

Report on Open Data & IoT usage good practices for territorial governance at city-region level: some examples

EnCLOD

Project

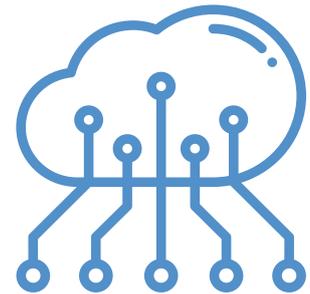
About the project

Premise

In our digital age, data is an essential resource for economic growth and innovation.

However, local public authorities in Central Europe are not always ready to take up the challenge of exploiting data for governance and decision making processes.

On the other hand, civil society and the private sector are digitalising at a faster pace than the public one.



Filling the gap

The EnCLOD project aims to strengthen the governance capacity of five Central European territories by leveraging [1] Open Data and [2] Internet of Things (IoT) technologies to address territorial needs, drive innovation, and support local economic development.

[1] Open data: data that anyone can access, use and share. Governments, businesses and individuals can use open data to bring about social, economic and environmental benefits.

(European Data)

[2] Internet of Things: “devices with embedded sensors, processing ability, software and other technologies that allows to connect and exchange data with other devices and systems over the internet or other communications networks”.

(European Commission)

About the project

How and where?

Fostering governance capacity of 5 territories in Central Europe by exploiting the opportunities coming from the technological progress.

The project includes the creation of 5 local Action Plans addressing, in each area, a specific challenge related to mobility/transport, environment, or climate change policy area.

The 5 Europe Pilot Areas are:

1 PROVINCE OF VICENZA, ITALY

2 ŽILINA, SLOVAKIA

3 DEBRECEN, HUNGARY

4 OLOMOUC, CZECH REPUBLIC

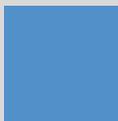
5 NOVA GORICA, SLOVENIA



About the project



Project Budget
1,91 Millions



Number of Partners
10 partners



Duration
May 2024 - October 2026

Introduction

This document (Deliverable 1.1.1) marks the starting point of the EnCLOD project's strategy to enhance the use of Open Data in territorial governance. Its main goal is to benchmark international good practices that can inform the future development of Open Data solutions across the project's five Pilot Areas in Central Europe.

To identify these practices, the University of Ljubljana, as activity coordinator, launched an online questionnaire shared with all project partners. The survey collected examples of how Open Data is used to support public authorities at national, European, and international levels.

Partners gathered and analysed **61 good practices**, focusing on urban and peri-urban mobility, road management, and climate change adaptation. Sources included Open Data Maturity Reports (data.europa.eu), ESPON programme results, and relevant literature. The analysis also considered methodologies and use cases involving IoT sensor networks for city-region planning.

This document collects the most relevant examples and organises them into five macro areas: traffic, environment, water, waste, and platforms. A shared format and criteria ensured consistency across all contributions.

A shared format and criteria for identifying good practices ensured consistency across contributions. The resulting collection, made publicly available via the project website, will feed into the development of Preliminary Guidelines (Activity 1.3), Local Action Plans (Activity 1.4), and other core project activities, serving as a foundation for future action, learning, and capacity building.



Some background

The EU ICT Rolling Plan 2025 identifies the Internet of Things (IoT) as a strategic priority for the digital single market. With over 20 billion connected devices today—expected to reach 50 billion by 2030—IoT is generating vast data volumes (79.4 zettabytes), impacting multiple sectors via cyber-physical systems. Key EU actions include developing standards for AI, data processing, digital twins, and ensuring security and privacy.

Globally, LoRaWAN—a key IoT technology—is projected to grow steadily, reaching \$5.7 billion in 2024. Despite market shifts, IoT continues to drive innovation, especially in cities. The EnCLOD project highlights challenges in open IoT data quality and accessibility, stressing that sustainable and reliable open data from the public sector is essential for governance and Europe's IoT competitiveness.

Methodology

A 20-question survey (short and long-form) was created via Google Forms to collect detailed input from project partners on the use of Open Data (OD) and IoT sensor networks in urban and regional planning. The process ensured standardised data collection, with responses shared in a common spreadsheet to encourage collaboration and avoid duplication. There were no word limits, allowing for in-depth contributions.

The main objective was to deepen understanding of how OD and IoT support governance in three key areas: urban and peri-urban mobility, road management, and climate change adaptation. The goal was to gather at least 40 responses—61 were received, enriching the benchmarking and future project activities.

The questionnaire

The questionnaire was divided into two sections: the first included 6 questions related to the partner's organisation, while the second featured 14 questions focused on the specific example provided as a best practice. Feedback was requested from all partners, including those not formally required to submit a response, to ensure broad input and engagement.

Findings from the questionnaire



Traffic



Environment



Water



Waste



Platform

Selected examples



Traffic

WeCount



Environment

Asthmapping

Luftdaten



Water

NYC Energy & Water
Performance Map



Waste

TrashTAG (Carlo Ratti –
Senseable City Lab)



Platform

IPR Prague

We Count

Description of the project

WeCount empowers citizens to actively collect and analyse mobility data using low-cost traffic sensors (Telraam), applying participatory science methods across five pilot cities: Madrid, Ljubljana, Dublin, Cardiff, and Leuven.

The concept is simple: with a sensor in combination with a low-cost computer and software, anyone can count the traffic in his/her street and contact the government to initiate a policy-making process in the field of mobility & air quality



Teleraam

It is a low-cost, open-source device, consisting of:

1. A camera module to capture images of the street
2. A software processing the images to detect and classify objects
3. A web portal where all data is collected, analysed, and made publicly available



They are able to count and classify:

- Pedestrians
- Cars
- Cyclists
- Heavy vehicles

The Pilot Cities

The project is currently active in Dublin (Ireland), Cardiff (UK), Ljubljana (Slovenia), Madrid & Barcelona (Spain), Leuven (Belgium).

An example: Leuven (Belgium)

The city of Leuven in Belgium, is a growing university city of just over 100.000 inhabitants.

Its mobility challenge for the next period is meeting the growing city's mobility demands while continuing the transition of the mobility system in favour of sustainable transport.

Next years, the focus will expand from the city centre to the city's residential zones.



Asthmapping

Description of the project

Asthma suffocates. A chronic disease that steals breath—even life. Medication helps, but treatment needs precision. Most fail to track it.

Asthmapolis is a smart inhaler system that allows patients and health providers better monitor the behavior of the disease.

It uses Bluetooth sensors to track asthma attacks by recording time and location. Patients monitor treatment, while public health officials analyze data to detect patterns and outbreaks.



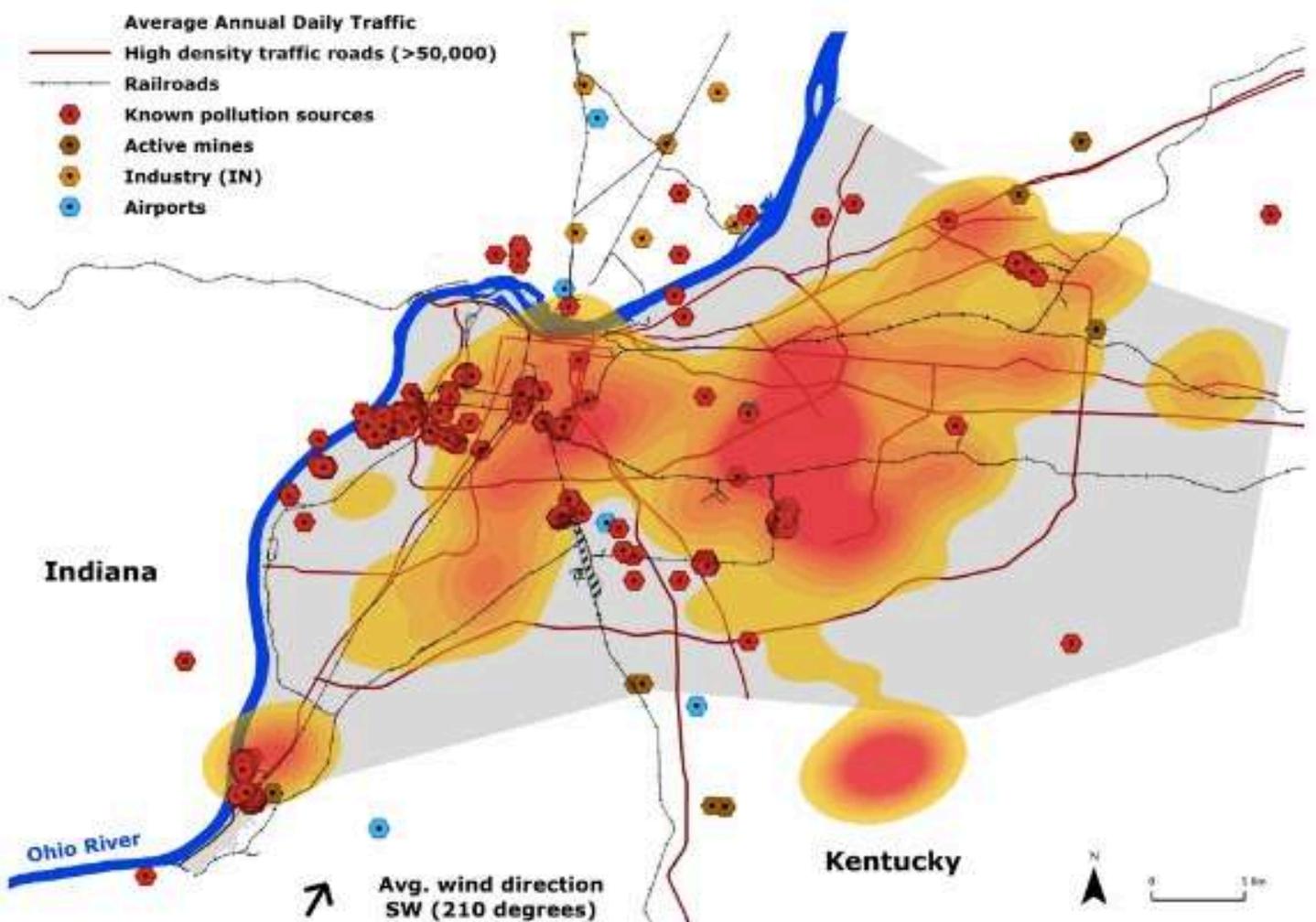
Description of the project

Every time patients use their inhaler, the sensor records the time and their location.

Using a smartphone or base station, all the information is sent to Asthmapolis' servers where the data can be used by:

- Individuals to monitor their treatments' response;
- Public health officials to map patterns and outbreaks.

Asthma hotspots and local sources of pollution to explore in analysis



Luftdaten

Description of the project

Luftdaten is a citizen science project that collects and shares real-time air quality data using low cost DIY sensors.

- 11.559 sensors worldwide
- 77 countries

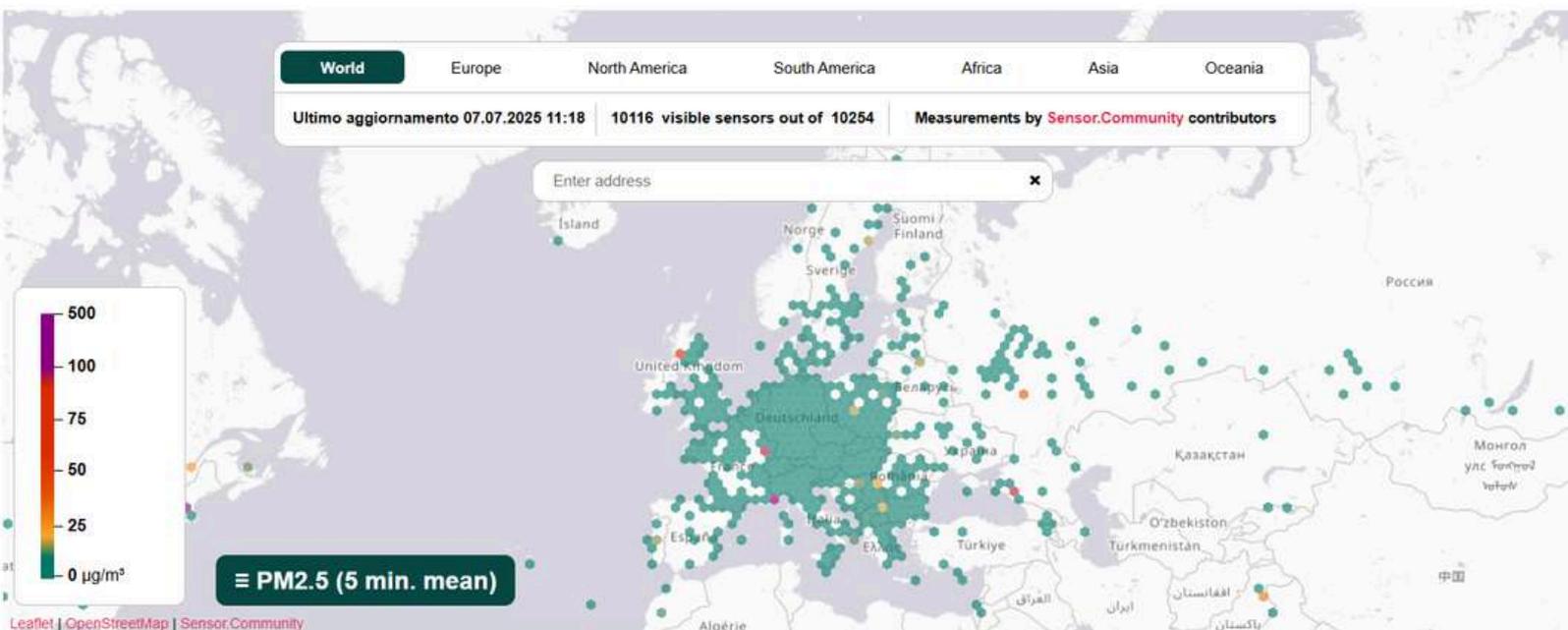


Luftdaten

Description of the project

The programme aims to promote development in the areas of transparency, open data, and citizen science.

Luftdaten generates a constantly updated particle map. This makes particles in the air visible, thus enabling citizens to check the quality of the air and participate for a better society.

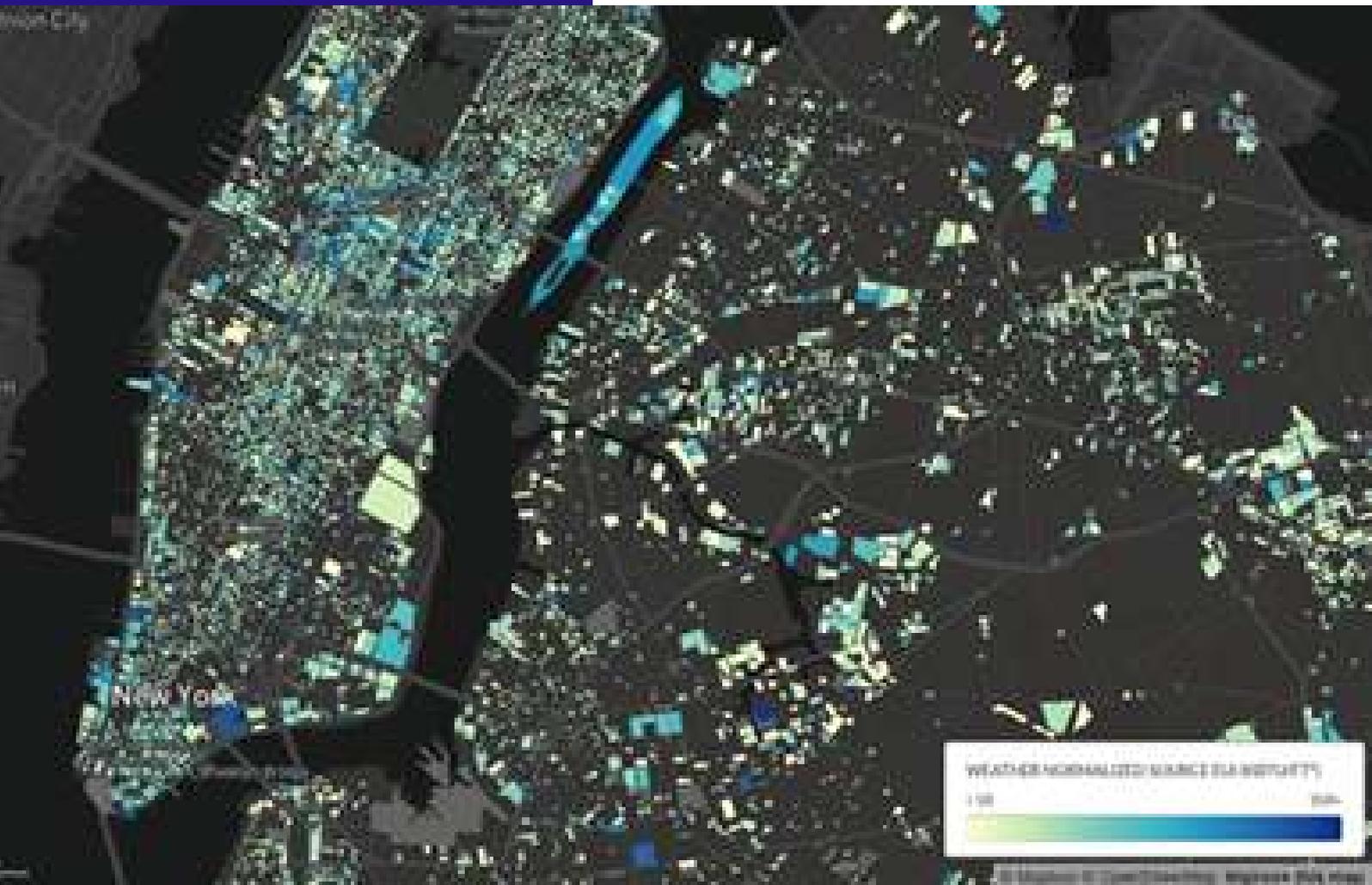


NYC Energy & Water Performance Map

Description of the project

The NYC Energy & Water Performance Map provides an interactive data analysis platform covering 12 years of data on energy, water efficiency, and carbon emissions for nearly 30,000 of New York City's largest buildings.

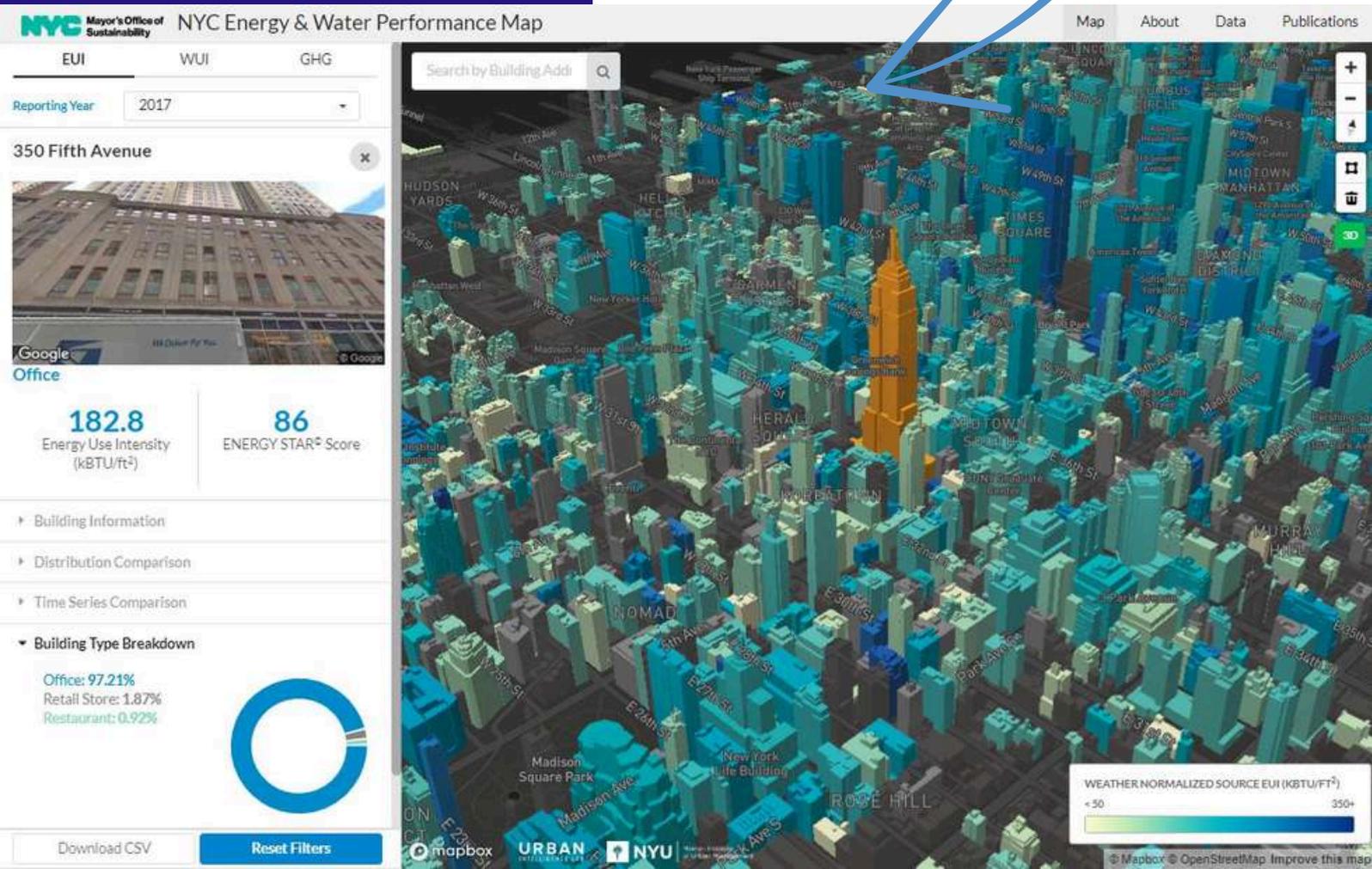
The aim is to **empower the citizens** of NYC to understand the energy, water, and climate change impacts of the spaces they rent and buy.



Description of the project

The NYC Energy & Water Performance Map shows New Yorkers how their building compares to other similar buildings on energy and water management. It does this through an intuitive interface that provides GHG, energy, and water efficiency details for specific buildings and how their performance compares to others in the city.

Roughly 70% of New York's greenhouse gas emissions come from buildings



Trash Track (Carlo Ratti – Senseable City Lab)

Description of the project

Trash Track consists in using small smart tags to follow where our garbage goes. They reveal the final destination of what citizens have got rid of, thus increasing awareness on sustainable practices.

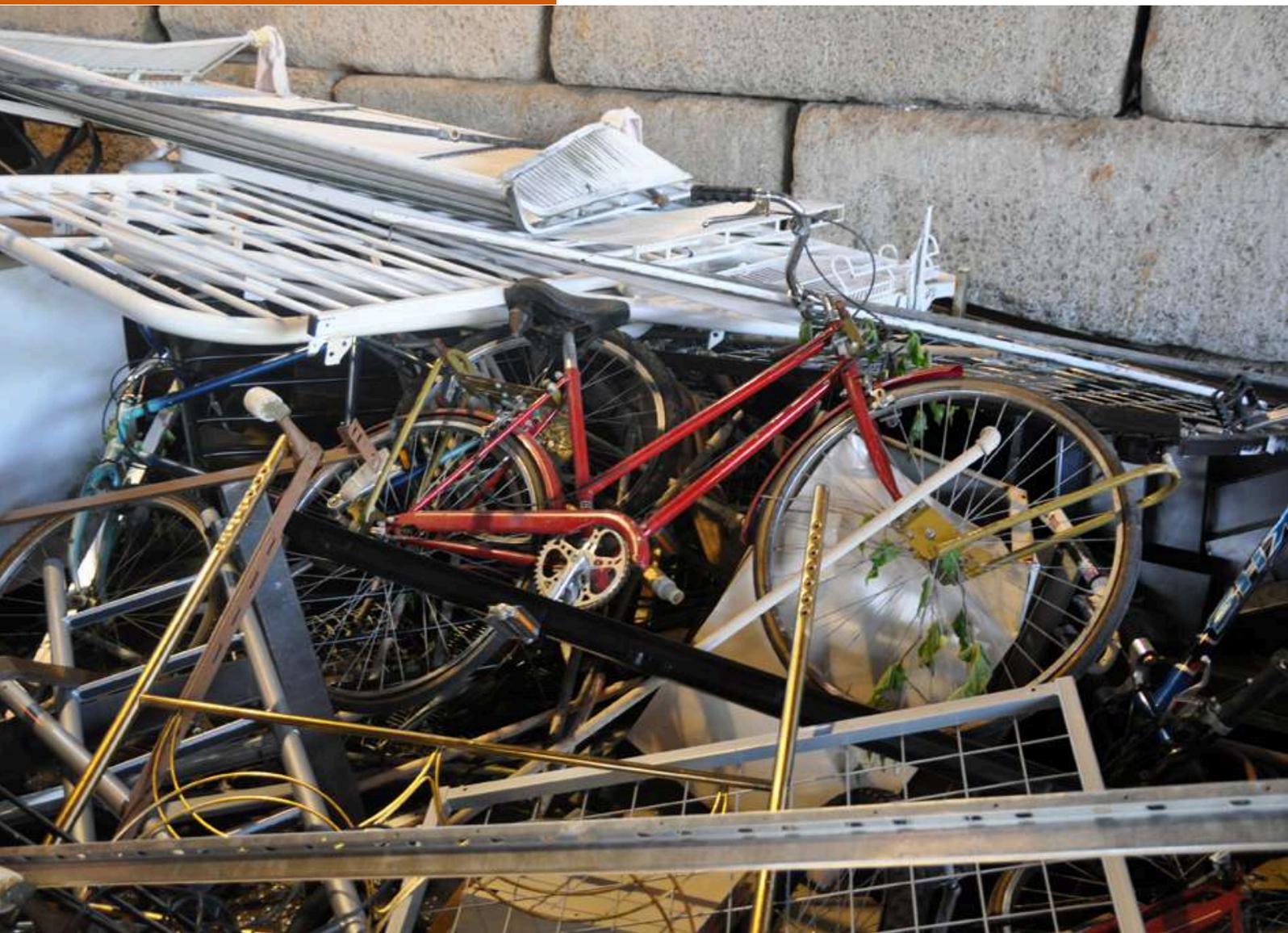


“Why do we know so much about the supply chain and so little about the removal chain?”

Description of the project

This initiative combines community engagement and geotagging to promote global cleanup efforts, visualized through social media participation.

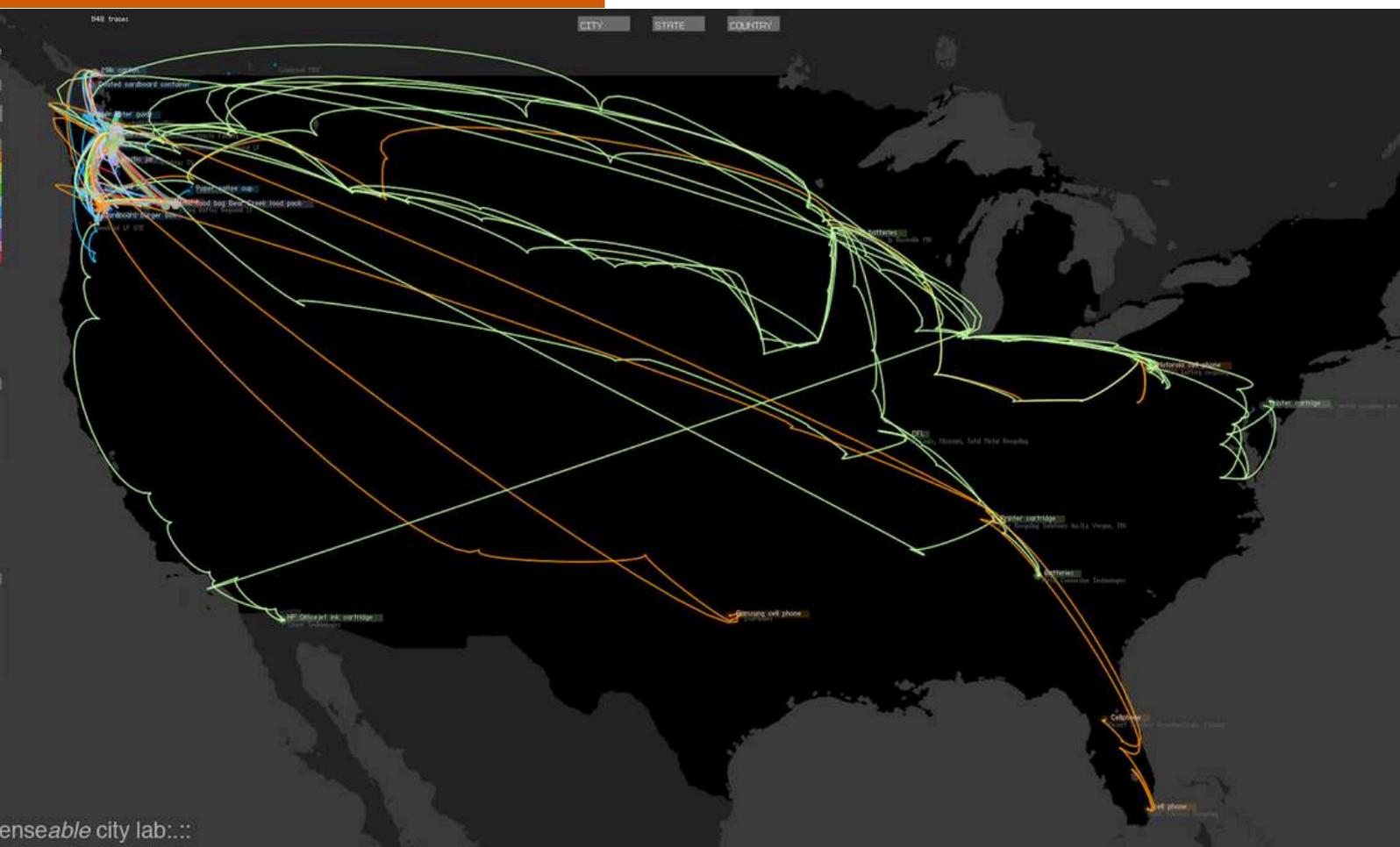
It is an initial investigation into understanding the 'removal-chain' in urban areas, representing change that is taking place in cities: a bottom-up approach to managing resources and promoting behavioral change through pervasive technologies



An example: Seattle 2009

500 people have been invited to tag their garbage.

A total of 3000 trash objects have been followed.



IPR Prague

Description of the project

The Prague Institute of Planning and Development ([IPR Prague](#)) is Prague's main policy-making unit for architecture, planning, development, design, and administration.

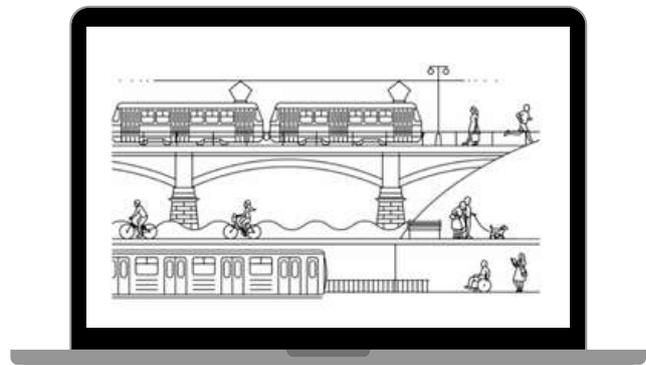
It develops and manages the city's geographical data and performs spatial analyses of traffic accessibility, ownership relations within the city, and the structure of built-up areas, among others.



It developed 5 tools

1. Geoportal of Prague App

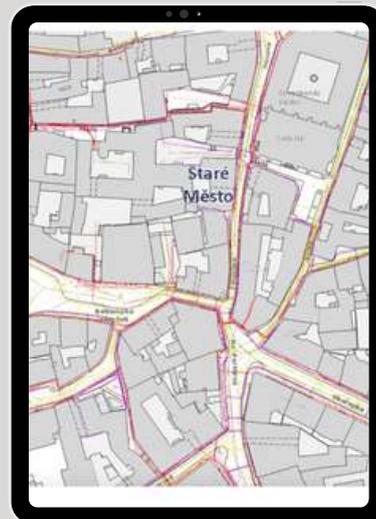
A publicly accessible, online source of maps and information about Prague. The website offers more than 30 on-line maps, aerial photographs from different years, a noise map, and a map of the most photographed places.



2. Digital Map of Public Administration of Prague App

One of IPR key activities is managing the basic geographical data for all urban governance activities.

The app includes the Technical Map, orthophoto maps, 3D models of Prague and a basic map of the city at a scale of 1 : 25000



3. Open Data

IPR Prague provides access to data for equal, transparent sharing of spatial information. For this, it is preparing the eVýdej service - a free-of charge, electronic service for issuing spatial data and a system for direct access to open geographical data.

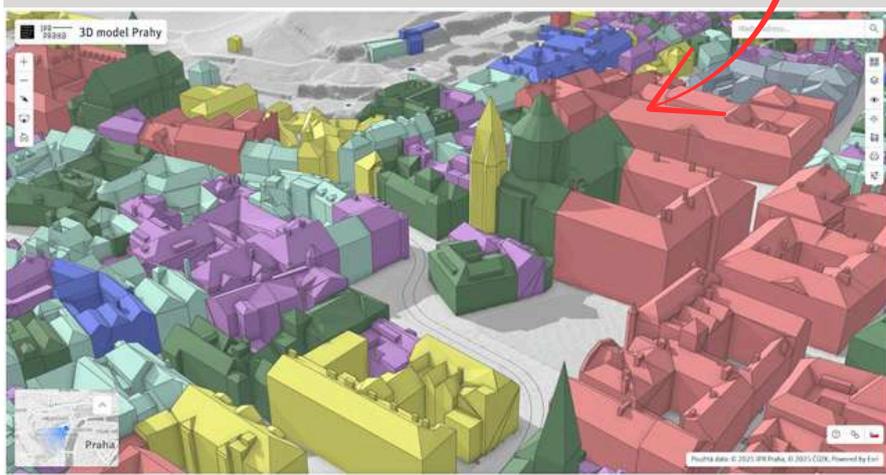


4. Spatial Analytical Documentation App

Over the last years, all spatial analytical documentation serving as the basis for planning documentation has been updated. These documents describe the important **values of the capital**, as well as the **limits**, problems and **development possibilities**. The current version is the most detailed one.

5. 3D Model Application App

Unlike Google Maps and other programs, the 3D model application of Prague provides a wide range of detailed information about every building (e.g. how many floors a building has and who owns it). It includes data on more than 200.000 buildings in the city.



Conclusion



7.000 lives
saved due to quicker response



5.5% less
road fatalities



Congestion costs are
1% of GDP



16% less
energy used



629 million hours
saved (equivalent to €27.9 billion)

EnCLOD Project

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