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Gorgon-tuan Problem

Chevron's Gorgon LNG project released millions of tonnes CO2 last year that were meant to be sequestered by its carbon capture and storage (CCS) project. This failure represents half of the national increase in emissions over the last year. If required to offset these emissions, Gorgon would need to pay more than $55m million a year. However, Gorgon will face no penalties and is in line to receive $60m in taxpayer subsidy. Under the safeguard mechanism, it has an emission limit that assumes CCS is not operating.

Tom Swann
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Australia's greenhouse gas emissions have increased for three years in a row. The Department of Energy and Environment's *National Greenhouse Gas Inventory Quarterly Update* for March 2018 says:

> Emissions for the year to March 2018 increased 1.3 per cent or 6.8 Mt CO2-e. This increase was mainly driven by LNG production for export.[1]

LNG emissions come from stationary energy (gas used in LNG processing) and fugitives (release of CO2 and methane). LNG also increases emissions from electricity, which is used in the extraction and transport of gas.

[1] Department of Energy and Environment (2018) *Environment's National Greenhouse Gas Inventory Quarterly Update - March 2018,* https://www.environment.gov.au/system/files/resources/63391569-7ffa-4395-b245-e53893158566/files/nggi-quarterly-update-mar-2018.pdf

The single largest source of LNG emissions is the Gorgon LNG Project off the North West of Western Australia. The main stake in the project is held by Chevron.

The gas in the Gorgon reservoir is relatively high in CO2. The Gorgon Project intends to sequester this CO2 with carbon capture and storage (CCS). The Gorgon LNG Project is often lauded as the CCS flagship project. For example, on ABC RN the CEO of the Minerals Council Tania Constable pointed to Gorgon as the largest CCS project in the world, when it starts in 2019.[2] Ms Constable did not explain that the Gorgon Project's CCS has failed for the past two years emitting millions of tonnes of CO2 that it promised to sequester.

Fugitive emissions from Gorgon are included in the National Greenhouse Gas Inventory.[3] They therefore make it harder to reach our emissions targets. The Government's emissions projections for future years include Gorgon CCS coming on "as currently scheduled" – presumably meaning as rescheduled for 2019, after two years of failure.[4] These projections will need to be adjusted further if there are further failures.

The Gorgon CCS project has CCS capacity of 3.4 to 4Mt per year.[5] Chevron previously estimated the Gorgon CCS project was to sequester between 5.5 and 7.8Mt of CO2 over the first two years of operation.[6] It is likely the emissions from the second year of operation would be larger than the first, as production ramps up. There have also been some issues with production, but it is unclear whether and by how much this has reduced fugitive emissions.[7]

[2] ABC RN (2018) *RN Breakfast, Tania Constable, CEO of the MCA,* https://abcmedia.akamaized.net/rn/podcast/2018/10/bst_20181012_0816.mp3

[3] Senate Environment and Communications Committee (2018) *Question on Notice 162,* https://www.aph.gov.au/api/qon/downloadestimatesquestions/EstimatesQuestion-CommitteeId8-EstimatesRoundId3-PortfolioId10-QuestionNumber162

[4] Senate Environment and Communications Committee (2018) *Question on Notice 164,* https://www.aph.gov.au/api/qon/downloadestimatesquestions/EstimatesQuestion-CommitteeId8-EstimatesRoundId3-PortfolioId10-QuestionNumber164

[5] Global CCS Institute (2018) *Gorgon Carbon Dioxide Injection,* https://www.globalccsinstitute.com/projects/gorgon-carbon-dioxide-injection-project

[6] Milne (2017) *Carbon hiccup for Chevron with 5 million-tonne greenhouse gas problem at Gorgon LNG plant,* https://thewest.com.au/business/oil-gas/carbon-hiccup-for-chevron-with-5-million-tonne-greenhouse-gas-problem-at-gorgon-lng-plant-ng-b88694565z

[7] Milne (2017) *Carbon hiccup for Chevron with 5 million-tonne greenhouse gas problem at Gorgon LNG plant,*

In short, in a year when Australia's total emissions increased by 6.8Mt CO2, Chevron's failing Gorgon CCS project emitted up to 4Mt CO2. Gorgon's CCS failure so far represents a significant part, likely half or more, of Australia's emissions increase.

Chevron's fact sheet on the project not only ignores its failures to date, but further notes:

> The Australian Government has committed $60 million to the Gorgon Carbon Dioxide Injection Project as part of the Low Emissions Technology Demonstration Fund (LETDF).[8]

Penalties for emitting millions of tonnes of CO2?

There is no federal requirement for Gorgon to sequester these emissions; it is not part of the federal approval.[9] As discussed below, Gorgon's emissions are subject to the safeguard mechanism, but Chevron has set itself an emissions limit that does not assume CCS operates successfully.

The WA Government approval for Gorgon requires it to sequester at least 80% of its fugitive emissions over a five year period. It is unclear how this is now possible and purchasing offsets to meet this target would cost tens of millions of dollars.

The WA Government has decided not to impose penalties, citing uncertainty about the meaning of "commencement of operations".

Failing to follow through on compliance through requiring offsets not only increases emissions sets a precedent that undermines the force of such obligations in the future.[10]

[8] Chevron (2018) *Gorgon carbon dioxide injection project*, https://australia.chevron.com/-/media/australia/publications/documents/gorgon-co2-injection-project.pdf

[9] Senate Environment and Communications Committee (2018) *Question on Notice 163,* https://www.aph.gov.au/api/qon/downloadestimatesquestions/EstimatesQuestion-CommitteeId8-EstimatesRoundId3-PortfolioId10-QuestionNumber163

[10] Diss (2018) *How the Gorgon gas plant could wipe out a year's worth of Australia's solar emissions savings,* https://www.abc.net.au/news/2018-06-21/gorgon-gas-plant-wiping-out-a-year-of-solar-emission-savings/9890386

On 17 October 2018, the WA Government gave Chevron "the benefit of the doubt", saying they would revisit the question of offsets if the CCS was not working in "six months or a year's time".[11]

The Federal Government indemnified the Western Australian Government over long term risks from CO2 leaks from Gorgon. This appears in every federal budget as a 'contingent liability'.[12]

Safeguard mechanism?

Gorgon is covered by the Commonwealth Government's safeguard mechanism. This policy is intended to limit emissions increases from large industrial and extractive facilities in Australia. Every facility has 'baseline', or emissions limit. Companies with facilities that breach their limit may need to buy offsets to cover the breach.

Gorgon's emissions limit is a 'calculated baseline' based on Chevron's projection of emissions from the project.[13] Specifically, the limit is set at the emissions projected by Chevron for the year of highest production (of LNG) in the first five years of operation.

The emissions limit for 'Gorgon Operations' is set at 8.3Mt CO2-e per year.[14] 'Gorgon Upstream' and 'Gorgon Downstream' are listed as separate facilities with their own much smaller limits, together bringing Gorgon's *total* emissions limit to 8.7Mt per year.

It is unclear when the projections used to set Gorgon's emission limit assume CCS will be operational. The Clean Energy Regulator says all details of the projection are confidential.[15] However it appears the Gorgon emissions limit does not include operational CCS.

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[11] Milne (2018) *Chevron Gets Lifeline on Delayed Gorgon Capture,* https://thewest.com.au/business/energy/chevron-gets-lifeline-on-delayed-gorgon-carbon-capture-ng-b88992451z

[12] Senate Environment and Communications Committee (2018) *Question on Notice 164,* https://www.aph.gov.au/api/qon/downloadestimatesquestions/EstimatesQuestion-CommitteeId3-EstimatesRoundId3-PortfolioId17-QuestionNumber164

[13] A calculated baseline is the projected emissions in the year of projected highest production (of LNG) in its first five years of operation:
CER (2018) *Calculated Baseline,* http://www.cleanenergyregulator.gov.au/NGER/The-safeguard-mechanism/Baselines/Calculated-baseline

[14] CER (2018) *Safeguard baselines table,* http://www.cleanenergyregulator.gov.au/NGER/National%20greenhouse%20and%20energy%20reporting%20data/Safeguard-baselines-table#Safeguard-baselines-table

[15] CER Personal communication.

Chevron says CCS will reduce the project's emissions by around 40%:

> The Project plans to inject between 3.4 and 4 million tonnes of reservoir CO2 each year. This will reduce greenhouse gas emissions from the Gorgon Project by approximately 40 percent. [16]

It is unclear whether this refers to peak production, or is averaged over the life of the project. At any rate, we can infer the (average or peak) total CO2 emissions *before* CCS are 8.5 to 10Mt per year, and the CO2 emissions *after* CCS are at 5.1 to 6Mt per year. Since the emissions limit for the project is 8.7Mt, or 8.3Mt just for Gorgon Operations, it appears Chevron's emissions limit is based on a year where CCS is not operating.

Despite Chevron's emphasis on CCS at Gorgon, it has set an emissions limit that does not include CCS being operational. Gorgon will face no penalty for this failure under the safeguard mechanism.

If Gorgon's CCS had been projected as operational from the beginning, the baseline would have been set at a level assuming CCS operates. It therefore would have imposed an obligation if CCS failed.

All details about Chevron's projection are confidential. We cannot even find out what date Chevron applied for the limit.[17] However it appears to be late 2017, after Gorgon had operated for a year without CCS and as production continued to ramp up.

Gorgon's emissions limit was as 'updated' in November 2017[18] and the Clean Energy Regulator advised this was Chevron's first emissions limit.[19] The last deadline to submit that limit was 31 October 2017.[20] In December 2017, Chevron reported to the WA Government that Gorgon's CCS would be delayed again.[21] If Chevron submitted its limit in late 2017, it likely knew at the time that CCS would not be operational soon.

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[16] Chevron (2018) Gorgon carbon dioxide injection project, https://australia.chevron.com/-/media/australia/publications/documents/gorgon-co2-injection-project.pdf

[17] CER Personal communication.

[18] Table updated in November for Gorgon Operations, projections lodged beforehand. CER (2018) *Safeguard baselines table* http://www.cleanenergyregulator.gov.au/NGER/National%20greenhouse%20and%20energy%20reporting%20data/Safeguard-baselines-table#Safeguard-baselines-table

[19] Prior to this it had the default baseline of 100,000 tonnes CO2e.

[20] CER Personal communication

[21] Milne (2017) *Carbon hiccup for Chevron with 5 million-tonne greenhouse gas problem at Gorgon LNG plant* https://thewest.com.au/business/oil-gas/carbon-hiccup-for-chevron-with-5-million-tonne-greenhouse-gas-problem-at-gorgon-lng-plant-ng-b88694565z

Moreover, this was during the ramp up of production. LNG production started in March 2016, ramping up in October 2016 and again in March 2017.[22] The 2017-18 year would have been projected as having higher production and it appears it, or a later year, was projected assuming CCS was not operational.

If CCS does not become operational Chevron may still be at risk of breaching the safeguard mechanism. Chevron reports that 'Gorgon Operations' emitted 7.7Mt CO2-e in 2016-17.[23] The emissions limit was 8.3Mt. So during the ramp-up of production, Gorgon came within 0.6Mt of hitting its limit under the safeguard mechanism. Emissions are likely to be higher in 2017-18, with increased production.

Facilities that breach their emissions limit may be required to purchase offsets. This can be avoided however if they can bring down emissions in future year to keep the three year average below the emissions limit.

Cost of offsetting Gorgon's failing CCS

If Gorgon were required to offset the emissions it did not sequester, it might do this by purchasing Australian Carbon Credit Units (ACCUs).

The average price of ACCUs following the sixth government auction in December 2017 was $13.08. Offsetting 4Mt of CO2 at this price would cost $52 million. It would likely cost Gorgon more as lower cost abatement options are generally exhausted first.

If CCS continues to fail while the world and Australia takes action in line with the Paris Agreement, the cost of offsetting could be ten times greater. This is according to the projected carbon price in such a scenario put forward by the Climate Change Authority.[24]

Conclusion

Despite being widely lauded as a success story for CCS, the Gorgon LNG Project has failed to sequester CO2 as promised over its first two years. This has led to millions of

[22] WA DJTSI (2018) *WA Liquefied Natural Gas Industry Profile* https://www.jtsi.wa.gov.au/docs/default-source/default-document-library/wa-lng-profile-0218.pdf?sfvrsn=8

[23] Gorgon Upstream and Downstream are listed as separate facilities with far smaller emissions limits. CER (2018) *2016-17 Safeguard facility reported emissions,* http://www.cleanenergyregulator.gov.au/NGER/National%20greenhouse%20and%20energy%20reporting%20data/safeguard-facility-reported-emissions/safeguard-facility-emissions-2016-17

[24] See Ogge (2018) *NT Options for the implementation of Recommendation 9.8 of NT Fracking Inquiry* http://www.tai.org.au/sites/default/files/P637%20NT%20offset%20paper%20%5BWEB%5D_0.pdf

tonnes of additional emissions, likely at least half as large as the increase in national emissions last year. Chevron will not however face a penalty for this. It does not face penalties for breaching its Western Australian approval, and the WA government remains ambiguous about when it would require Chevron to purchase offsets. It has set an emissions limit for itself under the safeguard mechanism that does not include operational CCS.