MEASURING THE DECARBONISATION PROGRESS OF BUILDINGS BASED ON EUROPEAN OPEN BIG DATA

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Abstract – The European Commission (EC) has established climate neutrality by 2050 as one of its objectives. To achieve this, decarbonising the building stock is crucial since buildings are responsible for 36 % of European greenhouse gas emissions. Monitoring the progress of decarbonisation is crucial to understand where we stand in terms of achieving long-term decarbonisation goals, facilitate evidence-based decision-making, promote accountability among member states (MS), and engage the public in these initiatives. However, data collection for monitoring the decarbonisation of buildings represents a challenge for MS, for which they may not be adequately prepared. To promote the collection and publication of open data, the EC has established frameworks for developing open data infrastructures within MS through various directives, offering comprehensive and well-organized information. Directives such as the Infrastructure for Spatial Information in Europe (INSPIRE), which advocates for the collection and accessibility of data in diverse topics, and the Energy Performance of Buildings Directive (EPBD), enabling the analysis of extensive information on the energy efficiency of constructed assets through the open publication of Energy Performance Certificates (EPC) databases, exemplify these efforts. However, this information often remains dispersed and narrowly focused, necessitating the integration of other data sources to extract meaningful insights. The paper delves into the benefits of georeferencing and automated cross-referencing of open data on buildings, enabling the monitoring of decarbonisation progress. To achieve this, we have developed a national-scale Urban Building Energy Model (UBEM) for Spain. This model is founded on EPCs and other open data derived from public information sources established through European directives. Additionally, we have investigated the prospect of integrating data from Digital Building Logbooks (DBL), which are emerging data repositories on buildings promoted by the EC in the forthcoming EPBD, into the UBEM to enhance the model. The study showcases significant potential in developing information on various topics, including characterising the Spanish building stock – a framework that may be extrapolated to other MS – in terms of energy performance based on location, archetype, and age. The study also focuses on estimating energy consumption and carbon dioxide emissions, monitoring the progress of renovations, evaluating the achieved energy savings, and identifying and characterising the least energy-efficient segments of the building stock.

Keywords – Building decarbonisation; Digital Building Logbook (DBL); digitisation; Urban Building Energy Model (UBEM); renovation

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