Australian Capital Territory

Climate Change and Greenhouse Gas Reduction (Greenhouse Gas Emissions Measurement Method) Determination 2013

Disallowable Instrument DI2013-76

made under the

Climate Change and Greenhouse Gas Reductions Act 2010 (the Act) s 11 (Measuring greenhouse gas emissions – determination)

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1 Name of instrument

This instrument is the *Climate Change and Greenhouse Gas Reduction (Greenhouse Gas Emissions Measurement Method) Determination 2013*.

2 Commencement

This instrument commences on the day after it is notified.

3 Revocation

I revoke the *Climate Change and Greenhouse Gas Reduction (Greenhouse Gas Emissions Measurement Method) Determination 2011,* DI2011-257.

4 Determination of method for measuring greenhouse gas emissions

I determine the method for measuring the amount of greenhouse gas emissions in the ACT for the year (the *annual emissions amount*) as set out in the schedule attached to this instrument.

Simon Corbell MLA
Minister for the Environment and Sustainable Development

21 May 2013

1. Objects of the determination

This determination sets out the method for the measurement of greenhouse gas emissions arising from sources, or attributable to activities, located within the geographic boundary of the Australian Capital Territory (ACT).

2. Application of the determination

The method determined in this instrument must be used to measure the amount of greenhouse gas emissions in the ACT for the year (the annual emissions amount) in the annual report prepared by an independent entity as required under section 12 of the Act.

3. Greenhouse gas emissions covered

The emissions covered by this determination are:

- Scope 1 emissions from:
  - fuel combustion
  - fugitive emissions from fuels
  - industrial processes
  - agriculture
  - land use, land use change and forestry
  - waste.
- Scope 2 emissions from electricity consumption in the ACT, adjusted for scope 3 electricity transmission and distribution losses.

The annual data on these emissions will be obtained from the National Greenhouse Accounts except for the following:

- electricity consumption
- natural gas consumption
- wood fuel combustion
- road transport
- natural gas leakage.

4. Definitions

In this Determination:

carbon dioxide equivalence or ***CO_2-e***, means the amount of greenhouse gas multiplied by its specific global warming potential.

dry wood means wood that:

a) has a moisture content of 20% or less if the moisture content is calculated on a wet basis; and

b) is combusted to produce heat.

emission factors refer to the kilograms of carbon dioxide equivalent emitted per unit of activity.

energy content factor, for a fuel, means gigajoules of energy per unit of the fuel measured as a gross calorific value.

fugitive emissions means the release of emissions that occur during the extraction, processing and delivery of fossil fuels.

global warming potential refers to an index (on a 100 year time horizon) representing the combined effect of the differing times greenhouse gases remain in the atmosphere and their relative effectiveness in absorbing outgoing infrared radiation.

greenhouse gas emissions has the meaning given by the *Climate Change and Greenhouse Gas Reduction Act 2010*.

scope 1 emissions refer to the emission of greenhouse gases directly resulting from an activity, or series of activities (including ancillary activities).

scope 2 emissions refer to the emission of greenhouse gases that occurs outside the ACT as a consequence of using grid-supplied electricity, heating and/or cooling within the ACT.

scope 3 emissions refer to the emission of greenhouse gases not included as a scope 1 or scope 2 emission that occur outside the ACT as a result of activities within the jurisdiction due to use of goods and services. Scope 3 emissions include electricity transmission and distribution losses.

5. Method

The method for calculating the emissions for which annual data will not be obtained from the National Greenhouse Accounts will be made using the following equations:

Equation 1: Stationary energy combustion emissions – electricity consumption

$$EIE = \frac{\left(\frac{QE}{1 - NL} - GP\right) \times EFE}{1000}$$

Where:

EIE is emissions from electricity consumption expressed in tonnes of CO_2-e

NL is the network loss (that is, transmission and distribution losses) expressed as a ratio of combined NSW and ACT electricity generation and consumption

QE is the consumption of purchased electricity expressed in kilowatt hours

GP is purchases of GreenPower expressed in kilowatt hours

EFE is the emissions factor for scope 2 electricity consumption for NSW/ACT in kilograms of CO_2-e emissions per kilowatt hour

Equation 2: Stationary energy combustion emissions – natural gas

$$ENG = \frac{QNG \times \sum_j EFNG_j}{1000}$$

Where:

ENG is emissions from natural gas consumption expressed in tonnes of CO_2-e

QNG is the consumption of purchased natural gas less consumption by ACTION Buses expressed in gigajoules

$EFNG_j$ is the emissions factor for natural gas combustion for greenhouse gas type j = CO_2, CH_4 and N_2O in kilograms of CO_2-e per gigajoule

Equation 3: Stationary energy combustion emissions – wood fuel

$$EWF = \sum_i \frac{QWF \times ECWF \times UWF_i \times \sum_j EFWF_{ij}}{1000}$$

Where:

EWF is emissions from wood fuel consumption expressed in tonnes of CO_2-e

QWF is the consumption of dry wood expressed in tonnes

$ECWF$ is the energy content factor for dry wood expressed in gigajoules per tonne

UWF_i is the share of wood fuel consumption used in activity type i = heating and stoves

$EFWF_{ij}$ is the emissions factor for activity type i for greenhouse gas type j = CH_4 and N_2O in kilograms of CO_2-e per gigajoule

Equation 4: Transport fuel emissions – road transport

$$ERT = \sum_i \sum_k \frac{QRT_{ik} \times ECRT_i \times \sum_j EFRT_{ijk}}{1000}$$

Where:

ERT is emissions from road transport vehicles expressed in tonnes of CO_2-e

QRT_{ik} is the quantity of transport fuel type *i* = auto gasoline, ethanol, diesel, and liquefied petroleum gas (LPG) sold measured in kilolitres and CNG consumed by ACTION Buses expressed in cubic metres, consumed by vehicle year of manufacture *k* = pre-2005 or post-2004

$ECRT_i$ is the energy content factor for transport fuel type *i* expressed in gigajoules per kilolitre or gigajoules per cubic metre

$EFRT_{ijk}$ is the emissions factor for transport fuel type *i* for greenhouse gas type j = CO_2, CH_4 and N_2O in kilograms of CO_2-e emissions per gigajoule, consumed by vehicle year of manufacture *k* = pre-2005 and post-2004

Equation 5: Fugitive emissions – natural gas leakage

$$ENGL = S \times \%UAG \times L \times \sum_j C_j$$

Where:

$ENGL$ is emissions from natural gas leakage expressed in tonnes of CO_2-e

S is the total gas utility sales from the pipeline system expressed in terajoules

$\%UAG$ is the percentage of unaccounted for gas in the Territory's pipeline system, relative to the amount issued annually by gas utilities

L is the portion of unaccounted for gas allocated as leakage, which is equal to 0.55[1]

C_j is the natural gas composition factor for greenhouse gas type j = CO_2 and CH_4 supplied from the Territory's pipeline system expressed in tonnes of CO_2-e per terajoule[2]

[1] Variable is consistent with 'Method 1 – natural gas distribution' defined in the *National Greenhouse and Energy Reporting (Measurement) Determination 2008 (C'wth)*.

[2] ACT and NSW share the same coefficient.

6. Annual report about greenhouse gas emissions and targets

The annual report prepared by an independent entity as required under section 12 of the Act must include the information as calculated in the following table:

Greenhouse Gas Source and Sink Categories		Total (CO_2-e) Gg (kilo tonnes)
Total ACT emissions and removals		1+2+3+4+5
1 Energy		A+B
A Fuel combustion activities		a+b+c+d
	Electricity	a[1]
	Natural gas	b[2]
	Transport fuels	c[3]
	Wood fuel	d[4]
B Fugitive emissions from fuels		e
	Natural gas leakage	e[5]
2 Industrial processes		f+g
	Consumption of Halocarbons and F_6	f[6]
	Other	g[6]
3 Agriculture		h+i+j
	Enteric fermentation	h[6]
	Manure management	i[6]
	Agricultural soils	j[6]
4 Land use, land-use change and forestry		k
	Afforestation and deforestation	k[6]
5 Waste		l+m
	Solid waste disposal on land	l[6]
	Wastewater handling	m[6]
Total emissions including net CO_2 from LULUCF		1+2+3+4+5
Total emissions excluding net CO_2 from LULUCF		1+2+3+5

[1] EIE given by equation 1

[2] ENG given by equation 2

[3] ERT given by equation 4

[4] EWF given by equation 3

[5] ENGL given by equation 5

[6] Data from the Australian Greenhouse Emissions Information System (Department of Climate Change and Energy Efficiency)