National Greenhouse and Energy Reporting (Measurement) Amendment Determination 2011 (No. 1)

National Greenhouse and Energy Reporting Act 2007

I, GREG COMBET, Minister for Climate Change and Energy Efficiency, make this Determination under subsection 10 (3) of the National Greenhouse and Energy Reporting Act 2007.

Dated 23 June 2011

GREG COMBET
Minister for Climate Change and Energy Efficiency
1 Name of Determination
This Determination is the *National Greenhouse and Energy Reporting (Measurement) Amendment Determination 2011 (No. 1)*.

2 Commencement
This Determination commences as follows:
(a) on 1 July 2011 — sections 1 to 4 and Schedule 1;
(b) on 1 July 2012 — Schedule 2.

3 Amendment of *National Greenhouse and Energy Reporting (Measurement) Determination 2008*
Schedules 1 and 2 amend the *National Greenhouse and Energy Reporting (Measurement) Determination 2008*.

4 Application
(1) The amendments made by Schedule 1 apply in relation to the 2011–2012 financial year and to later financial years.

(2) The amendments made by Schedule 2 apply in relation to the 2012–2013 financial year and to later financial years.
Schedule 1 Amendments commencing on 1 July 2011

(section 3)

[1] Section 1.8, after definition of blended fuel
insert
briquette means an agglomerate formed by compacting a particulate material in a briquette press, with or without added binder material.

[2] Section 1.8, after definition of principal activity
insert
pyrolysis of coal means the decomposition of coal by heat.

[3] Section 1.8, definition of uncertainty protocol
omit
Uncertainty

[4] Paragraph 1.13 (d)
substitute
(d) completeness — all identifiable emission sources mentioned in section 1.10 must be accounted for.

[5] Subsections 1.21 (5) and 1.27 (5)
omit
The
insert
If method 1 is available for the source, the

[6] Subparagraph 2.3 (1) (a) (iii)
omit
of

[7] Subsection 2.3 (3), except the note
substitute
(3) Method 1 must not be used for estimating emissions of carbon dioxide for the main fuel combusted from the operation of the facility if:
   (a) the principal activity of the facility is electricity generation (ANZSIC industry classification and code 2611); and
(b) the generating unit:
   (i) has the capacity to produce 30 megawatts or more of electricity; and
   (ii) generates more than 50 megawatt hours of electricity in a reporting year.

[8] **Paragraph 2.10 (3) (b)**

*omit*

*conveyer.*

*insert*

*conveyer; or*

[9] **After paragraph 2.10 (3) (b)**

*insert*

(c) if it is not feasible to use one of the collection methods mentioned in paragraph (a) or (b) — by using another collection method that provides representative ash sampling.

[10] **Section 2.11**

*substitute*

2.11 **Sampling for carbon in fly ash**

Fly ash must be sampled for its carbon content in accordance with:

(a) a procedure set out in column 2 of an item in the following table, and at a frequency set out in column 3 for that item; or

(b) if it is not feasible to use one of the procedures mentioned in paragraph (a) — another procedure that provides representative ash sampling, at least every two years, or after significant changes in operating conditions.

<table>
<thead>
<tr>
<th>Item</th>
<th>Procedure</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>At the outlet of a boiler air heater or the inlet to a flue gas cleaning plant using the isokinetic sampling method in AS 4323.1—1995 or AS 4323.2—1995, or in a standard that is equivalent to one of those standards</td>
<td>At least every 2 years, or after significant changes in operating conditions</td>
</tr>
<tr>
<td>2</td>
<td>By using standard industry ‘cegrit’ extraction equipment</td>
<td>At least every year, or after significant changes in operating conditions</td>
</tr>
</tbody>
</table>

*National Greenhouse and Energy Reporting (Measurement) Amendment Determination 2011 (No. 1)*
Item | Procedure | Frequency
--- | --- | ---
3 | By collecting fly ash from:  
(a) the fly ash collection hoppers of a flue gas cleaning plant; or  
(b) downstream of fly ash collection hoppers from ash silos or sluiceways | At least once a year, or after significant changes in operating conditions
4 | From on-line carbon in ash analysers using sample extraction probes and infrared analysers | At least every 2 years, or after significant changes in operating conditions


*substitute*

(3) Method 1 must not be used for estimating emissions of carbon dioxide for the main fuel combusted from the operation of the facility if:

(a) the principal activity of the facility is electricity generation (ANZSIC industry classification and code 2611); and

(b) the generating unit:

(i) has the capacity to produce 30 megawatts or more of electricity; and

(ii) generates more than 50 megawatt hours of electricity in a reporting year.

[12] **Subsection 2.48A (1), definition of \( Q_{pog} \)**

*omit*

facility for stationary energy purposes.

*insert*

facility, estimated in accordance with Division 2.4.6.

[13] **Subsection 2.48A (3)**

*substitute*

(3) For \( OF_{pog} \) in paragraph (2) (b), estimate as follows:

\[
OF_{pog} = \frac{Q_{pog} - \text{Oil Transferred Offsite}_{pog}}{Q_{pog}}
\]

where:

\( Q_{pog} \) is the quantity of petroleum based oils or petroleum based greases consumed from the operation of the facility, estimated in accordance with Division 2.4.6.
Oil Transferred Offsite\textsubscript{pog} is the quantity of oils, derived from petroleum based oils or petroleum based greases, transferred outside the facility, and estimated in accordance with Division 2.4.6.

[14] Division 2.5.2, heading

\textit{substitute}

Division 2.5.2 Energy — manufacture of solid fuels

[15] Section 2.57

\textit{omit}(coke ovens).

\textit{insert}

through the pyrolysis of coal or the coal briquette process.

[16] Subsection 2.58 (1)

\textit{substitute}

(1) One or more of the following methods must be used for estimating emissions during the year from combustion of fuels for energy in the manufacture of solid fuels:

(a) if a facility is constituted by the manufacture of solid fuel using coke ovens as part of an integrated metalworks — the methods provided in Part 4.4 must be used; and

(b) in any other case — one of the following methods must be used:

(i) method 1 under subsection (3);

(ii) method 2 under subsections (4) to (7);

(iii) method 3 under subsections (8) to (10);

(iv) method 4 under Part 1.3.

[17] After subsection 2.58 (2)

\textit{insert}

Method 1

(3) Method 1, based on a carbon mass balance approach, is:

\textit{Step 1} Work out the carbon content in fuel types (i) or carbonaceous input material delivered for the activity during the year, measured in tonnes of carbon, as follows:

\[ \sum_i CCF_i \times Q_i \]
where:

$\Sigma$ means the sum of the carbon content values obtained for all fuel types $(i)$ or carbonaceous input material.

$CCF_i$ is the carbon content factor mentioned in Schedule 3, measured in tonnes of carbon, for each appropriate unit of fuel type $(i)$ or carbonaceous input material consumed during the year from the operation of the activity.

$Q_i$ is the quantity of fuel type $(i)$ or carbonaceous input material delivered for the activity during the year, measured in an appropriate unit and estimated in accordance with criterion A in Divisions 2.2.5, 2.3.6 and 2.4.6.

**Step 2** Work out the carbon content in products $(p)$ leaving the activity during the year, measured in tonnes of carbon, as follows:

$$\Sigma_p CCF_p \times A_p$$

where:

$\Sigma_p$ means the sum of the carbon content values obtained for all product types $(p)$.

$CCF_p$ is the carbon content factor, measured in tonnes of carbon, for each tonne of product type $(p)$ produced during the year.

$A_p$ is the quantity of product types $(p)$ produced leaving the activity during the year, measured in tonnes.

**Step 3** Work out the carbon content in waste by-product types $(r)$ leaving the activity, other than as an emission of greenhouse gas, during the year, measured in tonnes of carbon, as follows:

$$\Sigma_r CCF_r \times Y_r$$

where:

$\Sigma_r$ means the sum of the carbon content values obtained for all waste by-product types $(r)$.

$CCF_r$ is the carbon content factor, measured in tonnes of carbon, for each tonne of waste by-product types $(r)$.

$Y_r$ is the quantity of waste by-product types $(r)$ leaving the activity during the year, measured in tonnes.

**Step 4** Work out the carbon content in the amount of the change in stocks of inputs, products and waste by-products held within the boundary of the activity during the year, measured in tonnes of carbon, as follows:

$$\Sigma_i CCF_i \times \Delta S_{qi} + \Sigma_p CCF_p \times \Delta S_{qp} + \Sigma_r CCF_r \times \Delta S_{yr}$$
where:

\( \Sigma \) has the same meaning as in step 1.

\( CCF_i \) has the same meaning as in step 1.

\( \Delta S_{qi} \) is the change in stocks of fuel type (i) for the activity and held within the boundary of the activity during the year, measured in tonnes.

\( \Sigma \) has the same meaning as in step 2.

\( CCF_p \) has the same meaning as in step 2.

\( \Delta S_{ap} \) is the change in stocks of product types (p) produced by the activity and held within the boundary of the activity during the year, measured in tonnes.

\( \Sigma \) has the same meaning as in step 3.

\( CCF_r \) has the same meaning as in step 3.

\( \Delta S_{yr} \) is the change in stocks of waste by-product types (r) produced from the operation of the activity and held within the boundary of the activity during the year, measured in tonnes.

**Step 5** Work out the emissions of carbon dioxide released from the operation of the activity during the year, measured in CO\(_2\)-e tonnes, as follows:

(a) add the amounts worked out under steps 2, 3 and 4 to work out a new amount (amount A);

(b) subtract amount A from the amount worked out under step 1 to work out a new amount (amount B);

(c) multiply amount B by 3.664 to work out the amount of emissions released from the operation of the activity during the year.

**Method 2**

(4) Subject to subsections (5) to (7), method 2 is the same as method 1 under subsection (3).

(5) In applying method 1 as method 2, step 4 in subsection (3) is to be omitted and the following step 4 substituted.

**Step 4** Work out the carbon content in the amount of the change in stocks of inputs, products and waste by-products held within the boundary of the activity during the year, measured in tonnes of carbon, as follows:

\[ \Sigma_i CCF_i \times \Delta S_{qi} + \Sigma_p CCF_p \times \Delta S_{ap} + \Sigma_r CCF_r \times \Delta S_{yr} + \alpha \gamma RCCS_{CO_2} \]

where:

\( \Sigma \) has the same meaning as in step 1.

\( CCF_i \) has the same meaning as in step 1.

\( \Delta S_{qi} \) is the change in stocks of fuel type (i) for the activity and held within the boundary of the activity during the year, measured in tonnes.
\( \sum_p \) has the same meaning as in step 2.

\( CCF_p \) has the same meaning as in step 2.

\( \Delta S_{ap} \) is the change in stocks of product types \( (p) \) produced by the activity and held within the boundary of the activity during the year, measured in tonnes.

\( \sum_r \) has the same meaning as in step 3.

\( CCF_r \) has the same meaning as in step 3.

\( \Delta S_{yr} \) is the change in stocks of waste by-product types \( (r) \) produced from the operation of the activity and held within the boundary of the activity during the year, measured in tonnes.

\( \alpha \) is the factor \( \frac{1}{3.664} \) for converting the mass of carbon dioxide to a mass of carbon.

\( \gamma \) is the factor \( 1.861 \times 10^{-3} \) for converting a quantity of carbon dioxide from cubic metres at standard conditions of pressure and temperature to \( \text{CO}_2 \)-e tonnes.

\( \text{RCCS}_{\text{CO}_2} \) is carbon dioxide captured for permanent storage, measured in cubic metres in accordance with Division 1.2.3.

(6) If a fuel type \( (i) \) or carbonaceous input material delivered for the activity during the year accounts for more than 5% of total carbon input for the activity, based on a calculation using the factors specified in Schedule 3, sampling and analysis of fuel type \( (i) \) or carbonaceous input material must be carried out to determine its carbon content.

(7) The sampling and analysis is to be carried out using the sampling and analysis provided for in Divisions 2.2.3, 2.3.3 and 2.4.3 that apply to the combustion of solid, gaseous and liquid fuels.

**Method 3**

(8) Subject to subsections (9) and (10), method 3 is the same as method 2 under subsections (4) to (7).

(9) If a fuel type \( (i) \) or carbonaceous input material delivered for the activity during the year accounts for more than 5% of total carbon input for the activity, based on a calculation using the factors specified in Schedule 3, sampling and analysis of fuel type \( (i) \) or carbonaceous input material must be carried out to determine its carbon content.

(10) The sampling and analysis is to be carried out using the methods set out in Divisions 2.2.4, 2.3.4 and 2.4.4 that apply to the combustion of solid, gaseous and liquid fuels.
[18] **Subsection 3.6 (1)**

*omit*

For paragraph 3.4 (2) (b) and subsection 3.4 (3),

*insert*

For subsections 3.4 (2) and (3),

[19] **Sections 3.15 and 3.16**

*substitute*

3.15 **Method 2 — coal mine waste gas flared**

For subparagraph 3.4 (4) (a) (ii), method 2 is:

\[
E_{iCO_2} = \frac{Q_j \times EC_i \times EF_j \times OF_i + QCO_2}{1000}
\]

where:

- \(E_{iCO_2}\) is the emissions of CO\(_2\) released from coal mine waste gas \((i)\) flared from the mine during the year, measured in CO\(_2\)-e tonnes.
- \(Q_j\) is the quantity of methane \((j)\) within the fuel type from the mine during the year, measured in cubic metres in accordance with Division 2.3.3.
- \(EC_i\) is the energy content factor of coal mine waste gas \((i)\) mentioned in item 19 of Schedule 1, measured in gigajoules per cubic metre.
- \(EF_j\) is the emission factor for the methane \((j)\) within the fuel type from the mine during the year, measured in kilograms of CO\(_2\)-e per gigajoule, estimated in accordance with any of the standards in Division 2.3.3.
- \(OF_i\) is 0.98/0.995, which is the correction factor for the oxidation of coal mine waste gas \((i)\) flared.
- \(QCO_2\) is the quantity of carbon dioxide within the coal mine waste gas emitted from the mine during the year, measured in CO\(_2\)-e tonnes in accordance with Division 2.3.3.

3.16 **Method 3 — coal mine waste gas flared**

(1) For subparagraph 3.4 (4) (a) (iii), method 3 is the same as method 2 under section 3.15.

(2) In applying method 2 under section 3.15, the facility specific emission factor \(EF_h\) must be determined in accordance with the procedure for determining \(EF_{iCO_2,exe}\) in Division 2.3.4.
Subsection 3.43 (1)

substitute

(1) Subject to section 1.18, for estimating emissions released by oil or gas flaring during the year from the operation of a facility that is constituted by oil or gas exploration:

(a) if estimating emissions of carbon dioxide released — one of the following methods must be used:
   (i) method 1 under section 3.44;
   (ii) method 2 under section 3.45;
   (iii) method 3 under section 3.46; and

(b) if estimating emissions of methane released — method 1 under section 3.44 must be used; and

(c) if estimating emissions of nitrous oxide released — method 1 under section 3.44 must be used.

Note There is no method 4 under paragraph (a) and no method 2, 3 or 4 under paragraph (b) or (c).

Sections 3.45 and 3.46

substitute

3.45 Method 2 — oil or gas exploration

Combustion of gaseous fuels (flared) emissions

(1) For subparagraph 3.43 (1) (a) (ii), method 2 for combustion of gaseous fuels is:

\[ E_{\text{CO}_2} = Q_h \times EF_h \times OF_i + Q_{\text{CO}_2} \]

where:

\( E_{\text{CO}_2} \) is the fugitive emissions of \( \text{CO}_2 \) from fuel type \( i \) flared in oil or gas exploration during the year, measured in \( \text{CO}_2\)-e tonnes.

\( Q_h \) is the total quantity of hydrocarbons \( h \) within the fuel type \( i \) in oil or gas exploration during the year, measured in tonnes in accordance with Division 2.3.3.

\( EF_h \) is the emission factor for the total hydrocarbons \( h \) within the fuel type \( i \) in oil or gas exploration during the year, measured in \( \text{CO}_2\)-e tonnes per tonne of the fuel type \( f \) flared, estimated in accordance with Division 2.3.3.

\( OF_i \) is 0.98/0.995, which is the correction factor for the oxidation of fuel type \( i \) flared.
$QCO_2$ is the quantity of CO$_2$ within fuel type (i) in oil or gas exploration during the year, measured in CO$_2$-e tonnes in accordance with Division 2.3.3.

**Combustion of liquid fuels (flared) emissions**

(2) For subparagraph 3.43 (1) (a) (ii), method 2 for combustion of liquid fuels is the same as method 1, but the carbon dioxide emissions factor $EF_h$ must be determined in accordance with method 2 in Division 2.4.3.

### 3.46 Method 3 — oil or gas exploration

**Combustion of gaseous fuels (flared) emissions**

(1) For subparagraph 3.43 (1) (a) (iii), method 3 for the combustion of gaseous fuels is the same as method 2, but the carbon dioxide emissions factor $EF_h$ must be determined in accordance with method 3 in Division 2.3.4.

**Combustion of liquid fuels (flared) emissions**

(2) For subparagraph 3.43 (1) (a) (iii), method 3 for the combustion of liquid fuels is the same as method 2, but the carbon dioxide emissions factor $EF_h$ must be determined in accordance with method 3 in Division 2.4.4.

#### [22] Paragraph 3.51 (1) (b)

*substitute*

(b) if estimating emissions of methane released — method 1 under section 3.55 must be used; and

#### [23] Subsection 3.51 (1), note

*substitute*

*Note* There is no method 4 under paragraph (a) and no method 2, 3 or 4 under paragraph (b) or (c).
Sections 3.53 and 3.54

substitute

Method 2 — crude oil production

Combustion of gaseous fuels (flared) emissions of carbon dioxide

(1) For subparagraph 3.51 (1) (a) (ii), method 2 for combustion of gaseous fuels is:

\[ E_{\text{CO}_2} = Q_h \times EF_h \times OF + Q_{CO_2} \]

where:

- \( E_{\text{CO}_2} \) is the fugitive emissions of \( \text{CO}_2 \) from fuel type \( (i) \) flared in crude oil production during the year, measured in \( \text{CO}_2\)-e tonnes.
- \( Q_h \) is the total quantity of hydrocarbons \( (h) \) within the fuel type \( (i) \) in crude oil production during the year, measured in tonnes in accordance with Division 2.3.3.
- \( EF_h \) is the emission factor for the total hydrocarbons \( (h) \) within the fuel type \( (i) \) in crude oil production during the year, measured in \( \text{CO}_2\)-e tonnes per tonne of fuel type \( (i) \) flared, estimated in accordance with method 2 in Division 2.3.3.
- \( OF \) is 0.98/0.995, which is the correction factor for the oxidation of fuel type \( (i) \) flared.
- \( Q_{CO_2} \) is the quantity of \( \text{CO}_2 \) within the fuel type \( (i) \) in crude oil production during the year, measured in \( \text{CO}_2\)-e tonnes in accordance with Division 2.3.3.

Combustion of liquid fuels (flared) emissions of carbon dioxide

(2) For subparagraph 3.51 (1) (a) (ii), method 2 for combustion of liquid fuels is the same as method 1, but the carbon dioxide emissions factor \( EF_h \) must be determined in accordance with method 2 in Division 2.4.3.

Method 3 — crude oil production

Combustion of gaseous fuels (flared) emissions of carbon dioxide

(1) For subparagraph 3.51 (1) (a) (iii), method 3 for the combustion of gaseous fuels is the same as method 2, but the carbon dioxide emissions factor \( EF_h \) must be determined in accordance with method 3 in Division 2.3.4.
Combustion of liquid fuels (flared) emissions of carbon dioxide

(2) For subparagraph 3.51 (1) (a) (iii), method 3 for the combustion of liquid fuels is the same as method 2, but the carbon dioxide emissions factor $EF_h$ must be determined in accordance with method 3 in Division 2.4.4.

[25] **Section 3.55**

after

provided for

insert

in

[26] **Section 3.56**

omit

[27] **Paragraph 3.62 (4) (b)**

substitute

(b) method 1 under section 3.67 must be used for estimating emissions of methane released; and

[28] **Subsection 3.62 (4), note**

omit the last sentence, insert

There is no method 4 for emissions of carbon dioxide and no method 2, 3 or 4 for emissions of nitrous oxide or methane.

[29] **Subsection 3.67 (2)**

omit $EF_{ijk}$

insert $EF_{ij}$
Section 3.68

Method 2 — gas flared from crude oil refining

For subparagraph 3.62 (4) (a) (ii), method 2 is:

$$E_{iCO_2} = Q_h \times EF_h \times OF_i + QCO_2$$

where:

- $E_{iCO_2}$ is the fugitive emissions of CO$_2$ from fuel type ($i$) flared in crude oil refining during the year, measured in CO$_2$-e tonnes.
- $Q_h$ is the total quantity of hydrocarbons ($h$) within the fuel type ($i$) in crude oil refining during the year, measured in tonnes in accordance with Division 2.3.3.
- $EF_h$ is the emission factor for the total hydrocarbons ($h$) within the fuel type ($i$) in the crude oil refining during the year, measured in CO$_2$-e tonnes per tonne of fuel type ($i$) flared, estimated in accordance with method 2 in Division 2.3.3.
- $OF_i$ is 0.98/0.995, which is the correction factor for the oxidation of fuel type ($i$) flared.
- $QCO_2$ is the quantity of CO$_2$ within the fuel type ($i$) in the crude oil refining during the year, measured in CO$_2$-e tonnes in accordance with Division 2.3.3.

Section 3.69

Method 3 is the same as method 1 under section 3.67

For subparagraph 3.62 (4) (a) (iii), method 3 is the same as method 2 under section 3.68.

Subsection 3.80 (1), formula

$$E_{jp} = S_p \times \%UAG_p \times 0.55 \times C_{jp}$$
[33] **Subsection 3.80 (1), definitions of \(E_{jp}\) and \(S_p\)**

Substitute

\(E_{jp}\) is the fugitive emissions of gas type \((j)\) that result from natural gas distribution through a system of pipelines with sales of gas in a State or Territory \((p)\) during the year, measured in \(\text{CO}_2\)-e tonnes.

\(S_p\) is the total sales during the year from the pipeline system in a State or Territory \((p)\), measured in terajoules.

[34] **Subsection 3.80 (1), definition of \(C_{i,p,j}\)**

Substitute

\(C_{jp}\) is the natural gas composition factor for gas type \((j)\) for the natural gas supplied from the pipeline system in a State or Territory \((p)\), measured in \(\text{CO}_2\)-e tonnes per terajoule.

[35] **Subsection 3.80 (3)**

Omit

\(C_{i,p,j}\)

Insert

\(C_{jp}\)

[36] **Paragraph 3.83 (3) (b)**

Substitute

(b) method 1 under section 3.85 must be used for estimating emissions of methane released; and

[37] **Subsection 3.83 (3), note**

Omit the last sentence, insert

There is no method 4 for emissions of carbon dioxide and no method 2, 3 or 4 for emissions of nitrous oxide or methane.
[38] **Section 3.86**

*substitute*

3.86 **Method 2 — gas flared from natural gas production and processing**

For subparagraph 3.83 (3) (a) (ii), method 2 is:

\[ E_{iCO_2} = Q_h \times EF_h \times OF_i + QCO_2 \]

where:

- \( E_{iCO_2} \) is the fugitive emissions of \( CO_2 \) from fuel type \( i \) flared in the natural gas production and processing during the year, measured in \( CO_2 \)-e tonnes.
- \( Q_h \) is the total quantity of hydrocarbons \( h \) within the fuel type \( i \) in the natural gas production and processing during the year, measured in tonnes in accordance with Division 2.3.3.
- \( EF_h \) is the emission factor for the total hydrocarbons \( h \) within the fuel type \( i \) in the natural gas production and processing during the year, measured in \( CO_2 \)-e tonnes per tonne of fuel type \( i \) flared, estimated in accordance with Division 2.3.3.
- \( OF_i \) is 0.98/0.995, which is the correction factor for the oxidation of fuel type \( i \) flared.
- \( QCO_2 \) is the quantity of \( CO_2 \) within the fuel type \( i \) in the natural gas production and processing during the year, measured in \( CO_2 \)-e tonnes in accordance with Division 2.3.3.

[39] **Section 3.87**

*omit*

Method 3 is the same as method 1

*insert*

For subparagraph 3.83 (3) (a) (iii), method 3 is the same as method 2 under section 3.86,

[40] **Sections 4.13 and 4.14**

*substitute*

4.13 **Method 1 — lime production**

(1) Method 1 is:

\[ E_{ij} = (A_i + A_{ikd} \times F_{kld}) \times EF_{ij} \]
where:

\( \bar{E}_{ij} \) is the emissions of carbon dioxide \((j)\) released from the production of lime \((i)\) during the year, measured in CO\(_2\)-e tonnes.

\( A_i \) is the quantity of lime produced during the year, measured in tonnes and estimated under Division 4.2.5.

\( A_{lkd} \) is the quantity of lime kiln dust lost as a result of the production of lime during the year, measured in tonnes and estimated under Division 4.2.5.

\( F_{lkd} \) is:

(a) the fraction of calcination achieved for lime kiln dust in the production of lime during the year; or

(b) if the data mentioned in paragraph (a) is not available — the value 1.

\( EF_{ij} \) is the carbon dioxide \((j)\) emission factor for lime, measured in tonnes of emission of carbon dioxide per tonne of lime produced, as follows:

(a) for commercial lime production — 0.675;

(b) for non-commercial lime production — 0.730;

(c) for magnesian lime and dolomitic lime production — 0.860.

(2) In this section:

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>dolomitic lime</td>
<td>lime formed from limestone containing more than 35% magnesium carbonate.</td>
</tr>
<tr>
<td>magnesian lime</td>
<td>lime formed from limestone containing 5–35% magnesium carbonate.</td>
</tr>
</tbody>
</table>

4.14 Method 2 — lime production

(1) Method 2 is:

\[ \bar{E}_{ij} = (A_i + A_{lkd} \times F_{lkd}) \times EF_{ij} - \gamma_R CCS_{CO_2} \]

where:

\( \bar{E}_{ij} \) is the emissions of carbon dioxide \((j)\) released from the production of lime \((i)\) during the year, measured in CO\(_2\)-e tonnes.

\( A_i \) is the quantity of lime produced during the year, measured in tonnes and estimated under Division 4.2.5.

\( A_{lkd} \) is the quantity of lime kiln dust lost as a result of the production of lime during the year, measured in tonnes and estimated under Division 4.2.5.

\( F_{lkd} \) is:

(a) the fraction of calcination achieved for lime kiln dust in the production of lime during the year; or

(b) if the data in paragraph (a) is not available — the value 1.
EF_{ij} is worked out using the following formula:

\[
EF_{ij} = F_{CaO} \times 0.785 + F_{MgO} \times 1.092
\]

where:

- \(F_{CaO}\) is the estimated fraction of lime that is calcium oxide derived from carbonate sources and produced from the operation of the facility.
- \(F_{MgO}\) is the estimated fraction of lime that is magnesium oxide derived from carbonate sources and produced from the operation of the facility.

\(\gamma\) is the factor \(1.861 \times 10^{-3}\) for converting a quantity of carbon dioxide from cubic metres at standard conditions of pressure and temperature to CO\(_2\)-e tonnes.

\(RCCS_{CO_2}\) is carbon dioxide captured for permanent storage, measured in cubic metres in accordance with Division 1.2.3.

(2) Method 2 requires lime to be sampled and analysed in accordance with sections 4.15 and 4.16.

[41] **After subsection 4.15 (1)**

*insert*

*Note* Appropriate standards for sampling are:

- ASTM C25-06, *Standard Test Methods for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime*
- ASTM C50-00 (2006), *Standard Practice for Sampling, Sample Preparation, Packaging, and Marking of Lime and Limestone Products*
- AS 4489.0–1997 *Test methods for limes and limestones — General introduction and list of methods.*

[42] **Section 4.20, after example 7**

*insert*

8  Phosphoric acid production from phosphate rock containing carbonates.

[43] **Subsection 4.33 (3)**

*omit*

Standard Practice for Sampling, Sample Preparation, Packaging, and Marking of Lime and Limestone Products.

*insert*

*Standard Practice for Sampling, Sample Preparation, Packaging, and Marking of Lime and Limestone Products.*
Division 4.3.5 Chemical or mineral production, other than carbide production, using a carbon reductant or carbon anode

Section 4.53 Application

This Division applies to emissions of carbon dioxide from activities producing a chemical or mineral product (other than carbide production), using a carbon reductant or carbon anode, including the following products:

(a) fused alumina;
(b) fused magnesia;
(c) fused zirconia;
(d) glass;
(e) synthetic rutile;
(f) titanium dioxide.

Note Magnesia produced in a process that does not use an electric arc furnace must be reported under Division 4.2.3.

Sections 4.55 to 4.57

Method 1 — chemical or mineral production, other than carbide production, using a carbon reductant or carbon anode

Method 1 is:

Step 1 Work out the carbon content in fuel types (i) or carbonaceous input material delivered for the activity during the year, measured in tonnes of carbon, as follows:

$$\Sigma_i CC_F_i \times Q_i$$

where:

$$\Sigma$$ means the sum of the carbon content values obtained for all fuel types (i) or carbonaceous input material.
CCF<sub>i</sub> is the carbon content factor mentioned in Schedule 3, measured in tonnes of carbon, for each appropriate unit of fuel type (i) or carbonaceous input material consumed during the year from the operation of the activity.

Q<sub>i</sub> is the quantity of fuel type (i) or carbonaceous input material delivered for the activity during the year, measured in an appropriate unit and estimated in accordance with criterion A in Divisions 2.2.5, 2.3.6 and 2.4.6.

**Step 2** Work out the carbon content in products (p) leaving the activity during the year, measured in tonnes of carbon, as follows:

\[ \Sigma_p \text{CCF}_p \times A_p \]

where:
\[ \Sigma_p \] means the sum of the carbon content values obtained for all product types (p).
\[ \text{CCF}_p \] is the carbon content factor, measured in tonnes of carbon, for each tonne of product type (p) produced during the year.
\[ A_p \] is the quantity of product types (p) produced leaving the activity during the year, measured in tonnes.

**Step 3** Work out the carbon content in waste by-product types (r) leaving the activity, other than as an emission of greenhouse gas, during the year, measured in tonnes of carbon, as follows:

\[ \Sigma_r \text{CCF}_r \times Y_r \]

where:
\[ \Sigma_r \] means the sum of the carbon content values obtained for all waste by-product types (r).
\[ \text{CCF}_r \] is the carbon content factor, measured in tonnes of carbon, for each tonne of waste by-product types (r).
\[ Y_r \] is the quantity of waste by-product types (r) leaving the activity during the year, measured in tonnes.

**Step 4** Work out the carbon content in the amount of the change in stocks of inputs, products and waste by-products held within the boundary of the activity during the year, measured in tonnes of carbon, as follows:

\[ \Sigma_i \text{CCF}_i \times \Delta S_{qi} + \Sigma_p \text{CCF}_p \times \Delta S_{qp} + \Sigma_r \text{CCF}_r \times \Delta S_{yr} \]

where:
\[ \Sigma \] has the same meaning as in step 1.
\[ \text{CCF}_i \] has the same meaning as in step 1.
\[ \Delta S_{qi} \] is the change in stocks of fuel type (i) for the activity and held within the boundary of the activity during the year, measured in tonnes.
Schedule 1

Amendments commencing on 1 July 2011

\[ \Sigma_p \] has the same meaning as in step 2.
\[ CCF_p \] has the same meaning as in step 2.
\[ \Delta S_{ap} \] is the change in stocks of product types (\( p \)) produced by the activity and held within the boundary of the activity during the year, measured in tonnes.
\[ \Sigma_r \] has the same meaning as in step 3.
\[ CCF_r \] has the same meaning as in step 3.
\[ \Delta S_{yr} \] is the change in stocks of waste by-product types (\( r \)) produced from the operation of the activity and held within the boundary of the activity during the year, measured in tonnes.

Step 5

Work out the emissions of carbon dioxide released from the operation of the activity during the year, measured in CO\(_2\)e tonnes, as follows:

(a) add the amounts worked out under steps 2, 3 and 4 to work out a new amount (\( \text{amount A} \));
(b) subtract \( \text{amount A} \) from the amount worked out under step 1 to work out a new amount (\( \text{amount B} \));
(c) multiply \( \text{amount B} \) by 3.664 to work out the amount of emissions released from the operation of the activity during the year.

4.56 Method 2 — chemical or mineral production, other than carbide production, using a carbon reductant or carbon anode

(1) Subject to this section, method 2 is the same as method 1 under section 4.55.

(2) In applying method 1 as method 2, step 4 in section 4.55 is to be omitted and the following step 4 substituted.

Step 4

Work out the carbon content in the amount of the change in stocks of inputs, products and waste by-products held within the boundary of the activity during the year, measured in tonnes of carbon, as follows:

\[ \Sigma_i \ CCF_i \times \Delta S_{qi} + \sum_p CCF_p \times \Delta S_{ap} + \sum_i CCF_i \times \Delta S_{ri} + \alpha \gamma R CCS_{CO_2} \]

where:
\[ \Sigma_i \] has the same meaning as in step 1.
\[ CCF_i \] has the same meaning as in step 1.
\[ \Delta S_{qi} \] is the change in stocks of fuel type (\( i \)) for the activity and held within the boundary of the activity during the year, measured in tonnes.
\[ \Sigma_p \] has the same meaning as in step 2.
\[ CCF_p \] has the same meaning as in step 2.
$\Delta S_{ap}$ is the change in stocks of product types ($p$) produced by the activity and held within the boundary of the activity during the year, measured in tonnes.

$\Sigma$ has the same meaning as in step 3.

$CCF_r$ has the same meaning as in step 3.

$\Delta S_{yr}$ is the change in stocks of waste by-product types ($r$) produced from the operation of the activity and held within the boundary of the activity during the year, measured in tonnes.

$\alpha$ is the factor $\frac{1}{3.664}$ for converting the mass of carbon dioxide to a mass of carbon.

$\gamma$ is the factor $1.861 \times 10^{-3}$ for converting a quantity of carbon dioxide from cubic metres at standard conditions of pressure and temperature to CO$_2$-e tonnes.

$RCCS_{CO_2}$ is carbon dioxide captured for permanent storage, measured in cubic metres in accordance with Division 1.2.3.

(3) If a fuel type ($i$) or carbonaceous input material delivered for the activity during the year accounts for more than 5% of total carbon input for the activity, based on a calculation using the factors specified in Schedule 3, sampling and analysis of fuel type ($i$) or carbonaceous input material must be carried out to determine its carbon content.

(4) The sampling and analysis is to be carried out using the sampling and analysis methods set out in Divisions 2.2.4, 2.3.4 and 2.4.4 that apply to the combustion of solid, gaseous and liquid fuels.

4.57 Method 3 — chemical or mineral production, other than carbide production, using a carbon reductant or carbon anode

(1) Subject to this section, method 3 is the same as method 2 under section 4.56.

(2) If a fuel type ($i$) or carbonaceous input material delivered for the activity during the year accounts for more than 5% of total carbon input for the activity, based on a calculation using the factors specified in Schedule 3, sampling and analysis of fuel type ($i$) or carbonaceous input material must be carried out to determine its carbon content.

(3) The sampling and analysis is to be carried out using the methods set out in Divisions 2.2.4, 2.3.4 and 2.4.4 that apply to the combustion of solid, gaseous and liquid fuels.
[47] **Section 4.63**

*substitute*

4.63 **Application**

This Division applies to emissions from production of the following:

(a) iron;
(b) steel;
(c) any metals produced using integrated metalworks.

[48] **Subparagraph 5.4 (5) (b) (v)**

*omit* 5.14).

*insert* 5.14);

[49] **After subparagraph 5.4 (5) (b) (v)**

*insert* (vi) the fraction of degradable organic carbon dissimilated (DOC$_F$) (see section 5.14A).

[50] **After section 5.14**

*insert*

5.14A **Fraction of degradable organic carbon dissimilated (DOC$_F$)**

For subparagraph 5.4 (5) (b) (vi), the fraction of organic carbon dissimilated (DOC$_F$) for a waste mix type mentioned in column 2 of an item of following the table is the value mentioned in column 3 for the item.

<table>
<thead>
<tr>
<th>Item</th>
<th>Waste mix type</th>
<th>DOC$_F$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Food</td>
<td>0.84</td>
</tr>
<tr>
<td>2</td>
<td>Paper and cardboard</td>
<td>0.49</td>
</tr>
<tr>
<td>3</td>
<td>Garden and green</td>
<td>0.47</td>
</tr>
<tr>
<td>4</td>
<td>Wood</td>
<td>0.23</td>
</tr>
<tr>
<td>5</td>
<td>Textiles</td>
<td>0.50</td>
</tr>
<tr>
<td>6</td>
<td>Sludge</td>
<td>0.50</td>
</tr>
<tr>
<td>7</td>
<td>Nappies</td>
<td>0.50</td>
</tr>
<tr>
<td>8</td>
<td>Rubber and leather</td>
<td>0.50</td>
</tr>
<tr>
<td>9</td>
<td>Inert waste, including concrete, metal, plastic and glass</td>
<td>0.00</td>
</tr>
</tbody>
</table>
[51] **Subsection 5.17L (2), definition of \( DOC_F \)**

\( DOC_F \) is the fraction of degradable organic carbon dissimilated mentioned in column 3 of an item of the table in section 5.14A for a waste mix type mentioned in column 2 for the item.

[52] **Subsection 5.25 (5), formula for \( CH_{4gen} \)**

\[
CH_{4gen} = \left[ (COD_w - COD_{sl} - COD_{eff}) \times MCF_{ww} \times EF_{wij} \right] \\
+ \left[ (COD_{sl} - COD_{sl} - COD_{ww}) \times MCF_{sl} \times EF_{slj} \right]
\]

[53] **Subsection 5.25 (5), definition of \( F_{wan} \), including the note**

\( MCF_{ww} \) is the methane correction factor for wastewater treated at the plant during the year.

*Note* IPCC default methane correction factors for various types of treatment are:
- managed aerobic treatment: 0
- unmanaged aerobic treatment: 0.3
- anaerobic digester/reactor: 0.8
- shallow anaerobic lagoon (<2 metres): 0.2
- deep anaerobic lagoon (>2 metres): 0.8.

[54] **Subsection 5.25 (5), definition of \( F_{slan} \), including the note**

\( MCF_{sl} \) is the methane correction factor for sludge treated at the plant during the year.

*Note* IPCC default methane correction factors for various types of treatment are:
- managed aerobic treatment: 0
- unmanaged aerobic treatment: 0.3
- anaerobic digester/reactor: 0.8
- shallow anaerobic lagoon (<2 metres): 0.2
- deep anaerobic lagoon (>2 metres): 0.8.

[55] **Subsection 5.25 (9), before definition of primary sludge**

*Insert* methane correction factor is the fraction of COD anaerobically treated.
Section 5.31

substitute

5.31 Method 1 — nitrous oxide released from wastewater handling (domestic and commercial)

(1) For paragraph 5.24 (1) (b), method 1 is:

\[ E_j = (N_{in} - N_{trl} - N_{tro} - N_{outdisij}) \times EF_{secij} + N_{outdisij} \times EF_{disij} \]

where:
- \( E_j \) is the emissions of nitrous oxide released from human sewage treated by the plant during the year, measured in tonnes of nitrous oxide and expressed in \( \text{CO}_2\text{-e} \) tonnes.
- \( N_{in} \) is the quantity of nitrogen entering the plant during the year, measured in tonnes of nitrogen and worked out as follows:
  \[ N_{in} = \text{Protein} \times \text{Frac}_{Pr} \times P \]
  where:
  - \( \text{Protein} \) is the annual per capita protein intake of the population being served by the plant, measured in tonnes per person.
  - \( \text{Frac}_{Pr} \) is the fraction of nitrogen in protein.
  - \( P \) is the population serviced by the plant during the year.
- \( N_{trl} \) is the quantity of nitrogen in sludge transferred out of the plant and removed to landfill during the year, measured in tonnes of nitrogen and worked out as follows:
  \[ N_{trl} = F_{Ntrl} \times M_{trl} \]
  where:
  - \( F_{Ntrl} \) is the fraction of nitrogen in the sludge transferred out of the plant.
  - \( M_{trl} \) is the dry mass of sludge transferred out of the plant to landfill during the year, measured in tonnes.
- \( N_{tro} \) is the quantity of nitrogen in sludge transferred out of the plant and removed to a site other than landfill during the year, measured in tonnes of nitrogen and worked out as follows:
  \[ N_{tro} = F_{Ntro} \times M_{tro} \]
  where:
  - \( F_{Ntro} \) is the fraction of nitrogen in the sludge transferred out of the plant to a site other than landfill.
\( M_{tro} \) is the dry mass of sludge transferred out of the plant to a site other than landfill during the year, measured in tonnes.

\( N_{outdisij} \) is the quantity of nitrogen leaving the plant, differentiated by discharge environment.

\( EF_{secij} \) is the emission factor for wastewater treatment.

\( EF_{disij} \) is the emission factor for nitrogen discharge, differentiated by the discharge environment.

(2) For **Protein** in subsection (1), the annual per capita protein intake is 0.036 tonnes per year.

(3) For **\( \text{Frac}_P \)** in subsection (1), the factor is 0.16 tonnes of nitrogen per tonne of protein.

(4) For **\( F_{Ntrl} \) and \( F_{Ntro} \)** in subsection (1), the factor is 0.05.

(5) For \( N_{outdisij} \) in subsection (1), discharge environments mentioned in column 2 of an item of the following table are defined in column 3 for the item.

<table>
<thead>
<tr>
<th>Item</th>
<th>Discharge environment</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Enclosed waters</td>
<td>All waters other than open coastal waters or estuarine waters</td>
</tr>
<tr>
<td>2</td>
<td>Estuarine waters</td>
<td>All waters (other than open coastal waters) that are:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(a) ordinarily subject to tidal influence; and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) enclosed by a straight line drawn between the low water marks of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>consecutive headlands</td>
</tr>
<tr>
<td>3</td>
<td>Open coastal waters (ocean and deep</td>
<td>All waters of the Pacific Ocean, Southern Ocean and Indian Ocean, except</td>
</tr>
<tr>
<td></td>
<td>ocean)</td>
<td>those waters enclosed by a straight line drawn between the low water</td>
</tr>
<tr>
<td></td>
<td></td>
<td>marks of consecutive headlands</td>
</tr>
</tbody>
</table>

(6) For \( EF_{secij} \) in subsection (1), the emission factor is 4.9 tonnes of nitrous oxide, measured in \( CO_2-e \) per tonne of nitrogen produced.

(7) For \( EF_{disij} \) in subsection (1), the emission factor mentioned in column 3 of an item of the following table must be used for the discharge environment mentioned in column 2 for the item.

<table>
<thead>
<tr>
<th>Item</th>
<th>Discharge environment</th>
<th>( EF_{disij} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Enclosed waters</td>
<td>4.9</td>
</tr>
<tr>
<td>2</td>
<td>Estuarine waters</td>
<td>1.2</td>
</tr>
<tr>
<td>3</td>
<td>Open coastal waters (ocean and deep</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>ocean)</td>
<td></td>
</tr>
</tbody>
</table>
[57] **Subsection 5.40 (1)**

*substitute*

(1) This Part applies to emissions released from the decomposition of organic material and the flaring of sludge biogas, resulting from the handling of domestic or commercial wastewater through treatment in wastewater collection and treatment systems.

[58] **Subsection 5.42 (5), formula**

*substitute*

\[
CH_{d_{gen}} = \sum_{w,i} \left( \frac{COD_{si} - COD_{sl} - COD_{eff}}{MCF_{ww} \times EF_{wij}} \right) + \sum_{s} \left( \frac{COD_{sl} - COD_{trl} - COD_{tno}}{MCF_{sl} \times EF_{slij}} \right)
\]

[59] **Subsection 5.42 (5), after definition of COD\_sl**

*insert*

$COD_{eff}$ is the quantity of COD effluent leaving the plant during the year, measured in tonnes.

[60] **Subsection 5.42 (5), definition of F\_wan, including the note**

*substitute*

$MCF_{ww}$ is the methane correction factor for wastewater treated at the plant during the year.

**Note** IPCC default methane correction factors for various types of treatment are:
- managed aerobic treatment: 0
- unmanaged aerobic treatment: 0.3
- anaerobic digester/reactor: 0.8
- shallow anaerobic lagoon (<2 metres): 0.2
- deep anaerobic lagoon (>2 metres): 0.8.

[61] **Subsection 5.42 (5), definition of F\_slan, including the note**

*substitute*

$MCF_{sl}$ is the methane correction factor for sludge treated at the plant during the year.

**Note** IPCC default methane correction factors for various types of treatment are:
- managed aerobic treatment: 0
- unmanaged aerobic treatment: 0.3
- anaerobic digester/reactor: 0.8
- shallow anaerobic lagoon (<2 metres): 0.2
- deep anaerobic lagoon (>2 metres): 0.8.
[62] Subsection 5.42 (8)

*omitted*  
$F_{\text{wan}}$

*insert*  
$MCF_{\text{ww}}$

[63] Subsection 5.42 (8), table, heading, column 5

*substitute*  

$MCF_{\text{ww}}$

*default value*

[64] After subsection 5.42 (9)

*insert*  

(10) In this section:  

*methane correction factor* is the fraction of COD anaerobically treated.

[65] Subsection 5.52 (1), including the note

*substitute*  

(1) Subject to section 1.18, one of the following methods must be used for estimating emissions of carbon dioxide released from the operation of a facility that is constituted by waste incineration (the *plant*):  

(a) method 1 under section 5.53;  

(b) method 4 under Part 1.3.  

*Note* There is no method 2 or 3 for this section.

[66] Paragraph 8.7 (1) (a)

*substitute*  

(a) the uncertainty level of the energy content factor is:  

(i) as specified in column 3 for the item; or  

(ii) as worked out in accordance with section 7 of the uncertainty protocol; and

[67] Section 8.8, table, item 8

*omitted*  

vented or
[68]  **Subsection 8.9 (1), table, after item 6**  
*insert*  
<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Aluminium (carbon anode consumption)</td>
<td>5</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Aluminium production (perfluoronated carbon compound emissions)</td>
<td>6</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

[69]  **Schedule 1, Part 1, note to the table**  
*omit*  
Black coal represents coal for uses other than electricity and coking.

[70]  **Schedule 1, Part 4, after item 63**  
*insert*  
<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>63A</td>
<td>Liquefied natural gas (light duty vehicles)</td>
<td>25.3</td>
<td>51.2</td>
<td>5.5</td>
</tr>
<tr>
<td>63B</td>
<td>Liquefied natural gas (heavy duty vehicles)</td>
<td>25.3</td>
<td>51.2</td>
<td>2.1</td>
</tr>
</tbody>
</table>

[71]  **Schedule 1, Part 6, table**  
*substitute*  
<table>
<thead>
<tr>
<th>Item</th>
<th>State, Territory or grid description</th>
<th>Emission factor kg CO$_2$e/kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>77</td>
<td>New South Wales and Australian Capital Territory</td>
<td>0.89</td>
</tr>
<tr>
<td>78</td>
<td>Victoria</td>
<td>1.21</td>
</tr>
<tr>
<td>79</td>
<td>Queensland</td>
<td>0.88</td>
</tr>
<tr>
<td>80</td>
<td>South Australia</td>
<td>0.68</td>
</tr>
<tr>
<td>81</td>
<td>South West Interconnected System in Western Australia</td>
<td>0.80</td>
</tr>
<tr>
<td>82</td>
<td>Tasmania</td>
<td>0.30</td>
</tr>
<tr>
<td>83</td>
<td>Northern Territory</td>
<td>0.67</td>
</tr>
</tbody>
</table>

[72]  **Further amendments**  

<table>
<thead>
<tr>
<th>Provision</th>
<th><em>omit each mention of</em></th>
<th><em>insert</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsection 1.10 (1), table, item 3J</td>
<td>reductant</td>
<td>reductant or carbon anode</td>
</tr>
<tr>
<td>Subsection 2.12 (3), table, item 4</td>
<td>Brown coal briquettes</td>
<td>Coal briquettes</td>
</tr>
<tr>
<td>Subsection 2.12 (3), table, item 5</td>
<td>Coke oven coke</td>
<td>Coal coke</td>
</tr>
</tbody>
</table>

30  
*National Greenhouse and Energy Reporting (Measurement) Amendment Determination 2011 (No. 1)*
<table>
<thead>
<tr>
<th>Provision</th>
<th>omit each mention of</th>
<th>insert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsection 2.15 (1)</td>
<td>2.14 (b)</td>
<td>2.14 (2) (b)</td>
</tr>
<tr>
<td>Subsection 2.16 (1)</td>
<td>2.14 (c)</td>
<td>2.14 (2) (c)</td>
</tr>
<tr>
<td>Section 2.30</td>
<td>2.29 (1) (b)</td>
<td>2.29 (2) (b)</td>
</tr>
<tr>
<td>Subsection 2.31 (1)</td>
<td>2.29 (1) (c)</td>
<td>2.29 (2) (c)</td>
</tr>
<tr>
<td>Subsection 2.38 (1)</td>
<td>2.29 (1) (d)</td>
<td>2.29 (4) (b)</td>
</tr>
<tr>
<td>Subparagraph 2.66 (1) (b) (ii) and paragraph 2.67 (b)</td>
<td>D6866—08</td>
<td>D6866—10</td>
</tr>
<tr>
<td>Subsection 4.1 (2) (b) (v)</td>
<td>reductant</td>
<td>reductant or carbon anode</td>
</tr>
<tr>
<td>Sections 4.31, 4.32 and 4.66 and subsection 4.67 (1A)</td>
<td>increase in stocks</td>
<td>change in stocks</td>
</tr>
<tr>
<td>Subsection 5.25 (6)</td>
<td>$F_{wan}$</td>
<td>$MCF_{ww}$</td>
</tr>
<tr>
<td>Subsection 5.42 (9), table, item 2</td>
<td>tonne of paper produced</td>
<td>tonne of product</td>
</tr>
<tr>
<td>Subsection 8.6 (1), table, item 4</td>
<td>Brown coal briquettes</td>
<td>Coal briquettes</td>
</tr>
<tr>
<td>Subsection 8.6 (1), table, item 5</td>
<td>Coke oven coke</td>
<td>Coal coke</td>
</tr>
<tr>
<td>Schedule 1, Part 1, item 4</td>
<td>Brown coal briquettes</td>
<td>Coal briquettes</td>
</tr>
<tr>
<td>Schedule 1, Part 1, item 5</td>
<td>Coke oven coke</td>
<td>Coal coke</td>
</tr>
<tr>
<td>Schedule 2, item 4</td>
<td>Brown coal briquettes</td>
<td>Coal briquettes</td>
</tr>
<tr>
<td>Schedule 2, item 5</td>
<td>Coke oven coke</td>
<td>Coal coke</td>
</tr>
<tr>
<td>Schedule 3, Part 1, item 4</td>
<td>Brown coal briquettes</td>
<td>Coal briquettes</td>
</tr>
<tr>
<td>Schedule 3, Part 1, item 5</td>
<td>Coke oven coke</td>
<td>Coal coke</td>
</tr>
</tbody>
</table>
Schedule 2 Amendments commencing on 1 July 2012

(sections 3)

Sections 4.71 to 4.73

substitute

Method 1 — ferroalloy metal

Method 1, based on a carbon mass balance approach, is:

Step 1 Work out the carbon content in fuel types \((i)\) or carbonaceous input material delivered for the activity during the year, measured in tonnes of carbon, as follows:

\[
\sum_i CCF_i \times Q_i
\]

where:

\(\sum_i\) means the sum of the carbon content values obtained for all fuel types \((i)\) or carbonaceous input material.

\(CCF_i\) is the carbon content factor mentioned in Schedule 3, measured in tonnes of carbon, for each appropriate unit of fuel type \((i)\) or carbonaceous input material consumed during the year from the operation of the activity.

\(Q_i\) is the quantity of fuel type \((i)\) or carbonaceous input material delivered for the activity during the year, measured in an appropriate unit and estimated in accordance with:

(a) criterion \(A\) in Divisions 2.2.5, 2.3.6 and 2.4.6; or

(b) if the quantity of fuel or carbonaceous input material is not acquired as part of a commercial transaction — industry practice, consistent with the principles in section 1.13.

Step 2 Work out the carbon content in products \((p)\) leaving the activity during the year, measured in tonnes of carbon, as follows:

\[
\sum_p CCF_p \times A_p
\]

where:

\(\sum_p\) means the sum of the carbon content values obtained for all product types \((p)\).

\(CCF_p\) is the carbon content factor, measured in tonnes of carbon, for each tonne of product type \((p)\) produced during the year.
$A_p$ is the quantity of product types ($p$) produced leaving the activity during the year, measured in tonnes.

**Step 3** Work out the carbon content in waste by-product types ($r$) leaving the activity, other than as an emission of greenhouse gases, during the year, measured in tonnes of carbon, as follows:

$$\sum_r CCF_r \times Y_r$$

where:

- $\sum_r$ means the sum of the carbon content values obtained for all waste by-product types ($r$).
- $CCF_r$ is the carbon content factor, measured in tonnes of carbon, for each tonne of waste by-product types ($r$).
- $Y_r$ is the quantity of waste by-product types ($r$) leaving the activity during the year, measured in tonnes.

**Step 4** Work out the carbon content in the amount of the change in stocks of inputs, products and waste by-products held within the boundary of the activity during the year, measured in tonnes of carbon, as follows:

$$\sum_i CCF_i \times \Delta S_{qi} + \sum_p CCF_p \times \Delta S_{ap} + \sum_r CCF_r \times \Delta S_{yr}$$

where:

- $\sum_i$ has the same meaning as in step 1.
- $CCF_i$ has the same meaning as in step 1.
- $\Delta S_{qi}$ is the change in stocks of fuel type ($i$) for the activity and held within the boundary of the activity during the year, measured in tonnes.
- $\sum_p$ has the same meaning as in step 2.
- $CCF_p$ has the same meaning as in step 2.
- $\Delta S_{ap}$ is the change in stocks of product types ($p$) produced by the activity and held within the boundary of the activity during the year, measured in tonnes.
- $\sum_r$ has the same meaning as in step 3.
- $CCF_r$ has the same meaning as in step 3.
- $\Delta S_{yr}$ is the change in stocks of waste by-product types ($r$) produced from the operation of the activity and held within the boundary of the activity during the year, measured in tonnes.

**Step 5** Work out the emissions of carbon dioxide released from the operation of the activity during the year, measured in CO$_2$-e tonnes, as follows:

(a) add the amounts worked out under steps 2, 3 and 4 to work out a new amount ($\text{amount } A$);

(b) subtract amount $A$ from the amount worked out under step 1 to work out a new amount ($\text{amount } B$);
(c) multiply amount B by 3.664 to work out the amount of emissions released from the operation of the activity during the year.

4.72 Method 2 — ferroalloy metal

(1) Subject to this section, method 2 is the same as method 1 under section 4.71.

(2) In applying method 1 as method 2, step 4 in section 4.71 is to be omitted and the following step 4 substituted.

Step 4 Work out the carbon content in the amount of the change in stocks of inputs, products and waste by-products held within the boundary of the activity during the year, measured in tonnes of carbon, as follows:

\[ \sum_i CCF_i \times \Delta S_{qi} + \sum_p CCF_p \times \Delta S_{ap} + \sum_r CCF_r \times \Delta S_{yr} + \alpha \gamma RCCS_{CO_2} \]

where:
- \( \Sigma \) has the same meaning as in step 1.
- \( CCF_i \) has the same meaning as in step 1.
- \( \Delta S_{qi} \) is the change in stocks of fuel type \((i)\) for the activity and held within the boundary of the activity during the year, measured in tonnes.
- \( \Sigma \) has the same meaning as in step 2.
- \( CCF_p \) has the same meaning as in step 2.
- \( \Delta S_{ap} \) is the change in stocks of product types \((p)\) produced by the activity and held within the boundary of the activity during the year, measured in tonnes.
- \( \Sigma \) has the same meaning as in step 3.
- \( CCF_r \) has the same meaning as in step 3.
- \( \Delta S_{yr} \) is the change in stocks of waste by-product types \((r)\) produced from the operation of the activity and held within the boundary of the activity during the year, measured in tonnes.
- \( \alpha \) is the factor \( \frac{1}{3.664} \) for converting the mass of carbon dioxide to a mass of carbon.
- \( \gamma \) is the factor \( 1.861 \times 10^{-3} \) for converting a quantity of carbon dioxide from cubic metres at standard conditions of pressure and temperature to \( CO_2 \)-e tonnes.
- \( RCCS_{CO_2} \) is carbon dioxide captured for permanent storage, measured in cubic metres in accordance with Division 1.2.3.
(3) If a fuel type \( (i) \) or carbonaceous input material delivered for the activity during the year accounts for more than 5% of total carbon input for the activity, based on a calculation using the factors specified in Schedule 3, sampling and analysis of fuel type \( (i) \) or carbonaceous input material must be carried out to determine its carbon content.

(4) The sampling and analysis is to be carried out using the sampling and analysis provided for in Divisions 2.2.3, 2.3.3 and 2.4.3 that apply to the combustion of solid, gaseous and liquid fuels.

4.73 **Method 3 — ferroalloy metal**

(1) Subject to this section, method 3 is the same as method 2 under section 4.72.

(2) If a fuel type \( (i) \) or carbonaceous input material delivered for the activity during the year accounts for more than 5% of total carbon input for the activity, based on a calculation using the factors specified in Schedule 3, sampling and analysis of fuel type \( (i) \) or carbonaceous input material must be carried out to determine its carbon content.

(3) The sampling and analysis is to be carried out using the methods set out in Divisions 2.2.4, 2.3.4 and 2.4.4 that apply to the combustion of solid, gaseous and liquid fuels.

[74] **Sections 4.94 to 4.96**

*substitute*

4.94 **Method 1 — other metals**

Method 1, based on a carbon mass balance approach, is:

**Step 1** Work out the carbon content in fuel types \( (i) \) or carbonaceous input material delivered for the activity during the year, measured in tonnes of carbon, as follows:

\[
\sum_i CCF_i \times Q_i
\]

where:

- \( \sum \) means the sum of the carbon content values obtained for all fuel types \( (i) \) or carbonaceous input material.
- \( CCF_i \) is the carbon content factor mentioned in Schedule 3, measured in tonnes of carbon, for each appropriate unit of fuel type \( (i) \) or carbonaceous input material consumed during the year from the operation of the activity.
\(Q_i\) is the quantity of fuel type \((i)\) or carbonaceous input material delivered for the activity during the year, measured in an appropriate unit and estimated in accordance with:

(a) criterion A in Divisions 2.2.5, 2.3.6 and 2.4.6; or

(b) if the quantity of fuel or carbonaceous input material is not acquired as part of a commercial transaction — industry practice, consistent with the principles in section 1.13.

**Step 2** Work out the carbon content in products \((p)\) leaving the activity during the year, measured in tonnes of carbon, as follows:

\[
\sum_p \text{CCF}_p \times A_p
\]

where:

\(\sum_p\) means the sum of the carbon content values obtained for all product types \((p)\).

\(\text{CCF}_p\) is the carbon content factor, measured in tonnes of carbon, for each tonne of product type \((p)\) produced during the year.

\(A_p\) is the quantity of product types \((p)\) produced leaving the activity during the year, measured in tonnes.

**Step 3** Work out the carbon content in waste by-product types \((r)\) leaving the activity, other than as an emission of greenhouse gas, during the year, measured in tonnes of carbon, as follows:

\[
\sum_r \text{CCF}_r \times Y_r
\]

where:

\(\sum_r\) means the sum of the carbon content values obtained for all waste by-product types \((r)\).

\(\text{CCF}_r\) is the carbon content factor, measured in tonnes of carbon, for each tonne of waste by-product types \((r)\).

\(Y_r\) is the quantity of waste by-product types \((r)\) leaving the activity during the year, measured in tonnes.

**Step 4** Work out the carbon content in the amount of the change in stocks of inputs, products and waste by-products held within the boundary of the activity during the year, measured in tonnes of carbon, as follows:

\[
\sum_i \text{CCF}_i \times \Delta S_{qi} + \sum_p \text{CCF}_p \times \Delta S_{ap} + \sum_r \text{CCF}_r \times \Delta S_{yr}
\]

where:

\(\sum\) has the same meaning as in step 1.

\(\text{CCF}_i\) has the same meaning as in step 1.

\(\Delta S_{qi}\) is the change in stocks of fuel type \((i)\) for the activity and held within the boundary of the activity during the year, measured in tonnes.
\( \Sigma \) has the same meaning as in step 2.

\( \text{CCF}_p \) has the same meaning as in step 2.

\( \Delta S_{ap} \) is the change in stocks of product types (\( p \)) produced by the activity and held within the boundary of the activity during the year, measured in tonnes.

\( \Sigma \) has the same meaning as in step 3.

\( \text{CCF}_i \) has the same meaning as in step 3.

\( \Delta S_{yr} \) is the change in stocks of waste by-product types (\( r \)) produced from the operation of the activity and held within the boundary of the activity during the year, measured in tonnes.

**Step 5**

Work out the emissions of carbon dioxide released from the operation of the activity during the year, measured in CO\(_2\)-e tonnes, as follows:

(a) add the amounts worked out under steps 2, 3 and 4 to work out a new amount (\( \text{amount A} \));

(b) subtract amount A from the amount worked out under step 1 to work out a new amount (\( \text{amount B} \));

(c) multiply amount B by 3.664 to work out the amount of emissions released from the operation of the activity during the year.

**4.95 Method 2 — other metals**

(1) Subject to this section, method 2 is the same as method 1 under section 4.94.

(2) In applying method 1 as method 2, step 4 in section 4.94 is to be omitted and the following step 4 substituted.

**Step 4**

Work out the carbon content in the amount of the change in stocks of inputs, products and waste by-products held within the boundary of the activity during the year, measured in tonnes of carbon, as follows:

\[
\sum_i \text{CCF}_i \times \Delta S_{gi} + \sum_p \text{CCF}_p \times \Delta S_{ap} + \sum_r \text{CCF}_r \times \Delta S_{yr} + \alpha \gamma \text{RCCS}_{\text{CO2}}
\]

where:

\( \Sigma \) has the same meaning as in step 1.

\( \text{CCF}_i \) has the same meaning as in step 1.

\( \Delta S_{gi} \) is the change in stocks of fuel type (\( i \)) for the activity and held within the boundary of the activity during the year, measured in tonnes.

\( \Sigma \) has the same meaning as in step 2.

\( \text{CCF}_p \) has the same meaning as in step 2.

\( \Delta S_{ap} \) is the change in stocks of product types (\( p \)) produced by the activity and held within the boundary of the activity during the year, measured in tonnes.
\[ \Sigma \] has the same meaning as in step 3.

\[ CCF_r \] has the same meaning as in step 3.

\[ \Delta S_{yr} \] is the change in stocks of waste by-product types \((r)\) produced from the operation of the activity and held within the boundary of the activity during the year, measured in tonnes.

\[ \alpha \] is the factor \( \frac{1}{3.664} \) for converting the mass of carbon dioxide to a mass of carbon.

\[ \gamma \] is the factor \( 1.861 \times 10^{-3} \) for converting a quantity of carbon dioxide from cubic metres at standard conditions of pressure and temperature to \( \text{CO}_2 \)-e tonnes.

\[ \text{RCCS}_{\text{CO}_2} \] is carbon dioxide captured for permanent storage, measured in cubic metres in accordance with Division 1.2.3.

(3) If a fuel type \((i)\) or carbonaceous input material delivered for the activity during the year accounts for more than 5% of total carbon input for the activity, based on a calculation using the factors specified in Schedule 3, sampling and analysis of fuel type \((i)\) or carbonaceous input material must be carried out to determine its carbon content.

(4) The sampling and analysis is to be carried out using the methods set out in Divisions 2.2.4, 2.3.4 and 2.4.4 that apply to the combustion of solid, gaseous and liquid fuels.

4.96 Method 3 — other metals

(1) Subject to this section, method 3 is the same as method 2 under section 4.95.

(2) If a fuel type \((i)\) or carbonaceous input material delivered for the activity during the year accounts for more than 5% of total carbon input for the activity, based on a calculation using the factors specified in Schedule 3, sampling and analysis of fuel type \((i)\) or carbonaceous input material must be carried out to determine its carbon content.

(3) The sampling and analysis is to be carried out using the methods set out in Divisions 2.2.4, 2.3.4 and 2.4.4 that apply to the combustion of solid, gaseous and liquid fuels.

Note