

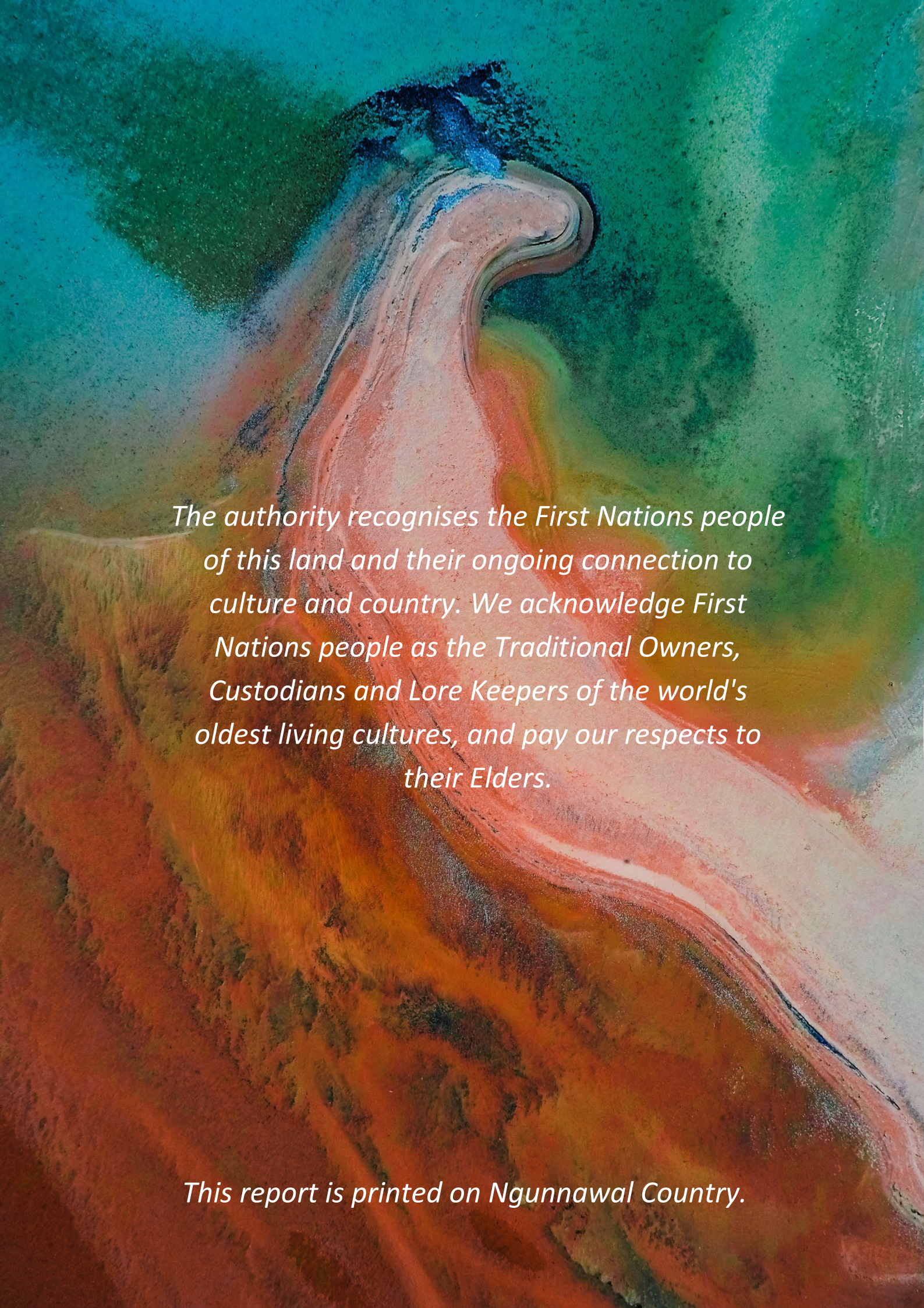


CLIMATE
CHANGE
AUTHORITY

2023 REVIEW OF THE NATIONAL GREENHOUSE AND ENERGY REPORTING LEGISLATION

December 2023





The authority recognises the First Nations people of this land and their ongoing connection to culture and country. We acknowledge First Nations people as the Traditional Owners, Custodians and Lore Keepers of the world's oldest living cultures, and pay our respects to their Elders.

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The Department of Climate Change, Energy, the Environment and Water, the Clean Energy Regulator and other government agencies also provided technical expertise to the authority in the preparation of this review.

The views expressed in the review are the authority's own and should not be taken as the views or positions of any of the entities listed.



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Acronyms

AASB	Australian Accounting Standards Board
ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ACCU	Australian carbon credit unit
AES	Australian Energy Statistics
API	application programming interface
AtJ	Alcohol to Jet
BoM	Bureau of Meteorology
CBAM	carbon border adjustment mechanism
CCA	Climate Change Authority
CER	Clean Energy Regulator (the regulator)
CO ₂	carbon dioxide
CO ₂ -e	carbon dioxide equivalent
DCCEEW	Department of Climate Change, Energy, the Environment and Water (the department)
EERS	Emissions and Energy Reporting System
EITE	emissions intensive, trade exposed
ERF	Emissions Reduction Fund (now known as the ACCU Scheme)
ETF	enhanced transparency framework
FLIGHT	Facility Level Information on GreenHouse gases Tool
FT	Fischer Tropsch
FY	financial year
GO	Guarantee of Origin
HEFA	hydroprocessed esters and fatty acids
ICAO	International Civil Aviation Organization
IEA	International Energy Agency
ILUC	indirect land use change
IMEO	International Methane Emissions Observatory
IPCC	Intergovernmental Panel on Climate Change
kt	kilotonne (thousand tonnes)
LGC	large-scale generation certificate
LNG	liquefied natural gas
LULUCF	Land Use, Land-Use Change and Forestry
MMP	Metcoal Methane Partnership
MRV	measurement, reporting and verification
Mt	megatonne (million tonnes)
NDC	Nationally Determined Contribution
NFF	National Farmers Federation
NGER Act	National Greenhouse and Energy Reporting Act 2007
NGER Scheme	National Greenhouse and Energy Reporting scheme
OGMP 2.0	Oil and Gas Methane Partnership 2.0
RTC	Reporting Transfer Certificate
SMC	Safeguard Mechanism Credit
t	tonne
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
US EPA	United States Environmental Protection Agency
US GHGRP	United States Greenhouse Gas Reporting Program

Summary

The Climate Change Authority (the authority) is a statutory agency established to provide independent, expert advice to the Australian Government on climate change policy. The authority is required to review the operation of the *National Greenhouse and Energy Reporting Act 2007* (NGER Act) every five years. This is the authority's second review of the NGER Act.

The NGER legislation establishes:

- the National Greenhouse and Energy Reporting scheme
- the Safeguard Mechanism
- a framework for administration and compliance for these schemes.

The NGER scheme is a national reporting framework for companies that meet certain thresholds to report their greenhouse gas emissions, energy consumption and energy production for the purposes of informing government policy and programs, informing the Australian public and helping meet Australia's international reporting obligations. In 2020-21, the total direct emissions from companies, referred to as their scope 1 emissions, reported under the NGER scheme accounted for 68% of Australia's total net greenhouse gas emissions.

The Safeguard Mechanism is a framework for reducing the emissions of Australia's largest industrial facilities over time. It underwent major reforms earlier this year which introduced declining facility baselines, limits on total emissions under the mechanism, and a system (Safeguard Mechanism Credits) for trading over-achievement on baselines.

The authority framed this year's review with the question 'is the NGER legislation fit for purpose in the Paris Plus context?'. The authority uses the term 'Paris Plus' to describe the various agreements, targets, cross-border instruments and other initiatives and behaviours that implement or contribute to the goals of the Paris Agreement. With markets and governments reorienting to net zero emissions, it is timely to ask whether Australia's domestic climate change policies are fit for purpose in this evolving post-Kyoto Protocol era of increasing climate ambition.

While NGER is a long-standing and reputable scheme, the domestic and global contexts are changing. These changes make it important to consider how the scheme may need to evolve — whether that be to meet new expectations from the public, improve or enhance the interactions and complementarity of the NGER scheme with new reporting initiatives, or ensure it remains best practice.

The authority's 2023 review of the NGER legislation focused on the NGER scheme, with the reformed Safeguard Mechanism having only recently commenced operation.

The authority's 2023 review of the NGER legislation has focused on the following key themes of the NGER scheme:

- NGER scheme coverage, including sectoral coverage and reporting thresholds.
- Transparency and confidentiality.
- Estimation methods, with a focus on fugitive methane measurement, reporting and verification.
- Administration and compliance of the NGER scheme.

The authority notes that the government's 2023 reforms to the Safeguard Mechanism have served to better align Australia's main industrial emissions reduction policy with the Paris Plus context. However, as the reforms only took effect in July this year, data is not yet available on the performance of the new arrangements. In this review, the authority briefly comments on the performance of the Safeguard Mechanism prior to the recent reforms and provides some observations on the reformed mechanism.

As part of the concurrent review of the *Carbon Credits (Carbon Farming Initiative) Act 2011* (ACCU Scheme Review), the authority has examined the operation of Australia's carbon crediting scheme in light of the changing international and domestic context, including the introduction of the Safeguard Mechanism reforms. Interested readers are directed to the ACCU Scheme Review for the results of this analysis. Further assessments of the performance of the Safeguard Mechanism will be an ongoing feature of the authority's work.

The NGER scheme is performing well but the time is right to make some changes to ensure it remains fit for purpose.

The authority found that the NGER scheme continues to be integral to meeting Australia's international energy and emissions reporting obligations. The NGER scheme is also informing the development, implementation and monitoring of government policies, programs and activities, as well as the Australian community.

However, the authority observes that the emissions and energy data needs of both the government and the public are growing. In considering these changing needs, the authority identified key areas for consideration in this year's review including: transparency and confidentiality, NGER scheme coverage (including reporting thresholds and sectoral coverage), methane measurement, reporting and verification, and administration and compliance.

In response to increasing demand for emissions data, more facility level NGER data should be published.

The authority heard from many stakeholders that data reported under the NGER scheme currently lack the necessary transparency to meet increasing demand for more granular information. Enhancing the accessibility and transparency of the data would provide many benefits, including better utility of NGER data in policy analysis and impact tracking, improving community confidence in emissions reporting, supporting more transparent benchmarking between facilities, and better informing financial institutions' lending and investment decisions.

The NGER scheme collects a rich set of emissions and energy data. However, currently the NGER legislation allows the Clean Energy Regulator (the regulator) to publish only a subset of this data. Under the NGER scheme, the regulator publishes aggregate emissions and energy data for corporations, only where they meet a certain emissions threshold. Facility-level data is not available unless the facility is an electricity generator or meets the coverage threshold for the Safeguard Mechanism.

The authority is of the view that increasing the transparency of the data collected under the NGER scheme is essential to ensure it remains aligned with the expectations of the public and the standards set internationally. In particular, the authority recommends that facility-level data (including emissions by greenhouse gas) be published for all but the very lowest emitting facilities.

Under section 25 of the NGER legislation, corporations can request that data be withheld from publication, with some exceptions, on the basis that the information has commercial value. The authority weighed the current operation of this provision against consistent calls for increased transparency of data collected under the NGER scheme.

The authority is of the view that it is appropriate for companies to continue to be able to request that certain data are withheld from publication in specific and limited circumstances, i.e. when publication would unacceptably reveal the trade secrets or other commercially valuable information, as is provided for under the existing tests. However, consideration should be given to clarifying the specific circumstances in which data can be withheld from publication under section 25, and to streamlining the application and decision-making process.

Reporting under the NGER scheme should be extended to agriculture and land emissions in a separate and staged manner.

Emissions and removals from Agriculture and Land Use, Land-Use Change and Forestry, as defined by the United Nations Framework Convention on Climate Change (UNFCCC), are currently excluded from the NGER scheme. The explanatory memorandum for the National Greenhouse and Energy Reporting Bill 2007 explains that the NGER scheme excludes agriculture because there were no methodologies available for the agriculture sector at the time that would provide meaningful data at the company level. In 2023, workable methods for calculating emissions at the farm-level are emerging and these could form a starting point for NGER emissions calculations. Developing a methodology to account for emissions at the farm level is likely to be challenging and could introduce a reporting burden. However, there are also benefits to be realised from improved information on emissions from agricultural practices.

The authority estimates that including emissions from agricultural sources under the NGER scheme could cover approximately 5-10% of emissions from the agriculture sector. Only larger agri-businesses within the agriculture sector are likely to run cattle herds large enough that their emissions alone could exceed the facility reporting threshold.

The authority is of the view that the government should work with stakeholders to include agriculture under the NGER scheme in a manner that meets private and public sector requirements for robust, comparable data and minimises unnecessary reporting costs.

The authority recognises issues remain in the development of methods for reporting emissions from the land sector, with further work needed to develop an approach that is robust and useable for the purposes of the NGER scheme. The authority is of the view that reporting requirements for the land sector should be introduced, but over a longer timeframe than that for the agricultural sector.

The federal, state and territory governments should agree on a framework that ensures consistent reporting of emissions from government operations.

Given many governments are moving towards more transparent reporting requirements, imposing additional NGER reporting requirements would be premature at this stage. It is important, however, that government emissions reporting is robust, transparent and consistent across governments. A standard agreed by governments could provide assurance that reporting of government emissions will be adequate and comparable.

Publicly owned landfills should be required to report under the NGER scheme.

Currently, approximately 65% of total waste disposal in Australia is covered by NGER data — emissions that are not captured come from state, territory and local government owned landfills and smaller landfills that do not trigger the NGER threshold. Government entities are not required to report emissions, except in cases where an incorporated government agency is also a constitutional corporation. The authority is of the view that the NGER scheme should be expanded to cover publicly owned landfills where possible as these are a significant source of emissions from the waste sector.

Expanding reporting to publicly owned landfills would provide more information on emissions from waste disposal and increase equity in reporting between private and public landfills. The authority notes legal advice would need to be sought to confirm validity of any proposed approach.

A study by the government on the use of NGER emissions data can facilitate estimation of scope 3 emissions at the entity level in Australia.

Scope 3 emissions are indirect emissions other than from energy use generated from sources upstream or downstream in the reporting facility's value chain. Determining scope 3 emissions can help meet the demands of consumers and shareholders, help manage risks, and identify opportunities to reduce emissions in supply chains.

The benefits of scope 3 emissions reporting to accountability and transparency of emissions beyond a facility were highlighted through consultation for this review. The Australian government's proposal on climate-related financial disclosures will include mandatory reporting of scope 3 emissions. Data reported through the NGER scheme are a potentially valuable source of information for supporting estimates of scope 3 at the entity level.

Further analysis could be undertaken over the coming years as scope 3 emissions reporting is introduced through climate-related financial disclosures to formalise the data used to facilitate these disclosures.

The proportion of each sector's emissions reported under the NGER scheme must, at a minimum, be maintained at current levels.

The authority heard from several stakeholders that reducing reporting thresholds to capture more data in the NGER scheme would provide a more comprehensive picture of Australia's emissions. Stakeholders also said that reducing thresholds to capture smaller businesses may help increase their understanding of their emissions and facilitate decarbonisation activities. The authority noted these benefits while also acknowledging that lowering the threshold would impose new regulatory burden on companies. On balance, the authority considers that the current proportion of emissions reported under the scheme for each sector (that currently reports) was sufficient to meet the objectives of the scheme, and that the benefits of reducing the thresholds to capture more companies did not outweigh the costs.

The authority is of the view that, at a minimum, the current proportion of each sector's emissions reported under the scheme should be maintained. The authority makes this comment in the context of Australia's transition to net zero. As companies decarbonise, the NGER scheme will need to maintain sufficient reporting of emissions across each of the sectors to ensure it continues to meet the objectives set out in the legislation. The percentage of each sector's emissions reported under the NGER scheme should be monitored, and amending the thresholds if needed, will ensure sufficient coverage of each reporting sector is either maintained, or increased if necessary to ensure the objectives of the scheme continue to be met.

A certification scheme or framework is needed before market-based reporting is made available for renewable liquid and gaseous fuels.

Emissions estimation methods in the Measurement Determination do not currently allow NGER reporters that source their fuel from common infrastructure to reflect the emissions benefits of using renewable fuels. This is because the emissions calculation method for fuel sourced from common infrastructure uses an emissions factor based on the location of the infrastructure.

Market-based reporting would allow NGER reporters to make claims on the lower emissions intensity attributable to renewable liquid fuel and gaseous purchases. Governance mechanisms are required to avoid double counting and other adverse impacts associated with renewable fuels. The authority recommends the government develop a framework to approve certifications that can guarantee the renewable status of renewable liquid and gaseous fuels. Following the establishment of renewable liquid and gaseous fuel certification schemes, the authority recommends introducing market-based reporting for these fuels in the NGER scheme.

Several improvements can be made to fugitive methane emissions measurement and reporting under the NGER scheme.

Research teams around the world are using remote sensing satellites to observe methane plumes near the earth's surface. Over the past five years, developments in satellite technologies and inverse modelling techniques have resulted in a new source of data to estimate fugitive methane emissions from individual facilities. Some of these satellite observations have raised questions about the accuracy of estimated fugitive methane emissions from coal mining and oil and gas operations in Australia reported under the NGER scheme.

In this review, the authority considered these satellite observations, particularly those used to make comparisons with estimates from the NGER scheme. In considering improvements for the NGER scheme, the authority also took into consideration two emerging international frameworks for methane measurement, reporting and verification being developed by the United Nations Environment Program and industry - the Oil and Gas Methane Partnership (OGMP) 2.0 and the Metcoal Methane Partnership (MMP).

In examining the available evidence, the authority observed general agreement between satellite-based observations and reported fugitive methane emissions from coal mining where the reported emissions are estimated using directly measured, higher order methods¹ However, discrepancies appear to be more prevalent between satellite observations and reported emissions for coal mining where simpler, lower order methods are available.

The authority is of the view that the accuracy of estimated fugitive methane emissions reported under the NGER scheme may be impacted due to the use of lower order methods. Simple emissions factors do not adequately capture temporal or spatial specificity or variability at the facility level.

The authority has identified a number of improvements to the NGER Measurement Determination that would enhance the accuracy of fugitive methane emissions reporting and bring the NGER scheme

¹ Up to four estimation methods are available for estimating emissions under the NGER scheme. These range from simple, lower order methods that generally use emissions factors, to more sophisticated, higher order methods that typically require direct measurement. Further details on these methods can be found in Section 2.2.2 and Section 4.2.

into better alignment with international best practice in methane measurement, reporting and verification. These include:

- A series of recommendations to move measurement and reporting of fugitive methane emissions in Australia to higher order methods. In some instances the authority recommends making this shift mandatory (e.g. by phasing out Method 1) and in other instances, it recommends enabling the shift (e.g. through increasing the availability of higher order methods for different activities in coal mining and oil and gas operations).
- A recommendation for the government to develop a policy framework for implementing independent verification of facility-level fugitive methane emissions estimates using top-down measurements conducted by reporters, and reported through the NGER scheme.
- A recommendation that the government supports the development of Australia's sovereign capability in methane emissions measurement and quantification.

The authority will continue to monitor and review the operation of the reformed Safeguard Mechanism.

The authority is supportive of the reforms made to the Safeguard Mechanism and notes close alignment between the reforms and previous recommendations by the authority.

The authority has previously recommended baselines decline linearly in line with Australia's emissions reduction targets, and that facilities should be able to trade over-and under-achievement of baselines once baselines have commenced declining and are binding.

One area of divergence between the reformed Safeguard Mechanism and the authority's previous recommendations is around transition planning. The authority previously recommended requiring all covered facilities to prepare and publish strategies setting out how they will comply with declining baselines. The reformed Safeguard Mechanism only requires facilities that apply for multi-year monitoring periods to prepare a plan for complying with their Safeguard obligations. The authority notes, however, that it is likely that large companies will need to publish transition plans through the climate-related disclosure framework which is currently being consulted on by the government.

A key feature of the authority's future work examining industry sector decarbonisation will be analysing the performance of the Safeguard Mechanism. The authority will also provide annual advice to the Minister for Climate Change and Energy on whether Safeguard emissions are declining consistent with the objectives set out in the NGER legislation.

The authority is also expected to have a role in the government's 2026-27 review of the Safeguard Mechanism. The authority is expected to advise on the extent to which on-site abatement is being driven by the Safeguard reforms, and whether any additional incentives are required (such as a discount on ACCUs when used for more than a certain percentage of a baseline or any circumstances where limits on the use of ACCUs may be appropriate).

Administration of the NGER scheme is working well, but there are opportunities to streamline some activities.

The authority heard from a number of stakeholders that both the regulator and the Department of Climate Change, Energy, the Environment and Water are performing well in their respective roles. The authority found a few opportunities to streamline administration activities, including:

- giving the regulator the discretion to deregister corporations that are in liquidation
- amending a gap in the legislation that currently means reporters that register late do not have to provide reports for the years between the year they first trigger a reporting threshold and the year they register
- removing references to a corporation's 'trading name' and replacing with 'registered business name' to align with changes to Australian Securities and Investment Commission registers.

Compliance with the NGER scheme is high, and the regulator is taking appropriate enforcement action in instances of non-compliance.

The authority is of the view that the regulator is applying the audit framework effectively and actively working to improve it, e.g. through the increasing sophistication of its assessment process and through its responsive approach to setting compliance and enforcement priorities. Analysis conducted by the authority indicated that the accuracy of NGER reports was generally high, as indicated by low resubmission rates and the high proportion of audits with no adverse findings. However, some concerns were raised around the availability of appropriately skilled auditors, which may be heightened in future by the use of the auditor register for climate-related financial disclosure audits. The authority notes that the pool of appropriately skilled auditors should continue to be monitored to ensure the audit framework remains effective.

In instances where significant non-compliance was identified, the authority found that the regulator was taking appropriate enforcement action. Since the 2018 review, there have been two enforceable undertakings. Both undertakings relate to reporters making errors in their NGER reports, resulting in over- and under- reporting of emissions. Both undertakings are ongoing, requiring various actions from the reporters to improve the quality of their reports.



Recommendations

Coverage

1. The proportion of each sector's emissions reported under the NGER scheme must, at a minimum, be maintained at current levels.
2.
 - a. The NGER scheme be expanded to include methods for calculating emissions from the UNFCCC-defined agriculture and land sectors. The government should work with interested parties in the agriculture sector on the most appropriate way to include these emissions sources under the same thresholds as for other sectors and develop robust estimation methods for facility-level emissions reporting in these sectors.
 - b. Introduce mandatory reporting requirements for agricultural sector emissions by the 2026-27 financial year and for land sector emissions by the 2027-28 financial year.
3. Seek agreement with state and territory governments on a framework that will allow for consistent reporting of emissions by government entities. In the absence of an agreed framework, the government should explore the potential to extend coverage of the NGER scheme to government entities.
4. Extend NGER coverage to publicly owned landfills where legally possible.
5. Undertake a study to investigate the use of the emissions data reported through the NGER scheme to facilitate estimation of scope 3 emissions at the entity level in Australia.

Market-based reporting

6. Develop a framework to approve certifications that can guarantee the renewable status of renewable liquid and gaseous fuels. This framework should be informed by a review of existing international certification schemes. The certifications approved under the framework need to guard against adverse impacts.
7. Introduce optional market-based reporting of renewable liquid and gaseous fuels once a framework for approving certifications for renewable fuels is operational.
8. Engage with the IPCC to create guidance on the definition and emissions factors of renewable synthetic fuels. Subsequently amend the definition for renewable fuels in the NGER Regulations to include renewable synthetic fuels once there is clear guidance from the IPCC.

Transparency

9. As a first step in increasing the transparency of NGER data, the NGER scheme requires that the regulator publish, starting with data for the 2023-24 financial year, the following data at the facility level for facilities which produce annual emissions greater than or equal to 5,000 t CO₂-e:
 - a. Scope 1 emissions by greenhouse gas as a consistent time-series.
 - b. Scope 2 emissions as a consistent time-series.
 - c. The method used in each financial year to estimate scope 1 and scope 2 emissions.
10. Resource the regulator to publish relevant NGER datasets through an application programming interface (API) so that users can download and programmatically query the data using their own software. This should be implemented for the publication of the 2024-25 NGER data.

11. Resource the regulator to improve the accessibility and usefulness of the published data by exploring opportunities to present data in additional formats on its website. This should be implemented for the publication of the 2024-25 NGER data.
12. Resource the regulator to collect the necessary information from reporters such that it can link facilities reported under the NGER scheme across time.

Confidentiality

13. Monitor the future utilisation of section 25 of the NGER Act and whether it is impacting upon the overall effectiveness of the publication regime in section 24 of the Act.
14. Consider measures to provide additional guidance and streamline the process for making and deciding non-publication applications under section 25 of the NGER Act, including through legislative amendment if needed.

Increasing the accuracy of reported fugitive methane emissions in the NGER scheme

15. Phase out Method 1 estimation methodologies for fugitive methane emissions, including as a matter of urgency for the extraction of coal in open cut coal mining.
16. Resource the department to establish higher order estimation methods for all fugitive methane emission sources included in the Measurement Determination.
17. As a matter of urgency, review Method 2 for extraction of coal in open cut coal mining with respect to sampling requirements and standards.
18. Review the requirement for integrated gas facilities to use the same method across activities to allow for flexibility to use higher order methods for larger emission sources, while ensuring integrity of estimated emissions.
19. 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 from Australian facilities. This panel should evaluate whether any further research studies are needed and should be resourced to conduct required studies. The panel of experts should be commissioned in the first quarter of 2024, and the guidelines for making top-down verification measurements published as soon as practicable.
20. Develop a top-down verification policy framework for the verification of bottom-up estimates of fugitive methane emissions reported under the NGER scheme. This should be phased in on a trial basis as soon as practicable, with mandatory verification using top-down measurements commencing the year after. If any discrepancies are found between bottom-up estimates obtained using an NGER method and the top-down verification measurement, the bottom-up measurement approach should be refined by the reporting entity to reconcile the emission estimates.
21. 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 methane emissions.
22. Prioritise and support the development of Australia's sovereign capability in methane emissions measurement and quantification, by building on existing expertise and leveraging international partnerships where appropriate.

Administration and compliance

23. Authorise the regulator to deregister corporations in liquidation from the NGER scheme on the regulator's own initiative to reduce the administrative burden for the regulator.
24. Require corporations that meet reporting thresholds to provide reports for all years following their trigger year, regardless of when they register, to ensure completeness of the NGER datasets.
25. Update the NGER scheme to replace references to a corporation's 'trading name' with 'registered business name'.



1. Introduction

The *National Greenhouse and Energy Reporting Act 2007* (NGER Act) establishes the National Greenhouse and Energy Reporting (NGER) scheme, the Safeguard Mechanism, and a framework for administration and compliance. Figure 1.1 presents a description of each of these components.

The Act and its instruments are implemented by the Clean Energy Regulator (the regulator). The regulator also ensures compliance with the legislation. The Department of Climate Change, Energy, the Environment and Water (the department) has formal policy oversight of the NGER Act.

The NGER Act has two objectives, the first relates to the NGER scheme and the second relates to the Safeguard Mechanism.

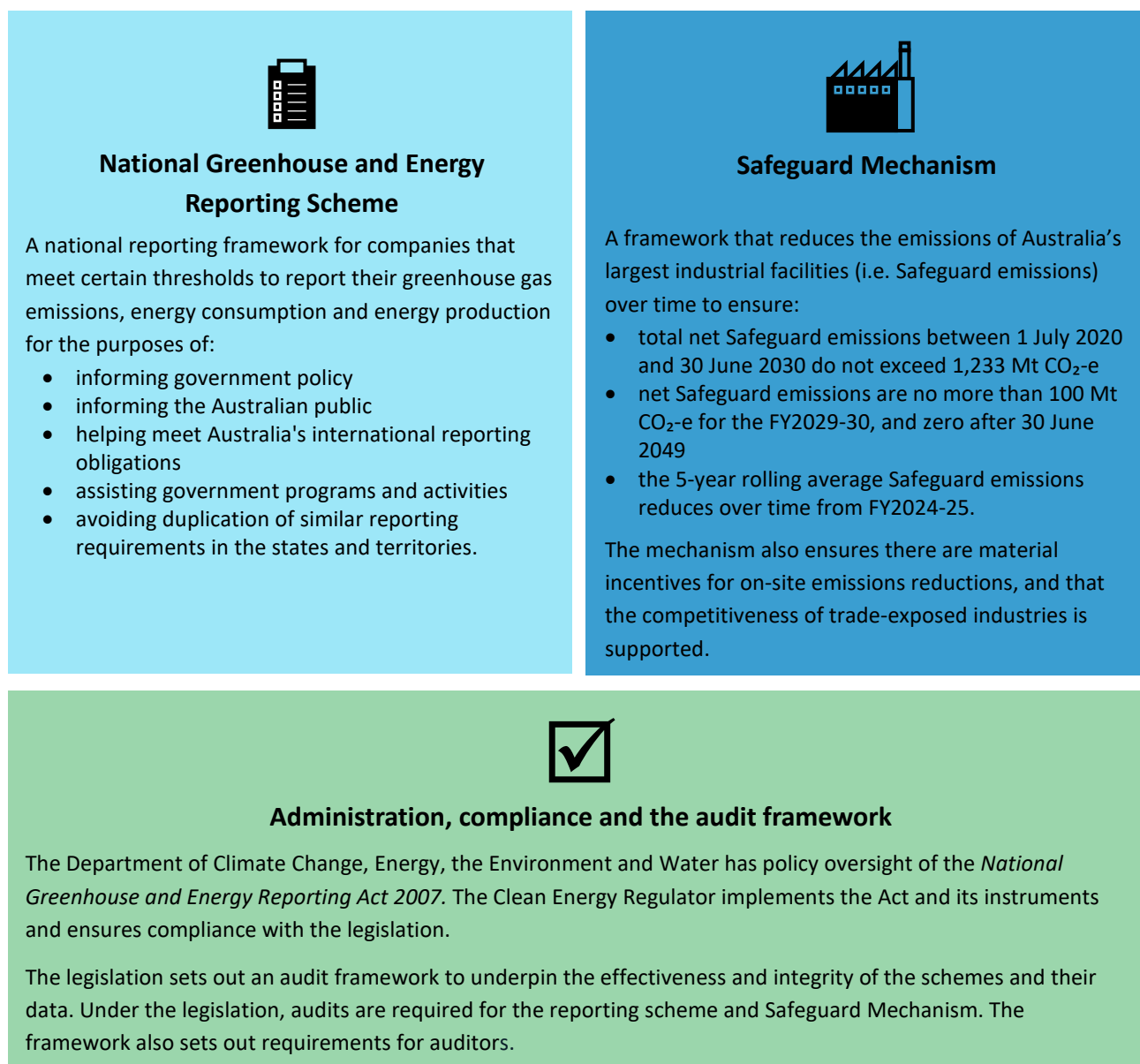


Figure 1.1 The three components of the NGER Act.²

² FY is financial year.

The first objective is to introduce a single national reporting framework for the reporting and dissemination of information related to greenhouse gas emissions, greenhouse gas projects, energy consumption and energy production of corporations to:

- inform government policy formulation and the Australian public
- meet Australia's international reporting obligations
- assist Commonwealth, state and territory government programs and activities
- avoid the duplication of similar reporting requirements in the states and territories.

The second objective is to contribute to the achievement of Australia's greenhouse gas emissions reduction targets by ensuring that each of the following outcomes (known as the Safeguard outcomes) are achieved:

- Net covered emissions of greenhouse gases from the operation of a safeguard facility do not exceed the baseline applicable to the facility
- Total net safeguard emissions for all of the financial years between 1 July 2020 and 30 June 2030 do not exceed a total of 1,233 Mt CO₂-e
- Net safeguard emissions decline to:
 - a. no more than 100 Mt CO₂-e for the financial year beginning on 1 July 2029
 - b. zero for any financial year to begin after 30 June 2049
- The 5-year rolling average safeguard emissions for each financial year that begins after 30 June 2024 are lower than the past five-year rolling average safeguard emissions for that financial year
- The responsible emitter for each safeguard facility has a material incentive to invest in reducing covered emissions from the operation of the facility
- The competitiveness of trade-exposed industries is appropriately supported as Australia and its regions seize the opportunities of the move to a global net zero economy.

1.1. Reviews by the Climate Change Authority

The NGER Act states that the Climate Change Authority (the authority) must conduct a review of the operation of the Act and accompanying legislative instruments every five years. This is the authority's second review of the NGER legislation. The first review was conducted in 2018 (CCA, 2018).

The NGER Act states that the authority must make provision for public consultation when conducting the review. The consultation carried out by the authority for this review is described further in Section 1.4. The Act also states that if the review recommends action by government, the authority must assess the costs and benefits of that action.

1.2. The 2018 review

At the time of the authority's first NGER review in 2018, the NGER scheme had been in place for over a decade, while the Safeguard Mechanism had been in operation for less than three years (CCA, 2018).

In 2018, the authority found the NGER legislation was operating well, meeting its objectives and generally fit for purpose. The NGER scheme had broad support from industry, governments and others, and was widely considered to be a best-practice approach to measuring and reporting emissions and energy. The high-quality data collected by the scheme was being used extensively by governments and others to develop energy and climate change policies. It was also a critical input to

meeting Australia's international energy and emissions reporting obligations (CCA, 2018).

The authority found that all facilities covered by the Safeguard Mechanism kept their net emissions at or below their baselines in its first year of operation (2016-17). In 2018, the authority observed facilities with Safeguard obligations were generally comfortable with its operation and the options for meeting their baselines. However, at the time, many called for clarity around the future operation of the policy (CCA, 2018).

Although the authority found the legislation was meeting its objectives, it also identified opportunities for improvements to reduce costs and enhance administration. The authority made 20 recommendations across the three components of the legislation. The government responded in 2019, accepting (or accepting-in-principle) 13 of the recommendations and noting seven (Australian Government, 2019). Appendix C contains the full list of recommendations and government responses for each.

Some of the recommendations have been progressed over the past five years, while others remain relevant to this review. Recommendations that the authority has revisited relate to:

- Expanding the range of emissions and energy data that is reported and published. In particular, considering whether the NGER scheme should be expanded to allow for reporting of emissions from agricultural sources, and whether government entities should report under the scheme. In 2019, the government noted these recommendations.
- Enhancing the usefulness of the data for governments and the public. In particular, funding the regulator to enhance the NGER dataset to allow for time series analysis. In 2019, the government noted this recommendation.

1.3. Framing the 2023 review

The circumstances in which the authority is conducting this review have changed considerably since the 2018 review. The global transition to net zero has gathered considerable momentum — as at 25 September 2023, 97 Parties covering approximately 81% of global greenhouse gas emissions had adopted net zero pledges either in law (27 Parties), in a policy document such as an NDC or a long-term strategy (54 Parties), or in an announcement by a high-level government official (16 Parties) (UNEP, 2023). Significant policy changes are emerging to support these targets such as domestic carbon prices and the European Union's first-in-kind Carbon Border Adjustment Mechanism — both of which aim to price greenhouse gas emissions into economic systems (World Bank, 2023).

At the time of the authority's last review, the Paris Agreement had been agreed but reporting was yet to commence for all parties. The enhanced transparency framework (ETF), referred to as the modalities, procedures and guidelines (MPGs), was agreed by countries in Katowice in December 2018 and elaborated in Glasgow in November 2021.³ It provides guidance on comprehensive reporting for all countries under the Paris Agreement to manage issues such as double counting and environmental integrity (UNFCCC, 2018)

³ [FCCC/PA/CMA/2018/3/Add.2](#), Decision 18/CMA.1.

Australia participates under the Paris Agreement reporting framework and relies on the NGER scheme to provide much of the data necessary for completing the annual national inventory reporting and national inventory component of the biennial transparency report (DCCEEW, 2023a).

The effect of the Paris Agreement reaches beyond just national reporting and compliance — the last five years have seen a substantial impact on the direction of private finance flowing towards sustainable investments.

Given the utmost importance of effective action to reduce emissions, the growing demands of investors and the importance of ensuring consumers are well informed, there are very likely to be significant benefits from enhancing the available information on the sources of emissions in Australia. However, measures to do so should seek to minimise the costs associated with adding to regulatory reporting burdens.

The NGER legislation has a significant role to play in supporting a credible system for standardising and enhancing emissions reporting by corporates and the publication of the data, leveraging its established and robust framework.

Against this backdrop, the authority has framed the 2023 review using the following question: *Is the NGER legislation fit for purpose in the Paris Plus context?* In other words, is the legislation aligned with the various agreements, targets, cross-border instruments and other initiatives that implement or contribute to the goals of the Paris Agreement.

1.4. Approach to the 2023 review

In this review, the authority assessed the performance of the individual elements of the legislation against the legislated objectives and in the context of the ‘fit for Paris Plus’ framing. A greater emphasis was placed on the NGER scheme, given the Safeguard Mechanism has just been through a major reform process. As the reformed Safeguard Mechanism only came into effect on 1 July 2023, there were no data available for the authority to assess its performance in this review. As part of the concurrent review of the *Carbon Credits (Carbon Farming Initiative) Act 2011* (ACCU Scheme review), however, the authority has examined the potential impact of the reformed Safeguard Mechanism on domestic carbon markets. Interested readers are directed to the ACCU scheme review for the results of this analysis. Analysis of the Safeguard Mechanism will also form an ongoing part of the authority’s work on industry sector decarbonisation, and in particular through its annual advice to the Minister for Climate Change and Energy.

In July of this year, the Minister for Climate Change and Energy wrote to the authority to suggest it consider whether updates to methane emissions measurement, reporting and verification rules are required (Minister for Climate Change and Energy, pers. comm., 2023). The NGER legislation houses the methods that companies use to calculate their methane emissions. The Minister noted the recent reforms to the Safeguard Mechanism and the importance of the NGER scheme to its operation, and more generally for tracking Australia’s progress in meeting its emissions reduction targets. The Minister also noted work by other organisations seeking to improve understanding of methane emissions from fossil fuel production. The authority agreed that it is timely to perform a detailed analysis of methane measurement, reporting and verification as part of this review.

Paris Plus

The various agreements, targets and cross-border instruments with the purpose of contributing to the goals of the Paris Agreement, such as:

- voluntary carbon markets
- carbon border adjustment mechanisms (CBAMs)
- subnational and corporate targets
- climate-related financial disclosure
- taxonomies and certification schemes
- international agreements to reduce aviation and maritime emissions

(CCA, 2021a)

Other key areas of focus for this review include:

- coverage of the NGER scheme
- transparency and confidentiality of NGER data
- administration of, and compliance with, the NGER scheme.

The authority's general approach to the review involved desktop research and analysis, supported by extensive consultation. Further details on this consultation can be found below.

In conducting this review and formulating recommendations, the authority had regard to the principles set out in the *Climate Change Authority Act 2011*, which says that any measures to respond to climate change should:

- i. be economically efficient
- ii. be environmentally effective
- iii. be equitable
- iv. be in the public interest
- v. take account of the impact on households, business, workers, and communities
- vi. support the development of an effective global response to climate change
- vii. be consistent with Australia's foreign policy and trade objectives
- viii. take account of the matters set out in Article 2 of the Paris Agreement
- ix. boost economic, employment and social benefits, including for rural and regional Australia.

The authority decided that no additional principles, beyond those listed in the Act, were required to guide this review.

1.4.1 Public consultation

In May 2023, the authority released a consultation paper entitled: *Setting, Tracking and Achieving Australia's Emissions Reduction Targets*. This paper sought feedback on the four projects the authority has progressed this year:

- advice on emissions reduction targets for Australia's next Nationally Determined Contribution (NDC) under the Paris Agreement
- advice for the Minister for Climate Change and Energy's Annual Climate Change Statement, i.e. the authority's 2023 Annual Progress Report
- review of the *Carbon Credits (Carbon Farming Initiative) Act 2011* (ACCU Scheme review)
- review of the *National Greenhouse and Energy Reporting Act 2007* (NGER review).

For the NGER review, the consultation paper sought feedback on the strengths and weaknesses of the NGER scheme, how the NGER scheme could be improved in the context of the Paris Agreement era, and methane measurement, reporting and verification.

The authority received 323 submissions, with 62 submissions directly responding on the NGER legislation.

In July and August 2023, the authority conducted three workshops on fugitive methane measurement, reporting and verification—one with industry, one with methane measurement scientists, and one with non-government organisations. In total, over 100 participants attended these workshops. These workshops explored the measurement and reporting of fugitive emissions in the NGER scheme, and possible options for improvements.

In August 2023, the authority conducted a final round of public consultation through the release of a survey, which sought feedback on the key themes of the review. The survey received 69 responses from a range of interested parties.

Throughout the year, the authority also met with 100 individuals from 60 organisations to discuss the NGER review. The authority heard from a wide range of interested parties including:

- companies with reporting obligations under the NGER scheme and the Safeguard Mechanism
- government agencies that administer the legislation or use the data
- academics and technical experts
- thinktanks and non-government organisations.



2. Overview of the legislation and its operation

2.1. National Greenhouse and Energy Reporting legislation

The NGER Act establishes the legislative framework for the National Greenhouse and Energy Reporting (NGER) scheme, the Safeguard Mechanism and the associated administration, compliance and audit framework.

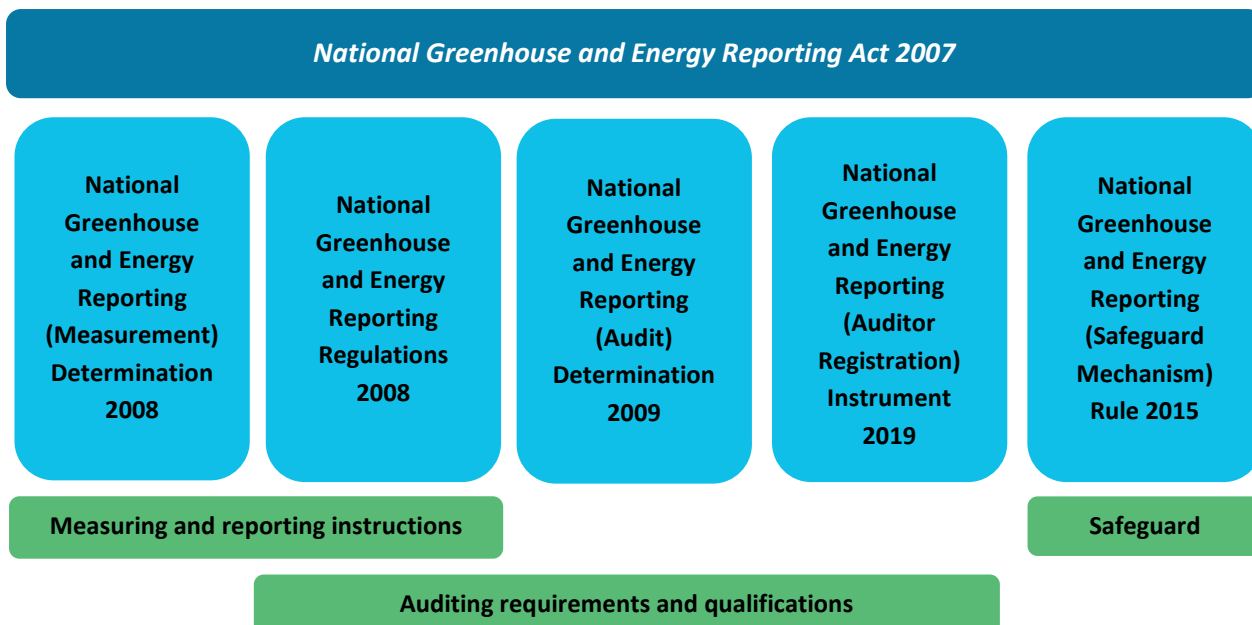


Figure 2.1 The National Greenhouse and Energy Reporting Act and the supporting legislation.

Under the NGER Act there are five legislative instruments (shown in blue in Figure 2.1) which detail the requirements of these three components (shown in green in Figure 2.1). These are:

- The *National Greenhouse and Energy Reporting Regulations 2008* specifies details to support the operation of the NGER Act, including in relation to registration, reporting, disclosure and general administration.
- The *National Greenhouse and Energy Reporting (Measurement) Determination 2008* (Measurement Determination) sets out methods, standards and criteria to be applied when estimating greenhouse gas emissions, energy production and energy consumption.
- The *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015* sets out detail to support the operation of the Safeguard Mechanism, including in relation to coverage, baselines, crediting, compliance, registration, reporting and other general administrative procedures.
- The *National Greenhouse and Energy Reporting (Audit) Determination 2009* sets out requirements for preparing for, conducting and reporting on greenhouse and energy audits.
- The *National Greenhouse and Energy Reporting (Auditor Registration) Instrument 2019* specifies the qualifications that an auditor must have to be registered under the NGER Act.

2.2. The reporting scheme

The NGER scheme is the national reporting framework for certain companies to report their greenhouse gas emissions, energy consumption and energy production to the Australian Government.

The NGER Act and supporting instruments detail the requirements of the NGER scheme, including which companies have an obligation to report under the scheme, reporting requirements, and the annual reporting and publication cycle.

2.2.1 Companies required to report under the NGER scheme

Constitutional corporations that meet certain thresholds must report emissions and energy data to the Clean Energy Regulator (the regulator). There are different emissions and energy thresholds for corporate groups and facilities under section 13 of the NGER Act. Reporting obligations are triggered if any of the thresholds are met.

The corporate group thresholds are:

- 50 kilotonnes (kt) CO₂-e of combined scope 1 and scope 2 emissions,
- production of 200 terajoules (TJ) of energy, or
- consumption of 200 TJ of energy.

The facility thresholds are:

- 25 kt CO₂-e of combined scope 1 and scope 2 emissions,
- production of 100 TJ of energy, or
- consumption of 100 TJ of energy.

If a corporate group threshold is met, data on all facilities in the group must be reported regardless of whether individual facilities have met the facility threshold. However, if a facility threshold is met but a corporate group threshold is not, only data for the facility that meets the facility threshold must be reported (Section 13, NGER Act; Part 3, NGER Regulations).

A facility is defined as an activity (or series of activities) that generates greenhouse gas emissions or produces or consumes energy (CER, 2023a). The NGER Regulations provide additional detail to guide application of the definition, such as in relation to grouping of activities and the attribution of activities to particular industries. Examples of facilities which report under the scheme are electricity power stations, mine sites, landfills, construction sites, manufacturing plants, retail outlets, air, rail and road transport operations, and gas and water supply facilities. The definition of a facility under the NGER legislation is intentionally broad and is designed to provide corporations with a degree of flexibility in applying the definition to their own specific circumstances (CER, 2022a). For example, a facility could be defined as a factory as well as the transportation of goods that are outside the factory's boundaries but still associated with the factory's activities (CER, 2023a).

Reporting obligations under the NGER Act primarily apply to the controlling corporations (usually at the top of the corporate hierarchy in Australia). The controlling corporation's group ('corporate group') may consist of a single controlling corporation, or it may have subsidiaries that are recognised as group members under the NGER scheme (CER, 2023a). The controlling corporation must report on all facilities within its corporate group over which it or its group members have operational control. Operational control is defined as having the greatest authority to introduce and implement any operating, health and safety, or environmental policies for the facility (Section 11, NGER Act).

Registration and de-registration of companies

All controlling corporations that meet any of the thresholds described above must register with the regulator by 31 August following the financial year in which they first meet the threshold. A controlling corporation may apply to be deregistered provided it is not likely to meet any of the thresholds for the next three years and it can demonstrate that it has complied with its reporting obligations under the NGER Act (CER, 2022b).

There are two situations in which reporting obligations for a facility may not apply to the controlling corporation and are instead met through a different emissions and energy report:

- If a group member of a corporate group agrees with its controlling corporation to take on reporting obligations for one or more facilities, the group member completes a report containing information about the agreed facility or facilities (Section 22X, NGER Act)
- If a corporation or group member wishes to take on reporting obligations for facilities it has financial control for, the corporation will need to obtain a Reporting Transfer Certificate (RTC) for each individual facility. This transfers NGER reporting obligations from a controlling corporation with operational control over a facility to the corporation that has financial control over the facility (Section 22G, NGER Act).

The regulator is of the view that there is good awareness of reporting obligations across industry, with most companies self-identifying when a relevant reporting threshold is met (CER pers. comm., 2023). The authority observed that the regulator takes a proactive approach to preventing non-compliance through education and monitoring activities to provide advice and support to companies. Appendix E outlines the regulator's compliance and enforcement framework and details the various education and monitoring activities undertaken by the regulator.

2.2.2 Reporting requirements under the NGER scheme

The NGER Act requires all registered corporations to report scope 1 and scope 2 greenhouse gas emissions, energy production and energy consumption data relating to the operation of facilities for each financial year.

The Measurement Determination sets out methods, standards and criteria to be applied when calculating this information. The Measurement Determination is updated annually to reflect improvements in emission estimation methods, updates to emission factors and responses to consultation feedback (DCCEEW, 2022a). Only emissions and energy production and consumption data from specific activities and sources for which there are applicable methods are required to be reported.

The integrity of the data reported under the scheme is underpinned by the methods in the Measurement Determination. These are aligned with the international emissions reporting requirements established under the Paris Agreement, including the application of certain Intergovernmental Panel on Climate Change (IPCC) guidelines for national greenhouse gas inventories mentioned in relevant decisions of parties to the agreement,⁴ and those used to report energy production and consumption to the International Energy Agency (IEA, 2023a).

⁴ Decisions 18/CMA.1 ([FCCC/PA/CMA/2018/3/Add.2](#)) and 5/CMA.3 ([FCCC/PA/CMA/2021/10/Add.2](#)).

Scope 1

Emissions released as a direct result of an activity. Scope 1 emissions are sometimes referred to as direct emissions.

Examples of scope 1 emissions are:

- emissions produced from manufacturing processes, such as from the manufacture of cement
- emissions from the burning of diesel fuel in trucks
- fugitive emissions, such as methane emissions from coal mines
- production of electricity by burning coal.

Scope 1 emissions must be reported under the NGER scheme.

Scope 2

Indirect emissions that are associated with the use of purchased electricity (or heating, cooling or steam) at a facility. Scope 2 emissions from one facility are part of the scope 1 emissions from another facility.

Examples of scope 2 emissions are the emissions from electricity purchased (or heating, cooling or steam) and used by:

- a car factory to power its machinery and lighting
- an aluminium smelter to power electrolytic processes
- a large supermarket for lighting, heating or cooling.

Scope 2 emissions must be reported under the NGER scheme.

Scope 3

Scope 3 emissions are all other indirect greenhouse gas emissions other than scope 2 emissions that are generated in the wider economy. They occur as a consequence of the activities of a facility, but from sources not owned or controlled by that facility's business.

Examples of scope 3 emissions are the emissions associated with the:

- extraction and production of purchased materials
- transportation of purchased fuels
- use of sold products and services
- flying on a commercial airline by a person from another business.

Scope 3 emissions are not reported under the NGER scheme.

Table 2.1 Scope 1, 2 and 3 emissions (CER, 2023b).

Reporting requirements for energy production and consumption

The NGER Regulations, in conjunction with the Measurement Determination, require the total energy content of energy produced or consumed from various fuels (such as coal, petroleum, gas and biofuel) or energy commodities (such as sulphur, uranium and hydrogen) to be reported. Electricity production and consumption must also be reported if the generating unit has the capacity to produce at least 0.5 megawatts (MW) of electricity and generates more than 100,000 kilowatt hours (kWh) of electricity (or 20,000 kWh if the electricity is not generated at the facility). Where electricity production is reported, it is necessary to identify certain sources of electricity (e.g. whether it was thermal, geothermal, solar, wind, water or biogas generation).

For example, if a coal-fired power plant uses coal to produce electricity it must report the coal used as an energy source and the electricity generated as energy production. The reporting scheme covers most of Australia's energy production and consumption.

Reporting requirements for greenhouse gas emissions

The NGER Act requires scope 1 and scope 2 emissions data to be reported (see Table 2.2). Scope 1 emissions are the release of a greenhouse gas into the atmosphere as a direct result of an activity or series of activities that constitute the facility (Division 2.5, NGER Regulations). Scope 2 emissions are indirect emissions that are the result of purchased electricity (or heating, cooling or steam) that is consumed by the facility (Division 2.5, NGER Regulations).

Scope 2 emissions are reportable if electricity consumed at a facility is purchased from the main electricity grid of a state or territory, a network other than the main grid, or a direct connection from the producer (CER, 2023b). Electricity produced and consumed at the same facility does not give rise to reportable scope 2 emissions (CER, n.d., a). For example, a power station burns coal to create electricity, causing reportable scope 1 emissions for the power station. If the electricity is then supplied to the grid and consumed by a factory to power its machinery, the emissions that resulted from the burning of the coal to create the electricity used in the factory represent scope 2 emissions which must be reported by the factory. It is important to note a facility's scope 2 emissions are another facility's scope 1 emissions. However, the availability of scope 1 and scope 2 data is important for understanding how energy consumers, through their demand for electricity, influence the amount of greenhouse gas emissions being emitted by the power station.

Under the NGER scheme, companies must report their emissions of carbon dioxide, methane, nitrous oxide, sulphur hexafluoride, and certain hydrofluorocarbons and perfluorocarbons (CER, 2023b). This is broadly consistent with the gases covered under the United Nations Framework Convention on Climate Change (UNFCCC, 1997) and those reported in Australia's greenhouse gas inventory (DCCEEW, 2023b).

Emissions reported under the NGER scheme

The NGER Regulations, in conjunction with the Measurement Determination, requires all scope 1 emissions arising from energy (including fuel combustion and fugitive emissions), industrial processes and waste to be reported. Scope 1 emissions from agriculture, land use, land use change, forestry, private vehicle transport and residential sectors are not included under the scheme. For example, agricultural businesses are not required to report scope 1 emissions arising from agricultural activities, such as methane emissions from livestock. However, these businesses must report any scope 1 emissions due to fuel combustion, industrial processes and waste, scope 2 emissions and energy production and consumption, provided they meet the reporting threshold.

Emissions source	Total Australian emissions (Mt CO ₂ -e)	NGER total reported scope 1 emissions (Mt CO ₂ -e)	NGER proportion of source emissions reported (%)
Energy – fuel combustion			
<i>Electricity generation</i>	163	149	91
<i>Transport</i>	90	16	18
<i>Other fuel combustion</i>	102	83 ⁵	81
Energy – fugitive emissions	49	42	86
Industrial processes	33	21	64
Waste	13	4	31
Agriculture	78	0	0
Land use, land use change and forestry	-64	0	0
TOTAL	465	315	68

Table 2.2 The proportion of Australia’s emissions captured under the NGER scheme by sector for the reporting year 2020-21. Total Australian emissions (DCCEEW, n.d.) and NGER total reported scope 1 emissions.

Emissions from the transport and waste sectors are not well covered by the scheme due to the requirement for reporters to be constitutional corporations. For the transport sector, a significant portion of emissions are due to light vehicles owned by individuals who do not need to report. For the waste sector, many landfills are owned by local councils which also do not meet the definition of constitutional corporation.

While the majority of emissions for the fugitive emissions, industrial processes and other fuel combustion inventory sectors are covered under the NGER scheme, a little over 30% of Australia’s net emissions are not reported. Other approaches are used to obtain estimates for the remaining sources of Australia’s emissions that are not reported under the scheme (which are largely from agriculture, small-scale manufacturing industries, transport and service industries).

Methods to estimate emissions

Emissions are only reportable if there is a relevant method available in the Measurement Determination which specifies how to estimate the emissions from a particular source (Section 13, NGER Act). There are up to four possible methods available for estimating scope 1 emissions from each source (Methods 1, 2, 3 and 4). The availability of each method in the Measurement Determination differs depending on the source of emissions, and reporters can currently choose which method to use out of those available. Generally, the higher the method used to estimate emissions, the more accurate the estimated emissions (CER, 2022c).

⁵ This number may include some fuel combustion emissions from on-site electricity generation.

Method 1 is the simplest estimation method, and is based on default emission factors which are used to estimate greenhouse gas emissions of a particular activity by converting a unit of activity into an emissions equivalent (DCCEEW, 2023c). Emission factors are often based on a sample of measurement data, averaged to develop a representative rate of emissions for a given activity (IPCC, 2019a). The amount of emissions is calculated by multiplying the specific emission factor by the quantity of the activity. The Method 1 emission factors available in the Measurement Determination are based on those used in Australia’s National Greenhouse Gas Inventory (Explanatory Statement, National Greenhouse and Energy Reporting (Measurement) Amendment (2023 Update) Determination 2023, 2023). Most of these are country-specific values derived from studies which reflect emissions from activities undertaken in an Australian context.

NGER Methods 2 and 3 require the use of progressively higher levels of facility-specific information to estimate emissions, such as through sampling according to Australian or international standards. Method 4 is the most sophisticated, requiring direct measurement or monitoring of emissions.

Method 1	Method 2	Method 3	Method 4
The simplest method, also referred to as the default method. It uses emission factors.	Requires facility-specific information such as industry-based sampling and applies Australian or international standards, or their equivalent, to the analysis.	Very similar to method 2, except that it requires Australian or international standards to be applied to <i>both</i> sampling and analysis.	Typically requires direct monitoring or measuring of emissions on a periodic or continual basis.

Table 2.3 An overview of the methods included in the NGER Measurement Determination.

For scope 2 emissions, the Measurement Determination provides two compulsory location-based⁶ methods (Methods A1 and A2) to estimate emissions from the consumption of purchased energy depending on whether the electricity was purchased from the main grid or from other sources. These methods employ emission factors of tonnes of scope 1 emissions per kilowatt hour of electricity consumed. Scope 2 emission factors for the consumption of purchased electricity from Australia’s major electricity grids are updated annually to reflect the latest data on the mix of electricity generation sources, which is a major determinant of the emission factors (CER, 2022d). This is known as the location-based method where the emission factor reflects the average emissions of the grid.

In June 2023, the Measurement Determination was updated to introduce optional and supplementary reporting of market-based scope 2 emissions from consumption of electricity purchased or acquired from an external (to the facility) network. This amendment allows reporters to have the lower emissions associated with some electricity purchases reflected in their scope 2 emissions.

2.2.3 Reporting cycle

All registered controlling corporations (and group members or corporations that have taken on reporting responsibilities) are required to submit an NGER report each year (Section 19, NGER Act). Reports are submitted electronically through the Emissions and Energy Reporting System (EERS). The deadline for reporting is 31 October (or the next working day if the date falls on a weekend or public

⁶ Location-based means reporters must report the fuel or electricity they physically consume.

holiday) for the preceding financial year (CER, 2022e).

2.2.4 Publication of data reported under the NGER scheme

Not all information reported under the NGER scheme is published. By 28 February, the regulator is required to publish specific data reported by corporations above certain emissions thresholds, known as the “publication threshold” (Section 24, NGER Act).

The publication threshold for controlling corporations is 50 kt CO₂-e per year for combined scope 1 and 2 emissions. For each corporate group that meets this threshold, the regulator must publish its total scope 1 emissions, total scope 2 emissions and net energy consumption. For Reporting Transfer Certificate (RTC) holders, if the reported combined scope 1 and 2 emissions are 25 kt CO₂-e or more, or the production or consumption of energy is 100 TJ or more, the regulator must publish its total scope 1 emissions, total scope 2 emissions and net energy consumption.

Under section 24 of the NGER Act the regulator must also publish data on emissions and energy produced by designated electricity generation facilities.

More detailed data is available for use by governments under strict confidentiality conditions.

2.2.5 Audit framework

The audit framework established under the NGER Act applies to the NGER scheme as well as other schemes the regulator administers. Audits are not mandated under the NGER scheme, however the regulator actively encourages reporters to conduct voluntary audits. The regulator may also initiate an audit under certain circumstances, such as when it has grounds to suspect non-compliance.

Under the NGER Act, the regulator is required to maintain a register of auditors to assist participants and appoint a suitable auditor.

2.3. The Safeguard Mechanism

The Safeguard Mechanism provides a framework to reduce emissions at Australia’s largest industrial facilities through legislated limits, known as baselines, on scope 1 emissions. If a Safeguard facility exceeds its baseline, excess emissions must be managed. Facilities that fail to comply with the Safeguard Mechanism can become liable to pay a penalty (CER, 2023c).

The Safeguard Mechanism was first legislated in 2014 and commenced operation in 2016 (DCCEEW, 2023d). The policy has recently undergone significant reforms which came into effect on 1 July 2023. To provide assurance that industrial facilities will deliver a proportional share of Australia’s emissions reduction targets (43% below 2005 levels by 2030 and net zero by 2050) and achieve real emissions reductions, the reforms included the addition of emissions targets in the second object of the NGER Act.

These emissions targets are known as the “Safeguard outcomes” and include:

- Total net Safeguard emissions for all of the financial years between 1 July 2020 and 30 June 2030 do not exceed a total of 1,233 million tonnes of carbon dioxide equivalence.
- Net Safeguard emissions decline to:
 - i. no more than 100 million tonnes of carbon dioxide equivalence for the financial year beginning on 1 July 2029
 - ii. zero for any financial year to begin after 30 June 2049.
- The 5-year rolling average of Safeguard emissions for each financial year that begins after 30 June 2024 is lower than the past 5-year rolling average safeguard emissions for that financial year.

Under the Safeguard reforms, when the Minister makes or amends the Safeguard Rules, they must be satisfied that those rules are consistent with the Safeguard outcomes, as well as the other objects of the Act. The Minister is also required to publish their reasons for being satisfied (Section 22XS, NGER Act).

Other key elements of the reforms included declining facility baselines, which reduce over time, and the introduction of Safeguard Mechanism Credits (SMCs) to incentivise facilities to reduce their emissions beyond their baselines.

The Safeguard Mechanism is administered through the NGER scheme, therefore facilities under the Safeguard Mechanism must also adhere to the reporting requirements outlined in Section 2.2.

2.3.1 Safeguard facilities

The Safeguard Mechanism applies to facilities that emit gross scope 1 emissions of 100 kt CO₂-e per year, or more (Part 2, Safeguard Rule). This applies to facilities across a broad range of industry sectors including mining, oil and gas extraction, manufacturing, electricity generation, transport and waste (DCCEEW, 2023e).

The Safeguard Mechanism has been designed to accommodate the unique circumstances of the electricity generation and waste sectors:

- For the electricity sector, a single ‘sectoral’ baseline of 198 Mt CO₂-e (based on the electricity sector’s emissions from 2009-2010 to 2013-2014) is applied across all electricity generators connected to one of Australia’s main electricity grids and is not expected to be exceeded (Australian Government, 2023).
- For the waste sector, only emissions from waste deposited after the scheme commenced in 2016 are covered (Australian Government, 2023).

In 2021-22, the Safeguard Mechanism covered 219 facilities (CER, 2023d) predominantly in the mining, manufacturing, gas and transport sectors. Figure 2.2 shows the breakdown of the number of Safeguard facilities by sector (excluding grid-connected electricity generators which are subject to a sectoral baseline). These facilities reported a total of 137.5 Mt CO₂-e scope 1 emissions in 2021-22 (CER, 2023d), accounting for 35% of the total emissions reported under the NGER scheme (CER, 2023e).

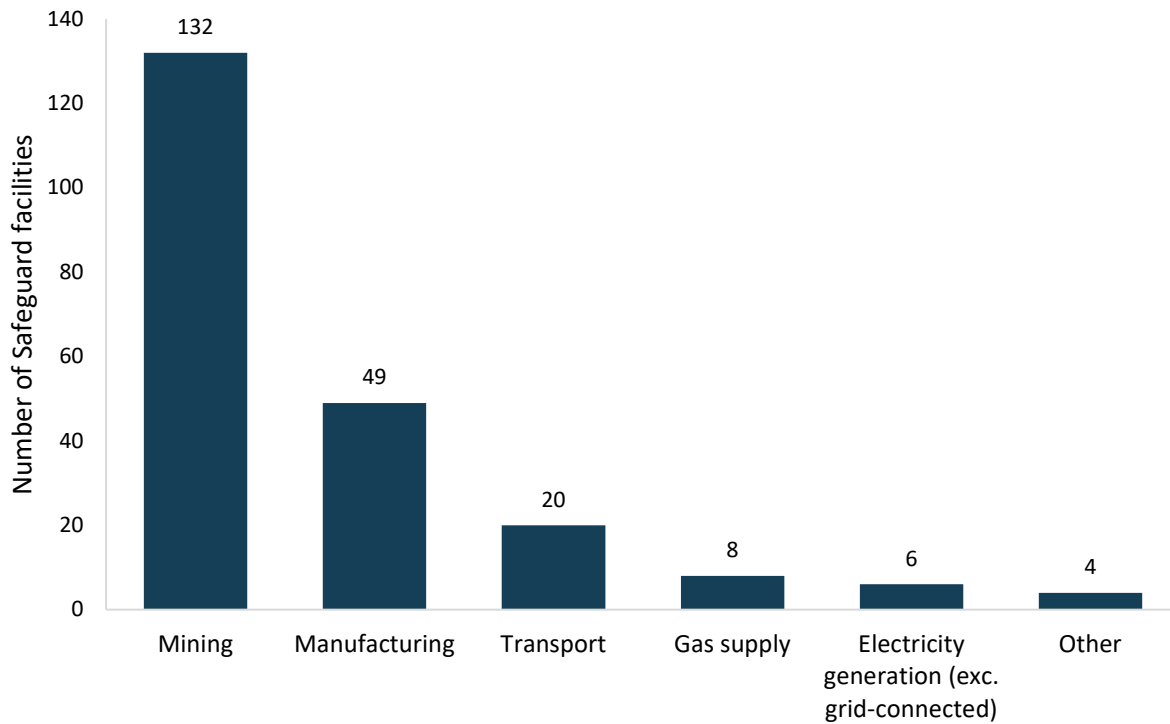


Figure 2.2 The number of Safeguard facilities by sector, excluding grid-connected electricity generators.

2.3.2 Baseline setting

Following the reforms to the Safeguard Mechanism, from 2023-24 baselines for all facilities will be set using a production-adjusted (intensity) framework. This involves multiplying a production value by an emissions intensity value, allowing baselines to grow and fall with production.

Baselines for existing facilities will be set using a hybrid industry-average site-specific emissions intensity model, with ratios initially weighted towards site-specific values and transitioning to entirely industry-average values by 2030, as outlined in Table 2.4. This approach was chosen by the Department of Climate Change, Energy, the Environment and Water (the department) because industry average baselines are expected to be more efficient as they provide an incentive for production to occur where emissions are lowest (DCCEEW, 2023d). This approach also removes aggregate headroom, allowing for crediting and trading to begin at scheme commencement.

	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
Industry Average:	10 : 90	20 : 80	30 : 70	40 : 60	60 : 40	80 : 20	100 : 0
Site Specific							

Table 2.4 The hybrid industry average/site-specific emissions intensity weighting model to be used for existing facilities.

Site-specific emission intensity values for existing facilities are set using historic data, calculated using the middle three values from the five most recent years of data (2017-18 to 2021-22) to calculate a production-weighted, average emissions intensity value(s) for the facility.

The baselines for new facilities will be set using international best practice emissions-intensity values (adapted for the Australian context), recognising these facilities have the opportunity to use the latest technology and build international best practice emissions performance into the design of the facility. This also applies to existing facilities that begin producing new products (DCCEEW, 2023d).

2.3.3 Data published for Safeguard facilities

Under the NGER legislation, the regulator will be required to publish by 15 April (for financial years 2023-24 onwards) the following information for the preceding year for each facility covered under the Safeguard Mechanism:

- amount of covered emissions (gross scope 1 emissions)
- breakdown of covered emissions by carbon dioxide, methane and nitrous oxide
- baseline emissions number
- number of Safeguard Mechanism Credits (SMCs) issued
- if a monitoring period for the facility ended during the preceding year, the following is also published
 - the facility's net emissions number
 - the number and type of offsets surrendered
 - the methodology determinations under which any surrendered ACCUs were created.

The regulator is also required to publish for each financial year between 1 July 2023 and 30 June 2030 a report on the outcomes from Safeguard facilities for each financial year, including gross emissions, net emissions, 5 year rolling average and total cumulative emissions over financial years since 1 July 2020.

Further information about the Safeguard Mechanism and the administration and compliance of the NGER legislation can be found in Appendix E.





3. The reporting scheme

3.1. Performance of the scheme

In assessing whether the NGER scheme is meeting the objective set out in the NGER legislation, it is important to consider the context in which the scheme is operating. This includes the requirements for international reporting obligations, the needs of government policy and the needs of the Australian public, along with the global environment in which Australia is operating.

3.1.1 The NGER scheme in the Paris Plus context

As outlined in Chapter 1, the context in which the NGER scheme is operating has changed since its introduction in 2007, and even since 2018, when the authority completed its first review of the scheme. Australia now finds itself in the world of ‘Paris Plus’ — a world in which governments and markets are reorienting to net zero emissions.

In this Paris Plus world, there is an ever-increasing demand for climate-related data from governments and markets alike. Governments are not only tracking their progress towards their domestic targets but are also looking more closely at the emissions generated across the global supply chains that cross their borders (CCA, 2021a). Capital is increasingly being allocated to less carbon intensive investments (CCA, 2021a).

Around the world, new policies and initiatives that support the provision of climate-related data for governments, markets and consumers are emerging. Examples include: Carbon Border Adjustment Mechanisms (CBAMs), climate-related financial disclosures and product-based embedded emissions accounting schemes. Here in Australia, the government is currently developing a Guarantee of Origin (GO) scheme (a product-based embedded emissions accounting scheme) (DCCEEW, 2023f) and climate-related financial disclosure mandates (The Treasury, 2023) — both of which have links to the NGER scheme and are expected to begin in 2024. The government is also undertaking a review of carbon leakage, due in late 2024, which will include an assessment of the feasibility of an Australian Carbon Border Adjustment Mechanism, particularly in relation to steel and cement (DCCEEW, 2023g).

This chapter considers the performance of the NGER scheme against the objective of the legislation in the context of ‘Paris Plus’. It also explores the potential interactions between the NGER scheme and the emerging GO scheme and the proposed climate-related financial disclosure system.

3.1.2 Meeting Australia’s international reporting obligations

The NGER scheme plays an integral role in providing the data for Australia to meet its international reporting obligations including to the United Nations Framework Convention on Climate Change (UNFCCC) and the International Energy Agency (IEA) (DCCEEW, 2022b).

Australia’s annual National Inventory Report and associated Common Reporting Tables (CRTs) fulfil its national inventory reporting obligations under both the UNFCCC and the Paris Agreement (DCCEEW, 2023a). The national greenhouse inventory, of which the NGER dataset is a key source, is also the official basis for tracking progress towards Australia’s national emissions reduction targets submitted under its Nationally Determined Contribution (NDC). In the most recent National Inventory Report, the Department of Climate Change, Energy, the Environment and Water (the department) noted that the NGER scheme is one of the most critical assets in the preparation of these reports (for the sectors where facility-level data is relevant) (DCCEEW, 2023a). NGER data covers three of the five emission source sectors (Figure 3.1) — energy, industrial processes and product use (IPPU) and waste — and is used to estimate approximately 60% of Australia’s emissions (DCCEEW, 2023a).



Figure 3.1 Sectors in Australia’s National Inventory Reports that are informed by NGER data. The width of the boxes is proportional to the sector’s contribution to total inventory emissions. *The land use, land use change and forestry is a net negative contributor.

The NGER dataset is also used to prepare the Australian Energy Statistics (AES). The AES is the authoritative and official source of energy statistics for Australia and forms the basis of Australia’s international reporting obligations to the IEA (DCCEEW, 2023h). The AES provides detailed energy consumption, production and trade statistics and balances, by state and territory, by energy type and by industry, in energy content units and volume or mass units (DCCEEW, 2023i). Facility level data from the NGER scheme are a key input to the AES (DCCEEW, 2022c).

It will be important to ensure that the NGER scheme continues to support Australia’s international reporting obligations and policy development in the same robust manner it has since 2008. In formulating recommendations for the NGER scheme in this review, the authority has carefully considered opportunities for supporting emerging data needs and maintaining the integrity of the scheme.

3.1.3 Informing government policies, programs and activities

The NGER scheme collects information on energy and emissions which informs government policies, programs and activities. In addition to publicly available data, government agencies can access the more extensive dataset reported under the reporting scheme relevant to their jurisdiction, subject to requirements for data protection and confidentiality. Currently, the Clean Energy Regulator (the regulator) shares more detailed NGER data with 45 Commonwealth, state and territory, and local government agencies (CER pers. comms.).

State and territory government agencies use NGER data for a range of different activities including emissions and energy modelling, and designing policies, strategies and programs. For example, the NSW Government uses NGER data to develop regional- and local-scale greenhouse gas emissions datasets, which are compiled to inform state, regional and local climate mitigation actions (NSW DPE, 2022). The NSW Government makes these regional- and local-scale emissions datasets that they derive from this analysis accessible through the NSW Net Zero Emissions Dashboard (NSW DPE, 2022).

At the federal level, NGER data informs policy design and implementation. Federal agencies use NGER data to model future emissions and to track progress towards emissions reduction targets. As Australia moves towards net zero, measuring and accounting for every tonne of greenhouse gas emissions will be essential, placing an even higher emphasis on the accuracy and integrity of NGER data (IPCC, 2022).

NGER data was used in the design of the reformed Safeguard Mechanism and will underpin emissions reported by Safeguard facilities each financial year as they meet their compliance obligations. Importantly, declining baselines and the creation of Safeguard Mechanism Credits (SMCs) mean NGER data and methods will go beyond providing information and will be integral to the operation of new markets. Safeguard facility emissions numbers, calculated using NGER methods, will underpin the assessment of Safeguard facilities’ performance against their baselines, including calculation of any liability that needs to be addressed (e.g. by surrender of ACCUs or SMCs), and any SMCs generated. This

new role for the NGER scheme places an even higher emphasis on accuracy, transparency, and integrity.

NGER scheme elements are also used to inform other federal policies, programs and initiatives including Climate Active, the Corporate Emissions Reduction Transparency initiative and the ACCU Scheme (Climate Active, 2022; CER, 2023f; CER, 2021). As discussed further below, future federal policies and initiatives will also interact with the NGER scheme, including the GO scheme and the climate-related financial disclosures.

The authority also uses NGER data to inform its advice to the government on progress towards national emissions reduction targets and sectoral emissions reduction.

3.1.4 Informing the Australian public

The regulator is required by legislation to publish certain information collected under the NGER scheme:

- Scope 1 and 2 emissions and net energy consumption by company (for those that meet the relevant publication threshold).
- Scope 1 and 2 emissions and net energy consumption for Reporting Transfer Certificate (RTC) holders (for those that meet the relevant publication threshold).
- Facility-level emissions and generation data for designated electricity generation facilities.
- Facility-level emissions data for Safeguard facilities.
- A list of all registered reporters under the NGER Act.
- A register of greenhouse and energy auditors.

The regulator also publishes additional aggregated data, permitted under the legislation, to provide additional insights to the Australian public (CER, 2023g).

Respondents to the authority's consultation on the review noted the role of the NGER scheme in informing the Australian public, but have emphasised that the needs of the public are changing:

The data gathered has enabled higher quality public policy, progress tracking and public accountability.... However, as the need for high-quality, transparent data increases, the NGER scheme should be improved.

Climateworks, submission to this review

...Expectations and needs associated with emissions disclosure have significantly evolved [since 2007]. There is now a wider group of stakeholders that require access to reliable information on corporate emissions. This group includes financial institutions, who need emissions data to inform their investment and lending decisions.

Australian Sustainable Finance Institute, submission to this review

The authority recognises the needs of the Australian public have been evolving, particularly in the Paris Plus context. For example, NGER data will have an increasingly important role to play in verifying emissions and energy claims made by companies (where the companies are NGER reporters). Already, the regulator works closely with other regulators, such as the Australian Competition and Consumer Commission and the Australian Securities and Investment Commission and provides data and information in support of their potential regulatory action relating to greenwashing (CER, 2023h).

Transparency is a key theme of the authority's NGER review this year. Detailed findings and recommendations on the transparency of the NGER scheme can be found in Section 3.4.

3.1.5 Reducing duplication

Reducing duplication of emissions and energy reporting requirements across jurisdictions and minimising the regulatory burden on businesses was one of the primary motivations for establishing the NGER scheme (Revised Explanatory Memorandum, National Greenhouse and Energy Reporting Bill 2007). The 2018 review found that cases of duplicative reporting had largely been eliminated, with only a small number of instances where some duplication remained. In those instances, the authority considered that a limited amount of duplication was necessary due to different reporting schemes having different purposes, frameworks and definitions (CCA, 2018).

The authority has not been made aware of any major changes to the current state of reporting and levels of duplication since the 2018 review. However, new reporting schemes are emerging at the national level — some voluntary and some mandatory — where there is the potential for unnecessary duplication of reporting to emerge. The next section explores the potential interactions between the NGER scheme and these emerging schemes.

3.1.6 Interactions with emerging reporting schemes

Climate-related financial disclosures and the GO scheme are two examples of emerging reporting schemes in Australia with links to the NGER scheme. While both schemes are still under development in 2023, the authority has considered the potential future interactions between these emerging schemes and the NGER scheme. As the climate reporting and information environment continues to develop in Australia, it will be important to ensure complementarity between the schemes and avoid unnecessary duplication of reporting.

Climate-related financial disclosures

The government has committed to ensuring large businesses and financial institutions provide greater transparency and accountability when it comes to their climate-related plans, financial risks, and opportunities (The Treasury, 2023). As part of this commitment, the government will introduce standardised, internationally-aligned reporting requirements for businesses to make disclosures regarding governance, strategy, risk management, targets and metrics — including greenhouse gas emissions (The Treasury, 2023). The government is proposing to phase in the requirements over three years, beginning in 2024-25.

In June 2023, the government released a consultation paper on proposed positions for the detailed implementation of disclosure of climate-related financial risks and opportunities (The Treasury, 2023). Legislation was also introduced to Parliament this year to give the Australian Accounting Standards Board (AASB) the ability to develop climate-related reporting standards. The next steps will be for the AASB to develop and consult on these standards.

The proposed design of the climate-related financial disclosures identifies interactions with the NGER scheme:

- **Determining who must make a disclosure** – all entities that are required to report under Chapter 2M of the *Corporations Act 2001* that are registered as a ‘Controlling Corporation’ reporting under the NGER Act are proposed to be covered by climate-related disclosure requirements, even if they do not meet the main threshold criteria that will be set for the disclosures (The Treasury, 2023).
- **Determining when disclosures will be phased in** – it is proposed that requirements for NGER reporters to make disclosures will be phased in based on the NGER publication threshold (50 kt CO₂-e), with those over the publication threshold in group 1 (disclosures starting in 2024-25) and those below the publication threshold in group 3 (disclosures starting in 2027-28) (The Treasury, 2023).
- **Information in the disclosure** – it is proposed that disclosures will include gross⁷ scope 1 and 2 emissions for the reporting period and that these will be calculated consistent with methods set out in the NGER legislation (The Treasury, 2023). It is also proposed that companies would be required to disclose material scope 3 emissions, material climate-related risks and opportunities to their business, and information on scenario analysis and transition planning.
- **Auditing providers** – it is proposed that the Register of Greenhouse and Energy Auditors established under the NGER scheme would be available for the use of climate-related disclosure audits (The Treasury, 2023).

The NGER scheme and the proposed climate-related financial disclosures will serve two different but important purposes. The authority is of the view that the proposed ways in which the NGER scheme will support the disclosures are appropriate — the NGER scheme will provide a reliable and nationally consistent framework for calculating emissions in the disclosures, ensuring the emissions reported across the two schemes are comparable and robust. The authority has identified further opportunities for the NGER scheme to support robust and consistent emissions reporting via the climate-related financial disclosures. These opportunities are discussed below in Section 3.2 Coverage.

Guarantee of Origin scheme

The government is developing a GO scheme to track and verify emissions associated with hydrogen, renewable electricity, and potentially other products (CER, 2023i). The GO scheme will include a product-based emissions accounting framework that measures and tracks emissions across the value chain — i.e. the emissions ‘embedded’ in the product. It is intended that the scheme will be voluntary and will support businesses and consumers looking to credibly demonstrate the low emission characteristics of the products or energy that they produce or purchase (DCCEEW, 2023j).

In 2023, the department continued to develop the GO scheme including consulting on the proposed scheme design (DCCEEW, 2023j). In parallel, the regulator has been conducting trials to test the GO scheme for tracking and verifying emissions embedded in hydrogen and its derivatives (CER, 2023i; CER, 2023j). The scheme is intended to be legislated by the start of 2024 (DCCEEW, 2022d).

⁷ Defined here as emissions without the consideration of offsets.

The GO scheme is proposed to be established under new legislation and implemented by the regulator (DCCEEW, 2023j). Consultation conducted by the department revealed that this was the preferred approach by stakeholders, over an amendment to the NGER Act (DCCEEW, 2022d). Nevertheless, interactions exist between the proposed GO scheme and the NGER scheme:

- The GO scheme will draw upon the NGER Measurement Determination in establishing emissions measurement and approaches, and when there is an overlap between the two schemes, the GO scheme will look to align the measurement and emissions approach with the NGER method (DCCEEW, 2022d).
- The department has proposed that participants in the GO scheme may use supplier-specific emissions data or default emissions factors for calculating upstream emissions, where the use of supplier-specific emissions data may draw on NGER data, if the supplier is an NGER reporter (DCCEEW, 2022d).
- The department is considering the alignment of audit requirements under the NGER scheme and the GO scheme, to improve efficiency and reduce participation costs where a business participates in both schemes (DCCEEW, 2022d).

3.2. Coverage

In assessing the performance of the NGER scheme, the authority considered the key theme of coverage, including reporting thresholds, sectoral coverage and scope 3 emissions.

3.2.1 Reporting thresholds

Reported emissions under the NGER scheme currently include 68% of emissions reported in Australia's national greenhouse gas inventory (Table 2.3). The proportion of emissions reported across each sector varies, with nearly full coverage of electricity generation emissions, less than 20% coverage of transport emissions, and no coverage of agricultural emissions (Table 2.3).

As the Australian economy decarbonises over the coming decades, it is critical that the NGER scheme continues to meet its legislated objectives. To this end, the authority is of the view that it will be important to ensure:

- the proportion of emissions across each sector reported under the scheme is sufficient and does not decline below current levels
- the total scope 1 emissions reported under the scheme as a percentage of Australia's total net emissions across all sectors (including those that do not currently report such as agriculture) does not decline below the current 68% level.

The authority notes that the current 68% level of coverage would increase if emissions from the agricultural sector are reported under the scheme, and is of the view that the increased level of coverage should also be maintained. The recommendations and supporting analysis in this chapter set out a pathway for achieving this.

Under the NGER scheme, the reporting thresholds determine which companies have an obligation to report their emissions and energy data to the regulator. There are two types of thresholds: facility and corporate group thresholds. Companies are required to report if they exceed any of the thresholds in Table 3.1 (Section 13, NGER Act).

	Scope 1 and 2 emissions combined (kt CO ₂ -e per year)	Energy production (TJ per year)	Energy use (TJ per year)
Corporate group threshold	50	200	200
Facility threshold	25	100	100

Table 3.1 The NGER scheme reporting thresholds for corporate groups and facilities.

These thresholds were set based on a cost-benefit analysis when the NGER scheme was established (Revised Explanatory Memorandum, National Greenhouse and Energy Reporting Bill 2007). It was estimated that the scheme would cover 71% of emissions (excluding IPCC-defined Agriculture and Land Use, Land Use Change and Forestry emissions), with the conclusion that this ‘would provide sufficient coverage of emissions and energy data to provide a sound basis for greenhouse gas and energy policy development and programme administration and maintain the integrity of existing national data collections’ (Revised Explanatory Memorandum, National Greenhouse and Energy Reporting Bill 2007).

In relation to the current reporting thresholds of the NGER scheme, the authority heard from various stakeholders through its public consultation:

- Support for reducing reporting thresholds to achieve greater coverage of a broader range of corporate and facility emissions data, providing a more comprehensive understanding of Australia's greenhouse gas emissions profile.
- Current reporting thresholds potentially exclude companies with the real ability to implement improvements, and extending the coverage of the NGER framework could help smaller businesses decarbonise and improve their energy performance.
- Reporting thresholds may need to be lowered as businesses reduce their emissions to maintain visibility of emitters.
- NGER scheme reporting obligations should align and be complementary with those for any incoming or future mandatory climate-related disclosures.
- The complexity of the scheme may become problematic if smaller entities are required to begin reporting and there is no simplification of reporting (e.g. mandatory reporting for scope 1 emissions only) to enable a greater number of smaller entities to report.

In the public survey conducted for this review, the authority asked respondents if the current corporate group and facility reporting thresholds were appropriate. Nearly half of respondents (26/53) thought both the corporate group and facility reporting thresholds were about right, while around a fifth (10/53) of respondents thought the reporting thresholds were too high and around a fifth (10/53) of respondents thought the reporting thresholds were too low.

Analysis of the current reporting thresholds

Noting the interest the authority observed in lowering the reporting threshold/s and the need to ensure the total reported emissions under the NGER scheme is sufficient as Australia decarbonises, the authority explored the option of reducing the corporate group and facility thresholds. This section presents the results of this analysis.

Table 3.2 outlines the percentage of reporters⁸ meeting the corporate group and facility thresholds, and the associated share of emissions reported in 2021-22.

	Percentage of reporters triggering threshold (%)	Share of emissions reported (%)
Corporate group energy and emissions thresholds	52	97.9
Corporate group energy threshold only	37	1.7
Corporate group emissions threshold only	1	0.1
Facility threshold (emissions or energy)	10	0.3
Does not meet any corporate group or facility threshold	0.4	< 0.01
TOTAL	100%	100%

Table 3.2 The percentage of reporters meeting each threshold and the associated share of emissions reported in 2021-22.

There is a clear trend towards reporters meeting a corporate group threshold, with 90% meeting one or both corporate group thresholds. The authority’s analysis found that the corporate group energy threshold is the most common reporting threshold, which is met by 89% of reporters and accounts for nearly all emissions reported under the NGER scheme (more than 99%, Table 3.2).



⁸ At the corporate group level

Further analysis of emissions by sector revealed that more than 99% of emissions reported for nearly all sectors (apart from waste) are reported due to the corporate group energy consumption threshold being exceeded, shown in Figure 3.2. For the waste sector, 87% of emissions are reported due to the corporate group energy consumption threshold being exceeded.

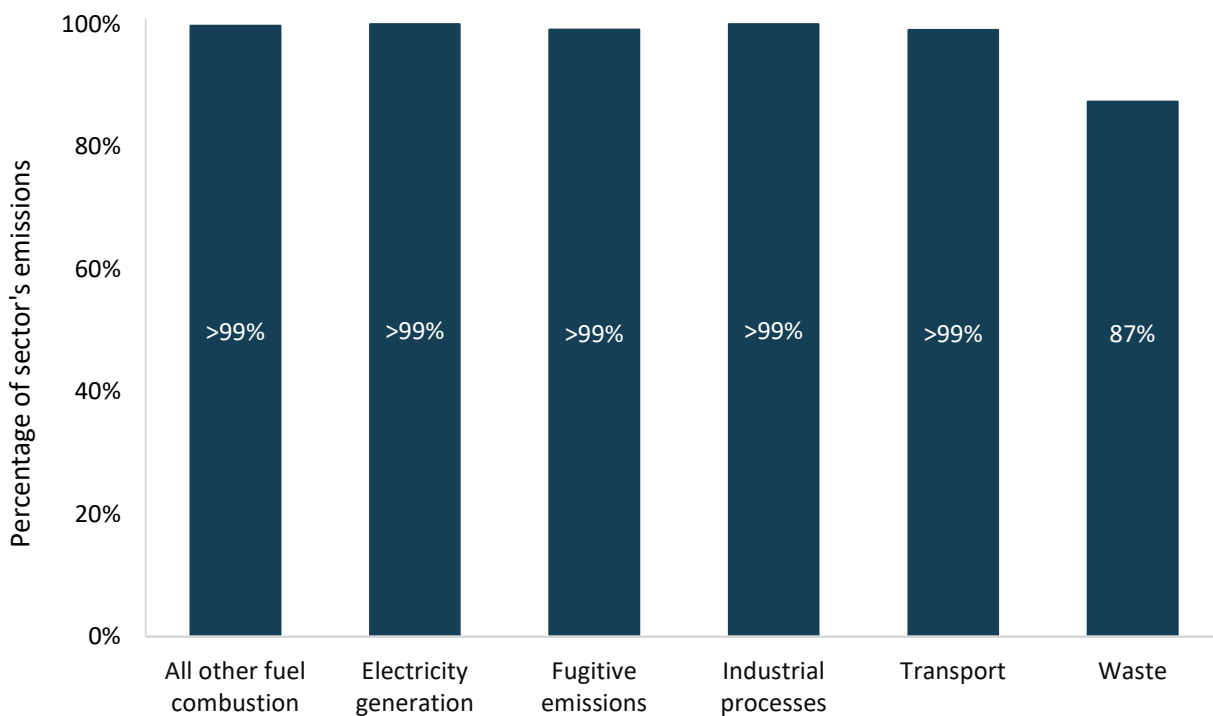


Figure 3.2 The percentage of emissions reported for each sector due to the corporate group energy consumption threshold being exceeded.

To better understand the effectiveness of the current corporate group and facility thresholds, the authority looked at the distribution of reported emissions and energy consumption and production at both the company (reporter) and facility level.

Distribution of reported emissions and energy consumption and production by corporate group

The authority found that 95% of emissions are reported by 34% of companies in 2021-22 (Figure 3.3). The distributions of energy consumption and energy production reported by companies (Figure 3.4 and 3.5) show that around 89% of reporters⁹ under the scheme met the corporate group energy consumption threshold compared to 30% of reporters¹⁰ that met the corporate group energy production threshold.

It is evident that both the corporate group emissions and energy consumption thresholds play a key role in terms of the emissions (Table 3.2) and energy consumption (Figure 3.4) reported under the NGER scheme.

⁹ Comprising 14% reporting total annual energy consumption of between 200 TJ and 300 TJ and 75% reporting total annual energy consumption of more than 300 TJ (Figure 3.4).

¹⁰ Comprising 3% reporting total annual energy production of between 200 TJ and 300 TJ and 27% reporting total annual energy production of more than 300 TJ (see Figure 3.5).

As companies reduce their emissions over the coming years, they may fall below the corporate group emissions threshold. However, as a large proportion of companies trigger the corporate group energy consumption threshold, it is expected that a majority of current reporters will still have an obligation to report under the NGER scheme (assuming energy consumption levels of these businesses remain relatively constant). Furthermore, the authority also notes that 75% of companies reported a total annual energy consumption of at least 300 TJ. This is well above the corporate group energy consumption threshold of 200 TJ. Therefore, it is not expected that the coverage of the scheme will reduce significantly between now and the next review of the NGER legislation in 2028.

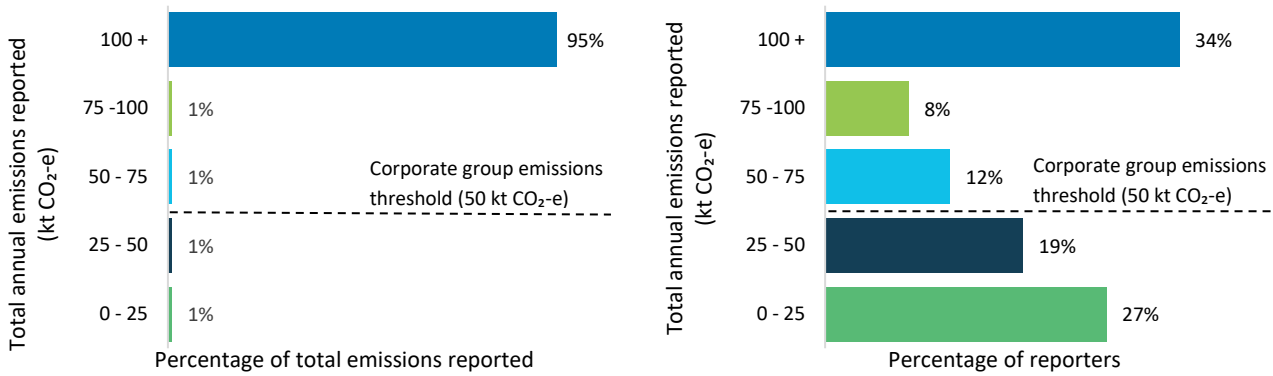


Figure 3.3 The percentage of emissions reported for various bands of total annual emissions reported at the corporate group level (left) and the percentage of reporting companies in each band (right).

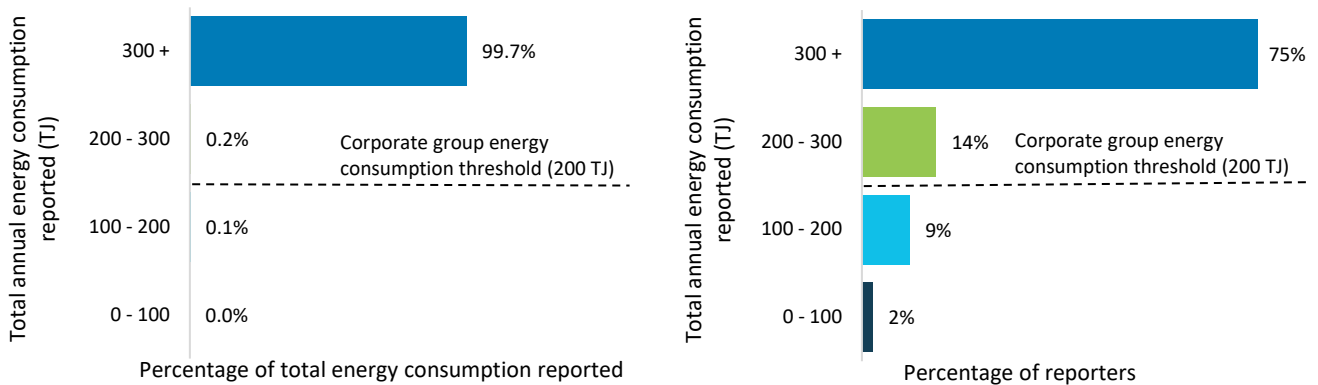


Figure 3.4 The percentage of energy consumption reported for various bands of total annual energy consumption reported at the corporate group level (left) and the percentage of reporting companies in each band (right).

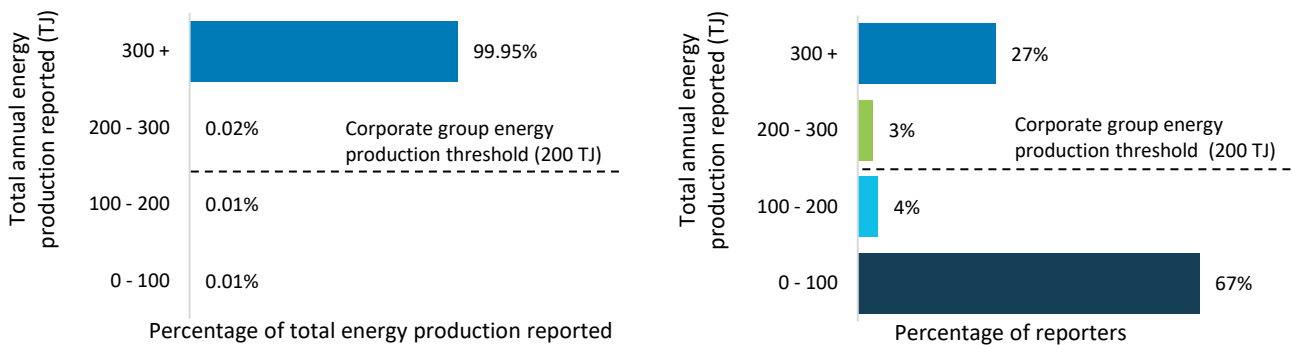


Figure 3.5 The percentage of energy production reported for various bands of total annual energy production reported at the corporate group level (left) and the percentage of reporting companies in each band (right).

Distribution of reported emissions and energy consumption and production by facility

Figures 3.6, 3.7 and 3.8 show the distribution of emissions, energy consumption and energy production reported at the facility level in 2021-22. The authority found that the majority of reporting facilities (77%) did not meet any facility threshold, indicating that most facilities report due to a corporate group threshold being met. The authority also found the distribution of emissions and energy consumption and production reported at the facility-level was heavily skewed, with a small number of facilities accounting for a significant proportion of emissions or energy production/consumption. For example, only 5% of facilities accounted for 87% of reported emissions.

Figures 3.6, 3.7 and 3.8 show the majority of facilities fall below the facility emissions, energy consumption or energy production thresholds. Table 3.2 shows just over 10% of reporters did not meet a corporate group threshold (10% met a facility threshold only and 0.4% did not meet any threshold). Further analysis conducted by the authority revealed these reporters accounted for less than 1% of all facilities. Therefore more than 99% of reporting facilities are captured by at least a corporate group threshold.

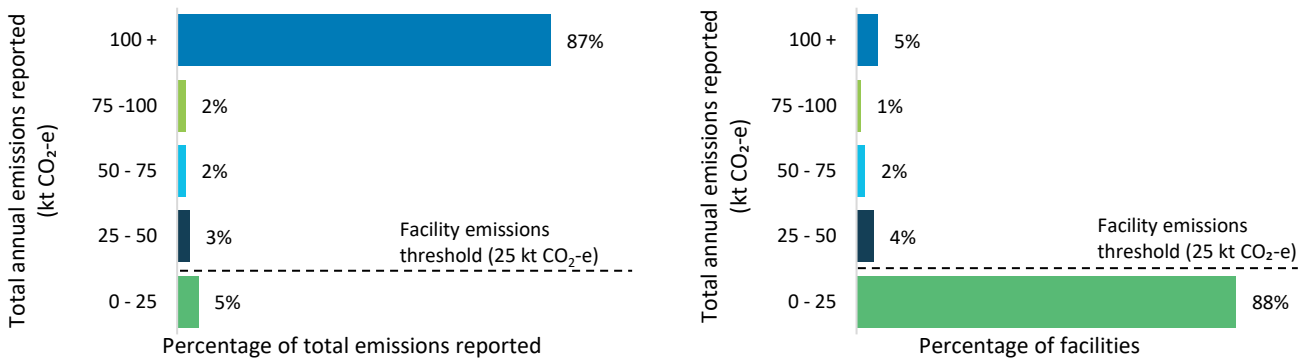


Figure 3.6 The percentage of emissions reported for various bands of total annual emissions reported at the facility level (left) and the percentage of facilities in each band (right).

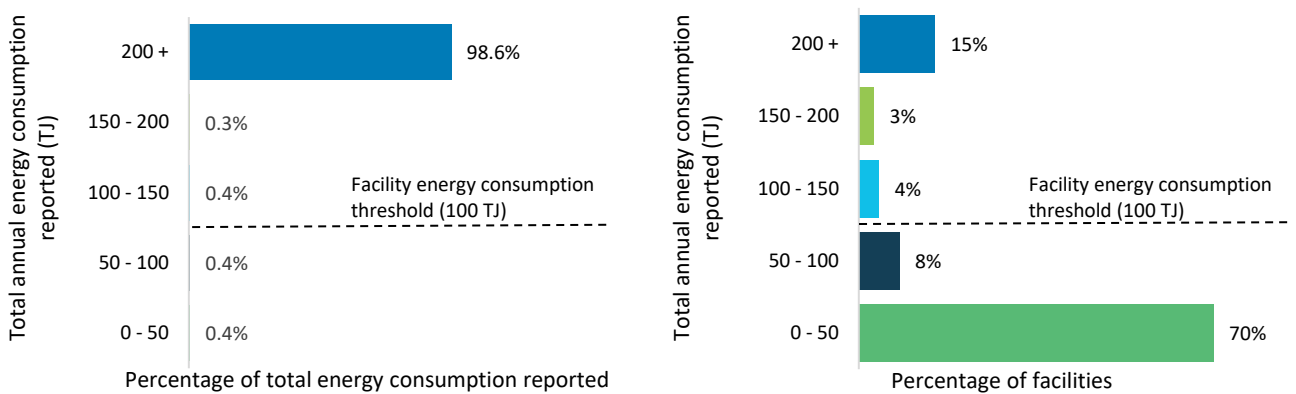


Figure 3.7 The percentage of energy consumption reported for various bands of total annual energy consumption reported at the facility level (left) and the percentage of facilities in each band (right).

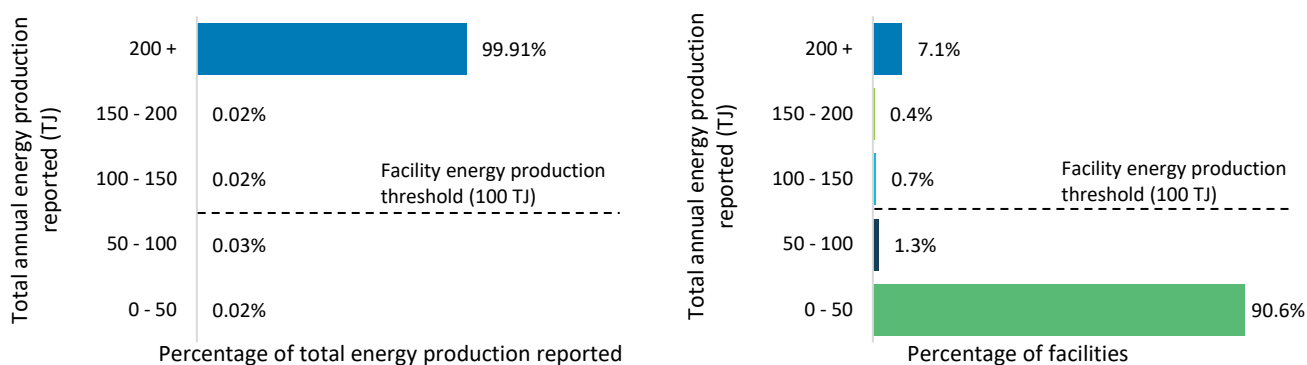


Figure 3.8 The percentage of energy production reported for various bands of total annual energy production reported at the facility level (left) and the percentage of facilities in each band (right).

Reporting thresholds and coverage of international reporting schemes

The coverage of international reporting schemes as a percentage of total economy-wide emissions varies. This is in part due to the different levels and types of thresholds used by each scheme. For example, some schemes use emissions and energy thresholds while others use thresholds based on company size attributes (e.g. number of employees, turnover or total assets).

The varying levels of coverage are also due to the varying sectoral coverage across schemes and the differing structure of economies. The coverage of Australia’s NGER scheme is comparable to other international reporting schemes, as shown in Figure 3.3.

The United States Environmental Protection Agency (US EPA) estimates that its Greenhouse Gas Reporting Program (US GHGRP) covers 85-90% of the United States’ total net emissions (US EPA, 2023). Like the NGER scheme, which covers around 70% of Australia’s net emissions, the US GHGRP includes all sectors except the agriculture and land use sectors. The US GHGRP includes reporting requirements for both direct emitters (at the facility level) and upstream suppliers. The emissions reported by direct emitters account for 50% of the United States’ total net emissions. Estimated emissions (from release, oxidation or combustion of supplied products) reported by suppliers account for the remaining 35-40% of the United States’ total emissions. This value is an approximation as it accounts for the double counting between the emissions reported by suppliers (as scope 3 emissions) and the direct emissions reported by facilities due to the combustion of fuels supplied.

In comparison, Canada’s Greenhouse Gas Reporting Program employs a facility level emissions threshold on scope 1 emissions. This threshold was decreased from 50 kt CO₂-e to 10 kt CO₂-e in 2017 (Government of Canada, 2017), with a minimal increase in coverage of total greenhouse gas emissions in Canada from 37% to 43% (Government of Canada, 2023a; Government of Canada, 2020).

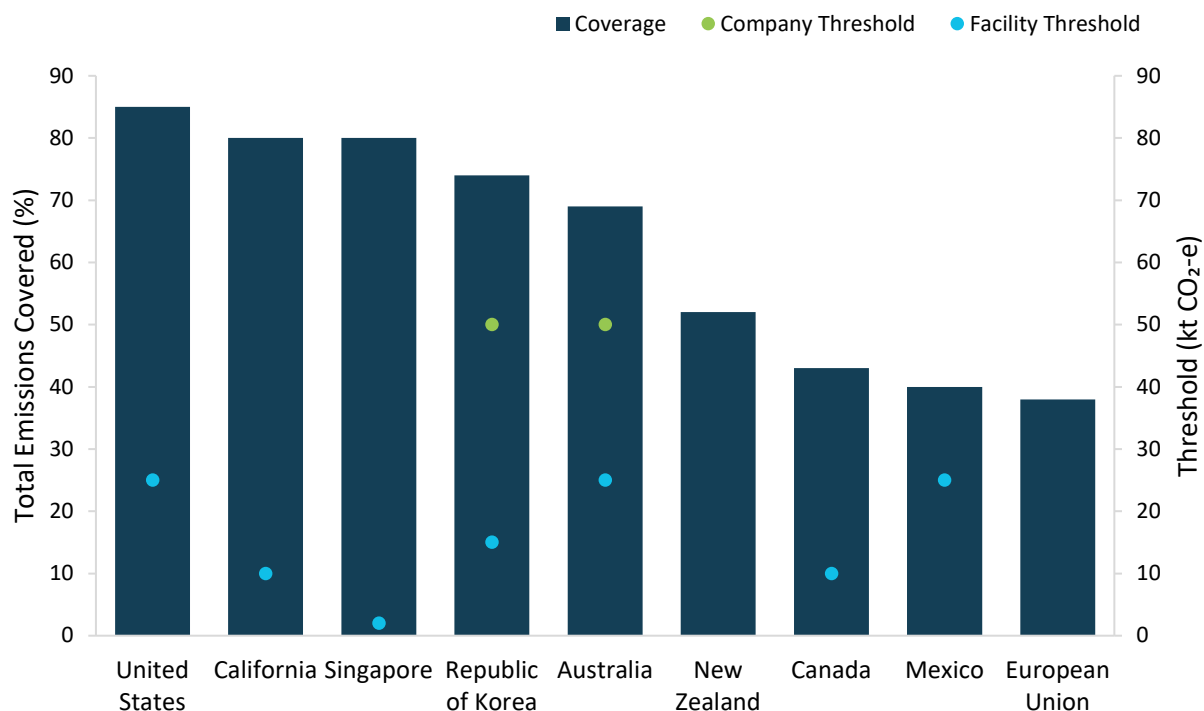


Figure 3.9 The total emissions covered (dark blue), facility-level reporting thresholds (light blue) and corporate-level reporting thresholds (green) of various international reporting schemes.¹¹ Thresholds may not be directly comparable due to differences in the scope of reporting requirements (see Appendix B).

Potential benefits and impacts of lowering the reporting threshold

As the Australian economy decarbonises, some companies may fall below the emissions reporting threshold, however the number of reporters with an obligation under the scheme is not expected to significantly reduce due to the large percentage of reporters that meet an energy threshold. The government could consider lowering the reporting thresholds to either maintain the current coverage of the scheme if it is expected to reduce (possibly due to energy efficiency improvements) or increase the proportion of each sector's emissions reported under the scheme. Potential benefits of this approach include:

- ensuring the scheme continues to meet its objectives
- maintaining and possibly increasing transparency of companies' emissions
- improved awareness and management of energy and emissions by more companies
- increased share of emissions and energy reported for particular sectors
- increased coverage of businesses reporting could support emerging climate-related financial disclosure reporting requirements.

¹¹ Thresholds for the New Zealand and European Union schemes vary by sector.

However, the authority notes careful consideration needs to be given to the potential impacts of lowering the reporting thresholds, such as:

- increased cost and regulatory burden to companies
- a detrimental effect on the integrity of the reported data (lowering the threshold will likely affect small companies with less experience, existing expertise and resources for reporting)
- any increased administrative burden on the regulator.

Careful consideration must be given if any reporting threshold is lowered to ensure it results in a material difference in the coverage of the scheme and the integrity of data reported is maintained.

The authority is of the view that the proportion of each sector's emissions currently reported under the scheme is a more valuable point of reference than the proportion of Australia's total net emissions reported under the scheme. Maintaining the proportion of each sector's emissions reported under the NGER scheme will be important in tracking the emissions reductions in each sector as they begin to decarbonise.

Recommendation 1

The proportion of each sector's emissions reported under the NGER scheme must, at a minimum, be maintained at current levels.

3.2.2 Sectoral coverage

Agriculture and land

Emissions from Agriculture and Land Use, Land-Use Change and Forestry (land), as defined by the UNFCCC, are currently excluded from NGER (Figure 3.1). By and large this means that most primary producers, including agri-businesses, do not report emissions within the NGER scheme. There are cases where primary producers that are also large energy consumers or manage significant agricultural waste streams already report emissions within the scheme. In either case, emissions from the major sources of emissions in agriculture, including from ruminant livestock and fertiliser use, and emissions from land clearing are not required to be reported through the scheme.

The agriculture sector covers emissions from agricultural production and includes sources of emissions such as enteric fermentation, fertiliser use, manure management, and rice cultivation. In 2020-21, emissions from agriculture were estimated to be 78 Mt CO₂-e. Emissions from enteric fermentation (methane emitted from the rumen of ruminant livestock) represented approximately 70% of emissions from the agriculture sector, or 12% of national emissions (DCCEEW, 2023a).

The land sector includes sources and sinks of carbon from vegetation and soils and covers greenhouse gas emissions associated with land management practices that impact the carbon stored in vegetation and soils, such as changes in land use from forest to cropland or grassland. Emissions and sinks from land occur over vast areas and can be influenced not only by management of the land, but also environmental conditions. The land sector removed more carbon dioxide from the atmosphere than it released in 2022-23, resulting in net negative emissions of 64 Mt CO₂-e, equivalent to removing 14% of Australia's national total (DCCEEW, 2023k).

Estimated coverage of agriculture and land sectors

Assessing the potential coverage of agriculture and land sector emissions is challenging because detailed, good quality data on emissions from farming operations is not readily available. The authority's analysis of potential emissions coverage in the agriculture sector has relied on the best available information, but it is necessarily incomplete and should be read as indicative. These

challenges highlight the limited access to robust data on emissions from agriculture and the land sector, and the need to improve emissions data and transparency on activities and practices. Noting these limitations, in the authority's assessment the inclusion of emissions from agriculture within the NGER scheme is likely to cover in the order of 5 to 10% of agricultural emissions, or approximately 4 to 8 Mt CO₂-e.

The authority has derived approximate emissions factors from National Greenhouse Accounts data for emissions from enteric methane, manure management and associated soil emissions. With these emissions factors, approximately 15,000 head of cattle would be sufficient to exceed the NGER scheme's 25,000 t CO₂-e facility publication threshold. Of the agri-businesses with these characteristics, only some are operated as constitutional corporations, and it is only this subset which is required to report under the NGER scheme. This limitation applies across all sectors included in the NGER scheme.

The majority of farms in Australia are operated as non-corporate structures. Agriculture businesses that potentially meet the threshold for inclusion in the NGER scheme are likely to have turnover greater than \$1 million per annum in most years (ABARES, 2021), and would therefore be relatively well-placed to establish and maintain inventory systems to report emissions.

Livestock emissions from feedlots with a capacity of greater than 11,000 head of cattle could also exceed the facility threshold of 25,000 t CO₂-e. Total emissions from cattle on feedlots were approximately 2 Mt CO₂-e in 2021 (DCCEEW, 2023b). Approximately 65% of cattle in feedlots are kept in facilities with greater than 10,000 head of cattle (ALFA, 2023). Based on these figures, the inclusion of agriculture in the NGER scheme could potentially capture about 1.3 Mt CO₂-e per year arising from feedlots. Whether or not feedlots are operated as constitutional corporations or using business arrangements will affect these estimates. The authority notes the review process underway by the department assessing scientific information for a potential update to this emissions factor due to report in 2025.

The authority also considered whether the largest sized agri-businesses, those running cattle herds in the order of 100,000 to 450,000 head across all their properties, would be captured by the NGER corporate group threshold of 50,000 t CO₂-e. Based on limited publicly available information, conversations with stakeholders and authority analysis, companies which may reach this threshold include: AACo, BBRC, Consolidated Pastoral Company, Crown Point Pastoral, Hancock Prospecting, Heytesbury Pastoral Company, Australian Country Choice, Northern Australia Pastoral Company, Paraway Pastoral, Stanbroke Beef (AACo, 2023; Hancock Prospecting, 2023; CPC, 2023; Beef Central, 2020; BBRC, 2023; Business News, n.d.; Stanbroke, 2023; Australian Country Choice, 2023; Paraway Pastoral Company, n.d.; NAPCO, 2023). The total annual emissions from the pasture cattle owned by the companies listed above, running cattle across Queensland, the Northern Territory, Western Australia and South Australia would be approximately 4 Mt CO₂-e, or 5% of emissions from the Australian agriculture sector.

Growing need for emissions reporting in the agriculture and land sectors

There are strong drivers for introducing comparable coverage of emissions for the UNFCCC-defined agriculture and land sectors under the NGER scheme. As Australia makes the transition to a net zero economy, all sectors will need to contribute. Market and regulatory requirements for businesses to report emissions are extending to the agriculture and land sectors (Box 1) and having facility-level reporting could lead to better estimates and a greater level of confidence in the emissions reporting for these sectors. Internationally, New Zealand (Motu, 2017), Germany (Climate Leadership Council, 2023), Italy (Climate Leadership Council, 2023) and Mexico (ICAP, 2014; IETA, 2018) require reporting of agricultural emissions under their national emissions reporting schemes.

Box 1: Market and supply-chain pressures for lower emissions agricultural products

Investors, financiers and supply-chains are increasingly seeking to manage their exposure to high-emitting sectors, such as agriculture, by establishing schemes or mechanisms to meet their voluntary commitments, mandatory disclosure and market requirements (DAFF, 2023; UNEP, 2021; SBTi, 2023).

As a result, it will become increasingly important for agri-businesses to understand their emissions to respond to the need for information, remain competitive, maintain access to markets (DAFF, 2023) and manage risks to their business.

Industry submissions to the authority's Issues Paper highlighted the growing need to support farmers to measure and report their emissions to meet industry-led emissions reduction commitments (Australian Dairy Industry Council and Pork Australia submissions).

Agriculture is a significant industry for Australia, with a gross value of \$92 billion in 2022-23 (ABARES, 2023a). Agriculture exports account for 72% of agriculture production, which exposes producers to international reporting obligations (ABARES, 2023b).

Rural Research and Development Corporations allow the Australian government and primary producers to co-invest in agreed priority areas of investment. To address the need for farm-level emissions data, some private companies and Rural Research and Development Corporations are developing tools for estimating and calculating on-farm emissions (MLA, 2023; MyFootprint, 2023; AIA, 2023).

The authority recommended in its 2023 annual progress report that the Australian government should develop a program to support farmers to measure, reduce and disclose their emissions in line with an established Government standard. In this review, the authority is recommending that new NGER methods would provide that standard for companies and facilities that exceed NGER thresholds.

Companies with large industrial sector emissions are required to report emissions under the NGER scheme. Introducing comparable reporting requirements for the agriculture and land sector would provide the same regulatory support for and assurance of emissions estimates reported by businesses for these sectors of the economy. This would also help the government to plan, prepare and provide targeted support for actions to reduce these emissions, including supporting the government's proposed climate-related financial disclosure framework. Under this framework, businesses will be required to report their scope 1, 2 and 3 emissions from all sectors, including agriculture and land emissions (Section 3.1.6) (The Treasury, 2023).

Investors and banks told the authority that they need better information on emissions from agricultural practices to support these reporting requirements. The Australian Sustainable Finance Institute (ASFI) submission to this review noted the importance of reliable, transparent, and accessible corporate emissions data and stated:

“Increasingly capital will not flow into areas where there is significant uncertainty with respect to the quantification of climate-related risk. Excluding key sectors such as agriculture and forestry from emissions reporting under NGERs will have significant adverse impacts for the businesses in those sectors and the broader Australian economy.”

ASFI submission to this review

The National Farmers Federation (NFF) submission to the Treasury on climate-related financial disclosures expressed concern that new demands for data on agriculture emissions may lead to individual farmers having to develop their own reporting frameworks to report the same information

through a range of different reporting mechanisms (NFF, 2023). Developing methods under the NGER scheme, along with guidance, would provide a reporting standard to assist farmers to report their emissions and harmonise reporting across the agricultural industry.

The extension of the NGER scheme to the agriculture and land sectors is consistent with the first object of the NGER Act, as it would allow better informed government policy, a better-informed Australian public and assist government programs and activities (NGER Act, 2007). It is also consistent with the explanatory memorandum for the National Greenhouse and Energy Reporting Bill 2007, which states that it was the intent of the scheme that agriculture emissions would be reported once appropriate methodologies became available (NGER Bill 2007 Explanatory Memorandum, 2007). Methods for calculating emissions from agriculture were not included in the scheme in 2007 because there were no methodologies available for the agriculture sector at the time that would provide meaningful data at the company level (NGER Bill 2007 Explanatory Memorandum, 2007). Workable methods for calculating emissions at the farm level are now emerging and in the authority's view these could form a starting point for Method 1 equivalent estimation methods for NGER. The NGER methods should build upon existing National Inventory methods and draw on industry tools that are found to be sufficiently robust. As for other sectors, the methods should provide flexibility for businesses to report using the tier of method that best suits their needs. The authority notes the ownership structure of firms will have implications for the extent of coverage of the sector by the NGER scheme, as the scheme only applies to constitutional corporations. The NGER scheme methods could also provide a voluntary standard to be adopted to meet market demands outside the NGER scheme, by farmers and businesses that do not meet NGER thresholds.

There is an important role for the government to regulate the standard to which these emissions should be reported. The alternative, where companies decide upon and justify the methods they use to meet corporate reporting requirements individually (including for climate disclosures), will incur a private cost to the economy with associated complexities around the consistency, quality and integrity of the adopted approaches.

The authority notes the concerns raised by a number of stakeholders about the potential for undue burden that NGER farm-level reporting could introduce. This includes the cost, difficulty, and uncertainty of data collection; and complexity of accounting for on-farm practices, conditions, and business structure. The authority recognises that time needs to be given for developing robust calculations for emissions accounting on-farm as it is likely to be an involved and lengthy process.

Considering scope 1 and 2 emissions, expanding reporting of emissions to the agriculture and land sector under the NGER scheme will likely cover a similar group of companies that will be covered by climate-related financial disclosure requirements and, rather than lead to increased reporting costs for businesses, it would provide certainty for businesses on methods that meet government requirements. Companies should be supported to build the capacity and skills needed to report emissions consistent with NGER reporting requirements.

The authority also recognises that extending coverage to the agriculture and land sectors may introduce new reporting obligations for some corporations currently reporting industrial emissions, as they would be expected to extend their reporting to scope 1 agriculture and land sector emissions and removals. Where agriculture and land sector emissions are a low-level source for a business, a simplified approach should be allowed, as is currently supported under the NGER scheme for other sources of emissions (CER, 2023k).

The authority is aware significant challenges remain in the development of methods for reporting emissions from the land sector. Methods for reporting carbon sequestration are available through the ACCU scheme, but further work and time is required to develop an approach that is useable for the purposes of the NGER scheme. Based on research and stakeholder consultation, the authority considers a longer timeframe is needed for further refinement of these approaches. The authority is of the view that reporting of agriculture and land emissions should be done separately (i.e. not allow covered entities to report the net of agricultural and land emissions).

Design of a method for NGER coverage of the land sector will need to consider which emissions and removals sources need to be included. An NGER method for the sector should at least cover changes in forest cover, land clearing and forest regrowth.

Decisions will also need to be made on how to include the land sector as part of the NGER threshold. It is the authority's view that emissions from other sectors and emissions or removals from the land sector should be reported separately and not be combined to report net emissions. The authority is of the view that Australia needs to know more about the emissions and emissions trends of Australia's large primary producers. The use of a forest sink to lower emissions on a net basis to take a company out of scheme participation would defeat this purpose.

Recommendation 2a

The NGER scheme be expanded to include methods for calculating emissions from the UNFCCC-defined agriculture and land sectors. The government should work with interested parties in the agriculture sector on the most appropriate way to include these emissions sources under the same thresholds as for other sectors and develop robust estimation methods for facility-level emissions reporting in these sectors.

Recommendation 2b

Introduce mandatory reporting requirements for agricultural sector emissions by the 2026-27 financial year and for land sector emissions by the 2027-28 financial year.

Based on publicly available information, some agri-businesses may run herds large enough to exceed the 100,000 t CO₂-e per year emissions threshold for coverage under the Safeguard Mechanism. This is a result of the comparatively large land area and accompanying herd size of these agri-businesses. If agricultural facilities do reach the threshold for Safeguard Mechanism coverage it is the authority's view that legislative amendments be put in place to ensure that Safeguard entities are not covered by the Safeguard Mechanism at this time.

In its 2023 Annual Progress Report, the authority has recommended the government fund an extensive challenge-based program of research and early-stage commercialisation of agriculture emissions reduction technologies. The authority also recommended the government develop a program to support farmers to measure, reduce and disclose their emissions in line with an established government standard, provide advice on actions farmers can take to reduce emissions, and help them to implement high priority actions. The authority will give further consideration to net zero technology and emissions pathways in the agricultural sector in its sectoral pathways review commissioned by the Parliament.

Whole-of-government reporting

The NGER scheme only applies to entities that are constitutional corporations. Government entities that are not a constitutional corporation are not required to report (CER, 2022f). This means most government operations do not have reporting requirements under the NGER scheme.

Coverage of government departments and agencies under the NGER scheme would increase information currently available to the public and policy makers and improve accountability and transparency. It would also provide a level of consistency in reporting across jurisdictions, and ensure emissions are reported to a consistent standard by public sector entities across the country.

There is a move towards the voluntary reporting of emissions from government operations in Australia. The Australian Government has set a target for net zero emissions by 2030 for the Australian Public Service (DoF, 2023). The Department of Finance has developed a framework for public reporting of emissions from all Commonwealth entities (DoF, 2023). Emissions will be reported in annual reports, commencing for all Commonwealth entities in 2023 (DoF, 2023). The ACT (EPSD Directorate, 2022), Queensland (State of Queensland, 2022), New South Wales (NSW Government, 2023), and Victoria (DEECA, 2022) have publicly reported emissions from government operations and the authority understands other states are in the process of investigating potential emissions reporting options.

Given many governments are moving towards more transparent reporting requirements, looking to impose additional NGER reporting requirements would be premature at this stage. It is important, however, that government emissions reporting is robust, transparent and consistent across governments. A standard agreed by governments could provide assurance that reporting of government emissions will be adequate and comparable.

Recommendation 3

Seek agreement with state and territory governments on a framework that will allow for consistent reporting of emissions by government entities. In the absence of an agreed framework, the government should explore the potential to extend coverage of the NGER scheme to government entities.

Publicly owned landfills

Approximately 65% of total waste disposal activity in Australia is covered by the NGER scheme (DCCEEW, 2022e). Waste management by landfill is becoming increasingly concentrated, and the 21 largest landfills account for approximately 50% of Australia's waste disposal (DCCEEW, 2023a).

Publicly owned landfills, that is landfills owned by state and territory governments and local government bodies, previously reported their emissions through the NGER scheme when the carbon price was in effect. The *Clean Energy Act 2011* expanded reporting requirements to include not-for-profit entities that met the criteria for liable entities. This included landfills with annual emissions over 25,000 t CO₂-e, or 10,000 t CO₂-e for landfills located near a large landfill facility (Clean Energy Act 2011 s23; Clean Energy (Consequential Amendments) Bill 2023). This resulted in reporting requirements, and at the time an emissions liability, for 27 councils (CCA, 2018). The legislation package that created the carbon price was repealed in 2014.

Most publicly owned landfills are not constitutional corporations and do not report their emissions through the NGER scheme. The authority has considered whether the reporting obligations under the NGER scheme should apply to all waste facilities with annual emissions over 25,000 t CO₂-e. This change would provide more information on waste emissions and increasing equity in reporting between private and public landfills. The authority does not propose that waste facilities with emissions below this limit would be required to participate in the scheme as was the case under the *Clean Energy Act 2011*.

Expanding reporting requirements to publicly owned landfills would increase the reporting burden on captured landfill owners, that are mostly local councils. This could impact smaller councils with fewer resources, however, quantities of waste disposed to landfill are collected by state government agencies (DCCEEW, 2023a), and the regulator has developed a solid waste calculator to assist with calculations (CER, 2023l). Although local councils may need to build capacity to understand reporting requirements, this could be eased by use of existing data and tools.

The constitutional basis for the NGER Act arises from the census and statistics power, corporations power, external affairs power and the incidental power (Section 4, NGER Act). The authority notes that legal advice would need to be sought to confirm the appropriate constitutional head of power before extending reporting requirements to publicly owned landfills.

Recommendation 4

Extend NGER coverage to publicly owned landfills where legally possible.

3.2.3 Scope 3 emissions

The NGER scheme does not require entities to report their scope 3 emissions.

Scope 3 emissions are indirect emissions other than from electricity use generated from sources upstream or downstream in the reporting facility's value chain (Table 2.1). Scope 3 emissions include emissions within supply chains that occur inside Australia. For example, the emissions associated with mining bauxite and transporting the ore to an alumina refinery for alumina production are scope 3 emissions for the alumina refinery, and scope 1 emissions for the mining operation.

Scope 3 emissions also include emissions which occur upstream or downstream of production and can include emissions outside of Australia, such as emissions from the combustion of Australian coal or liquefied natural gas (LNG) exported to other countries.

At the aggregate level, potential direct downstream emissions from the combustion of fossil fuels exported by Australia, coal and LNG, are up to 1,100 Mt CO₂-e per year.¹² At the entity level the emissions associated with the combustion of these fuels in other countries depends upon the nature and efficiency of the power stations in which they are combusted. Information on where and when these fuels are combusted, and the associated emissions, are not captured by the NGER scheme.

Determining and disclosing scope 3 emissions can help to meet the demands of consumers and shareholders, help manage risks, such as transition risks, and identify opportunities to reduce emissions in supply chains (CCA, 2021b; GHG Protocol, 2022; The Treasury, 2023). For these reasons the reporting of scope 3 emissions is coming into focus for businesses because visibility of scope 3 emissions can assist in identifying potential transition risks in supply chains (The Treasury, 2023).

¹² Based on internal analysis using Resources and energy quarterly (REQ) June 2023 data for coal and LNG export quantities in the year to March 2023.

Consultation for this review highlighted that inclusion of scope 3 emissions within the NGER scheme would increase accountability and transparency of emissions generated beyond a facility, including emissions from waste and burning of fossil fuels. A submission from the Australian Sustainable Finance Institute recommended aligning NGER reporting with climate related financial reporting, including scope 3 emissions.

The Australian government's proposal on climate-related financial disclosures includes mandatory reporting of scope 3 emissions, consistent with the International Sustainability Standards Board's standard on climate disclosures (ISSB, 2023; The Treasury, 2023). As requirements are implemented over the next few years Australian companies will gain considerable understanding of the methods to estimate scope 3 emissions, and the challenges and assumptions needed in making these calculations.

The data reported by entities through the NGER scheme on Australian greenhouse gas emissions are a potentially valuable source of information for determining estimates of scope 3 emissions at the entity level. These are the emissions that occur within Australia upstream of manufacturing and processing facilities, for example, that feed into the productions of manufactured products like alumina, aluminium and steel. The NGER system captures 68% of Australia's emissions and includes data on emissions within these domestic supply chains.

Using the NGER system to derive information about scope 3 emissions associated with domestic supply chains, at the entity level, would require additional reporting of data through the scheme, such as information about the quantity of materials sold or consumed by other NGER reporters.

A detailed data modelling exercise would help determine how effective such an approach would be for understanding domestic scope 3 emissions at the entity level. This is a type of analysis that could be undertaken over the coming years as scope 3 emissions reporting is introduced through climate-related financial disclosures to formalise the data used to support these disclosures.

While the authority notes the importance of and interest in scope 3 emissions reporting, this topic was not further investigated for the 2023 NGER review. However, the authority will pursue this topic through its upcoming work program.

Recommendation 5

Undertake a study to investigate the use of the emissions data reported through the NGER scheme to facilitate estimation of scope 3 emissions at the entity level in Australia.

3.3. Estimation Methods

The Measurement Determination describes the estimation methods, standards and criteria to be applied by reporters when calculating their energy and emissions information. As a legislative instrument under the NGER Act, the Measurement Determination is within the scope of the authority's review. The authority's review has focused on two specific areas of the Measurement Determination: fugitive methane emissions measurement and the emerging area of market-based reporting methods. Chapter 4 presents the authority's findings on methane measurement reporting and verification, and this section explores market-based reporting methods.

3.3.1 Market-based methods for electricity

In June 2023, amendments were made to the NGER legislation to introduce optional, supplementary reporting of market-based scope 2 emissions from consumption of electricity purchased or acquired from an external (to the facility) network. This amendment allows NGER reporters to make unique claims on the zero-emissions intensity attributable to some renewable electricity purchases and reflect these in their scope 2 emissions reporting.

Eligible purchases include large-scale generation certificates (LGCs) from the Renewable Electricity Target and GreenPower certificates (Chapter 7.4, Measurement Determination).

Previously reporters could only calculate their scope 2 emissions using the 'location-based' method whereby for electricity consumed from the grid, reporters calculate their scope 2 emissions by multiplying the quantity of electricity used by an emissions factor which reflects the average emissions intensity of the local grid (the Measurement Determination incorporating amendments up to *National Greenhouse and Energy Reporting (Measurement) Amendment (2022 Update) Determination 2022*). Emissions factors are used at the state and territory level. Reporters must still report their location-based scope 2 emissions but now also have the option to report on their market-based scope 2 emissions (DCCEEW, 2023I). This amendment took effect on 1 July 2023.

3.3.2 Market-based methods for renewable fuels

During the department's 2023 consultation on NGER scheme updates, NGER scheme participants requested an extension of the optional market-based reporting for scope 2 electricity emissions to emissions associated with the use of liquid and gaseous renewable fuels (such as renewable diesel and biomethane), where they are distributed via common infrastructure and consumed by multiple parties (DCCEEW, 2023I).

Renewable fuels are fuels that can be manufactured using biogenic sources which absorb carbon dioxide from the atmosphere as they grow, or through industrial processes powered by renewables or other low-emission energy sources which utilise captured carbon dioxide in the industrial process (IEA, 2023b) (CSIRO, 2018). These are attributed a zero scope 1 emissions factor for carbon dioxide. For the purposes of the NGER scheme, these fuels can only be considered on a scope 1 basis. Renewable fuels produced through industrial processes are also referred to as synthetic fuels (IEA, 2021). Examples of renewable fuels include biomethane, sustainable aviation fuel and biodiesel.

Through submissions made to the authority's issues paper, the authority heard from a number of stakeholders that current emissions accounting methodologies are not capturing renewable fuels appropriately (Australian Institute of Petroleum, one anonymous submission) and that market-based reporting or mass-balance accounting¹³ for liquid and gaseous renewable fuels should be introduced (Bioenergy Australia, Origin, EDL, bp Australia, one anonymous submission).

The need for market-based methods emerge when shared infrastructure is used to store or transport low-emissions energy sources with incumbent fuels, or electricity. Currently, the reporting of emissions from the combustion of fuel sourced from common infrastructure (for example a fuel storage tank or natural gas pipeline) can only be done based on a location-based method. The Measurement Determination does not allow NGER reporters that source their fuel from common infrastructure to reflect the full emissions benefits of using renewable fuels that they have purchased and deposited in the common infrastructure (DCCEEW, 2023I). Instead, they would only be attributed a part share of the emissions reduction from the renewable fuels they purchased. Distribution from shared infrastructure is common at airports, seaports and in gas networks.

¹³ Mass-balance accounting allows for tracking of mixed renewable and conventional fuel in systems and products (DECC, 2014)

Box 2: Reporting lower carbon fuels from common infrastructure under the current scheme

Consider for example, three airlines that must report their consumption of fuel that they have drawn from common fuel storage infrastructure. If airline 1 adds renewable fuel to the common infrastructure, the fuel drawn by the three airlines will be a blend of fossil and renewable fuels. Airline 1 has two options to determine the amount of renewable fuel they physically consumed in accordance with the blended liquid fuel provisions in section 2.67 of the NGER Measurement Determination:

- Adopt the manufacturer's determination of the composition of the blend. This is unlikely to apply or be useful as the manufacturer won't know the composition of the fuel being drawn on from the storage infrastructure at the airport.
- Adopt the result of sampling and isotopic radiocarbon analysis of each batch of fuel consumed. Fuel consumed would need to be analysed batch by batch given the likely heterogeneous blending of the renewable and conventional jet fuel as they are added to, distributed, and drawn from through the system. This is unlikely to be cost effective, particularly at low blend rates.

Under the existing NGER settings, the full emissions benefit of airline 1's purchase cannot be attributed to airline 1 in its reporting and it is unlikely that the full volume of renewable fuel purchased and added to the common infrastructure would be reported across the three airlines.

Source: supplied by DCCEEW to the authority

Market-based reporting would allow for NGER reporters to make claims on the lower emissions intensity attributable to renewable liquid and gaseous fuel purchases, even if the fuel they purchased is distributed through common infrastructure and physically consumed by multiple entities. This is particularly important for entities that need to demonstrate that they have reduced their emissions to meet their obligations under the Safeguard Mechanism.

Effective market-based reporting needs to:

- avoid double counting
- ensure appropriate and accurate recognition of the impact of the use of renewable fuels on a facility's emissions and manage potential adverse impacts.

To avoid double counting, proof of purchases could be undertaken using mass or unit-based certificates. For example, scope 2 renewable electricity claims are confirmed using eligible renewable electricity certificates. Eligible renewable fuel certificates could be used to confirm renewable fuel purchases, which would have the zero scope 1 carbon emissions factor applied under the NGER scheme. Currently, there are no renewable fuel certificates recognised in the NGER scheme.

The need for certification schemes for renewable fuels was raised with the authority by stakeholders (EDL, Grattan Institute, 2 anonymous submissions). In August 2023, GreenPower launched the Renewable Gas Certification Pilot to certify biogas, biomethane and renewable hydrogen projects in Australia for the creation of renewable gas certificates, called Renewable Gas Guarantee of Origin (RGGO). This pilot scheme has been designed as an interim scheme to bridge the gap until a permanent scheme is established (GreenPower, 2023). Currently there are no Australian renewable liquid fuel certification schemes.

A framework to approve certification of renewable fuels (including lifecycle considerations) will be important for ensuring appropriate and accurate recognition of the impact of the use of renewable fuels on a facility's emissions and manage potential adverse impacts. Renewable fuels do not always

result in lower emissions than the fossil fuel equivalent due to the lifecycle emissions of the renewable fuel, for example, jet fuel produced from palm oil through a hydroprocessed esters and fatty acids manufacturing pathway can have a similar emissions profile to conventional jet fuel (Becken, Mackey, & Lee, 2023). Lifecycle emissions from renewable fuels can range from being more emissions intensive to over 90% emissions reduction compared to fossil fuels (Figure 3.10). Food crops tend to have less lifecycle emissions reductions than other feedstocks. Other adverse impacts from the production of renewable liquid fuels can include environmentally damaging impacts on land, water, pesticide and fertiliser use and can also impact food prices by diverting food products to fuel markets (Jeswani, Chilvers, & Azapagic, 2020). A certification framework could set minimum benchmarks for lifecycle emissions reductions for reporters to claim the zero scope 1 carbon emissions factor for renewable fuels under NGER and manage social and environmental adverse impacts.

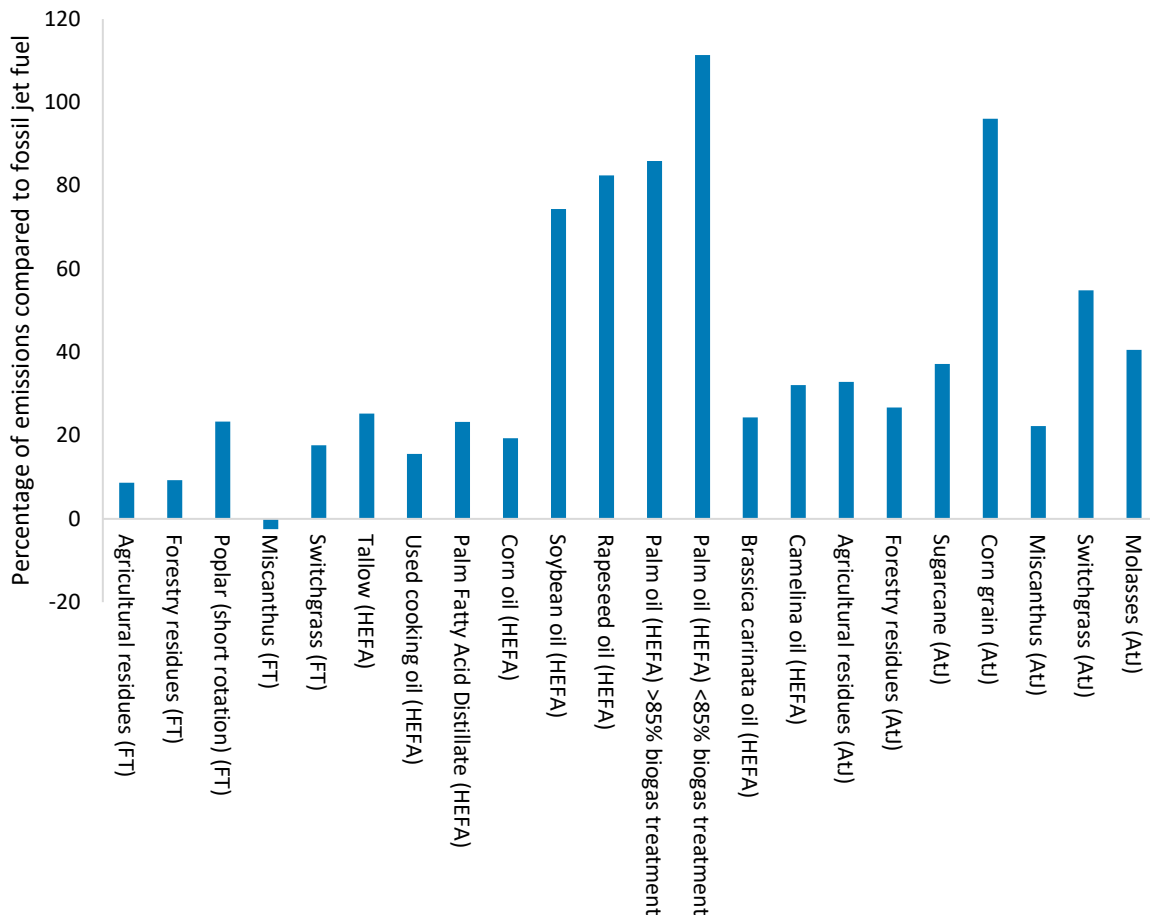


Figure 3.10 A comparison of the lifecycle emissions of different combinations of feedstocks and manufacturing pathways for renewable jet fuel compared to fossil jet fuel with the manufacturing pathway shown in brackets.

Notes:

- Calculations included lifecycle assessments and indirect land use change (ILUC) calculations. Lifecycle emissions are based on the International Civil Aviation Organization (ICAO) factors. Feedstocks that are considered ‘waste products’ are assumed to not have upstream emissions.
- These are global lifecycle emissions, fuels produced in different countries can have vastly different lifecycle emissions.
- FT= Fischer Tropsch manufacturing pathway, HEFA= hydroprocessed esters and fatty acids manufacturing pathway and AtJ= Alcohol to Jet manufacturing pathway.
- Source: (Becken, Mackey, & Lee, 2023)

Recommendation 6

Develop a framework to approve certifications that can guarantee the renewable status of renewable liquid and gaseous fuels. This framework should be informed by a review of existing international certification schemes. The certifications approved under the framework need to guard against adverse impacts.

Recommendation 7

Introduce optional market-based reporting of renewable liquid and gaseous fuels once a framework for approving certifications for renewable fuels is operational.

Renewable fuel definitions

The July 2023 amendments to the NGER Regulations included new definitions of ‘renewable diesel’ and ‘renewable aviation kerosene’ (Part 1, NGER Act).

renewable diesel means a biofuel that:

- (a) is produced through a process such as gasification, Fischer-Tropsch synthesis, hydrothermal conversions or hydroprocessing; and
- (b) consists mainly of alkane and other hydrocarbons; and
- (c) is suitable for use as:
 - (i) a substitute for diesel oil; or
 - (ii) a blending component substitute for diesel oil.

renewable aviation kerosene means a biofuel that:

- (a) is produced through a process such as gasification, Fischer-Tropsch synthesis, hydrothermal conversions or hydroprocessing; and
- (b) consists mainly of alkanes and other hydrocarbons; and
- (c) is either or both of the following:
 - (i) a synthetic blending component within the meaning of the American Society for Testing and Materials Standard *ASTM D7566: Standard Specification for Aviation Turbine Fuel Containing Synthesized Hydrocarbons*, published by ASTM International, as in force or existing from time to time;
 - (ii) a synthetic blending component permitted in aviation turbine fuel that meets the requirements set out in the United Kingdom Defence Standard *Def Stan 91-091: Turbine Fuel, Kerosene Type, Jet A-1; NATO CODE: F-35; Joint Service Designation: AVTUR*, published by UK Defence Standardization, as in force or existing from time to time.

The current wording for this definition requires all renewable diesel and renewable aviation kerosene to be biofuels and excludes synthetic renewable fuels produced from non-biological feedstocks. Technology and plans are developing such that there is, or could soon be, the manufacture of synthetic renewable fuels that have a short carbon cycle, such as fuels made from carbon drawn from the atmosphere through direct air capture.¹⁴

¹⁴ Existing direct air capture plant can capture 4,000 t CO₂ per year (IEA, 2022), meeting the month-to-year definition of the short carbon cycle.

The authority is of the view that the exclusion of synthetic renewable fuels¹⁵ such as these, from the renewable fuel definitions could result in emissions reporting that does not recognise the potential full emissions benefit of these fuels, which could discourage investment in these emerging low emissions technologies. The authority acknowledges that the emissions benefit of fuels based on carbon drawn from the atmosphere through direct air capture will need to be assessed on a full life cycle basis and will require certification of the emissions intensity of their manufacture.

The IPCC distinguishes biogenic fuels from fossil fuels by the time taken for their formation, which are months-to-years for biogenic fuels (short carbon cycle), and millions of years for fossil fuels (long carbon cycle) (IPCC, 2018). Due to the short carbon cycle of biogenic fuels, they are considered renewable and assigned a zero carbon emissions factor (Schedule 1, Part 3, Measurement Determination).

The authority acknowledges that there is currently a lack of guidance from the IPCC on how to account for synthetic renewable fuels under National Greenhouse Gas Inventories. The authority is of the view that the definition of renewable synthetic fuels needs to reflect their full emissions benefits.

Recommendation 8

Engage with the IPCC to create guidance on the definition and emissions factors of renewable synthetic fuels. Subsequently amend the definition for renewable fuels in the NGER Regulations to include renewable synthetic fuels once there is clear guidance from the IPCC.

3.4. Transparency

As noted in Chapter 2, only a limited amount of information reported under the NGER scheme is published each year by the regulator.

For corporations that meet the publication threshold (50 kt CO₂-e per year for combined scope 1 and 2 emissions for corporate groups), the regulator must publish: gross scope 1 emissions, gross scope 2 emissions and net energy consumption (Section 24, NGER Act).

The regulator is also required to publish:

- Scope 1 emissions, scope 2 emissions and energy consumption for Reporting Transfer Certificate (RTC) holders that meet the relevant publication threshold (25 kt CO₂-e of combined scope 1 and 2 emissions, or 100 TJ of energy consumption or production)
- Scope 1 emissions, scope 2 emissions and electricity generation for all facilities in the electricity sector (CER, 2023m)
- Scope 1 emissions, scope 1 emissions that were carbon dioxide, methane and nitrous oxide (DCCEE, 2023d), offset use and facility baselines for all facilities covered under the Safeguard Mechanism (CER, 2023n).¹⁶

¹⁵ Currently, there is not a universal definition of synthetic renewable fuels. Synthetic fuels are produced artificially from renewable or non-renewable sources that resemble the characteristics of fossil-derived fuels (Ram & Salkuti, 2023). The definition of 'renewable' consistent with the IPCC's guidance for biogenic sources would exclude fuels derived from fossil carbon.

¹⁶ The requirement to publish Safeguard facility emissions by gas type is under new subsection 24(3A) of the NGER Act, which was added as part of the Safeguard reforms and applies for the 2023-24 financial year and following.

Under section 25 of the NGER Act registered corporations can apply to have all or part of their reported emissions and energy data, with some exceptions, withheld from publication on the basis of commercial value considerations (CER, 2022g).

For the reporting year 2021-22, only 417 of the 871 registered controlling corporations (CER, 2023o; CER, 2023p) had their data published at the corporate group level (CER, 2023q). The corporations for which data were published produced the vast majority of reported emissions, accounting for nearly 98% of the total emissions reported under the NGER scheme (CER, 2023p; CER, 2023e).

At the facility level, the regulator published 2021-22 data for 219 facilities under the Safeguard Mechanism (CER, 2023d) and 561 designated electricity generation facilities (CER, 2023r). This data published at the facility level accounted for 71% of the total emissions reported under the NGER scheme. These facilities, for which emissions data is published, account for less than 10% of the approximately 8500 facilities reported under the NGER scheme in 2021-22.

During the authority's review there were a range of views expressed by stakeholders on the question of whether more of the NGER dataset should be made available to the public, with some arguing for the release of more information and others being of the view that the current balance between data disclosure and confidentiality is appropriate. In the public survey conducted for this review, the authority asked respondents how well the current publicly available data meets their data needs. The majority of respondents said the current data published either does not or only partially meets their data needs. The authority heard that high-quality, accessible, and transparent data could:

- allow organisations to better understand emissions and energy use across the Australian economy more effectively, allowing for greater accountability and enhancing the utility of NGER data in policy analysis and impact tracking
- improve community confidence in corporate emissions reporting and allow corporate greenwashing to be more easily assessed (and consequently reducing the opportunities for it)
- support climate-related financial risk disclosures if published data is consistent with stakeholder needs for reliable corporate emissions data
- better inform financial institutions' lending and investment decisions and support customers' confidence in the accuracy of corporate emissions
- support analysis on the opportunities for emissions reductions and allow for more transparent benchmarking between facilities.

The authority is concerned that there is currently no facility level emissions or energy data published for 90% of facilities reporting under the NGER scheme. The authority is also concerned that the published data under the scheme does not include reliable time series data for corporate groups or facilities, information relating to the estimation methods used or emissions by greenhouse gas (noting that Safeguard facilities will be required to report by gas type in future).

The authority's 2018 NGER Review identified the need to improve public access to NGER data and called for increasing the amount of data reported publicly to better meet data users' needs (Recommendation 15) (CCA, 2018). Following this recommendation, the Australian Government committed to progressively publish more useful key findings and trends based on data users' needs and priorities (Australian Government, 2019). However, the information published by the regulator since the review has remained largely unchanged (CER, 2022h) due to limited resourcing and limited value in the insights that can be published under the current data aggregation rules.

As momentum builds for Australia to meet its legislated climate targets, there will be an increasing need for high-quality and transparent emissions data. The benefits of improving the transparency and usefulness of the data reported under the NGER scheme include enhancing data analysis, increasing the accountability of emitters, and better informing consumers, investors and other decision-makers.

The current publication threshold and aggregation of the published data were set at the commencement of the scheme in 2007 based on concerns for disclosing commercially sensitive information. However, the authority heard concerns that these provisions for commercial sensitivity are misaligned with the shifting community expectations around the transparency of reported emissions.

3.4.1 Comparison to international schemes

There is growing international recognition of the importance and value of transparent and accessible emissions data, including at the entity and asset-level. This is reflected in emissions reporting schemes such as those in Canada, the US and California publishing facility-level emissions by greenhouse gas. Table 3.6 compares the different data published across international reporting schemes.

Emissions reporting scheme	Facility-level emissions data	Emissions by greenhouse gas	Time-series data	Sector data
Australia: National Greenhouse and Energy Reporting (NGER) Scheme	<i>Only for Safeguard and electricity-sector facilities</i>	<i>Only for Safeguard facilities</i>	✗	✗
United States: Greenhouse Gas Reporting Program (GHGRP) (US EPA, 2022a)	✓	✓	✓	✓
Canada: Greenhouse Gas Reporting Program (GHGRP) (Government of Canada, 2023b)	✓	✓	✓	✓
California: Mandatory Greenhouse Gas Reporting Regulation (MRR) (CARB, 2022)	✓	✓	✓	✓

Table 3.3 Comparison of different data published under international reporting schemes.

BOX 3.3: Data published under the United States' Greenhouse Gas Reporting Program

Under the United States' Greenhouse Gas Reporting Program (GHGRP) data is reported from both direct emitters and upstream suppliers. The data collected under the program is made publicly available each year unless the data qualifies for confidential treatment (US EPA, 2023).

The facility-level data published includes information such as (US EPA, 2022b):

- Address, coordinates, ID number and industry classification of the facility
- Emissions by greenhouse gas
- Emissions by source/process
- Emissions per year since 2010
- Fuel type
- Measurement methods used
- Report submitted by the facility

The reported data are made available to the public each year through resources such as interactive tools, profiles and fact sheets on specific topics of interest to help the public use and derive value from the greenhouse gas reporting data. The published data products include (US EPA, 2022a):

1. **Facility Level Information on GreenHouse gases Tool (FLIGHT):** *An interactive website with mapping features to search the data for individual facilities by name or location, or filter the data by state or county, fuel type, industry sectors and sub-sectors, annual facility emission thresholds, and greenhouse gas type. It also allows comparison of emission trends over time, data to be viewed in several formats including maps, tables, charts and graphs, and any data set generated using filters to be downloaded.*
2. **National Data Highlights:** *Interactive data visualisations of reported greenhouse gas emissions showing trends by sector, gas, location, and facility emission ranges.*
3. **Yearly Overview Profile:** *Annual report of data collected by GHGRP containing an overview of the data, including emissions trends by industry, state and gas, the number of reporters whose emissions fall above and below certain threshold values, and descriptions of monitoring methods used.*
4. **Sector Data Highlights and Profiles:** *Data highlights for each sector, analyses of the industries that report under the GHGRP program including estimates of GHGRP coverage, emissions trends (including discussion), emissions by state, gas, and process, the number of reporters whose emissions fall above and below certain threshold values, and monitoring methods used.*
5. **Envirofacts:** *Provides all publicly available data collected by the GHGRP in a searchable, downloadable format by facilities. This includes GHG data and much of the underlying data facilities use to determine greenhouse gas values and other reported data.*
6. **State and Tribal Fact Sheet:** *Interactive fact sheet summarising GHGRP emissions by state, tribal lands, or EPA region for the current year.*
7. **Data Frequently Requested:** *Data sets readily available for download.*

3.4.2 Options to improve transparency under the NGER scheme

The authority is of the view that increasing the transparency of the data collected under the NGER scheme is essential to ensure it remains aligned with the expectations of the public and the standards set internationally. In the public survey conducted for this review, the authority asked respondents what changes they would recommend to government in relation to the current content of the publicly available data. Over 80% of respondents recommended some change, such as publishing data at the facility level, emissions by greenhouse gas, information on estimation methods used or data as a consistent time-series. Some respondents suggested the usefulness of the data would be improved if it was published in a more accessible format, or it included additional information such as sector, fuel type, emissions source and the uncertainty of the reported emissions.

Feedback from state and territory government users of NGER data on the accessibility of the data was mixed. Some noted that accessibility was adequate, while others noted issues such as the restrictive nature of the data protection and confidentiality provisions, the lack of time-series consistent datasets and the need to perform cleansing activities on the datasets provided.

Here the authority considers several different opportunities to improve the transparency and usefulness of the published data.

Publishing emissions data by source and type at the facility level

Publishing scope 1 emissions data by greenhouse gas (e.g. carbon dioxide, methane and nitrous oxide) at the facility level would bring the published NGER data in line with the subset to be published for the Safeguard Mechanism. Such an approach would also bring Australia in line with the much more comprehensive emissions datasets published for comparable international reporting schemes in jurisdictions such as Canada and the US. Additionally, it would consolidate all publicly available facility-level data into a single dataset.

The authority heard from stakeholders during the public consultation that publishing emissions data at the facility level would allow for greater accountability and improve the community and scientific value of the NGER data, enhancing its utility in policy analysis and impact tracking. The authority also noted that reporting emissions by greenhouse gas could highlight opportunities to reduce emissions, and reporting on emissions (and mitigation efforts) should be clear, transparent, and publicly accessible.

With these goals in mind, the authority was also mindful that the distribution of emissions reported by each facility is heavily skewed. In 2021-22, approximately 43% of facilities reported total scope 1 and 2 emissions of only 0.5 kt CO₂-e or less. An appropriate facility-level publication threshold could be considered to limit the administrative burden for the regulator while still improving transparency and granularity of the data published. Table 3.7 outlines the number of facilities that would exceed a range of potential facility-level publication thresholds of combined facility-level scope 1 and 2 emissions.

Examples of possible facility-level publication thresholds (kt CO ₂ -e)	Number of facilities above publication threshold (approx.)	Total reported emissions covered (%)
25	1000	95
10	1700	98
5	2400	99
0	8500	100

Table 3.4 The number of facilities that would exceed a range of potential facility-level publication thresholds (combined scope 1 and 2) and the proportion of emissions covered.

Publishing time-series data

For the facility-level data that is currently published (Safeguard and electricity generation facilities), the lack of unique identifier for each facility hinders the ability to link facilities on a year-to-year basis. This lack of robust time series data makes comparisons between years very time consuming and in many cases not possible for members of the public who don't have access to specific information such as the name of a former owner of a facility. Publishing time series data at the facility level would allow better tracking of emissions reductions over time and would bring the NGER scheme in line with comparable international schemes such as Canada and the US.

Information on estimation methods

There is no information published relating to the estimation methods used by reporters to calculate their emissions. In the reporting year 2021-2022, the simplest estimation method (Method 1) was used in more than 80% of the activities that reported emissions of a greenhouse gas, accounting for 36% of reported scope 1 emissions. Public reporting of the estimation methods used may increase the accountability for how reporters are measuring their emissions. The authority found the lack of public reporting of the estimation methods used by companies may reduce incentives to move to higher order reporting methods.

Presentation and accessibility of published data

One of the objectives of the NGER scheme is to inform government policy formulation and the Australian public. The authority noted the usefulness and accessibility of both the publicly published data set and more detailed data set (for use by governments under strict confidentiality conditions) could be improved by publishing the relevant dataset through an application programming interface (API) so that users can download and programmatically query the data using their own software.¹⁷

Other supporting materials that would support the transparency of the NGER data include interactive maps and graphing functions. Reporting schemes for Canada, the US and California present facility data through an interactive mapping tool with features to filter data by criteria such as facility type, location, name, industry and emissions by greenhouse gas (CARB, 2022; US EPA, 2022a; Government of Canada, 2023a).

¹⁷ Through the use of an application programming interface (API) users can download and use their own software to query the NGER data set. The department makes the national inventory data available in this way which allows users to programmatically query data using [Open Data Protocol v4](#).

The US Greenhouse Gas Reporting Program also produces other resources such as interactive data profiles and tools on specific topics of interest to help the public use and derive value from the greenhouse gas reporting data.

Recommendation 9

As a first step in increasing the transparency of NGER data, the NGER scheme requires that the regulator publish, starting with data for the 2023-24 financial year, the following data at the facility level for facilities which produce annual emissions greater than or equal to 5,000 t CO₂-e:

- Scope 1 emissions by greenhouse gas as a consistent time-series.
- Scope 2 emissions as a consistent time-series.
- The method used in each financial year to estimate scope 1 and scope 2 emissions.

Recommendation 10

Resource the regulator to publish relevant NGER datasets through an application programming interface (API) so that users can download and programmatically query the data using their own software. This should be implemented for the publication of the 2024-25 NGER data.

Recommendation 11

Resource the regulator to improve the accessibility and usefulness of the published data by exploring opportunities to present data in additional formats on its website. This should be implemented for the publication of the 2024-25 NGER data.

Recommendation 12

Resource the regulator to collect the necessary information from reporters such that it can link facilities reported under the NGER scheme across time.

3.5. Confidentiality

Each year, the regulator publishes a subset of the data it collects under the NGER legislation. Under section 25 of the NGER Act, corporations can request parts, or all of this data, with some exceptions, be withheld from publication on the basis of commercial value considerations (Box 3.4). The exceptions are defined in subsection 25(5). This subsection states that section 25 does not apply to the emissions and energy production data for designated generation facilities—the regulator must publish these data. As a result of the recent amendments to the NGER Act, the regulator will be required to publish an expanded set of data relating to emissions from Safeguard facilities.¹⁸ These new data are also not subject to applications under section 25.

¹⁸ See subsection 24(3A) of the NGER Act which was inserted by the *Safeguard Mechanism (Crediting) Amendment Act 2023*.

Box 3.4: section 25 of the NGER Act

25 Requests for information not to be published

- (1) A registered corporation, a person required to provide a report under section 22G, 22X or 22XB, or a person required to provide information under section 20, may apply to the Regulator requesting information not be published if the information reveals, or could be capable of revealing:
 - (a) trade secrets; or
 - (b) any other matter having a commercial value that would be, or could reasonably be expected to be, destroyed or diminished if the information were disclosed;
 - (c) about a specific facility, technology or corporate initiative relating to the corporation or the person.
- (2) The application must:
 - (a) identify the corporation or the person; and
 - (b) identify the information that is requested not to be published; and
 - (c) be given in the manner and form approved by the Regulator.
- (3) The Regulator may accept the application and not publish the information if he or she is satisfied that the information would reveal, or would be capable of revealing, information of a kind specified in subsection (1).
- (4) The Regulator must notify an applicant, in writing, of a decision to accept or refuse an application under this section.
- (5) This section does not apply to information required to be published under subsection 24(1AF), (3A) or (3B).

Currently, corporations do not frequently seek to utilise this confidentiality process. Over the past 10 years, only 30 applications have been received by the regulator under section 25 (CER pers. comm.). Of these applications:

- 5 applications have been accepted and the data withheld from publication. These applications were assessed between the years 2010-11 – 2012-13 — with none accepted since that time.
- 10 applications have been refused.
- 15 applications have been withdrawn.¹⁹

In deciding whether to accept or refuse an application under the test in subsection 25(1), the regulator assesses whether the information that the applicant is requesting to be withheld has commercial value that would be, or could be expected to be, impacted by publication.

The regulator has told the authority that processing applications under section 25 is resource intensive for both the regulator and the applicant. Applications can be complex and may require numerous

¹⁹ An applicant can withdraw an application at any time before the regulator makes the final decision. The majority of applications have been withdrawn because the regulator has confirmed that the information the corporation was applying to have withheld was not information the regulator was required to publish (CER pers. comms).

engagements with applicants in order to obtain relevant information and ensure procedural fairness. They can, therefore, take a considerable amount of time to process. For example, a recent application took over one year to process and reach a decision (CER, 2023s; Hendry, 2022).

As applications under section 25 are infrequent, and the majority of these are not approved, the authority used this review to consider whether section 25 should remain in the NGER Act — that is, should corporations retain the ability to have this kind of information withheld from publication?

Many responses to the authority's public survey conducted for this review supported publication of reported information with some limited and specific situations in which information would not be published, while others supported the removal of section 25. Respondents who supported retention of the exemption mechanism pointed to the need to protect commercially valuable information and information relating to new technologies. Several respondents stated that there was a stronger case for publication of emissions data while retaining some level of protection against disclosure of commercially sensitive energy consumption and production data.

The authority understands the views of many people that data relating to emissions and energy should be public knowledge (see previous section on Transparency and associated recommendation).

Ultimately, the authority came to the view that section 25 should be retained. The authority's view is that based on current circumstances it is appropriate for sensitive data to continue to be withheld from publication in specific, limited, circumstances, i.e. when publication would be likely to cause unacceptable commercial damage.

Relevantly, the test in subsection 25(1) is cast in the same terms as the general protection against disclosure of this type of information under section 47 of the *Freedom of Information Act 1982* (FOI Act). Section 47 of the FOI Act provides that documents are exempt from release if they would reveal trade secrets or any other information that has commercial value which would be, or could be expected to be, destroyed or diminished by disclosure. The authority has not identified a clear reason why the limited class of information that currently falls within the scope of section 25 of the NGER Act should not receive similar protection.

The authority also observed that there is no current indication that the section 25 mechanism is being over-used in a way that materially impacts general transparency of relevant emissions data.

The authority noted, however, that the level of use of the section 25 mechanism may change in the future. For example, if the government accepts the authority's recommendation to publish more facility-level data for NGER facilities generally (see above), this could significantly increase the situations in which information that is viewed by corporations as commercially sensitive is in scope for publication. This may, in turn, cause an upsurge in section 25 applications to the regulator. Accordingly, the authority recommends that the government maintains a watching brief over the level of utilisation of the section 25 mechanism, with a view to revisiting its appropriateness and scope in the event that its existence undermines the overall effectiveness of the publication regime. At that time, it may be appropriate to import into the provision an additional public interest test that would need to be satisfied before an application is approved. Any upsurge in applications may also necessitate consideration of the regulator's resourcing available for processing.

Although the authority recommends retention of the section 25 mechanism, based on the regulator's experience with applications to date the authority considers that opportunities for improving the process should be examined, to ensure it is efficient and results in timely resolution of applications. Measures to achieve this may require legislative amendment.

Specifically, further consideration should be given to providing greater clarity on how to determine whether information has commercial value and how that value may be diminished or destroyed. Presently applicants and decision-makers have the benefit of non-binding guidance issued by the regulator (CER, n.d., b). Some guidance on the application of the relevant tests may also be drawn from the FOI context. Overall, this provides limited certainty for both the regulator and applicants. Therefore, there may be benefit, particularly in the event of an increase in applications, in providing for legislatively-recognised guidelines for the application of relevant tests.²⁰ In the public survey conducted for this review over half the respondents who expressed a view about the adequacy of the test in section 25 supported more clearly defining the characteristics of data that has commercial value. Many of these responses came from corporations that report under the NGER scheme. Numerous individuals and organisations who expressed support for increased transparency over emissions also supported greater clarity in the test for non-publication.

Consideration should also be given to whether the section 25 application and decision-making process can be streamlined in order to reduce the administrative burden on the regulator and improve timeframes. The legislation could specify, or allow for subordinate rules to prescribe, additional process matters such as content requirements, and processes and timeframes for the provision of supplementary information by applicants.

Finally, consideration should be given to requiring that section 25 applications must be made for a specific period or reporting year. At the moment, applications do not have to specify a timeframe for non-publication, meaning that if the regulator approves the application the information in question is withheld from publication indefinitely. Given that section 25 provides an exception to the general expectation that data should be published, it seems appropriate that the duration of protection should be time-limited, so it is revisited periodically.

Recommendation 13

Monitor the future utilisation of section 25 of the NGER Act and whether it is impacting upon the overall effectiveness of the publication regime in section 24 of the Act.

Recommendation 14

Consider measures to provide additional guidance and streamline the process for making and deciding non-publication applications under section 25 of the NGER Act, including through legislative amendment if needed.

²⁰ For an example of guidelines of this kind, see the Information Commissioner's guidelines issued under section 93A of the FOI Act.



4. Fugitive methane measurement, reporting and verification

Methane has a much shorter lifetime in the atmosphere than carbon dioxide — with a mean lifetime of 11.8 years compared to centuries — but has a significantly higher short-term global warming potential than carbon dioxide (IPCC, 2021; CSIRO, 2022). Due to these two features, immediate and major reductions in methane emissions, together with stringent carbon dioxide mitigation, will have near-term effects on the climate in the next few decades (IPCC, 2022).

Accuracy of reported emissions is crucial for identifying mitigation opportunities and for tracking progress in emissions reduction.

In Australia, methane comprises 24% of national emissions (Figure 4.1).²¹ The largest sources of methane emissions are agriculture, fugitive emissions associated with coal and gas production, waste, and Land Use, Land-Use Change and Forestry (LULUCF). A significant majority of Australia’s fugitive emissions (86%) are reported under the NGER scheme (see Table 2.2).

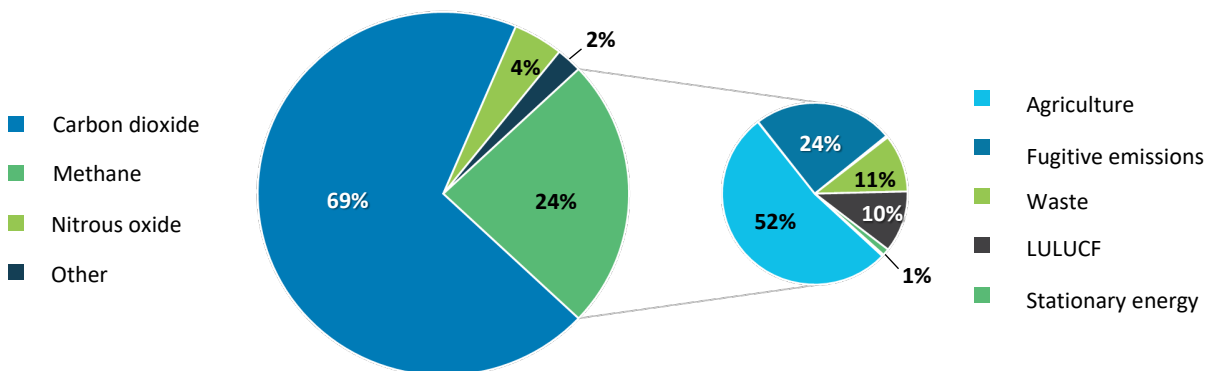


Figure 4.1 The total greenhouse gases reported for the year to March 2023 in the Quarterly Update of Australia’s National Greenhouse Gas Inventory: March 2023 and the sectoral breakdown of Australia’s national methane emissions (DCCEEW, 2023k). *Stationary energy emissions exclude electricity.

Research teams around the world are using satellites to observe methane plumes near the earth’s surface. Over the past five years developments in satellite technologies and inverse modelling, the technique used to trace a plume back to a source and make an estimate of the rate of emissions, has resulted in new sources of data to estimate facility level emissions (RMI, 2023).

A study published in 2021 by researchers at the Netherlands Institute for Space Research (Sadavarte, et al., 2021) made conclusions that emissions may be under-reported at Australian facilities. The conclusions of Sadavarte et al. (2021) have fed into other reports such as the International Energy Agency’s Global Methane Tracker which makes claims that fugitive methane emissions are under-reported across coal and oil and gas producing facilities in Australia (IEA, 2023c).

With the general concern about the accuracy of reported fugitive emissions growing, the Minister for Climate Change and Energy wrote to the Chair of the Climate Change Authority in relation to the authority’s review of the NGER legislation in 2023. In this correspondence the Minister drew attention to the recent reforms to the Safeguard Mechanism, and the increasing importance these changes place on the accuracy of emissions reported under the NGER scheme. The Minister suggested that the authority may wish to consider whether updates to the NGER methane emissions measurement, reporting and verification (MRV) rules are required. The letter noted the work of the Metcoal Methane

²¹ Australia commenced reporting its national greenhouse gas inventory using IPCC Fifth Assessment Report (AR5) GWP100 in May 2021 (DCCEEW, 2021).

Partnership and the Oil and Gas Methane Partnership 2.0 and suggested the authority may like to consider whether mandatory requirements for source-site reconciliation and direct measurement of emissions are practicable at this time. The Minister noted observations and recommendations on the benefits and costs of possible changes would be of assistance.

This chapter examines the reporting of fugitive methane emissions in Australia through the NGER scheme, the questions around the accuracy of that reporting and the options to address those questions through the NGER scheme, where the authority considers necessary.

4.1. Fugitive methane emissions in Australia

Fugitive emissions are defined by the IPCC as the ‘intentional or unintentional release of greenhouse gasses that occur during the extraction, processing and delivery of fossil fuels to the point of final use’ (IPCC, 2019b).

Fugitive emissions constitute around a quarter of Australia’s reported methane emissions and accounted for 11% of Australia’s total emissions in 2022 (Figure 4.1 & Table 4.1) (DCCEEW, 2023k; DCCEEW, 2023a). Coal and ‘oil and gas’ production are the source of all of fugitive emissions in Australia accounting for 57% and 43% of Australia’s fugitive emissions, respectively (see Table 4.1). While methane emissions from landfill and wastewater treatment may also be viewed as other sources of fugitive methane emissions, the IPCC definition is specific to emissions stemming from the energy sector.

In Australia, the composition of fugitive emissions is approximately 70% methane, with the remainder made up mostly of carbon dioxide (DCCEEW, 2023k). Fugitive emissions can vary depending on the facility setup, basin characteristics, activity stage, and activity type. For example, in coal mining, there can be wide variations in both the gas content and the composition of the gas across Australian coal basins, which are also impacted by whether a mine is on the surface or underground. In oil and gas operations, there can be significant variances in the geological characteristics of the oil or gas basin, and fugitive emissions compositions are dependent on how processed the product is and which activity is occurring. Flaring — the combustion of fugitive emissions — changes the composition of fugitive emissions, converting most of the methane into carbon dioxide (NSW EPA, 2015). Venting is the disposal of emissions by release to the atmosphere either intentionally or unintentionally.

Sector		Fugitive emissions (Mt CO ₂ -e)	Proportion of Australia's fugitive emissions (%)		Proportion of Australia's total emissions (%)	
Coal	Underground mines	17.4	36	57	3.8	6.0
	Surface mining	9.3	19		2.0	
	Other, incl. flaring	1.1	2.4		0.2	
Oil & gas	Oil	0.1	0.3	43	0.03	4.5
	Natural gas	5.7	12		1.2	
	Venting	9.8	20		2.1	
	Flaring	5.3	11		1.1	
Total	Fugitive emissions	48.8	100		10.5	

Table 4.1 Fugitive emissions reported in the 2021 National Inventory, by sector and source (DCCEEW, 2023m). Total national emissions reported for this year, 2020-21, was 465 Mt CO₂-e.

4.2. Reporting of fugitive methane emissions in the NGER scheme

The nature of fugitive emissions from coal, oil and gas operations are different, and this affects how these emissions can be measured. While fugitive emissions from oil and gas operations are generally highly concentrated, fugitive emissions from open cut coal operations tend to be more diffuse once mining has commenced. Due to this variability there are different methods available to measure or estimate emissions for activities across these sectors.

The *National Greenhouse and Energy Reporting (Measurement) Determination 2008* (Measurement Determination) outlines the methods for calculating emissions for the NGER scheme. An overview of these methods is included in Table 2.4. There are four general methods available to reporters, with methods increasing in complexity from Method 1 to Method 4. Method 1 uses a default multiplier referred to as an emissions factor. Methods 2 and 3 can require sampling to estimate emissions for an activity, or have an emissions factor applied to each piece of equipment or component, and Method 4 requires direct measurement of emissions on either a continuous or periodic basis.

Reporters are given a choice of methods they may use to estimate emissions, however not all methods are available for estimating emissions from all sources. Method availability depends on the sector and the activity, and the technologies available for measurement or estimation (Chapter 3, Measurement Determination). An overview of the methods available for reporting fugitive emissions is included at Appendix D. Methods are updated annually by the Department of Climate Change, Energy, the Environment and Water (the department) (CER, 2023t; DCCEEW, 2022b). Recent updates to methods for estimating fugitive emissions include:

- going beyond international reporting requirements by splitting natural gas production and processing into separate source types
- the addition of new sources for natural gas storage, natural gas liquefaction, storage and transfer, and produced water
- introduction of methods reflecting the latest available research, including results of Leak Detection and Repair (LDAR) programs
- increasing the Method 1 emissions factor for open cut coal mining in Queensland from 0.023 to 0.031 CO₂-e per tonne of run-of-mine coal extracted, incorporating updated data sources.

4.2.1 Coal mining methods under the NGER scheme

In the Measurement Determination, fugitive methane emissions from coal mining are split into a small number of activities — 4 for underground mining and 3 for open cut mining (Chapter 3, Part 3.2, Measurement Determination). In both types of mining, the extraction of coal activity is responsible for the largest portion of fugitive emissions (DCCEEW, 2023a).

Coal mining activities, other than coal extraction, that are included in the Measurement Determination for reporting fugitive methane emissions include:

- pre-mining venting, where emissions are released prior to the commencement of mining
- flaring of coal mine waste gas
- post-mining activities that include the processing of coal from gassy underground mines.

To estimate fugitive emissions associated with coal extraction in underground coal mines, the Measurement Determination limits the choice of method to Method 4. To implement Method 4 in an underground coal mining setting, sensors are installed to monitor the composition and flow rates of gas venting from the mine shaft (DCCEEW, 2023a).

The Measurement Determination allows for the use of a range of methods for estimating fugitive emissions from underground coal mining activities other than coal extraction:

- Method 1 is available for processing of coal, reported as post mining activities
- Methods 1-2 are available for estimating methane emissions from flaring of coal mine waste gas
- Method 4 is available for pre-mining venting or flaring emissions.

In open cut coal mining, methane is released to the atmosphere from the exposed portions of the coal seams which creates a diffuse source of emissions. The Measurement Determination makes Methods 1-3 available for reporting these emissions. Methane emissions from flared coal mine waste gas can be reported using Method 1, and pre-mining venting emissions must be reported using Method 4 only.

Decommissioned underground coal mines are also split into 2 activities for fugitive methane:

- Methane for decommissioned mines, where gas continues to be released from the mine after mining concludes, for which Method 1 and 4 are available.
- Flaring of coal mine waste gas, for which Method 1 is available.

4.2.2 Oil and gas methods under the NGER scheme

Methods for estimating fugitive methane emissions from oil and gas operations are categorised into a large number of specific activities in the Measurement Determination (Chapter 3, Part 3.3, Measurement Determination). These activities and available methods are summarised in Figure 4.2, and covered in more detail in Appendix D. The activities for which emissions are reported typically fall under three broad categories:

- leakage, or the unintended release of emissions
- venting, where emissions are disposed by release to the atmosphere either intentionally or unintentionally
- flaring, where methane is disposed of by combustion, converting it to carbon dioxide.

Activity	Emissions source	Methods	Activity	Emissions source	Methods	Activity	Emissions source	Methods
Oil or gas exploration	Venting/leakage	1, 4	Onshore natural gas production	Leakage	1, 2, 3	Produced water	Leakage	1, 2
	Flaring	1, 2A						
Crude oil production	Leakage	1, 2, 3	Offshore natural gas production	Leakage	1, 2, 3	Natural gas transmission	Venting/leakage	1, 2, 3
	Venting	1, 4					Flaring	1, 2A
	Flaring	1, 2A				Natural gas production	Venting	1, 4
Crude oil transport	Venting/leakage	1, 2	Flaring	1, 2A	Venting		1	
	Crude oil refining	Leakage	1, 2, 3	Natural gas gathering and boosting	Leakage	1, 2, 3	Natural gas liquefaction, storage and transfer	Flaring
Venting		1, 4	Venting		1	Leakage		1, 2, 3
Flaring		1, 2A	Flaring		1, 2A	Venting		1
			Natural gas processing	Leakage	1, 2, 3	Natural gas distribution	Flaring	1, 2A
				Venting	1		Leakage	1, 2, 3
				Flaring	1, 2A		Flaring	1, 2A

Figure 4.2 Summary of method availability for reporting oil and gas fugitive methane emissions under the NGER Measurement Determination (Chapter 3, Part 3.3, Measurement Determination).

For oil and gas sources, Method 1 frequently applies the emissions factor to throughput of oil or gas through the segment (Explanatory Statement, National Greenhouse and Energy Reporting (Measurement) Amendment (2021 Update) Determination 2021). Methods 2 and 3 typically apply emissions factors to each piece of equipment or component for leak emissions sources, or sampling of the gas composition for flaring emissions sources, while Method 4 requires direct measurement or engineering calculation approaches.

Reporters must use the same method for a group of several defined activities if these activities are within the facility boundary (Chapter 3, Part 3.3, Measurement Determination). These include emissions reported for leakage from onshore natural gas production, offshore natural gas production, natural gas processing, natural gas gathering and boosting, natural gas storage, and natural gas liquefaction, storage and transfer.

Results of LDAR programs²² can be reflected in emissions reported under the NGER scheme if they are made using appropriate requirements and standards. Reporters can apply a lower, ‘no-leak’ emissions factor for relevant equipment components for a number of estimated sources of leakages (Chapter 3, Part 3.3, Measurement Determination).

²² LDAR programs routinely monitor equipment to identify leaks for repair.

4.3. Remote sensing technologies put a focus on Australia’s fugitive methane emissions

Remote sensing technologies, ranging from satellites to on the ground sensors, are being deployed by researchers around the world to quantify facility-level methane emissions from the top-down. Some studies using these technologies have concluded that methane emissions may have been underestimated at some Australian facilities using traditional bottom-up approaches for estimating fugitive methane emissions (Sadavarte, et al., 2021; Palmer, et al., 2021).

4.3.1 Research into the use of remote sensing technologies for the estimation of greenhouse gas emissions

Satellites have been used to detect and estimate concentrations of greenhouse gases from orbit for some time, with the first satellite dedicated to greenhouse gas monitoring, Greenhouse Gases Observing Satellite (GOSAT), launched by Japan in 2009 (NIES, n.d.). More satellites have been launched since, including those from the Copernicus program of the European Space Agency, the EMIT program from NASA, and GHGSat (ESA, n.d.; NASA, 2022; GHGSat, n.d.). A number of satellites are scheduled to launch in the coming years, which are planned to generate higher resolution and more timely, specific data on the release of greenhouse gases into the earth’s atmosphere (Jacob D. J., et al., 2022).

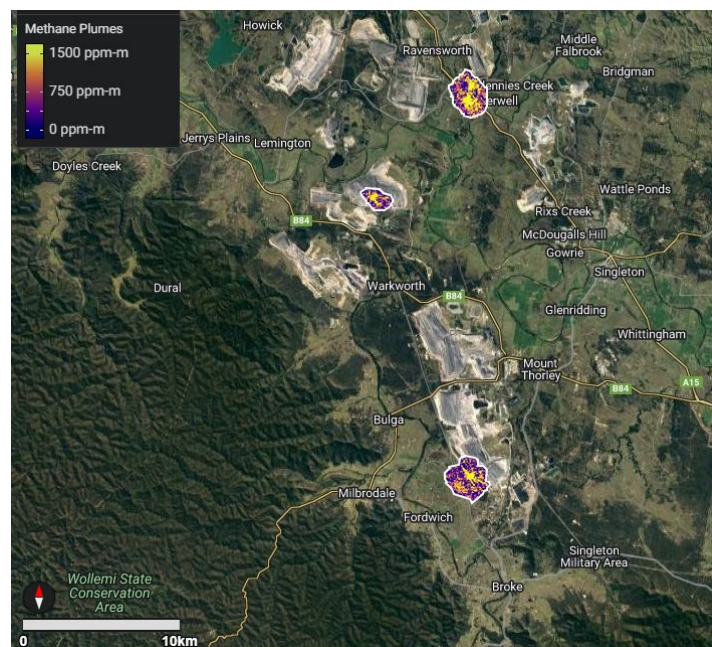


Figure 4.3 Image of methane plumes in the Hunter Valley, New South Wales, observed by NASA’s EMIT satellite on 25 January 2023 (NASA, 2023), accessed by the authority 8 August 2023.

Satellites provide an indirect measure of greenhouse gas emissions. Researchers that have used satellite-based measurements of methane plumes in the atmosphere rely on a technique known as ‘inverse modelling’ to transform data collected from the atmosphere, including measurements of gas concentrations and weather information, into estimates of emissions at the earth’s surface (Cho, Chung, Miller, & Saibaba, 2022). Inverse modelling is a developing field and the speed of inverse modelling has increased with computational power in recent years (Chevallier, Lloret, Cozic, Takache, & Remaud, 2023).

There are limitations to satellite-based measurements that prevent this technology being used to estimate emissions reliably at the facility level (Sherwin, et al., 2023; Cooper, Dubey, & Hawkes, 2022). These limitations stem from cloud coverage, the fraction of sunlight reflected by the earth’s surface, and wind (Cooper, Dubey, & Hawkes, 2022). These estimates are also very sensitive to assumptions of wind speed, which can introduce a 30% uncertainty to emissions estimates (Jacob D. J., et al., 2022; Varon, et al., 2018). The resolution of methane-detecting satellites currently limit the identification of

facilities that are geographically close – for example, the TROPOMI satellite has a resolution of $5.5 \times 7 \text{ km}^2$ (Jacob D. J., et al., 2022).

The temporal nature of these satellite observations also limit their use in making conclusions about the total annual emissions from a facility. For example, coal and gas fugitive emissions sources have been found to have high temporal variability (Riddick, Mauzeralla, Celia, Kang, & Bandilla, 2020; Frankenberg, et al., 2016; Zavala-Araiza, et al., 2015; Duren, et al., 2019; Dreger & Kędzior, 2021; UNEP, 2022; Swolkień, Fix, & Gałkowski, 2022).

As a result, accurate estimates of these emissions are difficult with limited sampling. This limitation occurs for all approaches that use limited sampling to track emissions sources that vary over time.

Despite these limitations, the combination of improved satellite data and processing power has enabled the detection of concentrated emissions sources. Fugitive methane venting and leaks that result in concentrated plumes of methane, known as super-emitting events, are the most frequently identified sources of emissions because of their concentration and scale (Zavala-Araiza, et al., 2015; NASA, 2022; Irakulis-Loitxate, Guanter, Maasackers, Zavala-Araiza, & Aben, 2022; Zhang, et al., 2020).

4.3.2 Satellite studies of methane emissions from Australian facilities

Two international satellite-based studies have reported on emission estimates for Australian facilities (Sadavarte, et al., 2021; Palmer, et al., 2021).²³

A report from researchers at the Netherlands Institute for Space Research evaluated three locations with coal mines in the Bowen Basin in Queensland, comparing satellite-based emissions estimates with their estimates of reported methane emissions (Sadavarte, et al., 2021). The Sadavarte et al. analysis estimated reported emissions by combining data from the EDGARv4.3.2 global emissions inventory, Australia's National Inventory,²⁴ basin-level gas content, mine type and production volumes (Sadavarte, et al., 2021). The authors concluded that there were underestimations in the reported emissions for two of the three sources.

As a further examination of the satellite data reported in the Sadavarte et al. study, the authority has performed analysis to compare these satellite-based estimates with the total facility-wide emissions for these mines reported under the Safeguard Mechanism (Table 4.4). The Safeguard data includes emissions reported for the whole facility, including all reported fugitive emissions. The authority's analysis of NGER data indicates that for Safeguard facilities where coal mining is the primary activity at the facility:

- Underground: fugitive emissions comprised an average of 95% of emissions reported to the NGER scheme, with fuel combustion comprising the remaining 5%
- Open cut: fugitive emissions comprised an average of 41% of total emissions reported to the NGER scheme, and fuel combustion comprises 59%

Confidentiality constraints prevent this Safeguard facility data from being further disaggregated. As such, the facility-wide emissions reported under the Safeguard Mechanism for these mines have been treated as the ceiling of the reported fugitive emissions in the authority's analysis.

Emissions reported under the Safeguard Mechanism for 2018-19 and 2019-20 were averaged to obtain averaged annual facility emissions for the mines covering the same years as the Sadavarte et al. study.

²³ Other studies have come to similar conclusions regarding estimates of methane emissions reported to the US and Canadian National Inventories (Dubey, Cooper, Staffell, Hawkes, & Balcombe, 2023; Shen, et al., 2022).

²⁴ The study used the state level fugitive methane emissions from open cut and underground coal mining published in the National Inventory Report 2018 (DCCEEW, 2020).

For sources where Sadavarte et al. estimated the emissions from multiple mines, Safeguard data for those mines were combined.

The authority’s analysis found that:

- total facility-wide emissions reported by these facilities were found to be within the uncertainty range of the satellite-based estimates made by Sadavarte et al. for two sources (Sources 2 and 3 in Table 4.2), which have a mix of open cut and underground mines
- satellite-based estimates made by Sadavarte et al. for Hail Creek (Source 1 in Table 4.4) — an open cut mine for which Methods 1-3 are available — were higher than the total facility-wide emissions reported for that year.

	Source 1	Source 2			Source 3	
	Hail Creek (HC) Mine	Goonyella Broadmeadow (GB) Mine, Moranbah North (MN) Mine* & Grosvenor (G) Mine			Capcoal Grasree (CG) Mine & Oaky Creek (OC) Mine	
Mine type	Open cut	Open cut and underground				
Facility name	HC	GB	MN*	G	CG*	OC
Avg annual facility emissions reported to Safeguard (Mt CO₂-e)	0.50	1.2	2.0	1.2	2.8	1.2
Avg annual emissions reported to Safeguard per source (Mt CO₂-e)	0.50	4.4			4.0	
Sadavarte et al. satellite estimates per source (Mt CO₂-e)	5.8 ± 1.3	4.8 ± 1.5			3.8 ± 1.6	

Table 4.2 Sadavarte et al estimates of fugitive emissions compared to the total emissions reported per facility under the Safeguard Mechanism (Sadavarte, et al., 2021). AR4 used to convert from methane to CO₂-e.²⁵

A similar satellite-based study by the UK National Centre for Earth Observation (NCEO) estimated emissions associated with coal mines in the Bowen Basin and compared these estimates with facility-wide data reported under the Safeguard Mechanism (Palmer, et al., 2021). The study found estimated emissions were within the margin of error of the total reported emissions for underground coal mines. However, estimated emissions made by Palmer et al. were higher than the reported emissions for the two open cut coal mines (Table 4.3).

²⁵ The Global Warming Potential (GWP) from the IPCC’s Fourth Assessment Report (AR4) was used for the reporting periods 2015–16 to 2019–20. AR4 used a GWP of methane of 25. *Two mines were under multiyear reporting for this period, so “reported covered emissions” for 2018-19 were used.

	Hail Creek	Coppabella	Moranbah North/ Broadmeadow	Capcoal
Mine type	Open cut	Open cut	Underground	Open cut and underground
Palmer et al. satellite estimate (Mt CO ₂ -e)	1.1 ± 0.5	0.8 ± 0.4	2.9 ± 1.3	2.8 ± 1.3
Annual facility emissions reported to Safeguard (Mt CO ₂ -e)	0.5	0.2	3.2	2.8

Table 4.3 Palmer et al. comparison of fugitive emissions and total emissions reported per facility under the Safeguard Mechanism (Palmer, et al., 2021). Palmer et al. satellite emissions estimates using AR5, while emissions were reported to the NGER scheme under AR4 for this period.²⁶ The Palmer et al. data was converted to AR4 in the table.

From this very limited pool of two satellite-based studies, and the authority's own analysis, the authority has observed general agreement between satellite-based estimates of fugitive emissions and reported emissions using Method 4 (i.e. underground coal mines). However, discrepancies appear to be more prevalent for two open cut mines examined in these studies where lower order methods are available for reporting emissions.

While further studies will be required to investigate the concordance between satellite-derived estimates and reporting based on lower order methods in the NGER scheme, the evidence presented here points to possible issues around the accuracy of emissions estimates based on lower order methods in the NGER scheme.

4.3.3 Use of lower order reporting methods may underlie possible discrepancies between estimates of fugitive emissions

To further understand the possible discrepancy between measurements made by remote sensing and reported emissions, the authority has reviewed the methods used by NGER reporters to estimate fugitive emissions based on analysis of 2021-22 NGER data (Figure 4.3).

The authority's analysis has found 54% of Australia's total fugitive emissions from coal mines, and oil and gas operations used Method 1.

Further analysis by states and territories showed that for open cut mining:

- 72% of fugitive emissions were reported using Method 1 in Queensland
- 26% of fugitive emissions were reported using Method 1 in New South Wales.

The emissions factor for fugitive methane is lower in Queensland than in NSW, indicating reporters may be incentivised to use Method 1 where the use of a lower emission factor may lead to a lower estimation of fugitive emission than higher order methods (Measurement Determination).²⁷ In contrast, in NSW where the emissions factor is higher, reporters may be incentivised to use higher order methods to estimate their fugitive emission from open cut mining.

²⁶ The IPCC Fifth Assessment Report (AR5) uses a GWP of methane of 28.

²⁷ For the year 2021-22, these were 0.023 and 0.061 tonnes CO₂-e per tonne of coal, for Queensland and New South Wales, respectively. In 2023, the Queensland Method 1 emission factor was revised to 0.031 tonnes CO₂-e per tonne of coal.

For the gas sector, the authority found that Method 1 is the most frequently used method. However due to confidentiality constraints of the NGER Act, the portion of emissions reported using each method cannot be disclosed.

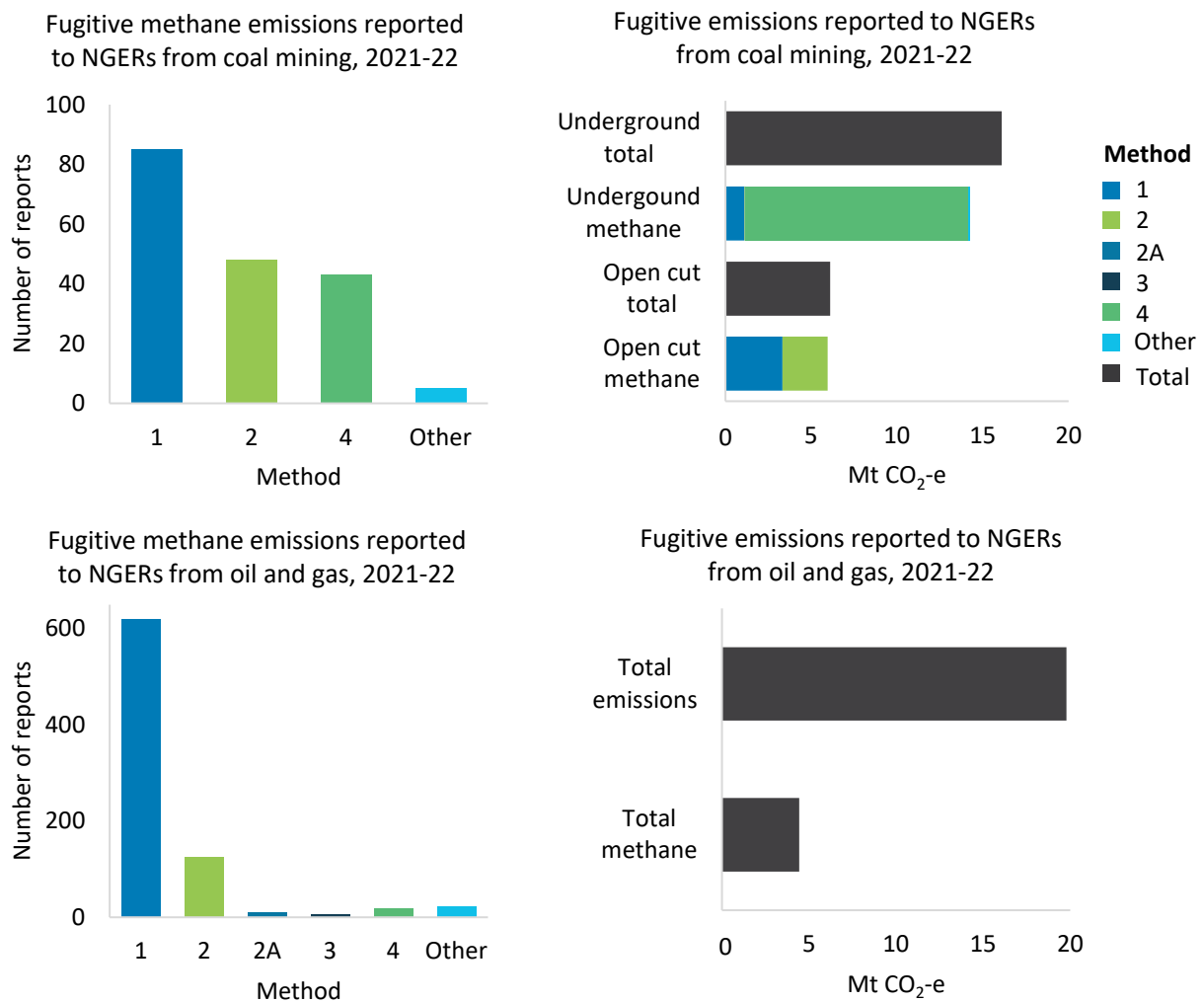


Figure 4.4 An overview of methods used to report fugitive emissions under the NGER scheme in 2021-22 (CO₂-e). The methods used for reporting some fugitive emissions are not shown due to confidentiality constraints.

4.4. International developments in methane measurement reporting and verification

There is growing international momentum to improve the accuracy and transparency of methane emissions monitoring. In considering possible improvements to the NGER scheme, the authority has reviewed international developments in methane measurement, reporting and verification.

Methane measurement, reporting and verification (MRV) frameworks provide systematic approaches for measuring or estimating methane emissions, reporting these emissions, and verifying these emissions, typically through an independent third-party.

4.4.1 Oil and Gas Methane Partnership 2.0 and Metcoal Methane Partnership

Two new international frameworks for improving methane MRV are being developed by the United Nations Environment Program (UNEP) together with industry groups— the Oil and Gas Methane Partnership (OGMP) 2.0 and the Metcoal Methane Partnership (MMP).

Launched in 2020, the OGMP 2.0 reporting framework was developed in conjunction with the European Commission, the Environmental Defense Fund, the Clean Air Taskforce, and the Climate and Clean Air Coalition to establish a comprehensive measurement-based methane reporting framework for the oil

and gas industry. Over 100 companies, with assets representing over 35% of the world’s oil and gas production, have joined OGMP 2.0 (OGMP, n.d., a).

The yet to be completed MMP is being developed by the UNEP International Methane Emissions Observatory (IMEO) for metallurgical coal producers. MMP is aimed at decarbonising the steel supply chain. MMP aims to establish a performance framework for substantial, sustained reduction of methane emissions. It aims to provide guidelines on scientific methodologies for quantifying and reporting emissions, requiring annual reporting of emissions data to IMEO.

Both OGMP 2.0 and MMP frameworks include flexibility of reporting, with five levels available to estimate and report methane emissions increasing in complexity from Level 1 (based on emission factors) to Level 5 (requiring source and site level measurements), see Table 4.4. These frameworks also set performance targets for either absolute methane emissions reduction or reduction in methane intensity.²⁸

Both frameworks describe a ‘gold standard’ for methane emissions estimation and reporting:

- MMP gold standard: companies must reach Level 5 for operated underground sites within 3 years, and for all non-operated sites and surface mines within 5 years.
- OGMP 2.0 gold standard: all assets with material emissions must report at Level 4,²⁹ with all remaining sources reported at Level 3³⁰ and demonstrated efforts to move to Level 5 (OGMP, 2020; OGMP, 2022).

	Level 1	Level 2	Level 3	Level 4	Level 5
OGMP 2.0	Reporting: Uses an aggregate for whole operation.	Reporting: Some disaggregation of sources, including for leaks, venting and flaring.	Reporting: Detailed disaggregation of sources required. Estimation: Emissions factors include those from guidance documentation, academic or industry studies, or international standards	Reporting: As per level 3 Estimation: Source-level measurement or sampling. Detailed engineering calculations and modelling can be used where appropriate.	Reporting & Estimation: As per Level 4. Requires additional site-level measurements for quality assurance of total source-level estimates.
MMP	Estimation: Uses simple emission factor related to production.	Estimation: Typically uses generic emissions factors, but more quantification can be used.		Reporting: As per level 3 Estimation: Site specific measurements at an appropriate frequency for lowest uncertainty of estimated emissions.	

Table 4.4 A simplified overview of the estimation and reporting levels of the OGMP 2.0 and MMP frameworks (OGMP, 2020).

Similarly, the NGER reporting scheme typically makes multiple methods available to reporters, increasing in complexity from Method 1 to Method 4. Methods 1-4 for reporting emissions under the NGER scheme are well aligned with Levels 2-4 in both OGMP 2.0 and MMP.

²⁸ Volume of methane released per tonne of coal or as percentage of marketed gas.

²⁹ Defined as a minimum 70% of total emissions for the facility.

³⁰ Must include justification as to why over 90% of emissions are not reported at Level 4.

While there is significant alignment between the two international frameworks and the NGER scheme, there are a number of areas where these frameworks diverge:

- **Source-site reconciliation** - the NGER scheme does not include methods for site- or facility-level measurement for verification of total source-level emissions measured or estimated across the site.
- **Completeness of emissions sources** - some categories of emissions that are required under OGMP 2.0/MMP are not currently required to be reported under the NGER scheme. These include: decommissioned open cut coal mines, post mining emissions for open cut coal mines and non-gassy underground coal mines, and coal waste pile emissions using Method 1.
- **Granularity of reported emissions** - under the NGER scheme, some activities cover emissions from a number of sources that are disaggregated under OGMP 2.0 and MMP. These include natural gas transmission sources, and natural gas distribution sources.
- **Availability of direct measurement methodologies** - some activities which have Level 4 reporting methods under OGMP 2.0 and MMP do not have a comparable Method 4 direct measurement or detailed engineering calculations available under the NGER scheme. These include: leakage sources in oil and gas, flaring sources in oil and gas, and some vented sources in oil and gas.

A number of Australian oil and gas facilities are covered under OGMP 2.0 (OGMP, n.d., b). The authority will monitor new measurement methods developed as part of these frameworks in our annual progress report for potential future inclusion in the NGER Measurement Determination.

4.4.2 Source-site reconciliation of emissions estimates

Top-down measurements provide a means to verify bottom-up reported emissions

Both OGMP 2.0 and MMP place a high importance on direct measurement of emissions sources, as opposed to the use of emissions factors. In addition to this, these frameworks require verification or quality assurance of these measurements through site-level measurements. Site-level measurements are designed to quantify the total amount of emissions across all sources of emissions within a site or facility. While satellite measurements conducted from orbital height do not yet have the accuracy required for measuring methane emissions at the facility-level, there are many measurement technologies that are currently suitable for measuring these emissions closer to the ground (Erland, Thorpe, & Gamon, 2022). Examples of technologies used for these measurements are outlined in Box 4.1.

At the highest level (Level 5) both OGMP 2.0 and MMP approach estimating methane emissions using a combination of direct measurements and site-level measurements. These are also referred to as 'bottom-up' and 'top-down' measurements.

Bottom-up measurements or estimates use data obtained close to the source of emissions. The NGER scheme, including Methods 1-4, are examples of methodologies for making bottom-up estimates or measurements of emissions.

Top-down measurements or estimates are made at a larger spatial scale, beyond individual point sources. Top-down measurements use technologies to detect or measure emissions from a range of spatial scales ranging from: plant or equipment scale, to facility or site scale, to larger areas including basins. These measurements are useful to understand total emissions across a particular spatial scale. In recent years, there have been significant advancements in top-down measurement technologies. Box 4.1 explores these advancements.

Box 4.1 Spatial scale of top-down measurement technologies

The most appropriate technology for top-down measurements depends on the volume and concentration of methane, and the geographical scale of the site or facility (Erland, Thorpe, & Gamon, 2022). A summary of methods and applicable scale of measurements are included in the table below (WMO, 2019), (Erland, Thorpe, & Gamon, 2022).

Scale of measurement	Platform for measurement	Examples for use of data
Regional – sub-regional (1 km ² – 1000 km ²)	Satellite	Detect methane emission hotspots, estimate regional fluxes. Identify super-emitting leaks.
Sub-regional – facility (1 km ² – 100 km ²)	Airborne (aircraft and remote sensing)	Source detection, make basin-wide estimates, identify super-emitting leaks.
Facility – site (<1 m ² to 1 km ²)	Ground-based (including vehicles)	Identify super-emitting leaks, determine facility-wide emission factors. Emissions reporting, input to facility-scale reporting, leak identification.

The process of bringing top-down and bottom-up measurements together to evaluate the completeness of emissions estimates is called ‘source-site reconciliation’. Source-site reconciliation is the process where the total of the bottom-up emissions measurements and estimates from across a facility are compared and cross-checked against a top-down, site- or facility-wide emissions measurement. This reconciliation process can be used to verify emissions totals and can also be used to identify unknown emissions sources (OGMP, 2022; Johnson, Conrad, & Tyner, 2023; Erland, Thorpe, & Gamon, 2022).

While all fugitive methane measurements have uncertainties associated with them, making measurements at multiple ‘levels’ – both at the source level and at the site level – and reconciling differences in emissions estimates will reduce the overall uncertainty in the reported emissions (Wang, et al., 2022). These different measurements can be considered complementary, with discrepancies between the two estimates used to detect previously unknown methane sources and implement improved bottom-up measurements (Daniels, et al., 2023).

Sources of fugitive methane emissions not reported in the NGER scheme may be identified in the reconciliation process. From coal mining, this could include unidentified gas migration, unused mine entries or bore holes, or new ground seeps opening, including micro-seepage that can be difficult to detect (IEA, 2023d; Sechman, Kotarba, Kędzior, Kochman, & Twaróg, 2020). In gas facilities, unaccounted sources of emissions can include unknown intermittent leaks due to plant operations or other activities (Cusworth, et al., 2021; Saint-Vincent & Pekney, 2020).

Limited top-down measurements of fugitive methane emissions in Australia

The authority has found limited examples of top-down emissions measurements being conducted in Australia. A study conducted by CSIRO, Australian Coal Industry’s Research Program (ACARP), and the Department of Industry, Innovation and Science evaluated two top-down measurement techniques for their potential to estimate fugitive emissions over open cut coal mines in the Hunter Valley and the Bowen Basin (Day, et al., 2017). The study found emissions were able to be accurately estimated for some emissions sources using mobile monitoring techniques (vehicles equipped with a methane analyser) and atmospheric modelling methods, but more development is required for these techniques to be appropriate for estimating all coal mining fugitive sources.

Several studies have evaluated basin-wide estimates of fugitive emissions for the Surat Basin. For example, one study used data acquired from 2 continuous monitoring stations that measured methane concentrations for 3 years, and additional ground-based instruments for 1.5 years (Luhar, et al., 2020). The authors found that estimated fugitive emissions from coal seam gas production in the basin were 33% higher than expected from their detailed bottom-up emissions estimate. Another study of the basin used aircraft equipped with sensors to measure gas concentration (Neininger, Kelly, Hacker, Lu, & Schwietzke, 2021). The emissions estimates obtained using aerial surveys were found to be slightly higher than their detailed, bottom-up emissions estimate of the Basin, but the authors found good overall agreement between the top-down measurements and bottom-up estimates.

This year, scientists from the International Methane Emissions Observatory (IMEO) conducted a study of coal mine methane emissions in the Bowen Basin. Results from this study may provide more information about the appropriate measurement technologies to accurately estimate emissions from more Australian coal mines.

Capability gap for top-down measurements of fugitive methane emissions in Australia

Historically, Australia has been world leading in scientific research and technical capability relating to atmospheric methane measurement and quantification. In the early 1970s the Australian Government committed to the UNEP to monitor and study global atmospheric composition for climate change purposes as a result of human activities and natural variability. As a result, the Kennaook/Cape Grim Baseline Air Pollution Station began recording methane concentrations from 1978 and has been in continuous operation since as a joint responsibility of the Australian Bureau of Meteorology (BoM) and the CSIRO (Wang, Yung, Lacis, Mo, & Hansen, 1976; CSIRO, n.d., a). Using data recorded at this station, Australian scientists from the CSIRO have made significant advances in the understanding of the growth and changes in atmospheric methane concentrations, evaluated the sources of increased methane, and developed models of the global methane cycle (Fraser, Khalil, Rasmussen, & Crawford, 1981; Pearman, Etheridge, de Silva, & Fraser, 1986; Pearman & Eraser, Sources of increased methane, 1988; Steele, et al., 1992; Fung, et al., 1991).

Since this time, while nodes of methane measurement expertise have developed across Australia within the CSIRO, University of New South Wales, University of Wollongong, University of Melbourne, and other universities, Australia has failed to keep pace with global developments and investment in methane measurement capability.

Australia's small methane measurement and analysis community include research institutions and domestic companies offering methane measurement, reporting and verification services utilising technologies that cover different scales of emissions sources, from ground-based measurements to drones and light aircraft. However, this sector will require time and dedicated investment to reach its full potential.

High quality data on all sources of methane in geographical areas surrounding a facility are essential for improving the accuracy of any facility-wide emissions measurements.

Continuous monitoring of methane emissions is important for establishing the natural, or background, levels of methane in the atmosphere. Emissions monitoring networks can provide very important data to validate emissions estimates for national inventories, as well as help improve understanding of atmospheric science (NOAA, n.d.).

There are currently 4 stations in the Australian Greenhouse Gas Observation Network (AGGON), which monitor the atmospheric concentration of greenhouse gases (CSIRO, n.d., b). By comparison there are 7 stations across the state of California in the United States, and 46 stations across 16 countries in the European Union (CARB, n.d.; ICOS, n.d.). Due to Australia's large geography and limited number of monitoring stations, there are gaps in Australia's emissions monitoring network.

4.5. Improving fugitive emissions reporting under the NGER Scheme

The authority has identified improvements that can be made to the NGER Measurement Determination to enhance the accuracy of fugitive emissions reporting.

4.5.1 Increasing the accuracy of reported fugitive methane emissions in the NGER scheme

The authority has heard from many stakeholders that the use of Method 1 is no longer appropriate for estimating fugitive emissions with the accuracy required to track emissions reduction activities. While the use of Method 1 brings benefit to reporters such as simplicity and lower cost, the authority is of the view that moving to higher order methods would provide increased accuracy of Australia's reported fugitive emissions.

Further, as Method 1 uses an emissions factor and commodity production volumes to calculate emissions, reported fugitive emissions change only when production levels change. Without being able to account for reduced emissions, there is little incentive to invest in emissions abatement activities.

Method 1 for extraction of coal in open cut mines uses some emissions factors that are based on older studies with limited sample sizes. For example, the emissions factor for New South Wales coal mines is based on a 1993 study from the CSIRO (DCCEEW, 2023n).

Emissions factors are also not able to accurately capture the variability of methane content across different coal seams or gas zones (ACARP, 2008). Importantly, where mines are pre-drained of methane, the use of emissions factors do not capture this reduction of fugitive emissions in the mine. This may discourage the use of pre-drainage, as this reduction is unable to be reflected in a facility's reported emissions where Method 1 is used. Reduction of emissions through pre-drainage can be captured by moving to Method 2. Emissions factors also fail to capture the variability of mine depths.

'Australia's heavy reliance on emissions factors to report methane means that companies can deliberately or inadvertently overlook significant emissions sources, such as intermittent leaks. It also reduces the incentive for companies to adopt best practices for methane detection and abatement, such as replacing pneumatics and pumps, installing recovery systems, and implementing leak detection and repair programmes.'

Environmental Defense Fund submission to this review

'Woodside supports improvements to the measurement, reporting and verification (MRV) of reported methane emissions for the purpose of identifying and promoting mitigation activities by enabling more transparency in the crediting of methane reductions. The framework should be holistic and tailored for Australian operations, with a pragmatic approach that balances measurement and estimation, ensuring that operators can optimise measurement type and frequency according to the materiality of emissions measured and their variability.'

Woodside Energy submission to this review

In the public survey conducted for this review, less than a quarter of all respondents (and less than half who identified as NGER reporters) classified the current reporting of fugitive emissions as somewhat accurate or very accurate. Survey respondents identified costs as the largest barrier to moving to higher order methods, followed by availability of technology and access to instrumentation or services.

'This assumption [that the use of emissions factors implies there may be significant under reporting when compared to direct metering] ignores the logic with which NGERs was designed and the conservative approach taken to develop emissions factors. Reporting entities that use estimation rather than direct metering are not withholding information or completing their obligations to a lesser degree of veracity. Further, there may be site-specific determinates that preclude direct measurement / metering.'

AIGN submission to this review

Recommendation 15

Phase out Method 1 estimation methodologies for fugitive methane emissions, including as a matter of urgency for the extraction of coal in open cut coal mining.

As part of the phase out of Method 1 estimation methodologies, the authority is of the view that the government should establish higher order methods for all fugitive emission sources included in the Measurement Determination.

There are activities in the Measurement Determination for which Method 1 is the only available method. These include some venting sources in oil and gas, and post mining emissions in coal mining.

The authority is of the view that where possible, higher order methods should be established to enable Australian reporters to report their emissions to the highest degree of accuracy.

Establishing higher order methods for all remaining coal mining activities, where possible, would likely support alignment with the anticipated Metcoal Methane Partnership reporting requirements. The Metcoal Methane Partnership draft standards require that all activities have measurement or sampling methods for 95% of their emissions.

The authority's analysis suggests that direct measurement methods or detailed engineering calculations should be made available for all activities reported in the oil and gas sector, to ensure all emission sources with high materiality can be measured using Method 4. Gold standard reporting under OGMP 2.0 guidelines require a minimum of 70%, and targets of over 90%, of an oil and gas asset's total emissions to be reported at the equivalent of Method 4 (OGMP, 2022). Higher order method availability will enable enhanced monitoring of emissions reductions and facilitate Australian reporters to be able to sign up for OGMP 2.0.

'There is currently no method within the NGER program for reporting fugitive methane emissions from the oil and gas sector that is based upon the direct measurement of emissions. Rather, the binary characterisation of fugitive emissions leaks with the NGER determination (method 2 and 3) as either a leaker or non-leaker, without further differentiation with respect to the size of leaks, means there is no incentive under the NGER scheme to improve methane emission performance – carrying out detailed surveillance or undertaking actions with incremental improvement in leak rates.'

Australian Energy Producers submission to this review

The authority has not conducted a detailed analysis of activities for which higher order methods for estimating fugitive emissions are not yet available. The authority is of the view that the department should be adequately resourced to review these activities, and develop and consult on higher order methods for estimating fugitive emissions for amendable activities.

The establishment of some higher order methods may require further scientific studies to address current information gaps. As part of the annual review of the Measurement Determination, the department can only update methods where new data becomes available. Where there are gaps in available and suitable research required to establish these higher order methods, the government should fund research to develop them.

Recommendation 16

Resource the department to establish higher order estimation methods for all fugitive methane emission sources included in the Measurement Determination.

Method 2 and 3 for the estimation of fugitive emissions from extraction of coal from open cut mines were developed from an Australian Coal Industry Research Program's (ACARP) study published in 2011 (ACARP, 2011). The Method 2 and 3 guidelines in the Measurement Determination require a minimum of 3 boreholes to be sampled (ACARP, 2011). Due to the variability of methane content throughout coal seams, this number of samples may be inadequate, particularly for modern deeper mines that typically have higher methane content.

In a workshop organised by the authority on methane measurement, reporting, and verification, scientific experts stated that there may be issues with the sampling requirements for Method 2 for the estimation of fugitive emissions from open cut mining. These measurements may not be representative of the whole-of-mine emissions.

Recommendation 17

As a matter of urgency, review Method 2 for extraction of coal in open cut coal mining with respect to sampling requirements and standards.

The current reporting requirements for integrated gas facilities require all emissions sources within a facility to use the same method for a selected group of activities (Measurement Determination). Under current requirements, unless all measurements within an integrated gas facility are made at the same level for this group, they cannot be reported using that method. This requirement was identified by reporters as a barrier to using higher order methods.

To enable the direct measurement of sources within integrated gas facilities, particularly for those of high materiality, the government should review the flexibility for reporting of emissions, while ensuring greater flexibility of reporting does not compromise the integrity of estimated emissions. For example, increased flexibility of reporting of emissions from integrated gas facilities could be contingent on reporters providing evidence of emissions monitoring strategies in place at facilities, including continual emissions monitoring devices.

'Woodside would welcome a process to enable greater flexibility to incorporate emerging technologies for use in the reporting of methane emissions on all sources but in particular with any requirements to report fugitive emissions in line with LDAR practices.'

Woodside Energy submission to this review

Recommendation 18

Review the requirement for integrated gas facilities to use the same method across activities to allow for flexibility to use higher order methods for larger emission sources, while ensuring integrity of estimated emissions.

4.5.2 Introducing top-down verification of reported emissions in the NGER scheme

As global efforts to monitor fugitive methane emissions gain momentum, increased capability in satellite-based monitoring programs will enable the increased detection of fugitive emissions from Australian facilities. Emissions reporting in Australia will continue to be a source of interest for international studies and media outlets. The authority is concerned that the current disorderly process where a range of methods are used by different groups, without agreed standards and protocols, to make emission estimates for Australian facilities, will undermine confidence in the NGER scheme. With the NGER scheme recognised as an international best practice emissions reporting framework, through appropriate investment, Australia is well placed to become a world leader in methane emissions reporting.

The authority is of the view that top-down verification of emissions estimates should be institutionalised within the NGER framework. This will allow for the comparison of estimates made using methods documented in the Measurement Determination with top-down measurements made using known, standardised and agreed methods. Such an arrangement would allow for an orderly process of verification of emissions estimates reported through the NGER framework.

‘Amendments to update the Measurement Determination should be made to require all fossil fuel facility operators to conduct direct methane emissions measurement at both the source and site levels, for coal, oil and gas activities covered by the Determination (and equivalent requirements for facilities that have ceased operation).’

Environmental Defense Fund submission to this review

‘The NGER review should consider enhancing methane measurement reporting in line with best international practices, to promote accuracy and reliability. Therefore, NGER scheme reconciliation with voluntary measurement and reporting approaches such as the Methane Partnership 2.0 (OGMP 2.0) framework represents a further consideration.’

APA submission to this review

‘The emergence of remote sensing measurement should continue to be supported, and improvements monitored. At the same time, it should be recognised that a “top-down” method must be rigorously ground-truthed against the existing “bottom-up” methods.’

AIGN submission to this review

The authority heard broad support for top-down emissions verification through a number of submissions to the review, and during workshops with industry, scientists and non-government organisations. In the public survey conducted for this review, none of the 30 respondents who identified as NGER reporters or the 12 respondents who identified as reporting fugitive emissions to the NGER scheme, had signed up to OGMP 2.0. The survey also found there was limited intent from respondents who identified as reporters to sign up to MMP when it launches.

Australia should develop guidelines to be referenced within the Measurement Determination for reporting top-down verification of emissions that are appropriate for the NGER scheme, including standards and methodologies. Due to differences in the nature of emissions sources across industries, these guidelines should be designed so that they can capture fugitive emissions sources across both coal, and oil and gas. They should be based on information and advice provided by a panel of scientific and industry experts with experience and knowledge in these measurement technologies.

The authority is of the view that a rigorous scientific and technological review will need to be undertaken in Australia to document the range of sensor technologies, sample collection processes (drone, aircraft, satellite, ground based) and analytic methods (e.g. inverse modelling) needed to develop top down emissions estimates. Acceptable calibration, uncertainty and sensitivity levels for each type of measurement should be a key focus of this review. Such a review should draw on Australia’s industry and science experts, including from the CSIRO and officials from the National Measurement Institute (NMI). Where information gaps exist, government should fund further studies to develop the scientific evidence base specific to the Australian context for development of these guidelines.

Recommendation 19

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 from Australian facilities. This panel should evaluate whether any further research studies are needed and should be resourced to conduct required studies. The panel of experts should be commissioned in the first quarter of 2024, and the guidelines for making top-down verification measurements published as soon as practicable.

Alongside the development of guidelines for making top-down verification measurements, a top-down verification policy framework should be established and integrated into the NGER scheme. Such a framework should include details such as:

- verification requirements, including the frequency of top-down measurements
- schedule of phasing in of top-down emissions verification
- training or experience requirements for reporters
- guidance on reconciliation between top-down verification measurements and bottom-up emissions estimates.

The Clean Energy Regulator (the regulator) should be involved in overseeing the reconciliation process.

Recommendation 20

Develop a top-down verification policy framework for the verification of bottom-up estimates of fugitive methane emissions reported under the NGER scheme. This should be phased in on a trial basis as soon as practicable, with mandatory verification using top-down measurements commencing the year after. If any discrepancies are found between bottom-up estimates obtained using an NGER method and the top-down verification measurement, the bottom-up measurement approach should be refined by the reporting entity to reconcile the emission estimates.

4.5.3 Developing sovereign capability in methane measurement reporting and verification

In the future, satellite technologies may reach the standards required to verify emissions from some high emitting facilities within the NGER scheme. The government should continue to monitor these developments, and should consult the expert panel on the appropriate requirements that should be met for the detection of fugitive emissions. Requirements may include acceptable satellite detection limits and accuracy, standards for inverse modelling, and what data to be included with any satellite reports.

Recommendation 21

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 methane emissions.

Throughout consultation for this review, the authority has heard the need to develop Australia's capability in methane measurement expertise. This foundational knowledge base is required to improve top-down emissions measurements, and contribute to the broader knowledge base of methane mitigation opportunities for Australia.

With the growing importance of methane emissions in the global response to climate change, and as a signatory to the Global Methane Pledge, the authority views that it is important the government prioritise and support the re-establishment of Australia as a world leader in methane emissions monitoring and quantification. This support should aim to expand and connect existing nodes of expertise and could leverage emerging international partnerships such as the International Methane Emissions Observatory (UNEP, n.d.).

Development of Australia's sovereign capability in methane measurement will be critical to ensure the NGER scheme continues to support the achievement of Australia's greenhouse gas emissions reduction targets by:

- improving the robustness of the emissions data reported to the NGER scheme
- providing a basis for understanding third party reports of methane emissions events
- allow identification of abatement opportunities and tracking of progress towards emissions reduction targets.

Recommendation 22

Prioritise and support the development of Australia's sovereign capability in methane emissions measurement and quantification, by building on existing expertise and leveraging international partnerships where appropriate.

5. The Safeguard Mechanism

The Safeguard Mechanism is created under Part 3H of the NGER Act. Accordingly, the authority is required to review its operation as part of its five yearly statutory review of the Act. Following the reforms of the Safeguard Mechanism which came into effect on 1 July 2023, the operation of the policy from this year onwards will look very different compared with its first seven years.

Key aspects of the reforms to the Safeguard Mechanism include using a production-adjusted emissions intensity framework to set all baselines and the requirement for baselines to decline in a predictable and gradual way that is consistent with achieving Australia's emissions reduction target of 43% below 2005 levels by 2030 and net zero by 2050. The decline rate has been set at 4.9% each year until 2030 and applies to all new and existing Safeguard facilities, unless a differential trade exposed baseline adjusted facility rate has been approved for a facility.

The Safeguard Mechanism reforms also establish the following emissions targets (known as the 'Safeguard outcomes'):

- Total net Safeguard emissions for all of the financial years between 1 July 2020 and 30 June 2030 do not exceed a total of 1,233 million tonnes of carbon dioxide equivalence.
- Net Safeguard emissions decline to:
 - i. no more than 100 million tonnes of carbon dioxide equivalence for the financial year beginning on 1 July 2029
 - ii. zero for any financial year to begin after 30 June 2049.
- The 5-year rolling average of Safeguard emissions for each financial year that begins after 30 June 2024 is lower than the past 5-year rolling average Safeguard emissions for that financial year.

Here the authority provides a brief assessment on the performance of the scheme prior to the 2023 reforms and provides some observations on the reformed scheme.

5.1. Performance of the mechanism prior to the recent reforms

The Safeguard Mechanism was introduced into the NGER Act on 1 July 2016, with the objective to *...ensure that net covered emissions of greenhouse gases from the operation of a designated large facility do not exceed the baseline applicable to the facility.*

Facilities covered by the Safeguard Mechanism were required to keep their emissions below a baseline applicable for that facility. The Clean Energy Regulator (the regulator) set the baseline for each facility. There have been two types of baselines used under the mechanism (DCCEEW, 2022f):

- **Fixed baselines**, which place a total, or absolute, limit on the emissions a facility is permitted to produce.
- **Production-adjusted (or emissions intensity) baselines**, which place a limit on the amount of emissions a facility is permitted to emit on average to make their product or service.

The Safeguard Mechanism transitioned to a production-adjusted framework over the period 2019 to 2021 (DCCEEW, 2022f). Prior to the recent reforms to the mechanism, most facilities had production-adjusted baselines, or were moving on to them soon (DCCEEW, 2022f).

Landfills have had different coverage and baselines setting arrangements to other Safeguard facilities, recognising they do not have an identifiable production variable (CER, 2023u). Grid-connected electricity generators also received different treatment. A single sectoral baseline of 198 Mt CO₂-e was applied to all generators connected to Australia’s five main electricity grids (CER, 2023u). This sectoral approach was taken to grid-connected electricity generators in recognition that the electricity sector behaves more like a single entity, where the output produced is centrally coordinated to meet demand in real time (CER, 2023u).

5.1.1 Performance at the facility level

Since 2016, all facilities have stayed at or below their baseline. To stay below their baseline, some facilities managed excess emissions by exercising flexible compliance options, including applying for multi-year monitoring periods and surrendering Australian Carbon Credit Units (ACCUs) (Table 5.1). In general, however, the use of these compliance options was often not required, as the level of emissions allowed by baselines was generally higher than the actual emissions produced by Safeguard facilities. For example, in 2021-22, baselines were, on average, approximately 40% higher than the actual emissions from the corresponding facility (not including facilities utilising multi-year monitoring periods).

Year	Number of covered facilities	Number of facilities with multi-year monitoring periods	Number of facilities that surrendered ACCUs (including deemed surrender)
2016-17	203	6	16
2017-18	211	17	13
2018-19	210	31	18
2019-20	215	28	13
2020-21	212	40	14
2021-22	219	31	15

Table 5.1 Number of facilities covered by the Safeguard Mechanism each year and usage of compliance options (CER, 2023n).

5.1.2 Performance at the mechanism level

Total emissions covered by the Safeguard Mechanism trended up over the first three years of the scheme and have then slightly declined over the following three years (Figure 5.1). However, the aggregate emissions from Safeguard facilities each year have never dropped below the initial level of 131 Mt CO₂-e in its first year of operation in 2016-17 (shown by the black line in Figure 5.1). The increase in aggregate emissions each year from the 2016-17 level is shown in light blue in Figure 5.1. The resulting cumulative increase in aggregate Safeguard emissions since 2016-17 is 43 Mt CO₂-e, indicating that over the first six years of operation the Safeguard Mechanism was not effective in reducing the total absolute emissions from Australia’s industrial sector.

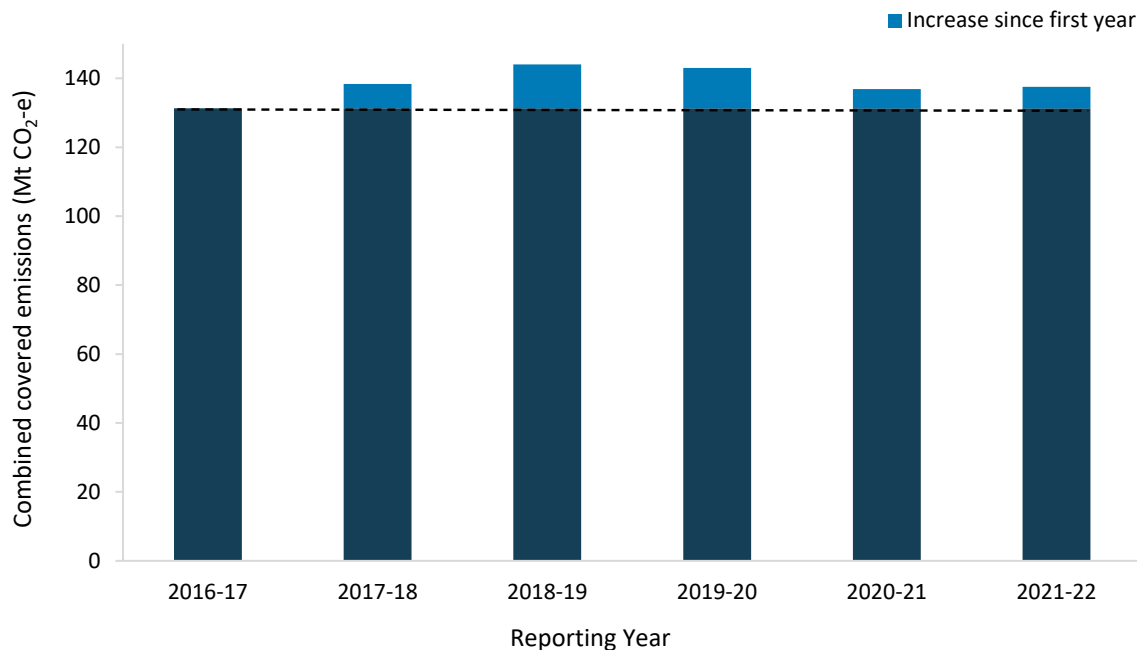


Figure 5.1 Total emissions covered by the Safeguard Mechanism since its introduction in 2016 (CER, 2023n)

To date, there has been little demand for ACCUs from facilities covered by the Safeguard Mechanism (Table 5.2).

Reporting year	Combined gross covered emissions (Mt CO ₂ -e)	ACCUs surrendered (total)	Percentage of total covered emissions covered by ACCUs (%)	Percentage of total ACCUs issued by government used for Safeguard compliance (%)
2016-17	131.3	448,097	0.34	3.4
2017-18	138.4	260,428	0.19	2.1
2018-19	144	190,381	0.13	1.4
2019-20	143	246,539	0.17	1.6
2020-21	136.9	419,315	0.31	2.5
2021-22	137.5	738,862	0.54	4.5

Table 5.2 ACCUs (CER, 2022i) and the Safeguard Mechanism (CER, 2023n)

5.1.3 Performance of the grid-connected electricity sector

Emissions from the grid-connected electricity generation facilities have been below the sectoral baseline each year since the introduction of the Safeguard Mechanism (Figure 5.2). In 2021-22, emissions from the grid-connected electricity sector were 57 Mt CO₂-e (or 29%) below the sectoral baseline. This means individual baseline compliance obligations have not been triggered for the grid-connected electricity sector since the Safeguard Mechanism was put in place.

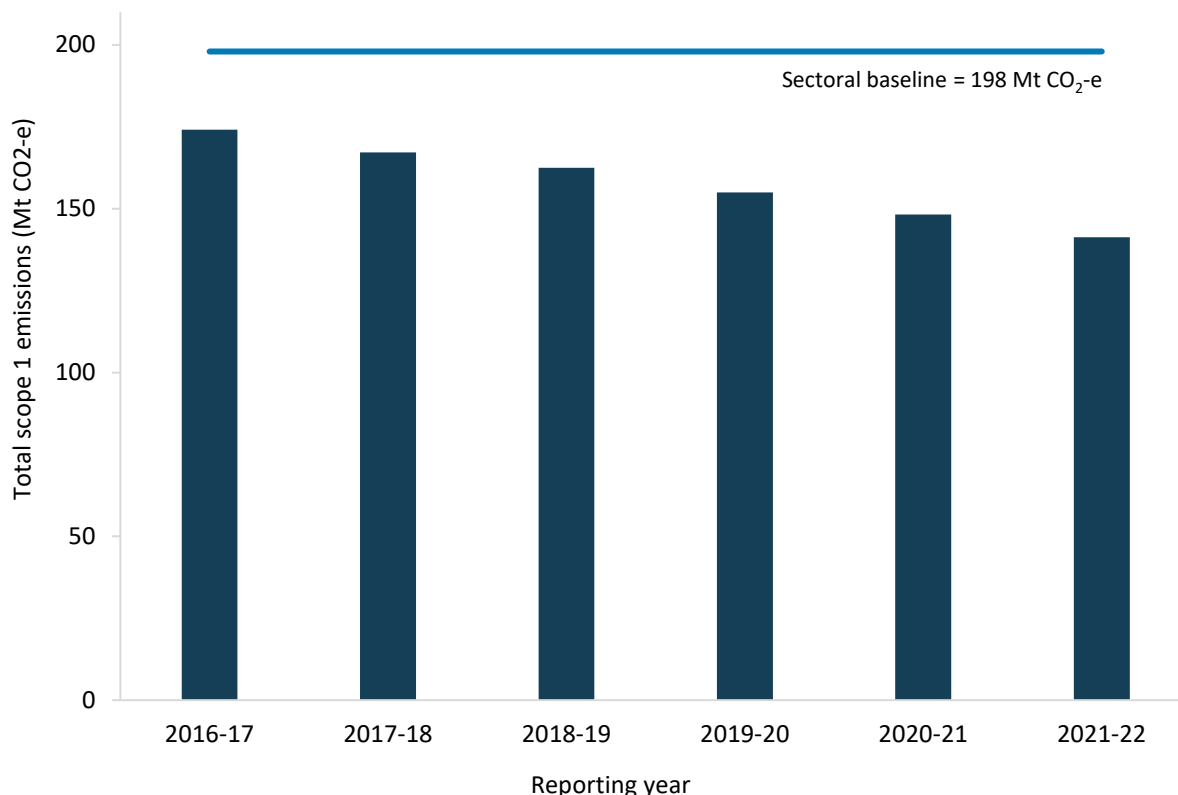


Figure 5.2 Emissions from the grid connected electricity sector by year compared with sectoral baseline (CER, 2023m).

5.2. Observations on the reformed Safeguard Mechanism

The data for the first year of operation of the reformed Safeguard Mechanism may not be available until April 2025. Following the release of that data the authority will be able to begin to make observations about the performance of the reformed scheme. However, as part of the concurrent review of the *Carbon Credits (Carbon Farming Initiative) Act 2011* (ACCU Scheme review), the authority has examined the potential impact of the reformed Safeguard Mechanism on the domestic carbon markets. Interested readers are directed to the ACCU scheme review for the results of this analysis.

In this section the authority makes observations of the reformed scheme by comparing it to its previous recommendations. This section also describes the work the authority will be conducting in future years to assess the performance of the reformed Safeguard Mechanism.

5.2.1 Previous recommendations by the authority

Table 5.3 presents a summary of recommendations made by the authority in recent years. There is good alignment between the reformed mechanism and these previous recommendations.

Report	Year	Recommendation
Submission to the Safeguard Mechanism Consultation	2022	<p>In a submission to the department, the authority offered the following comments on key issues raised in the Safeguard Mechanism Reforms consultation paper:</p> <ul style="list-style-type: none"> • The Safeguard Mechanism’s share of the national abatement task should be determined with consideration given to the potential contributions of all sectors of the economy. It should not be less than a proportional share. • Crediting and trading of over-achievement against baselines should commence once baselines are binding and declining for a Safeguard facility to earn credits. • Flexible compliance options based on carbon markets can smooth the transition to lower emissions but need to be of high environmental integrity. • If/when international offsets are recognised for use in the Safeguard Mechanism, the offsets recognized should be Internationally Traded Mitigation Outcomes created under Paris Agreement rules. • Tailored treatment for Emissions Intensive Trade Exposed (EITE) entities should be targeted to where a risk of carbon leakage is demonstrated to clearly exist, and should be transitional and transparent. • Safeguard facilities should prepare and publish strategies and plans setting out how they intend to comply with their declining baselines.
Prospering in a low emissions world: an updated climate policy toolkit for Australia	2020	<p>Recommendation 14: Enhance the Safeguard Mechanism to deliver emissions reductions from large emitters in industry with:</p> <ul style="list-style-type: none"> • declining baselines with clear trajectories and the ability to trade under- and over-achievement once baselines have commenced declining and are binding • targeted, transitional and transparent competitiveness assistance to emissions intensive, trade exposed industries captured by the enhanced Safeguard Mechanism where a demonstrated risk of carbon leakage exists.
Review of the Emissions Reduction Fund	2020	<p>Recommendation 2: To realise abatement opportunities in industrial facilities, leverage co-investment and avoid risks to the ACCU market, the government’s low-emissions technology incentive scheme make Safeguard Mechanism Credit (SMC) – concessional loans bundled with grants and tax incentives – available to Safeguard-covered facilities undertaking transformative, below-baseline abatement projects.</p> <p>If designed as a carbon market mechanism, and noting the King Review recommendation that the incentive scheme not be an offsets scheme, consideration be given to mitigating risks to the ACCU market by:</p> <ul style="list-style-type: none"> • ensuring below-baseline carbon credits (SMCs) are: <ul style="list-style-type: none"> ○ allocated for emissions reductions that meet a ‘transformative project’ threshold, for example by setting crediting baselines well below compliance baselines ○ saleable only to the government and to entities under the Safeguard Mechanism for the purpose of complying with Safeguard obligations (and not otherwise fungible with ACCUs)

		<ul style="list-style-type: none"> • allowing banking of SMCs for use in future years only after an assessment of the outcomes of the initial pilot phase • funding any government purchase of SMCs separately from amounts already allocated to the Climate Solutions Fund for the purchase of ACCUs • giving future consideration to implementing declining baselines with clear trajectories, to maintain demand for ACCUs and SMCs (for example, as technology evolves) and enhance co-investment in both schemes
Review of the National Greenhouse and Energy Reporting legislation	2018	<ul style="list-style-type: none"> • Update Safeguard baselines to align approaches for measuring emissions and setting baselines. • Improve liquidity in the market for ACCUs to reduce costs of complying with the Safeguard. • Increase the incentive for Safeguard facilities to invest in projects that reduce their indirect emissions using the Emissions Reduction Fund. • Remove deemed surrender so Safeguard facilities only benefit once from the ACCUs they generate.

Table 5.3 Previous recommendations by the authority on the Safeguard Mechanism

Central to the reformed Safeguard Mechanism are declining facility baselines. Previous reports by the authority have recommended that baselines decline linearly in line with Australia’s emissions reduction targets (CCA, 2020a; CCA, 2020b). The authority has also recommended the ability to trade over- and under-achievement of baselines, once baselines commenced declining and are binding (CCA, 2020a). This feature appears in the reformed Safeguard Mechanism in the form of ‘Safeguard Mechanism Credits’. The authority has also noted that once crediting is in place, a Safeguard facility should not be able to register an ACCU Scheme project to earn ACCUs from an activity that addresses the facility’s scope 1 emissions—to remove any possibility of double-counting emissions reductions (CCA, 2022). Under the reforms, ERF projects that solely reduce covered emissions at Safeguard facilities are no longer able to be registered (DCCEEW, 2023d).

Another area of alignment relates to emissions intensive, trade exposed (EITE) industries. The reformed mechanism offers tailored treatment for EITE businesses. The authority previously recommended targeted, transitional and transparent competitiveness assistance to EITE businesses captured by the Safeguard Mechanism where a demonstrated risk of carbon leakage exists (CCA, 2020a). Alongside the Safeguard Mechanism reforms, the government offered support to EITEs in the form of access to funding for low emissions technologies and discounted baseline decline rate—availability of support depends on the type of EITE facility. The authority has previously suggested support mechanisms that do not include differential baseline decline rates—as differential decline rates would shift the emissions reduction effort onto non-EITE facilities (CCA, 2022). The authority notes that the baseline decline rate was set accounting for trade-exposed baseline adjustments and includes a reserve to account for higher-than-expected use of these adjustments (DCCEEW, 2023d).

One area of divergence between the reformed Safeguard Mechanism and the authority’s previous recommendations is around transition planning. The authority previously recommended requiring all covered facilities to prepare and publish strategies setting out how they will comply with declining baselines (CCA, 2022). Such reporting requirements could have several benefits.

- This would be in keeping with good practice corporate disclosures and would ensure that where facilities are not subject to mainstream reporting requirements of publicly listed companies, they are required to publish relevant information.
- The reported information would send valuable signals to the market, for example about future demand for low emissions technologies and alternatives to high-emissions energy sources, and for carbon offsets.
- It would also provide information and confidence in relation to expected outcomes under the Safeguard Mechanism reforms.

The reformed Safeguard Mechanism only requires facilities that apply for multi-year monitoring periods to prepare a plan for complying with their Safeguard obligations. Facilities that use ACCUs to meet 30% cent or more of their baseline will be required to submit statements on why more on-site abatement has not been undertaken, with aspects of this to be published to allow scrutiny.

It is possible these statements will include some detail on transition plans.

While the reforms do not go to the extent of requiring all Safeguard facilities to prepare transition plans, it is likely that the requirements under the government's proposed climate-related financial disclosures will see more information on corporate transition plans published. Under the current proposal, all entities covered by the financial disclosure mandate³¹ will be required to disclose transition plans, including information about offsets, target setting and mitigation strategies (The Treasury, 2023). The proposal notes that for entities that do not have a transition plan, the disclosure requirement could be met by stating they do not have a transition plan. The proposal also notes that, as part of the broader consultation on the government's Sustainable Finance Strategy, Treasury will consider arrangements that could strengthen the development and disclosure of company transition plans. The authority will continue to monitor the design and implementation of the government's initiatives under the Sustainable Finance Strategy and assess the availability of information on Safeguard facility transition plans.

5.2.2 Future work by the authority

Ongoing analysis of the performance of the Safeguard Mechanism will be a key workstream for the authority in the future.

Under recent changes to the *Climate Change Act 2022* the authority must, as part of its annual advice to the Minister for Climate Change and Energy, advise on whether gross and net Safeguard emissions are declining consistently with Safeguard outcomes specified in the objects of the NGER Act. This new reporting obligation will first come into effect for the authority's 2024 Annual Progress Report. The authority's advice must take into account:

- i. the impact of any expanded Safeguard facilities and new Safeguard facilities, and any facilities of those kinds expected in the future, and
- ii. any emissions estimates that are given to the authority by the Minister for the Environment about approvals under the *Environment Protection and Biodiversity Conservation Act 1999* that relate to Safeguard facilities.

If Safeguard emissions, or net Safeguard emissions for the financial year are not declining in line with the Safeguard outcomes, the authority's advice to the Minister must also consider whether any

³¹ As proposed, public companies and large proprietary companies that are controlling corporations for Safeguard facilities would be subject to the new disclosure requirements from 2024-25 onwards.

amendments to the Safeguard rules are needed in order to achieve those outcomes.

The authority is currently establishing a process for providing this advice on an annual basis, noting the timing of the advice will be determined by the availability of Safeguard Mechanism data.

The authority is also expected to have a role in the government's 2026-2027 review of the Safeguard Mechanism. It is expected the authority will be asked to advise on the extent to which on-site abatement is being driven by the Safeguard reforms, and whether any additional incentives are required (such as a discount on ACCUs when used for more than a certain percentage of a baseline or any circumstances where limits on the use of ACCUs may be appropriate) (DCCEEW, 2023d).



6. Administration and compliance

6.1. Administration

The Department of Climate Change, Energy, the Environment and Water (the department) has policy oversight of the National Greenhouse and Energy Reporting legislation. Its responsibilities include:

- policy development for the NGER scheme and the Safeguard Mechanism
- conducting the annual review of the NGER Measurement Determination
- ongoing engagement with the public and industry on the NGER scheme and the Safeguard Mechanism.

The Clean Energy Regulator (the regulator) implements the NGER Act, its legislative instruments, and related policies and processes. This includes (CER, 2022j):

- registering and deregistering corporations for reporting
- receiving reports via the Emissions and Energy Reporting System (EERS)
- monitoring and enforcing compliance
- applying the audit framework
- administering the National Greenhouse and Energy Register
- administering the Safeguard Mechanism
- publishing data.

In the public survey conducted for this review, the authority asked respondents how satisfied they were with the department's role in maintaining and updating the NGER scheme. The authority also asked about the level of satisfaction in the regulator's implementation of the NGER scheme. In both cases, only a minority of respondents were unsatisfied to some extent. Some issues were raised by respondents, particularly relating to the scheme guidance materials and the availability of process-related information under the scheme. Scheme guidance materials are discussed further in Section 6.2.

6.1.1 Administration activities

Having considered feedback from the regulator, the authority has identified opportunities to streamline and improve the regulator's administration activities. The first of these relates to deregistration of entities below the reporting threshold.

Deregistration of entities below the reporting threshold

NGER reporters that fall below the reporting threshold must apply to the regulator if they wish to be deregistered. These reporters will be deregistered by the regulator, provided they meet certain conditions. Deregistration cannot be performed on the regulator's own initiative unless the corporation ceases to exist — as specified in subsection 18B(5) of the NGER Act.

In general, the deregistration process works as intended. However, one operational issue has surfaced relating to corporations in liquidation. When a corporation enters liquidation, the regulator can only deregister it once it ceases to exist. For the duration of their liquidation, they are considered non-reporting entities. Historically, the regulator has deregistered several corporations once they ceased to exist under the Australian Securities and Investments Commission (ASIC) but prior to that, they were considered non-reporting entities within the NGER scheme for five to ten years (CER pers. comms.). Over time, the regulator has developed better processes for identifying when companies go into liquidation and can contact them while the administrators are actively involved in matters. However, there are still three corporations in the NGER scheme that are undergoing liquidation and

cannot be deregistered. Two of the companies haven't reported for 13 years and the other hasn't reported for five years (CER pers. comms).

The authority is of the view that these non-reporting corporations in liquidation add to the administrative burden of the regulator and that it should have the discretion to deregister these corporations from the NGER scheme. This may require legislative amendments. It may be appropriate for the amendments to include guidance on the criteria for deregistration in these circumstances, for example by including a minimum time that the regulator must wait after an entity enters liquidation prior to deregistration.

Recommendation 23

Authorise the regulator to deregister corporations in liquidation from the NGER scheme on the regulator's own initiative to reduce the administrative burden for the regulator.

Reporting in a corporation's trigger year

When a corporation meets a reporting threshold for the first time, it must register under the NGER scheme (Section 12, NGER Act). The authority understands that in general, there is good awareness of the NGER scheme in Australian industry, and that most companies self-identify and register once they pass a threshold. As an additional measure to ensure compliance, the regulator performs business and sectoral monitoring throughout the year and communicates with companies in instances where it believes registration and reporting may be required (CER pers. comms). Occasionally, companies do not immediately realise they have an obligation and end up registering late i.e. after the first year they exceed a threshold, or their 'trigger year'.

Currently there is no legislative basis for the regulator to require submission of reports for the years between the trigger year and the year of registration. The regulator can only require a report for the trigger year and the year of registration.

For example, if Corporation A triggers the reporting threshold in 2021-22 and registration occurs in 2022-23, the regulator requires reports for 2021-22 and 2022-23. In comparison, if Corporation B triggers the reporting threshold in 2021-22 and registration occurs in 2023-24, the regulator can only require reports for 2021-22 and 2023-24, leaving a gap in the data for 2022-23 as there is not requirement to provide any data for the year in between.

For the years 2017-18 to 2020-21, a total of eight reporters have registered more than one year after their trigger year (CER pers. comms). The regulator reports that while incomplete data between the trigger year and the year of registration is not desirable, pursuing voluntary provision of data may have data quality issues, and is also not desirable. The remaining option to resolve this issue is to create a legislative basis for the regulator to request reporting for all years following the trigger year, regardless of when registration occurs.

Recommendation 24

Require corporations that meet reporting thresholds to provide reports for all years following their trigger year, regardless of when they register, to ensure completeness of the NGER datasets.

Replacing 'trading name' with 'registered business name'

Currently the *National Greenhouse and Energy Reporting Regulations 2008* require the National Greenhouse and Energy Register to capture a corporation's trading name, where it has one. Trading names are being phased out by ASIC and replaced with 'registered business names'. The transition period ends on 31 October 2023, after which time trading names will no longer be displayed in the Australian Business Register (Australian Business Register, 2021). To ensure the NGER documentation remains up to date and comparable with other systems, the authority recommends updating the NGER legislation to remove references to 'trading name' and replace them with 'registered business name'.

Recommendation 25

Update the NGER scheme to replace references to a corporation's 'trading name' with 'registered business name'.

6.12 Cost to business

The explanatory memorandum for the NGER Bill explains that one of the design objectives of the scheme was to provide a single, cooperative, streamlined, reporting system for greenhouse and energy data across all jurisdictions that imposes least cost and red tape burden needed to maintain the integrity of existing national data collections (Revised Explanatory Memorandum, National Greenhouse and Energy Reporting Bill 2007). That is, the design of the scheme sought to balance compliance costs (to corporations and governments) with achievement of scheme outcomes.

Costs to businesses under the NGER scheme can include purchasing and operating measurement equipment, paying staff or consultants to manage reporting, and auditing requirements.

In the public survey conducted for this review, the authority asked respondents about the administrative burden for businesses associated with reporting under the scheme. Most respondents viewed the administrative burden as either somewhat significant or non-significant. However, when asked about the balance the NGER scheme strikes between costs on businesses and achieving the NGER scheme's statutory duties, most were supportive of the balance being struck.

6.1.3 Cost to government

In 2022-23 the regulator spent around \$3.8 million implementing the NGER scheme and the Safeguard Mechanism. This covered costs for activities such as program management, engagement, compliance, data management and publication, and development of education materials; it does not include costs for auditing and broader corporate overheads. The regulator expects administration costs to increase following the reforms to the Safeguard Mechanism. In 2021-22, the department spent around \$800,000 overseeing the NGER scheme. This does not include the cost of overseeing the Safeguard Mechanism, however the department also notes its work has increased due to additional focus on methods that the reformed Safeguard Mechanism has introduced. This also excludes the cost of the authority's review of the NGER Act and associated legislation, which occurs every five years.

6.2. Compliance and enforcement under the legislation

Based on feedback from the regulator and the public responses to the survey, the authority has found compliance and enforcement under the NGER legislation is currently functioning effectively.

6.2.1 Guidance and education

The regulator has guidelines available on its website to assist reporters to comply with their NGER obligations (CER, 2023v). In 2018, the authority heard that this education and guidance is important for supporting compliance and data quality (CCA, 2018).

In the public survey conducted by the authority this year, the authority found the large majority of NGER reporter respondents viewed the guidance provided by the regulator as either moderately or very helpful in ensuring they report correctly under the NGER scheme. Some respondents suggested improvements that could be made, in particular the inclusion of more case studies and worked examples in the written guidance material.

6.2.2 Resubmissions and audits

In the 2018 review of the NGER legislation, the authority considered two indicators to understand the extent of compliance with the legislation: the number of resubmissions requested by the regulator because non-compliance was identified in reported data; and the number of adverse audit findings (CCA, 2018). The authority has re-examined these indicators to understand the extent of compliance since the last review.

Once reports are submitted each year, the regulator performs sophisticated analyses using automated and detailed manual assessments to identify errors. Where material errors are found, resubmissions are requested by the regulator (CER pers. comm.). In 2018, the authority found that the percentage of resubmissions had been falling over the nine years since the scheme was introduced—the average portion of total reports that were required to be resubmitted was 13% in the first five years of operation and dropped to an average of 9% in the following four years (CCA, 2018). The authority noted the decline in resubmissions could be interpreted as an indicator of increased accuracy of the data reported (CCA, 2018). Table 6.1 shows that the rate of resubmissions has continued to decline since the authority’s last review, with an average resubmission rate of 7% (inclusive of the reporting year 2017-18). Again, this decrease could be a sign that accuracy of submitted reports has continued to increase.

	2017-18	2018-19	2019-20	2020-21	2021-22
Number of submissions	869	878	915	932	953
Number of resubmissions	89	78	43	37	64*
Resubmissions as a percentage of total submissions	10	9	5	4	7

Table 6.1 Report submissions and resubmissions for the NGER scheme and the Safeguard Mechanism (CER pers. comms). * A data cleansing project was conducted for location information submitted for the NGER reporting period 2021-22. This project increased the number of resubmissions of data by eight for that period.

In addition to the detailed analysis the regulator conducts, audits are also performed on submitted reports (Table 6.2). Over the last five years, the regulator has received on average voluntary audits on 6-8% of submissions each year. The regulator has also initiated audits on 1% of submissions each year, on average across the five years. The regulator initiates audits to investigate particular compliance priorities or risks.

Of the regulator-initiated audits over the last five years, the percentage of audits returning adverse findings has been on average less than 20%. Most return clean findings (no material errors) or qualified findings (the report is prepared in compliance with the NGER Act in all material aspects except this qualification).

The high number of regulator-initiated audits, which are conducted to investigate compliance priorities and risk areas, with no adverse findings indicates high levels of compliance and can indicate accuracy in reported data.

Reporting year	2017-18	2018-19	2019-20	2020-21	2021-22
Number of submissions	869	878	915	932	953
Voluntary audits	61	67	77	68	59
Regulator initiated audits	18	11 [^]	6	9	7 [*]
Total number of audits	79	78	83	77	66

Table 6.2 Audits and audit outcomes for the NGER scheme and Safeguard Mechanism (CER pers. comms). [^] 11 audits were performed on 9 different reporting entities; ^{*} 7 audits have been finalised as of 3 August 2023, however a total of 10 audits on 2021-22 NGER reports have been scheduled

In the public survey conducted for this review, the authority asked respondents how effective the NGER audit framework is in ensuring that reporters are reporting correctly, completely and are fully compliant with their reporting requirements under the NGER Act. There was a fairly even split between respondents that found it effective to some extent and those that found it ineffective to some extent. A number of respondents commented about the availability (or lack thereof) of auditors with sufficient knowledge of the technical aspects of emissions reporting.

Considering the feedback from the survey and the research presented here, the authority is of the view that the regulator is applying the audit framework effectively and actively working to improve it, e.g. through the increasing sophistication of its assessment process and through its responsive approach to setting compliance and enforcement priorities.

The planned climate-related financial disclosures scheme may draw upon the Register of Greenhouse and Energy Auditors established under the NGER legislation. The timing of these reporting requirements will affect the demand for these auditors if they coincide. Given this and the concerns raised through the public survey, the authority is of the view that the pool of appropriately skilled auditors will likely need to increase over coming years.

6.2.3 Enforcement action

The regulator has a range of enforcement powers including (CER, 2017):

- accepting enforceable undertakings from scheme participants in cases of potential or actual non-compliance
- issuing infringement notices
- pursuing legal action for breaches of civil penalty provisions
- imposing conditions on, suspending or deregistering greenhouse and energy auditors
- publishing any reporters that submit a late report, if the reporter has a history of late reporting (for the 21-22 reporting period onwards).

Enforceable undertakings are written statements from a person or organisation that they will do, or refrain from doing certain things in order to resolve breaches or improve compliance with legislation (CER, 2023w).

The 2018 review found that, to that time, the regulator’s enforcement action relating to greenhouse and energy reporting has been limited to issuing two enforceable undertakings (CCA, 2018). Since that time there have been two additional enforceable undertakings. Both undertakings relate to reporters making errors in their NGER reports, resulting in over- and under- reporting of emissions.

Both undertakings are ongoing, requiring various actions from the reporters to improve the quality of their reports (CER, 2023x). The regulator finds that enforceable undertakings have been effective in improving reporter behaviour and data compliance (CER pers. comms., 2023).

In 2018 there was broad support by reporters for the current approach and level of penalties (CCA, 2018). In 2023, this was also generally the view of respondents when asked about enforcement powers and activities of the regulator in the survey conducted by the authority for this review.



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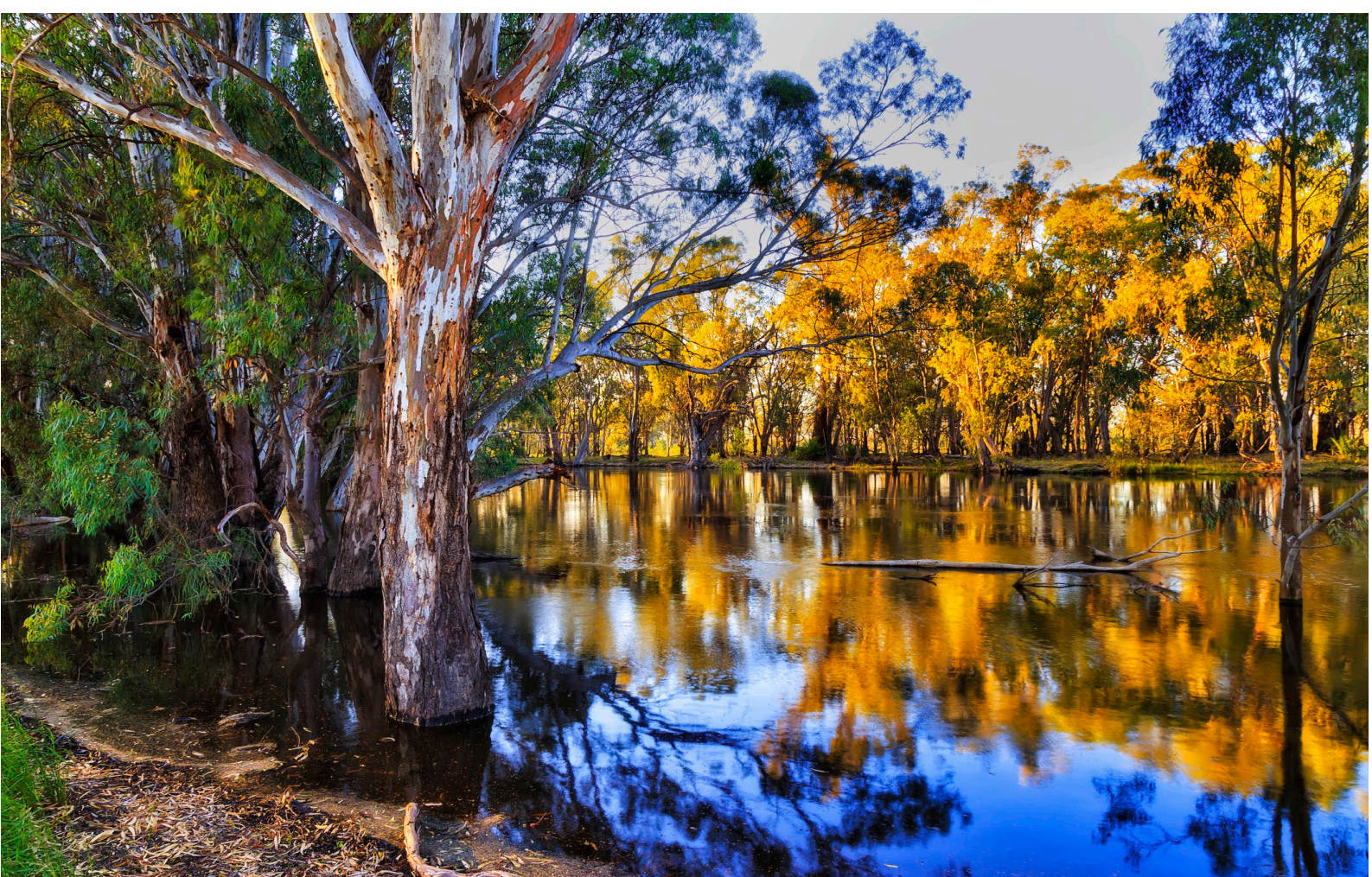


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Appendix A: Assessment of Costs and Benefits

The Authority is required to have regard to the principles set out in the *Climate Change Authority Act 2011* when performing its functions. In addition, the NGER Act requires that the authority, in formulating a recommendation that the government take particular action, must analyse the costs and benefits of that action. The table below summarises the potential costs and benefits associated with the recommendations in this report. Further analyses of the costs and benefits of the recommendations are made throughout the report.

Recommendation		Cost	Benefit
Coverage			
1	The proportion of each sector's emissions reported under the NGER scheme must, at a minimum, be maintained at current levels.	Costs to monitor each sector's emissions reported under the NGER scheme.	Ensure sufficient emissions and energy data availability across each sector to inform government and the public.
2	<p>a. The NGER scheme be expanded to include methods for calculating emissions from the UNFCCC-defined agriculture and land sectors. The government should work with interested parties in the agriculture sector on the most appropriate way to include these emissions sources under the same thresholds as for other sectors and develop robust estimation methods for facility-level emissions reporting in these sectors.</p> <p>b. Introduce mandatory reporting requirements for agricultural sector emissions by the 2026-27 financial year and for land sector emissions by the 2027-28 financial year.</p>	<p>Costs of reporting for large emitters in the agriculture sector.</p> <p>Increase in administrative costs to government.</p> <p>Cost to government to develop method and change legislation.</p>	<p>Increased data for government to develop policy and monitor progress to assist the agriculture sector to reduce emissions.</p> <p>Development of emissions calculation methodologies that can support climate-related financial disclosure reporting and farm emissions reporting more broadly.</p> <p>Increased fairness and consistency of reporting between sectors.</p>
3	Seek agreement with state and territory governments on a framework that will allow for consistent reporting of emissions by government entities. In the absence of an agreed framework, the government should explore the potential to extend coverage of the NGER scheme to government entities.	<p>Cost to government to investigate constitutional power and change legislation.</p> <p>Increased costs to local government councils that are required to report emissions from landfill.</p>	Increased consistency and transparency of emissions reporting between government entities.

4	Extend NGER coverage to publicly owned landfills where legally possible.	<p>Cost to government for development of framework.</p> <p>Increased costs to operators of publicly owned landfills that are required to report emissions.</p>	<p>Increased fairness between privately owned and publicly owned landfills.</p> <p>Increased transparency of emissions from large emitters in the waste sector.</p>
5	Undertake a study to investigate the use of the emissions data reported through the NGER scheme to facilitate estimation of scope 3 emissions at the entity level in Australia.	Cost of development of guidance and information on scope 3 emissions reporting.	<p>Eased burden on companies required to report scope 3 emissions under climate related financial disclosure framework.</p> <p>Consistency of reporting of scope 3 emissions.</p>
Market-based reporting			
6	Develop a framework to approve certifications that can guarantee the renewable status of renewable liquid and gaseous fuels. This framework should be informed by a review of existing international certification schemes. The certifications approved under the framework need to guard against adverse impacts.	<p>Costs to undertake reviews of international renewable fuel certification schemes.</p> <p>General policy development.</p>	<p>Alignment of Australian and international certification schemes supports engagement with international trading.</p> <p>Reduces risk of adverse outcomes.</p> <p>Provides assurance that renewable fuels are genuinely renewable.</p> <p>Improves market confidence and increases transparency.</p>
7	Introduce optional market-based reporting of renewable liquid and gaseous fuels once a framework for approving certifications for renewable fuels is operational.	<p>General policy development.</p> <p>Potential cost to collate additional data.</p>	<p>Greater transparency in providing accurate accounting across shared infrastructure.</p> <p>Limits double counting.</p> <p>Contributes to decarbonisation by encouraging the uptake of renewable fuels.</p>

8	Engage with the IPCC to create guidance on the definition and emissions factors of renewable synthetic fuels. Subsequently amend the definition for renewable fuels in the NGER Regulations to include renewable synthetic fuels once there is clear guidance from the IPCC.	General policy development.	Encourages uptake of synthetic renewable fuels.
Transparency			
9	As a first step in increasing the transparency of the NGER data, the NGER scheme requires that the regulator publish, starting with data for the 2023-24 financial year, the following data at the facility level for facilities which produce annual emissions greater than or equal to 5,000 t CO ₂ -e: a. Scope 1 emissions by greenhouse gas as a consistent time-series. b. Scope 2 emissions as a consistent time-series. c. The method used in each financial year to estimate scope 1 and scope 2 emissions.	Administrative cost to the regulator.	Enable greater use of the publicly available data. Increased transparency.
10	Resource the regulator to publish relevant NGER datasets through an application programming interface (API) so that users can download and programmatically query the data using their own software. This should be implemented for the publication of the 2024-25 NGER data.	Administrative cost to the regulator.	Improve the accessibility and usefulness of the data for all users. Reduce overall costs to governments and the public for data analysis.
11	Resource the regulator to improve the accessibility and usefulness of the published data by exploring opportunities to present data in additional formats on its website. This should be implemented for the publication of the 2024-25 NGER data.	Administrative cost to the regulator.	Improve the accessibility and usefulness of the publicly available data. Enable greater use of the publicly available data.
12	Resource the regulator to collect the necessary information from reporters such that it can link facilities reported under the NGER scheme across time.	Administrative cost to the regulator.	Increase transparency. Reduce overall costs to users for data analysis.

Confidentiality			
13	Monitor the future utilisation of section 25 of the NGER Act and whether it is impacting upon the overall effectiveness of the publication regime in section 24 of the Act.	Administrative cost to the government.	Ensure provisions strike appropriate balance between transparency and information protection.
14	Consider measures to provide additional guidance and streamline the process for making and deciding non-publication applications under section 25 of the NGER Act, including through legislative amendment if needed.	Cost to government from policy process, legislative change and implementation.	Reduce administrative cost to the regulator. Reduce administrative cost to applicants.
Increasing the accuracy of reported fugitive methane emissions in the NGER scheme			
15	Phase out Method 1 estimation methodologies for fugitive methane emissions, including as a matter of urgency for the extraction of coal in open cut coal mining.	Cost of collecting data for scheme users.	Improved accuracy of reported emissions estimates. Improved integrity of the NGER scheme. Improved understanding of emissions abatement opportunities.
16	Resource the department to establish higher order methods for all fugitive methane emission sources included in the Measurement Determination.	Administrative cost to the regulator.	Improved accuracy of reported emissions.
17	As a matter of urgency, review Method 2 for extraction of coal in open cut coal mining with respect to sampling requirements and standards.	Administrative cost to the regulator.	Improved accuracy of reported emissions.
18	Review the requirement for integrated gas facilities to use the same method across activities to allow for flexibility to use higher order methods for larger emission sources, while ensuring integrity of estimated emissions.	Administrative cost to the regulator.	Improved accuracy of reported emissions.

19	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 from Australian facilities. This panel should evaluate whether any further research studies are needed and should be resourced to conduct required studies. The panel of experts should be commissioned in the first quarter of 2024, and the guidelines for making top-down verification measurements published as soon as practicable.	Administrative cost to the regulator. R&D costs to DCCEEW.	Improved accuracy of reported emissions. Improved reliability of reported emissions.
20	Develop a top-down verification policy framework for the verification of bottom-up estimates of fugitive methane emissions reported under the NGER scheme. This should be phased in on a trial basis as soon as practicable, with mandatory verification using top-down measurements commencing the year after. If any discrepancies are found between bottom-up estimates obtained using an NGER method and the top-down verification measurement, the bottom-up measurement approach should be refined by the reporting entity to reconcile the emission estimates.	Administrative cost to the regulator. Cost of collecting data for scheme users.	Improved accuracy of reported emissions. Improved reliability of reported emissions.
21	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 methane emissions.	Administrative cost to the regulator.	Improved accuracy of reported emissions.
22	Prioritise and support the development of Australia's sovereign capability in methane emissions measurement and quantification, by building on existing expertise and leveraging international partnerships where appropriate.	Administrative cost to DCCEEW.	Improved accuracy of reported emissions. Improved accuracy of national emissions inventory. Improved capability to measure emissions.

Administration and compliance			
23	Authorise the regulator to deregister corporations in liquidation from the NGER scheme on the regulator's own initiative to reduce the administrative burden for the regulator.	Administrative costs to the regulator. Cost to government to change framework.	Reduced ongoing administrative costs to the regulator.
24	Require corporations that meet reporting thresholds to provide reports for all years following their trigger year, regardless of when they register, to ensure completeness of the NGER datasets.	Administrative costs to the regulator. Cost to government to change legislation.	Reduced ongoing administrative costs to the regulator. Improved data collected.
25	Update the NGER scheme to replace references to a corporation's 'trading name' with 'registered business name'.	Administrative costs to the regulator. Cost to government to change framework.	Reduced ongoing administrative costs to the regulator.



Appendix B: International Reporting Schemes

A summary of requirements for international reporting schemes.

Jurisdiction of operation	Scheme	Commenced	Gases covered	Industry sectors covered	Scope	National emission covered	Threshold
California	Regulation for the mandatory reporting of greenhouse gas emissions (MRR)	2007	CO ₂ , N ₂ O, CH ₄ , SF ₆ , NF ₃ , Other fluorinated GHG emissions	Electricity generation, cement production, lime manufacturing, nitric acid production, petroleum refining, geologic sequestration, injection of carbon dioxide	Scope 1 Scope 2	80%	No threshold for electricity generation, cement production, lime manufacturing, nitric acid production, petroleum refineries, geologic sequestration of carbon dioxide, injection of carbon dioxide 10,000 t CO ₂ -e for other reporters
Canada	Greenhouse Gas Reporting Program (GHGRP)	2004	CO ₂ , N ₂ O, CH ₄ , SF ₆ , NF ₃ , HFCs, PFCs	Stationary fuel combustion, industrial process emissions, industrial product use emissions, fugitives, on-site transportation, waste, wastewater	Scope 1	43%	10,000 t CO ₂ -e No threshold for any facility engaged in CO ₂ capture, CO ₂ transport, CO ₂ injections, CO ₂ storage
European Union	European Union Emissions Trading Scheme (EU ETS)	2005	CO ₂ , N ₂ O, PFCs	Domestic aviation, industry, power	Scope 1	38%	Variable by sector
Japan	Mandatory Greenhouse Gas Accounting and Reporting Framework	2006	CO ₂ , CH ₄ , N ₂ O, SF ₆ , NF ₃ , HFCs, PFCs	Electricity generation, fossil fuel exploration, industrial processes, agriculture, waste	Scope 1 Scope 2	50%	3,000 t CO ₂ -e

Mexico	National Registry of Emissions	2014	CO ₂ , CH ₄ , N ₂ O, SF ₆ , NF ₃ , HFCs, PFCs, CFCs, HCFCs, black carbon	Energy, industry, transport, agriculture, commercial and waste sectors	Scope 1 Scope 2	40%	25,000 t CO ₂ -e
New Zealand	Emissions Trading Scheme	2008	CO ₂ , CH ₄ , N ₂ O, SF ₆ , HFCs, PFCs	Liquid fossil fuels, stationary energy, industrial processes, agriculture, forestry	Scope 1	52%	Variable by sector
Republic of Korea	GHG and Energy Target Management Scheme	2011	CO ₂ , CH ₄ , N ₂ O, SF ₆ , HFCs, PFCs	Energy, industrial processes, domestic aviation, transport, waste, buildings	Scope 1 Scope 2	74%	15,000 t CO ₂ -e (facility)
Singapore	Measurement and Reporting Requirements for Greenhouse Gas Emissions	2013	CO ₂ , CH ₄ , N ₂ O, SF ₆ , HFCs, PFCs	Fuel combustion, industrial processes, product use	Scope 1	80%	2,000 t CO ₂ -e (facility)
United Kingdom	Streamlined energy and Carbon Reporting	2019	CO ₂ , CH ₄ , N ₂ O, SF ₆ , HFCs, PFCs	Publicly traded companies	Scope 1 Scope 2		More than 250 employed, more than 40 million euros or assets of 20 million euros Listed on EU regulated market
United States	Greenhouse Gas Reporting Program (GHGRP)	2010	CO ₂ , CH ₄ , N ₂ O, SF ₆ , HFCs, PFCs, other fluorinated gases (not CFC or HCFC)	Energy, industrial, manure management, waste, natural gas, suppliers of industrial greenhouse gases, injection of CO ₂ and geologic sequestration	Scope 1 Some downstream	85-90%	25,000 t CO ₂ -e

Appendix C: Recommendations from the Authority’s 2018 Review and Government Response

NGER scheme (Australian Government, 2019)

	Recommendation	Government response	Government action
R.1	The department and regulator analyse opportunities for data sharing between the reporting scheme and the National Pollutant Inventory and the Petroleum and Other Fuels Reporting program, and work with the Australian Bureau of Statistics on opportunities to share data with the Energy, Water and Environment Survey.	The government <i>accepted</i> this recommendation.	<p>The Clean Energy Regulator will work with the Department of the Environment and Energy to analyse data sharing opportunities to reduce duplicated data being reported under both the National Pollutant Inventory and the Petroleum and Other Fuels Reporting program and the NGER scheme.</p> <p>The regulator has an arrangement in place to share NGER data with the Australian Bureau of Statistics, and is exploring other opportunities that could lower the burden for businesses that report to both agencies.</p>
R.2	The department examine whether there are efficiency gains in having the regulator administer the reporting for carbon neutral certification against the National Carbon Offset Standard.	The government <i>noted</i> this recommendation.	Voluntary certifications against the Australian Government’s National Carbon Offset Standard are increasing and the Department of the Environment and Energy is streamlining the reporting and administrative requirements for carbon neutral certified entities. The department will consider whether there could be a role for the Clean Energy Regulator to support reporting for carbon neutral certification.
R.3	To the extent possible, the government align the compliance framework and administrative arrangements for the Carbon Offsetting and Reduction Scheme for International Aviation with those established under the National Greenhouse and Energy Reporting legislation.	The government <i>noted</i> this recommendation.	The government is currently using existing Australian aviation legislation to require eligible Australian international airlines to satisfy the most immediate needs of CORSIA, including monitoring, reporting and verification of emissions data. The Department of Infrastructure, Transport, Cities and Regional Development continues to work in consultation with the Department of the Environment and Energy, the Clean Energy Regulator and interested stakeholders to develop a longer-term strategy to fulfil Australia’s obligations under CORSIA, including management of offsetting obligations.

<p>R.4</p>	<p>The regulator and government data users continue to work together to clarify what data is available and how it can be shared and used more efficiently</p>	<p>The government <i>accepted</i> this recommendation.</p>	<p>The Clean Energy Regulator is committed to publishing more NGER data trends and information so that others can understand and use this valuable data set. The regulator opened a new Reporting Hub in June 2019. The Reporting Hub allows data users to access data more efficiently and the regulator has provided additional filtered data reports which allow more efficient analysis of certain data attributes.</p> <p>The regulator is continuing to engage with government data users to better understand their data needs and priorities and to determine how they can be incorporated into existing data sharing arrangements.</p>
<p>R.5</p>	<p>The regulator consult widely with reporters to progress developments to the Emissions and Energy Reporting System, with a view to enabling data to be easily uploaded and downloaded by reporters and greater use of pre-fill data, in time for the 2020–21 reporting year</p>	<p>The government <i>accepted-in-principle</i> this recommendation.</p>	<p>The feasibility of the timing proposed in this recommendation will be determined following consultation by the Clean Energy Regulator with NGER reporters, and assessment of the impact on the regulator’s IT Roadmap priorities. The regulator has developed and initiated the CER Digital Portal and Website Baseline User Research Plan, which seeks to identify ways to improve the user experience across all digital services, including users of the Emissions and Energy Reporting System. The timing of any changes will be contingent on resourcing and government priorities.</p>
<p>R.6</p>	<p>The regulator continue to develop its long-term information technology systems and services roadmap to increase opportunities for data sharing across schemes, including working with other program administrators, and consider the benefits and costs of developing a common reporting portal for existing and future energy and emissions reporting schemes.</p>	<p>The government <i>accepted</i> this recommendation.</p>	<p>The Clean Energy Regulator will explore long-term opportunities for data sharing across schemes administered by the regulator and within government. The regulator will also build a common portal for current and future energy and emissions reporting schemes that it administers, and for any schemes that it may operate on behalf of other agencies.</p> <p>The regulator is open to considering and discussing opportunities that may arise to collaborate with other program administrators in terms of a common reporting portal for broader energy and emissions schemes.</p>

<p>R.7</p>	<p>The department enhance the current process for implementing updates to the measurement determination by consulting earlier with industry, increasing transparency on how issues will be resolved and working with the regulator to better publicise updates</p>	<p>The government <i>accepted</i> this recommendation.</p>	<p>The Department of the Environment and Energy undertakes an annual review of the measurement determination. It will work with the Clean Energy regulator to improve the transparency of the review process, including in relation to stakeholder consultation and communication of updates to the legislation.</p>
<p>R.8</p>	<p>The regulator work with the department to enhance understanding among reporters and auditors (in time for the 2019–20 reporting year) about the existing provisions in the legislation that can reduce the costs of reporting on small sources of emissions and energy. In addition, the department should work closely with the regulator and industry to systematically review provisions, and their administration, that apply to small sources of emissions and energy to assess if further improvements can be made to reduce reporting costs while meeting the objectives of the reporting scheme.</p>	<p>The government <i>accepted</i> this recommendation.</p>	<p>An analysis of 2017-18 NGER data has identified that 73% of all reporters could have used at least one streamlining provision in the legislation. The Clean Energy Regulator has developed an engagement plan to educate these reporters on the streamlining provisions available to them and will commence engagement by the end of July 2019. This plan will include making more explicit guidance and information for auditors and reporters on reporting on small sources of emissions and energy available through its website and regular outreach program.</p>
<p>R.9</p>	<p>The department amend the measurement determination, in consultation with industry, to include emissions from</p>	<p>The government <i>noted</i> this recommendation.</p>	

	agricultural sources to allow reporting on a voluntary basis. Voluntary reporting of agricultural emissions should be reviewed after five years		
R.10	The department examine opportunities to improve the quality of data available on aerosols and indirect greenhouse gases (including black carbon) by assessing the merits of including these substances in the reporting scheme.	The government <i>noted</i> this recommendation.	The Department of the Environment and Energy will further explore this recommendation in consultation with interested stakeholders
R.11	The department undertake analysis to determine whether the benefits of extending the reporting scheme to Australian, and state and territory government agencies and local councils exceed the costs (for those that do not currently report under the scheme)	The government <i>noted</i> this recommendation.	The Department of the Environment and Energy will further explore this recommendation in consultation with interested stakeholders.
R.12	The department test the feasibility of optional reporting for scope 2 emissions (from electricity use) that accounts for direct sourcing of low-emissions energy	The government <i>accepted</i> this recommendation.	The Department of the Environment and Energy will test the feasibility of different options for reporting scope 2 emissions (from electricity use) that accounts for direct sourcing of low-emissions energy. It will aim to consider the outcomes of the feasibility assessment in the context of the 2019-20 annual review of the NGER measurement determination.
R.13	The regulator, supported by the department, be allocated funding to enhance the dataset for time series analysis. The dataset should be updated each year within three months of the data being	The Government <i>noted</i> this recommendation.	The Clean Energy Regulator intends to progressively improve data quality requirements within the Emissions and Energy Reporting System as funds become available to ensure that reporters take responsibility for submitting accurate data and to reduce the future need for data refinement activities. Refining a subset of the NGER data has

	reported, for use by Australian governments.		commenced through a project under the Data and Integration Partnership for Australia funded by the Department of the Prime Minister and Cabinet and further refinement work on time series analysis for the remaining dataset is underway in the regulator.
R.14	The government legislate arrangements to ensure the regulator retains its ability to disseminate emissions and energy information obtained prior to 2 April 2012 and Australian Government ministers and agencies retain their ability to publish this information.	The government <i>accepted</i> this recommendation.	The Department of the Environment and Energy will investigate the most appropriate mechanism to ensure that this information can continue to be disseminated and published.
R.15	The regulator identify ways to better meet data users' needs by publishing more detailed analyses of key findings and trends, increasing the volume of data reported publicly and improving the presentation of data on the website.	The government <i>accepted</i> this recommendation.	The Clean Energy Regulator has commenced engagement with data users to identify their needs and priorities. Based on this information the regulator will progressively publish more useful key findings and trends. Several new data publications and a review of data on the regulator's website has already been planned for later in 2019.

Safeguard Mechanism (Australian Government, 2019)

	Recommendation	Government response	Government Action
R.16	The regulator update baselines to reflect changes to the measurement determination that lead to a material difference in reported emissions.	The government <i>accepted in part</i> this recommendation	In March 2019, the government amended the Safeguard Rule to make it simpler and fairer. As facilities transition to calculated baselines during 2018-19 and 2019-20, these baselines will reflect the latest measurement determination. The amendments introduce an option to use default emissions intensity values to set baselines. Default values will be updated to reflect material changes to the measurement determination. Baselines for facilities using the default values will therefore reflect these changes. Facilities have the option to use default emissions intensity values at any time.
R.17	The regulator continue to pursue opportunities to increase information available about the market for Australian Carbon Credit Units.	The government <i>accepted</i> this recommendation.	<p>In March 2019, the government amended the Safeguard Rule to require the regulator to publish additional information regarding the likely demand for Australian Carbon Credit Units (ACCU) from Safeguard facilities with a multi-year monitoring period. The first new publication will be delivered at the same time as other annual publication requirements under the Safeguard Mechanism (expected in March 2020).</p> <p>In addition, the Clean Energy Regulator has commenced publishing regular ACCU Market Updates. The regulator’s first ACCU Market Update was published in December 2018. It is intended that these updates be published regularly to provide a more transparent picture of supply and demand in the market.</p> <p>Consistent with the government’s response to the Climate Change Authority’s 2017 review of the Emissions Reduction Fund, the government is pursuing an amendment to the Australian National Registry of Emissions Units Act 2011 to provide for regular publication of Australian carbon credit unit holdings. This will help market liquidity and transparency for the Emissions Reduction</p>

			Fund and Safeguard Mechanism.
R.18	The department investigate the feasibility and potential uptake of allowing safeguard facilities to participate in the Emissions Reduction Fund in a way that recognises reductions in indirect emissions without resulting in an increase in reported direct emissions.	The government <i>accepted</i> this recommendation.	<p>The government is committed to reducing Australia’s emissions using the Emissions Reduction Fund. The Fund provides a broad range of opportunities to reduce emissions across the economy, including from facilities covered by the Safeguard Mechanism. The government is interested in reducing barriers to participation in the Fund, including addressing any potential barriers to participation from Safeguard facilities and addressing disincentives for facilities to reduce their indirect emissions.</p> <p>The Department of the Environment and Energy intends to look at options to distinguish between activities that reduce indirect emissions and those that reduce direct emissions. This will seek to overcome the existing barriers for Safeguard facilities to pursue projects that reduce indirect emissions through the Fund.</p> <p>The government is pursuing an amendment to the <i>National Greenhouse and Energy Reporting Act 2007</i> to facilitate this outcome.</p>
R.19	The government remove the option for deemed surrender under the safeguard.	The government <i>notes</i> this recommendation.	<p>The government notes there may be occasions where Safeguard facilities have both a regulatory requirement to surrender Australian Carbon Credit Units and a contractual obligation to transfer Australian Carbon Credit Units to the government (for which payment is received). Any change to the current arrangements would constitute a change in policy. As outlined in the government’s 2017 Review of Climate Change Policies, the role of the Safeguard Mechanism will be reviewed in 2020 in the context of progress towards the 2030 Paris Agreement target. This review provides an opportunity to consider policy settings, such as deemed surrender.</p>

	Recommendation	Government response	Government Action
R.20	<p>The regulator continue to work with reporters and auditors to better target compliance audits</p> <p>to ensure integrity of the data and reduce costs to business.</p>	<p>The government <i>accepted</i> this recommendation.</p>	<p>The Clean Energy Regulator is progressively maturing its audit function to better target reporters and areas of interest and to increase transparency for reporters. The regulator regularly conducts engagement and outreach events for auditors and also receives valuable feedback through surveys and directly from clients to inform this process.</p>



Appendix D: Method Availability for Reporting Fugitive Methane Under the NGER Scheme

Summary of method availability for activities for reporting fugitive methane emissions under the NGER Measurement Determination (Measurement Determination). Incidental emissions are reported using general principles outlined in section 1.13 of the Measurement Determination.

Source	Method Availability				
	1	2	2A	3	4
Part 3.2 Coal mining					
Division 3.2.2 Underground mines					
Pre-mining venting or fugitive release	–	–	–	–	Yes
Extraction of coal	–	–	–	–	Yes
Flaring of coal mine waste gas	Yes	Yes	–	–	–
Post-mining activities	Yes	–	–	–	–
Division 3.2.3 Open cut mines					
Pre-mining venting or fugitive release	–	–	–	–	Yes
Extraction of coal	Yes	Yes	–	Yes	–
Flaring of coal mine waste gas	Yes	–	–	–	–
Division 3.2.4 Decommissioned underground mines					
Decommissioned underground mine emissions	Yes	–	–	–	Yes
Flaring of coal mine waste gas	Yes	–	–	–	–
Part 3.3 Oil and natural gas					
Division 3.3.2 Oil or gas exploration and development					
Emissions that are flared	Yes	–	Yes	–	–
System upsets, accidents and deliberate releases	Yes	–	–	–	Yes
Division 3.3.3 Crude oil production					
Crude oil production (non-flared) – fugitive leak emissions	Yes	Yes	–	Yes	–
Crude oil production (flared)	Yes	–	Yes	–	–
Crude oil production (non-flared) – fugitive vent emissions	Yes	–	–	–	Yes
Division 3.3.4 Crude oil transport					
Crude oil transport (non-flared)	Yes	Yes	–	–	–
Division 3.3.5 Crude oil refining					
Crude oil refining and storage tanks	Yes	Yes	–	Yes	–
Process vents, system upsets and accidents	Yes	–	–	–	Yes
Crude oil refining (flared)	Yes	–	Yes	–	–
Division 3.3.6A Onshore natural gas production (other than emissions that are vented or flared)					
Wellheads	Yes	Yes	–	Yes	–
Division 3.3.6B Offshore natural gas production (other than emissions that are vented or flared)					
Offshore platforms	Yes	Yes	–	Yes	–
Division 3.3.6C Natural gas gathering and boosting (other than emissions that are vented or flared)					

Natural gas gathering and boosting	Yes	Yes	–	Yes	–
Division 3.3.6D Produced water from oil and gas exploration and development, crude oil production, natural gas production or natural gas gathering and boosting (other than emissions that are vented or flared)					
Produced water	Yes	Yes	–	–	–
Division 3.3.6E Natural gas processing (other than emissions that are vented or flared)					
Natural gas processing	Yes	Yes	–	Yes	–
Division 3.3.7 Natural gas transmission (other than emissions that are flared)					
Natural gas transmission	Yes	Yes	–	Yes	–
Division 3.3.7A Natural gas storage (other than emissions that are vented or flared)					
Natural gas storage	Yes	Yes	–	Yes	–
Division 3.3.7B Natural gas liquefaction, storage and transfer (other than emissions that are vented or flared)					
Natural gas liquefaction, storage and transfer	Yes	Yes	–	Yes	–
Division 3.3.8 Natural gas distribution (other than emissions that are flared)					
Natural gas distribution	Yes	Yes	–	Yes	–
Division 3.3.9A Natural gas production (emissions that are vented or flared)					
Emissions that are vented	Yes	–	–	–	Yes
Emissions that are flared	Yes	–	Yes	–	–
Division 3.3.9B Natural gas gathering and boosting (emissions that are vented or flared)					
Emissions that are vented	Yes	–	–	–	–
Emissions that are flared	Yes	–	Yes	–	–
Division 3.3.9C Natural gas processing (emissions that are vented or flared)					
Emissions that are vented	Yes	–	–	–	–
Emissions that are flared	Yes	–	Yes	–	–
Division 3.3.9D Natural gas transmission (emissions that are flared)					
Emissions that are flared	Yes	–	Yes	–	–
Division 3.3.9E Natural gas storage (emissions that are vented or flared)					
Emissions that are vented	Yes	–	–	–	–
Emissions that are flared	Yes	–	Yes	–	–
Division 3.3.9F Natural gas liquefaction, storage or transfer (emissions that are vented or flared)					
Emissions that are vented	Yes	–	–	–	–
Emissions that are flared	Yes	–	Yes	–	–
Division 3.3.9G Natural gas distribution (emissions that are flared)					
Emissions that are flared	Yes	–	Yes	–	–

Appendix E: Safeguard Mechanism and Administration and Compliance

The Safeguard Mechanism

Under the Safeguard Mechanism, facilities are required to ensure their net scope 1 emissions do not exceed their baseline set by the Clean Energy Regulator (the regulator).

Baseline decline rate

The recent reforms also introduced the requirement for baselines to decline in a predictable and gradual way that is consistent with achieving Australia's emissions reduction target of 43% below 2005 levels by 2030 and net zero by 2050.

The decline rate is set at 4.9% each year until 2030 and applies to both new and existing Safeguard facilities. A reserve has been built into this decline rate to allow for any higher than expected production growth (at new and existing facilities) or use of trade exposed baseline adjustments. Decline rates for 2030-31 onwards will be set in five-year blocks, following updates to Australia's Nationally Determined Contribution.

There is tailored treatment for emissions intensive, trade exposed businesses to ensure they are not competitively disadvantaged and emissions do not leak overseas. Within the recent reforms, the objects of the NGER Act have been amended to ensure that 'the competitiveness of trade-exposed industries is appropriately supported as Australia and its regions seize the opportunities of the move to a global net zero economy'. This includes a subset of trade exposed facilities, which face increased risk of carbon leakage, being eligible for a discounted decline rate.

Safeguard Mechanism Credits (SMCs)

The reforms also introduced the ability for Safeguard facilities to generate Safeguard Mechanism Credits (SMCs) when their reported gross scope 1 emissions are below their baseline. Each credit issued represents 1 t CO₂-e below the baseline in a particular financial year. SMCs incentivise Safeguard facilities to reduce their emissions below their baselines (CER, 2023c).

Facilities that fall below the Safeguard threshold of 100 kt CO₂-e can continue receiving SMCs for up to 10 years (noting their baseline will continue to decline) as long as they are covered by the Safeguard Mechanism for at least: i) 3 years between 2017 to 2022; or ii) 3 in 5 years before the facility started receiving credits.

ACCU Scheme projects that solely reduce emissions at Safeguard facilities are no longer able to be registered, however projects that were already registered before the passage of the reforms legislation on 30 March will continue to generate and sell credits until the end of the existing crediting period (DCCEEW, 2023d).

Complying with the Safeguard Mechanism

Under the Safeguard Mechanism, facilities must ensure their net scope 1 emissions do not exceed their baseline. A facility's net scope 1 emissions is defined as the gross scope 1 emissions, less any surrendered domestic offset credits.

Domestic offset credits that can be surrendered include:

- Australian Carbon Credit Units (ACCUs)
- Safeguard Mechanism Credits (SMCs).

If a facility surrenders ACCUs to more than 30% of its baseline it must also submit a statement to the regulator detailing why on-site abatement has not been undertaken.

Facilities can surrender SMCs to meet their own obligations, sell to other Safeguard facilities or hold onto them for future use. Facilities can use SMCs in any year up to 2030, irrespective of when they were issued, giving companies flexibility around the timing of their abatement activities.

A facility can also apply for a multi-year monitoring period (MYMP) of up to five years where it has exceeded its baseline but has a credible plan to reduce the cumulative emissions before the end of the five-year period. This provides facilities with additional time to implement abatement activities that will result in below-baseline emissions in later years. This is available up until 2030. A facility can only earn SMCs at the end of the monitoring period.

Until 2030, a facility may also apply to borrow up to 10% of its baseline number from the following year, which is to be repaid with 10% interest in the year following the borrowing (the interest rate is set at 2% for the first two years of the reformed Safeguard Mechanism to allow time to adjust and support early investment in on-site abatement).

Facilities that exceed their baseline may also apply to the regulator to purchase ACCUs at a fixed price. The price of these ACCUs is set at \$75 in 2023-24 and will be indexed in future financial years by the Consumer Price Index plus an additional 2% per annum (DCCEEW, 2023d). The government expects there to be sufficient ACCUs and SMCs available in the market below this price. However, this measure is intended to prevent excessive prices and to provide certainty to facilities on the maximum compliance costs they would face (DCCEEW, 2023d).

2026-27 Review of the Safeguard Mechanism

The government has committed to review the reformed Safeguard Mechanism in 2026-27 to ensure the policy settings are appropriate (DCCEEW, 2023d). The review will include the initial impacts of resetting and declining baselines; the costs and availability of domestic offsets; the appropriate treatment of international units; the suitability of arrangements for emissions intensive, trade exposed activities; and the treatment of flexibility mechanisms beyond 2030, such as banking and borrowing and multi-year monitoring periods.

As part of the review, the authority will advise the government on the extent to which on-site abatement is being driven by the reforms, and whether any additional incentives are required.

Key dates under the legislation

Figure E.1 outlines the key dates for the reporting scheme and Safeguard Mechanism from 2024 onwards (noting dates for 2023 are slightly different due to the reformed Safeguard Mechanism coming into effect on 1 July 2023).

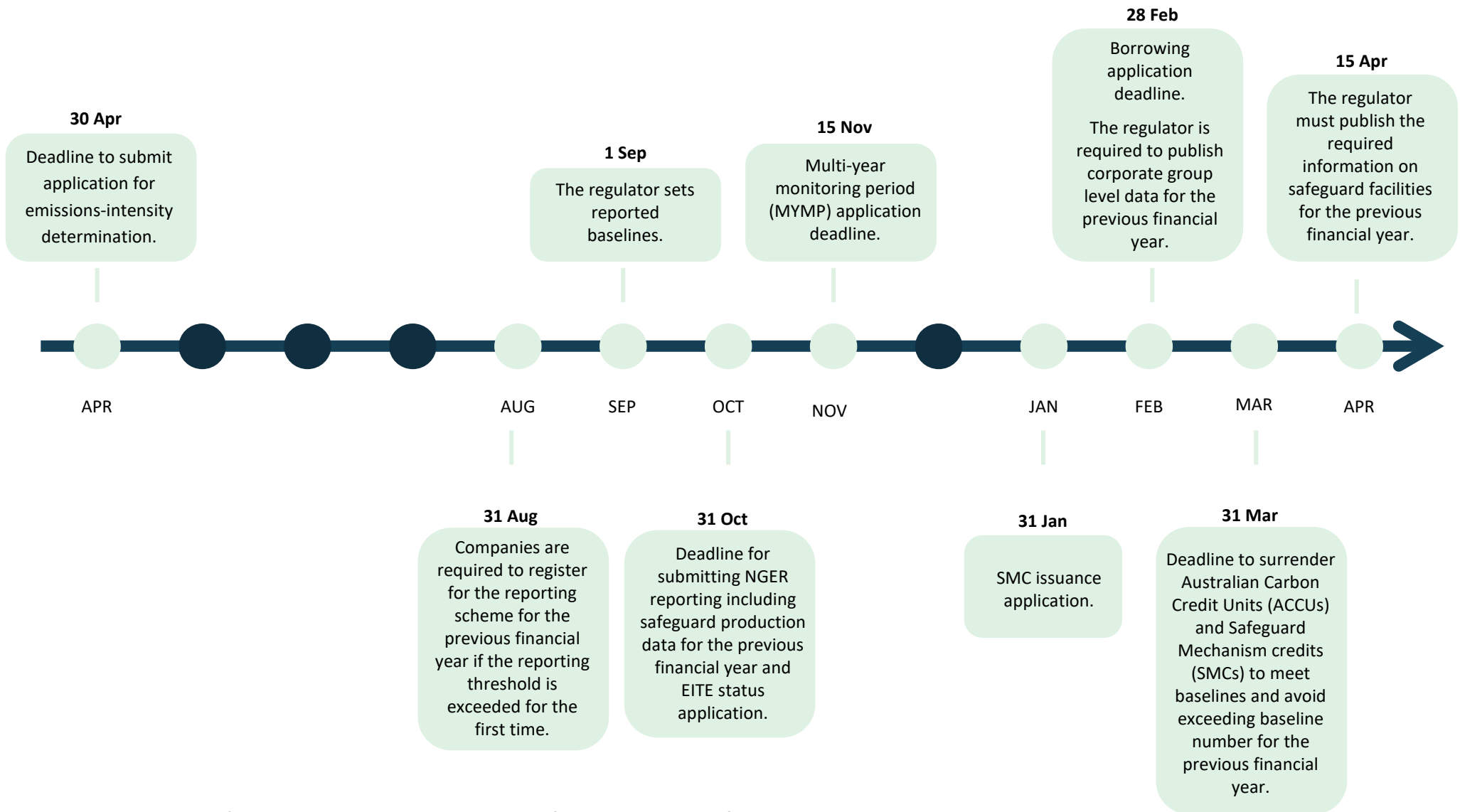


Figure E.1 Key dates for NGER reporting scheme and the Safeguard Mechanism from 2024

Administration and compliance

The Department of Climate Change, Energy, the Environment and Water (the department) and the regulator both play a role in the governance of the legislation. The department has formal oversight of the scheme and is responsible for policy development for the NGER scheme and the Safeguard Mechanism, amending the legislation based on consultation with the public and industry stakeholders, and conducting the annual review of the NGER Measurement Determination.

The regulator implements the NGER Act, its legislative instruments and related policies and processes (CER, 2022j). This includes compliance and enforcement with the reporting scheme and the Safeguard Mechanism through education, monitoring and enforcement tools (CER, 2022k).

The regulator uses an intelligence-led risk-based approach in determining the appropriate response where a suspected compliance issue exists. Figure E.2 provides an overview of the regulator’s response continuum to non-compliance issues (CER, 2022k).

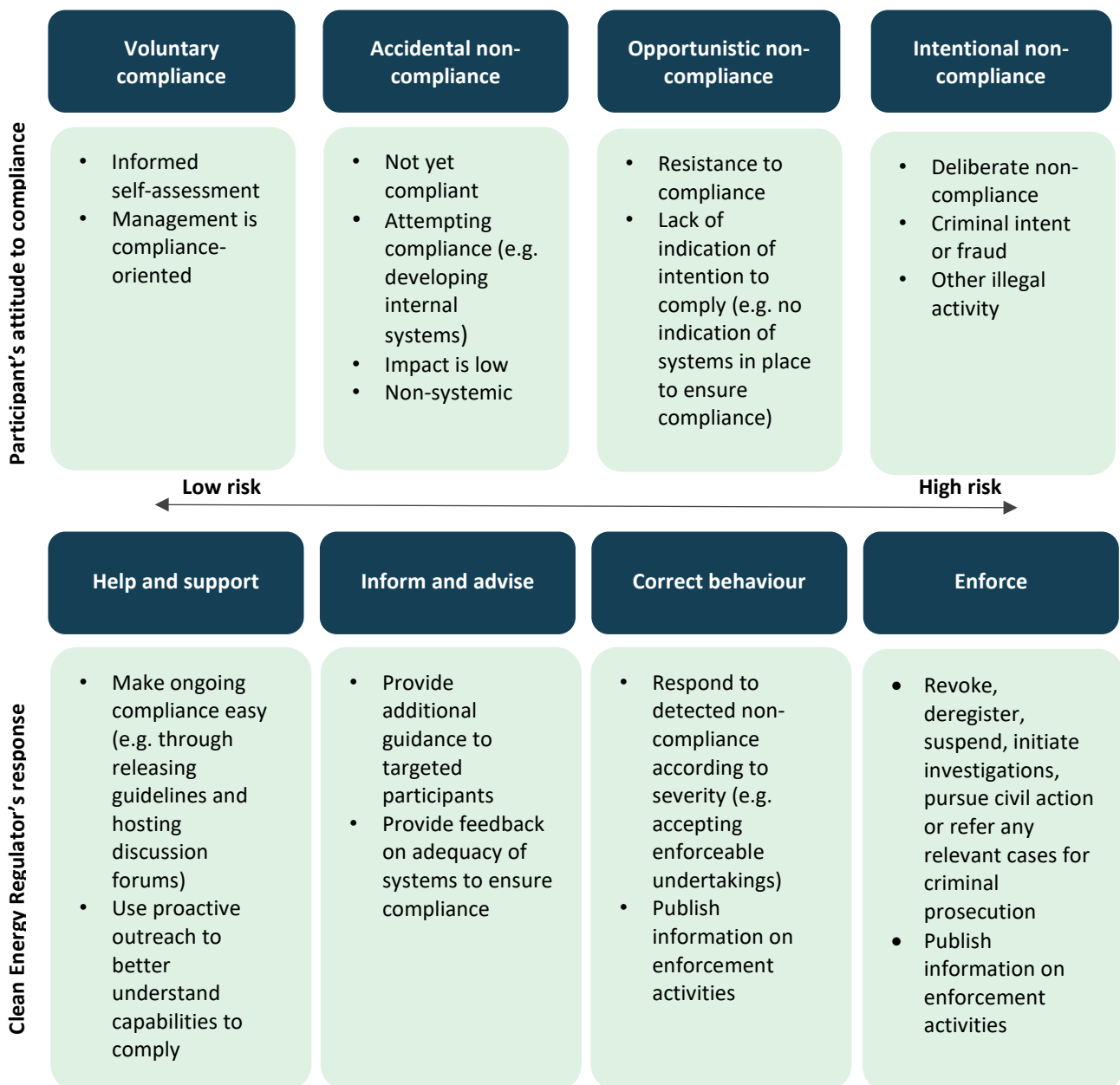


Figure E.2 The regulator’s approach to non-compliance issues.

The regulator finds the level of awareness of reporting obligations across industry to be relatively high. As part of the regulator's compliance and enforcement framework it takes a proactive approach through education and monitoring to provide advice and support to companies to prevent non-compliance.

Education

The regulator recognises that education and engagement are important to ensure companies are aware of potential obligations they may have under the scheme and are equipped with the knowledge to meet those obligations. To help drive this preventative approach the regulator:

- provides comprehensive guidance and information online on how the scheme works and what participants can do to comply with scheme requirements
- publishes further information resources such as factsheets, booklets, brochures, newsletters, calculators and online resources
- co-designs and collaborates with scheme participants and stakeholders on the development of guidance and guidelines to provide clarity on compliance expectations.

Monitoring

The regulator also conducts ongoing monitoring as part of its preventative approach to non-compliance. The regulator uses data collected through its own business operations, in addition to public information and information received from third parties to assist in monitoring compliance through activities such as:

- comparing reports from scheme participants to third party data (e.g. regarding electricity generation, greenhouse gas emissions or abatement)
- identifying behavioural trends within and across the schemes
- identifying changes and activities across relevant industries and sectors
- detecting possible contraventions and deciding whether enforcement action is required.

Where there is suspected non-compliance, the regulator uses relevant information where possible to assess the intent of the behaviour and take the appropriate compliance action such as:

- exercising coercive information-gathering powers
- conducting inspections and audits
- executing monitoring warrants.



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