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TIMEPAC 

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Implementing Building Renovation Plans through a Holistic Data-Driven Platform

The Retabit project



Project PID2020-115936RB-C21
Funded by the Ministry of Science and Innovation

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Green Deal Fit for 55 Renovation Wave

Europe climate-neutral
(net zero emissions) by 2050

~75% of EU buildings
are not energy efficient

only 1% are energy-efficient
renovated every year

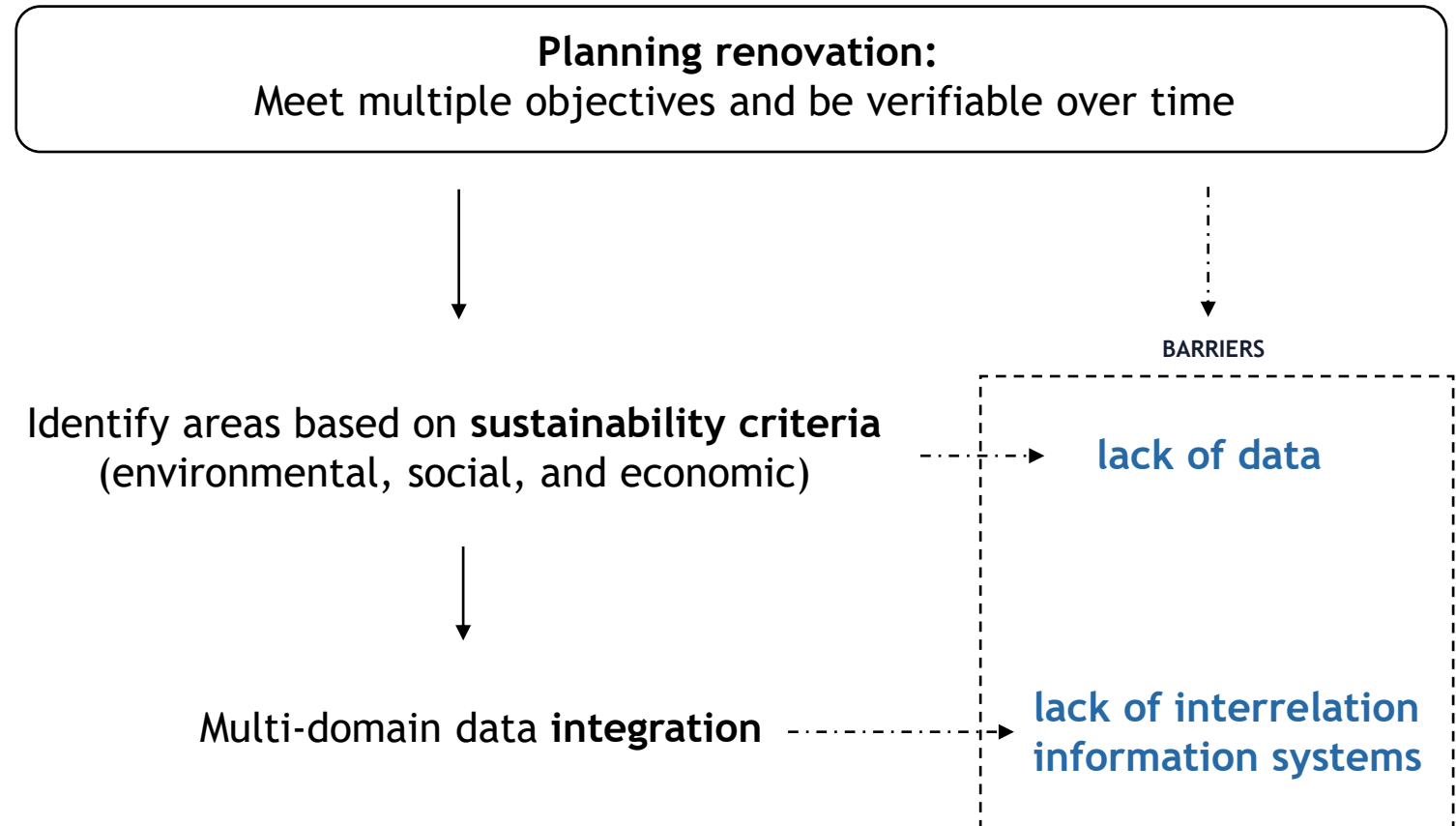
**Green Deal
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Building retrofitting programs



Green Deal Fit for 55 Renovation Wave

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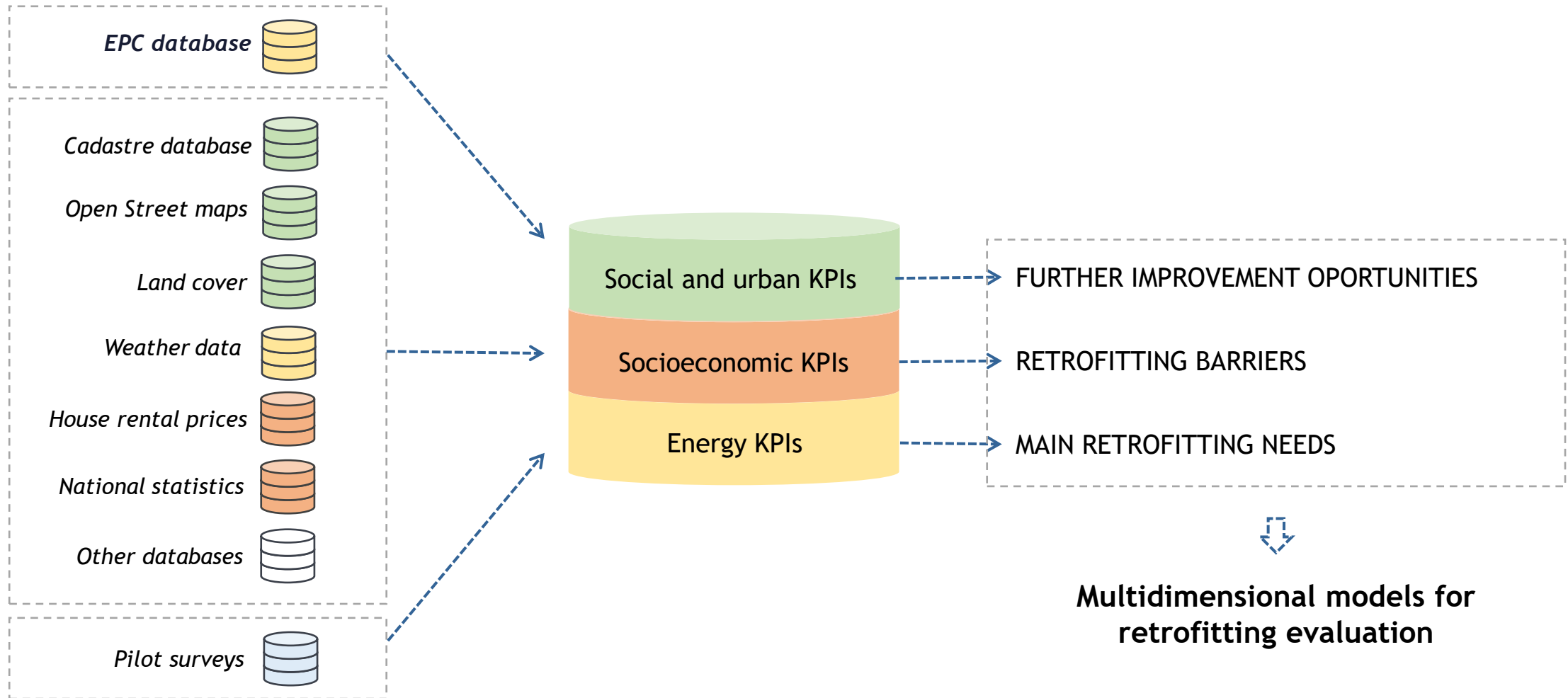
The Retabit project

RETABIT is a project co-financed by the Spanish national research plan (2021-24)

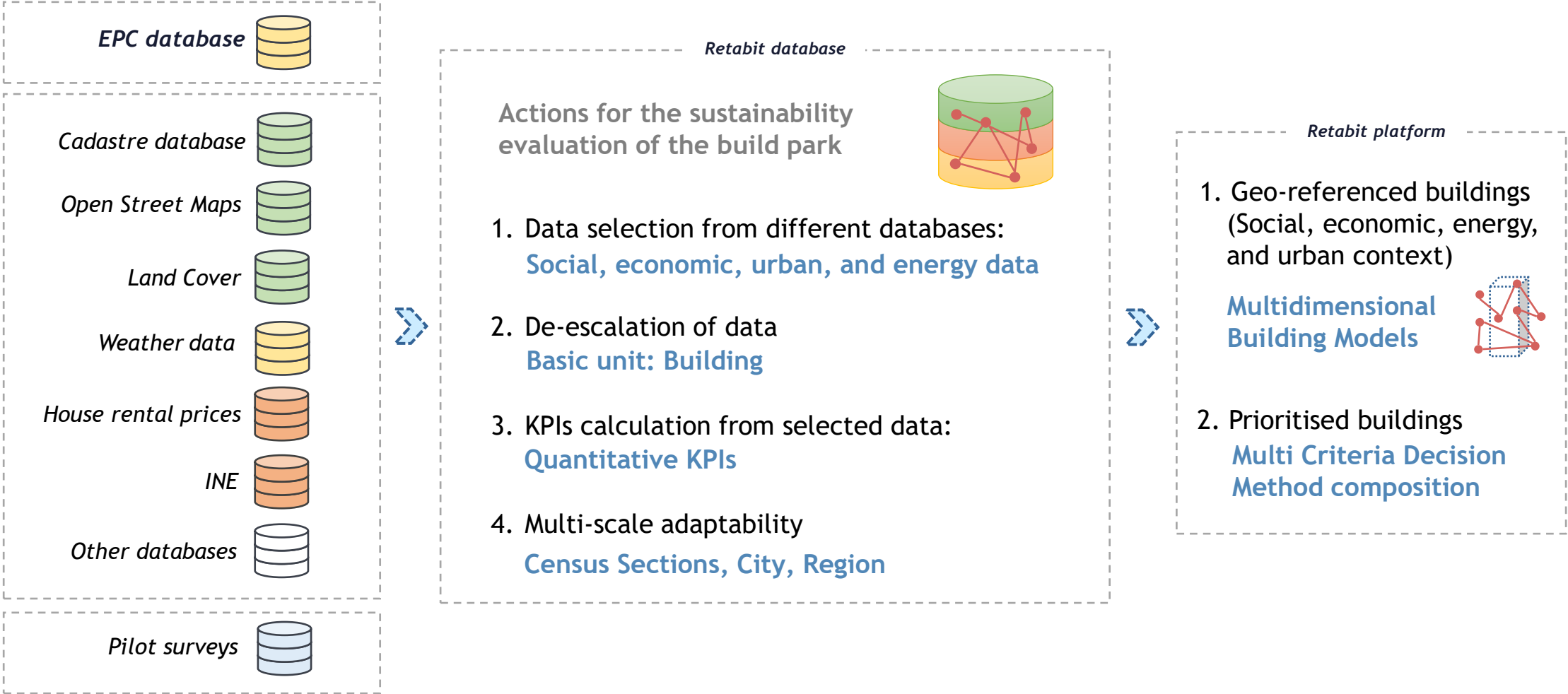
The goal is to develop a **service platform** which will facilitate the multiple stakeholders involved in **large-scale residential building retrofitting programs** to:

1. Explore urban areas and evaluate their renovation potential based on building classification and sustainability indicators
2. Create and assess renovation plans based on multidimensional indicators
3. To follow up the impact of the implemented renovation plans over time

Integrated data for assessing retrofitting programs



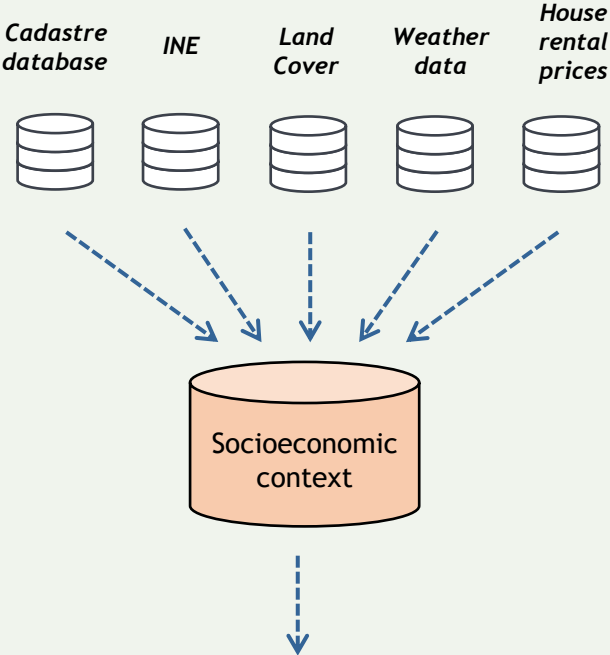
Generation of KPIs from data



Socioeconomic context

Which densified areas with low urban and building quality are inhabited by economically vulnerable populations?

Socioeconomic context



Which densified areas with low urban and building quality are inhabited by economically vulnerable populations?

Example of socioeconomic KPI application



KPI 20: Median household income

Description: Family income in € per year.

Database: Spanish National Institute of Statistics (INE)

Basic Unit: Census Section > De-escalated to building



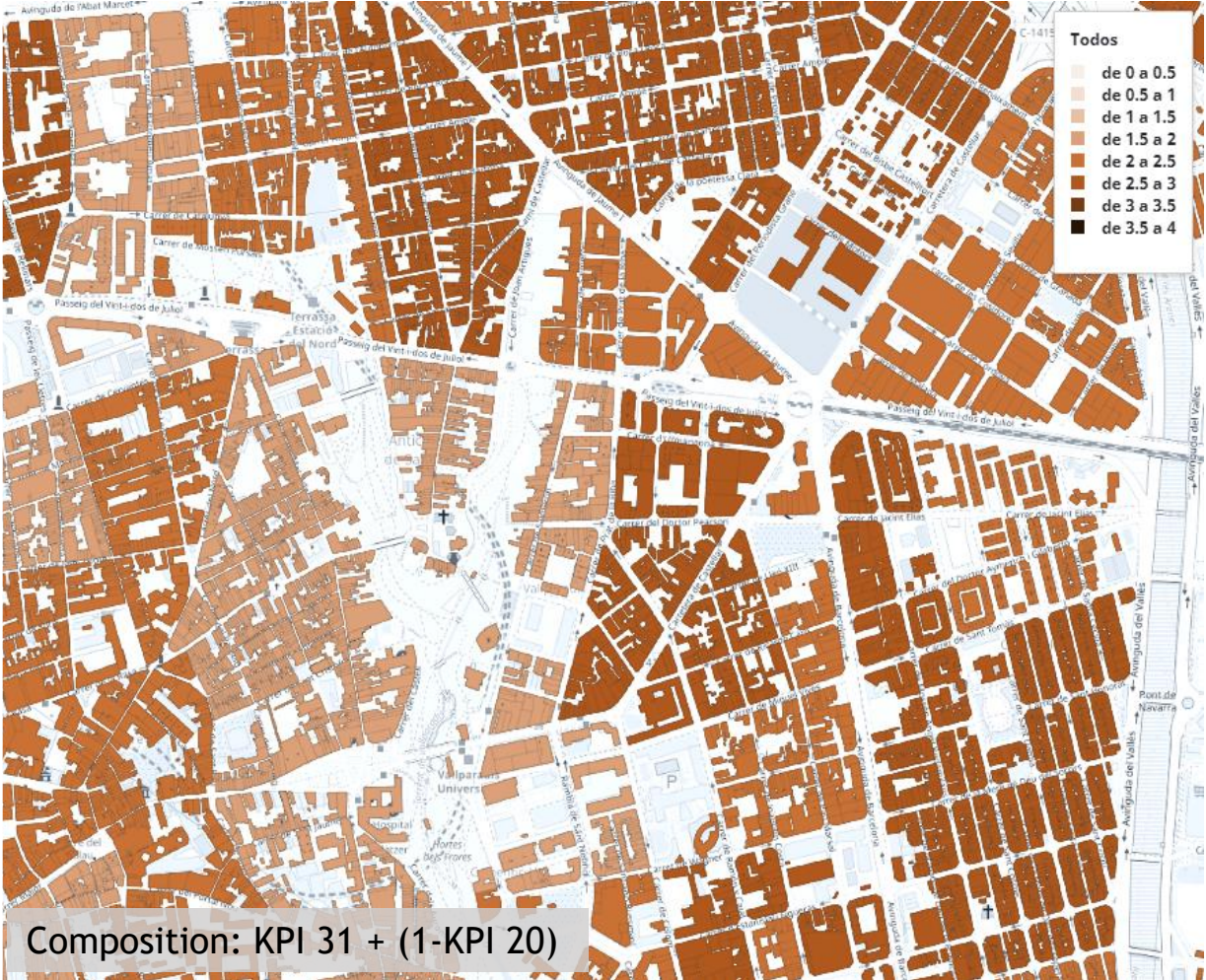
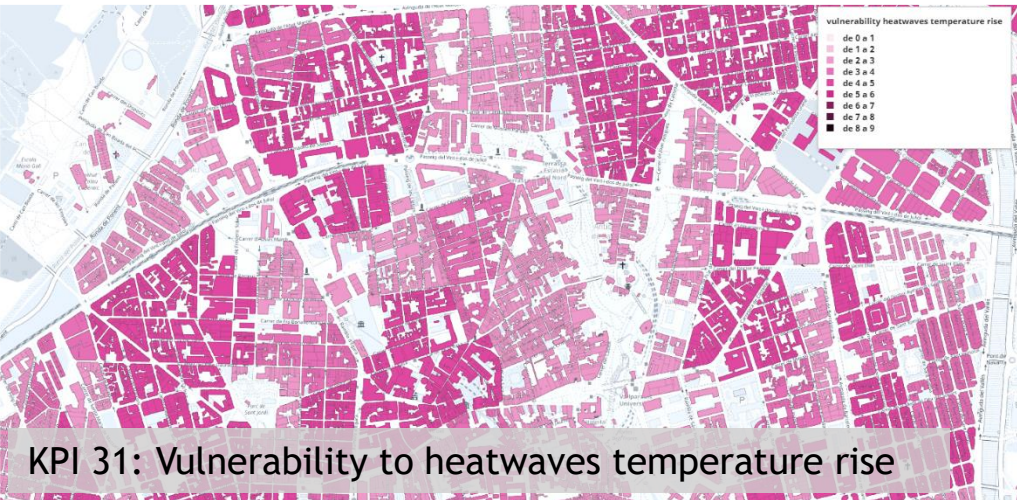
KPI 31: Vulnerability to heatwaves temperature rise

Description: Deterioration of climatic comfort because of the increase of urban heat island effect

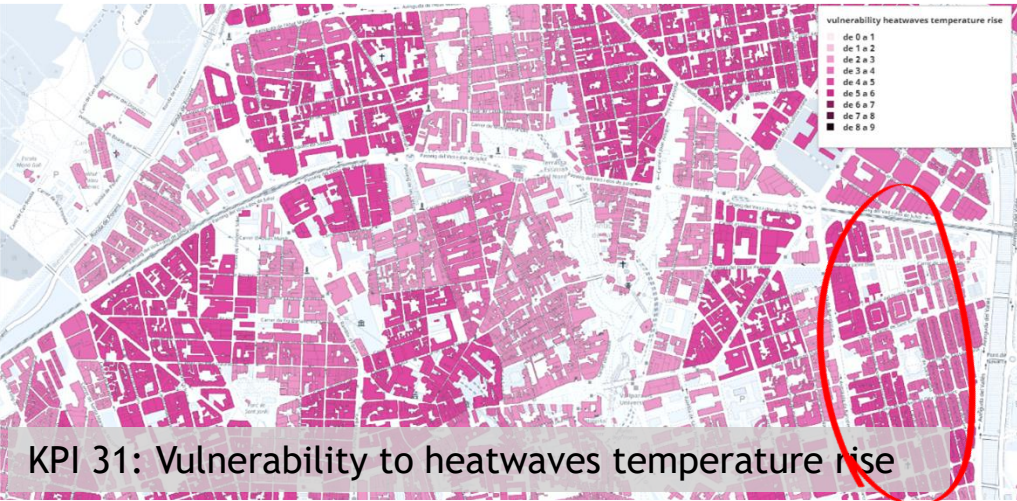
Database: House rental prices, weather data (Gencat), Land cover (ICGC).

Basic Unit: Building

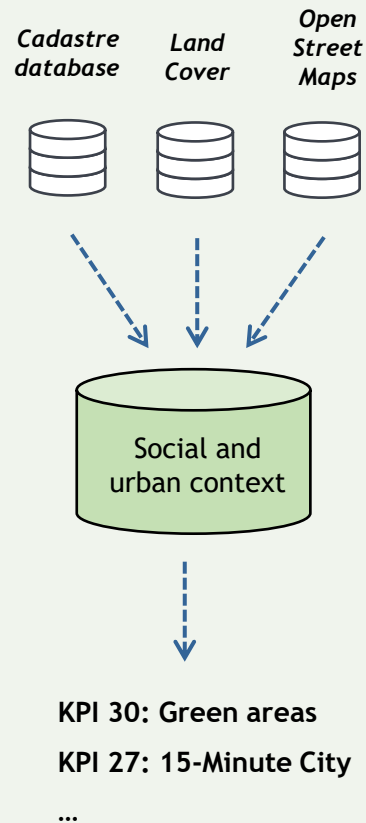
Example of socioeconomic KPI application



Example of socioeconomic KPI application

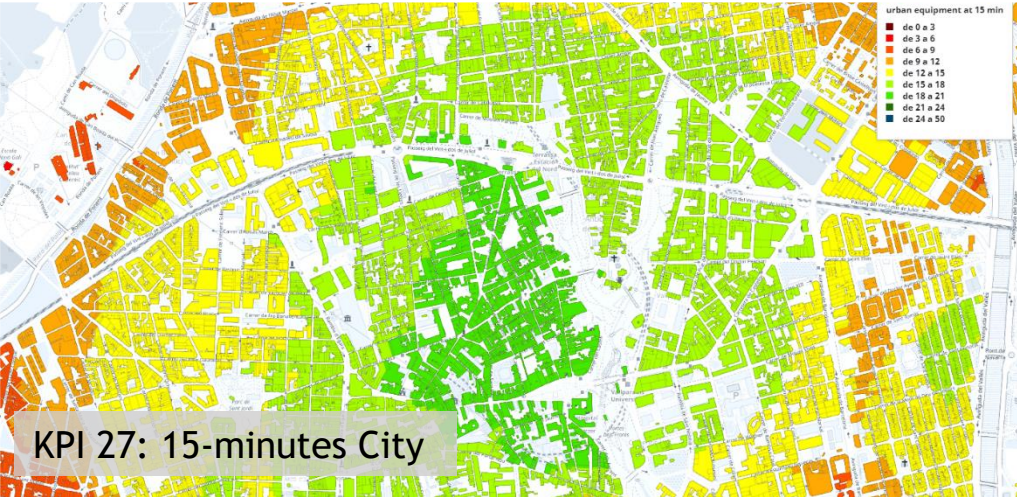


Social and Urban context

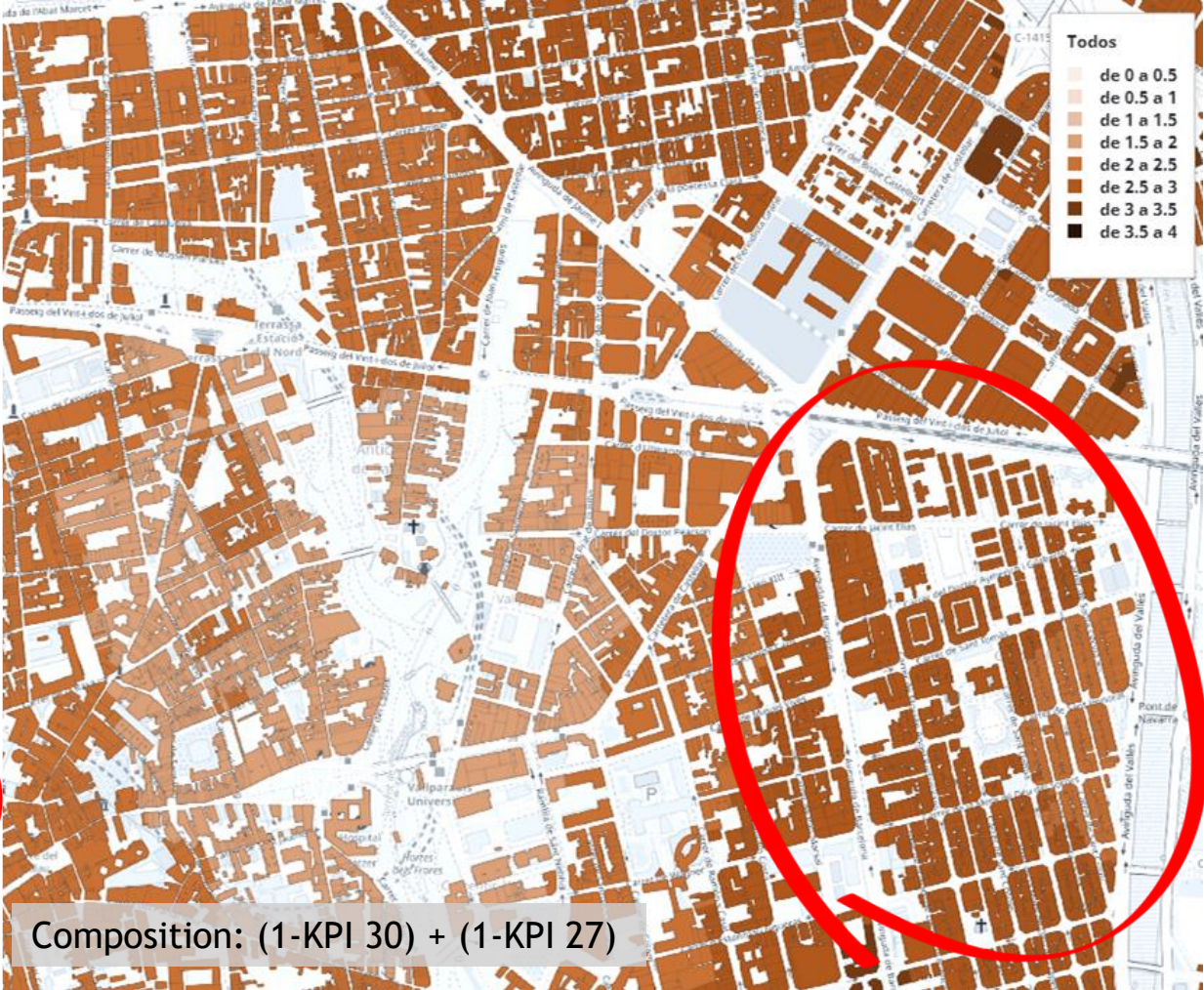


Where are the areas with limited access to green spaces and essential urban amenities near to the buildings?

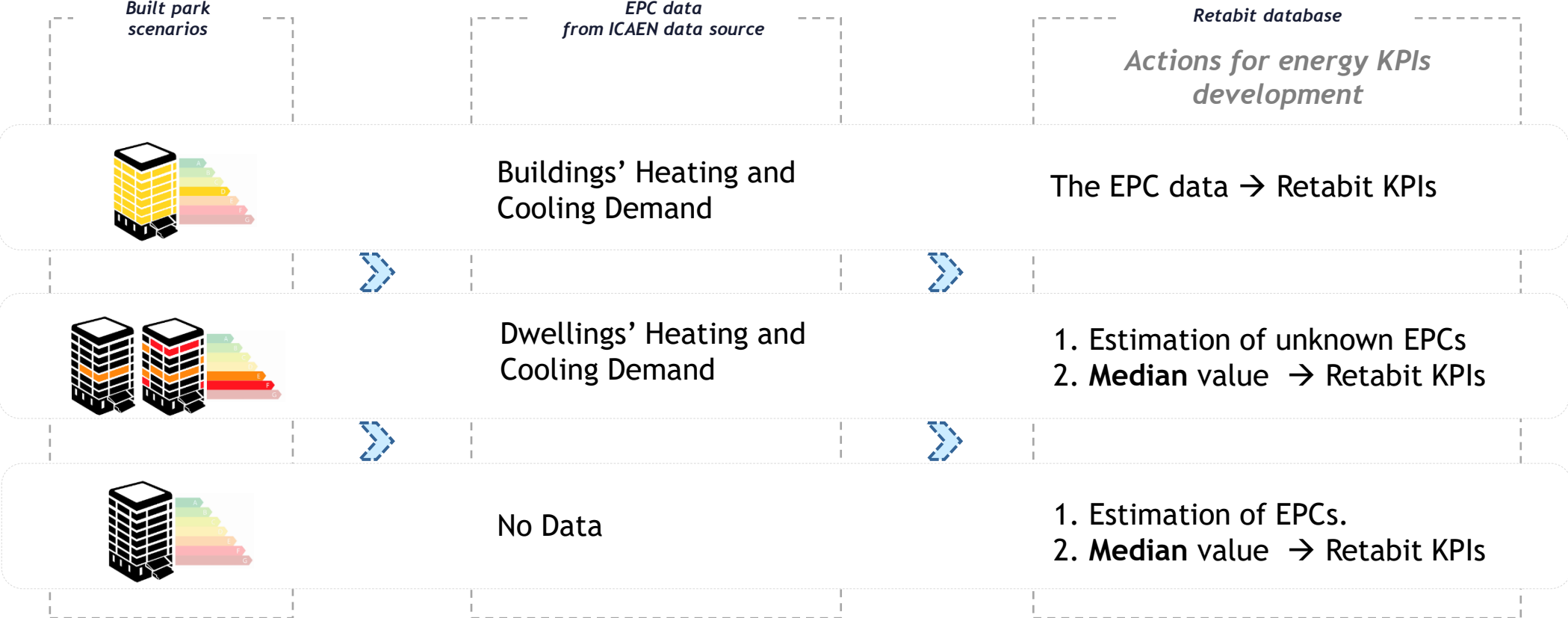
Example of social and urban KPI application



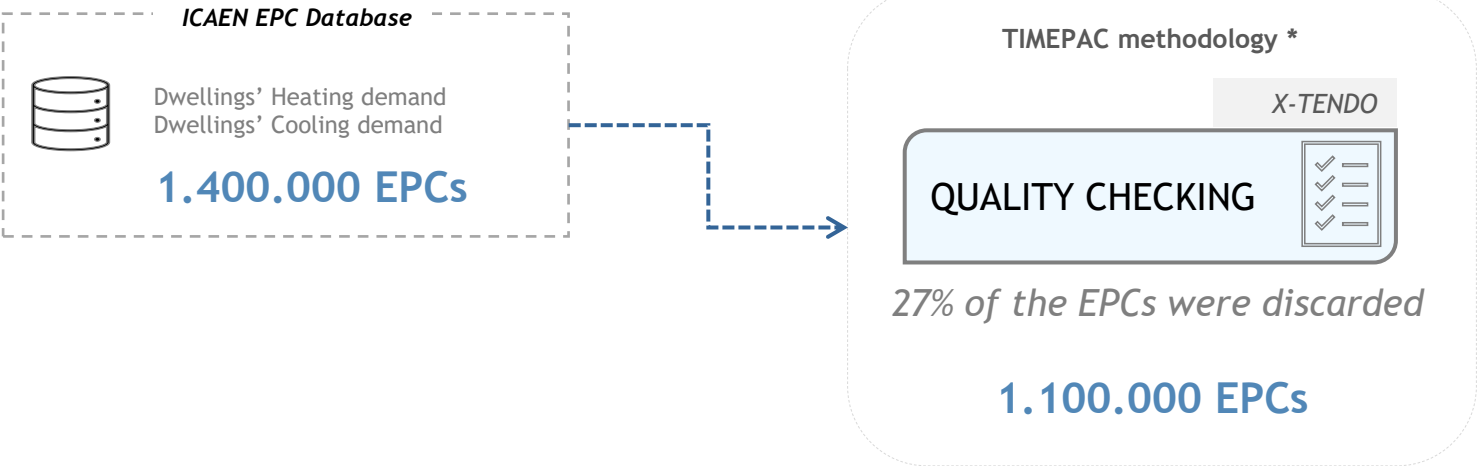
Example of social and urban KPI application



Energy Context – Use of Energy Performance Certificates (EPCs) study

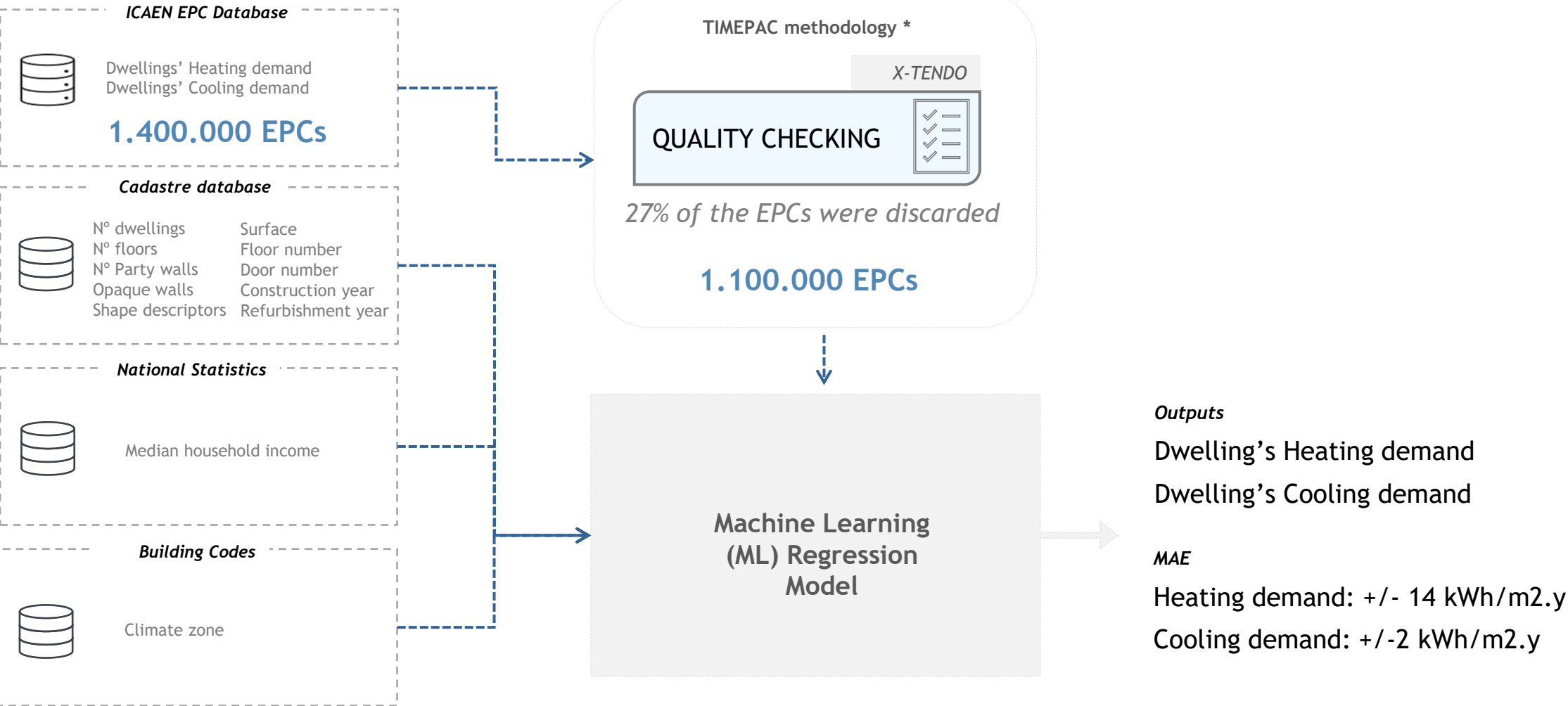


Estimation of EPC process



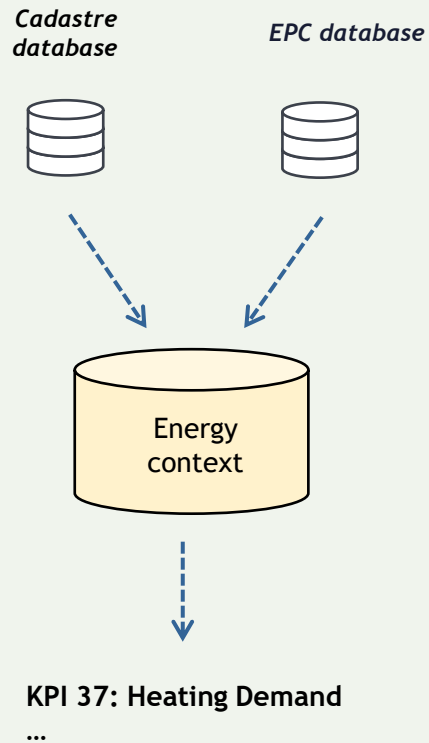
* Ilaria Ballarini, Matteo Piro, Mamak P. Tootkaboni (2023) "D2.5 - Procedures and services to undertake large-scale statistical analysis of EPCs databases"

Estimation of EPC process



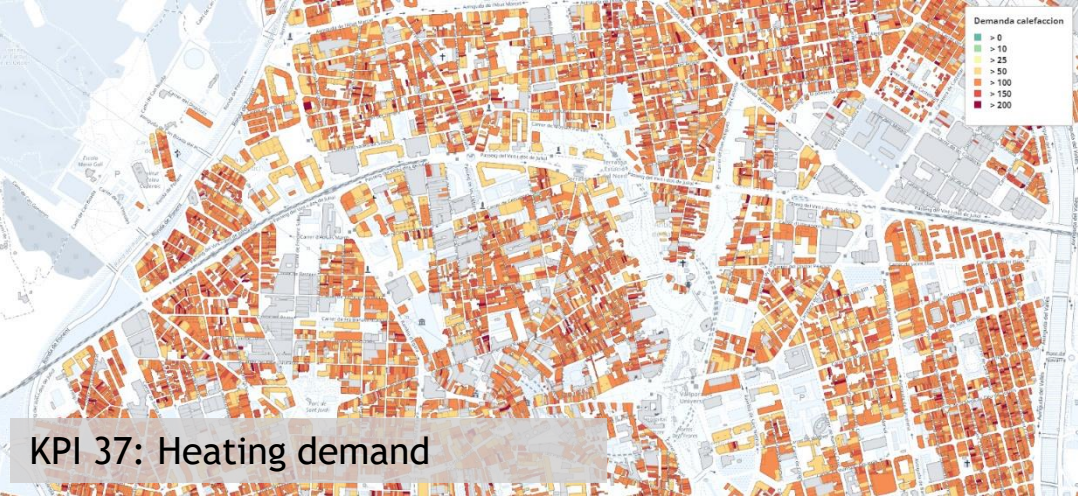
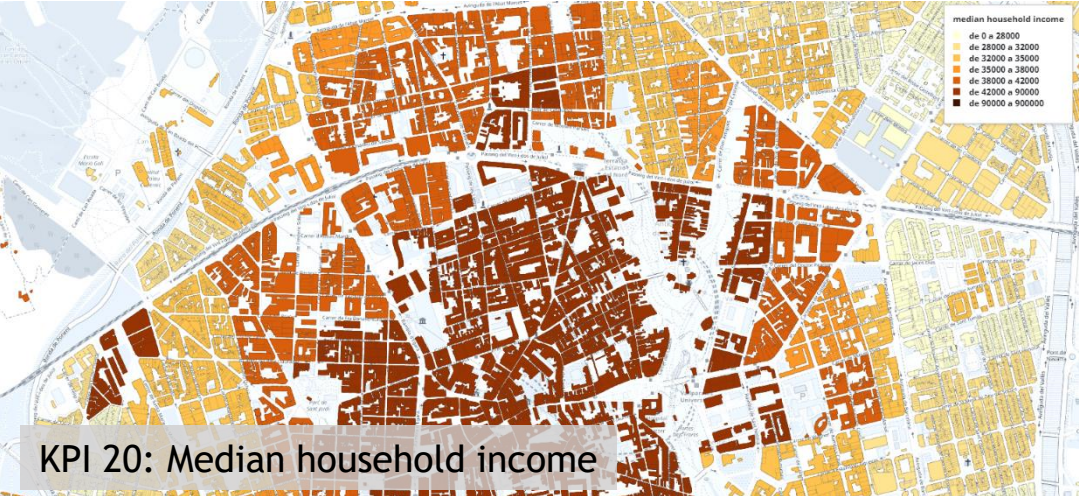
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Social and Urban context

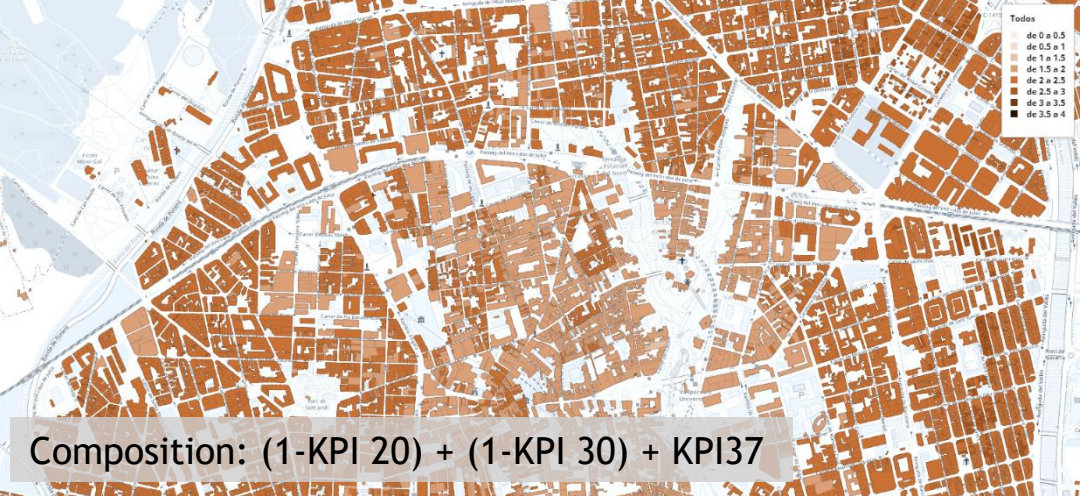


In urban contexts, where are the locations with vulnerable populations residing in non-efficient buildings that do not promote energy efficiency?

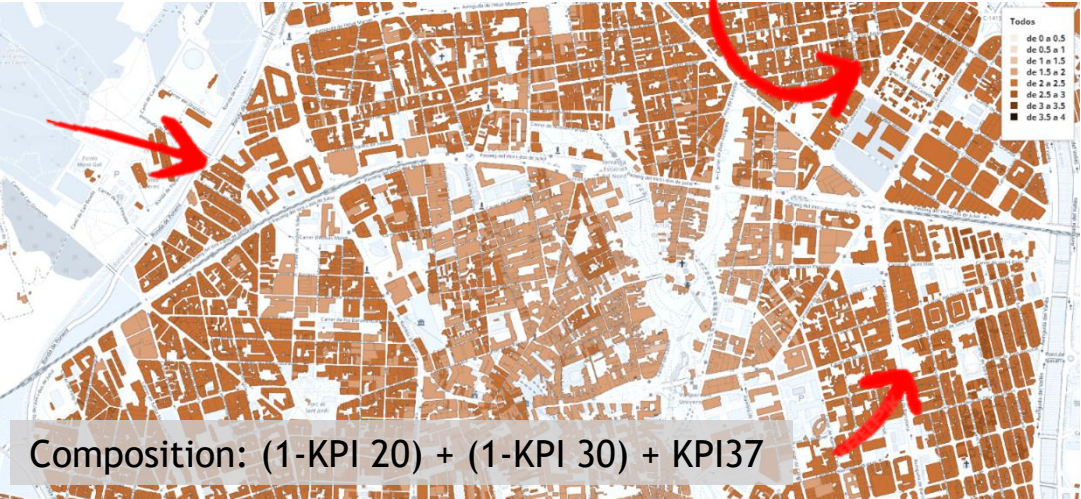
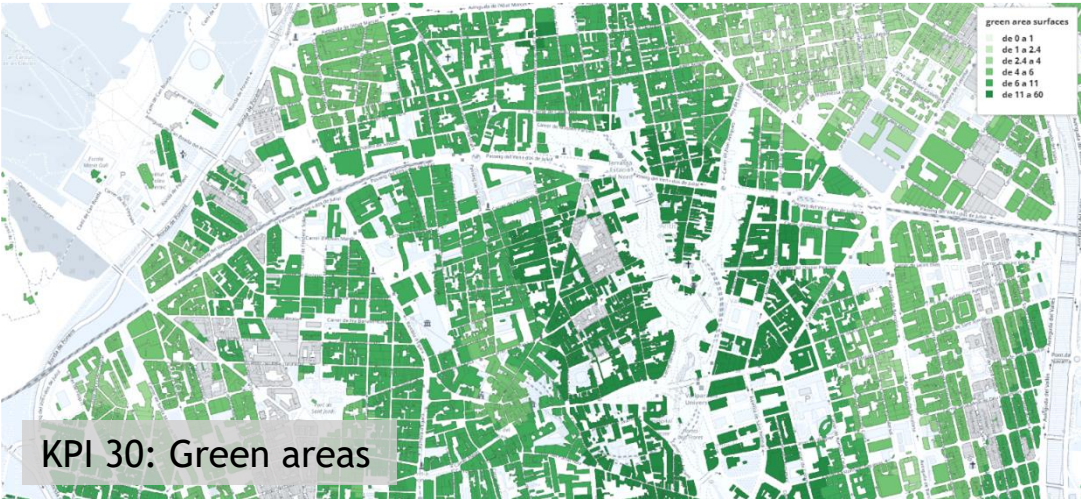
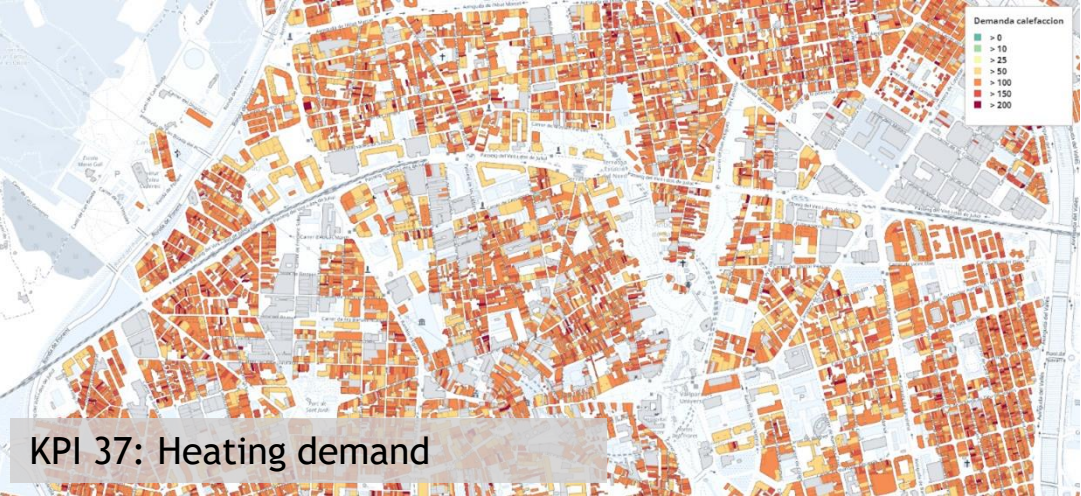
Example of energy, socioeconomic and urban KPI application



Example of energy, socioeconomic and urban KPI application



Example of energy, socioeconomic and urban KPI application



Conclusions

Expected impact of the

 **Retabit**

Platform

- **Enhances sustainability urban assessment via Open Data**

Transition to a climate-neutral city by assessing retrofitting needs across various domains (social, economic, environmental) and scales, providing specific opportunities for tailored retrofitting scenarios.

- **Proposes a holistic retrofitting perspective:**

Planning and targeted retrofitting by prioritizing areas where social, economic, and environmental factors hindering the transition to a climate-neutral city are prominent.

- **Offers tailored solutions related to building renovation plans:**

Solve the retrofitting programs current problems (lack of data and interrelations) and estimates impacts and costs.

Conclusions

Regarding the EPC use in



- **The EPC Database could be positioned as primary energy context Data Source:**

To supply the absence of EPCs Retabit Machine Learning approach proved to be feasible.

- **Data Quality Check for accurate assessment:**

The reliability and quantity of EPCs significantly impact the ML approach effectiveness.

- **Enhancing the approach with additional features:**

More inputs (obstacles/shadow profiles, and orientation) are necessary to improve results.

- **EPC Database Updating for Retabit Platform:**

Regular EPC database updates, especially in alignment with renovation projects, are vital for tracking new impacts and opportunities within the Retabit platform.

**If you would like more information,
please contact us at
info@retabit.es**

or visit ww.retabit.es

Thanks for your attention!

Retabit is a research Project co-funded by the Spanish Ministry of Science and Innovation (2021-24) Project number PID2020-115936RB-C21

