

Australia's uncertain progress to net zero

Richard Cumpston & Clancy Cumpston

This analysis has been made to help Australians contribute to climate policies. It looks at the incomplete progress to date, and at problems in emission measurements and offsets. Please contact Dr Richard Cumpston, a director of Australian Projections, on 0433 170 276 or richard.cumpston@gmail.com with any questions.

Summary

The "Annual climate change statement 2023" fails to meet some of the reporting requirements of the Climate Change Act 2022.

The government's emissions projections suggest the 2030 legislated targets are achievable. Lack of operational data for most of the government's policies creates large uncertainties.

The emissions projections stop at 2035. As sectoral plans are still under development, emission projections to the net zero target date of 2050 are not feasible.

The statement does not provide estimates of the impacts on rural and regional Australia, nor adequately address the risks from climate change impacts. This will disappoint regional members of Parliament, and the independents who proposed some of the requirements. There may be no direct way to enforce the reporting requirements.

The Climate Change Authority's "2023 review of the national greenhouse and energy reporting legislation" recommended phasing out Method 1 estimates of fugitive methane emissions, most urgently for open cut coal mining. A broad review of emission measurement methods is needed for all industries. Continuous emission measurements seem needed, with quarterly reporting.

The Authority's "2023 review of the Carbon Credits (Carbon Farming Initiative) Act 2011" considers that the attributes of different types of sequestration should align with the nature of the emissions being offset. We suggest that offsets be at least "climate neutral", in that the cooling provided by the offset each year should be no less than the warming from the emissions being offset.

1. Failure to report on the effectiveness of the Commonwealth's policies in achieving emissions targets

1.1 Achievement of national and Safeguard targets

Subsection 12(1) of the Climate Change Act 2022 requires the annual climate change statement to include reporting on:

(d) the effectiveness of the Commonwealth's policies in contributing to the achievement of Australia's greenhouse gas emissions reduction targets and reducing emissions in the sectors covered by those policies and in particular whether safeguard emissions and net safeguard emissions are declining consistently with the safeguard outcomes

1.2 Legislated greenhouse gas emissions targets

Subsection 10(1) of the Climate Change Act 2022 defines Australia's greenhouse gas emissions reduction targets as

- (a) reducing Australia's net greenhouse gas emissions to 43% below 2050 levels by 2030
 - (i) Implemented as a point target; and*
 - (ii) Implemented as an emissions budget covering the period 2021-2030**
- (b) reducing Australia's net greenhouse gas emissions to zero by 2050.*

1.3 Net emissions projections close to legislated targets to 2030

"Australia's emissions projections 2023" (DCCEEW November 2023a p3) project emissions in 2030 as 42% below 2005 levels, after allowing for policies which have been announced but where detailed design is still under consultation. This is close to the 43% target. Emissions from 2021 to 2030 are projected as 4,322 Mtonnes CO₂-e, close to the target of 4,353.

1.4 Legislated Safeguard emissions targets

Legislated Safeguard outcomes are in subsection 3(2) of the National Greenhouse and Energy Reporting Act 2007:

- (a) net covered emissions of greenhouse gases from the operation of a designated large facility do not exceed the baseline applicable to the facility*
- (b) total net safeguard emissions from 1 July 2020 to 30 June 2030 do not exceed 1,233 million tonnes of carbon dioxide equivalence*
- (c) net safeguard emissions decline to:
 - (i) no more than 100 million tonnes in the year beginning on 1 July 2029, and*
 - (iii) zero for any financial year beginning after 30 June 2049**
- (d) the 5-year rolling average emissions for each financial year that begins after 30 June 2024 are lower than the past 5-year rolling average*
- (e) the responsible emitter for each large facility has a material incentive to invest in reducing emissions.*

1.5 Safeguard emission projections a little below targets to 2030

From figures 11 and 15 of “Australia’s emissions projections 2023”, net Safeguard emissions may total about 1,215 Mtonnes from 1 July 2020 to 30 June 2030, and may be about 93 Mtonnes in 29-30. These are a little below the legislated targets of 1,233 and 100 Mtonnes.

1.6 No projections or plans beyond 2035

“Australia’s emissions projections 2023” give no projections beyond 2035. While Australia now has a legislated target of net zero emissions by 2050, it still lacks the plans and legislation to get there.

“...the Government is developing sectoral decarbonisation plans, covering electricity and energy, transport, industry, resources, the built environment and agriculture and land... The sectoral plans will inform the development of the Net Zero Plan.” (climate change statement p22)

A New Vehicle Efficiency Standard is under consultation, to come into effect on 1 January 2025 (Bowen & King 4 February 2024).

2. Failure to report on impacts on rural and regional Australia, and on risks from climate change impacts

2.1 Reporting requirements

Subsection 12(1) of the Climate Change Act requires the annual climate change statement to include reporting on:

(e) the impact of the Commonwealth's climate change policies to achieve Australia's greenhouse gas emissions reduction targets on rural and regional Australia, including the social, employment and economic benefits being delivered by those policies in rural and regional Australia; and

(f) risks to Australia from climate change impacts, such as those relating to Australia's environment, biodiversity, health, infrastructure, agriculture, investment, economy or national security.

2.2 Impacts of policies on rural and regional Australia

Paragraph 12(1)(e) was proposed by Helen Haines, the independent member for Indi, who wanted Australia’s climate policies to boost economic, employment and social benefits for regional and rural Australia (House of Representative Hansard 4 August 2022, p629).

In a dissenting report to the Senate Environment and Communications Legislation Committee report of 31 August 2022 on the Climate Change Bill 2022, National Senators said

“The Nationals welcome evidence to the Inquiry that finally recognise that action on climate change will disproportionately affect certain groups, industries and regions.”

The climate change statement contains no data or projections for the impacts of climate change policies on rural and regional Australia. It is not clear whether the government has any capacity to make useful projections for regional areas.

2.3 Risks to Australia from climate change impacts

Paragraph 12(1)(f) was proposed by David Pocock, the independent senator for the ACT:

“Climate change presents unparalleled risks to the systems that support life on this planet and all the people and places we love” (Senate Hansard 8 September 2022 p979).

“An increasingly hot and dry climate will require careful management of Australia’s water resources.” (climate change statement p58)

Higher temperatures may lead to higher rainfall totals, but also higher evaporation before water reaches rivers or artesian basins. Available water may not be sufficient to meet all potential uses, such as coal mining in agricultural basins.

Treasury’s “Intergenerational report 2023” (p102) showed projections to 2063 of production-weighted impacts on crop yields due to the direct impacts of temperature rises and precipitation changes. These showed a small overall increase to about 2030, then declines depending on the global temperature scenario. To be useful to farmers, these projections need to be location and crop specific, and to allow for water availability rather than precipitation.

3. Ways to ensure government compliance with reporting requirements of Climate Change Act 2022

3.1 No direct ways to enforce the reporting requirements?

The Act places numerous obligations on the Minister and the Climate Change Authority. These include the timing of reports, their content and procedures for making them public. No penalties are specified for failures to meet these obligations. We are not aware of any legislated penalties for such failures by Commonwealth ministers or agencies.

3.2 Indirect ways to enforce the reporting requirements

The 2023 Lowy Institute poll of 2077 Australian adults showed that 59% considered climate change to be a vital threat to Australia’s national interests, and a further 30% considered it an important threat. Voters in regional seats with agricultural or tourism industries threatened by climate change may react poorly to perceived government inaction.

All the unmet reporting requirements were either proposed by the government, or by independents with the support of the government. Questions in Parliament or at Senate estimates hearings may disclose reasons for temporary failures to meet requirements. Another review by the Senate Environment and Communications Legislation Committee of the Climate Change Act 2022 may be valuable.

4. Under-estimation of fugitive emissions

4.1 Request by the Minister for Climate Change and Energy

The Authority's "2023 review of the national greenhouse and energy reporting legislation" said (p65)

"With the general concern about the accuracy of reported fugitive emissions growing, he Minister ... wrote to the Chair of the Climate Change Authority in relation to the authority's review of the NGER legislation in 2023... the Minister drew attention to the recent reforms to the Safeguard Mechanism, and the increased importance these changes place on the accuracy of emissions reported under the NGER scheme... fugitive emissions are defined by IPCC as the intentional or unintentional release of greenhouse gases that occur during the extraction, processing and delivery of fossil fuels to the point of final use".

4.2 Reported emission intensities for open cut and underground coal mining

Year to 30 June	Emissions MtCO ₂ e Open cut	Emissions MtCO ₂ e Under- ground	Production Mtonnes Open cut	Production Mtonnes Under- ground	Emission intensity Open cut	Emission intensity Under- ground	Intensity ratio Open/ Under- ground
2001	6.44	23.08	229	92	0.0281	0.2508	0.112
2002	7.00	22.09	253	92	0.0277	0.2401	0.115
2003	7.28	21.25	268	82	0.0271	0.2591	0.105
2004	7.30	21.24	280	83	0.0261	0.2559	0.102
2005	7.77	22.23	306	87	0.0254	0.2555	0.099
2006	8.15	23.46	314	97	0.0260	0.2419	0.107
2007	8.13	25.22	323	94	0.0252	0.2683	0.094
2008	7.72	26.50	318	103	0.0243	0.2573	0.094
2009	7.50	25.98	341	105	0.0220	0.2474	0.089
2010	7.86	24.82	361	115	0.0218	0.2158	0.101
2011	7.49	24.34	351	108	0.0213	0.2254	0.095
2012	7.29	24.26	387	96	0.0188	0.2527	0.075
2013	7.93	23.73	420	114	0.0189	0.2082	0.091
2014	8.38	22.33	439	123	0.0191	0.1815	0.105
2015	8.63	22.55	443	124	0.0195	0.1819	0.107
2016	8.88	23.75	446	122	0.0199	0.1947	0.102
2017	8.96	23.03	453	114	0.0198	0.2020	0.098
2018	9.14	22.67	466	109	0.0196	0.2079	0.094
2019	9.59	21.23	496	94	0.0193	0.2258	0.086
2020	9.62	20.42	480	96	0.0201	0.2123	0.094
2021	9.37	19.89	446	88	0.0210	0.2267	0.093
2022	9.24	17.53	448	88	0.0206	0.1991	0.104
2023	8.99	16.28	431	84	0.0209	0.1938	0.108
Average 00-01 to 22-23					0.0223	0.2263	0.099
22-23 as a % of 00-01					74%	77%	96%

Emissions are from figure 26 of "Australia's emission projections 2023", and are for black and brown coal. The chart book calendar year values were interpolated to get values for years to 30 June. We understand from DCCEE that fugitive emissions from brown coal are of the order of 0.01 to 0.02 Mtonnes of CO₂e~ a year. Production tonnages are for black coal only, and are taken from DSIR's "Resources and energy quarterly September 2023:

historical data”, and similar earlier publications. Emission intensities were estimated by dividing emissions by production.

4.3 Under-reporting of emissions by open cut coal mines

Over the 23 years to 22-23, emission intensities reported by open cut coal mines averaged about 10% of those reported by underground coal mines (see the above table). The much lower reported emission intensities may partly be due to the shallower depths of open cut mines. A DCCEE April 2023 consultation paper included data from about 1200 Queensland boreholes adjacent to active coal mine fields. These data suggest that coal methane content increases linearly with depth, and that the common operating depths of Queensland open cut mines are between 50 and 300 metres, with an average of about 160 metres. No systematic depth data are available for underground coal mines, but their average depths may be double or triple those of open cut mines. Much of the difference in reported emission intensities appears to be due to woefully inadequate emission measurement methods for open cut mines.

4.4 Measurement methods under the National Greenhouse and Energy Reporting Act

The “2023 review of the national greenhouse and energy reporting legislation” said

“Emissions are only reportable if there is a relevant method defined in the Measurement Determination ... There are up to four possible methods available for estimating scope 1 emissions from each source (Methods 1, 2, 3 and 4) ... reporters can currently choose which method to use ... Generally, the higher the method ... the more accurate the estimated emissions.” (p22)

We understand that Method 1 is usually an average emission intensity for the industry. An above-average emitter can under-report their emissions by choosing Method 1 (and thus reduce their offset requirements if a Safeguard facility). It is bizarre that reporters can choose which method to use.

“To estimate fugitive emissions associated with coal extraction in underground coal mines, the Measurement Determination limits the choice of method to Method 4 ... sensors are installed to monitor the composition and flow rates of gas venting from the mine shaft.” (p68).

This direct measurement of gas flows from underground coal mines helps explain why the reported emission intensities from open cut mines are so much lower.

4.5 Recommendations by the Climate Change Authority

The Authority made 8 recommendations intended to Increase the accuracy of reported fugitive methane emissions (p9), including

- Phase out Method 1 estimation methodologies for fugitive methane emissions, including as a matter of urgency for open cut coal mining
- Resource the department to establish higher order estimation methods for all fugitive methane emission sources
- As a matter of urgency, review Method 2 for open cut coal mining
- Review the requirement for integrated gas facilities to use the same method across activities to allow the flexibility to use higher order methods for larger sources

- Commission a panel of Australian and international experts to establish a best practice process to document the standards and requirements for making transparent, repeatable and credible top-down measurements of fugitive methane emissions. The panel should be commissioned in the first quarter of 2024, and guidelines for top-down verification measurements published as soon as possible.
- Determine the appropriate requirements to be met for future use of satellite technology in detection of fugitive methane emissions, and for verification of estimated fugitive emission emissions.

4.6 Problems created by inadequate emission reporting methods

The Minister's request to the Authority (see 4.1) referred to the increased importance the reforms to the Safeguard Mechanism place on the accuracy of emission reports. Offsets required from facilities under this mechanism depend on their emission intensity relative to other facilities in the same industry. Inadequate reporting methods for open cut coal mines are resulting in excessive offset requirements for underground coal mines, while many open cut mines will unfairly receive Safeguard Mechanism Credits.

Inadequate reporting methods are also causing international problems for Australia. Based on increasing evidence from satellite measurements, bodies such as the International Energy Agency are commenting on the under-reporting of our fossil fuel emissions:

"The IEA estimates that methane emissions from coal mining in Australia are about 81% higher than the national inventory data. For the oil and gas sector, IEA's estimates are 92% higher than the national inventory data." (Institute for Energy Economics and Financial Analysis, June 2023)

This may affect our ability to negotiate free trade treaties, or avoid penalties under evolving cross border mechanisms.

4.7 Broad review of all emission estimation methods

The Authority has recommended urgent action on methane estimation methods for open cut coal mining, and other actions on all fugitive methane emissions. But the emission estimation methods for all industries may suffer from similar problems, including method choice at the discretion of the emitter, and failure to use available technology. A broad review of all methods is needed.

We suggest that large emitters be required to measure emissions continuously, with the records available for independent audit. Emissions should be reported quarterly, allowing quick corrective action to be taken if needed. Quarterly reports should be publicly available.

5. Matching sequestration types to the emissions being offset

5.1 Risk that Australia is lagging global norms

The Authority's "2023 review of the Carbon Credits (Carbon Farming Initiative) Act 2011" said (p3)

"Carbon market rules under the Paris Agreement were agreed in 2021. The rules and practices within both regulated and voluntary markets are evolving rapidly in response... There is a risk Australia is lagging global norms on acceptance of older, 'vintage' carbon

offsets for use in the Safeguard Mechanism and granting units for permanence periods less than 100 years.”

5.2 90% of recent sequestration projects have permanence periods of 25 years

“When a project proponent applies to register a sequestration project, they must nominate a permanence period of either 25 or 100 years... the trend (towards 25-years) has increased to nine-in-ten new sequestration projects over the last three years.” (p36)

5.3 Requiring offsets to be at least climate neutral

“The authority’s view is that climate policy and carbon markets need to move towards recognising ‘like for like’ where the attributes of different types of sequestration align with the nature of emissions being offset.” (p36)

We suggest that offsets be at least “climate neutral”, in that the cooling provided by offsets each year should be at least equal the warming from the emissions being offset.

“Methane has a much shorter atmospheric lifetime than carbon dioxide (CO₂) - around 12 years compared with centuries - but absorbs much more energy while it exists in the atmosphere.” (IEA 2022)

Trying to offset a methane emission with carbon dioxide sequestration from a revegetation project will result in warming from the methane exceeding cooling from the offset for many years

Acknowledgements

We are grateful for the information given to us by staff of the Climate Change Authority, the Department of Agriculture, Fisheries and Forestry, the Department of Climate Change, Energy, the Environment and Water, the Department of Industry, Science and Resources and the Department of Prime Minister and Cabinet. The opinions expressed are ours.

Abbreviations

Authority	Climate Change Authority
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DISR	Department of Industry, Science and Resources
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
NGER	National Greenhouse and Energy Reporting

References

Bowen C & King C (4 February 2024) *Delivering Australians more choice of cars to save on fuel* <https://minister.dcceew.gov.au/bowen/media-releases/joint-media-release-delivering-australians-more-choice-cars-save-fuel> (accessed 5 February 2024)

Climate Change Authority (18 December 2023a) 2023 *review of the national greenhouse and energy reporting legislation* <https://www.climatechangeauthority.gov.au/nger-act-reviews> (accessed 19 December 2023)

Climate Change Authority (18 December 2023b) 2023 *review of the Carbon Credits (Carbon Farming Initiative) Act 2022* <https://www.climatechangeauthority.gov.au/accu-scheme-reviews> (accessed 19 December 2023)

DCCEEW (3 April 2023) *National Greenhouse and Energy Reporting (NGER) Scheme - 2023 Proposed Amendments Consultation Paper* <https://consult.dcceew.gov.au/2023-nger-scheme-proposed-updates> (accessed 4 September 2023)

DCCEEW (November 2023a) *Australia's emissions projections 2023* <https://www.dcceew.gov.au/climate-change/publications/australias-emissions-projections-2023> (accessed 10 December 2023)

DCCEEW (November 2023b) *Annual Climate Change Statement 2023* <https://www.dcceew.gov.au/climate-change/strategies/annual-climate-change-statement-2023> (accessed 30 November 2023)

DISR (3 October 2023) *Resources and energy quarterly September 2023: historical data* <https://www.industry.gov.au/publications/resources-and-energy-quarterly-september-2023> (accessed 10 January 2024)

Institute for Energy Economics and Financial Analysis (June 2023) *Gross under-reporting of fugitive methane emissions has big implications for industry* <https://ieefa.org/resources/gross-under-reporting-fugitive-methane-emissions-has-big-implications-industry> (accessed 5 February 2024)

International Energy Agency (2022) *Methane and climate change* <https://www.iea.org/reports/global-methane-tracker-2022/methane-and-climate-change> (accessed 5 February 2024)

Lowy Institute (21 June 2023) *Lowy Institute Poll 2023* <https://poll.lowyinstitute.org/report/2023/> (accessed 4 February 2023)

Senate Environment and Communications Legislation Committee (31 August 2022) *Climate Change Bill 2022 [Provisions] and the Climate Change (Consequential Amendments) Bill 2022 [Provisions]* https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/ClimateChangeBills2022 (accessed 8 January 2024)

Treasury (24 August 2023) *Intergenerational Report 2023* <https://treasury.gov.au/publication/2023-intergenerational-report> (accessed 9 January 2023)