



# COUNCIL CARBON AND ENERGY FOOTPRINT INFORMATION SERIES

## GREENHOUSE GAS EMISSIONS FACTORS SUMMARY

To calculate an organisation's greenhouse gas emissions the approved methods allow direct measurement of actual emissions or estimated emissions based the quantities of fuels, gases and the like that are used in combination with the relevant emissions factors. The first of these methods is typically very costly and would not be used for emissions from council activities.

The standard emission factors are set in the National Greenhouse and Energy Reporting (Measurement) Determination 2008 (Determination), which is updated by the Australian Government annually in June of each year.

The emission factors are based on Australian and international research and are amended as new information comes to hand.

One issue over the years that has affected factors is better understanding of the impacts of methane and nitrous oxide on climate change. Both are more powerful greenhouse gases than carbon dioxide, but act in complex ways. Their impact is calculated relative to that of carbon dioxide over a 100-year timeframe through an index called global warming potential (GWP).

The GWP for methane has been increased from 21 to 28 times that of carbon dioxide over the past ten years as knowledge has improved. The GWP of nitrous oxide (produced in small amounts in composting and combustion of fuels) has been reduced from 310 to 265. The GWP of these gases may be adjusted again in future.

The greenhouse gas emissions factors for the combustion of solid, liquid and gaseous fuels are listed in the NGAF and if the weight or volume of fuel that is used is known then the associated emissions can be calculated. For example, 1 litre of unleaded petrol used in a vehicle engine produces about 2.3 kg of carbon dioxide equivalent. The factors depend on how the fuel is measured, for instance petrol and diesel are

measured by volume, LPG in bottles is measured by weight and natural gas is usually billed based on the energy content.

The NGAF also includes emission factors for waste treatment processes such as composting and anaerobic digestion using the mass of organic waste being composted as the basis for the calculations.

For electricity (which are included in Scope 2 emissions) the issue is complicated as multiple different types of electricity generation technology input into the state and National Electricity Market (NEM) grids. Electricity can be generated using high emission technology such as coal fired power stations or those with low emissions such as hydro, solar and wind. As electricity used by a consumer is the same no matter what the mix of generation is the Determination sets the average emission intensity factor for each state and the NEM overall each year. To allow for annual variations the emission factors are averaged over 3 years.

Almost all the mains electricity generated in Tasmania is from renewable sources. A small proportion is however produced by the natural gas-fuelled power station at Bell Bay and it has been determined that some methane emissions arise from decomposing vegetation in hydro lakes. In addition to these issues, some of the electricity used in Tasmania is imported from Victoria through the Basslink cable. While these imports are typically similar to the amount exported, the emissions factor is based on the source of the electricity at the time it is being used.

This means that Tasmania's emissions factor for electricity is greater than zero, but it is significantly lower than those for mainland states. In 2021/22, for example, the Tasmanian factor was 0.16 kilograms of carbon dioxide per kWh, compared to 0.96 kgCO<sub>2</sub>-e/kWh for Victoria.

While the electricity emissions factor is gradually declining across the National Electricity Market area as more wind and solar power generation is built, the Tasmanian factor can fluctuate up and down depending on the Tasmania's circumstances in any given year. During the period 2017/18 to 2021/22 the Tasmanian factor varied between 0.15 to 0.19 kgCO<sub>2</sub>-e/kWh. In some years the factor may be higher than the previous year and this change should be considered when reporting on carbon footprint results.

The Council Carbon and Energy Footprint Information Series has been developed as part of the Southern Councils Climate Collaboration. The Collaboration is an initiative of the Southern Tasmanian Councils Authority climate program, the Regional Climate Change Initiative. It is supporting the 12 southern councils to build capacity and capability to develop climate responses, to reduce their carbon emissions, and respond to the challenges and opportunities of a changing climate.

The Collaboration uses a common and consistent approach to work with councils to find local solutions. The approaches and resources used in the Collaboration have been developed specifically to meet the role and functions of councils and enable actions to be scaled between councils or regionally resulting in greater efficiencies and avoid duplication and maladaptive responses. The Information Series outlines key concepts, and methods, used in the preparation of Council Carbon and Energy Footprints through the Collaboration.



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