

Emissions Factors September 2024

Australia

Background

Eden Suite uses emission factors published by the Federal Department of Climate Change, Energy, the Environment and Water Efficiency (DCEEW) in their National Greenhouse Account (NGA) factors. These factors are used for Scope 1 and 2 emissions and some Scope 3 (e.g. Waste). In September 2024 DCEEW simplified and aligned reporting so that one table provided factors for both NGA and NGERs. NGA factors from the year before should be applied to the following year's emissions. For example, the NGA Factors released in September 2024 should be applied to 2024-25 reporting. Where no factors are provided by DCEEW other sources are used, primarily DEFRA (UK) for air travel and Victorian EPA for paper.

Links

- Department of Climate Change, Energy, Environment and Water, [National Greenhouse Account Factors, September 2024](#)
- Environment Protection Authority Victoria (EPA Victoria), [Greenhouse Gas Inventory Management Plan 2012-13](#)
- The UK Government, [UK.gov Greenhouse gas reporting: conversion factors 2024](#)

Emissions factors

The table below provides the emission factors used by Eden Suite

(NOTE: In September 2024 DCEEW's update to the scope 2 emission factors discontinued the practice of applying a three-year average to calculate emission factors and used renewable generation data sourced from the Australian Energy Market Operator via the NEM-Review tool for the time period matching the latest available NGER generation data. This is consistent with the most recent update to the NGER Measurement Determination.)

Emissions source	Unit	Emissions conversion factor into kg (per unit)	Reference
Direct emissions (Scope 1)			
Petrol for vehicles	GJ	67.62	National Greenhouse Account Factors, September 2024, Table 9
LPG for vehicles	GJ	61	National Greenhouse Account Factors, September 2024, Table 9
Automotive diesel oil for vehicles (ADO)	GJ	70.41	National Greenhouse Account Factors, September 2024, Table 9
Ethanol for vehicles	GJ	0.40	National Greenhouse Account Factors, September 2024, Table 9
E10 (calculated as 90% gasoline and 10% ethanol)	GJ	60.898	Calculated from above
Avgas for aircraft	GJ	67.66	National Greenhouse Account Factors, September 2024, Table 9
Avtur for aircraft	GJ	70.21	National Greenhouse Account Factors, September 2024, Table 9
Natural gas	GJ	51.53	National Greenhouse Account Factors, September 2024 Table 5
LPG (stationery energy)	GJ	60.6	National Greenhouse Account Factors, September 2024, Table 8

Emissions source	Unit	Emissions conversion factor into kg (per unit)	Reference
Diesel oil (stationery energy)	GJ	70.2	National Greenhouse Account Factors, September 2024, Table 8
Indirect emissions (Scope 2)			
Purchased electricity (NSW)	kWh	0.66	National Greenhouse Account Factors, September 2024, Table 1
Purchased electricity (Victoria)	kWh	0.77	National Greenhouse Account Factors, September 2024, Table 1
Purchased electricity (QLD)	kWh	0.71	National Greenhouse Account Factors, September 2024, Table 1
Purchased electricity (SA)	kWh	0.23	National Greenhouse Account Factors, September 2024, Table 1
Purchased electricity (WA) – SWIS (NWIS 0.61)	kWh	0.51	National Greenhouse Account Factors, September 2024, Table 1
Purchased electricity (TAS)	kWh	0.15	National Greenhouse Account Factors, September 2024, Table 1
Purchased electricity (NT)	kWh	0.56	National Greenhouse Account Factors, September 2024, Table 1
Purchased electricity (National)	kWh	0.63	National Greenhouse Account Factors, September 2024, Table 1
Scope 2 Residual Mix Factor Factor for the market-based method	kWh	0.81	National Greenhouse Account Factors, September 2024, Table 2
Renewable Power Percentage (RPP)	%	18.72	2023/24 FY as used in Example 2 NGA Factors September 2024
Indirect emissions (Scope 3)			
Purchased electricity (NSW)	kWh	0.04	National Greenhouse Account Factors, September 2024, Table 1
Purchased electricity (Victoria)	kWh	0.09	National Greenhouse Account Factors, September 2024, Table 1
Purchased electricity (QLD)	kWh	0.1	National Greenhouse Account Factors, September 2024, Table 1
Purchased electricity (SA)	kWh	0.05	National Greenhouse Account Factors, September 2024, Table 1
Purchased electricity (WA) – SWIS (NWIS 0.09)	kWh	0.06	National Greenhouse Account Factors, September 2024, Table 1
Purchased electricity (TAS)	kWh	0.03	National Greenhouse Account Factors, September 2024, Table 1
Purchased electricity (NT)	kWh	0.07	National Greenhouse Account Factors, September 2024, Table 1
Purchased electricity (National)	kWh	0.08	National Greenhouse Account Factors, September 2024, Table 1
Scope 3 Residual Mix Factor Factor for the market-based method	kWh	0.11	National Greenhouse Account Factors, September 2024, Table 2

Emissions source	Unit	Emissions conversion factor into kg (per unit)		Reference
Emissions from fuel extraction for natural gas (VIC)	GJ	4.0		National Greenhouse Account Factors, September 2024, Table 6
Emissions from fuel extraction for natural gas (NSW)	GJ	13.1		National Greenhouse Account Factors, September 2024, Table 6
Emissions from fuel extraction for natural gas (QLD)	GJ	8.8		National Greenhouse Account Factors, September 2024, Table 6
Emissions from fuel extraction for natural gas (SA)	GJ	10.7		National Greenhouse Account Factors, September 2024, Table 6
Emissions from fuel extraction for natural gas (WA)	GJ	4.1		National Greenhouse Account Factors, September 2024, Table 6
Emissions from fuel extraction for petrol/gasoline (transport)	GJ	17.2		National Greenhouse Account Factors, September 2024, Table 9
Emissions from fuel extraction for LPG (transport)	GJ	20.2		National Greenhouse Account Factors, September 2024, Table 9
Emissions from fuel extraction for ADO/diesel (transport)	GJ	17.3		National Greenhouse Account Factors, September 2024, Table 9
Emissions from fuel extraction for E10 (transport)	GJ	15.48		Calculated from 10% ethanol = 90% gasoline
Emissions from fuel extraction Avgas	GJ	18		National Greenhouse Account Factors, September 2024, Table 9
Emissions from fuel extraction for Avtur	GJ	18		National Greenhouse Account Factors, September 2024, Table 9
Waste emissions (Scope 3)				
Municipal solid waste (generic)	tonnes	1.6		National Greenhouse Account Factors, September 2024, Table 16
Commercial Waste	tonnes	1.3		National Greenhouse Account Factors, September 2024, Table 16
Construction Waste	tonnes	0.2		National Greenhouse Account Factors, September 2024, Table 16
Clinical Waste	tonnes	0.879		National Greenhouse Account Factors, September 2024, Table 18
Air Travel emissions (Scope 3)				
Flights*	Passenger km	<463km	0.000209	UK Government factors 2024 - Full set (for advanced users) – Business travel - air Note: these factors include radiative forcing and uplift factors The 463km limit for short-haul flights has been defined following the classification used by UK DEFRA (see table 32), based on the guidance from CORINAIR (originally referenced here). CORINAIR sets 250 nautical miles (463km) as the upper limit for 'short flights'
		463-3700km		
		Average	0.000293	
		Economy	0.000225	
		Business	0.000652	
		>3700km		
		Average	0.000197	
		Economy	0.000151	
		Premium Economy	0.000242	

Emissions source	Unit	Emissions conversion factor into kg (per unit)		Reference
		Business	0.000438	
		First Class	0.000605	
Paper emissions (Scope 3)				
Office copy paper**	kg	100% Recycled	0.00152	EPA Victoria, Greenhouse Gas Inventory Management Plan 2012-13
		Virgin	0.0013	
Water emissions (Scope 3)				
Adelaide	kl	0.0007486		National performance report 2022-23: urban water utilities
Canberra	kl	0.0010355		National performance report 2022-23: urban water utilities
Darwin	kl	0.00066762		National performance report 2022-23: urban water utilities
Melbourne	kl	0.00163571		National performance report 2022-23: urban water utilities
Perth	kl	0.00173059		National performance report 2022-23: urban water utilities
South East Queensland	kl	0.00110067		National performance report 2022-23: urban water utilities
Sydney	kl	0.00089773		National performance report 2022-23: urban water utilities
Tasmania	kl	0.00145665		National performance report 2022-23: urban water utilities
Optional indirect emissions (Scope 3)				
Staff commuting	km	See reference		EPA Victoria, Greenhouse Gas Inventory Management Plan 2012-13, page 28
Taxi	\$ expenditure	See reference		EPA Victoria, Greenhouse Gas Inventory Management Plan 2012-13, page 22

Refrigerants and Medical Gases

Eden Suite is adopting the IPCC AR6 100-year GWP values (released 2020) for the 2024/2025 factor year and onwards.

The primary reference used is:

<https://ghgprotocol.org/sites/default/files/2024-08/Global-Warming-Potential-Values%20%28August%202024%29.pdf>

However, this reference does not include AR6 100-year GWPs for a number of the blends captured in Eden Suite.

In those instances, we manually calculate the blend GWPs using the AR6 100-year GWP for each of the blend components. We then seek to corroborate the calculations with an additional reference. In most instances The Climate Registry concurs:

https://theclimateregistry.org/wp-content/uploads/2024/03/2024-Emission-Factor-Documents_FINAL.pdf

However, for blends R-401A and R-404A, The Climate Registry has applied (undocumented) weightings that misalign their values with other references.

The GWPs used in Eden Suite for these two specific blends have instead been corroborated by the Global Logistics Emission Council:

https://smart-freight-centre-media.s3.amazonaws.com/documents/GLEC_FRAMEWORK_v3_UPDATED_02_04_24.pdf.

Fuel type	AR6 100-year GWP	Note
METHOXYFLURANE	4	C3H4Cl2F2O
Halogenated Alcohols and Ethers		
DESFLURANE	2590	Desflurane (HFE-236ea2) (CHF2OCHFCF3) (C3H2F6O)
ISOFLURANE	539	Isoflurane (HCFE-235da2) (CHF2OCHClCF3) (C3H2ClF5O)
SEVOFLURANE	195	Sevoflurane (HFE-347mmz1) ((CF3)2CHOCH2F) (C4H3F7O)
Hydrofluorocarbons		
HCFC_124	597	CHClFCF3 (stored as it is a component of blend R-402A)
REFRIGERANT_R134A	1530	R-134a (HFC-134a) (CH2FCF3) [from elsewhere: C2H2F4]
REFRIGERANT_R22	1960	R-22 (HCFC-22) (CHClF2) [from elsewhere: Chlorodifluoromethane : difluoromonochloromethane]
REFRIGERANT_R227EA	3600	R-227ea (HFC-227ea) (CF3CHFCF3) [from elsewhere: C3HF7 : heptafluoropropane]
HFC_32	771	R-32 (HFC-32) (CH2F2) [from elsewhere: Difluoromethane]
Blends		
REFRIGERANT_R401A_MP39 ****	1263	R-401A (MP39) (HCFC-401A) : 53% HCFC-22 (R-22) + 13% HFC-152a (R-152A) + 34% HCFC-124 (R-124)
REFRIGERANT_R402A_HP80 ****	2989	R-402A (HP80) (HCFC-402A) : 38% HCFC-22 (R-22) + 60% HFC-125 (R-125) + 2% R-290 [https://naturalrefrigerants.com/ipcc-includes-gwps-for-hydrocarbons-in-new-report/ R-290 GWP 100-year 0.02]
REFRIGERANT_R404A	4728	R-404A (HFC-404A) : 44% HFC-125 (R-125) + 52% HFC-143A (R-143A) + 4% HFC-134A (R-134A)
REFRIGERANT_R407A	2262	R-407A : 20% HFC-32 (R-32) + 40% HFC-125 (R-125) + 40% HFC-134A (R-134A)
REFRIGERANT_R407C	1908	R-407C (HFC-407C) : 23% HFC-32 (R-32) + 25% HFC-125 (R-125) + 52% HFC-134A (R-134A)
REFRIGERANT_R410A	2256	R-410A (HFC-410A) : 50% HFC-32 (R-32) + 50% HFC-125 (R-125)
HFCs and SF6 (includes duplication from above +)		
METHANE	27	methane - non fossil
NITROUS_OXIDE	273	
SF6	24300	
HFC_23	14600	R-23
HFC_32 +	771	R-32
HFC_41	135	R-41
HFC_43_10mee	1600	R-4310mee
HFC_125	3740	R-125

Fuel type	AR6 100-year GWP	Note
HFC_134	1260	R-134
REFRIGERANT_R134A	1530	R-134a (CH ₂ FCF ₃)
HFC_143	364	R-143
HFC_143a	5810	R-143a
HFC_152a	164	R-152a
REFRIGERANT_R227EA	3600	heptafluoropropane (C ₃ HF ₇)
HFC_236fa	8690	R-236fa
HFC_245ca	787	R-245ca

***Flights**

Note: these factors include radiative forcing and uplift factors and WTT emissions

****Office Paper**

It is assumed that 1 ream= 2.5kgs

For more detail, see EPA Victoria Greenhouse Gas Inventory Management Plan 2012-13 for how to apply these emissions factors.

*****Reticulated water**

Where 1 kL= 1m³

****** manually calculated from blend component GWPs**