

Australian Hydrogen Conference – Adelaide 2022

Thank you, Fiona, for your welcome, and good morning everyone.

Before I begin, I want to acknowledge the Kurna people as the Traditional Owners of the land on which we meet.

I would also like to acknowledge the 23 Traditional Owner Groups and six Aboriginal Land Councils that Santos works alongside in our operations across Australia, and I pay my respects to all their Elders past, present and emerging.

Santos would not be able to operate if it were not for the support of those Traditional Owner and Land Councils groups and I acknowledge the important role they play in our industry.

It is great to be here this morning to reconnect and re-engage with industry colleagues and to be able to talk face-to-face about the opportunities that lie ahead for a clean energy future, and to highlight Santos' hydrogen ambitions.

And it's very fitting that these discussions on the future of the energy sector are happening here in Adelaide. Santos is proudly South

Australian, first delivering natural gas from reservoirs in the Cooper Basin to a home in suburban Adelaide in 1969.

More than 50 years later, those same reservoirs in the Cooper Basin are the focal point of our future, brimming with potential opportunities for clean energy, including hydrogen.

At Santos, we are really excited about these opportunities – in particular, the potential for hydrogen to deliver a step-change in emissions reduction as we work towards our industry-leading net-zero by 2040 targets.

Hydrogen production is a natural extension of what Santos already does.

We have been producing natural gas and liquids for more than five decades, and our experience and access to resources makes hydrogen production a natural progression.

This knowledge and experience means we're well-positioned to decarbonise natural gas and generate new revenue streams through carbon solutions, like carbon capture and storage (CCS) technology.

Clean hydrogen is hydrogen with low Scope 1 and 2 emissions when produced from natural gas combined with carbon capture and storage, or when produced from other low-emissions production technologies, including renewable sources.

At Santos, we're focussing on developing both. We will ultimately use CCS technology to accelerate the development of affordable clean hydrogen production and support the evolution of hydrogen markets.

The International Energy Agency considers hydrogen as one of the key pillars of decarbonisation.

In fact, in their Net Zero 2050 scenario, the IEA suggests about half the world's gas production would be used to make hydrogen and about 40 per cent of the world's hydrogen would be made from natural gas.

This means hydrogen is a critical component of the future energy supply.

Currently, hydrogen is the only obvious pathway to eliminating Scope 1, 2 and 3 emissions associated with gas production and consumption.

It is clear that the world will need to rely on clean hydrogen to meet its emissions targets.

But despite all the ambitions, we know the development of hydrogen is not without its challenges.

We will need to continue to work with governments to ensure robust policies are in place to create a viable industry with the longevity it needs to support the future. We will also need to work with our customers to build market demand.

As a well-established company with an extensive history in producing, processing, and transporting gases, at Santos we understand the technical challenges posed by hydrogen and we have the technical expertise to manage those challenges and to develop supply chains required across the country.

Our aim is to meet evolving customer demand for cleaner energy through the development of CCS projects and the subsequent production of new clean fuels such as hydrogen.

Our approach is simple: we are looking for clear market signals to invest and will be in the best position to meet demand by leveraging our

natural advantages to produce low-cost clean hydrogen, including right here in South Australia.

We see CCS as the key enabler for clean hydrogen.

Our commitment to CCS is the first step in establishing the infrastructure to support the growth of hydrogen and ammonia markets in Australia and Asia.

Santos is a global leader in CCS deployment, as we currently construct one of the world's biggest CCS projects at Moomba to store 1.7 million tonnes of CO₂ every year.

We are also one of the first companies in the world to book CO₂ storage resources – 100 million tonnes in the Cooper Basin – which has the potential to store 20 million tonnes of CO₂ per year for more than 50 years, the equivalent of taking one third of light duty vehicles off Australian roads each and every year.

As I said, we are focussing on delivering clean hydrogen from either natural gas with CCS or renewables, with a view to producing the lowest cost clean hydrogen in order to enable a faster transition with lower emissions.

Hydrogen production from natural gas and CCS can have life cycle emissions of 1.2kg CO₂ per kilogram of hydrogen, which is much lower than conventional hydrogen production with a comparable level of emissions to hydrogen produced from renewables, nuclear or waste biomass technologies.

Despite the similarities, there is a key differentiator between hydrogen from natural gas with CCS or hydrogen from renewables – and that is cost.

Hydrogen made from natural gas in combination with CCS is cost-competitive and sustainable; currently half the cost of generating hydrogen from water and electricity.

Low-cost CCS enables us to produce clean hydrogen more economically, in line with the Federal Government's targets of around ~US \$2 per kg, versus forecast costs of greater ~US \$4 per kg from hydrogen from renewables initially.

It is clear that natural gas combined with CCS technology could support the acceleration of a future hydrogen economy until the cost of hydrogen made from renewable sources comes down.

Focussing *only* on clean hydrogen from renewables risks missing the opportunity to support these markets with clean fuel, and will delay the transition due to those higher costs.

Our CCS project in Moomba is critical to decarbonising natural gas and essential for our path to new low-emissions and clean-burning fuels like hydrogen.

The Cooper Basin has the potential to become a large-scale, commercial CCS hub enabling low-carbon, cost-competitive hydrogen production in Australia.

This is the same Cooper Basin which Santos has been working in and around for some 65 years.

We know the geographical and geological formations well which means we have a thorough knowledge of the reservoirs, but on top of that, the Cooper Basin has world-class wind and solar opportunities.

Subsequently, South Australia is the prime location to kick start our hydrogen ambitions.

We want to leverage the opportunities sensibly, by moving quickly to market with hydrogen from natural gas and then scaling up with renewables.

We will look to establish infrastructure initially where required and then as the cost curve goes down and capital requirements for renewables and electrolysers decrease, we can transition and produce clean hydrogen from renewables at low cost, utilising common infrastructure.

However, in many cases, existing infrastructure will be utilised or converted for hydrogen activities extending its useful life and reducing costs of hydrogen production and supply.

The other key benefit of this approach in producing clean hydrogen from natural gas is that by utilising CCS, we can not only enable production of hydrogen but support decarbonisation of hard to abate sectors through CCS, which comprise 54% of global emissions.

Our existing infrastructure position also enables us to work closely with both domestic and international customers in these hard to abate sectors, such as mining, to reduce their emissions and provide CO₂ solutions.

At Santos, we're aiming to be a global leader in the transition to cleaner energy and clean fuels, by helping the world decarbonise to reach net-zero emissions in an affordable and sustainable way.

That's why we're excited to be working alongside both the State and Federal Government as well as industry partners on a hydrogen export hub at Port Bonython.

By coupling the hub with our CCS facility at Moomba, we're seeking to unlock South Australia's potential for a globally significant hydrogen hub, including optionality for CO₂ storage services for permanent storage underground in the Cooper Basin.

And it's not just in South Australia that we're progressing these plans. Where possible, we're looking to combine our natural gas developments with CCS projects to reduce carbon emissions from our own production and create a carbon solutions business, while helping third parties, including our customers, reduce their emissions and enable future clean fuels projects.

Earlier this year we took FEED on our Bayu-Undan CCS project in the Timor Sea, northwest of our Darwin LNG project.

We are looking at a storage capacity of around 10 million tonnes of CO₂ per year once production from the field ceases.

This would enable us to store 2.3 million tonnes of CO₂ per year from our Barossa gas project, making it one of the lowest-carbon LNG projects in the world.

Bayu-Undan is a low-cost, large-scale, commercial CCS proposal that could also store CO₂ from our customers in Korea and Japan who have already expressed great interest in the project.

Just as our customers have looked to us for energy resources for decades, they are now looking to us to help them decarbonise their economies through CCS.

In WA, we are looking at the potential for our Reindeer facilities in WA to be used for CCS when gas production ends.

Importantly, all these CCS projects are at the low end of the global CCS cost curve, giving Santos a critical competitive advantage at a time when the need to accelerate CCS deployment globally has never been greater.

As I mentioned earlier, the development of hydrogen is not without its challenges and going forward, there are a range of solutions that must be developed.

However, these are the technical challenges that our industry is used to facing and overcoming.

Given the challenges in transporting a flammable gas like hydrogen efficiently, the optimal hydrogen transport mode varies by distance, geography, and end-use – there is no perfect solution.

Gaseous hydrogen is not suitable for long distance shipping due to low energy density so suppliers must either liquify hydrogen, convert it to ammonia, or bind it to a liquid organic hydrogen carrier, all of which introduce additional handling and energy requirements.

Retrofitted pipelines similar to what Santos currently own potentially present the lowest transportation costs, however there are metallurgy concerns so a coordinated approach to hydrogen gas blending in pipelines will likely be required nationally.

At Santos, we know natural gas combined with CCS technology is the fastest and most realistic path to a future hydrogen economy, at a price customers will be willing to pay.

The hydrogen customers of tomorrow are our natural gas customers of today, and we have the existing relationships and knowledge of our customer's businesses to understand their energy and decarbonisation needs.

Our CCS hubs are already attracting significant attention from international customers and investors who are looking to reduce emissions from coal-fired power stations, using hydrogen and ammonia.

We'll continue to work with our customers, investors, technology developers and governments to help build our new cleaner energy, clean fuels and carbon markets.

But to be successful, we must have robust policy and be open to collaboration to deliver hydrogen through a range of technologies to ensure we do not delay the energy transition.

Santos has invested over A\$20 million in the last two years to develop a cost-competitive solution to deliver hydrogen from natural gas with CCS.

We have also partnered with leading technology providers and are moving forward with studies of three hydrogen transport technologies with a view to securing commercial offtake agreements.

To this end, we see it as imperative that strong collaboration continues, and that it's driven between government, industry, customers, and research groups to maximise the potential of hydrogen and to ensure we have the right structural measures in place to build hydrogen supply chains.

This is a once in a lifetime opportunity that we're committed to getting right. We're very excited to be part of this next phase in global energy markets and working with many of you in the room to deliver on a clean hydrogen future.

Thank you very much for your time and I look forward to taking some questions.