Australian Government
Clean Energy Regulator

NATIONAL GREENHOUSE AND ENERGY REPORTING

User Guide

National Greenhouse and Energy Reporting uncertainty calculator 2013-14

Contents

Contents 1
Purpose 3
Introduction 3
Disclaimer 3
Background to uncertainty reporting 3
What is uncertainty? 3
What is it used for? 3
Why has the Calculator been developed? 4
Principles of calculating uncertainty 4
Changes to uncertainty requirements 4
Requirements prior the 2013–14 year reporting year 4
Requirements for the 2013–14 year reporting year onwards 4
Methods for determining uncertainty 5
Calculating uncertainty: where method 1 is used to estimate emissions 5
Calculating uncertainty: where method 2, 3 and 4 are used to estimate emissions 5
The Calculator 5
How do I find the Calculator 2013-14? 5
Entering data into the Calculator 6
Exporting the data from EERS 6
Manual entry of uncertainty data 7
Components of the Calculator 7
Worksheets of the Calculator 7
Colour coding of cells 8
Source and fuel input worksheet 8
Output worksheet 12
Adding your data to EERS 12
Appendix 1 - Uncertainty of Elements worksheet 12
Available inputs 13
How to calculate percentage uncertainty of samples 13
Uncertainty reporting process 14
Reporting uncertainty in EERS 14
Special cases: Emissions from entities that are not common 'facilities' 17
Facility Aggregates 17
Vertically integrated production processes (VIPPs) 17
Incidental and percentage reporting 17

Calculating uncertainty: Industrial process sources using method 1 17
Calculating uncertainty for carbon mass balance equations using method 1 18
Calculating uncertainty from Methods 2, 3 and 1 (non-default factors) emissions 20
Calculating uncertainty from Method 4 emissions estimates 20
Where a corporation exceeds the limits of the Calculator 21
Further information 21
Abbreviations and definitions 21

Purpose

Introduction

Under the National Greenhouse and Energy Reporting (NGER) Act 2007 (NGER Act), controlling corporations that meet various thresholds are required to report on their greenhouse gas emissions, energy consumption and energy production. The NGER Uncertainty Calculator 2013-14 (the Calculator) has been developed by the Clean Energy Regulator to assist reporting of statistical uncertainty of scope 1 emissions for emissions and energy reports, as required under sections 19, 22E, 22G or 22X of the NGER Act.

This guide provides information about the reporting requirements for uncertainty under the NGER Act. This includes information about:

- background information to reporting uncertainty
- the changes from the pre-2013-14 reporting year compared with the requirements from 2013-14 onwards
- available methods for uncertainty calculation
- use of the Calculator, and
- information for entering uncertainty data into the Emissions and Energy Reporting System (EERS).

The Calculator, and versions for previous reporting years, can be found on the Forms and Calculators page on the Clean Energy Regulator website.

Disclaimer

This guide is for information purposes only. Reporters should refer to Chapter 8 of the National Greenhouse and Energy Reporting (Measurement) Determination 2008 (Measurement Determination), and the World Resources Institute and World Business Council of Sustainable Development GHG Protocol Guidance on Uncertainty Assessment in GHG Inventories and Calculating Statistical Parameter Uncertainty (September 2003), version 1.0 (the Uncertainty Protocol), before using the Calculator. More information on the Uncertainty Protocol can be found on the Greenhouse Gas Protocol website.

Background to uncertainty reporting

What is uncertainty?

Uncertainty can be described as the amount of variation in a numerical result consistent with observations. Statistical uncertainty as measured under NGER legislation accounts for the level of uncertainty that may be attributed to sampling and statistical variation. Uncertainty is to be reported at the 95% confidence level.

What is it used for?

The uncertainty estimates provided under NGER legislation will help to inform the uncertainty estimates published in Australia's National Greenhouse Accounts, including:

- meeting Australia's reporting commitments under the United Nations Framework Convention on Climate Change (UNFCCC)
- tracking progress against Australia's target under the Kyoto Protocol, and
- informing policy makers and the public.

The uncertainty data can also assist corporations in understanding the uncertainties associated with their emission estimates, informing their allocation of resources and their choice of methods under the NGER legislation.

Why has the Calculator been developed?

The Calculator and this guide have been developed in order to decrease the reporting burden on reporters and increase their understanding of the obligations under the NGER Act. As EERS does not have the capability to calculate uncertainty for the 2013–14 reporting year, the Calculator provides a spreadsheet that will calculate a reporter's uncertainty value, which can then be directly entered into EERS.

Use of the Calculator is not compulsory. Reporters can employ their own method for calculating uncertainty in line with Chapter 8 of the Measurement Determination and the Uncertainty Protocol.

Principles of calculating uncertainty

There are a number of sources of uncertainty identified in the Uncertainty Protocol – however reporters are only required to estimate the statistical uncertainty. This type of uncertainty results from natural variations (for example, random human errors in the measurement process and fluctuations in measurement equipment). More information on statistical and other sources of uncertainty can be found in the Uncertainty Protocol.

The methods in the Uncertainty Protocol and the Measurement Determination are based on an assumption that the following principles hold true for calculating scope 1 emissions:

- the estimated parameters are uncorrelated (i.e. all parameters are fully independent)
- errors in each parameter are normally distributed
- no biases in the estimator function exist (i.e. the estimated value is the mean value), and
- individual uncertainties in each parameter are less than 60% of the mean.

Changes to uncertainty requirements

Requirements prior the 2013–14 year reporting year

Certain reporters where required to report an assessment of uncertainty for estimated scope 1 emissions at the controlling corporation level for 2010-11 and subsequent years prior to the 2013–14 reporting year.

Reporting uncertainty was voluntary for the 2008-09 and 2009-10 reporting periods.

Requirements for the 2013–14 year reporting year onwards

From 2013-14, amendments to regulations 4.08 and 4.17A of the NGER Regulations introduce a new threshold for uncertainty associated with the estimate of emissions from combustion of an energy type (i.e. fuel), or from a source, at a facility. Uncertainty must be reported for a facility if the scope 1 emissions from the combustion of that energy type or for that source are 25 kilotonnes carbon dioxide equivalence (kt CO2-e) or more in a reporting year. The amendments remove the requirement for uncertainty to be aggregated across facilities with the same energy type or source to the corporation or group levels.

Methods for determining uncertainty

The Measurement Determination provides four methods for determining a reporter's scope 1 emissions. Part 8.1 of the Measurement Determination outlines that uncertainty must be calculated using the same method by which emissions for the source were estimated.

Calculating uncertainty: where method 1 is used to estimate emissions

Part 8.3 of the Measurement Determination provides default uncertainty values which can be used to calculate the uncertainty for emissions estimated using method 1. Default values in the Measurement Determination are either aggregated uncertainties or uncertainties for parameters needed to calculate uncertainty for the emissions source. In some situations, reporters have the option of performing their own assessment of uncertainty in accordance with the Uncertainty Protocol (refer to part 8.3 of the Measurement Determination).

Calculating uncertainty: where method 2, 3 and 4 are used to estimate emissions

As set out in part 8.4 of the Measurement Determination, calculations of uncertainty of scope 1 emissions estimated by methods 2, 3 or 4 are to be made in accordance with the Uncertainty Protocol. Item 4, Part 7 of the Uncertainty Protocol is not to be used when emissions are estimated using methods 2, 3, or 4.

The Calculator

The Calculator:

- enables reporters to use relevant default uncertainty factors from the Measurement Determination
- aggregates emissions factor, energy content factor and activity data uncertainties, and
- aggregates uncertainties from multiple data lines to single sources and fuels as necessary.

For the 2013–14 reporting period, reporters are able to use a feature within the Emissions and Energy Reporting System (EERS) to export a table of data relevant to their uncertainty reporting. The data can be saved as a CSV file (a text file that can be opened using Microsoft Excel), and contains all activity data that is held in EERS at the time of the export.

How do I find the Calculator 2013-14?

The Calculator is available for download from the Clean Energy Regulator's website:

- go to the Forms and Calculators page
- scroll down until you find the: "Uncertainty Calculator 2013–14" and click on it, and
- when the File Download panel appears, choose Save to save the Calculator, in the form of an Excel spreadsheet, onto your computer system.

The Calculator is described in more detail below.

Entering data into the Calculator

Data can be entered into the Calculator manually, or using the EERS uncertainty data export functionality.

Reporters are advised to finish entering activity data into EERS before starting uncertainty reporting. Any changes to activity data for fuels or sources with scope 1 emissions of 25,000 t CO2-e or more can have an effect on uncertainty reporting.

Exporting the data from EERS

To use the EERS uncertainty data export functionality:

- log into EERS
- in Client Portal Home page, click on Report Uncertainty in the left hand navigation pane
- from the Facility Uncertainty screen, click the Export as CSV button in the upper right
- save the file, which is an Exported_Activities.csv file
- open the Exported_Activities.csv file in Microsoft Excel, and
- select and copy the data in the CSV file. Make sure not to copy the heading row (see Figure 1).

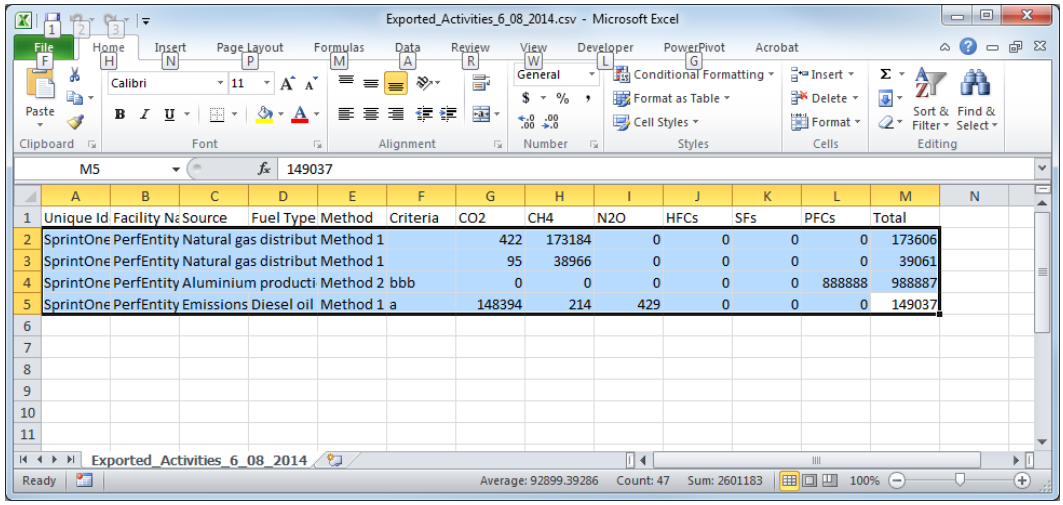


Figure 1: The Exported Activities file opened in Excel.

To import the data into the Calculator:

- open the calculator on the Forms and Calculators page of the Clean Energy Regulator website, and
- put the cursor in column B, row 8 (the first data field) and paste the data into the Calculator (see Figure 2).

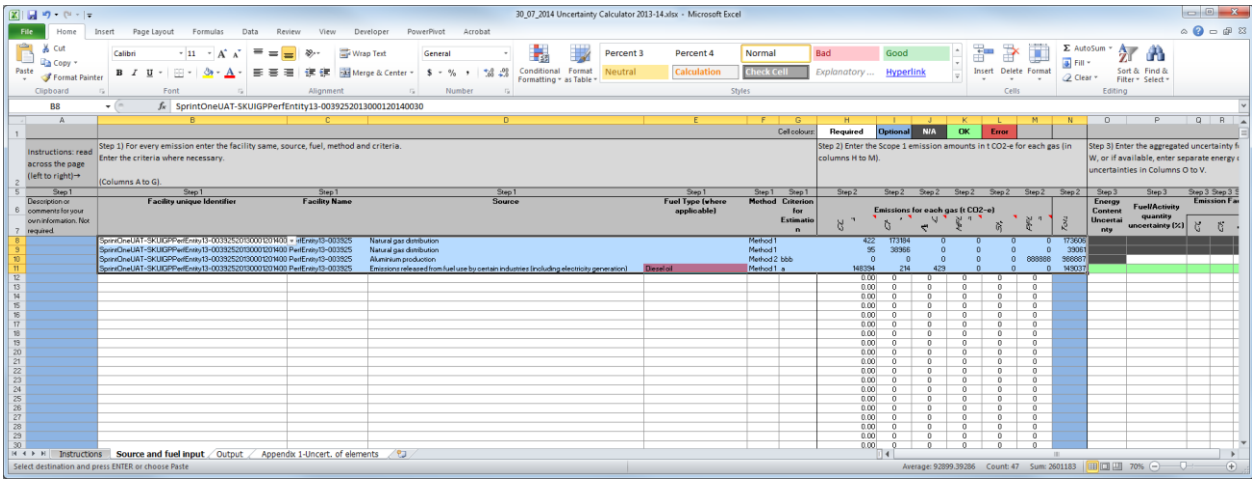


Figure 2: CSV export file data pasted into the source and fuel input tab of the Calculator

Manual entry of uncertainty data

Data can be manually entered, or edited in the uncertainty calculator. To manually enter data:

- log into EERS
- in Client Portal Home page, click on Report Uncertainty in the left hand navigation pane
- in the Facility Uncertainty screen, click on the Modify button on the right hand side and the Add/modify entry – Uncertainty screen will open
- open the Calculator in Excel
- ensure the Calculator is open on the Source and fuel input tab, and
- enter manually the facility unique identifier and facility name data into the Source and fuel input tab. Enter other data from the Add/modify entry – Uncertainty EERS screen in EERS.

Components of the Calculator

Worksheets of the Calculator

The Calculator has an Instructions worksheet and three worksheets for data entry and calculations:

- source and fuel input
- output, and
- Appendix 1 - Uncertainty of Elements

These worksheets can be accessed through the tabs along the bottom and are briefly described below.

The Source and fuel input worksheet is where source level data is entered for each facility, Network/Pipeline or Vertically Integrated Production Process (VIPP). Further instructions are included in row 2, at the top of this worksheet. Reporters can enter data relating to a facility's:

- unique identifier and facility name
- source, fuel, method and measurement criteria
- scope 1 emissions for each gas, relevant quantity data (where appropriate), and
- non-default uncertainty levels (for energy content, measurement and emissions factor uncertainty levels).

The Output worksheet is where the uncertainty is calculated for a source (or fuel) at a facility. In addition, reporters are able to enter details to assist record keeping.

Appendix 1 - Uncertainty of Elements worksheet is an optional worksheet for independently calculating uncertainty values rather than using the default values built into the Calculator. For example, it can be used to calculate the percentage uncertainty of samples collected by a corporation. Reporters are able to distinguish between sample series and the worksheet calculates other information such as standard deviations, mean, count of measurements, t-factor (to a 95% confidence interval) and uncertainty (at 95% confidence interval) for the sample series. This function assists reporters in calculating uncertainty in accordance with the Uncertainty Protocol.

Colour coding of cells

The Calculator workbook has six colours indicating different data entry or calculation requirements or steps:

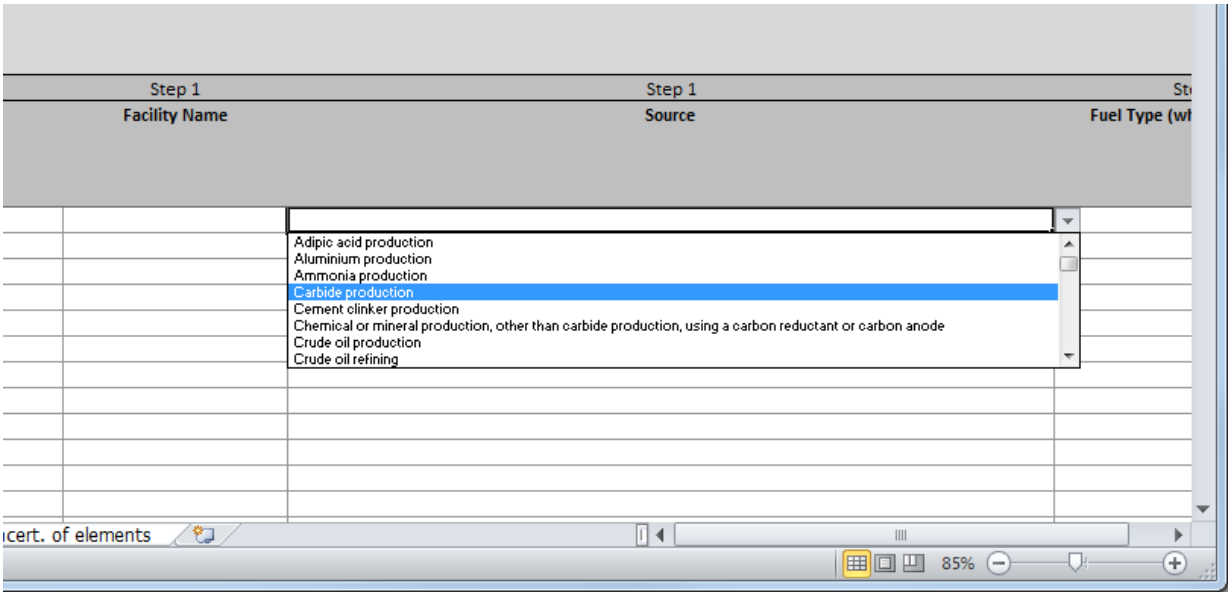
- White: Data or information must be entered into these cells.
- Blue: Optional data. If optional data is entered, other data entry requirements may alter.
- Black: Blacked out cells are not applicable, and do not require or allow data to be entered.
- Green: These cells do not require further information to be entered; hence they are 'ok'. Default values will be used if no further information is entered.
- Red: Red cells indicate data entry or calculation errors, and require correction.
- Purple: Purple cells contain the results of calculations.

Source and fuel input worksheet

Step 1 for calculating your uncertainty in the Calculator relates to completion of columns A-G of the source and fuel input worksheet as described below. This step ensures the facility, source, fuel and method are correctly identified, and the criterion used, where appropriate. Note, with the exception of column A, these fields do not need to be entered manually if the EERS uncertainty data export instructions are used.

- Description or comments (column A): This heading is to help a reporter identify which source the data has been entered for. The column is free text so a reporter can choose to describe the source to in a way that minimises confusion for later use or other users, including an auditor.
- Facility Unique Identifier (column B): This is a required field. The identifier is a text string that is unique to a facility (because facility names are not required to be unique). EERS automatically generates a facility unique identifier using the reporting organisation, facility name and dates of operational control.
- Facility Name (column C): The name of the facility to which the source is to be attributed is a required field. Facility names do not have to be unique although reporters are advised to make them unique for the corporation's group. Once a facility name has been entered it will appear in the drop-down menu and is selectable for the remainder of sources at that facility.

- Source (column D): This is a required field for the source of emissions. There is a drop-down menu that covers all of the emissions necessary for complying with uncertainty obligations. The source types are listed alphabetically (see Figure 3a).
- Fuel Type (where applicable) (column E): Each row in this column has a drop down menu containing a list of fuel and energy commodities. This list is context sensitive, depending on the source selected. Fuels are listed alphabetically.



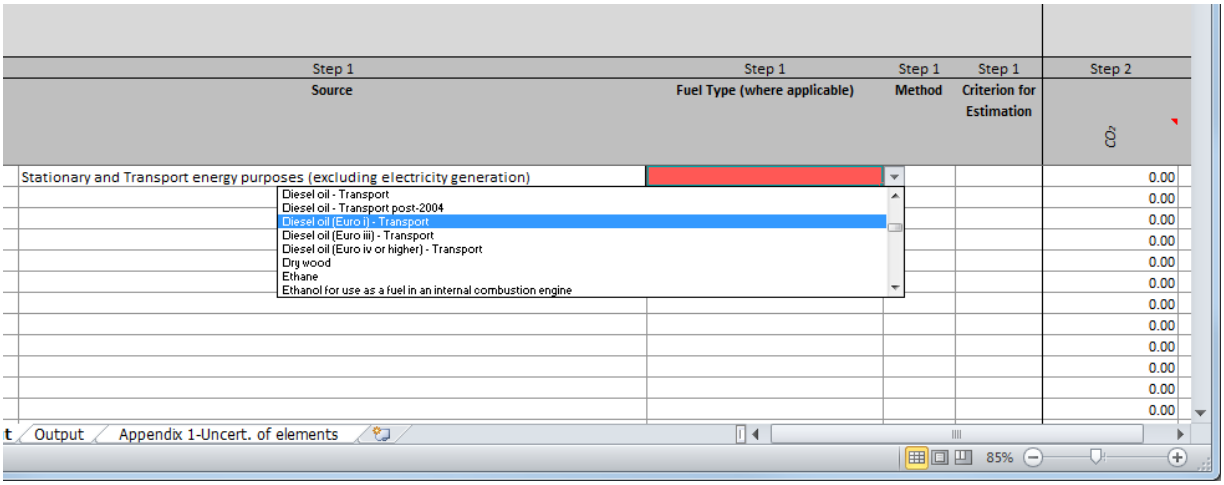


Figure 3a-3b: Fields used for data entry in Step 1, including the drop-down menus for Source of Emissions and Fuel Type.

- Method (column F): This is a required field, and shows the method that was used to estimate the emissions from the selected source. This will also be the method used to calculate the uncertainty for that source. Where multiple methods have been used to measure a single source of emissions, a separate line should be used for each method and for emission amounts from gases using that method.
- Criterion for Estimation (column G): Reporters should select the criterion for measurement (a, aa, aaa or bbb) of the amount of fuel where applicable (e.g. amount of diesel oil consumed).

Step 2 for calculating your uncertainty in the Calculator relates to completion of columns A - N of this worksheet as described below. This step ensures the scope 1 emissions amounts and total emissions are entered. Note these fields do not need to be entered manually if the EERS uncertainty data export instructions are used.

- Emissions for each gas (t CO2-e) (columns H-M): Each column under this heading relates to one of the six greenhouse gases reported under the NGER Act (see Figure 2), and data must be entered. Emissions estimates, in tonnes of carbon dioxide equivalence (t CO2-e), should be entered in the column corresponding to the specific greenhouse gas. If there are no emissions of a particular greenhouse gas then zero should be entered in the relevant cell(s).
- Total (column N): The total of scope 1 emissions in t CO2-e.

Step 2) Enter the Scope 1 emission amounts in t CO2-e for each gas (in columns H to M).

Step 2	Step 2	Step 2	Step 2	Step 2	Step 2	Step 2
Emissions for each gas (t CO2-e)						
CO_2	CH_4	N_2O	HFCs	SF_6	PFCs	Total
75,938.00	19	188	0	0	0	76145
1,049,997.00	259	2593	0	0	0	1052849
0.00	265484	0	0	0	0	265484
19,469.00	19469	0	0	0	0	38938
0.00	0	1	0	0	0	1
23,802.00	23802	0	0	0	0	47604
0.00	0	1	0	0	0	1
30,217.00	30217	0	0	0	0	60434
0.00	0	1	0	0	0	1
1,046.00	0	0	0	0	0	1046
0.00	27694	0	0	0	0	27694
0.00	0	1	0	0	0	1

Figure 4: Emissions for each gas (t CO2-e)

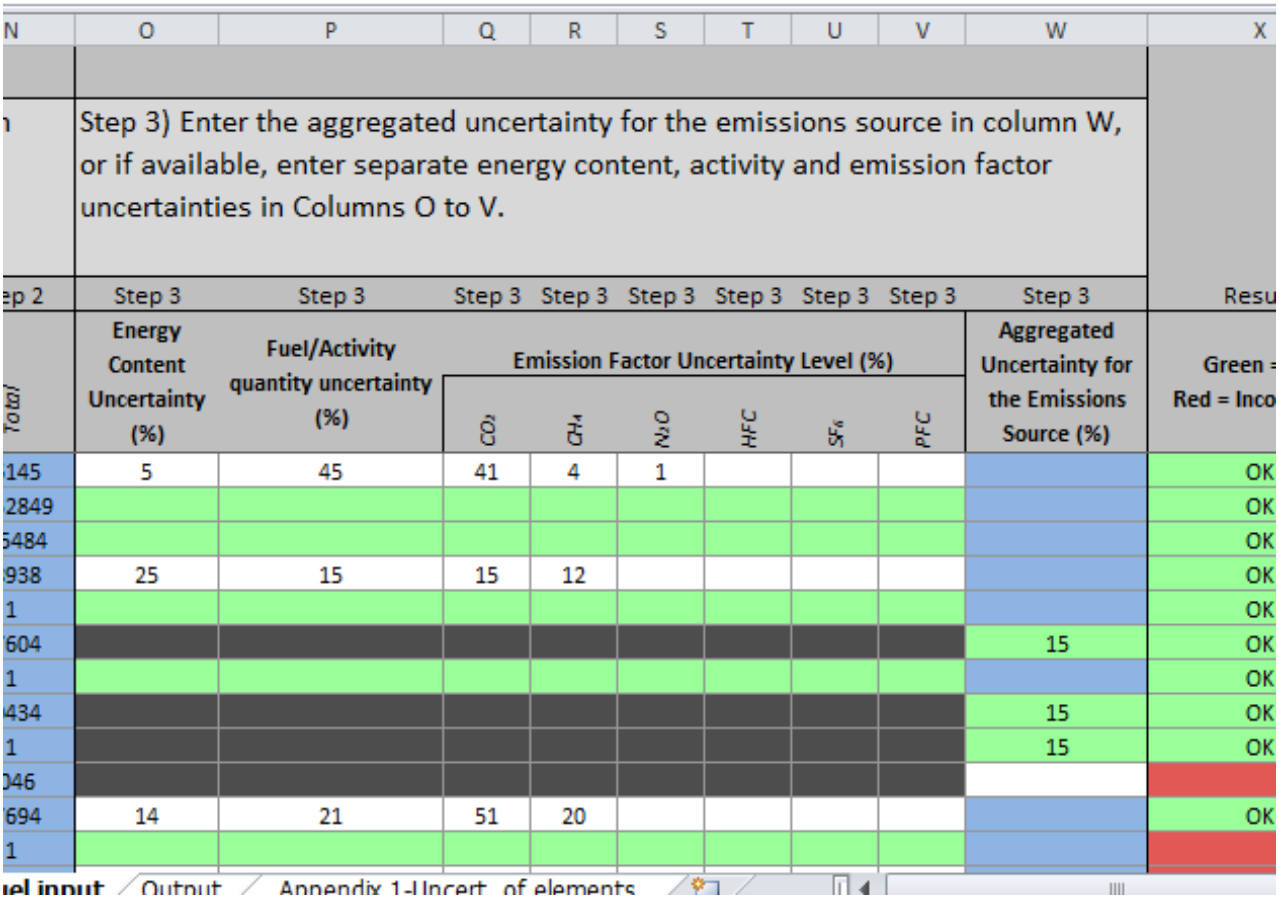
Step 3 for calculating your uncertainty requires correct completion of columns O to W to give an aggregated uncertainty for the emissions source. If Method 1 is used, default values will be used.

- Energy Content Uncertainty (%) (column O): Reporters should leave these cells blank if they intend to use default values under Method 1. If energy content percentage uncertainty is calculated independently, enter the value as a whole number (e.g. 3.3% uncertainty is entered as “3”).
- Fuel/Activity Quantity Uncertainty (%) (column P): Reporters should leave these cells blank if they intend to use default values under Method 1. If fuel or activity quantity uncertainty is calculated independently, enter the value as a whole number (e.g. 2.9% uncertainty is entered as “3”).
- Emission Factor Uncertainty Level (%) (columns Q-V): There are six columns for the reportable greenhouse gases under this heading. Reporters should leave these cells blank if they intend to use

default values under Method 1 or if the source does not have emissions for a particular gas. Enter the percentage value as a whole number.

- Aggregated Uncertainty for the Emissions Source (%)(column W): Some sources and methods 2, 3 and 4 allow for the direct entry of aggregated uncertainty for a source. If a value is entered here, the columns for the three headings directly above (columns O to V) will be blacked out. This is shown in Figure 3.
- If aggregated uncertainty for a source is entered, then the only other field that needs to be filled out for that source is the emissions for each gas in t CO2-e.

Note: If aggregated uncertainty is used, all workings for calculating the aggregated uncertainty for the emission source must be well documented and made readily available in the event that an audit is undertaken or a request by the Clean Energy Regulator.



N	O	P	Q	R	S	T	U	V	W	X
	Step 3) Enter the aggregated uncertainty for the emissions source in column W, or if available, enter separate energy content, activity and emission factor uncertainties in Columns O to V.									
ep 2	Step 3	Step 3	Step 3	Step 3	Step 3	Step 3	Step 3	Step 3	Step 3	Resu
Total	Energy Content Uncertainty (%)	Fuel/Activity quantity uncertainty (%)	Emission Factor Uncertainty Level (%)						Aggregated Uncertainty for the Emissions Source (%)	Green = Red = Inco
			CO_2	CH_4	N_2O	HFC	SF_6	PFC		
145	5	45	41	4	1					OK
2849										OK
5484										OK
938	25	15	15	12						OK
1										OK
604									15	OK
1										OK
434									15	OK
1									15	OK
046										
694	14	21	51	20						OK
1										

uel input / Output / Appendix 1-Uncert. of elements

Figure 5: Fields used for data entry in Step 3.

Output worksheet

The Output worksheet is where the aggregated uncertainty for each source and fuel type for each facility is displayed.

Rows 6-12 of the Output worksheet allows the manual input of the following details:

- Corporation Name.
- CEO Contact Name.
- Primary Contact Name (i.e. NGER Contact Person).
- Primary contact details.
- Comments, and
- Date completed.

This information is not required, but reporters may choose to enter details so they have a record for future years.

Once a facility unique identifier has been entered in the Source and fuel input worksheet, the facility name will be shown in the Facility Name column as shown in Figure 4.

COMMERCIAL-IN-CONFIDENCE

Cell colours: Required | Optional | N/A | Ok | Error

IDENTIFYING DETAILS

Corporation Name	
CEO Contact Name	
Primary Contact Name	
Primary Contact Phone	
Primary Contact Email	
Comments	
Date completed	

D = Uncertainty *E = Emissions*

	Facility name	Source or fuel	Comments	Uncertainty for the source or fuel at the Facility (%)	Error count	$(D*E)^2$	Sum E
1	Facility 1 for - IBGMON	Ammonia production		49.9	0	3,178,264,238,114,240	1,128,994
2	Facility 1 for - IBGMON	Biodiesel		70.7	0	352,567,355,227,076	265,484
3	facility-TAS-RLIAFJ	Ammonia production		22.7	0	784,237,817,309	38,938
4	facility-TAS-RLIAFJ	Liquefied natural gas		50.5	0	2,551	1
5	facility-SA-VYVQDR	Liquefied natural gas		10.7	0	1,331,642,063,925	108,039
6	facility-SA-VYVQDR	Biodiesel		70.7	0	5,002	1

Figure 6: Output worksheet example after data has been entered.

Adding your data to EERS

Once the uncertainty for a source or fuel type (at a facility) has been calculated these numbers can be entered into the uncertainty add/modify entry screen in EERS.

Appendix 1 - Uncertainty of Elements worksheet

This is an optional worksheet for independently calculating uncertainty values rather than using default values built into the Calculator (see Figure 5). This worksheet helps reporters calculate the uncertainty for a set of measurements or other data. The worksheet has been developed in accordance with the Uncertainty Protocol and uses the t-factor method with a 95% confidence interval in accordance with part 8.2 of the Measurement Determination.

Available inputs

- Description: Cells in this row can be used to describe the samples which have been taken which will assist clear identification and record keeping (e.g. Facility 1 brown coal energy content).
- Measurement Unit: The unit in which the samples are measured (e.g. GJ/t).
- Measurement: For a set of samples, each of the individual samples need to be entered (see next section). The following will automatically be calculated each time a new measurement sample is entered:
- Standard deviation (row 8).
- Mean (row 9).
- Count of measurements (row 10).
- t-factor (95% confidence interval) (row 11) .
- uncertainty at a 95% confidence interval (row 12), and
- the percentage uncertainty (row 13).

The percentage uncertainty can then be manually entered into the Source and fuel worksheet as part of Step 3 above. The other variables are provided for the reporter's information.

How to calculate percentage uncertainty of samples

Entering sample data to obtain a percentage uncertainty for the sample set can be done by following the procedures below. An example has been provided (Figure 5).

- Under reference number 1 (column C) enter the description of the fuel source (e.g. 'Facility 1 anthracite energy content').
- In the same column, enter the Measurement unit used (e.g. GJ/t) (at row 15).
- In the same column, enter measurement results with one value per cell, starting at reference number 1 (row 18) and progressing downwards (e.g. '27.0 (row 18), 28.2 (row 19), 29.3 (row 20), etc). Enter numerical data only. Do not enter the measurement unit in these cells.
- These steps can then be repeated for all remaining sample sets of data.

CALCULATING THE UNCERTAINTY OF VARIOUS ELEMENTS USED IN NGER REPORTING

Hover over here for instructions

Registered Corporation Name	Example Corporation

Reference Number	Example	1	2	3	4	5	6	7
Description	Fuel Factor **example only**	Fac 1 anthracite energy content	Transport NSW LPG energy content	Transport NSW CO_2 emissions factor	Transport NSW N_2O emissions factor	Transport NSW CH_4 emissions factor		
Standard Deviation	0.079	0.929	1.727	4.124	0.025	0.028		
Mean	0.650	28.525	24.367	58.083	0.105	0.191		
Count of measurements	5	8	12	12	12	12		
t-factor (95% CI)	2.780	2.360	2.200	2.200	2.200	2.200		
Uncertainty @ 95% CI	0.098	0.775	1.097	2.619	0.016	0.018		
% Uncertainty	15	3	5	5	15	9		
Measurement unit	kg/GJ	GJ/t	GJ/t	kg CO_2-e/ GL	kg CO_2-e/ GL	kg CO_2-e/ GL		
Measurement								
1	0.700	27	25.2	64.2	0.1	0.2		
2	0.650	28.2	24.8	64.5	0.05	0.15		
3	0.600	29.3	24.6	64.2	0.06	0.16		
4	0.750	28.5	23.2	59.8	0.12	0.19		
5	0.550	30	23.5	58.5	0.13	0.22		
6		27.9	23.9	56.3	0.11	0.15		
7		28.2	24.9	56.5	0.12	0.17		
8		29.1	25.2	54.5	0.13	0.19		
9			23.4	55.3	0.11	0.19		
10			23.8	55.2	0.1	0.22		
11			28.6	54.1	0.11	0.23		
12			21.3	53.9	0.12	0.22		
13								

Figure 7: Example of the Appendix 1 - Uncertainty of Elements worksheet.

Uncertainty reporting process

Reporting uncertainty in EERS

For the 2013–14 reporting year, a corporation will report uncertainty at the source or fuel type level in EERS as part of its section 19, 22E, 22G and 22X (as applicable) emissions and energy reports.

In order to report uncertainty, reporters must:

- ensure all relevant activity data has been entered into EERS
- click on the data entry tab and then on the entity at the highest level of the Corporate Structure in the left hand navigation pane showing Reporting Entity Information title (see Figure 8), and
- the Report Uncertainty button can be found on the lower left, underneath the Corporate Structure.

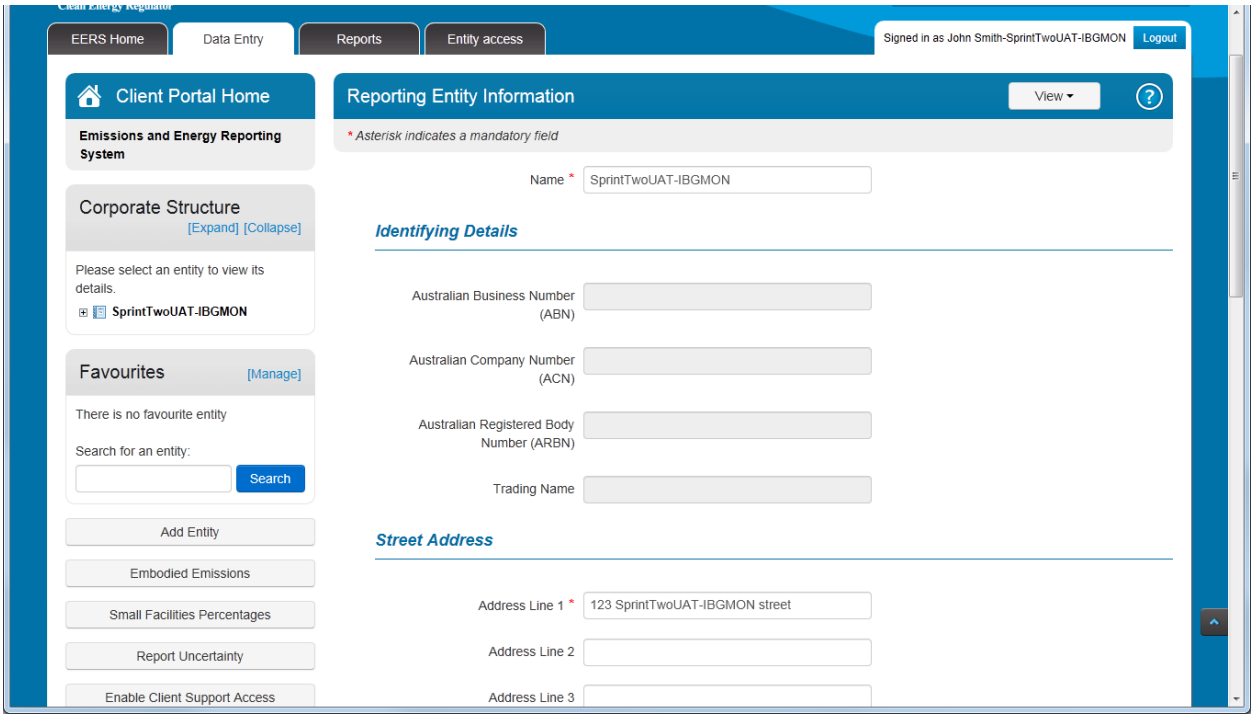


Figure 8: Report Uncertainty button on the lower left

- The Facility Uncertainty reporting screen (see Figure 9) shows all sources and fuels relevant to reporting uncertainty for the organisation.
- To go back to the Reporting Entity Information screen, click the blue hyperlinks at the top or bottom of the table.

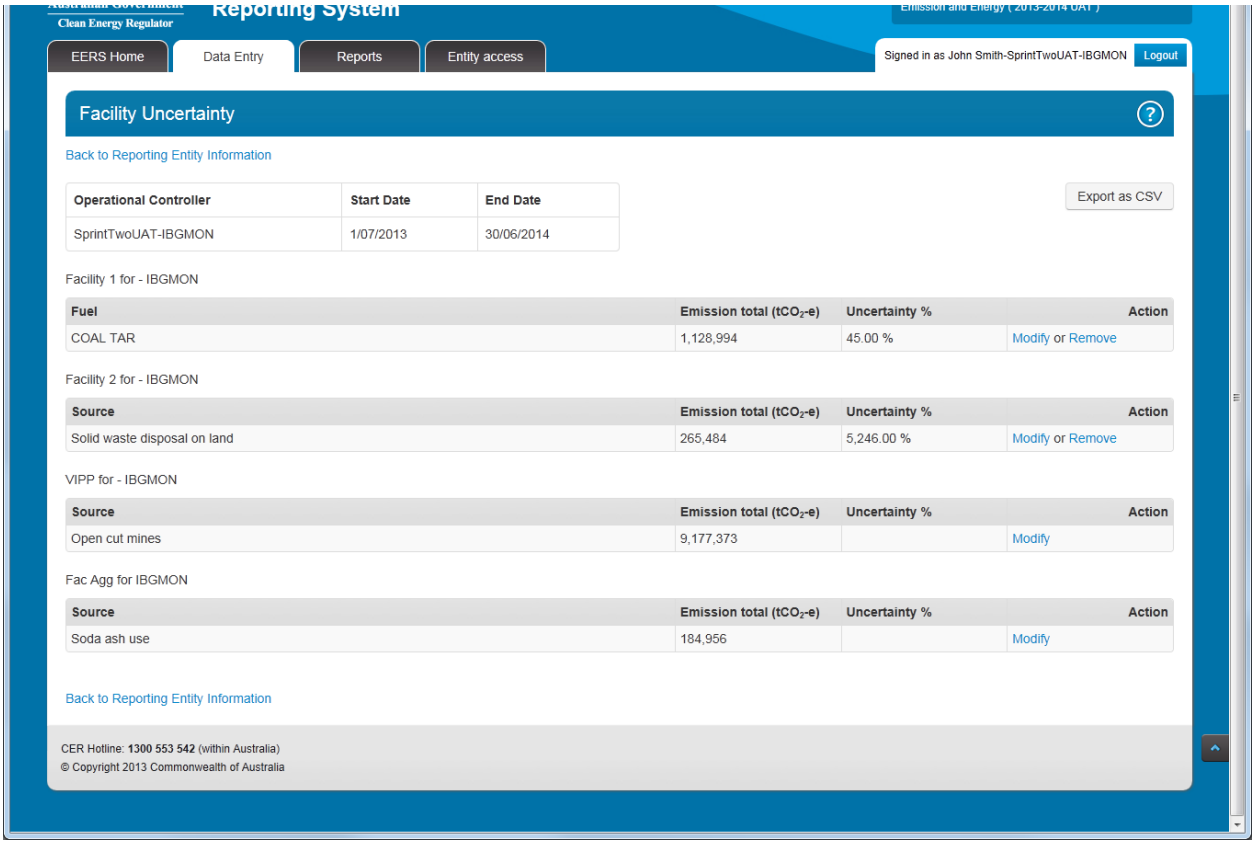


Figure 9: Uncertainty screen

- To modify or remove a reported uncertainty amount click the blue hyperlink adjacent to the uncertainty amount which will display the uncertainty add/modify entry screen (shown in Figure 10).
- On this screen, reporters should enter the uncertainty related to the activity data for all the fuels and/or sources on this screen in the Uncertainty box of the left hand side of the screen (see Figure 10).To calculate and report this uncertainty in accordance with the Measurement Determination, reporters may choose to use the Calculator.

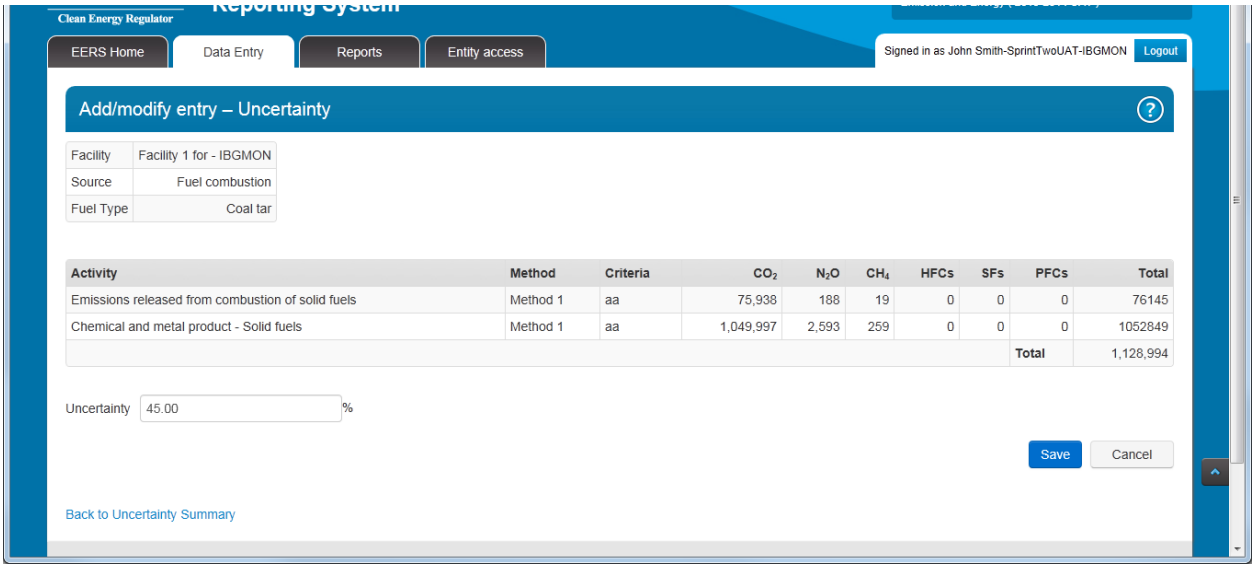


Figure 10: ty Add/modify – Uncertainty entry screen.

- After reporting uncertainty, reporters should continue generating and submitting their reports. If any of the activities relevant to uncertainty reporting are adjusted, reporters should reassess their uncertainty reporting.

Special cases: Emissions from entities that are not common 'facilities'

Facility Aggregates

Uncertainty reporting will only apply to a facility where scope 1 emissions from combustion of a fuel type or from a source at the facility are 25,000 t CO2-e or more (see NGER Regulations 4.08 and 4.17A). Facilities cannot be reported within a facility aggregate if scope 1 emissions from the facility are 25,000 t CO2 -e or more (see NGER Regulation 4.25). Therefore emissions from facility aggregates will not appear in the uncertainty dashboard.

Vertically integrated production processes (VIPPs)

Emissions from VIPPs will appear in the uncertainty dashboard.

Corporations are advised to treat VIPPs in the same way as facilities when reporting uncertainty.

Incidental and percentage reporting

Data reported as a percentage under regulation 4.26 is not subject to uncertainty reporting requirements.

Data reported as an incidental under regulation 4.27 is not subject to uncertainty reporting requirements.

Calculating uncertainty: Industrial process sources using method 1

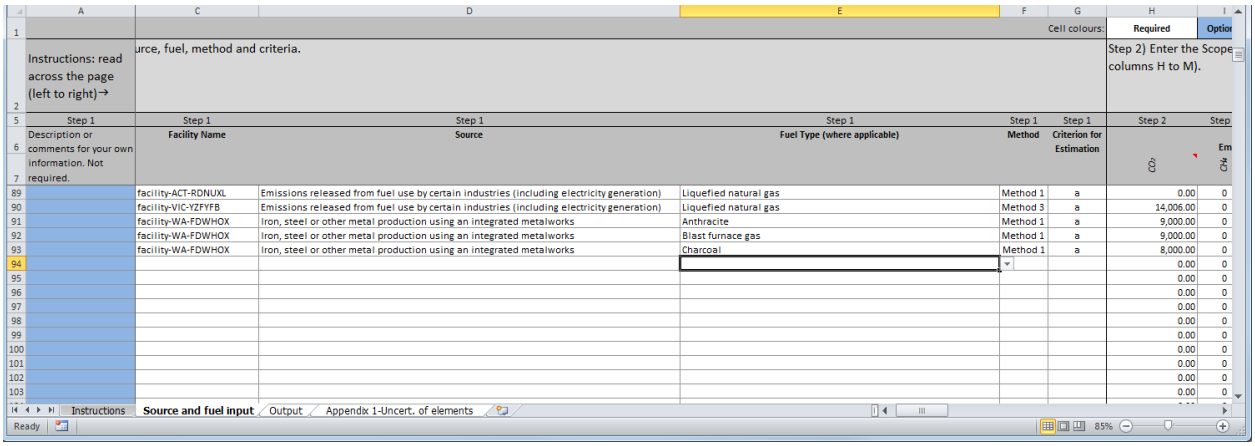
The table below (Table 1) specifies industrial process sources that do not have default uncertainty values in the Measurement Determination. If emissions from these sources involve the combustion of a fuel, then default fuel combustion uncertainty factors may be used for emissions attributable to each fuel. Otherwise, the uncertainty must be calculated in accordance with the Uncertainty Protocol.

Source
Sodium cyanide production
Soda ash production
Ammonia production
Carbide production
Chemical or mineral production (other than carbide production) using a carbon reductant or carbon anode
Iron, steel or other metal production using an integrated metalworks
Ferroalloys production
Aluminium production (where activity is emissions from the production of baked carbon anodes)
Other metals production

Table 1: Sources without default uncertainty values in the Measurement Determination

Using default combustion uncertainty factors for industrial process sources.

In the following screenshot, the source iron, steel or other metal production using an integrated metalwork's involves the combustion of three fuels. The three example fuels are anthracite coal, blast furnace gas, and charcoal. It is necessary to understand the amount emissions from each of these fuels. These three fuels and the amount of scope 1 emissions have been entered into the uncertainty calculator on rows 91, 92 and 93 of the source and fuel input screen, as shown in Figure 11.



	Step 1	Step 1	Step 1	Step 1	Step 1	Step 2	Step
	Description or comments for your own information. Not required.	Facility Name	Source	Fuel Type (where applicable)	Method	Criterion for Estimation	CO_2
89		facility-ACT-RDNUXL	Emissions released from fuel use by certain industries (including electricity generation)	Liquefied natural gas	Method 1	a	0.00
90		facility-VIC-YZFYFB	Emissions released from fuel use by certain industries (including electricity generation)	Liquefied natural gas	Method 3	a	14,006.00
91		facility-WA-FDWHOX	Iron, steel or other metal production using an integrated metalworks	Anthracite	Method 1	a	9,000.00
92		facility-WA-FDWHOX	Iron, steel or other metal production using an integrated metalworks	Blast furnace gas	Method 1	a	9,000.00
93		facility-WA-FDWHOX	Iron, steel or other metal production using an integrated metalworks	Charcoal	Method 1	a	8,000.00

Figure 11: Fuel combustion for particular industrial processes

Calculating uncertainty for carbon mass balance equations using method 1

The Measurement Determination provides methods based on a carbon mass balance approach for estimating scope 1 emissions from sources:

- which have multiple carbon inputs and outputs, and
- where the integrated nature of a facility means that the emissions estimate for the process as a whole is more accurate than estimates of emissions from different aspects of the process.

A carbon mass balance approach is provided for estimating emission from some activities under the following industrial process sources:

- Division 4.2.3 – Use of carbonated for production of a product other than cement clinker, lime or soda ash (limited use).
- Division 4.2.4 - Soda ash use and production.
- Division 4.3.5 – Chemical or mineral production, other than carbide production, using a carbon reductant or carbon anode.
- Division 4.4.1 – Iron, steel or other metal production using an integrated metalworks.
- Division 4.4.2 – Ferroalloys production, and
- Division 4.4.5 – Other metals production.

The rules in the Measurement Determination for assessing the uncertainty of emissions estimates using method 1, 2 or 3 are part of the uncertainty associated with estimating based on a number of parameters, including the energy content factor, emissions factor and/or activity data.

Part 8.3 of the Measurement Determination does not set out default values for assessing the uncertainty of emissions estimates using a method based on a carbon mass balance approach, which is a function of uncertainty associated with carbon content factors and activity data.

Given this, it is reasonable for reporters to assess uncertainty of emissions estimates using a carbon mass balance approach in accordance with the uncertainty protocol: GHG Protocol guidance on uncertainty assessment in GHG inventories and calculating statistical parameter uncertainty .

Part 7 of the uncertainty protocol recommends four ways to quantify uncertainty ranges for indirectly measured emissions:

- run statistical tests on one or several sets of sample data (e.g. by the method explained in section 6.2 of the GHG Protocol)
- determine the instrument precision of any measurement equipment used, especially for activity data
- consult experts within the company to give an estimation of the uncertainty range of the data used as explained in Section 6.1 of the uncertainty protocol, and
- use third-hand uncertainty ranges (e.g. the Intergovernmental Panel on Climate Change (IPCC) data provided in the second worksheet of the uncertainty tool)

The uncertainty protocol recommends item 4 is only used where it is not possible to collect facility specific data for use in items 1 to 3. Section 8.15(2) of the Measurement Determination prevents the use of Item 4 when emissions are estimated using method 2, 3, or 4.

When using method 1, if it is not feasible to use items 1 to 3 of the uncertainty protocol to assess the uncertainty of estimates of emissions. A reporter may use item 4 and the IPCC overall source uncertainty figure of 10% for carbon dioxide from industrial processes sources provided in the worksheet of the uncertainty protocol , if the reporter is confident it is a reasonable assessment of the uncertainty.

Calculating uncertainty from Methods 2, 3 and 1 (non-default factors) emissions

Uncertainty for emissions estimates calculated under Methods 2, and 3 must be calculated in accordance with the Uncertainty Protocol (Part 8.4 of the Measurement Determination). Under certain circumstances, outlined in part 8.3 of the Measurement Determination uncertainty for emissions estimated under Method 1 can also be calculated in this manner.

The procedure for applying these methods to the Calculator is outlined as follows:

- enter a description for the source (e.g. natural gas (pipeline) - petroleum refining)
- type in the facility name under the 'Facility Name' column or, alternatively select the facility name from the drop down menu
- choose a Source (e.g. fuel combustion)
- select the method used to measure the emissions of the source, and
- choose criterion for estimation (if applicable).

Note: The criterion for estimation will be blacked out, where this is not a required variable for uncertainty calculations.

- For Method 2 and 3 calculations, a reporter must calculate the uncertainty according to the principles in the Uncertainty Protocol. Data may be entered into the Calculator in either of two ways.
  - » Enter: estimated scope 1 emissions (from the EERS-generated section 19 NGER report), calculated energy content uncertainty, Fuel/Activity quantity uncertainty, and emission factor uncertainty (for each of the gases). The energy content, activity/fuel quantity and emissions factor uncertainties must have been calculated in accordance with Part 8.4 of the Measurement Determination.

OR

  - » Enter the emissions data and aggregated uncertainty for the emissions source. Certain cells of the worksheet become blacked out to indicate fields where data is not required.
- Reporters may use the Appendix 1 - Uncertainty of Elements worksheet (discussed previously) to calculate uncertainties based on the principles outlined in the Uncertainty Protocol.
- For Method 1 (using non-default values), where uncertainty values are calculated in accordance with the Measurement Determination and the Uncertainty Protocol, these can be entered into the relevant cells. If no value is entered, default values will be applied.
- If multiple sources are attributed to a single facility, the calculator will aggregate the uncertainty for each source. The aggregated uncertainty for each facility as well as the corporation's total percentage uncertainty will be shown on the Output worksheet (Figure 6).

Calculating uncertainty from Method 4 emissions estimates

Assessments of uncertainty for emissions estimated under Method 4 must conform to principles outlined in the Uncertainty Protocol. When using Method 4 to calculate emissions estimates, only estimated emissions and aggregated uncertainty can be entered into the Calculator for each emission source. All other cells for entering uncertainty factors will be blacked out by the Calculator when this is done.

Emissions data for each gas must also be entered in order to calculate the percentage uncertainty for the particular source.

Note: Data and methodologies associated with the calculation of the aggregated uncertainty under Method 4 should be documented and retained.

Where a corporation exceeds the limits of the Calculator

The Calculator has been designed to meet the needs of the majority of reporting corporations, but is limited to 50 facilities and fuel combinations.

Where a corporation exceeds either of these limits it is suggested that data be split between several copies of the Calculator. In doing so, reporters should ensure that all data for a single facility is located in the same copy of the Calculator. Otherwise, errors may occur.

Further information

If you require any further information on the Calculator please email reporting@cleanenergyregulator.gov.au.

Abbreviations and definitions

Term	Definition
t CO2-e	Tonnes of equivalent carbon dioxide
the Calculator	NGER Uncertainty Calculator 2013-14
EERS	Emissions and Energy Reporting System
NGER	National Greenhouse and Energy Reporting
NGER Act	National Greenhouse and Energy Reporting Act 2007
Measurement Determination	National Greenhouse and Energy Reporting (Measurement) Determination 2008
NGER Regulations	National Greenhouse and Energy Reporting Regulations 2008
Uncertainty Protocol	GHG Uncertainty protocol guidance on uncertainty assessment in GHG inventories and calculating statistical parameter uncertainty (September 2003 v1.0)
User Guide	NGER Uncertainty Calculator 2012-13 User Guide
VIPP	Vertically Integrated Production Process