

GIS-Based District Residential Building Energy Modelling

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MD4: Supervisory and Control Infrastructures

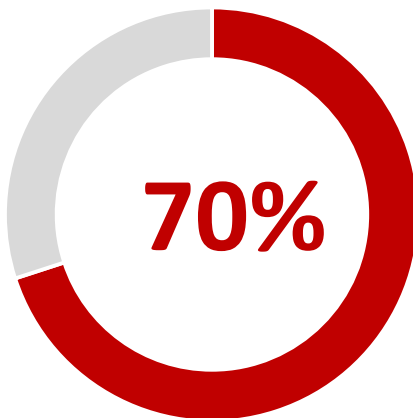


Buildings play a significant role in urban energy demand

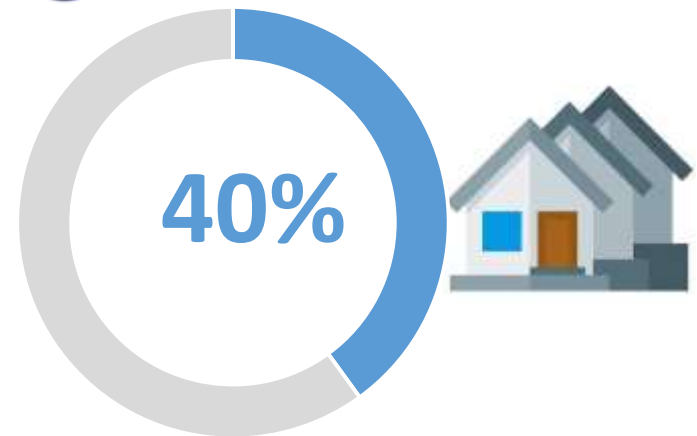
Urban Energy Consumption



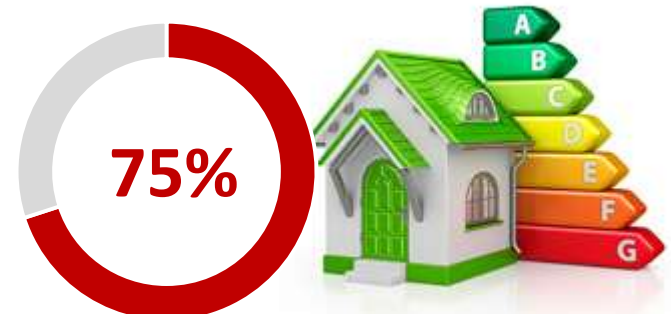
Urban Greenhouse Gas Emissions



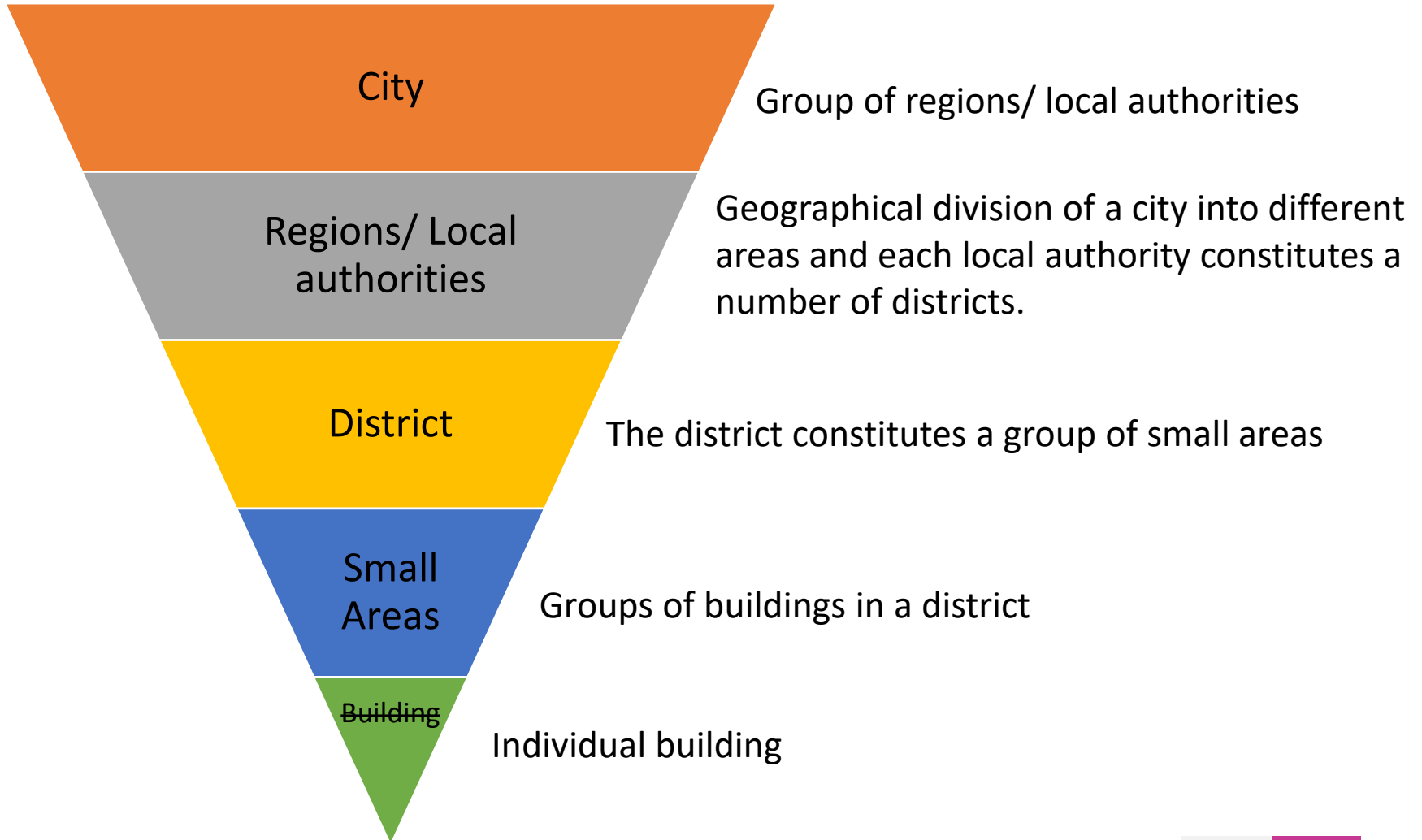
 Overall Energy Consumption



 Energy Inefficient



Energy and emission reductions are possible through building energy analysis at a local level

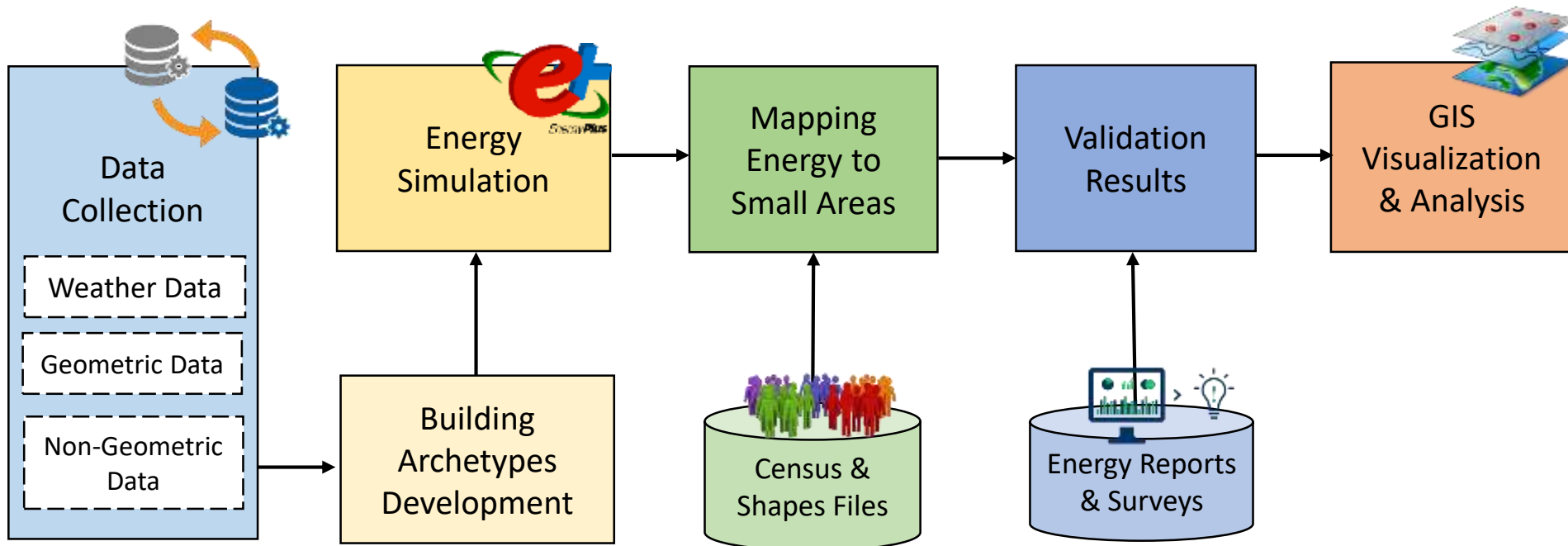


Energy modelling at a large scale is complex and time-consuming task

- Geometric and non-geometric data required for individual building.
- Trade-off between effort and accuracy, especially regarding modelling and the data collection of the building stock.
- Uncertainty associated with the national level buildings archetypes.
- Small areas concept is used for detailed analysis.

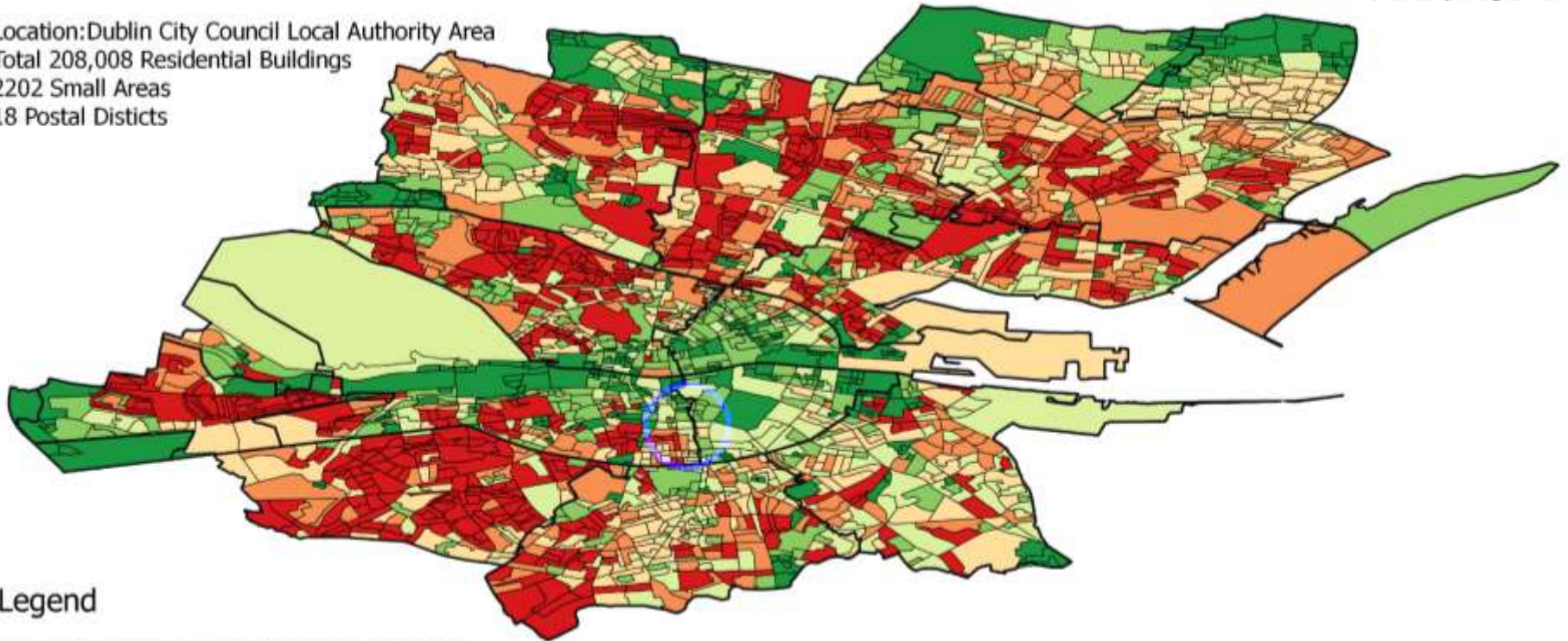


Methodology for GIS-based residential building energy modelling at district scale



Energy modelling result of Dublin city shows area need of renovation

Location: Dublin City Council Local Authority Area
Total 208,008 Residential Buildings
2202 Small Areas
18 Postal Districts

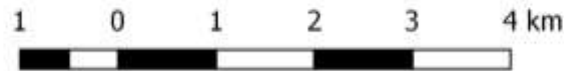


Legend

Annual Small Areas Energy Use (kWh/m²/yr)

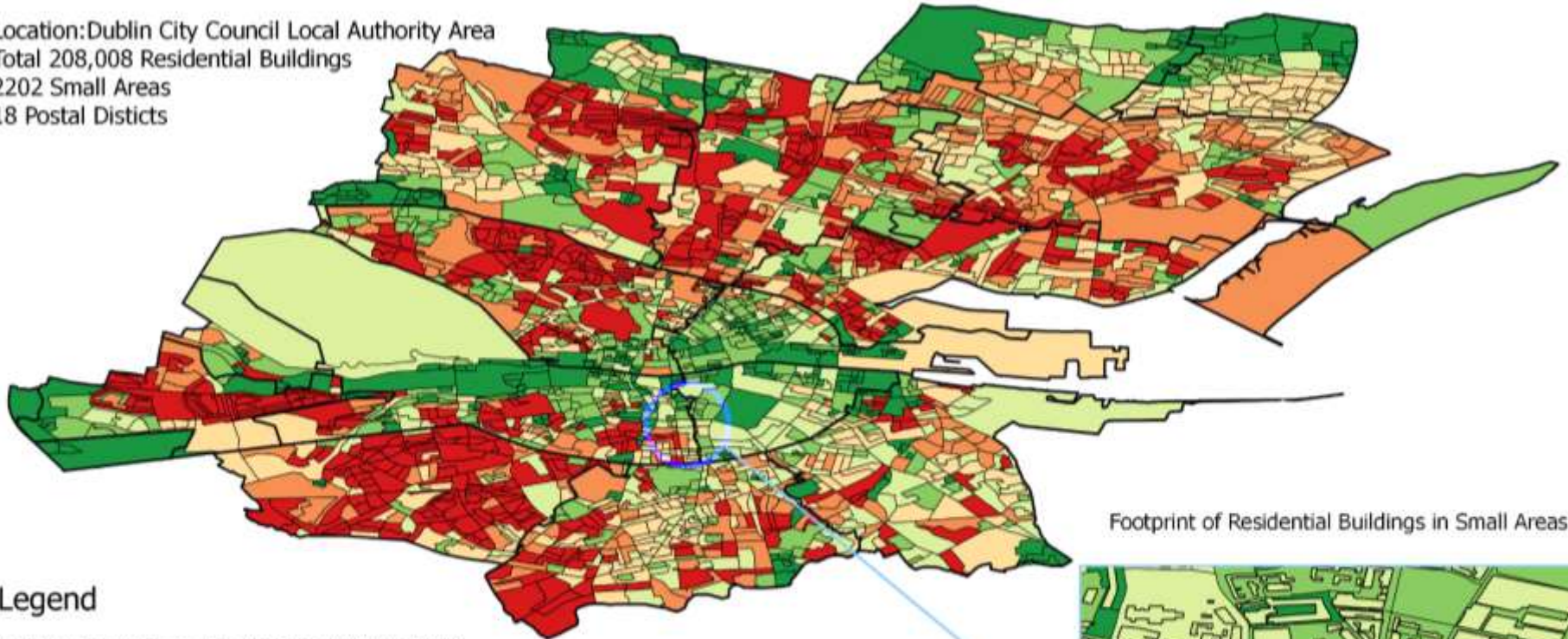
- 0 - 120
- 120 - 136
- 136 - 150
- 150 - 162
- 162 - 173
- 173 - 186

□ Districts Boundary



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□ Districts Boundary



Footprint of Residential Buildings in Small Areas



Conclusion & Future Work

- A **generalized methodology** for GIS-based district energy modelling using bottom up and **data driven** approach.
- Instead of mapping results directly to districts, the **small areas** concept is used for detailed analysis.
- GIS-based modelling will aid the local authorities or city planners to identify **priority areas**.



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