Australian Government

Department of Climate Change, Energy, the Environment and Water

Safeguard Mechanism: Prescribed production variables and default emissions intensities

This draft document refers only to production variables that are proposed to be amended in the *National Greenhouse and Energy Reporting (Safeguard Mechanism) Amendment (Production Variables Update) Rules 2023*

Abbreviations and acronyms

CO_2	Carbon dioxide
CCS	Carbon Capture and Storage
CMWG	Coal mine waste gas
GJ	Gigajoules
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
NGER	National Greenhouse and Energy Reporting
t	tonnes
t CO_2-e	tonnes of CO_2 equivalent

PURPOSE OF THIS DOCUMENT

This document is an extract of the 'Safeguard Mechanism document', containing material relevant to production variables that are being updated as a result of the Department of Climate Change, Energy, the Environment and Water (the Department) review into Safeguard Mechanism production variables.

The Safeguard Mechanism document is referred to in section 16 of the *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015* (Safeguard Rule). It is available on the Department's website. The purpose of this document is to **define production variables** for use in baselines made under the Safeguard Mechanism and determine what emissions are relevantly associated with each production variable in accordance with section 16 of the Safeguard Rule.

Production variable definitions and default emissions intensity values are published in Schedule 1 of the Safeguard Rule. Each production variable definition identifies the emissions sources that can contribute to the calculation of an emissions intensity value for the production variable.

There are three types of emissions intensity values:

- **Default emissions intensity values**: are set by the Government and published in the Safeguard Mechanism Rule. They represent the industry average emissions intensity of production, calculated in accordance with the Framework.
- **Facility-specific emissions intensity values**: are set by the Clean Energy Regulator, after an application by a responsible emitter. They represent the emissions intensity of production at an individual facility.
- **Benchmarks**: are set at international best practice, adapted for an Australia context, and apply to new facilities.

Background

Defining prescribed production variables and default emissions intensities

The process of defining the production variables and default emissions intensity values was undertaken in accordance with the *Framework for developing default production variables and emissions-intensity values* (the Framework document). It involved extensive stakeholder consultation and independent technical expert review. As part of the reforms to the Safeguard Mechanism in 2023, production variables were reviewed to ensure they remain appropriate and effective in the context of shifting to declining baselines to contribute to Australia's emissions reduction targets.

Production variable definitions and emissions source boundaries

Section 16 of the Safeguard Rule requires that when emissions are relevantly associated to production variables in an emissions intensity determination application, that must be done in a way that has regard to this document. This ensures that covered emissions are relevant to the default emissions intensity for that production variable.

It is intended that all scope 1 NGER-reported emissions from a facility can be assigned to a production variable. Where a facility produces multiple products, emissions must be apportioned in a justifiable manner, making sure no emissions are counted more than once and the total emissions counted cannot be more than the total emissions from the facility. In some cases, emissions from a particular process will need to be apportioned among two or more production variables.

This document provides guidance for businesses and auditors on the emissions sources used in the development of default emissions intensity values, which emissions sources can be used in facility-specific emissions intensity calculations and how apportioning should be done.

The following sections set out the emissions sources that were either included in or excluded from default emissions intensity calculations, and specify which emissions sources can be included in the calculation of an facility-specific emissions intensity value for a production variable.

Emissions-intensity values

The Safeguard Rule specifies default emissions-intensity values for each production variable. Global Warming Potential values from the Intergovernmental Panel on Climate Change Fifth Assessment Report (AR5) apply to baselines that relate to 2020-21 and later years.

Review of production variables

As part of the Safeguard Mechanism reforms in 2023, the Department reviewed production variables to ensure they remained appropriate and effective in meeting the emissions reduction objective.

Note: Throughout this document, the terms 'on-site' and 'off-site' refer to the site of a facility.

SCHEDULE 1 PRODUCTION VARIABLES

Manufacturing (other)

1. Monoammonium phosphate

1.1. Production variable definition

1. Tonnes of monoammonium phosphate ($(NH_4)H_2PO_4$) products that:
   (a) have a concentration of monoammonium phosphate equal to or greater than 70%; and
   (b) are produced as part of carrying on the monoammonium phosphate production activity at the facility; and
   (c) have a free moisture content less than 2.5%; and
   (d) are of saleable quality.
2. The metric in subsection (1) is applicable to a facility that conducts the activity of producing monoammonium phosphate through:
   (a) the chemical transformation of phosphate rock to phosphoric acid (H_3PO_4); and
   (b) the chemical transformation of that phosphoric acid and anhydrous ammonia (NH_3) to produce monoammonium phosphate ($(NH_4)H_2PO_4$).
3. The activity in subsection (2) is the ***monoammonium phosphate production activity***.

1.2. Inclusions

Scope 1 emissions from the following processes at the facility are included:

- the mining and beneficiation of phosphate rock;
- the reaction of phosphate rock with sulphuric acid to create phosphoric acid;
- reaction of phosphoric acid and ammonia to produce monoammonium phosphate;
- product drying / conditioning, storage and despatch;
- by-product (gypsum) handling and storage;
- the use of machinery, equipment and processes for the physical and/or chemical transformation described in the activity definition, including, for example:
  - machinery used to move materials within the facility, including mobile equipment;
  - control rooms, laboratories, maintenance workshops;
  - machinery used to create non-electrical energy for use in the activity;
  - the processing of by-products where they involve the recovery of materials for re-use within the activity or are necessary for the activity to proceed as described;
  - processing of by-products and waste materials from the activity; and

- other incidental, ancillary or supporting processes which are not included in another default or estimated emissions intensity value.

1.3. Exclusions

Scope 1 emissions from the following processes must be excluded:

- upstream production of the anhydrous ammonia feedstock;
- production of sulphuric acid used as in an input into the conversion of phosphate rock to phosphoric acid;
- production of monoammonium phosphate using phosphoric acid imported from a source off-site;
- processes that do not occur within the facility; and
- on-site electricity generation.

2. Diammonium phosphate

2.1. Production variable definition

1. Tonnes of diammonium phosphate ($(NH_4)_2HPO_4$) products that:
   (a) have a concentration of diammonium phosphate equal to or greater than 70%; and
   (b) are produced as part of carrying on the diammonium phosphate production activity at the facility; and
   (c) have a free moisture content less than 2.5%; and
   (d) are of saleable quality.
2. The metric in subsection (1) is applicable to a facility that conducts the activity of producing either or both of diammonium phosphate through:
   (c) the chemical transformation of phosphate rock to phosphoric acid (H_3PO_4); and
   (d) the chemical transformation of that phosphoric acid and anhydrous ammonia (NH_3) to produce diammonium phosphate ($(NH_4)_2H_2PO_4$).
3. The activity in subsection (2) is the ***diammonium phosphate production activity***.

2.2. Inclusions

Scope 1 emissions from the following processes at the facility are included:

- the mining and beneficiation of phosphate rock;
- the reaction of phosphate rock with sulphuric acid to create phosphoric acid;
- reaction of phosphoric acid and ammonia to produce diammonium phosphate;
- product drying / conditioning, storage and despatch;
- by-product (gypsum) handling and storage;

- the use of machinery, equipment and processes for the physical and/or chemical transformation described in the activity definition, including, for example:
    - machinery used to move materials within the facility, including mobile equipment;
    - control rooms, laboratories, maintenance workshops;
    - machinery used to create non-electrical energy for use in the activity;
    - the processing of by-products where they involve the recovery of materials for re-use within the activity or are necessary for the activity to proceed as described;
    - processing of by-products and waste materials from the activity; and
- other incidental, ancillary or supporting processes which are not included in another default or estimated emissions intensity value.

2.3. Exclusions

Scope 1 emissions from the following processes must be excluded:

- upstream production of the anhydrous ammonia feedstock;
- production of sulphuric acid used as in an input into the conversion of phosphate rock to phosphoric acid;
- production of diammonium phosphate using phosphoric acid imported from a source off-site;
- processes that do not occur within the facility; and
- on-site electricity generation.

Coal mining

3. Run of mine coal

3.1. Production variable definition

1. Tonnes of run-of-mine coal that is produced as part of carrying on the coal mining activity at the facility.

   Note: The coal may be sold with or without beneficiation.

2. The metric in subsection (1) is applicable to a facility that conducts the activity of coal mining.

3. The default emissions intensity is the average of:

   (a) 0.0653 t CO_2-e; and

   (b) the facility-specific emissions intensity number for the facility per tonne of coal.

Definition of coal mining activity

Where the activity of ***coal mining*** is the physical extraction of coal in an open-cut or underground coal mine and includes activities to enable the extraction of coal and post-mining activities.

3.2. Scope of the activity

Saleable coal is the primary output from a coal mine. In some cases, the run-of-mine (ROM) coal is the saleable product, while in other circumstances the ROM coal requires beneficiation. Therefore, ROM coal can be an output or intermediate product depending on the facility circumstances.

The production variable is for the production of coal from underground and open-cut mining processes. The scope of the production variable includes the processes required to extract the coal and to prepare for and undertake beneficiation.

Beneficiation can include:

- crushing so that the product coal is of relatively uniform size;
- washing and flotation to remove partings and lower ash content; and
- disposal of waste.

The production variable includes all development processes required to allow extraction of the coal, including development of new mining areas through the life of the facility. This includes land clearing, removal and storage of topsoil for later use, and rehabilitation of mined areas that occurs during the continued operation of the mine.

Coal mine waste gas and fugitive emissions produced at a facility undertaking the coal mining activity are included in the definition of the production variable.

Coal is mined from both open-cut and underground mines, based on the physical characteristics of the mine geology and the most economically efficient mining method. Both

open-cut and underground mining may be used for any particular coal seam, and separate seams mined at a single facility. Both mining methods are covered by this production variable.

Open-cut mining of coal

Open-cut mining includes all forms of extraction that are not conducted underground. Open-cut mining involves the removal and storage of overburden and interburden material to allow access to the production coal seams. The overburden, interburden and coal are mined using drill and blasting techniques to break up the materials to allow extraction. Mining equipment includes draglines, hydraulic shovels, excavators, haul trucks, earth moving equipment and conveyor systems.

The primary source of scope 1 emissions is the combustion of liquid fuel – usually diesel – used in hydraulic shovels, excavators, bulldozers, haul trucks, drilling rigs and stationary diesel engines used for water management, electricity generation, and sometimes in-pit or primary ROM crushing. Major equipment items such as draglines commonly use electric power.

Emissions from blasting include the oxidation of hydrocarbons (diesel) mixed with other materials, usually ammonium nitrate, to generate the explosive reaction.

During the life of the mine, waste material will require multiple movements as the mine plan evolves. All movement of waste material within the facility is covered by the production variable.

The movement of coal within the mine may involve temporary storage intended to provide buffering for the crushing and beneficiation process and short-term storage of saleable coal (either ROM or washed coal) prior to shipment. Washery tailings are usually stored in a tailings pond.

As mining is completed in different parts of the facility the mined area is rehabilitated by profiling the surface to a finished level, replacing topsoil, and revegetation. The emissions from rehabilitation are included in the production variable.

Underground mining of coal

Underground mining, like open-cut mining, requires significant activity to prepare for the extraction of coal. Shallow underground mines may include the development of an access ramp allowing vehicles to access the underground mining areas for haulage of coal and waste material (during development) to the surface. Deeper mines would generally be developed with one or more vertical shafts to lift coal and possibly waste material (during development) to the surface. Underground mines also include vertical shafts for ventilation including powerful ventilation fans, and sometimes cooling water supply and other services such as electricity and communications.

Different mining techniques can be employed underground depending on the characteristics of the mine geology. The most common techniques are long-wall mining and continuous mining. In each case the primary mining equipment is electrically operated. There is minimal waste material during normal mining operations. Waste material is, when possible, left underground as backfill of previous voids. Coal, and waste when required, is brought to the surface for treatment (coal) or storage (coal and waste).

The primary source of scope 1 emissions from underground mining is from the combustion of liquid fuel – usually diesel – used in underground vehicles, haul trucks, and drilling rigs when access ramps are available, stationary engines used for water management, electricity generation and sometimes underground primary ROM crushing. Emissions from blasting will occur.

Beneficiation of ROM coal

A coal preparation plant (CPP; also known as a coal handling and preparation plant (CHPP), coal handling plant, prep plant, tipple or wash plant) is a facility that washes coal of soil and rock, crushes it into graded sized chunks (sorting), stockpiles grades preparing it for sale.

Measurement of ROM coal

The output of the activity is defined as tonnes of ROM coal, that is coal that is produced in the mining operations before screening, crushing or preparation of the coal has occurred. The measurement of this output is expected to be based on company records of the quantity of ROM coal mined and received for beneficiation or sale. The measurement of the output for the issue of a baseline is by tonne of ROM coal that is suitable to be: further processed on-site (or transferred to another facility) to produce a saleable product; or sold directly from the facility, where the coal was mined.

Mine rehabilitation

Rehabilitation for an individual mine or part of a mine may occur at a facility while other parts of the mine continue in operation, or at the end of life of the facility. The rehabilitation that occurs during the continued operation of the mine are included in the production variable. End of mine life rehabilitation is not included in the production variable.

3.3. Inclusions

For the purposes of the development of the default emissions intensity value and the preparation of an estimated (site-specific) emission intensity value for this production variable, scope 1 emissions from the following processes at the facility are included:

- the use of on-site machinery, equipment and processes for the extraction and treatment of the ore described in the activity definition, including, for example:
    - machinery used to:
        - prepare and remove topsoil and overburden to allow mining of ore;
        - develop underground access roadways;
        - install equipment required to move materials;
        - allow drainage of coal mine waste gas;
    - machinery used to move materials within the facility, including mobile equipment;
    - control rooms, laboratories, maintenance workshops;
    - machinery used to create non-electrical energy for use in the activity;

    - the processing of by-products where they involve the recovery of materials for re-use within the activity or are necessary for the activity to proceed as described;
    - on-site processing of waste materials from the activity;
- beneficiation of coal including:
    - crushing to size the coal;
    - washing to remove waste material;
    - sorting by coal quality;
- Emissions which result from CMWG sources at an underground mine including.
    - surface in-seam pre-mining drainage;
    - underground in-seam pre-mining drainage;
    - drainage of waste coal mine gas from the goaf (the mined area of an underground mine);
    - waste coal mine gas entrained in ventilation air (VAM);
- the supply of utilities such as, but not limited to, compressed air, cooling and water where these are used in support of the activity and within the facility;
- the regeneration of any solvents used within the activity;
- fugitive emissions from post-mining storage of coal from an underground mine where the average annual percentage of methane in VAM exceeds 0.1%;
- the storage and loading of the saleable coal into a medium of transportation such as trucks or rail trains;
- transportation of inputs used in the activity to storage at the facility, where the transport activity wholly occurs within the facility;
- transportation of the output of the activity from storage at the facility, where the transport activity wholly occurs within the facility;
- complementary processes, such as packaging, head office, administrative and marketing operations, which occur within the boundary of the facility that is undertaking the activity;
- other incidental, ancillary or supporting processes which are not included in another default or estimated emissions intensity value; and
- where the facility is (or includes) an open-cut coal mine, the fugitives emissions associated with the open-cut coal mine are included.

It is intended that all scope 1 NGER-reported emissions from a facility can be assigned to a production variable. Where a facility produces multiple products, emissions must be apportioned in a justifiable manner, making sure no emissions are counted more than once and the total emissions counted cannot be more than the total emissions from the facility.

3.4. Exclusions

Scope 1 emissions from the following processes were not included in the default emissions intensity calculation for this production variable, and must be excluded from the calculation of an estimated (site-specific) emissions intensity value for the production variable:

- on-site electricity generation;
- CMWG from a decommissioned underground mine; and
- processes that do not occur within the facility.

Iron ore mining

4. Iron ore

4.1. Production variable definition

1. Tonnes of run-of-mine iron ore, on a wet basis, that:
   (a) is produced as part of carrying on the iron ore mining activity at the facility; and
   (b) is of saleable quality.
2. The metric in subsection (1) is applicable to a facility that conducts the activity of mining iron ore through:
   (a) the physical extraction of mineral ores that contain iron ore metal; and
   (b) the processing of the extracted ores to produce an iron ore product of saleable quality.

   Note: The processes may include crushing, screening, grinding, separation, concentrating, filtration and waste to tailings.
3. The activity in subsection (2) is the ***iron ore mining activity***.

4.2. Scope of the activity

Hematite ore is the most common oxide mineral form requiring limited processing including crushing and screening. Magnetite ore requires additional processing to remove impurities. Magnetite ore processing leads to a concentrate.

The production variable includes all development processes required to allow extraction of the iron ore, including development of new mining areas through the life of the facility. This includes land clearing and removal and storage of topsoil for later use.

Iron ores are presently mined from open-cut mines in Australia. This production variable would apply to underground mines should they be developed.

Open-cut mining of iron ore

Open-cut mining involves the removal and storage of overburden material that allows access to the iron ore. The overburden and ore are mined using drill and blasting techniques to break up the materials to allow extraction, usually via excavator loading into trucks.

Dewatering is a significant activity at mines that are below the natural water table.

The primary source of scope 1 emissions is the combustion of liquid fuel – usually diesel – used in excavators, bulldozers, haul trucks, drilling rigs and stationary diesel engines used for water management, electricity generation, and sometimes in-pit or primary ROM crushing.

Emissions from blasting include the oxidation of hydrocarbons mixed with other materials, usually ammonium nitrate, to generate the explosive reaction.

During the life of the mine, material may require multiple movements as the mine plan evolves. All movement of waste material within the facility is covered by the production variable.

The hauling of ore for treatment may involve temporary storage intended to provide buffering for the milling process, or for longer-term storage of lower grade ores for later blending or treatment, often at the end of the mine life.

Underground mining of iron ore

Underground mining, like open-cut mining, requires significant activity to prepare for the extraction of ore for treatment. Shallow underground mines may include the development of an access ramp allowing vehicles to access the underground mining areas for haulage of ore and possibly waste to the surface. Deeper mines would generally be developed with one or more vertical shafts to lift ore and possibly waste material to the surface. Underground mines would also include vertical shafts for ventilation, and sometimes cooling water supply and other services such as electricity and communications.

Different mining techniques can be employed underground depending on the characteristics of the ore body. All involve drilling, blasting and movement of any waste required to access the ore. Waste material is, when possible, left underground as backfill of previous voids. Ore, and waste when required, is brought to the surface for treatment (ore) or storage (ore and waste).

The primary source of scope 1 emissions from underground mining is from the combustion of liquid fuel – usually diesel – used in underground vehicles, haul trucks, and drilling rigs when access ramps are available, stationary engines used for water management, electricity generation and sometimes underground primary ROM crushing. Emissions from blasting will occur.

Processing of iron ore

Some iron ore mines require limited or no additional processing. Crushing, screening to separate waste material and ore into fines and lumps for sale and washing. Large material may undergo further crushing and return to the separation process.

Other iron ore mines may require more significant processing which could include crushing, grinding, separation and filtration to produce a concentrate for sale with waste going to a tailings facility.

The processing of iron ore is primarily electrically driven machinery. Scope 1 emissions are primarily related to ore and material handling processes.

Measurement of saleable iron ore

The output of the activity is defined as tonnes of saleable iron ore produced by mining operations that is suitable for (or has been through) primary crushing. The measurement of this output is expected to be based on records of the quantity of ROM iron ore produced, measured on a wet basis, prior to processing (e.g. beneficiation or concentrating) using calibrated instruments, based on company records of the quantity of ROM ore mined, or other industry standards as applicable. Evidence of the measurement may include third party

transport bill of lading records or internal company production records. The measurement of the production variable is by tonne of saleable iron ore that is produced at the facility where the iron ore was mined, which is suitable for: processing into concentrate, feedstock at the facility; or transportation away from the facility.

Mine rehabilitation

Rehabilitation for individual mines may occur at a facility while other mines are operated, or at the end of life of the facility. The rehabilitation which occurs during the continued operation of the mine are included in the production variable. End of mine life rehabilitation is not included in the production variable.

4.3. Inclusions

Scope 1 emissions from the following processes at the facility are included:

- the use of on-site machinery, equipment and processes for the extraction and treatment of the ore to produce the iron ore product at the facility described in the activity definition, including, for example:
    - machinery used to:
        - prepare and remove topsoil and overburden to allow mining of ore;
        - develop underground access pathways;
        - dewater mine areas;
        - install equipment required to move materials;
    - machinery used to move materials within the facility, including mobile equipment;
    - control rooms, laboratories, maintenance workshops;
    - machinery used to create non-electrical energy for use in the activity;
    - the processing of by-products where they involve the recovery of materials for re-use within the activity or are necessary for the activity to proceed as described;
    - on-site processing of waste materials;
- the treatment of mined iron ore to size and separate iron ore from waste materials, including:
    - crushing, grinding, screening and filtration to separate waste material and appropriately size material for sale or further processing;
    - washing of ore;
    - mineral recovery processes intended to return iron ore to the crushing and screening process;
- the supply of utilities such as, but not limited to, compressed air, cooling and water where these are used in support of the activity and within the facility;
- drilling and blasting using explosives and other equipment;

- the storage and loading of the iron ore product into a medium of transportation such as trucks or rail trains;
- transportation of inputs used in the activity to storage at the facility, where the transport activity wholly occurs within the facility;
- transportation of the output of the activity from storage at the facility, where the transport activity wholly occurs within the facility;
- complementary processes, such as packaging, head office, administrative and marketing operations, which occur within the boundary of the facility which is undertaking the activity; and
- other incidental, ancillary or supporting processes which are not included in another default or estimated emissions intensity value.

4.4. Exclusions

Scope 1 emissions from the following processes were not included in the calculation of the default emissions intensity for the iron ore prescribed production variable:

- on-site electricity generation; and
- processes that do not occur within the facility.

Oil and gas

5. Reservoir carbon dioxide from existing gas fields

5.1. Production variable definition

1. Tonnes of reservoir carbon dioxide that:
   (a) were separated in an acid gas removal unit from natural gas, crude oil mixtures or products produced from extracted hydrocarbons that are not covered extracted hydrocarbons[1] as part of one of the following activities:
      (i) the oil and gas extraction activity;
      (ii) the integrated crude oil extraction and stabilisation activity;
      (iii) the natural gas processing activity;
      (iv) the integrated natural gas extraction and processing activity;
      (v) the processed natural gas liquefaction activity;
      (vi) the unprocessed natural gas liquefaction activity; and
   (b) when separated, consist of a mixture that is overwhelmingly carbon dioxide (CO_2) and may contain incidental associated substances derived from the source material and capture and separation processes; and
   (c) have not previously been included as a tonne of reservoir carbon dioxide under this section; and
   (d) were not imported as a carbon dioxide stream from another facility.
2. The metric in subsection (1) is applicable to a facility that separates reservoir carbon dioxide from natural gas, crude oil mixtures or products produced from extracted hydrocarbons as part of one of the following activities:
   (a) the oil and gas extraction activity;
   (b) the integrated crude oil extraction and stabilisation activity;
   (c) the natural gas processing activity;
   (d) the integrated natural gas extraction and processing activity;
   (e) the processed natural gas liquefaction activity;
   (f) the unprocessed natural gas liquefaction activity.
3. The default emissions intensity is 0.928 t CO_2-e per tonne of reservoir carbon dioxide.

5.2. Scope of the activity

The production of reservoir CO_2 from existing gas fields as a by-product of oil and gas extraction and production activities is the process of separating naturally occurring reservoir

[1] The definition of covered extracted hydrocarbons is in the definition of the *reservoir carbon dioxide from new gas fields* production variable.

CO_2 present in a natural gas and/or crude oil mixture, or their products, from the mixture or product stream.

The activity may occur as part of any oil and gas extraction and production activity that resulted in the production of one or more hydrocarbon production variables.

For the removal of reservoir CO_2 from natural gas, the processing may involve chemical absorption, a membrane process or any other process that created a CO_2 rich stream from the natural gas. The composition of this stream is overwhelmingly carbon dioxide, but may contain incidental associated substances derived from the natural gas and the process used to separate the carbon dioxide from the natural gas.

The output of the activity is tonnes of naturally occurring reservoir CO_2 separated from the product stream. The production variable therefore is reservoir CO_2 that is released to atmosphere, is stored using a carbon capture and storage (CCS) mechanism or is stored by being utilised in an enhanced oil recovery or other petroleum reservoir management process. Reservoir CO_2 can only be counted once, so reservoir CO_2 that has previously been separated and reinjected (for example, for enhanced oil recovery) and has resurfaced is not included in the production variable.

The default emissions intensity for reservoir CO_2 from existing gas fields is 0.928 t CO_2-e per tonne of reservoir carbon dioxide.

5.3. Inclusions

Emissions that are included in the reservoir CO_2 production variable calculation include:

- tonnes of naturally occurring reservoir CO_2 separated in an acid gas removal unit, including incidental associated substances derived from the natural gas and the process used to separate the carbon dioxide from the natural gas.

Emissions that are included in the 'storage rate' calculation include:

- the fraction of the separated CO_2 that is injected into geological storage using a carbon capture and storage (CCS) process or enhanced oil recovery or other petroleum reservoir management purposes, rather than being released to atmosphere.

5.4. Exclusions

Emissions that are not included in the production variable and associated 'storage rate' calculation include:

- machinery, equipment and processes involved in the separation of CO_2 from the feed stream or product—these are to be assigned to the facility's oil and gas production variables;
- further treatment, if any, of the separated CO_2 stream—these are to be assigned to the facility's oil and gas production variables;
- machinery, equipment and processes involved in the storage of CO_2 using a CCS mechanism, or utilisation of the CO_2 in enhanced oil recovery or other petroleum reservoir management processes—these are to be assigned to the facility's oil and gas production variables;

- the regeneration of any catalysts or solvents used to separate the CO_2, even if the regeneration is undertaken within the activity, as these are to be assigned to the relevant oil and gas production variables;
- other incidental, ancillary or supporting processes;
- processes which do not occur within the facility; and
- on-site electricity generation.

5.5. Multiple production variables from the same facility

It is intended that all scope 1 NGER-reported emissions from a facility can be assigned to a production variable.

The ***reservoir carbon dioxide from existing gas fields*** production variable may be used in conjunction with any other oil and gas production variable, where the activity has included the separation of reservoir CO_2 from the feed stream or product, to provide an allowance for the emission of reservoir CO_2. The apportionment of emissions between the CO_2 production variable and the hydrocarbon production variable(s) is to be as described in the inclusions and exclusions above.

6. Reservoir carbon dioxide from new gas fields

6.1. Production variable definition

1. Tonnes of reservoir carbon dioxide that:
   (a) were separated in an acid gas removal unit from natural gas, crude oil mixtures or products produced from extracted hydrocarbons that are not covered extracted hydrocarbons as part of one of the following activities:
      (i) the oil and gas extraction activity;
      (ii) the integrated crude oil extraction and stabilisation activity;
      (iii) the natural gas processing activity;
      (iv) the integrated natural gas extraction and processing activity;
      (v) the processed natural gas liquefaction activity;
      (vi) the unprocessed natural gas liquefaction activity; and
   (b) when separated, consist of a mixture that is overwhelmingly carbon dioxide (CO_2) and may contain incidental associated substances derived from the source material and capture and separation processes; and
   (c) have not previously been included as a tonne of reservoir carbon dioxide under this section; and
   (d) were not imported as a carbon dioxide stream from another facility.
2. The metric in subsection (1) is applicable to a facility that separates reservoir carbon dioxide from natural gas, crude oil mixtures or products produced from extracted hydrocarbons as part of one of the following activities:
   (a) the oil and gas extraction activity;

(b) the integrated crude oil extraction and stabilisation activity;

(c) the natural gas processing activity;

(d) the integrated natural gas extraction and processing activity;

(e) the processed natural gas liquefaction activity;

(f) the unprocessed natural gas liquefaction activity.

Covered extracted hydrocarbons

3. Extracted hydrocarbons are covered extracted hydrocarbons if they:

   (a) originate from a field (other a field that is covered by subsection (4)) in respect of which the commercial extraction of hydrocarbons was not undertaken before 1 July 2023; and

   (b) are used as an input in the unprocessed natural gas liquefaction activity or the processed natural gas liquefaction activity (whether or not they are processed at a natural gas processing facility to produce pipeline gas beforehand); and

   (c) are not purchased from the domestic wholesale gas market.

4. A field is covered by this subsection if, before 1 July 2023, the field, or part of the field, was included in an area in which the commercial extraction of hydrocarbons was occurring in accordance with a licence (however described) granted under a law of the Commonwealth, a State or a Territory.

Emissions intensities

5. The default emissions intensity is zero t CO_2-e per tonnes of reservoir carbon dioxide.

6. The best practice emissions intensity is zero t CO_2-e per tonnes of reservoir carbon dioxide.

6.2. Scope of the activity

The production of reservoir CO_2 from new gas fields as a by-product of oil and gas extraction and production activities is the process of separating naturally occurring reservoir CO_2 present in a natural gas and/or crude oil mixture, or their products, from the mixture or product stream.

The activity may occur as part of any oil and gas extraction and production activity that resulted in the production of one or more hydrocarbon production variables.

For the removal of reservoir CO_2 from natural gas, the processing may involve chemical absorption, a membrane process or any other process that created a CO_2 rich stream from the natural gas. The composition of this stream is overwhelmingly carbon dioxide, but may contain incidental associated substances derived from the natural gas and the process used to separate the carbon dioxide from the natural gas.

The output of the activity is tonnes of naturally occurring reservoir CO_2 separated from the product stream. The production variable therefore is reservoir CO_2 that is released to atmosphere, is stored using a carbon capture and storage (CCS) mechanism or is stored by being utilised in an enhanced oil recovery or other petroleum reservoir management process.

Reservoir CO_2 can only be counted once, so reservoir CO_2 that has previously been separated and reinjected (for example, for enhanced oil recovery) and has resurfaced is not included in the production variable.

The default emissions intensity for reservoir CO_2 from new gas fields is zero.

The best practice emissions intensity for reservoir CO_2 from new gas fields is zero.

6.3. Inclusions

Emissions that are included in the reservoir CO_2 production variable calculation include:

- tonnes of naturally occurring reservoir CO_2 separated in an acid gas removal unit, including incidental associated substances derived from the natural gas and the process used to separate the carbon dioxide from the natural gas.

Emissions that are included in the 'storage rate' calculation include:

- the fraction of the separated CO_2 that is injected into geological storage using a carbon capture and storage (CCS) process or enhanced oil recovery or other petroleum reservoir management purposes, rather than being released to atmosphere.

6.4. Exclusions

Emissions that are not included in the production variable and associated 'storage rate' calculation include:

- machinery, equipment and processes involved in the separation of CO_2 from the feed stream or product—these are to be assigned to the facility's oil and gas production variables;
- further treatment, if any, of the separated CO_2 stream—these are to be assigned to the facility's oil and gas production variables;
- machinery, equipment and processes involved in the storage of CO_2 using a CCS mechanism, or utilisation of the CO_2 in enhanced oil recovery or other petroleum reservoir management processes—these are to be assigned to the facility's oil and gas production variables;
- the regeneration of any catalysts or solvents used to separate the CO_2, even if the regeneration is undertaken within the activity, as these are to be assigned to the relevant oil and gas production variables;
- other incidental, ancillary or supporting processes;
- processes which do not occur within the facility; and
- on-site electricity generation.

6.5. Multiple production variables from the same facility

It is intended that all scope 1 NGER-reported emissions from a facility can be assigned to a production variable.

The ***reservoir carbon dioxide from new gas fields*** production variable may be used in conjunction with any other oil and gas production variable, where the activity has included the

separation of reservoir CO_2 from the feed stream or product, to provide an allowance for the emission of reservoir CO_2. The apportionment of emissions between the CO_2 production variable and the hydrocarbon production variable(s) is to be as described in the inclusions and exclusions above.

Steel manufacturing

There are nine prescribed production variables for primary steel manufacturing. Five production variables for integrated iron and steel manufacturing—from the preparation of raw materials to casting of carbon steel—are being grouped together in the activity of ***integrated iron and steel manufacturing***. This grouping is made in recognition of the integrated nature of the processes, which will avoid duplication of processes in the inclusions and exclusions list. The remaining four production variables are being defined as four activities that each represent the relevant production variable.

General definitions

integrated iron and steel manufacturing is the chemical and physical transformation of iron ore into crude iron, crude carbon steel products and hot-rolled carbon steel products involving all of the following processes:

(a) the chemical and physical transformation of iron ore into iron ore sinter or iron ore pellets;

(b) the chemical and physical transformation of iron ore feed, including iron ore sinter and iron ore pellets, into molten or metallic iron that includes the reduction of oxides of iron;

(c) either, or both of, the chemical and physical transformation of molten or metallic iron (with or without cold ferrous feed, such as pig iron, flat iron and ferrous scrap) into 1 or more of the following:

(i) continuously cast carbon steel products;

(ii) ingots of carbon steel;

(iii) hot-rolled carbon steel products, which commenced hot-rolling at a temperature above 800 °C;

(iv) hot briquetted iron.

manufacture of carbon steel from cold ferrous feed is the physical and chemical transformation of cold ferrous feed (such as ferrous scrap, hot briquetted iron, pig iron and flat iron) by heating and melting into liquid steel and the subsequent casting of the liquid steel to produce 1 or more of the following:

(a) continuously cast carbon steel products;

(b) ingots of carbon steel.

(c) hot-rolled carbon steel products, which commenced hot-rolling at a temperature above 800 °C.

hot-rolled long products is the hot-rolling of continuously cast carbon steel products (originally produced from an integrated iron and steel manufacturing activity or manufacture of carbon steel from cold ferrous feed activity) into carbon steel long products that*:*

(a) are in coils or straight lengths; and

(b) are generally produced in rod, bar and structural (section) mills; and

(c) generally have a cross sectional shape such as I, T, Y, U, V, H, C, L, square, rectangular, round, flat, hexagonal, angle, channel, structural beam profile or rail profile.

hot-rolled flat products is the hot-rolling of continuously cast carbon steel products (originally produced from an integrated iron and steel manufacturing activity or manufacture of carbon steel from cold ferrous feed activity) into carbon steel flat products that*:*

(a) are flat in profile, such as plate and hot rolled coil; and

(b) are generally produced in hot strip mills and plate mills; and

(c) are generally greater than 600 mm in width; and

(d) are generally less than 150 mm in thickness.

carbon steel means material that*:*

(a) contains by mass more iron (Fe) than any other single element; and

(b) has a carbon (C) concentration less than 2%.

coke oven coke means the solid product obtained from the carbonisation of coal (principally coking coal) at a high temperature and includes coke breeze and foundry coke.

The following inclusions and exclusions list *applies* to the ***integrated iron and steel manufacturing*** activity, specifically:

- coke oven coke (integrated iron and steel manufacturing)
- lime (integrated iron and steel manufacturing)
- iron ore sinter (integrated iron and steel manufacturing)
- iron ore pellets (integrated iron and steel manufacturing)
- continuously cast carbon steel products and ingots of carbon steel (integrated iron and steel manufacturing).

Inclusions for integrated iron and steel manufacturing

Scope 1 emissions from the following processes at the facility are included:

- the use of machinery, equipment and processes used for the physical and/or chemical transformation described in the activity definition, including, for example:
    - machinery used to move materials within the facility, including mobile equipment;
    - control rooms, laboratories, maintenance workshops;
    - machinery used to create non-electrical energy for use in the activity;
    - the processing of by-products where it involves the recovery of materials for re-use within the activity or is necessary for the activity to proceed as described[2]; and
    - onsite processing of waste materials and by-products from the activity;

[2] Examples include BTX, blast furnace slag, gypsum and ammonium sulphate.

- waste heat recovery within the facility;
- steam produced on-site that is not used to produce electricity;
- the production of cryogenic gases e.g. oxygen, nitrogen and argon that are consumed in the activity;
- the conduct of secondary metallurgical treatment;
- the production of intermediate products manufactured for export from the facility;
- casting via the continuous casting process or ingot casting process into intermediate steel products;
- the processing of cold ferrous feed where that process is conducted on site;
- the treatment or combustion of indigenous waste gases, e.g. coke oven gas, blast furnace gas and basic oxygen steelmaking off-gas;
- steel scrap receival (including quality checks and storage);
- warehousing or storage of activity outputs, raw materials and consumables used by the activity where this is at the same location as the activity;
- water and waste treatment (including gases) necessary for the activity to be conducted;
- transportation of inputs (including intermediate products) used in the activity to storage at the facility, where the transport activity wholly occurs within the facility;
- transportation of the outputs (including intermediate products) from the activity from storage at the facility, where the transport activity wholly occurs within the facility;
- complementary activities, such as raw material preparation (including blending, sizing), straightening and cold-forming, facility managed port operations, packaging, head office, administrative and marketing operations where they are undertaken at the site of the facility; and
- other incidental, ancillary or supporting processes which are not included in another default or estimated emissions intensity value.

When calculating estimated (site-specific) emissions intensity values, a facility can assign emissions which do not relate to a specific output either to one production variable only, or apportion those emissions among production variables in accordance with:

- the methods used to calculate the emissions of continuously cast carbon steel in accordance with the requirements in the *National Greenhouse and Energy Reporting (Measurement) Determination 2008*; and
- the apportioning method used by the responsible emitter in their data submission to the Department for the purposes of calculating the default emissions intensity in 2019.

Exclusions for integrated iron and steel manufacturing

Scope 1 emissions from the following processes are not taken to relate to the activity and must be excluded:

- the primary extraction and concentration of raw materials prior to the conduct of the activity;

- any stand-alone finishing processes, including, but not limited to, cold-rolling, annealing, pickling or coating of steel products;
- processes which do not occur within the facility;
- on-site electricity generation.

7. Coke oven coke (integrated iron and steel manufacturing)

7.1. Production variable definition

1. Tonnes of coke oven coke on a dry weight basis that:
   (a) are produced as part of carrying on the integrated iron and steel manufacturing activity at the facility; and
   (b) meet the necessary requirements for use in the integrated iron and steel manufacturing activity.
2. The metric in subsection (1) is applicable to a facility that conducts the activity of ***integrated iron and steel manufacturing***.

7.2. Inclusions

Scope 1 emissions from the following processes are included within the production variable:

- the component of emissions from the activity of integrated iron and steel manufacturing that is attributable to the production of coke oven coke by:
  - the methods used to calculate the emissions of coke oven coke in accordance with the requirements in the *National Greenhouse and Energy Reporting (Measurement) Determination 2008*; and
  - the apportioning method used by the responsible emitter in their data submission to the Department for the purposes of calculating the default emissions intensity in 2019; and
- other incidental, ancillary or supporting processes which are not included in another default or estimated emissions intensity value.

7.3. Exclusions

Scope 1 emissions from the following processes are not taken to relate to the production variable and must be excluded:

- processes excluded from the activity of integrated iron and steel manufacturing;
- processes which do not occur within the facility;
- on-site electricity generation; and
- coal mining.

8. Lime (integrated iron and steel manufacturing)

8.1. Production variable definition

1. Tonnes of lime on a dry weight basis that:
   (a) are produced as part of carrying on the integrated iron and steel manufacturing activity at the facility; and
   (b) meet the necessary requirements for use in the integrated iron and steel manufacturing activity.
2. The metric in subsection (1) is applicable to a facility that conducts the activity of ***integrated iron and steel manufacturing***.

8.2. Inclusions

Scope 1 emissions from the following processes are included within the production variable:

- the component of emissions from the activity of ***integrated iron and steel manufacturing*** that is attributable to the production of lime (including burnt lime and burnt dolomite) by:
  - the methods used to calculate the emissions of lime in accordance with the requirements in the *National Greenhouse and Energy Reporting (Measurement) Determination 2008*; and
  - the apportioning method used by the responsible emitter in their data submission to the Department for the purposes of calculating the default emissions intensity in 2019; and
- other incidental, ancillary or supporting processes which are not included in another default or estimated emissions intensity value.

8.3. Exclusions

Scope 1 emissions from the following processes are not taken to relate to the production variable and must be excluded:

- processes excluded from the activity of integrated iron and steel manufacturing;
- processes which do not occur within the facility;
- on-site electricity generation; and
- the extraction of raw materials.

9. Iron ore sinter (integrated iron and steel manufacturing)

9.1. Production variable definition

1. Tonnes of iron ore sinter on a dry weight basis that:
   (a) are produced as part of carrying on the integrated iron and steel manufacturing activity at the facility; and

(b) meet the necessary requirements for use in the integrated iron and steel manufacturing activity.

2. The metric in subsection (1) is applicable to a facility that conducts the activity of ***integrated iron and steel manufacturing***.

9.2. Inclusions

Scope 1 emissions from the following processes are included within the production variable:

- the component of emissions from the activity of integrated iron and steel manufacturing that is attributable to the production of iron ore sinter by:
    - the methods used to calculate the emissions of iron ore sinter in accordance with the requirements in the *National Greenhouse and Energy Reporting (Measurement) Determination 2008*; and
    - the apportioning method used by the responsible emitter in their data submission to the Department for the purposes of calculating the default emissions intensity in 2019; and
- other incidental, ancillary or supporting processes which are not included in another default or estimated emissions intensity value.

9.3. Exclusions

Scope 1 emissions from the following processes are not taken to relate to the production variable and must be excluded:

- processes excluded from the activity of integrated iron and steel manufacturing***;***
- processes which do not occur within the facility;
- on-site electricity generation; and
- iron ore mining.

10. Iron ore pellets (integrated iron and steel manufacturing)

10.1. Production variable definition

1. Tonnes of iron ore pellets on a dry weight basis that:
    (a) are produced as part of carrying on the integrated iron and steel manufacturing activity at the facility; and
    (b) meet the necessary requirements for use in the integrated iron and steel manufacturing activity.
2. The metric in subsection (1) is applicable to a facility that conducts the activity of ***integrated iron and steel manufacturing***.

10.2. Inclusions

Scope 1 emissions from the following processes are included within the production variable:

- the component of emissions from the activity of integrated iron and steel manufacturing that is attributable to the production of iron ore pellets by:
    - the methods used to calculate the emissions of iron ore pellets in accordance with the requirements in the *National Greenhouse and Energy Reporting (Measurement) Determination 2008*; and
    - the apportioning method used by the responsible emitter in their data submission to the Department for the purposes of calculating the default emissions intensity in 2019; and
- other incidental, ancillary or supporting processes which are not included in another default or estimated emissions intensity value.

10.3. Exclusions

Scope 1 emissions from the following processes are not taken to relate to the production variable and must be excluded:

- processes excluded from the activity of integrated iron and steel manufacturing;
- processes which do not occur within the facility;
- on-site electricity generation; and
- iron ore mining.

11. Continuously cast carbon steel products and ingots of carbon steel (integrated iron and steel manufacturing)

11.1. Production variable definition

1. Tonnes of continuously cast carbon steel products and ingots of carbon steel that:
    (a) are produced as part of carrying on the integrated iron and steel manufacturing activity at the facility; and
    (b) are of saleable quality.
2. The metric in subsection (1) is applicable to a facility that conducts the activity of ***integrated iron and steel manufacturing***.

11.2. Inclusions

Scope 1 emissions from the following processes are included within the production variable:

- the component of emissions from the activity of integrated iron and steel manufacturing that is attributable to the production of continuously cast carbon steel products by:

- the methods used to calculate the emissions of continuously cast carbon steel in accordance with the requirements in the *National Greenhouse and Energy Reporting (Measurement) Determination 2008*; and
- the apportioning method used by the responsible emitter in their data submission to the Department for the purposes of calculating the default emissions intensity in 2019.

- other incidental, ancillary or supporting processes which are not included in another default or estimated emissions intensity value.

11.3. Exclusions

Scope 1 emissions from the following processes are not taken to relate to the production variable and must be excluded:

- processes excluded from the activity of integrated iron and steel manufacturing;
- processes which do not occur within the facility; and
- on-site electricity generation.

12. Hot-rolled long products

12.1. Production variable definition

1. Tonnes of hot-rolled carbon steel long products that:
   (a) are produced as part of carrying on the hot-rolled carbon steel long products activity at the facility; and
   (b) are in coils or straight lengths; and
   (c) are generally produced in rod, bar and structural (section) mills; and
   (d) generally have a cross sectional shape such as I, T, Y, U, V, H, C, L, square, rectangular, round, flat, hexagonal, angle, channel, structural beam profile or rail profile; and
   (e) are of saleable quality.
2. The metric in subsection (1) is applicable to a facility that conducts the activity of the hot-rolling continuously cast carbon steel products (originally produced from an integrated iron and steel manufacturing activity or manufacture of carbon steel from cold ferrous feed activity) into carbon steel long products that:
   (a) are in coils or straight lengths; and
   (b) are generally produced in rod, bar and structural (section) mills; and
   (c) generally have a cross sectional shape such as I, T, Y, U, V, H, C, L, square, rectangular, round, flat, hexagonal, angle, channel, structural beam profile or rail profile.
3. The activity in subsection (2) is the ***hot-rolled carbon steel long products activity***.

12.2. Inclusions

Scope 1 emissions from the following processes are included within the activity boundary:

- the direct emissions from machinery, equipment and processes used for the physical and/or chemical transformation described in the activity definition, including, for example:
    - machinery used to move materials within the facility, including mobile equipment;
    - control rooms, laboratories, maintenance workshops;
    - machinery used to create non-electrical energy for use in the activity;
    - the on-site recovery and processing of steel scrap from rolling operations back into facility operations;
    - onsite processing of waste materials and by-products from the activity;
- waste heat recovery within the facility;
- steam produced on-site that is not used to produce electricity;
- warehousing or storage of activity outputs, raw materials and consumables used by the activity where this is at the same location as the activity;
- water and waste treatment (including gases) necessary for the activity to be conducted;
- transportation of inputs used in the activity to storage at the facility, where the transport activity wholly occurs within the facility;
- transportation of the output of the activity from storage at the facility, where the transport activity wholly occurs within the facility;
- complementary processes, such as packaging, head office, administrative and marketing operations where they are undertaken at the site of the facility; and
- other incidental, ancillary or supporting processes which are not included in another default or estimated emissions intensity value.

Where emissions need to be apportioned among the activity of integrated iron and steel manufacturing and the activity of hot-rolled long products, the responsible emitter should use:

- the methods used to calculate the emissions of continuously cast carbon steel in accordance with the requirements in the *National Greenhouse and Energy Reporting (Measurement) Determination 2008*; and
- the apportioning method used by the responsible emitter in their data submission to the Department for the purposes of calculating the default emissions intensity in 2019.

A facility can assign emissions from ancillary services or processes (which do not relate to a specific output) to one production variable only, or apportion those emissions among production variables as described above.

12.3. Exclusions

Scope 1 emissions from the following processes are not taken to relate to the activity and must be excluded:

- any stand-alone finishing processes, including, but not limited to, cold-rolling, annealing, pickling or coating of steel products;
- processes which do not occur within the facility; and
- on-site electricity generation.

13. Hot-rolled flat products

13.1. Production variable definition

1. Tonnes of hot-rolled carbon steel flat products that:
   (a) are produced as part of carrying on the hot-rolled carbon steel flat products activity at the facility; and
   (b) are flat in profile, such as plate and hot rolled coil; and
   (c) are generally produced in hot strip mills and plate mills; and
   (d) are generally greater than 600 mm in width; and
   (e) are generally less than 150 mm in thickness; and
   (f) are of saleable quality.
2. The metric in subsection (1) is applicable to a facility that conducts the activity of the hot-rolling continuously cast carbon steel products (originally produced from an integrated iron and steel manufacturing activity or manufacture of carbon steel from cold ferrous feed activity) into carbon steel flat products that:
   (a) are flat in profile, such as plate and hot rolled coil; and
   (b) are generally produced in hot strip mills and plate mills; and
   (c) are generally greater than 600 mm in width; and
   (d) are generally less than 150 mm in thickness.
3. The activity in subsection (2) is the ***hot-rolled carbon steel flat products activity***.

13.2. Inclusions

Scope 1 emissions from the following processes are included within the activity boundary:

- the use of machinery, equipment and processes for the physical and/or chemical transformation described in the activity definition, including, for example:
  - machinery used to move materials within the facility, including mobile equipment;
  - control rooms, laboratories, maintenance workshops;
  - machinery used to create non-electrical energy for use in the activity;

    - the processing of by-products where it involves the recovery of materials for re-use within the activity or is necessary for the activity to proceed as described[3]; and
    - the on-site recovery and processing of steel scrap from rolling operations back into facility operations; and
    - onsite processing of waste materials and by-products from the activity;
- waste heat recovery within the facility;
- steam produced on-site that is not used to produce electricity;
- casting via the continuous casting process or ingot casting process into intermediate steel products;
- warehousing or storage of activity outputs, raw materials and consumables used by the activity where this is at the same location as the activity;
- water and waste treatment (including gases) necessary for the activity to be conducted;
- transportation of inputs used in the activity to storage at the facility, where the transport activity wholly occurs within the facility;
- transportation of the output of the activity from storage at the facility, where the transport activity wholly occurs within the facility;
- complementary processes, such as packaging, head office, administrative and marketing operations, where they are undertaken at the site of the facility; and
- other incidental, ancillary or supporting processes which are not included in another default or estimated emissions intensity value.

Where emissions need to be apportioned among the activity of integrated iron and steel manufacturing and the activity of hot-rolled flat products, the responsible emitter should use:

- the methods used to calculate the emissions of continuously cast carbon steel in accordance with the requirements in the *National Greenhouse and Energy Reporting (Measurement) Determination 2008*; and
- the apportioning method used by the responsible emitter in their data submission to the Department for the purposes of calculating the default emissions intensity in 2019.

A facility can assign emissions from ancillary services or processes (which do not relate to a specific output) to one production variable only, or apportion those emissions among production variables as described above.

13.3. Exclusions

Scope 1 emissions from the following processes are not taken to relate to the activity and must be excluded:

- any stand-alone finishing processes, including, but not limited to, cold-rolling, annealing, pickling or coating of steel products;
- processes which do not occur within the facility; and

[3] Examples include BTX, blast furnace slag, gypsum and ammonium sulphate.

- on-site electricity generation.

14. Continuously cast carbon steel products and ingots of carbon steel (manufacture of carbon steel products from cold ferrous feed)

14.1. Production variable definition

1. Tonnes of continuously cast carbon steel products and ingots of carbon steel that:
   (a) are produced as part of carrying on the manufacture of carbon steel products from cold ferrous feed activity at the facility; and
   (b) are not produced as part of carrying on the integrated iron and steel manufacturing activity at the facility; and
   (c) are of saleable quality.
2. The metric in subsection (1) is applicable to a facility that conducts the activity of the ***manufacture of carbon steel products from cold ferrous feed***.

14.2. Inclusions

Scope 1 emissions from the following processes are included within the activity boundary:

- the use of machinery, equipment and processes used for the physical and/or chemical transformation described in the activity definition, including, for example:
  - machinery used to move materials within the facility, including mobile equipment;;
  - control rooms, laboratories, maintenance workshops;
  - machinery used to create non-electrical energy for use in the activity;
  - the processing of by-products where it involves the recovery of materials for re-use within the activity or is necessary for the activity to proceed as described; and
  - onsite processing of waste materials or by-products from the activity;
- waste heat recovery within the facility;
- steam produced on-site that is not used to produce electricity;
- warehousing or storage of activity outputs, raw materials and consumables used by the activity where this is at the same location as the activity;
- the preparation of cold ferrous feed prior to any heating and melting into liquid steel;
- the conduct of secondary metallurgical treatment;
- the production of cryogenic gases, e.g. oxygen, nitrogen and argon that are consumed in the activity;
- casting via processes such as continuous casting or ingot casting into intermediate steel products;
- water and waste treatment (including gases etc.) necessary for the activity to be conducted;

- transportation of inputs used in the activity to storage at the facility, where the transport activity wholly occurs within the facility as the activity;
- transportation of the outputs from the activity from storage at the facility, where the transport activity wholly occurs within the facility;
- complementary processes, such as raw material preparation (including blending, sizing), facility managed port operations, straightening and cold-forming, packaging, head office, administrative and marketing operations where they are undertaken at the site of the facility; and
- other incidental, ancillary or supporting processes which are not included in another default or estimated emissions intensity value.

It is intended that all scope 1 NGER-reported emissions from a facility can be assigned to a production variable, but where a facility produces multiple products, emissions cannot be counted more than once.

When calculating estimated (site-specific) emissions intensity values, a facility can assign emissions from ancillary services or processes (which do not relate to a specific output) to one production variable only, or apportion those emissions among production variables on a justifiable basis.

14.3. Exclusions

Scope 1 emissions from the following processes are not taken to relate to the activity and must be excluded:

- the primary extraction and concentration of raw materials prior to the conduct of the activity;
- any stand-alone finishing processes, including, but not limited to, cold-rolling, annealing, pickling or coating of steel products;
- processes which do not occur within the facility; and
- on-site electricity generation.

15. Iron ore pellets (not from integrated iron and steel manufacturing)

15.1. Production variable definition

1. Tonnes of iron ore pellets on a dry weight basis that:
   (a) are produced as part of carrying on the iron ore pellet production activity at the facility; and
   (b) have a concentration of iron (Fe) equal to or greater than 63%; and
   (c) have a concentration of alumina (aluminium oxide (Al_2O_3)) equal to or less than 2%; and
   (d) have a concentration of silicon dioxide (silica (SiO_2)) equal to or less than 7%; and
   (e) have an average diameter of between 9 and 16 millimetres; and
   (f) are of saleable quality.
2. The metric in subsection (1) is applicable to a facility that conducts the activity of producing iron ore pellets through the physical and chemical transformation of iron ore into saleable iron ore pellets that are for the production of steel and that have:
   (a) a concentration of iron (Fe) equal to or greater than 63%; and
   (b) a concentration of alumina (aluminium oxide (Al_2O_3)) equal to or less than 2%; and
   (c) a concentration of silicon dioxide (silica (SiO_2)) equal to or less than 7%; and
   (d) an average diameter of between 9 and 16 millimetres.
3. However, the metric in subsection (1) is not applicable to a facility that includes the integrated iron and steel manufacturing activity.
4. The activity in subsection (2) is the ***iron ore pellets production activity***.
5. In this section:

   iron ore means any form of iron ore product that has not been semi-processed into iron ore balls or exposed to a hardening process by the application of heat or pressure and includes:
   (a) magnetite ore that has been concentrated; and
   (b) hematite ore that has been crushed to varying extents.

15.2. Inclusions

Scope 1 emissions from the following processes within the facility are included:

- the direct emissions from machinery, equipment, facilities and processes used for the physical and/or chemical transformation described in the activity definition, including, for example:
  - machinery used to move materials within the facility, including mobile equipment;

    - control rooms, laboratories, maintenance workshops;
    - machinery used to create non-electrical energy for use in the activity;
    - the processing of by-products where they involve the recovery of materials for re-use within the activity or are necessary for the activity to proceed as described; and
    - onsite processing of by-products and waste materials from the activity;
- emissions associated with the production of hot air for use in furnace operations;
- waste heat recovery within the facility;
- steam produced on-site that is not used to produce electricity;
- transportation of inputs used in the activity to storage at the facility, where the transport activity wholly occurs within the facility;
- transportation of the output of the activity from storage at the facility, where the transport activity wholly occurs within the facility;
- complementary processes, such as packaging, head office, administrative and marketing operations where they are undertaken at the site of the facility; and
- other incidental, ancillary or supporting processes which are not included in another default or estimated emissions intensity value.

The default emissions intensity value for the iron ore pellets production activity includes all scope 1 NGER-reported emissions from the facilities relevant for setting the default emissions intensity value, except scope 1 emissions from on-site electricity generation.

15.3. Exclusions

Scope 1 emissions from the following processes are not taken to relate to the activity and must be excluded:

- the production of iron ore concentrate;
- processes which do not occur within the facility; and
- on-site electricity generation.

16. Treated steel flat products

16.1. Production variable definition

1. Tonnes of treated steel flat products that:
    (a) are produced as part of carrying on the treated steel flat products activity at the facility; and
    (b) are flat in profile, such as plate and coil; and
    (c) have not previously been included as a tonne of treated steel flat products under this section; and
    (a) have been treated with one or a combination of the following processes:

a. annealing;

b. metal coating;

c. painting.

(d) are of saleable quality.

2. The metric in subsection (1) is applicable to a facility that conducts the activity of transforming hot-rolled steel coil, using a combination of physical or chemical processes, into treated steel flat products that:

(b) are flat in profile, such as plate and coil; and

(c) have involved the pickling and cold-rolling of hot-rolled steel coil; and

(d) have been treated with one or a combination of the following processes:

d. annealing;

e. metal coating;

f. painting.

3. The activity in subsection (2) is the ***treated steel flat products activity***.

16.2. Inclusions

Scope 1 emissions from the following processes are included:

- the use of machinery, equipment and processes for the physical and/or chemical transformation described in the activity definition, including, for example:
  - the pickling, cold reduction, annealing, metal coating and painting processes;
  - machinery used to move materials within the facility, including mobile equipment;
  - control rooms, laboratories, maintenance workshops;
  - machinery used to create non-electrical energy for use in the activity;
  - the processing of by-products where it involves the recovery of materials for re-use within the activity or is necessary for the activity to proceed as described;
  - the on-site recovery and processing of steel scrap; and
  - on-site processing of waste materials and by-products from the activity;
- waste heat recovery within the facility;
- steam produced on-site that is not used to produce electricity;
- warehousing or storage of activity outputs, raw materials and consumables used by the activity where this is at the same location as the activity;
- water and waste treatment (including gases) necessary for the activity to be conducted;
- on-site transportation of steel products;
- complementary processes, such as packaging, head office, administrative and marketing operations, where they are undertaken at the site of the facility; and
- other incidental, ancillary or supporting processes which are not included in another

default or estimated emissions intensity value.

It is intended that all scope 1 NGER-reported emissions from a facility can be assigned to a production variable, but where a facility produces multiple products, emissions cannot be counted more than once.

A facility can assign emissions from ancillary services or processes (which do not relate to a specific output) to one production variable only, or apportion those emissions among production variables as described above.

16.3. Exclusions

Scope 1 emissions from the following processes are not taken to relate to the activity and must be excluded:

- any upstream processes, including, but not limited to the production of hot-rolled steel coil;
- processes which do not occur within the facility; and
- on-site electricity generation.

Wastewater

17. COD removed from wastewater (domestic and commercial)

17.1. Production variable definition

1. Tonnes of COD removed, calculated in accordance with subsection (2);

2. The metric in subsection (1) is applicable to a facility whose primary activity is the handling of either or both of domestic or commercial wastewater and reports emissions under Division 5.3 of the NGER (Measurement) Determination.

3. For paragraph (1), COD removed is given by the following equation:

$$\text{COD removed} = \text{COD}_{\text{measured entering}} - (\text{COD}_{\text{in effluent leaving site}} + \text{COD}_{\text{in sludge leaving site}})$$

where:

COD$_{\textit{measured entering}}$ is the COD entering the site measured consistently with the requirements in Division 5.3 of the NGER (Measurement) Determination.

COD$_{\textit{in effluent leaving site}}$ is the COD leaving the site measured consistently with the requirements in Division 5.3 of the NGER (Measurement) Determination.

COD$_{\textit{in sludge leaving site}}$ is COD in sludge leaving the site measured consistently with the requirements in Division 5.3 of the NGER (Measurement) Determination.

In this section:

COD or ***chemical oxygen demand*** means the total material available for chemical oxidation (both biodegradable and non-biodegradable) measured in tonnes.

17.2. Inclusions

Scope 1 emissions of all gases, other than nitrous oxide, from the following processes at the facility are included:

- the treatment of wastewater received by the facility as well as from other associated on-site processes, including:
    - flaring;
    - stationary equipment such as diesel back-up or natural gas boilers not used to generate electricity;
    - sulphur hexafluoride gases used in equipment at the facility;
- the use of machinery, equipment and processes for the physical and/or chemical transformation described in the activity definition, including, for example:
    - machinery used to move materials within the facility, including mobile equipment;

- control rooms, laboratories, maintenance workshops;
- machinery used to create non-electrical energy for use in the activity;
- the processing of by-products where they involve the recovery of materials for re-use within the facility or are necessary for the activity to proceed as described;
- processing of waste materials from the activity;
- furnaces; and

- other incidental, ancillary or supporting processes which are not included in another default or estimated emissions intensity value.

The default emissions intensity value for the COD removed activity includes all scope 1 NGER-reported emissions, other than emissions of nitrous oxide and scope 1 emissions from on-site electricity generation, from the facilities relevant for setting the default intensity value.

17.3. Exclusions

Scope 1 emissions from the following processes must be excluded:

- further treatment of the outflow by receiving entities;
- pre-treatment of industrial and commercial wastewater that occurs off-site;
- processes that do not occur within the facility, such as the distribution and transportation of treated wastewater, sludge biosolids, and other outputs from the facility to receiving destinations;
- on-site electricity generation; and
- processes that are included in the definition of another production variable.

18. Nitrogen removed from wastewater (domestic and commercial)

18.1. Production variable definition

1. Tonnes of nitrogen removed, calculated in accordance with subsection (2).
2. The metric in subsection (1) is applicable to a facility whose primary activity is the handling of either or both of domestic or commercial wastewater and reports emissions under Division 5.3 of the NGER (Measurement) Determination.
3. For paragraph (1), nitrogen removed is given by the following equation:

$$\text{nitrogen removed} = N_{\text{measured entering}} - (N_{\text{in effluent leaving site}} + N_{\text{in sludge leaving site}})$$

where:

$N_{measured\ entering}$ is the nitrogen entering the site measured consistently with the requirements in Division 5.3 of the NGER (Measurement) Determination.

$N_{in\ effluent\ leaving\ site}$ is the nitrogen leaving the site measured consistently with the requirements in Division 5.3 of the NGER (Measurement) Determination.

$N_{in\ sludge\ leaving\ site}$ is the nitrogen in sludge leaving the site measured consistently with the requirements in Division 5.3 of the NGER (Measurement) Determination.

In this section:

COD or ***chemical oxygen demand*** means the total material available for chemical oxidation (both biodegradable and non-biodegradable) measured in tonnes.

18.2. Inclusions

Scope 1 emissions of nitrous oxide from the following processes at the facility are included:

- the treatment of wastewater received by the facility as well as from other associated on-site processes;
- the use of machinery, equipment and processes for the physical and/or chemical transformation described in the activity definition, including, for example:
    - machinery used to move materials within the facility, including mobile equipment;
    - control rooms, laboratories, maintenance workshops;
    - machinery used to create non-electrical energy for use in the activity;
    - the processing of by-products where they involve the recovery of materials for re-use within the facility or are necessary for the activity to proceed as described;
    - processing of by-products and waste materials from the activity;
    - furnaces;
    - flaring; and
- other incidental, ancillary or supporting processes which are not included in another default or estimated emissions intensity value.

The default emissions intensity value for the nitrogen removed activity includes all scope 1 NGER-reported emissions of nitrous oxide from the facilities relevant for setting the default intensity value, except scope 1 emissions from on-site electricity generation.

18.3. Exclusions

Scope 1 emissions from the following processes must be excluded:

- further treatment of the outflow by receiving entities;
- pre-treatment of industrial and commercial wastewater that occurs off-site;
- processes that do not occur within the facility, such as the distribution and transportation of treated wastewater, sludge biosolids, and other outputs from the facility to receiving destinations; and
- on-site electricity generation.

Natural gas transmission

Natural gas transmission is the activity of transporting natural gas from processing facilities to a distribution system, or to industrial customers, through high pressure pipelines with a maximum allowable operating pressure greater than 1,050 kilopascals.

The natural gas transmission production variables do not apply to facilities that process natural gas and may also compress the gas as part of, or subsequent to, the processing activity. These facilities should use the processed natural gas (processing only) or processed natural gas (production and processing) production variables.

Definitions

(1) In this part:

natural gas has the meaning given by the NGER Regulations.

natural gas transmission pipeline means a pipeline for the conveyance of natural gas reports emissions under Division 3.3.7 of the NGER (Measurement) Determination.

(2) The activity of ***natural gas transmission*** is the transport of natural gas through natural gas transmission pipelines to customers or distribution networks**.**

Note: Customers could include large industrial facilities, liquefied natural gas stations or natural gas processing stations.

19. Fugitive emissions from transmission pipelines

This production variable accounts for the fugitive emissions associated with a natural gas transmission pipeline. Natural gas distribution facilities can also include high pressure pipelines (over 1,050 kilopascals) within the boundary of a gas distribution facility. These are technically reported as 'transmission' under NGER, with associated transmission fugitive emissions reported. It is intended that the *kilometres of natural gas transmission pipelines* production variable is applicable to a natural gas distribution facility that has high pressure pipelines which are considered transmission pipelines and reports emissions under Division 3.3.7 of the NGER (Measurement) Determination.

The default emissions intensity value is comprised of the emissions factors in the NGER (Measurement) Determination for:

- tonnes of CO_2-e per kilometre of gas transmission piping associated with carbon dioxide; and
- tonnes of CO_2-e per kilometre of gas transmission piping associated with methane.

19.1. Production variable definition

1. Kilometres of natural gas transmission pipelines used to deliver natural gas or plant condensate to customers or distribution networks as part of carrying on the natural gas transmission activity at the facility.

2. The metric in subsection (1) is applicable to a facility that conducts the natural gas transmission activity and reports emissions under Division 3.3.7 of the NGER (Measurement) Determination.

3. The kilometres of the natural gas transmissions pipelines must not be greater than the kilometres of pipelines reported under section 3.76 of the NGER (Measurement) Determination for the same financial year.

19.2. Inclusions

Scope 1 emissions from the following processes at the facility are included:

- Natural gas transmission pipelines at a pressure greater than 1,050 kilopascals, including looping and laterals, upstream of or within a natural gas distribution facility.

19.3. Exclusions

Scope 1 emissions from the following processes must be excluded:

- machinery, equipment and processes which are integral to, and essential for, the activity described in the natural gas distribution activity definition, including, for example:
    - distribution piping, including gas mains and service lengths (from the gas main to the customer's meter)
    - equipment at stations constituting part of the distribution system, such as city gate stations, gate stations, regulator stations and metering stations
    - control rooms, gas sampling stations, laboratories, maintenance workshops;
- processes which do not occur within the facility; and
- on-site electricity generation.

20. Natural gas throughput

1. Gigajoules of natural gas that are received by the facility as part of carrying on the natural gas transmission activity at the facility.

2. The metric in subsection (1) is applicable to a facility that conducts the natural gas transmission activity and reports emissions under Division 3.3.7 of the NGER (Measurement) Determination.

20.1. Inclusions

Scope 1 emissions from the following processes at the facility are included:

- the use of on-site machinery, equipment and processes to assist the delivery of natural gas, including:
    - equipment at stations constituting part of the transmission system, such as compressor stations, metering stations and regular stations;
    - control rooms, laboratories, maintenance workshops;
    - the supply of utilities, such as, but not limited to, compressed air, nitrogen, steam and water where these are used in support of the activity and within the activity boundaries;
    - maintenance and development activities including transport of staff and materials, where the transport activity wholly occurs within the facility reporting boundary; and
    - complementary activities, such as head office, administrative and marketing operations, if they are carried out at the same location as the activity.
- waste heat recovery within the facility; and
- other incidental, ancillary or supporting processes which are not included in another definition of another production variable.

20.2. Exclusions

Scope 1 emissions from the following processes must be excluded

- processing of the natural gas upstream of the activity boundary;
- transport of the natural gas by compression into the activity, if the compression occurs upstream of the activity boundary;
- natural gas distribution pipelines with a maximum allowable operating pressure of 1,050 kilopascals or less, downstream of the activity boundary;
- local distribution within the customer's premises downstream of the transmission entity's operation control, which is normally the point of sale or delivery to the customer;
- on-site electricity generation;
- processes that are included in the definition of another production variable, such as fugitive emissions in the kilometres of transmission pipeline production variable; and

- processes that do not occur within the facility.

The default emissions intensity value for the natural gas throughput production variable includes all scope 1 NGER-reported emissions from the gas transmission facilities relevant for setting the default intensity value, except scope 1 emissions from on-site electricity generation and fugitive emissions.

Clinker and cement

There are two prescribed production variables for clinker and cement manufacturing. One is for the production of ***clinker*** that is not used by the facility to make cement. The other is for the production of ***cement*** made from clinker produced at a facility.

Definitions

(1) In this Part:

cement means any hydraulic cement, including general purpose and blended cements, meeting the minimum requirements for such cements set out in AS 3972—2010 or any other specific contract and export specifications.

Note: In 2020, AS 3972—2010 was available from http://www.standards.org.au.

Portland cement clinker means the Portland cement clinker resulting from clinker production which:

(a) has a concentration of calcium silicates equal to or greater than 60% by mass; and

(b) has a concentration of magnesium oxide (MgO) equal to or less than 4.5% by mass; and

(c) is useable in the making of Portland cement.

supplementary cementitious material means any mineral additive to cement which meets the minimum requirements for such additives set out in any of Australian Standards AS 3582.1:2016, AS 3582.2:2016, AS 3582.3:2016 or AS 3582.4:2022, or any other specific contract and export specifications.

Note: In 2023, each of the abovementioned Australian Standards was available from http://www.standards.org.au.

(2) In this Part the activity of ***clinker production*** is the physical and chemical transformation of:

(a) either or both of calcium carbonate compounds (limestone ($CaCO_3$)) and other calcium carbonate ($CaCO_3$) feedstocks; and

(b) any of the following:

(i) clay;

(ii) clay mixed with 1 or more feedstocks that contain 1 or more of the following:

(A) silicon dioxide (SiO_2);

(B) iron (Fe);

(C) aluminium oxide (alumina (Al_2O_3));

(iii) 1 or more feedstocks that, when combined, contain all of the following:

(A) silicon dioxide (SiO_2); and

(B) iron (Fe); and

(C) aluminium oxide (alumina (Al_2O_3));

that are fused together at a temperature above 1000 °C into Portland cement clinker.

21. Clinker

21.1. Production variable definition

1. Tonnes of Portland cement clinker on a dry weight basis that:
   (a) is produced as part of carrying on the clinker production activity at the facility; and
   (b) is exported from the facility or allocated for export from the facility (whether the export will occur within or after the reporting year); and
   (c) is not used to make cement at the facility; and
   (d) is of saleable quality.
2. The metric in subsection (1) is applicable to a facility that:
   (a) conducts the clinker production activity at the facility; and
   (b) if the cement production variable is applicable to the facility—also uses that prescribed production variable.

21.2. Inclusions

Scope 1 emissions from the following processes at the facility are included:

- the use of on-site machinery, equipment and processes which are integral to, and essential for, the physical and/or chemical transformation described in the activity definition, including, for example:
  - machinery used to move materials within and as part of the activity;
  - control rooms, laboratories, maintenance workshops;
  - machinery used to create non-electrical energy for use in the activity;
  - the processing of by-products where it involves the recovery of materials for re-use within the activity or is necessary for the activity to proceed as described; and
  - onsite processing of waste materials;
- waste heat recovery within the activity boundary;
- the supply of utilities such as, but not limited to, compressed air, nitrogen, steam and water where these are used in support of the activity and within the activity boundaries;
- crushing, pre-homogenisation and grinding of raw materials that is contiguous with the clinker production process associated with clinker dispatched;
- kiln dust production and reprocessing;
- reject production where this is not recycled in the process; and
- other incidental, ancillary or supporting processes which are not included in the definition of another production variable.

21.3. Exclusions

Scope 1 emissions from the following processes must be excluded:

- extraction of raw materials;
- crushing of raw materials that is not contiguous with the clinker production process;
- production of clinker that is used, or intended to be used, for making cement on-site;
- processes which do not occur within the facility; and
- on-site electricity generation.

22. Cement produced from clinker and supplementary cementitious material

22.1. Production variable definition

1. Combined:

   (a) Tonnes of cement on a dry weight basis that is:

   (i) produced as part of carrying out the cement production activity at the facility; and

   (ii) attributable to Portland cement clinker produced as part of carrying on the clinker production activity at the facility in accordance with subsection (5); and

   (iii) of saleable quality; and

2. In this section, a ***related entity*** means any of the following:

   (a) the responsible emitter for the facility;

   (b) an entity within the same corporate group as the responsible emitter;

   (c) an entity;

   (i) for which the chief executive officer is also the chief executive officer of the responsible emitter; and

   (ii) which has substantially the same operating, health and safety, and environmental policies as the responsible emitter.

   (d) a joint venture entity of which the responsible emitter or a member of the responsible emitter's corporate group has at least 50% ownership.

3. The metric in subsection (1) is applicable to a facility that:

   (a) conducts the clinker production activity at the facility; and

   (b) conducts the activity of producing cement through the physical transformation of Portland cement clinker into cement through a process of comminution with gypsum or other additives (the ***cement production activity***); and

   (c) if the clinker production variable is applicable to the facility—also uses that prescribed production variable.

4. For paragraph (1)(a) cement is attributable to Portland cement clinker produced as part of carrying on the clinker production activity at the facility in accordance with the following equation:

$$\mathrm{Ce_a} = \mathrm{Ce_f} \times \frac{\mathrm{Cl_f}}{\mathrm{Cl_f} + \mathrm{Cl_i}}$$

where:

Ce_a is the cement attributable to Portland cement clinker produced as part of carrying on the clinker production activity at the facility, in tonnes.

Ce_f is the total amount of cement produced at the facility (f) in the reporting year, in tonnes, that is of saleable quality.

Cl_f is the amount of Portland cement clinker, in tonnes, produced as part of carrying on the clinker production activity at the facility (f) in the reporting year and used, or intended to be used, to produce cement at the facility, not including any tonnes of Portland cement clinker counted for the clinker production variable.

Cl_i is the amount of Portland cement clinker, in tonnes, not covered by ***Cl_f*** and imported in the reporting year to produce cement at the facility (whether or not the Portland cement clinker was produced in or outside of Australia).

5. For paragraphs 4.23C(2)(b) and 4.23D(3)(b) of the NGER Regulations, the following information must be included in a report under the Act in calculating the amount of the prescribed (annually adjusted) production variable for a reporting year:
   (a) the total amount of Portland cement clinker produced at a facility in the reporting year (whether or not it is used, exported from the facility or stockpiled);
   (b) the value of each variable in the equation in subsection (4);
   (c) the total amount of supplementary cementitious material in a reporting year which satisfies paragraph (1)(b) of this production variable;
   (d) evidence demonstrating the amount in paragraph (c) was added to cement covered by paragraph (1)(a) of this production variable;
   (e) if the supplementary cementitious material was provided by an entity other than the responsible emitter for the facility, evidence to show the entity was a related entity.

22.2. Inclusions

Scope 1 emissions from the following processes at the facility are included:

- the use of on-site machinery, equipment and processes which are integral to, and essential for, the physical and/or chemical transformation described in the activity definition, including, for example:
  - machinery used to move materials within and as part of the activity;
  - control rooms, laboratories, maintenance workshops;
  - machinery used to create non-electrical energy for use in the activity;
  - the processing of by-products where it involves the recovery of materials for re-use within the activity or is necessary for the activity to proceed as described; and
  - onsite processing of waste materials;
- waste heat recovery within the activity boundary;

- the supply of utilities such as, but not limited to, compressed air, nitrogen, steam and water where these are used in support of the activity and within the activity boundaries;
- crushing, pre-homogenisation and grinding of raw materials that is contiguous with the clinker production process associated with clinker used for making cement on-site;
- transforming of clinker, both produced on-site and imported, into cement through milling, including the process of comminution with gypsum and other additives;
- kiln dust production and reprocessing;
- reject production where this is not recycled in the process; and
- other incidental, ancillary or supporting processes which are not included in the definition of another production variable.

22.3. Exclusions

Scope 1 emissions from the following processes must be excluded:

- extraction of raw materials;
- crushing of raw materials that is not contiguous with the clinker production process; and
- production of clinker that is not used, or not intended to be used, for making cement on-site;
- processes which do not occur within the facility; and
- on-site electricity generation.

Metal manufacturing

23. Copper anode

23.1. Production variable definition

1. Tonnes of copper anode that:
   (a) has a copper concentration between 99 and 99.9% by mass on an annual average basis; and
   (b) is produced as part of carrying on the copper anode production activity at the facility; and
   (c) is of saleable quality.
2. The metric in subsection (1) is applicable to a facility that conducts the activity of producing copper anode through the physical and chemical transformation of copper sulphide concentrates in a smelter, with or without secondary inputs such as copper scrap, and copper scrap in a smelter to produce copper anodes (the ***copper anode production activity***).

Note: Copper anode is often an input into the production of copper cathode at the same facility.

Measurement

Evidence of the measurement of tonnes of copper anode may include internal company production records.

23.2. Inclusions

Scope 1 emissions from the following processes at the facility are included:

- the use of machinery, equipment and processes for the physical and/or chemical transformation described in the activity definition, including, for example:
  - machinery used to move materials within the facility and as part of the activity, including mobile equipment;
  - control rooms, laboratories, maintenance workshops;
  - machinery used to create non-electrical energy for use in the activity;
  - the processing of by-products where they involve the recovery of materials for re-use within the activity or are necessary for the activity to proceed as described;
  - processing of by-products and waste materials from the activity;
  - production of sulphuric acid;
- waste heat recovery within the facility;
- the supply of utilities such as, but not limited to, natural gas used in heating baths, compressed air, nitrogen, steam and water where these are used in support of the activity and within the activity boundary; and

- other incidental, ancillary or supporting processes which are not included in another default or estimated emissions intensity value.

23.3. Exclusions

Scope 1 emissions from the following processes must be excluded:

- processes which do not occur within the facility; and
- on-site electricity generation.

24. Lithium hydroxide

24.1. Production variable definition.

1. Tonnes of lithium hydroxide monohydrate ($LiOH.H_2O$) that:

    a. has a concentration of lithium hydroxide monohydrate equal to or greater than 98.9% by weight; and

    b. is produced as part of carrying on the lithium hydroxide refining production activity at the facility; and

    c. is of saleable quality.

2. The metric in subsection (1) is applicable to a facility that conducts the activity of producing lithium hydroxide monohydrate that has a concentration of lithium hydroxide monohydrate equal to or greater than 98.9% by weight (the lithium hydroxide refining production activity).

24.2. Inclusions

Scope 1 emissions from the following processes at the facility are included:

- the use of machinery, equipment and processes for the physical and/or chemical transformation described in the activity definition, including, for example:
    - machinery used to move materials within the facility and as part of the activity, including mobile equipment;
    - control rooms, laboratories, maintenance workshops;
    - machinery used to create non-electrical energy for use in the activity;
    - the processing of by-products where they involve the recovery of materials for re-use within the activity or are necessary for the activity to proceed as described;
    - processing of by-products,-waste materials and tailings from the activity;
- chemical reactions during the calcining process;
- waste heat recovery within the facility;

- the supply of utilities such as, but not limited to, natural gas, compressed air, nitrogen, steam and water where these are used in support of the activity and within the activity boundary; and
- other incidental, ancillary or supporting processes which are not included in another default emissions intensity value.

24.3. Exclusions

Scope 1 emissions from the following processes must be excluded:

- upstream mining and concentrating of spodumene ore concentrate
- downstream processing of the lithium hydroxide into cathodes, batteries and other products
- processes that are included in the definition of another production variable
- processes which do not occur within the facility; and
- on-site electricity generation