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## An Urban Building Database (UBD) supporting a Smart City Information System

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### Highlights

- A conceptual framework for the development of an UBD is proposed;
- The key characteristics of an UBD are discussed;
- The integration, processing and analysis of Big Data in Smart Cities is described;
- A methodology based on archetypes is proposed to fill data gaps;
- The development of an UBD for Lisbon is presented;

### ABSTRACT

Urban energy modelling requires a large amount of detailed data to perform systematic dynamic simulations of a large number of buildings, where the adoption of energy efficiency strategies is an important concern for sustainable urban planning.

National statistical datasets collect important aggregated data regarding building construction, energy consumption and occupants, and cities are making a significant effort to update spatial referenced data of their territory. However, these data is generally not detailed enough, being available at different scales and in different formats.

The integrated use of these data is critical to validate different methods to predict and model energy consumption in cities, as well in addressing its energy saving potential. Furthermore, scenario analysis for retrofit or new design is only possible at building scale, highlighting the potential of a bottom-up database.

This paper presents the process of collecting, mapping, cleansing and integrating urban data resulting in an UBD to support an information system for Smart Cities. The goal is to reduce the gap between the available urban data and the specific data required to run a complete urban building energy simulation. Key characteristics of an UBD are explored and applied to a case study in Lisbon, Portugal.

As a result, a Buildings Dashboard is developed, materializing the UBD user interface. This dashboard allows the interactive visualization and data exploration of the building stock at multiple scales. Future work includes the development of an Urban Scenario category, bringing new insights on urban energy simulation and scenario evaluation to this platform.

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