

Pilot Version 1.0 – May 2012

GLOBAL PROTOCOL FOR COMMUNITY-SCALE GREENHOUSE GAS EMISSIONS (GPC)

Pilot Version 1.0 – May 2012



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This document is prepared by: C40 Cities Climate Leadership Group and ICLEI Local Governments for Sustainability in collaboration with: World Resources Institute, World Bank, UNEP, and UN-HABITAT

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GPC is prepared pursuant to the Memorandum of Understanding that was signed between ICLEI – Local Governments for Sustainability and C40 Cities Climate Leadership Group on 1 June 2011 in Sao Paulo.

Local governments are invited to use this GPC Pilot Version 1.0 to conduct their community GHG inventories. Other stakeholders are welcome to give their comments. All feedback should be sent to gpc@c40.com, gpc@iclei.org, and/or ghgp.cities@wri.org.

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Table 1. GPC 2012 Accounting and Reporting Pilot Framework

1.0 Introduction

Cities are rapidly growing as centers of innovation, energy consumption, population, and sources of global greenhouse gas (GHG) emissions. As a major source of emissions, cities also have a huge potential to drive emissions reductions. To effectively manage emissions, cities must first measure and report them publicly. Planning for climate action at the city level starts with developing a GHG inventory. An inventory allows local policy makers and community members to understand which sectors are responsible for the highest level of GHG emissions in their city or community, and respond by developing action plans for those sectors.

Although many cities have conducted a GHG inventory and set reduction targets, there is currently no consistent global guidance for conducting a city-level inventory. The resulting inconsistent inventories cannot be easily communicated between local, subnational and national governments, financing institutions and the private sector. The lack of a common approach also prevents comparison between cities over time, and reduces the ability of cities to demonstrate the global impact of collective local actions.

The *Global Protocol for Community-Scale GHG Emissions* (GPC) resolves the differences between existing protocols. It is a joint mission between all interested stakeholders to develop an open, global protocol for community-scale accounting and reporting.

1.1 Purpose of GPC

This Protocol provides requirements and guidance for cities on preparing and publicly reporting a GHG emission inventory. The primary goal is to provide a standardized step-by-step approach to help cities quantify their GHG emissions in order to manage and reduce their GHG impacts.

The GPC was developed with the following objectives:

- Help cities prepare a comprehensive and credible GHG inventory;
- Help cities develop effective strategies for managing and reducing their GHG emissions through a thorough understanding of GHG impacts from their human activities;
- Support consistent and transparent public reporting;
- Harmonize existing international protocols and standards for city level GHG inventories;
- Support cities' ability to demonstrate the global impact of collective local actions, and to measure collective progress credibly over time.
- Support GHG accounting, reporting, and trading schemes at the local/subnational/national level; and
- Facilitate access of local governments to climate finance opportunities.

1.2 Target Users

The GPC is intended for adoption by local authorities or city governments who exercise jurisdiction over a defined geographic area. Local authority, as defined by ISO/TR-14069, is a public body recognized as such by legislation or by the directives of a higher level of government to set general policies, plans or requirements. Academics, NGOs, or other parties representing the local authority may also use the GPC.

In the context of this document, local authority is used to represent any and all of these relevant audiences.

GPC can also be useful for sub-national entities such as towns, districts, counties, prefectures, provinces and states pursuant to appropriate modifications.

1.3 Relationship to other Protocols/Standards

The GPC is building upon the knowledge, experiences, and practices defined in previously published protocols and standards. These include the *International Local Government GHG Emissions Analysis Protocol*¹, the *International Standard for Determining Greenhouse Gas Emissions for Cities*², the GHG Protocol Standards³, the *Baseline Emissions Inventory/Monitoring Emissions Inventory methodology*⁴, and the *Local Government Operations Protocol*⁵.

Upon publication, the GPC – pilot version will replace the provisions related to community GHG emissions of *International Local Government GHG Emissions Analysis Protocol*, and the *International Standard for Determining GHG Emissions for Cities*.

1.4 Development Process of GPC to Date

Development of the GPC commenced in June, 2011, as a result of a Memorandum of Understanding between C40 and ICLEI. Thereafter, the two worked in close consultation with local governments, and in close collaboration with the World Resources Institute and the Joint Work Programme of the Cities Alliance between the World Bank, UNEP, and UN-HABITAT.

The initial draft, including a comprehensive background and accounting guidance, was prepared by experts from each of the partner and collaborating organizations. It was released for an initial public comment period between 20 March – 20 April 2012; and this effort was supported by public webinars held on 3 and 4 April 2012. During this phase, the GPC authors received inputs from more than 30 expert organizations worldwide and city officials representing cities such as Almada, Arendal, Buenos Aires, Eugene, Mexico City, Paris, Portland, Taipei City and Toronto; these were incorporated in the GPC Pilot Version 1.0.

.GPC Pilot Version 1.0 includes accounting and reporting principles and GPC 2012 Accounting and Reporting Pilot Framework (also available in Excel format). The Full Version of GPC 1.0 to be published later in 2012 will incorporate the insight, feedback and knowledge gained through the testing of the Pilot Version 1.0 by a globally representative selection of cities throughout the remainder of the year.

Section 5 outlines the future work of the partners and collaborators to revise the GPC and publish the global standard based on the experience from pilot testing, as well as to expand its scope.

¹ ICLEI – Local Governments for Sustainability

² United Nations Environment Program (UNEP), United Nations Human Settlements Program (UN Habitat), and the World Bank.

³ World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD)

⁴ The Covenant of Mayors Initiative

⁵ ICLEI-USA

2.0 Accounting and Reporting Principles

Accounting and reporting for community scale GHG emissions shall be based on the following principles:

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, subnational, national, and regional regulations. The principle of relevance should be applied when determining whether to exclude any emissions. Local authorities should also use this principle when selecting data sources and deciding the data quality.

Completeness: All emissions sources within the inventory boundary shall be accounted for. Any exclusion of emission sources shall be justified and clearly explained. Notation keys should be used when an emission source is excluded, considered not relevant, and/or not occurring.

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 cities. Accounting of emissions should follow the standardized, preferred methodologies provided by the GPC. Any deviation from the preferred methodologies should be justified and disclosed.

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.

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.

Measurability: The data required to support completion of an inventory should be readily available or made available with reasonable time and/or cost. Any exclusions of emission sources shall be justified and disclosed. The use of proxy data and estimated figures should be justified and clearly disclosed.

In the practice of completing an inventory, sometimes conflicts may be encountered among these six principles, and tradeoffs between them may therefore be required. For example, achieving *complete* inventories may at times require using less accurate data. On the other hand, achieving the most *accurate* inventory may require excluding activities with low data accuracy thus compromising overall completeness.

In these or similar scenarios, local authorities should strive to achieve an appropriate balance among the principles and objectives of conducting a GHG inventory. For instance, tracking performance toward a specific reduction target may require more accurate data. Over time, as both the accuracy and completeness of GHG data increase, the need for tradeoffs between these accounting principles will likely diminish.

The GPC 2012 Accounting and Reporting Pilot Framework (Table 1) presents a complete list of sources for a community scale GHG inventory and includes options for aggregation and reporting by BASIC, BASIC+ and EXPANDED and by Scopes (Scope 1, 2, and 3).

In specific cases, local authorities may need to follow the respective local, subnational, national, regional regulations or practices. For example, The Covenant of Mayors Initiative excludes some sources in order to prevent double counting with European Emissions Trading Scheme; provincial level programs or emissions trading schemes in China, South Korea, or Indonesia require a more comprehensive GHG inventory; in the U.S, local authorities may need to consider the various goals of programs at the state or federal level.

In order to meet these requirements, local authorities may need to consider using a sub-set of BASIC sources or a combination of the BASIC and BASIC+ sources (see *Section 4 Reporting* for further details on these reporting options).

GPC Full Version 1.0 will also include guidance for such national and regional practices.

In these cases, however, local authorities are encouraged to include an additional set of results according to the GPC's requirements to ensure international comparability and to ensure full compliance with the GPC BASIC inventory.

Local authorities may also find that some of the emission sources indicated in the GPC do not exist within their defined community boundary, or that the emissions are not significant. Water-borne transport, for instance, does not exist in some inland cities. In such contexts, excluding or omitting emission sources that are not relevant to the objectives of the inventory should apply the principle of relevance. Notation keys should be appropriately used.

When local authorities encounter tradeoffs between principles or between the GPC and local/subnational/national/regional requirements, they should revisit their objective of conducting a GHG inventory. Generally, local authorities should prioritize the city's inventory needs based on key objectives and significance of emissions. While fulfilling minimum needs or requirements, local authorities should aim to improve completeness and accuracy over time to ensure full compliance with the GPC.

3.0 Boundary Setting

The inventory boundary shall be set according to the geopolitical territory where the respective local authority (or local government) has full jurisdictional authority (generally speaking the city or community's boundary). One of the main challenges of this approach is that some activities within the boundary may result in emissions outside the city. To manage this, direct and indirect GHG emissions of communities should be addressed first:

- Direct emissions are emissions from sources within the city boundary.
- Indirect emissions are emissions that are a consequence of the activities within the city boundary, but occur at sources outside the city.

To help delineate the distinction between direct and indirect emissions, GPC adopts the GHG Protocol’s *scope* framework, which is also elaborated in the *International Local Government GHG Emissions Analysis Protocol*, as such:

- **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, heating and/or cooling within the community boundary.
- **Scope 3:** All other indirect emissions that occur outside the boundary as a result of activities within the community’s geopolitical boundary, as well as trans-boundary emissions due to exchange/use/consumption of goods and services

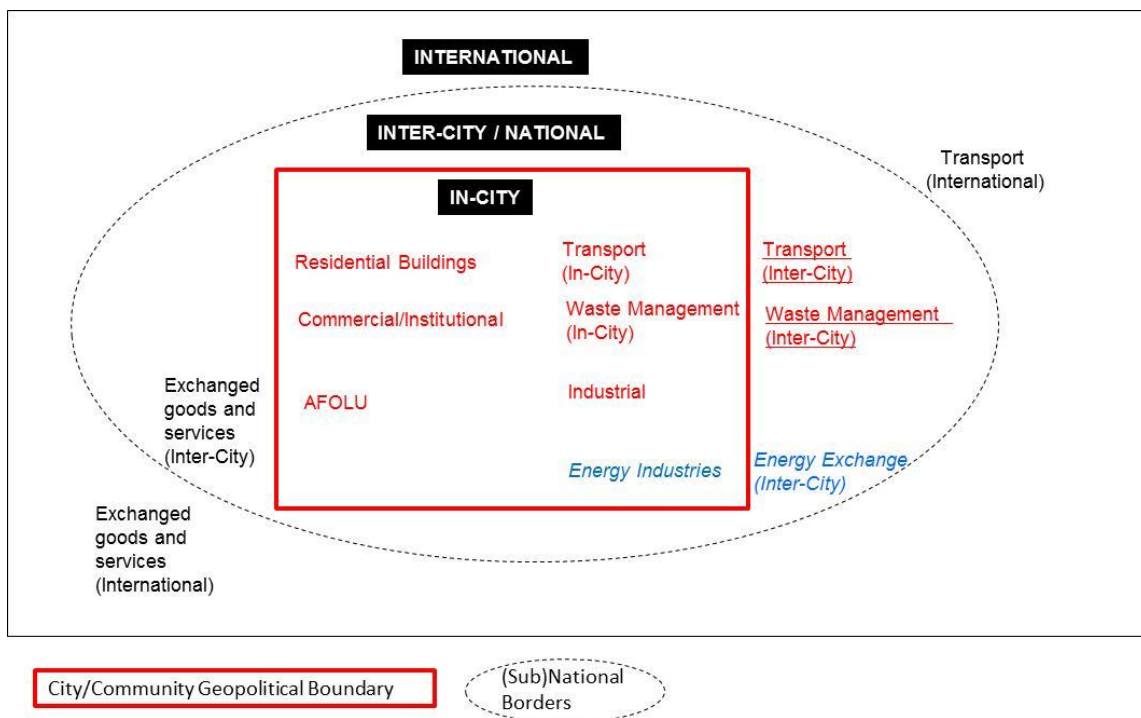


Figure 1. Sources and boundaries of community-scale GHG emissions

Figure 1 above illustrates the concept of direct and indirect emissions, and the relationship between a city inventory and a national inventory. Direct emissions (*scope 1*) include sources located within the city boundary (solid red-lined box). These include sources such as in-city transit systems, energy use from buildings, and emissions from industrial activities. The hashed-line represents the regional boundaries, such as state or provincial borders. Some activities in the city transcend the city boundary into other communities. Regional transportation systems, electricity generation and use, waste disposal, and exchanges of goods and services are examples of activities that may be shared between cities. These activities are indirect emissions (*scopes 2 and 3*) outside of the city boundary, but within the country boundary. The solid line black box indicates international boundaries, or global emissions. Activities indicated here could also be driven by a city, and may include international air or marine transportation and the import or export of goods and services.

4.0 Reporting

A credible GHG inventory report presents information based on the principles of relevance, completeness, consistency, transparency, accuracy, and measurability. To ensure comparability between cities, GPC requires local authorities to report their GHG emissions based on the GPC 2012 Accounting and Reporting Framework that is presented in Table 1 along with the guidance provided under key accounting principles in *Section 2*.

Considering both local decision-making needs and the *IPCC Guidelines for National GHG Inventories*, the GPC 2012 Accounting and Reporting Framework includes six main categories: Stationary units, Mobile units (in the *IPCC Guidelines* these two categories are grouped under 'energy'), Waste, IPPU (industrial process and product use), AFOLU (agriculture, forestry, and land use), and Other indirect emissions. These emission sources are further categorized by *scopes* (see *Section 3 Boundary Setting*) to distinguish direct and indirect impacts.

For each source, the corresponding IPCC classification number is also provided. This enables local authorities to have a more active collaboration with their national governments in the preparation of national GHG inventories that are submitted to UNFCCC.

In order to ease the reporting process, and following the practice used by national governments in the IPCC and UNFCCC processes, GPC enables the use of Notation Keys. These are:

- **IE – Included Elsewhere:** Emissions for this activity are estimated and presented in another category of the inventory. The category where these emissions are included should be noted in explanation.
- **NE– Not Estimated:** Emissions occur but have not been estimated or reported; justification for exclusion should be noted.
- **NA – Not Applicable:** The activity occurs but does not cause emissions; explanation should be provided.
- **NO – Not Occurring:** An activity or process does not occur or exist within the community.

GPC presents the following approach to report community-scale GHG inventories.

Reporting by Sources

- GPC 2012 BASIC:** Covers all *scope 1* and *scope 2* emissions of stationary units, mobile units, wastes, and Industrial Processes and Product Use (IPPU), as well as *scope 3* emissions of waste sector. Dark green cells in the GPC 2012 Framework indicate these sources. In reporting the total by BASIC, Scope 1 emissions from Energy Generation (GPC I.3.1) are not included in order to prevent double counting since the total BASIC figure also includes Scope 2 emissions. However in reporting by 'Scopes', total Scope 1 emissions must also include Scope 1 emissions from energy generation (GPC I.3.1).
- GPC 2012 BASIC+:** Covers GPC 2012 BASIC as well as agriculture, forestry and land use (AFOLU) and *scope 3* emissions for mobile units.

GPC 2012 EXPANDED: Covers the entirety of *scopes 1, 2, and 3* emissions including trans-boundary emissions due to the exchange/use/consumption of goods and services.

Reporting by Scopes:

Regardless of whether local authorities choose to report BASIC, BASIC+, or EXPANDED, the GHG data shall be aggregated and reported by *scope 1, scope 2, and scope 3* separately.

4.1 GPC 2012 BASIC Reporting

Local authorities wishing to comply with the GPC pilot framework are required to account and report at least in the GPC 2012 BASIC and scopes 1 and 2 categories. In order to ensure compliance with GPC 2012 BASIC, it is recommended that Notation Keys be used as appropriate, so that a lack of quantified GHG emissions in the respected source is justified.

The selection of sources that are included in GPC 2012 BASIC is based on the analysis of current best practices in different regions and the availability of internationally accepted GHG accounting methodology. There are readily available methodologies for all GPC 2012 BASIC categories and sources included in the table, as noted in the references to the *IPCC Guidelines for National GHG Inventories*, or are included in other published documents.

In order to report through GPC 2012 BASIC+, further guidance is needed for accounting and reporting of agriculture, forestry and land use in urban spaces, as well as appropriate accounting and allocation of GHG emissions due to inter-city and international transport. These sources require further clarification and international consensus, which will be addressed in a future GPC update.

Reporting through GPC 2012 EXPANDED includes all *scope 3* categories based on full consumption-based and production-based accounting. This is a new area of work where accounting methodologies are either not available or require further development. The GPC partners C40, ICLEI and WRI will work to expand the GPC into this category

4.2 Required Information

Emissions by Sources:	Total GHG emissions (in tCO ₂ e). For sources included in GPC 2012 BASIC; if quantification is not possible, Notation Keys should be used. The total number of occurrences of each Notation Key and relevant GPC reference number should be indicated. If GPC 2012 BASIC+ or EXPANDED is chosen, sources that are included should be clearly indicated.
Emissions by Scopes:	Indicate the scope of each emission source, and separate total emissions by <i>scope 1</i> , <i>scope 2</i> , and <i>scope 3</i> . It is noted that in reporting by ‘scopes’, complete Scope 1 emissions must be reported including emissions from Energy Generation (GPC I.3.1).
Gases:	Data for CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, and SF ₆ in metric tons and in tons of CO ₂ equivalent should be reported.
Data quality:	<i>High (H)</i> : localized emission factors and detailed activity data <i>Medium (M)</i> : national emission factors or generic activity data <i>Low (L)</i> : international/national emission factors and generic activity data
Year:	Year of inventory or emission data
Quantification:	Report source or sector-specific quantification methods used

5.0 Limitations and Future Work

GPC Pilot Version 1.0 is an important advancement in the evolution of community-scale GHG accounting and reporting. This iteration is based primarily upon a production-based inventory. The Pilot Version plays a key role in the development of the GPC Full Version 1.0: new information from testing the GPC Pilot Version in cities around the world will be used to refine the document and will be reflected in the publication of the GPC Full Version 1.0 in later 2012. The GPC Full Version 1.0 will establish the single minimum global standard for cities of all sizes and geographies.

Future work of the GPC partners and collaborators, beyond the publication of the Full Version 1.0, will aim to generate a consumption-based view of GHG emissions for communities, which reflects the behavior patterns of urban residents and businesses. The combination of both views, production and consumption, across all cities and communities worldwide, provides for a comprehensive inventorying of global GHG emissions and presents for maximum abatement opportunities.

The main limitations in the Pilot Version include the lack of international consensus on methodologies for accounting the emissions from cross-boundary transportation and AFOLU, possible double counting between in-boundary power plant emissions and emissions from grid electricity (between *scope 1* and *scope 2*), and the lack of framework and methodologies for quantifying full *scope 3* emissions.

C40, ICLEI, and WRI have taken the lead in institutionalizing a process for incorporating updates and revisions to the GPC on an ongoing basis, including addressing the remaining issues that were not fully resolved in the Pilot Version as described above. Proposals for future iterations include:

- Develop and publish GPC Full Version 1.0 that will serve as a global standard for accounting and reporting of a city’s Basic and Basic+ inventories including all Scope 1 and 2 emissions

- Develop and publish further updates and revisions in GPC Full Version 1.0 that will standardize accounting and reporting of a city's Expanded inventory including full Scope 3 emissions;
- Clarify and seek international consensus on methodologies for accounting cross-boundary transportation, grid electricity, and AFOLU;
- Develop national/regional supplements as needed; and
- Develop further supporting guidance on accounting methodologies and emission factors.

Table 1. GPC 2012 Accounting and Reporting Pilot Framework

GPC No.	IPCC Class	Scope	GHG Emissions Sources	Accounting Approach	Notation keys				GASES						Data Quality			
					IE	NE	NO	NA	CO ₂	CH ₄	N ₂ O	HFC	PFC	SF ₆	CO _{2e}	H	M	L
I.			Stationary Units															
I.1			Residential Buildings															
I.1.1	1A4b	1	Direct Emissions (Scope1)	In-Boundary Fuel Combustion														
I.1.2		2	Energy Indirect Emissions (Scope2)	In-Boundary Energy Consumption														
I.2			Commercial/Institutional Facilities															
I.2.1	1A4a	1	Direct Emissions (Scope1)	In-Boundary Fuel Combustion														
I.2.2		2	Energy Indirect Emissions (Scope2)	In-Boundary Energy Consumption														
I.3			Energy Generation															
I.3.1.	1A1	1	Direct Emissions (Scope1)	In-Boundary Fuel Combustion														
I.3.2		2	Energy Indirect Emissions (Scope2)	In-Boundary Energy Consumption														
I.4			Industrial Energy Use															
I.4.1	1A2+1A5+1A4c	1	Direct Emissions (Scope1)															
I.4.2		2	Energy Indirect Emissions (Scope2)	In-Boundary Energy Consumption														
I.5			Fugitive Emissions															
I.5.1	1B	1	Direct Emissions (Scope1)															
II.			Mobile Units															
II.1			On-Road Transportation															
II.1.1	1A3b	1	Direct Emissions (Scope1)	In-Boundary Fuel Combustion														
II.1.2		2	Energy Indirect Emissions (Scope2)	In-Boundary Energy Consumption														
II.1.3		3	Indirect Emissions from Transboundary On-Road Inter-City or International Transportation Trips that Originate and/or Complete their Journey Within the Community (Scope3)															
II.2			Railways															
II.2.1	1A3c	1	Direct Emissions (Scope1)	Proportional Fuel Combustion														
II.2.2		2	Energy Indirect Emissions (Scope2)	Proportional Energy Consumption														
II.2.3		3	Indirect Emissions from Transboundary Inter-City or International Railway Trips that Originate and/or Complete their Journey Within the Community (Scope3)															
II.3			Water-Borne Navigation															
II.3.1.	1A3dii	1	Direct Emissions (Scope1)	Proportional Fuel Combustion														
II.3.2		2	Energy Indirect Emissions (Scope2)	Proportional Energy Consumption														
II.3.3		3	Indirect Emissions from Inter-City or International Water-Borne Navigation Trips that Originate their Journey Within the Community (Scope3)															
I.4			Aviation															
II.4.1	1A3aii	1	Direct Emissions (Scope1)	Proportional Fuel Combustion														
II.4.2		2	Energy Indirect Emissions (Scope2)	Proportional Energy Consumption														
II.4.3		3	Indirect Emissions from Inter-City or International Aviation that Originate and/or Complete their Journey Within the Community (Scope3)															
II.5			Off-Road															
II.5.1	1A3eii	1	Direct Emissions (Scope1)	In-boundary Fuel Combustion														

III.			Waste																	
III.1			Solid Waste Disposal																	
III.1.1	4A	1+3	Option-1: First Order Decay (FOD) Method - Direct (Scope1-Current Year) and Indirect (Scope3-Previous Years) Emissions from Landfills Located Within the Community Boundary (excluding emissions due to incoming waste from other communities)	In-boundary Waste Generated and Proportional Waste Treated																
III.1.2		1+3	Option-2: Methane Commitment (MC) Method - Direct (Current Year) and Indirect (Scope3-Future Year) Emissions from Landfills Located Within the Community Boundary (excluding emissions due to incoming waste from other communities)	In-boundary Waste Generated and Proportional Waste Treated																
III.1.3		3	Indirect Emissions (Scope3) from Community Wastes Deposited in Landfills Located Outside the Community Boundary	Proportional Waste Treated																
III.3			Biological Treatment of Waste																	
III.3.1	4B	1	Direct (Scope1) Emissions from Biological Treatment of Waste in the Community Boundary (excluding emissions due to incoming waste from other communities)	In-boundary Waste Generated and Proportional Waste Treated																
III.3.2		3	Indirect Emissions (Scope3) from Biological Treatment of Wastes Outside the Community Boundary	Proportional Waste Treated																
III.4			Incineration and open burning																	
III.4.1	4C	1	Direct (Scope1) Emissions from Incineration and Open Burning of Waste in the Community Boundary (excluding emissions due to incoming waste from other communities)	In-boundary Waste Generated and Proportional Waste Treated																
III.4.2		3	Indirect Emissions (Scope3) from Incineration and Open burning of Wastes Outside the Community Boundary	Proportional Waste Treated																
III.5			Wastewater Treatment and discharge																	
III.5.1	4D	1	Direct (Scope1) Emissions from WWT and discharge in the Community Boundary (excluding emissions due to incoming waste from other communities)	In-boundary Waste Generated and Proportional Waste Treated																
III.5.2		3	Indirect Emissions (Scope3) from WWT and discharge Outside the Community Boundary	Proportional Waste Treated																
IV.			Industrial Processes and Product Use (IPPU)																	
IV.1	2A+2B+2C+2E	1	Direct Emissions from Industrial Processes	In-boundary Production																
IV.2	2D+2F+2G+2H	1	Direct Emissions from Product Use	In-boundary Product use																
V.			Agriculture, Forestry, and Land Use (AFOLU)																	
V.1	3	1	Direct Emissions from AFOLU	In-boundary areas																
VI.			Other Indirect Emissions																	
VI.1		3	All other Scope3 Emissions from all sources																	
VI.2		3	All transboundary Scope3 emissions due to exchange/consumption of goods and services																	
					IE	NE	NO	NA	No. of occurrence and GPC No. for Notation Keys (out of 28 entries)											
									Sources included in BASIC+ (out of 5 data entries)											
									Sources included in EXPANDED											