Analysis of Glencore's forward coal emissions profile

ACCR research presentation - providing further information for investors in consideration of the 2023 shareholder resolution to Glencore plc on thermal coal production

February 2023

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*****EMBARGOED*****
Until 12:00 noon AEDT // 01:00 GMT Wednesday 22nd February

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Executive Summary

- Glencore's disclosed emissions footprint is significant at 280 Mt CO_2e per annum, around 0.6% of total global emissions.
- Coal production accounts for approximately 90% of all Glencore's CO_2e emissions.
- **Based on current disclosures by Glencore and its stated strategy, Glencore's forecast cumulative emissions from coal production do not appear to be Paris-aligned.**
- Glencore's ability to reach its own target of a 50% reduction in emissions by 2035 is achieved with the assistance of beneficial carbon accounting, making its emissions reductions appear more significant.
- If Glencore proceeds with plans for the greenfield development of the Wandoan coal mine in Australia, alignment with the International Energy Agency Net Zero Emissions (IEA NZE) 2050 coal pathway does not appear feasible.
- While Glencore says it is exploring the potential to reduce emissions associated with Wandoan coal by using carbon capture and storage (CCS) to sequester emissions, to fully sequester all its emissions will require *more* CCS capacity than in the pipeline for coal-related capture across the entire globe in 2030.
- Analysis of proposed carbon capture projects shows they are costly, unproven on an industrial scale, and do not necessarily stop greenhouse gases being emitted. One of the proposed projects may use captured CO_2 for enhanced oil recovery, which cannot be classified as CCS, since far more CO_2 is emitted than sequestered.

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Glencore’s emissions footprint

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Emissions footprint: Glencore's disclosed annual emissions are significant at 280 Mt CO2e (around 0.6% of total global emissions). Coal production, specifically thermal coal, is the largest driver of Glencore's emissions. **Coal accounts for ~90% of Glencore's emissions.**

Chart: Glencore 2021 disclosed emissions from products sold (Mt CO2e)

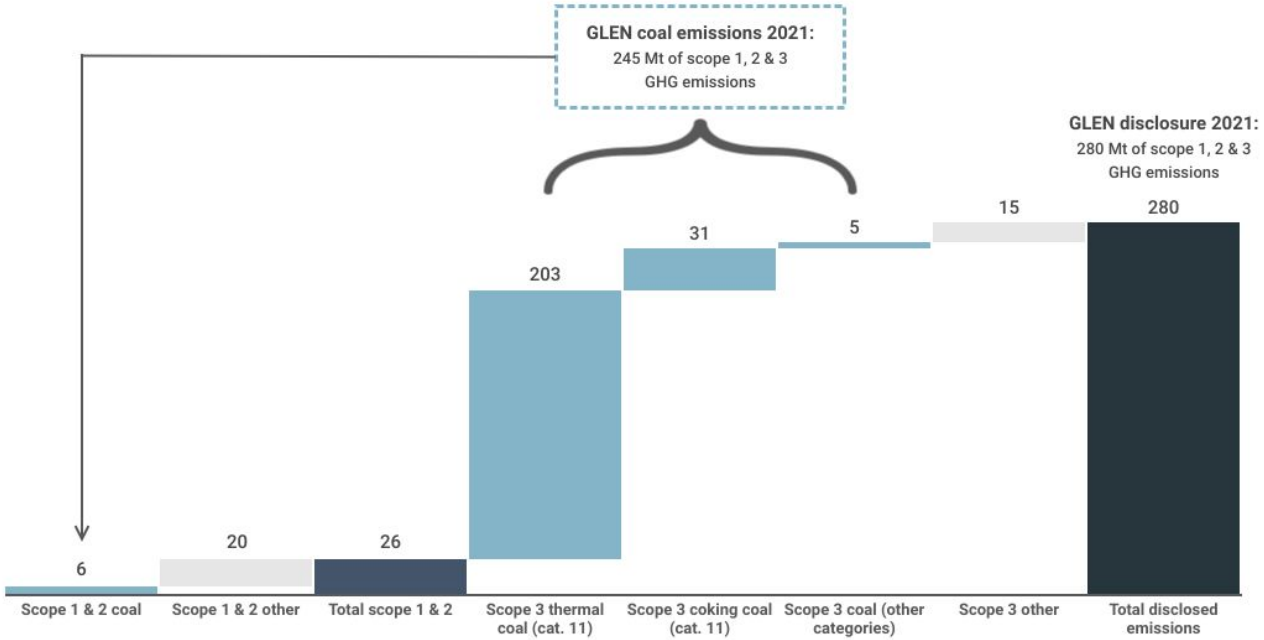


Chart: Australasian Centre for Corporate Responsibility | Source: Company Data, ACCR Estimates

*Note: Chart shows scope 3 emissions on an operational basis, in line with Glencore's 2021 Climate Change Report
Source: Glencore 2021 Climate Change Report, Glencore 2021 Annual Report

Total emissions footprint: When third-party sales are included in Glencore's emissions footprint (i.e. emissions from its marketing business), its total 2021 emissions are estimated at ~1Gt. Although not directly under the control of Glencore, these energy products account for nearly half of Glencore's total revenue. **Glencore faces significant exposure to risk in a decarbonising world.**

Chart: Glencore 2021 emissions from products sold (Mt CO2e)

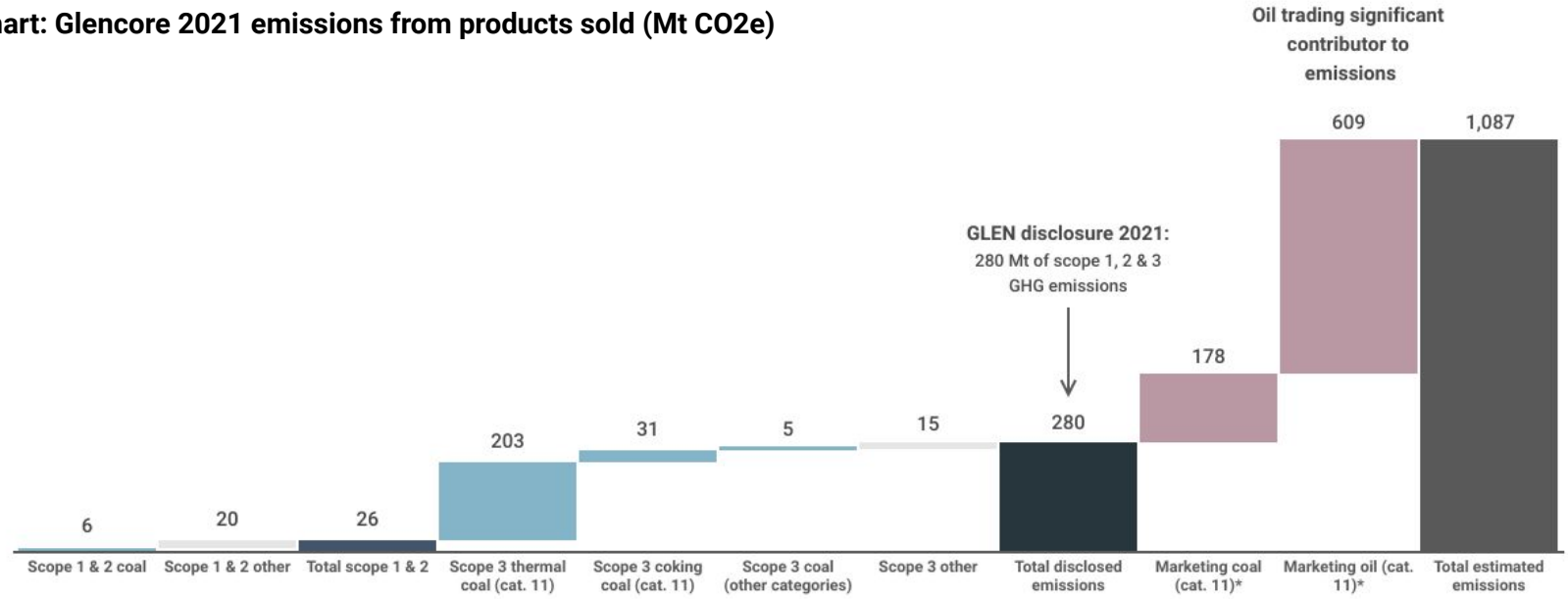
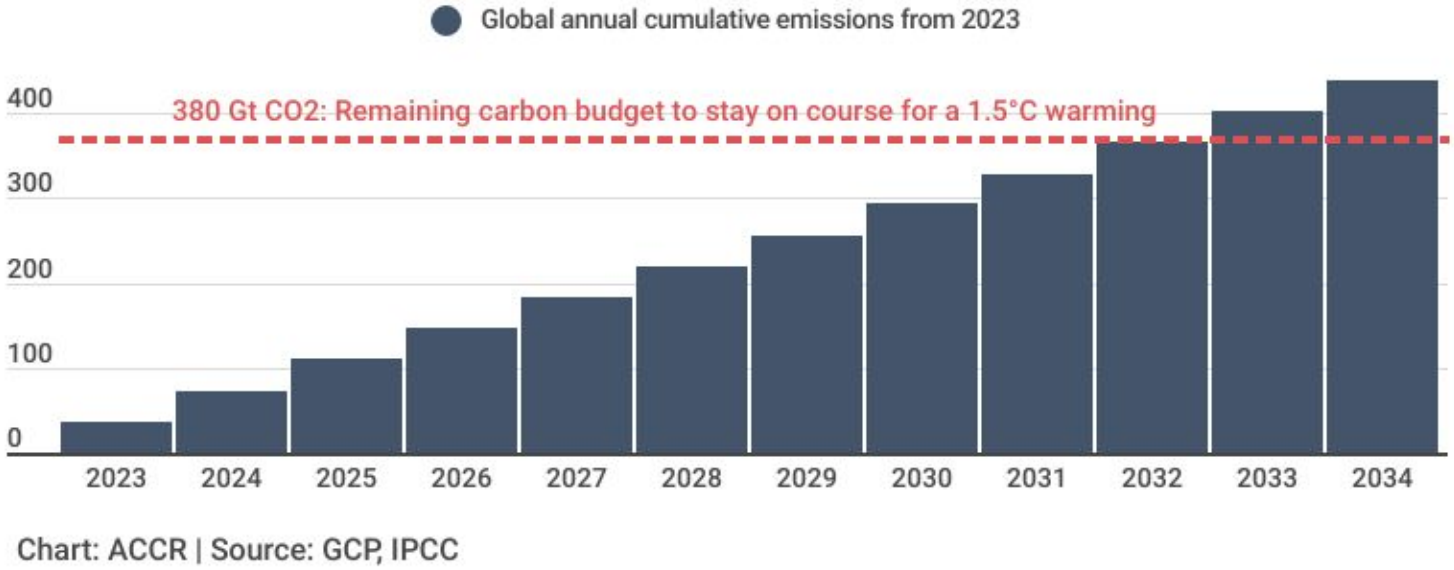


Chart: Australasian Centre for Corporate Responsibility | Source: Company Data, ACCR Estimates

*Estimated by multiplying sales volumes of energy products by industry standard emissions factors.
Source: Glencore 2021 Climate Change Report, Glencore 2021 Annual Report, Department of Climate Change, Energy, the Environment and Water

Carbon budget: The remaining global carbon budget to stay on course for 1.5c warming is around ~380 GtCO2. Currently, global emissions are around 40 Gt annually, which means the global carbon budget could be exhausted in less than a decade if business continues as usual. **This is why is it important for companies to reduce *cumulative* carbon emissions when transitioning,** which means reducing absolute emissions now.

Chart: Global annual cumulative emissions vs remaining carbon budget (CO2)



Source: IPCC, CarbonBrief

Forecast coal emissions & Paris-alignment: Glencore's production profile is driven by: a current approach to operate mines to end of life; pursuit of a significant thermal mine extension (Hunter Valley, NSW, Australia); studying the potential of a large scale greenfield coal to hydrogen development (Wandoan Coal project, Qld, Australia). Forecast emissions for Glencore are expected to remain broadly flat to 2033 (263 Mt in 2022, to 266 Mt in 2033). This is in contrast to the IEA Net Zero Emissions global coal emissions pathway, which falls by 50% from 2021-2030, and 74% from 2021-2035.

Chart: Glencore forecasted coal emissions FY21-FY50 (Mt CO2e)

Glencore's forecasted emissions from coal production do not appear to be Paris-aligned from a 2021 baseline.

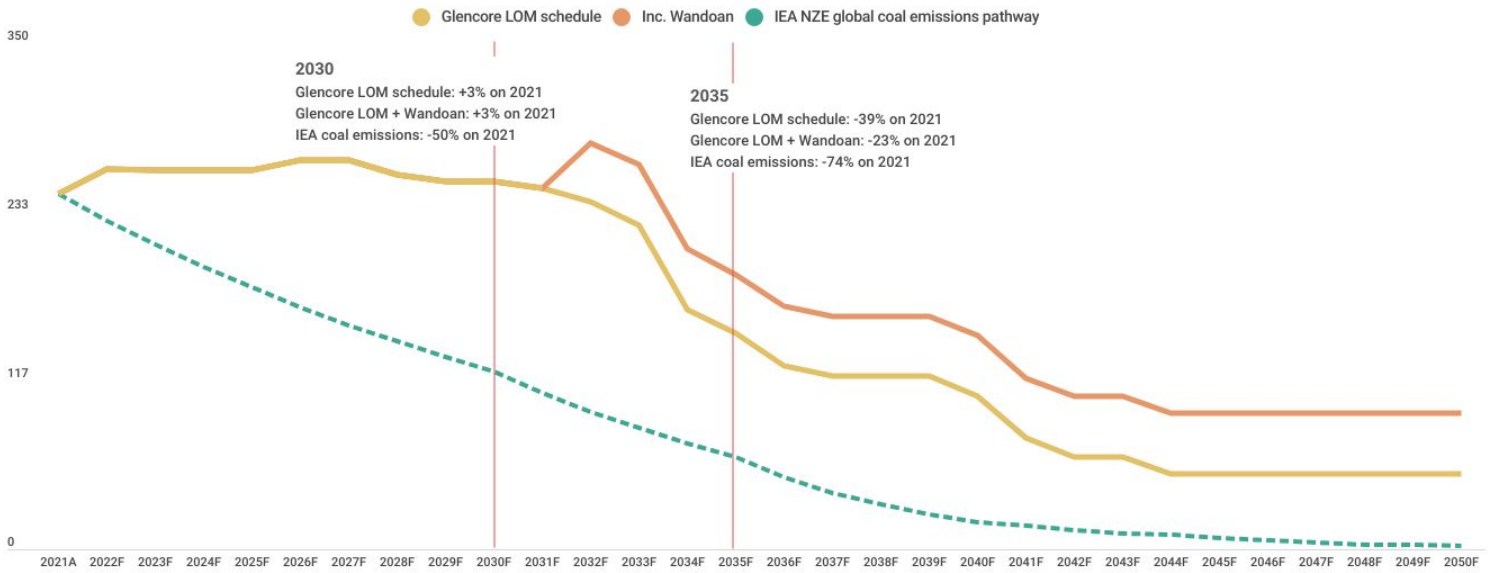


Chart: Australasian Centre for Corporate Responsibility | Source: Company Data, IEA, ACCR Estimates

Source: Glencore 2021 Resources and Reserves report, IEA World Energy Outlook 2022

Glencore's emissions footprint - key takeaways

- The 2022 IEA Net Zero Emissions global coal emissions pathway falls by 50% from 2021-2030, and 74% from 2021-2035. In contrast, forecast emissions for Glencore are expected to remain broadly flat to from 2021 to 2033.

- Based on current disclosures by Glencore and its stated strategy, Glencore's forecast emissions from coal production on a 2021 baseline do not appear to be Paris-aligned.

- There are three key drivers of the Glencore forecast production profile
  - A current approach to operate mines to end of life
  - Continuing to pursue a coal mine extension (Hunter Valley Operations)
  - Continuing to pursue greenfield development at Wandoan.

- The global carbon budget is rapidly diminishing. This is why is it is critical companies reduce cumulative carbon emissions when transitioning, which means reducing absolute emissions over time from now.

Analysis of Glencore’s 2035 emissions target

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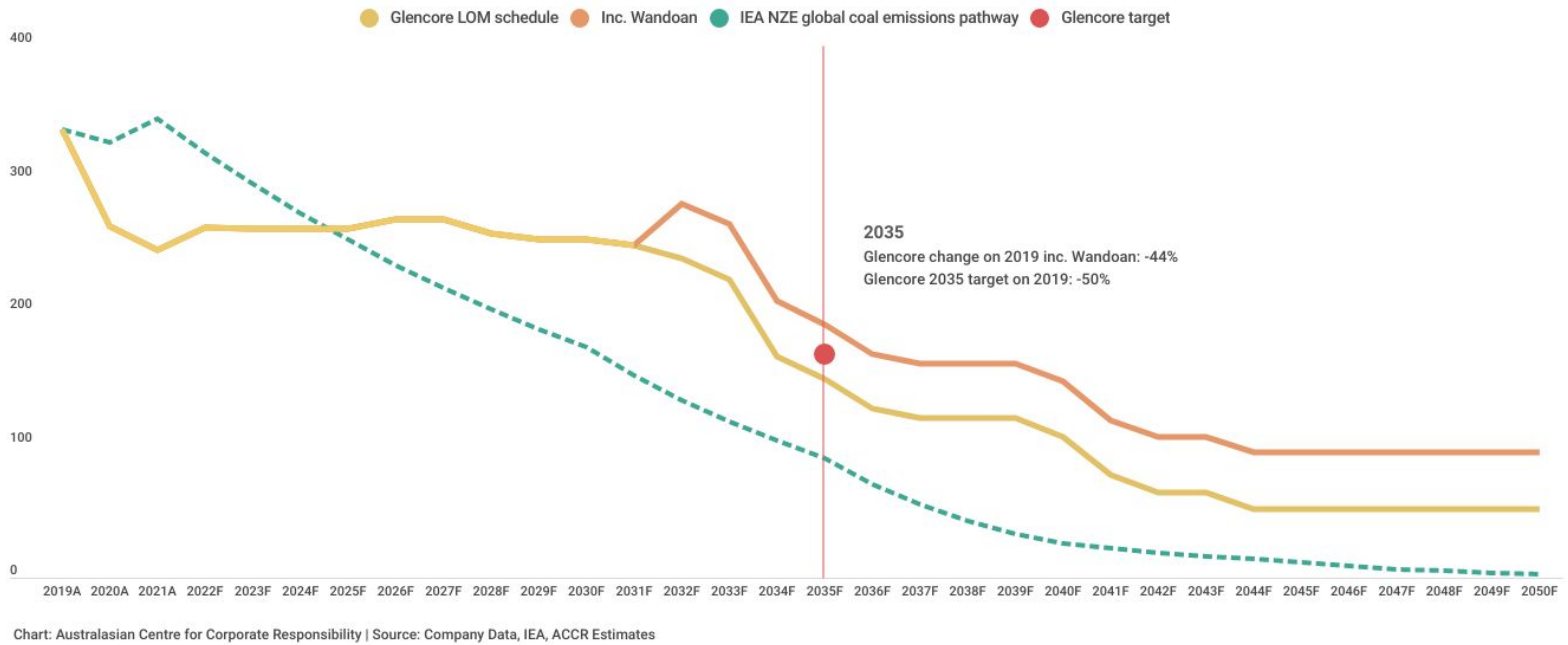
Calculating coal emissions using a 2019 baseline: Glencore uses a 2019 baseline for all its emissions reductions targets**.** By choosing this baseline, Glencore can maintain broadly flat levels of production over the next decade, whilst still achieving a nominal reduction in emissions on the baseline. Comparison between this graph and the graph on slide 8: slide 8 uses a 2021 baseline, and this slide uses a 2019 baseline - illustrates how Glencore's selection of a 2019 baseline drives a nominal reduction in emissions.

Chart: Glencore forecasted coal emissions FY19-FY50 (Mt CO2e)



Source: Glencore 2021 Resources and Reserves report, IEA World Energy Outlook 2022

Impact of rebasing: Glencore intends to rebase its 2019 emissions to incorporate its 2022 acquisition of the remaining 2/3rds of the Cerrejón mine (Colombia). Because Cerrejón expires in 2033, Glencore can add ~39MtCO2 to its baseline, thereby allowing it to achieve its 2035 target. Additionally, Glencore halted production at the Prodeco mine almost immediately post the base year of 2019, reducing volumes from 16mt tonnes in 2019, to zero from Q2 2020. By rebasing for Cerrejón, but not for Prodeco, Glencore increases its 2019 baseline by 27%.

Glencore's decision to select 2019 as a baseline, and to rebase Cerrejón but not Prodeco, allows it to reach its 2035 target, but this is driven by carbon accounting instead of real-world emissions reductions.

Chart: Glencore forecasted coal emissions FY19-FY50, Cerrejón rebased (Mt CO2e)

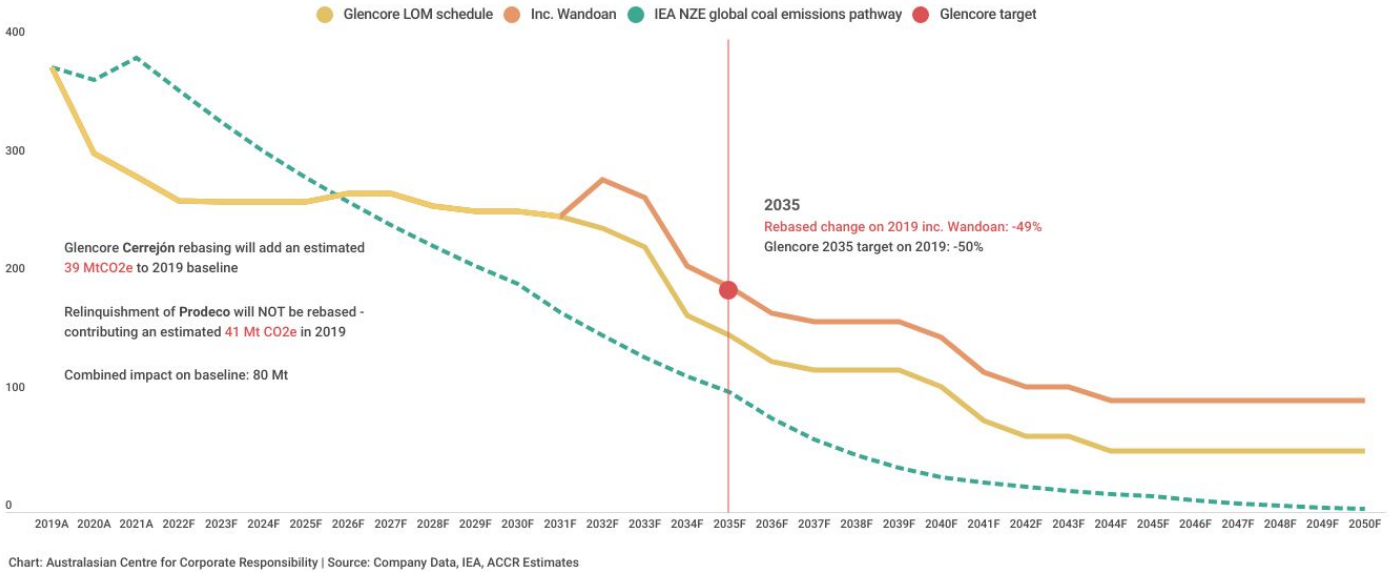


Chart: Australasian Centre for Corporate Responsibility | Source: Company Data, IEA, ACCR Estimates

Source: Glencore 2021 Resources and Reserves report, IEA World Energy Outlook 2022

Impact of Prodeco: Prodeco had a big impact on Glencore's base year, producing 15.6 Mt of coal annually, which equates to approximately 15% of Glencore's current production volumes. Halting coal production immediately after the base year and not rebasing for this, **has the effect of amplifying Glencore's nominal emissions reductions.**

	2019	2020 Q1*	2020 Q2	2020 Q3	2020 Q4	2021
Prodeco coal volumes (Mt)	15.6	3.8	0	0	0	0

* Mining operations were suspended in late March 2020

Source: Glencore, Pg9 2020 Q4 production report, Pg11 2020 H1 production report

Climate accounting - an example with a hypothetical coal company: Buying mines with a short reserve life, post base year, *increases* absolute cumulative emissions but improves chances of meeting long term emission targets. As the example below illustrates, Case 2 can *mathematically* achieve its target, while increasing its cumulative emissions over the same period of time.

Mining Company	**Case 1**	**Case 2:** Same as Case 1 except the Mining company buys a mine in 2022, with a four year reserve life with 2020 Base Emissions of 20
2020 Base Year Emissions	100	100 + 20 = 120
2030 Target Emissions	50% reduction from 2020	50% Reduction from 2020
2030 Actual Emissions	60	60 + 0 = 60
Shortfall	**20%** (100-60/100*50%)-1	**0%** (120-60/120*50%)-1

Climate accounting - how Glencore's acquisition of Cerrejón in June 2021 allows it to get close to reaching its 2035 target: Glencore's treatment of Cerrejón (rebasing its 2019 emissions to include this mine) adds an additional 39 MtCO2e to its annual coal emissions - increasing its baseline by 39 Mt CO2e. This allows Glencore to only fall 1% short of reaching its 2035 emissions reduction target, as opposed to 13% without the additional Cerrejón volumes.

Glencore	*Forecast 2035 emissions shortfall pre-acquisition*	*Forecast 2025 emissions shortfall post-acquisition* (Cerrejón's end of mine life is 2034, 2019 Base emissions is 39)
2019 Base Year Emissions	337	337 + 39 = 376
2035 Target Emissions	50% reduction from 2019	50% Reduction from 2019
2035 Forecast Emissions	190	190 + 0 = 190
Target shortfall	**13%** (337-190/337*50%)-1	**1%** (376-190/376*50%)-1

Carbon accounting aside, even accepting Glencore's methodology, the company's 2035 emissions reduction targets still appear to be **misaligned with Paris and the International Energy Agency Net Zero Emissions (IEA NZE) pathway.**

Table: Glencore targets vs IEA NZE (% change on 2019)

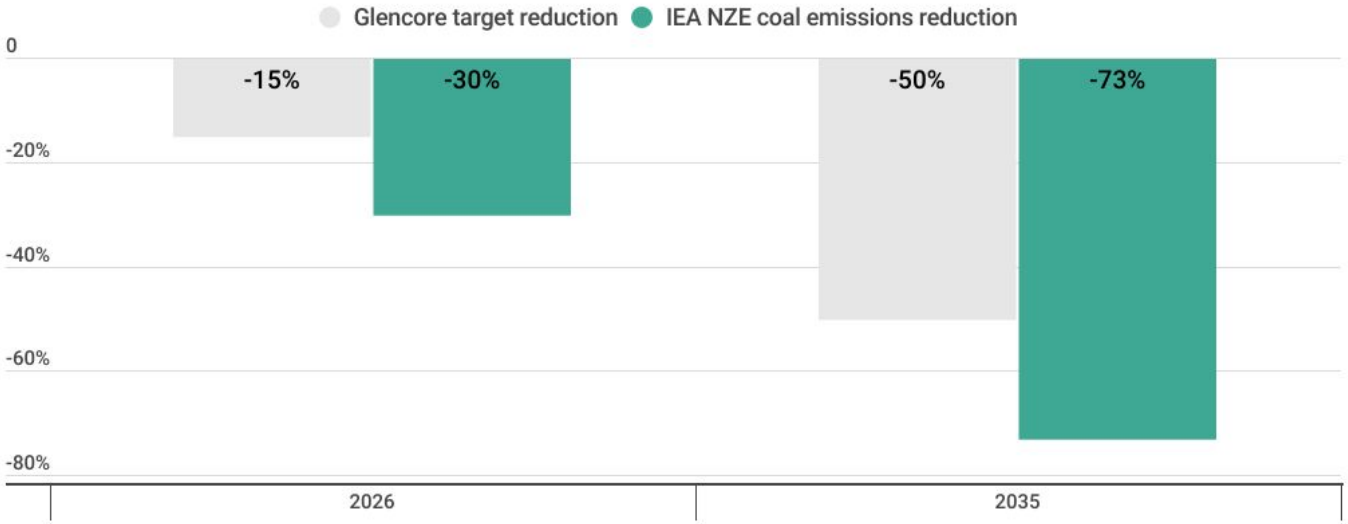


Chart: Australasian Centre for Corporate Responsibility | Source: Company Data, IEA, ACCR Estimates

Source: Glencore 2021 Climate Change Report, IEA World Energy Outlook 2022

Glencore's 2035 emissions target - key takeaways

- On paper, Glencore appears to get close (a 1% shortfall) to reaching its 2035 emissions target. However this result has been assisted by:

    i) Selecting 2019 as the base year, which includes Prodeco, that subsequently halted production in the first quarter of 2020.

    ii) Rebasing the 2019 emissions to incorporate the 2022 acquisition of the remaining stake of Cerrejón

    iii) Selecting 2035 as the target year, which comes two years after the expiry of Cerrejón, Glencore's biggest mine by annual production.

- Even accepting this methodology, Glencore's 2035 emissions target does not appear to be Paris aligned. Glencore has a target of 50% emissions reduction by 2035, compared to the IEA NZE coal emission pathway of 73%.

Is Glencore’s forecasted coal production to 2050 aligned with the IEA NZE Coal Pathway?

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Coal production: Glencore's plan to operate its current mines until end of life, and to potentially develop Wandoan (a project put back on the agenda in Glencore's December 2022 Investor Update), results in its coal trajectory plateauing in the short-term, but over producing against the updated 2022 IEA NZE coal pathway by the middle of the decade.

Chart: Glencore's forecasted coal production vs the updated 2022 IEA NZE coal aligned pathway FY19-50 (Mt)

Source: Glencore 2021 Resources and Reserves report, IEA World Energy Outlook 2022

Cumulative coal production: In total, how much more coal will Glencore produce by 2050 compared to a Paris-aligned pathway? Due to the rapidly declining and limited global budget, we are interested in the company's cumulative emissions impact. By 2050, Glencore's production is - cumulatively - 439 Mt over Paris-alignment if it pursues Wandoan. To put this into perspective, applying the current Australian national account factors, this equates to over 1 Gt CO2e, which is over 2% of current global emissions.

Chart: Glencore's forecasted cumulative coal production relative to IEA NZE coal aligned pathway FY19-50 (Mt)

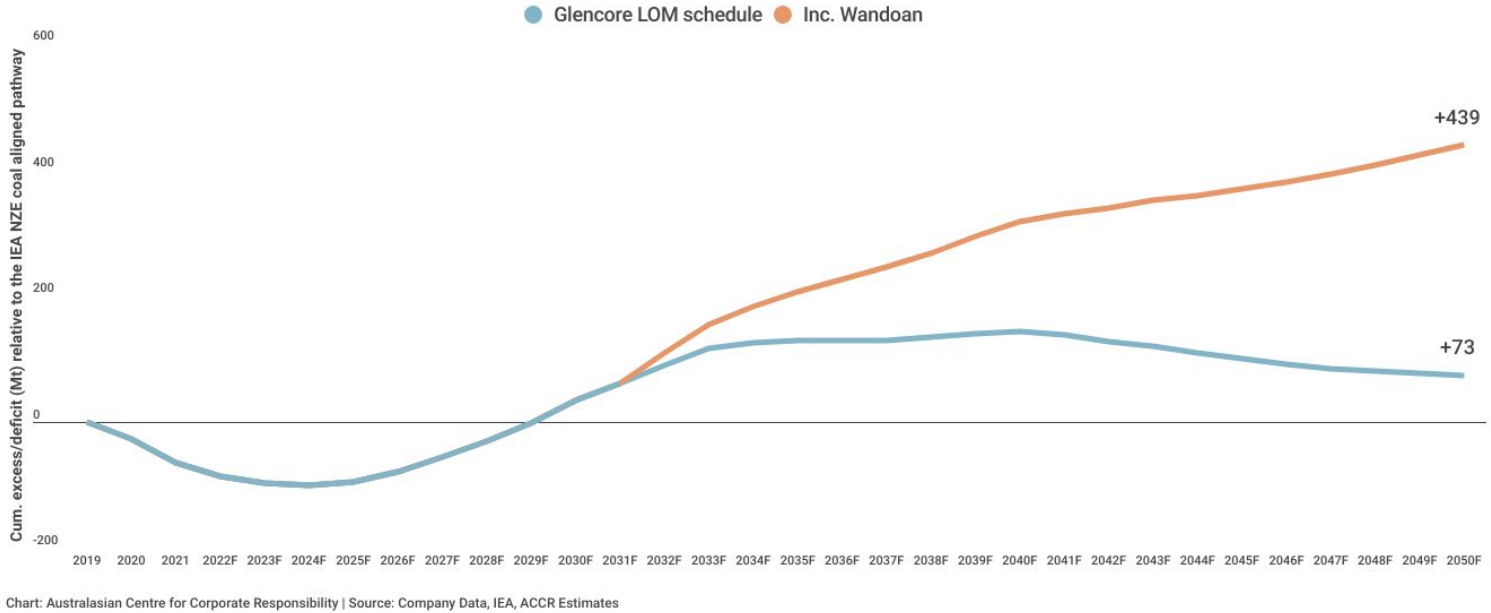

Chart: Australasian Centre for Corporate Responsibility | Source: Company Data, IEA, ACCR Estimates

Source: Glencore 2021 Resources and Reserves report, IEA World Energy Outlook 2022

Cumulative coal production: Glencore's December 2022 decision to withdraw plans for the Valeria mine made a significant positive impact towards the company achieving Paris-alignment. However, if Wandoan proceeds it is difficult to see how Glencore will even get close to aligning with the IEA NZE pathway.

Chart: Glencore's cumulative coal production pathways relative to IEA NZE coal aligned pathway FY19-50 (Mt)

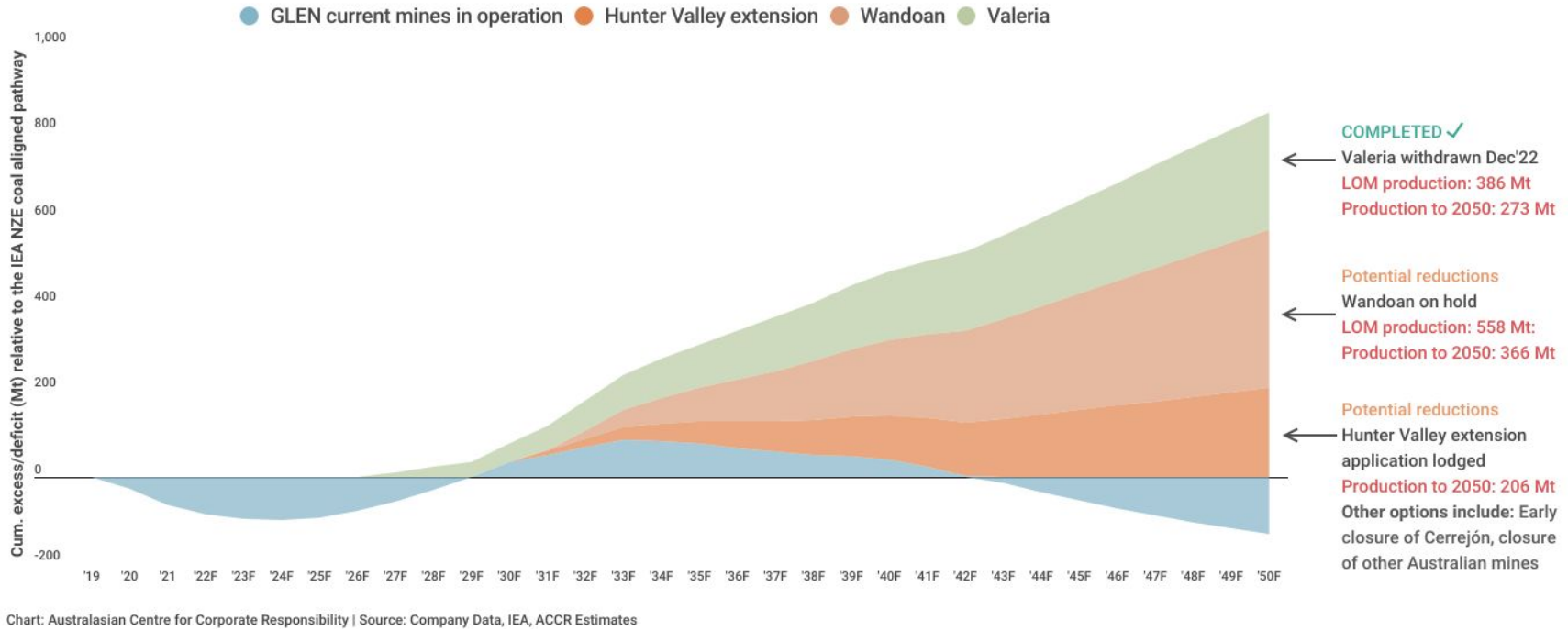

Chart: Australasian Centre for Corporate Responsibility | Source: Company Data, IEA, ACCR Estimates

Source: Glencore 2021 Resources and Reserves report, IEA World Energy Outlook 2022

Is Glencore aligned with the 2050 IEA NZE Coal Pathway? - key takeaways

- Because the global carbon budget - i.e. the amount of CO2 left to emit if we want to have a 50% chance of limiting global warming to 1.5°C - is dwindling, it is the *cumulative* impact of a company's emissions that is more important than when, and if, they reach net-zero.

- Despite the benefits of selecting 2019 as the base year, **Glencore's annual production from 2026 is consistently significantly above the IEA NZE coal aligned pathway.**

- From 2019-2050, Glencore's cumulative coal production is 439 Mt above the IEA NZE coal aligned pathway. Applying the current Australian national account factors, this equates to over 1 Gt CO2e, or over 2% of current global annual emissions.

- The withdrawal from Valeria was a positive step, but if Wandoan proceeds (366 Mt) it is difficult to see how Glencore could get close to aligning with the IEA NZE pathway.

Wandoan expansion & carbon capture

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Overview of the Wandoan mine: The Wandoan project would represents a significant expansion in coal production for Glencore. The mine would produce on average 22 Mt of coal per year, which represents 21% of Glencore's 2021 coal production. It would require significant investment, e.g. coal rail lines, with costs estimated at around US$5 billion.

Table: Wandoan mine overview

Detail	Description
Production (Mtpa)	22
% 2021 production	21%
Location/Type	QLD - thermal
Ownership	87.5% interest
Operating timeframe	2032 - 2062
Estimated costs	Reported estimates ~US$5 billion
Customers	Export - Japan key market

Sources: Glencore resources and reserves report 2021 - Valeria customers J-Power, Japan Coal Development - Wandoan customers 12.5% owned by Sumitomo Corporation - Wandoan US$5 billion
https://www.couriermail.com.au/news/work-on-7b-surat-basin-project-still-over-a-year-away/news-story/a767e309f42aed3ba3dd22e39e4f621b

Carbon capture and storage (CCS): Glencore is studying the potential to reduce emissions associated with Wandoan coal by using CCS to sequester emissions.

Glencore is undertaking two CCS projects related to Wandoan:

1. Glencore Surat Hydrogen Project
    - In which hydrogen is produced through coal gasification and coupled with CCS
2. CTSCo Project
    - Currently proposed as a pilot - if approved, CO2 would be captured from a coal-fired power station in Queensland
    - CO2 would be stored deep underground, and may also be utilised for **enhanced oil recovery** in the Moonie oil field
    - It is envisaged that the CTSCo EPQ10 carbon storage site could eventually store CO2 from the Glencore Surat Hydrogen Project

Source: Glencore, see Appendix slide 41 for Glencore's December 2022 Investor Day Presentation

1.Glencore Surat Hydrogen Project: Hydrogen made from coal gasification is one of the most intensive fuel sources in the market. Even if you couple this with 90% efficient CCS (which has not been proven to scale), this method would still produce roughly equivalent emissions to natural gas, another fossil fuel. **The average capture efficiency today is around 70.5%, which would effectively produce the same amount of lifecycle emissions as simply combusting thermal coal, at a much greater cost.**

Chart: Lifecycle emissions intensity by fuel type (kg CO2e/GJ)

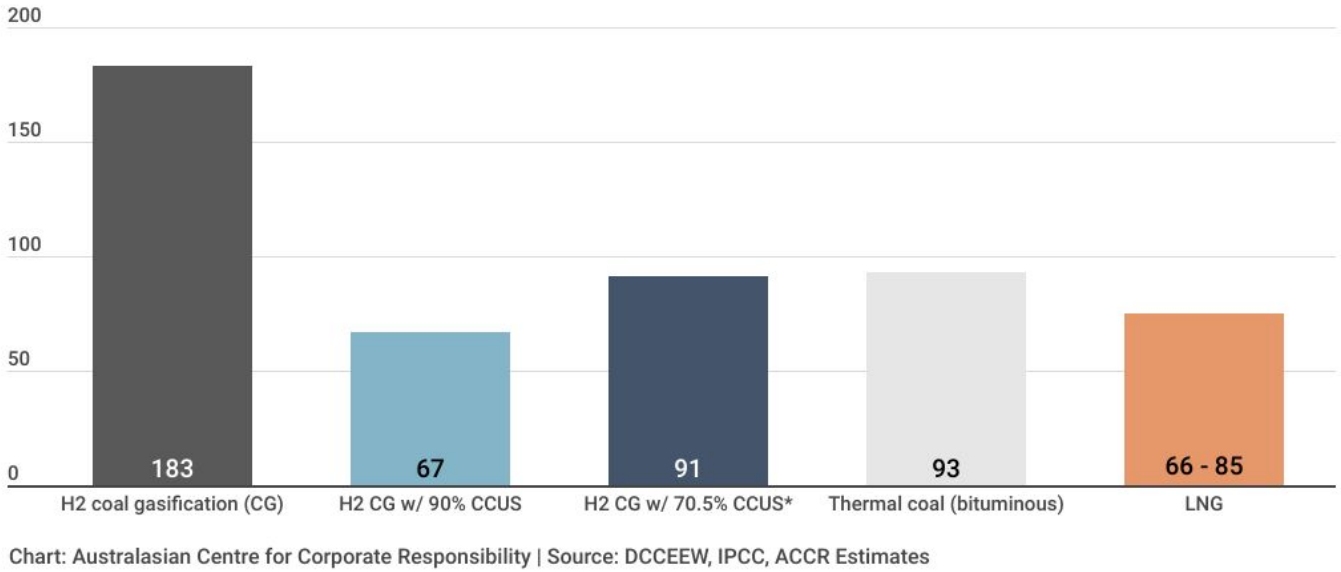

Chart: Australasian Centre for Corporate Responsibility | Source: DCCEEW, IPCC, ACCR Estimates

* ACCR estimate

2. CTSCo Project - potential future storage site:

- Currently proposed as a pilot, Glencore intends to capture CO2 from the Millmerran coal-fired power station in Queensland.
- CO2 will be transported hundreds of kilometres to a CO2 storage facility - EPQ10.
- This CO2 may be utilised by Bridgeport Energy for the Moonie Oil Field CO2 EOR Project.*
- In December 2022, Glencore promoted the CTSCo EPQ10 carbon storage site as a possibility to eventually store CO2 from the Glencore Surat Wandoan Coal to Hydrogen Project

*New Hope Group, Bridgeport Energy, Supporting Document for the Moonie Oil Field (PL1) CO2 initial injection, available at https://newhopegroup.com.au/general-reporting/, accessed February 2023

Carbon Capture: Emissions from Wandoan alone will require a greater CCS capacity than will be available globally in 2030.

Table: Wandoan coal emissions vs global coal-related CCS projects

Annual Wandoan production	22 Mt
Estimated annual emissions from Wandoan coal	~45 Mt CO2e
Current 2030 combined global pipeline of coal-related CCUS projects	35 Mt CO2e
Largest operating commercial-scale CCUS facility related to coal	3 Mt CO2e (Great Plains Synfuel Plant, US)

Source: https://iea.blob.core.windows.net/assets/4192696b-6518-4cfc-bb34-acc9312bf4b2/CoalinNetZeroTransitions.pdf

Carbon Capture: Emissions from Wandoan will require a greater CCS capacity than available globally

Chart: Estimated annual emissions from Wandoan coal combustion vs global CCS project capacities (Mt CO2e)

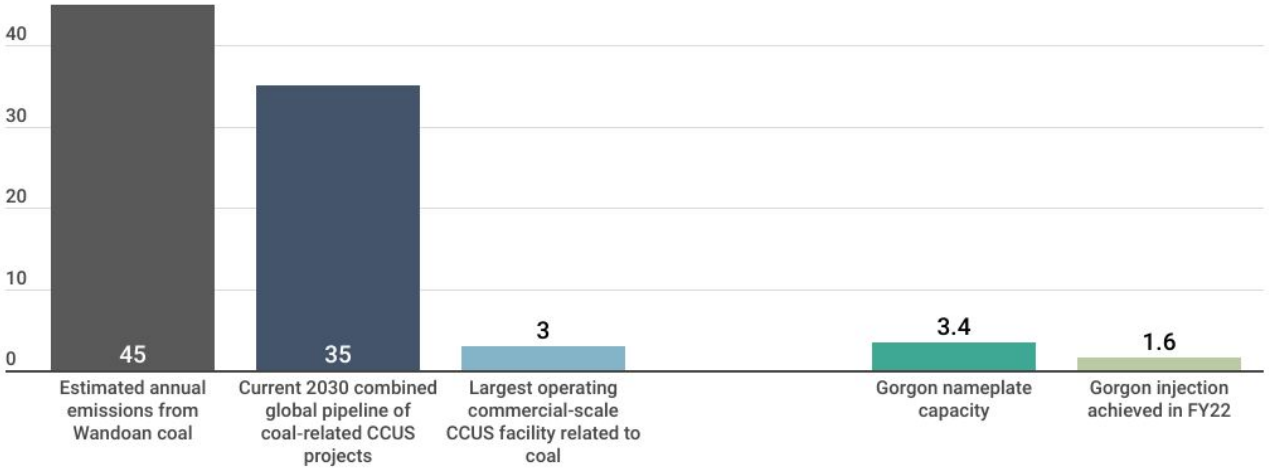

Chart: Australasian Centre for Corporate Responsibility | Source: IEA, Chevron, company data, ACCR Estimates

Source: https://iea.blob.core.windows.net/assets/4192696b-6518-4cfc-bb34-acc9312bf4b2/CoalinNetZeroTransitions.pdf

Carbon Capture: This graph covers the cost-aspect of CCS, showing the levelized cost of electricity (LCOE) for countries currently employing coal-based CCS. It shows the inclusion of CCS greatly increases the LCOE of coal for countries such as India, China, Japan and the US. Australia has the most expensive coal compared to these countries and limited CCS experience.

Chart: Current LCOE range of coal & coal + CCUS by country ($/MWh) 2H 2022

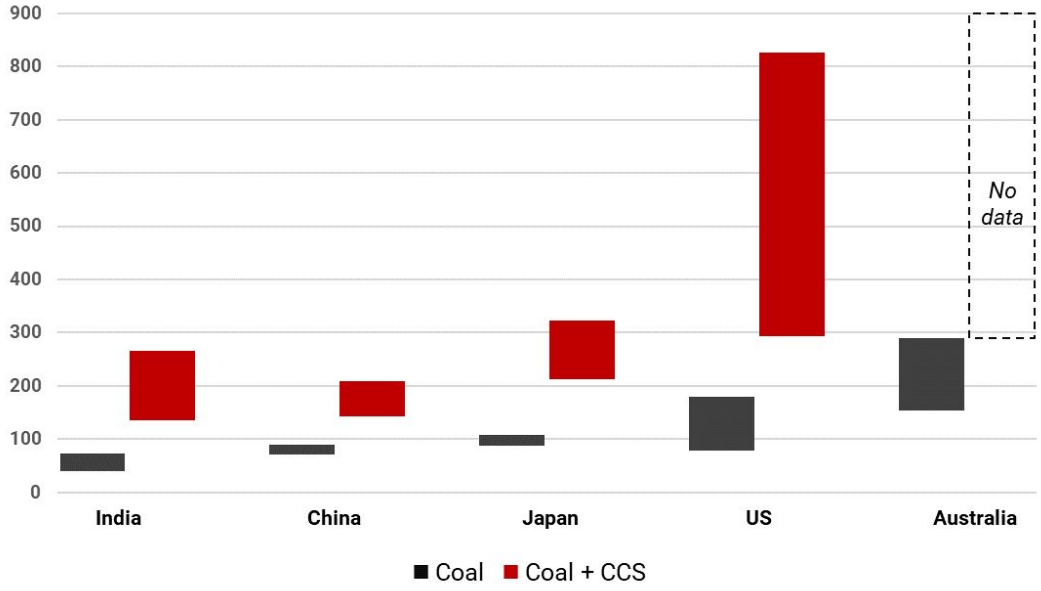

Chart: Australasian Centre for Corporate Responsibility | Source: Bloomberg NEF

Carbon Capture: The Moonie Enhanced Oil Recovery involves injecting CO2 into an oil reserve, thereby increasing the amount of oil that may be extracted. As a consequence, this project will lead to five times more emissions produced, than sequestered

Table: Moonie EOR overview

Project schedule	8 years
Cumulative CO2 injection	960,000 tonnes
Cumulative CO2 sequestration	768,000 tonnes
Oil recovered*	1.73 MMm^3 = 1.3 Mt (@741 kg/m^3)
Estimated emissions from recovered crude	**4.06 Mt CO2e - >5x more than sequestered**

*Mass of oil recovered estimated by multiplying injected volume by the relative substance density of Moonie crude oil

Source: Moonie Oil Field CO2 EOR Project Initial Injection Plan 2021

Wandoan Expansion and Carbon Capture - key takeaways

- **Surat Hydrogen Project:**
  - Hydrogen made from coal gasification is one of the most emissions intensive fuel sources
  - CCS has not been proven on an industrial scale, and coupled with coal-based hydrogen will still produce similar amounts of greenhouse gas emissions as unabated fossil fuels.

- **CTSCo Project:**
  - CCS most likely can only sequester a fraction of the emissions from Wandoan coal (emissions at peak capacity are estimated to reach 45 MtCO2e, and the largest coal-based CCS project operating has a capacity of 3 Mtpa).
  - CCS is costly, and will materially increase the LCOE of electricity generated from coal.
  - The Moonie Fields EOR project will result in more CO2 emitted than sequestered.

Glencore’s capex and final points

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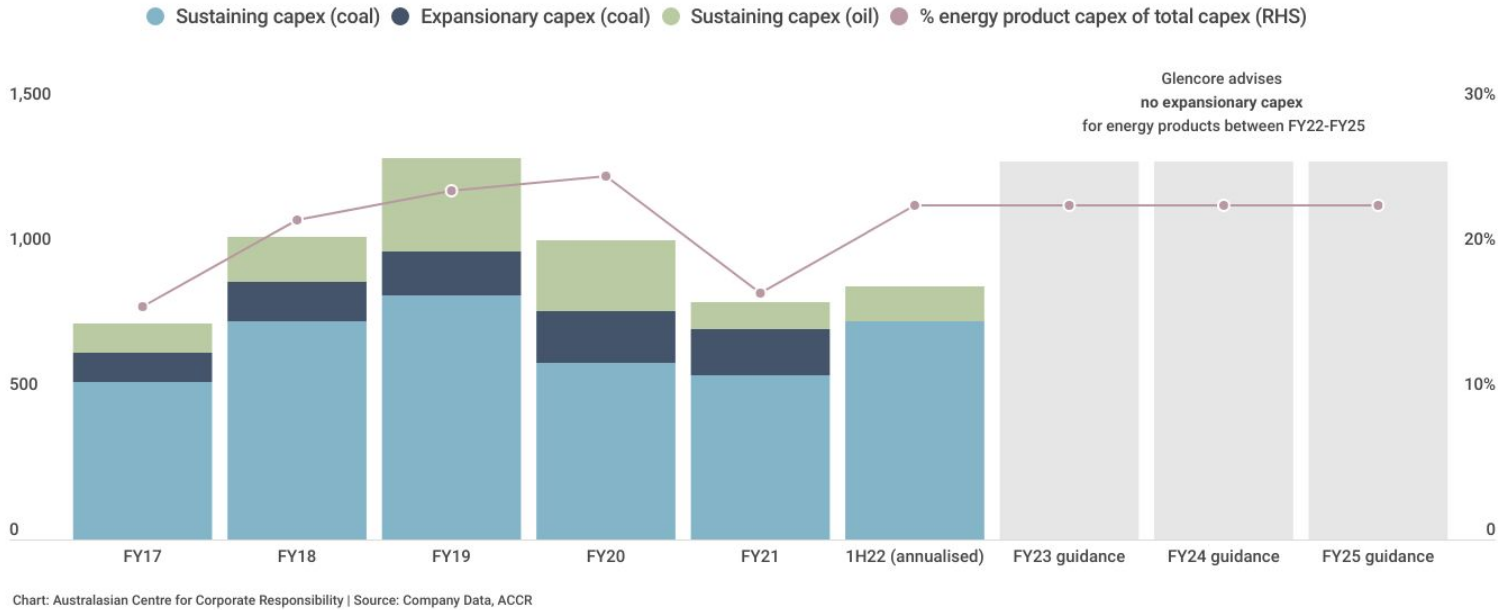
We estimate Glencore may spend $1bn on coal capex p.a over FY23-25. It is unclear if this includes capex for proposed Wandoan mine. Glencore must provide details of capex alignment with Paris.

Chart: Glencore energy products capex (Industrials segment, $US million)



Source: Glencore annual reports, Glencore Investor Update 2022

Final points

- This research is based on public information and company disclosures available at February 2023.

- While this research currently outlines evidence to suggest a likely misalignment between Glencore's forward coal production and the 2022 IEA NZE coal pathway, there are opportunities for alignment into the future.

- Current evidence suggests that shareholders would benefit from enhanced disclosure from Glencore to step out how thermal coal production can and will align with the Paris Agreement going forward.

Appendix

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2023 Shareholder Resolution to Glencore PLC on thermal coal production

Ordinary Resolution - Projected thermal coal production

That the Climate Action Transition Plan to be presented for a vote (by whatever name called) at the 2024 Glencore plc Annual General Meeting includes:

a. *Disclosure of how the Company's projected thermal coal production aligns with the Paris Agreement's objective to pursue efforts to limit the global temperature increase to 1.5°C;*
b. *Details of how the Company's capital expenditure allocated to thermal coal production will align with the disclosure in a. above; and*
c. *The extent of any inconsistency between the disclosure in a. above with the IEA Net Zero Scenario timelines for the phase out of unabated thermal coal for electricity generation in (i) advanced economies, and (ii) developing economies.*

Full resolution and supporting statement: https://www.accr.org.au/news/accr-shareholder-resolution-to-glencore-plc-on-thermal-coal-production/

Calculations used for Glencore's current emissions footprint, slide 6

The slide shows Glencore reports 280 Mt of emissions, of which 254 are scope 3.

Total Cat.11 emissions are 237 Mt. Cat.11 from thermal/coking is estimated to be 234 Mt, with the remainder attributed to oil (included in the 15 Mt of 'Scope 3 other').

The total scope 1, 2 and 3 emissions from coal equate to 245 Mt.

Glencore reports Category 11 emissions on both an operational basis (237 Mt) and an equity basis (258 Mt). These are two different ways of calculating category 11 emissions. ACCR has used Category 11 on an operational basis as that is what is reported in Glencore's Climate Change report, and what Glencore will likely use going forward to track its targets.

Emissions from 'marketing oil/coal (pink bars on slide 5) are estimated as the emissions from selected marketing sales of coal and oil reported by Glencore. This is calculated by multiplying sales volumes of energy products by industry standard emissions factors.

It is unclear whether there is any crossover between Glencore's reported Industrials production and marketing sales. However, reconciliation of revenues using realised commodity prices, coupled with immaterial intersegment eliminations within 'energy product' revenues, suggests that any possible crossover is marginal at best.

Glencore's stated commitments regarding coal

- *"Our approach to our coal assets is to continue to operate our mines until they reach the end of their lives."*

- *"Due to Covid-19, global economic activity fell significantly during 2020. As a result, global energy demand also declined, reflected by a reduction in our produced coal volumes. As the world recovers from the impacts of the pandemic and global demand grows, we forecast a recovery in our coal production as our operations gradually move back towards their normalised steady state."*

Source: Glencore 2021 Climate Change Report

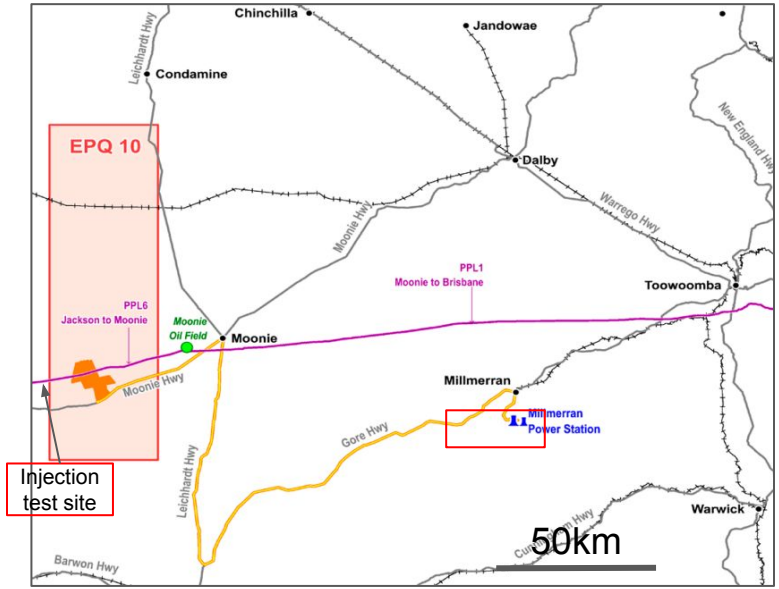
Glencore's statements on rebasing for Cerrejón acquisition

- *"Base line restated to account for 100% ownership of Cerrejón from 2019, in line with Greenhouse Gas Protocol requirements. Due to the decision by Prodeco to cease operations and relinquish its licenses and pending the outcome of the relinquishment process, the base line has not been restated to exclude Prodeco. Our 2019 emission data is unchanged but will be restated for acquisitions and disposals following completion of the transactions during 2022."*

Source: Glencore 2021 Climate Change Report

Glencore's Surat Basin Carbon Capture and Storage project (CTSCo) in QLD

Map: Location of Millmerran power station and test injection side



Millmerran Power station (Intergen, 850MW)

- Coal demand: 3.6 Mt/y
  (currently Intergen Commodore mine)
- Annual emissions: 5.1 MtCO2/y
- Capture technology: Post combustion plant
- CO2 transportation & injection:
  - 260 km by truck from Millmerran to transport facility
  - 9 km via flowline to injection site
  - Injected 2.3 km underground

Source: Glencore CTSCo, OpenNEM, Queensland Government

Reference slide on Wandoan: Glencore's 2022 Investor Update, December 2022

SUPPORTING THE JOURNEY TO NET ZERO

Supplying the energy needs of today

Abatement is one of our decarbonisation strategy pillars

Our CTSCo Carbon Capture and Storage Project achieved a significant milestone with the recent release of its EIS for public comment

If approved, the CTSCo Project will capture CO2 from the Millmerran Power Station and transport it to the EPQ10 storage site in the Surat Basin

The project has the potential to:

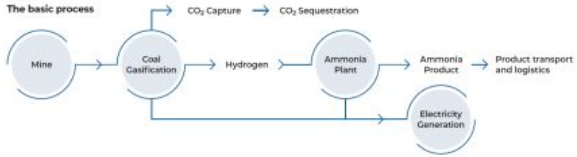
- store significant volumes of CO2
- enable future industries including hydrogen production
- contribute to Australian and Queensland Government climate and emission reduction goals

CTSCo
Carbon Transport & Storage
A GLENCORE Company

Surat Blue hydrogen project – pre-feasibility

Concurrently, we are studying the potential use of the Wandoan coal resource as feedstock for production of low-emissions blue hydrogen and ammonia

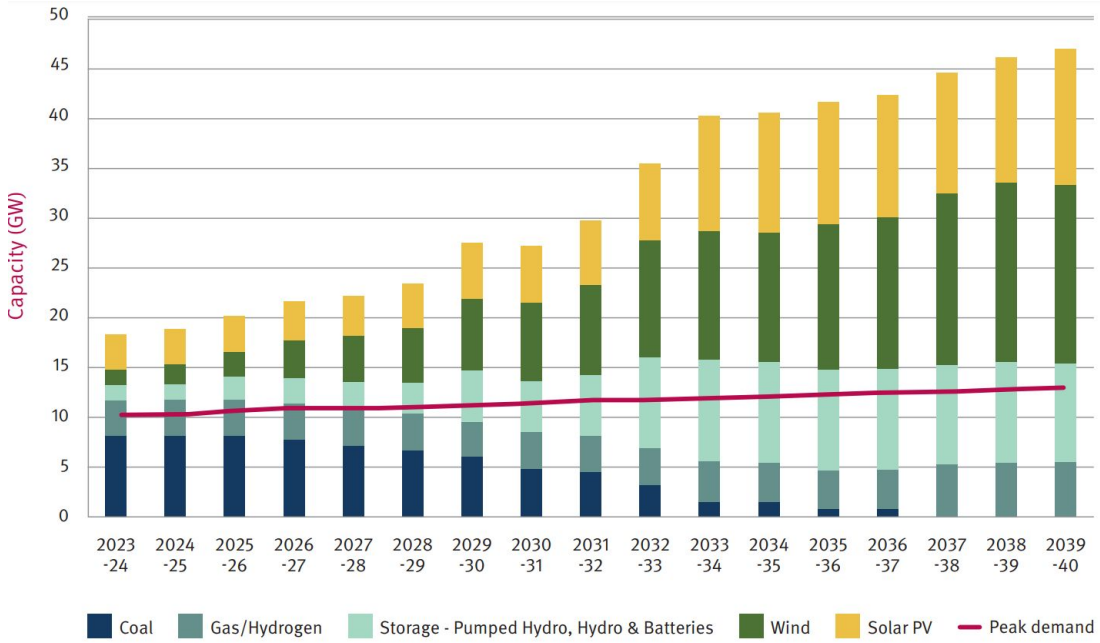
The vast majority of total CO2e produced would be captured, transported and stored at the nearby CTSCo EPQ10 carbon storage site



GLENCORE SURAT HYDROGEN

Glencore's Surat Basin Carbon Capture and Storage project (CTSCo) in QLD

Chart: Modelled Queensland energy mix 2023-2040



Queensland Energy and jobs plan:

- By 2035: No regular reliance on coal fired power generation
- By 2037: Coal phased out of the electricity grid

AEMO ISP 2022:

- <2C scenario: Millmerran phased out by 2042
- 1.5C scenario: Millmerran phased out by 2030

Source: Queensland government, AEMO 2022 ISP

Japan's coal demand

Energy mix for electricity grid (%)	2019	2030 (5th SEP)	2030 (6th SEP)
Coal	32	26	19
Gas/LNG	37	27	20
Nuclear	6	20-22	20-22
Renewables (Total)	18	22-24	36-38
Solar	6.7	7	14-16
Wind	0.7	1.7	5

Japan's Strategic Energy Plan (SEP)

- 2021 much more confident and ambitious in renewable generation
- Emission reduction by 2030: -46%, ambition to reach 50% (2013 base)
- Strong emphasis on self sufficiency

Source: Japan Strategic Energy Plan 2021

India's thermal coal demand - no projected medium/long term growth for imported coal

Energy mix for electricity grid (GW)	2022	2026-27	2031-2032
Coal	203	240	249
Gas/LNG	25	25	25
Nuclear	7	14	22
Solar	63	186	334
Wind	42	81	134
Hydro	52	57	68
Coal imports (Mtpa)	27	40	40

India's 2030 NDC ambitions

- 45% reduction on 2005 emission intensity
- 50% from non-fossil electricity generation
- 500GW non-fossil generation capacity
- Not aligned with Paris Agreement

CEA National 2030 electricity plan (2022)

- India is tracking behind on solar and wind installations.
- Coal imports remain stable at 40Mtpa

Source: CEA (2022), UNFCCC (2022), IRENA (2022)

Paris agreement consistent (1.5C) scenarios: coal decline is rapid

Baseline: ‘19/’20

Decline in coal use by 2030 (%)	IEA WEO 2022 (NZE)	IPCC AR6 median	IPCC AR6 filtered
2030	-48	-75 [-65–80]	-68
2035	-71		-80

- IEA, IPCC: system models
  - IEA NZE: updated in 2022
  - IPCC: pre-Covid
- IPCC database include scenarios with assumptions using speculative ranges
- Coal use needs to decline fast

Source: IEA, IPCC, ACCR modeling

Paris agreement consistent (1.5C) scenarios: coal decline is rapid

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	IEA WEO 2022 (APS)		
2030	-20		

- IEA, IPCC: system models
  - IEA NZE: updated in 2022
  - IPCC: pre-Covid
- IPCC database include scenarios with assumptions using speculative ranges
- Coal use needs to decline fast
- Existing NDCs show 20% decline

Source: Japan Strategic Energy Plan 2021

Coal demand in emerging markets: Including Wandoan, Glencore's forecasted production declines trail behind the decline rate of Emerging Markets demand in a 1.5ºC scenario.

Chart: Glencore forecasted coal production (Cerrejón rebased) vs IEA NZE Emerging Markets demand FY21-FY50

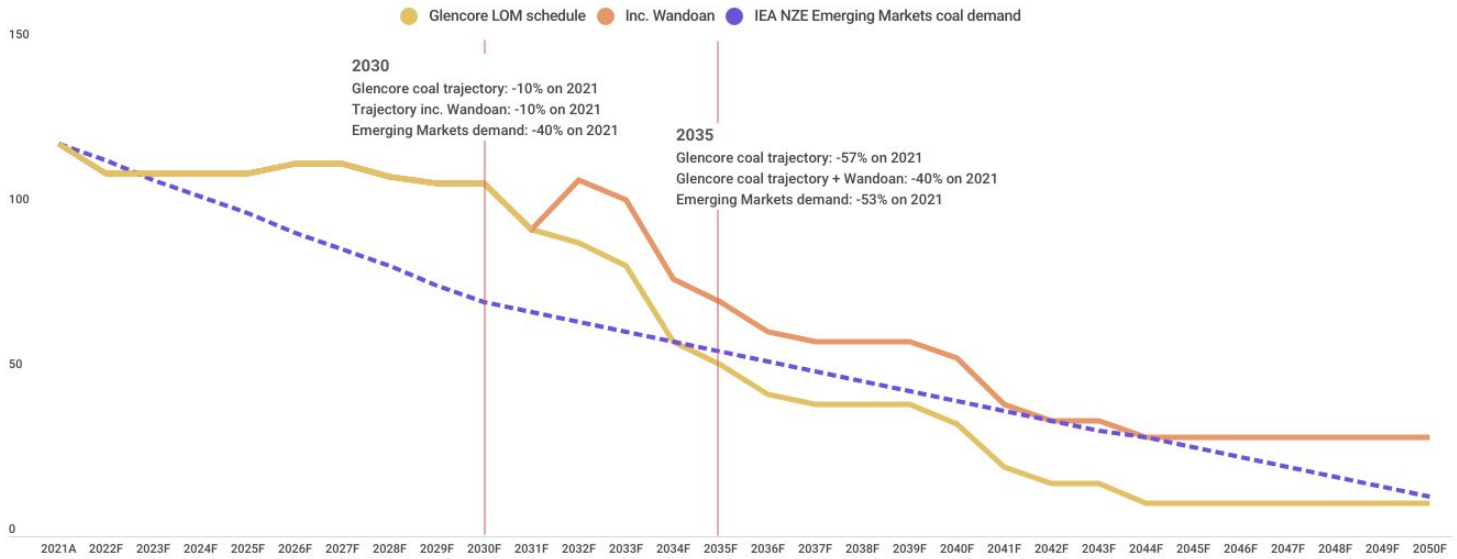

Chart: Australasian Centre for Corporate Responsibility | Source: Company Data, IEA, ACCR Estimates

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