Australian Government
Climate Change Authority

REVIEW OF THE NATIONAL GREENHOUSE AND ENERGY REPORTING LEGISLATION

FINAL REPORT

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FOREWORD

To develop effective responses to climate change and energy challenges, decision-makers in government and industry need to draw on a range of information. In Australia, the National Greenhouse and Energy Reporting legislation underpins much of this evidence base by requiring Australia's largest companies to measure and report their greenhouse gas emissions and energy production and use each year.

The legislation also implements the safeguard mechanism, which places limits on emissions from large facilities in the industrial and electricity sectors and provides a framework for companies to measure, report and manage their emissions.

The Authority is pleased to present its review of the legislation here.

The Authority finds the legislation is operating well, is meeting its objectives and is generally fit for purpose. The reporting scheme in particular has wide support from industry, governments and others who use the information reported. The safeguard is working as intended as all facilities covered by it have kept their net emissions at or below their emissions limits (baselines).

Although the Authority finds the legislation is effectively administered and meeting its objectives, there are opportunities for improvements. Individually, each opportunity for improvement may be seen as incremental, however, collectively they can make an important contribution to building on the schemes' strengths and improving their overall efficiency and effectiveness.

Under the Paris Agreement, Australia has committed to reducing emissions across the economy by 26 to 28 per cent on 2005 levels by 2030. The Government has said it will review and refine emissions reduction policies to ensure Australia meets these targets. In its 2016 report *Towards a Climate Policy Toolkit: Special Review on Australia's climate goals and policies*, the Authority recommended a toolkit of measures to reduce emissions across all sectors of the Australian economy. As the Authority said in 2016, the safeguard is one avenue that could be used to reduce emissions in the industrial sector if baselines are made to decline. In 2019 the Authority will assess the changes that have occurred since 2016 and update its advice on efficient and effective emissions reduction policies.

In conducting this review, the Authority consulted widely with industry, government agencies and data users. We thank those who generously shared their time and expertise with the Authority.

Wendy Craik AM

Chair, Climate Change Authority
21 December 2018

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EXECUTIVE SUMMARY

The Climate Change Authority is an independent statutory agency, which provides 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 legislation every five years. Its first review is presented here.

The National Greenhouse and Energy Reporting legislation establishes:

- the National Greenhouse and Energy Reporting scheme, which requires large companies to report their greenhouse gas emissions and energy production and use
- the safeguard mechanism, which places emissions limits on large industrial and electricity-generation facilities
- the framework for administration and compliance, including auditing requirements for these and other climate change policies.

The reporting scheme and safeguard have broad coverage. In 2016–17, the reporting scheme covered around 750 companies, 63 per cent of Australia's emissions and most of Australia's energy. The safeguard applied to 203 facilities in the mining, oil and gas, manufacturing, transport and off-grid electricity sectors and 284 grid-connected electricity generators, which together accounted for 58 per cent of Australia's emissions.

It is timely to review the energy and emissions reporting aspects of the legislation as they have been in place for over a decade. As the safeguard has only been in place for less than three years, it is more difficult to form a view on its long-term effectiveness.

In coming to its findings, the Authority consulted widely with industry, government agencies and data users and also undertook its own research and analysis.

The legislation is effectively administered and meeting its objectives

Overall, the Authority found the legislation is operating well, meeting its objectives and is generally fit for purpose. The Authority found the Department of the Environment and Energy and the Clean Energy Regulator are effective administrators of the legislation. The Authority heard they took a professional, educative and constructive approach to its administration. Some described the Regulator as a model regulator.

The emissions and energy reporting scheme is a high quality and widely used scheme, with broad support

The Authority finds the energy and emissions reporting scheme enjoys broad support from industry, governments and others. It is widely considered to be a best-practice approach to measuring and reporting emissions and energy and compares favourably to schemes in other countries.

The high quality data collected through the scheme is used extensively by governments and others to develop energy and climate change policies. It is also a critical input to meeting Australia's international energy and emissions reporting obligations.

The success of the scheme is underpinned by private investments in mature data collection and reporting systems by companies, and effective administration by the Regulator and the Department. The Regulator's constructive and professional approach to supporting companies to meet their obligations was singled out by many as a key driver of the success of the scheme.

The Authority identified a number of opportunities for improving the reporting scheme. Many of these can reduce costs to businesses or the scheme's administrators, while further enhancing the integrity of the

data collected. For example, the Authority has recommended the Government continue to monitor and analyse reporting obligations placed on businesses and ensure they are streamlined where possible. It has also recommended developments to the online reporting system to reduce both the costs associated with reporting and the risk of errors, and recommended work be undertaken to improve the development and use of the measurement determination and related legislation.

The Authority has also made recommendations to extend reporting, on a voluntary basis, to agricultural emissions. While this may impose additional costs on businesses and government, it will build on industry sustainability objectives and enhance the value of the dataset collected.

Finally, the Authority's recommendations aim to improve the usefulness of the dataset generated through the scheme, for government and other users. For example, the Authority has recommended the dataset used by governments be enhanced for time series analysis, and data users' needs be better met through the Regulator publishing more detailed analyses of key findings and trends.

The safeguard mechanism is working as intended

The Authority found that in its first year of operation (2016–17) all facilities covered by the safeguard kept their net emissions at or below their baselines. The Authority heard that companies with safeguard obligations are generally comfortable with the mechanism's operation and the options for meeting their baselines. The Authority has made some recommendations, which seek to improve the consistency of net emissions and baseline numbers and ensure compliance options continue to work effectively.

The future of the safeguard and the ongoing need for a policy toolkit

In its 2016 report: *Towards a Climate Policy Toolkit: Special Review on Australia's climate goals and policies* (Special Review) the Authority made recommendations on the safeguard in the industrial sector as part of a broader policy toolkit to reduce Australia's emissions. This included removing access to further baseline increases and declining baselines linearly in line with Australia's economy-wide emissions reduction commitments under the Paris Agreement.

The Authority remains of the view a comprehensive policy toolkit is needed to capture the emissions reduction opportunities that exist across all sectors of the Australian economy. The safeguard is one policy that could be designed to reduce emissions in the industrial sector as part of a policy toolkit. The Authority intends over the course of 2019 to update the advice it provided in its 2016 report *Towards a Climate Policy Toolkit: Special Review on Australia's climate goals and policies*.

WHAT DID THE AUTHORITY FIND?

The National Greenhouse and Energy Reporting legislation is working well, meeting its objectives and enjoys broad support from industry, governments and others.

The National Greenhouse and Energy Reporting scheme:

- reduces duplicative reporting of emissions and energy across jurisdictions and has minimised the regulatory burden on businesses
- generates a high quality dataset, which is accurate, has broad coverage and compares favourably against international schemes
- informs government energy and emissions policies, programs and activities at both the Australian and state and territory level
- provides data which is crucial to meeting Australia's international reporting obligations on emissions and energy
- helps companies better understand their energy and emissions and meet other reporting requirements
- uses approaches to measuring energy and emissions that are fit for purpose
- informs investors and others such as academics and analysts
- involves an online system used by companies to report that is generally fit for purpose and effective.

The safeguard mechanism:

- is working as intended as all covered facilities kept their net emissions at or below their baseline
- contains flexible compliance options that are being employed by safeguard facilities.

Administration and compliance:

- the legislation is well administered by the Clean Energy Regulator and the Department of the Environment and Energy
- scheme participants are satisfied with the approach taken to engage with and provide guidance to participants and enforce compliance.

The future of the safeguard and the policy toolkit:

- a comprehensive policy toolkit is needed to capture the emissions reduction opportunities that exist across the different sectors of Australia's economy
- the safeguard mechanism is one policy that could be designed to effectively and efficiently reduce emissions in the industrial sector as part of this policy toolkit.

Although the legislation is working well, there are a number of incremental opportunities for improvement. Collectively, they can make an important contribution to building on the schemes' strengths and improving their overall efficiency and effectiveness.

WHAT DID THE AUTHORITY RECOMMEND?

THE NATIONAL GREENHOUSE AND ENERGY REPORTING SCHEME

Continue streamlining government requirements for energy and emissions data and its administration to improve efficiency and reduce costs to government and business

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 (Recommendation 1, Section 4.1.1).

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 (Recommendation 2, Section 4.1.2).

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 (Recommendation 3, Section 4.1.2).

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 (Recommendation 4, Section 4.1.3).

Enhance the Emissions and Energy Reporting System to reduce the burden on reporters, improve the quality of data and enable data sharing

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 (Recommendation 5, Section 4.2).

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 (Recommendation 6, 4.2).

Facilitate greater input from industry in the measurement determination update process

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 (Recommendation 7, Section 4.3).

Reduce the cost associated with reporting emissions and energy from small sources

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 (Recommendation 8, Section 4.4).

Expand the range of emissions and energy data that is reported and published

The Department amend the measurement determination, in consultation with industry, to include emissions from agricultural sources to allow reporting on a voluntary basis. Voluntary reporting of agricultural emissions should be reviewed after five years (Recommendation 9, Section 4.6.2).

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 (Recommendation 10, Section 4.6.2).

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) (Recommendation 11, Section 4.6.3).

The Department test the feasibility of optional reporting for scope 2 emissions (from electricity use) that accounts for direct sourcing of low-emissions energy (Recommendation 12, Section 4.6.4).

Enhance the usefulness of the data for governments and the public

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 reported, for use by Australian governments (Recommendation 13, Section 4.8).

The Government legislate 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 (Recommendation 14, Section 4.8.1).

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 (Recommendation 15, Section 4.9).

THE SAFEGUARD MECHANISM

Update baselines to align approaches for measuring emissions and setting baselines

The Regulator update baselines to reflect changes to the measurement determination that lead to a material difference in reported emissions (Recommendation 16, Section 5.2.2).

Improve liquidity in the market for Australian Carbon Credit Units to reduce costs of complying with the safeguard

The Regulator continue to pursue opportunities to increase the information available about the market for Australian Carbon Credit Units (Recommendation 17, Section 5.2.3).

Increase the incentive for safeguard facilities to invest in projects that reduce their indirect emissions

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 (Recommendation 18, Section 5.2.4).

Remove deemed surrender so safeguard facilities only benefit once from the Australian Carbon Credit Units they generate

The Government remove the option for deemed surrender under the safeguard (Recommendation 19, Section 5.2.5).

ADMINISTRATION AND COMPLIANCE

Continue to target compliance audits to reduce costs

The Regulator continue to work with reporters and auditors to better target compliance audits to ensure integrity of the data and reduce costs to business (Recommendation 20, Section 6.2.2).

1 INTRODUCTION

1.1 ABOUT THE CLIMATE CHANGE AUTHORITY AND THE REVIEW

The Climate Change Authority is an independent, statutory agency which provides expert advice to the Australian Government on climate change matters. Under the *National Greenhouse and Energy Reporting Act 2007* (Cth), the Authority is required to review the operation of the Act and its supporting legislative instruments by 31 December 2018 and then complete further reviews every five years.

1.2 OVERVIEW OF THE LEGISLATION

The National Greenhouse and Energy Reporting legislation has three key elements. It:

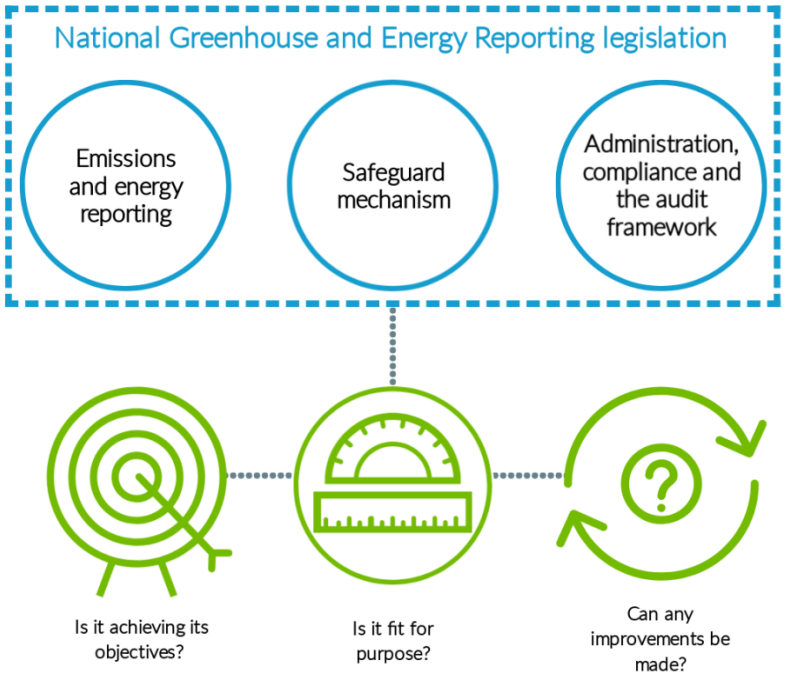
- requires companies over certain thresholds to measure and report their greenhouse gas emissions as well as their energy production and use to the Australian Government
- establishes the safeguard mechanism, which places emissions limits on large industrial and electricity-generation facilities
- establishes arrangements for administration and compliance, including the greenhouse and energy auditing framework. The framework applies to audits required under the reporting scheme, the safeguard and other climate change policies such as the Emissions Reduction Fund and the Renewable Energy Target.

Chapter 2 describes the legislation, its supporting instruments and objectives in greater detail.

1.3 FOCUS OF THE REVIEW

This review focuses on the key elements of the legislation with a view to determining whether each of the individual elements is achieving its objectives, is fit for purpose and if any improvements are needed (Figure 1). There is a greater emphasis on the reporting scheme, given it has now been in operation for over a decade. By contrast, the safeguard has only been in place for two and a half years.

FIGURE 1 Focus of the review



1.4 APPROACH TO THE REVIEW

The Authority's approach to the review involved an assessment of the operation of the legislation through desktop research, its own analyses and extensive consultation.

The Authority assessed the legislation with reference to the principles in its legislation: economic efficiency, environmental effectiveness, equity, public interest, supporting the development of an effective global response to climate change, consistency with Australia's foreign policy and trade objectives and taking into account the impact on households, businesses, workers and communities (Appendix A). Appendix B provides a summary of the costs and benefits of the Authority's recommendations.

1.4.1 Public consultation

The Authority published a consultation paper in July 2018. It received 40 written submissions in response to the paper (Appendix C).[1] The Authority also met with over 100 individuals from more than 80 organisations. The Authority heard from a wide range of stakeholders including:

- companies that have obligations under the reporting scheme and safeguard
- service providers that assist companies in meeting their obligations
- individuals and groups that use the data reported
- government bodies that administer the legislation or use the data reported.

The Authority built on existing work on some of the matters covered by this review. In particular, the Authority considered the public submissions made to the Department of the Environment and Energy's consultations on safeguard baseline settings in 2018 and the Government's review of climate change policies in 2017.

1.5 THIS REPORT

Chapter 2 of this report provides an overview of the legislation and its operation.

Chapters 3 and 4 describe findings and recommendations for the National Greenhouse and Energy Reporting scheme.

Chapter 5 outlines findings and recommendations for the safeguard mechanism.

Chapter 6 describes the Authority's findings and recommendations for the administration and compliance framework.

Chapter 7 outlines the Authority's advice on the future role of the safeguard and the need for a policy toolkit.

Finally, Chapter 8 concludes.

[1] Submissions, as well as a summary of the issues raised across all consultations, can be found on the Authority's website at http://www.climatechangeauthority.gov.au/summary-submissions-review-national-greenhouse-and-energy-reporting-legislation.

2 OVERVIEW OF THE LEGISLATION AND ITS OPERATION

2.1 NATIONAL GREENHOUSE AND ENERGY REPORTING LEGISLATION

The *National Greenhouse and Energy Reporting Act 2007* (Cth) establishes the National Greenhouse and Energy Reporting scheme, the safeguard mechanism and the framework for administration and compliance, including the auditing framework for these and other climate change policies. Legislative instruments made under the Act detail requirements for these elements (Figure 2).

The Department of the Environment and Energy is responsible for developing policy for the reporting scheme, safeguard mechanism and the auditing framework. The Clean Energy Regulator is responsible for administering the Act and its legislative instruments and ensures compliance with the legislation.

FIGURE 2 The National Greenhouse and Energy Reporting Act 2007 and its supporting legislative instruments

2.2 OBJECTIVES OF THE LEGISLATION

The Act has two objectives. The first is to introduce a single national reporting framework for information related to greenhouse gas emissions and energy to:

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

The second objective is to ensure net emissions from large industrial and electricity-generation facilities do not exceed the emissions limits (baselines) set under the legislation. These objectives, and how they relate to the three elements of the legislation, are summarised in Figure 3. Box 1 outlines how the legislation and its objectives have evolved since the legislation was introduced in 2007.

FIGURE 3 Key elements of the legislation

National Greenhouse and Energy Reporting scheme

A national reporting framework for information related to greenhouse gas emissions and energy.
The objective is to:

- inform governments and the public
- meet international obligations
- assist with government programs and activities
- avoid the duplication of similar reporting requirements

Safeguard mechanism

The safeguard mechanism provides a framework for Australia's companies to measure, report and manage their emissions.

The objective of the safeguard is to ensure large facilities do not exceed their greenhouse gas emissions limits (known as baselines).

Administration, compliance and the audit framework

The Department of the Environment and Energy is responsible for policy development of the *National Greenhouse and Energy Reporting Act 2007*. The Clean Energy Regulator administers the Act and its instruments, and ensures compliance with the legislation.

The legislation sets out an audit framework to underpin the effectiveness and integrity of the scheme and its data. Under the legislation, audits are required for the reporting scheme, safeguard mechanism, the Emissions Reduction Fund and the Renewable Energy Target. The framework also sets out requirements for auditors.

BOX 1 Evolution of the National Greenhouse and Energy Reporting legislation

The *National Greenhouse and Energy Reporting Act 2007* (Cth) was introduced in 2007 (with reporting from 1 July 2008) to implement a streamlined national emissions and energy reporting scheme. It aimed to replace a range of industry surveys and Australian, state and territory government greenhouse gas emissions or energy reporting requirements. The objects of the original Act referred to the role of the reporting scheme in underpinning the introduction of an emissions trading scheme in the future.

The Act also established arrangements for administration and compliance, including an auditing framework. Originally, the legislation was administered by the Greenhouse and Energy Data Officer on behalf of the Department of Climate Change and Energy. When the carbon pricing mechanism (an emissions trading scheme) was introduced in 2011 under the *Clean Energy Act 2011* (Cth), the Officer was replaced by the Clean Energy Regulator.

The Regulator was established under the *Clean Energy Regulator Act 2011* (Cth) to administer climate change laws, including the carbon pricing mechanism and the reporting scheme. Amendments were made to the legislation to ensure the objects supported the mechanism and the auditing framework was expanded to cover the carbon pricing mechanism.

In 2014, the carbon pricing mechanism was repealed as well as any amendments to the Act that supported the *Clean Energy Act 2011* (Cth).

Legislation was passed in 2014 to establish the Emissions Reduction Fund (which combines crediting of emission reduction units with Government purchases) and the safeguard mechanism. At the same time, the objects of the legislation were amended to support the safeguard mechanism and the auditing framework was also extended. The *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015* (Cth) was established under the Act in 2015. The Rule outlines the requirement on large facilities to avoid exceeding their emissions limits. The safeguard mechanism commenced in July 2016.

The Clean Energy Regulator's role was also expanded in 2014 to administer the Fund and the safeguard.

2.3 THE REPORTING SCHEME

The legislation establishes rules for the National Greenhouse and Energy Reporting scheme, including:

- which companies are required to report
- what and how to report
- what data is shared and published.

2.3.1 Which companies are required to report

Companies have to report emissions and energy data if they, or facilities they control, meet certain thresholds. There are separate thresholds for individual facilities and corporate groups (Table 1) and reporting obligations are triggered if any one of the thresholds is exceeded. In 2016–17, 748 companies

representing more than 25,000 facilities reported emissions and energy data under the scheme (CER 2018c).[2]

TABLE 1 Corporate group and facility thresholds

	Scope 1 and 2 emissions combined (kt CO_2-e/year)	Energy production (TJ/year)	Energy use (TJ/year)
Corporate group threshold	50	200	200
Facility threshold	25	100	100

Note: To provide companies time to transition into the reporting scheme, the corporate group thresholds were gradually reduced from 125,000 t CO_2-e and 500 terajoules in 2008–09 to current threshold levels in 2010–11.
Source: *National Greenhouse and Energy Reporting Act 2007* (Cth)

Companies are required to report at the facility level. Facilities are defined as an activity or series of activities that generate greenhouse gas emissions or produce or use energy and form a single enterprise. Examples of facilities include factories, electricity generators, manufacturing plants, landfill and construction sites, retail outlets and transport companies. Activities that constitute a single facility may not be on the same physical site; for example, transport operations.

Reporters or 'controlling corporations' are generally the companies (at the head of the corporate group) that have operational control over one or more facilities that meet the thresholds. Operational control refers to the ability to introduce and implement operating, health and safety or environmental policies at a facility.

If the corporate group threshold is met, data on all facilities (even if they individually do not meet the facility threshold) must be reported. If the facility threshold is met but the corporate group threshold is not, only data for facilities that meet the threshold need to be reported.

Companies must register with the Regulator by 31 August following the financial year in which they first meet a reporting threshold. For example, if a company exceeded a threshold for the first time in 2017–18, they must register by 31 August 2018 (CER 2016a).

A company can apply to be de-registered if they expect to be below the threshold for three years in a row. In certain circumstances, a company can transfer responsibility for reporting to another company — who must also register.

2.3.2 What and how to report

The National Greenhouse and Energy Reporting measurement determination details how companies must measure their emissions and energy data. The measurement methods used in the determination underpin the integrity of the data collected and are based on those used for international reporting of energy and emissions. For example, they are consistent with the methods used to report energy production and consumption to the International Energy Agency and to develop Australia's national greenhouse gas inventory submitted to the United Nations Framework Convention on Climate Change.

The measurement determination provides reporters with flexibility in how they measure emissions and energy. This approach allows companies to use simplified generic emissions factors. The National Greenhouse and Energy Reporting Regulations also includes provisions for simplified reporting for small facilities or incidental emissions and energy. These provisions aim to reduce the reporting burden where it will not materially affect the quality of the data.

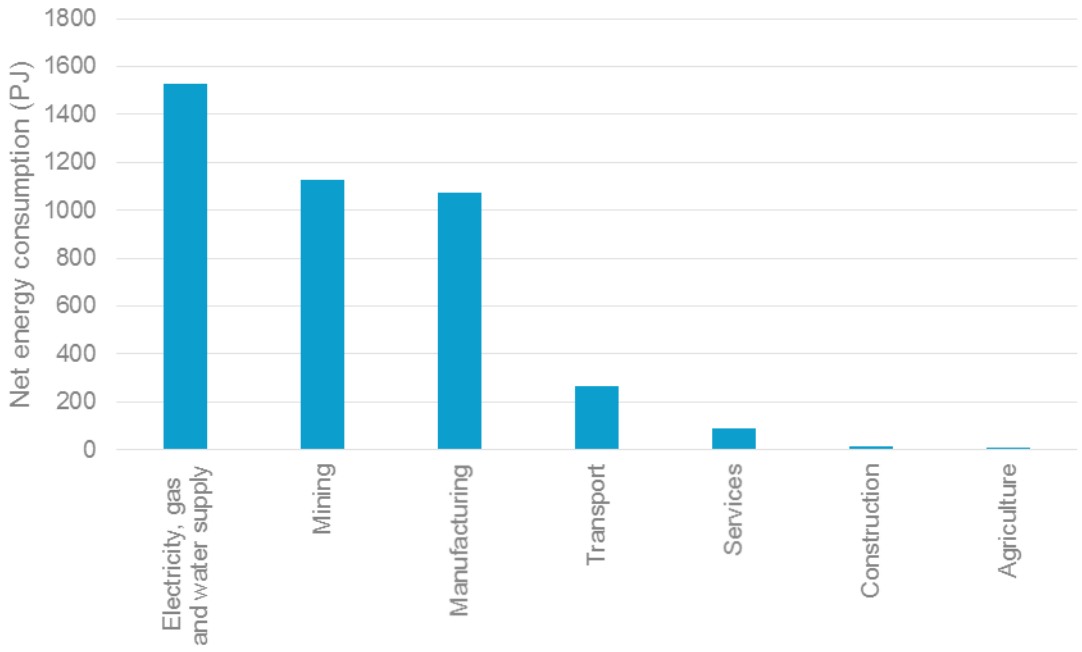
[2] There were 836 reporters in 2016–17; however, 88 of those were below reporting thresholds and thus their data is not included in the dataset on emissions and energy.

Types of energy production and use

The production and use of various fuels and energy commodities must be reported under the scheme including coal, petroleum, gas and biofuel. Sources of energy for electricity generation such as wind and solar must also be reported. 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.

Figure 4 shows the net energy consumption reported under the scheme by sector.

FIGURE 4 Reported net energy consumption by sector, 2016–17

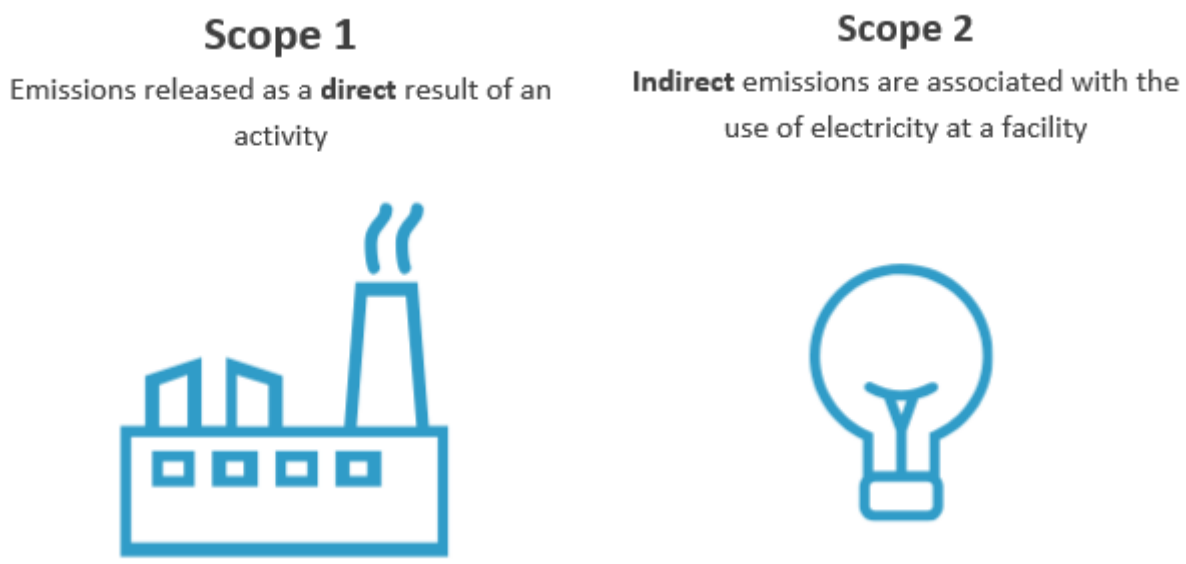


Source: CER 2018c

Types of emissions

Companies that meet the reporting threshold are required to report their emissions of carbon dioxide, methane, nitrous oxide, sulphur hexafluoride, and certain hydrofluorocarbons and perfluorocarbons. This broadly aligns with the gases currently covered under the Kyoto Protocol of the United Nations Framework Convention on Climate Change and those reported in Australia's greenhouse gas inventory. Companies must report their direct (or scope 1) emissions. These are emissions released as a direct result of an activity at their facility. For example, a coal-fired electricity generator releases emissions by burning fossil fuels to produce energy; or a chemical producer releases emissions as a by-product of producing nitric acid. They must also report indirect (or scope 2) emissions from the use of purchased electricity. For example, a large supermarket using electricity from the grid for lighting, heating or cooling must report the associated emissions (Figure 5).

FIGURE 5 Scope 1 and 2 emissions



EXAMPLES OF SCOPE 1 EMISSIONS

Emissions from:

- the production of electricity by burning coal
- burning natural gas to heat up a hardware store
- manufacturing processes such as cement
- the burning of diesel fuel in trucks
- fugitive emissions from coal mining
- process emissions from smelting aluminium.

EXAMPLES OF SCOPE 2 EMISSIONS

Emissions from electricity purchased and used by:

- a large supermarket for lighting, heating or cooling
- an aluminium smelter to power electrolytic processes
- a cement producer to grind raw materials.

Reporting scope 2 emissions introduces duplication where emissions from electricity production are already covered by scope 1 reporting obligations on electricity generators. However, it helps decision-makers to identify the large energy users and the amount of emissions from energy for which they are responsible. For example, alumina and aluminium production accounts for about 20 per cent of all scope 2 emissions reported under the scheme but less than 5 per cent of scope 1 emissions (CER 2018c). Reporting only on scope 1 emissions for alumina and aluminium would provide much less than a full picture of the sector's contribution to Australia's energy use and emissions profile.

Emissions sources

International greenhouse gas inventories group emissions into five source categories:

- energy (including fuel combustion for electricity generation, transport and other purposes, and fugitive emissions resulting from mining, and oil and gas production and distribution)
- industrial processes
- agriculture
- land use, land use change and forestry
- waste.

The measurement determination, and therefore emissions reporting under the scheme, covers emissions arising from energy, industrial processes and waste. It does not include emissions arising from agriculture or land use, land use change and forestry activities (for example methane from livestock or carbon emissions and sequestration from land management).

This means land and agriculture businesses are not required to report emissions arising from agricultural activities such as methane from livestock, but they are required to report their scope 1 emissions (from energy, industrial processes and waste), scope 2 emissions and energy use and production if they meet the reporting thresholds.

In 2016–17, 63 per cent of Australia's emissions (or 335 million tonnes of carbon dioxide-equivalent (Mt CO_2-e)) were reported as scope 1 emissions under the scheme.

Table 2 compares the coverage of emissions sources under the reporting scheme in 2016–17 with the total emissions for Australia, as reported under the national greenhouse gas inventory. Table 2 shows:

- electricity generation accounts for over half of all emissions reported and 35 per cent of Australia's total emissions
- the majority of emissions arising from electricity generation, fugitive emissions, and industrial processes are reported under the scheme
- emissions arising from waste and transport are not well covered by the scheme[3]
- emissions from agricultural sources, and land use, land use change and forestry are not included in the scheme.

TABLE 2 Proportion of Australia's emissions captured by the reporting scheme by emissions source category, 2016–17

Emissions source	Total Australian emissions (Mt CO_2-e)	Emissions source contribution to Australia's emissions (%)	Total reported emissions (Mt CO_2-e)	Proportion of source emissions reported (%)
Energy – fuel combustion				
Electricity generation	*187*	*35*	*188*	*100*
Transport	*99*	*19*	*19*	*19*
Other fuel combustion	*95*	*18*	*61*	*64*
Energy – fugitive emissions	52	10	43	83
Industrial processes	33	6	22	66
Waste	13	2	4	29
Agriculture	72	14	0	0
Land use, land use change and forestry	–22	–4	0	0
Total	**529**	**100**	**335**	**63**

Sources: CER 2018c; Commonwealth of Australia 2018d

[3] Low coverage of emissions from waste and transport is mostly due to the need for reporters to be constitutional corporations. Many sources of waste emissions (landfills) are owned by local councils that do not meet the definition of a constitutional corporation. Other waste emissions that are not covered include those from landfills that are below the reporting threshold. In the transport sector, many of the emissions arise from light vehicles owned by individuals who do not need to report.

How and when companies report

Companies report their emissions and energy data electronically using the Emissions and Energy Reporting System, which is administered by the Regulator (CER 2016b). Companies must submit their reports to the Regulator by 31 October for the preceding financial year.

2.3.3 What data is shared and published

For each corporate group that meets the publication thresholds, the Regulator must publish data on the group's total scope 1 emissions, total scope 2 emissions and net energy consumption.[4] The publication threshold for corporate groups are combined scope 1 and 2 emissions equal to or greater than 50,000 t CO_2-e per year (CER 2017b).[5] More detailed reported data is available for use by governments under strict confidentiality conditions.

The Regulator is also required to publish data on scope 1 emissions and electricity generation by all facilities in the electricity sector.

Data must be published by the Regulator by the end of February for the preceding financial year.

2.4 THE SAFEGUARD MECHANISM

The safeguard mechanism commenced on 1 July 2016. It aims to ensure emissions reductions purchased under the Emissions Reduction Fund are not offset by significant increases in emissions above business-as-usual levels elsewhere in the economy. The safeguard was designed to allow businesses to continue normal operations while at the same time providing an incentive to keep their emissions at or below their baseline.

The National Greenhouse and Energy Reporting legislation establishes rules for:

- facilities and emissions to which the safeguard applies
- setting and publishing emissions limits (called baselines) and
- managing net emissions to comply with the safeguard.

2.4.1 Facilities and emissions to which the safeguard mechanism applies

The safeguard mechanism applies to facilities whose scope 1 emissions are more than 100,000 t CO_2-e a year. Facilities are required to ensure their scope 1 emissions do not exceed the baseline set by the Regulator. For most facilities, baselines are set based on their historical emissions (CER 2018i).

In 2016–17, the safeguard applied to 203 large facilities in the mining, oil and gas, manufacturing, transport and off-grid electricity sectors (CER 2018j). Figure 6 shows the number of safeguard facilities in each of these sectors. Grid-connected electricity generators, with scope 1 emissions over 100,000 t CO_2-e a year, are subject to the safeguard if the sectoral baseline is breached. This would occur if total scope 1 emissions from grid-connected electricity generators exceeds the sectoral baseline of 198 Mt CO_2-e a year. That sectoral baseline has not been breached to date.[6]

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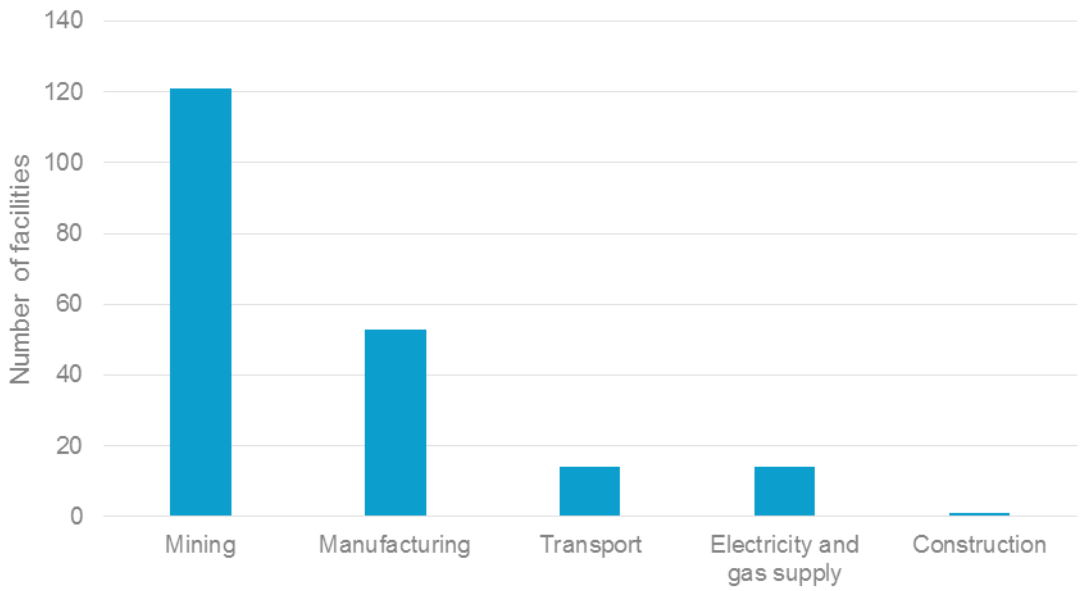
[4] Net energy consumption is the total energy consumed at a facility minus the energy content of secondary fuels and energy commodities produced. Secondary fuels and energy commodities produced is defined as energy made from other energy sources (for example electricity).

[5] The thresholds for reporting transfer certificate holders are emissions equal to or greater than 25,000 t CO_2-e or production or consumption of energy of 100 terajoules or more per year. Reporting transfer certificate holders are companies that have taken on reporting obligations from the controlling corporation.

[6] There are 284 electricity generators in the sectoral baseline which includes generators with scope 1 emissions of 0, such as renewable generators. Fifty-eight of the 284 grid-connected electricity generators had emissions above 100,000 t CO_2-e in 2016–17.

FIGURE 6 Number of safeguard facilities by sector, excluding grid-connected electricity generators



Source: CER 2018c

Facilities subject to the safeguard, together with grid-connected electricity generators included in the sectoral baseline, accounted for 58 per cent of Australia's emissions in 2016–17 (CER 2018j, Commonwealth of Australia 2018d).

2.4.2 Baselines

Baselines represent the reference point against which emissions performance is measured under the safeguard and are defined as an absolute quantity of emissions. Most facilities have reported baselines set at the high point of their historical emissions under the reporting scheme for the period from 2009–10 to 2013–14 (CER 2018i).

Where historical emissions are not available or are viewed as a poor indicator of future emissions, such as for new or significantly expanded facilities, facilities can apply for calculated baselines. A calculated baseline is set at the highest level of forecast production over the next three financial years (or five years for large facilities) multiplied by the forecast emissions intensity (emissions per unit of production) of that production.[7] At the end of the three- (or five-) year period, facilities on calculated baselines can apply for production-adjusted baselines. This is a one-off adjustment based on actual production rather than forecast production. Facilities who have no other baseline receive a default baseline of 100,000 t CO_2-e per year.

Under the current legislation, from 2020 calculated baselines will not be available for new facilities or facilities undertaking a significant expansion. Rather these facilities can apply for a benchmark baseline, which is calculated using a forecast production figure (per the existing calculated baseline approach) and a benchmark emissions intensity value that reflects industry best practice.

The sectoral baseline for the grid-connected electricity sector is set at the level of the sector's emissions in 2009–10, the high point of Australia's electricity emissions between 2009–10 and 2013–14. If the sectoral baseline is reached, individual generators' baselines will be set on the basis of the high point of

[7] A large facility is defined as a facility, which is not a grid-connected electricity generator, whose annual direct emissions are expected to exceed 2 Mt CO_2-e within five years after the baseline starts.

the individual generator's emissions between 2009–10 and 2013–14. The Authority is of the view the sectoral baseline is unlikely to be breached (Section 5.1.2).

Under the safeguard, the Regulator publishes baselines as soon as practicable after they are made.

2.4.3 How to comply with the safeguard mechanism

By the end of February each year, facilities covered by the safeguard must ensure their net scope 1 emissions for the previous financial year do not exceed their baseline. Net scope 1 emissions are calculated as the total scope 1 emissions from the facility reported under the reporting scheme, less any Australian Carbon Credit Units surrendered to offset emissions. The Regulator publishes total and net scope 1 emissions for safeguard facilities. Facilities can apply to the Regulator for the information not to be published if the information is commercially sensitive.

If a facility exceeds its baseline, safeguard obligations can be met through:

- applying for a calculated baseline—in certain circumstances, such as if the facility has significantly expanded, a facility can apply for a new baseline
- applying for an emissions intensity baseline variation—a facility can apply to have its baseline temporarily increased in any year where its baseline is exceeded and at the same time the facility improves its emissions intensity
- applying for a multi-year monitoring period—a facility can apply for a multi-year monitoring period of two or three years, which provides it with additional time to reduce its average net emissions in line with its baseline
- surrendering Australian Carbon Credit Units—a facility may surrender Australian Carbon Credit Units purchased on the secondary market or created itself to reduce its net emissions
- applying for an exceptional circumstance exemption—an exemption to safeguard obligations may be granted in exceptional circumstances where excess emissions are a direct result of a natural disaster or criminal activity.

In 2016–17, all facilities had net emissions at or below their baseline by the end of February. To achieve this result, 16 facilities surrendered Australian Carbon Credit Units (CER 2018j).

2.4.4 Proposed amendments to the safeguard mechanism

In response to concerns raised by stakeholders during its 2017 review of climate change policies, the Government committed to consult on changes to the safeguard. The aim is to make it fairer and simpler and bring safeguard baselines up to date with individual circumstances such as changes in production (Commonwealth of Australia 2017b). At the time of this review, the proposed amendments had not yet been legislated.

There are three key changes proposed:

- Move facilities from reported (historical) baselines to calculated baselines. This would ensure baselines are set consistently across facilities.
- Allow baselines to be updated annually based on changes in production to prevent baselines becoming out of date. The Government will publish two types of production variables:
  - fixed production variables—baselines that use these will be updated once for production
  - annually adjusted production variables—baselines that use these will be updated annually for production.

- Allow facilities to use Government-determined production variables and associated default emissions intensities (or site-specific values, per the current approach) for their calculated baseline application.[8] For example, baselines could be calculated using the high point of forecast production of a Government-determined production variable over the next three years multiplied by the default emissions intensity of that production variable. This is intended to reduce the cost of baseline applications.

The changes are proposed to take effect from the 2018–19 compliance year (DoEE 2018a, b). This means they need to be legislated before October 2019, as this is the deadline by which facilities must apply for a baseline variation (for example a calculated baseline) for 2018–19.

Table 3 compares current and proposed safeguard baselines.

TABLE 3 Comparison between current and proposed safeguard baselines

Type of baseline	Current baselines	Proposed baselines
Reported baselines – based on historical emissions	Apply until replaced by another baseline	Cease to exist from 2020–2021[9]
Calculated baselines – based on forecast emissions	Facilities can apply for a calculated baseline once which is updated once for production after 3 or 5 years (when they move on to a production-adjusted baseline)[10]	All facilities, including those that already have a calculated baseline will be able to apply for a calculated baseline once but some can be updated annually for production[11]
	Based on audited site-specific emissions intensity forecasts	Can use production variables and associated default emissions intensities determined by the Government (or site-specific values until 1 July 2020)[12]
Default baselines – set at the safeguard threshold	Applies to facilities without another baseline in place; for example, facilities that did not receive a reported baseline and have not applied for a calculated baseline	Applies to facilities without another baseline in place; for example, facilities with a reported baseline that do not apply for a calculated baseline in time for 2020–2021

Source: Based on DoEE 2018b

The proposed amendments, which allow for annual updates to baselines for production, mean calculated baseline applications using the significant expansion criteria and emissions intensity baseline variations are no longer necessary. The amendments also aim to simplify and improve access to multi-year monitoring periods including by extending the application deadline for multi-year monitoring periods to 1 February the following year. Applications will need to include an estimate of the number of Australian Carbon Credit Units the facility is likely to need to keep its emissions below its baseline. Under the proposed amendments, the Regulator will be required to publish information about the future demand for Australian Carbon Credit Units coming from safeguard facilities.

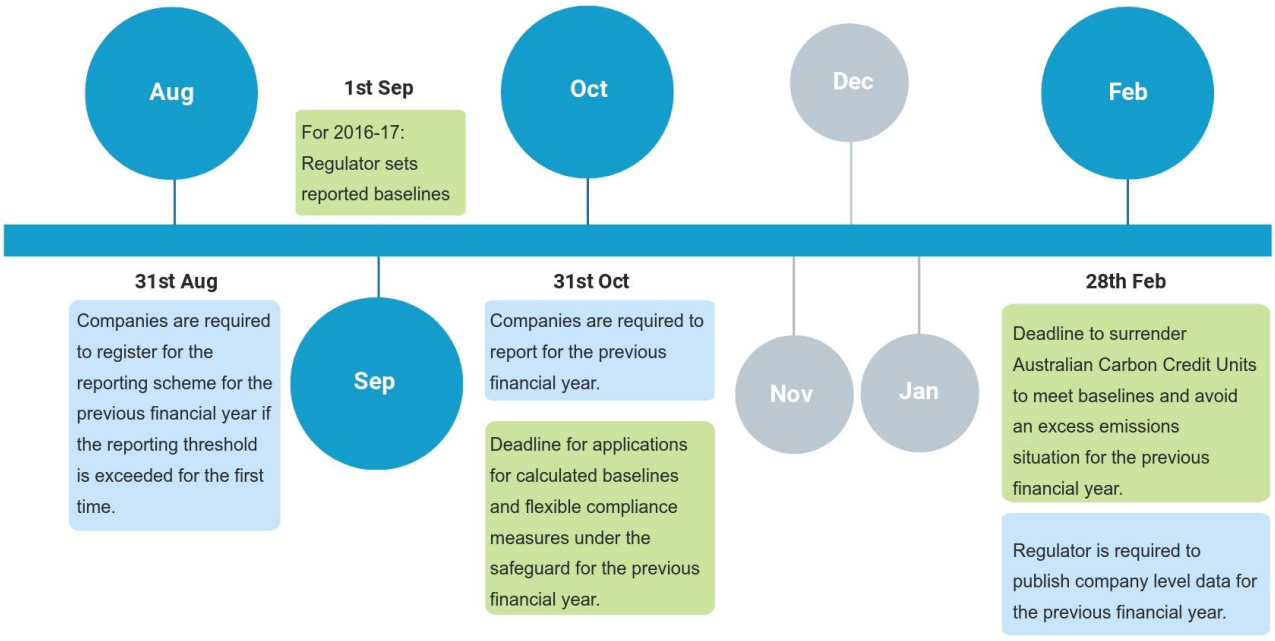
[8] Calculated baselines that commence from 1 July 2020 will need to use the Government-determined production variables and associated default emissions intensities.
[9] Grid-connected electricity generators are exempt from the requirement to move onto a calculated baseline until the sectoral baseline is exceeded.
[10] Facilities in the mining and oil and gas sector with variable emissions can apply for calculated baselines twice until 2025.
[11] If they use the Government-determined annually adjusted production variables.
[12] Calculated baselines that commence from 1 July 2020 will need to use the Government-determined production variables and associated default emissions intensities and will no longer be able to use site-specific values (with the exception of facilities in the mining and oil and gas sectors with variable emissions).

From 1 July 2020, new facilities will still be required to apply for benchmark baselines. However, facilities that undergo a significant expansion will only be required to apply for benchmark baselines if they use site-specific or Government-determined fixed production variables and not if they use the Government-determined annually adjusted production variables. This is because annual updates for production would account for a significant expansion. The Government's consultation paper on the proposed amendments states that benchmark emissions intensities will be considered after the baseline setting approach for existing facilities has been settled (DoEE 2018a).

2.5 KEY DATES UNDER THE LEGISLATION

Figure 7 illustrates key dates for the reporting scheme and the safeguard mechanism.

FIGURE 7 Timeline for the reporting scheme and the safeguard



Note: Reporting obligations are shown in blue and safeguard obligations are in green.

2.6 ADMINISTRATION AND COMPLIANCE

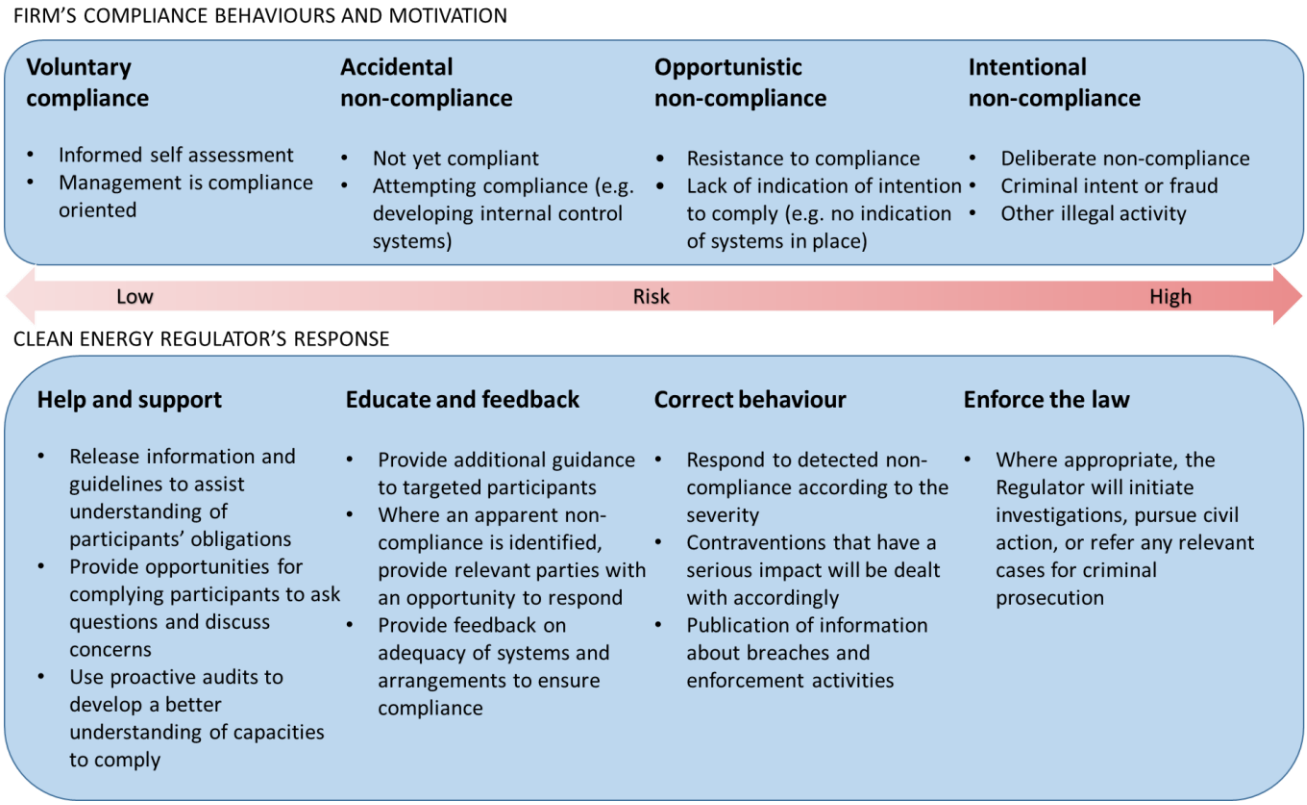
The Department of the Environment and Energy and the Clean Energy Regulator both play a role in the governance of the legislation. The Regulator is the primary agency responsible for compliance. It maintains and monitors enforcement and compliance with the reporting scheme and the safeguard through:

- education activities
- publishing guidance material
- maintaining and enforcing an audit framework
- undertaking enforcement action as required.

The Regulator takes a tiered approach to compliance for the schemes it administers, only using enforcement powers to address areas of opportunistic or intentional non-compliance. The Regulator's approach is set out in Figure 8 below.

A risk-based approach is used to detect non-compliance, focusing on those areas or companies the Regulator considers are at greatest risk of material breaches of the legislation. To target potential areas of non-compliance the Regulator considers the findings of audits and the results of data analytics and other information gathering (CER 2018d).

FIGURE 8 The Clean Energy Regulator's tiered approach to compliance



Source: Based on CER 2018d

The audit framework established under the *National Greenhouse and Energy Reporting Act 2007* (Cth) applies to the reporting scheme, the safeguard, the Emissions Reduction Fund and the Renewable Energy Target. It is also used in the National Carbon Offset Standard.

Audits are not mandated under the reporting scheme; however, the Regulator actively encourages reporters to conduct voluntary audits. The Regulator may also require reporters to conduct audits, or may conduct audits itself as part of a risk-based approach to compliance.

Under the safeguard, some compliance options for meeting obligations require an audit report to be included in the application such as for calculated baselines.

3 THE REPORTING SCHEME: WHAT IS WORKING WELL

3.1 WORKS WELL, MEETS ITS OBJECTIVES AND ENJOYS BROAD SUPPORT

In this chapter, the Climate Change Authority sets out its findings on the operation of the National Greenhouse and Energy Reporting scheme. These findings are based on an evaluation of evidence collected through its own research and analysis and extensive consultation with Government agencies that administer the scheme, reporters and data users.

The Authority found the scheme is working well, is generally fit for purpose and has strong support from industry, governments and others. The Authority is of the view it is meeting the objective of the legislation (Section 2.2) through the provision of high quality energy and emissions data, which has:

- been used extensively by Australian, state and territory governments in the development of policies and other activities
- informed companies, governments and other data users
- been essential for Australia to meet its international energy and emissions reporting obligations
- reduced reporting burdens on companies over time.

> *[T]he National Greenhouse and Energy Reporting System … [is] largely working as intended.*
> Australian Aluminium Council, submission on this review (p. 1)

Although the Authority found the scheme is working well, it recommends a number of improvements to enhance the efficiency and effectiveness of the scheme. These are discussed in Chapter 4.

3.2 REDUCED DUPLICATIVE REPORTING

One of the primary motivations for the introduction of the reporting scheme included reducing duplication of emissions and energy reporting requirements across jurisdictions and minimising the regulatory burden on businesses.

The Authority's analysis indicates cases of duplicative reporting have largely been eliminated. Examples of programs that were identified as collecting duplicative emissions and energy information that have now ceased include:

- the voluntary Australian Bureau of Agricultural and Resource Economics Fuel and Electricity Survey
- the voluntary National Greenhouse Gas Inventory Survey
- New South Wales Energy Savings Action Plans
- Commonwealth Energy Efficiency Opportunities
- Victoria's Environment and Resource Efficiency Plans
- South Australia's Greenhouse Strategy.

Industry and others also told the Authority duplicative reporting has reduced over time. This is partly because programs ended and partly due to the sharing of data.

3.3 HIGH QUALITY DATASET COMPARES FAVOURABLY TO INTERNATIONAL SCHEMES

The Authority found the energy and emissions data reported under the scheme is of a high quality and has broad coverage, capturing over 60 per cent of Australia's emissions and most of its energy production and use.

The Authority's analysis indicates the high quality of data is achieved through:

- high levels of compliance with the scheme's requirements, including the rules and comprehensive methods that set out how to measure and report energy and emissions (published in the measurement determination)
- education and guidance materials provided by the Regulator and the Department to assist reporters understand their obligations, complemented by a comprehensive auditing framework and other compliance measures
- use of mature and accurate measurement and reporting systems by companies covered by the scheme.

The Authority found the scheme compares well with similar emissions reporting schemes in other countries in terms of coverage, reporting thresholds and compliance settings. Australia's scheme captures a broad set of emissions data at the company level and the arrangements for ensuring the quality of the data are generally more developed than in other countries (PMR 2015). This view was supported by both reporters and data users. Australia also collects comprehensive energy data at the company level through the reporting scheme, whereas many other countries conduct separate mandatory surveys to collect energy data for the industrial and manufacturing sectors.

> *Australia leads the way in emissions and energy reporting, and Australia's system is best-in-class.*
>
> National Australia Bank, submission on this review (p. 5)

Appendix D provides more information on how Australia's scheme compares with other international emissions reporting schemes.

3.4 FIT-FOR-PURPOSE APPROACHES TO MEASURING EMISSIONS AND ENERGY

The Authority found the measurement determination, which details how companies must measure and report their emissions and energy data, was generally fit for purpose as it led to a high quality dataset and was generally supported by the companies who use it.

> *The methods for our industry are [an] appropriate attempt to balance the administrative workload and accuracy.*
>
> The Cement Industry Federation, submission on this review (p. 4)

3.5 ESSENTIAL FOR MEETING AUSTRALIA'S INTERNATIONAL REPORTING OBLIGATIONS

As set out below, the Authority found the reporting scheme plays an essential role in Australia meeting its international reporting obligations on greenhouse gas emissions and energy. The importance of emissions data in informing Australia's emissions inventory and tracking progress against emissions reduction commitments was widely recognised by industry, whereas there was less understanding of the importance of the energy data.

3.5.1 Australia's international reporting on emissions to the United Nations Framework Convention on Climate Change

Australia is required to submit an inventory of greenhouse gas emissions to the United Nations Framework Convention on Climate Change each year. This is used to track Australia's progress against its emissions reduction commitments. The emissions and energy data collected under the reporting scheme is one of the principal data sources for developing Australia's national inventory report. The Government describes the National Greenhouse and Energy Reporting scheme as 'one of the most critical assets in the preparation of the inventory' (Commonwealth of Australia 2018b).

Data collected under the scheme informs the inventory directly and indirectly except for the agriculture and land categories (Figure 9). The energy data in Australian Energy Statistics (which is primarily based on the reporting data) is also used to calculate Australia's greenhouse gas emissions from energy and transport sources.

FIGURE 9 Emissions source categories in the National Greenhouse Gas Inventory informed by data from the reporting scheme

Energy sector (includes transport)		Industrial processes and product use	Waste	Agriculture	Land use, land use change, and forestry
Fuel combustion	Fugitive emissions				
✓	✓	✓	✓	X	X

Note: Other information sources also inform emissions estimates in each sector.
Source: Climate Change Authority, based on Figure 1.1 in Commonwealth of Australia 2018b

Many of the features of the reporting scheme are in place to support international reporting. For example, the gases covered, emissions source categories and emissions estimation methods used in the reporting scheme are consistent with international rules.

An international expert review in 2017 found the systems supporting the delivery of Australia's national inventory, of which the reporting scheme is a significant part, are working well—providing further evidence the reporting scheme is meeting this objective (UNFCCC Compliance Committee 2018).

3.5.2 Reporting energy data to the International Energy Agency and other international fora

Australia is required to provide statistics on energy production and consumption to the International Energy Agency each year. These official statistics are the Australian Energy Statistics, which estimate Australia's energy supply and use across all types of energy and across all parts of the economy, by state and territory. The statistics are compiled using an internationally agreed framework, enabling the comparison of Australia with other countries. The framework includes reporting primary and secondary energy production and consumption, and reporting energy consumption for different activities such as for electricity generation, transport, other stationary energy, and for non-combustion purposes such as lubricants.

The Department of the Environment and Energy produces the Australian Energy Statistics. The reporting scheme is the primary data source used to produce these statistics, as it covers most of Australia's energy production and use. Prior to the establishment of the mandatory reporting scheme, the Australian Energy Statistics relied on a voluntary annual survey. The data gathered through the mandatory reporting scheme has led to improved energy reporting through an increase in the number of reports and greater detail in energy use information (Che et al. 2013).

As well as reporting to the International Energy Agency, Australia supplies energy data to a number of other international energy fora. These include the International Renewable Energy Agency and Asia

Pacific Economic Cooperation Energy Working Group (DoEE n.d.b).[13] The Australian Energy Statistics underpin reporting to these other fora.

The Authority's research found the Australian Energy Statistics are widely used by all levels of government, industry, researchers and commentators in addition to meeting international energy and emissions reporting requirements.

3.6 INFORMS GOVERNMENT POLICIES, PROGRAMS AND ACTIVITIES

The Australian and state and territory governments have access to data reported under the reporting scheme relevant to their jurisdiction, subject to requirements for data protection and confidentiality. The Authority found this access is critical for minimising duplication by governments in collecting energy and emissions data and for companies in reporting the data. The Authority heard the ability for state and territory governments to access data has improved over time as information sharing agreements and systems have been established.

The Authority's research found data collected under the reporting scheme is used to inform a broad range of energy and emissions policies, programs and activities at both the Australian and state and territory levels.

The Authority's analysis indicates that data reported under the reporting scheme is integral to the development and implementation of Australian Government emissions and energy policies (Table 11 in Appendix E). For example, the emissions data informs baselines and net emissions positions under the safeguard mechanism; and emissions data and measurement factors inform activities under the Emissions Reduction Fund. It is also used to develop Australia's emissions inventories and emissions projections, which provide context for emissions reduction policies.

Energy statistics and modelling developed using the energy data feeds into policies such as the National Energy Productivity Plan, which includes measures to improve energy productivity by 40 per cent between 2015 and 2030 (Table 11 in Appendix E).

Throughout the review, the Authority heard state and territory governments use information reported and published under the legislation to inform their policy development, programs and activities. This includes guiding strategic work and policy positions, informing emissions accounts and risk assessments, tracking large emitters and reporting on state and territory government operations. State and territory government representatives said they found it useful to have a single, consistent framework. Table 12 in Appendix E illustrates some specific examples of data informing state and territory government programs, activities and policy.

> *It is highly valuable for Australia to have a single, consistent framework for gathering and disseminating energy and emissions information.*
>
> Australian Capital Territory Government, pers. comm.

[13] Statistics provided to these fora are used to inform policies and analysis by the Clean Energy Ministerial, the International Partnership for Energy Efficiency Cooperation and the G20 Sustainability Working Group.

3.7 THE EMISSIONS AND ENERGY REPORTING SYSTEM IS EASY TO USE AND EFFECTIVE

Reporters use the online Emissions and Energy Reporting System to enter their reporting data. Drawing primarily on feedback from reporters and the Regulator, the Authority found the reporting system is working well and is fit for purpose. Reporters noted the current system has improved over time and is an improvement over the old system.

> *…the Emissions and Energy Reporting System tool ('EERS') is now relatively user friendly.*
> Rio Tinto, submission on this review (p. 5)

In 2012, the Australian National Audit Office conducted a security audit of the online reporting tool that preceded the current reporting system. The audit identified data security vulnerabilities with the original tool and made recommendations for improvements to it (The Auditor-General 2012). The Regulator has advised the Authority they conduct regular security tests of all systems, including the current online reporting tool, and respond to any potential risks identified. As threats become increasingly sophisticated, the Regulator continually enhances its systems in response.

3.8 HELPS COMPANIES BETTER UNDERSTAND THEIR OWN ENERGY AND EMISSIONS AND MEET OTHER REPORTING REQUIREMENTS

Reporters said the data they collect to meet the legislative requirements informed their own understanding of their energy use and emissions to varying degrees. Some said the reporting process generated valuable information while others said established internal data collection processes informed the reporting process.

> *[Australian Industry Greenhouse Network] members prepare their respective [National Greenhouse and Energy Reporting scheme] reports based off their own internal emissions data management systems – not the other way around.*
> Australian Industry Greenhouse Network, submission on this review (p. 4)

Some reporters told the Authority data collected under the scheme informs their business management by:

- providing insights into variances between operations
- allowing benchmarking to be performed across operations
- enabling energy efficiency opportunities to be identified
- assisting with assessments of transition risk (Sustainable Business Australia, submission on this review).

Other reporters said reporting alone does not drive changes in business operations to reduce emissions and energy use, as other drivers such as reducing costs and organisational values are more important.

Some reporters said the energy and emissions data reported under the scheme is used for other internal and external reporting, such as on climate risk and sustainability. The Authority heard some reporters were better able to engage their board when reporting about sustainability issues due to the legislative basis of the data collected and the fact it is underpinned by nationally recognised measurement methods.

Others said they used a different approach for sustainability reporting to ensure consistency across a global business (Rio Tinto, submission on this review). Reporters from the building sector told the Authority the National Australian Built Environment Rating System and the Green Star industry accreditation scheme is used for company-level reporting.

3.9 INFORMS INVESTORS AND OTHER DECISION-MAKERS

The reporting data released publicly by the Regulator to meet legislative requirements, and additional published aggregated information, is summarised in Table 4. The Authority heard from a number of users of the published data and information. They said they valued the dataset as it was generated from a government source and had a high degree of credibility.

The Authority was told data published under the scheme is used by the private sector and others to inform investment decisions and contribute to policy discussions. For example, National Australia Bank said it uses the data for risk assessments and also when analysing their lending portfolios. Other data users said they conducted emissions intensity benchmarking where possible, assessed industry trends or compared companies' performance. Investors also said they use the data to get a better understanding of the potential exposure of companies to climate risk (Box 2).

TABLE 4 Data publicly available on the Clean Energy Regulator's website

Title	Description	Publication required under legislation?
Reported data		
Corporate emissions and energy data	Scope 1 and 2 emissions and net energy consumption by company.	Yes
Electricity sector emissions and generation data	Emissions and generation data at the facility level in the electricity sector.[14]	Yes
Extract of the National Greenhouse and Energy Register by year	A list of those registered under the National Greenhouse and Energy Reporting Act for the previous reporting year.	Yes
Safeguard baselines table	Baseline number and type of baseline in force, by facility.	Yes
Safeguard facility reported emissions	Reported covered emissions, baseline number, surrendered Australian Carbon Credit Units and net emissions by facility.	Yes
Register of auditors	A list of registered auditors to assist participants in identifying and appointing an auditor.	Yes
Net energy consumption 2010 to 2012	Data that preceded that listed under corporate emissions and energy data.	No
Aggregated data		
A closer look at emissions and energy data	Summarised information from the reporting data on emissions, energy consumption and production across industries, states and territories.	No
Data highlights	Key points arising from previous year's reporting data, presented graphically. This includes emissions by state and industry and a list of the top emitters.	No

Source: CER 2018f

[14] This includes both grid-connected and non-grid generators where the principal activity is electricity production. Facilities that generate electricity for their own use or as a secondary activity are not included in this dataset.

BOX 2 Climate-related financial risk disclosure

The National Greenhouse and Energy Reporting scheme provides information that investors and companies can draw on for climate-related financial risk disclosure.

Financial regulators, institutional investors and shareholders are placing increasing pressure on companies to report climate risks and how they are being managed (for example ACSI 2017, IGCC 2016). The Australian Prudential Regulation Authority has recognised climate change imposes 'foreseeable, material and actionable' financial risks on Australian companies (Summerhayes 2017). The Australian regulatory framework for financial reporting may already require disclosure of climate risks. The *Corporations Act 2001* (Cth) requires company directors to report on 'any matter …that has significantly affected, or may significantly affect the entity… in future financial years' (s. 299). The Australian Securities and Investments Commission has issued guidance that these matters include environmental risks (ASIC 2016). Legal advice provided by Noel Hutley SC and Sebastian Hartford-Davis to the Centre for Policy Development stated that directors have legal obligations to consider climate change risks and if they don't they could be found liable for breaching their duty of care and diligence in the future (CPD 2016).

Information about the emissions associated with a company's activities can assist investors to understand the degree of risk the global transition to a lower-carbon economy exposes the company to. The Task Force on Climate-related Financial Disclosures recommends companies disclose their scope 1 and scope 2 emissions and the related risks in their financial reporting, as well as scope 3 emissions if appropriate (TCFD 2017a).[15]

While the current reporting framework does not include scope 3 emissions, the data reported on scope 1 and 2 emissions and energy use could be used to help inform climate-related financial risk disclosure statements. In its submission on this review, ClimateWorks said emissions and energy data is valuable for investors to understand climate risk exposure and that further disclosure would help price these risks into the market.

Companies, market analysts and the Task Force have identified the lack of standardised metrics as a barrier to companies adequately disclosing their climate risks (EY 2018, SBA 2017, TCFD 2017a). The Authority supports further work on this through collaborative efforts between the public and private sectors. In developing principles to underpin metrics for climate risk disclosure, it is important that agencies responsible for financial regulation and policy development work with those responsible for emissions and energy reporting data, and energy and climate policies. Metrics should build on existing data and minimise the burden on business.

The Authority is of the view that while the reporting data should continue to be used by companies to inform their climate-related financial risk disclosures, the reporting scheme should not be expanded to include other aspects of these disclosures. This view is supported by stakeholders. For example, one stakeholder cautioned against expanding the scope of the reporting scheme if other mechanisms already exist for reporters to communicate with their stakeholders on climate-related risks.

[15] Scope 3 emissions are indirect emissions (not included in scope 2) that occur in the value chain of the reporter, including both upstream and downstream emissions.

4 THE REPORTING SCHEME: WHAT COULD BE IMPROVED?

As discussed in Chapter 3, the Climate Change Authority found the reporting scheme is generally working well, has broad support and is meeting its objective. However, the Authority has also identified a number of opportunities for improvements. Many of these opportunities, which are described in this chapter, can reduce costs to businesses or the scheme's administrators, while further enhancing the integrity of the data collected.

4.1 STREAMLINING GOVERNMENT REQUIREMENTS FOR EMISSIONS AND ENERGY DATA

There may be opportunities for further streamlining of business reporting obligations to governments. The Australian Government and some states and territories have a small number of programs that overlap to some extent with the reporting scheme, in terms of activities reported and businesses required to report. Further reporting requirements are also expected in the near future; for example, for compliance under the Carbon Offsetting and Reduction Scheme for International Aviation (Section 4.1.2).

In this section, the Authority considers whether new or existing reporting schemes could or should share the data generated; be integrated with the National Greenhouse and Energy Reporting scheme; or draw upon the existing administrative arrangements of the reporting scheme.

To inform its views the Authority has considered if there:

- is overlap in the information that is measured and reported
- is convergence or opportunities to align: reporting periods, compliance deadlines or the criteria for companies that will be responsible for reporting
- are reasons to align the compliance, enforcement and data management frameworks
- are administrative efficiencies to be gained through administration by the Clean Energy Regulator.

4.1.1 Increased data sharing

Petroleum and other fuels reporting

Currently, businesses that produce, refine, wholesale or hold stocks of oil, petroleum fuels or fuel-related products are required to report monthly information relating to these activities to the Department of the Environment and Energy under the *Petroleum and Other Fuels Reporting Act 2017* (Cth). This data is used to inform energy security policy, meet Australia's reporting obligations as a member of the International Energy Agency and to prepare the monthly Australian Petroleum Statistics Report.

In designing the mandatory petroleum statistics reporting scheme, consideration was given to information already collected by Government and opportunities for data sharing across Government agencies to reduce the regulatory burden on business. The Department advised the Authority that after careful review, it concluded the definitions, format and frequency used in the National Greenhouse and Energy Reporting scheme meant the data collected did not meet the requirements for petroleum reporting. A number of other data sharing arrangements were put in place including with the National Offshore Petroleum Titles Administrator, the Western Australian Department of Mines, Industry Regulation and Safety, the Australian Competition and Consumer Commission, the Department of Home Affairs and the Australian Taxation Office.

Nonetheless, the Authority considers there remains some duplication of reporting that could be reduced by using the petroleum data to inform the reporting scheme. For example, energy production data from

upstream oil production, petroleum refineries and biofuel producers is collected under both schemes. Some monthly data reported under the petroleum reporting framework could be aggregated and used as an input to the annual emissions and energy reporting, reducing the need for companies to report again. The Authority recommends the Department consider opportunities to share the petroleum data with the reporting scheme (see Section 4.4). This would help to reduce the reporting requirements on businesses that report under both schemes and improve consistency in datasets.

National Pollutant Inventory

The National Pollutant Inventory provides the community, industry and governments with information about 93 toxic substances and the source and location of these emissions. The data collected and published addresses the community's right to know about substances that could potentially harm their health or environment (Commonwealth of Australia 2018c).

Several reporters told the Authority there was some duplication in reporting under the reporting scheme and the pollutant inventory. Over 200 organisations commonly report to both the pollutant inventory and the National Greenhouse and Energy Reporting scheme. For the most part, the substances reported under the two schemes differ but both schemes collect data related to fuel combustion.

Under the pollutant inventory, fuel combustion information is used to estimate emissions of indirect greenhouse gases and aerosols—which are both air pollutants and affect the climate (Section 4.6.2). Under the reporting scheme the major greenhouse gas emissions from fuel combustion are reported.

The pollutant inventory is particularly concerned with spatial aspects of activities and informing those in the immediate vicinity. By contrast, the precise location of activities that lead to greenhouse gas emissions and energy use is not as important for health or environment reasons. The different purposes of the two schemes means the schemes use different thresholds and facility definitions.

In submissions on this review, the different purposes of the two schemes were recognised.

> *[Australian Industry Greenhouse Network] members support [the National Greenhouse and Energy Reporting scheme] and the National Pollutant Inventory (NPI) remaining separate due to their different purposes.*
>
> Australian Industry Greenhouse Network, submission on this review (p. 5)

Others, however, said they would like to see the two schemes integrated or harmonised to some extent. This included aligning reporting dates, or sharing data.

The Authority recognises the different purposes of the two schemes and the associated differences in definitions, responsible reporters, thresholds, timing and legislative frameworks. Changing these factors to harmonise the two schemes may have unintended consequences that compromise the achievement of the schemes' objectives.

The Authority is of the view the Department and the Regulator should work together to identify the potential for sharing fuel combustion data between the two schemes where relevant definitions and reporters align. This will help to reduce the regulatory burden on business and increase the consistency of government datasets.

Energy, Water and Environment Survey

The Australian Bureau of Statistics conducts the Energy, Water and Environment Survey every three years. The survey, which is used to compile industry benchmarks, is being conducted this year and has been sent to approximately 10,000 businesses in the mining, manufacturing, utilities, construction and transport industries.

In 2015 the Australian Bureau of Statistics trialled substituting energy consumption data from the reporting scheme to reduce the reporting burden for businesses completing the survey. This approach was also applied to the 2016 and 2017 iterations of the Environment Indicators Survey which is shorter and surveys fewer businesses in the intervening years.

Data substitution stopped in 2018 and the surveys are again collecting all data from the businesses surveyed. The Australian Bureau of Statistics found there was not much direct overlap between the two reporting schemes. The Bureau told the Authority that of the 40 items in the Energy, Water and Environment Survey, on average five data items on energy consumption from 200–300 business units (compared with 700 companies reporting to both schemes) could substitute data from the reporting scheme. This is due to differences in requirements of the survey and the reporting scheme. For example, reporting scheme business definitions are based on operational control while the survey uses financial control. The data from the reporting scheme continues to be used by the Australian Bureau of Statistics as a valuable data source for comparison.

The Authority encourages the Australian Bureau of Statistics to continue working with the Regulator on ways to make best use of reporting scheme data to corroborate the survey and to reduce the reporting burden on businesses, such as through sharing data for those companies who report to both.

Recommendation

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.

4.1.2 Streamlined administration of reporting schemes and other programs

National Carbon Offset Standard

The Department currently administers carbon neutral certification against the National Carbon Offset Standard. Businesses that wish to be certified must measure, reduce and offset their emissions and publicly report on their carbon neutrality annually. The Department checks that businesses have met their reporting obligations, and assesses the accuracy of the carbon accounts and offsets prior to re-certification. The Department is currently streamlining this annual reporting administration process, which includes compliance and carbon data assessment.

Given the Regulator already has established systems for businesses to report energy and emissions data, there could be opportunities for efficiency gains by using the Regulator's systems (Section 4.2). If pursued, the Department should continue to be responsible for policy development of the standard and would be able to focus resources on expanding its uptake. The Regulator would need to be adequately resourced to administer the annual reporting against the standard.

Recommendation

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.

International aviation reporting

Australian aircraft operators will soon need to report on and manage emissions from international flights under the Carbon Offsetting and Reduction Scheme for International Aviation (aviation scheme) (ICAO n.d.). Under the aviation scheme, the Australian Government will be responsible for collating and reporting emissions information and ensuring Australian aircraft operators manage their emissions in line with the scheme requirements.

As a result of significant differences between the two schemes, the reporting scheme as it currently stands cannot be used to meet the international aviation reporting requirements. For example, there is no overlap in the emissions that aircraft operators would report on under the two schemes: under the reporting scheme only domestic flights are covered, and only international flights are relevant for the aviation scheme.

However, given the Regulator has the experience and systems required to administer energy and emissions reporting, the Authority considers they would be well placed to manage the administration of Australia's requirements under the aviation scheme. The Authority also considers that a common compliance framework for emissions reduction initiatives is important for efficiency and environmental integrity.

Therefore, the Authority recommends the Department of Infrastructure, Regional Development and Cities (the agency with the lead in implementing the aviation scheme) and the Regulator should align elements of the two schemes to the extent possible; for example, administrative procedures, compliance penalties and data sharing arrangements.

The International Maritime Organisation has recently announced an emissions reduction target for the international shipping sector (IMO 2018). At the appropriate time, the Government could also consider whether there are opportunities to align administration and compliance frameworks for the shipping sector with the reporting scheme and the aviation scheme.

Recommendation

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.

4.1.3 Improving government agency use of the data

The Authority heard from some government data users, including at the state and territory level, that it was unclear in some instances what reporting data is available to them and how it could be used and shared. The Authority also heard from industry there are remaining, but limited, examples where state governments are requesting information already provided through the reporting scheme. Additionally, some held concerns that duplication of reporting requirements may increase, as state governments become more involved in pursuing emissions reduction policies.

The Authority understands that one of the reasons for state governments separately requesting reported data from industry is due to their concerns around the confidentiality requirements of data collected under the reporting scheme. In some cases, state agencies are required to publish reported data publicly (for example, in Environmental Impact Statements or project approvals). A state or territory is permitted to publish emissions and energy information collected under the reporting scheme if required under a law of the state or territory (CER pers. comm.).

Some state and territory government officials also told the Authority concerns around confidentiality requirements had limited their willingness to share analysis with state government ministers. The data protection requirements for reporting data collected by the Regulator are set out in the *National Greenhouse and Energy Reporting Act 2007* and in the *Clean Energy Regulator Act 2011*. The Regulator may give approval for data to be shared with ministers, external consultants or other government agencies if adequate security provisions and understanding of data confidentiality requirements are in place (CER pers. comm.).

The Regulator requires all state and territory government agencies to complete a security checklist, which outlines the rules for disclosure of information, before gaining access to the data. Some stakeholders reported this, and other guidance on interpreting the data sharing rules, had helped to counter confidentiality concerns.

The Authority heard from data users that part of the overly cautious approach to the use of data is due to the relatively high penalty for unlawful disclosure of greenhouse and energy information or audit information.[16]

The Authority is of the view the Regulator should continue to provide education and support to data users to improve understanding of their obligations under the legislation, and also support data users to better use the data where it is permitted by the legislation. The Authority also notes the importance of state government data users and others contacting the Regulator to clarify any areas of uncertainty.

Concerns were also raised with the Authority that the ability for some Australian Government agencies to access the reporting data are limited by overly stringent data sharing and confidentiality provisions. The Authority recommends the Regulator continue to work with interested government data users to provide efficient access to reporting data.

Recommendation

R.4 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.

4.2 MAKE THE EMISSIONS AND ENERGY REPORTING SYSTEM MORE EFFICIENT

Reporters suggested improvements to the online Emissions and Energy Reporting System, to reduce the reporting burden and improve the quality of the data.

Currently, reporters cannot upload emissions and energy data into the reporting system from their internal databases. They suggested an electronic upload mechanism be developed to reduce the cost of reporting.

Reporters also said extensive time-intensive manual data entry is required. The Chamber of Minerals and Energy Western Australia stated in their submission on this review, ‘The current reliance on manual data entry increases the risk of typographic errors…’ (p. 10). While the reporting system currently allows pre-fill of some attributes relating to the reporting organisation, it could be enhanced by also including pre-fill and automation of data that is otherwise required to be manually entered more than once. This would reduce costs to reporters and reduce errors.

[16] The maximum penalty for unlawful disclosure of greenhouse and energy information or audit information is set at imprisonment for 2 years or a fine of $25,200.

The Chamber of Minerals and Energy Western Australia also said '…the absence of an extract function, reduces reporters' ability to verify and validate entered data' (submission on this review, p. 10). Others also supported a mechanism that enables reported information to be downloaded in a useable format such as a Microsoft Excel document. This could reduce errors by allowing data to be checked by reporters before submitting.

The Authority recognises the Regulator's ongoing work to address many of these issues by improving the reporting system and acknowledges current resource constraints to implement these changes quickly. The Authority understands the Regulator has developed a roadmap to improve its information technology systems and services and encourages the Regulator to continue to consult with industry on improvements required and how best to prioritise them.

As noted in Section 4.1, the Authority heard cases of reporters being required to submit the same information to multiple schemes, such as to the National Pollutant Inventory. The Authority recommends the Regulator give consideration to establishing a common reporting system for multiple reporting schemes, to make entry and sharing of energy and climate-related emissions data between schemes easier. A similar approach has been taken by the Canadian Government, which introduced a 'single window' for reporting greenhouse gas emissions and pollutants (Environment and Climate Change Canada 2017). Schemes for which this may be suited include the National Carbon Offset Scheme, the National Pollutant Inventory, the aviation scheme and the Petroleum and Other Fuels Reporting program. The Authority is of the view the portal should facilitate data sharing, but not involve the direct integration of these schemes.

The use of a single reporting portal may also reduce the opportunities for errors in inputting common company-specific information, and allow for greater matching of data across schemes and through time. Some reporters were supportive of a single reporting portal.

The Authority acknowledges that linking the Emissions and Energy Reporting System with other systems would involve complex data mapping and additional resources to implement it. Nonetheless, this should be considered in the context of future systems developments with the aim of enabling this form of integration.

Recommendation

R.5 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.

Recommendation

R.6 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.

4.3 IMPROVE THE MEASUREMENT DETERMINATION UPDATE PROCESS

The measurement determination is updated annually in response to industry feedback to correct any errors and to keep reporting in line with the national emissions inventory. Industry was generally supportive of these annual updates and the extensive consultation the Department conducts to make them; however, industry also raised some areas for improvement.

One area of potential improvement is the timing of the consultation for the update process. Some in industry support the current timing: consulting in the months preceding the July start to the reporting year. Others saw merit in earlier consultation. For example, members of the oil and gas sector said that earlier engagement with industry would have improved their recent experience where substantial changes to the measurement of emissions were proposed. Some reporters also noted that an earlier opportunity for consultation, closer to the end of the reporting year, would allow for more timely feedback on improvements to the reporting process for the following year.

> *Bringing forward the timeframe may assist those involved as any issues would be front of mind.*
> Origin, submission on this review (p. 2)

The Department has made a commitment to industry to provide longer lead times for material changes to the measurement determination in the future (Australian Industry Greenhouse Network, submission on this review). The Authority considers the Department, together with the Regulator, should provide industry with an opportunity to raise concerns around the measurement determination soon after the 31 October reporting deadline.

Reporters also suggested the updated measurement determination is at times published after the beginning of the reporting year to which it applies, allowing no lead time before the new rules commence. The Authority found the amendments are made into law and made public in late June prior to the start of the reporting year.[17] Consultation on exposure draft legislation usually occurs in May through to early June and is accompanied by guidance explaining the changes. The Department has said that generally few changes occur to the exposure draft text and as it has been developed in consultation with relevant industry stakeholders they are already aware of the changes. The Authority considers that the exposure draft legislation provides an adequate avenue for managing readiness for implementing the changes where they are routine. For substantial changes, for which extensive consultation should be undertaken, registering the updated legislation a month or two earlier would allow reporters to better prepare for the new methods.

Through the measurement determination update process and other fora, the Department has indicated its openness to industry suggesting areas for improvement. Some reporters have had positive experiences in this regard. For example, one reporter told the Authority they had been working constructively with the Department on a new facility-specific method for fugitive emissions from natural gas distribution (ATCO Gas pers. comm.). Others said long-standing issues have been raised with the Regulator or Department, but have not been resolved.

The Authority is of the view the update process should allow reporters to share their issues with both the measurement determination and the reporting system in a systematic and timely way. The Department can then prioritise how the issues will be addressed and communicate to industry its approach, including reasons for not pursuing issues where that is the case. The Authority encourages the Department to consider the specific issues raised by stakeholders in their submissions on this review in the annual update process (Appendix F).

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[17] The updated measurement determination applies from the beginning of the reporting year (1 July) for emissions reported by 31 October the following year (i.e. 15 months after the start date for the determination). The compiled determination, which is a consolidated version of the already registered updates made to the determination, is often registered in early July. The timing for compilation and registration is affected by Office of Parliamentary Counsel resourcing and prioritisation constraints.

The Regulator publicises updates to the measurement determination and the reporting system at the beginning of the reporting year and provides some information on their website. However, the Authority found not all stakeholders were aware of all updates to the measurement determination. For example, some reporters were unaware of changes to the reporting of emissions from domestic and commercial waste water which began from 1 July 2018 and which can materially reduce their reporting burden. The Authority is of the view the Regulator should continue to work with reporters to ensure wider understanding of changes to the determination.

Recommendation

R.7 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.

4.4 REDUCING COSTS ASSOCIATED WITH REPORTING EMISSIONS AND ENERGY FROM SMALL SOURCES—MATERIALITY ISSUES

The Authority heard reporters are spending a significant amount of effort measuring what they considered to be small or non-material emissions and energy. A few specific emissions sources were repeatedly identified in this regard:

- oils and greases for non-combustible uses (for example those used as a lubricant)
- sulphur hexafluoride emissions (SF_6)
- mud degassing from the drilling of oil and gas wells and the use of soda ash while drilling those wells.

Members of the Australian Petroleum Production and Exploration Association, for example, said the three sources noted above can amount to less than 0.05 per cent of total emissions but in some cases require up to 80 per cent of the measurement effort.

The legislation already includes a number of provisions to ease the reporting burden in relation to small emissions and energy sources (Box 3). These provisions were made less restrictive and thresholds were raised to try to reduce the reporting burden following the 2012 Australian National Audit Office audit of the scheme (DIICCSRTE n.d.a).

BOX 3 Existing provisions for simplified reporting in the legislation

Small facilities

Small facilities that fall below set thresholds and constitute less than 5 per cent of a corporate group's emissions and energy can estimate facility emissions or energy as a percentage of the group total.

The provision for small facilities was used by more than 40 reporters, for a total of 72,000 t CO_2-e in 2016–17.[18]

Incidental emissions and energy

A facility can estimate incidental sources of emissions and energy using their own approach, consistent with measurement principles of transparency, accuracy, comparability and completeness.[19] The provisions for calculating incidental emissions were used by 157 reporters, for a total of 174,000 t CO_2-e in 2016–17.[20]

For example, sulphur hexafluoride emissions are more often incidental to a facility's total emissions. In 2016–17, only 8 per cent of reported emissions of this gas were calculated using the incidental provision. This implies greater use could be made of the existing provisions.

Source-specific thresholds and sector limits

Methods for some sources of emissions and energy only apply to instances of a source above a specific threshold or are limited to some industry sectors (Table 5).

TABLE 5 Examples of thresholds and limits

Sector	Applicability
Domestic and commercial waste water	Only reported if a facility provides water supply, sewerage and drainage services (ANZSIC code 281)
Combustion of a fuel source	Only reported for each instance above 1 t (solid fuel), 1 kL (liquid fuel) or 5 kL (non-fuel use of liquid oil or grease), or 1000 m^3 (gaseous fuel)
Hydrofluorocarbons	Only reported above a facility threshold of 100 kg and reporting restricted to several ANZSIC codes
Scope 2 emissions	Only reported above a facility threshold of 20,000 kWh of purchased electricity
Uncertainty calculations	Only required for sources of scope 1 emissions that exceed 25,000 t CO_2-e

Default methods (method 1)

Default methods use national average estimates to simplify emissions reporting requirements.

Over 95 per cent of the individual emission-producing activities (such as the carbon dioxide emissions from the burning of diesel fuel for transport purposes) reported on under the scheme are estimated using the simplest emissions estimation approach—default methods. However, just 30 per cent of emissions are related to these activities. The majority of emissions (70 per cent) are reported using more accurate activity- or facility-specific approaches.

[18] Forty reporters is 5 per cent of all reporters, and total emissions reported using the small facilities provision is less than 0.02 per cent of all reported emissions.
[19] Incidental emissions and energy are defined in terms of a maximum amount of emissions or energy production or use, specified for a single source and all incidental sources combined. These are set out in Section 4.27 of the *National Greenhouse and Energy Reporting Regulations 2008* (Cth).
[20] One hundred and fifty-seven reporters is 21 per cent of all reporters, and total emissions reported using the incidental emissions provision is less than 0.05 per cent of all reported emissions.

The Authority found the provisions outlined in Box 3 are being used, but reporters could make greater use of them. For example, internal analysis done by the Regulator for 2013–14 suggested around half of all reporters reported unnecessarily on instances of below-threshold emissions.

The Authority heard greater use is not being made of the simplified reporting provisions, partly due to the need to measure emissions to determine if they are below source-specific thresholds. This is a generally recognised issue with other international schemes (The Greenhouse Gas Protocol n.d., USA EPA 2009). The Regulator, however, has said that reporters may be able to use a suitable proxy or indicator (for example production) to show that an instance of a source is below a threshold which does not require the collection of full data each year. The Authority was also told that use of simplified reporting is further limited because auditors purportedly ask for a high level of evidence to support a simplified method for calculating small sources of emissions and energy, which is also deterring use.

An across-the-board materiality threshold that excludes all small sources, suggested by some reporters, is not considered appropriate as emissions thought to be insignificant for one facility may be significant for another, and such a threshold could jeopardise completeness of the inventory (The Greenhouse Gas Protocol n.d.). Several national and industry-level reporting frameworks in other countries similarly don't have an across-the-board materiality threshold and use simplified reporting and source-specific thresholds to reduce costs (USA EPA 2009, Greenhouse Gas Protocol 2015 n.d., Government of Canada 2018).

The Authority considers the burden associated with reporting small emissions and energy sources could be reduced through the provision of improved guidance for reporters and auditors. This could include worked examples outlining acceptable measurement approaches for the incidental approach and increasing awareness of source and industry-specific thresholds and exclusions. Guidance provided by June 2019 would assist reporting for 2019–20.

The Authority is also of the view the Regulator and the Department should review current source-specific reporting thresholds and exclusions to assess whether changing these could reduce costs to industry while maintaining the quality of the dataset.

Finally, the Authority recommends a review of the key sources of most concern identified above (lubricants, sulphur hexafluoride, mud degassing and soda ash in well drilling) to assess how the data is used and if it could be collected in a simplified way. Small sources of energy and possibly other small emissions sources should also be considered.

If the data is not used, consideration should be given to not reporting that source. If only partly used, the data could only be required from sectors for which the source is material, as has been done for domestic and commercial waste water treatment.

If the data is used, it may be able to be collected in a different way. For example, it may be possible to change the point of obligation for reporting to a different point in the supply chain and still report using the National Greenhouse and Energy Reporting scheme, or get the data from another source. Some stakeholders suggested the *Petroleum and Other Fuels Reporting Act 2017* (Cth) as a possible source for data on lubricating oils and greases.

Not all sources of emissions will be able to have reporting simplified. For example, the National Greenhouse and Energy Reporting scheme is currently the only complete source of data on sulphur hexafluoride (Box 4).

Consideration should also be given to potential future uses of the data and ensuring the scheme remains fit for purpose for prospective policies or changes in international reporting.

BOX 4 Case study on reporting sulphur hexafluoride

Sulphur hexafluoride (SF_6) is used in equipment that transmits and distributes electricity (for example, for electrical insulation). Sulphur hexafluoride is a greenhouse gas with a high global warming potential (22,800 times that of carbon dioxide). Countries must report emissions from sulphur hexafluoride in their national greenhouse gas inventories to the United Nations Framework Convention on Climate Change. A decision by signatory countries affirmed that actual emissions should be estimated and that countries should make every effort to develop the necessary sources of data to do this (UNFCCC 1997, Decision 2/CP.3).

In submissions on this review, reporters repeatedly raised the burden of reporting on what forms a small percentage of their total emissions and suggested removing this requirement unless the data is used. Over 300 facilities report on sulphur hexafluoride. The Australian Industry Greenhouse Network submission stated:

> *The Government tracks all SF_6 imports, manufacture in Australia (if any) and destruction. This data could easily be accessed to account for Australia's SF_6 emissions in Australia's international reporting.*
>
> Australian Industry Greenhouse Network, submission on this review (p. 6)

However, the reporting data is the only complete source of data on stocks of sulphur hexafluoride used in electricity supply and distribution equipment in Australia, which is the main source of emissions. The *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989* (Cth) collects data on imports but this information is incomplete, as only imports above 25 kg in a calendar year require a licence.

Losses of sulphur hexafluoride from equipment use and destruction also need to be measured. The reporting scheme is the only source of data in Australia on the uses of sulphur hexafluoride. This data is vital to derive a national emissions factor and report on Australia's national emissions of sulphur hexafluoride (Commonwealth of Australia 2018b).

This example highlights the importance of data on some small sources of emissions that is collected by the reporting system.

Recommendation

R.8 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.

4.5 ENHANCE COMMUNICATION ON ENERGY DATA USE

The Authority heard that some reporters find reporting production and consumption of energy to be more difficult than emissions, especially reporting the transformation of energy within a facility from one product to another, and for facilities that use biomass cogeneration systems. Adding to the frustration around energy reporting, many in industry said they did not know how the detailed energy data was being used or why they needed to report on energy transformation within their facility—which can be a very complex process.

The Authority considers this frustration can be reduced through increased communication by the Department as to how the energy data is used. For example, the Authority's research has found that Australia's international energy reporting requires that Australia estimate all energy production and use within the country; and data on energy transformations is needed to correctly classify energy to its end use (such as electricity generation or transport), to align statistics on energy and emissions and to estimate losses along the supply chain. As noted in Section 3.5.2, the reporting data is the primary data source used to produce the statistics used for international energy reporting and it is widely used by all levels of government, industry, researchers and commentators.

4.6 EXPANDING WHAT IS REPORTED

In this section, the Authority considers a number of areas where the reporting scheme could be expanded. An expanded scheme may increase the volume of data collected, but care needs to be taken in each case to weigh the potential benefits of more data with the increased cost of coverage to businesses and Government.

4.6.1 The emissions and energy thresholds for reporting

The Authority found there was broad support for the current reporting thresholds to be retained; however, some submissions supported lower emissions thresholds, for example:

> *[W]e believe that thresholds should be kept as is, or otherwise decreased to capture a greater segment of Australia's non-safeguard reporting companies and emissions. This will help better inform policy making and assist government programs and activities.*
>
> National Australia Bank, submission on this review (p. 3)

No submissions requested a change to the threshold in terms of energy consumption or production.

Lowering reporting thresholds

If reporting thresholds were to be lowered, resulting in more companies reporting under the scheme, the potential benefits include:

- an increase in the share of national emissions and energy reported (from the current 63 per cent). This would increase transparency of emissions and energy sources and enhance data analysis
- an increase in the share of emissions and energy reported for particular sectors. This may improve the utility of sectoral emissions and energy data and enhance data analysis
- improvements in private sector management of energy and emissions to the extent that reporting affects business behaviour.

However, there are several issues that should be considered in lowering thresholds, including the increase in regulatory burden on companies. Companies added to the scheme by lowering thresholds are likely to be smaller companies with less expertise or resources for reporting. This may affect the integrity of the reported data and increase administrative burden on the Regulator disproportionately. The cost–benefit analysis of the scheme included in the explanatory memorandum stated that 'direct reporting of emissions by smaller energy users and smaller emitters would not contribute to the quality' of the national greenhouse gas inventory (Revised Explanatory Memorandum, National Greenhouse and Energy Reporting Bill 2007 (Cth), p. 97). Additionally, increased coverage may not lead to significant changes in the usefulness of the data.

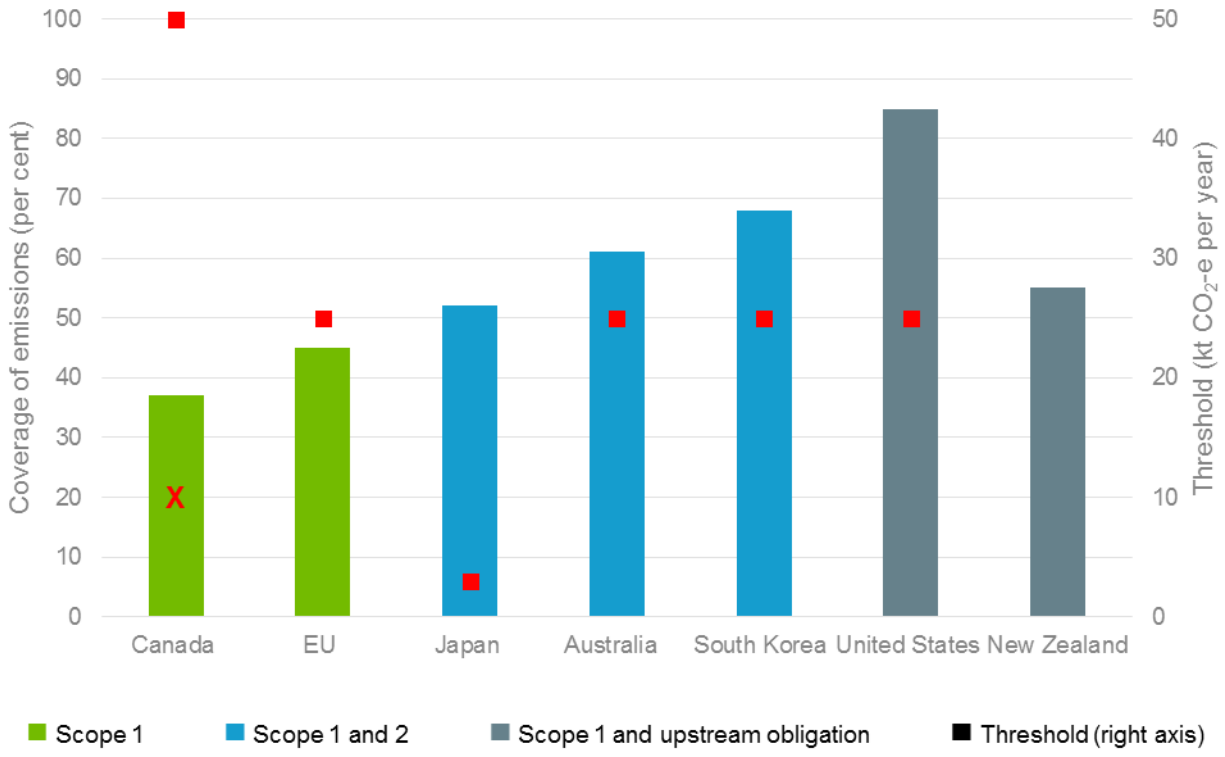
There is currently no comprehensive data source available on energy use and emissions from businesses that do not currently report. This makes quantitative analysis of lowering thresholds difficult.

Australia's emissions threshold is comparable to most other countries around the world with similar reporting schemes (Figure 10). Some countries have more stringent thresholds (such as Japan) and

others have no thresholds for particular sectors (Table 10 in Appendix D). Differences in the scope of the schemes should be noted. Some countries don't include scope 2 emissions in their thresholds, which effectively makes Australia's threshold more stringent.

The coverage of the schemes, as a percentage of total economy-wide emissions, ranges from 37 per cent in Canada to over 80 per cent in the United States. This partly reflects the thresholds but also the structure of economies and reporting schemes. For example, the high rate of coverage in the United States is likely due to the lower relative contribution of emissions from non-covered sectors such as agriculture to national emissions, and also reporting obligations on upstream companies.

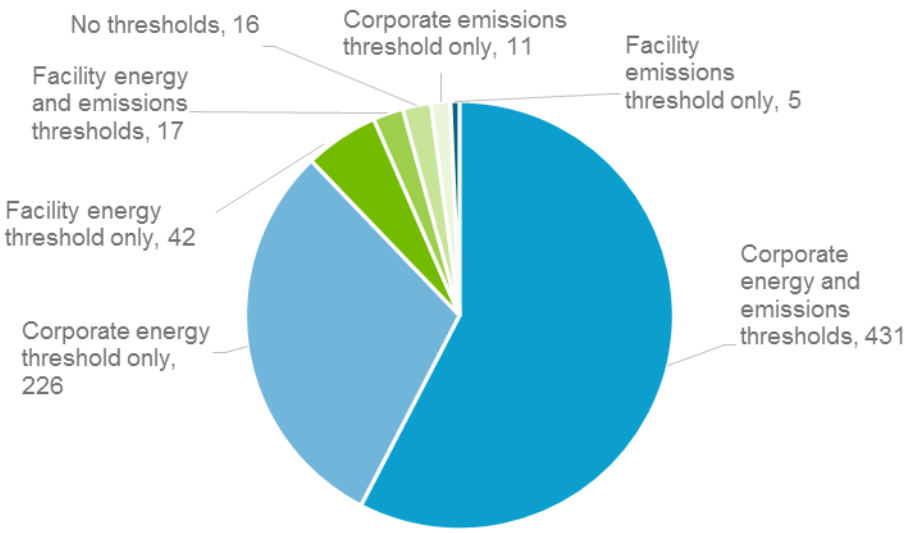
FIGURE 10 Emissions thresholds and scheme coverage – international comparison



Notes: Thresholds in New Zealand vary by sector. In 2017, Canada committed to reducing their threshold to 10,000 t CO_2-e per year (represented by the cross). Thresholds may not be directly comparable due to differences in the scope of reporting requirements.
Sources: Canada: Environment and Climate Change Canada 2018; EU: European Commission n.d.; France: Ministry of Environment, Energy and the Sea 2016; Japan: Greenhouse Gas Inventory Office of Japan 2017; Japanese Ministry of Economy, Trade and Industry 2018; New Zealand: *Climate Change Response Act 2002* (New Zealand), Environmental Defense Fund 2015; South Korea: Korea Environment Corporation 2013, Republic of Korea Ministry of Environment 2017, Hyun and Oh n.d., International Partnership on Mitigation and MRV 2015; United States: US EPA n.d.a, US EPA n.d.b., US EPA n.d.c.; All: World Resources Institute 2013, World Resources Institute 2015.

Reporting thresholds are a primary factor in determining which companies are required to report under the scheme. Figure 11 shows which thresholds reporters meet. At the corporate group level, 431 reporters meet both the emissions and energy thresholds, 226 meet only the energy threshold and 11 meet only the emissions threshold. Just 2 per cent of reporters met one of the emissions thresholds without also meeting an energy threshold. It is possible that lowering the emissions threshold would not increase coverage of the scheme because most companies meet the energy threshold first.

FIGURE 11 Number of reporters meeting each reporting threshold, 2016–17



Note: As outlined in Section 2.3.1, the thresholds are defined in terms of energy production and consumption and emissions for corporate groups and for individual facilities. Sixteen reporters did not meet any of the thresholds in 2016–17 but submitted reports as reporting transfer certificate holders, or as a controlling corporation reporting on residual energy and emissions not reported by transfer certificate holders.
Source: CER 2018c

Raising reporting thresholds

Higher thresholds would reduce the regulatory burden on businesses, but would also reduce the data made available to data users through the scheme. The Authority did not hear from any reporters requesting the overall threshold be raised, and the current level of coverage of emissions and energy are highly valued by key data users.[21] Therefore, there appears to be little reason to raise the thresholds. One government agency noted higher thresholds would likely lead to an increase in other reporting burdens in order to fill the gaps left from lower coverage. Another said that changes to thresholds affect the ability to conduct longitudinal analysis and should therefore be kept to a minimum.

The thresholds were set at the commencement of the scheme based on a cost–benefit analysis. This analysis estimated that the scheme would cover 71 per cent of emissions, excluding agriculture and land use emissions (Revised Explanatory Memorandum, National Greenhouse and Energy Reporting Bill 2007 (Cth)). The analysis concluded that this level of coverage 'would provide sufficient coverage of emissions and energy data to provide a sound basis for greenhouse 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 (Cth), p. 56–57). There is little evidence that the structure of the economy has substantially changed since the scheme was designed.[22]

The Authority found no evidence to support recommending a change to the current reporting thresholds.

[21] In its submission, the Australian Sugar Milling Council supported an alternative approach to determining reporting obligations by focusing on the highest energy-consuming and producing and carbon-emitting industry sectors, and excluding the sugar milling sector.
[22] The key inputs into the original analysis were the distribution of emissions across sources and the number of businesses in each sector of the economy. The scheme currently covers 70 per cent of emissions, excluding agriculture and land use emissions, very similar to the estimate of 71 per cent in the original analysis. Note that coverage is 63 per cent of *total* Australian emissions *including* emissions from agriculture and land use.

4.6.2 Expanding covered emissions sources

Agriculture and land

Emissions from agricultural sources, and land use, land use change and forestry are not required to be reported under the scheme.[23] Some reporters and data users said the scheme should be expanded to cover these emissions to increase coverage and provide a fuller picture of the major contributors to Australia's emissions footprint. It was argued by some that including all sectors and emissions sources maintains principles of equity and serves the public interest. Arguably, more complete data would better inform the development of policy responses to climate change. Finally, the Authority heard there have been significant developments in measuring emissions from agricultural activities, as evidenced by projects under the Emissions Reduction Fund, which has partly addressed one of the original challenges in expanding coverage to these sources.

Potential benefits from expanding coverage include: improving the data available on these emissions sources, and providing a means for operators in the agriculture and land sectors to measure and report publicly on their emissions. Costs are mostly associated with the costs to companies in these sectors that would be required to report; costs to the Regulator of managing a greater number of reporters; and costs to the Department of including these emissions in the measurement determination.

Currently emissions from these sources are estimated by the Department using other data. The Government has comprehensive spatial monitoring of woody vegetation cover which allows the emissions from land use to be monitored and measured remotely. Emissions from agricultural sources are estimated using activity-level data (collected by the Australian Bureau of Statistics) and emissions factors. Data on agricultural emissions is understood to be of reasonable quality but is not able to incorporate information on mitigation activities by individual companies—and the resulting impact on emissions. Reporting by companies may lead to more accurate data if measurement methods account for mitigation activities. Reporting by companies will also help to generate information to improve the accuracy of estimates of agricultural emissions at the national level.

Despite the fact that agricultural emissions accounted for 14 per cent of national emissions in 2016–17 (Table 2), extending the scheme to include agricultural emissions is not likely to result in a significant increase in the total emissions reported under the scheme. The current emissions reporting thresholds and the requirement for reporting falling only on constitutional corporations, together mean very few agricultural operations are likely to report if the scheme were to be extended to agricultural emissions (Box 5).

[23] Agricultural businesses are not currently excluded from the scheme if their energy use, or emissions from energy and waste, meet the current thresholds. There are currently around 23 reporters under the scheme that report on their energy use, and energy and waste emissions from agricultural activities. There are no methods for reporting of emissions from agricultural sources in the measurement determination.

BOX 5 Estimated coverage of agricultural emissions

Table 6 provides estimates of emissions associated with an average farm for selected industries and states. It shows emissions from an average farm are much smaller than the facility emissions reporting threshold.

TABLE 6 Emissions reporting threshold and average agricultural emissions, 2013 to 2016

	Emissions for an average farm per year (kt CO_2-e)	Herd size needed to meet 25,000 t CO_2-e per year emissions threshold (head)	Average herd size (head)
Beef specialist farm – WA	2.0	18,680	1,451
Beef specialist farm – Qld	1.8	19,190	1,349
Beef specialist farm – NT	14.8	18,928	11,172
Sheep specialist farm – NSW	4.5	126,585	3,035
Sheep specialist farm – Vic	4.1	139,233	2,573
Dairy farm – Vic	0.6	8,050	373

Note: These emissions estimates are based on simple state-based emissions factors for livestock and the herd size (beef cattle, sheep and dairy cattle) for the average farm of each type. It excludes emissions from other sources such as energy, transport and waste. Analysis presented in the table is designed to provide an indication of emissions for an average farm.
Source: Based on DoEE pers. comm., and DAWR 2018

Analysis conducted by the Australian Bureau of Agricultural and Resource Economics in 2009 (Ford et al. 2009), found that a threshold of 25,000 t CO_2-e would cover only 2 per cent of agricultural emissions (excluding livestock in feedlots). Similar analysis by the Authority for this review found a threshold of 25,000 t CO_2-e would cover in the order of 5 per cent of total agricultural emissions (including livestock in feedlots).

In addition to those companies that have agricultural emissions of 25,000 t CO_2-e or more, companies that are already required to report (due to meeting the reporting threshold) could also report agricultural emissions. Currently around 23 companies conducting agricultural activities report under the scheme.

Adding 5 per cent of emissions from agricultural sources would increase total coverage of the reporting scheme from 63.40 per cent to 64.09 per cent of Australia's national emissions.

Australia's approach to excluding agricultural emissions is consistent with many other emissions reporting schemes around the world. New Zealand, France and Mexico cover agricultural emissions, but New Zealand does so at a point in the supply chain that minimises the number of reporters (such as by fertiliser suppliers and abattoirs), as part of an emissions trading scheme (Appendix D).[24] However, interest in understanding the emissions profile of agricultural producers is increasing internationally (FAIRR Initiative 2018;GRAIN and IATP 2018).

The National Farmers' Federation has noted in its 2030 Roadmap (NFF 2018) the agriculture sector's role in reducing greenhouse gas emissions. The Roadmap envisages Australian agriculture trending towards carbon neutrality by 2030 and identifies analysing carbon footprints of individual farms as a step to reach this goal. Meat and Livestock Australia has also stated that the red meat industry could be carbon neutral by 2030 (MLA 2017).

[24] Other schemes include emissions from energy and industrial processes by agricultural companies (for example Canada).

In order to manage emissions and achieve these objectives, the agriculture sector will need to measure emissions. Extending the measurement determination under the scheme would provide the sector with a national standard for measuring emissions. Including agricultural emissions under the reporting scheme would support the red meat industry in meeting its carbon neutral target and help the entire sector track towards carbon neutrality. It will also provide confidence in industry statements by providing evidence of emissions levels using a consistent measurement approach. Measurement and reporting of greenhouse gas emissions is also used by companies to demonstrate their sustainability credentials and inform climate risk assessments of themselves and related companies. Finally, a nationally consistent approach to measuring agricultural emissions could be used as the basis for developing a farm-based measurement tool the Authority has previously recommended (CCA 2018).

The Authority understands estimating agricultural emissions at the company level, using an approach consistent with Australia's national greenhouse gas inventory, is possible using information already held by most agricultural producers (Eckard pers. comm.). The Authority therefore considers the National Greenhouse and Energy Reporting scheme should be extended to cover emissions arising from agricultural sources. The Authority is of the view that emissions from agricultural sources should be treated consistently with other emissions sources. The transition towards an expanded reporting scheme could be achieved by extending the measurement determination to agricultural emissions sources and allow reporting on an opt-in voluntary basis.

The Authority therefore recommends the Department work with industry to update the measurement determination to include agricultural emissions within two years and consider the feasibility of including other land based activities, such as on-farm sequestration. Once developed, agricultural emissions will be able to be reported on a voluntary basis, with a review of this reporting after five years.

Recommendation

R.9 The Department amend the measurement determination, in consultation with industry, to include emissions from agricultural sources to allow reporting on a voluntary basis. Voluntary reporting of agricultural emissions should be reviewed after five years.

Indirect greenhouse gases and black carbon

Information on some indirect greenhouse gases (short-lived climate forcers) is currently reported in Australia's national inventory, although they are not part of emissions targets under the Kyoto Protocol (Commonwealth of Australia 2018b).[25] The rules for the treatment of these gases under the Paris Agreement are yet to be determined; however, the requirement to report on them is likely to continue (IPCC TFI WGI 2018).

Additionally, in 2016 Australia made a commitment to the Climate and Clean Air Coalition to develop a black carbon inventory and associated projections (CCAC 2016).[26] The Department will publish its first black carbon inventory as part of Australia's national inventory in 2019. Two data sources will be used to compile it, the National Greenhouse and Energy Reporting scheme and the National Pollutant Inventory.

[25] Carbon monoxide (CO), oxides of nitrogen (NOx), and non-methane volatile organic compounds (NMVOCs) are indirect greenhouse gases. Sulphur dioxide (SO_2) is an aerosol precursor and also influences global warming. Information on these gases and aerosols are included in the national inventory as supporting information and not included in total greenhouse gas emissions figures. This is because there are no internationally agreed global warming potentials assigned to these gases (UNFCCC 2011, Decision 4/CMP.7 and IPCC 2007).

[26] Black carbon is an airborne particle that is emitted when carbon-based fuels are not fully combusted. This includes fossil fuels as well as biofuels. It is a short-lived greenhouse gas (IPCC TFI WGI 2018).

Both these schemes include data on emissions arising from fuel combustion activities (Section 4.1.1). Neither framework currently provides a complete inventory of black carbon emissions.

The discussion paper released for the 2018 review of the National Pollutant Inventory noted there are some perceived concerns around the accuracy and reliability of air emissions data from the pollutant inventory. The reasons for this include that methods for estimating pollutants are not routinely updated or are inconsistently applied (Commonwealth of Australia 2018c). Any potential data accuracy issues flowing from the pollutant inventory may negatively affect Australia's ability to estimate and track black carbon and other indirect greenhouse gas emissions in the future.

There may be an opportunity to extend the National Greenhouse and Energy Reporting scheme to include these substances, given fuel combustion activities are already reported under the scheme. In some cases, such as reporting on carbon monoxide, no further data would need to be collected by reporters.

The Authority is of the view that to future-proof the reporting scheme for these climate reporting requirements, the Department should consider ways to improve the quality of the data collected on aerosols and indirect greenhouse gases (including black carbon). This could include examining opportunities to report this data in the reporting scheme.

Recommendation

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.

4.6.3 Government agencies and local councils

The reporting scheme places obligations on constitutional corporations to report energy and emissions. This excludes other types of legal entities including most government agencies and local councils. A few state government agencies classified as constitutional corporations, such as state-owned electricity generators or hospitals, currently report under the reporting scheme. Due to the nature of their governance and operations, seven local councils are also considered to be constitutional corporations and therefore report under the scheme.

The Australian, Australian Capital Territory, New South Wales and Western Australian governments currently have their own programs for reporting on emissions and energy use for some or all government operations. For example, some Australian Government agencies report on emissions and energy in their annual reports as part of their response to Section 516A of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth). The Act requires reporting on ecologically sustainable development and environmental performance, however it provides flexibility on what and how agencies report, meaning data cannot necessarily be aggregated or compared. Five councils currently also report under the National Carbon Offset Standard (DoEE n.d.a).

In its submission on this review, the National Waste and Recycling Industry Council called for the reporting scheme to be expanded to local councils so that privately and government-owned landfills are subject to the same requirements and to increase data availability. Further, the Authority heard from some state government officials that reporting would enable benchmarking of their operations such as hospitals and schools.

The Authority is of the view that expanding the reporting scheme to government agencies and local councils that exceed the reporting thresholds would have benefits including broader coverage and

increased information available to support policy making (such as updating the National Waste Policy). It would also build on existing momentum in government action on climate change such as carbon neutral commitments by metropolitan councils and state government commitments to reduce government emissions.

If government agencies were included in the reporting scheme, the common measurement approach may allow for efficiency comparisons across jurisdictions and between government and private industry. It would also ensure that government agency emissions and energy efficiency performance information was readily available to the public. An expanded reporting scheme that included government entities would remove the need for the current separate reporting arrangements for energy and emissions. However, expanding the reporting scheme would impose additional costs on those not already reporting.

If the reporting scheme were expanded to local councils, it is likely the reporting threshold would exclude smaller councils. It is unknown how many additional councils would be covered as there is a lack of data on those not already reporting. It is likely, however, that it would include some not already reporting. For example, the carbon pricing mechanism, which applied to all legal entities with scope 1 emissions over 25,000 t CO_2-e per year, covered 27 local councils. Expanding the reporting scheme to local councils would likely include a greater number than those covered by the carbon pricing mechanism as the reporting scheme also applies to energy use and scope 2 emissions.

The Authority recommends the Department undertake analysis to determine which additional government agencies and local councils would be captured by an expanded reporting scheme and what the costs and benefits of an expanded scheme would be. To alleviate concerns over cost, one option for transitioning may be to allow government agencies and local councils to use the reporting scheme on a voluntary basis. Careful consideration would be needed to determine how the current definitions of facilities and controlling corporations would apply to government entities.

Recommendation

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).

4.6.4 Company-specific emissions factors in scope 2 emissions reporting

Reporting of scope 2 emissions provides a more complete picture of the emissions profile of a facility or corporate group, including the emissions produced elsewhere but driven by the facility's demand for electricity. Current reporting of scope 2 emissions is based on electricity consumption and a state-average emissions factor for electricity generation. While this approach adequately captures all electricity emissions within a particular jurisdiction (Commonwealth of Australia 2018a), reporting of scope 2 emissions at the facility level does not reflect the emissions intensity of the electricity supply arrangements in place for each facility. This means that even if a facility sources its electricity from a low-emissions source, such as through a power purchase agreement with a wind farm, this is not reflected in its scope 2 emissions number.

The Authority heard some would prefer scope 2 emissions to be reported using an approach which reflects contractual agreements for electricity supply. It should be noted that companies can report their purchases of lower emissions power and associated scope 2 emissions (contract-based approach) in fora other than the reporting scheme, such as in their own sustainability reports.

The Department advised the Authority it has previously considered the merits of using a contract-based approach to measuring scope 2 emissions, including an extensive consultation process in 2010

(DIICCSRTE n.d.b). Its previous analysis found that the benefits of using a contract-based approach were outweighed at the time by the additional complexity and lack of transparency. Part of the complexity with using an approach that takes into account contractual arrangements is determining the emissions factor for residual electricity not covered by contracts.

The Authority understands the importance of maintaining the current approach to reporting scope 2 emissions to prevent double counting, or under reporting, and to preserve the existing reliable dataset.

The Authority also recognises the importance of allowing companies to reflect the efforts and investments they are making to contribute to reduced emissions using nationally consistent measures. Reporters currently have the option to provide the Regulator with additional information on purchases of GreenPower and renewable energy certificates, which is published. This provides context for the other data that is reported and published under the reporting scheme. In 2016–17 no reporters chose to report this information. Also, this information does not extend to other means of contracting low-emissions electricity (for example, through power purchase agreements). Furthermore, the information on purchases of GreenPower and renewable energy certificates is published on the Regulator's website separate to—and not easily matched with—reported emissions.

The Authority therefore recommends the Department re-investigate the feasibility of allowing for optional alternative approaches to measuring scope 2 emissions that more accurately reflect companies' use of low-emissions electricity given the recent growth in investment in renewable generation. Alternative reporting allows published scope 2 emissions data to better reflect efforts to reduce emissions through the purchase of lower emissions power. The Authority also recommends the Regulator improve the way additional information is published, so that it can easily be matched with the reported emissions data (Recommendation R.15).

Recommendation

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.

4.6.5 Scope 3 emissions reporting

Some companies in Australia are currently measuring and reporting on scope 3 emissions, either as part of meeting shareholder calls for sustainability disclosures, to implement the recommendations of the Financial Stability Board's Task Force on Climate-related Financial Disclosures, or through the National Carbon Offset Standard (BHP 2018, BHP Billiton n.d.).

The Authority heard reporting of scope 3 emissions through a system managed by the Government, such as the National Greenhouse and Energy Reporting scheme, would increase the consistency of reports and act as a 'government sanctioned source of truth' compared with the current system of voluntary reporting using a variety of different methods. The Authority was told it would also help companies meet requirements for climate-related financial disclosures. The Financial Stability Board's Task Force recommends disclosure of scope 3 emissions if appropriate (TCFD 2017b).

Other companies had the view that scope 3 emissions data collection was time-intensive, unreliable and inconsistent and that little could be done to manage the emissions. For example, AGL said they did not support including scope 3 emissions in the reporting scheme, stating that:

> *… we would caution against extending the requirements of the scheme; for example, to include Scope 3 emissions… care needs to be taken that extending the reach of the NGER scheme does in fact assist in providing useful information in a more efficient and economic manner.*
>
> AGL, submission on this review (p. 2)

The challenges and burden of reporting scope 3 emissions have also been recognised in the past by the Government (Department of Climate Change 2009).

While reporting on scope 3 emissions would assist in meeting the scheme's objective of informing governments and the public, the Authority is of the view that the resources required to collect and analyse these emissions is unlikely to be proportionate to its value for data users at this stage. Additionally, there are alternative fora currently available for companies to voluntarily report scope 3 emissions, including through the Australian Government supported National Carbon Offset Standard, and work going on at the international level to support scope 3 reporting, such as through the Global Reporting Standards and United Nations Environment Programme Finance Initiative.

The Authority has concluded, therefore, that reporting of scope 3 emissions should not be required at this stage under the National Greenhouse and Energy Reporting scheme.

4.7 ENABLING VOLUNTARY REPORTING

Some submissions supported the idea of voluntary reporting of emissions and energy data by companies that currently sit outside the scope of the scheme. This would include companies that currently cannot report because their emissions and energy use are below the reporting threshold, their company structure does not fit the constitutional corporation definition or their emissions sources are not currently covered by the measurement determination. Voluntary reporting would provide companies that currently do not report a forum in which to publish their emissions and energy use.

Some Australian and state government data users indicated they would find increased reporting, in particular by companies under the energy reporting threshold, valuable for their data analysis (DoEE pers. comm.). The Australian Petroleum Production and Exploration Association said voluntary reporting might be appropriate so long as voluntary inputs were clearly identified and data quality was maintained. Ensuring data reported voluntarily was of a high standard could impose substantive costs on the Regulator in conducting quality assurance.

The Regulator also reported little interest by businesses in voluntary reporting initiatives. For example, there was little demand from industry for voluntary reporting of GreenPower, renewable energy certificates and offset scope 2 emissions from industry.[27] There are also already other mechanisms non-reporting companies can use to publish and promote their progress in reducing emissions and energy use, such as sustainability reporting.

The Authority is of the view that the costs to the Regulator of voluntary reporting by those not within the scope of the current scheme are likely to outweigh its benefits and recommends against generally providing for voluntary reporting of emissions and energy data for now. However, the Authority sees benefits in using voluntary reporting as a means of extending the scheme in a targeted and staged manner. For example, the Authority has recommended voluntary reporting for agriculture and that the benefits of including government agencies and local councils be assessed by the Department. The

[27] Offset scope 2 emissions are total scope 2 emissions minus any renewable energy certificates that are surrendered.

Authority considers the scheme could initially be extended in these areas on a voluntary basis to build capacity before requiring mandatory reporting if appropriate.

4.8 IMPROVE THE USEFULNESS OF THE DATA FOR GOVERNMENTS

The current energy and emissions dataset arising from the reporting scheme is highly valued by government agencies as it is comprehensive, consistent, timely and supported by robust measurement approaches. However, the Authority heard the reliability and consistency of ancillary (descriptive) data is poorer. This data is not audited and input errors can easily creep in, which often remain undetected until the data is used. However, ancillary data is vital to inform government policy development. Multiple government data users noted the importance of continuity in how a facility is named over time to allow for longitudinal analysis. In Section 4.2 the Authority has made some recommendations to improve the system reporters use to enter data. These enhancements to the reporting system are expected to improve the quality of data entered by reporters in the future.

Problems with the data, such as the identified issues with ancillary data, can affect users' trust in the data and reduce the quality and impact of analysis conducted. It can also mean multiple data users spend time identifying errors and cleaning and verifying the data. The Authority understands that currently a number of different government data users conduct their own processes to identify and address errors.

The Authority is of the view that efficiencies could be realised by establishing a single, clean analytical dataset each year (for use by all relevant government agencies) in which known errors are corrected before the data is used. The correction of errors and consolidation of the dataset by the Regulator would ensure consistency in corporate group and facility names and categorisation of the activities of these facilities. There would also be value in undertaking this process to collect and clean historical data.

Improvements to the analytical dataset would reduce the need for each individual user to conduct their own data-cleaning process; there would be greater consistency between various datasets; and consistency over time would allow for greater longitudinal data analysis. The Authority understands the Regulator and the Department are currently working together to progress development of such a dataset.

Recommendation

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 reported, for use by Australian governments.

4.8.1 Data sharing rules

Currently, the Regulator relies on powers conferred by the *Clean Energy (Consequential Amendments) Regulation 2012* (Cth) to support the dissemination of emissions and energy information collected prior to 2 April 2012 to Australian and state and territory government agencies.[28] Regulations also allow Australian Government ministers and agencies to publish such information in an aggregated form.

Regulations of that kind automatically sunset, or come to an end, ten years after they are made. If no action is taken, on 1 April 2022, the Regulator would no longer have a legislative power to disseminate emissions and energy information obtained prior to 2 April 2012 and Australian Government ministers

[28] The *Clean Energy (Consequential Amendments) Regulation 2012* (Cth) was implemented as part of a bill to transition functions from other bodies such as the Greenhouse and Energy Data Officer to the Clean Energy Regulator.

and agencies would no longer be permitted to publish this information. The Authority recommends this legislative power be preserved.

Recommendation

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.

4.9 IMPROVE PUBLIC ACCESS TO THE DATA

As noted in Chapter 2, the Regulator publishes only a small amount of the data reported. Data users have told the Authority the lack of publicly available facility-level data limits the use of reporting data. Data at the facility level is currently only published on scope 1 emissions for safeguard facilities and designated electricity-generation facilities. There is no data published on scope 2 emissions or energy use by individual facilities. The Regulator does publish some key data highlights based on the reported data, summarising scope 1 emissions by state and industry, listing the top emitters and noting total net energy consumption.

The Authority heard publication of emissions and energy data by facility would be useful for informing investors and financial institutions to support decision making, and may support benchmarking of emissions and energy performance by researchers and reporters.

Some reporters told the Authority they support more data being made available to better inform the public, increase transparency, support climate-related financial risk disclosures and facilitate benchmarking. Others raised concerns about the release of facility-level data, due to commercial sensitivities.

Increasing the availability of reported data to the public is consistent with the Australian Government's Public Data Policy Statement released in 2015. The policy commits government entities to, among other things, make anonymised data open by default (PMC 2015).

The Authority recommends the Regulator examine options for increasing the usefulness of data published under the scheme. Some options the Authority has considered include:

- Providing reporters with the ability to allow disclosure of facility-level data on total scope 1 and 2 emissions and energy use, through a simple tick-box approach. This could be on an opt-in or opt-out basis. The approach would increase the amount of data available to the public, but allow companies to protect the information they know to be commercially sensitive without high administrative burdens for either the company or the Regulator.
- Releasing anonymised, but detailed data in a similar manner to how the Australian Bureau of Statistics releases census data. This data would allow for some more detailed analysis of emissions and energy by industry or region that may be useful for policy analysis. However, as many sectors with significant emissions profiles are also characterised by a small number of operators, it may be the case that data for these sectors would not be able to be published in an anonymous way.
- Publishing more detailed analyses—directly or through an intermediary—of key findings and trends. This was recommended by several data users. As custodian of the data, the Regulator would be able to publish data in an accurate and informative way, while still preserving the confidentiality of reporters. The Regulator should consult with reporters and data users to determine what data and analysis would be useful but not raise confidentiality concerns.

Some data users also indicated an interest in the development of industry benchmarks based on the emissions and energy data (for example, UnitingCare Queensland submission on this review). The Authority agrees there is value in establishing industry benchmarks, but is also aware of the following challenges associated with calculating emissions or energy intensities for use as benchmarks:

- The Regulator does not currently hold production information required to calculate intensity values.
- There are many different approaches to calculating intensities based on various input and output measures.
- Publishing benchmark data may lead to further concerns around release of commercially sensitive information.

In addition to considering options to increase the availability of data, the Authority also considers the data could be presented in a format that improves its usefulness, for example by consolidating various pieces of data on a single webpage.

One stakeholder indicated an interest in being able to report the cancellation of offsets, so that information about emissions would be reported in the context of action taken to reduce net emissions. The legislation for the reporting scheme allows for companies to report on offsets or greenhouse gas projects (*National Greenhouse and Energy Reporting Act 2007* (Cth) s. 21A), however, this has not been implemented. Currently, the Regulator publishes voluntary cancellations or surrender of offsets in the Australian National Registry of Emissions Units.[29] However, the published cancellations are often listed against the broker or agent that generates, purchases and manages offsets on behalf of a company. It is not currently possible for the public to match all cancelled units to the companies responsible for the offsets.

The Regulator also provides the opportunity for reporters to report and publish their purchases of GreenPower and surrendered Renewable Energy Certificates (and the extent their scope 2 emissions are offset as a result). However, this information is not presented with scope 1 and 2 emissions information and there has been limited and declining interest in this reporting option from reporters.

In the context of increasing scrutiny of corporate action to manage and offset emissions, the Authority sees value for businesses and the public in providing a broader picture of a company's net carbon position. Bringing this data together will help both data users and reporters increase the use of information published by the Regulator.

Recommendation

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.

[29] The Registry holds units issued under the Kyoto Protocol (such as assigned amount units and certified emission reduction units) and Australian Carbon Credit Units (CER 2016d)).

5 THE SAFEGUARD MECHANISM

5.1 WORKING AS INTENDED

5.1.1 The industrial and off-grid electricity sector

In its first year of operation, 2016–17, all 203 industrial facilities and off-grid electricity generators covered by the safeguard had net emissions at or below their baseline (CER 2018j) and the sectoral baseline for electricity was not breached.

Eighty-nine facilities used the different compliance options available to keep their net emissions at or below their baselines (Table 7). Most (75) of these facilities opted to apply for a calculated baseline based on their forecast production and emissions intensity of that production. Fifty-nine of those applied under the initial calculated baseline criteria which is a one-off adjustment only available to facilities in 2016–17. Sixteen facilities surrendered a total of nearly 450,000 Australian Carbon Credit Units for compliance with the safeguard amounting to 0.45 Mt CO_2-e. This represents less than 1 per cent of the total emissions covered by the safeguard and three per cent of the total Australian Carbon Credit Units issued that year (CER 2018a, j).

TABLE 7 The number of facilities that used options for meeting baselines in 2016–17

Approach	Number of facilities
Calculated baseline granted	75
Emissions intensity baseline variation granted	2
Multi-year monitoring period granted	6
Surrendered Australian Carbon Credit Units	16

Note: The sum of facilities that used compliance options exceeds 89 as some facilities made use of multiple compliance options.
Source: Climate Change Authority analysis based on CER 2018j

In aggregate, for 2016–17 baselines were 34 Mt CO_2-e (or 26 per cent) above actual emissions (CER 2018j). There are a number of reasons why a facility's baseline may be greater than its actual emissions, including that the facility has reduced its production level or invested in new technology that reduces its emissions intensity.

Data for safeguard facilities' emissions in 2017–18 is expected to be available in March 2019 so the Authority is unable to comment on safeguard outcomes for 2017–18.

5.1.2 The grid-connected electricity sector

In 2016–17, emissions from grid-connected electricity generators were below the sectoral baseline by almost 24 Mt CO_2-e (or 12 per cent). This meant individual baseline compliance obligations were not triggered (CER 2018g). Australia's electricity emissions have remained below their 2009 peak ever since, and are projected to continue to decline in the short to medium term and then remain relatively flat until 2030 (Commonwealth of Australia 2018e).

5.1.3 Overall

The Authority heard companies with safeguard obligations generally support the mechanism's broad policy approach and principles.[30]

> *The Safeguard Mechanism is meeting its stated intent.*
> Australian Industry Greenhouse Network, submission on this review (p. 7)

The Authority was also told the safeguard is a mechanism that provides an incentive for companies to manage their emissions.

> *…the presence of a legislated cap on the greenhouse gas emissions from our facilities is influencing the way we approach operating our facilities to ensure greenhouse gas emissions are managed appropriately.*
> Chevron, submission on this review (p. 11)

Companies emphasised the importance of having options to meet their baselines. This provides flexibility to deal with variations in emissions-intensity and business circumstances that are not related to production changes.

> *…flexible compliance provisions offers the best least cost approach [to compliance].*
> Minerals Council of Australia, submission on the Government's consultation on safeguard baseline settings (p. 1)

5.2 WHAT COULD BE IMPROVED?

5.2.1 Account for business expansion in baselines and reduce the cost of baseline applications

Some industry members said the current options for setting facility baselines do not provide appropriate reference points for businesses incrementally expanding production. In its submission on the Government's 2017 review of climate change policies, the Bureau of Steel Manufacturers of Australia said 'The design of the safeguard mechanism fails to recognise that mature industries (like steel) tend to grow incrementally over time' (p. 13). In those circumstances, a baseline based on historical data may not be representative of the business' current operations and the business will not meet the significant expansion criteria for a calculated baseline. The Authority is of the view that the Government's proposed amendments address this concern by allowing annual updates to baselines based on changes in production. This would enable businesses to incrementally expand production without exceeding their baseline so long as the increased production is associated with an equal or improved emissions intensity.

The Authority heard that, in general, safeguard facilities support the proposed amendments. Hydro Tasmania '…supports the intention to simplify and bring up-to-date baselines…' (submission on this review, p. 3). The amendments also address other concerns raised. Chevron said 'Experience with preparing an application for a Calculated Emissions Baseline suggest that each application can cost several hundred thousand dollars given the significant internal and external (NGER Audit costs) resources required' (submission on this review, p. 12). The proposed amendments allow businesses to use Government-determined production variables and associated default emissions intensities. The Authority is of the view that this will reduce the cost of baseline applications.

5.2.2 Update baselines to reflect changes in how emissions are measured

The National Greenhouse and Energy Reporting measurement determination is periodically updated (Section 4.3). These updates affect a facility's emissions reported under the scheme. However,

[30] It was noted that it is difficult to evaluate the effectiveness of the mechanism after such a short period of operation.

baselines are not adjusted for changes to the measurement determination.[31] This could mean a facility is over or under its baseline only because of differences in measurement approaches. Many companies with safeguard obligations called for consistent approaches to measuring reported emissions and baselines.

> *Where changes to the measurement determination lead to changes in reported but not actual emissions, this should be reflected in baselines.*
>
> Australian Petroleum Production and Exploration Association, submission on this review (p. 26)

The Authority is of the view that changes to measuring a facility's reported emissions should flow through to baselines where they lead to a material difference in reported emissions and recommends the Department undertake analysis to determine a suitable definition for 'material'. Some in industry suggested the threshold could be when changes in measurement lead to at least a 5 per cent change in baseline numbers. The Authority recommends the Department develop a process to update baselines that minimises the administrative burden for Government and businesses and provides facilities with time to transition to changes in their baseline.

Recommendation

R.16 The Regulator update baselines to reflect changes to the measurement determination that lead to a material difference in reported emissions.

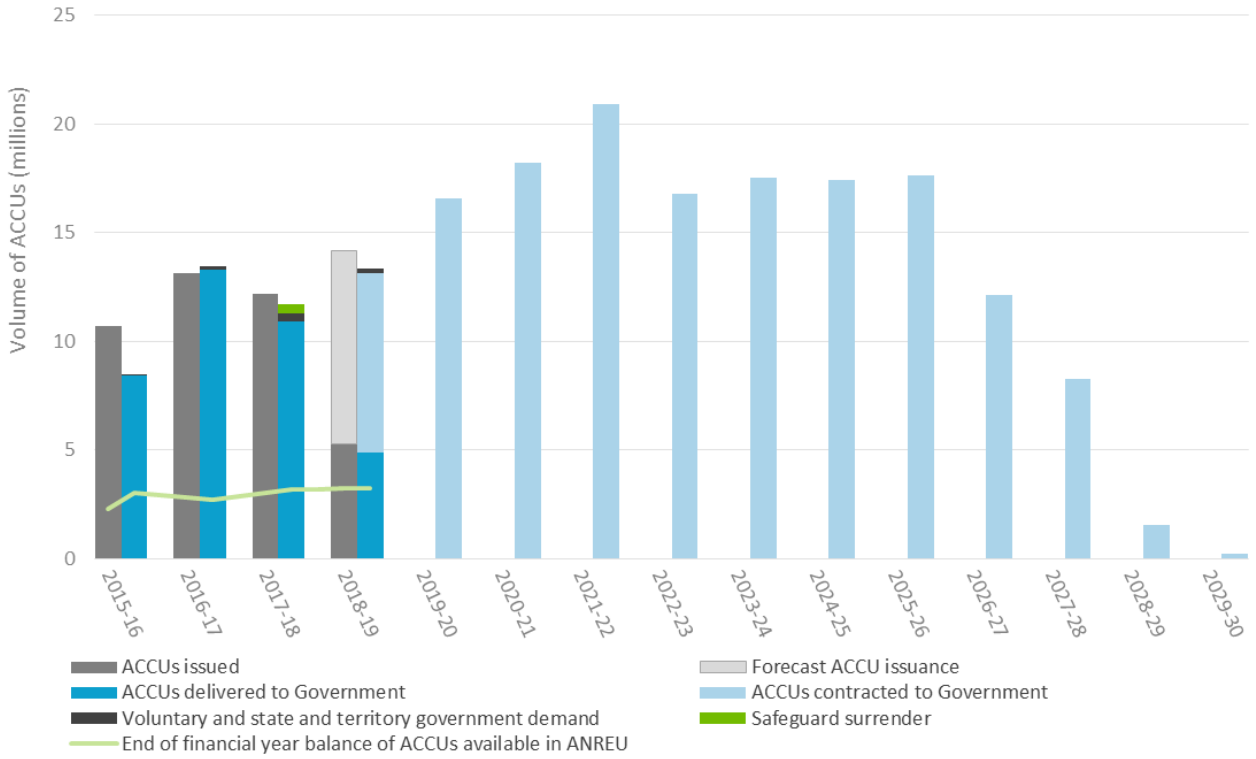
5.2.3 Improve liquidity in the market for Australian Carbon Credit Units

Industry told the Authority the use of Australian Carbon Credit Units is an important mechanism for meeting baselines. Many market participants are concerned about the future availability of low-cost units including because most of the units issued to date have been delivered to the Government under contract and this is expected to continue to be the case given the large volume of units contracted to the Government (Figure 12).

> *…there is simply no indication a liquid [Australian Carbon Credit Units] market will be available…*
>
> Chevron, submission on the Government's review of climate change policies (p. 12)

[31] The Regulator may amend baselines to account for updates to global warming potentials specified in the *National Greenhouse and Energy Reporting Regulations 2008* (Cth) (Section 56 of the Safeguard Rule). Global warming potentials convert different greenhouse gas emissions into a single carbon dioxide-equivalent (CO_2-e) metric that would produce the same warming effect as carbon dioxide over a 100 year period. Global warming potentials may be updated from time to time as the science improves, based on the findings of the Intergovernmental Panel on Climate Change.

FIGURE 12 Australian Carbon Credit Unit supply-demand balance



Note: Data current as of 13 December 2018. The Australian Carbon Credit Units (ACCUs) contracted to Government will change over time due to early delivery, delivery failures, contract lapses and terminations, and new contracts. ANREU is the Australian National Registry of Emissions Units
Source: CER 2018l

The Authority encourages companies to develop options for meeting their safeguard obligations over time, including purchasing Australian Carbon Credit Units over both the shorter and longer term. The avenues currently available to companies seeking to purchase Australian Carbon Credit Units are outlined in Box 6.

BOX 6 Avenues available to companies seeking to purchase Australian Carbon Credit Units

The Regulator maintains a publicly available project registry, which identifies the volume of credits generated by each project as well as the person(s) to whom they are issued (CER 2018h). With support from the Department of the Environment and Energy, the Carbon Market Institute has developed an online market platform for carbon credits including Australian Carbon Credit Units. The Carbon Marketplace provides a description of the project used to generate the credits, including any co-benefits, and contact details for the owner of the credits (CMI n.d.). Potential buyers could examine the registry or Marketplace and contact those they suspect may have credits they could buy and also enter into longer-term contracts for supply. A spot price is also advertised publicly by CommTrade Carbon on an online market-based platform (with a price of $15.37 per unit as at 30 November 2018) (CommTrade Carbon 2018).

As discussed in Section 5.1, in 2016–17, 16 safeguard facilities surrendered nearly 450,000 Australian Carbon Credit Units (CER 2018j). Instead of purchasing credits, companies can also participate in the Emissions Reduction Fund themselves to generate credits available for use by their safeguard facilities. For example, BHP Billiton has joint operational control of a safeguard facility that surrendered credits in 2016–17 and also participates in the Fund through one of its subsidiaries (CER 2018h, j).

The Authority heard a number of suggestions from stakeholders to improve liquidity and lower costs in the market for Australian Carbon Credit Units including:

- introducing a price cap on units
- the Clean Energy Regulator holding a reserve of units that could be sold to safeguard facilities
- the Regulator entering into agreements with safeguard facilities that allow for safeguard obligations to be met through the surrender of units based on a long-term delivery schedule.

For the supply of carbon credits to respond to changes in demand from safeguard facilities, prospective investors in projects that generate credits need visibility of the anticipated volume required to meet safeguard obligations. There are also other sources of demand for credits, such as businesses voluntarily seeking to offset their emissions (DoEE n.d.c) and state government tenders (CER pers. comm.). In its submission on this review, the Australian Industry Greenhouse Network suggested '…improving the flow of information to aid in market growth and price discovery…' (p. 8).

The Authority supports measures to increase the availability of information around the carbon credit market. In its review of the Emissions Reduction Fund (CCA 2017), the Authority supported measures to increase transparency and liquidity in the market for carbon credits. In line with that recommendation, the Regulator has been increasing the availability of information on supply and demand in the carbon credit market over time, such as running workshops with market participants on sourcing carbon credits (CER 2018b). This could provide information to support the development of new Emissions Reduction Fund projects and increase supply of carbon credits.

Recommendation

R.17 The Regulator continue to pursue opportunities to increase information available about the market for Australian Carbon Credit Units.

5.2.4 Increase the incentive for safeguard facilities to invest in projects that reduce their indirect emissions

The safeguard only applies to a facility's direct (scope 1) emissions. This means its baseline and reported emissions are determined on the basis of its direct emissions.

A safeguard facility can undertake a project under the Emissions Reduction Fund that reduces emissions at its facility and generates Australian Carbon Credit Units. When the Regulator issues the facility with credits, it adjusts the facility's net emissions number upwards by the amount of the credits issued. When it surrenders the credits to Government or it, or another company, delivers the credits to Government under a contract, the Regulator adjusts the facility's net emissions number downwards by the amount of the credits. The upwards adjustment prevents a safeguard facility that undertakes a project that reduces its direct emissions from double counting the same emissions reduction from a technical carbon accounting perspective; that is, counting the emissions reduction once when its net emissions are lower because it implemented the project and secondly when it surrenders the credits created through the project or it or another facility delivers the credits to Government under a contract.

In its submission on this review, Rio Tinto said '…the incentives for reduction in scope 2 emissions through ERF projects are significantly offset by the double counting rule…' (p. 7). If a facility undertakes a project that reduces its indirect (scope 2) emissions, its net emissions number will still be adjusted upwards by the amount of the credits issued despite the fact that the project has not reduced its direct emissions. If the facility doesn't surrender the credits to Government or they are not delivered to

Government under a contract in that year, in some circumstances the facility could exceed its baseline thus reducing the incentives to undertake these types of projects.

The Authority recommends the Department of the Environment and Energy 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 Authority notes there are a number of other reasons for the low uptake of Emissions Reduction Fund projects by safeguard facilities, including the price of the carbon credits generated.

Recommendation

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.

5.2.5 Remove deemed surrender

As discussed in Section 5.2.4, when Australian Carbon Credit Units generated by a safeguard facility are delivered to Government under an Emissions Reduction Fund contract, the Regulator adjusts the facility's net emissions number downwards by the amount of the credits delivered (deemed surrender).

If the safeguard facility's emissions are above its baseline, deemed surrender allows a single Australian Carbon Credit Unit to be used for two purposes: the satisfaction of a contractual obligation to the Government (for which a payment is received) and reduction of a safeguard facility's net emissions. In contrast, offsets can generally only be used once. Deemed surrender allows the scheme participant to gain a benefit from the same emissions reductions twice.

Views on deemed surrender varied. Some called for its removal. National Australia Bank said, '…facilities should not be able to use the same emissions reductions to meet safeguard mechanism and Emissions Reduction Fund (ERF) contract obligations' (submission on this review, p. 6). Others said it should be kept. Rio Tinto stated that the deemed surrender rule '…provides incentives for emissions reduction fund projects at facilities' (submission on this review, p. 7). One industry member suggested safeguard facilities should be eligible to benefit from the Emissions Reduction Fund and meet their baseline requirements, given those outside of the safeguard are supported by Government to participate in the Fund and reduce their emissions.

The Authority is of the view that in some circumstances deemed surrender may result in the Government purchasing emissions reductions that would have occurred anyway. To date the use of deemed surrender has been limited to one facility (CER pers. comm.); however, its use may increase overtime. As such, the Authority recommends removing deemed surrender so safeguard facilities can only benefit once from the Australian Carbon Credit Units they generate. Safeguard facilities would still be able to participate in Emissions Reduction Fund projects and would have a choice to either use the units to meet contractual obligations to Government under the Fund, or use the units to reduce their net emissions under the safeguard.

Recommendation

R.19 The Government remove the option for deemed surrender under the safeguard.

6 ADMINISTRATION AND COMPLIANCE

6.1 WELL-ADMINISTERED SCHEMES

Effective administration of the reporting scheme and the safeguard mechanism helps ensure their integrity and that the objectives of the legislation are met in a cost-effective manner.

The Climate Change Authority heard that the current administration of the schemes by the Department of the Environment and Energy, and the Clean Energy Regulator is working well. The responsibilities of the agencies are clear, and reporters are generally satisfied with their engagement, particularly with the Regulator.

Reporters told the Authority that the Department does a good job overall and is open to feedback. They also said the Regulator's approach to scheme administration is generally effective and fair, and fosters constructive and positive relationships with scheme participants. Some described the Regulator as a model regulator.

Many aspects of the administration of specific elements of the reporting scheme and safeguard mechanism are addressed in Chapters 3, 4 and 5. Therefore, this section takes a broader view of administration, looking at how the overall administrative approach seeks to ensure costs to business and government are appropriate.

6.1.1 Cost to business

Efficient administration seeks to minimise the costs, to both the government and reporters, without compromising the outcomes of the schemes. Costs to businesses of reporting under the National Greenhouse and Energy Reporting scheme can include purchasing and operating measurement equipment, paying staff or consultants to manage reporting, and auditing. The Authority heard from some reporters who found the cost of reporting to be significant.

> *It should be acknowledged that the collection of [National Greenhouse and Energy Reporting scheme] data requires significant administrative effort by a large number of Australian companies. Nonetheless, there are no equivalent, high-quality sources of this data.*
>
> Hydro Tasmania, submission on this review (p. 2)

Specific estimates of the time required to complete the reporting task included 'a minimum of five days administrative effort per month' (Australian Pork Ltd, submission on this review, p. 2) and 'the equivalent of more than five weeks of full time work' (UnitingCare Queensland, submission on this review, p. 1). Costs may be smaller or larger than these estimates depending on a range of factors, such as the complexity of the reporters. The Authority has made a number of recommendations in Chapter 4 to reduce regulatory burden, such as allowing data to be uploaded directly from internal systems to the Regulator's reporting tool (Section 4.2).

Some submissions on this review noted the disproportionate costs associated with measuring and reporting on emissions from immaterial facilities and sources. The Authority has made recommendations to reduce those costs (Section 4.44).

In addition to costs of measuring and reporting on emissions and energy use, businesses face costs of voluntary and Regulator-initiated audits and the costs of completing voluntary audits varies significantly. Audits also impose internal costs on businesses, through time taken to engage with auditors and provide required information.

Additional costs associated with coverage by the safeguard mechanism are primarily associated with managing emissions to ensure baselines are not breached. Audits must be included with certain applications, including for calculated baselines. Audits under the safeguard cost on average between

$25,000 and $60,000 per audit (CER pers. comm.). Some audits are reported as costing higher or lower amounts and may vary due to the scope of the audit undertaken and level of experience of the auditors.

In an effort to ensure the Regulator has the right balance between compliance and regulatory burden, the Regulator conducts an annual self-assessment under the Government's Regulator Performance Framework. In 2016–17 the assessment found all key performance indicators had been met and the Regulator had successfully made improvements to minimise regulatory burden (such as targeting activities to areas of most importance and ensuring the Regulator is coordinated and informed when responding to clients) (CER 2017a).

The Authority is of the view the Regulator is suitably mindful of the costs the schemes impose on businesses and reduces costs where possible. The Authority has identified some areas that could help to reduce costs further in Chapters 4 and 5.

6.1.2 Costs to Government

In 2017–18, the Regulator spent around $4.1 million to administer the reporting scheme and safeguard (CER pers. comm.). This includes costs for registration, engagement, compliance, assessment, publication and audits; it does not include corporate overheads. In the same period, the costs to the Department were about $0.8 million. The current costs are of the same order of magnitude as the costs estimated in the explanatory memorandum for the legislation, which did not include the safeguard (Revised Explanatory Memorandum, National Greenhouse and Energy Reporting Bill 2007 (Cth)).

There are a number of measures in place to ensure Government operations and expenditure are efficient. These measures include an annual efficiency dividend, annual budget processes, audits by the Australian National Audit Office and a review under the National Commission of Audit in 2015. These processes have not identified any issues with the funding and expenditure related to the National Greenhouse and Energy Reporting legislation.

6.2 COMPLIANCE AND ENFORCEMENT UNDER THE LEGISLATION

6.2.1 Guidance and education

The provision of guidance is a key element of the Regulator's approach to ensuring reports submitted under the reporting scheme are accurate and for improving compliance with the safeguard mechanism. Some reporters told the Authority the Regulator's commitment to education is important for supporting compliance and data quality. Many also told the Authority of positive experiences with available guidance material and direct communication with the Regulator. Other reporters, however, suggested there are opportunities to simplify and consolidate guidance material and there is a need to focus on notifying reporters when updated guidance becomes available. The Authority encourages the Regulator to continue to provide guidance where appropriate and consider the best way to make the advice available to reporters.

The Authority received submissions from industry outlining difficulties in using existing methods under the measurement determination, which they said can be complex or ambiguous as to how they are intended to be applied (Woodside Energy, submission on this review). Reporters and service providers have said a ruling on how to interpret some aspects of the measurement determination would be particularly beneficial, as is done by the Australian Tax Office for tax law.

The Authority is of the view that the best way to manage these complexities and ambiguities is to amend the measurement determination itself and for the Regulator to continue to provide appropriate guidance. These concerns might be best addressed through the enhanced process for annually updating the measurement determination (Recommendation R.7).

6.2.2 Resubmissions and audits

Compliance with the legislation ensures the data submitted under the reporting scheme is accurate. The Authority considered two indicators to understand the extent of compliance: the number of resubmissions requested by the Regulator because non-compliance was identified in reported data; and the number of adverse audit findings.

In the period between 2012–13 and 2016–17, the number of resubmissions submitted to the Regulator decreased to 6 per cent of all 843 reports submitted (Table 8). The decline in resubmissions can be interpreted as an indicator of increased accuracy of the data reported.

TABLE 8 Report submissions and resubmissions

	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17
Number of submissions	636	776	852	831	841	838	836	819	843
Number of resubmissions	94	109	113	65	126	94	79	78	49
Resubmissions as a percentage of reports submitted (%)	15	14	13	8	15	11	9	10	6

Note: The increase in the number of resubmissions in 2012–13 and 2013–14 correlates to the introduction and repeal of the carbon pricing mechanism and increased scrutiny by both the Regulator and reporters at that time (CER pers. comm.)
Source: CER pers. comm.

In 2016–17, the Regulator received 73 voluntary audits under the reporting scheme and 14 audits for the safeguard.[32] The Regulator also initiates a series of audits each year to investigate particular compliance priorities or risks. Of the Regulator-initiated audits of the reporting scheme in 2016–17, almost 80 per cent returned an unqualified (no material errors) or qualified audit (one or more material errors were found not affecting the conclusions) (CER pers. comm.). Again, a low number of adverse findings from audits targeting known risks can indicate the reported data is generally accurate.

The Regulator monitors the performance of auditors accredited under the National Greenhouse and Energy Reporting legislation by conducting analysis and risk profiling of auditors, on-site and desktop assessments and registration reviews. The Regulator also undertakes active education and engagement activities with auditors. In 2016–17, the Regulator conducted nine inspections of registered auditors. As a result, one auditor was de-registered due to issues with the conduct of their audits. Two other auditors chose to de-register voluntarily following inspection.

The Authority is of the view that the Regulator is actively monitoring and improving the audit framework. This provides confidence in the data and outcomes of the audited schemes administered by the Regulator (the reporting scheme, safeguard mechanism, Emissions Reduction Fund and Renewable Energy Target) and the National Carbon Offset Standard, which also relies on accredited auditors.

Overall, reporters agreed the compliance approach was appropriate and the audit framework is working well. A number of reporters, however, said the Regulator has initiated an audit of the same information that they had previously had voluntarily audited. This imposes costs to both Government and the business, and reporters were unaware of the reasons for re-auditing the same information. Some also said audits were focused on immaterial energy or emissions data. Again, this imposes costs on both

[32] This indicates around 8 per cent of reports submitted under the reporting scheme included a voluntary audit. Other reporters may have completed voluntary audits but did not provide the reports to the Regulator.

business and the Regulator but appeared to have little significance in terms of identifying material errors in reported data.

While the costs of a compliance audit are paid for by the Regulator, there can be significant internal costs to the audited company to facilitate the audit and provide requested information. Chevron reported that a Regulator-initiated audit cost over $100,000 in internal resources (submission on this review). The Authority notes the Regulator's efforts to reduce business costs associated with audits, by issuing guidance targeted to avoiding duplicating effort in re-auditing information covered by voluntary audits (CER 2018k). The Authority welcomes this position and is of the view this should continue. It considers the guidance strikes the right balance in seeking to avoid duplication of effort and associated costs, while retaining the ability to conduct compliance audits where required.

Recommendation

R.20 The Regulator continue to work with reporters and auditors to better target compliance audits to ensure integrity of the data and reduce costs to business.

6.2.3 Enforcement action

The Regulator has the power to issue infringement notices for non-compliance with civil penalty provisions, commence court proceedings and enter into enforceable undertakings with scheme participants. Enforceable undertakings require participants to undertake to implement, or refrain from, certain actions to rectify breaches or potential breaches of the legislation. Those undertakings are enforceable by a court. To date, the Regulator's enforcement action relating to greenhouse and energy reporting has been limited to issuing two enforceable undertakings. One has been completed; the other is still current and requires a reporter to commit to meet future reporting deadlines and employ a consultant to support the completion of reports (CER 2018e). The Authority heard there was broad support by reporters for the current approach and level of penalties. Some data users expressed views that the penalties for unlawful disclosure of emissions and energy information are too severe (Section 4.1.3).

The Authority considers the current approach to monitoring compliance and enforcement is appropriate. The Regulator's tiered approach to compliance (Section 2.6) is considered fitting as it seeks to minimise the burden on reporters and maintain productive relationships while supporting compliance with the legislation.

Accuracy of the reported emissions data also assists with compliance under the safeguard mechanism. Compliance with the legislation for the safeguard is achieved when facilities have net emissions (based on reported emissions data) at or below baselines, which as noted in Section 5.1, was achieved in 2016–17.

6.2.4 Ensuring participation

The Authority heard from some who queried how the Regulator ensures companies that should be registered under the reporting scheme are registered.

> *We are keen to understand how the CER identifies companies that should be reporting under the scheme but have not yet commenced reporting.*
>
> National Australia Bank, submission on this review (p. 11)

Under the reporting scheme reporters must self-identify as required to register. However, the Regulator also conducts its own checks, including identifying growth areas, cross-checking with reporters under

other schemes and data matching companies against comparable companies who have registered. The Regulator contacts companies when they identify a possible need for registration. In some cases, the Regulator is notified by other reporters or interested parties of potential gaps in registration and investigates these (CER pers. comm.). The Authority is satisfied this risk-based approach is adequate to ensure high levels of compliance.

7 THE FUTURE OF THE SAFEGUARD MECHANISM

In Chapter 5, the Climate Change Authority reviewed the current operation of the safeguard mechanism as required by the *National Greenhouse and Energy Reporting Act 2007* (Cth). In this chapter, the Authority provides advice on the future role of the safeguard drawing on its 2016 report: *Towards a Climate Policy Toolkit: Special Review on Australia's climate goals and policies* (2016 Special Review), which made recommendations on the safeguard as part of a broader policy toolkit to reduce Australia's emissions (CCA 2016).

7.1 THE SAFEGUARD MECHANISM'S OBJECTIVE

The safeguard's objective is to ensure net emissions from large industrial and electricity facilities do not exceed the emissions limits (baselines) set under the legislation. As discussed in Section 5.1, in 2016–17 all facilities covered by the safeguard kept their net emissions at or below their baselines.

However, some suggested the safeguard's objective should be redefined to reduce baselines in line with Australia's long-term, economy-wide emissions reduction target.

> *The Government should consider maintaining the current policy architecture established under the Safeguard Mechanism and adapting the framework by implementing design features that will drive down emissions nationally.*
>
> Carbon Market Institute, submission on this review (p. 13)

Others said reducing baselines would have cost implications, which would need to be managed.

> *[The] Safeguard Mechanism should avoid arbitrary reductions in facility baselines given the disproportionate emissions reduction burden likely to be placed on those covered facilities and the potential to introduce unintended distortions to trade and investment flows into and out of Australia.*
>
> Chevron, submission on this review (p. 5)

The Authority heard a range of different suggestions for how the costs of declining baselines and the impacts on emissions-intensive trade-exposed industries could be managed. These included improving access to international and domestic carbon credit units and investment in research and development of new emissions reduction technologies.

7.2 THE AUTHORITY'S PREVIOUS ADVICE

In its 2016 Special Review (CCA 2016), the Authority recommended the safeguard be enhanced to reduce emissions in the direct combustion, industrial processes and fugitive emissions sectors. The enhanced safeguard would remove access to further baseline increases and baselines would decline linearly in line with Australia's economy-wide emissions reduction commitments under the Paris Agreement (Box 7). For the electricity sector, the Authority recommended an emissions intensity scheme be implemented. In its 2017 joint review with the Australian Energy Market Commission, the Authority recommended the Government consider implementing a low-emissions target in the electricity sector given the Government had ruled out an emissions intensity scheme (CCA and AEMC 2017).

BOX 7 2016 Special Review findings

In its 2016 Special Review (CCA 2016), the Authority recommended a policy toolkit be put in place that uses current and new measures to form a long-term and durable solution to Australia's climate change challenge.

The Authority's key recommendations were:

- For the industrial sector (direct combustion, industrial processes and fugitives):
  - Enhance the safeguard mechanism:
    - Remove access to further baseline increases.
    - Decline safeguard baselines from 2018 in line with Australia's economy-wide emissions reduction commitments under the Paris Agreement.
    - Allow safeguard facilities to meet their safeguard obligations with Emissions Reduction Fund offsets and international credits and permits (provided the international units meet qualitative and quantitative eligibility restrictions).
    - Lower thresholds to 25,000 t CO_2-e to extend the coverage of the safeguard to more facilities. Recent analysis by the Authority suggests this would capture around an additional 250 facilities and a further 2 per cent of Australia's emissions.
- For the electricity-generation sector:
  - Implement an emissions intensity scheme.
- For the transport sector:
  - Introduce emissions reduction standards for light vehicles.
  - Conduct a cost-benefit analysis to investigate emissions reduction standards for heavy vehicles.
- For the waste sector:
  - Harmonise and enhance regulation.
- For the agriculture and land sector:
  - Continue Emissions Reduction Fund crediting.
  - Continue Emissions Reduction Fund purchasing until the enhanced safeguard is in place and provides a source of demand for these offsets.

7.3 AUSTRALIA'S EMISSIONS FOR SAFEGUARD SECTORS

The Department of the Environment and Energy projects electricity-sector emissions will decline to 17 per cent below 2005 levels in 2030, from 197 Mt CO_2-e to 163 Mt CO_2-e (Commonwealth of Australia 2018e). Emissions in the National Electricity Market are projected to decline to 26 per cent below 2005 levels by 2030, from 176 Mt CO_2-e to 131 Mt CO_2-e (Commonwealth of Australia 2018e). The National Electricity Market includes grid-connected electricity in the eastern and south eastern states and accounted for approximately 85 per cent of total electricity emissions in the year to June 2018 (Commonwealth of Australia 2018d).

Under the Paris Agreement, Australia committed to reducing emissions across its entire economy by 26 to 28 per cent on 2005 levels by 2030 (based on current estimates from 605 Mt CO_2-e in 2005 to 435–447 Mt CO_2-e in 2030). The Department of the Environment and Energy projects Australia's

economy-wide 2030 emissions to be 7 per cent below 2005 levels or 563 Mt CO_2-e under a business-as-usual scenario (Commonwealth of Australia 2018e) and further reductions are needed to meet the economy-wide 26 to 28 per cent target.[33]

In line with its 2016 Special Review (CCA 2016), the Authority remains of the view the electricity sector has the potential to achieve further significant emissions reductions. A concerted policy response would allow low-cost emissions reductions available in the electricity sector to be realised. Decarbonising electricity also offers an important avenue for reducing emissions in other sectors; for example, by electrifying light vehicles (CCA 2016).

Emissions reductions in the industrial sector are likely to be needed to meet the economy-wide emissions reduction target. However, under a business-as-usual scenario including the safeguard, emissions in the industrial sector (direct combustion, fugitives and industrial processes) and transport are projected to increase by 33 per cent on 2005 levels by 2030 from 235 Mt CO_2-e to 313 Mt CO_2-e (Commonwealth of Australia 2018e).[34]

7.4 THE SAFEGUARD AS A POSSIBLE MECHANISM TO REDUCE EMISSIONS

In line with its 2016 Special Review (CCA 2016), the Authority remains of the view a policy toolkit is needed to capture the emissions reduction opportunities that exist across the different sectors of Australia's economy (Box 7). If designed well, the policy toolkit would create incentives for businesses to innovate and invest in new low-emissions technologies.

Submissions highlighted the importance of sharing the emissions reduction burden across all sectors of the economy to reduce the overall cost of emissions reductions.

> *The challenge for Australia is to successfully transition to a low carbon economy across all emissions sources – electricity, stationary energy, transport, fugitive emissions, industrial processes and product use, agriculture, waste, land use and land use change and forestry.*
>
> Australian Industry Greenhouse Network, submission on this review (p. 8)

In keeping with its legislation, the Authority has regard to the following principles in assessing the relative merits of emissions reduction policies:

- economic efficiency
- environmental effectiveness
- equity
- in the public interest
- take account of the impact on households, business, workers and communities
- support the development of an effective global response to climate change
- be consistent with Australia's foreign policy and trade objectives.

[33] These projections are indicative estimates and are revised over time. The Department's business-as-usual projections include current policies and measures including the Emissions Reduction Fund, the large-scale Renewable Energy Target, National Energy Productivity Plan and legislated phase-down of hydrofluorocarbons. In its Intended Nationally Determined Contribution submission to the UNFCCC in 2015, Australia indicated it would translate the 2030 economy-wide target into an emissions budget covering the period 2021-2030. The Department's business-as-usual emissions projections (Commonwealth of Australia 2018e) indicate that Australia's cumulative emissions over the 2021-2030 period will be 5487 Mt CO_2-e relative to the estimated emissions budget of 4733-4800 Mt CO_2-e.

[34] Industrial and transport safeguard facilities accounted for almost half the emissions in the industrial sector in 2016–17 (Commonwealth of Australia 2018d, CER 2018j).

Other principles the Authority considers should be taken into account when designing climate change policies include:

- Credibility—to provide an incentive for businesses to invest and innovate
- Durability and simplicity—to reduce the costs to government associated with implementing policies and the costs to businesses of adjusting to new policies
- Scalability and adaptability—to enable Australia to adjust its emissions reduction commitment over time, in response to changes in technology, the economy and the action of international competitors
- Coherence with other policies—Australia needs a policy toolkit with broad coverage to reduce the overall costs of emissions reductions and maximise opportunities created
- Flexibility—include a range of compliance options to reduce the cost of emissions reductions, such as allowing access to international units subject to quantitative and qualitative limits.

The safeguard mechanism is one policy that could be designed to meet the Authority's principles for an effective and efficient emissions reduction policy in the industrial sector, as part of a policy toolkit that captures the emissions reduction opportunities across the Australian economy. As such, the Authority is of the view the Government should consider how the safeguard could be adapted as a mechanism to reduce emissions in the industrial sector.

The Authority heard the safeguard may not be an appropriate policy for achieving effective and efficient emissions reductions in all sectors, for example the waste sector.

> *The [National Waste and Recycling Industry Council] does not believe the Safeguard Mechanism is a fit for purpose tool for landfills.*
>
> The National Waste and Recycling Industry Council, submission on this review (p. 2)

In the 2016 Special Review (CCA 2016), the Authority recommended government landfill regulations that limit methane emissions be harmonised and enhanced to achieve emissions reductions in the waste sector. The Authority found emissions from the sector are already regulated for odour and safety by state governments but there are further opportunities for emissions reductions.

The safeguard may also not be appropriate for reducing emissions in the light vehicle sector. In the 2016 Special Review (CCA 2016), the Authority recommended emissions reduction standards be introduced for light vehicles as this could deliver substantial, low-cost emissions reductions, with net economic benefits.

In 2019 the Authority will assess the changes that have occurred since it gave its advice on a policy toolkit in 2016 and update its advice on effective and efficient emissions reduction policies.

8 CONCLUSION

This review found the National Greenhouse and Energy Reporting legislation is operating well, is meeting its objectives and is generally fit for purpose. The energy and emissions reporting scheme has been in place for over a decade and enjoys broad support from industry, government and others. It is widely considered to be a best-practice approach to measuring and reporting emissions and energy and compares favourably to schemes in other countries. The high quality data that is collected by the scheme is used extensively by governments and others to develop energy and climate change policies and is a critical input to meeting Australia's international energy and emissions reporting obligations.

The safeguard mechanism has been in place for less than three years, so it is more difficult to form a view on its long-term effectiveness. The Climate Change Authority found, however, that in its first year of operation (2016–17) all facilities covered by the safeguard kept their net emissions at or below their baselines. The Authority heard that most companies with safeguard obligations are comfortable with the mechanism's operation and the options for meeting their baselines; however, many called for clarity around its future. The Authority is of the view a comprehensive policy toolkit is needed to capture the emissions reduction opportunities that exist across the different sectors of Australia's economy. As said by the Authority in 2016, the safeguard could be used to reduce emissions in the industrial sector if baselines are made to decline.

The Authority has identified some opportunities for improvements. Many of these opportunities can reduce costs to businesses or the schemes' administrators. For the reporting scheme, they include streamlining reporting requirements and improving the system used by companies to report. For the safeguard, they include ensuring obligations are the result of consistent approaches to measuring emissions and setting baselines, and compliance options continue to work effectively. For administration and compliance, the Authority recommends continuing to target compliance audits to reduce costs. Collectively, these improvements will enhance what the Authority considers to be well-functioning schemes. The Authority encourages the Department of the Environment and Energy and the Clean Energy Regulator to continue to work together with industry to implement the improvements effectively and efficiently.

Appendix A. Guiding principles for this review

The principles established in the *Climate Change Authority Act 2011* (Cth) guide all of the Climate Change Authority's work. These include that measures to respond to climate change should:

- be economically efficient, environmentally effective, equitable and in the public interest
- support the development of an effective global response to climate change, and be consistent with Australia's foreign policy and trade objectives
- take account of the impact on households, businesses, workers and communities.

The Authority is required to review the operation of the National Greenhouse and Energy Reporting legislation. That legislation includes:

- the *National Greenhouse and Energy Reporting Act 2007* (Cth), which establishes the framework for the reporting scheme and safeguard
- the *National Greenhouse and Energy Reporting (Measurement) Determination 2008* (Cth), which describes how to measure greenhouse gas emissions and energy production and use
- the *National Greenhouse and Energy Reporting Regulations 2008* (Cth), which sets out the reporting and auditing requirements
- the *National Greenhouse and Energy Reporting (Audit) Determination 2009* (Cth), which sets out the audit requirements
- the *National Greenhouse and Energy Reporting (Auditor Registration) Instrument 2017 (No. 2)* (Cth), which specifies the qualifications that auditors must have
- the *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015* (Cth), which sets out the compliance rules and procedures for administering the safeguard.

The *Clean Energy Regulator Act 2011* (Cth) establishes the Clean Energy Regulator and its functions and powers in regards to administering its schemes.

The first objective of the *National Greenhouse and Energy Reporting Act 2007* (Cth) is to introduce a single national reporting framework for the reporting and dissemination of information related to greenhouse gas emissions and projects, energy consumption and energy production of companies to:

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

The second objective is to ensure net covered emissions of greenhouse gases from the operation of a designated large facility do not exceed the baseline applicable to the facility.

Appendix B. Overview of the costs and benefits of the Authority's recommendations

The *National Greenhouse and Energy Reporting Act 2007* (Cth) requires the Climate Change Authority to analyse the costs and benefits of any recommendations formulated during this review. The Authority is also required to have regard to the principles set out in the *Climate Change Authority Act 2011* (Cth) when performing its functions. These include that measures to respond to climate change should be economically efficient, environmentally effective, equitable, in the public interest, support the development of an effective global response to climate change, be consistent with Australia's foreign policy and trade objectives, and take account of the impact on households, businesses, workers and communities. Table 9 presents a summary of the expected outcomes of recommendations against key criteria. Further analyses of the costs and benefits of the recommendations are made throughout the report.

TABLE 9 Analysing the recommendations' outcomes

Where the Authority has recommended further analysis be conducted before a change is implemented, italicised text indicates the outcome of the recommendation if the change is made.

	Recommendation	Economic efficiency		Environmental effectiveness	Equity	Responsible agency and implementation process
		Benefits	Costs			
R.1	Analyse opportunities for data sharing between the reporting scheme and the National Pollutant Inventory, the Petroleum and Other Fuels Reporting program and the Energy, Water and Environment Survey	*Reduce transaction costs* *Reduce cost to Government of collecting information*	Costs to Government of undertaking the analysis	NA	NA	Regulator, Department and Australian Bureau of Statistics
R.2	Examine whether there are efficiency gains in having the Regulator administer the reporting for carbon neutral certification against the National Carbon Offset Standard	*Reduce administrative costs to Department* *Reduce overall administrative costs*	Costs to Department of undertaking the analysis *Increase administrative costs to Regulator*	*Allows Departmental resources to be focused on expanding uptake of the Standard*	NA	Department and Regulator *Change to legislation*

	Recommendation	Economic efficiency		Environmental effectiveness	Equity	Responsible agency and implementation process
		Benefits	Costs			
R.3	Align the compliance framework and administrative arrangements for the Carbon Offset and Reduction Scheme for International Aviation with those established under the National Greenhouse and Energy Reporting legislation	Reduce administrative costs to industry and the Department of Infrastructure, Regional Development and Cities Reduce overall administrative costs	Initial alignment costs	Effective compliance with emissions reduction initiatives	All participants in emissions reduction initiatives are subject to the same compliance framework	Department of Infrastructure, Regional Development and Cities and the Regulator
R.4	Clarify what data is available and how it can be shared and used more efficiently	Reduce transaction costs to industry associated with duplicative reporting Reduce cost to governments of collecting information	Administrative costs to Regulator	Enable greater use of data for policy making	All governments have access to data	Regulator and state and territory governments
R.5	Progress developments to the Emissions and Energy Reporting System including for uploading and downloading data and greater use of pre-fill data	Reduce transaction costs to industry and improve data quality Reduce overall administrative costs to Regulator	Administrative costs to Regulator in short term	Improve data quality for use by policy makers	NA	Regulator

	Recommendation	Economic efficiency		Environmental effectiveness	Equity	Responsible agency and implementation process
		Benefits	Costs			
R.6	Continue to develop the long-term information technology systems roadmap to increase opportunities for data sharing and consider the benefits and costs of developing a common reporting portal for existing and future energy and emissions reporting schemes	*Reduce costs to industry and Government overall and improve data quality*	Administrative costs to Regulator	*Enable greater use of data for policy making*	NA	Regulator and other administrators such as the Department
R.7	Enhance the current process for implementing updates to the measurement determination by consulting earlier, increasing transparency and better publicising changes	Reduce transaction costs to industry through improved changes to the measurement determination	Increase administrative costs to Department	Improve the estimation of energy and emissions data	Increase transparency and opportunity for stakeholder issues to be addressed	Department and Regulator
R.8	Enhance understanding among reporters and auditors about the existing provisions in the measurement determination that can reduce the costs of reporting on small sources of emissions and energy and systematically review these provisions and their administration	Reduce transaction costs to industry	Increase administrative costs to Regulator	NA	NA	Regulator and Department

	Recommendation	Economic efficiency		Environmental effectiveness	Equity	Responsible agency and implementation process
		Benefits	Costs			
R.9	Amend the measurement determination to include emissions from agricultural sources to allow voluntary reporting	Increase data and methods availability and consistency in reporting	Increase administrative costs to Department and Regulator Reduce transaction costs to industry of developing new measurement methods Increase cost to industry of greater reporting	Increase data and methods available for policy making and industry action	Increase transparency and improve consistency of reporting across all sectors of the economy	Department Change to legislation
R.10	Examine opportunities to improve the quality of data available on aerosols and indirect greenhouse gases by assessing the merits of including these substances in the reporting scheme	*Improve data quality and could reduce administrative costs to the Department*	Costs to Department of undertaking the analysis *Increase administrative costs to Regulator*	*Improve quality of data for policy making*	NA	Department *Change to legislation*
R.11	Analyse whether the benefits of extending the reporting scheme to government agencies and local councils exceed the costs	*Improve data availability* *Reduce transaction costs to those already reporting elsewhere*	Costs to Department of undertaking the analysis *Increase administrative costs to Department and Regulator* *Increase transaction costs to agencies and local councils not already reporting*	*Increase data available for policy making and government action*	*Increase transparency and improve consistency of reporting across all sectors of the economy*	Department *Change to legislation*

	Recommendation	Economic efficiency		Environmental effectiveness	Equity	Responsible agency and implementation process
		Benefits	Costs			
R.12	Test the feasibility of optional reporting for scope 2 emissions that accounts for direct sourcing of low-emissions energy	*Improve data availability*	Costs to Department of undertaking the analysis *Increase administrative costs to Department to establish method and Regulator to administer* *Increase transaction costs to industry*	*Increase data available for policy making* *Encourage greater direct sourcing of low-emissions energy*	*Increase transparency*	Department *Change to legislation*
R.13	Allocate the Regulator funding to enhance the dataset for time series analysis, which is updated each year within three months of data being reported, for use by Australian governments	Reduce overall costs to governments for data analysis	Increase cost to Government for data cleaning	Enable greater use of data for policy making	Improved data available to all users	Regulator and Department
R.14	Legislate to ensure the Regulator retains its ability to disseminate emissions and energy information obtained prior to 2 April 2012 and government agencies retain their ability to publish this information after the relevant regulations sunset	Supports continued data availability and publication	No change to status quo	Enable continued use of data for policy making and publication	Data continues to be made available	Change to legislation

	Recommendation	Economic efficiency		Environmental effectiveness	Equity	Responsible agency and implementation process
		Benefits	Costs			
R.15	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	Improve data availability Reduce costs to data users	Increase administrative costs to Regulator	Enable greater use of data	Increase transparency	Regulator
R.16	Safeguard baselines be updated to reflect changes to the measurement determination that lead to a material difference in reported emissions	Cost of complying with safeguard better reflects real emissions	Increase administrative cost to Department and Regulator	Estimation of emissions obligations for safeguard better reflects real emissions		Change to legislation
R.17	Continue to pursue opportunities to increase the information available about the market for Australian Carbon Credit Units	Reduce costs of complying with safeguard obligations	Increase administrative cost to Regulator	Possible increase in investment in Emissions Reduction Fund projects	Increase transparency Possible increase in availability of Australian Carbon Credit Units including for safeguard facilities	Regulator
R.18	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	*Increase availability of Australian Carbon Credit Units on secondary market*	Costs to Department of undertaking the analysis	*Increase investment by safeguard facilities in projects that reduce their indirect emissions*	*Provide the same incentives for safeguard and non-safeguard facilities to participate in the Emissions Reduction Fund*	Department *Change to legislation*

	Recommendation	Economic efficiency		Environmental effectiveness	Equity	Responsible agency and implementation process
		Benefits	Costs			
R.19	Remove the option for deemed surrender	Improve efficiency of the Emissions Reduction Fund	Increase administrative cost to Department	Reduce the risk that the Government purchases abatement under the Emissions Reduction Fund that may have occurred anyway		Change to legislation
R.20	Continue to work with reporters and auditors to better target compliance audits to ensure integrity of the data and reduce costs to business	Reduce transaction costs Reduce administrative costs to Regulator	NA	NA		Regulator

Appendix C. Public consultations

The Climate Change Authority conducts public consultations for all of its reviews.

On 31 July 2018, the Authority released a paper to facilitate consultation for this review. The Authority received 40 stakeholder submissions. The Authority also met with over 100 individuals from more than 80 organisations. The Authority met with and received submissions from:

- companies across a range of sectors that have obligations under the reporting scheme and safeguard
- service providers that assist companies in meeting their obligations
- individuals and groups that use the data reported
- the government bodies that administer the legislation or use the data reported.

Submissions are available on the Authority's website at http://www.climatechangeauthority.gov.au/submissions/submissions-received. A summary of submissions received is also available at http://www.climatechangeauthority.gov.au/summary-submissions-review-national-greenhouse-and-energy-reporting-legislation.

The Authority also drew on public submissions on the Department of the Environment and Energy's consultations on safeguard baseline settings in 2018 and the Government's review of climate change policies in 2017.

The Authority thanks all those that provided submissions or engaged with the Authority for this work.

Organisations that made non-confidential submissions on this review were:

- AGL
- Australian Petroleum Production and Exploration Association
- Australian Aluminium Council
- Australian Industry Greenhouse Network
- Australian Pork
- Australian Sugar Milling Council
- Cement Industry Federation
- Chamber of Minerals and Energy of Western Australia
- Chartered Accountants Australia and New Zealand
- Chevron Australia
- Carbon Market Institute
- ClimateWorks Australia
- ConocoPhillips
- Energy Queensland
- ERM Power
- Greenbase
- Hydro Tasmania
- Law Society of New South Wales Young Lawyers
- National Australia Bank
- National Waste and Recycling Industry Council
- Origin Energy
- Rio Tinto
- Sustainable Business Australia
- Tim Kelly
- UnitingCare Queensland
- UNSW Centre for Energy and Environmental Markets
- Woodside Energy

Appendix D. International reporting schemes

TABLE 10 Summary of international company-level emissions reporting schemes

Country of operation	Scheme	Commenced	Gases covered	Industry sectors covered	Scope	National emissions covered	Threshold
Canada	Greenhouse Gas Reporting Program	2004	CO_2, CH_4, N_2O, SF_6, HFCs, PFCs	Stationary energy, industrial processes, fugitive emissions, on-site transport, waste	Scope 1	37 per cent[35]	Facility: 10 kt CO_2-e per year
European Economic Area[36]	EU Emissions Trading Scheme	2005	CO_2 N_2O and PFCs for certain processes	Stationary energy, industrial processes, civil aviation	Scope 1	Around 45 per cent	Facility: 25 kt CO_2-e per year[37]
France	Greenhouse Gas Emissions Reporting	2011	CO_2, CH_4, N_2O, SF_6, HFCs, PFCs, NF_3	Stationary energy, industrial processes, transport, agriculture, forestry	Scope 1 and 2 (scope 3 voluntary)	15–30 per cent[38]	Companies: 500 employees Public bodies: 250 employees Local authorities: 50,000 inhabitants
Japan	Mandatory Greenhouse Gas Accounting and Reporting System	2006	CO_2, CH_4, N_2O, SF_6, HFCs and PFCs	Large emitters including transport	Scope 1 and 2	55 per cent	Companies with energy consumption of 1,500 kL of crude oil equivalent per year; or 3,000 t CO_2-e per year; and 21 full-time employees

[35] This figure is for 2016 and based on the now outdated threshold of 50 kt CO_2-e per year. The percent of national emissions covered is expected to increase with the lowered facility threshold of 10 kt CO_2-e per year starting with the 2017 data reported by companies in 2018.
[36] EU and Iceland, Liechtenstein, Norway
[37] Hospitals and facilities below this threshold can be excluded where equivalent measures for emissions reduction are in place (European Commission n.d).
[38] This figure is direct emissions only, based on a 2012 assessment (World Resources Institute 2013).

Country of operation	Scheme	Commenced	Gases covered	Industry sectors covered	Scope	National emissions covered	Threshold
Mexico	National Emissions Register	2016	CO_2 , CH_4 , N_2O, HFCs, PFCs, HCFCs, CFCs, SF_6, NF_3, halogenated ether, halocarbon, and black carbon	Energy, industry, commercial, waste, agriculture, transport	Scope 1 and 2	Data not available	Facility or corporate group: 25 kt CO_2-e per year
New Zealand	New Zealand Emissions Trading Scheme	2008	CO_2, CH_4, N_2O, SF_6, HFCs, PFCs, NF3, other fluorinated greenhouse gases	All sectors of the economy: stationary energy, industrial processes, waste, transport, agriculture, forestry	Scope 1 and upstream point of obligation	55 per cent	Thresholds vary by sector, obligation is aimed as far upstream as possible
Republic of Korea	Target Management System	2012	CO_2, CH_4, N_2O, SF_6, HFCs, PFCs	Stationary energy, industrial processes, manufacturers, buildings, waste, transport, agriculture	Scope 1 and 2	Around 68 per cent[39]	Facility: 15 kt CO_2-e per year; 80 TJ per year Corporate group: 50 kt CO_2-e per year; 200 TJ per year
United States	Greenhouse Gases Reporting Program	2010	CO_2, CH_4, N_2O, SF_6 HFCs, PFCs, NF_3, other fully fluorinated greenhouse gases, HFEs, very short-lived compounds	Threshold activities: industrial processes, waste All in: electricity generation, aluminium production, nitric acid production, CO_2 injection	Scope 1 and upstream point of obligation (for suppliers of fuels and industrial greenhouse gases)	85–90 per cent	Facility: 25 kt CO_2-e per year No threshold for 'all in' category

Sources: Canada: Environment and Climate Change Canada 2018; EU: European Commission n.d.a., European Commission n.d.b.; France: Republic of France Ministry of Environment, Energy and the Sea 2016; Japan: Greenhouse Gas Inventory Office of Japan 2017; Japanese Ministry of Economy, Trade and Industry 2018; Mexico: Mexican Department of Environment and Natural Resources 2015; New Zealand: *Climate Change Response Act 2002* (New Zealand), Environmental Defense Fund 2015, Motu Economic and Public Policy Research 2018; Republic of Korea: Korea Environment Corporation 2013, Republic of Korea Ministry of Environment 2017, Hyun and Oh n.d., International Partnership on Mitigation and MRV 2015; United States: US EPA n.d.; All: World Resources Institute 2013, World Resources Institute 2015.

[39] This figure is for 2012 based on higher thresholds.

Appendix E. Use of the reporting scheme in Australian Government policies, programs and activities

TABLE 11 Examples of reporting data, factors and methods informing Australian Government policies, programs and activities

Program or activity	Description	Information used
Emissions		
Safeguard mechanism	Places emissions limits on large facilities.	Reporting data is used to set emissions limits for large facilities and determine whether facilities' net emissions are at or below their emissions limit.
Emissions Reduction Fund	An emissions offset scheme that credits project-level reductions in emissions combined with Government purchasing of emissions reductions.	Reporting data used for measuring emissions under the facilities method. Emissions factors and some methods from the measurement determination (for example emissions from fuel combustion) are used as part of most Emissions Reduction Fund methods.
National Carbon Offset Standard	A voluntary standard to manage emissions and to achieve carbon neutrality.	Data can be reported under the National Carbon Offset Standard using reporting data where boundaries match. Auditors accredited under National Greenhouse and Energy Reporting legislation can be used.
National Greenhouse Gas Inventory	Estimates of Australia's emissions submitted under Australia's international treaty obligations (United Nations Framework Convention on Climate Change and Kyoto Protocol).	Reporting data (both emissions and energy) used to inform emissions estimates for energy, industrial processes and waste emissions sources.
National emissions projections	Projections of Australia's future emissions are published by the Department to provide an assessment of how Australia is tracking against its emissions reduction targets. Projections are reported as part of meeting Australia's international reporting obligations to the United Nations Framework Convention on Climate Change.	Reporting data supports more accurate emissions projections than otherwise would be available by allowing for detailed sectoral projections. Facility-level emissions data is used to project the emissions intensity of individual facilities.
National Greenhouse Accounts Factors	A workbook published by the Department to help companies and individuals compile a broad range of emissions inventories, including to support voluntary and scope 3 reporting.	Uses many emissions factors and the simplest methods (method 1) from the measurement determination.

Program or activity	Description	Information used
Energy		
Australian Energy Statistics	Official estimates of Australia's energy production and use, used for domestic policy and analysis and international reporting.	Reporting data (on primary and secondary energy production and consumption) is the primary data source. Other government-held data, including the Australian Petroleum Statistics and Australian Bureau of Statistics datasets, are also used.
International energy data reporting	Reporting of Australia's annual energy data on supply and use to the International Energy Agency and other fora.	Australian Energy Statistics, which relies on the reporting data. These data are compiled used internationally agreed frameworks.
National Energy Productivity Plan initiatives	A Council of Australian Governments plan that includes measures to improve Australia's energy productivity by 40 per cent between 2015 and 2030.	Reporting data, including scope 1 and 2 emissions and energy data, is integral to the development of initiatives such as informing research on benchmarks and energy use models. A suite of metrics is being developed to track how National Energy Productivity Plan measures are impacting Australia's energy and emissions trajectories. Certain metrics are reliant on both emissions and energy data from the reporting scheme.
Carbon Dioxide Equivalent Intensity Index	This is an important operational index used for the settlement of over-the-counter hedge contracts between electricity market participants. It provides a formal, independent measure of the average emissions intensity of National Electricity Market generators and is published regularly by the Australian Energy Market Operator.	Reporting data is used as an input to the calculation of the index.
Energy, Water and Environment Survey (Australian Bureau of Statistics)	Provides statistics on industry energy and water use.	Energy reporting data (including grid electricity and fuel use) used to quality-check and corroborate survey-based estimates.
Energy Account Australia (Australian Bureau of Statistics)	Provides statistics for changes in supply and use of energy, consistent with a national accounts framework.	Energy reporting data used (both production and use).
Australian Energy Market Operator Electricity Forecasting	Independent forecasts of electricity consumption, maximum and minimum demand over a 20-year period for the National Electricity Market and for each National Electricity Market region.	Emissions and energy reporting data is an input for sector-disaggregated consumption forecasts. In addition, Australian Energy Statistics (which uses reporting data) is used for developing sector-based long-term econometric models for energy consumption forecasting. The Australian Energy Market Operator

Program or activity	Description	Information used
		also conducts their own in-depth surveys of large energy users.
Australian Renewable Energy Agency funding of projects to accelerate renewable energy	Financial support to projects that map or scope renewable energy opportunities including improved energy productivity, network constraints and barrier analysis.	Reporting data (electricity use and fuel source use by location) is used.
National Energy Security Assessments (Department of the Environment and Energy)	Assessments used by governments, market institutions and businesses to identify where change may be needed to address challenges affecting delivery of electricity, gas and liquid fuels to consumers and mitigate risks.	Reporting data is being used to support the development of a model of the liquid fuel supply system in Australia, which will be used for the 2019 assessment as well as future assessments. Reporting data is being used to develop an understanding of the regional aspects of liquid fuel supply and consumption.

Source: Based on consultation with relevant agencies, AEMO 2014; CER 2017c; CER 2015; Commonwealth of Australia 2018a; Commonwealth of Australia 2018b; Commonwealth of Australia 2017a; Commonwealth of Australia 2015; DoEE 2017; DoEE n.d.d; DoEE n.d.e; DoEE n.d.f; DoEE n.d.g

TABLE 12 Examples of data informing state and territory government programs, activities and policy

State	Program, activity or policy	Description	Information used
ACT	ACT Greenhouse Gas Inventory	Estimates of ACT emissions	Emissions data (also relies on some data collected individually from large emitters)
ACT	ACT emissions reduction targets	The ACT has legislated emissions reduction targets to 2045	Energy and emissions data
ACT	Carbon Neutral Government	The ACT has set a target of carbon neutral government operations by 2020	Emissions factors from the measurement determination are used to calculate the ACT Government's scope 1 and 2 emissions
NSW	Energy Savings Scheme	Creates financial incentives for organisations to invest in energy savings projects	Energy data
NSW	Gas Efficiency Improvement Program	Involved market-based activities to improve gas efficiency	Energy data
SA	Climate Change Strategies	Set frameworks for reducing emissions in South Australia while maximising economic opportunities	Emissions data
TAS	Tasmanian emissions reduction targets	Tasmania has legislated emissions reduction targets to 2050	Emissions data. Supplemented by state inventory data
VIC	Climate change policy development and analysis	For example assessing impacts of policies on emissions-intensive trade-exposed producers	Scope 1 and 2 emissions data. Data from other sources are also used, for example from the Australian Energy Market Operator
WA	Forming state positions on national policies	For example developing positions on the safeguard and National Energy Guarantee	Emissions and energy data
QLD	Biofuels mandate	Requires fuel sellers to sell minimum amounts of sustainable bio-based fuel	Emissions and energy data

Notes: This table is not exhaustive. It includes examples of state and territory data use identified through research and consultations.
Sources: Based on consultations with state and territory government officials during the review.

Appendix F. Stakeholder issues with measurement of emissions and energy

During this review, stakeholders raised a number of issues with the methods for measurement of emissions and energy in the *National Greenhouse and Energy Reporting Regulations 2008* (Cth) and *National Greenhouse and Energy Reporting (Measurement) Determination 2008* (Cth) (Table 13). These issues have been grouped into themes in Table 13 and the Climate Change Authority encourages the Department of the Environment and Energy to consider these issues as part of the enhanced annual measurement determination update process (Recommendation R.7).

Further information on these issues can be found in the submissions listed below. The submissions can be found on the Authority's website at www.climatechangeauthority.gov.au/summary-submissions-review-national-greenhouse-and-energy-reporting-legislation.

TABLE 13 Issues with measurement of emissions and energy in submissions

Issue	Stakeholder submission
Burden of reporting – general	AGL
	Australian Pork Limited
	UnitingCare
Burden of reporting on non-material emissions and energy	Australian Aluminium Council
	Australian Industry Greenhouse Network
	Australian Petroleum Production & Exploration Association
	Australian Sugar Milling Council
	Chamber of Minerals and Energy WA
	Chevron
	Origin
	Rio Tinto
	Woodside Energy
Reported emissions from purchased electricity (scope 2) do not reflect business efforts to source low-emissions energy	Centre for Energy and Environmental Markets, University of New South Wales
	Tim Kelly
Overly stringent measurement requirements for higher-order methods	Australian Aluminium Council
	Australian Pork Limited
	Rio Tinto
	Woodside Energy
Complexity or inflexibility of some aspects (e.g. energy transformation)	Australian Petroleum Production and Exploration Association
	Chamber of Energy and Minerals WA
	Greenbase
	Woodside Energy

Sector-specific issues	AGL
	Australian Sugar Milling Council
	Chartered Accountants Australia New Zealand
	National Australia Bank
	National Waste and Recycling Industry Council
	Tim Kelly
	Woodside Energy

GLOSSARY OF TERMS

Term	Definition
audit framework	The set of rules that govern how greenhouse and energy auditors and audits are managed, including the qualifications auditors are required to hold and maintain.
Australian Carbon Credit Unit (ACCU)	A unit issued for verified emissions reductions under the Emissions Reduction Fund. One unit is equivalent to a reduction of 1 t CO_2-e.
baseline (safeguard)	See safeguard baseline.
constitutional corporation	A corporation as defined in the Australian Constitution: 'foreign corporations, and trading or financial corporations formed within the limits of the Commonwealth'
controlling corporation	A company usually at the top of the corporate hierarchy that does not have a holding company incorporated in Australia. Reporting obligations under the National Greenhouse and Energy Reporting legislation apply to controlling corporations.
covered emissions (safeguard)	Covered emissions for the purpose of meeting the safeguard threshold are scope 1 emissions (excluding emissions from: landfill waste deposited before 1 July 2016; electricity generators covered by the electricity sectoral baseline; and the Greater Sunrise or Joint Petroleum Development Area).
corporate group	A corporate group is a group of companies owned or operated by a single controlling corporation. It may consist of a controlling corporation only or it may include several associated subsidiary companies with National Greenhouse and Energy Reporting obligations.
Chlorofluorocarbons (CFCs)	Synthetic greenhouse gases with very high global warming potentials.
designated electricity-generation facilities	A facility where the principal activity is electricity production. Facilities that generate electricity for their own use or as a secondary activity are not considered a designated generation facility.
emissions intensity	A measure of the amount of emissions associated with a unit of output; for example, emissions per unit of gross domestic product or production.
emissions intensity scheme	A mechanism where, for the electricity sector, government sets an emissions intensity baseline in emissions per unit of electricity generated. Electricity generators below the baseline receive permits that they can sell and generators above the baseline must buy permits for excess emissions.
facility	A single enterprise comprised of an activity or series of activities that produce emissions or involve the production or consumption of energy.
global warming potential	Global warming potentials are used to convert masses of different greenhouse gases into a single carbon dioxide-equivalent metric that would produce the same warming effect as carbon dioxide over a 100 year period.
hydrofluorocarbons (HFCs)	Synthetic greenhouse gases with very high global warming potentials.
hydrochlorofluorocarbons (HCFCs)	Synthetic greenhouse gases with very high global warming potentials.
hydrofluoroethers (HFEs)	Synthetic greenhouse gases with very high global warming potentials.
Low-emissions target	Places an obligation on liable companies to supply electricity from low-emissions generation sources.
measurement determination	The set of methods and criteria for calculating greenhouse gas emissions and energy data under the *National Greenhouse and Energy Reporting (Measurement) Determination 2008* (Cth).
Mt CO_2-e	Million tonnes of carbon dioxide-equivalent. A measure used to compare emissions from greenhouse gases based on their global warming potential.

National Greenhouse Gas Inventory	An annual report presented to the United Nations Framework Convention on Climate Change that contains Australia's greenhouse gas emissions data.
net emissions (safeguard)	Reported covered emissions minus eligible offsets surrendered under the safeguard.
operational control	A company has operational control over a facility if it can introduce or implement operating, health and safety or environmental policies at a facility. The company with operational control of a facility, or its controlling corporation, is generally responsible for ensuring the facility meets its requirements under the National Greenhouse and Energy Reporting Act.
Paris Agreement	An international agreement adopted under the United Nations Framework Convention on Climate Change in 2015. A key outcome of the Agreement is a global goal to hold average temperature increase to well below 2°C and pursue efforts to keep warming below 1.5°C above pre-industrial levels.
perfluorocarbons (PFCs)	Synthetic greenhouse gases with very high global warming potentials.
production variables	Represents the amount of productive output at a facility covered by the safeguard mechanism. It is used to determine the emissions intensity at a facility.
reporting scheme	The National Greenhouse and Energy Reporting scheme.
reporting transfer certificate	A certificate that allows reporting obligations under the National Greenhouse and Energy Reporting scheme to transfer from a controlling corporation with operational control over the facility to the corporation that has financial control over the facility.
responsible emitter	Person with operational control over a safeguard facility that is required to keep its net emissions at or below its safeguard baseline. Responsible emitters may be an individual, a company, a trust or a local council.
safeguard baseline	An emissions limit on safeguard facilities. There are different types of baselines (described in Section 2.4.2).
safeguard threshold	An emissions limit that triggers safeguard obligations under the National Greenhouse and Energy Reporting legislation.
sectoral baseline	The sectoral baseline for the grid-connected electricity sector is set at the sector's emissions in 2009–10, the high point of Australia's electricity emissions between 2009–10 and 2013–14.
safeguard facility	A facility that emits more than 100,000 t CO_2-e per year of scope 1 covered emissions and has safeguard obligations.
safeguard mechanism	A mechanism that establishes regulatory emissions limits for facilities. Safeguard facilities must keep their emissions at or below their baseline.
safeguard obligations	Companies with safeguard obligations are required to report their scope 1 emissions to the Clean Energy Regulator and keep their emissions below a safeguard baseline.
scope 1 emissions	Emissions released as a direct result of an activity.
scope 2 emissions	Indirect emissions that are a direct result of activities that generate electricity, heating, cooling or steam consumed by a facility.
scope 3 emissions	Indirect emissions (not included in scope 2) that occur in the value chain of the reporter, including both upstream and downstream emissions.
threshold	An emissions or energy limit that triggers reporting, publication or safeguard obligations under the National Greenhouse and Energy Reporting legislation.
United Nations Framework Convention on Climate Change	An international treaty that commits signatory countries to stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous human-induced interference with the climate system.

REFERENCES

Australian Council of Superannuation Investors (ACSI) 2017, *ACSI Governance Guidelines – A guide to investor expectations of listed Australian companies,* ACSI, Melbourne.

Australian Energy Market Operator (AEMO) 2014, *NEMW Consultative Forum – NEM power station emissions intensities – updated impact assessment,* viewed 18 December 2018, https://www.aemo.com.au/-/media/Files/PDF/NEM_Power_Station_Emissio_Intensities_Updated_Impact_Assessment.pdf.

Australian Securities and Investments Commission (ASIC) 2016, *Report 469 – ASIC regulation of corporate finance: July to December 2015,* ASIC.

BHP 2018, *Scope 3 Emissions Calculation Methodology 2018,* viewed 18 December 2018, https://www.bhp.com/-/media/documents/investors/annual-reports/2018/bhpscoper3emissionscalculationmethodology2018.pdf?la=en.

BHP Billiton n.d., *BHP Billiton Scope 3 emissions,* viewed 18 December 2018, https://www.bhp.com/-/media/bhp/documents/investors/annual-reports/2016/161003_bhpbillitonscope3emissions.pdf?la=en.

Carbon Market Institute n.d., *Australia's Carbon Marketplace*, viewed 4 December 2018, https://marketplace.carbonmarketinstitute.org.

Centre for Policy Development (CPD) 2016, *New legal opinion and business roundtable on climate risks and directors' duties*, viewed 4 December 2018, https://cpd.org.au/2016/10/directorsduties.

Che, N., Feng, A., McCluskey, C., Pham, P., Wilcock, T. and Stanwix, G. 2013, *2013 Australian Energy Update*, Bureau of Resources and Energy Economics, Canberra.

Clean Energy Act 2011 (Cth).

Clean Energy Regulator Act 2011 (Cth).

Clean Energy Regulator (CER) 2018a, *Australian carbon credit units issued*, viewed 4 December 2018, http://www.cleanenergyregulator.gov.au/ERF/project-and-contracts-registers/project-register/Historical-ACCU-data.

CER 2018b, *Buying ACCUs*, viewed 4 December 2018, http://www.cleanenergyregulator.gov.au/Infohub/Markets/Pages/Buying-ACCUs.aspx.

CER 2018c, *Client Portal*, viewed 4 December 2018, http://www.cleanenergyregulator.gov.au/OSR/CP.

CER 2018d, *Compliance, education and enforcement policy*, viewed 4 December 2018, http://www.cleanenergyregulator.gov.au/About/Policies-and-publications/Compliance-education-and-enforcement-policy.

CER 2018e, *Current enforceable undertakings*, viewed 4 December 2018, http://www.cleanenergyregulator.gov.au/About/Compliance-and-Enforcement/Compliance%20and%20enforcement%20action/enforceable-undertakings/Current-enforceable-undertakings.

CER 2018f, *Data and Information*, viewed 4 December 2018, http://www.cleanenergyregulator.gov.au/Infohub/Data-and-information/Data-and-Information.

CER 2018g, *Electricity sector emissions and generation data 2016–17*, viewed 4 December 2018, http://www.cleanenergyregulator.gov.au/NGER/National%20greenhouse%20and%20energy%20reporting%20data/electricity-sector-emissions-and-generation-data/electricity-sector-emissions-and-generation-data-2016-17.

CER 2018h, *Emissions Reduction Fund project register*, viewed 4 December 2018, http://www.cleanenergyregulator.gov.au/ERF/project-and-contracts-registers/project-register.

CER 2018i, *Safeguard baseline tables*, viewed 4 December 2018, http://www.cleanenergyregulator.gov.au/NGER/National%20greenhouse%20and%20energy%20reporting%20data/Safeguard-baselines-table.

CER 2018j, *2016–17 Safeguard facility reported emissions*, viewed 4 December 2018, http://www.cleanenergyregulator.gov.au/NGER/National%20greenhouse%20and%20energy%20reporting%20data/safeguard-facility-reported-emissions/safeguard-facility-emissions-2016-17

CER 2018k, *Use of voluntary assurance audit reports for National Greenhouse and Energy Reporting*, viewed 4 December 2018, http://www.cleanenergyregulator.gov.au/NGER/Pages/Reporting%20cycle/Complying%20with%20NGER/Use-of-voluntary-assurance-audit-reports-for-National-Greenhouse-and-Energy-Reporting.aspx.

CER 2018l, *ACCU market update – December 2018* viewed 20 December 2018, http://www.cleanenergyregulator.gov.au/Infohub/Markets/buying-accus/australian-carbon-credit-unit-market-updates/december-2018.

CER 2017a, *Regulator Performance Framework Self-Assessment Report,* CER, Canberra,

CER 2017b, *What data is published and why*, viewed 4 December 2018, http://www.cleanenergyregulator.gov.au/NGER/National%20greenhouse%20and%20energy%20reporting%20data/What-data-is-published-and-why.

CER 2017c, *Facilities method*, viewed 5 December 2018, http://www.cleanenergyregulator.gov.au/ERF/Choosing-a-project-type/Opportunities-for-industry/facility-methods/facilities-method

CER 2016a, *Register and deregister*, viewed 4 December 2018, http://www.cleanenergyregulator.gov.au/NGER/Reporting-cycle/Register-and-deregister.

CER 2016b, *Report*, viewed 4 December 2018, http://www.cleanenergyregulator.gov.au/NGER/Reporting-cycle/Report.

CER 2016d, *The Australian national registry of emissions units*, viewed 4 December 2018, http://www.cleanenergyregulator.gov.au/OSR/ANREU/The-Australian-national-registry-of-emissions-units.

CER 2015, *About the mechanism*, viewed 4 December 2018, http://www.cleanenergyregulator.gov.au/Infohub/CPM/About-the-mechanism.

Climate Change Authority Act 2011 (Cth).

Climate Change Authority (CCA) 2018, *Reaping the rewards: improving farm profitability, reducing emissions and conserving natural capital – final report,* CCA, Canberra.

CCA 2017, *Review of the Emissions Reduction Fund,* CCA, Canberra.

CCA 2016, *Towards a climate policy toolkit: Special review on Australia's climate goals and policies,* CCA, Melbourne.

CCA and Australian Energy Market Commission (AEMC) 2017, *Towards the next generation: delivering affordable, secure and lower emissions power,* CCA, Canberra.

Climate & Clean Air Coalition (CCAC) 2016, *The Marrakech Communiqué,* viewed 18 December 2018, http://www.ccacoalition.org/ru/resources/marrakech-communique.

Climate Change Response Act 2002 (New Zealand)

Commonwealth of Australia 2018a, *National Greenhouse Accounts Factors – Australian National Greenhouse Accounts,* Department of the Environment and Energy, Canberra.

Commonwealth of Australia 2018b, *National Inventory Report 2016 Volume 1,* Department of Environment and Energy, Canberra.

Commonwealth of Australia 2018c, *The Review of the National Pollutant Inventory Discussion Paper,* National Environment Protection Council, Canberra.

Commonwealth of Australia 2018d, *Quarterly Update of Australia's National Greenhouse Gas Inventory: June 2018,* Department of the Environment and Energy, Canberra.

Commonwealth of Australia 2018e, *Australia's emissions projections 2018,* Department of the Environment and Energy, Canberra.

Commonwealth of Australia 2017a, *Australia's emissions projections 2017,* Department of the Environment and Energy, Canberra.

Commonwealth of Australia 2017b, *2017 Review of Climate Change Policies,* Department of the Environment and Energy, Canberra.

Commonwealth of Australia 2015, *Emissions Reduction Fund Methodology Determination Guidelines,* Department of the Environment, Canberra.

CommTrade Carbon 2018, *CommTrade*, viewed 4 December 2018, https://www.commtrade.co.nz.

Corporations Act 2001 (Cth).

Department of Agriculture and Water Resources (DAWR) 2018, *AGSURF Data*, viewed 4 December 2018, http://apps.daff.gov.au/AGSURF/agsurf.asp.

Department of Climate Change 2009, *National Greenhouse and Energy Reporting Streamlining Protocol,* Council of Australian Government Expert Group on Streamlining Greenhouse and Energy Reporting, Canberra.

Department of the Environment and Energy (DoEE) 2018a, *Consultation on amendments to the National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015*, viewed 4 December 2018, http://www.environment.gov.au/climate-change/government/emissions-reduction-fund/consultation/safeguard-mechanism-legislative-amendments-2018.

DoEE 2018b, *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015 – Exposure draft compilation of proposed amendments to the safeguard rule.*

DoEE 2017, *National Carbon Offset Standard for Organisations,* viewed 18 December 2018, http://www.environment.gov.au/system/files/resources/d24bb1e1-3c93-4a78-98b0-61a8e506821c/files/ncos-organisations.pdf.

DoEE n.d.a, *Carbon neutral certified organisations, products and services and events*, viewed 4 December 2018, http://www.environment.gov.au/climate-change/government/carbon-neutral/certified-businesses#Certified_organisations.

DoEE n.d.b, *International activity*, viewed 4 December 2018, https://www.energy.gov.au/government-priorities/international-activity.

DoEE n.d.c, *National Carbon Offset Standard Appendix A,* viewed 18 December 2018, http://www.environment.gov.au/system/files/resources/d0f92314-912f-405e-8982-d342dd932704/files/ncos-appendixa.pdf.

DoEE n.d.d, *Energy Data* viewed 5 December 2018, https://www.energy.gov.au/government-priorities/energy-data

DoEE n.d.e, *Energy security assessments*, viewed 5 December 2018, https://www.energy.gov.au/government-priorities/energy-security/energy-security-assessments

DoEE n.d.f, *How the National Greenhouse Gas Inventory works*, viewed 5 December 2018, http://www.environment.gov.au/climate-change/climate-science-data/greenhouse-gas-measurement/how-inventory-works

DoEE n.d.g, *Methodology for the 2017 Projections,* viewed 18 December 2018, https://www.environment.gov.au/system/files/resources/eb62f30f-3e0f-4bfa-bb7a-c87818160fcf/files/2017-projections-methodology.pdf.

Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education (DIICCSRTE) n.d.a, *Streamlining reporting under the National Greenhouse and Energy Reporting Scheme*, viewed 4 December 2018, http://pandora.nla.gov.au/pan/142904/20130920-1151/climatechange.gov.au/climate-change/greenhouse-gas-measurement-and-reporting/company-emissions-measurement/national/nger-consultations/streamlining-reporting-under-national-greenhouse-and-energy-reporting-scheme.html.

DIICCSRTE n.d.b, *Treatment of renewable energy in the National Greenhouse and Energy Reporting System*, viewed 4 December 2018, http://webarchive.nla.gov.au/gov/20130905072559/http://www.climatechange.gov.au/climate-change/greenhouse-gas-measurement-and-reporting/company-emissions-measurement/national/nger-consultations/treatment-renewable-energy-national-greenhouse-and-energy-reporting-system.

Environment and Climate Change Canada 2017, *Guidance*, viewed 4 December 2018, https://ec.gc.ca/gu-sw/default.asp?lang=En&n=18E16F61-1&offset=1.

Environment and Climate Change Canada 2018, *Overview of 2016 reported emissions: facility greenhouse gas reporting program*, Environment and Climate Change Canada.

European Commission (EC) n.d.a, *EU ETS Handbook,* viewed 18 December 2018, https://ec.europa.eu/clima/sites/clima/files/docs/ets_handbook_en.pdf.

European Commission n.d.b, *EU Emissions Trading System (EU ETS)*, viewed 5 December 2018, https://ec.europa.eu/clima/policies/ets_en.

EY 2018, *Climate Risk Disclosure Barometer 2018*, EY, Australia.

Farm Animal Investment Risk & Return (FAIRR) Initiative 2018, *Coller FAIRR Protein Producer Index Report: Benchmarking intensive livestock and fish farming on environmental, social and governance issues,* viewed 19 December 2018, https://index.fairr.org/

Ford, M., Gurney, A., Tulloh, C., McInnis, T., Mi, R. and H. Ahammad 2009, *Agriculture and the Carbon Pollution Reduction Scheme (CPRS): economic issues and implications,* ABARE, Canberra.

Greenhouse Gas Inventory Office of Japan 2017, *National Greenhouse Gas Inventory Report of Japan,* viewed 18 December 2018, https://www.env.go.jp/earth/ondanka/ghg-mrv/unfccc/material/NIR-JPN-2017_E.pdf.

Government of Canada 2018, *Reporting greenhouse gas emissions: questions and answers*, viewed 4 December 2018, https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/facility-reporting/reporting/questions-answers.html.

GRAIN and the Institute for Agriculture and Trade Policy (IATP) 2018, *Emissions impossible – How big meat and dairy are heating up the plane,t* viewed 18 December 2018, https://www.grain.org/article/entries/5976-emissions-impossible-how-big-meat-and-dairy-are-heating-up-the-planet.

Intergovernmental panel on climate change Task Force on National Greenhouse Gas Inventories Working Group I (IPCC TFI WGI) 2018, *Expert Meeting on Short-Lived Climate Forcers (SLCF) Meeting Report* viewed 18 December 2018, https://www.ipcc-nggip.iges.or.jp/public/mtdocs/pdfiles/1805_Expert_Meeting_on_SLCF_Report.pdf.

IPCC, 2007, *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, and New York.

Hyun, J. and Oh, H n.d. *Korea's Emission Trading System: An Attempt of Non-Annex I Party Countries to Reduce GHG Emissions Voluntarily*, viewed 5 December 2018, https://www.thepmr.org/system/files/documents/KETS_HyunOh1.pdf.

International Civil Aviation Organisation (ICAO) n.d., *CORSIA Implementation Plan brochure* viewed, 18 December 2018, https://www.icao.int/environmental-protection/Documents/CorsiaBrochure_8Panels-ENG-Web.pdf.

International Maritime Organisation (IMO) 2018, *Low carbon shipping and air pollution control*, viewed 4 December 2018, http://www.imo.org/en/MediaCentre/HotTopics/GHG/Pages/default.aspx.

International Partnership on Mitigation and MRV 2015, *Web-based GHG Management System of the Republic of Korea*, viewed 5 December 2018, https://www.transparency-partnership.net/sites/default/files/ws15223_south_korea_gpa2015_en_long-fin.pdf.

Investor Group on Climate Change (IGCC) 2016, *Senate Economics References Committee Inquiry into carbon risk disclosure – Submission by the Investor Group on Climate Change,* IGCC, Sydney.

Japanese Ministry of Economy, Trade and Industry 2018, *Announcement of Figures for FY2015 Greenhouse Gas Emissions Calculated Under the GHG Emissions Accounting, Reporting, and Disclosure System*, viewed 5 December 2018, http://www.meti.go.jp/english/press/2018/0831_001.html.

Korea Environment Corporation 2013, *Korean Emission Trading Scheme*, presentation, viewed 5 December 2018, https://icapcarbonaction.com/en/index.php?option=com_attach&task=download&id=114.

Meat and Livestock Australia (MLA) 2017, *Red meat industry can be carbon neutral by 2030*, viewed 4 December 2018, https://www.mla.com.au/news-and-events/industry-news/red-meat-industry-can-be-carbon-neutral-by-2030/.

Mexican Department of Environment and Natural Resources 2015, *National Emissions Register: mitigation component*, presentation, viewed 5 December 2018, https://www.thepmr.org/sites/wbpmr/files/Mexico_RENE_PMR_240915.pdf.

Motu Economic and Public Policy Research 2018, *A guide to the New Zealand Emissions Trading Scheme*, guide, viewed 5 December 2018, http://www.mfe.govt.nz/sites/default/files/media/Climate%20Change/A%20Guide%20to%20the%20New%20Zealand%20Emissions%20Trading%20Scheme.pdf.

National Farmers' Federation (NFF) 2018, *2030 Roadmap – Australian Agriculture's Plan for a $100 Billion Industry,* NFF, Canberra.

National Greenhouse and Energy (Measurement) Determination 2008 (Cth).

National Greenhouse and Energy Reporting Act 2007 (Cth).

National Greenhouse and Energy Reporting (Audit) Determination 2009 (Cth).

National Greenhouse and Energy Reporting (Auditor Registration) Instrument 2017 (No. 2) (Cth).

National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015 (Cth).

National Greenhouse and Energy Reporting Regulations 2008 (Cth).

Ozone Protection and Synthetic Greenhouse Gas Management Act 1898 (Cth).

Partnership for Market Readiness (PMR) 2015, *Guide for designing mandatory greenhouse gas reporting programs,* World Bank Group, Washington.

Petroleum and Other Fuels Reporting Act 2017 (Cth).

Prime Minister and Cabinet (PMC) 2015, *Australian Government Public Data Policy Statement,* viewed 18 December 2018, https://www.pmc.gov.au/sites/default/files/publications/aust_govt_public_data_policy_statement_1.pdf.

Summerhayes, G 2017, 'Australia's new horizon: Climate change challenges and prudential risk', *Presentation to the Insurance Council of Australia Annual Forum*, Sydney, 17 February.

Republic of France Ministry of Environment, Energy and the Sea 2016, *Method for the realisation of balance sheets of greenhouse gas emissions in accordance with Article L. 229–25 of the environmental code version 4*, viewed 5 December 2018, https://www.ecologique-solidaire.gouv.fr/sites/default/files/Guide%20m%C3%A9thodologique%20sp%C3%A9cifique%20pour%20les%20collectivit%C3%A9s%20pour%20la%20r%C3%A9alisation%20du%20bilan%20d%E2%80%99%C3%A9missions%20de%20GES.pdf.

Republic of Korea Ministry of Environment 2017, *Greenhouse Gas Target Management System*, viewed 5 December 2018, http://eng.me.go.kr/eng/web/index.do?menuId=207.

Sustainable Business Australia (SBA) 2017, *Climate Action in 2017,* viewed 12 December 2018, https://www.slideshare.net/sustainablebusinessaustralia/sba-climate-action-in-2017-report-release.

Task Force on Climate-related Financial Disclosures (TCFD) 2017a, *Final report – recommendations of the Task Force on Climate-related Financial Disclosures,* viewed 18 December 2018, https://www.fsb-tcfd.org/wp-content/uploads/2017/06/FINAL-2017-TCFD-Report-11052018.pdf.

TCFD 2017b, *Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures,* viewed 18 December 2018, https://www.fsb-tcfd.org/wp-content/uploads/2017/12/FINAL-TCFD-Annex-Amended-121517.pdf.

The Auditor-General 2012, *Administration of the National Greenhouse and Energy Reporting Scheme,* Australian National Audit Office, Canberra.

The Greenhouse Gas Protocol n.d., *A Corporate Accounting and Reporting Standard,* viewed 18 December 2018, https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf.

United National Framework Convention on Climate Change (UNFCCC) Compliance Committee 2018, *Report of the individual review of the annual submission of Australia submitted in 2017,* viewed 18 December 2018, https://unfccc.int/sites/default/files/resource/2017%20ARR%20of%20AUS_complete.pdf.

UNFCCC 2011, *Decision 4/CMP.7 Decisions adopted by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol,* FCCC/KP/CMP/2011/10/Add.1, viewed 16 December 2018, https://unfccc.int/resource/docs/2011/cmp7/eng/10a01.pdf

UNFCCC 1997, *Decision 2/CP.3 Methodological issues related to the Kyoto Protocol,* FCCC/CP/1997/7/Add.1, viewed 13 December 2018, https://unfccc.int/resource/docs/cop3/07a01.pdf.

United States Environment Protection Agency (US EPA) 2009, *Mandatory Greenhouse Gas Reporting Rule: EPA's Response to Public Comments,* Washington

US EPA n.d. *Greenhouse Gas Reporting Program (GHGRP),* viewed 5 December 2018, https://www.epa.gov/ghgreporting.

World Resources Institute 2013, *Designing greenhouse gas reporting systems: learning from existing programs, Working Paper,* viewed 18 December 2018, https://wriorg.s3.amazonaws.com/s3fs-public/designing_greenhouse_gas_reporting_systems.pdf?_ga=2.238027392.1488601087.1545095048-595207551.1545095048.

World Resources Institute 2015, *Guide for Designing Mandatory Greenhouse Gas Reporting Programs,* The World Bank, Washington.