

GHG Protocol Standards for Cities and Businesses

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GHG Protocol

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GAS PROTOCOL



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World Business
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for Sustainable
Development

Outline

1. GHG Protocol Overview
2. GHG Protocol for Businesses
3. GHG Protocol for Cities
4. Recap

1

GHG Protocol Overview

About the GHG Protocol

- GHG Protocol standards and guidance enable companies, cities and national governments to measure, manage and report their greenhouse gas emissions.
- Greenhouse Gas Protocol provides the world's most widely used greenhouse gas accounting standards for companies and cities.
- Greenhouse gas accounting and reporting standards developed through inclusive global multi-stakeholder development processes



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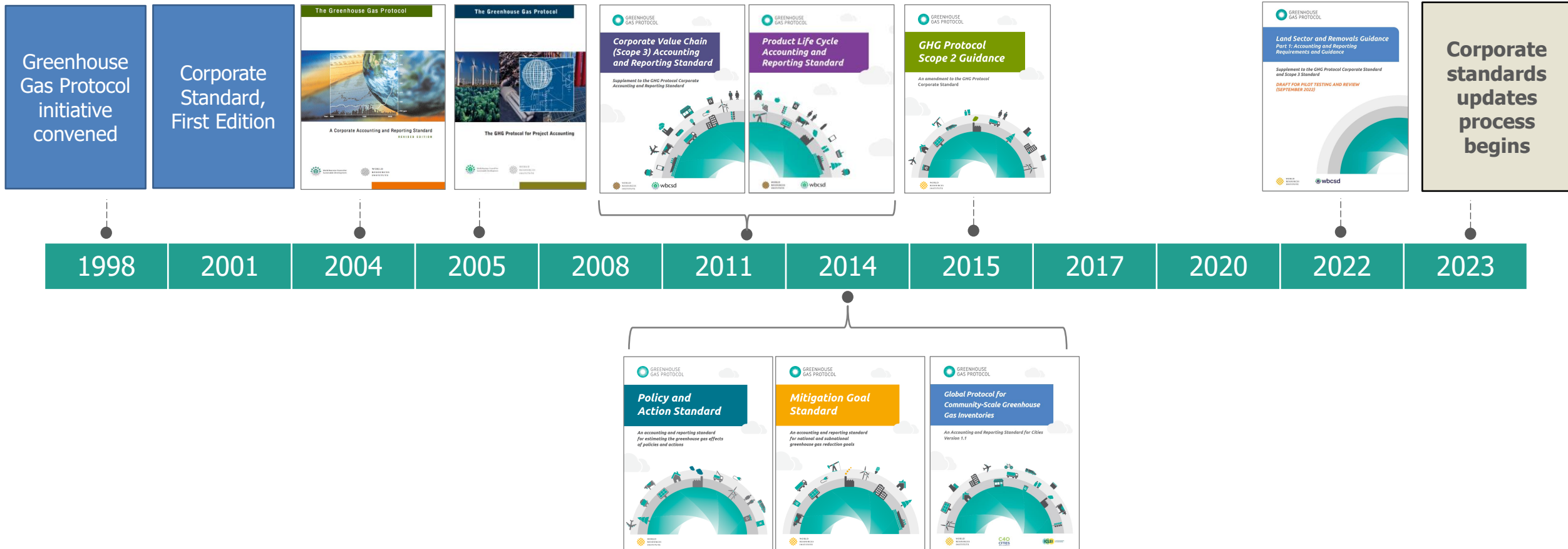


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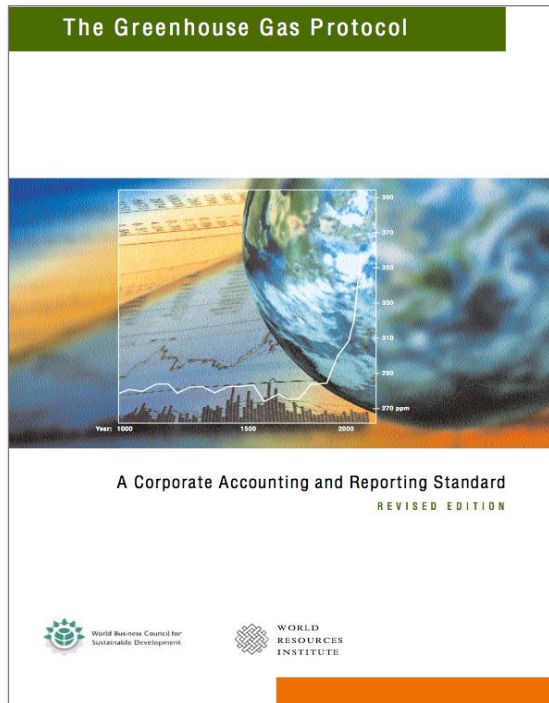


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Development

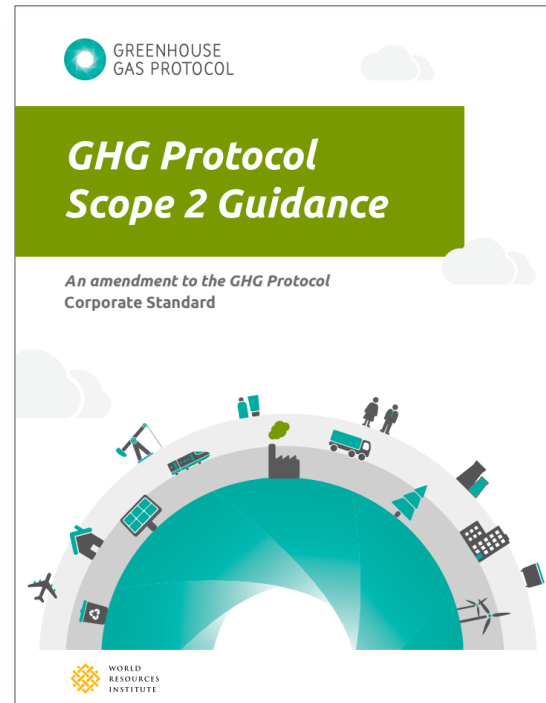
History of GHG Protocol Standards



Standards and guidance for company/organization-level inventories



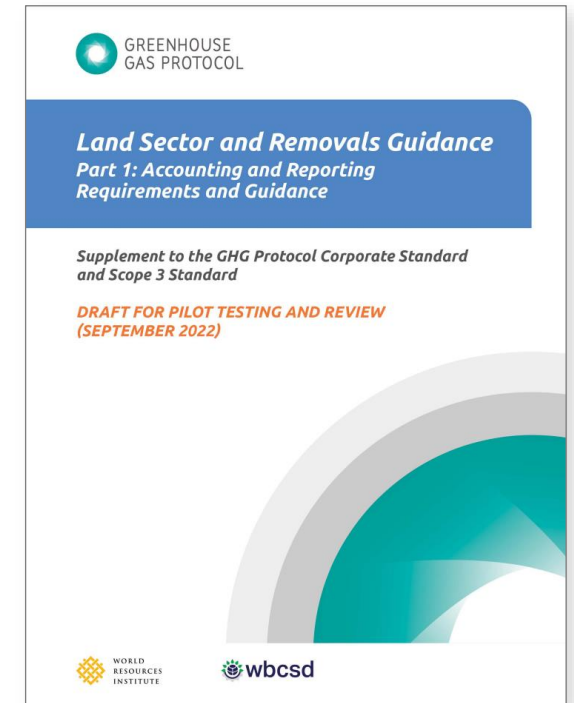
Corporate Standard



Scope 2 Guidance



Scope 3 Standard



Land Sector and Removals Guidance

*Under development;
Draft available*

Standards and guidance for cities and countries



**Policy and Action
Standard**

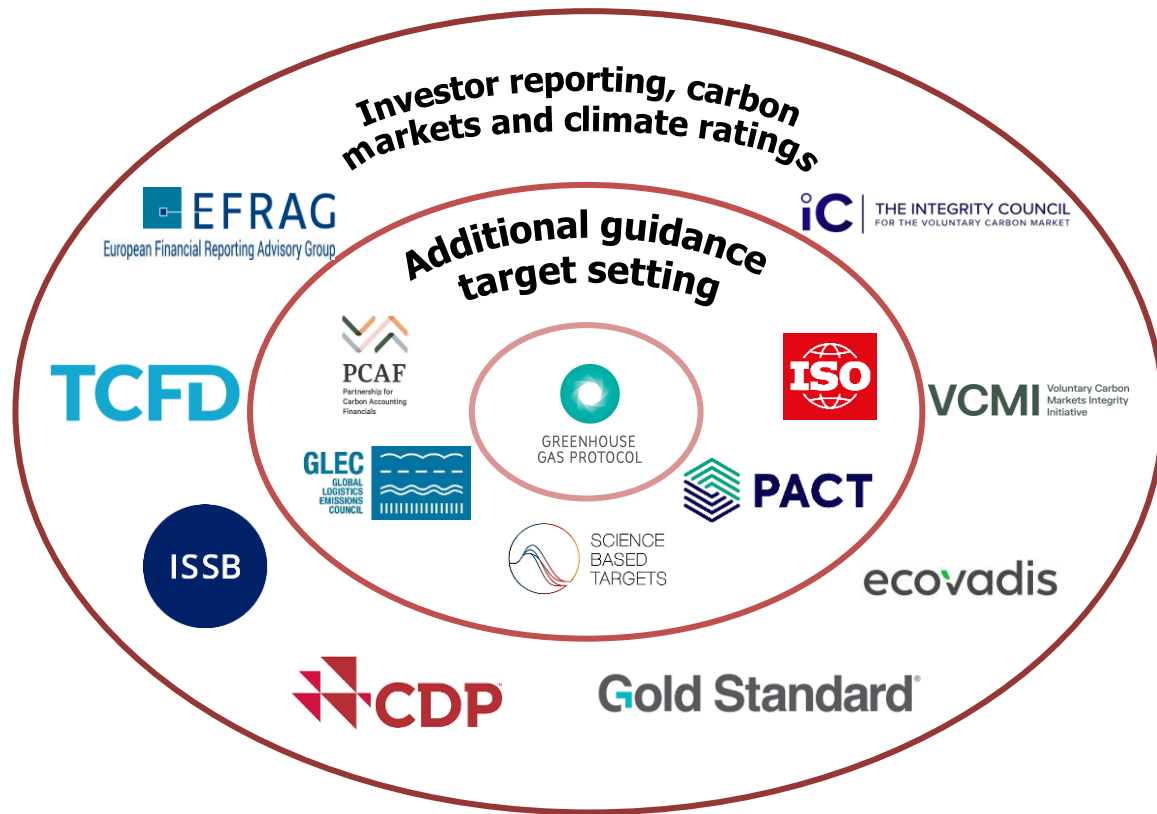


**Mitigation Goal
Standard**



**GHG Protocol for
Cities (GPC)**

GHG Protocol is now foundation of most corporate climate programs



NOT EXHAUSTIVE

Sources: Press search, GHG Protocol website, CDP data (2022)

30

Standards, guidance documents, calculation tools, and online training materials released since 2004

90%

of Fortune 500 companies using GHG Protocol's Standards to calculate emissions

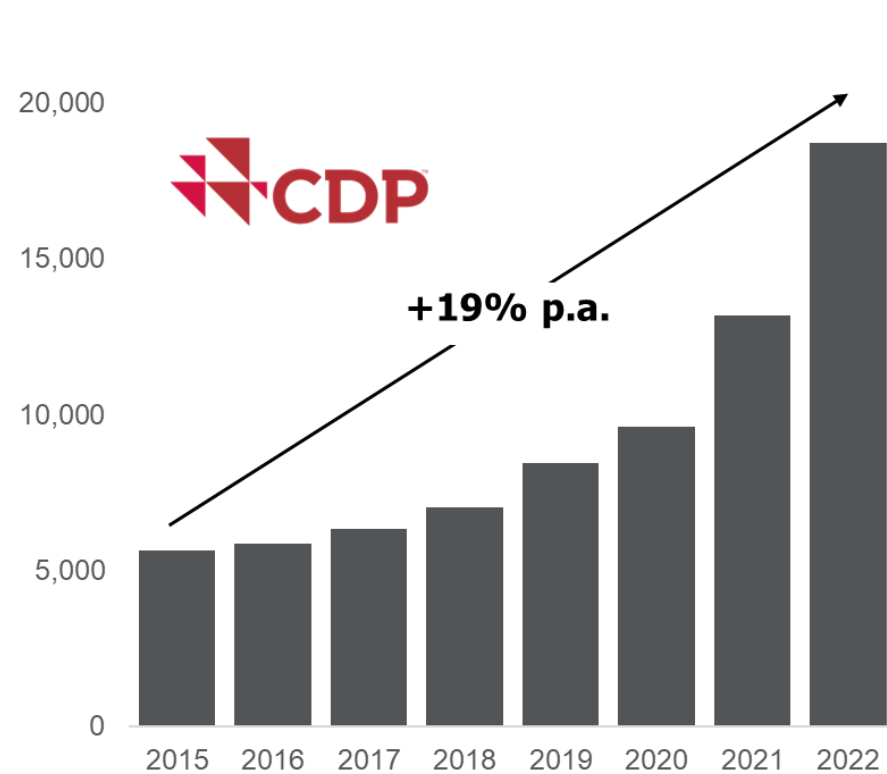
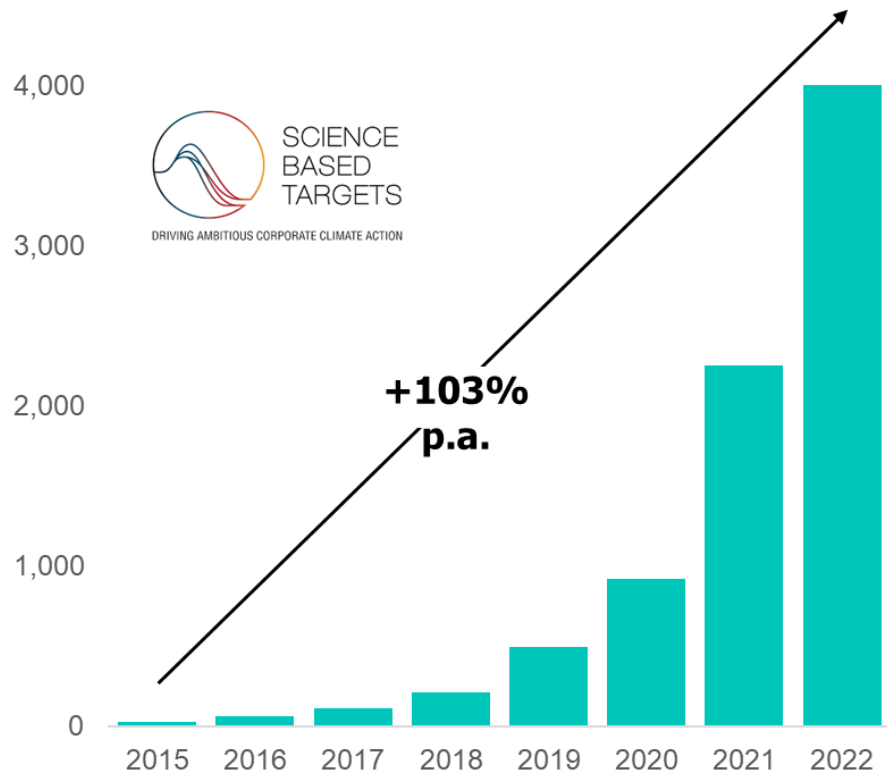
330+

Cities reporting to the CDP explicitly name the GHG Protocol's GPC as their primary emissions inventory methodology (2022)

Corporate GHG management trend

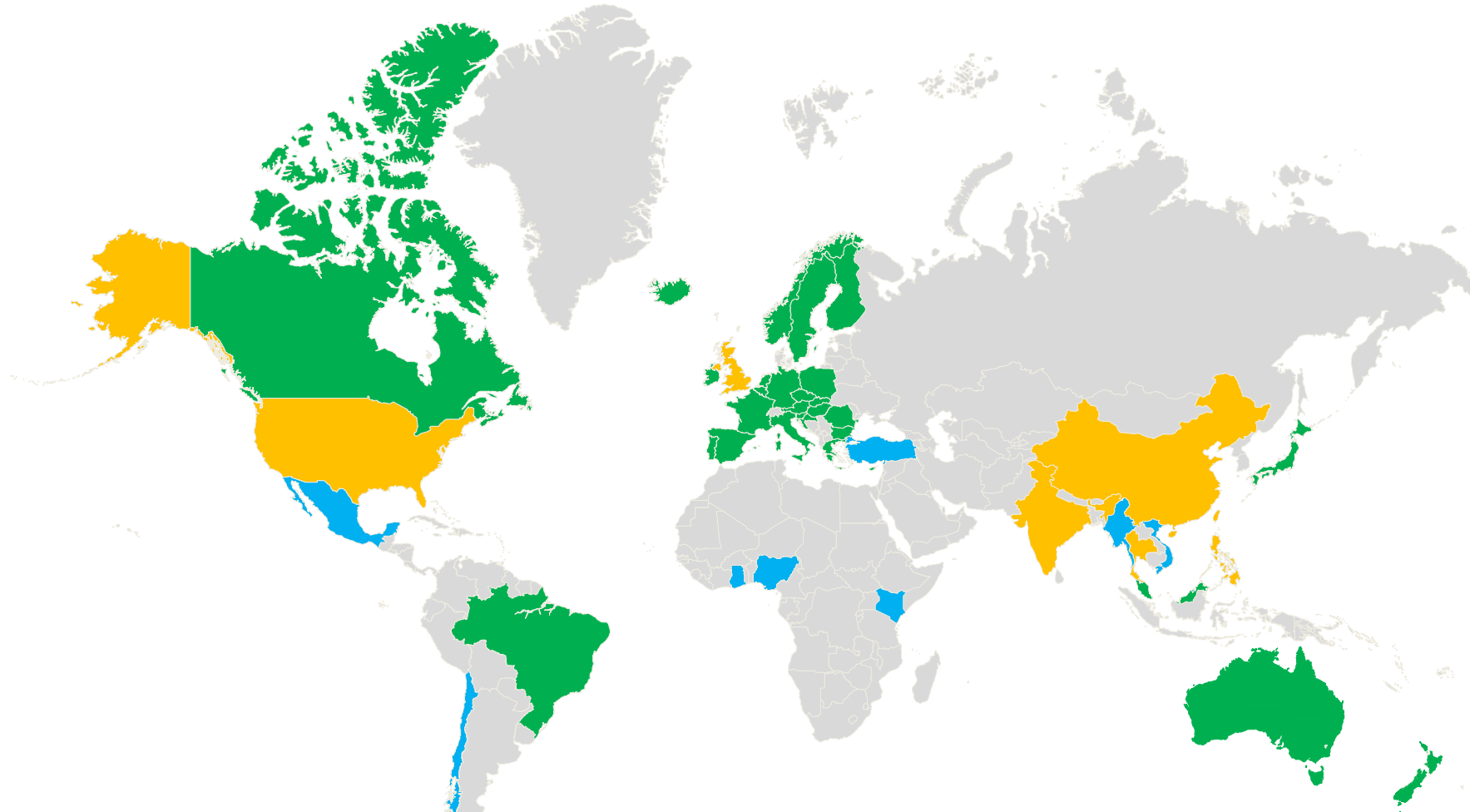





GHG measurement, disclosure and target-setting among companies has significantly increased over the last few years



More and more jurisdictions have adopted GHG Protocol standards for mandatory corporate GHG reporting

70,000+
companies affected



-  Scopes 1,2*
-  Scopes 1,2,3*
-  Jurisdictions that the relevant regulators have declared supporting the ISSB standards**

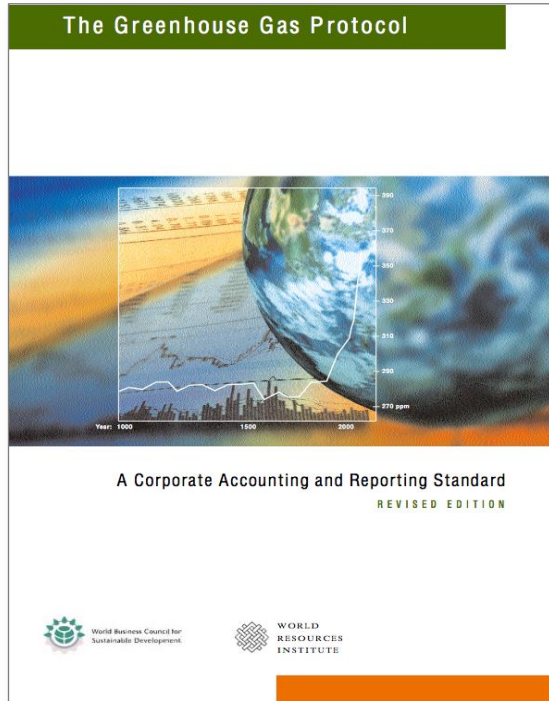
* Including committed/draft regulations such as draft rules or guidance in which the status may change depending on regulatory approval processes

** <https://www.ifrs.org/ifrs-sustainability-disclosure-standards-around-the-world/cop28-declaration-of-support/further-statements-of-support/> .

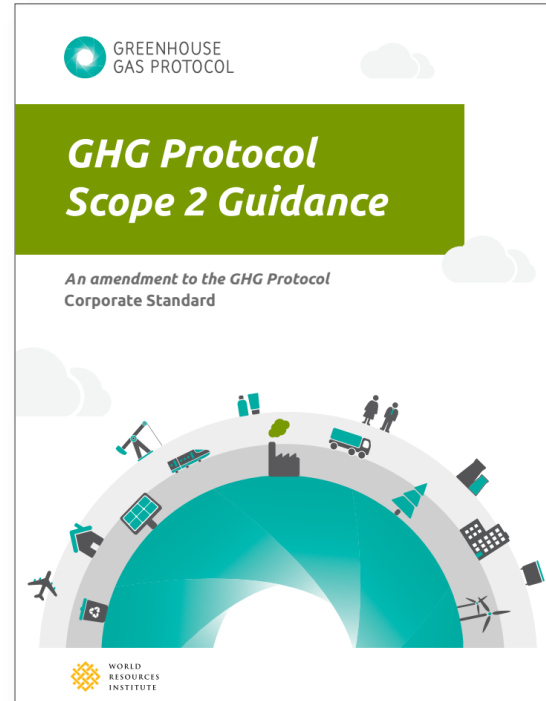
2

GHG Protocol for Businesses

Standards and guidance for company/organization-level inventories



Corporate Standard



Scope 2 Guidance



Scope 3 Standard



Land Sector and Removals Guidance

*Under development;
Draft available*

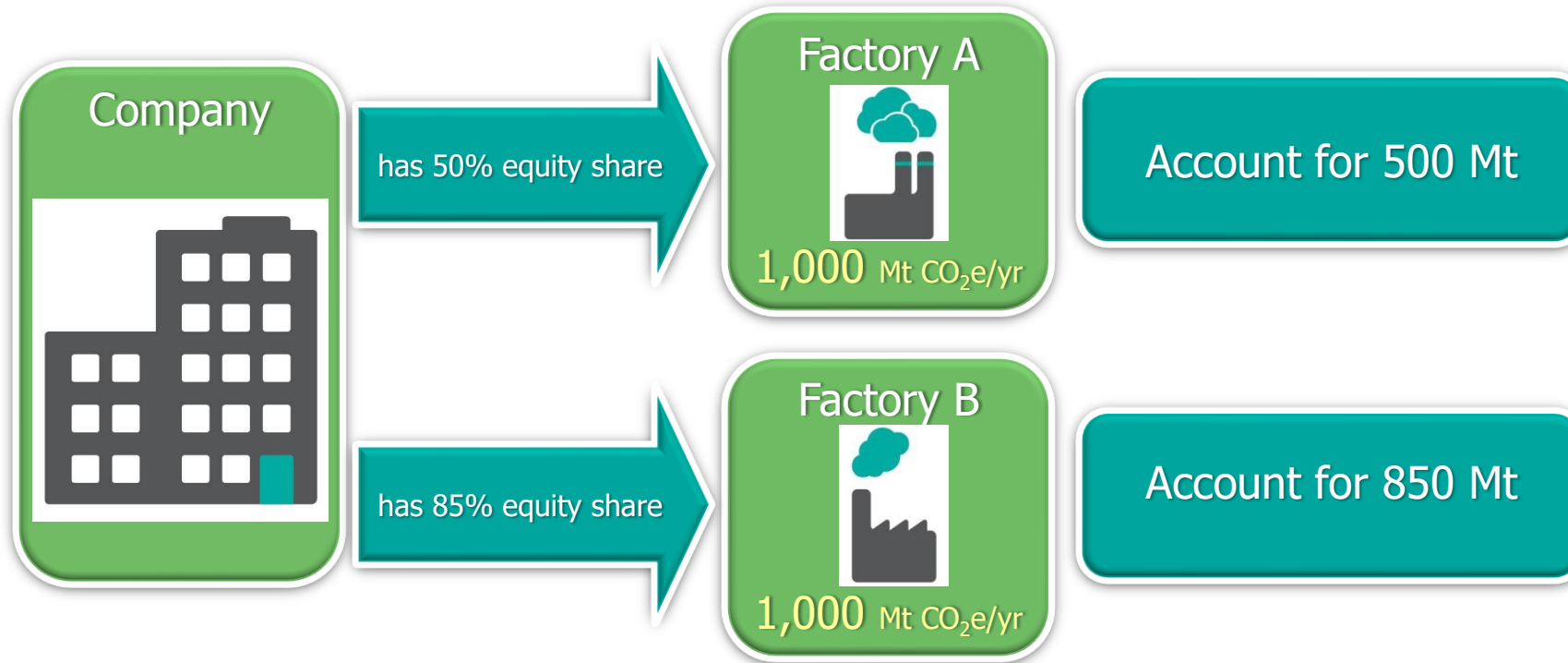
Organizational boundaries

- Determine which operations are **owned** or **controlled** by the reporting company and the fraction of those operations that should be reflected in an inventory
- Important because companies often have complex business structures composed of:
 - Subsidiaries
 - Joint ventures
 - Franchises, etc.
- Organizational boundaries establish a consistent approach for accounting for the emissions from all parts of a company
- To develop an inventory: **one of three boundary approaches** must be selected and used consistently across the entire structure of a company

Setting organizational boundaries: Equity Share Approach

Definition: **% of ownership**; economic interest

Account for emissions according to the company's **equity share** in the operation
(independent of financial or operational control)



Setting organizational boundaries: Control Approaches

Definition:

- **Financial control**
- **Operational control**

Generally account for 100% of emissions from operations under the company's "control"

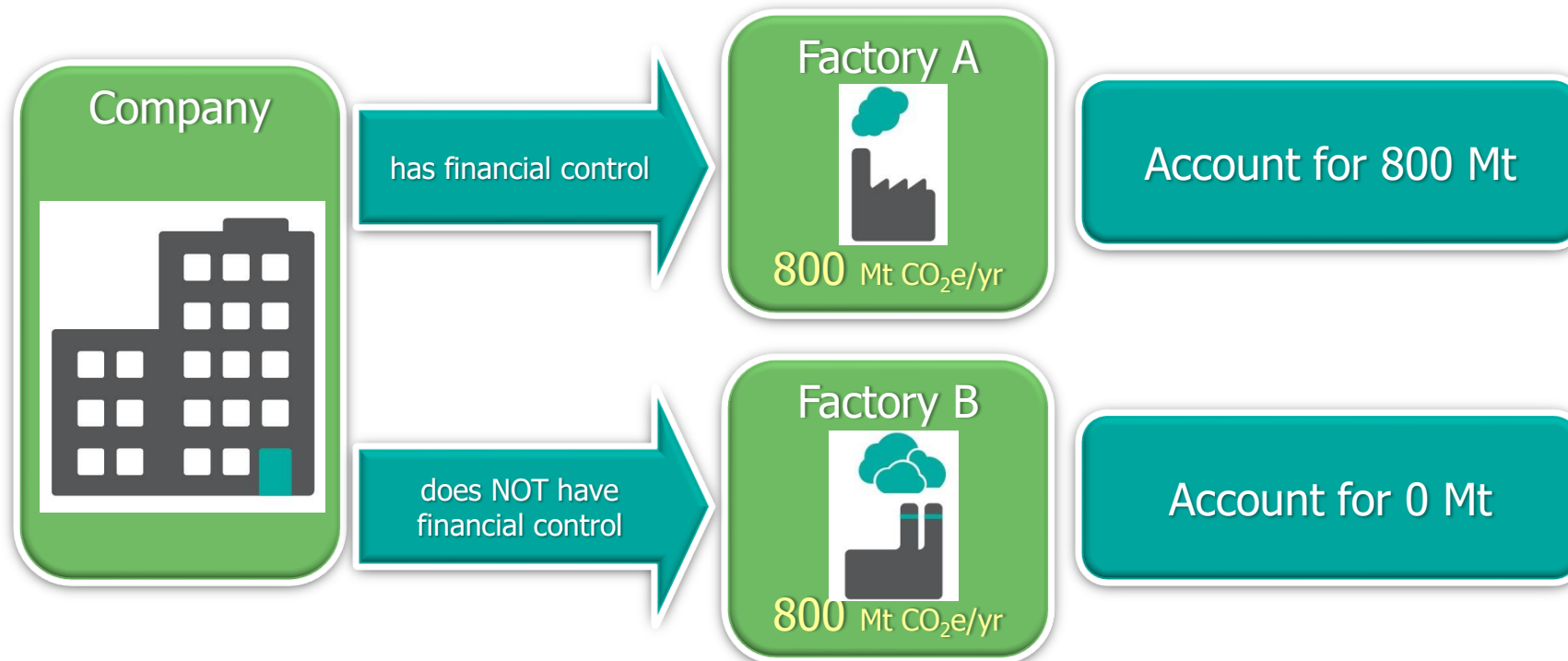
- Independent of equity share

Setting organizational boundaries: Financial Control

Definition: ability to direct an operation's financial and operational policies

- To determine, consider corporate voting rights and financial accounting status

Account for **100%** of emissions from each operation under **financial control**.

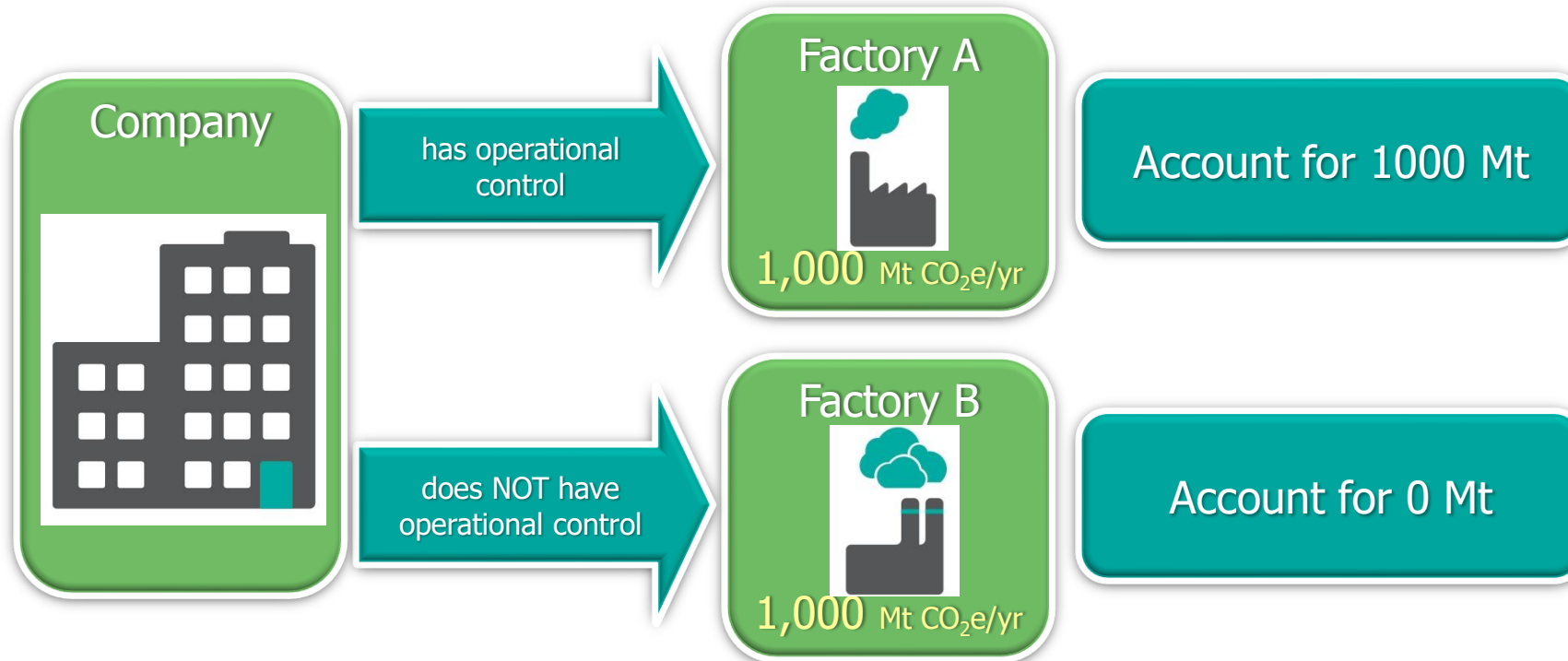


Setting organizational boundaries: Operation Control

Definition: authority to introduce and implement operating policies

- To determine, consider ownership of operating permit

Account for **100%** of the emissions from each operation under **operational control**



Organizational boundaries: Summaries of consolidation approaches

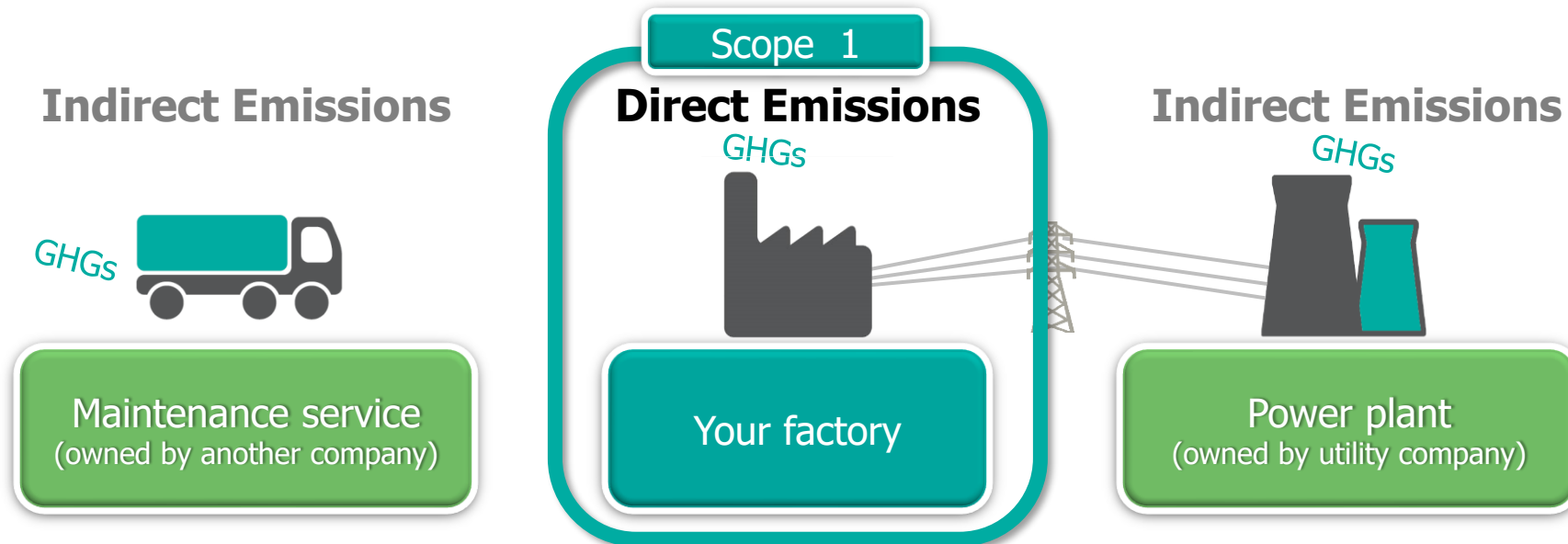
APPROACH	DEFINITION	GHG ACCOUNTING
Equity share	Percent ownership	% owned
Financial control	Directs financial policies to gain economic benefits	If yes: 100% If no: 0% If joint: % owned
Operational control	Authority to introduce and implement operating policies	If yes: 100% If no: 0%

Operations boundaries

<i>Emissions type</i>	<i>Scope</i>	<i>Definition</i>	<i>Examples</i>
Direct emissions	Scope 1	Emissions from operations that are owned or controlled by the reporting company	Emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.; emissions from chemical production in owned or controlled process equipment
	Scope 2	Emissions from the generation of purchased or acquired electricity, steam, heating, or cooling consumed by the reporting company	Use of purchased electricity, steam, heating, or cooling
Indirect emissions	Scope 3	All indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions	Production of purchased products, transportation of purchased products, or use of sold products

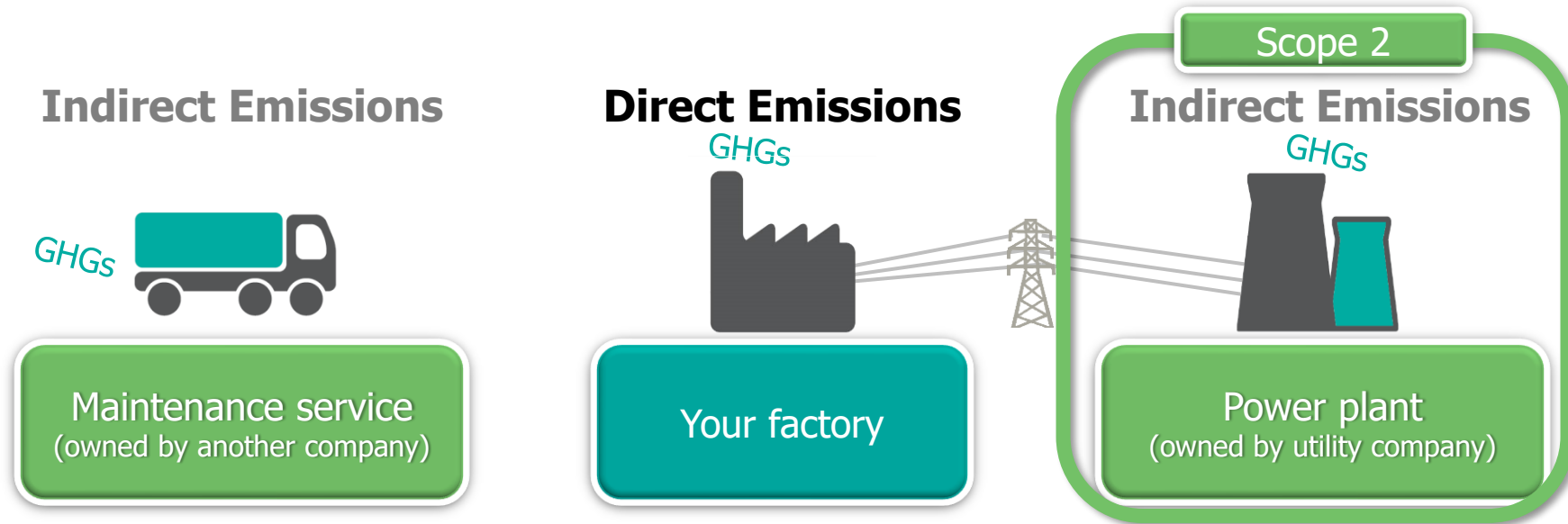
Scope 1

- Direct GHG emissions from sources a company owns or controls
- Examples:
 - Generation of electricity, heat, or steam
 - Physical or chemical processing
 - Transportation of materials, products, waste, and employees
 - Fugitive emissions
- Inclusion in GHG inventory: **required**



Scope 2

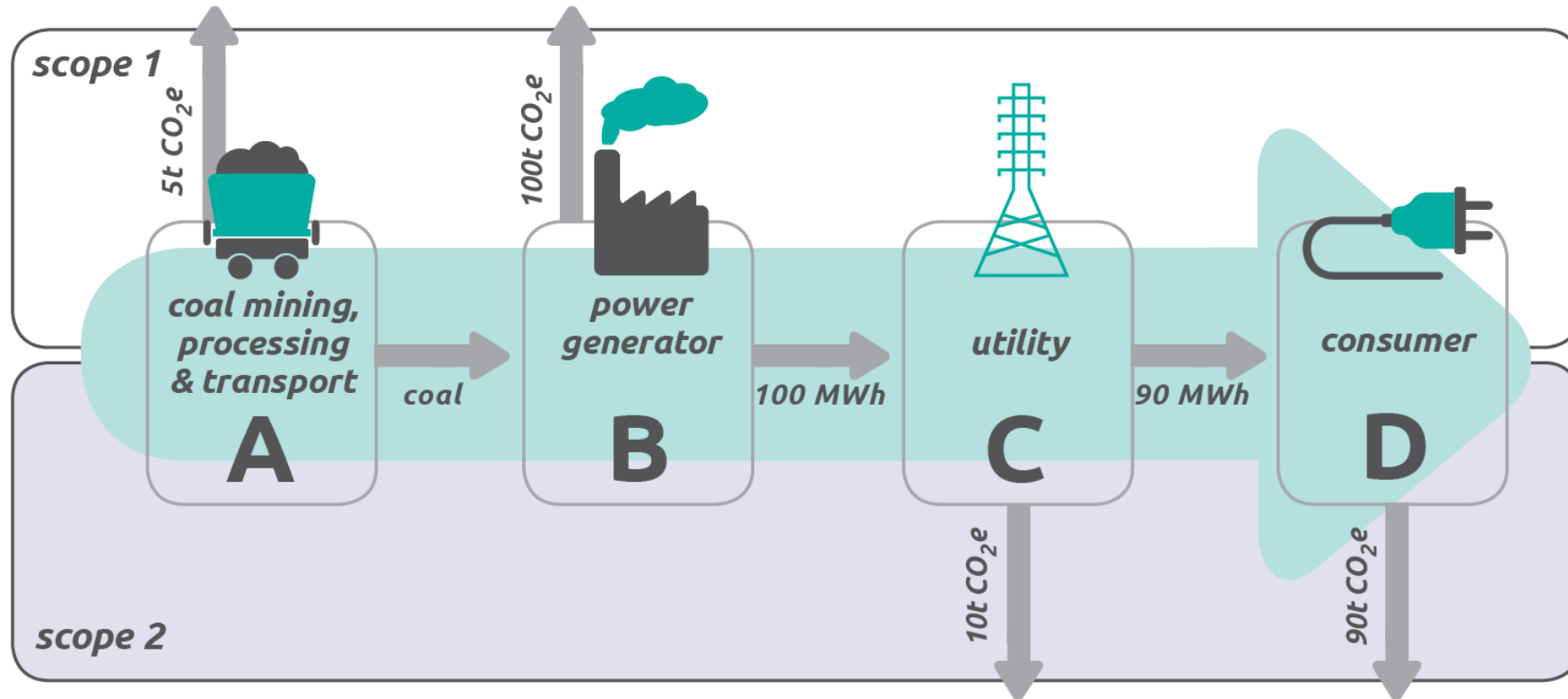
- Indirect emissions from purchased electricity, steam, heating and cooling
- Inclusion in GHG inventory: **required**



Scope 2: two calculation approaches

	Location-based	Market-based
What is it?	Reflects the average emissions intensity of grids on which energy consumption occurs	Reflects emissions from electricity that companies have purposefully chosen (via bundled or unbundled certificates)
To which markets does it apply?	All electricity grids	Markets providing consumer choice of differentiated electricity products or supplier-specific data

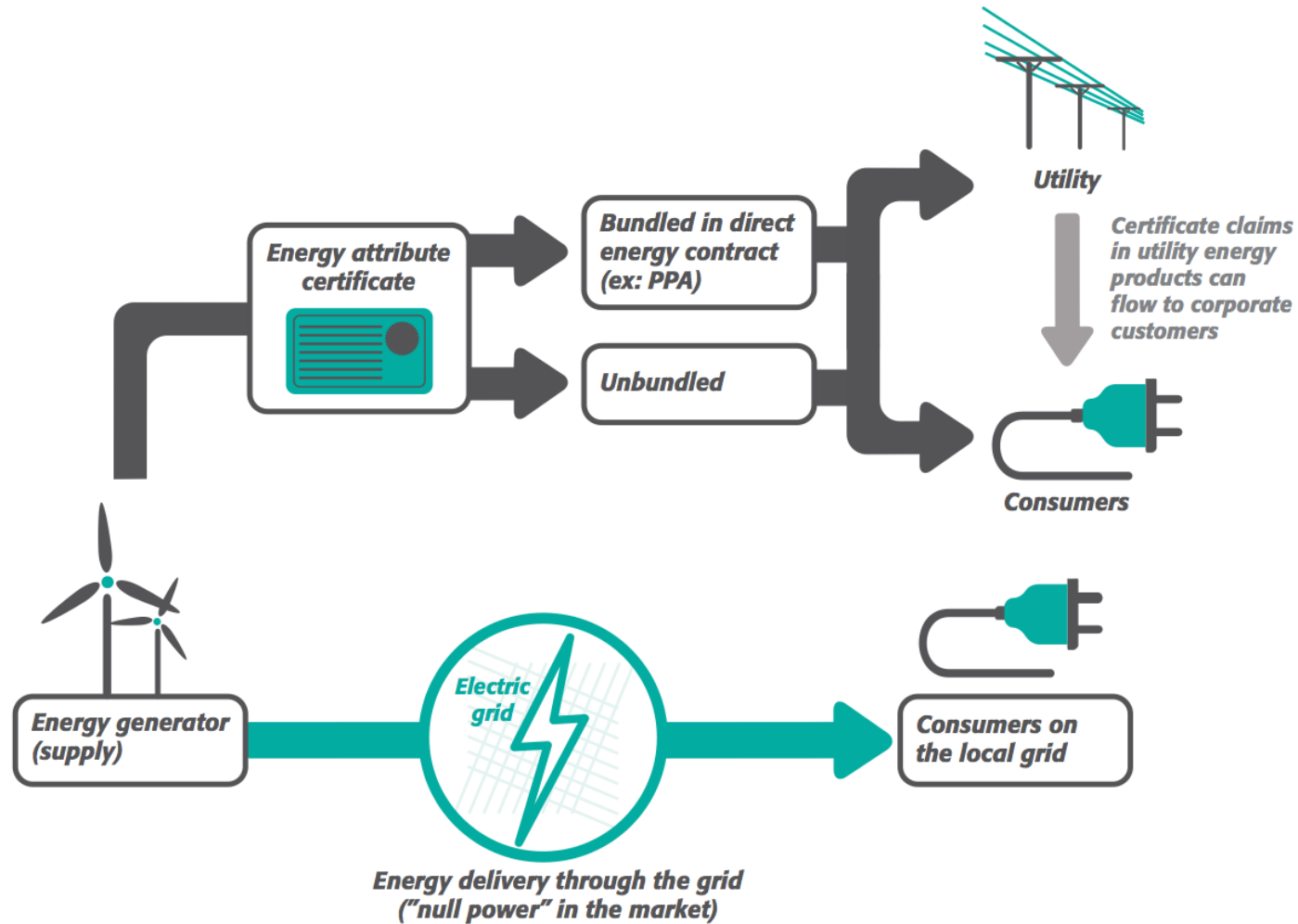
Scope 2: markets with no consumer choice



Scope 2: types of differentiated products

- Supplier-specific emission rates
- Energy attribute certificates (GOs, RECs)
- Direct contracts such as power purchase agreements (PPAs), where other instruments or energy attribute certificates do not exist
- Residual mix (e.g., the emissions rate left after the three other contractual information items are removed from the system)

Scope 2: markets with consumer choice



Scope 2 – requirements for reporting

- **For companies with operations only in markets that do not provide product or supplier-specific data or other contractual instruments:**
 - Only one scope 2 figure **shall** be accounted and reported, based on the location-based method.
- **For companies with any operations in markets providing product or supplier-specific data in the form of contractual instruments**
 - Two scope 2 figures shall be accounted and reported, one for the market-based method and one for the location-based method.

Scope 3

- The Scope 3 Standard categorizes scope 3 emissions into **15 distinct categories**. The categories are intended to provide companies with a systematic framework to organize, understand, and report on the diversity of scope 3 activities within a corporate value chain.
- The categories are designed to be **mutually exclusive**, such that, for any one reporting company, there is no double counting of emissions between categories. Each scope 3 category is comprised of multiple scope 3 activities that individually result in emissions. Each category is described in detail in the Scope 3 Standard (Chapter 5).
- The Scope 3 Standard divides scope 3 emissions into upstream and downstream emissions. The distinction is based on the **financial transactions** of the reporting company.
 - **Upstream emissions** are indirect GHG emissions related to purchased or acquired goods and services.
 - **Downstream emissions** are indirect GHG emissions related to sold goods and services.

Scope 3: 15 categories

Upstream or downstream

Upstream scope 3 emissions

Downstream scope 3 emissions

Scope 3 category

1. Purchased goods and services
2. Capital goods
3. Fuel- and energy-related activities (not included in scope 1 or scope 2)
4. Upstream transportation and distribution
5. Waste generated in operations
6. Business travel
7. Employee commuting
8. Upstream leased assets
9. Downstream transportation and distribution
10. Processing of sold products
11. Use of sold products
12. End-of-life treatment of sold products
13. Downstream leased assets
14. Franchises
15. Investments

Scope 3 categories: upstream

1. Purchased goods and services

- Extraction, production, and transportation of goods and services purchased or acquired by the reporting company in the reporting year, not otherwise included in Categories 2 - 8

- All upstream (cradle-to-gate) emissions of purchased goods and services

2. Capital goods

- Extraction, production, and transportation of capital goods purchased or acquired by the reporting company in the reporting year

- All upstream (cradle-to-gate) emissions of purchased capital goods

Scope 3 categories: upstre

3. Fuel- and energy-related activities (not included in scope 1 or scope 2)

- Extraction, production, and transportation of fuels and energy purchased or acquired by the reporting company in the reporting year, not already accounted for in scope 1 or scope 2, including:
 - a.** Upstream emissions of purchased fuels (extraction, production, and transportation of fuels consumed by the reporting company)
 - b.** Upstream emissions of purchased electricity (extraction, production, and transportation of fuels consumed in the generation of electricity, steam, heating, and cooling consumed by the reporting company)
 - c.** Transmission and distribution (T&D) losses (generation of electricity, steam, heating and cooling that is consumed (i.e., lost) in a T&D system) – reported by end user
 - d.** Generation of purchased electricity that is sold to end users (generation of electricity, steam, heating, and cooling that is purchased by the reporting company and sold to end users) – reported by utility company or energy retailer only
- a.** For upstream emissions of purchased fuels: All upstream (cradle-to-gate) emissions of purchased fuels (from raw material extraction up to the point of, but excluding combustion)
- b.** For upstream emissions of purchased electricity: All upstream (cradle-to-gate) emissions of purchased fuels (from raw material extraction up to the point of, but excluding, combustion by a power generator)
- c.** For T&D losses: All upstream (cradle-to-gate) emissions of energy consumed in a T&D system, including emissions from combustion
- d.** For generation of purchased electricity that is sold to end users: Emissions from the generation of purchased energy

Scope 3 categories: upstream

4. Upstream transportation and distribution

- Transportation and distribution of products purchased by the reporting company in the reporting year between a company's tier 1 suppliers and its own operations (in vehicles and facilities not owned or controlled by the reporting company)
- Transportation and distribution services purchased by the reporting company in the reporting year, including inbound logistics, outbound logistics (e.g., of sold products), and transportation and distribution between a company's own facilities (in vehicles and facilities not owned or controlled by the reporting company)
- The scope 1 and scope 2 emissions of transportation and distribution providers that occur during use of vehicles and facilities (e.g., from energy use)
- **Optional:** The life cycle emissions associated with manufacturing vehicles, facilities, or infrastructure

Scope 3 categories: upstream

5. Waste generated in operations

- Disposal and treatment of waste generated in the reporting company's operations in the reporting year (in facilities not owned or controlled by the reporting company)

- The scope 1 and scope 2 emissions of waste management suppliers that occur during disposal or treatment
- **Optional:** Emissions from transportation of waste

6. Business travel

- Transportation of employees for business-related activities during the reporting year (in vehicles not owned or operated by the reporting company)

- The scope 1 and scope 2 emissions of transportation carriers that occur during use of vehicles (e.g., from energy use)
- **Optional:** The life cycle emissions associated with manufacturing vehicles or infrastructure

Scope 3 categories: upstream

7. Employee commuting

- Transportation of employees between their homes and their worksites during the reporting year (in vehicles not owned or operated by the reporting company)

- The scope 1 and scope 2 emissions of employees and transportation providers that occur during use of vehicles (e.g., from energy use)
- **Optional:** Emissions from employee teleworking

8. Upstream leased assets

- Operation of assets leased by the reporting company (lessee) in the reporting year and not included in scope 1 and scope 2 – reported by lessee

- The scope 1 and scope 2 emissions of lessors that occur during the reporting company's operation of leased assets (e.g., from energy use)
- **Optional:** The life cycle emissions associated with manufacturing or constructing leased assets

Scope 3 categories: downstream

9. Downstream transportation and distribution

- Transportation and distribution of products sold by the reporting company in the reporting year between the reporting company's operations and the end consumer (if not paid for by the reporting company), including retail and storage (in vehicles and facilities not owned or controlled by the reporting company)

- The scope 1 and scope 2 emissions of transportation providers, distributors, and retailers that occur during use of vehicles and facilities (e.g., from energy use)
- **Optional:** The life cycle emissions associated with manufacturing vehicles, facilities, or infrastructure

10. Processing of sold products

- Processing of intermediate products sold in the reporting year by downstream companies (e.g., manufacturers)

- The scope 1 and scope 2 emissions of downstream companies that occur during processing (e.g., from energy use)

Scope 3 categories: downstream

11. Use of sold products

- End use of goods and services sold by the reporting company in the reporting year
- The direct use-phase emissions of sold products over their expected lifetime (i.e., the scope 1 and scope 2 emissions of end users that occur from the use of: products that directly consume energy (fuels or electricity) during use; fuels and feedstocks; and GHGs and products that contain or form GHGs that are emitted during use)
- **Optional:** The indirect use-phase emissions of sold products over their expected lifetime (i.e., emissions from the use of products that indirectly consume energy (fuels or electricity) during use)

Scope 3 categories: downstream

12. End-of-life treatment of sold products

- Waste disposal and treatment of products sold by the reporting company (in the reporting year) at the end of their life

- The scope 1 and scope 2 emissions of waste management companies that occur during disposal or treatment of sold products

13. Downstream leased assets

- Operation of assets owned by the reporting company (lessor) and leased to other entities in the reporting year, not included in scope 1 and scope 2 – reported by lessor

- The scope 1 and scope 2 emissions of lessees that occur during operation of leased assets (e.g., from energy use).
- **Optional:** The life cycle emissions associated with manufacturing or constructing leased assets

Scope 3 categories: downstream

14. Franchises

- Operation of franchises in the reporting year, not included in scope 1 and scope 2 – reported by franchisor

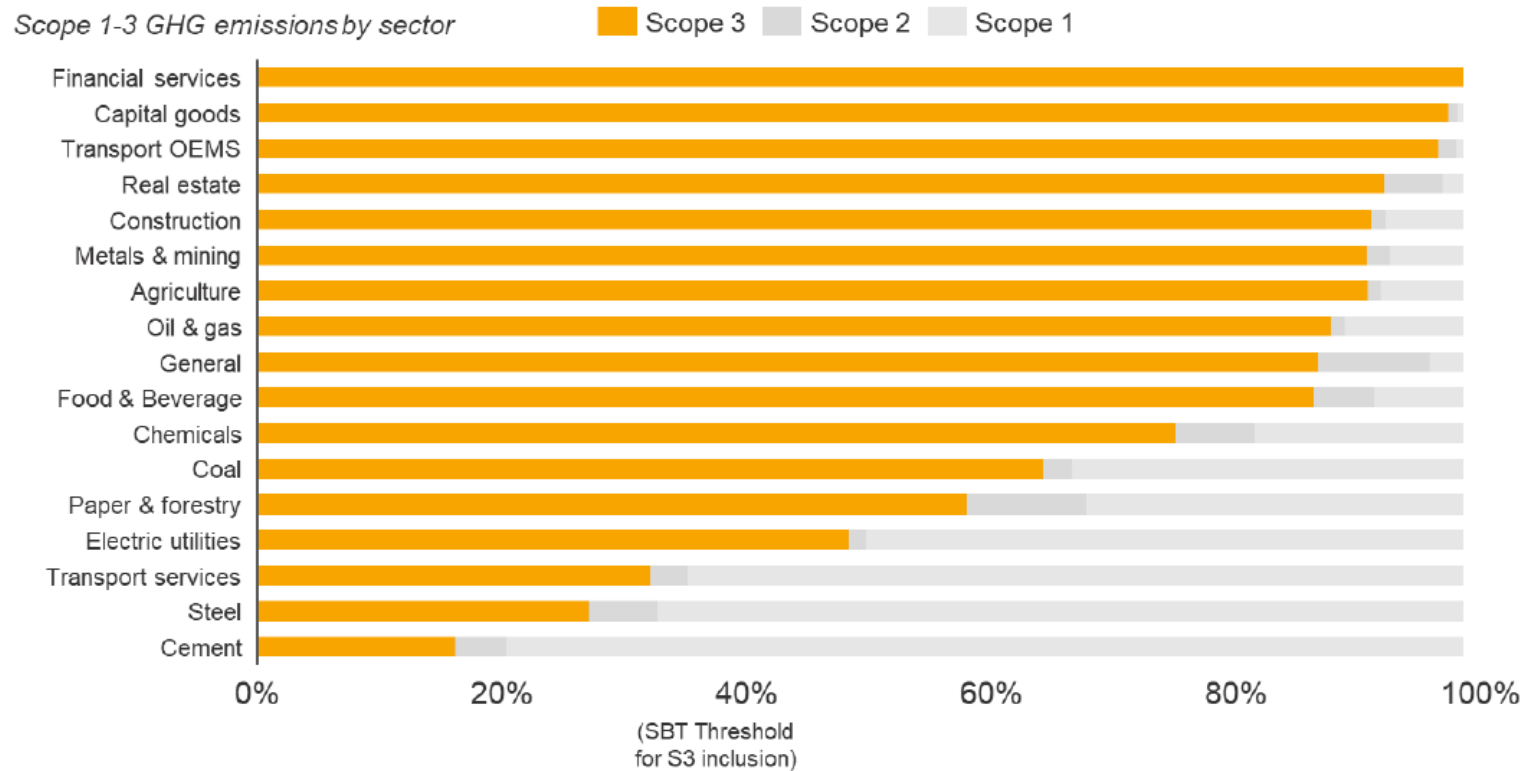
- The scope 1 and scope 2 emissions of franchisees that occur during operation of franchises (e.g., from energy use)
- **Optional:** The life cycle emissions associated with manufacturing or constructing franchises

15. Investments

- Operation of investments (including equity and debt investments and project finance) in the reporting year, not included in scope 1 or scope 2

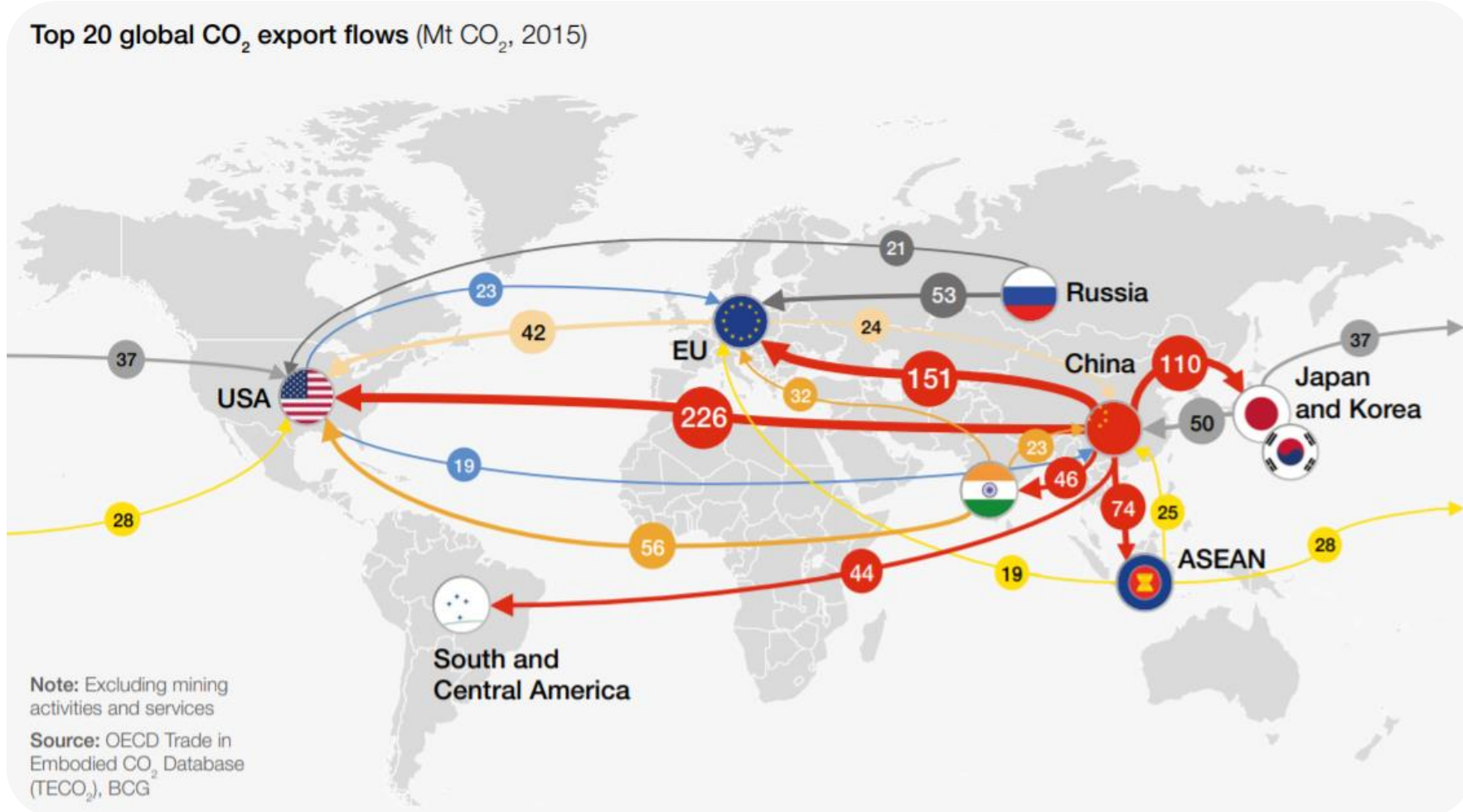
- See the description of category 15 (Investments) in section 5.5 for the required and optional boundaries

Scope 3: About 75% of corporate GHG emissions originate in scope 3



Source: Catalyzing Value Chain Decarbonization, SBTi, February 2023.

Embedded GHG emissions in global trades



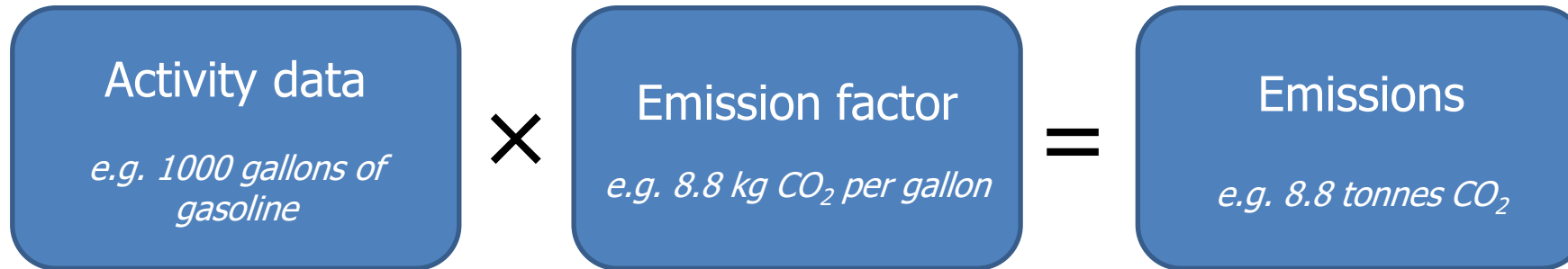
More and more jurisdictions are considering mandating scope 3 reporting

Jurisdiction	Scope 1	Scope 2	Scope 3
Australia*			
Brazil*			
Canada*			
EU			
Hong Kong*			
India			
China mainland*			
Japan*			
Malaysia*			
New Zealand			
Philippines			
Singapore			
Taiwan			
UK			
USA			

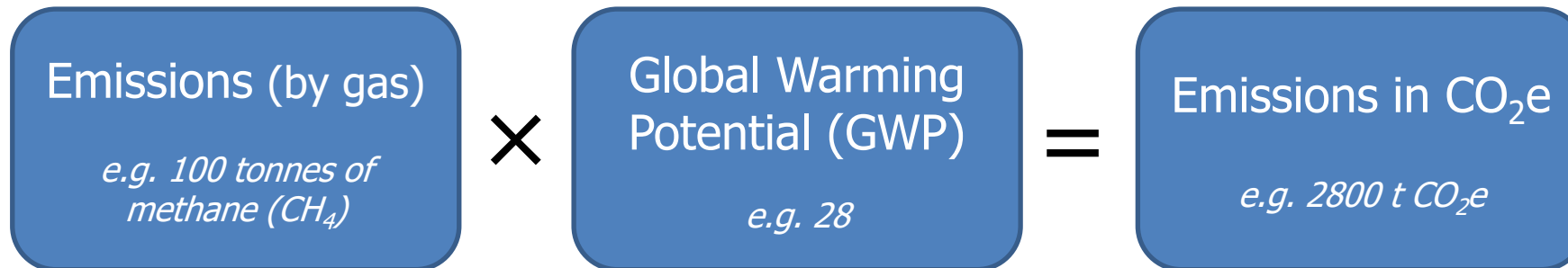
Note: This is an incomplete list based on publicly available information. The table shows only a high-level snapshot of the requirements, which may not fully reflect the nuances of each reporting regulation/guideline and the status of implementation.

* Jurisdictions with committed/draft regulations such as draft rules or guidance in which the status may change depending on regulatory approval processes.

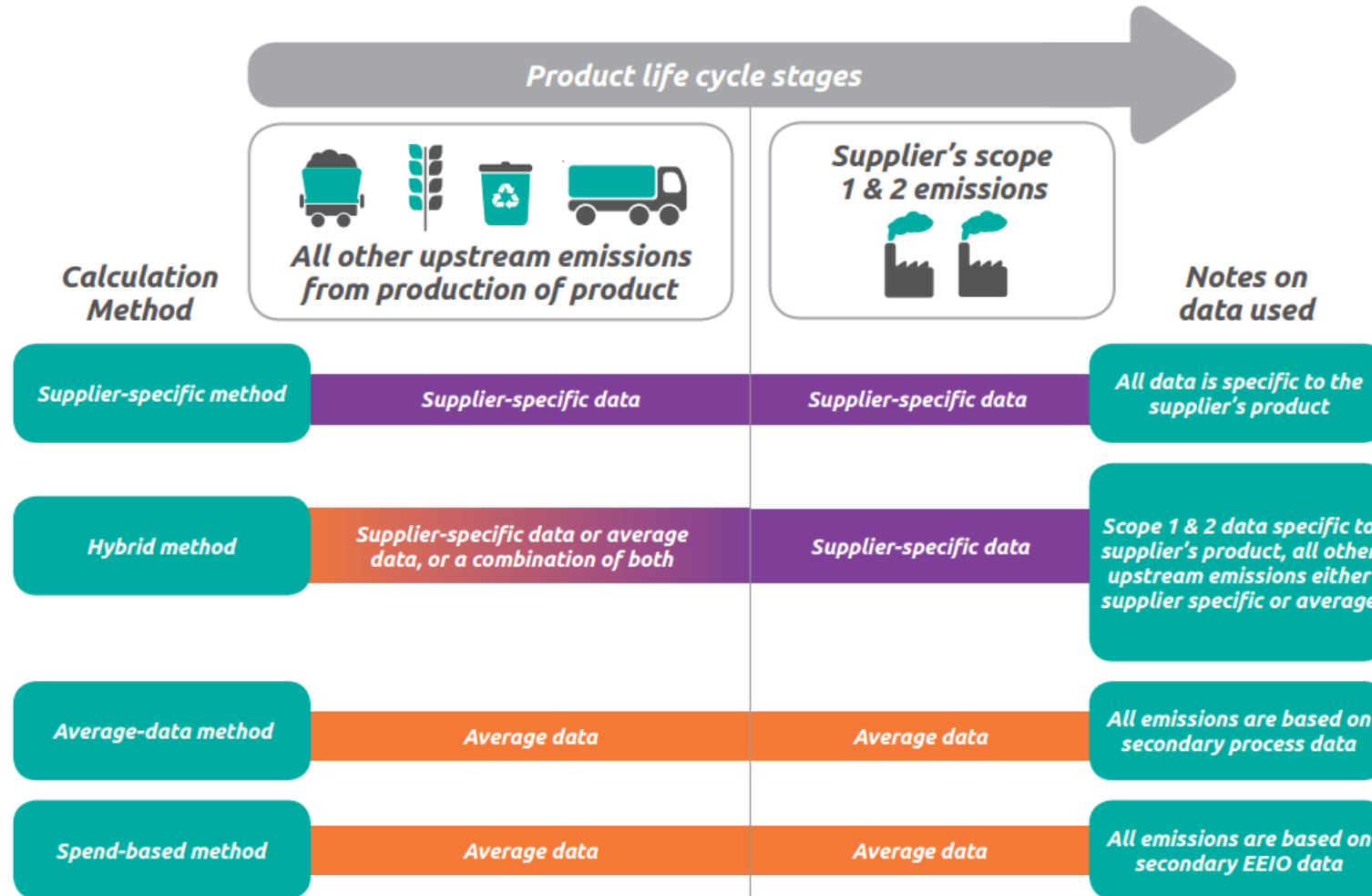
Basic approach to calculating emissions



Converting non-CO₂ gases to carbon dioxide equivalent (CO₂e):



Methods for calculating upstream scope 3 emissions from products (cat. 1)



Greenhouse gas accounting and reporting resources:

- GHG Protocol website provides resources for companies, organizations, cities, and governments:

- Greenhouse gas accounting and reporting standards
- Sector guidance
- Calculation tools & emission factors
- Online training resources

- Available at www.ghgprotocol.org



Corporate Standard

The GHG Protocol Corporate Accounting and Reporting Standard provides requirements and guidance for companies and other organizations, such as NGOs, government agencies, and universities, that are preparing a corporate-level GHG emissions inventory.

Best for: Companies and Organizations
Online learning product:
[Corporate Standard Training Webinar](#)



Corporate Value Chain (Scope 3) Standard

The Corporate Value Chain (Scope 3) Standard allows companies to assess their entire value chain emissions impact and identify where to focus reduction activities.

Best for: Companies and Organizations
Online learning product:
[Corporate Value Chain \(Scope 3\) Standard Online Course](#)



Product Standard

The Product Standard can be used to understand the full life cycle emissions of a product and focus efforts on the greatest GHG reduction opportunities. This is the first step towards more sustainable products.

Best for: Companies and Organizations
Online learning product:
[Product Life Cycle Standard Online Course](#)



Project Protocol

The GHG Protocol for Project Accounting is the most comprehensive, policy-neutral accounting tool for quantifying the greenhouse gas benefits of climate change mitigation projects.



Scope 2 Guidance

The Scope 2 Guidance standardizes how corporations measure emissions from purchased or acquired electricity, steam, heat, and cooling (called "scope 2 emissions").



Scope 3 Calculation Guidance

Building on the Scope 3 Standard, this companion guide makes it easier than ever for businesses to complete their scope 3 inventories.

GHG Protocol resources for calculating scope 3 emissions

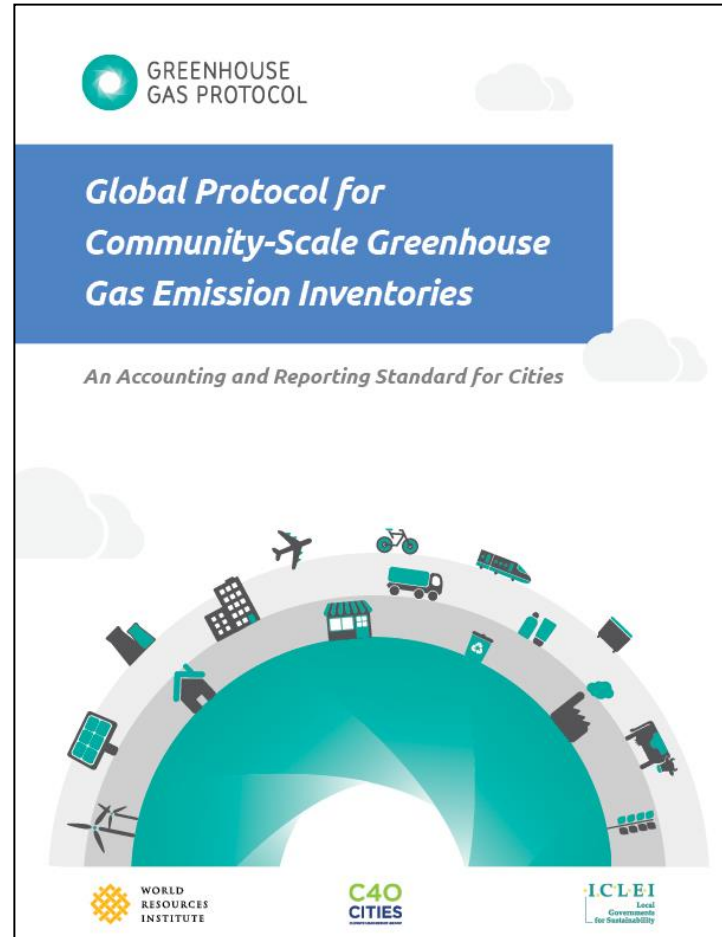
- Excel-based calculation tools
 - » <https://ghgprotocol.org/calculation-tools>
- *Technical Guidance for Calculating Scope 3 Emissions* (for each scope 3 category)
 - » <https://ghgprotocol.org/scope-3-technical-calculation-guidance>
- Supplier engagement guidance
 - » <https://ghgprotocol.org/standards/scope-3-standard>
- List of life cycle databases
 - » <https://ghgprotocol.org/life-cycle-databases>
- Scope 3 evaluator tool (for scope 3 screening assessment)
 - » <https://ghgprotocol.org/scope-3-evaluator>
- Scope 3 online training (e-learning) course
 - » <https://ghgprotocol.org/scope3-standard-online-course>

All scope 3 resources are available at <https://ghgprotocol.org/standards/scope-3-standard>

3

GHG Protocol for Cities

The GHG Protocol for Cities (GPC)



Geographic boundary

- Cities shall establish a geographic boundary that identifies the spatial dimensions of the inventory's assessment boundary.
- This geographic boundary defines the physical perimeter separating in-boundary emissions from out-of-boundary and trans-boundary emissions.

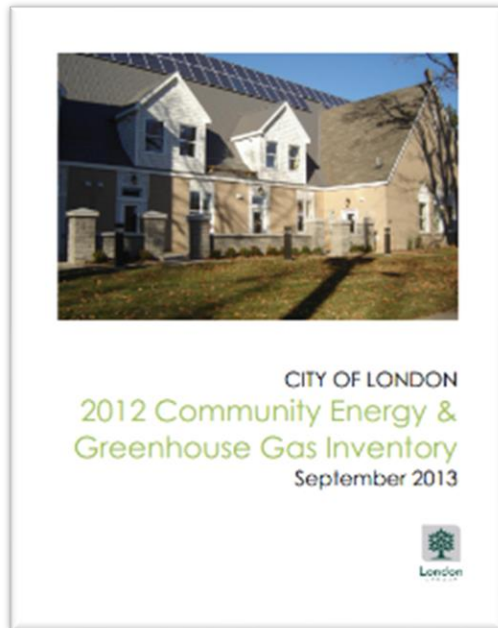
Melbourne chose to report emissions only from the Central Business District administrative area.

Quito reported emissions from just the urban area of the city as the metropolitan area was very large and skewed their results.

Cities can also choose the administrative boundary of the local government, a ward/borough within city, or any other geographically identifiable entity.

Time period of assessment

Normally, a single reporting year (calendar year/financial year)



London, UK, **annually**



Mexico city, **biennially**



Rio de Janeiro, Brazil,
every 4 years

GPC recommends to update annually

Greenhouse gases

- | | |
|---|-------|
| <ul style="list-style-type: none">• Carbon dioxide (CO₂)• Methane (CH₄)• Nitrous oxide (N₂O) | BASIC |
|---|-------|
- Hydrofluorocarbons (HFCs)
 - Perfluorocarbons (PFCs)
 - Sulphur hexafluoride (SF₆)
 - Nitrogen trifluoride (NF₃)

Reporting framework

Scope Framework

Comprehensively report all GHG emissions from:

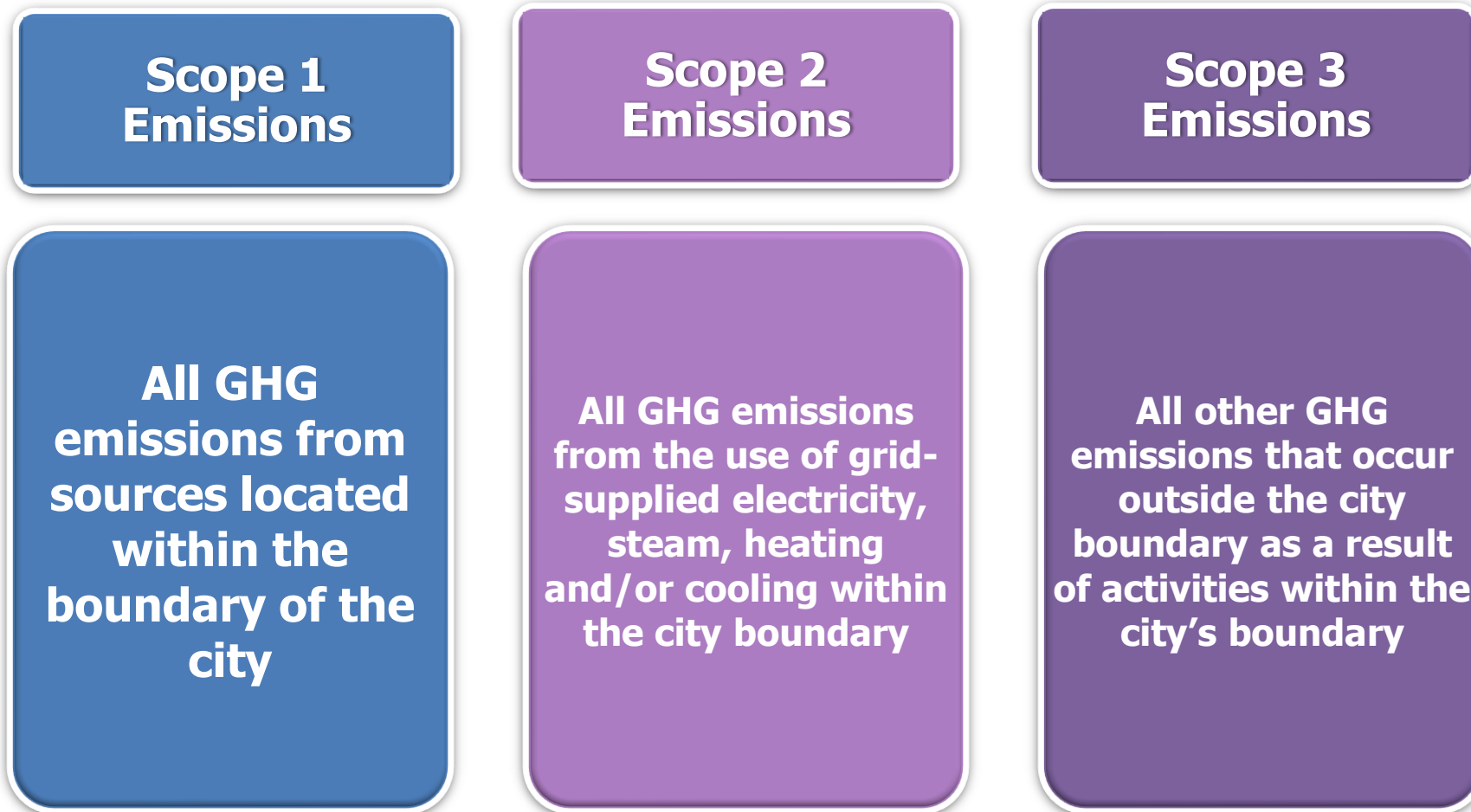
- Emissions from in-boundary sources (**scope 1**, or “**territorial**”)
- Emissions from the use of grid-supplied energy (**scope 2**)
- Emissions from out-of-boundary sources as a result of activities in the city (**scope 3**)

City-induced Framework

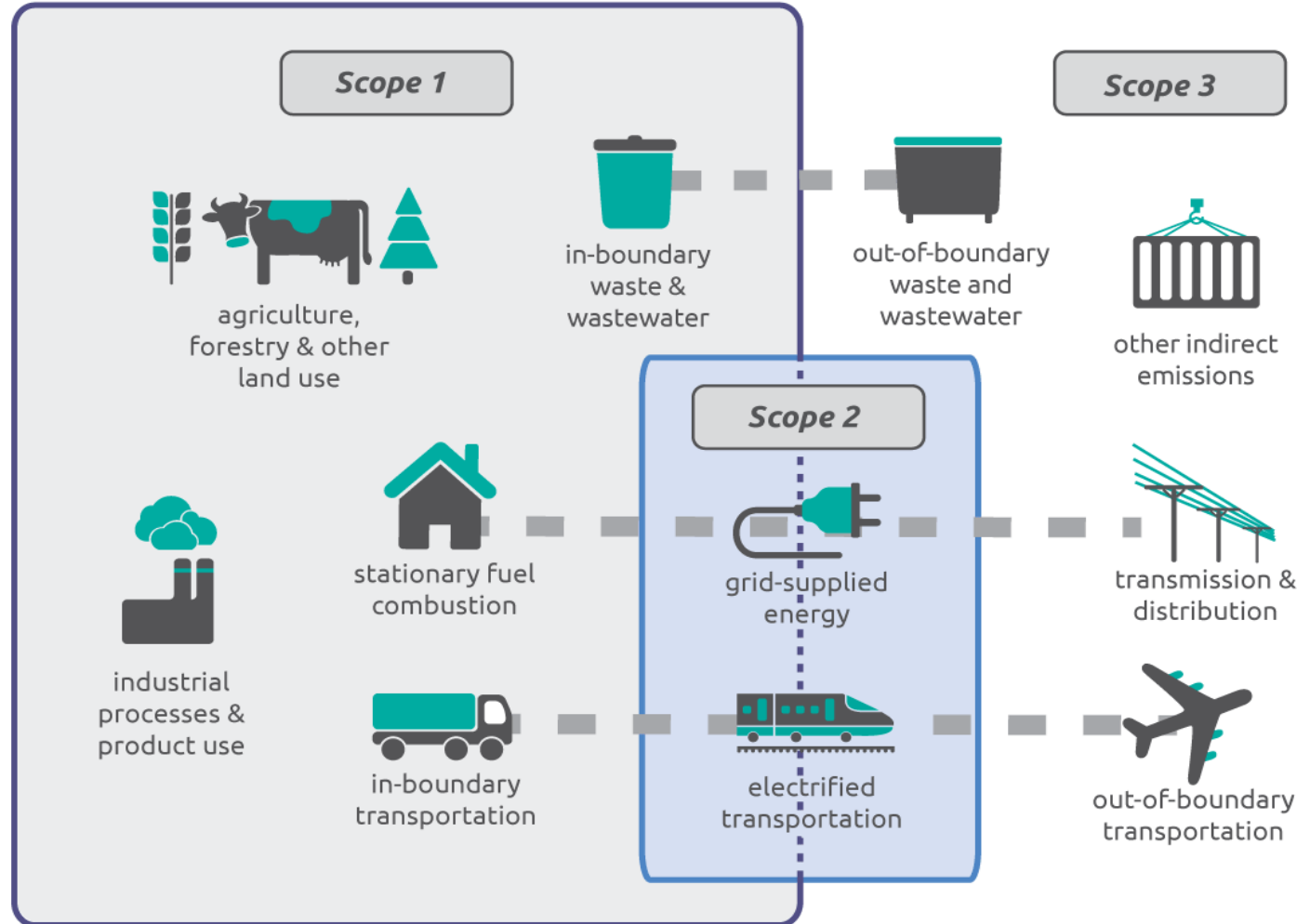
Report only GHG emissions that attributable to activities in the city:

- **BASIC** level reporting:
Cover sources that occur in almost all cities and calculation methodologies/data are more readily available
- **BASIC+** level reporting:
More comprehensive coverage of emissions sources

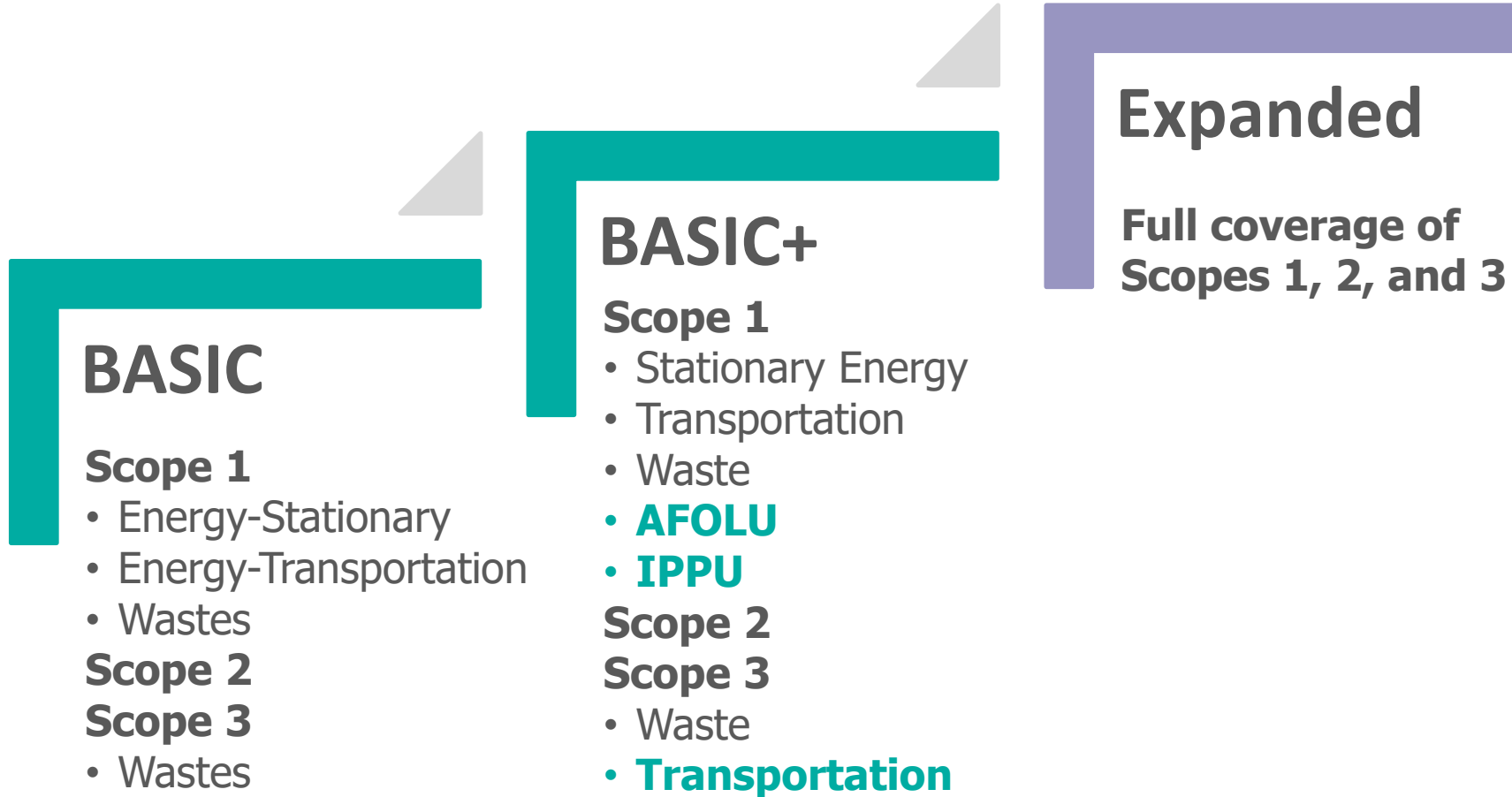
Scope framework



Scope framework - illustration



City-Induced Framework



Reporting framework

Inventory boundary	City Information
Name of city	
Country	
Inventory year	
Geographic boundary	
Land area (km ²)	
Resident population	
GDP (US\$)	
Composition of economy	
Climate	
Other information	

Sector		Total by scope (tCO ₂ e)				Total by city-induced reporting level (tCO ₂ e)	
		Scope 1 (Territorial)	Scope 2	Scope 3 included in BASIC/ BASIC+	Other Scope 3	BASIC	BASIC+
Stationary Energy	Energy use (all I emissions except I.4.4)						
	<i>Energy generation supplied to the grid (I.4.4)</i>						
Transportation (all II emissions)							
Waste	Generated in the city (all III.X.1 and III.X.2).						
	<i>Generated outside city (all III.X.3)</i>						
IPPU (all IV emissions)							
AFOLU (all V emissions)							
Total		(All territorial emissions)				(All BASIC emissions)	(All BASIC & BASIC+ emissions)

Sources required for BASIC reporting

+ Sources required for BASIC+ reporting


Sources included in Other Scope 3

Sources required for territorial total but not for BASIC/BASIC+ reporting (*italics*)

Non-applicable emissions

Reporting requirements: inventory boundary

A. INVENTORY BOUNDARY (GPC CHAPTER 4.4, TABLE 4.1, PAGE 40)

Boundary	Information	Reference(s)	Map of city boundary
Name of city	Autonomous City of Buenos Aires		
Country	Argentina		
Region	Buenos Aires Province		
Inventory year (select from list)	2013	<i>Calendar year: 1st of January 2013 to 31st of December 2013.</i>	
Geographic boundary (select from list)	Administrative boundary of a local government	http://www.buenosaires.gob.ar/agenciaambiental/cambioclimatico/english-information-	
Heating degree days (HDD, °C)	n/a	<i>Inventory is not weather corrected</i>	
Cooling degree days (CDD, °C)	n/a	<i>Inventory is not weather corrected</i>	
Land area (km2) within city boundary	202.04	Source: General direction of legislative documentation (CEDOM)	
Resident population within city boundary*	3079071	Lost city of Atlantic population estimate	
GDP (US\$) of economic activity within city boundary*	79384000000	Source: Treasury Secretariat converted to US Dollar based on exchange currency price	
Type of economy (select from list)	Services	Source: Treasury Secretariat - Statistics and Census General Direction (Anual report)	
Climate (select from list)	Temperate, hot summer	It's located in a region with humid subtropical climate, with scarce rainfalls	
Other information	3.389.350 commuters	The City doubles its population daily because of the more than 3 million people	

* Should correspond to inventory year

Reporting requirements: inventory information

- Reporting level
 - BASIC/BASIC+

Most cities report a **BASIC** inventory. BASIC should be stated unless all BASIC+ sources that are occurring have been included. **Paris** stated a BASIC+ inventory but had not estimated or confirmed the absence of some BASIC sources so could only report a BASIC inventory.

- GHGs included
 - CO₂, CH₄, N₂O, HFC, PFC, SF₆, NF₃

A BASIC inventory shall report **CO₂, CH₄ and N₂O**

- Global warming potentials
 - IPCC Assessment Report (2nd, 3rd, 4th, 5th, 6th)

An explanation should be provided if GWPs from latest IPCC guidelines aren't used. **Tokyo** had to update their 2013 inventory as they had used 2nd AR in their 2012 inventory

- Overall methodology
 - E.g., IPCC 2006 Guidelines

A brief **description** is adequate

- Emission sources
 - Stationary energy
 - Transportation
 - Waste
 - Industrial processes and product use
 - Agriculture, forestry, and other land use

Stationary energy, transportation and waste are required for a **BASIC** inventory. IPPU and AFOLU are required for a **BASIC+** inventory

Reporting requirements: information on emissions

Emissions by gas

- Emissions in metric tonnes by gas as well as CO₂ equivalent (CO₂e)

Emissions by source

- Emissions by gas for each sector and subsector

Emissions by scope

- Emissions aggregated and reported by scope 1, 2 and 3 separately

Reporting requirements: Notation Keys

Any specific exclusions of sources, facilities, and / or operations and a justification for their exclusion. Consistent with national government inventory practices based on IPCC and UNFCCC processes, the GPC uses **Notation Keys** so that exclusions can be clearly identified and justified.

NE must NOT be used for BASIC sources

NO can be used for *very insignificant* sources

Notation key	Definition	Explanation
IE	Included Elsewhere	GHG emissions for this activity are estimated and presented in another category of the inventory. That category shall be noted in the explanation.
NE	Not Estimated	Emissions occur but have not been estimated or reported; justification for exclusion shall be noted in the explanation.
NO	Not Occurring	An activity or process does not occur or exist within the city.
C	Confidential	GHG emissions which could lead to the disclosure of confidential information and can therefore not be reported.

Reporting requirement? methodology and data quality

Description of **methodologies**

London – “domestic combustion of gas, coal & oil is calculated by summing UK sub-national energy data for London boroughs and multiplying by UK average emission factor for fuel type”

Description of the **types** and **sources** of data, including activity data, emission factors, and GWP

This includes a source name, provider, reporting period, frequency, when the data was released, the scale of the data and a link to where the data can be accessed

Assessment of **data quality** for the activity data and emission factors:

- **High (H)** generally includes localized emission factors and detailed activity data;
- **Medium (M)** generally includes national emission factors or generic activity data;
- **Low (L)** generally includes international/national emission factors and generic activity data.

Sydney assessed metered data from gas utility companies to be high quality AD

Amman used transport EFs from Zarqa (a nearby city); these were assessed to be medium quality

London used the latest IPCC 2006 EF for composting; this was assessed to be low quality

Reporting requirements: global warming potentials

Convert individual GHGs into CO₂e using GWPs from latest IPCC guidelines (AR4) or in-line with country's national inventory

Many ICLEI US cities had to update their inventories from using AR2 GWPs to AR4.

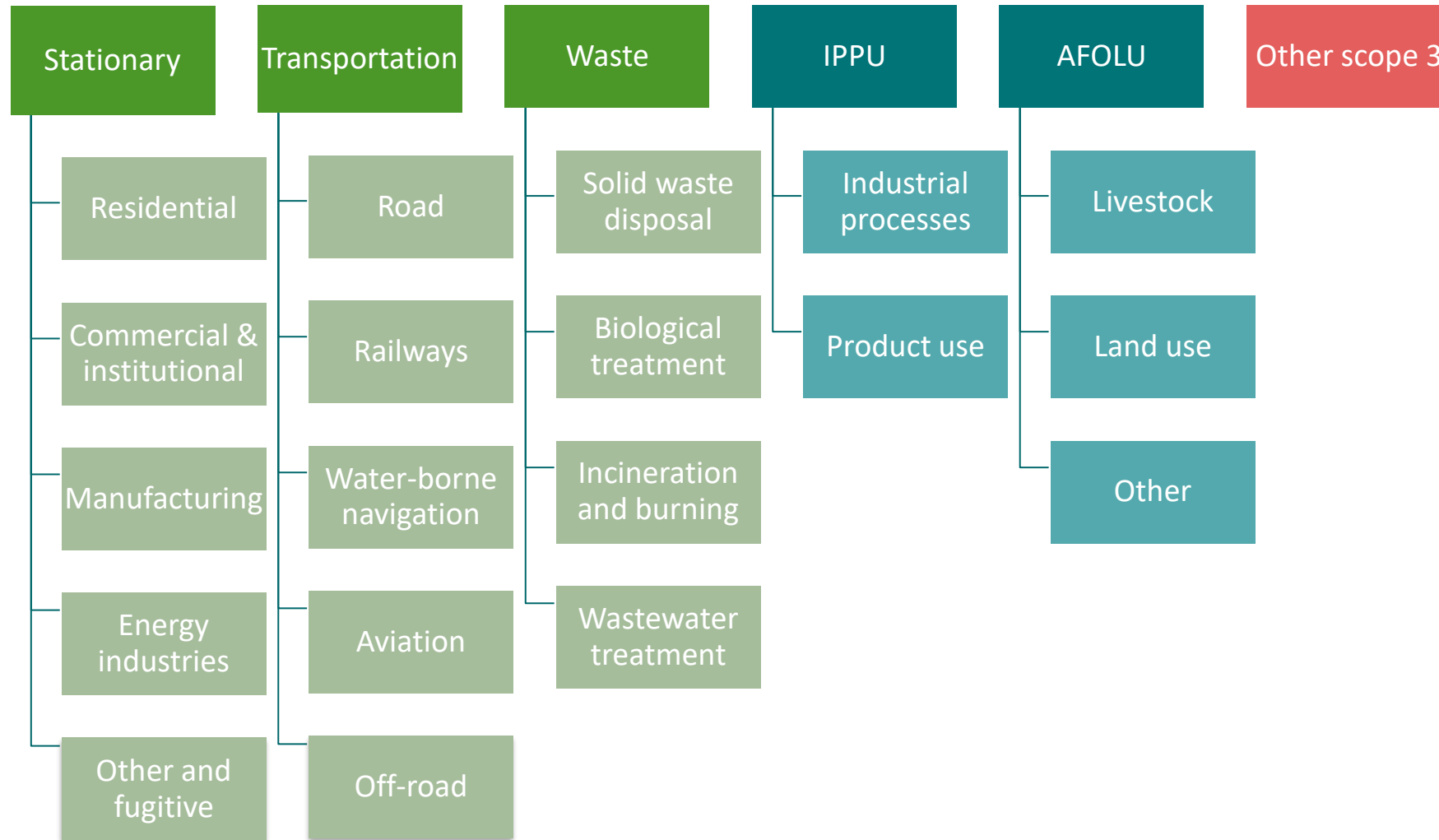
Tokyo also had to update their 2013 inventory as they had used 2nd AR in their 2012 inventory

Any changes in GWP values used should be reflected in the city's historical emissions profile.

Table 5.2 GWP of major GHG gases

Name	Formula	GWP values in IPCC Second Assessment Report ¹⁹ (CO ₂ e)	GWP values in IPCC Third Assessment Report ²⁰ (CO ₂ e)	GWP values in IPCC Fourth Assessment Report ²¹ (CO ₂ e)	GWP values in IPCC Fifth Assessment Report ²² (CO ₂ e)
Carbon dioxide	CO ₂	1	1	1	1
Methane	CH ₄	21	23	25	28
Nitrous oxide	N ₂ O	310	296	298	265
Sulfur hexafluoride	SF ₆	23,900	22,200	22,800	23,500
Carbon tetrafluoride	CF ₄	6,500	5,700	7,390	6,630
Hexafluoroethane	C ₂ F ₆	9,200	11,900	12,200	11,100
HFC-23	CHF ₃	11,700	12,000	14,800	12,400
HFC-32	CH ₂ F ₂	650	550	675	677
HFC-41	CH ₃ F	150	97	92	116
HFC-125	C ₂ HF ₅	2,800	3,400	3,500	3,170
HFC-134	C ₂ H ₂ F ₄	1,000	1,100	1,100	1,120
HFC-134a	CH ₂ FCF ₃	1,300	1,300	14,300	1,300
HFC-143	C ₂ H ₃ F ₃	300	330	353	328
HFC-143a	C ₂ H ₃ F ₃	3,800	4,300	4,470	4,800
HFC-152a	C ₂ H ₂ F ₂	140	120	124	138
HFC-227ea	C ₃ HF ₇	2,900	3,500	3,220	3,350
HFC-236fa	C ₃ H ₂ F ₆	6,300	9,400	9,810	8,060
HFC-245ca	C ₃ H ₃ F ₅	560	950	1,030	716
Nitrogen trifluoride	NF ₃	-	-	17,200	16,100

Emissions sectors








Stationary Energy: reporting sub-sectors

Stationary energy source by subsectors	Scope 1	Scope 2	Scope 3
Residential buildings	1.1.1	1.1.2	1.1.3
Commercial and institutional buildings / facilities	1.2.1	1.2.2	1.2.3
Manufacturing industries and construction	1.3.1	1.3.2	1.3.3
Energy industries	1.4.1	1.4.2	1.4.3
In-boundary production of grid-supplied energy	1.4.4		
Agriculture, forestry and fishing activities	1.5.1	1.5.2	1.5.3
Non-specified sources	1.6.1	1.6.2	1.6.3
Fugitive emissions from mining, processing, storage and transportation of coal	1.7.1		
Fugitive emissions from oil and natural gas systems	1.8.1		

BASIC = 

BASIC+ = 

-  All cities and communities have emissions in these sectors
-  Most cities have emissions in these sectors; smaller towns may not
-  Less common and dependent on specific activities occurring.
-  Rare
-  Occurs where there are natural gas networks

Transportation: defining boundaries

Scope 1 Emissions

Emissions from travel occurring within the city boundary

Scope 2 Emissions

All GHG emissions from the generation of grid-supplied electricity used for electric-powered mobile units

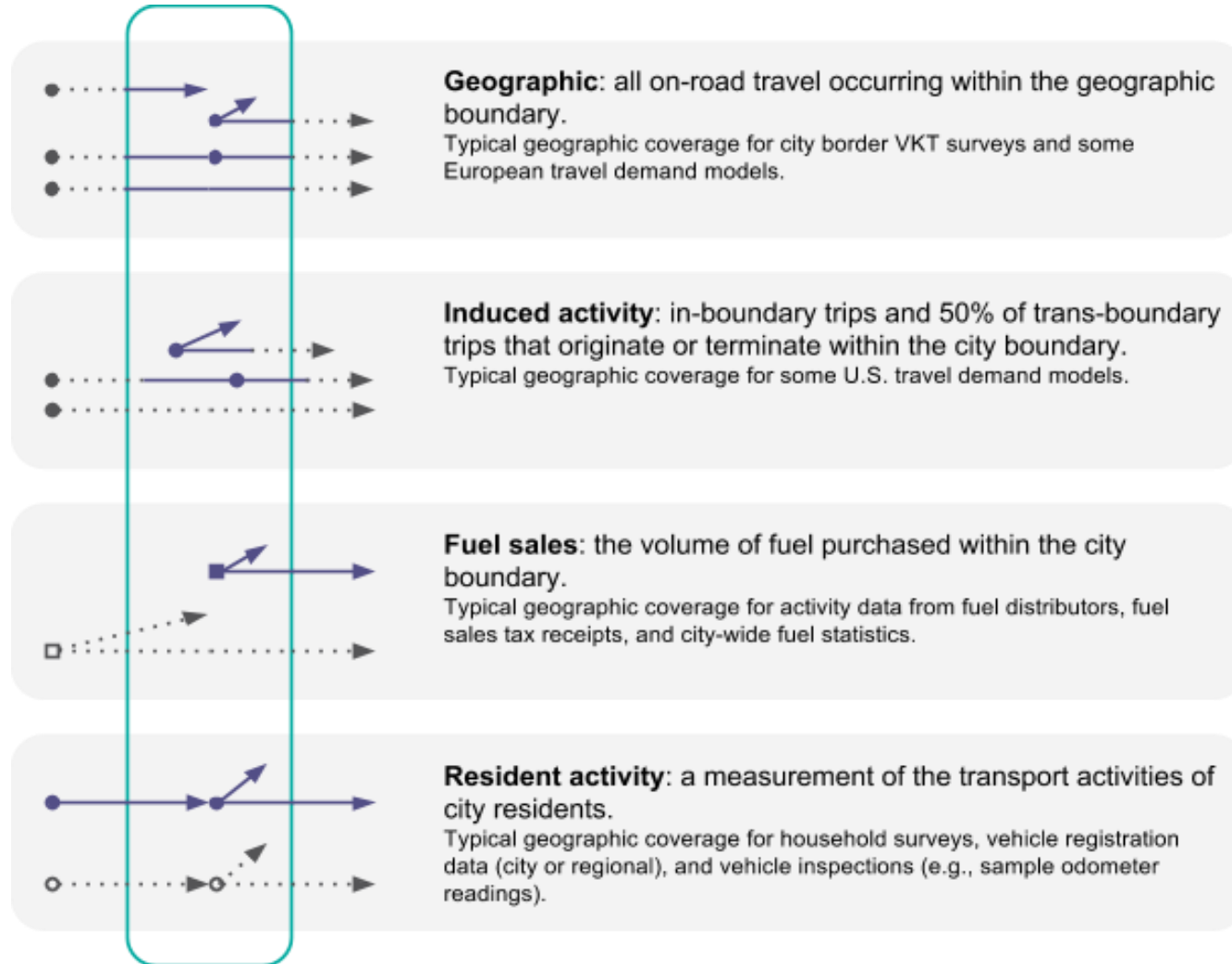
Scope 3 Emissions

GHG emissions from trans-boundary journeys occurring outside the city boundary, and T&D losses from grid-supplied energy

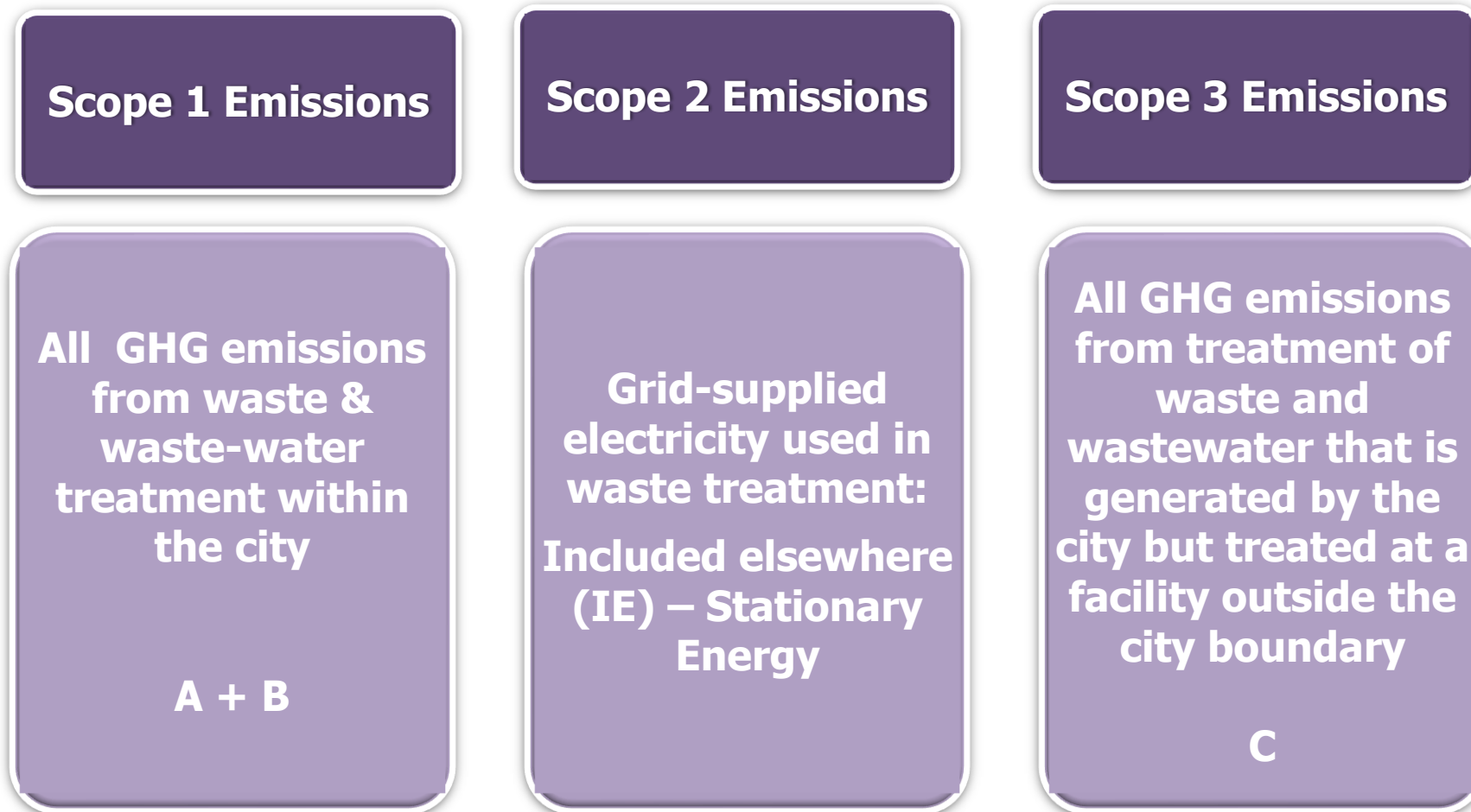
Road Transport: four methods

Method	Allocation principle	Scope 1	Scope 2	Scope 3
Fuel Sales Approach	N/A unless additional steps taken	All emission from fuel sold within boundary	Any electric charging station in the city boundary	N/A unless fuel sales allocated between Scope 1 and 3 by specified method
City- induced Activity	Origin-Destination	Report in-boundary 50% of trip (pass through trips excluded)		Report out-of-boundary portion of 50% trip allocation
Geographic/ Territorial	N/A	All traffic occurring within city boundaries, regardless of origin or destination		N/A
Resident Activity	Options	Either resident activity is all Scope 1 or use origin-destination		

Road Transport: four methods

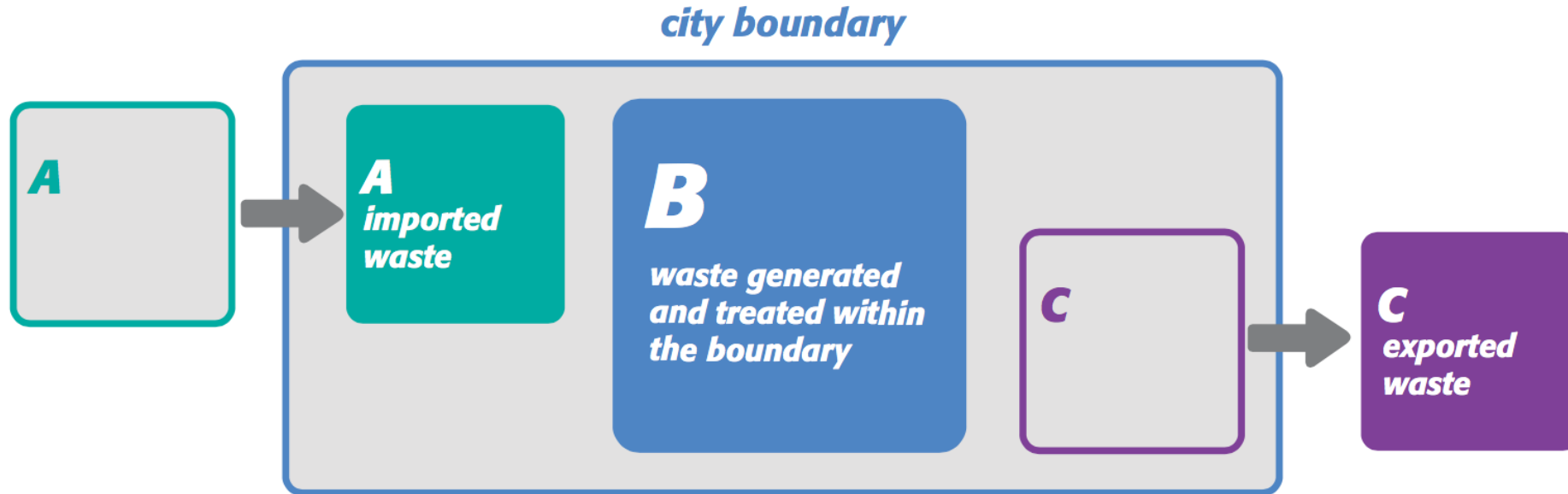


Waste: defining boundaries



Waste: defining boundaries

- Emissions generated within the boundary = Scope 1
- Emissions generated outside of the boundary = Scope 3 (whether treated inside or outside the city boundary)

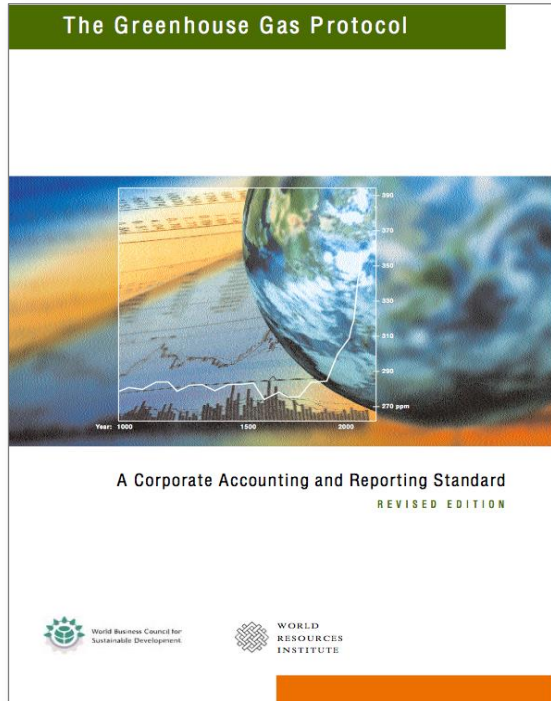


- Emissions from imported waste and wastewater treatment = EXCLUDED from BASIC reporting (but included in total Scope 1 emissions for the **Territorial inventory**)

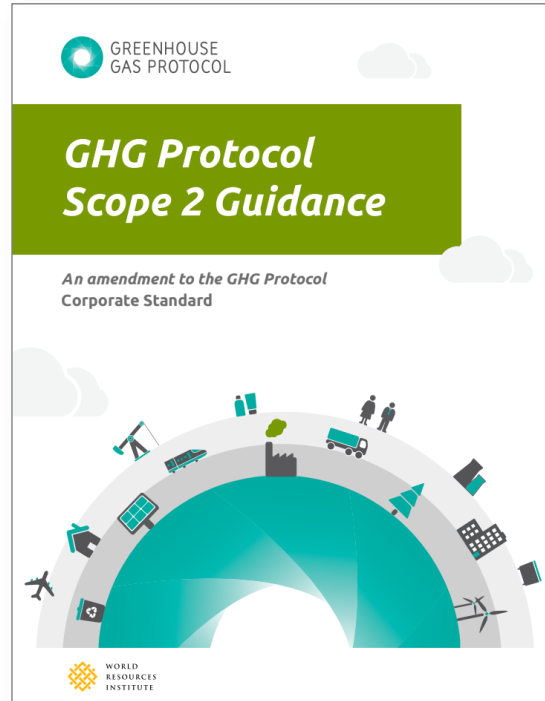
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Recap

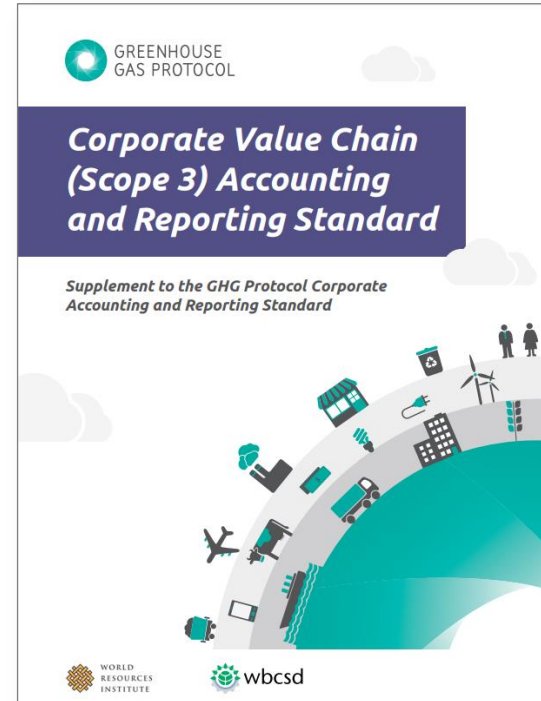
Standards and guidance for company/organization-level inventories



Corporate Standard



Scope 2 Guidance



Scope 3 Standard



Land Sector and Removals Guidance

*Under development;
Draft available*

Being updated

Standards and guidance for cities and countries



**Policy and Action
Standard**



**Mitigation Goal
Standard**



**GHG Protocol for
Cities (GPC)**

Thank you

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ghgprotocol.org