

USER'S MANUAL

Community-Level GHG Inventory for Local Government Units (LGUs) in the Philippines



With support from:





REVISION HISTORY

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DISCLAIMER

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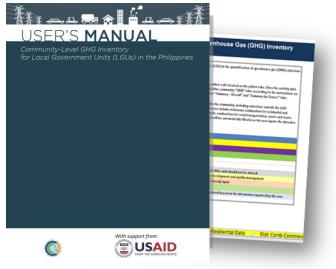
1.Introduction

1.1 Policies / Rationale

The Climate Change Act as amended in 2012 (RA 10174) declares that it is the policy of the Philippine Government to strengthen, integrate, consolidate, and institutionalize government initiatives to achieve coordination in the implementation of plans and programs to address climate change in the context of sustainable development.

Section 14 of this Act specifically recognizes the role that LGUs play in mainstreaming climate change efforts within the government and requires them to formulate and implement local climate change action plans (LCCAP) that is consistent with local and national policies and frameworks.

To complement this Act, Memorandum Circular No. 2014-135 or the Guidelines for the Formulation of the LCCAP was released by the Department of Interior and Local Government. Section 3.3.5 of the Memorandum Circular strongly suggests LGUs to identify mitigation options to help reduce their carbon footprints and contribute to efforts in addressing climate change.



Development of a greenhouse gas (GHG) inventory¹ is an activity that can support better planning for mitigation options that the LGUs can implement. Thus capacity building efforts related to GHG inventories are being supported by the Climate Change Commission, the sole policy-making body of the government that is tasked to coordinate, monitor and evaluate programs and action plans of the government relating to climate change.

¹A GHG inventory is an accounting of GHGs that are emitted to and/or removed from the atmosphere over a period of time.

This User's Manual is produced by the CCC, with support from the USAID, to enable LGUs to institutionalize the process of developing their community-wide GHG inventories.

1.2 Purpose

This User's Manual provides a step-by-step guide for the LGUs to quantify and manage information and data related to the development of their community-level GHG inventories.

A Community-level inventory is a useful planning tool in developing mitigation actions for the entire community. It includes emissions from activities within the LGU's jurisdiction, including emissions from sources and/or activities in the different sectors within the community, such as energy, transportation, agriculture, industry, and waste.

This User's Manual is accompanied by a **GHG Inventory Quantification Support Spreadsheet**<filename: Spreadsheet for Community-Level GHG Quantification in the Philippines>. The two go hand-in-hand, and complement each other. While the Spreadsheet can be treated as a stand-alone document, the User's Manual explains in simple terms, the information required by the Spreadsheet and provides step-bystep instructions that are especially helpful for first-time users.

Collectively, the Spreadsheet, and the User's Manual aim to facilitate and institutionalize the process of planning, collecting and managing data, quantifying and reporting of an LGU's community -wide GHG emissions.

1.3 Scope and limitations

A number of categories of emission sources within the community level are included in this version of the User's Manual and the Spreadsheet. Other categories are presently not included but may be included in later versions as greater understanding of LGUs' experiences in these categories become available.





The following categories of emission sources are considered in this version:

- Stationary Combustion from commercial and residential buildings
- Purchased Electricity (Commercial buildings, Residential buildings, others (e.g. streetlights, mass rapid transit etc.))
- Mobile Combustion
- Solid Waste in Landfills(including GHG emissions from solid waste produced from within the community but landfilled outside the community geopolitical boundaries)
- Wastewater Treatment and Discharge
- Agriculture (crops and livestock)
- Industrial Processes and Products Use for Selected industries
- Forestry

In order for LGUs to accurately account for these categories, specific data to be collected, and the sources from which it is to be collected, are identified and defined in both the User's Manual and the

Spreadsheet. In most cases, data considered are from the same source that provided it for use in the development of LGUs GHG inventories under USAID's previous capacity building efforts. However, in other cases, more specific data that can lead to a more accurate quantification of GHG emissions for a given source is desirable. Thus, this User's Manual also presents optional or alternate options to address better accuracy needs.

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1.4 GHG Accounting Protocols and Principles

Present government policies, particularly the Memorandum Circular No. 2014-135 or the Guidelines for the Formulation of the LCCAP, does not require but rather encourage GHG reduction efforts from LGUs. Thus, rules governing the conduct of GHG inventories are dependent on the choices made by the LGUs but are anchored in internationally recognized standards and protocols on community-level GHG accounting. The main reference document for the conduct of this type of inventory is the IPCC Guidelines for National GHG inventories. In some cases the Global Protocol for Community-Scale GHG Emissions (GPC) is also used. Guidelines from both these documents are used in this Manual as well as the Spreadsheet, when applicable.

The IPCC Guidelines and the GPC have provided good practice approaches in ensuring the quality of the GHG inventory report. The IPCC has identified the principles of transparency, accuracy, completeness, consistency and comparability as indicators of GHG inventory qualities. Meanwhile the GPC has identified the principles of relevance, completeness, consistency, transparency, accuracy and measurability as indicators in the conduct of the inventory. Often, tradeoffs are encountered in applying these principles, so it is necessary for LGUs to decide which among



these will have more weight as they conduct their inventories.

The following principles have governed past LGU GHG inventories and are used as guides in this Manual and Spreadsheet:

- Transparency Activity data, emission sources, emission factors, and accounting methodologies should be adequately documented and disclosed to enable verification. The information should be sufficient to enable individuals outside of the inventory process to use the same source data and derive the same results. All exclusions need to be clearly identified and justified.
- Relevance- The reported GHG emissions shall appropriately reflect emissions occurring as a result
of activities and consumption from within the city's geopolitical boundary. The
inventory shall also serve the decision-making need of the local authority, and take into
consideration relevant local and national regulations.
- Accuracy
 The calculation of GHG emissions should not systematically overstate or understate actual GHG emissions. Accuracy should be sufficient to give decision makers and the public reasonable assurance of the integrity of the reported information. Local authorities should reduce uncertainties in the quantification process to the extent that it is possible and practical.
- Completeness All emissions sources within the inventory boundary shall be accounted for. Any exclusion of emission sources shall be justified and clearly explained.
- Consistency Emissions calculations shall be consistent in approach, boundary, and methodology. Consistent methodologies for calculating GHG emissions will enable meaningful trend analysis over time, documentation of reductions, and comparisons between LGUs.
- Comparability The GHG inventory is reported in a way that allows it to be compared with other inventories from other LGUs. This should be reflected in appropriate choice of emissions or removals categories and in the use of the same reporting guidelines as that of the other LGUs'.

1.5 GHG Inventory Management and Reporting Process

LGUs who wish to conduct their GHG inventories are expected to go through the following process:

- Planning and Design
- o Implementation (data collection, calculating emissions, data quality management)
- Reporting
- o Improvement
- Finalization

Both the Manual and the Spreadsheet are guided by this process of the GHG inventory but puts special emphasis on data quantification and quality management. Nevertheless, it provides an overall idea of



the inventory process which LGUs need to go through. Each LGU will go through this process at its own pace, depending on factors such as human resources, budget and technical capabilities. Thus, a completely filled out Spreadsheet, which complies with all the steps in the manual, will allow the LGUs to experience going through this whole

cycle.





1.6 GHG Emissions Quantification

In order to understand the data needed to quantify GHG emissions, LGUs need to know the general quantification equation used in computing for GHG emissions:

GHG EMISSIONS = Activity Data X Emission Factor

Activity data (A) is any data that pertains to the magnitude of human activity resulting to GHG emissions. This can be volume of fuel (measured in Liters), weight of fuel (measured in kilogram units), amount of electricity usage (measured in kilowatt-hour) or distances travelled (measured in kilometers) etc.

Emission factor (EF) is the average emission rate of a given GHG for a given source, relative to units of activity. They are always expressed as ratios, for example, 2.68 kg of CO2 per Liter of diesel. The table below dissects this definition and example even more:

Question: What is the EF of diesel?					
Answer: 2.6	Answer: 2.68 kg CO2/L				
Salient points of EF definition	Values/answers based on the question				
"given GHG"	CO2				
"given source"	Diesel				
"Unit of activity"	Liters				
"Average emission rate"	2.68 kg co2/L of diesel				

Activity data may be within the control of the LGUs or can be gathered from published local or national databases. EFs are taken from published national or international guidance documents. Sometimes, EF values are not readily available for the given activity data, so additional computations are needed, but the Spreadsheet has collected and encoded these formula for all major GHG sources of emissions. Therefore, the LGUs' focus is only on gathering and making sure that the Activity data is complete and accurate. Guidelines on activity data collection are found in chapter 3.

1.7 Quantification of GHG Removals by Sinks

LGUs with forests need to look into the contribution of these forests in their GHG inventories. Forests are unique in the sense that they can be a source of greenhouse gas emissions or they can remove GHG emissions by absorbing them. The net carbon emissions or removal of the forest and land use sector is dependent on two basic biophysical processes:²

- a) Changes in forest/woody carbon stocks due to the net annual biomass growth of existing forest and non-forest stands, and possible biomass regrowth in abandoned lands;
- b) Land use and forest conversion practices which affect the carbon chemistry of the atmosphere via biomass burning, decay and soil carbon release and uptake.

² Tracking Greenhouse Gases: An Inventory Manual, page 122

The current version of the Spreadsheet and the Manual only considers process (a), as the methodology for this are simpler and data are available.

1.8 Data Quality Management

Apart from GHG emissions quantification, special emphasis is made on quality assurance (QA) and quality control (QC)³. These data quality management concepts are included in the Spreadsheets as well as this User's Manual to set and/or improve LGU's internal procedures and systems for collecting and managing GHG emissions-related data. It also identifies opportunities for improvement as well as best practices that the LGUs may implement in the future.

It is important to have QA/QC checks to ascertain whether there are data that were incorrectly stated or were omitted that may cause emissions to be misrepresented , thus potentially influencing decisions or actions taken by the users of the GHG inventory report.

Knowing the probabilities of how much of the data collected were misrepresented will provide LGUs a gauge of the accuracy of their data and will aid them in determining how much weight they will put (i.e. how relevant the data is) for that particular data in decision-making.

For starters, LGUs are not expected to have QA/QC procedures in place especially for those generating first-time inventory reports. However, for some LGUs, procedures may be devised to ensure the quality of data. For these LGUs, the Spreadsheet requires answering questions such as "How Much data uncertainty this data has?" or provide for "basis of data uncertainty" as shown below:

Data Uncertainty	or File Code Where Data is	Transcribe d from Survey or Data	ip and Storage Location of Data (e.g. 1 G	Corresponding Quality Control (QC) Reference in Applicable Checklist	Basis of Data Uncertainty

Note that these questions or information do not affect the calculation of the GHG emissions in the Spreadsheet, but are essential for QA/QC. Hence, guidelines are provided in the User's Manual when applicable, but LGUs may opt not to answer them for the time being.

³*Quality Assurance* is a planned system of review procedures conducted by personnel not involved in the inventory development process. Meanwhile, *Quality Control* is a system of routine technical activities implemented by the inventory development team to measure and control the quality of the inventory as it is prepared (2006 IPCC Guidelines)

1.9 Reporting GHG Emissions and/or Removals by Sinks

The Spreadsheet can be considered as a predefined template which the LGUs can use in reporting their GHG inventories. It can also be a good starting point for LGUs to improve upon as data and emission factors are improved. The advantages of using this template include:

- Concise format allows LGUs to focus on data collection and improving data quality
- Accommodates varying levels of capacities between LGUs by providing essential steps as well as optional steps to cater to more advanced information
- Standardized format allows comparison of results among LGUs
- Once data are properly inputted in the Spreadsheet, an overall GHG Emissions and removals by Sinks Summary for community-wide GHG emissions by sources is automatically calculated. This snapshot provides an easy reference for LGUs of their emissions by sources:

Below is an example of a GHG Emission Summary Table.

D	E	F	G
G Emissions Summary			
Emission Source	GHG Emissions (tonnes CO₂e)	Proportion of Total Emissions	Veighted Uncertaint
Scope 1 Emissions (Net of Forestry and Land Use)			
GHG Emissions from Community-Level Residential Stationary Fuel Use	500.00	0.48%	
GHG Emissions from Community-Level Commercial Stationary Fuel Use	600.00	0.58%	
GHG Emissions from Community Mobile Combustion	1100.00	1.06%	
GHG Emissions from Solid Waste Disposal - IPCC FOD Method*	3750.00	3.62%	
GHG Emissions from Other Solid Waste Treatment (ICLEI)*	560.00	0.54%	
GHG Emissions from Solid Waste Open Burning (ICLEI)*	210.00	0.20%	
GHG Emissions from Wastewater Treatment and Discharge	4000.00	3.86%	
GHG Emissions from Community-Level Agriculture (Crops)	500.00	0.48%	
GHG Emissions from Community-Level Agriculture (Livestock)	740.00	0.72%	
GHG Emissions from Solid Waste Disposal - Inside LGU Geopolitical Boundaries (ICLEI)	0.00	0.00%	
GHG Emissions from Wastewater Treatment and Discharge (Other Sources)	0.00	0.00%	
GHG Emissions from Industrial Processes and Product Use	2000.00	1.93%	
Scope 1 Emissions/Removal (Forestry and Land Use)			
GHG Emissions from Forestry and Land Use	19533.36	18.87%	
GHG Removal from Sink		0.00%	
Total Scope 1 Emissions	33,493	32.36%	
Scope 2 Emissions			
GHG Emissions from Purchased Electricity at Community-Level Residential Sites	20000.00	19.32%	
GHG Emissions from Purchased Electricity at Community-Level Commercial Sites	50000.00	48.31%	
GHG Emissions from Purchased Electricity at Community-Level for All Other Sources	0.00	0.00%	
Total Scope 2 Emissions	70,000	67.64%	
Scope 3 Emissions			
GHG Emissions from Solid Waste Disposal - Outside LGU Geopolitical Boundaries (ICLEI)	0.00	0.00%	
Total Scope 3 Emissions			
otal Emissions and Uncertainty	103,493	100.00%	
Instructions / InternalControl / General Info Summary-Over	all Stat Comb-Res	idential Data 🖉 St	at Comb-Co

Emissions are classified according to SCOPES. Scopes establish the inventory boundaries so that GHG emissions to be accounted for and reported in the inventory are clearly stated. Boundaries define the scale and reach of emissions that will be included by the LGU in its GHG inventory Report. There are 3 scopes used in the inventory reporting⁴:

- Scope 1: All direct emissions from sources within the geopolitical boundary of the community.
- Scope 2: Energy-related indirect emissions that occur outside the community boundary as a consequence of consumption/use of grid-supplied electricity,

⁴World Resources Institute, World Business Council for Sustainable Development, 2001



• Scope 3: All other indirect emissions that occur outside the boundary as a result of activities within the community's geopolitical boundary, including trans-boundary emissions due to exchange/use/consumption of goods and services

It is best practice for LGUs to report all of its Scopes 1 and 2 emissions. Scope 3 emissions are also relevant, especially those on waste, so they are also commonly reported.

Take note that the Total GHG emission reflected in the summary includes emissions from the forestry sector but excludes removals by sinks. Similarly, the proportion of total emissions considers GHG emissions from forestry and not the removal by sinks. This way of presenting the results will ensure the inclusion of all GHG emission sources necessary for the LGUs to identify and prioritize mitigation actions within their communities.

The GHG Inventory Quantification Support Spreadsheet

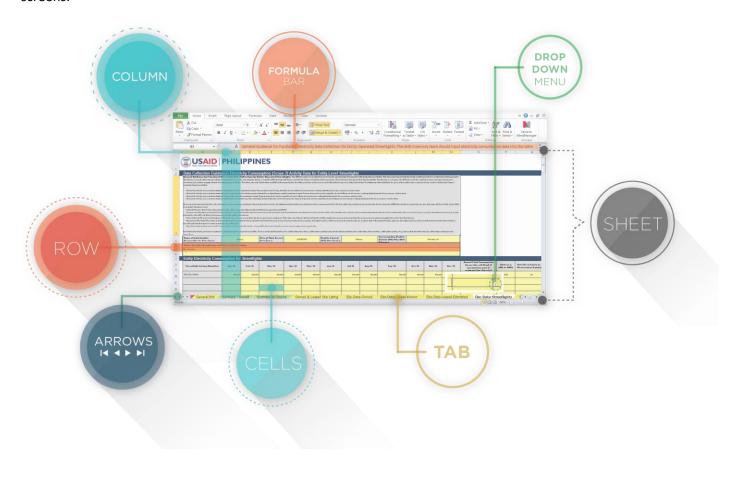
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This User's Manual complements the GHG Inventory Quantification Support Spreadsheet. Thus, it is important to first understand the basic features of the Spreadsheet before proceeding with the inventory process.

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2.1 Basic Parts of the Spreadsheet Screen

The Spreadsheet was made using the Microsoft Excel software. This software should be installed in the LGUs' computers in order to use the Spreadsheet. The following are the basic parts of the Spreadsheet and their specific functions as they appear on the screens:





Column	Vertical grid pattern in an excel worksheet Each column is denoted by a capital letter (e.g. A, B, C ZZ)
Row	Horizontal grid patterns in an excel worksheet. Each row is denoted by a number (e.g. 1, 2, 31001,000)
Cell	A rectangular box which stores data. It is the intersection formed by a column and a row. Each cell can be uniquely identified by its column and row (e.g. A1, J75ZZ100) An <i>active cell</i> is a cell outlined by a black/dark blue border. Data can be typed here.
Formula Bar	The space where data or formula used in active cells are displayed
Worksheet	A single page composed of many cells arranged in a grid pattern using columns and rows. Each worksheet contains information, data and formula. They are governed
	by color-coded "rules" and LGUs are required to follow the step-by-step procedures in order to fill them out.
Data Sheets	For our own purposes, data sheets are worksheets that are used for data collection purposes.
Spreadsheet	Spreadsheet is a collective set of worksheets
Tab	Found at the bottom of the worksheet, it displays the name of a specific worksheet (e.g. summary, elec data –owned etc).
Arrows (I ≯, <i>∢</i> I, <i>∢</i> , ≯)	Found at the lower left of the worksheet, clicking these symbols allows the user to view the tabs that are not currently shown.
Drop-down menu	Sometimes, an arrow (\checkmark) automatically appears on the lower right portion of an active cell. This signifies the presence of a drop-down menu. Click on the arrow to view the menu/list and select applicable data.

2.2 Color-Coding Scheme

The Spreadsheet uses the following color-coding scheme for easy reference:



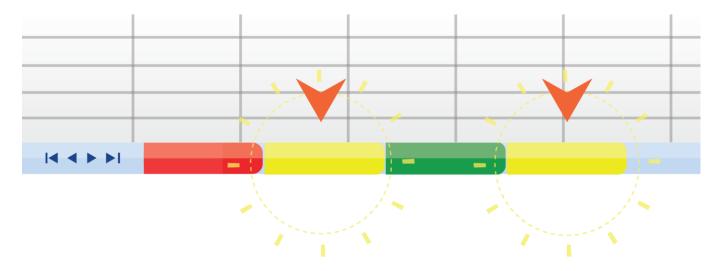


As a general rule, yellow tabs and (light) yellow cells indicate data inputs. Users are required to fill this out. For starters, it is highly recommended that LGUs only concern themselves with yellow tabs and cells. Users may go ahead and alter the orange and (light) green only after doing the yellow ones.

Blue and grey cells contain values that are default or were automatically computed or copied from other cells. They are easy to identify not only because of their colours but by the formula that appears in the formula bar when active cells are clicked. Extra caution is needed to prevent accidental deletion of these formulas they may affect the whole Spreadsheet.

2.3 Worksheets

Note that the Spreadsheet contains 45 worksheets (or 45 tabs), 22 of which are colored yellow. These yellow worksheets are data input worksheets and require data from the LGUs. Each of these yellow worksheets corresponds to a particular LGUs' source of emissions. Thus it is good practice to fill out as much of these yellow cells as possible by following the step-by-step guide in Chapter 4 by collecting as much data as possible by following procedures outlined in Chapter 3. The tabs, found at the bottom part of the screen, identify the worksheets.



2.4 Software Version with Macros Enabled

Note that this Spreadsheet has codes or "Macros" in it. Macros is a function in Excel that allows it to create repetitive tasks and standardized formats. Hence it is recommended that LGUs use the most recent version of Microsoft Excel when using this Spreadsheet, to maximize the use of Macros.

3. Activity Data Collection

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This Chapter presents a Step-By-Step procedure in identifying and gathering the correct data needed for the GHG community-level inventory. Activity data is almost always unique to any LGU, but in this Chapter, datasheet templates are presented so that LGUs can focus on their actual data gathering.

These datasheets were designed to mirror the worksheets found in the Spreadsheet, and were meant to be used to summarize and record the data collected from the surveys conducted/ to be conducted by the LGUs. The purpose of this simplified approach is for the LGU to first gather the correct data, and when complete, input them in the Spreadsheet.

A compilation of the Data Sheets used in this Chapter is found in the Annex 1: Data Sheets.

3.1 General Guidelines on Activity Data

Activity data (A) for community-level inventory should be derived from the following:

- 1. Census or Sampling
- 2. National or regional consumption data of the Philippines

Census or survey

Activity data can be collected by conducting a survey using a census⁵ or sampling⁶ method within the geopolitical boundaries of the local government unit (LGU), or in some cases, outside the LGU boundaries. The survey for activity data needed for the community-level inventory may be incorporated with the other surveys being conducted within the LGU⁷.

Guidance Notes:

Fuel data consumed by the community are obtained from fuel suppliers operating within the geopolitical boundaries of the LGU and those fuel suppliers **based outside** the LGU **but servicing the households and businesses within**. The activity data collected from these fuel suppliers are often in Peso amount and not in liters sold. The data to be used in the computation of emissions has to be converted to activity data units (i.e. liters, kilograms, cubic meter, kilowatt-hours) using the average price per unit. It is necessary to document the steps taken and assumptions used to convert the Peso amount to activity data units.

⁵ Census is a procedure of systematically collecting data from a whole population ⁶Sampling is a process of choosing a **representative sample** from a target population ⁷An example of this survey is the local census periodically done by the LGUs





Municipality of Kalayaan, Laguna experience

A census which covers the entire 4,966 households of Kalayaan was conducted for their first inventory. Respondents who own or operate businesses (e.g. restaurants, *'sari-sari'*stores) in Kalayaan were asked to include total consumption in their responses. The census was conducted from May to June 2012 during the summer season in the Philippines. Questions on the monthly consumption of the following were included in the census: LPG, kerosene, fuelwood and charcoal for cooking; Fuel use for generators; and Kerosene for lighting.

Prior to the conduct of this census, the Kalayaan GHG Inventory Team undertook training with the faculty of the University of the Philippines – Los Banos on how to formulate survey questionnaires. This training was supported by the USAID.

A total of 11 surveyors, who were all working full time for the municipality as interns for the summer were tasked to carry out the census in the three barangays. In addition, thirty (30) students doing their on-the-job training in the municipality under the Special Program for the Employment of Students (SPES) were tasked to assist the 11 surveyors. Thus, each surveyor had a team of at least two members when carrying out the task. The Kalayaan GHG Inventory Team oversaw the process of surveying and encoding of the data.

National or regional consumption data of the Philippines

Government agencies such as the Department of Energy (DoE), Environmental Management Bureau of the Department of Environment and Natural Resources (EMB-DENR) or the Land Transportation Office (LTO), and statistical office such the Philippine Statistics Authority (the newly created office which covers the National Statistics Office⁸, National Statistical Coordination Board and Bureau of Agricultural Statistics) may be able to provide information needed for the community-level inventory. The Planning Office of the LGU may also have data on household and commercial establishments within the geopolitical boundaries of the LGU.

⁸ National Statistics Office conducts the Household Energy Consumption Survey(HECS)



The Spreadsheet has been developed using activity data based on household and vehicle surveys. If the LGU does not have household and/or vehicle survey, the LGU may proceed directly to the emission data sources and will need to skip some of the columns in the Spreadsheet that are not applicable. The decision tree will provide the guide on the steps to follow for computing emissions depending on the data collection approaches adopted.

3.2 Stationary Combustion

Stationary Combustion fuels are those used by residential and commercial sectors for cooking, lighting, heating and cooling within the geopolitical boundaries of the LGU.



Step 1 Request information for the number of residential households (including multi-unit buildings) and registered businesses (for commercial sector) within the LGU boundaries from the concerned Division/Office of the LGU (i.e. Planning Division or Business Licensing Division for commercial establishments), Philippine Statistics Authority, Philippines Business Registry, other government offices or directly from fuel suppliers.

Step 2 Conduct the survey method chosen (census or sampling). The survey method to be adopted will depend on the time and resources available, such as personnel and budget.



Step 3 Prepare the summary of the data collected from the residential sector based on the suggested format of *Datasheet 3.1. List of Households included in the inventory per Districts/Barangays*.

	Districts/Barangays included in the inventory	Total Population	Total Number of Residential Households	Total number surveyed (enter "NA" if no data)	Source of data
1.					Example:
2.					• LGU
3.					Philippine Statistics
4.					Authority
5.					Household survey

Datasheet 3.1. List of all Households included in the inventory per Districts/Barangays

Step 4 Prepare the summary of the data collected from the commercial sector based on the suggested format of *Datasheet 4.1. List of Commercial Establishments included in the inventory per District/Barangay.*

	Districts/ Barangays included in the inventory	Total Population	Total Number of Registered Businesses (enter "NA" if no survey is used)	Total number of business surveyed (enter "NA" if no data)	Source of data
1.					Example:
2.					• Permit and Licensing
3.					Division of the LGU
4.					Commercial
5.					establishment survey
6.					

Datasheet 4.1. List of all of Commercial Establishments included in the inventory per District/Barangay

Step 5 Identify the emission sources of the residential sector. Use Datasheet 5.1 to record the information collected on fuel consumption of the residential sector for stationary combustion.

Step 5.1. Consolidate all activity data according to District/Barangay (Column A) and Application (Column D). Indicate the Data Source Identifier in Column B (title of the source document) and the Type of Data in Column C (i.e. household survey, fuel supplier, national averages). Disaggregate the data according to the type of fuel (blended diesel, gasoline, LPG, fuel wood), annual volume and unit of measurement (i.e. liters, kilograms) and indicate in Columns E, F and G respectively. Ensure that there is no double counting when applying combination of data collection approaches. (Skip Step 5.A and proceed to Step 6)



Datasheet 5.1.Emission sources and fuel consumption of the residential sector – Stationary Combustion (Examples are provided)

Α	В	С	D	E	F	G
District/ Barangay/ LGU	Data Source Identifier	Type of Data	Application	Fuel type	Annual Volume	Unit
Longos	Surveyed Residence Longos 1	Individual Household survey	cooking	kerosene	300	liters
San Antonio	Data Fuel Sale data from Fuel supplier San Antonio	Fuel supplier survey	generator	Blended diesel	10,000	liters

Step 5 .A. Identify the emission sources of the residential sector. Use Datasheet 5.1 to record the information collected on the fuel consumption of the residential sector for stationary combustion.

Step 5 .A. 1. Consolidate all activity data according to District/Barangay (Column A) and Application (Column D) *if available*. Indicate the Data Source Identifier (title of the source document) and the Type of Data (i.e. fuel supplier, national averages). If disaggregated activity data per District/Barangay and Application of fuel are not available, put the name of the LGU in Column A, disregard Application in Column D, consolidate and identify the fuel consumed per fuel type, amount and units in Columns E, F, G respectively. Ensure that there is no double counting when applying combination of data collection approaches.

Step 6 Identify the emission sources of the commercial sector. Use Datasheet 6.1 to record the information collected on the fuel consumption of the commercial sector for stationary combustion.

Step 6.1 Consolidate all activity data according to District/Barangay (Column A) and Application (Column D). Indicate the Data Source Identifier in Column B (title of the source document) and the Type of Data (i.e. business survey, fuel supplier, national averages). Disaggregate the data according to the type of fuel (blended diesel, gasoline, LPG, fuel wood), annual volume and unit of measurement (i.e. liters, kilograms) and indicate in Columns E, F, and G respectively. Ensure that there is no double counting when applying combination of data collection approaches. (Skip Step 6.A and proceed to Step 7)

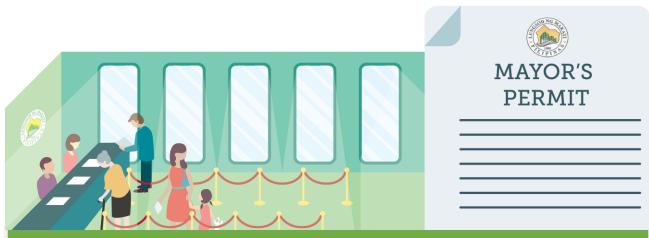
Datasheet 6.1.Emission sources and fuel consumption of the commercial sector – Stationary Combustion (Examples are provided)

Α	В	С	D	E	F	G
District/ Barangay/ LGU	Data Source Identifier	Type of Data	Application	Fuel type	Annual Volume	Unit
Longos	Surveyed Businesses Longos 1	Individual Business survey	generator	Blended diesel	3000	liters
San Antonio	Data Fuel Sale data from Fuel supplier San Antonio	Fuel supplier	cooking	LPG	5000	kg



Step 6.A Identify the emission sources of the commercial sector. Use Datasheet 6.1 to record the information collected on the fuel consumed of the commercial sector for stationary combustion.

Step 6.A. 1 Consolidate all activity data according to District/Barangay (Column A) and Application (Column D) *if available*. Indicate the Data Source Identifier (title of the source document) and the Type of Data (i.e. business survey, fuel supplier, national averages). If dis aggregated activity data per District/Barangay and application of fuel are not available, put the name of the LGU in column A, disregard Application in column D, consolidate and identify the fuel consumed per fuel type, amount and units in Columns E, F, G respectively. Ensure that there is no double counting when applying combination of data collection approaches.



Makati City experience

Most LGUs do not collect GHG emissions-related data in their communities, but have processes and procedures in place that can be utilized to collect these data. Examples of these procedures include issuances and/or renewals of permits and performance monitoring for certain sectors.

To facilitate easier and more systematic collection of activity data from the business sector, Makati LGU included the submission of relevant activity data (i.e. annual fuel and electricity consumption of the business establishment) for the Community-level Inventory as part of the requirements when securing or renewing business permit.



3.3 Mobile Combustion

Mobile Combustion refers to fuels used for on-road transportation⁹ within the geopolitical boundaries of the LGU.

There are two methods to collect activity data for mobile combustion, namely, (1) Distance-based Method or (2) Fuel-based Method. The type of vehicle and year model is needed when using the Distance-based Method. Activity data needs to be segregated according to fuel type (e.g. gasoline, diesel, LPG, others).

Distance-based method	Activity data is sourced using distance travelled by the vehicle, per fuel type (e.g. 100 kilometers)
Fuel based method. This is the preferred method.	Activity data is sourced from the amount of fuel consumed by the vehicle, per fuel type (e.g. 100 liters)



Step 7 Request information for the number of registered vehicles by type within the LGU boundaries from the Philippines Land Transportation Office (Department of Transportation and Communications) or other relevant government agencies including the LGU for the registered tricycles. *Use Datasheet 7.1. List of all Vehicles* included in the inventory per Districts/Barangays to record the data collected.

⁹On-road transportation are vehicles used for transportation



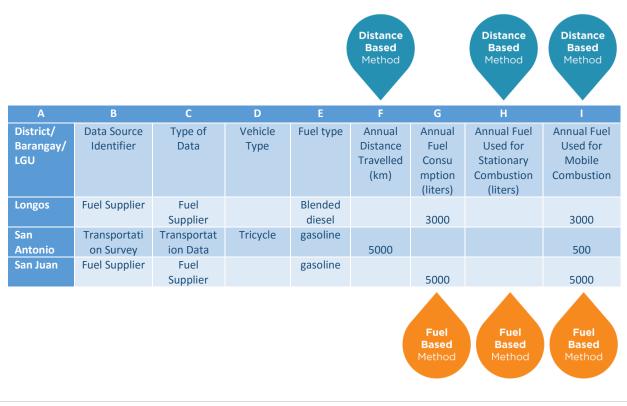
Datasheet 7.1. List of all Vehicles included in the inventory per Districts	/Barangays
---	------------

	Districts/Barangay s included in the inventory	Total Population	Total Number of Vehicles registered within the District	Total number surveyed (enter "NA" if no data)	Source of data
1.					Eveneraley
2.					Example:
3.					Land Transportation Office (LTO)
4.					Office (LTO)
5.					LGU for tricycles

Step 8 Identify emission sources from mobile combustion. Use *Datasheet 8.1Fuel consumption – Mobile Combustion* to record the information collected on the type and amount of fuel consumed per emission source for mobile combustion.

Step 8.1 Consolidate the data collected according to District/Barangay (Column A) and Vehicle type (Column D). Indicate the Data Source Identifier in Column B (title of the source document) and the Type of Data (i.e. fuel supplier, national averages). Disaggregate the data according to the type of fuel (i.e. diesel, gasoline, LPG) and indicate in Column E. Use Columns G, H, I for Fuel-based Method **OR** Columns F, H, I for Distance-based Method. Ensure that there is no double counting when applying a combination of data collection approaches. (Skip Step 8.A and proceed to Step 9).

Datasheet 8.1. Fuel consumption – Mobile Combustion (Examples are provided)





Step 8.A Identify emission sources from mobile combustion. Use *Datasheet 8.1Fuel consumption* – *Mobile Combustion* to record the information collected on the type and amount of fuel consumed per emission source for mobile combustion.

Step 8.A . 1 Consolidate the data collected according to District/Barangay (Column A) and Vehicle type (Column D). If disaggregated activity data per District/Barangay and vehicle type are not available, put the name of the LGU in Column A, disregard Column D, consolidate fuel consumed per fuel type and indicate in Column E. Use Columns G, H, I for fuel-based approach **OR** Columns F, H, I for distance-based approach. Ensure that there is no double counting when applying a combination of data collection approaches.

3.4 Electricity Consumption

Electricity Consumption refers to electricity consumed within the geopolitical boundaries of the LGU. Data on total community electricity consumption should be secured from the electricity providers (e.g. utility company or electric cooperatives) or from government offices. Wherever possible, this data should be segregated by the electricity provider into the different sectors of the community (e.g. residential, commercial, industrial, public facilities).



LGU Experience

To facilitate the collection of electricity consumption data, the LGUs wrote a letter to their respective electricity provider (e.g. MERALCO office or electric cooperative), requesting for the electricity consumption within their geopolitical boundaries segregated according to sectors (e.g. residential, commercial, industrial, public facilities).



Step 9 Use *Datasheet 9.1 Activity Data –Electricity Consumption-Residential Sector* to collect the activity data on electricity consumption of the residential sector. If activity data is not segregated according to Districts/Barangay, indicate the name of the LGU.

Datasheet 9.1 Activity Da	ta –Electricity Consumption-Re		les are provided)
District / Barangay/ LGU-	Data Source Identifier (e.g. Household Survey Number or Utility Name and Source Identifier)	Data Type - (e.g. Household Surveys, electricity provider)	Actual Annual Electricity Consumption (kWh)
Longos	Longos-Utility_provider_AAA- household_elec	Electricity Utilities Provider	8,000,000
San Antonio	San_Antonio- Utility_provider_BBB- household elec	Electricity Utilities Provider	10,000,000

Datasheet 9.1 Activity Data – Electricity Consumption-Residential Sector (Examples are provided)

Step 10 Use *Datasheet 10.1 Activity Data –Electricity Consumption-Commercial Sector* to collect the activity data on electricity consumption of the commercial sector. If activity data is not segregated according to Districts/Barangay, indicate the name of the LGU.

Datasheet 10.1 Activity Data – Electricity Consumption-Commercial Sector (Examples are provided)

District / Barangay/ LGU	Data Source Identifier (e.g. Business Survey Number or Utility Name and Source Identifier)	Data Type - (e.g. Business Surveys, electricity provider)	Actual Annual Electricity Consumption (kWh)
Longos	Longos-Utility_provider_AAA- commercial_elec	Electricity Utilities Provider	8,000,000
San Antonio	San_Antonio- Utility_provider_BBB- commercial_elec	Electricity Utilities Provider	10,000,000



Step 11 Use Datasheet 11.1 Activity Data –Electricity Consumption-Other Sectors to collect the activity data on electricity consumption of the other sectors. If activity data is not segregated according to Districts/Barangay, indicate the name of the LGU and the sector.

Datasheet 11.1 Activity Data – Electricity Consumption-Other sectors (Examples are provided)

District / Barangay/ LGU	Data Source Identifier (e.g. Streetlights, MRT line, Utility Name and Source Identifier)	Data Type (e.g. Surveys, National Census Averages, Other)	Actual Annual Electricity Consumption (kWh)
Longos	Longos-Utility_provider_AAA- other_elec	Electricity Utilities Provider	800,000
San Antonio	San_Antonio- Utility_provider_BBB- other_elec	Electricity Utilities Provider	220,000

3.5 Agriculture

Agriculture Emissions are those generated by agricultural activities like crop production (mainly rice production) and raising of livestock. More specifically, these are emission that result from livestock management (i.e. methane (CH₄) and nitrous oxide (N₂O) emissions from manure production and use) and from soil management (i.e. nitrous oxide emissions from crop management practices). GHG emissions resulting from fuel combustion in on-farm equipment ¹⁰and human sewage disposal are not reported under the agriculture category.

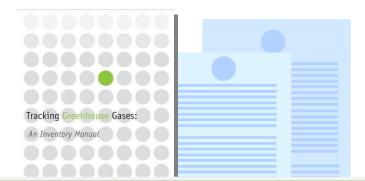
¹⁰On-farm equipment such as farm tractors, tree cutters, dryers, etc.



Guidance Notes

Livestock-related manure management data collection for LGUs in the Philippines should be based on a default value for farm management of nutrients by livestock type (e.g. cattle, poultry, swine etc.). A complete list of all significant livestock populations that have default emission factor values is provided in the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines)Section 4 - Agriculture* (i.e. dairy cows, other cattle, buffalo, sheep, goats, camels, horses, mules and asses, swine, and poultry). More detailed categories should be used if data is available.

For crop production in the Philippines, the general IPCC methodology for calculating CH₄ emissions from rice production should be used based on the annual harvested areas. Rice production in the Philippines should be disaggregated into one of the four following categories: Dry Season/Irrigated, Dry Season/Non-Irrigated, Wet Season/Irrigated, or Wet Season/Non-Irrigated). For other crops, it is recommended that the LGU acquire regional/custom emission factors from reliable sources (e.g. peer-reviewed scientific journals), since GHG emissions from cropping practices are very dependent on local climatic and soil conditions.



LGU Experience

The LGUs that developed the Community-level Inventory under the Climate Change and Clean Energy (CEnergy) Project of the USAID used emission factors derived from the 2000 National Inventory of the Philippines for the computation of the emissions of livestock production and soil management.



Step 12 Request agricultural land use (total hectares under agricultural crop production), crop-type (including growing season and irrigation practices), and livestock headcounts for any farms inside the LGU's geopolitical boundaries from the national, regional or local statistics office (i.e Bureau of Agricultural Statistics, local Agriculture Office). This data should include the land area designated to each crop-type and corresponding irrigation practice and growing season (e.g. rice, dry season, irrigated), and livestock headcounts for the LGU by animal type. Also request the statistics office to provide crop-specific emission factors for the Philippines as well as animal-specific (e.g. manure management) emission factors specific to the Philippines if available. Documentation to support the validity of the data acquired must be included in the report.



Batangas City Experience

The LGU's local agriculture offices (through their Municipal or City Agriculture Officers) can be good sources of primary data. Oftentimes, the report that these offices generate are enough inputs for the GHG inventory report in the agriculture sector. This eliminates the need for LGUs to conduct separate surveys for the sole purpose of GHG inventory.

Batangas City LGU secured the data on hectares used for crop production including rice cultivation and the number of livestock from the Local Agriculture Office. The rice cultivation data is already segregated according to irrigation practice and growing season, while the livestock data is segregated according to the type of livestock.



Step 13 Record the activity data on crop production collected based on the suggested format of *Datasheet 13.1 Agriculture Crop Emission Sources*. If data according to District/Barangay is not available, put the name of the LGU. Indicate the Data Source Identifier in Column B and the Type of Data in Column C. The Application in Column D must specify the growing season (dry or wet) and irrigation practice (irrigated or rainfed). Indicate the total hectares cultivated in Column E.

Datasheet 13.1 Agriculture Crop Emission Sources (Examples are provided)

A B C		D	E	
District/ Barangay/ LGU	Barangay/ LGU Government Agriculture Agency and Department) (e.g. Agricultural Bure Census Averages, Oth		Application (e.g. crop type and approach)	Total Hectares Under Production (hectares, ha)
Longos-agriculture-		Data Directly from Government Agricultural Agency	Rice (Dry Season, Irrigated)	200
Longos	Longos-agriculture- bureau-crop-type-area	Data Directly from Government Agricultural Agency	Rice (Dry Season, Rainfed)	500
Data Directly from		Crop Residues (tonnes of dry weight)	800	

Step 14 Record the activity data on livestock production collected based on the suggested format of *Datasheet 14.1 Livestock Emission Sources*. If data according to District/Barangay is not available, put the name of the LGU. Indicate the Data Source Identifier in Column B and the Type of Data in Column C. The Application in Column D must specify the type of livestock (e.g. buffalo, poultry, cattle, etc.). Indicate the number of heads/population in Column E.

Guidance Notes

Headcount (of livestock) refer to **average population** in a given year, not on the total annual population. Care must be taken to determine the average population as GHG emissions may be overestimated if total annual population is used. A good indicator to determine total population is annual sales, while census of animals undertaken by the local DA office usually indicates average annual population.



batasheet i hi Elvestoek Ellission Sources (Examples are provided)	Datasheet 14.1 Livestock	Emission	Sources	(Examples are provided)	
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А	В	ВС		Е
District/ Barangay/ LGU	Data Source Identifier (e.g. Name of Government Agriculture Agency and Department)	Type of Data (e.g. Government Agricultural Bureau, National Census Averages, Other)	Application (e.g. Livestock Type)	Total Headcount
Longos	Longos-agriculture- bureau-livestock	Data Directly from Government Agricultural Agency	Buffalo	200
Longos	Longos-agriculture- bureau-livestock	Data Directly from Government Agricultural Agency	Poultry	1800
San Antonio	SanAntonio-livestock	Data Directly from Government Agricultural Agency	Cattle	100
San Antonio	SanAntonio-livestock	Data Directly from Government Agricultural Agency	Goat	1300

3.6 Solid Waste

Solid Waste refers to municipal solid waste ("MSW") generated within the LGU's geopolitical boundaries that may cause GHG emissions inside the LGU's geopolitical boundaries (e.g. the LGU operates or has substantial control over the solid waste facility) or the solid waste is transported to a disposal site outside the LGU's geopolitical boundaries and causes GHG emissions.

Emissions from waste facilities should be calculated using any of the following in cases where the waste is landfilled:

- 1. First order decay (FOD) model at disposal sites; or
- ICLEI-based waste quantification methodology (which estimates future emissions of current waste generation);

A combination of the IPCC FOD method may be used for solid waste disposal at managed sites and the ICLEI methods for waste disposal via open burning, composting, anaerobic digestion, or other/uncategorized, which are IPCC compliant.

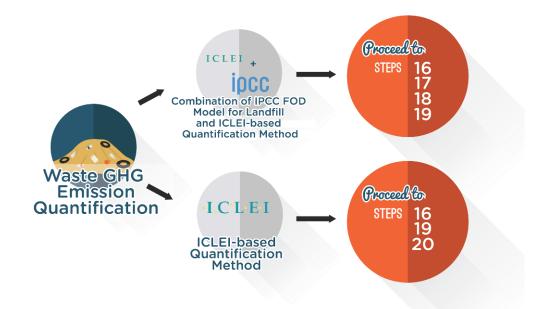


The user must however choose only one method for

determining GHG emissions from disposal at solid waste disposal sites (SWDS), like landfill.¹¹



Step 15 Choose the methodology to be used in estimating emissions from solid waste and follow the decision tree depending on the chosen methodology.



Step 16 Collect the data needed for the quantification of the waste emissions from the concerned unit/division of the LGU (e.g. Environment and Natural Resources Office). *Use Datasheet 16.1 Solid Waste Disposal Data Entry Parameters (IPCC FOD Method*) to record the data collected. Identify the sources of the data. You may use the IPCC Default Values if no data are available.

Datasheet 16.1 Landfill Solid Waste Disposal Data Entry Parameters (IPCC FOD Method) (Sample LGU-specific values are provided using the IPCC default values)

	IPCC default value		User-defined
Starting year	195	50	1950
DOC (Degradable organic carbon)			
(weight fraction, wet basis)	Range	Default	User-defined
Disposable nappies	0.18-0.32	0.24	0.24
Food waste	0.08-0.20	0.15	0.15
Garden	0.18-0.22	0.2	0.2
Paper	0.36-0.45	0.4	0.4
Sewage sludge	0.04-0.05	0.05	0.05
Textiles	0.20-0.40	0.24	0.24
Wood and straw	0.39-0.46	0.43	0.43
DOCf (fraction of DOC dissimilated)		0.5	0.5
Methane generation rate constant (k)			
(years ⁻¹)	Range	Default	User-defined

	0-0-0		
Disposable nappies	0.15–0.2	0.17	0.17
Food waste	0.17–0.7	0.4	0.4
Garden	0.15–0.2	0.17	0.17
Paper	0.06–0.085	0.07	0.07
Sewage sludge	0.17–0.7	0.4	0.4
Textiles	0.06-0.085	0.07	0.07
Wood and straw	0.03–0.05	0.035	0.035
Industrial waste	0.15–0.2	0.17	0.17
Delay time (months)		6	6
Fraction of methane (F) in developed gas		0.5	0.5
Conversion factor, C to CH4		1.33	1.33
Oxidation factor (OX)		0	0
Parameters for carbon storage			
% paper in industrial waste		0%	0%
% wood in industrial waste		0%	0%

Step 17 Identify the distribution of waste by waste management type using the *Datasheet 17.1 Solid Waste Disposal Data Entry for Methane Correction Factor (MCF) Calculation* (IPCC FOD Method)

Guidance Notes:

LGUs are familiar with RA 9003 classification but may not be familiar with the IPCC classification, which provides the default MCF values for specific types of solid waste management. This table provides LGUs with conversion guides in order to apply appropriate IPCC default values.

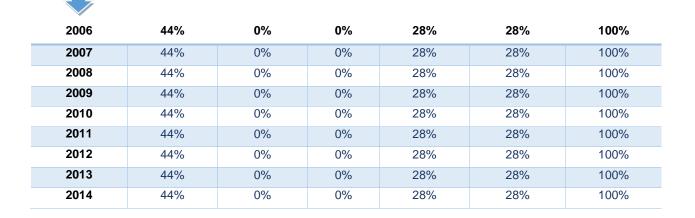
R.A. 9003	IPCC 2006/WORKSHEET	
Controlled disposal facilities	Unmanaged, deep type	
Sanitary Landfills Anaerobic, managed		
Open dumpsites Unmanaged, deep type		

Datasheet 17.1 Solid Waste Disposal Data Entry for Methane Correction Factor (MCF) Calculation (Sample values are provided)

	Unmanaged, shallow	Unmanaged, deep	Managed	Managed, semi-aerobic	Uncategorized	Total (100%)
	MCF	MCF	MCF	MCF	MCF	10tal (10076)
IPCC default	0.4	0.8	1	0.5	0.6	



User-defined value	0.4	0.8	1	0.5	0.6	
User-defined value (Philippines)	44%	0%	0%	28%	28%	
Year	%	%	%	%	%	
1950	44%	0%	0%	28%	28%	100%
1951	44%	0%	0%	28%	28%	100%
1952	44%	0%	0%	28%	28%	100%
1953	44%	0%	0%	28%	28%	100%
1954	44%	0%	0%	28%	28%	100%



Guidance Notes

If 50-year data on waste distribution per management type is not available, use the most recent waste characterization data. It is good practice to fill out the most recent years, depending on availability of data, as newer wastes generate more emissions than older wastes.

Step 18 Identify and record waste diversion and composition rates using the Datasheet 18.1 Waste Diversion Rates and Datasheet 18.2 Waste Composition Rates

Year	Populati on	Waste per capita (tonnes/ca pita/yr)	% to Solid Waste Disposal Site (SWDS)	% MSW Compos ted	% MSW Sent to Anaerobic Digestion	% MSW Open Burned	% Total MSW Other/Unspeci- fied		
IPCC defaultI		0.19							
1950									

Datasheet 18.1 Waste Diversion Rates

1951	-0-	0-0-0	000	-00-	• • •
1951					
1953					
2011					
2012					
2013					
2014					

Datasheet 18.2 Waste Compositions (% tonnes)

Year	Food (%)	Garden (%)	Paper (%)	Wood (%)	Textile (%)	Nappies(%)	Sludge (%)	Plastics and other Inert (%)
1950								
1951								
1952								
1953								

2011				
2012				
2013				
2014				

Step 19 Collect the data needed for the quantification of the waste emissions from the concerned unit/division of the LGU (e.g. Environment and Natural Resources Office). Use Datasheet 19.1 General Solid Waste Composting Activity Data to record the data collected for composting activity and Datasheet 19.2 General Solid Waste Open Burning Activity Data for open burning.

Datasheet 19.1 General Solid Waste Composting Activity Data

Data Source Identifier	Population	Total Solid Waste (Actual) for District/Barangay	Fraction of Total Solid Waste Sent for Anaerobic Digestion Facilities	Fraction of Total Solid Waste Sent for Composting	
	inhabitants	tonnes	%	%	
LGU					



Datasheet 19.2 General Solid Waste Open Burning Activity Data								
Data Source Identifier	Population	Total Solid Waste (Actual) for District/Barangay	Amount of Total Solid Waste Open Burned					
	inhabitants	tonnes	tonnes					
LGU								

Datasheet 19.2 General Solid Waste Open Burning Activity Data

Step 20 (For ICELI method) Collect the data needed for the quantification of the waste emissions from the concerned unit/division of the LGU (e.g. Environment and Natural Resources Office). Use *Datasheet 20.1 Landfill Solid Waste Disposal Data Entry (ICLEI method) by Landfill type* to record the data collected.

District Baranga		Total solid waste	Fraction of solid waste sent to specific disposal site	Specific Landfill Site	Location of Landfill site (outside or
	inhabitants	tonnes	(%)		inside LGU)
LGU				Unmanaged - shallow	
				Managed – semi- aerobic	
				Uncategorized	

3.7 Wastewater

Waste water emissions included are those associated with Methane (CH₄) and Nitrous Oxide (N₂O) emissions from waste water and sewage. LGUs should account for CH₄ and N₂O emissions from any wastewater systems and disposal activities coming from the following sources:

- 1. Waste water **generated inside** the LGU's geopolitical boundaries (Scope 1).
- 2. Wastewater **generated/received from outside t**he geopolitical boundaries of the LGU, **but treated within** the boundaries of the LGU (Scope 1).
- Wastewater generated by the LGU but is treated outside the geopolitical boundaries of the LGU (Scope 3)





LGU Experience

Wastewater **generated/received from outside the** geopolitical boundaries of the LGU, **but treated within** the boundaries of the LGU and Wastewater **generated by the LGU** but is **treated outside** the geopolitical boundaries of the LGU are real cases but are not properly documented. LGUs are encouraged to check their boundaries to determine if there are these cases, and report as appropriate.

Emissions from wastewater treatment should be calculated by using the first order decay (FOD) model utilized by the IPCC.

The type of data required to quantify emissions from wastewater generally consists of determining the types of wastewater systems inside the LGU's geopolitical boundaries and the number of residents and entities using each type of wastewater management system. Default methane correction factors (IPCC, 2006) for each treatment system and a default maximum methane producing capacity factor (IPCC, 2006) are generally used to determine emissions from wastewater treatment and discharge. Default emission factor values to determine N₂O emissions for human sewage (e.g. g N₂O/person/year) are also generally used, although country-specific or test sample-specific data may also be used.¹²

Guidance Notes

For example, N_2O emissions specific to the LGU can be calculated by determining the annual per capita protein consumption, the fraction of nitrogen in protein, factor of non-consumed protein added to wastewater, nitrogen removed with sludge etc. Furthermore, LGU-specific CH₄ emission factors can be used by sourcing the maximum CH₄ producing capacity (B_o) for domestic wastewater. However, since sewage systems and sludge treatment are rare in the Philippines, the majority of wastewater treatment systems will be of "uncollected" forms (e.g. uncollected septic tanks) LGUspecific CH₄ emission factors or N₂O emissions may be difficult to determine.

¹²Guidance Document, page 41



Step 21 Collect the data needed for the quantification of the wastewater emissions from the concerned government agencies (e.g. Department of Environment and Natural Resources (DENR) National Water Resources Board (NWRB), or unit/division of the LGU (e.g. local or barangay sanitation unit). Use *Datasheet 21.1 Wastewater Management System*, to record the data collected. Prepare separate tables for wastewater generated by the LGU and wastewater received from outside the geopolitical boundaries of the LGU.

Datasheet 21.1 Wastewater Management System	(IPCC default values are provided for items 2 -9)
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	Data Needed		Examples	ls it used in the LGU (Yes or No)	% of population using the system
			dry climate, ground water table lower than latrine, small family (2-5 people)		
		Open-pits/	dry climate, ground water table lower than latrine, communal		
		Latrines	wet climate/flush water use, ground water table than latrine		
			regular sediment removal for fertilizer		
		River	Stagnant oxygen deficient rivers and lakes		
		Discharge	Rivers, lakes and estuaries		
	Wastewater	Untreated	River Discharge		
1	1 systems or types in LGU		Sewers (closed and underground)		
			Open sewers		
			Aerobic –centralized and well managed		
			Aerobic – not well managed		
			Sludge anaerobic treatment		
		Treated	Aerobic shallow ponds		
			Anaerobic lagoons – shallow, (less than 2 meters)		
			Anaerobic lagoons – shallow, (more than 2 meters)		
			Anaerobic reactors		

	Data needed	Default Values (IPCC)		LGU Specific
		Uncollected	Collected	Specific
2	Per Capita BOD generation (per day) for the LGU (maybe national value or default IPCC value)	40	40	
3	LGU or region specific correction factor for industrial BOD discharges in sewers (national or IPCC default value)	1.00	1.25	
4	Maximum Methane production capacity factor used in the calculation in reference to the BOD from LGU or region specific data (if available)	.60 kgCH4,	/kgBOD	
5	LGU, regional, national maximum methane production capacity factor used in the computation in reference to the COD	.25 kgCH4	/kgCOD	



0

implemented by LGU of specific waste treatment facility
 LGU, regional, national methane correction factor (reference as appropriate)

3.8 Forest and Land Use change

Most of the greenhouse gas emissions from forest and land use change are attributed to timber/wood harvesting and conversion of forest into other land uses such as agriculture, settlements, etc. Forest can be a source of greenhouse gas emissions or removal. The net carbon emissions or removal of the forest and land use sector is dependent on two basic biophysical processes:¹³

- c) Changes in forest/woody carbon stocks due to the net annual biomass growth of existing forest and non-forest stands, and possible biomass regrowth in abandoned lands;
- d) Land use and forest conversion practices which affect the carbon chemistry of the atmosphere via biomass burning, decay and soil carbon release and uptake.

The accompanying spreadsheet covers only the GHG emissions/removals of forest and other land-use due to changes in carbon stocks and not the GHG emissions due to biomass burning and decay.

Step 22 Collect the data needed for the quantification of the GHG emissions from forest and other land use change. Use *Datasheet 22.1 Forestry and Other Land-Use Change Data for GHG emissions* to record the data collected.

District or Barangay	Data Source Identifier	Emission Type	Emission Source	Annual Total
Name of LGU		Wood Products Harvesting	Charcoal (cu.m.)	
Name of LGU		Wood Products Harvesting	Construction (cu.m.)	
Name of LGU		Changes in the use of forest lands	Forest converted to Agriculture (ha)	
Name of LGU		Changes in the use of forest lands	Forest converted to settlement (ha)	

Datasheet 22.1 Forestry and Other Land-Use Change Data for GHG emissions (Examples are provided)

¹³ Tracking Greenhouse Gases: An Inventory Manual, page 122

Step 23 Collect other data parameters needed for the quantification of the GHG emissions and or removals from forest and other land use change. Use *Datasheet 23.1 1 Parameters for Forest and other Land-use Change* to record the data collected. Identify the sources of the data.

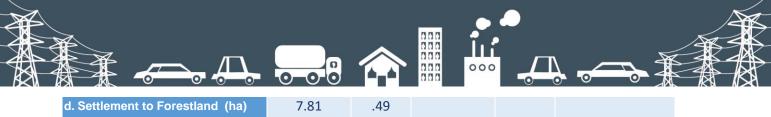
Guidance Notes

Default values are provided for **biomass growth rate** and **carbon content** of the biomass and forestland types. However, it is highly recommended to use local/regional/provincial values if available.

Datasheet 23.1 Parameters for Forest and other Land-use Change

	Default V	alues	User-Def	ined	
Data requirements	Biomass	Carbon	Biomass	Carbon	Source of Data
	Growth rate	Content	Growth rate	Content	
1. Wood and wood products					
harvesting		10			
a. Fuel wood (cu.m.)		.49			
b. Charcoal (tons)		.49			
c. Construction (cu.m.)		.49			
d. Novelties (tons)		.49			
2. Changes in use of the forestlands					
a. Used for Agriculture (ha)	7.81	.49			
b. Used as Grasslands (ha)	7.81	.49			
c. Left as Barren Areas (ha)	7.81	.49			
3. Forestland remaining					
a. General Forestland type ¹⁴ (ha)	7.81	.49			
b. Primary Forest - Visayas (ha)	2.10*	0.45*			
c. Secondary Forest- Luzon (ha)	6.50*	0.44*			
d. Brushland –for wood- Visayas (ha)	9.40*	0.45*			
e. Grassland – Visayas (ha)	0.00*	0.45*			
f. Tree plantations – (<i>e.g.</i> S. <i>macrophylla</i> - Luzon (ha)	7.50*	0.43*			
4. Lands converted to forestland					
a. Barren to Forestland (ha)	7.81	.49			
b. Grassland to Forestland (ha)	7.81	.49			
c. Wetlands to Forestland (ha)	7.81	.49			

¹⁴ General forestland type is used if no disaggregated data on forestland type is available



e. Cropland to Forestland (ha) 7.81 .49

*Tracking Greenhouse Gases: An Inventory Manual, Table 64. page 129

Data Requirement	Default Value (tons/ha)	User-defined (tons/ha)	Source of Data
Carbon stock in existing Forest	262		

Step 24 Collect the data needed for the quantification of the GHG removals from forest and other land use change. Use *Datasheet 24.1 Forestry and Other Land-Use Change Data for GHG removals* to record the data collected.

Datasheet 24.1 Forestry and Other Land-Use Change Data for GHG removals. (Examples are provided)

District or Barangay	Data Source Identifier	Removal Type	Removal Source	<i>Annual</i> Total (ha)
Name of LGU		Remaining Forestland	Carbon stock in inventory year	
Name of LGU		Change in Forestland	Grassland to Forest	
Name of LGU		Change in Forestland	Barren to Forest land	

3.9 Industrial processes and products use (IPPU)

The greenhouse gases from the industry sector are mainly coming from the industrial production processes that chemically or physically transform raw materials. During these industrial processes, different greenhouse gases are produced such as carbon dioxide (CO₂), methane, (CH₄) and nitrous oxide (N₂O). Other greenhouse gases such as hydroflourocarbons (HFCs) are used in products such as refrigeration and aerosol cans. Sulphur hexafluoride (SF6) are used in electrical equipment. The IPCC categorized the industrial process according to the following:

- Mineral Industry
- Chemical Industry
- Metal Industry
- Non-Energy Products from Fuels and Solvent used
- Electronics Industry
- Products Used as Substitute for Ozone Depleting Substances
- Other Product and Manufacture Use
- Others such as Pulp and Paper and Food Industry

Not all of these types of industries may be present in your community, or the GHG emissions of the industries easily attributable to the community. Annex 3 provides the industry categories that may be included in the GHG inventory if present in the community.

An important step in computing for the GHG emissions from the industrial sector is the identification of GHG intensive industries present in the community using the recommended list as guide. The data requirements may include the volume of inputs (in metric tons) and/or the aggregated production (in metric tons) of each industry identified.

Step 25 Identify the GHG intensive industries present in the community using the recommended list (e.g mineral industry, chemical industry, etc) in Annex 3. Get the names and relevant information of the specific industries and use *Datasheet 25.1 List of Industrial Processes in the Community* to record the data collected.

Datasheet 25.1 List of Industrial Processes in the Community

IPCC Category	Name of Industries	Contact Details	Potential Source of Data
Mineral	Company Name		Business Permit Division of the LGU;
winera	Company Name		Industry Association; Local Chapter
Chemical	Company Name		of Chamber of Commerce
Chemical	Company Name		of chamber of commerce

Step 26 Collect the activity data needed for each industry identified using the datasheet as shown in the example below. Please refer to the Annex 1 for the specific datasheets applicable to your sub-sector.

Datasheet 26.1 Mineral Industry- Activity Data

Sub-sector		Activity Data	Units	Source of Data
Cement	Name of Company	Type of cement produced		
Production	Name of Company	Mass of cement produced per type	tonnes	
Limestone	Name of Company	Mass of lime produced per type	tonnes	
Production	Name of Company	Mass of fille produced per type	tonnes	
Glass	Name of Company	Total glass production par type	tonnes	
Production	Name of Company	Total glass production per type	tonnes	

Guidance Notes:

The spreadsheet provides GHG emission computation **for selected industrial process and products use only**. Please refer to the IPCC Volume 3 for the complete list of industries and emission factors. It is highly recommended to use local/national industry emission factors if available.

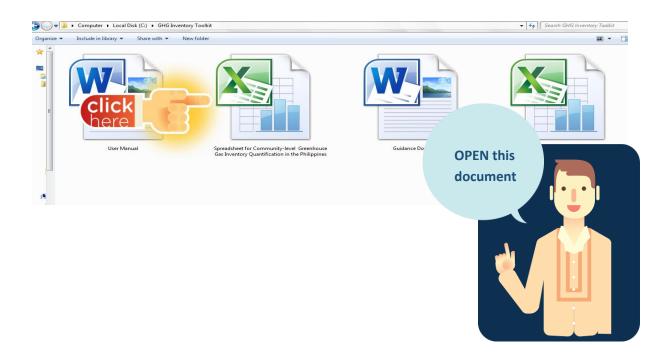
4. Steps to **Input Data** in the Spreadsheet

This Chapter presents Step -By-step procedures in encoding the data gathered in Chapter 3 in an orderly and correct manner in the Spreadsheet. This chapter is designed to let the user go through the Spreadsheet in a chronological order (i.e. 1st tab, 2nd tab, etc). The datasheets prepared in the previous chapter will serve as the source documents for the data input in this chapter. The data encoders are advised to take the necessary steps to ensure that correct data are captured in the spreadsheets.

Remember that the focus of this Chapter is to fill out the yellow tabs and (light) yellow cells only. Blue and grey cells contain values that are default or were automatically computed or copied from other cells. LGUs are asked to Not Delete the contents of these cells, as they may affect the whole Spreadsheet.

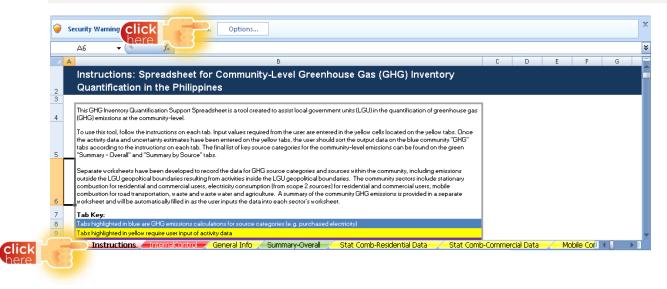
4.1 General Overview Worksheets

Step 1 Open the spreadsheet titled "Spreadsheet for CEnergy_ Community-GHG_Inventory_Quantification





Step 2 Click the Instruction tab. Enable the macros by clicking the "Options".



Step 2.1 Choose "Enable the content" and click "ok".



The Instructions tab helps user to familiarize themselves with the general language of the Spreadsheet.

Clipb	oard Instructions: Spreadsheet for Entity (Local Govern
11	Tab Key:
12	Tabs highlighted in blue are GHG emissions calculations for source categorie
13	Tabs highlighted in yellow require user input of acti∨ity data
14	Tabs highlighted in purple are for emission factors and other reference inform
15	Tabs highlighted in green are summary tabs or general user information tabs
17	

18	Cell Key:
19	Cells highlighted in grey are static idenfiers, automatically transcribed from ar
20	Cells highlighted in yellow should be filled in by the user to calculate GHG emi
21	Cells highlighted in orange can be filled in (e.g. with regional/custom factors),
22	Cells highlighted in green can be altered with empirical data if available but hi
23	Cells highlighted in blue contain the GHG emissions which are automatically c
14 4	H Instructions General Info / Summary - Overall / Summary by Source //

The general instructions are provided in this spreadsheet. This is what it looks like.

Step 3 Click the **General Info** tab. Input the name of your LGU/community in Row 9 and provide all available data required. Use the drop-down menu in Row 10 to indicate the GHG Inventory Year.

	A	В	С	D	E	F	G	Н	I.	J	K	L	R 🔺
1													
2		General Info	ormation										
3 4						Fill	out a	all the					
4		Name of GHG Inv											
5		GHG Inventory	Organization:			ye	llow	cells					
6 7		Manager(s) Contact	Title: Email:							~			
8		Information	Telephone:							0 0			
9	1	Name of Commu		marina									
10		GHG Inventory Y	'ear:	2012	-				-				
11	- 8	Reporting Date:		500000									
12	- 8	Population (year Land Area (sq. k		500000									
14	- li	Urbanized Area (•					
10 11 12 13 14	h	click		General Info Summary-Overall Stat Comb-Re		Data							¥
N N	-	CIICK		General Into Summary-Overall Stat Como-Re	sidential		-					ш	P
		here											
		0 Chat											
	4.	iz stat	lonary	/ Combustion									

Stationary Combustion – fuels used by residential and commercial sectors for cooking, lighting, heating and cooling within the geopolitical boundaries of the LGU.

Step 4 Click the **Stat-Comb-Residential Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List in Row 6, the assumptions used as shown in the example. Refer to *Datasheet 3.1. List of all Households included in the inventory per Districts/Barangays* to fill-out the yellow cells starting in Row 8, Colum C. If disaggregated data per Districts/Barangay are not available, input the name of the LGU and provide the other data requirement if available. Click the *"Add Row"* and *"Delete Row"* as applicable. Click the *"Update"* button when finished with the encoding of the name/s of the LGU/District/Barangay.

000

	A B	С	D	E	F	G	Н	I	
					^		·		
1									
2	Dat	a Collection	Guidance: Residential	Stationary Combusti	on (Scope 1) ,	Activity Data			
7		District or Barangay	Total Population in District or Barangay	Total Number of Residential Households in District/Barangay (enter "N/A" if no survey data)	Number of Households Surveyed (enter "N/A" if no data)	S-Representative	data oftar listi	na all th	
8							date after listi		
9						names of	f District/Bara	ngay or	LGU
10						covered	by the invento	ory	
10		Add Row	Delete Row			2			
12	Com	munity-Level Resi	dential Stati		Update	<< Click to update the	e "District and Barangay" di	opdown list bela	w.
ÎÂ A	F FI	District or Instructions	memory here		Application (e.g. t Comb-Residenti	al Data Stat Comb	o-Commercial Data Mc		

Step 4.1. Choose the name of your LGU or District/Barangay from the drop-down menu in Row 15, Column C. Refer to *Datasheet 5.1 Emission sources and fuel consumption of the residential sector* – *Stationary Combustion* to fill-out the yellow cells starting in Row 15.

4	A B C	D	E	F	G	Н	I.
1							_
2	Data Collection	Guidance: Residential	Stationary Combusti	on (Scope 1) /	Activity Data		
12	Community-Level Resid	dential Stationary Combustion E	missions Sources	Update	<< Click to update the	"District and Barangay" dro	pdown list below.
13	District or Barangay – <i>please select</i>	Data Source Identifier (e.g.	Type of Data (e.g. Individual Household Surveys, National Census Averages, Other) -	Application (e.g. cooking, lighting, generators) –	Fuel Type - <i>please</i> select from drop-	Annual Total Consumption	Units (e.g. litres, kq, tonnes, m³) –
14	from drop-down	Residential Survey Number)	please select from drop- down	please select from drop-down	dae n		metric only
15	Name of LGU	×					
16							
10							
17							
	► ► Instructions	l InternalControl 🦯 General Infi	Summary-Overall Stat	t Comb-Residenti	al Data 🦯 Stat Comb	I -Commercial Data 📈 Mob	

Step 4.2 Indicate the Data Source Identifier in Column D.

Step 4. 3 Use the drop-down menu in Column E to choose the Type of data;



Step 4.4 Use the drop-down menu in Column F to choose the Application. Use 'Other" if specific use of fuel is not listed or unknown.

Step 4.5 Use the drop-down menu in Column G to choose the Fuel type. Choose the 'Blended Diesel Residential/Commercial' for diesel used in the Philippines;

Step 4.6 Input the Annual total Consumption in Column H and identify the units in Column I.

Step 5 Click the **Stat-Comb-Commercial Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and to get better view of the spreadsheet. List in Row 6, all the assumptions used as shown in the example. Refer to *Datasheet 4.1.List of all of Commercial Establishments included in the inventory per District/Barangay* to fill-out the yellow cells starting in Row 8, Colum E if available.

		<u></u>			, -, ,		··· - ···· / /		
4	A B	С	D	E	F	G	Н	I	
									Chaur/Uh
									Show/Hic
1									
2	Dat	a Collection (Guidance: Commercial S	Stationary Combus	tion (Scope '	1) Activity Data			
7		District or Barangay	Total Population in District or Barangay	Total Number of Registered Businesses in District or Barangay (enter "N/A" if no survey	Number of Businesses Surveyed (enter "N/A" if no data)	Representative Sample of Businesses Surveyed		Note	s
8									
9									
10									
11									
12	Com	munity-Level Comm	nercial Stationary Combustion Emi	ssions Sources					Data Upper
H 4		Instructions 🖌 I	internalControl 🧹 General Info	Summary-Over Cli	ck	Stat Com	b-Commercial D	ata Mobile Co	
				ne	rel				

Step 5.1 Choose the name of your LGU or District/Barangay from the drop-down menu in Row 15, Column C. Refer to *Datasheet 6.1 Emission sources and fuel consumption of the commercial sector* – *Stationary Combustion* to fill-out the yellow cells starting in Row 15.

-	В	с	D	E	F	G	Н	I
12	Cor	nmunity-Level Comme	rcial Stationary Combustion Emissions	s Sources				
13		District or Barangay - please select from drop-down	Data Source Identifier (e.g. Business Survey Number)	Type of Data (e.g. Individual Business Surveys, National Census Averages, Other) - please select from drop- down	Application (e.g. cooking, lighting, generators) - please select from drop-down	Fuel Type (please select from drop-down)	<i>Annual</i> Total Consumption	Units (e.g. litres, l tonnes, m ⁸) - meti only
15		Name of the LGU	-					
16		Name of the LGU San Antonio San Juan						
17		z add rows above as neo	essi					
18								
19								
20								
21								
14 4	\rightarrow	N Stat Comb-Res	idential DataStat Comb-Comme	rcial Data Mobile Comb	 -Community-All Data	Elec-Residential Dat	a <u>Elec-Commer</u>	i cial E I ∢ → I



Step 5.2 Indicate the Data Source Identifier in Column D.

Step 5.3 Use the drop-down menu in Column E to choose the type of data;

Step 5.4 Use the drop-down menu in Column F to choose the Application. Use 'Other" if specific use of fuel is not listed or unknown.

Step 5.5 Use the drop-down menu in Column G to choose the Fuel type. Choose the 'Blended Diesel Residential/Commercial' for diesel used in the Philippines;

Step 5.6 Input the Annual total Consumption in Column H and identify the units in Column I.

4.3 Mobile Combustion

Mobile Combustion – fuels used for transportation¹⁵ within the geopolitical boundaries of the LGU.

Step 6 Click the **Mobile-Comb-Community- All Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions used in Row 6 as shown in the example. Refer to *Datasheet 7.1.List of all Vehicles included in the inventory per Districts/Barangays* to fill-out the yellow cells starting in Row 8, Colum D if available.

	B	C	D	F	F	G	н
	-	-			· · · ·	-	
1							
2	Data Collection Gui	idance: Community-L	evel Mobile Coml	oustion (Scope 1) /	Activity Data		
7	Barangay or District	Population of Barangay or District	Total Number of Registered Vehicles within the District (Government Agency)	Number of Vehicles Captured in Survey Data (enter "N/A if no survey data was used)	Representative Sample		Notes
8							
9							
10							
11							
12	Community-Level Mobile Co	ombustion					
Read	otat comb nosidor	Vehicle Type or Mobile Emission Same Mobile till Day Click here	Type of Data (e.g. Transportation Wobi	Application (Vehicle Type) if Using Distance- Based Method – <i>select</i> le Comb-Community-All	Application if Using Fuel Consumption- Based Method (Mobile Data Elec-Residential		Sold by Fuel Sup

¹⁵Transportation excludes off-road vehicles and other machineries used in farm lands and forests.



Step 6.1 Choose the name of your LGU or Districts/Barangays from the drop-down menu in Row 14, Column C. Refer to *Datasheet 8.1 .Fuel consumption – Mobile Combustion* to fill-out the yellow cells starting in Row 14 Column CI.

-	А	В	С	D	E	F	G	н	I 1
								st	ow/Hide Instructio
1									
2		Data Collection Gu	idance: Community-L	evel Mobile Co	mbustion (Scope 1) Activity Data			
10									
11									
12		Community-Level Mobile Con	abustion						
13		District or Barangay (please select from dropdowa)	Vehicle Type or Mobile Emissions Source Identifier (e.g. annual diesel sales from fuel supplier)	Type of Data (e.g. Transportation Surreys, National Census Averages, Fuel Supplier) - please select from drop-	Application (Yekicle Type) if Using Distance- Based Method - select from drop-down, e.g. bws - diesel, otherwise leave blant	Application if Using Fuel Consumption-Based Method (Mobile Fuel Combustion - All Applications) - otherwise leare blant	Annual Distance Travelled (kilometers, if distance-based methodology being used) - otkerwise leare blant	Annual Fuel Consumption or Fuel Sold by Fuel Supplier (Litres or Kg) - otherwise leave blant	Amount of Fuel Use Stationary Combus Purposes (litres) fro Supplier - <i>otherwise</i> -7474 -
14			•						
15	F	Name of LGU							
16									
17									
18									
14 4	+	N Stat Comb-Com	mercial Data Mobile C	omb-Community-/	All Data Elec-Reside	I ential Data / Elec-Co	ommercial Data 📈 Ele	c-Other Aaricul	turel 4 m >

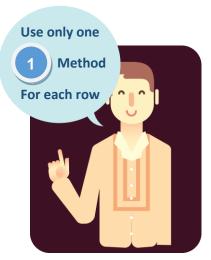
Step 6.2 Indicate the Vehicle type or Mobile Emissions Source Identifier in Column C.

Step 6. 3 Use the drop-down menu in Column D to choose the Type of data.

Step 6.4 Use the drop-down menu in Column E to choose the Application (if using the Distance-based method).

Step 6.5 Use the drop-down menu in Column F to choose the Application (if using the Fuel Consumption-based method). Choose 'On-Road Diesel Fuel' for Diesel used in the Philippines.

Step 6.6 Use Column G to input Annual Distance Travelled and Column H for Annual Fuel Consumption.



Step 6.7 If the amount for Fuel used in Stationary

Combustion is known, input the amount in Column I. Column J will automatically reflect the difference between Column H and Column I which represents the Annual Amount of Fuel Consumed for Mobile Combustion. However, if the amount of Fuel used in Stationary Combustion is unknown, **leave the cell blank**.



4.4 Electricity Consumption

Step 7 Click the **Elec-Residential Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions used in Row 6.

	51 ·							
A	В	С	D	E	F	G	Н	
								Show/ł
1								
2	Data Collection	Guidance: Residentia	l Electricity Co	nsumption (Sco	pe 2) Activity D	ata		
8								
9								
10								
11								
12	Residential Electricity	Consumption - Community (k¥	h)					
13	District or Barangay - please select from drop-down	Data Source Identifier (e.g. Residential Survey Number or Utility Name and Source Identfier)	Data Type – (e.g. Individual Household Surveys, National Census Averages, Other) – please	Actual Annual Electricity Consumption (kWh) – enter "N/A" if electricity data is estimated	Estimated Annual Consumption for Emissions Source (enter "N/A" if actual consumption/utility	Units (e.g. k\hlousehold)	Data Uncertainty (see source section in 'Guidance for GHG Inventory Data Collection and Quality Management'	Account Di
14	click here		Residential Data 🦯	Elec-Commercial Data	Elec-Other A	griculture-Crops Data	Agriculture-Lives)

Step 7.1 Choose the name of your LGU or Districts/Barangays from the drop-down menu in Row 14, Column B. Refer to *Datasheet9.1.Activity Data –Electricity Consumption-Residential Sector per District/Barangay* to fill-out the yellow cells.

	В	С	D	E	F	G	н
12	Residential Electricity Con	sumption - Community (kWh)					
13	District or Barangay - please select from drop- down	Data Source Identifier (e.g. Residential Survey Number or Utility Name and Source Identfier)	Data Type - (e.g. Individual Household Surveys, National Census Averages, Other) - please select from drop-down	Actual Annual Electricity Consumption (KWh) - enter "N/A" if electricity data is estimated	Estimated Annual Consumption for Emissions Source (enter "N/A" if actual consumption/utility values provided)	Units (e.g. kWh/household)	Data Uncertai source sec 'Guidance f Inventory Data and Quality Mai document for
10			nom drop-dovin				document for
14		-					
	Name of the LGU						
15							
16	z add rows above as necessa	ry .					
17							
18							
19							
20							
21							
22							
23							
24							
Rea		Community-All Data Elec-Res	idential Data Elec-0	Commercial Data 📈 Elec-C	ther Agriculture-Cr	ops Data Agriculture	-Lives

Step 7.2 Indicate the Data Source Identifier in Column C.

Step 7.3 Use the drop-down menu in Column D to choose the Type of data.



Step 7.4 Use Column E if Annual Electricity Consumption in known and Column F if Annual Electricity Consumption is estimated.

Step 7.5 Indicate the unit in Column G.

Step 8 Click the **Elec-Commercial Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions used in Row 6.

🔺 A	В	С	D	E	F	G	Н	-
								Show/Hide
1								
1								
2	Data Collection	Guidance: Comme	rcial Electricity	Consumption	(Scope 2) Activi	y Data		
		Total Number of	Number of	Representative				
	District or Barangay	Commercial Institutions	Businesses	Sample of Business			Notes	
7	,	in District or Barangay (enter "N/A" if no survey	Surveyed (enter "N/A" if no data)	Surveys				
8		(enter nim into survey	nin ii no uata)					
9								
10								
11								
12	Commercial Electricity	Consumption - Community	(k₩h)					
			Data Type - (e.g.		Estimated Annual		Data Uncertainty (see	
	District or Barangay -	Data Source Identifier	Indi	Actual Annual	Consumption for		source section in	•
14 4 1		Communit alial		Elec-Commercia	Data Elec-Other	Agriculture-Crops E	Data 📈 Agriculture-Live	<u>el 4 🔤 🕨 🖌</u>
		CIICK						
		here						

Step 8.1 Choose the name of your LGU or Districts/Barangays from the drop-down menu in Row 14, Column B Refer to *Datasheet 10.1.Activity Data –Electricity Consumption-Commercial Sector per District/Barangay* o fill-out the yellow cells..

	А	В	C	D	E	F	G	Н				
1									Show/Hide			
2		Data Collection	Guidance: Comme	rcial Electricity	Consumption	(Scope 2) Activity	/ Data					
11												
12												
13		District or Barangay - please select from drop-down	Data Source Identifier (e.g. Commercial Survey Number or Utility Name and Source Identfier)	Data Type - (e.g. Individual Business Surveys, National Census Averages, Other) - please select from drop-	Actual Annual Electricity Consumption (kWh)	Estimated Annual Consumption for Emissions Source (enter "N/A" if actual consumption/utility values provided)	Units (e.g. k₩h)	Data Uncertainty (see source section in 'Guidance for GHG Inventory Data Collection and Quality Management'	Account or F Data i			
14			•									
15		Name of LGU										
16												
17												
18	\leftrightarrow	Elec-Residentia	Data Elec-Commerci	al Data Elec-Othe	r Agriculture-Crop	os Data 🚽 Agriculture	Livestock Data	Solid Waste-Parameters				

Step 8.2 Indicate the Data Source Identifier in Column C.

Step 8.3 Use the drop-down menu in Column D to choose the Type of data.



Step 8.4 Use Column E if Annual Electricity Consumption in known and Column F if Annual Electricity Consumption is estimated.

Step 8.5 Indicate the unit in Column G.

Step 9 Click the **Elec-Other Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions used in Row 6.

4	A B	С	D	E	F	G	Н	-
								Show/Hide
1		o :	(0 0) 4			-112	-	
2	Data Collection	Guidance: All Othe	er (Scope 2) Ad	tivity Data (e.g.	. MRT, Streetligh	its, etc.)		
	District or Barangay	Other Electric	city Consumption Att	ributable			Notes	
7								
8								
9								
10								
11								
12	All Other Electricity Co	nsumption - Community (k ¹	√h)					
	District - Ba	Data Source Identifier	Data Type – (e.g. Individual Business	Actual Annual	Estimated Annual Consumption for		Data Uncertainty (see source section in	
C	lick	Elec-Other	Agriculture-Crops Da		ivestock Data 📈 So	lid Waste-Parameter	rs-IPCC FOD Solid Was	
h	ere							

Step 9.1 Choose the name of your LGU or Districts/Barangays from the drop-down menu in Row 14, Column B. Refer to *Datasheet11.1.Activity Data –Electricity Consumption-Other Sector per District/Barangay* to fill-out the yellow cells.

	А	В	с	D	E	F	G	н
13		District or Barangay - please select from drop- down	Data Source Identifier (e.g. Streetlights, MRT line, Utility Name and Source Identfier)	Data Type - (e.g. Individual Business Surveys, National Census Averages, Other) - please select from drop-down	Actual Annual Electricity Consumption (kWh)	Estimated Annual Consumption for Emissions Source (enter "N/A" if actual consumption/utility values provided)	Units (e.g. kWh/household)	Data Uncertainty (s source section ir 'Guidance for GH(Inventory Data Collec and Quality Managerr document for guidar
14		Name of the LGU	•					
15		Name of the LGU						
16		z add rows above as necessa	ary					
17								
18								
19								
20								
21								
22								
23								
24								
25								
R. 4	+	Elec-Commercial D	ata Elec-Other Agricul	ture-Crops Data 📈 A	ariculture-Livestock Dat	a Solid Waste-Paramet	ers-IPCC FOD	lid WasII ∢ II → I

Step 9.2 Indicate the Data Source Identifier in Column C.

Step 9.3 Use the drop-down menu in Column D to choose the Type of data.



Step 9.4 Use Column E if Annual Electricity Consumption in known and Column F if Annual Electricity Consumption is estimated.

Step 9.5 Indicate the unit in Column G.

4.5 Agriculture

Step 10.Click the **Agriculture-Crops Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions used in Row 6 as shown in the example.

	A B	C C	D	E	F	G	Н	1
								Show/F
1								_
2	_ D	ata Collection Guid	lance: Agriculture	e (Crops) Activity I	Data			
6	As	ssumptions (<i>example only</i>): • Wet season: March 16 - Septer •Assumed that all data provided		is correct		_		
7		District or Barangay	Total Population in District or Barangay	Total Hectares under Crop Production (hectares, ha)	Hectares Represented by Sampling (enter	Representative Sample of Hectares Under Agricultural		Notes
8								
9								
10								
11								
H ((} →	click here		culture-Crops Data 🦯	Agriculture-Livestock	Data 🧹 Solid Waste-I	Parameters-IPCC FOD	

Step10.1 Choose the name of your LGU from the drop-down menu in Row 14, Column C and accomplish all the other columns based on *Datasheet 13.1 Agriculture Crop Emission Sources* to fillout the yellow cells if available.

	A	ВС	D	E	F	G	Н	-
12	(Community-Level Agriculture Cr	op Emissions Sources					
13		District or Barangay - please select from drop-down	Data Source Identifier (e.g. Name of Government Agriculture Agency and Department)	Type of Data (e.g. Agricultural Bureau, Census Averages, Other) - <i>please</i> select from drop-down	Application (e.g. crop type and approach) - please select from drop- down	Total Hectares Under Production (hectares, ha)	Data Uncertainty (see source section in 'Guidance for GHG Inventory Data Collection and Quality Management' document for guidance)	Accou
14		Name of the LGU	•					
15								
16								
17								
18								
19								 •
14	\leftrightarrow	Elec-Other Agriculture	-Crops Data 🖉 Agricultu	ure-Livestock Data 🏒 Solid	Waste-Parameters-IPCC	FOD / Solid Waste-MC	F-IPCC FOD 🔨 Sol 🛛 🖣 📗	



Step 10.3 Use the drop-down menu in Column E to choose the Type of data.

Step 10.4 Use the drop-down menu in Column F to choose the Application.

Step 10.5 Input total hectares in Column G.

Step 11.Click the **Agriculture-Livestock Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions used in Row 6G.

	A B) C	D	E	F	G	н	I 🖌				
								Show/				
1												
2	2 Data Collection Guidance: Agriculture (Livestock) Activity Data											
5												
6	Assumptions (<i>eviample only</i>): • Assumed that all data provided by the Bureau of Agriculture is correct											
7		District or Barangay	Total Population in District or Barangay	Total Livestock (headcount)	Headcount Represented in Survey Data (enter "N/A" if survey data not	Representative Sample of Livestock		Notes				
8												
9												
10												
м	<	Elec-Commercia	Data Er click		Agriculture-Livestock Dat	a Solid Waste-F	Parameters-IPCC FOD	Solid Was I 4 💷 🕨				
			here	L 3								

Step 11.1 Choose the name of your LGU from the drop-down menu in Row 15, Column C and accomplish all the other columns based *Datasheet 14.1 Livestock Emission Sources* to fill-out the yellow cells if available.

	А		c	D	E	F	G	н
	_			ure Livestock Emissions Source		r	G	н
13			District or Barangay (please select from drop-down)	Data Source Identifier (e.g. Name of Government Agriculture Agency and Department)	Type of Data (e.g. Government Agricultural Bureau, National Census Averages, Other) - <i>please</i> <i>select from drop-down</i>	Application (e.g. Livestock Type)	Total Heacount	Data Uncertainty (see source section in 'Guidance for GHG Inventory Data Collection and Quality Management' for guidance)
15		Þ	Name of the LGU	•				
16			Name of the LGU					
17								
18								
19								
20								
21								
14 4	\leftrightarrow	H 🗸	Agriculture-Crops D	ata Agriculture-Livestock	Data Solid Waste-Parar	 neters-IPCC FOD 📈 Solid W.	aste-MCF-IPCC FOD	Solid Waste-Activ



Step 11.2 Indicate the Data Source Identifier in Column D.

Step 11.3 Use the drop-down menu in Column E to choose the Type of Data.

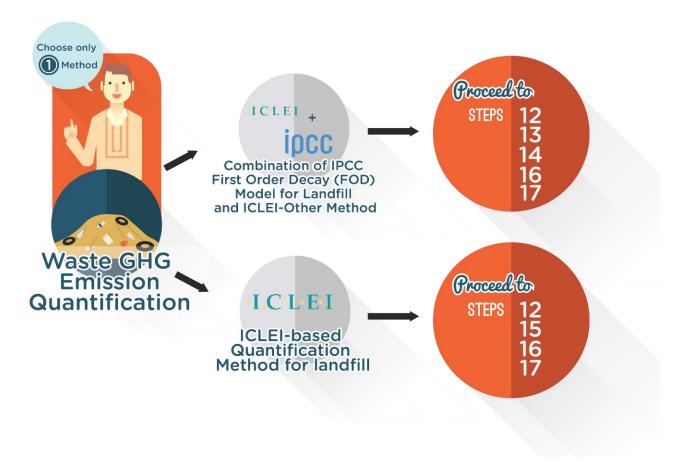
Step 11.4 Use the drop-down menu in Column F to choose the Application.

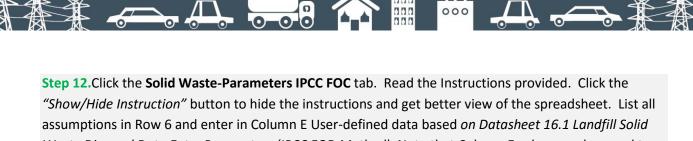
Step 11.5 Input the Total Headcount in Column G.

4.6 Solid Waste

Solid Waste - Solid waste refers to municipal solid waste ("MSW") generated within the LGU's geopolitical boundaries that may cause GHG emissions inside the LGU's geopolitical boundaries (e.g. the LGU operates or has substantial control over the solid waste facility) or the solid waste is transported to a disposal site outside the LGU's geopolitical boundaries and causes GHG emissions.

Follow the decision tree depending on the methodology chosen for estimating GHG emissions from solid waste in disposal site.





Waste Disposal Data Entry Parameters (IPCC FOD Method). Note that Column E values can be equal to default values as found in column D. However, use LGU specific or nationally determined values for these parameters in Column E if available.

Landfill Solid Waste Dispo				O Method)				
	IPCC defa		User-defined		Reference and co	mments		
Starting year	1950							
DOC (Degradable organic carbon)				esste by composition				
(weight fraction, wet basis)	Range	Default	User-defined					
Disposable nappies	0.18-0.32	0.24						
Food waste	0.08-0.20	0.15						
Garden	0.18-0.22	0.2						
Paper	0.36-0.45	0.4						
Sewage sludge	0.04-0.05	0.05						
Textiles	0.20-0.40	0.24						
Wood and straw	0.33-0.46	0.43						
DOCf (fraction of DOC dissimilated)		0.5						
Methane generation rate constant (k)	Climate Zone: Moist and wet tropical (range and default rates shown below)							
(years ⁻¹)	Bange	Default	User-defined					
Disposable nappies	0.15-0.2	0.17						
Food waste	0.17-0.7	0.4						
Garden	0.15-0.2	0.17						
Paper	0.06-0.085	0.07						
Sewage sludge	0.17-0.7	0.4						
Textiles	0.06-0.085	0.07						
Wood and straw	0.03-0.05	0.035	ו					

Step 13 Click **Solid Waste-MCF-IPCC-FOD** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Fill-out all the yellow cells starting with Row 13, Columns C, D, E, F and G using *Datasheet 17.1 Solid Waste Disposal Data Entry for Methane Correction Factor (MCF) Calculation* as reference.

		Col	umns C, D,	E, F, G				
		-						
LGU-Specific Assumpt	ions and Notes on Me	ethodology						
Assumptions Landfill Solid Waste Dis	sposal Data Entry for	MCF Calculation (IPCC FOD Method	1				
	Unmanaged, shallo v	Unmanaged, deep	Managed	Managed, semi- aerobic	Uncategorised			
	MCF	MCF	MCF	MCF	MCF	1		
IPCC default	0.4	0.8	1	0.5	0.6	Distribution Check	References and comme	
User-defined value	0.4	0.8	1	0.5	0.6	– Total (100%)	nererences and comme	
Distribution of Waste by	Waste Management	Type – Annex A1.	1]		
User-defined value					28%			
Year	%	%	%	%	%			
0								
1								
2								
3	and the second second second							
4								
5								
		Solid Waste	MCF-IPCC FOD	Solid Waste-Activ	ity-IPCC FOD 📈 S	iolid Waste-Landfill-IC	LEI Solid Wast 4	



Step 14. Click **Solid Waste-Activity-IPCC-FOD** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. Fill-out all the yellow cells starting with Row 11, Columns F,H, J, L, N, P, R, T, V, X, Z, AB, AD, using the Datasheet 18.1 as reference.

A B	С	D	E	F	G	н	I	J	К
LGU-Specific Assumpti DCC (specific to waste to DCC (specific to waste to DCC (specific to waste to DCC (specific to waste) Half-life time (trV2, years) Process start in depositi exp2: exp(-k' (t13-M)/t2) Fraction to CH4: F	ons and Notes on Meth- ype): DOC iype): DOCf 1: h= In(2)/k on year (month): M								
	tivity Data Inpu	it (IPCC FOD Mei	thod) - % by	Туре					
							Waste Diversio	n (Destination) Ra	ites (%) and A
Year	Population (LGU)	₩aste per capita (tonnes/capita/yr)	Total MS₩ (tonnes)	% to Solid ₩aste Disposal Site (S₩DS)	Total MS₩ Deposited to Landfill	% MS₩ Composted	Total MS₩ Composted (tonnes)	% MS₩ Sent to Anaerobic Digestion	Total MS₩ Sent to Anaerobic
IPCC Defaults		0.19			(tonnes)				Digestion (toppes)
	1						-		
	2						-		
	4						-	je stali konstali konst	
	5						-	ļ	
click here	F	Solid Waste-Activit	I IY-IPCC FOD	Solid Waste-Lar	ndfill-ICLEI	Solid Waste-Oth		t Solid Wast	

Step 15. Click **Solid Waste-Landfill- ICLEI** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. Fill-out all the yellow cells starting with Row 10, Columns B, C, D, G, J, K and L Datasheet 20.1 Landfill Solid Waste Disposal Data Entry (ICLEI method) by Landfill type as reference.

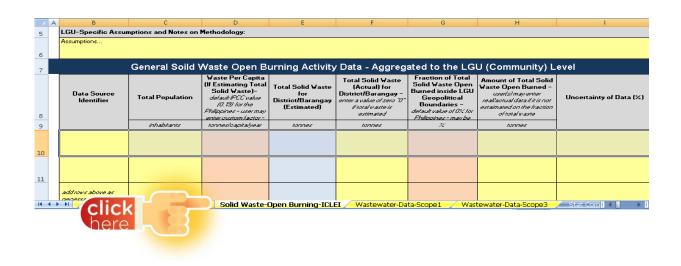
_			-	_	-	_	-		
	A	B I CII Eposifio Acoumr	C Ditions and Notes on Meth	D	E	F	G	Н	
5		Assumptions	Alons and notes on med	loadlogy					
	ľ	Assumptions							
6									
7		General Soil	d Waste Activit	y Data					
8		Data Source Identifier	District/Barangay	Total Population of District/Barangay	Waste Per Capita (If Estimating Total Solid Waste) default IPCC value (0.19) for the Philippines - user may enter custom factor - enter "N/4" if total waste information does not need to be estimated		Total Solid Waste (Actual) for District/Barangay - enter a value of zero "0" if total waste is estimated	Fraction of Total Solid Waste Disposed in Solid Waste Disposal Sites - default value of 62% for Philippines - may be changed to custom	Amoı Lar Distric
9	L			inhabitants	tonnes/capita/year	tannes	tonnes	%	t
10									
11	Ĩ		Ť						
12									
13									
14									
14 4	•		Sc Sc	did Waste-Landfill-ICL	EI Solid Waste-Other Meth	nods-ICLEI 📈 Solid	Waste-Open Burning	-ICLEI Wast	
		here	J						



Step 16.Click **Solid Waste-Other Methods- ECLEI** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. Fill-out all the yellow cells starting with Row 10, Columns B, C, F, H and I using *Datasheet 19.1 General Solid Waste Composting Activity Data*.

	A	В	с	D	E	F	G	н	
5	-	LGU-Specific Assumptions and M	lotes on Methodology	_					
		Assumptions							
6									
7		General Soild Waste C	omposting (Biol	ogical Waste) Ac	tivity Data - Ag	gregated to the L	.GU (Community) Level	
8		Data Source Identifier	Total Population	Waste Per Capita (If Estimating Total Solid Waste)- default IPCC value (0.19) for the Philippines - user may enter custom factor- enter "NA" if total waste	Total Solid Waste for District/Barangay (Estimated)	Total Solid Waste (Actual) for District/Barangay - enter a value of zero "0" if total waste is estimated	Fraction of Total Solid Waste Sent for Composting - default value of 10% for Philippines - may be changed to custom value	Fraction of Total Solid Waste Sent for Anaerobic Digestion Facilities - default value unknown for Philippines- must be changed to custom value	En R
9			inhabitants	tonnes/capita/year	tonnes	tonnes	%	%	
10 11 12 13			Solid Waste-Oth	ner Methods-ICLEI	Solid Waste-Open B	urning-ICLEI 📈 Waste	swater-Data-Scope1	Wastewafi 4 ∎ →	J V

Step 17. Click **Solid Waste-Landfill- Open Burning- ECLEI** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. Fill-out all the yellow cells starting with Row 10, Columns B, C, F and H using *Datasheet 19.2 General Solid Waste Open Burning Activity Data* as reference.





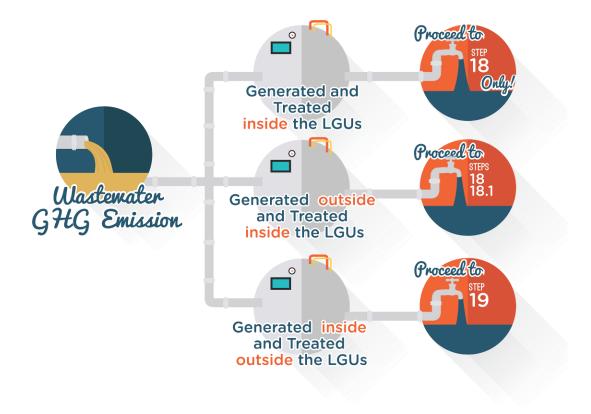
4.7 Wastewater

Wastewater - Waste water emissions included are those associated with Methane (CH_4) and Nitrous Oxide (N_2O) emissions from waste water and sewage. LGUs should account for CH_4 and N_2O emissions from any wastewater systems and disposal activities coming from the following sources:

- 1. Waste water generated and treated inside the LGU's geopolitical boundaries (Scope 1).
- 2. Wastewater **generated/received from outside t**he geopolitical boundaries of the LGU, **but treated within** the boundaries of the LGU (Scope 1).
- Wastewater generated by the LGU but is treated outside the geopolitical boundaries of the LGU (Scope 3)

Note that wastewater **generated/received from outside t**he geopolitical boundaries of the LGU, **but treated within** the boundaries of the LGU and Wastewater **generated by the LGU** but is **treated outside** the geopolitical boundaries of the LGU are real cases but are not properly documented. LGUs are encouraged to check their boundaries to determine if there are these cases, and report as appropriate.

Follow the decision tree below for the steps in computing for the emissions of your wastewater.





Step 18. Click **Wastewater-Data-Scope 1** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. Fill-out all the yellow cells in Row 8 starting with Column C, D and Reference Sources of Data. Fill-out Columns I and J starting in Row 12 using *Datasheet 21.1 Wastewater Management System* as reference.

	В	С	D	E	F	G	Н	1	J
	-	fic Assumptions and Not	es on Methodology	-					
;	Assumptions								
	, issuinpliens								
5									
			Total Population in	Beference Source	e(s) for Data <i>(e.g. treati</i>	ment sustem			
,		LGU	LGU		distribution by population?	nerk system		Notes	
<u> </u>									
}									
9	Overviev	w of Wastewater	Management Sys	tems in LGU for O	wn Waste				
						CH ₄ Emissions	N ₂ O Emission	Is the system used	% pop
						Potential	Potential	in the LGU?	using the
0						See legend below	See legend below	Yes or No	
2		Septic tanks				Seelegenobeloir	Seelegend Deloir	Tesomo	1
2 3			dry climate, ground v	ater table lower than latri	ne, small family (2-5 pe	ec			(
4		Onen Ditellations		ater table lower than latri					ĵ
5	Uncollected	Open Pits/latrines		ter use, ground water table	e than latrine)[
6			regular sediment rem						
7		River Discharge		icientrivers and lakes					
8			Rivers, lakes and est						
9			River Discharge	Stagnant oxigen deficie Rivers, lakes and estuar					
0		Untreated	Sewers (closed and		163				(
2			Onap Somore				,		1
			Wastewater-	Data-Scope1 / Wastev	vater-Data-Scope3 🏒	 Stat Comb-Res 	idential GHG 📿 🦯	Stat Comb-Comr 🛙 🖣	
								_	
	h	oro							

Step 18.1.Proceed to Row 31, Wastewater Management in LGU for Other Waste Sources if your LGU/community is receiving wastewater from other sources. Provide data required in Row 33 and answer the questions in column I starting from Row 36 to Row 53.

В	с	D	E	F	G	н	
Overvie	w of Wastewater N	lanagement Sv	stems in LGU for	Other Waste So	urces (e.a.	Waste Rece	ived from
2	Waste Source (e.g. LGU Name from which Waste Received)	Total Population of Waste Source	Reference Source(s) for I				Notes
1					CH₄ Emissions Potential	N ₂ O Emission Potential	Is the system the LGU
5					See legend below	See legend below	Yes or I
5	Septic tanks						Yes
			er table lower than latrine, sr				No
Uncollected	Open Pits/latrines		er table lower than latrine, co				No
Uncollected	opont Kondennoo		use, ground water table thar	1 latrine			Yes
		regular sediment remov					No
	River Discharge	Stagnant oxigen deficien					No
		Rivers, lakes and estuar					No
		River Discharge	Stagnant oxigen deficientri				No
	Untreated		Rivers, lakes and estuaries	1			Yes
		Sewers (closed and und	er ground)				No
		Open Sewers					No
2			Centralized aeribic well ma				No
	olid Waste-Landfill-ICLEI	I Solid Waste-Other Metho	Centralized aeribic not well		astewater-Data-9	Cope1 Wastew	No.



Step 19. Click **Wastewater-Data-Scope 3** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. Fill-out all the yellow cells in Row 8 starting with Column C, D and Reference Sources of Data. Fill-out Columns I and J using *Datasheet 21.1 Wastewater Management System* as reference.

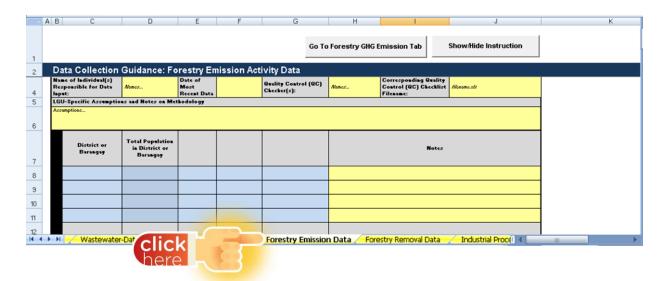
C C	D Managament Sv	stems in LGU for 0	F Dwp Waste	G	Н	I	J
N OI Wastewaler	management Sys	stems in LGO for t	JWN Waste	CH₄ Emissions Potential	N₂O Emission Potential	Is the system used in the LGU?	% population using the system
				See legend below	See legend below	Yes or No	1.
Septic tanks							
		water table lower than lat					
Open Pits/latrines		water table lower than lat					
openrikshdunies		ater use, ground water tab	le than latrine				
	regular sediment re						
River Discharge		ficientrivers and lakes					
The Discharge	Rivers, lakes and es	stuaries					J
	River Discharge	Stagnant oxigen defici					
Untreated	River Discharge	Rivers, lakes and estua	aries				
ontreated	Severs (closed and	under ground))[
	Open Severs						
		Centralized aeribic we	lmanaged				
	Aerobic	Centralized aeribic not	well managed - overload				l
	Aerobic	Sludge anaerobic treat	tment in aerobic plant				1
Treated		Aerobic shallow ponds					1
		Anaerobic lagoons	Shallow (less than 2 m)				
	Anaerobic	Anaeropie lagoons	Shallow more than 2 m				
		Anaerobic reactors					
							0:
	Management System e-Open Burning-IC h	ere				d from Other L Intial GHG 📿 Stat (

Step 20 Click **Forestry Parameters** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. Fill-out Column D (User –Defined Values) starting in Row 9. Indicate the References and comments. Default values may be used if User-Defined Values are not available. (*Note: Spreadsheet will automatically use the Default values if User-Defined Values are not entered*)

A	В	С	D	E	F	G
2	Data Collection Guidance:	Forestry Pa	rameters			
	Assumptions					
6						
7	Forestry Data Entry Param	neters				
8		Default val	ue (tons/ha)	User-defined		Reference and cor
9	Biomass in Forestlands Remaining	2	62			
LO	Carbon Fraction in Biomass				Equivalent Carbon	
L1		Default	User-defined		Refer	ence and comments
.2	Fuelwood (cu.m.)	0.49				
3	Charcoal (tons)	0.49				
4	Construction (cu.m.)	0.49				
5	Novelties (tons)	0.49				
6	Used for Agriculture (ha)	0.49				
7	Used as Grasslands (ha)	0.49				
8	Left as Barren Areas (ha)	0.49				
9	Protection Forest/Old Growth/Mossy/Pine/Sul				4. Tracking Greenhouse Gases:	
0	Secondary Growth (ha)	0.44			I. Tracking Greenhouse Gases: A	
1	Brushland (ha)	0.45			 Tracking Greenhouse Gases: A 	1
	here	Forestry Param	neters Forestr	y Emission Data 📿	Forestry Removal Data	- Industrial Proce



Step 21 Click **Forestry Emission Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. The name of your LGU or districts/barangays previously identified should be reflected starting in Row 8 Column C and the total population in Column D. Put additional notes if any in Column I.



Step 21.1 Choose the name of your LGU from the drop-down menu in Row 15, Column C and accomplish all the other columns based *Datasheet 22.1 Forestry and Other Land-Use Change Data for GHG emissions* to fill-out the yellow cells.

								-					
	A B C	D	E	F	G	Н	I. I.	J					
1					Go To	Forestry GHG	Emission Tab	Show/Hide Instruction					
2	Data Collection Guidance: Forestry Emission Activity Data												
14	District or Bara please selea drop-da	t from Data Sou	rce Identifier	Emission Type	Emission Source (<i>please select tram</i> drap-dawn)	<i>Annual</i> Total Consumption	Units (<i>please select</i> <i>from drop-down</i>)	Data Uncertainty (see sourc section in 'Guidance for GH Inventory Data Collection ar Quality Management' docume for guidance)					
16		-											
17	Name of LGU												
18													
19													
20													
21													
H 4	🕨 🛃 🧹 Wastewal	ter-Data-Scope3 🧹 F	orestry Parameter	Forestry En	nission Data / Forest	ry Removal Data 🚽	Industrial Proce						



Step 21.2 Indicate the Data Source Identifier in Column D.

Step 21.3 Use the drop-down menu in Column F to choose the Emission Type

Step 21.4 Use the drop-down menu in Column G to choose the Emission Source.

Step 21.5 Input the Annual total (in ha) in Column H.

Step 21.6 Use the drop-down menu in Column I to choose the appropriate unit.

Step 22 Click **Forestry Removal Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. The name of your LGU or districts/barangays previously identified should be reflected starting in Row 8 Column C and the total population in Column D. Put additional notes if any in Column I.

				G	To Forestry GHG Re	emoval Tab Sho
a Collection	Guidance: For	estry Remo	oval Activity Da			
of Individual(s)	Names	Date of Most Recent Data Entry:		Quality Control (QC) Checker(s):	Names	Corresponding Quality Control (QC) ////// Checklist Filename:
Specific Assumption	ns and Notes on Metho	dology				
	Total Population in					Notes
strict or Darangay	District or Barangay					Notes
me of LGU						
Forestry Pa	lick -	Fore	stry Removal Data 🦯	Industrial Processes Data	Stat Comb-Res	
	of Individual(s) Insible for Data	of Individual(s) Alames Specific Assumptions and Notes on Metho istrict or Barangay District or Barangay	of Individual(s) nsible for Data Alames Date of Most Recent Data Entry: Specific Assumptions and Notes on Methodology istriot or Barangay Inter of LGU Inter of LGU	of Individual(s) nsible for Data Alames Date of Most Recent Data Entry: Specific Assumptions and Notes on Methodology istrict or Barangay Interfue the second se	a Collection Guidance: Forestry Removal Activity Data of Individual(s) of Individual(s) nsible for Data Advines Bate of Most Recent Data Entry Entr	Total Population in District or Barangay Total Population in District or Barangay Total Population in District or Barangay Total Population in District or Barangay



Step 22.1 Choose the name of your LGU from the drop-down menu in Row 15, Column C and accomplish all the other columns *Datasheet 24.1 Forestry and Other Land-Use Change Data for GHG Removal* to fillout the yellow cells.

	A B	C	D	E	F	G	Н	1	
1						Go	To Forestry GHG Re	moval Tab	Show/H
2	Data	Collection	Guidance: For	estry Rem	oval Activity Da	ta			
11									
12									
13	Forestry	y Removal Source	•5						
14		rict or Barangay rase select from drop-down	Data Source le	dentifier	Removal Type (<i>please</i> select fram drap- dawn)	Removal Source (<i>please</i> select from drop-down)	Annual Total Removal	Units (<i>please select</i> from drop-down)	Data Un section Inventor Quality M
16			- -						
17	Nam	e of LGU							
18									
19									
H.	() H 📈	Forestry Paramet	ers 🧹 Forestry Emissi	on Data Fore	stry Removal Data 🦯	Industrial Processes Data	Stat Comb-Resil 4		•

Step 22.3Use the drop-down menu in Column F to choose the Emission Type.

Step 22.4 Use the drop-down menu in Column G to choose the Emission Source

Step 22.5Input the Annual Total (in ha) in Column H.

Step 22.6 Use the drop-down menu in Column I to choose the appropriate unit.

Step 23 Click **IPPU Data** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. List all the assumptions in Row 6. Fillout all the yellow cells particularly those in Column C, D and Reference Sources of Data.

	00		J.*	-		
1	AB	C	D	E	F	G
-	Det		Suidences Industrial Due			
2	_		Guidance: Industrial Pro	cesses Emission /	Activity Data	
5	LCO-	-Specific Assumption	ons and Notes on Methodology			
6						
				Total Number of		
		District or	Total Population in District or	Registered Businesses in District or Barangay	Number of Businesses Surveyed (enter "N/A"	
		Barangay	Barangay	(enter "N/A" if no survey	if no data)	Surveyed
7				data used)		
8						
9						
10						
14 4	► • • •	Forestry Parame	ters / Forestry Emissi		Industrial Processes Data 🦯 Stat Co	mb-Resil 4
		2 . c. c. c. c. y r drame	CII	CK	Contraction of the second seco	
			he	re R		



Step 23.1 Choose the name of your LGU from the drop-down menu in Row 15, Column C and accomplish all the other columns based on the **applicable datasheets** (i.e. *Datasheet 26.1 Mineral Industry, Datasheet 26.2 Chemical Industry, etc.*). Select "Others" for paper and food industries. Choose from the drop-down menu in Column G the specific operation of the selected industry. Input the annual production and units in Columns H and I respectively.

(Note: The spreadsheet provides quantification of GHG emissions of selected industries only.)

BC	D	E	F	G
Data Collection (Guidance: Industrial Pro	cesses Emission #	Activity Data	
Industrial Processes Em	ission Sources			
Barangay -	Data Sauraa Idaatifiar	Type of Data (e.g. ,	Industry Type (<i>please select from drop-</i>	Operation (<i>please select from drop-</i>
please select from drop-down	Data Source Identifier	from drop-down	dawn)	dawn)
Forestry Remov				
	Data Collection (Industrial Processes Em District or Barangay – please select tram drop-down	Data Collection Guidance: Industrial Pro Industrial Processes Emission Sources District or Barangay - plesse select from drop-down U	Data Collection Guidance: Industrial Processes Emission A Industrial Processes Emission Sources District or Barangay - plesse select from drap-down Industrial Processes Emission Sources District or Barangay - plesse select from drap-down Image: Construction of the select from drap-down Image: Construction of the select from drap-down Image: Construction of the select from drap-down	Data Collection Guidance: Industrial Processes Emission Activity Data Industrial Processes Emission Sources Industrial Processes Emission Sources District or Barangay - please select from drop-down Data Source Identifier Type of Data (e.g Others) - please select from drop- down) Industry Type (please select from drop- down) Image: Im

Step 23.2 Indicate the Data Source Identifier in Column D.

Step 23.3 Use the drop-down menu in Column E to choose the Type of Data.

Step 23.4 Use the drop-down menu in Column F to choose the Industry Type.

Step 23.5 Use the drop-down menu in Column G to choose the Operation

Step 23.6 Input the Annual Total Production in Column H.



Step 24 Click the **Stat Comb-Residential GHG** tab. Read the Instructions provided. Click the "Show/Hide Instruction" button to hide the instructions and get better view of the spreadsheet. Input data requirements in Row 7. Compare data input starting from Row 17 with your *Datasheet 5.1 Emission sources and fuel consumption of the residential sector – Stationary Combustion*. If there are incorrect data input, go back to the Stat Comb-Residential Data tab and correct data input using the "Go to" button.

- 4	U	C	r	G		1						
14	al Stationary Combustion GHG Emis	sions		#DIV/0!	#DIV/0!							
15	ation for Residential Stationary Con	tion for Residential Stationary Combustion										
16	Data Source Identifier (Sort Alphabetically)	Application (if known)	Type of Data (e.g. Individual Household Surveys, National Census Averages, Other)	Fuel Type	Quantity	Units	CO2 Emissior					
17	LPG Retailer	Cooking	Other (e.g. Fuel Supplier Totals)	Propane or Liquified Petroleum	10000.0	kilograms	1.61					
18	Charcoal Dealer	Cooking	Other (e.g. Fuel Supplier Totals)	Charcoal (Biomass, Internation	10000.0	kilograms	3304.0					
19	Gas Station	Generator(s)	Other (e.g. Fuel Supplier Totals)	Blended Diesel Residential/Co	5000.0	litres	2.66					
20	-	-	-	-		-	0.00					
21	-	-	-	-		-	0.00					
22	•			-		-	0.00					
H I	🕩 🕨 📈 Wastewater-Data-Sc	click 🗂 🗧	Stat Comb-R	esidential GHG 🔪 Stat Co	mb-Commercial GHG 📈 I	Mobile Combustion-GH						
		here										

Step 25 Click the **Stat Comb-Commercial GHG** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Input data requirements in Row 7. Check data input starting from Row 17 with your *Datasheet 4.1.List of all of Commercial Establishments included in the inventory per District/Barangay*. If there are incorrect data, go back to the Stat Comb-Commercial Data tab and correct data input using the "Go to" button.

15	ce Quantification fo	r Commercial S		_G bustion	н		
16	Data Source Identifier (Sort Alphabetically)	Application (if known)	Type of Data (e.g. Individual Household Surveys, National Census Averages, Other)	Fuel Type	Quantity	Units	CO₂ Err
17	LPG Retailer	cooking	Other (e.g. Fuel Supplier Totals)	Propane or Liquified Petroleum	15,000.0	kilogram	
18	Gas Station	Generator(s)	Other (e.g. Fuel Supplier Totals)	Blended Diesel Residential/Cor	10,000.0	litres	
19	-	-	-	-	-	-	
20	-	-	-	-	-	-	
21	-	-	-	-	-	-	
22	-	-	-	-	-	-	
23	-	-	-	-	-	-	
24	-	-			-	-	
-	Kastewater-Data-Sc	ope1 🦯 Wastewater-D	here		tt Comb-Commercial GHG	Mobile Combustion-GH	



Step 26 Click the **Mobile combustion-GHG** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Input data requirements in Row 7. Check data input starting from Row 17 with your *Datasheet7.1.List of all Vehicles included in the inventory per Districts/Barangays*. If there are incorrect data, go back to the Mobile Combustion Data tab and correct data input using the "Go to" button.

В	с	D	E	F	G	Н	I
Ir	ndividual GHG Se	ources (or Break-d	own by Fuel 1	Type) for Mobil	e Combustion		
	District or Barangay	Vehicle Type, Data Source, or Other Identifier	Distance Travelled (kilometers)	Annual fuel consumption (Litres)	Application (if Using Distance- based Methodology))	Fuel Type (if only Fuel Type and Amount is Available)	CO2 Emission
,	Ramon (Isabela)	Gas Station	-	500,000	•	#N/A	#N/A
3	Ramon (Isabela)	Gas Station	-	600,000	-	#N/A	#N/A
,	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-			-	-	-	
• •	N 🧹 Stat Comb-Reside	click	Mobile	e Combustion-GHG 🦯	Elec-Residential GHG 📈 Elec-	Commercial GHG 🖌 Elec-	

Step 27 Click the **Elec-Residential GHG** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input starting in Row 17 with your *Datasheet9.1.Activity Data –Electricity Consumption-Residential Sector per District/Barangay*. If there are incorrect data, go back to the Elec-Residential Data tab and correct data input using the "Go to" button. Use the drop-down menu in Column G for the emission factor type. Choose "Philippines" as the emission factor type if regional or grid specific emission factor is not available.

5 4	District or Barangay	from Purchased El	Quantity	Units	Emission Factor Type (National, Regional, Utility-Specific) - select from dropdown and refer to instructions	CO ₂ Emission Factor	Units	
.7						0.000	0	
.8					Custom (e.g. Utility-specific FLECO Grid Emission Facto Philippines (national defaul	r (e. 0.000	0	
.9				زي		0.000	0	
20						0.000	0	
1						0.000	0	
2						0.000	0	
	Stat Comb-Residen	tial GHG 🧹 Stat Comb-Comm	click here		Elec-Residential GH	G Electommercial G	HG <u>(</u> Elect <mark>o</mark> 4)	•

Step 28 Click the **Elec-Commercial GHG** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input starting in Row 17 with your *Datasheet10.1.Activity Data –Electricity Consumption-Commercial Sector per District/Barangay*. If there are incorrect data, go back to the Elec-Commercial Data tab and correct data input using the "Go to" button. Use the drop-down menu in Column G for the emission factor type. Choose "Philippines" as the emission factor type if regional or grid specific emission factor is not available.

000

- A	АВ С	D	E	F	G	н	
15	GHG Emissions from	Purchased Electric	ity from Indivi	dual Commer	cial Sources (e.	g. Barangays)	
16	District or Barangay	Data Identifier	Quantity	Units	Emission Factor Type (National, Regional, Utility- Specific) - select from dropdown and refer to instructions above	CO ₂ Emission Factor	U
17						0.000	
18					Custom (e.g. Utility-specific) Er FLECO Grid Emission Factor (e	niss .g. f	
19				- iC	Philippines (national default)	0.000	
20						0.000	
21						0.000	
22						0.000	
23						0.000	
24	Stat Comb-Residential GHG	- X Stat Comb-Commercial GH	G 🖉 Mobile Corr	lick		0.000 nercial GHG	
				nere			

Step 29 Click the **Elec-All Other GHG** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input starting in Row 17 with your *Datasheet11.1.Activity Data –Electricity Consumption-Other Sector per District/Barangay*. If there are incorrect data, go back to the Elec-All Other Data tab and correct data input using the "Go to" button. Use the drop-down menu in Column G for the emission factor type. Choose "Philippines" as the emission factor type if regional or grid specific emission factor is not available.

	ہ GHG Emissions from	⊳ Purchased Electric	ाty from All Ot	⊧ her Sources (н treetlights)	
6	District or Barangay	Data Identifier	Quantity	Units	Emission Factor Type (National, Regional, Utility- Specific) - select from dropdown and refer to instructions above	CO2Emission Factor	Un
7				:0			
8					Custom (e.g. Utility-specific) En FLECO Grid Emission Factor (e.	niss g. f	(
9				Ŭ.	Philippines (national default)		(
0							(
1							C
2							C
3							C
4							C
- + 	1 🧹 Stat Comb-Commercial GHG	 Mobile Combustion-GHG 	clic	k J	Elec-All Other GH	G Aariculture-Croll 4	

Step 30 Click the **Agriculture-Crops GHG** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input starting in Row 17 with your *Datasheet 13.1 Agriculture Crop Emission Sources*. If there are incorrect data, go back to the Agriculture-Crops Data tab and correct data input using the "Go to" button.

15 A	B C Individual GHG Sour	₀ ce (District/Barang	⊧ ay) Crop GHG Em	ہ issions Quantifi	ہ cation	н	
16	District within LGU	Data Source Identifier (Sort Alphabetically)	Type of Data (e.g. Individual Household Surveys, National Census Averages, Other)	Application (Crop Type and Irrigation)	Land Area	Units	co2
17			Data Directly from Government Agricultural Agency	Rice (Dry Season, Irrigated)		hectares	
18			Data Directly from Government Agricultural Agency	Rice (Dry Season, Rainfed)		hectares	
19			Data Directly from Government Agricultural Agency	Crop Residues (tonnes of dr	y weight)	hectares	
20			Data Directly from Government Agricultural Agency	Rice (Wet Season, Irrigated)		hectares	
21			Data Directly from Government Agricultural Agency	Other Crop Type (enter cust	om crop type name)	hectares	
22	-		-	-		hectares	
23	-	-	-	-	-	hectares	
24	-		-	-	-	hectares	
	X / Elec-Residential GHG / E	click here		Crops GHG, Agriculture	Livestock GHG 🖌 Solic		

Step 31 Click the **Agriculture-Livestock GHG** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input starting in Row 17 with your *Datasheet 14.1 Agriculture Livestock Emission Sources*. If there are incorrect data, go back to the Agriculture-Livestock Data tab and correct data input using the "Go to" button.

	01	· · · · · · · · · · · · · · · · · · ·						
	A B	С	D	E	F	G	Н	1
15	Ind	lividual GHG Source (Distric	t/Barangay) Livestock GHG Err	issions Quantification				
16		District within LGU	Data Source Identifier (Sort Alphabetically)	Type of Data (e.g. Individual Household Surveys, National Census Averages, Other)	Application (Livestock Type)	Headcount	Units	CO2 Emissi
17				Data Directly from Government Agricultural Agency	Buffalo		headcount	
18				Data Directly from Government Agricultural Agency	Poultry		headcount	
19				Data Directly from Government Agricultural Agency	Horse		headcount	
20				Data Directly from Government Agricultural Agency	Goat		headcount	
21				Data Directly from Government Agricultural Agency	Swine		headcount	
22				-	-	0	headcount	
23		-	-	-	-	0	headcount	
24		-	-			0	headcount	
н.	I I I	🔀 Elec-Residential GHG	🖌 Elec-Commercial GHG 🏒	click	Agr	iculture-Livestock GH	G 🔨 Solid Waste-GHG-L	۰ 📘 🕨
				here				



Step 32 Click the **Solid waste-GHG-Landfill** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input starting in Row 17. If there are incorrect data, go back to the Solid waste Landfill ICLEI Data tab and correct data input using the "Go to" button. Enter value for any methane (CH₄) recovery and capture project in Row 17, Column H if available. Otherwise, enter zero (0) If there is no methane recovery and capture project. Enter oxidation rate used in the computation in Row 17, Column J if available. Otherwise, use the default value of 10%.

	G	н	1	1	К	
15	ndfill	п	I	L	ĸ	L
16	CH₄ Emissions Generated at Specific Landfill Type (tonnes)	CH ₄ Recovery (%) - enter value for any CH ₄ recovery (e.g. from landfill gas capture and storage projects)	Oxidation Rate (OX) - ICLEI default (%)	Oxidation Rate (OX) - used in calculation (%) - user may input LGU/regional/national specific factor, otherwise the default factor is used	Net CH4 Emissions After CH4 Removal and Oxidation (tonnes)	GHG Emissions (tonr - Inside - Scop
17		0.0%	10.0%	10.0%	0.0	0.0
18		0.0%	10.0%	10.0%	0.0	0.0
19		0.0%	10.0%	10.0%	0.0	0.0
20						0.0
21		ĺ				0.0
22						0.0
23						0.0
ia a -		ick ere	Solid Waste-GHG-La	and fill Solid Waste-GHG-Other	ICLEI Z Solid Waste-GHG-O	

Step 33 Click the **Solid waste-GHG-Other -ICLEI** tab if applicable. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input. If there are incorrect data, go back to the Solid waste Other ICLEI Data tab and correct data input using the "Go to" button.

	AB	0	5	-		~			
		c CII (Aggregate)	D d) CH. Emission	e from Solid	Waste Disposal vi	G 2 Compostin	н	1	
13		Data Identifer	Total Mass of Waste Composted (tonnes)	CH ₄ Emission Factor (g CH ₄ /kg waste) - IPCC default - use LGU or regional- specific if available	Methane Recovered (tonnes) - enter 0 if no methane recovery used at site	Methane Released (tonnes)	Total CO2 Emissions (tonnes CO2)	Proportion of all GHG Emissions from Biological Treatment Emissions (%)	GH (t)
15		LGU_kalayaan	-	4.0	0.0	0.00	0.0	#DI∀/0!	
16	L	GU (Aggregated	d) N ₂ O Emissio	ns from Solid	Waste Disposal vi	a Compostin	g		
17		Data Identifer	Total Mass of Waste Composted (tonnes)	N ₂ O Emission Factor (g N ₂ O/kg waste) - IPCC default - use LGU or regional- specific if available		N₂O Released (tonnes)	Total CO ₂ Emissions (tonnes CO ₂)	Proportion of all GHG Emissions from Biological Treatment Emissions (%)	GH (t
18		LGU_kalayaan	-	1.5		0.00	0.0	#DI∨/0!	
19	L	GU (Aggregated	d) CH4 Emissio	ns from Solid	Waste Disposal vi	a Anaerobic	Digestion		
14		1 🖌 Aariculture-Livestay	click here	CH, Emission Factor Iso waste) - Solid	Methane Recovered Waste-GHG-Other-ICLEL	Methane Released Solid Waste-GHG-Op	Total CO2 en Burning 🖌 Soli	Proportion of all GHG Emissions from d Waste-GHG 1 (GH



Step 34 Click the **Solid waste-GHG-Open Burning** tab if applicable. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input. If there are incorrect data, go back to the Solid waste –Open Burning ICLEI Data tab and correct data input using the "Go to" button.

A	вс	D	E	F	G	н	I	
11								
12	Total Solid Waste Open Burning GHG Emissions by Scope	0.0						
13	LGU (Aggregated) C	O ₂ Emissions f	rom Solid Was	te Open Bu	irning			
14	Emissions Source Indicator	Total Fossil Carbon in Combusted Waste (tonnes fossil carbon in dry waste)	Default Oxidation Factor (%) - IPCC default	Oxidation Factor Used in Calculation (e.g. Philippines national factor)	Conversion of Carbon to CO2 Factor (ratio)	Total CO ₂ Emissions (tonnes CO ₂)		GHG En
15	LGU_kalayaan	-	58.0%	58.0%	3.67	0.0		
16	-		58.0%	58.0%	3.67	0.0		
17	Total GHG Emission	s from Solid W	aste (Open Bu	rning)				
18 19 20 21 22 K	click here	Solid Waste-GH	IG-Open Burning	Solid Waste-GHG Ca	alc-IPCC 🖌 Solid Wa	ste-GHG_Results-I	PCC / Wastewall (] > 0

Step 35 Click the **Solid waste-GHG_Calc- IPCC** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Review and check data input. Put assumptions in Row 5 as shown in the example.

A	B LGU-Specific Assumptions a DOC (specific to waste type) DOCf (specific to waste type) Half-life time ($t_{1/2}$, years); $h =$. Process start in deposition ; exp2: $exp(-k^*((13-M)^22))$ Fraction to CH $_4$ F	: DOC): DOCf In(2)/k	D	E	F	6	Н
		Food	Garden	Paper	Wood	Textile	Nappie
	DOC (specific to waste type): DOC	0.00	0.00	0.00	0.00	0.00	0.00
	Methane generation rate constant: k	0.00	0.00	0.00	0.00	0.00	0.00
	DOCf (specific to waste type): DOCf	0	0	0	0	0	0
5	Half-life time (t1/2, years): h= In(2)/k	#DI∨/0!	#DI∨/0!	#DI∨/0!	#DI∨/0!	#DI∨/0!	#DI∨/0
	exp1: exp(-k)	1.00	1.00	1.00	1.00	1.00	1.00
2	Process start in deposition year (month): M	7	7	7	7	7	7
3	exp2: exp(-k*((13-M)/12))	1	1	1	1	1	1
1	Fraction to CH; F	0	0	0	0	0	0
5	N Zolid Waste-GHG-Ot	click here		Solid Waste-GHG Calc	-IPCC Solid Waste-G	BHG_Results-IPCCWaste	wail 4



Step 36 Click the **Solid waste-GHG_Results- IPCC** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Enter the known value for the methane (CH₄) recovered from the Municipal Solid Waste Disposal site (MSW) and the Reference for the Source of Methane Recovery in Columns C and D respectively.

								=
A	В	С	D	E	F	G	Н	
6								
7		All Sources			Food	Garden	Paper	
8	Year	Amount of Methane Recovered from MSW (tonnes) - 0 = <i>IPCC</i> <i>default</i>	Reference for Source of Methane Recovery	Methane Oxidized (OX, fraction) - IPCC default = 0	Methane Emissions (tonnes)	Methane Emissions (tonnes)	Methane Emissions (tonnes)	N
9								
10	1950	0.000	N/A	0.0	0.0	0.0	0.0	
11	1951	0.000		0.0	4.1	0.0	3.2	
12	1952	0.000		0.0	5.6	0.0	4.5	
13	1953	0.000	N/A	0.0	6.4	0.0	5.0	
14	1954	0.000	N/A	0.0	6.8	0.0	5.4	
15	1955	0.000	N/A	0.0	7.1	0.0	5.7	
16	1956	0.000	N/A	0.0	7.5	0.0	5.9	
17	1957	0.000	N/A	0.0	7.8	0.0	6.1	
18	1958	0.000	N/A	0.0	8.1	0.0	6.4	
19	1959	0.000	N/A	0.0	8.4	0.0	6.6	
20	1960	0.000	N/A	0.0	8.7	0.0	6.9	
21	1961	0.000	N/A	0.0	9.0	0.0	7.1	
22 23	1962	0.000	N/A	0.0	9.3	0.0	7.4	
23	1963	0.000		P.2	9.6	0.0	7.6	
	Solid Waste-GHG-Other-I	CLEI 🖌 Solid Waste-G	HG-Open Bur clic	k e	Solid Waste-G	IG_Results-IPCC	Wastewa 🛛 🖣 📄 🔸	٥

Step 33 Click the **Wastewater-GHG-Scope 1** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Review and check data input/results.

🗾 A	В	С	D	E	F	G	
12	Total GHG emissions from Wastewater Treatment and Disposal			0.0			
General Wastewater Default and Custom Data for Own LGU							
14			Uncollected	Collected	Units		
15		Per capita BOD generation	40.00	40.00	gBOD/person/day	IPCC default, A	
16	IPCC Defaults	Correction factor for industrial BOD dischargers in sewers	1.00	1.25	index	IPCC default. S	
17		Sludge removal (S)	-	-	%	IPCC default. S	
18		Methane recovery (R)	-		%	IPCC default. S	
20			Uncollected	Collected	Units		
20	Factors used in Calculation	Per capita BOD generation (per day)	Uncollected 40.00	Collected 40.00	Units gBOD/person/day	to use LGU, re	
	Factors used in Calculation (Default or LGU-Specific Factors) - user may input custom (e.g. LGU-specific) factors in light orange cells or	Per capita BOD generation (per day) Per capita BOD generation (per year)				to use LGU, re	

Step 37 Click the **Wastewater-GHG-Scope 3** tab if applicable. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Review and check data input/results.

	B6 🗸 💿								
🗾 A	В	с	D	E	F	G			
12	General Wastew	ater Default and Custo	om Data						
13			Uncollected	Collected	Units				
14		Per capita BOD generation	40.00	40.00	gBOD/person/day	IPCC default, Asia.			
15	IPCC Defaults	Correction factor for industrial BOD dischargers in sewers	1.00	1.25	index	IPCC default. Sour			
16		Sludge removal (S)	-	-	%	IPCC default. Sour			
17		Methane recovery (R)	-	-	%	IPCC default. Sour			
19			Uncollected	Collected	Units				
	Factors used in Calculation (Default or LGU	Per capita BOD generation (per day)	Uncollected 40.00	Collected 40.00	Units gBOD/person/day	to use LGU, region:			
	Calculation (Default or LGU- Specific Factors) - user may input custom (e.g. LGU- specific) factors in light	Per capita BOD generation (per day) Per capita BOD generation (per year)				to use LGU, region: to use LGU, region:			
20	Calculation (Default or LGU Specific Factors) - user may input custom (e.g. LGU- specific) factors in light orange cells or use default factors	Per capita BOD generation (per year)	40.00	40.00	gBOD/person/day				

Step 38 Click the **Forestry Emission** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input starting in Row 17 with your *Datasheet 22.1 Forestry and Other Land-Use Change Data for GHG emissions*. If there are incorrect data, go back to the Forestry Emission Data tab and correct data input using the "Go to" button.

_	A B		-IF(IVIIO-0,0,IVIIO) \$IVI\$1 D	02) r	F	G	н	
		ndividual GHG Sour		for Eorestry	F	G	н	1
16				riorForesuy				
		District within LGU	Data Source Identifier (Sort Alphabetically)	Emission	Туре	Emission Source	Quantity	Units
17								
18			-		-	-	-	
19			-		-	-	-	
20			-		-	-	-	
21			-		-	-	-	
22			-		-	-	-	
23			-		-	-	-	
24			-		-	-	-	
25			-		-	-	-	
26	4 6 6	1 / Wortewater-GHG-9		Eorectry (- SHG Emission	- Forestry GHG Removal	- Industrial Brill 4	
		Wastewater-GHG-9	lick here					,



Step 39 Click the **Forestry Removal** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input starting in Row 17 with your *Datasheet 24.1 Forestry and Other Land-Use Change Data for GHG removals*. If there are incorrect data, go back to the Forestry Removal Data tab and correct data input using the "Go to" button.

	ΑB	C	D	E	F	G	Н	Letter 1
16	Ir	idividual GHG Remo	val Quantification for	r Forestry				
17		District within LGU	Data Source Identifier (Sort Alphabetically)	Emissi	on Type	Emission Source	Quantity	Units
18			-		-	-	-	
19			-		-	-	-	
20			-		-	-	-	
21			-		-	-	-	
22			-		-	-	-	
23			-		-	-	-	
24			-		-	-	-	
25			-		-	-	-	
26								
27								
14 4		Wastewater-GH	ere	Corestry GHG	Removal / Industria	Processes GHG 🖌 GV	VPsand (I (m	>

Step 40 Click the **Industrial Processes GHG** tab. Read the Instructions provided. Click the *"Show/Hide Instruction"* button to hide the instructions and get better view of the spreadsheet. Check data input starting in Row 17 with your applicable datasheets on industrial processes. If there are incorrect data, go back to the Industrial Processes Data tab and correct data input using the "Go to" button.

AB	C	D	E	F	G	Н	
						Go To Industria	l Processes
	IG Emissions from	n Industrial Processes	5				
					0.0		
					0.0		
1	Fotal Industrial Proc	esses GHG Emissions			0.0	0.0%	
i Ind	lividual GHG Sour	ce Quantification for	Industrial Proc	esses		1	
5	District within LGU	Data Source Identifier (<i>Sort Alphabetically</i>)	Industry Type	Type of Data (e.g. , Other)	Operation	Quantity	CO ₂ Emi
		-					
		-					
		-					
	📿 Wastewater-GHG-Sc	ope3 / Forestry GH	ick 👘		ocesses GHG Coresses GHG		•



4.8 Emissions Summary, by Source

Step 41 Click the **Summary-Overall** to view the summary of the GHG emissions categorized according to scopes.

D	E	F	G
3 Emissions Summary			
Emission Source	GHG Emissions (tonnes CO₂e)	Proportion of Total Emissions	Veighted Uncertain
Scope 1 Emissions (Net of Forestry and Land Use)			
GHG Emissions from Community-Level Residential Stationary Fuel Use	500.00	0.48%	
GHG Emissions from Community-Level Commercial Stationary Fuel Use	600.00	0.58%	
GHG Emissions from Community Mobile Combustion	1100.00	1.06%	
GHG Emissions from Solid Waste Disposal - IPCC FOD Method"	3750.00	3.62%	
GHG Emissions from Other Solid Waste Treatment (ICLEI)*	560.00	0.54%	
GHG Emissions from Solid Waste Open Burning (ICLEI)*	210.00	0.20%	
GHG Emissions from Wastewater Treatment and Discharge	4000.00	3.86%	
GHG Emissions from Community-Level Agriculture (Crops)	500.00	0.48%	
GHG Emissions from Community-Level Agriculture (Livestock)	740.00	0.72%	
GHG Emissions from Solid Waste Disposal - Inside LGU Geopolitical Boundaries (ICLEI)	0.00	0.00%	
GHG Emissions from Wastewater Treatment and Discharge (Other Sources)	0.00	0.00%	
GHG Emissions from Industrial Processes and Product Use	2000.00	1.93%	
Scope 1 Emissions/Removal (Forestry and Land Use)			
GHG Emissions from Forestry and Land Use	19533.36	18.87%	
GHG Removal from Sink		0.00%	
Total Scope 1 Emissions	33,493	32.36%	
Scope 2 Emissions	00,400	0210070	
GHG Emissions from Purchased Electricity at Community-Level Residential Sites	20000.00	19.32%	
GHG Emissions from Purchased Electricity at Community-Level Commercial Sites	50000.00	48.31%	
GHG Emissions from Purchased Electricity at Community-Level Commercial Sites	0.00	40.31%	
Total Scope 2 Emissions	70.000	67.64%	
•	70,000	07.04%	
Scope 3 Emissions		0.001	
GHG Emissions from Solid Waste Disposal - Outside LGU Geopolitical Boundaries (ICLEI)	0.00	0.00%	
Total Scope 3 Emissions			
Instructions Interceite Summary-Overs	all at Comb-Res	100.00% idential Data 🖌 St	at Comb-Co
	iunity -level		
GHG em	issions for the		
choson re	porting year of		
	e LGUs.		
th			



Annex 1: Data Sheets

Data Sheets for Community-Level Inventory

Datasheet 3.1. List of Households included in the inventory per Districts/Barangays

	Districts/Barangay s/ LGU included in the inventory	Total Population	Total Number of Residential Households	Total number surveyed (enter "NA" if no data)	Source of data
1.					Example:
2.					• LGU
3.					Philippine Statistics
4.					Authority
5.					Household survey

Datasheet 4.1. List of all of Commercial Establishments included in the inventory per District/Barangay

	Districts/ Barangays/ LGU included in the inventory	Total Population	Total Number of Registered Businesses (enter "NA" if no survey is used)	Total number of business surveyed (enter "NA" if no data)	Source of data
1.					Example:
2.					• Permit and Licensing
3.					Division of the LGU
4.					Commercial
5.					establishment survey
6.					

Datasheet 5.1. Emission sources and fuel consumption of the residential sector – Stationary Combustion

Α	В	С	D	E	F	G
District/ Barangay/ LGU	Data Source Identifier	Type of Data	Application	Fuel type	Annual Volume	Unit



Datasheet 6.1.Emission sources and fuel consumption of the commercial sector – Stationary Combustion

А	В	С	D	E	F	G
District/ Barangay/ LGU	Data Source Identifier	Type of Data	Application	Fuel type	Annual Volume	Unit

Datasheet 7.1. List of all Vehicles included in the inventory per Districts/Barangays

	Districts/Barangay s/ LGU included in the inventory	Total Population	Total Number of Vehicles registered within the District	Total number surveyed (enter "NA" if no data)	Source of data
1.					Evenerales
2.					Example:
3.					Land Transportation Office (LTO)
4.					Office (LTO)
5.					LGU for tricycles

Datasheet 8.1.Fuel consumption – Mobile Combustion (Example is provided)

Α	В	С	D	E	F	G	н	l I
District/ Barangay / LGU	Data Source Identifier	Type of Data	Vehicle Type	Fuel type	Annual Distance Travelled (km)	Annual Fuel Consu mption (liters)	Annual Fuel Used for Stationary Combustion (liters)	Annual Fuel Used for Mobile Combustion

Datasheet 9.1 Activity Data – Electricity Consumption-Residential Sector

District or Barangay -	Data Source Identifier (e.g. Household Survey Number or Utility Name and Source Identifier)	Data Type - (e.g. Household Surveys, electricity provider)	Actual Annual Electricity Consumption (kWh)



Datasheet 10.1 Activity Data – Electricity Consumption-Commercial Sector

District or Barangay -	Data Source Identifier (e.g. Business Survey Number or Utility Name and Source Identifier)	Data Type - (e.g. Business Surveys, electricity provider)	Actual Annual Electricity Consumption (kWh)

Datasheet 11.1 Activity Data –Electricity Consumption-Other sectors

District or Barangay	Data Source Identifier (e.g. Streetlights, MRT line, Utility Name and Source Identifier)	Data Type (e.g. Surveys, National Census Averages, Other)	Actual Annual Electricity Consumption (kWh)

Datasheet 13.1 Agriculture Crop Emission Sources

А	В	С	D	E
District or Barangay	Data Source Identifier (e.g. Name of Government Agriculture Agency and Department)	Type of Data (e.g. Agricultural Bureau, Census Averages, Other)	Application (e.g. crop type and approach)	Total Hectares Under Production (hectares, ha)

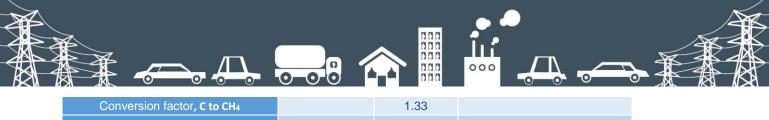


Datasheet 14.1 Livestock Emission Sources

А	В	С	D	E
District or Barangay	Data Source Identifier (e.g. Name of Government Agriculture Agency and Department)	Type of Data (e.g. Government Agricultural Bureau, National Census Averages, Other)	Application (e.g. Livestock Type)	Total Headcount

Datasheet 16.1 Landfill Solid Waste Disposal Data Entry Parameters (IPCC FOD Method)

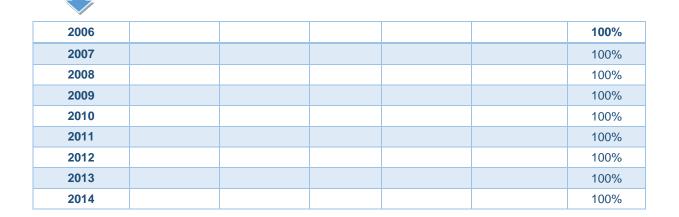
	IPCC defa	ult value	User-defined
Starting year	195	50	
DOC (Degradable organic carbon)			
(weight fraction, wet basis)	Range	Default	User-defined
Disposable nappies	0.18-0.32	0.24	
Food waste	0.08-0.20	0.15	
Garden	0.18-0.22	0.2	
Paper	0.36-0.45	0.4	
Sewage sludge	0.04-0.05	0.05	
Textiles	0.20-0.40	0.24	
Wood and straw	0.39-0.46	0.43	
DOCf (fraction of DOC dissimilated)		0.5	
Methane generation rate constant (k)			
(years ⁻¹)	Range	Default	User-defined
Disposable nappies	0.15–0.2	0.17	
Food waste	0.17–0.7	0.4	
Garden	0.15–0.2	0.17	
Paper	0.06-0.085	0.07	
Sewage sludge	0.17–0.7	0.4	
Textiles	0.06-0.085	0.07	
Wood and straw	0.03-0.05	0.035	
Industrial waste	0.15–0.2	0.17	
Delay time (months)		6	
Fraction of methane (F) in developed gas		0.5	



	1.55	
Oxidation factor (OX)	0	
Parameters for carbon storage		
% paper in industrial waste	0%	
% wood in industrial waste	0%	

Datasheet 17.1 Solid Waste Disposal Data Entry for Methane Correction Factor (MCF) Calculation

	Unmanaged, shallow	Unmanaged, deep	Managed	Managed, semi- aerobic	Uncategorized	
	MCF	MCF	MCF	MCF	MCF	
IPCC default	0.4	0.8	1	0.5	0.6	Total
User-defined value	0.4	0.8	1	0.5	0.6	(100%)
[Distribution of Wa	ste by Waste Ma	nagement Ty	/pe - Annex A1.	1	
User-defined value (Philippines)					28%	
Year	%	%	%	%	%	
1950						100%
1951						100%
1952						100%
1953						100%
1954						100%





Datasheet 18.1 Waste Diversion Rates

Year	Populati on	Waste per capita (tonnes/ca pita/yr)	% to Solid Waste Disposal Site (SWDS)	% MSW Compos ted	% MSW Sent to Anaerobic Digestion	% MSW Open Burned	% Total MSW Other/Unspecif ieded
IPCC default I		0.19					
1950							
1951							
1952							
1953							

2011				
2012				
2013				
2014				

Datasheet 18.2 Waste Compositions (% tonnes)

Year	Food (%)	Garden (%)	Paper (%)	Wood (%)	Textile (%)	Nappies(%)	Sludge (%)	Plastics and other Inert (%)
1950								
1951								
1952								
1953								
_								



2011				
2012				
2013				
2014				



Datasheet 19.1 General Solid Waste Composting Activity Data

Data Source Identifier	Population	Total Solid Waste (Actual) for District/Barangay	Fraction of Total Solid Waste Sent for Anaerobic Digestion Facilities	Fraction of Total Solid Waste sent for Composting	
	inhabitants	tonnes	%	%	
LGU					

Datasheet 19.2 General Solid Waste Open Burning Activity Data

Data Source Population		Total Solid Waste (Actual) for District/Barangay	Amount of Total Solid Waste Open Burned	
	inhabitants	tonnes	tonnes	
LGU				

Datasheet 20.1 Landfill Solid Waste Disposal Data Entry (ICLEI method) by Landfill type

District/ Barangay	Population inhabitants	Total solid waste	Fraction of solid waste sent to specific disposal site (%)	Specific Landfill Site	Location of Landfill site (outside or inside LGU)
LGU	interior		(70)	Unmanaged - shallow	
				Managed – semi- aerobic	
				Uncategorized	

Datasheet 21.1 Wastewater Management System

	Data Needed			Examples	ls it used in the LGU (Yes or No)	% of population using the system
				dry climate, ground water table lower than latrine, small family (2-5 people)		
		Wastewater systems or types in LGU	Open-pits/ Latrines	dry climate, ground water table lower than latrine, communal		
	1			wet climate/flush water use, ground water table than latrine		
				regular sediment removal for fertilizer		
			River	Stagnant oxygen deficient rivers and lakes		



	Discharge	Rivers, lakes and estuaries	
		River Discharge	
	Untreated	Sewers (closed and underground)	
		Open sewers	
	Treated	Aerobic –centralized and well managed	
		Aerobic – not well managed	
		Sludge anaerobic treatment	
		Aerobic shallow ponds	
		Anaerobic lagoons – shallow, (less than 2 meters)	
		Anaerobic lagoons – shallow, (more than 2 meters)	
		Anaerobic reactors	

	Data needed	Default Val	ues (IPCC)	LGU
		Uncollected	Collected	Specific
2	Per Capita BOD generation (per day) for the LGU (maybe national value or default IPCC value)	40	40	
3	LGU or region specific correction factor for industrial BOD discharges in sewers (national or IPCC default value)	1.00		
4	Maximum Methane production capacity factor used in the calculation in reference to the BOD from LGU or region specific data (if available)	.60 kgCH₄		
5	LGU, regional, national maximum methane production capacity factor used in the computation in reference to the COD	.25 kgCH4/kgCOD		
6	Annual per capita protein consumption (as localized as possible)	.59 g/pers		
7	Fraction of nitrogen in protein (as localized as possible)	.16 kg N/kg protein		
8	Factor for non-consumed protein added to wastewater	1.1		
9	Nitrogen removed in sludge (value of 0 unless sludge removal is implemented by LGU of specific waste treatment facility	0		
10	LGU, regional, national methane correction factor (reference as appropriate)			



Datasheet 22.1 Forestry and Other Land-Use Change Data for GHG emissions (Examples are provided)

District or Barangay	Data Source Identifier	Emission Type	Emission Source	<i>Annual</i> Total
Name of LGU		Wood Products Harvesting	Charcoal (cu.m.)	
Name of LGU		Wood Products Harvesting	Construction (cu.m.)	
Name of LGU		Changes in the use of forest lands	Converted to Agriculture (ha)	
Name of LGU		Changes in the use of forest lands	Converted to settlement (ha)	

Datasheet 23.1 Parameters for Forest and other Land-use Change

	Default V	alues	User-Defined			
Data requirements	Biomass	Carbon	Biomass	Carbon	Source of Data	
	Growth rate	Content	Growth rate	Content		
5. Wood and wood products harvesting						
a. Fuel wood (tons)		.49				
b. Charcoal (tons)		.49				
c. Construction (tons)		.49				
d. Novelties (tons)		.49				
 Changes in use of the forestlands 						
a. Used for Agriculture (ha)	7.81	.49				
b. Used as Grasslands (ha)	7.81	.49				
c. Left as Barren Areas (ha)	7.81	.49				
7. Forestland remaining						
g. General Forestland type ¹⁶ (ha)	7.81	.49				
h. Primary Forest - Visayas (ha)	2.10*	0.45*				
i. Secondary Forest- Luzon (ha)	6.50*	0.44*				
j. Brushland –for wood- Visayas (ha)	9.40*	0.45*				
k. Grassland – Visayas (ha)	0.00*	0.45*				
l. Tree plantations – S. <i>macrophylla</i> - Luzon (ha)	7.50*	0.43*				

¹⁶ General forestland type is used if no disaggregated data on forestland type is available



8. Lands converted to forestland				
a. Barren to Forestland (ha)	7.81	.49		
b. Grassland to Forestland (ha)	7.81	.49		
c. Wetlands to Forestland (ha)	7.81	.49		
d. Settlement to Forestland (ha)	7.81	.49		
e. Cropland to Forestland (ha)	7.81	.49		

*Tracking Greenhouse Gases: An Inventory Manual, Table 64. page 129

Data Requirement	Default Value (tons/ha)	User-defined (tons/ha)	Source of Data
Carbon stock in existing Forest	262		

Datasheet 24.1 Forestry and Other Land-Use Change Data for GHG removals. (Examples are provided)

District or Barangay	Data Source Identifier	Removal Type	Removal Source	<i>Annual</i> Total (ha)
Name of LGU		Remaining Forestland	Carbon stock in inventory year	
Name of LGU		Change in Forestland	Grassland to Forest	
Name of LGU		Change in Forestland	Barren to Forest land	

Datasheet 26.1 Mineral Industry- Activity Data

Sub-sector	Name of Company	Activity Data	Units	Source of Data
Cement		Type of cement produced		
Production		Mass of cement produced per type	tonnes	
Limestone Production		Mass of lime produced per type	tonnes	
Glass Production		Total glass production per type	tonnes	

Datasheet 26.2 Chemical Industry- Activity Data

Sub-sector	Name of Company	Activity Data	Units	Source of Data
Ammonia Production		Volume of NH ₃ produced		
Soda Ash		Volume of soda ash		



Production	Production capacity		
Petrochemical and Carbon Black Production	Methanol produced	tons	
	Ethylene produced	tons	
	Ethyl		

Datasheet 26.3 Metal Industry- Activity Data

Sub-sector	Name of Company	Activity Data	Units	Source of Data
Iron and Steel Production from integrated facilities		Amount of steel produced by process type		
Iron and Steel Production from non integrated facilities				

Datasheet 26.4 Electronic Industry- Activity Data

Sub-sector	Name of Company	Activity Data	Units	Source of Data
Integrated Circuit or Semiconductor		Plant production		
TFT Flat Panel Display		Plant production		
Photovoltaic		Plant production		
Heat Transfer Fluid		Plant production		
Other		Plant production		

Datasheet 26.5 Other Industry- Activity Data

Sub-sector	Name of Company	Activity Data	Units	Source of Data
Ex. Pulp and Paper		Production output		
Ex. Food Industries				
Others				

Annex 2: Potential Data Sources

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Data Requirement	Potential Data Sources	
List of Household	LGU, Philippine Statistics Authority; Household Survey	
List of Commercial Establishments	Permit and Licensing Division of the LGU; Commercial Establishment Survey	
Fuel consumption	Department of Energy; Gasoline Station; LPG Retailers/Distributors; Charcoal and Fuelwood Retailers/Distributors	
List of Vehicles	Land Transportation Office; LGU for tricycles	
Electricity Consumption	Energy provider; electric cooperatives	
Agricultural Crops	Agriculture Office based on the LGU; Philippine Statistics Office	
Agricultural Livestock	Agriculture Office based on the LGU; Philippine Statistics Office	
Amount of Solid Waste	LGU	
Waste Characterization Study (WACS)	LGU; National Solid Waste Management Commission	
Population	LGU; Philippine Statistics Office	
List of Industry	Permit and Licensing Division of the LGU; National Inventory Report of the country	
Forest Data	LGU; Forest Management Bureau; NAMRIA; National GHG Inventory Report of the country	



Annex 3: List of **Existing IPPU Categories** in the Philippines

List of Existing Industrial Processes and Product Use (IPPU) Categories In the Philippines, As of year 2010 that can be attributed directly to the LGUs

Source: EMB-DENR

Categories	Are these Industries Present within my LGU? Y= Yes; N=No
2A Mineral Industry	
2A1: Cement Production	
2A2: Lime Production	
2A3: Glass Production	
2B Chemical Industry	
2B1: Ammonia Production	
2B7: Soda Ash Production	
2B8: Petrochemical and Carbon Black Production	
2B8a: Methanol	
2B8b: Ethylene	
2B8c: Ethylene Dichloride and Vinyl Chloride Monomer	
2B8d: Ethylene Oxide	
2B8e: Acrylonitrile	
2B8f: Carbon Black	
2C Metal Industry	
2C1: Iron and Steel Production	
2C1a: Iron and Steel Production from integrated facilities	
2C1a: Iron and Steel Production from non integrated facilities	
2E Electronics Industry	
2E1: Integrated Circuit or Semiconductor	
2E2: TFT Flat Panel Display	
2E3: Photovoltaics	
2E4: Heat Transfer Fluid	
2E5: Other	
2F Other Industries	
2F1: Pulp and Paper	
2F2: Food Industries	
2F3: Others	





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