



CityCatalyst

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Introduction

About us



Open Earth Foundation

Open Source to fight climate change



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CityCatalyst – Greenhouse Gas Inventories for Cities

The screenshot displays the CityCatalyst web application interface. At the top, the navigation bar includes the CityCatalyst logo, the text "CityCatalyst", and menu items for "Dashboard" and "Learn". On the right side of the navigation bar, there is a language selector set to "EN" with a dropdown arrow, and a user profile icon labeled "Evan Prodr..." with a dropdown arrow.

The main content area features a dark blue background. On the left, the city profile for "Rio de Janeiro" is shown with a location pin icon. Below the city name, two key statistics are displayed: "355.3 ktCO₂e" (Total Emissions in 2022) and "6.2M" (Total Population). A dropdown menu is open below the city name, listing several cities: Montreal, Canada; Rio de Janeiro, Brazil; Trieste, Italy; Mendoza, Argentina; Rio Branco, Brazil; Camaçari, Brazil; Corumbá, Brazil; and Caxias do Sul, Brazil. At the bottom of the dropdown is an option to "Add a new city".

On the right side of the main content area, there is a map of Rio de Janeiro and its surrounding regions, including areas like Mendes, Reserva Biológica do Tingüá, Guapimirim, Itaperi, Queimados, Magé, Itaqui, Duque de Caxias, São Gonçalo, and Itaboraí. The map shows the city's location relative to the bay and surrounding land. A copyright notice for "© OpenStreetMap contributors" is visible at the bottom right of the map.

At the bottom of the interface, there are two white action cards. The first card, titled "Add data to inventory", features a green icon of a document with a plus sign and the text: "Upload data or connect third-party data to complete the GPC Basic Emissions Inventory". The second card, titled "Download & share", features a blue icon of a document with a download arrow and the text: "View and download your inventory data in CSV or GPC format and share your progress".

What is a greenhouse gas inventory?

Accounting

For all greenhouse gases emitted by or within a city

Purpose

Ordered

By sector, gas, scope

Hierarchy

Standard

GHG Protocol for Cities

Format

Why it matters

Measurement leads to climate action

Cities that track emissions are more likely to act

Necessary for investment

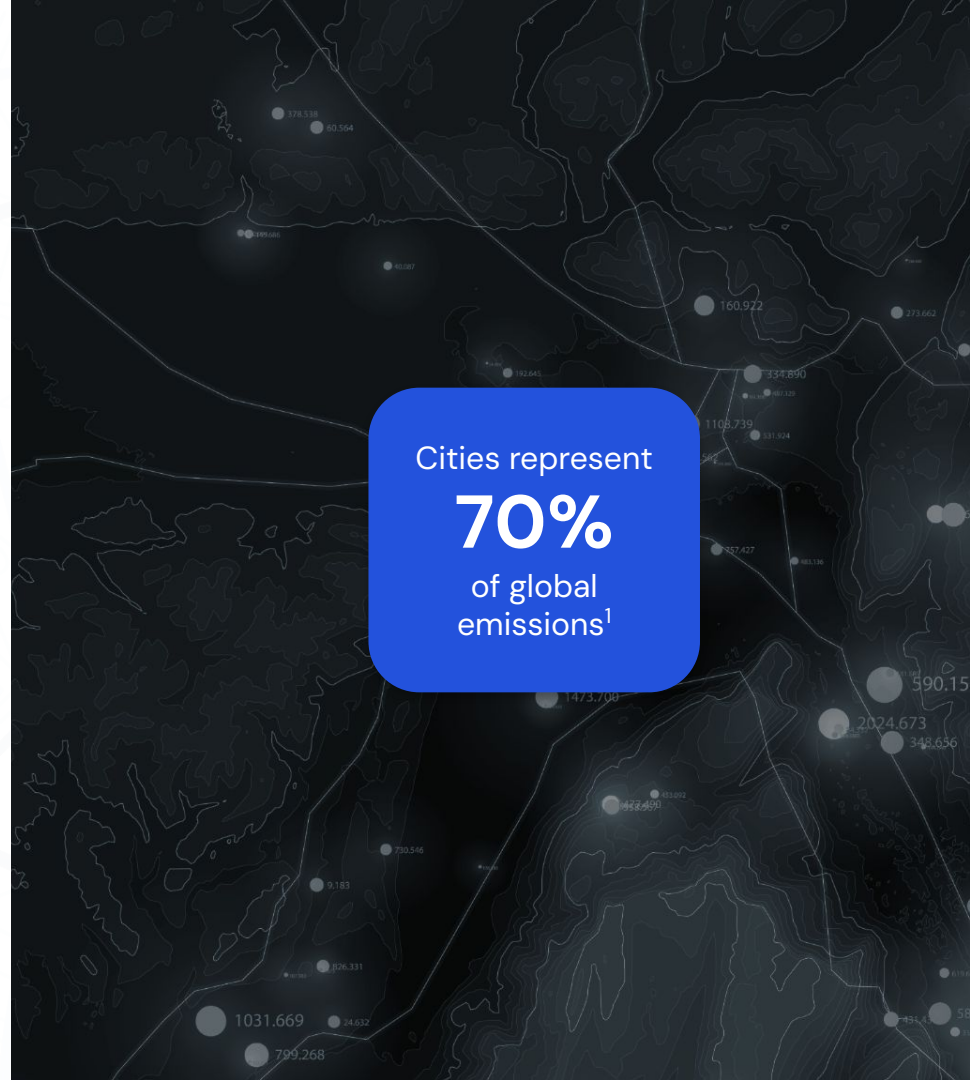
Grant-makers require an inventory

Coordination with other actors

Regional, national, corporate

Transparency for citizens

Holding city governments accountable



Only 5% of Cities Have a Greenhouse Gas Inventory

Data

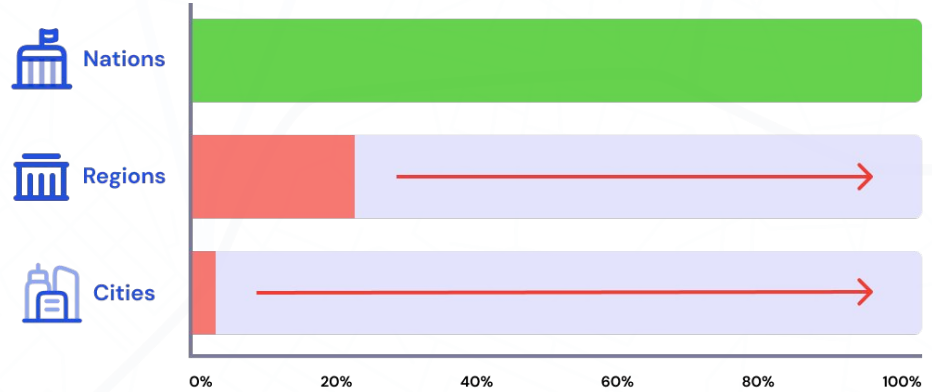
For every sector

Access

Personnel

Of input and output

Reliability



Web App For GHG Inventories

See your city's emissions totals for the year

Total Emissions

🌊 **6.16 Mt CO₂e**

Total GHG Emissions in 2022

🌊 **16.89 t CO₂e**

Emissions per capita in 2022

🕒 **0.3%**

% of country's emissions

Total Emissions



● INDUSTRIAL PROCESSES AND PRODUCT USE (IPPU)

● AGRICULTURE, FORESTRY AND LAND USE (AFOLU)

● WASTE AND WASTEWATER

● TRANSPORTATION

● STATIONARY ENERGY

Top Emissions

SUB-SECTOR	TOTAL EMISSIONS (CO ₂ EQ)	% OF EMISSIONS
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Emissions from land within the city boundary Scope 1 - AFOLU	4.32 Mt CO ₂ e	70%
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Emissions from livestock within the city boundary Scope 1 - AFOLU	1.03 Mt CO ₂ e	17%
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On-road transportation Scope 1 - Transportation	256.7 kt CO ₂ e	4%
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Global Data Warehouse For Easy Integration of Data

Add Data to Complete Your GHG Inventory

Add data or connect third-party data for your city and complete your city's emission inventory using the GPC Basic+ methodology. [Learn more](#) about GPC Protocol

Select Sector

Select and fill in the necessary data for the relevant sector to build a comprehensive GHG inventory.



Stationary energy

This sector deals with emissions that result from the generation of electricity, heat, and steam, as well as their consumption.

Scope Required for Basic+ GHG: 1, 2, 3

+ ADD DATA



Transportation

This sector deals with emissions from the transportation of goods and people within the city boundary.

Scope Required for Basic+ GHG: 1, 2, 3

+ ADD DATA



Waste and wastewater

This sector covers emissions generated from waste management processes.

Scope Required for Basic+ GHG: 1, 3

+ ADD DATA



Industrial processes and product use (IPPU)

This sector covers GHG emissions from industrial processes that transform materials, such as in steel production and chemical manufacturing.

Scope Required for Basic+ GHG: 1

+ ADD DATA



Agriculture, forestry and land use (AFOLU)

This sector covers emissions from agriculture, forestry, and land use changes, including livestock, land clearing, and activities like fertilizer application and rice cultivation.

Scope Required for Basic+ GHG: 1

+ ADD DATA

ASK AI

Guided data input for locally-sourced data

Add emission data ×

Building Type

Commercial / Institutional ▼

Fuel Type

Natural Gas ▼

Total fuel consumption 32,180 Liters (▼

Select emission factor type IPCC Emission Factor Database (EFDB ▼

Emissions factor values

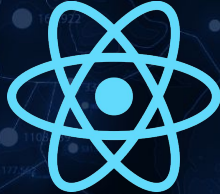
CO2 emission factor	N2O emission factor	CH4 emission factor
514.08 kg/m3	0.3 kg/m3	0.8 kg/m3

Go to page 1 of 1

Implementation

How we built it

NEXT.js



chakra



FastAPI



- Built using React, TypeScript, NextJS, ChakraUI, Postgres, Sequelize, AuthJS, Nivo, Pigeon Maps, Zod, i18next, decimal.js, ...
- Separate API for accessing data sources that different instances can connect to (because the individual data sources are very large) built on Python, FastAPI
- Data pipeline with Python, Pandas, and Mage AI to process large data sets into GPC standard and group by individual cities

Pilot project

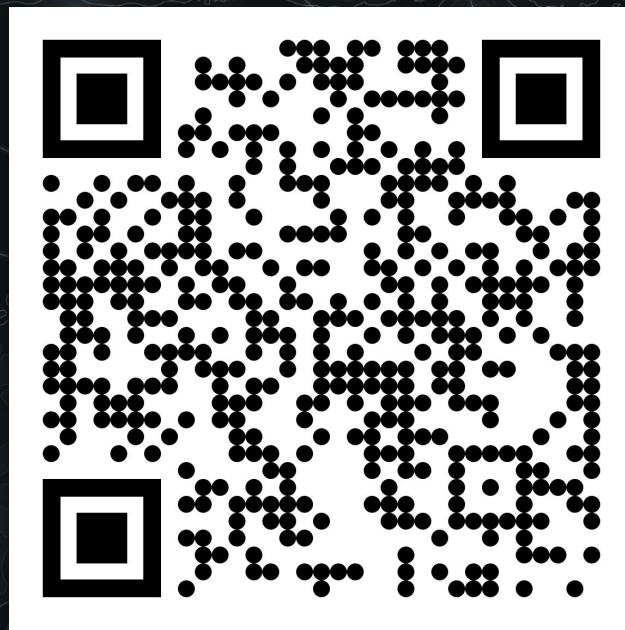
Brazil Pilot Project

- 50 cities in Brazil are getting a climate inventory (GHGI), climate action plan (CAP) and climate change risk assessment (CCRA) in this pilot project
- Collaboration with [I Care Brasil](#) for attaining the relevant data sources to supplement the publicly available ones
- 5 cities have been completed, the remaining ones are being finished in the next 2 months

How to **contribute**

- Create issues to report bugs or propose features
- Open pull requests
- Reach out to us

<https://github.com/Open-Earth-Foundation/CityCatalyst>





CityCatalyst

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