BEYOND SMART CITIES
URBAN GREENHOUSE GAS INVENTORY
SPECIALIST TRAINING COURSE
KRISHNAJI PAWAR, LEED AP BD+C,GSAS CGP,ISO 14001:2015,GCP
GHG AND CLIMATE CHANGE SPECIALIST CURRICULUM

GHG & CLIMATE CHANGE
URBAN GREENHOUSE GAS OVERVIEW
FOR GHG & CLIMATE CHANGE PROFESSIONALS
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WHAT SHOULD YOU LEARN
NO PLASTIC
Introduction
Defining an inventory boundary and emission sources
Categorizing emissions
Aggregating city inventories
Reporting requirements
Calculating GHG emissions
Tracking progress and setting targets
Managing inventory quality and verification

INTRODUCTION

Cities are the global centers of communication, commerce and culture. They are also a significant, and growing, source of energy consumption and greenhouse gas (GHG) emissions.

A city's ability to take effective action on mitigating climate change, and monitor progress, depends on having access to good quality data. Planning for climate action begins with developing a GHG inventory. An inventory enables cities to understand the emissions contribution of different activities in the community.

The GPC requires cities to measure and disclose a comprehensive GHG inventory using two distinct but complementary approaches. One captures emissions from both production and consumption activities taking place within the city boundary, including some emissions released outside the city boundary.

The other categorizes all emissions into "scopes," depending on where they physically occur. Separate accounting of emissions physically released within the city boundary should be used for aggregation of multiple city inventories in order to avoid double counting.

DEFINING AN INVENTORY BOUNDARY AND EMISSION SOURCES

To use the GPC, cities must first define an inventory boundary. This identifies the geographic area, time span, gases, and emission sources, covered by a GHG inventory. Any geographic boundary may be used for the GHG inventory.

The GPC is designed to account for GHG emissions in a single reporting year and covers the seven gases covered by the Kyoto Protocol

GHG emissions from city activities shall be classified into six main sectors:

- ☑Stationary energy
- ☑Transportation
- ☑Waste
- ☑Industrial processes and product use (IPPU)
- ☑Agriculture, forestry, and other land use (AFOLU)
- ☑Any other emissions occurring outside the geographic boundary as a result of city activities. These emissions are not covered in this version of the GPC but may be reported separately

CATEGORIZING EMISSIONS

Activities taking place within a city can generate GHG emissions that occur inside the city boundary as well as outside the city boundary.

To distinguish among them, the GPC groups emissions into three categories based on where they occur: scope 1, scope 2 or scope 3 emissions.

Scopes definitions for city inventories

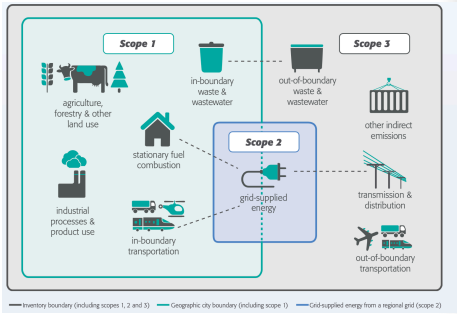
- ☑Scope 1 : GHG emissions from sources located within the city boundary
- ☑Scope 2 : GHG emissions occurring as a consequence of the use of grid-supplied electricity, heat, steam and/or cooling within the city boundary
- ☑Scope 3 : All other GHG emissions that occur outside the city boundary as a result of activities taking place within the city boundary

AGGREGATING CITY INVENTORIES

The GPC has been designed to allow city inventories to be aggregated at subnational and national levels in order to:

- ☑ Improve the data quality of a national inventory, particularly where major cities' inventories are reported;
- ☑ Measure the contribution of city mitigation actions to regional or national GHG emission reduction targets;
- ☑ And identify innovative transboundary and cross-sectorial strategies for GHG mitigation.

SOURCES AND BOUNDARIES OF CITY GHG EMISSIONS



REPORTING REQUIREMENTS

The GPC requires cities to report their emissions by gas, scope, sector and sub-sector, and to add up emissions using two distinct but complementary approaches:

- ☑ Scopes framework: This totals all emissions by scope 1, 2 and 3. Scope 1 (territorial) allows for the separate accounting of all GHG emissions produced within the geographic boundary of the city, consistent with national-level GHG reporting.
- ☑ City-induced framework: This totals GHG emissions attributable to activities taking place within the geographic boundary of the city. It covers selected scope 1 (territorial), 2 and 3 emission sources representing the key emitting sources occurring in almost all cities, and for which standardized methods are generally available.

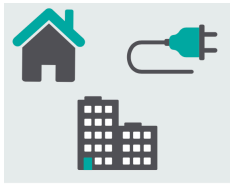
MANAGING INVENTORY QUALITY AND VERIFICATION

The GPC does not require that cities verify their inventory results, but recommends that cities choose the level and type of verification that meets their needs and capacity.

- To manage inventory quality over time, cities should establish a management plan for the inventory process. The design of an inventory management plan should provide for the selection, application, and updating of inventory methodologies as new data and research become available.
- Verification involves an assessment of the completeness and accuracy of reported data.
- Verification can be performed by the same organization that conducted the GPC assessment (self-verification), or by an independent organization (third-party verification).

EMISSION SOURCE SECTORS

STATIONARY ENERGY

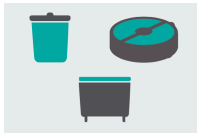


- Stationary energy sources are one of the largest contributors to a city's GHG emissions. These emissions come from the combustion of fuel in residential, commercial and institutional buildings and facilities and manufacturing industries and construction, as well as power plants to generate grid-supplied energy. This sector also includes fugitive emissions, which typically occur during extraction, transformation, and transportation of primary fossil fuels.

TRANSPORTATION

- Transportation covers all journeys by road, rail, water and air, including inter-city and international travel. GHG emissions are produced directly by the combustion of fuel or indirectly by the use of grid-supplied electricity. Collecting accurate data for transportation activities, calculating emissions and allocating these emissions to cities can be a particularly challenging process. To accommodate variations in data availability, existing transportation models, and inventory purposes, the GPC offers additional flexibility in calculating emissions from transportation.

WASTE



- Waste disposal and treatment produces GHG emissions through aerobic or anaerobic decomposition, or incineration. GHG emissions from solid waste shall be calculated by disposal route, namely landfill, biological treatment and incineration and open burning. If methane is recovered from solid waste or wastewater treatment facilities as an energy source, it shall be reported under Stationary Energy. Similarly, emissions from incineration with energy recovery are reported under Stationary Energy.

INDUSTRIAL PROCESSES AND PRODUCT USE (IPPU)

- GHG emissions are produced from a wide variety of non-energy related industrial activities. The main emission sources are releases from industrial processes that chemically or physically transform materials (e.g., the blast furnace in the iron and steel industry, and ammonia and other chemical products manufactured from fossil fuels and used as chemical feedstock). During these processes many different GHGs can be produced. In addition, certain products used by industry and end-consumers, such as refrigerants, foams or aerosol cans, also contain GHGs which can be released during use and disposal.

AGRICULTURE, FORESTRY AND OTHER LAND USE (AFOLU)

- Emissions and removals from the Agriculture, Forestry and Other Land Use (AFOLU) sector are produced through a variety of pathways, including livestock (enteric fermentation and manure management), land use and land use change (e.g., forested land being cleared for cropland or settlements), and aggregate sources and non-CO2 emission sources on land (e.g., fertilizer application and rice cultivation).

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