Government through the various review processes to improve and strengthen current regulation.

Santos' Gunnedah Basin Project

The Gunnedah Basin covers the districts of Gunnedah, Coonabarabran, Scone, Quirindi, Narrabri and Boggabri in north western New South Wales.

Exploration companies have been exploring for CSG in the Gunnedah Basin since the 1990s.

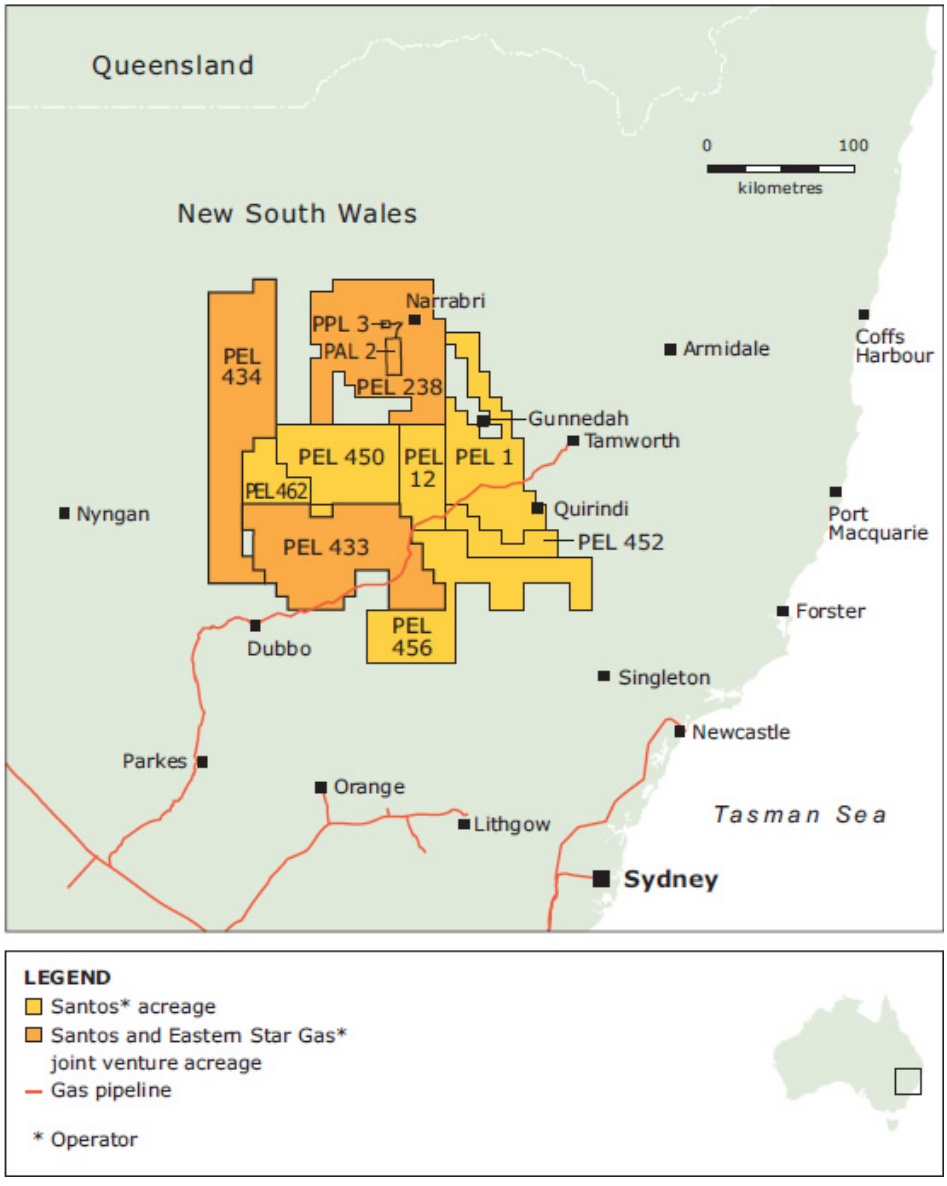
The Santos Gunnedah Basin Project is responsible for the exploration and development of Santos' interests in the Gunnedah basin. The Project, with staff based in Gunnedah, Adelaide and Brisbane is part of the Eastern Australian division of Santos.

FAST FACTS

- ✓ Santos first acquired interests in the Gunnedah Basin in 2007.
- ✓ Santos has a fully operational office in Gunnedah.

The Santos Gunnedah Basin Project is currently undertaking a CSG exploration and appraisal program, involving water monitoring, drilling core holes and operation of pilot wells for evaluation purposes. Santos is currently constructing two pilot testing areas for its first pilot tests in the Gunnedah Basin. They are in PEL 1, and both are on privately owned property with whom land access arrangements have been agreed.

Below: Santos Gunnedah Basin Interests.



Santos first acquired interests in the Gunnedah Basin in 2007 and in 2009 acquired a 20 percent holding in ESG together with a 35 percent equity interest in various exploration permits operated by ESG.

Santos announced on 18 July, 2011, that it had reached binding agreements to give effect to:

- the acquisition of 100 percent of the outstanding ordinary shares in ESG; and
- the subsequent sale of a 20 percent working level interest in ESG's permits in the Gunnedah Basin, northern New South Wales, to TRUenergy Holdings Pty Ltd (TRUenergy)

Upon completion of these transactions, Santos will assume operatorship and own 80 percent of ESG's CSG permits, with TRUenergy owning the remaining 20percent.

In addition to the permits held by ESG, Santos' other Gunnedah Basin assets (for which it is already operator) include:

- 25 percent of Petroleum Exploration Leases (PELs) 1 and 12 (Santos can increase its interest to 65 percent via farm-in);
- 15 percent of PEL 456 (Santos can increase its interest to 50 percent via farm-in); and
- 100 percent of PELs 450, 452 and 462.

Assumption of operatorship, and majority interest in the various CSG permits, will allow Santos to undertake coordinated development of its Gunnedah Basin acreage in line with community support, government regulation and scientific assessment.

Santos has a commitment to open and transparent consultation with the communities in which it operates. Since beginning exploration in the Gunnedah Basin in 2008, Santos has held more than 30 community information sessions and has met with a large number of community groups. Santos distributes newsletters to over 4,000 landowners in its exploration area. Santos regularly conducts site visits to its operations and takes a prominent attendance at the Agquip Field Days each year. Santos established a fully-operating office with locally based staff in Gunnedah in 2010.

Growing Local Economies and Delivering Local Benefits

The development of the CSG/LNG industry in NSW and Queensland represents a significant economic opportunity for Australia, in terms of economic benefits for rural and regional communities, energy security, lowering greenhouse gas emissions in Australia and Asia and of course, the substantial export revenue to be generated.

Importance of CSG to New South Wales

The CSG industry has the potential to bring significant economic benefits to the NSW economy, particularly in rural and regional areas. Santos will continue to work cooperatively and constructively with individual landholders, local communities, local government/s and the State Government to ensure the economic and environmental benefits of gas are realised in a timely and efficient manner as NSW moves to a low carbon economy. Santos considers that the following points are relevant:

- There is the potential to develop an indigenous, domestic gas source for the State to fuel households, industry and electricity generation. Presently, nearly all of NSW's gas is supplied from the Cooper Basin and the Bass Strait.
- Natural gas can help NSW in the move to a low carbon economy. Using natural gas to generate

FAST FACTS

- ✓ The CSG industry has the potential to create an indigenous gas source for NSW
- ✓ As Santos' record in Queensland demonstrates, a NSW CSG industry will create local employment opportunities.
- ✓ Santos will work with the local community to manage the demand on infrastructure such as schools, roads, hospitals, recreation facilities and accommodation.

electricity is a key strategy that can deliver significant reductions in CO2 emissions from power generation.

- As Santos' record in Queensland demonstrates, a NSW CSG industry will create local employment opportunities as well as significant opportunities for local suppliers.

Santos will continue to work with communities and their local representatives to manage the demand large resources projects like CSG place on local infrastructure such as schools, accommodation, roads, hospitals, community recreation facilities and libraries and airports. Santos understands that a social licence to operate, characterised by mutually-beneficial outcomes, is based on respectful, open and honest communications and ongoing consultations with landowners, community groups and community leaders. Santos is committed to delivering direct, economic benefits for the communities in which it operates.

In NSW, although Santos is only in the exploration and appraisal phase of its work, it has already contributed $100,000 towards video conferencing equipment for the new Gunnedah Rural Health Centre that is under construction and due for completion by mid-2012.

Since arriving in the Gunnedah Basin, Santos has committed to being available to landholders and communities to answer questions and address concerns raised. There has been active engagement through information sessions, briefings and updates including, but not limited to:

- Agquip annually (1,500+ inquiries per annum);
- 30 community briefings;
- Distributing regular newsletters to over 4,000 landowners in the exploration area;
- Presentations to a range of community groups;
- Participating in Namoi Water Study;
- Conducting regular engagement with landholders, local government, state MPs, federal MPs and other stakeholders;
- Presenting to Gunnedah, Gilgandra, Liverpool Plains, Narrabri and Warrumbungles Shire Councils.

Regional Development

Between now and 2035, Santos may decide to invest several billion dollars in pursuit of CSG opportunities in NSW. The likely impacts of a development as large as this will be far reaching for the State, region and the economy more broadly. Initial economic impact assessments show that Santos' projects in New South Wales will create substantial benefits in a similar way to Queensland.

The three major approved CSG projects in Queensland represent investments of over $50 billion in that State. Together they will see the creation of 18,000 direct new jobs and many more indirect 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. Many of these jobs will be in the regional areas.

Santos is in the process of obtaining independent quantitative economic assessment of the potential economic benefits of Santos potential projects in NSW.

Local Government

Local government, like the communities they represent are important partners in the development of the CSG industry in NSW.

Santos has held numerous briefings and meetings with local government representatives and presented to Gunnedah, Gilgandra, Liverpool Plains, Narrabri and Warrumbungles Shire Councils. These Shire Councils cover the Gunnedah Basin Project license regions. Additionally outside the

Gunnedah region Santos has held and attended numerous meetings with other Councils such as the Upper Hunter Shire Council and Moree Plains Shire Council.

Santos continues to work with communities and their local representatives to manage the demand large resources projects like CSG will place on local infrastructure as the projects ramp up. It is relevant to note that Santos is in the exploration and appraisal phase in the Gunnedah Basin region and the impact to date has been relatively minor. As we progress through the various stages of development, we intend to engage with the local communities and Councils to ensure that the impact of the Company's activities are well considered and accommodated in future plans for the community.

Royalties

The Santos Gunnedah Basin Project's CSG projects are expected to provide significant royalty payments to the NSW Government.

Santos CSG projects in NSW are at very early stages of development planning. However, based on our scenario planning, and including anticipated production from the Eastern Star Gas CSG areas, Santos envisages royalty payment to the NSW Government to exceed $150 million per annum over more than 20 years.

Co-existing Land Uses

Santos' existing operations demonstrate that agriculture and natural gas extraction can coexist successfully. As the global population increases, sustainable and multiple uses of land is the best response to increased domestic, regional and global demand for food and energy. This is particularly true when both can be provided safely and sustainably from the same land.

Below: Cattle grazing near a drilling rig at the Kahlua pilot site north-west of Gunnedah. Drilling rigs like this are typically present for 4 to 6 weeks.

Santos will only undertake natural gas developments in an environmentally sustainable manner. Similarly they will be undertaken in consultation with the Community and in a manner that can beneficially co-exist with agriculture.

The surface footprint of CSG extraction is small and temporary in nature. During their construction phase, well construction normally requires one hectare for approximately one year, and then decreases to approximately 25m by 25m, or 0.07ha for their productive life of approximately 20 years. At the end of their productive life, they are plugged with cement and the land is rehabilitated, in accordance with Government approvals, guidelines and regulations with no surface impact remaining.

Surface well facilities on Santos projects are generally spaced at one every 200 to 300 ha of surface, dependant on the subsurface characteristics. 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.

FAST FACTS

- ✓ The surface footprint of CSG extraction is small and temporary in nature.
- ✓ Surface well facilities are generally spaced at one every 200 to 300 ha or 1km by 2kms.
- ✓ Every reasonable attempt is made to ensure that surface facilities are located in areas not visible from roads or homesteads.
- ✓ Santos minimises the impact on existing land use by locating (where practicable) pipelines and roads along fence lines and property boundaries.

Where larger infrastructure is required, such as access roads, centralized treatment and compressor stations these are located in close consultation with landholders who are appropriately compensated.

Santos' pipelines will be buried typically between 0.75m to 1.2 metres below the ground depending on the surface land use requirements. The period of lost agricultural production during pipeline construction is generally a year or less. The width of pipeline corridors during construction depends on the diameter of the pipeline, but can range from approximately 8m for gathering lines to 30m for major gas trunklines.

Santos minimises the impact on existing land use by locating (where practicable) pipelines and roads along fence lines and property boundaries. Furthermore, every effort is made to minimise road impact by using and/or upgrading existing roads or stock routes.

Property Rights

Santos is seeking to establish long term, mutually beneficial relationships with landowners who are affected by our operations. Santos understands that without sound relationships with landowners (and the broader community), it will not be able to develop or operate any future CSG business in NSW successfully. Hence, our approach is to seek negotiated outcomes with landowners in a manner that builds the foundations for a long term relationship.

Santos acknowledges that landowners have concerns about how gas exploration and production will impact upon their existing land use, operations and property values. Santos agrees that landowners should be properly compensated for loss of productive land and amenity impact.

Santos has established 40 negotiated agreements with Landowners in the Gunnedah Basin to date. Importantly, each of these agreements has been achieved through open negotiation.

Compensation to NSW landowners to date has been for access to sites to conduct exploration and appraisal activities only. Our compensation is based on a $5,000 payment for non-permanent works such as coreholes plus in-kind works. In-kind works may include maintenance of existing roadways and replacement of fencing, use of machinery on-site, repair of dam walls or other aspects related to our presence on the site. In-kind contributions vary from site to site depending on the negotiated agreement.

The compensation arrangements take into account the value of the land affected, the impact on amenity and reasonable legal cost that the landowner may incur. The value of these payments is reviewed periodically. Once Santos has established that its initial exploration phase has demonstrated commercial CSG prospectivity, it will agree further compensation arrangements with landowners.

Confidentiality Agreements

The current landholder agreement used by Santos includes a standard confidentiality clause. While landholders have not raised concerns with this clause during negotiations, Santos is aware that there is a public concern about potential for the clause to limit a landholder's ability to discuss their compensation arrangement. In response to this concern, if, at any time a landholder wishes to waive the confidentiality clause, Santos will be willing do so.

Water

Water is one of the most important issues associated with the development of the CSG industry, both in terms of the perceived impact of CSG production on the quantity and quality of groundwater available for other uses and CSG water produced during the extraction process.

Santos is committed to having a minimal and manageable impact on groundwater in New South Wales and will meet this target by understanding the hydrogeology of shallow and deep aquifers and as an additional mitigate completing monitoring bores.

FAST FACTS

- ✓ Santos' commitment is to have a minimal and manageable impact on groundwater from its CSG operations in New South Wales.

In Queensland, Santos' commitment to a minimal and manageable impact to groundwater is demonstrated through the results of its numerical groundwater modeling. Santos conservatively predicts its CSG operations will have a minimal impact to groundwater in Fairview and Arcadia[9], and there will be no impact to the unconfined aquifer in Roma.[10] To support this modelling, Santos has prepared and is implementing a comprehensive Water Monitoring and Management Plan that both provides for widespread monitoring of Santos' Queensland CSG operations and specifies strategies to identify and mitigate any adverse risks. Santos will be aware of any potential changes to groundwater several years in advance of their first appearance, and if they appear will take appropriate groundwater management action to mitigate such impacts.

Santos' CSG operations in New South Wales are at an earlier stage of development, with a focus on exploration and appraisal activities. Santos will apply the same level of rigour to its NSW operations as it has in Queensland, to identify and mitigate any perceived risk to ground and surface waters. Santos is committed to build on the significant body of knowledge of the hydrological conditions in which it is operating and to this end is currently providing financial and in-kind support to an independent research group engaged in broadening the knowledge base of NSW water resources partly within the area of Santos' Gunnedah Basin activities[11]. Santos remains committed to working with local communities and landowners, to open and transparent communication and to meeting and exceeding where necessary, all Federal and State government environmental approval requirements prior to commencing its production operations.

[9] Santos 2010, *Bowen Basin Groundwater Model*
[10] URS, 2010 *Santos GLNG Project, Surat Groundwater Model.*
[11] Go to http://www.namoicatchmentwaterstudy.com.au/site/index.cfm?display=238460

About CSG Water

It is important to note that the water recovered from the deeper coal seams is not the same water that local communities extract from the near surface aquifers for agricultural and domestic purposes.

Coal Seam Gas water (known as incidental water in NSW) is contained within underground coal seams. Typically Coal Seam Gas is extracted from coal seams that lie at depths between 350 and 1200 metres below the surface in the Gunnedah Basin. Water is pumped from the coal seams to reduce the pressure within these seams as part of the gas extraction process. The incidental water extracted from the coal seams within Santos' Gunnedah Basin Project area is brackish which limits its capacity for use for other purposes unless treated.

Water and the Gunnedah Basin Project

Data Collection and Appraisal Monitoring

Santos has a good understanding of the distribution and nature of the shallow aquifers in the Gunnedah Basin and is committed to protecting the groundwater systems by collecting robust groundwater baseline data prior to the commencement of CSG production operations. In keeping with this commitment, Santos has undertaken a regional bore inventory of bores within the Gunnedah Basin Project area as well as commenced a comprehensive sampling program of all bores within a two km radius of its exploration and appraisal core wells.[12] To date, Santos has collected groundwater data from over 200 pre-existing mainly agricultural bores and will expand this sampling program for the duration of its CSG operations as the Gunnedah Basin Project develops.

In addition to collecting baseline groundwater data in the vicinity of Santos' exploration and appraisal wells, Santos has drilled dedicated Shallow Aquifer Monitoring Bores at the site of its Kahlua Pilot test well and will do the same for all future appraisal and production wells. These monitoring bores use quartz pressure gauges that have the capacity to pick up the smallest changes in water pressure and importantly detect potential changes in water levels within the shallow aquifer. The data is captured and transmitted remotely so Santos will have up to date data at all stages of its pilot testing and production operations. The continual data capture and transmission will act as a check and balance for any adverse groundwater impacts and provide assurance that any impacts are detected early.

Groundwater modeling

Santos' leases in the Gunnedah Basin include areas that overlie the major shallow aquifers which supply the local community water for irrigation, stock watering and domestic purposes. It is well understood that these aquifers lie between 5 and 170 metres below the surface. The coal seams targeted by Santos for its CSG operations are generally hundreds of meters below the aquifers. Geological studies indicate that the rock separating the near surface aquifers and the target coal seams have low to very low permeability.

To test this understanding and the broader impacts Santos' CSG operations may have on the Gunnedah Basin groundwater, Santos is committed to developing a robust groundwater model that simulates groundwater flow and predicts potential impacts over the long and short term timeframes as well as being an early warning detector of any adverse impacts. To ensure the model predicts the impacts as accurately as possible and remains relevant over the duration of the project, Santos will seek progressive reviews of the input data and quality of the interpretation by an independent scientific expert and refine the model as additional information becomes available.

Water Monitoring and Management Plan

Prior to commencing production phase operations, Santos will document and implement a Groundwater Impact Study (GWIS) to determine any impact its CSG production operations may have on the Gunnedah Basin Project area and more regionally. The GWIS will draw on the information collated from the regional bore inventory, existing databases and Santos' dedicated monitoring bores as well as the numerical groundwater modeling and academic literature. The findings of the GWIS

[12] Review of Environmental Factors Kahlua Pilot Wells – Single Well Test – PEL 1 Gunnedah Basin

will form the basis of a Water Monitoring and Management Plan (WMMP) for the Gunnedah operations and will report on potential impacts and strategies to manage and mitigate any adverse impacts identified. The WMMP will undergo independent expert review and form part of the environmental assessment process which will in turn be subject to public and Federal and State government review, comment, and compliance review.

The data obtained from the bores, as well as the data obtained from Santos' own aquifer pressure monitoring bores will be collated and used as a reference point for CSG operations, and also to provide quality data to assist in the development of an accurate hydrological model for the Gunnedah Basin Project Area. Significant amounts of this information have already been provided to the independent Namoi Catchment Water Study for incorporation in their assessment.

Santos is committed to undertaking the full environmental assessment processes in accordance with State and Federal laws, before progressing each stage of its coal seam gas development.

Incidental Water

The Gunnedah Basin Project will involve drilling several hundred wells into coal seams during the life of the Project and extraction of incidental water as a by-product of the gas extraction process. Santos is currently developing an understanding of the quantities and qualities of the incidental water it will produce during the production phase of its CSG operations with an important source of information being the testing of Santos' Kahlua Pilot appraisal well. Preliminary estimates by Santos suggest that incidental water will be extracted at a rate of approximately 5.0 GL per year with peak extraction rates of around 7.0 GL per year. The current surface and groundwater extraction for existing agricultural and other uses within the Namoi Catchment is estimated at 540GL per year. Initial testing of incidental water at the Kahlua Pilot well indicates water within the Gunnedah Basin Project area is brackish[13] which limits its capacity for reuse without treatment.

To this end, Santos is proposing to treat water containing high salt levels by reverse osmosis to produce high quality desalinated water that has multiple uses. Given the early stages of Santos' operations in the Gunnedah Basin, all beneficial reuse options are being considered including supplying water for irrigation and stock watering purposes as well as recharging depleted areas of the shallow aquifer system to boost local town supplies. Santos is currently trialling this reuse option in Roma where it is providing treated water to the aquifer that supplies the town water for domestic purposes.

Santos is committed to treating 100 percent of its incidental water and making the treated water available to the community for reuse. In this way, Santos is turning a currently unused resource into a useable resource providing a community benefit. Prior to finalising any reuse options, Santos will consult with landowners and community groups to determine their preferred reuse options.

Brine

The treatment of CSG water by reverse osmosis creates a brine residue. Santos is currently undertaking a scoping study to establish the feasibility of its disposal by re-injection into a suitable deep geological formation as it is currently doing in Fairview, Queensland. Any disposal into a geological storage site will involve Santos meeting a series of stringent criteria on the hydrologic integrity of the formation and putting in place early warning monitoring methods to detect any loss of containment.

If full reinjection into a geological formation is not possible, the remaining brine will be treated and disposed of according to relevant State waste management requirements. Santos is undertaking a scoping study to consider the commercial and technical feasibility of brine disposal to refine these options.

[13] Total Dissolved Salts of the incidental water in the Gunnedah Project area is estimated to be 3000 to 5000 ppm which compares to 35,000 ppm for typical seawater.

Great Artesian Basin

Santos recognises that concern exists about the impact CSG operations may have on the long term integrity of the aquifer systems in the Great Artesian Basin (GAB), and the environmentally unique mound spring habitats that the GAB aquifers support. The GAB aquifers are hosted within the Surat Basin equivalent sediments, which are predominantly located to the west of Santos' Gunnedah Basin Project area. Santos' CSG operations within the Project area will not have any material impact on the GAB aquifer systems.

Cumulative Impact

In consultation with other proponents, including AGL in their Camden and Gloucester Gas Projects as well as the Federal and State government, Santos will actively engage and contribute to the development of a groundwater impact model that predicts cumulative impacts at the production phase of operations.

Support for Namoi Catchment Water Study

In addition to supporting cumulative impact studies in New South Wales and Queensland, Santos is making a significant contribution to the independent Namoi Catchment Water Study (NCWS)[14] which will create a valuable asset for agribusiness and resource operators to use when planning in future.

For this reason, Santos has committed more than $500,000 to the NCWS, and Santos will share information gathered during its exploration and appraisal program with the study. The comprehensive groundwater sampling regime that Santos is undertaking in the Gunnedah Basin will be vital to the NCWS as it will provide real time monitoring of the water pressure movements of both the shallow aquifers and also the much deeper coal seams.

Collection of the groundwater monitoring data will help to:

- characterise existing groundwater systems;
- identify levels and quality of bore water within the region;
- enable maps and trend plots to be developed; and
- identify which areas would benefit from treated water.

The water samples are collected and independently analysed.

Well Drilling Process and Protections

Well Safety

Santos has stringent safety standards and practices in place at every level of its operations that meet, and in many cases exceed, regulatory requirements. Ongoing maintenance and assessment of equipment and gas wells enables Santos to identify and mitigate safety risks.

FAST FACT

✓ Santos has emergency response plans in place for every aspect of operations.

Santos' equipment is designed, engineered, installed and maintained to ensure robust performance and compliance with industry standards and regulatory requirements. Santos continually monitors gas fields via on-site operator inspections and electronically collected data sent via radio transmission to ensure the integrity of its facilities.

Completed Santos wells have American Petroleum Institute (API)-certified wellheads installed and have been pressure tested by an independent third party.

[14] http://www.namoicatchmentwaterstudy.com.au/site/index.cfm?display=238460

Santos manages CSG well safety in accordance with a series of safety management standards to ensure safe operation. This ensures rigorous standards are enforced for:

- design, construction, commissioning, operations, maintenance and decommissioning;
- environment, health and safety;
- ignition control;
- structural and mechanical integrity;
- training and competency;
- emergency preparedness; and
- incident and non-conformance investigation, corrective and preventative action.

Thorough planning and testing regimes, such as pressure and integrity testing, mean Santos understands the properties of each individual gas well and the risk of incidents is very low. Risks associated with gas well management are well understood and are minimised as part of operations.

Production variables at wellhead facilities such as pressure, temperature and flow rate are monitored. Deviations outside the normal operating envelope result in a physical inspection of the wellhead. In the unlikely event of a loss of containment of gas from wellhead facilities and equipment, the well is shut-in to repair the leak.

Santos has emergency response plans in place for every aspect of operations, including gas well management. These detailed plans outline actions, roles and responsibilities for emergency response to help ensure safety of people and protection of environment and property.

Gas may be flared for operational or safety reasons and is part of a normal procedure approved by environmental authorities.

Well sites and gas production facilities are secured and hazards are clearly signed.

Below: Four well pad in Pickinjinnie in Fairview Field, Queensland.

Below: Single well in Scotia field, Queensland.

Drilling

Santos uses proven drilling techniques to extract gas from Queensland's CSG resource in the Surat and Bowen Basins. The same techniques will be used in the Gunnedah Basin. Santos' 50-plus years of expertise in gas well drilling gives it the experience to implement these techniques.

The CSG zones being targeted by Santos are generally 350 to1,200 metres below the surface – well below stock or domestic bores which are 5m to 170m below the surface. Wells, typically between 100 millimetres and 300 millimetres in diameter, are drilled and are lined with steel casing which is cemented to the side of the hole, to isolate any aquifers that are intersected and also to ensure well integrity.

The processes used for drilling gas wells are significantly more stringent than those generally applied to domestic and irrigation bores.

The CSG wells Santos constructs are:

- Constructed to deliver gas;
- Constructed to reduce the risk to people, the environment and equipment;
- Designed to isolate water and hydrocarbon formations, contain drilling fluids and support pressure containment equipment; and
- Monitored and pressure tested in-situ.

FAST FACTS

- ✓ The CSG zones targeted by Santos are generally 350 to 1,200 metres below the surface – well below stock or domestic bores.
- ✓ Wells are lined with steel casing that is cemented to the side of the hole, to isolate any aquifers that are intersected.
- ✓ It is in Santos' best interest to maintain isolation from all aquifers and permeable formations – if water is allowed to flow in the coal seam, production will be compromised.
- ✓ To produce gas from the well for its full 20 to 40 year life, the gas must be contained and the well designs are driven by this requirement.

Santos uses surface casing to isolate any useable aquifers, and generally uses multiple casing string designs. All well designs are prepared by engineers, and are based on the Santos Drilling Operations Manual, which reflects many years of drilling experience. Santos complies with best practice API standards of well construction.

It is in Santos' best interest to maintain isolation from all aquifers and permeable formations. The CSG production model is based around removing water from the coal and then producing gas. If water is allowed to flow into the coal seam from aquifers above, production will be compromised and gas extraction would not be economic. Similarly, if gas was allowed to flow up into an aquifer (or any other formation) the economic resource would be lost, so again, Santos is diligent about ensuring the resource is intact. To produce gas from the well for its full 20 to 40 year life, the gas must be contained and the well designs are driven by this requirement.

All of Santos' wells have steel-casing that is cemented with oil field grade cement, which is then pressure tested to ensure its long term integrity.

Santos is focussed on minimising and managing the impact on the environment and has made many improvements to this end. For example, many of the CSG well designs use directional drilling to drill several wells from a single surface location (pad). Whilst the pad used is slightly larger, there are far fewer pads required. This reduces the total cleared area and allows the pads to be placed to minimise impact and therefore the environmental footprint of the CSG operations.

Santos requires all drilling contractors to comply with the Company's policies and procedures, monitoring performance regularly.

BTEX

There has been much written recently concerning detection of BTEX (benzene, toluene, ethylbenzene, and xylenes) in wells associated with CSG extraction. Santos does not use BTEX in its hydraulic fracturing additives for CSG wells.

It is important to put BTEX into context. These compounds (known as the "volatile organic compounds") are found in petroleum derivatives such as petrol and general lubricants and are also naturally occurring. They are also some of the most common chemicals humans come in contact with on a daily basis due to petroleum based products being in such regular use. As an example, popular soft drinks contain BTEX of up to 50 parts per billion (or 50 micrograms per litre), the Brisbane River can legally have up to 900 ppb and pristine rainforest streams can contain up to 600 ppb. The air we breathe contains BTEX at a level such that we receive approximately 220 micrograms per day and while refilling a car a person breathes in approximately 32 micrograms and driving for one hour exposes a person to a further 40 micrograms

Extremely low levels of BTEX can be detected in CSG and domestic irrigation wells as a result of grease that is used to lubricate the drill pipe or from the pump that is used to extract the water.

Remediation

In New South Wales, Santos will undertake rehabilitation of its CSG operations as disturbed areas are no longer required for operational purposes. The primary focus of Santos' rehabilitation is to return the land to its previous state. That objective includes measures to replace the soil profile and vegetation type, to eliminate any contamination of land and waters, and to ensure there is no introduction of weed species. Monitoring of rehabilitation outcomes is undertaken to ensure the results of rehabilitation are fed into the improvement of rehabilitation practices.

Prior to Santos commencing commencement of site activities, the site is surveyed and photographed. A final well survey is also undertaken once activities at the well have been completed.

Following completion of activities at the well site, the well is plugged and abandoned according to Santos policies and procedures and all regulatory requirements. This decommissioning and rehabilitation work involves draining the well sumps, filling and compacting the sump and removing gravel hardstand. The land surface is re-contoured to a stable landform similar to that of surrounding

undisturbed areas and the surface is ripped in order to promote natural revegetation. Surface drainage lines are reshaped and top soil is re-spread over the disturbed area and then harrowed and seeded with the aim of achieving at least 70 percent ground cover within one month after the rehabilitation work is completed. All foreign material such as equipment and associated infrastructure is removed.

Within one month of the rig being released from site, a rehabilitation audit is undertaken by an appropriately trained and competent environmental auditor. Six months after rig release, the site is revisited and checked against the completed audit to ensure the site is still compliant, with particular attention to weeds and compaction around the sumps. The site is not considered rehabilitated until the Landholder is satisfied with the outcomes.

This procedure represents best practice for the rehabilitation of CSG fields, and has been undertaken by Santos for many years in Queensland and more recently also in NSW. At the end of their productive life, wells are plugged with cement and rehabilitated, in accordance with Government approvals, guidelines and regulations with effectively no surface impact remaining.

Integrity of Cement Remediation

At the conclusion of the productive life of a CSG well, the surface facilities are removed and the well bore plugged with cement, hydrologically tested to confirm integrity and top soil replaced to a depth of approximately two meters. Best industry practice is utilised to ensure that the cement is of suitable composition with the result that the previously drilled well is permanently sealed by a combination of the remaining steel (that previously cased the well bore) and the final cement seal. Various methods of testing are used to ensure well bore and cement integrity, including pressure testing, mechanical testing, and obtaining downhole log data.

The combination of cement and steel ensures all geologic layers are hydraulically isolated from one another resulting in there being no material difference in the risk of a threat of leakage or cross contamination than exists in the surrounding undisturbed area.

Below: Pilot well site at Brawboy, near Gunnedah, NSW.

Below: the same site as above during rehabilitation.

Below: The same site 6 months later.

Hydraulic fracturing

Santos supports the NSW Government's current scientific review of the hydraulic fracturing process and looks forward to providing technical information to support the process if it is requested by the review

Hydraulic fracturing is a process used in circumstances where gas is tightly held in dense coal seams. When used, its advantage is that it substantially enhances the productivity of a gas well and, as a result, reduces the number of wells that would otherwise be required on the surface.

Hydraulic fracturing is not an explosive or high impact process. It involves pumping a specifically blended fluid, charged with proppants such as sand, down a well at sufficient pressure to force small passageways into the coal seam. The proppants keep the passageways open once the pressure is released and serve to improve the efficiency of the well.

Materials used in the fracturing process include around 99 percent percent water and sand, as well as about one percent of a range of chemicals in minute, diluted quantities, which assist in carrying and dispersing the sand in the coal seam. The chemicals are not specific to the CSG industry and have many common uses such as in swimming pools, toothpaste, baked goods, ice cream, food additives, detergents and soap.

As part of the process, the sand remains in the coal seam while the vast majority of the liquid, including chemicals, is recovered to ensure it does not impede the gas flow.

FAST FACTS

- ✓ Hydraulic fracturing is safe and has been used in the industry for more than 60 years.
- ✓ Fracturing enhances the productivity of a gas well.
- ✓ In a properly constructed well, fracturing cannot cause groundwater to leak into the coal seam as only the specific coal seam is fractured.
- ✓ Fewer gas wells are required when hydraulic fracturing is used, thereby decreasing the overall footprint.

Santos has decades of experience using this technology in the Cooper Basin and in south-west Queensland.

The chemicals utilised in this process, in the quantities used, are safe. Santos continually reviews all chemicals used in its activities. All of these chemicals have been assessed by the relevant Government Agencies and have the requisite Material Safety Data Sheet (MSDS) prepared. Only chemicals hazardous in the particular concentration being utilised are in the MSDS list for fracking fluid.

In a properly constructed well, hydraulic fracturing cannot cause groundwater to leak into the coal seam as only the specific coal seam itself is fractured. The fracture is not able to grow up to the shallow aquifers or to the surface.

Below: Chemicals used by Santos in fracturing are included in the table below:

Components	Purpose	Common Uses
Ethylene glycol monobutyl ether	Mutual solvent	Cleaning products, cosmetics, liquid soaps
Tetrakis (hydroxymethyl) phosphonium sulfate	Biocide	Water treatment
Oxyalkylated alcohol	Reduce fluid surface tension	Scouring agent for textiles
Ethylene glycol	Prevents scaling	Antifreeze, household cleansers, de-icing, caulk
Tetramethyl ammonium chloride	Reduce clay swelling	Type of salt

Crystalline silica (cristobalite)	Proppant	Sand and gravel
Crystalline silica (quartz)	Proppant	Sand and gravel
Hemicellulase enzyme	Reduce viscosity of guar gum gel	Commercial food processing of coffee
Methanol	Reduce fluid surface tension	Windscreen washer fluid, wastewater treatment, alternative fuel blends
Boric oxide	Crosslinker to increase viscosity	Used to produce high strength alloys, glasses, ceramics, detergents
Potassium carbonate	pH buffer	Soap, wine, glass, dyes, water softener
Sodium persulfate	Reduce viscosity of guar gum gel	Bleach in hair treatments, detergents
Petroleum distillate	Guar liquefier	Baby oil, make-up remover
Sodium acetate	pH buffer	Provides the primary flavouring in salt and vinegar potato chips
Guar gum	Thickens fluid to carry sand	Thickener in cosmetics, baked goods, ice cream, toothpaste and sauces
2-methyl-2h-isothiazol-3-one	Biocide	Preservative in cosmetics, shampoo detergents, dishwashing liquids
5-chloro-2-methyl-2h-isothiazolol-3-one	Biocide	Preservative in cosmetics, shampoo detergents, dishwashing liquids
Acetic Acid	Solvent	Additive in the food industry, descaling agent
Boric Acid	Gelling Agent	Antiseptic, insecticides, flame retardant
Diammonium peroxidisulphate	Breaker	Hair bleach
Diatomaceous earth, calcined	Filler	Tooth paste, hydroponics
Ethanol	non-ionic surfactant	Fuel, alcoholic beverages
Hydrochloric Acid (Muriatic Acid)	pH buffer	Multi purpose chemical reagent, food additive, swimming pool maintenance
Magnesium chloride	Salt	Food industry, anti icer on roads, aquariums
Magnesium nitrate	Salt	Agriculture as a fertilizer, ceramics
Magnesium silicate hydrate (talc)	Filler, stabiliser	Talcum powder, paints, food additive
Non-crystalline silica	Filler, stabiliser	Opal jewellery
Sodium Carbonate (Soda Ash)	pH buffer	Water softener, swimming pools, food additive
Sodium Hydroxide (caustic soda)	pH buffer	Cleaning agent, food preparation

Appendix: Santos CSG Operations in Queensland

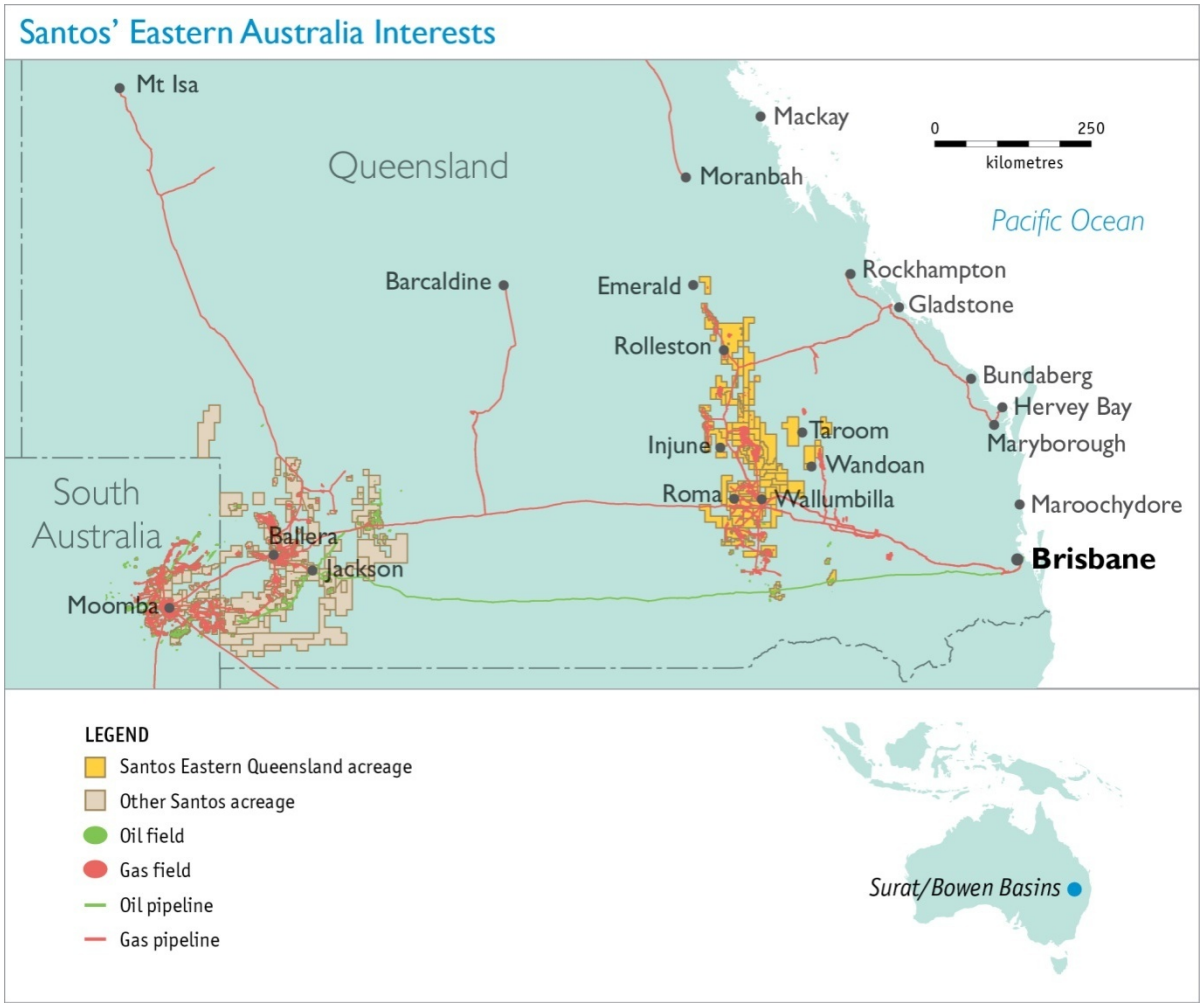
Gas is not new to Queensland, having been discovered there by accident at Roma in 1899. In fact, Queensland lays claim to the first reticulation of natural gas, at Roma, (for street lighting) and Brisbane was Australia's first capital city to have a natural gas distribution network.

FAST FACTS

- ✓ Coal seam gas is not new to Queensland.
- ✓ More than 70 percent of gas produced in Queensland comes from CSG.

Mindful of Queensland's extensive coal reserves, it became apparent almost 40 years ago that these coal reserves had the potential to contain gas. Santos, which has been conducting conventional oil and gas activities in the Surat Basin since the 1960s, began CSG exploration in 1996.

Exploration and gas production activities are currently being undertaken in the Scotia, Roma and Fairview fields. Exploration is also being undertaken in the Arcadia Valley field.



The Roma area was initially developed by Santos as a conventional gas field. However, the gas reserves from the coal seams in the area are now being developed for CSG production.

Santos purchased the Fairview and Arcadia Valley assets in 2005. Since then, Santos has progressed development of the Fairview field and has increased its reserves significantly.

Santos' extensive CSG resources in the Surat/Bowen Basins near Fairview and Injune in Queensland will, in part, supply the Santos GLNG project at Gladstone. The Santos GLNG project, a joint venture of Santos, PETRONAS, Total and KOGAS, will use world-first technology to process CSG into liquefied natural gas (LNG) for export - a cleaner energy source for energy-hungry Asia. It will deliver $9 billion in average gross, contracted, export revenue per annum for the life of the project. This is a significant economic boost for the domestic economy.

More than 70 percent of gas production in Queensland comes from CSG.[15] This production demonstrates that CSG extraction can coexist, and is coexisting, with other land uses and the industry can develop in a way that has a minimal and manageable impact on the environment.

Regulation in Queensland

In Queensland, the bulk of Santos' activities are regulated under the Petroleum and Gas (Production and Safety) Act 2004 and the Environmental Protection Act 1994. However, in recognition of the scale and scope of the Santos GLNG project, it was declared a "significant project for which an EIS is required" by the Coordinator-General under the State Development and Public Works Organisation Act 1971.

This declaration requires proponents to undertake a detailed assessment of environmental impacts and extensive community consultation for consideration by the Queensland Coordinator-General. Santos GLNG lodged its comprehensive 13,500 page environmental impact statement (EIS) in March 2009, after almost 18 months of investigations by environmental and other specialists.

The EIS investigated likely impacts and benefits of the project on: jobs and people in regional communities, rural industries and business, the environment, safety of the community, emergency services, local health, transport and housing.

The process had a strong focus on community input, with more than 2,700 people registering as project stakeholders. About 900 attended information sessions and several thousand called the project freecall line, emailed the project team or visited the Santos GLNG website.

Once the EIS was lodged, it was released for public review and written submissions were invited. The study received 48 submissions by the closing date.

On 28 May 2010, after almost two and a half years of extensive investigation, scientific assessment, consultation and review by regulators, Santos GLNG became Australia's first major CSG to LNG project to receive its environmental approval from the Queensland Coordinator-General.

FAST FACTS

- ✓ Because of its scale, the Santos GLNG project required an EIS.
- ✓ Santos conducted 18-months of investigations before lodging the EIS in March 2009.
- ✓ The process had a strong focus on community input, with more than 2,700 people registering as project stakeholders.
- ✓ On 28 May 2010, after almost two and a half years of extensive investigation, scientific assessment, consultation and review, Santos GLNG became Australia's first major coal seam gas to LNG project to receive its EIS approval from the Queensland Coordinator-General.

The Coordinator-General's report includes 900 environmental and social conditions. The subsequent Commonwealth Government approval under the Environmental Protection and Biodiversity Conservation Act 1999 included a further 300 conditions – meaning the Santos GLNG project is being developed with 1,200 conditions governing the operations and minimising impacts on the environment and communities.

[15] Department of Employment, Economic Development and Innovation, Queensland's petroleum - Exploration and development potential, February 2011.

Social and Economic Impact in Queensland

The Queensland Government has described the development of the CSG industry as a once in a generation opportunity for a generation of employment. The Government's modelling indicates that a medium size industry of 28mtpa would generate over 18,000 jobs in Queensland[16]. It would also increase gross state product by over $3.2 billion (one percent), generate private sector investment of over $40 billion and provide royalty returns of over $850 million per annum[17].

The recent Queensland State Budget explicitly nominated the development of the CSG/LNG industry as underpinning a predicted 27 percent increase in business investment in 2011-12. This increase will boost state economic growth from zero in 2010-11 (due mainly to natural disasters) to over five percent next financial year, driving unemployment below five percent and helping to create 140,000 new jobs.

These jobs are already being delivered. There has been a six-fold increase in direct, Santos employment in Queensland in the last six years, driven by the development of the Company's CSG reserves and the Santos GLNG project. In 2009-10, Santos delivered the equivalent of one new job each and every day. This six-fold increase does not include the hundreds of jobs created by the Company's contractors and sub-contractors. In total, the Santos GLNG project will create 5,000 jobs in construction, in addition to 1,000 permanent jobs in production.

FAST FACTS

- ✓ Santos GLNG project will create 5,000 jobs in construction, in addition to 1,000 permanent jobs in production.
- ✓ Santos GLNG project will generate $40 billion in federal income tax over the life of the project.
- ✓ Santos spent $22 million in the Roma region in 2010.

The project will also create direct economic benefits for Queenslanders. The most direct contribution will be through royalties. Queensland royalties will be approximately $180 million per annum, meaning the Santos GLNG project will pay some $6 billion in royalties over the life of the project.

This is the equivalent of $500,000 per day – enough to build a primary school every 50 days, or a high school every 100 days. But, by far the largest gain will be for the citizens of Australia, through income taxation. It is estimated that $40 billion will be collected in income taxation over the life of the Santos GLNG project, an enormous boost to Commonwealth revenues.

These financial returns to government and the community are in addition to the direct, local, economic stimulus provided by CSG/LNG projects. Already, Santos has invested $1 billion with Australian suppliers, and signed future contracts worth another $1 billion. In 2010, this included $504 million with 1,044 Queensland suppliers. Around half of this investment was spent with suppliers in regional Queensland, including $22 million in the Roma region where are fields are located.

At the local level in Queensland, Santos is active in contributing to the new infrastructure needed in the communities in which the Company operates. For example, Santos has already committed:

- $1 million for the Gladstone Hospital, including $700,000 to upgrade the high dependency unit and $300,000 for medical education;
- $2.65 million for the Gladstone Airport instrument landing system (ILS);
- $800,000 for community housing support through Gladstone Council;
- $250,000 for the Gladstone Rotary Club bus service for patients needing treatment in Rockhampton; and
- $4 million investment into the Roma community to upgrade the airport terminal, improve health services and increase housing support.

[16] Queensland Government, Blueprint for Queensland's LNG Industry p.3

[17] Queensland Government, Blueprint for Queensland's LNG Industry p.3

Santos is committed to delivering direct, economic benefits for the communities in which it operates, as well as growing the Australian economy overall.

Water Management in Queensland

Ground water models developed by Santos predict that town water supply bores will not be impacted as a result of CSG activities in the Roma, Fairview or Arcadia Valley fields in Queensland.

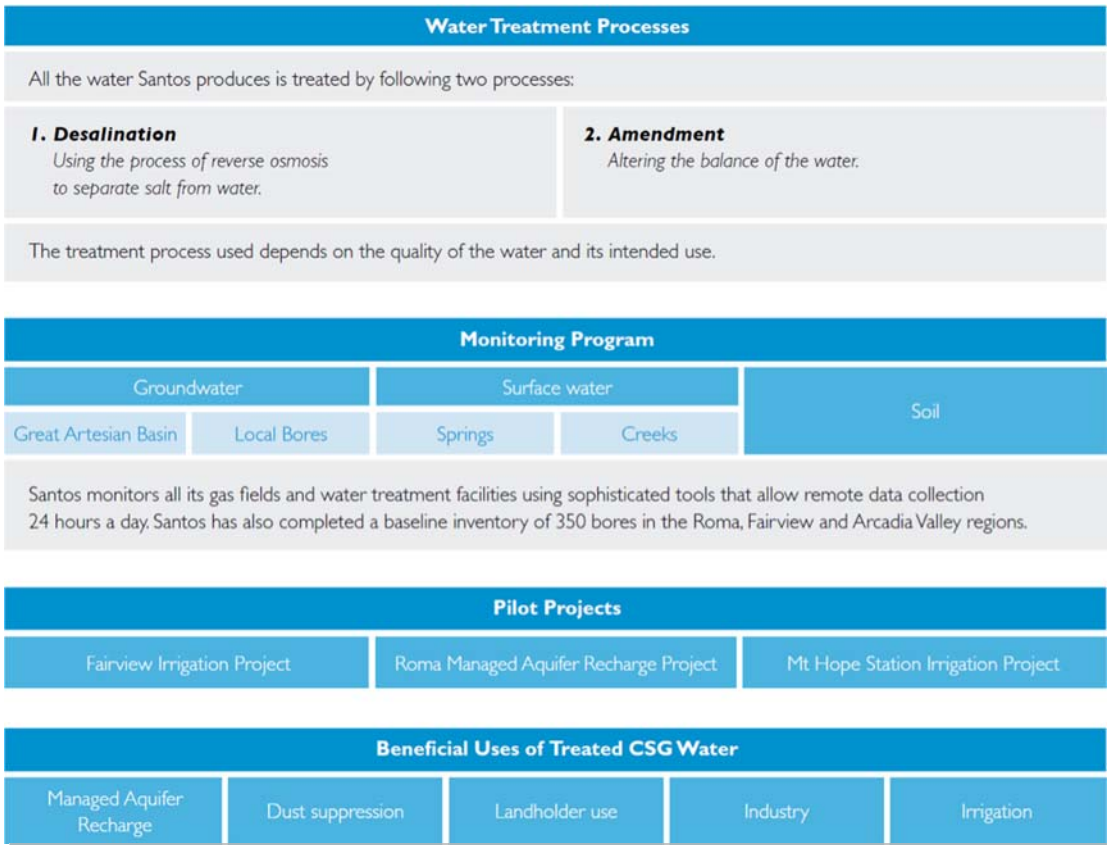
Santos' comprehensive water strategy for the GLNG joint venture project addresses 100 percent of the CSG water, as well as the project's impacts on soil and regional water resources. The strategy focuses on developing long-term solutions that benefit both local communities and the environment more broadly.

Santos is currently treating CSG water with high levels of TDS via desalination (reverse osmosis technology) and generating brine at the Pony Hills Water Treatment Plant in Fairview. The brine from this plant is subsequently re-injected into the Timbury Hills Formation in accordance with the Queensland Government's preferred approach to brine management. As Santos' CSG fields are further developed and expanded over time, additional brine management options or up-scaling of current options will be required.

Coal seam gas water with low to moderate concentrations of salt can be balanced via an amendment process. This process involves balancing the chemical make up to produce water that is suitable for irrigation. The suitability of amended water for a given purpose is determined by the water quality and is regulated by Department of Environment and Resource Management (DERM).

Santos is investigating a range of sustainable uses for treated CSG water that protects the local environment and benefits local communities. This includes using desalinated water, amended water and a combination of both to meet national standards and regulations.

The following chart summarises how Santos will manage its CSG water in Queensland.



Fairview Irrigation Pilot Project

Santos is establishing Australia's first large-scale treated CSG water irrigation project at its Fairview and Springwater stations, near Injune.

The project involves drip-irrigating 240 hectares of legume forage crops, mainly leucaena and locally adapted native tree species (initially Chinchilla white gum) with treated water. Around two million trees will be planted (over one million trees have been planted to date) or the equivalent of 2,000 hectares of forest plantation. This will produce enough high-quality forage for 1,500 head of cattle and potential for either saw logs or 40,000 tonnes of carbon absorbed from the atmosphere each year.

The pilot has created 50 jobs and research opportunities.

Roma Managed Aquifer Recharge Pilot Project

The Roma Managed Aquifer Recharge project being undertaken by Santos is the first of its kind in Queensland. It will use treated CSG water to increase Roma's town water supply. The Gubberamunda sandstone aquifer which currently supplies Roma's water supply is depleted from years of urban, industrial and stock water usage.

The town currently draws 3.5 megalitres of water a day, averaged over the year. As part of Santos' beneficial water reuse Managed Aquifer Recharge Project, the Company will be injecting treated CSG water into the aquifer. Initially, Santos is looking to inject around 10 megalitres of treated CSG water per day into the aquifer, and this may increase in the future.

Modelling indicates that, at the period of maximum groundwater impact, the vertical drainage from CSG activities, from Gubberamunda, will be minimal at 0.04 megalitres per day. That means, overall, the aquifer will be replenished with a net recharge of virtually the full 10megalitres of treated CSG water per day

This is the equivalent of supplying more than 50 years worth of water consumption to the town.

Mount Hope Station Irrigation Pilot Project

This partnership with the private landowners of Mount Hope Station will highlight how CSG water can actually help increase food production for farmers. Treated CSG water will be used to grow leucaena and other forage crops.

Farm productivity could be expected to increase 25 fold during CSG water production, and a legacy productivity improvement of fivefold could be expected to remain once the water production has ceased.

In fact, cattle on unimproved land sit at one beast per five hectares, but when fed on leucaena it can improve to up to five beasts per hectare. And, after irrigation has occurred to the leucaena and the cattle continue to feed on the crops, it is one beast per hectare.

That is, the landholder will experience an increase in agricultural productivity while CSG operations are underway, and CSG will leave a legacy of an increase even after water supply has ended. This is a concrete example that demonstrates CSG and agriculture coexist and actually increase agricultural productivity.

Santos hopes to use this as a model for other farmers the Company works with.

Below: Forage oats being watered with desalinated CSG water for stock feed at Springwater in Fairview CSG fields Queensland.

Below: Chinchilla white gum plantation.

Below: Leucaena crop – some of the 600 head of cattle grazing last year with average weight gains of approx 1.2kgs per day.

Queensland Land Access Code

Recent changes to Queensland legislation further strengthen the landholder access regime and ensure that landholders' rights are protected, while allowing for gas exploration and production. Companies are now required to comply with a Land Access Code that sets requirements in relation to communication, consultation and behaviour when entering private property. In particular, landholders must be provided with 10 days notice of a range of activities, associated with gas extraction. Santos welcomes the introduction of the Land Access Code and supports it.

Code of Conduct for Petroleum Activities

General Conduct

1. The Authority Holder will carry out the Petroleum Activities in a proper and workmanlike manner and use all efforts to extend courtesies to and respect the privacy of the Landholder.
2. The Authority Holder will consult with the Landholder regarding their core farming activities (such as harvesting, lambing, calving or mustering periods) and any relevant certification status of the Land such as organic certification.

Induction of contractors/sub-contractors

3. The Authority Holder must ensure that all persons acting on its behalf are aware of the Authority Holder's statutory responsibilities under the resource legislation, the provisions of the Land Access Code and any agreement between the Landholder and the Authority Holder.
4. The Authority Holder must induct any persons acting on its behalf as to its responsibilities under the resources legislation, the Land Access Code and any agreement between the Landholder and the Authority Holder relevant to the activities being undertaken by that person.
5. The Authority Holder must issue evidence of this induction to the person acting on its behalf and must produce documented evidence if requested by the Landholder.

Livestock and property

6. The Authority Holder must use the Land in a manner that minimises disturbance to people, livestock and property in the surrounding area.
7. The Authority Holder must immediately report any threat to the safety of livestock or the Landholder's property caused by the Authority Holder to the Landholder.
8. The Authority Holder must immediately report any accidental injury or killing of livestock to the Landholder.
9. The Authority Holder must immediately report any damage to the Landholder's property caused by the Authority Holder to the Landholder and must repair that damage as soon as possible.

Access points, roads and tracks

10. Vehicle movements must be curtailed in wet conditions to minimise damage on road infrastructure. Where vehicle movements are required, any damage must be repaired by the Authority Holder as soon as practicable.
11. The Authority Holder must use existing access points, formed roads and tracks that are available for entry if using the road or track is practicable.
12. Where it is not practicable to use existing access points and formed roads and tracks, additional access points and roads or tracks must be located in a manner that minimises impact on the Landholder's business operations.
13. The Authority Holder must, during such periods as it utilises the agreed paths of entry and access roads and tracks, maintain and keep in repair the paths, roads and tracks having regard to their condition at the commencement of authorised activities.
14. All vehicles must operate at speeds that suit the prevailing conditions and minimise noise, dust and disturbance,
15. The Authority Holder must promptly report any damage to the Landholder's access points, roads and tracks caused by the Authority Holder.

Obligation to prevent spread of declared pests

16. The Authority Holder must take all reasonable steps to ensure that it, and any person acting on its behalf, does not disperse the reproductive material of any declared pest when:
    (a) entering or leaving the land in the area of the Petroleum Authority; or
    (b) carrying out authorised activities for the Petroleum Authority.
17. Where wash down is required to minimise the risk of pest or weed spread, the Authority Holder must produce documented evidence that this has occurred if requested by the Landholder.

Land, water and vegetation management

18. The Authority Holder must implement appropriate erosion control measures around the site of the Petroleum Activities and agreed access routes.
19. The Authority Holder will refrain from destroying, removing or clearing trees, timber and scrub to an extent greater than is necessary having regard to the nature of the Petroleum Activities and will agree with the Landholder the location and treatment of any fallen timber.
20. The Authority Holder may only remove water from the Landholder's water sources (eg dams) with the Landholder's agreement.

21. The Authority Holder must take all reasonable steps to prevent erosion from the Land and of the bed or banks of any watercourse on the Land and to prevent the deposit of excavated material or eroded material in any watercourse.

Camps

22. Where a camp is to be established, the location and management plan for the camp must be agreed between the tenure/authority holder and the Landholder and must not be within 1km of a stock watering point.

23. Where no agreement is able to be reached between the Landholder and Authority Holder, any camp must be located so as to minimise the impact of the business operations of the Landholder.

Items brought onto the Land

24. The Authority Holder must remove all rubbish and construction debris from its activities on the Land and dispose of it in a suitable Local Authority facility.

25. The Authority Holder must not bring onto the Land any firearms, domestic animals, non-prescription drugs or alcohol.

Gates, grids and fences

26. The Authority Holder must leave all gates in the position found unless otherwise advised by the Landholder.

27. The Authority Holder must report any damage to grids on the Land to the Landholder immediately and, where such damage is caused by the Authority Holder, replace or repair them as soon as practicable.

28. The Authority Holder will obtain the Landholder's permission before erecting any gates on the Land and all gates must be kept in a stock proof condition.

29. Prior to interfering with a fence, the Authority Holder must consult with the Landholder.

30. Where it is agreed that fences may be cut, they should be immediately repaired, or stock-proof gates erected in accordance with the Landholder's instruction.

Rehabilitation

31. The Authority Holder must stockpile top soil and subsoil separately for backfilling and rehabilitation and must commence rehabilitation as soon as possible following completion of the Petroleum Activities.

32. Any roads or tracks constructed by the Authority Holder not required by the Landholder must be adequately rehabilitated by the Authority Holder.

Fire

33. The Authority Holder will comply with all statutory provisions that may be in force from time to time in relation to bush fire damage or to restrictions on the lighting of fires in the open and properly extinguish all camp fires after use.

34. The Authority Holder will take all reasonable precautions to prevent the outbreak of any fire and will not burn any debris or rubbish without the Landholder's consent.

"AS ONE OF AUSTRALIA'S LARGEST DOMESTIC GAS PRODUCERS, SANTOS HAS A 50-YEAR TRACK RECORD OF WORKING WITH LOCAL LANDHOLDERS AND CONTRIBUTING TO COMMUNITIES. OVER THE PAST 15 YEARS WE'VE TAKEN THE SAME APPROACH TO EXPLORING QUEENSLAND'S MULTI-BILLION DOLLAR COAL SEAM GAS RESOURCES. AS WE DEVELOP THAT BUSINESS AND EXPLORE NEW OPPORTUNITIES IN NEW SOUTH WALES, SANTOS IS COMMITTED TO HELPING LOCAL COMMUNITIES BENEFIT FROM THEIR NATURAL GAS RESOURCES SAFELY AND SUSTAINABLY, WHILE MAINTAINING THEIR VITAL ROLE AS FOOD PRODUCERS."