Welcome to the GHG Inventory Toolkit

Overview

The GHG Inventory Toolkit is designed to help organizations measure and manage their greenhouse gas (GHG) emissions. By accurately accounting for emissions, you can identify key areas for improvement, set reduction targets, and track progress over time. This toolkit covers five operational boundaries as follows:

Scope 1: Direct Emissions

- **Stationary Combustion:** Emissions from burning fuel in stationary sources such as boilers and furnaces.
- **Mobile Combustion:** Emissions from fuel used in transportation sources owned or controlled by the organization.
- **Refrigeration & AC (Refrigerant Use):** Emissions from refrigerants used in cooling systems.

Scope 2: Indirect Emissions

- **Purchased Electricity:** Indirect emissions from the generation of purchased electricity consumed by the organization.

Scope 3: Other Indirect Emissions

- **Employee Commuting:** Emissions resulting from the transportation of employees to and from their workplace.

How to Use This Toolkit

Introduction (This Sheet):

Provides an overview and walkthrough on using the toolkit.

Emissions Summary:

Contains fields for entering organizational details and visual summaries of your GHG emissions through charts and figures.

Operational Boundaries Data Entry Sheets:

Stationary Combustion: Enter data related to fuel consumption in stationary sources.
Mobile Combustion: Record fuel usage for company-owned or controlled vehicles.
Refrigeration & AC: Input data on refrigerant purchases, usage, and leaks.
Purchased Electricity: Enter electricity consumption data.
Employee Commuting: Collect and input data on employee commuting patterns.

Reference Data:

Contains emission factors and other relevant values. Users generally do not need to access this sheet but can view it for reference and verification.

General Steps

1. Begin with Data Collection:
Gather all necessary data related to fuel consumption, electricity usage, refrigerant usage, and employee commuting.

2. Input Data:
Enter the collected data into the respective operational boundary data entry sheets (Stationary Combustion, Mobile Combustion, Refrigeration & AC, Purchased Electricity, and Employee Commuting).

3. Review Inputs and Results:
Verify that the data entered is accurate and complete. Check the Reference Data sheet to ensure the emission factors and other relevant values are current and applicable. Review the calculations and results in the respective sheets.

4. View Emissions Summary:
Navigate to the Emissions Summary sheet to see a consolidated view of your GHG emissions, complete with charts and figures that help visualize the data.

5. Analyze Results:
Use the visual summaries and detailed figures in the Emissions Summary sheet to identify key sources of GHG emissions.

6. Action Plan:
Based on the insights gained from the summary and detailed data, create a plan for reducing your GHG emissions.

GHG Inventory Report Summary

Organizational Information

Name:	*Business/Organizational Entity*		
Address:	*Address of the Organization*		
Telephone:	*Telephone Number*	Email:	*Email Address*

nventory Reporting Period:	*Calendar year 2023*	Name of Preparer:	
Start:	*January 1, 2023*	Contact of Preparer:	
End:	*December 31, 2023*	Date Prepared:	*June 20,2024*

EMISSION SUMMARY

The total greenhouse gas emissions from each of the five source category are provided below. Additionally, the treemap on the left illustrates their respective percentage values with respect to the total emissions of the organization.

Stationary Combustion	#ERROR!	tCO2e
Mobile Combustion	#ERROR!	tCO2e
Refrigeration & A/C	#ERROR!	tCO2e
Purchased Electricity	#ERROR!	tCO2e
Employee Commuting	#ERROR!	tCO2e

RROR! tCO2e is the total estimated annual greenhouse gas emissions of Business/Organizational Entityfor Calendar year 2023

Emission Equivalencies

To provide a meaningful context for the total emissions, this section compares them to everyday activitie benchmarks that are easy to relate to. By translating emissions into familiar activities and quantities, it n data more understandable and impactful, helping users visualize the significance of their carbon footprir

Business/Organizational Entity's total estimated greenhouse gas emissions is:

ROR! Metric tons of carbon dioxide equivalent (tCO2e)

This is equivalent to carbon emissions in terms of:

Distance covered by a vehicle

#ERROR! kilometers driven by an average traditional jeepney
#ERROR! kilometers driven by an average passenger car
#ERROR! kilometers traveled by an average Philippine airliner
*assuming a 100-passenger airliner

Number of trips

#ERROR! car trips from Manila, Metro Manila to Baguio City (~245 km)
#ERROR! car trips from Iloilo City to Boracay, Malay (~226 km)
#ERROR! car trips from Davao City to General Santos City, So. Cotabato (~143
#ERROR! one-way direct flight between Manila and Cebu (~570 km)

Quantity of fuel consumed

#ERROR! metric tons of charcoal burned (1 metric ton = 1000 kg)
#ERROR! 11-kg liquified petroleum gas (LPG) tanks consumed
#ERROR! liters of gasoline consumed (1 tanker truck = 20,800 to 43,900 L capa
#ERROR! liters of diesel fuel consumed

This is also equivalent to carbon emissions avoided by:

#ERROR! tons of waste recycled instead of being sent to a landfill
#ERROR! kWh of electricity consumption reduction

Scope 1: Direct Emissions

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km)

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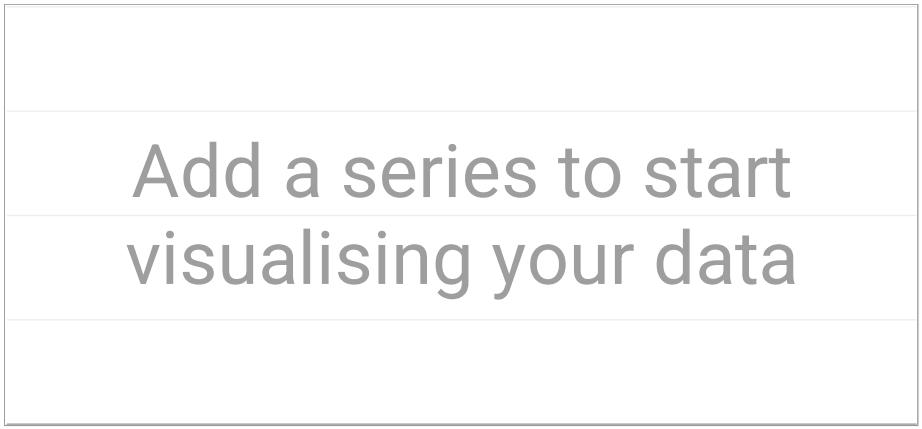
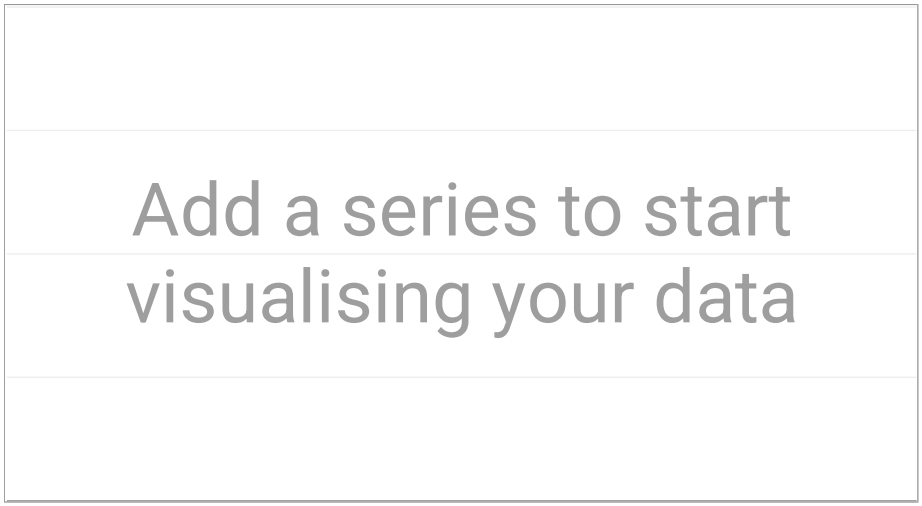
Stationary Combustion

These are missions from stationary combustion represent the release of greenhouse gases resulting from the burning of fuels in fixed or stationary sources such as various equipment and machinery, including boilers, heaters, furnaces, kilns, ovens, flares, thermal oxidizers, dryers, and any other devices that combust carbon-bearing fuels or waste stream materials.



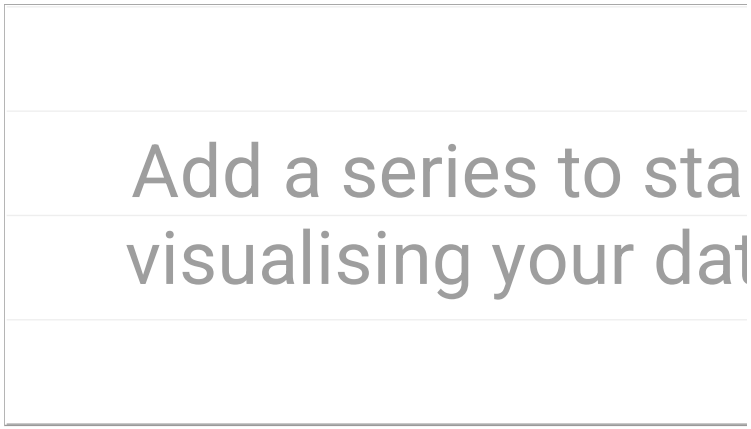


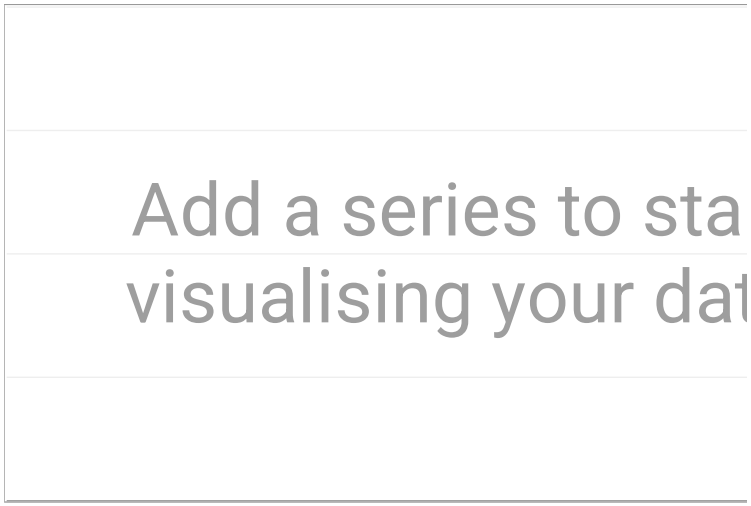
Notes/Remarks:

Scope 1: Direct Emissions

Mobile Combustion

Emissions from mobile combustion pertain to the release of greenhouse gases produced b
mobile sources, including vehicles such as cars, trucks, and fleets. This category addresse
footprint associated with transportation activities





Notes/Remarks:

Scope 1: Direct Emissions

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Refrigeration & AC

Emissions from refrigeration and air-conditioning focus on the release of greenhouse gases associated with the use of refrigerants in cooling systems. This category provides valuable insights into the contributions of refrigeration and air-conditioning practices to overall greenhouse gas emissions.

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Add a series to start visualising your data

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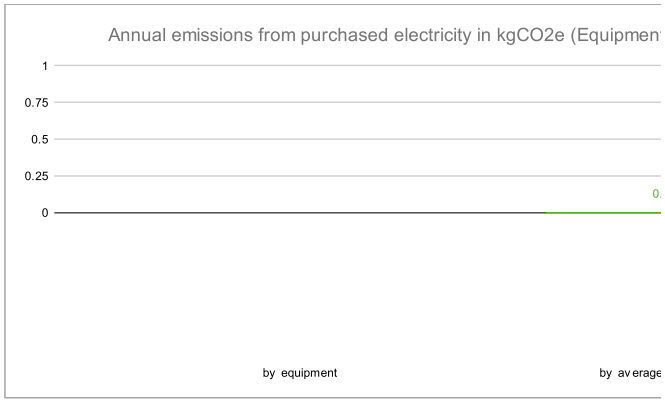
Add a series to start visualising your data

Notes/Remarks:

Scope 2: Indirect Emissi

Purchased Electricity

Emissions from purchased electricity involve the indirect release of greenhouse
generation of electricity that an organization electricity uses from the grid or a su
in evaluating the environmental impact of an entity's electricity consumption, offe
indirect emissions associated with the electricity usage.



Add a series to s
visualising your

Notes/Remarks:

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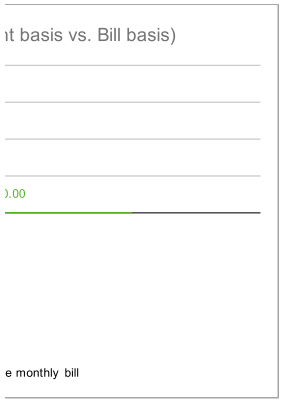
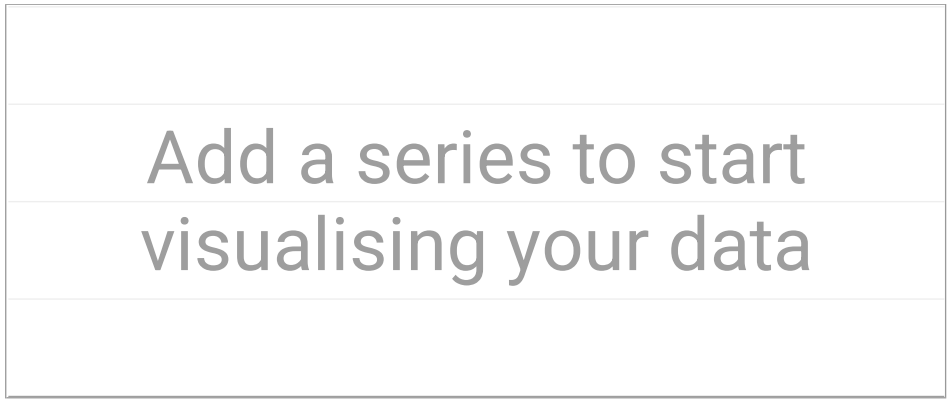
Scope 3: Other Indirect Emissions

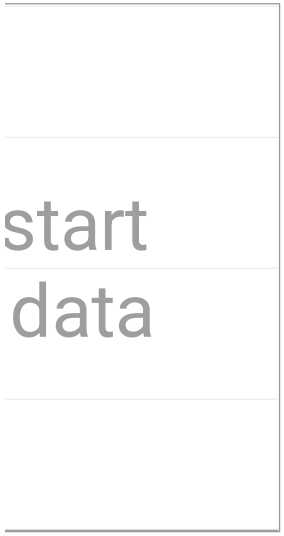
gases resulting from the
upplier. This category is important
ering valuable information on the

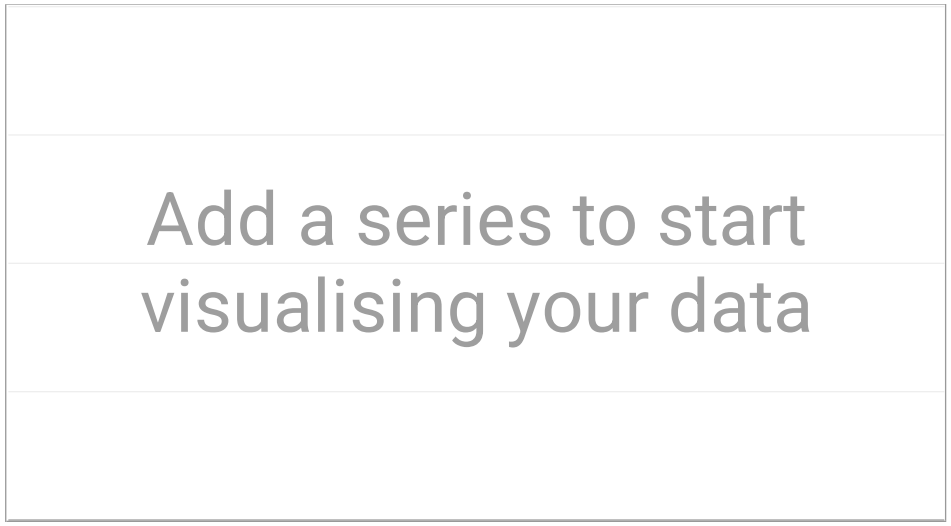
Employee Commuting

Emissions from employee commuting involve the indirect release of greenhouse gases resulting from the transportation methods employees use to travel to and from work. This category is important in evaluating the environmental impact of an organization's workforce mobility, offering valuable information on the indirect emissions associated with employees' commuting activities.









Notes/Remarks:

SCOPE 1 - Direct Emissions : Stationary Combustion

Instruction:
Enter the following data for each stationary combustion source in the table below.

- ○ **Source Description**: Provide a brief description of the stationary combustion source (e.g., single-burner stove).
- ○ **Fuel State**: Select the physical state of the fuel used in the stationary combustion source from the dropdown menu.
- ○ **Fuel Type**: Select the type of fuel used from the dropdown menu.
- ○ **Quantity Combusted**: Enter the annual amount of fuel combusted for the stationary combustion source.
- ○ **Units**: Select the appropriate unit for the quantity of fuel combusted from the dropdown menu. It may be necessary to convert the unit you have to the unit available in the dropdown menu in some cases.

For gaseous fuels, use the following conversion:

Natural Gas	974.658869	scf / mmBtu
Natural Gas	97.4658869	scf / therm
Natural Gas	100	scf / ccf
Natural Gas	1000	scf / Mcf
Natural Gas	35.31073446	scf / cubic meter
Propane Gas	397.4562798	scf / mmBtu
Propane Gas	39.74562798	scf / therm
Landfill Gas	2061.85567	scf / mmBtu
Landfill Gas	206.185567	scf / therm

Note: the table may be extended indefinitely to accommodate more entries by dragging the bottom-right corner of the table

ID	Source Description	Fuel State	Fuel	Quantity Combusted	Units	CO2 (kg)	CH4 (kg)	N2O (kg)	Total Annual Equivalent Emissions ($kgCO_2$)
001		Solid	Mixed (Electric Power Sector)	2	kg	4.1545	0.4783	0.0001	16.1323
002									0.0000
003									0.0000
004									0.0000
005									0.0000
006									0.0000
007									0.0000
008									0.0000
009									0.0000
010									0.0000
						#ERROR!	#ERROR!	#ERROR!	#ERROR!
									0

total 16.1323

SCOPE 1 - Direct Emissions : Mobile Combustion

Instruction:

Enter the following data for each mobile combustion source in the table below.

- **Source Description**: Provide a brief description of the mobile combustion source (e.g., brand, model, and year, if applic
- **Vehicle Type**: Select the category or type of vehicle from the dropdown menu that best matches the source.
- **Vehicle Year**: Enter the model year of the vehicle.
- **Fuel Type:** Select the type of fuel used from the dropdown menu.
- **Fuel Economy**: Enter the fuel economy of vehicle in kilometers per liter. It may be necessary to look up this information
- **Annual Distance Traveled** : Enter the annual distance traveledor covered by the vehicle in kilometers.

Note: the table may be extended indefinitely to accommodate more entries by dragging the bottom-right corner of the table

ID	Source Description	Vehicle Type	Vehicle Year	Fuel
001				
002				
003				
004				
005				
006				
007				
008				
009				
010				

cable). Only include vehicles owned or leased by your organization.

online.

Fuel Economy (kmpl)	Annual Distance Traveled (km)	Quantity Combusted (L)	CO2 (kg)	CH4 (kg)	N2O (kg)	**Total Annual Equivalent Emissions (kgCO₂)**
		#ERROR!	#ERROR!	#ERROR!	#ERROR!	#ERROR!
		#ERROR!	#ERROR!	#ERROR!	#ERROR!	#ERROR!
		#ERROR!	#ERROR!	#ERROR!	#ERROR!	#ERROR!
		#ERROR!	#ERROR!	#ERROR!	#ERROR!	#ERROR!
		#ERROR!	#ERROR!	#ERROR!	#ERROR!	#ERROR!
		#ERROR!	#ERROR!	#ERROR!	#ERROR!	#ERROR!
		#ERROR!	#ERROR!	#ERROR!	#ERROR!	#ERROR!
		#ERROR!	#ERROR!	#ERROR!	#ERROR!	#ERROR!
		#ERROR!	#ERROR!	#ERROR!	#ERROR!	#ERROR!
		#ERROR!	#ERROR!	#ERROR!	#ERROR!	#ERROR!
		#ERROR!	#ERROR!	#ERROR!	#ERROR!	#ERROR!

SCOPE 1 - Direct Emissions : Refrigeration & AC (refrigerant use)

Instruction:

Enter the following data for each refrigeration and AC equipment in the table below.

- **Source Description**: Provide a brief description of the refrigeration or air conditioning unit (e.g., brand, model, and/
- **Refrigerant Type**: Select the type of refrigerant used in the unit from the dropdown menu. You may enter the name
- **GWP**: If you selected the refrigerant type from the dropdown menu, this will be automatically filled up. Otherwise, e
- **New Unit Charge (kg)**: Enter the amount of refrigerant charged into new units in kilograms.
- **Operating Units (kg)**: Enter the amount of refrigerant currently in operating units in kilograms.
- **Disposed Units (kg)**: Enter the amount of refrigerant from disposed units in kilograms.
- **Time Since Last Recharge (years)**: Enter the time in years since the unit was last recharged.

Note: The table may be extended indefinitely to accommodate more entries by dragging the bottom-right corner of the table

ID	Source Description	Refrigerant Type	GWP	New Unit Charge (kg)
001				
002				
003				
004				
005				
006				
007				
008				
009				
010				

#ERROR!

or generic description, if applicable). Ex. Refrigerated pastry display
or designation of the refrigerant if it is not available from the menu.
nter the 100-year global warming potental of tge refrigerant. It may be necessary to look up this information online.

Operating Units (kg)	Disposed Units (kg)	Total Charge	Total Annual Equivalent Emissions ($kgCO_2$)
		#ERROR!	0.0000
		#ERROR!	0.0000
		#ERROR!	0.0000
		#ERROR!	0.0000
		#ERROR!	0.0000
		#ERROR!	0.0000
		#ERROR!	0.0000
		#ERROR!	0.0000
		#ERROR!	0.0000
		#ERROR!	0.0000
#ERROR!	#ERROR!		#ERROR!

SCOPE 2 - Indirect Emissions : Purchased Electricity

Instruction:

Select the appropriate Electrical Grid to which your organization is connected to from the dropdown menu and then select
You may also choose to select "Custom" for the Electrical Grid if you wish to use your own emission factors.
Enter the following data for each electrical equipment in the table below.

- **Source Description**: Provide a brief description of the electrical equipment (e.g., brand, model, and/or gener
- **Quantity**: Enter the quantity of the same electrical equipment present in the organization.
- **Power Rating**: Enter the nameplate power rating of the equipment or the measured power draw of the equip
- **Monthly Runtime**: Enter the amount of time in hours that the equipment is in operation within a month.

Note: The table may be extended indefinitely to accommodate more entries by dragging the bottom-right corner of th

Electrical Grid	**Emiss**
Luzon-Visayas	Simple Opera

ID	Source Description	Quantity	Power Rating (W)	Monthly Runtime (hr)
001				
002				
003				
004				
005				
006				
007				
008				
009				
010				

: the emission factor you need to use.

ric description, if applicable). Ex. Refrigerated pastry display

ɔment in watts (i.e., using wattmeter).

e table

ion Factor

ating Margin (OM)	0.25	0.1	0.45

Power Consumption	CO2 (kg)	CH4 (kg)	N2O (kg)	Total Annual Equivalent Emissions ($kgCO_2$)
0.0000	0.0000	0.0000	0.0000	#ERROR!
0.0000	0.0000	0.0000	0.0000	#ERROR!
0.0000	0.0000	0.0000	0.0000	#ERROR!
0.0000	0.0000	0.0000	0.0000	#ERROR!
0.0000	0.0000	0.0000	0.0000	#ERROR!
0.0000	0.0000	0.0000	0.0000	#ERROR!
0.0000	0.0000	0.0000	0.0000	#ERROR!
0.0000	0.0000	0.0000	0.0000	#ERROR!
0.0000	0.0000	0.0000	0.0000	#ERROR!
0.0000	0.0000	0.0000	0.0000	#ERROR!
#ERROR!	#ERROR!	#ERROR!	#ERROR!	#ERROR!

SCOPE 3 - Other Indirect Emissions : Employee Commuting

Instruction:

Enter the following data for each employee, staff, or personnel in the table below.

- **ID**: Assign a distinct ID number to each employee
- **Notes**: This can be used to put certain details or information about the specific employee.
- **Vehicle Type**: Select the category or type of vehicle from the dropdown menu that best matches the source.
- **Vehicle Year**: Enter the model year of the vehicle.
- **Fuel Type:** Select the type of fuel used from the dropdown menu.
- **Distance Covered Daily (km, back and forth)** : Enter the distance traveled or covered by the employee in kilometers f
- **Annual Work Days:** Enter the number of days within the year when the employee goes to work. (e.g., 312)

Note: The table may be extended indefinitely to accommodate more entries by dragging the bottom-right corner of the table
For employees that use private (owned) vehicles, change the fuel economy to that of the said vehicle. Otherwise, do not.
For employees that use multiple transport vehicles from and to work, make separate instances or entries for the same ID
For employees that travel together, still include all of them on the table but only put the required data on a single person. F
that they travel together with 001 but leave their data blank)

ID	Notes	Vehicle Type	Vehicle Year	Fuel Type
001				
002				
003				
004				
005				
006				
007				
008				
009				
010				

from home to work and vice versa.

				#ERROR!	#ERROR!	#ERROR!	#ERROR!
			#ERROR!	#ERROR!	#ERROR!	#ERROR!	

number. Make sure to take into account the separate distance traveled using different vehicles.
However, put a note which indicates them traveling together on each employee associated with that person. (e.g., put a note for 002 and 003

Fuel Economy (kmpl)	Distance Covered Daily (km, back and forth)	Quantity Combusted (L)	Anual Work Days	CO2 (kg)	CH4 (kg)	N2O (kg)	**Total Annual Equivalent Emissions (kgCO₂)**
		#ERROR!		#ERROR!	#ERROR!	#ERROR!	#ERROR!
		#ERROR!		#ERROR!	#ERROR!	#ERROR!	#ERROR!
		#ERROR!		#ERROR!	#ERROR!	#ERROR!	#ERROR!
		#ERROR!		#ERROR!	#ERROR!	#ERROR!	#ERROR!
		#ERROR!		#ERROR!	#ERROR!	#ERROR!	#ERROR!
		#ERROR!		#ERROR!	#ERROR!	#ERROR!	#ERROR!
		#ERROR!		#ERROR!	#ERROR!	#ERROR!	#ERROR!
		#ERROR!		#ERROR!	#ERROR!	#ERROR!	#ERROR!
		#ERROR!		#ERROR!	#ERROR!	#ERROR!	#ERROR!
		#ERROR!		#ERROR!	#ERROR!	#ERROR!	#ERROR!
				#ERROR!	#ERROR!	#ERROR!	#ERROR!
#ERROR!		#ERROR!		#ERROR!	#ERROR!	#ERROR!	#ERROR!
#ERROR!		#ERROR!		#ERROR!	#ERROR!	#ERROR!	#ERROR!

Stationary Combustion Emission Factors

Fuel Type	Emission Factors			Units
	CO2	CH4	N2O	
Biodiesels (International)	1.91E+00	2.70E-04	1.62E-05	kg / kg
Blended Diesel Industrial (Philippines)	2.66E+00	1.09E-04	2.18E-05	kg / L
Blended Diesel Residential/Commercial (Philippines)	2.66E+00	4.00E-04	2.18E-05	kg / L
Blended Gasoline Residential/Commercial (Philippines)	2.07E+00	3.20E-04	1.90E-04	kg / L
Charcoal (Biomass, International)	3.30E+00	5.90E-03	2.95E-05	kg / kg
Diesel (International)	2.68E+00	3.61E-04	2.17E-05	kg / L
Motor Gasoline (International)	2.27E+00	3.28E-04	1.97E-05	kg / L
Residual Fuel Oil (International)	2.94E+00	3.80E-04	2.28E-05	kg / L
Wood or Wood Waste (Biomass, International)	1.75E+00	4.68E-03	6.24E-05	kg / kg
Natural Gas	5.44E-02	1.03E-06	1.00E-07	kg/scf
Distillate Fuel Oil No. 2	1.02E+01	4.10E-04	8.00E-05	kg/gal
Residual Fuel Oil No. 6	1.13E+01	4.50E-04	9.00E-05	kg/gal
Kerosene	1.02E+01	4.10E-04	8.00E-05	kg/gal
Liquefied Petroleum Gases (LPG)	5.68E+00	2.80E-04	6.00E-05	kg/gal
Anthracite Coal	2.87E+00	3.04E-01	4.41E-05	kg / kg
Bituminous Coal	2.56E+00	3.02E-01	4.41E-05	kg / kg
Sub-bituminous Coal	1.85E+00	2.09E-01	3.09E-05	kg / kg
Lignite Coal	1.53E+00	1.72E-01	2.53E-05	kg / kg
Mixed (Commercial Sector)	2.22E+00	2.59E-01	3.75E-05	kg / kg
Mixed (Electric Power Sector)	2.08E+00	2.39E-01	3.53E-05	kg / kg
Mixed (Industrial Coking)	2.72E+00	3.18E-01	4.63E-05	kg / kg
Mixed (Industrial Sector)	2.33E+00	2.71E-01	3.97E-05	kg / kg
Coal Coke	3.11E+00	3.01E-01	4.41E-05	kg / kg
Municipal Solid Waste	9.94E-01	3.50E-01	4.63E-05	kg / kg
Petroleum Coke (Solid)	3.39E+00	1.06E+00	1.39E-04	kg / kg
Plastics	3.14E+00	1.34E+00	1.76E-04	kg / kg
Tires	2.65E+00	9.87E-01	1.30E-04	kg / kg
Agricultural Byproducts	1.07E+00	2.91E-01	3.86E-05	kg / kg
Peat	9.86E-01	2.82E-01	3.75E-05	kg / kg
Solid Byproducts	1.21E+00	3.66E-01	4.85E-05	kg / kg
Wood and Wood Residuals	1.81E+00	1.39E-01	1.39E-04	kg / kg
Propane Gas	1.55E-01	7.55E-06	1.51E-06	kg/scf
Landfill Gas	2.53E-02	1.55E-06	3.06E-07	kg/scf
Biodiesel (100%)	9.45E+00	1.40E-04	1.00E-05	kg/gal
Ethanol (100%)	5.75E+00	9.00E-05	1.00E-05	kg/gal
Rendered Animal Fat	8.88E+00	1.40E-04	1.00E-05	kg/gal
Vegetable Oil	9.79E+00	1.30E-04	1.00E-05	kg/gal

Purchased Electricity Emission Factors

Emission Factor (tCO2/MWh)	Grid		
	Luzon-Visayas		
	kgCO2/kWh	kgCH4/kWh	kgN2O/kWh
Simple Operating Margin (OM)	7.12E-01	9.36E-06	7.13E-06
Build Margin (BM)	5.98E-01	9.36E-06	7.13E-06
Combined Margin (CM)	6.84E-01	9.36E-06	7.13E-06
	5.98E-01	9.36E-06	7.13E-06

Emission Factor (tCO2/MWh)	Grid		
	Mindanao		
	kgCO2/kWh	kgCH4/kWh	kgN2O/kWh
Simple Operating Margin (OM)	7.80E-01	9.36E-06	7.13E-06
Build Margin (BM)	8.05E-01	9.36E-06	7.13E-06
Combined Margin (CM)	7.86E-01	9.36E-06	7.13E-06
	7.92E-01	9.36E-06	7.13E-06

Table 2. Default Assumptions from IPCC Good Practice Guidelines*

			Emission Factors (% of initial charge/yr)		
Application	Charge (kg)	Lifetime (years)	Assembly	Annual Leakage Rate	Recycling Efficiency
Domestic Refrigeration	0.05 - 0.5	12 - 15	0.2 - 1 %	0.1 - 0.5 %	70% of remainder
Stand-Alone Commercial Applications	0.2 - 6	8 - 12	0.5 - 3 %	1 - 10 %	70 - 80% of the remainder
Medium and Large Commercial refrigeration	50 - 2000	7 - 10	0.5 - 3 %	10 - 30 %	80 - 90% of remainder
Transport Refrigeration	3.0 - 8.0	6 - 9	0.2 - 1 %	15 - 50 %	70 - 80% of remainder
Industrial Refrigeration including Food Processing and Cold Storage	10 - 10000	10 - 20	0.5 - 3 %	7 - 25 %	80 - 90% of remainder
Chillers	10.0 - 2000	10 - 30	0.2 - 1 %	2 - 15 %	80 - 95% of remainder
Residential and Commercial A/C, including Heat Pumps	0.5 - 100	10 - 15	0.2 - 1 %	1 - 5 %	70 - 80% of remainder
Mobile Air Conditioners	Not provided	12	0.005	10 - 20 %	0

* These values are from IPCC Good Practice Guidelines and Uncertainty Management in National Greenhouse Gas Inventories (2000).These default values are provided for reference purposes only as their wide range can result in highly variable calculation outcomes. If a value is chosen from within the range, that value should be used consistently from reporting period to reporting period or year to year.They should only be used if entity-specific data are not available, but an inventory that uses these values should be considered preliminary.

Refrigerants and Global Warming Potentials (GWPs)

Gas	GWP
CO2	1
CH4	25
N2O	298
HFC-23	14,800
HFC-32	675
HFC-41	92
HFC-125	3,500
HFC-134	1,100
HFC-134a	1,430
HFC-143	353
HFC-143a	4,470
HFC-152	53
HFC-152a	124
HFC-161	12
HFC-227ea	3,220
HFC-236cb	1,340
HFC-236ea	1,370
HFC-236fa	9,810
HFC-245ca	693
HFC-245fa	1,030
HFC-365mfc	794
HFC-43-10mee	1,640
SF6	22,800
NF3	17,200
CF4	7,390
C2F6	12,200
C3F8	8,830
c-C4F8	10,300
C4F10	8,860
C5F12	9,160
C6F14	9,300
C10F18	>7,500

Note: Global Warming Potential (GWP) factors in the 2023 Emission Factors update associated with the Simplified GHG Calculator Tool v9 release are based on AR4 GWPs, but

Blended Refrigerants (ASHRAE #)

ASHRAE #	Blend GWP HFC/PFC	Blend Make-up
R-401A	16	53% HCFC-22 , 34% HCFC-124 , 13% HFC-152a
R-401B	14	61% HCFC-22 , 28% HCFC-124 , 11% HFC-152a
R-401C	19	33% HCFC-22 , 52% HCFC-124 , 15% HFC-152a
R-402A	2,100	38% HCFC-22 , 6% HFC-125 , 2% propane
R-402B	1,330	6% HCFC-22 , 38% HFC-125 , 2% propane
R-403B	3,444	56% HCFC-22 , 39% PFC-218 , 5% propane
R-404A	3,922	44% HFC-125 , 4% HFC-134a , 52% HFC 143a
R-406A	0	55% HCFC-22 , 41% HCFC-142b , 4% isobutane
R-407A	2,107	20% HFC-32 , 40% HFC-125 , 40% HFC-134a
R-407B	2,804	10% HFC-32 , 70% HFC-125 , 20% HFC-134a
R-407C	1,774	23% HFC-32 , 25% HFC-125 , 52% HFC-134a
R-407D	1,627	15% HFC-32 , 15% HFC-125 , 70% HFC-134a
R-407E	1,552	25% HFC-32 , 15% HFC-125 , 60% HFC-134a
R-408A	2,301	47% HCFC-22 , 7% HFC-125 , 46% HFC 143a
R-409A	0	60% HCFC-22 , 25% HCFC-124 , 15% HCFC-142b
R-410A	2,088	50% HFC-32 , 50% HFC-125
R-410B	2,229	45% HFC-32 , 55% HFC-125
R-411A	14	87.5% HCFC-22 , 11 HFC-152a , 1.5% propylene
R-411B	4	94% HCFC-22 , 3% HFC-152a , 3% propylene
R-413A	2,053	88% HFC-134a , 9% PFC-218 , 3% isobutane
R-414A	0	51% HCFC-22 , 28.5% HCFC-124 , 16.5% HCFC-142b
R-414B	0	5% HCFC-22 , 39% HCFC-124 , 9.5% HCFC-142b
R-417A	2,346	46.6% HFC-125 , 5% HFC-134a , 3.4% butane
R-422A	3,143	85.1% HFC-125 , 11.5% HFC-134a , 3.4% isobutane
R-422D	2,729	65.1% HFC-125 , 31.5% HFC-134a , 3.4% isobutane
R-423A	2,280	47.5% HFC-227ea , 52.5% HFC-134a ,
R-424A	2,440	50.5% HFC-125, 47% HFC-134a, 2.5% butane/pentane
R-426A	1,508	5.1% HFC-125, 93% HFC-134a, 1.9% butane/pentane
R-428A	3,607	77.5% HFC-125 , 2% HFC-143a , 1.9% isobutane
R-434A	3,245	63.2% HFC-125, 16% HFC-134a, 18% HFC-143a, 2.8% isobutane
R-500	32	73.8% CFC-12 , 26.2% HFC-152a , 48.8% HCFC-22
R-502	0	48.8% HCFC-22 , 51.2% CFC-115
R-504	325	48.2% HFC-32 , 51.8% CFC-115
R-507	3,985	5% HFC-125 , 5% HFC143a
R-508A	13,214	39% HFC-23 , 61% PFC-116
R-508B	13,396	46% HFC-23 , 54% PFC-116

Mobile Combustion

Fuel Type	CO2 Emission Factor (kg CO2 / unit)	Unit
Motor Gasoline	2.31943784	liter
Diesel Fuel	2.697205051	liter
Residual Fuel Oil	2.977228298	liter
Aviation Gasoline	2.195276589	liter
Kerosene-Type Jet Fuel	2.575685529	liter
Liquefied Petroleum Gases (LPG)	1.500501928	liter
Ethanol (100%)	1.51899403	liter
Biodiesel (100%)	2.496433666	liter
Liquefied Natural Gas (LNG)	1.188777936	liter
Compressed Natural Gas (CNG)	0.05444	scf

Fuel Type	CO2 Emission Factor (kg CO2 / unit)	CH4 Emission Factor (kg CH4 / unit)	N2O Emission Factor (kg N2O / unit)	Unit	Average Fuel Economy (kmpl)
Walking, Cycling	0	0	0	km	0
Motorcycle	1.17E-01	1.13E-04	1.13E-05	km	33.18
Tricycle	1.17E-01	1.13E-04	1.13E-05	km	33.18
Jeepney	2.88E-01	7.50E-06	6.20E-06	km	7.07
Taxi/Grab	2.12E-01	1.45E-05	5.00E-06	km	7.81
Car - hatchback	2.12E-01	1.45E-05	5.00E-06	km	7.81
Car - sedan	2.12E-01	1.45E-05	5.00E-06	km	7.81
Car - SUV	2.12E-01	1.45E-05	5.00E-06	km	7.81
Pick-up	2.88E-01	7.50E-06	6.20E-06	km	7.81
Bus	2.88E-01	7.50E-06	6.20E-06	km	3.6
Waterborne	2.61E-02	1.33E-04	4.00E-04	km	
Van	2.88E-01	7.50E-06	6.20E-06	km	
Airplane - short haul (< 482.8 km)	1.28E-01	4.40E-06	4.00E-06	km	
Airplane - medium haul (≥ 482.8 km, < 3701.5 km)	8.14E-02	4.00E-07	2.60E-06	km	
Airplane - long haul (≥ 3701.5 km)	1.00E-01	4.00E-07	2.60E-06	km	

[US EPA] United States Environmental Protection Agency. 2021. Inventory of U.S. greenhouse gas emissions and sinks: 1990–2018. 2021. https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissionsand-sinks-1990-2018.

Vergel, K. B., Marcelo, K. R. S., Salison, A. J. P., Elamparo, F. N. M., Saavedra, V. a. L., Villedo, K. P., Abao, N. S. A., Gonzales, A. O., Regidor, J. R. F., & Abaya, E. B. (2022). Estimation of transportation energy demand of the Philippines using a bottom-up approach. *Asian Transport Studies*, *8*, 100058. https://doi.org/10.1016/j.eastsj.2022.100058

SUMMARY

	kgCO2e
Stationary Combustion	#ERROR!
Mobile Combustion	#ERROR!
Refrigeration & A/C	#ERROR!
Purchased Electricity	#ERROR!
Employee Commuting	#ERROR!

SCOPE 1: DIRECT EMISSIONS

Stationary Combustion (Emissions by fuel type)

Fuel	Qty	Unit
#ERROR!	#ERROR!	#ERROR!
#ERROR!	#ERROR!	#ERROR!
#ERROR!	#ERROR!	#ERROR!
#ERROR!	#ERROR!	#ERROR!
#ERROR!	#ERROR!	#ERROR!
#ERROR!	#ERROR!	#ERROR!
#ERROR!	#ERROR!	#ERROR!

kgCO2e
#ERROR!
#ERROR!
#ERROR!
#ERROR!
#ERROR!
#ERROR!
#ERROR!

Mobile Combustion (Emissions by fuel type)

Fuel	Qty	Unit	kgCO2e
#ERROR!	#ERROR!	liters	#ERROR!
#ERROR!	#ERROR!	liters	#ERROR!

Refrigeration & AC (Emission by refrigerant gas)

Ref. Gas	Qty	Unit	kgCO2e
#ERROR!	#ERROR!	kg	#ERROR!
#ERROR!	#ERROR!	kg	#ERROR!
#ERROR!	#ERROR!	kg	#ERROR!
#ERROR!	#ERROR!	kg	#ERROR!
#ERROR!	#ERROR!	kg	#ERROR!

SCOPE 2: INDIRECT EMISSIONS

Purchased Electricity (Total emissions by equipment)

Source	kWh	kgCO2e
by equipment	#ERROR!	#ERROR!
by average monthly bill		0.00

Annual kWh by bill

Month	2021	2022	2023	2024
January				
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				
Average				

Grid	Luzon-Visayas		
Emission Factor	Simple Operating Margin (OM)		
	CO2	CH4	N20
	7.12E-01	9.36E-06	7.13E-06

Monthly emissions in kgCO2e (bill basis)

Month	2021	2022	2023	2024
January				
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				
Average				

SCOPE 3: OTHER INDIRECT EMISSIONS

Employee Commuting (Emissions by vehicle type and fuel type)

Vehicle	Fuel	Qty	Unit	kgCO2e
#ERROR!	#ERROR!	#ERROR!	liters	#ERROR!
#ERROR!	#ERROR!	#ERROR!	liters	#ERROR!
#ERROR!	#ERROR!	#ERROR!	liters	#ERROR!
#ERROR!	#ERROR!	#ERROR!	liters	#ERROR!
#ERROR!	#ERROR!	#ERROR!	liters	#ERROR!
#ERROR!	#ERROR!	#ERROR!	liters	#ERROR!
#ERROR!	#ERROR!	#ERROR!	liters	#ERROR!
#ERROR!	#ERROR!	#ERROR!	liters	#ERROR!
#ERROR!	#ERROR!	#ERROR!	liters	#ERROR!
#ERROR!	#ERROR!	#ERROR!	liters	#ERROR!

Employee Commuting (Emissions by employ

ID	kgCO2e
#ERROR!	#ERROR!
#ERROR!	#ERROR!
#ERROR!	#ERROR!
#ERROR!	#ERROR!
#ERROR!	#ERROR!
#ERROR!	#ERROR!
#ERROR!	#ERROR!
#ERROR!	#ERROR!
#ERROR!	#ERROR!
#ERROR!	#ERROR!