Australian Government
Department of Industry, Science, Energy and Resources

Safeguard Mechanism: Prescribed capture efficiency

Landfills

February 2021

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Glossary

- **Capture efficiency** – relates to a landfill gas capture system at a landfill, means the proportion of landfill gas generated by the landfill that is captured and combusted by the landfill gas collection system, expressed as a percentage
- **t CO_2-e** – tonnes carbon dioxide equivalent
- **Department** - Australian Government Department of Industry, Science, Energy and Resources
- **Landfill gas** - gas generated from anaerobic decomposition of biological material at a landfill
- **Landfill gas capture system** - a system to capture and combust landfill gas
- **Legacy emissions** - emissions attributable to waste accepted by the landfill facility *before* 1 July 2016 is a legacy emission from the operation of the landfill facility
- **NGER** - National Greenhouse and Energy Reporting. The National Greenhouse and Energy Reporting Act 2007 (NGER Act) introduced a single national framework for reporting and disseminating company information about greenhouse gas emissions, energy production and energy consumption.
- **Non-legacy emissions** - emissions attributable to waste accepted by the landfill facility on or *after* 1 July 2016 is a non-legacy emission from the operation of the landfill facility
- **Safeguard Mechanism** – The Safeguard Mechanism places emissions limits on facilities with over 100,000 tonnes of CO_2-e emissions a year
- **Scope 1** - Scope 1 emissions are direct emissions from activities at a covered facility

1. PURPOSE

The purpose of this paper is to set out a process to identify the **prescribed capture efficiency** for use in landfill baseline applications made under the Safeguard Mechanism. The prescribed capture efficiency represents a proportion of landfill gas that is captured and destroyed.

This paper is of interest to the landfills likely to become covered by the Safeguard Mechanism. It is understood from industry that this is likely to be 5 or 6 landfill facilities.

This paper is part of a targeted consultation process with the landfill sector. Following this targeted consultation process, the Department will prepare and publicly consult on legislative amendments to set the prescribed capture efficiency rate in the Safeguard Rule, which will allow Safeguard-covered landfills to set new baselines under subdivision 7 of the Rule.

2. HOW TO MAKE A SUBMISSION

We encourage interested landfill sector stakeholders to make submissions to the Department on this paper, preferably with coordination through the relevant landfill sector peak body. Submissions can be emailed to safeguard.mechanism@industry.gov.au by **COB 12 March 2021**.

3. BACKGROUND

The Safeguard Mechanism, together with the National Greenhouse and Energy Reporting (NGER) scheme, provide a framework for businesses to measure, report, and manage their emissions. It places emissions limits—called baselines—on large emitters, giving covered businesses a legislated obligation to keep net emissions below their baseline. The Safeguard Mechanism is legislated through the NGER Act and the *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015* (Safeguard Rule).

The Safeguard Mechanism covers facilities with annual scope 1 (direct) emissions of 100,000 tonnes carbon dioxide equivalent or more. For landfills, emissions from waste deposited before 1 July 2016 are not covered by the Safeguard Mechanism. This ensures the Safeguard Mechanism does not retrospectively cover emissions from activities that occurred in the past. As such, no landfills have yet been covered by the Safeguard Mechanism, but as more waste is deposited in landfills after 1 July 2016 some landfills are likely to be covered by the Safeguard Mechanism in the future. Industry information is that the number of facilities covered is likely to be small, around 5 or 6.

4. LANDFILL BASELINE

The landfill-benchmark baseline determination is the primary way of setting a baseline for landfills. It is available to the landfill sector only, recognising landfills have no discernible output, and emissions from solid waste take place in years after the waste has been deposited. It is worked out based on the prescribed capture efficiency for the landfill sector. Other types of baselines defined in the

Safeguard Mechanism are calculated-emissions and reported-emissions baselines[1]. Relevant landfills currently have reported baselines under the Safeguard Mechanism. In line with the March 2019 amendments to the Safeguard legislation, all reported baselines (for all Safeguard covered sectors, including mining, transport, manufacturing, oil, gas, landfills, and wastewater management) expire on 1 July 2021. This means that any landfill that exceeds the 100,000 tonne carbon dioxide equivalent non-legacy emissions coverage threshold from the 2021-22 year onwards may need to apply for a new landfill baseline (discussed below). The last date a baseline for the 2021-22 year can be applied for is the end of October 2022. Establishing the prescribed capture efficiency rate in the first half of the 2021 calendar year would allow relevant landfill facilities to apply for a new landfill baseline that would apply from the start of the 2020-21 year (baseline applications for the 2020-21 year are due to the Clean Energy Regulator before the end of October 2021).

A landfill baseline determination is worked out using the formula set out in section 54 of the Safeguard Rule[2]. The formula calculates the baseline emissions number applicable to a landfill facility in a particular financial year as follows[3]:

> The amount of non-legacy emissions in t CO_2-e emitted by the facility. The amount disregards any capture of those emissions at the facility.
>
> *multiplied by*
>
> One minus the prescribed capture efficiency. The prescribed capture efficiency represents the proportion of landfill gas that is captured and destroyed, so this number is subtracted from one to calculate the amount of covered emissions that does not need to be captured under the baseline determination.

Landfill baselines will change each year with the amount of non-legacy waste generated at the facility, allowing baselines to adjust with factors such as increases in landfill intake, and weather variability that affects the amount of landfill gas generated. This is consistent with baselines in other sectors which update annually with production. The prescribed capture efficiency will be set by the Minister for Energy and Emissions Reduction in the Safeguard Rule.

[1] Reported-emissions baselines are determined based on the historical high point of emissions reported under the NGER scheme between 2009–10 and 2013–14. Reported baselines cease on 1 July 2021 for all Safeguard-covered facilities. Calculated-emissions baselines are determined by multiplying an independently audited forecast of production by an emissions intensity value.

[2] https://www.legislation.gov.au/Details/F2020C00926

[3] The equation copied from the Safeguard Rule is: $B_t = NLCH_4t \times (1 - BC_t) \times (1 - OF)$, where:

- Bt is the baseline emissions number for the facility for the financial year (t).
- $NLCH_4t$ is the amount, in t CO_2-e, of non-legacy scope 1 greenhouse gas emissions of the facility in the financial year disregarding any capture of those emissions at the facility included in a report under the Act in relation to the facility and the financial year.
- BC_t is prescribed capture efficiency rate for non-legacy greenhouse gas emissions set out in the Benchmark Emissions-Intensity Index as in force at the start of the financial year.
- OF is the oxidation factor in the near surface conditions of the landfill in subsection 5.4(1) of the *NGER (Measurement) Determination* as in force at the start of the financial year.

5. INTERACTION WITH ERF PROJECTS

Many landfills generate credits under the Emissions Reduction Fund for capturing landfill gas. The prescribed capture efficiency for the Safeguard Mechanism will not affect the ability to generate credits under the Emissions Reduction Fund or the amount of credits generated.

6. SCOPE AND COVERAGE

To date, no landfill facility has a level of non-legacy emissions in excess of the Safeguard Mechanism coverage threshold of 100,000 t CO_2-e.

Some landfill facilities do not report under NGER because they do not have a controlling corporation, for example, landfill facilities that are operated by local governments. Section 19 of the NGER Act will not apply to these facilities. But if a facility's covered emissions exceed 100,000 tonnes CO_2-e, the Responsible Emitter must register to report under Section 15B of the NGER Act and report under Section 22XB of the NGER Act regardless of whether they are a corporation. These facilities would also be covered by the Safeguard Mechanism.

As well as landfill gas emissions, landfill facilities have relatively minor sources of emissions associated with combusting landfill gas, handling waste and running on-site offices and services. The baseline emissions number calculated using the prescribed capture efficiency covers all sources of scope 1 emissions at the landfill facility.

Stakeholder comment sought:

The Department is seeking stakeholder feedback on the likely timing of individual landfill facilities meeting the Safeguard Mechanism's 100,000 tonne non-legacy waste emissions coverage threshold, and particularly if there are any facilities that are likely to meet the coverage threshold in the 2020-21 year.

7. APPROACH FOR CALCULATING THE PRESCRIBED CAPTURE EFFICIENCY RATE

A policy framework based on four principles was established for developing prescribed production variables and default industry average emissions intensity values for use in calculated-emissions baselines[4]. All industry average emissions intensity values set in the Safeguard Rule for other safeguard sectors (including mining, transport, manufacturing, oil, gas, landfills, and wastewater management) have been developed in line with this framework. For consistency it is appropriate these principles apply to the calculation of the prescribed capture efficiency:

Principle 1: Effective

Provide a suitable basis for setting baselines that reflect emissions per unit of production, not adjusted, corrected or discounted for different technologies, geographies, inputs, or practices.

Principle 2: Consistent

Treat facilities and industries consistently. Provide a suitable reference point that is representative of a sectoral average.

Principle 3: Practical

Be as simple and low cost as possible, avoiding excessive measurement and reporting requirements and building on existing schemes, where possible.

Principle 4: Robust

Be based on high quality data and robust methodology that protects the confidentiality of sensitive industry data.

The policy framework sets out that the default emissions intensity calculation approach generates a value that represents the sectoral average. This approach provides for the value to be based on the average of around half the production-weighted emissions intensity values of relevant facilities in a sector, centred on the median production unit.

For landfills the equivalent process would base the prescribed capture efficiency on the average of around half the production-weighted capture efficiency values of NGER reporting landfills, centred on the median capture efficiency. Production weighting can be used when setting industry average default values used in calculated-emissions baseline applications. However, it is not obvious how to production-weight the capture efficiency values, as landfills do not have discernible production (unlike other Safeguard-covered sectors, such as steel production, mining, or air transport). In theory a proxy for production may be waste deposited, because receiving waste is a service a landfill performs. However this is not practical given that landfills' emissions are a function of how much

[4] The Framework document is available here: https://consult.industry.gov.au/climate-change/safeguard-mechanism-legislative-amendments-2018/supporting_documents/safeguardmechanismruleamendmentexplanatorydocument.pdf (see Appendix A).

waste was deposited each year of its operation, and the composition of this waste. There appear to be two other weighting options that could be adopted[5]:

Option 1: Weight capture efficiency values based on amount of landfill gas generated,

> A benefit is that landfill gas generated is a reported parameter, so this approach could be considered robust and practical. Landfill gas generated is also related to the reported emissions (taking into account landfill gas capture and incidental emissions). A drawback is that it is not necessarily a good proxy for "production", in the sense of waste received by the landfill. For instance a landfill located in a cooler climate would be expected to generate a little over half the landfill gas of an identical landfill (in terms of waste received) located in a warmer climate. Similarly, a landfill operating for 10 years would be expected to generate half the emissions for an identical landfill that had operated 20 years (identical in the sense it receives the same annual amount of waste). Under this option, the prescribed capture efficiency would likely be in the range 0.6-0.7[6].

Option 2: Do not weight, so that the prescribed capture efficiency is based on the average of around half the capture efficiency values of NGER reporting landfills, centred on the median capture efficiency.

> A benefit of no production weighting is that all NGER reporting landfills contribute equally to the calculation of the average value, avoiding an arbitrary proxy for "production". As well as consistent, this approach is also practical. A drawback is that under this approach the size of the facilities will not be reflected in the determination of the average capture efficiency value. Not weighting the capture efficiency values also deviates from the approach for setting other industry average values. Under this option, the prescribed capture efficiency would likely be in the range 0.35-0.45[7].

Stakeholder comment sought:

The Department is seeking stakeholder feedback on the options for weighting the capture efficiency value.

This approach (weighting by either Option 1 or Option 2) balances effectiveness and practicality; would not introduce additional reporting requirements; and would treat landfills consistently. Importantly, this approach would mean that the prescribed capture efficiency would be set using an industry average calculation approach that is broadly consistent with the approach used for calculating the industry average default emissions intensity values for all other sectors covered by the Safeguard Mechanism. These values have been set in the Safeguard Rule for the vast majority of

[5] Note that the capture efficiency rate ranges included in this section are preliminary only and are the subject of ongoing analysis. The indicative values are provided here to assist stakeholders in making submissions to this paper.

[6] Note that this is an estimated range that should be treated as indicative only. The final calculated number will be the subject of further consistency checking and review.

[7] Note that this is an estimated range that should be treated as indicative only. The final calculated number will be the subject of further consistency checking and review.

covered sectors, including for mining, transport, manufacturing (such as flat glass, steel, other metals, cement etc), oil, gas, landfills, and wastewater management[8].

Data sources and adjustments

The policy framework sets out that data over the period 2012-13 to 2016-17 is used to calculate default emissions intensities for prescribed production variables. For consistency, the same data period can be used for working out the prescribed capture efficiency rate. Data on scope 1 emissions and landfill gas can be obtained from NGER reports.

Calculation steps:

Step 1: For landfills reporting to the NGER scheme, calculate the capture efficiency rate for each year from 2012-13 to 2016-17 as follows:

1 – ["total scope 1 emissions*" *divided by* "total amount of landfill gas generated (t CO2-e)"]

*Note: Total scope 1 emissions rather than landfill gas captured is used in this equation so that the rate accounts for incidental emissions as well as landfill gas emissions. Because the equation for determining the landfill baseline includes an adjustment factor OF for near surface conditions of the landfill, the total scope 1 emissions needs to be increased by a factor of 1 + OF.

Step 2: Compile the data (up to 5 records from each landfill), and rank the data by capture efficiency, from largest to smallest

Step 3: Determine the average capture efficiency rate of around half the values closest to the median capture efficiency (Option 1 would weight the capture efficiency values by landfill gas, Option 2 would not weight)

These calculation steps are consistent with the Framework Document (see Footnote 4), which has set the approach for calculating default emissions intensity values for all sectors covered by the Safeguard Mechanism.

8. NEXT STEPS

Following feedback on this consultation paper, the Department will finalise the calculation of the prescribed capture efficiency rate, which will undergo review, and then consult on exposure draft legislation to install the rate in Subdivision 7 of the Safeguard Rule. This will then allow landfill facilities to set landfill baselines under the Safeguard Mechanism as they reach the coverage threshold.

[8] See Schedules 2 and 3 of the Safeguard Rule, here: https://www.legislation.gov.au/Details/F2020C00926