

# A phased approach to municipal waste data in big cities in the EU

From city delineation to waste generation

*12th meeting of the Expert Group on Environment and Climate Change Statistics (EG-ECCS)*

# Background & Key Challenges

- **Background:** Eurostat's aim to prepare a dataset on waste management for big cities.
- **Challenge 1:** Matching Eurostat's city delineation with municipal services' catchment areas.
- **Challenge 2:** Estimating waste generation from waste collection data.

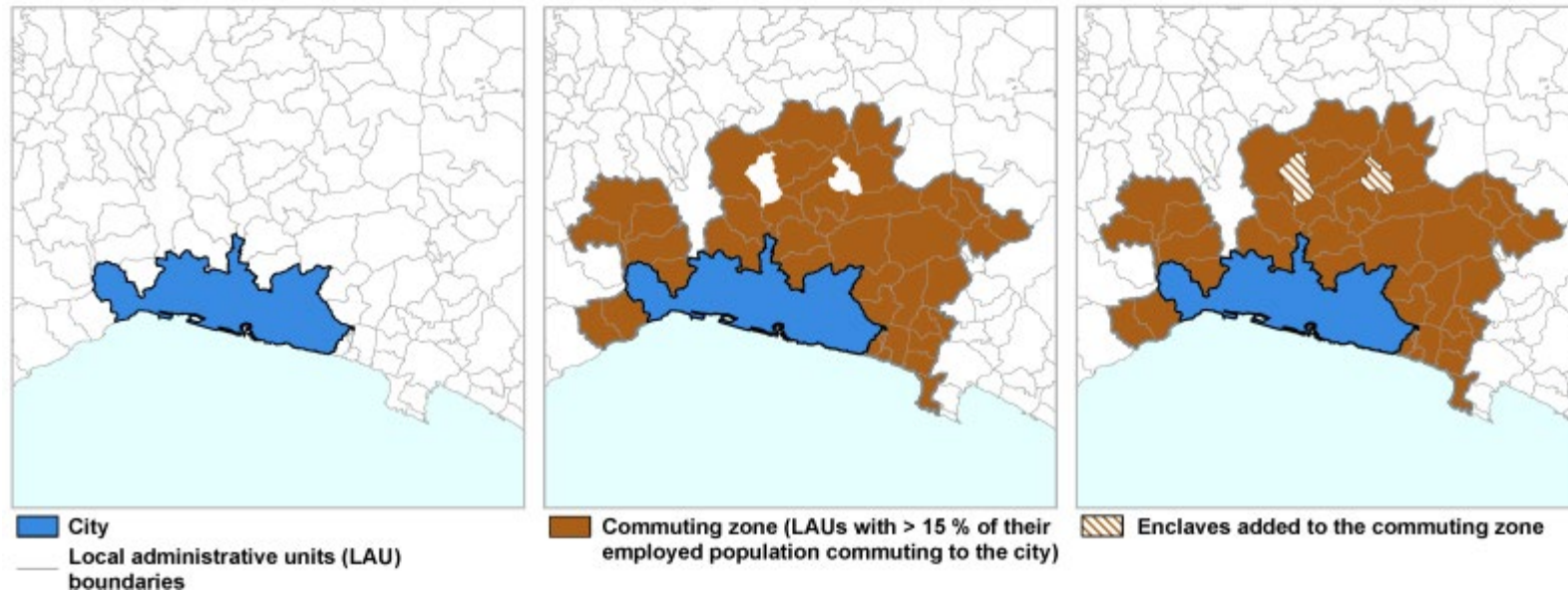


# Step 1: Defining "City"

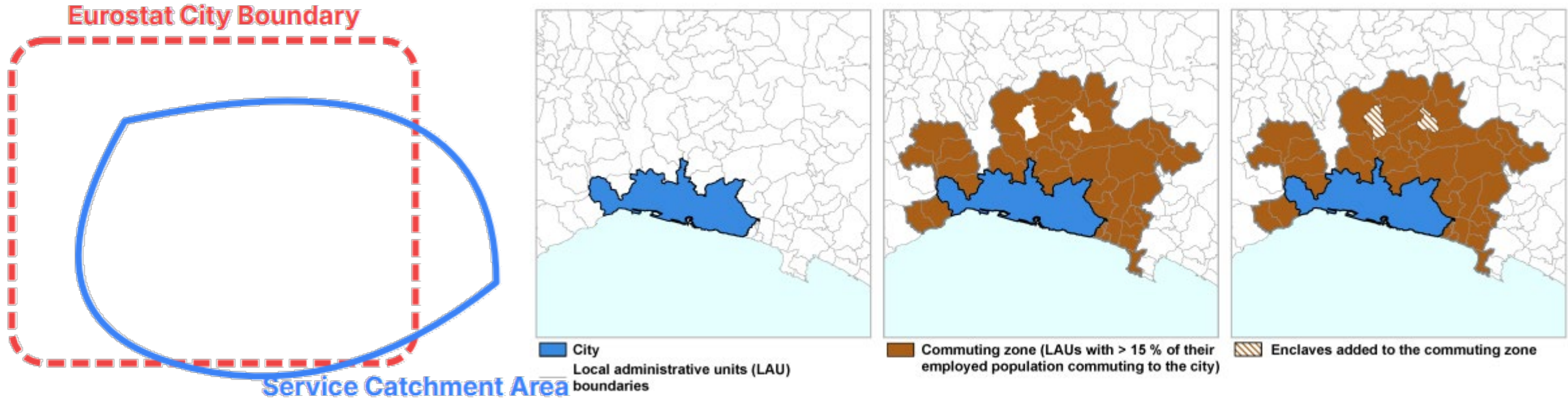
## Task 1: Delineating Big Cities

### Methodology:

- Start with the Eurostat Urban Audit definitions.
- Test this definition against actual waste management catchment areas.
- Identify how to aggregate or disaggregate data to align with the proposed city boundaries.



# City boundaries vs. catchment areas



The administrative boundaries of a city often do not align with the operational areas of municipal services. This requires a robust method for data harmonization.

# Phase 2: From collection to generation

## Task 2: Estimating waste generation broken down by materials

**Why?** Opportunities for resource recovery in the circular economy

### **Methodology:**

- Leverage existing high-quality data on collected waste.
- Apply modeling with the [Joint Research Centre](#) and waste characterization studies.
- Estimate waste generation by materials from collected waste streams.

**Benefit:** This model would enable countries to report only on collected amounts, simplifying the process.



# Exploring creative avenues: AI and web scraping

How can new technologies help us achieve our goals?



# AI in waste collection assessment

## Aiding separate collection assessment

- Use AI to identify how separate waste collection is organized in each city.
  - Is there separate collection for recyclable materials?
  - If there is, are they collected separated or co-mingled?
  - If co-mingled, what is the mix?
  - → prepare prompts, providing a list of cities first (Urban Audit above 500,000 inhabitants)
  - → ask questions above, ask to report in a table
  - → review results, ask again (50% errors found)
- This provides a qualitative layer of understanding to the data and is the first step in modelling
- Fast, multilingual, good as exploratory steps



# AI in waste collection assessment

## Results

- 67 cities analyzed (input to AI)
- Output is a table
- 3 hours work time
- Is it correct?
- Good for fast scoping studies → need to dig deeper afterwards

Country	City	Door-to-Door Collection	Recyclates Collection Method	Co-mingled Recyclates Mix
Austria	Wien (Vienna)	Yes	Separate	N/A
Belgium	Antwerpen	Yes	Co-mingled (blue bags)	plastic, metal, drink cartons
Belgium	Bruxelles / Brussel	Yes	Co-mingled (blue bags)	plastic, metal, drink cartons
Bulgaria	Sofia	No	Co-mingled	Plastic, metal, glass, paper
Croatia	Zagreb	Yes	Separate	N/A

Collection of recyclables	Number of cities	%
Separate collection	26	38.8%
plastic, metal, drink cartons/composite	29	43.3%
Plastic, metal, paper	6	9.0%
Plastic, metal	3	4.5%
Plastic, metal, glass, paper	3	4.5%
<b>Total</b>	<b>67</b>	<b>100%</b>



# Future project: Web scraping for sub-national data

- Target: collect municipal waste generation at sub national level, all EU
  - 244 NUTS2 regions
  - 24 EU official languages + non-official
  - Different semantics (municipal waste vs household waste)
- Step 1: Website database - Use AI chatbots to compile a list of websites.
- Step 2: Building a smart scraper - Understand data semantics (administrative level, household vs. municipal waste).
- Step 3: Data harmonization - Apply an algorithm to gross up household waste to municipal waste using national data and population proxies.



# Summary & next steps

- **Part 1 recap:** municipal waste in big cities: The phased approach for consistent data collection.
- **Part 2 recap:** forward-looking strategies using AI and web scraping.
- **Next steps:**
  - Prepare first analyses, initiate discussions with national authorities
  - Begin implementation of phases 1 and 2
  - Explore the AI and web scraping project



# Thank you



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