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The new Safeguard Mechanism and the Santos Barossa gas project

The Safeguard Mechanism now requires stronger action to cut pollution from gas projects including full abatement of reservoir emissions. The Santos Barossa project is particularly emissions-intensive and is likely to incur carbon costs of between $500m and $987m between now and 2030.

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INTRODUCTION

Australia's primary policy to address industrial greenhouse gas emissions is the Safeguard Mechanism. The policy covers facilities that emit over 100,000 tonnes of CO_2e- per year and was recently amended with new features including:

- All facilities to reduce net emissions by 4.9% per year to 2030, and to be at net zero emissions by 2050.
- A "hard cap" on gross emissions.
- New export gas developments must have zero net reservoir emissions from commencement.
- A review of Human Induced Regeneration offsets (HIR), one of the largest offsets methods in Australia.

These changes will have particular impact on the Santos Barossa project: a $5.2 billion offshore gas development located north of Darwin in the Timor Sea. The project involves a new floating production facility, underwater wells, and a pipeline connection to the existing Darwin LNG export facility. Barossa is possibly Australia's most carbon intensive gas development due to the very high CO_2 content in the Barossa field.

THE SAFEGUARD MECHANISM REFORMS AND THE BAROSSA PROJECT

Under the strengthened Safeguard Mechanism, there are several requirements that will impose additional costs on the Barossa Development.

Reservoir emissions

The most significant aspect of the new Safeguard Mechanism for the Barossa Project is its requirement that new offshore gas fields must either fully offset, or capture and permanently store, all reservoir carbon emissions. This requirement will take effect as soon as operation commences and will apply for the life of the project.

Any given gas field will contain an amount of CO_2 which will be trapped within the reservoir along with the natural gas (methane). This CO_2 is normally vented—i.e. released into the atmosphere—at the field and/or at the gas processing facility prior to liquefaction or refining. These emissions are referred to as "reservoir emissions".

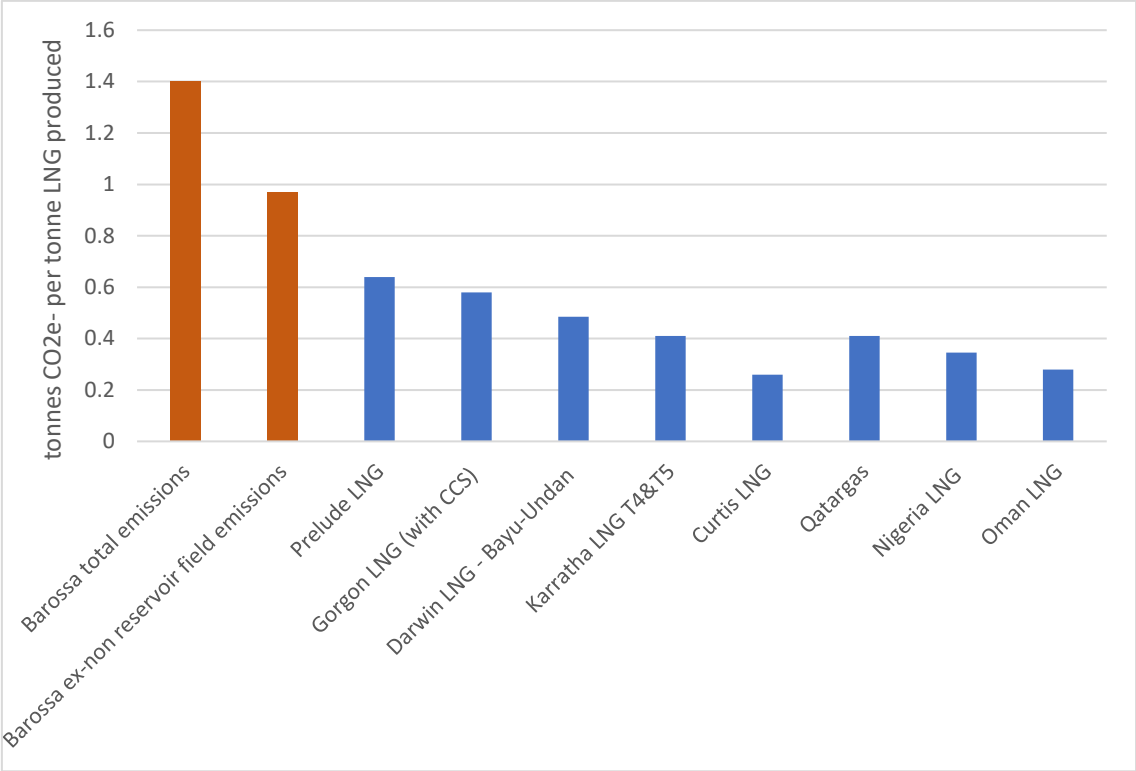
The level of reservoir emissions varies from field to field depending on how much CO_2 is trapped along with the natural gas. At 16%–20% CO_2 by volume,[1] the Barossa field has a higher proportion of reservoir CO_2 than any other gas field in Australia. The field has three times greater CO_2 content than the Bayu-Undan gas field, which currently feeds the Darwin LNG facility, and six times greater than the North West Shelf LNG facility in Western Australia.[2] This means that the Barossa field faces much higher abatement costs than other LNG development in Australia.

When the project's offshore and gas processing emissions are factored in, the LNG produced from the Barossa field would have a total emissions intensity of 1.4 tonnes of CO_2 per tonne of LNG produced. This makes the Barossa development the most emissions intensive LNG projects in Australia and the world, as shown in Figure 1 below:

[1] Conoco Phillips (2017) *Barossa Area Development Offshore Project Proposal*, page 131, Table 4-8, https://www.nopsema.gov.au/sites/default/files/documents/2021-03/Draft-for-public-comment-Barossa-Area-Development-Offshore-Project-Proposal-July-2017.pdf

[2] Institute for Energy Economics and Financial Analysis (IEEFA) (2022) *Santos' Loss Forces Them Back to The Drawing Board on Unapproved Barossa Gas Project*, https://ieefa.org/resources/santos-loss-forces-them-back-drawing-board-unapproved-barossa-gas-project

Figure 1: LNG facilities by emissions intensity, Australia and selected overseas



Sources: Conoco Phillips (2017) *Barossa Area Development Offshore Project Proposal*, Jacobs (2019) *NWS Project Extension Proposal Greenhouse Gas Benchmarking*, Figure 5-1, https://www.epa.wa.gov.au/sites/default/files/PER_documentation2/NWS%20Project%20Extension%20-%20Appendix%20F%20-%20Greenhouse%20Gas%20Benchmarking%20Report.pdf

Figure 1 includes two estimates for Barossa: total emissions intensity of 1.4 tonnes CO_2-e per tonne, which includes reservoir emissions, flaring and fuel gas emission in the field and LNG processing; and another estimate: 0.97t tonnes CO_2-e per tonne LNG, which excludes field flaring and fuel gas emissions to ensure a like-for-like comparison with the data for the other LNG facilities. It is likely, however, that Barossa's unusually large field fuel gas emissions relate to processing of its high reservoir emissions, meaning that the other projects are unlikely to have similarly large fuel gas emissions in the field. Regardless, Barossa's emissions are likely to be among the highest in the world on a per-tonne of LNG basis.

Other direct emissions

Beyond reservoir emissions, the new Safeguard Mechanism requires covered facilities to reduce other emissions at a rate of 4.9% per year to 2030 and to net-zero by 2050.

According to the Barossa Development Offshore Petroleum Proposal,[3] other emissions will include:

- 0.055 Mt CO_2-e per year from offshore flaring,
- 1.509 Mt CO_2-e per year from the use of fuel gas at the offshore facility, and
- 1.751 Mt CO_2-e per year from processing the gas at the Darwin LNG facility.[4]

All these emissions will be subject to the 4.9% per year reduction obligation.

ABATEMENT OPTIONS: RISKY AND EXPENSIVE

Abatement of reservoir gas and other emissions from the Barossa LNG project could be achieved through purchasing of offsets and/or Carbon Capture and Storage (CCS) technology. Both methods carry significant additional risk for Santos and its shareholders.

Carbon Capture and Storage

Santos has proposed the development of a CCS facility to capture the Barossa project's reservoir emissions. The captured CO_2 would be injected into the depleted Bayu-Undan gas fields.

There are very significant environmental and capital risks, as well as additional energy use, associated with this option. The proposed CCS facility would incur significant capital expenditure and would require a new environment impact assessment process under Northern Territory and Commonwealth environmental laws. This has the potential to delay the commencement of the project by several years.

In addition, the decommissioning costs and operational risks associated with an offshore CCS facility would be significant. The amount of energy required to pump CO_2 from the Barossa field to the injection site would be significant, and the risks associated with potential future carbon leakage from the fields would present an ongoing and potentially uninsurable risk for the company.

A similar CCS injection facility for reservoir gas at Chevron's Gorgon LNG project in Western Australia been plagued with ongoing technical problems, cost blowouts, and

[3] Conoco Phillips (2017) *Barossa Area Development Offshore Project Proposal*

[4] Historical baseline reported at Clean Energy Regulator (2023) *Safeguard baselines table*, https://www.cleanenergyregulator.gov.au/NGER/The-safeguard-mechanism/safeguard-data/Safeguard-baselines-table

compliance issues. The facility cost over $AU3 billion,[5] and has fallen short of its injection targets by about 50% in its first five years of operation. As a result, Chevron will now be required to retrospectively offset over five million tonnes of CO_2.[6]

Offsets

Facilities covered by the Safeguard Mechanism will only be able to use Australian Carbon Credit Units (ACCUs) or Safeguard Mechanism Credits to offset emissions. Using ACCUs to offset emissions also presents considerable risk to Santos and its shareholders, not least because the use of offsets to abate a high proportion of emissions is inconsistent with new international standards published by the United Nations[7] and the International Organization for Standardization[8] on greenwashing and net zero commitments:

> ***Non-state actors cannot buy cheap credits that often lack integrity instead of immediately cutting their own emissions across their value chain.***
>
> (United Nations High Level Expert Group on net Zero Commitments from Non-State entities)

As countries and businesses look to decarbonise supply chains, international markets will increasingly place a cost premium on products from facilities that do not comply with such standards.

The potential for failed offsetting projects in Australia is also very real. Analysis of several ACCU methods have found that far lower levels of abatement have been achieved than has been claimed, and that the offsets lack integrity and permanence.[9] It is likely that these risks will be reflected in significant additional future costs for

[5] IEEFA (2002) *If Chevron, Exxon and Shell can't get Gorgon's carbon capture and storage to work, who can?,* https://ieefa.org/articles/if-chevron-exxon-and-shell-cant-get-gorgons-carbon-capture-and-storage-work-who-can

[6] Sydney Morning Herald (2021) *Chevron's five years of Gorgon carbon storage failure could cost $230 million https://www.smh.com.au/environment/climate-change/chevron-s-five-years-of-gorgon-carbon-storage-failure-could-cost-230-million-20211110-p597uf.html*

[7] United Nations High Level Expert Group on the Net Zero Emissions Commitments of Non-State Entities (2023) *Integrity Matters, Net Zero Commitments by Business, Financial Institutions, Cities and Regions* https://www.un.org/sites/un2.un.org/files/high-level_expert_group_n7b.pdf

[8] International Organization for Standardization (2023) *Net Zero Guidelines* https://www.iso.org/netzero

[9] Long and McDonnald (2022) *Insider blows whistle on Australia's greenhouse gas reduction schemes*, https://www.abc.net.au/news/2022-03-24/insider-blows-whistle-on-greenhouse-gas-reduction-schemes/100933186

facilities relying on these forms of abatement, and contribute to a significant credibility gap in their corporate climate change commitments.

COST IMPACT ON BAROSSA PROJECT

The Barossa project's capital cost is estimated at $5.2 billion AUD.[10] Santos currently aims to produce the first gas from the project in 2025.[11]

This 2025 start date means that the facility will face the increased cost impacts of the strengthened Safeguard Mechanism—including abating all reservoir gas emissions and reducing other emissions in line with the Safeguard Mechanism annual decline rates published by the Australian Government—as soon as it begins operating.

Cost for abatement of reservoir gas

The most significant cost incurred by Santos under the Safeguard Mechanism will be that of the complete abatement of reservoir gas emissions. At the current ACCU price of $38 per tonne,[12] offsetting 1.8 million tonnes of reservoir emissions per year would cost $69 million per year. However, it is likely that the carbon price will rise significantly once the Safeguard Mechanism reforms take effect. This anticipated price rise will be further exacerbated by constraints on the use of cheap low-integrity offsets, the review of HIR method and the hard cap on emissions.

At a higher carbon price of $75 per tonne, the Government's proposed maximum price, Santos would incur a cost of $136 million per year to offset reservoir emissions only, or $683 million for five years of operation to 2030.

Cost of abatement for other emissions

In addition to fully abating reservoir emissions, Santos will face additional abatement costs for other emissions associated with processing of the Barossa gas and the Darwin LNG facility. Offshore emissions (other than reservoir gas) and processing emissions associated with the Barossa gas will be 3.315 Mt CO_2-e per year including offshore flaring and combustion of fuel gas, and emissions from gas processing at Darwin LNG. Under the Safeguard Mechanism, Santos will be required to abate or offset an

[10] Sydney Morning Herald (2022) *Santos restricts drilling its $5b Barossa project until court approval* https://www.smh.com.au/business/companies/santos-restricts-drilling-its-5b-barossa-project-until-court-approval-20220826-p5bd3a.html

[11] Santos (n.d.) *Barossa Gas Project,* https://www.santos.com/barossa

[12] Jarden ACCU web platform https://accus.com.au/

additional 4.06Mt CO_2-e under the Safeguard decline rate of 4.9% per year from 2025 to 2030.

This will represent an additional cost of $304.6 million for the five years of operation to 2030, based on the higher expected carbon price under the Safeguard Mechanism.

These additional costs are summarised in Table 1 below.

Table 1: estimated abatement costs for the Barossa to Darwin LNG project

	Emissions	Abatement required	Abatement required 2025-26 to 2029-30	Cost at carbon price ($m)	
	Mt CO_2-e/ yr	% of emissions	Mt CO_2-e	$38/t CO_2-e	$75/t CO_2-e
Reservoir emissions	1.821	100%	9.1	$346.0	$682.9
Other offshore emissions (fuel gas and flaring)	1.564	4.9% per year	1.92	$72.8	$143.7
Darwin LNG emissions	1.751	4.9% per year	2.14	$81.5	$160.9
Total per year	5.136				
Total to 2030	25.68		13.16	$500.3	$987.5

CONCLUSION

The strengthened Safeguard Mechanism will impose considerable additional costs on the Barossa LNG development. An estimated cost of between $500.3 and $987.5m to 2030 will be incurred under the new policy.

For context, this represents nearly 20% of the $5.2 billion capital costs of the project.

It is important to recognise that these costs will continue to increase after 2030 as the Safeguard Mechanism baseline for the Darwin LNG facility will decrease to zero by 2050.