6.3 EMISSIONS ACCOUNTING

Introduction to Scope 2 greenhouse gas emissions and calculations

Important notice
This unit is part of a package of learning materials designed to support understanding of foundational concepts relating to climate-related financial disclosures. These learning materials do not constitute application or regulatory guidance for the preparation of climate-related financial disclosures and are not intended to represent legal or professional advice. We encourage you to seek your own professional advice to find out how the *Corporations Act 2001* (Corporations Act) and other relevant laws may apply to you and your circumstances, as it is your responsibility to determine your obligations and comply with them.

Key topics

- Scope 2 greenhouse gas emissions and measurement methodologies
- Location-based method
- Market-based method

Relevance for climate-related disclosures

Understanding fundamental concepts on Scope 1, 2 and 3 greenhouse gas emissions may support you in identifying and understanding your emissions as part of your climate-related financial disclosures.

In this unit, you will learn foundational concepts on Scope 2 greenhouse gas emissions. You will also learn how to identify and understand Scope 2 greenhouse gas emissions using the location-based method and, if applicable to your entity's circumstances, the market-based method.

Overview

Greenhouse gas emissions are categorised as Scope 1, Scope 2 or Scope 3 emissions.

Scope 2 greenhouse gas emissions are indirect greenhouse gas emissions that come from the generation of an entity's purchased or acquired electricity, steam, heating or cooling. Scope 2 greenhouse gas emissions are considered an indirect emissions source (along with Scope 3 greenhouse gas emissions) because the emissions are a consequence of the entity's activities but are emitted outside the entity's inventory boundary, at sources owned or controlled by another entity (such as a power plant). Module 6 Unit 1 has further details on inventory boundaries.

Scope 2 greenhouse gas emissions

Scope 2 greenhouse gas emissions are indirect greenhouse gas emissions (that is, emissions that are a consequence of the activities of an entity but occur at sources owned or controlled by another entity). Scope 2 greenhouse gas emissions are the result of the generation of purchased or acquired electricity, steam, heating or cooling consumed by an entity. They are emissions that are produced by burning fossil fuels such as coal, oil and gas, to generate electricity, steam, heating or cooling.
Greenhouse gases are explained in Module 2, Unit 2. Scope 1 greenhouse gas emissions are explained in Module 6, Unit 2. Scope 3 greenhouse gas emissions are explained in Module 6, Unit 4.

ASIC Australian Securities & Investments Commission
Australian Government Australian Accounting Standards Board
UTS STUDIO THREE LEARNING

Accounting for Scope 2 greenhouse gas emissions

Before you begin measuring your greenhouse gas emissions, you may find it useful to familiarise yourself with the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (2004) (GHG Protocol Corporate Standard) and the GHG Protocol Scope 2 Guidance, which is an amendment to the GHG Protocol Corporate Standard and describes the baseline methodology for Scope 2 greenhouse gas emissions measurement.

There are two methods for Scope 2 greenhouse gas emissions accounting that are useful for different purposes:

- the location-based method, which reflects the emissions from the generation of purchased and acquired electricity based on grid-average emission factors, and
- the market-based method, which reflects the emissions from a provider that an entity chooses and relies on emission factors derived from contractual instruments.

We look at each of these methods in detail, with practical examples of how to calculate Scope 2 emissions under each method.

Location-based method

The location-based method reflects an entity's Scope 2 greenhouse gas emissions in the context of its location. Electricity grids in each state and territory in Australia have their own average emission factors which are calculated each year based on the physical characteristics of the grid, taking into account emissions attributed to interstate electricity flows and fuel mix.

An emission factor is a factor allowing greenhouse gas emissions to be estimated from a unit of available activity data. It represents the average emissions per unit of activity (for example fuel consumed, electricity used).

The location-based emission factors for each state are published each year in the National Greenhouse Accounts Factors (NGA Factors) by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW)[1].

In general, states that have more renewable energy generation supplying the grid will have lower emissions per unit of electricity (and therefore a lower emission factor), while those that have more fossil fuel generation will have higher emissions per unit of electricity (and a higher emission factor).

The general formula for calculating the amount of Scope 2 greenhouse gas emissions from electricity (in metric tonnes of carbon dioxide equivalent (tCO_2-e)) using the location-based method is:

Scope 2 greenhouse gas emissions (tCO_2-e) = Electricity consumed (kWh) x state- or territory-based emission factor (kg CO_2-e/kWh) / 1,000

Example: A boutique hotel group operates two properties in Sydney (NSW) with a combined annual electricity use of 2,000,000 kWh, and one in Brisbane (Qld) with an annual electricity consumption of 500,000 kWh.

Table 1: Example of Scope 2 greenhouse gas emissions (location-based)

NSW emissions	QLD emissions
Emission factor for NSW grid (2025)[1] = 0.64 kg CO_2-e/kWh Scope 2 greenhouse gas emissions (NSW) = 2,000,000 kWh x 0.64 kg CO_2-e/kWh = 1,280,000 kg CO_2-e (divided by 1,000 = 1,280 tonnes CO_2-e)	Emission factor for Qld grid (2025)[1] = 0.67 kg CO_2-e /kWh Scope 2 greenhouse gas emissions (Qld) = 500,000 kWh x 0.67 kg CO_2-e /kWh = 335,000 kg CO_2-e (divided by 1,000 = 335 tonnes CO_2-e)
Total Scope 2 greenhouse gas emissions (location-based)	
Total Scope 2 greenhouse gas emissions = 1,280 + 335 tonnes CO_2-e = 1,615 tonnes CO_2-e	

Market-based method

If relevant to your entity, you may also measure your entity's Scope 2 greenhouse gas emissions using the market-based method. The market-based method considers the electricity that an entity actually purchases, such as renewable energy or contracts with specific providers. It uses the emission factors relevant to the types of generation that have been contracted for, rather than using a grid average. This enables the entity to demonstrate how its contractual arrangements are contributing to emissions and emission reductions from energy purchases.

Under the market-based method, purchased electricity from renewable sources has an emission factor of zero, using the NGA Factors for 2025.

The general formula for calculating Scope 2 greenhouse gas emissions using the market-based method is:

Scope 2 greenhouse gas emissions (tCO_2-e) = Electricity consumed (kWh) x Supplier-specific emission factor (kg CO_2-e/kWh) / 1,000

Example: The boutique hotel group operates two properties in Sydney (NSW) with a combined annual electricity use of 2,000,000 kWh, and one in Brisbane (QLD) with an annual electricity consumption of 500,000 kWh. The group buys 50% of its electricity from GreenPower and the rest from the National Electricity Market grid for the Sydney hotels. The Brisbane hotel uses 100% GreenPower. GreenPower is a government-managed program which supplies 100% renewable energy from government accredited sources. As the energy supplied by GreenPower is 100% renewable, it has an emission factor of zero. Using the NGA Factors for 2025, the national residual mix factor is used to calculate emissions from remaining electricity consumption under the market-based method.

Table 2: Example of Scope 2 greenhouse gas emissions (market-based)

NSW emissions	Qld emissions
GreenPower emission factor[2] **= 0 kg CO_2-e /kWh** **Residual mix factor for national grid (2025)** **= 0.81 kg CO_2-e /kWh**	GreenPower emission factor[2] = 0 kg CO_2-e /kWh Total electricity use = 500,000 kWh

Total electricity use = 2,000,000 kWh **GreenPower Scope 2 greenhouse gas emissions** **= 50% x 2,000,000 kWh x 0 kg CO_2-e /kWh = 0** **Standard Electricity Scope 2 greenhouse gas emissions** **= 50% x 2,000,000 kWh x 0.81 kg CO_2-e /kWh** **= 810,000 kg CO_2-e** **(divided by 1,000 = 810 tonnes CO_2-e)** **Scope 2 greenhouse gas emissions (NSW)** **= 0 +810** **=810 tonnes CO_2-e**	GreenPower Scope 2 greenhouse gas emissions = 500,000 kWh x 0 kg CO_2-e /kWh = 0 Scope 2 greenhouse gas emissions (QLD) = 0 tonnes CO_2-e
Total Scope 2 greenhouse gas emissions (market-based)	
Total Scope 2 greenhouse gas emissions = 810 + 0 tonnes CO_2-e = 810 tonnes CO_2-e	

Key takeaways

- Scope 2 greenhouse gas emissions are indirect greenhouse gas emissions that come from the generation of an entity's purchased or acquired electricity, steam, heating or cooling.
- Scope 2 greenhouse gas emissions can be measured using the location-based method or if applicable, the market-based method, depending on your entity's circumstances and uses.
- The location-based method for electricity reflects average grid emission factors, while the market-based method reflects emissions attributed to the electricity covered by contractual instruments.

Sources

[1] Commonwealth Department of Climate Change, Energy, the Environment and Water (2025) *Australian National Greenhouse Accounts Factors*

[2] GreenPower (2023) *National GreenPower Accreditation Program*