



# Module 2

## Scope 2 Emissions Accounting

in partnership with



and



# Welcome to Module 2: Scope 2 Emissions Accounting

Before we start our training, please find the keys to our interactive PDF.

 Previous page	 Expand window	 Key concepts	 Further resources
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 Next page	 Click here for more information	 Check out this video	

# Welcome to Module 2: Scope 2 Emissions Accounting

We estimate this module will take 30 minutes for a first read-through. It can then be used as a step-by-step guide as you complete your Scope 2 Emissions Accounting.

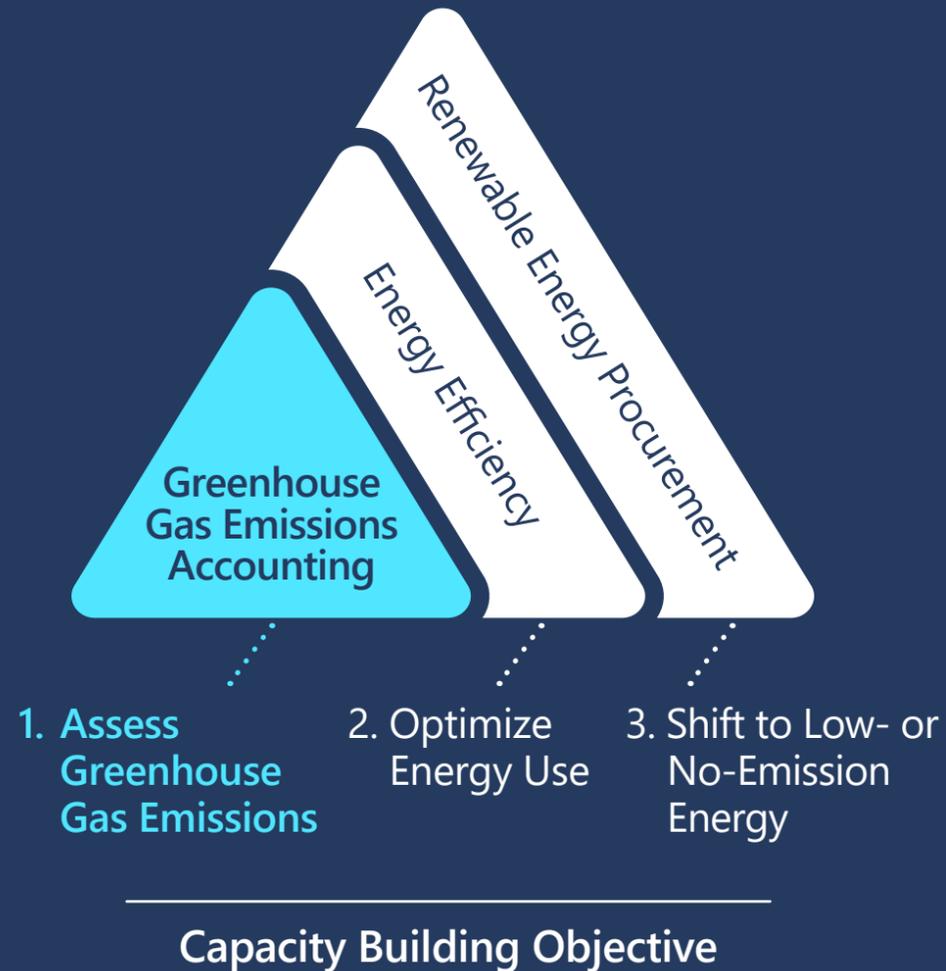
This module will take you through the step-by-step process for accounting for your company's Scope 2 GHG emissions. As a reminder, Scope 2 emissions are indirect emissions from the generation of electricity, steam and heating/cooling that is purchased by the company (i.e., not generated on site). The process for accounting for these emissions is conceptually very similar to the process covered in **Module 1**, but this time the data comes from different sources.

Most companies will have some amount of these emissions, and they are relatively straightforward to calculate using the simplest methodology put forward by the GHG Protocol. More complex methodologies may give you more granular results and are now encouraged, so we also cover these in the Appendix.



**Important!** It's also helpful to know that your bill-pay service may track utility-level data and can also conduct your Scope 2 emission accounting for you. Before you get started on this module, it might be helpful to check if your utility bill pay service offers this as a service.

# Learning objectives



## In this module, you will learn:

- How to use the two different methods for calculating Scope 2 GHG emissions – the location-based method and the market-based method
- The five overarching steps to calculating Scope 2 emissions
- The complicating factors you need to know when calculating Scope 2 emissions
- How to use the GHG Protocol Tool to do your Scope 2 emissions accounting

This training is the first part of a capacity building series on reducing energy-related greenhouse gas emissions

Once you complete this module, the following modules remain:

## Module 3

Scope 3  
Emissions  
Accounting

## Module 4

Emissions  
Reductions  
101

# Terms to know before you get started

Before we dive in

# Before we dive in, let's recap Module 1 and talk about how tools can help you with emissions accounting

There are a variety of different free tools available to help with emissions accounting. They involve a set of benefits and challenges that we outline below:

**For companies at the beginning of their emissions accounting journey, we suggest using the GHG Emissions Calculation Tool for Scope 2 emissions accounting for the following reasons:**

- It was developed by the World Resources Institute (WRI) and strictly follows the GHG Protocol guidance.
- It has been recently updated (as of March 2021) and will most likely be updated periodically.
- It allows users to easily include their own emissions factors (We will explain this in more detail later in this module).

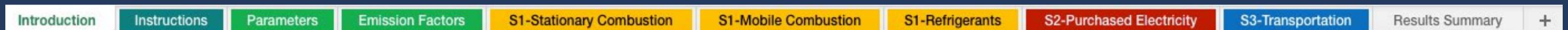
This tool can be accessed [here](#).

 More tools and databases are listed on the GHG Protocol website if you'd like to learn more about options beyond the GHG Emissions Calculation Tool.

# How does the GHG Emissions Calculation Tool work?

The GHG Emissions Calculation Tool is an Excel-workbook with different tabs for accounting various emissions from your company's activities.

These are the tabs that you'll want to focus on for Scope 2 emissions accounting. We will talk about the other tabs in later modules.



*Key tabs for Scope 2 accounting*

## There are two different methods for accounting for Scope 2 Emissions:

The decision-tree on the following page can help you decide which method is right for your company. This training is designed for companies relatively new to calculating GHG emissions, so we will focus on the location-based method since it is more straightforward. However, it may be useful to know the market-based method if your company wants to capture the decarbonization associated with procurement of lower-emissions energy. (For more details on energy procurement, please refer to **Module 4**.) The market-based method is becoming more widely used and should be your company's eventual preferred approach. However, if your company is new to emissions accounting, then the location-based method is a great starting point.

We've included more detail on the market-based method in the **Appendix**.

# This decision tree can help you determine which method is right for your company:

Is your company procuring electricity at any of your facilities with the intention of reducing GHG emissions (e.g. certificates, contracts with generators or suppliers for specific source energy, supplier labels, supplier emissions rates, green tariffs, contracts or other contractual instruments)?

If no

You may report Scope 2 emissions using only the location-based method. Continue to the next page of this training module to learn more.

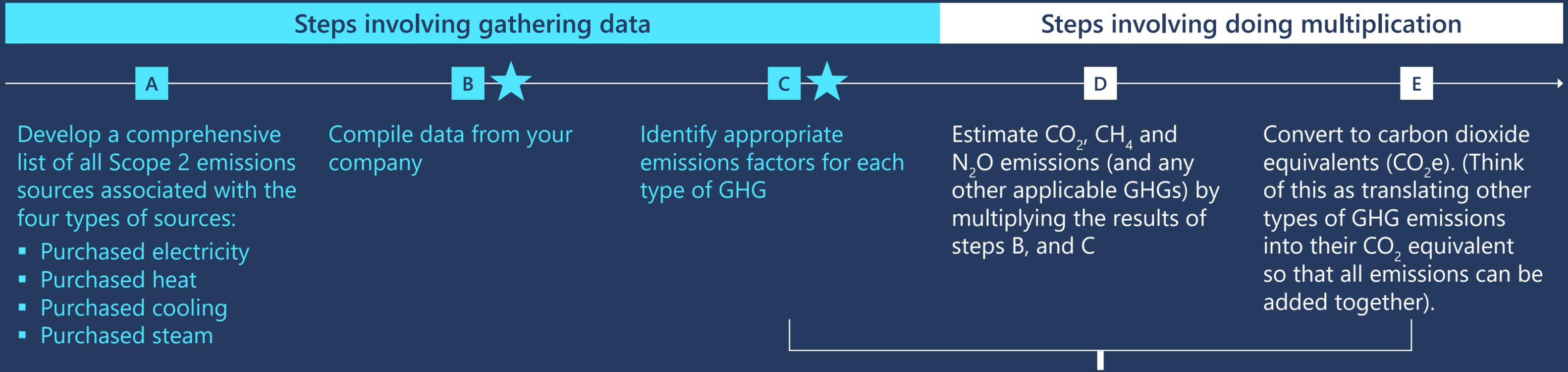
If yes

You may report Scope 2 emissions using both the location-based and market-based methods. (You can use different methods across different locations.) Continue to the next page of this training module to learn about the location-based method and then visit the **Appendix** to learn about the market-based method.

 **Note!** *The market-based method is becoming more widely used and should be your company's eventual preferred approach. But if your company is new to emissions accounting, then the location-based method a great starting point.*

# What is the step-by-step process for calculating Scope 2 Emissions Accounting?

Below is the step-by-step approach for calculating Scope 2 emissions. The overarching approach is the same for the location-based and market-based methods, but some steps are more complex using the market-based method. On the most basic level, these steps involve two main types of activities: gathering data and doing multiplication. Using the GHG Emissions Calculation Tool will help you do most of these steps in one place.



★ Note that these steps are more complex if using the market-based method. Learn more about this in the Appendix

The GHG Emissions Calculation Tool will help you with these 3 steps

Calculating Scope 2 emissions using the



**Location-based method**

**Step A** **Scope 2 emissions come from multiple sources, but purchased electricity is the most common**

Below we define each type of Scope 2 emissions and provide a checklist of where these come from. Ultimately purchased electricity will be the largest Scope 2 emissions source for most companies.

Emission type	Definition	Source checklist
Purchased Electricity	Indirect emissions from the generation of electricity through the combustion of fossil fuels and purchased from an entity outside Operational Boundary of the organization.	Annual total kWh of electricity usage used to operate: <ul style="list-style-type: none"> <li>• Machines</li> <li>• Lighting</li> <li>• Electric vehicle charging</li> <li>• Some types of heating and cooling</li> </ul>
Purchased Heat, Steam or Cooling	While not as common as purchased electricity, some organizations utilize spaces (such as office spaces) that use heat, steam, or cooling that is generated within the facility in which they are located but is generated outside their Organizational Boundary. Combined heat and power (CHP) plants produce electricity and steam. Such plants may be located on site (e.g., supplying heat/power across a large campus) or nearby. Some facilities purchase chilled water for cooling or refrigeration and emissions are associated with that cooling.	Annual usage associated with: <ul style="list-style-type: none"> <li>• Heaters, radiators, water heaters</li> <li>• Air conditioners</li> <li>• Chilled water</li> </ul> Calculation methods may entail use of: <ul style="list-style-type: none"> <li>• Area (e.g., square footage) of leased space</li> <li>• Average intensity factors</li> </ul>

Most common for all sectors

Only common for some sectors and geographies

Step  
B

# Where can I find data in my company?

Emission type	Where to find in your company
Purchased Electricity	<p>Check with the following departments to track down utility bills or invoices for purchased electricity:</p> <ul style="list-style-type: none"> <li>• Accounting department</li> <li>• Real estate department</li> <li>• Operations managers</li> <li>• Procurement staff</li> </ul> <p>If building space is shared with other organizations:</p> <ul style="list-style-type: none"> <li>• Figure out the total electricity consumption for the building</li> <li>• Figure out what percent of the building floor space your company occupied during the reporting period</li> <li>• Calculate your company’s electricity consumption as a percentage of the building total</li> </ul>
Purchased Heat, Steam or Cooling	<p>Check with the following departments to track down utility bills or invoices for purchased heat, steam, or cooling:</p> <ul style="list-style-type: none"> <li>• Accounting department</li> <li>• Real estate department</li> <li>• Operations managers</li> <li>• Procurement staff</li> </ul> <p>For leased properties:</p> <ul style="list-style-type: none"> <li>• Engage with the lessor and/or consult lease agreement</li> </ul>

Step  
C

## Where do I find emissions factors?

Step  
C

## Where can I find the most up to date emissions factors?

There is no “one-stop-shop” for emissions factors. Different organizations and agencies compile data to develop factors in different ways, resulting in different factors. Furthermore, emissions factors are revised and/or refined as the science evolves and methods are improved.

Below are different places to look for the most up-to-date emissions factors for Scope 2 emissions accounting.

### Environmental Protection Agency (EPA) – Emissions & Generation Resource Integrated Database (eGRID)

#### Access here

(Click on the PDF or Excel Workbook titled: GHG Emissions Factors Hub)  
Table 6 is for purchased electricity  
Table 7 is for purchased steam and heat

Use this if your company is located in the United States.

### Environment and Climate Change Canada (ECCC)

#### Access here

Use this if your company is located in Canada. See Annex 13 in Part 3 for most recent year available.

### UK Department for Environment Food & Rural Affairs (DEFRA)

#### Access here

Use this if your company is located in the UK. Some of these factors can also be used as proxies for other countries.

### International Energy Agency (IEA)

#### Access here

Use this if your company is located in another country (note there is a fee associated with accessing these emissions factors).



## Step D Putting it all together: Estimate emissions

Now we take the numbers we gathered in Steps B and C and put them together to estimate emissions. The calculations may seem complex at first glance, but it's a just few multiplication steps. At a high level, all you're doing is taking your activity data (collected in Step B) and your emissions factors (collected in Step C) and inputting them into the formula below:

$$\begin{array}{ccccc} \text{Activity data from} & \times & \text{Emissions factor from} & = & \text{Emissions} \\ \text{Step B} & & \text{Step C} & & \end{array}$$

You'll apply the calculations set out in Steps D and E for each of the activity data points that you gathered in Step B. On the following pages, we will take you through the step-by-step calculation process for one activity data point. Once you understand the steps, you can then repeat them for each activity data point.

Step  
D

## Putting it all together: Estimate emissions

There are two complicating factors to know about, and they are covered in more detail on the following pages:

### Complicating factor 1

**You'll need to do multiple calculations for each activity data point.**

Burning fossil fuels generally emits three different types of GHG emissions: CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O. This means that instead of the one calculation shown on the previous page, you'll actually have to do three calculations: one for CO<sub>2</sub>, one for CH<sub>4</sub> and one for N<sub>2</sub>O.

### Complicating factor 2

**You'll need to make sure you get your units of measure right.**

In order to do the multiplication shown on the previous page, you'll need to keep a close eye on your units of measure. You can't multiply activity data by emissions factors unless you've converted both to the right units.



*We'll explain these in more detail on the following pages.*

*The good news is that the GHG Emissions Calculation Tool will help you address both of these things.*

Step  
D

## Why you need to do multiple calculations for each activity data point

Complicating factor 1

As we mentioned on the previous page, the first complicating factor is that you will need to do a few sets of multiplication to get total GHG emissions for each activity data point. This is because burning fossil fuels generally creates three different types of GHG emissions: CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O. This means that instead of one calculation, you'll actually need to do three calculations:

For each activity data point

- For CO<sub>2</sub>: (Activity data from Step B) x (Emissions factor from step C for CO<sub>2</sub>) = Emissions for that activity data point
- For CH<sub>4</sub>: (Activity data from Step B) x (Emissions factor from step C for CH<sub>4</sub>) = Emissions for that activity data point
- For N<sub>2</sub>O: (Activity data from Step B) x (Emissions factor from step C for N<sub>2</sub>O) = Emissions for that activity data point

Step  
D

Complicating factor 1

## Why you need to do multiple calculations for each activity data point

For each activity data point

- For CO<sub>2</sub>: (Activity data from Step B) x (Emissions factor from step C for CO<sub>2</sub>) = Emissions for that activity data point
- For CH<sub>4</sub>: (Activity data from Step B) x (Emissions factor from step C for CH<sub>4</sub>) = Emissions for that activity data point
- For N<sub>2</sub>O: (Activity data from Step B) x (Emissions factor from step C for N<sub>2</sub>O) = Emissions for that activity data point

### For example, if you have collected the following:

Step  
B

You collected activity data that your company's takes up 65% of the square footage in a building that uses 1000 MWh of purchased electricity (650 MWh)

Step  
C

You collected the following emissions factors for diesel fuel: 453.2 lb CO<sub>2</sub>/MWh, 0.033 lb CH<sub>4</sub>/MWh, 0.004 lb N<sub>2</sub>O/MWh

### Then you can calculate:

For CO<sub>2</sub>: (650 MWh) x (453.2 lb CO<sub>2</sub>/MWh) = 294,580 lb of CO<sub>2</sub>

For CH<sub>4</sub>: (650 MWh) x (0.033 lb CH<sub>4</sub>/MWh) = 21.45 lb of CH<sub>4</sub>

For N<sub>2</sub>O: (650 MWh) x (0.004 lb N<sub>2</sub>O/MWh) = 2.6 lb of N<sub>2</sub>O

Step  
D

Complicating factor 1

# What does this look like in the GHG Emissions Calculation Tool?

In the screenshot below, we show what this looks like in practice using the GHG Emissions Calculation Tool:

The screenshot shows the 'Scope 2 Purchased Electricity' section of the GHG Emissions Calculation Tool. At the top, a navigation bar includes buttons for Introduction, Parameter Input, Scope 1 Stationary Combustion, Scope 1 Mobile Combustion, Scope 1 Refrigerants, Scope 2 Purchased Electricity (highlighted), Scope 3 Transportation, Result Summary, and Emission Factors. Below the navigation bar, the section title 'S2 - Purchased Electricity' is displayed. An information icon is followed by a text box explaining that electricity and other energy sources purchased from a local utility are included, and that utilities combust fossil fuels, emitting carbon dioxide, methane, and nitrous oxide. Below this, a list of required data includes energy source, usage, and units. A formula is provided:  $Emissions_{GHG, fuel} = Fuel\ Consumption_{fuel} * Emission\ Factor_{GHG, fuel}$ . A list of bullet points details user options for market-based vs. location-based emissions, data sources for grid average and residual mix factors, and a link to IEA emission factors. At the bottom, a table displays user-supplied data and resulting GHG emissions for the year 2018.

User supplied data							GHG Emissions (tonnes CO <sub>2</sub> e)				
Year	Facility ID	Amount of Electricity Consumption	Units	Calculation Approach	Type of Emission Factor	Custom Emission Factor	CO <sub>2</sub> (tonnes)	CH <sub>4</sub> (tonnes)	N <sub>2</sub> O (tonnes)	CO <sub>2</sub> e (tonnes)	EF (kgCO <sub>2</sub> e/kWh)
2018	1	20	kWh	Purchased Electricity - Location Based	Grid Average/Location Based	Example S2 - heat	0.00034	0	0.00000002	0.0003453	0.017265

Step  
D

Complicating factor 2

# How can the GHG Emissions Calculation Tool help you get your units of measure right?



## S2 - Purchased Electricity



Electricity and other sources of energy purchased from your local utility (that is not combusted on-site). Examples include electricity, steam, and chilled or hot water. To generate this energy, utilities combust coal, natural gas, and other fossil fuels, emitting carbon dioxide, methane, and nitrous oxide in the process.

Data required:

1. Energy source
2. Energy usage
3. Units (kWh for electricity)

$$\text{Emissions}_{\text{GHG, fuel}} = \text{Fuel Consumption}_{\text{fuel}} * \text{Emission Factor}_{\text{GHG, fuel}}$$

- User has the option to choose between market-based or location-based emissions
- The tool includes data for grid average emission factors for the US, Canada, Australia and China; residual mix factors are provided for the US, Canada and EU countries
- Market-based emissions hierarchy: Custom emission factors, residual mix, location based/grid average
- Country-level location based emission factors are available for other countries from the IEA. These factors may be purchased from: <http://data.iea.org/payment/products/122-emissions-factors-2017-edition.aspx>

User supplied data							GHG Emissions (tonnes CO <sub>2</sub> e)				
Year	Facility ID	Amount of Electricity Consumption	Units	Calculation Approach	Type of Emission Factor	Custom Emission Factor	CO <sub>2</sub> (tonnes)	CH <sub>4</sub> (tonnes)	N <sub>2</sub> O (tonnes)	CO <sub>2</sub> e (tonnes)	EF (kgCO <sub>2</sub> e/kWh)
2018	1	20	kWh	Purchased Electricity - Location Based	Grid Average/Location Based	Example S2 - heat	0.00034	0	0.00000002	0.0003453	0.017265

Step  
E

## Convert your Step D results into CO<sub>2</sub>-equivalents (CO<sub>2</sub>e)

As we mentioned in **Module 0**, CO<sub>2</sub>e is a simple way of normalizing non-CO<sub>2</sub> greenhouse gases to the reference gas CO<sub>2</sub> using Global Warming Potentials (GWP). GWP is a factor describing the relative heat trapping ability of GHGs in the atmosphere as compared to CO<sub>2</sub>. For more information about GWP, please refer back to **Module 0**.



**Remember!** Think of this as translating other types of GHG emissions into their CO<sub>2</sub> equivalents so that all emissions can be added together.



**Note!** In some cases your emissions factors will have already converted your answer to CO<sub>2</sub>e. If this is the case, then you can skip Step E.

Step  
E

## Convert your Step D results into CO<sub>2</sub>-equivalents (CO<sub>2</sub>e)

To do this, simply take your results from Step D and multiply them by the GWP for the given gas. CO<sub>2</sub> won't change because you just multiply it by 1; however, CH<sub>4</sub> and N<sub>2</sub>O will be much larger because you multiply them by 28 and 265, respectively. See below:

Greenhouse gas	Global warming potential (GWP)
Carbon dioxide (CO <sub>2</sub> )	1
Methane (CH <sub>4</sub> )	28
Nitrous oxide (N <sub>2</sub> O)	265

Now that all of your results are in terms of CO<sub>2</sub>e, you can add them all together to get the total GHGs for your first activity data point. For reporting, you'll also want to convert from kg of CO<sub>2</sub>e to metric tons of CO<sub>2</sub>e (tCO<sub>2</sub>e). (The GHG Emissions Calculation Tool will also do this for you.)

For CO<sub>2</sub>: 294,580 lb of CO<sub>2</sub> x 1 = 294,580 lb of CO<sub>2</sub>e

For CH<sub>4</sub>: 21.45 lb of CH<sub>4</sub> x 28 = 601 lb of CO<sub>2</sub>e

For N<sub>2</sub>O: 2.6 lb of N<sub>2</sub>O x 265 = 689 lb of CO<sub>2</sub>e

**Total = 295,870 kg of CO<sub>2</sub>e = 296 tCO<sub>2</sub>e**



*Now repeat this process for each of the activity data points on your list.*

*Navigate to the next page to see how the GHG Emissions Calculation Tool can make this easier for you.*

# Step E How can the GHG Emissions Calculation Tool help you convert to CO<sub>2</sub>e and simplify calculations for each activity data point?

Now this process can be repeated by adding a new line for each activity data point

User supplied data							GHG Emissions (tonnes CO <sub>2</sub> e)				
Year	Facility ID	Amount of Electricity Consumption	Units	Calculation Approach	Type of Emission Factor	Custom Emission Factor	CO <sub>2</sub> (tonnes)	CH <sub>4</sub> (tonnes)	N <sub>2</sub> O (tonnes)	CO <sub>2</sub> e (tonnes)	EF (kgCO <sub>2</sub> e/kWh)
2018	1	20	kWh	Purchased Electricity - Location Based	Grid Average/Location Based	Example S2 - heat	0.00034	0	0.00000002	0.0003453	0.017265

At the bottom of the page, the tool will sum all emissions from the location-based method into your total Scope 2 emissions. If you're also using the market-based method (see Appendix) then you will be able to sum the total of both the location-based and market-based total emissions.

Location Based - Total GHG emissions from fossil fuels (tonnes CO <sub>2</sub> e):	0.000
Market Based - Total GHG emissions from fossil fuels (tonnes CO <sub>2</sub> e):	0.000

**Once I've calculated my emissions, how and where do I report them?**

# Congratulations! You've completed Module 2: Scope 2 Emissions Accounting

Here's a quick recap. Now that you've completed this module, you should understand:

- ✓ There are two different methods for calculating Scope 2 GHG emissions. This training focuses on the more straightforward approach, called the location-based method.
- ✓ The GHG Emissions Calculation Tool will help you complete steps C, D and E by providing emissions factors, completing calculations and helping you keep track of your units of measure.
- ✓ If you want to use the more granular and more accurate market-based method to capture details of company-specific energy procurement, navigate to the **Appendix**.
- ✓ There are five overarching steps to calculating Scope 2 emissions:
  - ✓ **Step A:** Develop a comprehensive list of all Scope 2 emissions sources. Emissions from Purchased Electricity are most common for most companies, so focus on these.
  - ✓ **Step B:** Compile annual activity/usage/consumption from your company.
  - ✓ **Step C:** Identify appropriate emissions factors for each GHG.
  - ✓ **Step D:** Estimate CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O (and any other applicable GHGs) emissions by multiplying activity/usage/consumption data and emissions factors.
  - ✓ **Step E:** Convert to carbon dioxide equivalents in metric tons (tCO<sub>2</sub>e).

# Congratulations! You've completed Module 2: Scope 2 Emissions Accounting

Scope 1, 2 and 3 emissions are usually reported all together. Move on to **Module 3** to learn about calculating Scope 3 emissions:

## Module 3

Scope 3  
Emissions  
Accounting

## Module 4

Emissions  
Reductions  
101

# Appendix



Calculating Scope 2 emissions using the  
**Market-based method**

## What is the market-based method?

The market-based method reflects emissions from the electricity that companies have chosen through various types of contractual instruments. Under this method of Scope 2 accounting, the company will calculate emissions associated with the type of energy it specifically procures, as opposed to the average grid emissions.

This method is useful because it allows a consumer to claim the benefits of its renewable energy purchases along with any other specific purchasing choices, based on supplier- and product-specific emissions rates. If using this method instead of the location-based method, you will want to use it across all of the geographies in which your company operates.

Markets differ as to which contractual instruments are commonly available, but can include:

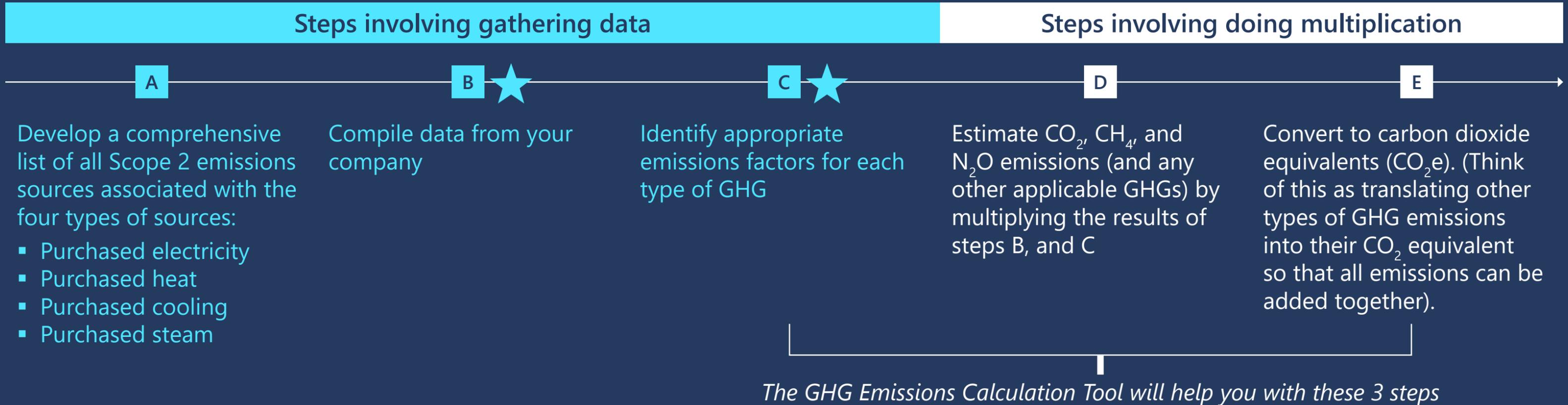
- Energy Attribute Certificates (RECs, GOs, I-REC, etc.)
- Power Purchase Agreements (PPAs) with energy generators (for low-carbon, renewable or fossil fuel-based energy)
- Green electricity products from energy suppliers



The overarching step-by-step approach to calculation with the market-based method is the same as with the location-based method, but a few of the steps are more complex when using the market-based method. We will cover these steps in this section.

# What is the step-by-step process for calculating Scope 2 emissions?

The step-by-step approach for the market-based method is the same as the approach for the location-based method. However, Steps B and C are more complex than in the location-based method.



★ Note that these steps are more complex if using the market-based method.

## Why is the market-based method more complex?

Simply put, this method allows you to use more specific activity data and emissions factors than the grid averages used in the location-based method. These factors follow the precision hierarchy set out by the GHG Protocol, shown on the following page. The highest level will give you the most precise inventory and the lowest level will give you the most generic inventory. (Note that level E is actually the same as the location-based method covered earlier in this module.) It is also important to note that this hierarchy is solely one of data precision and does not suggest the superiority of the underlying procurement approaches at higher levels.

# The GHG Protocol market-based method precision hierarchy

	Level	Examples
Precision Higher ↑  ↓ Lower	<b>A. Energy attribute certificates (EACs)</b> (that show proof of renewable energy production for consumption)	<ul style="list-style-type: none"> <li>Renewable Energy Certificates (US, Canada, Australia and others)</li> <li>Generator Declarations (UK)</li> <li>Guarantees of Origin (EU)</li> <li>Electricity contracts (e.g. PPAs) that also convey RECs or GOs</li> </ul>
	<b>B. Contracts for electricity</b> (such as your company's contract for a specific energy source)	<ul style="list-style-type: none"> <li>Contracts for electricity from specified sources (US) (e.g. PPAs)</li> <li>Contracts that convey attributes to the entity consuming the power where certificates do not exist</li> <li>Contracts for power that are silent on attributes, but where attributes are not otherwise tracked or claimed</li> </ul>
	<b>C. Supplier/utility emission rates</b> (generic rates for company you buy electricity from)	<ul style="list-style-type: none"> <li>Emissions rate allocated and disclosed to retail electricity users representing the entire delivered energy product (not only the supplier's owned assets)</li> <li>Green energy tariffs</li> <li>Voluntary renewable electricity program or produce</li> </ul>
	<b>D. Residual mix</b> (grid-level data with voluntary purchases removed)	<ul style="list-style-type: none"> <li>Calculated in many countries – this is provided in the GHG Emissions Calculation Tool</li> </ul>
	<b>E. Other grid-average emissions factors</b> Note: This is the same as the location-based method.	<ul style="list-style-type: none"> <li>eGRID total output rates (US)</li> <li>Defra annual grid average emissions factor (UK)</li> <li>IEA national electricity emissions factors</li> </ul>

Look for data for each level moving from the most precise to the least precise. Note that you will likely need to calculate your company's Scope 2 emissions using a combination of these methods because your company's electricity may come from multiple sources.

# Where can I find data and emissions factors for each level of the hierarchy?

	Level	Where to find activity data	Where to find emissions factors	
Precision Higher ↑    Lower ↓	<b>A. Energy attribute certificates (EACs)</b> (that show proof of renewable energy production for consumption)	Contracts for EACs (check with your procurement team, legal team or facilities managers)	Check your EAC contract	For these levels you will have to obtain custom emissions factors from your energy provider, and input them into the tool
	<b>B. Contracts for electricity</b> (such as your company's specific energy contract, where EACs do not exist or are not required for a usage claim)	Contracts with your utility provider (check with your procurement team, legal team or facilities managers)	Check your contract	
	<b>C. Supplier/utility emission rates</b> (generic rates for the company you buy electricity from)	Utility bills (check with your procurement, accounting or finance team)	<ul style="list-style-type: none"> <li>In general, contact your electric utility/supplier for an emissions factor specific to generation source mix.</li> <li>For US-based facilities, some utility-specific emissions factors are reported here: Edison Electric Institute (see "Utility Specific Residual Mix Emissions Rate" <a href="https://www.eei.org/Pages/CO2Emissions-Access.aspx">https://www.eei.org/Pages/CO2Emissions-Access.aspx</a>)</li> </ul>	
	<b>D. Residual mix</b> (grid-level data with voluntary purchases removed)	Utility bills (check with your procurement, accounting or finance team)	GHG Emissions Calculation Tool	For these levels, emissions factors are embedded in the GHG Emissions Calculation Tool
	<b>E. Other grid-average emissions factors</b> Note: This is the same as the location-based method.	Utility bills (check with your procurement, accounting or finance team)	GHG Emissions Calculation Tool	

# How can the GHG Emissions Calculation Tool help you with your market-based method calculations?

Introduction	Parameter Input	Scope 1 Stationary Combustion	Scope 1 Mobile Combustion	Scope 1 Refrigerants	Scope 2 Purchased Electricity	Scope 3 Transportation	Result Summary	Emission Factors
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## S2 - Purchased Electricity



Electricity and other sources of energy purchased from your local utility (that is not combusted on-site). Examples include electricity, steam, and chilled or hot water. To generate this energy, utilities combust coal, natural gas, and other fossil fuels, emitting carbon dioxide, methane, and nitrous oxide in the process.

Data required:

1. Energy source
2. Energy usage
3. Units (kWh for electricity)

$$\text{Emissions}_{\text{GHG, fuel}} = \text{Fuel Consumption}_{\text{fuel}} * \text{Emission Factor}_{\text{GHG, fuel}}$$

- User has the option to choose between market-based or location-based emissions
- The tool includes data for grid average emission factors for the US, Canada, Australia and China; residual mix factors are provided for the US, Canada and EU countries
- Market-based emissions hierarchy: Custom emission factors, residual mix, location based/grid average
- Country-level location based emission factors are available for other countries from the IEA. These factors may be purchased from: <http://data.iea.org/payment/products/122-emissions-factors-2017-edition.aspx>

User supplied data							GHG Emissions (tonnes CO <sub>2</sub> e)				
Year	Facility ID	Amount of Electricity Consumption	Units	Calculation Approach	Type of Emission Factor	Custom Emission Factor	CO <sub>2</sub> (tonnes)	CH <sub>4</sub> (tonnes)	N <sub>2</sub> O (tonnes)	CO <sub>2</sub> e (tonnes)	EF (kgCO <sub>2</sub> e/kWh)
2018	1	20	kWh	Purchased Electricity - Location Based	Grid Average/Location Based	Example S2 - heat	0.00034	0	0.00000002	0.0003453	0.017265

# If I need to use multiple levels of the hierarchy, will the GHG Emissions Calculation Tool help sum them together for me?

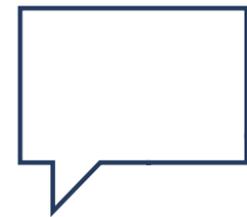
Yes! Simply navigate to the bottom of the sheet where you can see the sum of metric tons of CO<sub>2</sub>e (tCO<sub>2</sub>e) for both the location-based and market-based methods.

Location Based - Total GHG emissions from fossil fuels (tonnes CO <sub>2</sub> e):	0.000
Market Based - Total GHG emissions from fossil fuels (tonnes CO <sub>2</sub> e):	0.000

## Looking for more detail on the market-based method?

For further details, you can reference:

- The **GHG Protocol Scope 2** guidance
- The **Climate Registry General Reporting Protocol** pages C-9 to C-16



Looking for additional support?

Check out CDP's list of  
**accredited solutions providers**

