

A transparent assessment of retrofit potential in Italy based on open data

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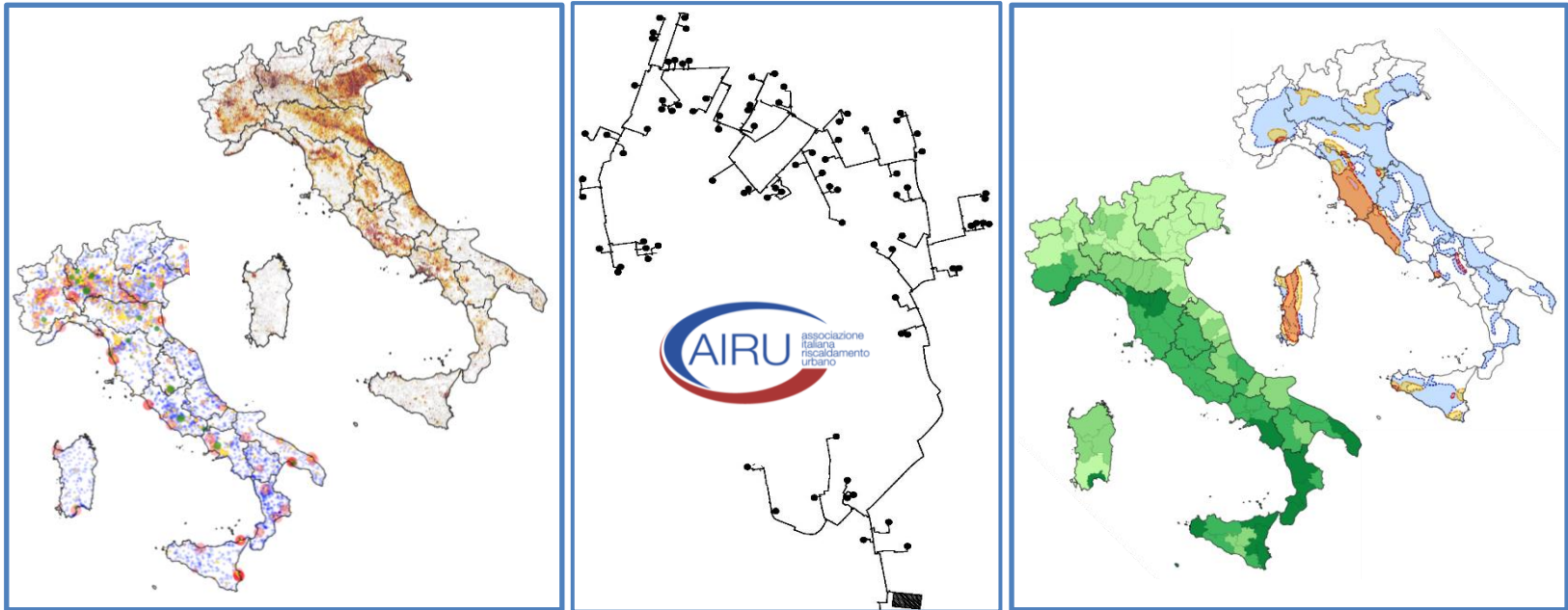


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Framework

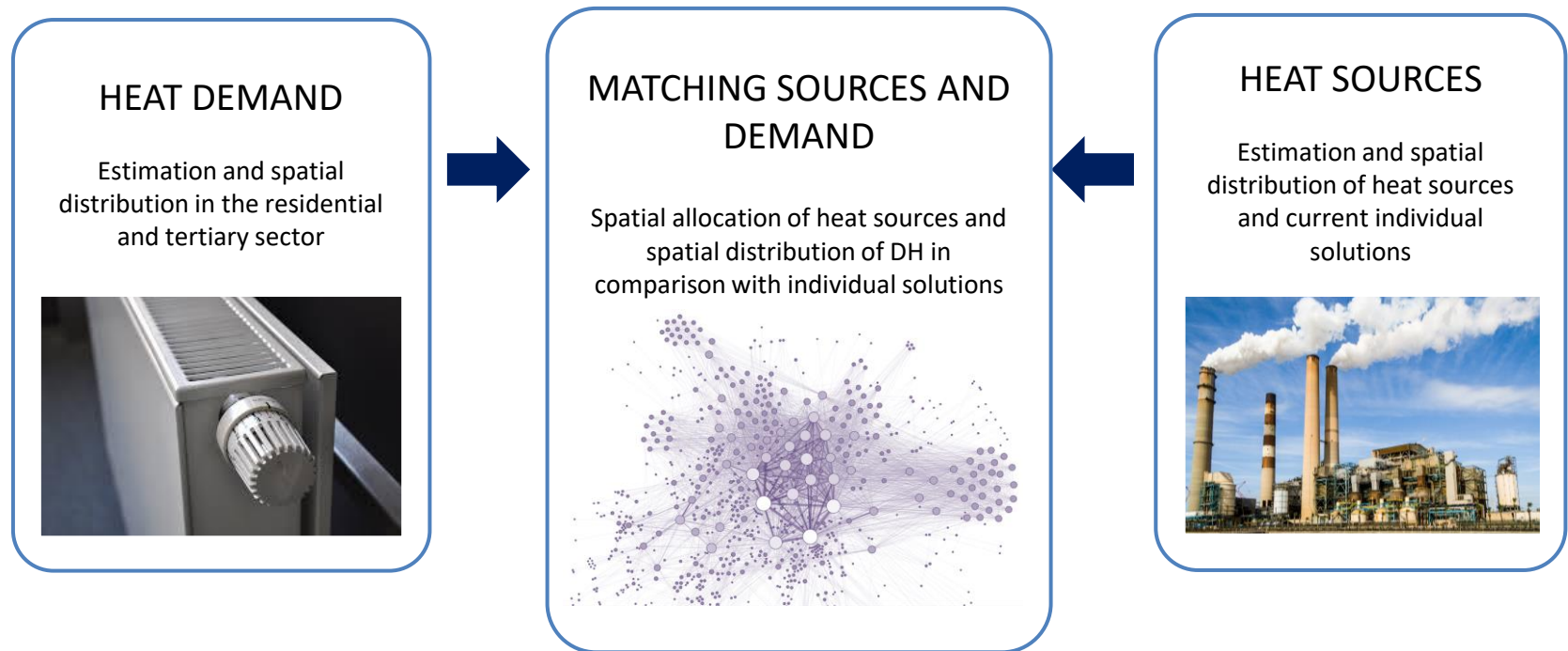
Assessing the potential diffusion of renewable based district heating in Italy through energy mapping



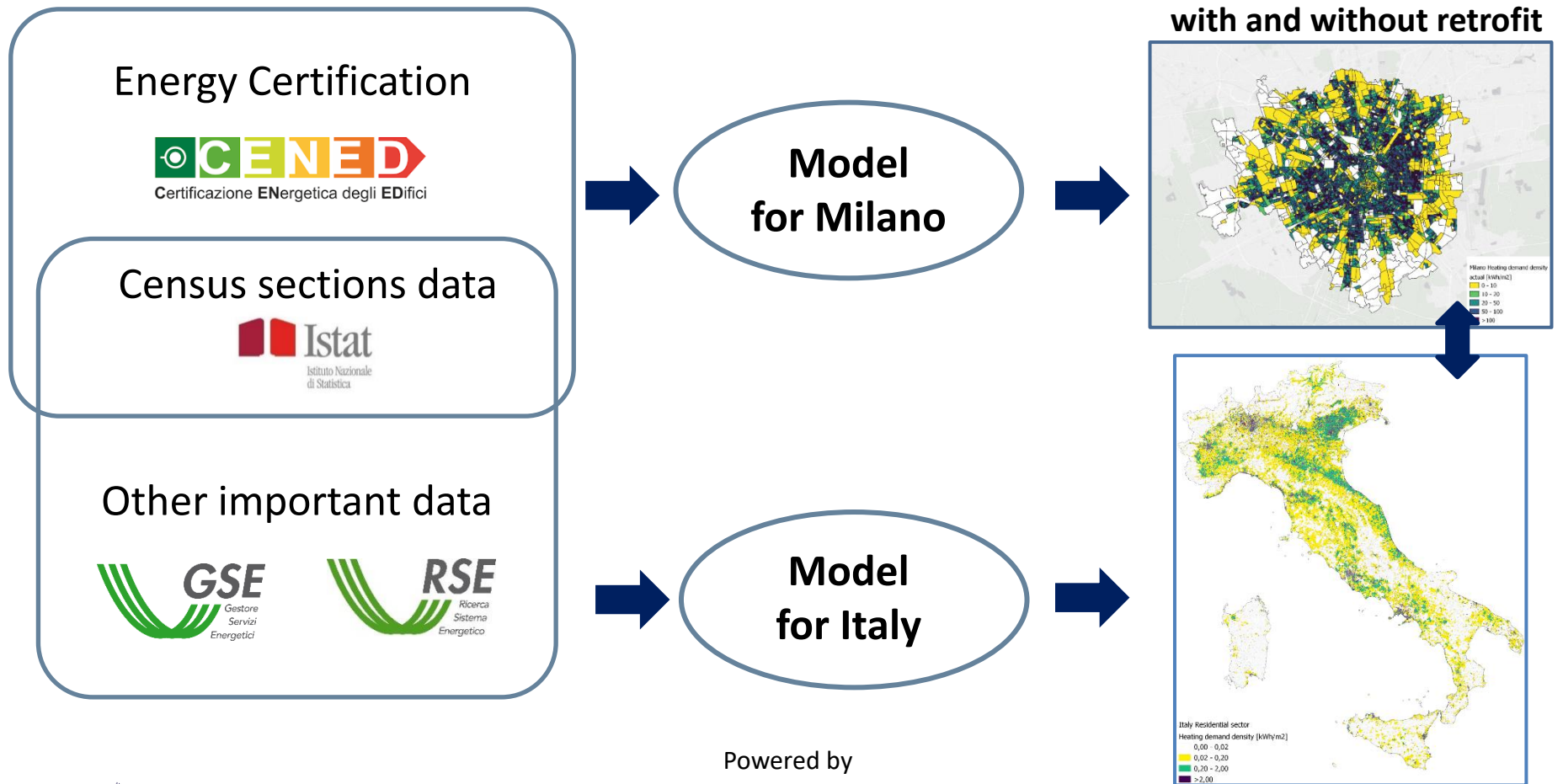
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Structure of the project



Structure of heating spatial distribution work

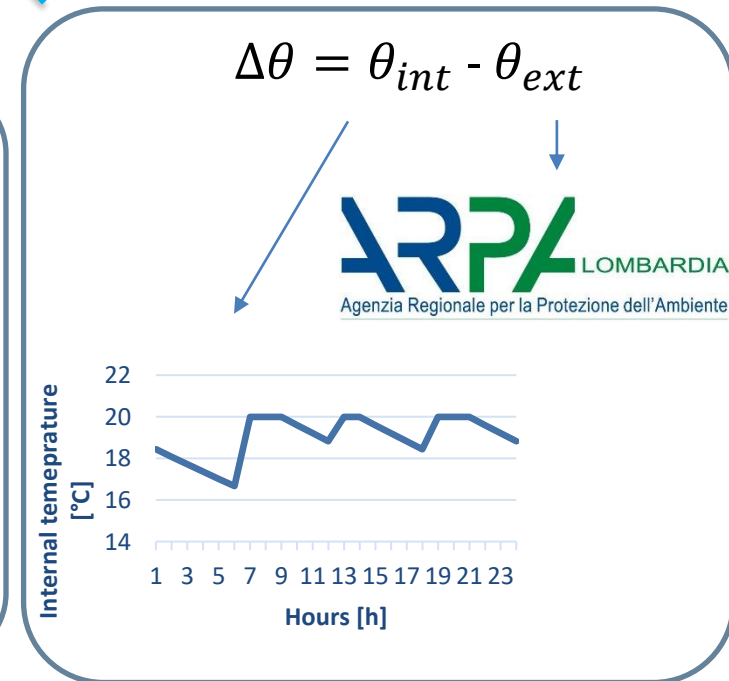
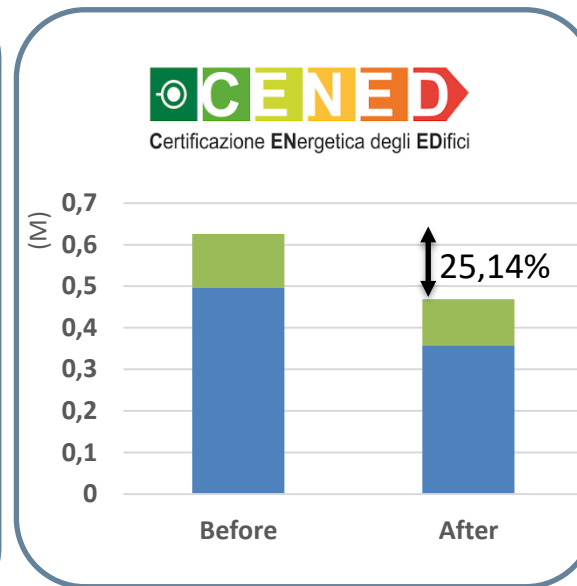
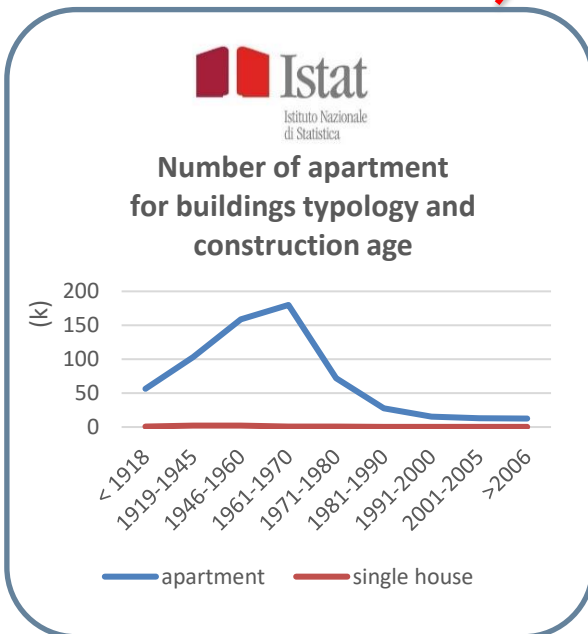


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First method

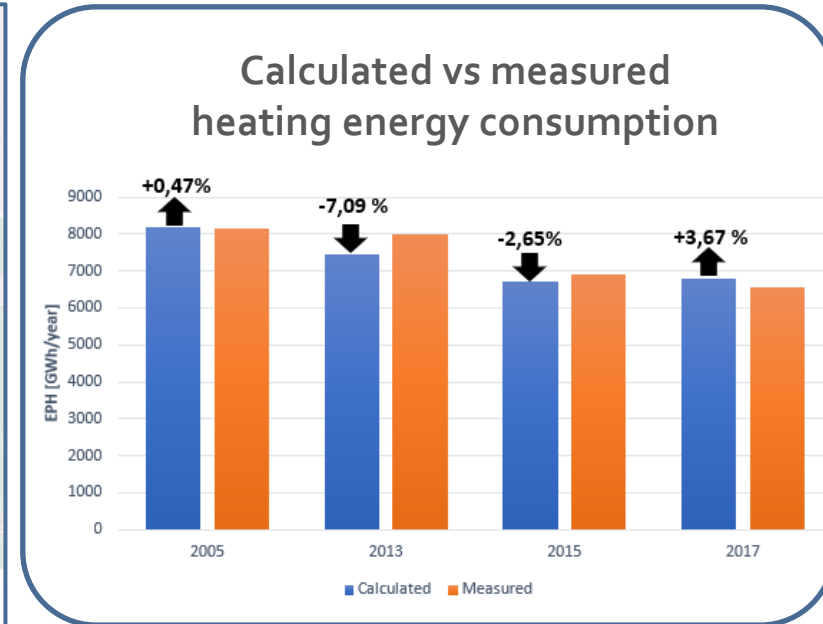
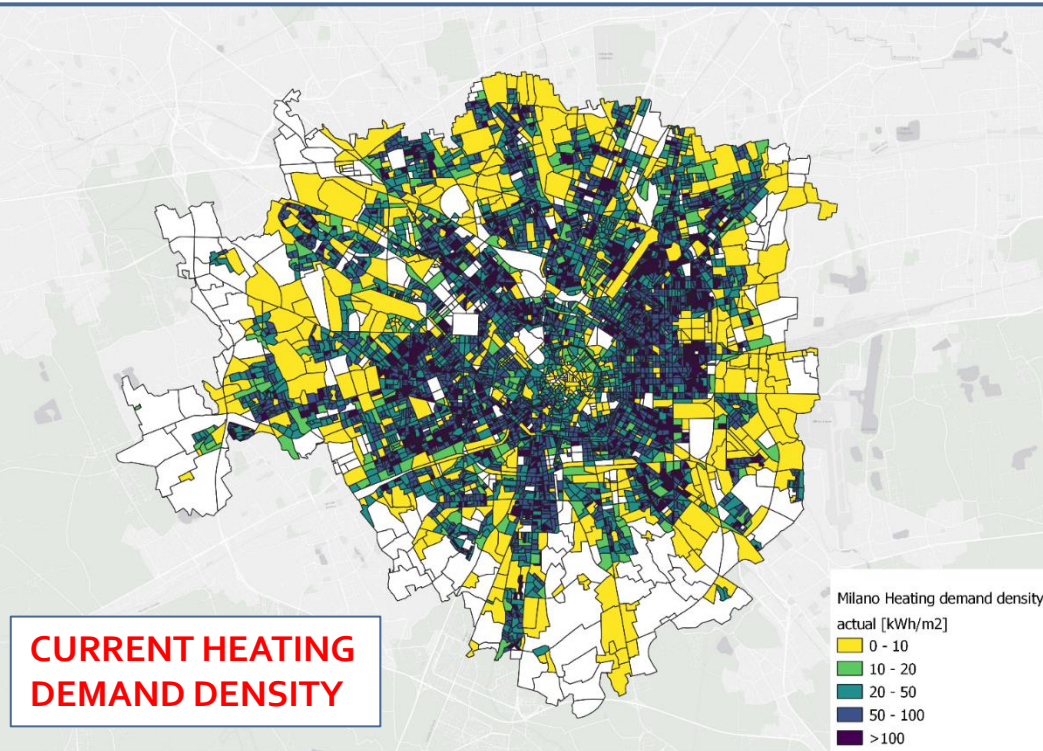
Model for Milano residential sector

$$Qd = n_{buildings} \sum_j A_j U_j \sum_{i=1}^N \Delta\theta_i \Delta t \left[\frac{Wh}{year} \right]$$



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Validation and results



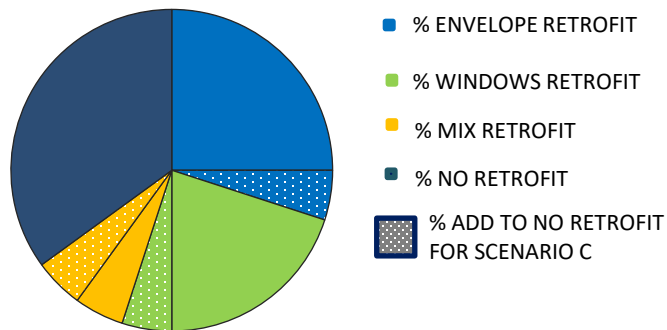
WHY?

Occupants' behavior

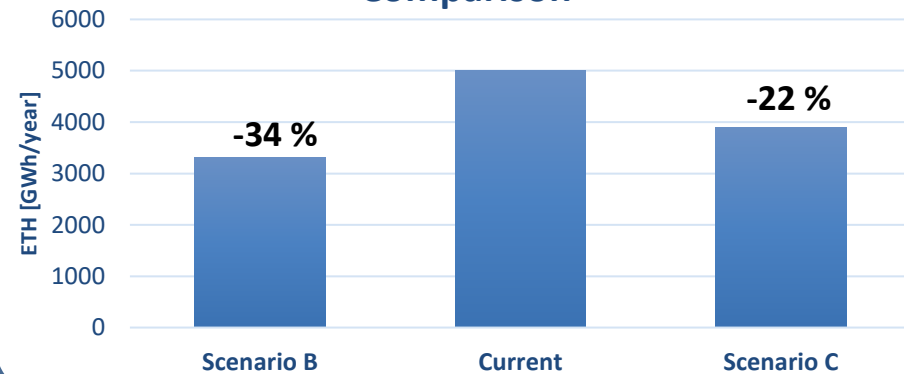
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Milano retrofit scenarios

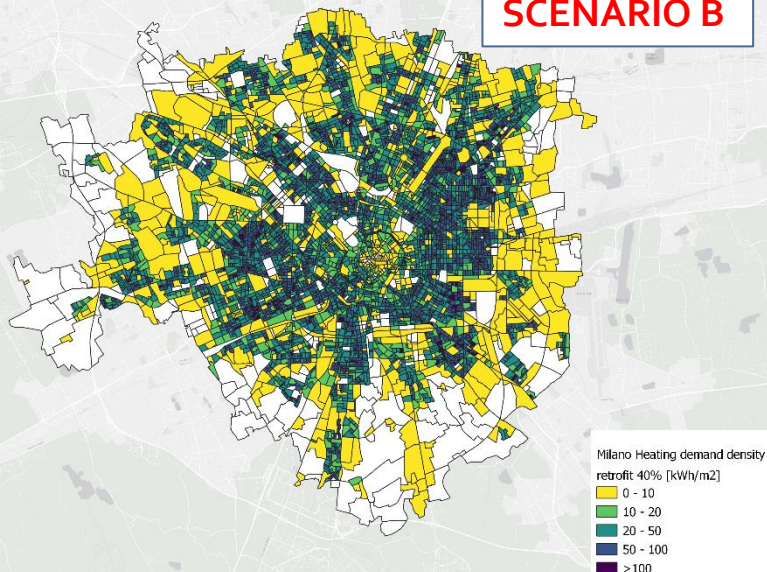
B and C scenarios



Comparison

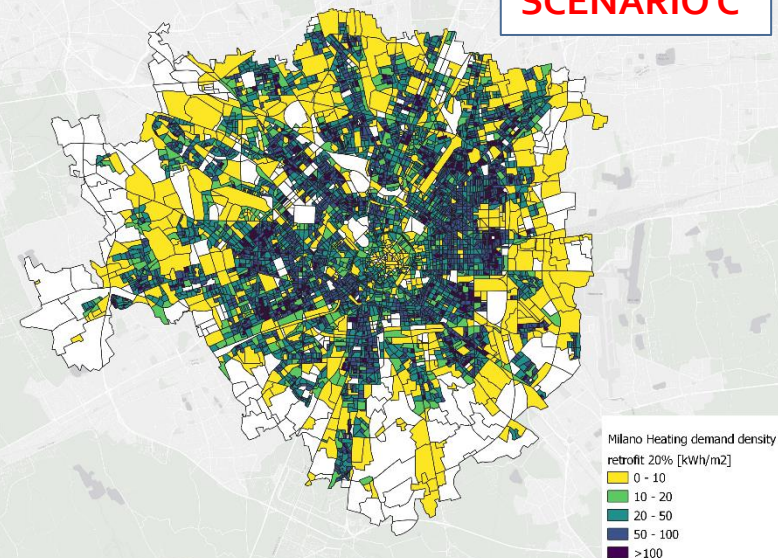


SCENARIO B



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SCENARIO C



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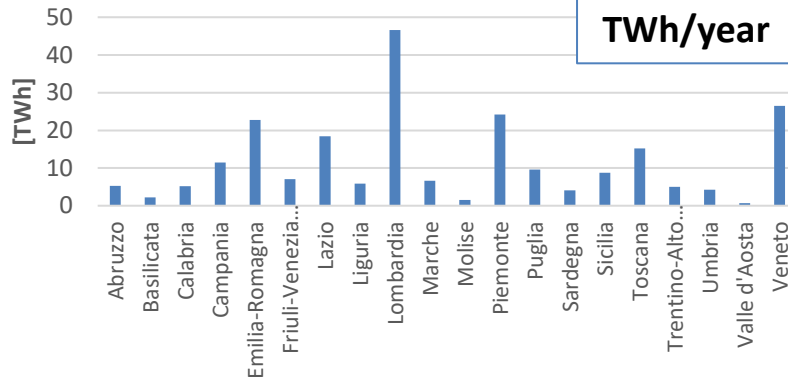


Second method

Model for Italy residential sector



Regional residential heating demand density

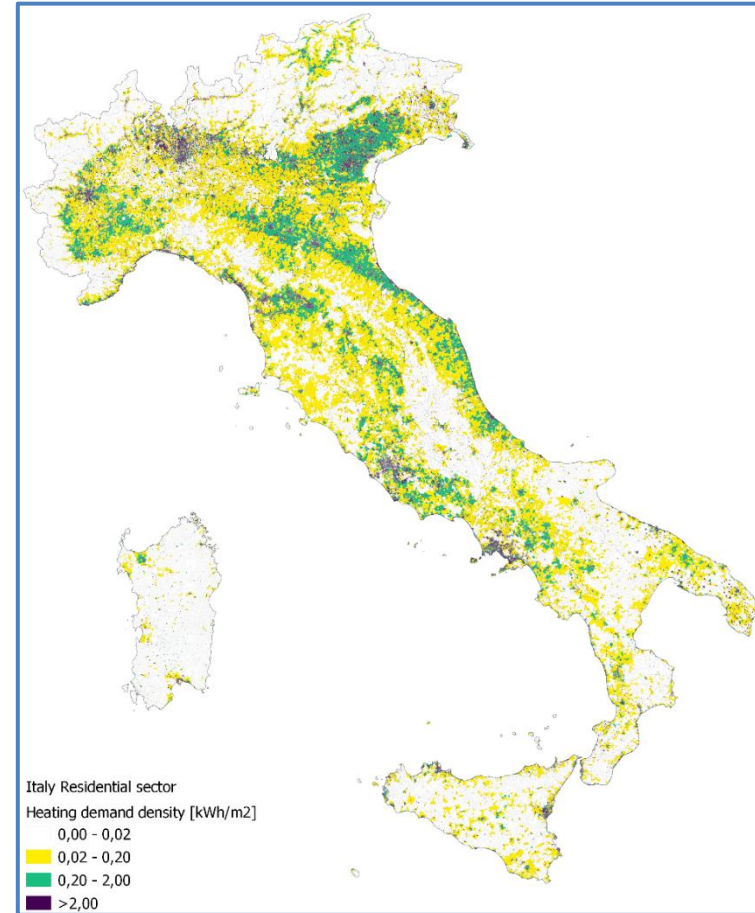


Census sections' m²
for each construction age



% construction age on total
heating energy demand

$$\left[\frac{kWh}{m^2 K} \right]_{city, age}$$

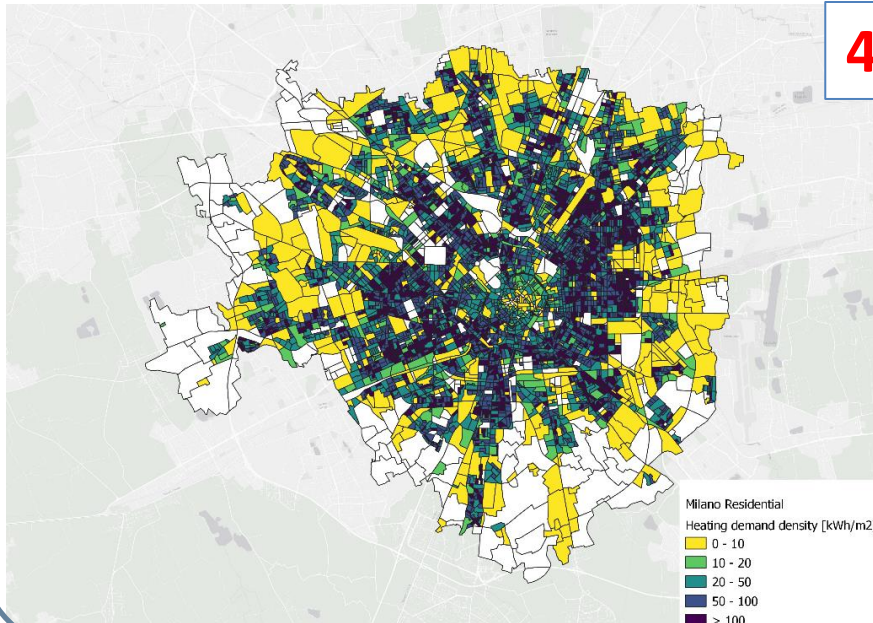


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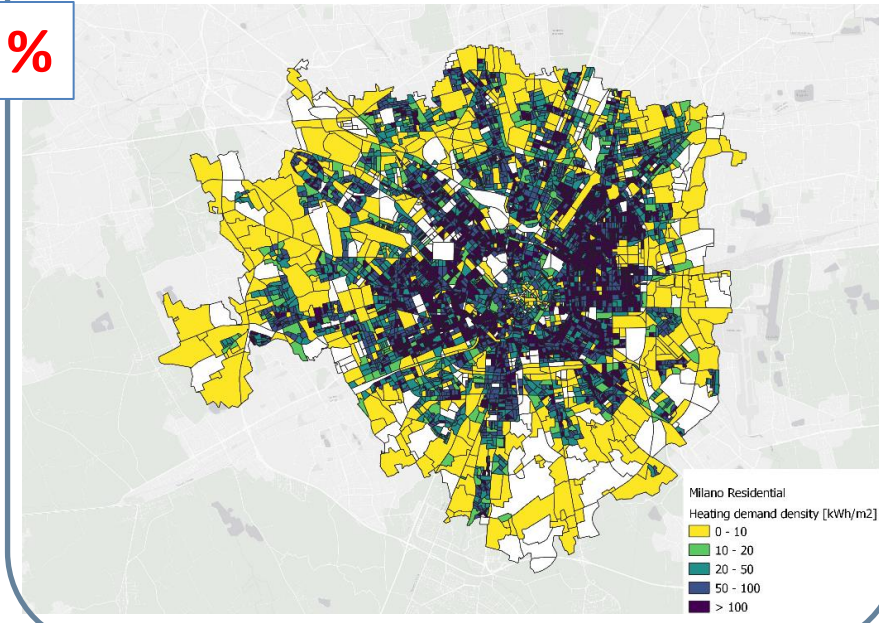
Comparison between the two methods for residential buildings heating demand in Milano

1st method
5,45 TWh



4,5 %

2nd method
5,72 TWh



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Italy retrofit scenario

Annual retrofit
of the italian residential floor area
1%

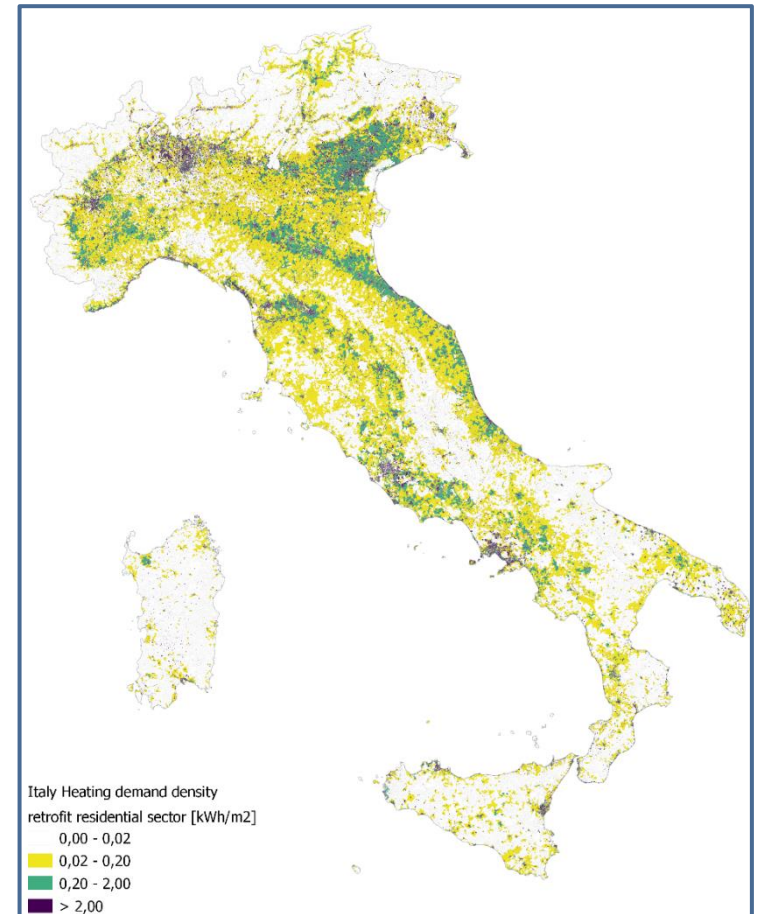


Worst buildings
in each census sections



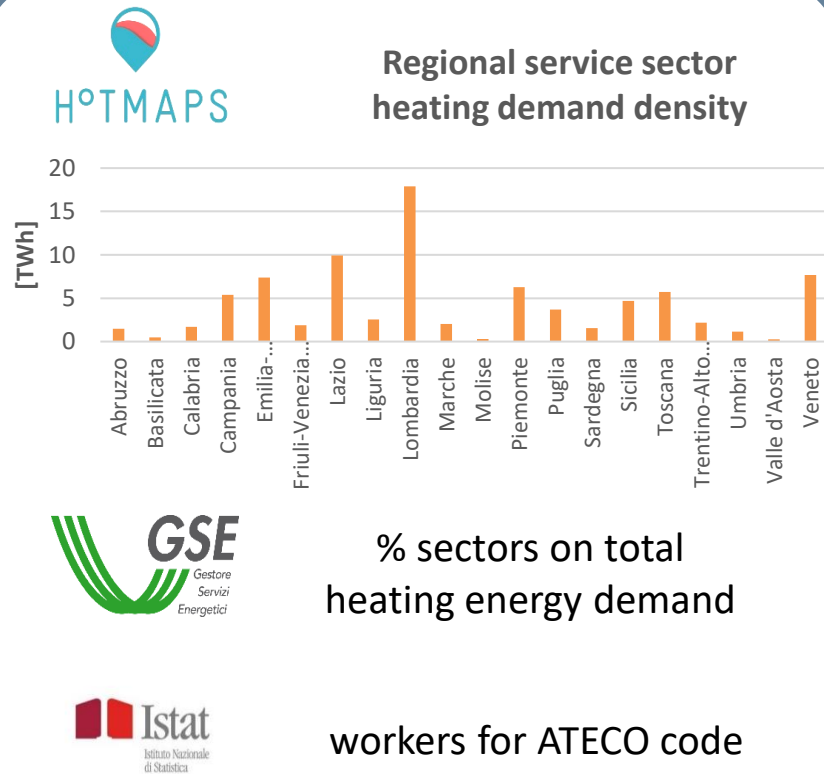
231,5 TWh -> 219,5 TWh

-5,2%



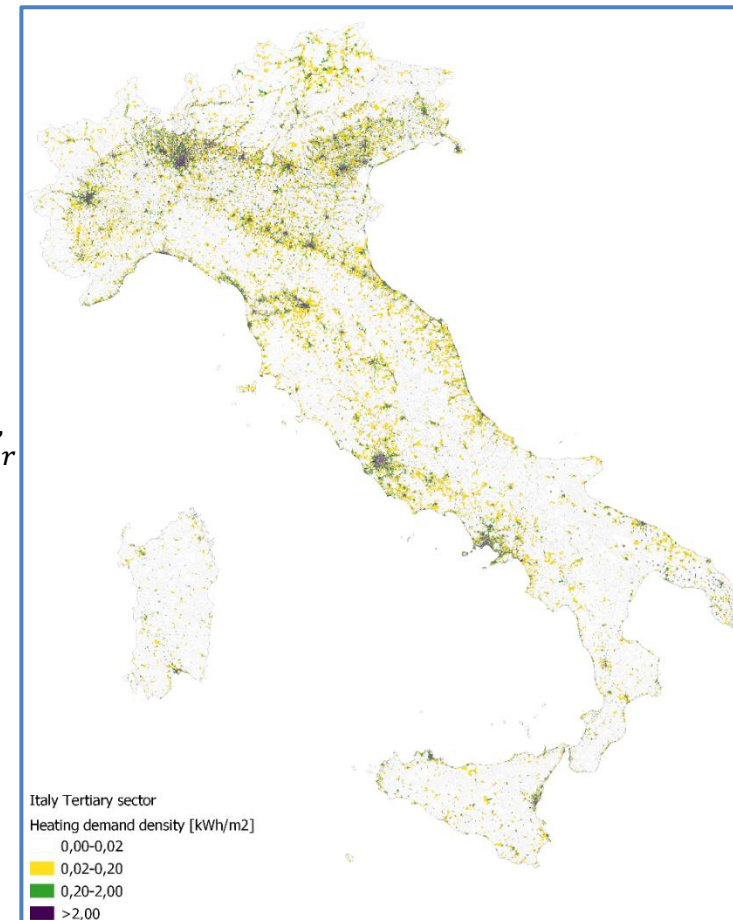
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Model for Italy service sector



$$\left[\frac{kWh}{workers} \right]_{city, sector}$$

➔



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Conclusions



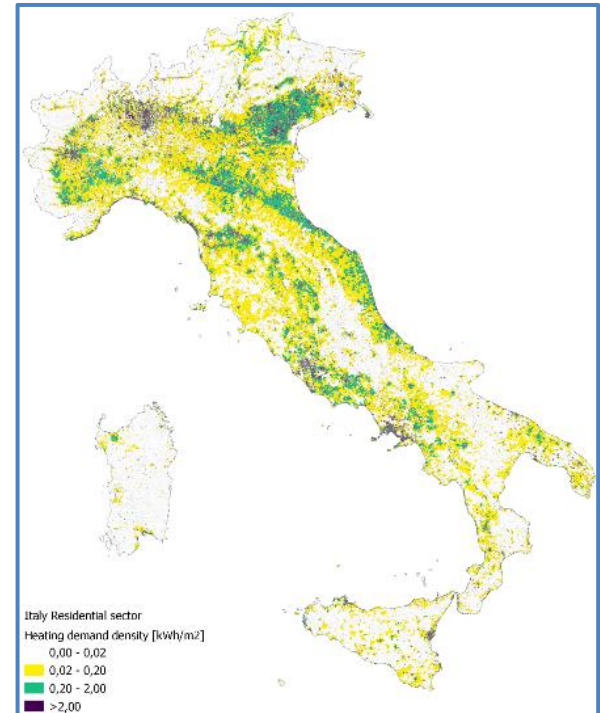
- Open data



- Automated model for Italy



- Spatial distribution
- High level of detail
- Retrofit simulation



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Thank you for your attention



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