COMPARISON OF BUILDING STOCK RELATED DATA SOURCES AND INDICATORS

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Introduction

The presence of comprehensive datasets on building stock has great potential for building stock modeling, policymaking, and achieving the net-zero GHG emissions target in 2050. One of the essential resources in building stock data is the Building Stock Observatory (BSO). BSO contains detailed information about building stock characteristics, building shell performances, energy consumption, energy poverty, and efficiency. All this information is required to increase the effectiveness of building stock policies and to interpret if these policies had the intended outcome. Builthub is a H2020 project that aims to develop a robust and flexible web platform that collects and exports EU-level building stock data. As a part of Builthub, BSO indicators were considered, and various data sources to derive these indicators were examined in this study. Comparing the building stock-based data sources, identifying the inconsistencies, and making the indicators consistent are other purposes of this conference contribution beyond the scope of the Builthub project.

Methodology

1) Comparing building stock related indicators from different data sources.

The general structure of the datasets is adjusted according to the table below. Datasets are compared in two main groups: the number of units and floor area.

Included data sources:

1. EU Census [1],
2. Hotmaps [2],
3. Invert [3],
4. ENER/C1/2018-494 [4],
5. Odyssee [5],
6. BSO [6].

Geographical Resolution	Sector	Subsector	Construction Period
EU-27 (NUTS0)	Residential	Single Family Houses	Before 1945
		Multi Family Houses	1945 - 1969
		Apartment Blocks	1970 - 1979
	Service	Education	1980 - 1989
		Health	1990 - 1999
		Hotels and Restaurants	2000 - 2010
		Offices	After 2010
		Other non-residential buildings	
		Trade	

Table 1 Adjusted structure of datasets

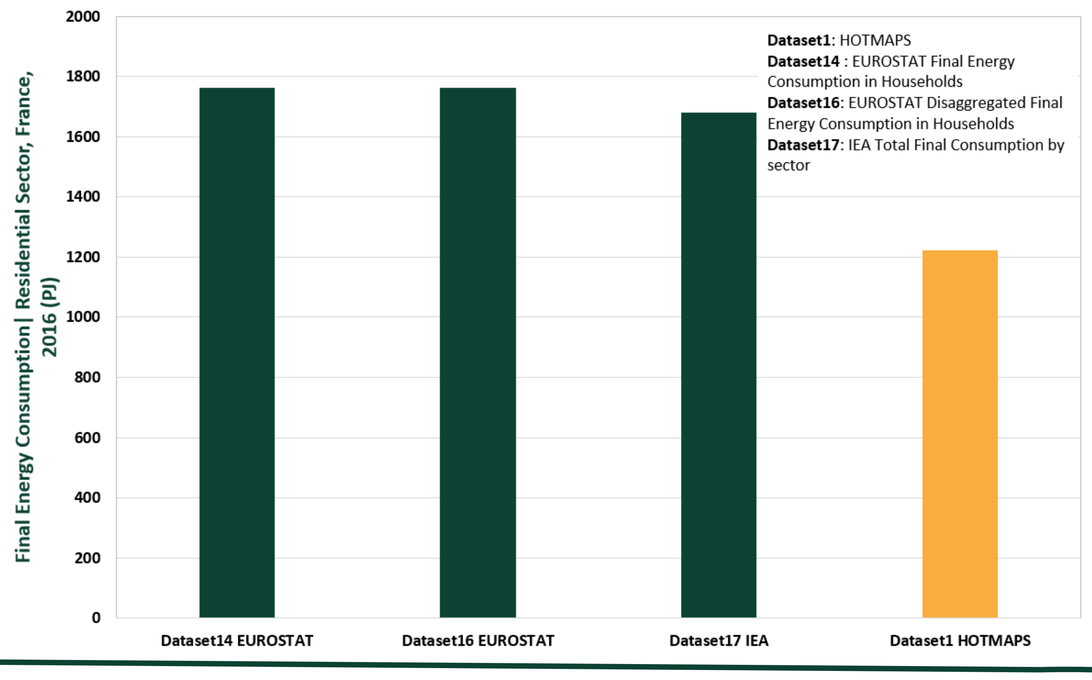
2) Identifying deviations.

Relative differences for each dataset and each country were calculated.

3) Discussing reasons for deviations and inconsistencies.

Results

In the following graph, the total final energy consumption in the residential sector has been calculated separately from four different data sources for France. The considered data sources are Eurostat Final Energy Consumption in households (Dataset14), Eurostat Disaggregated Final Energy Consumption in households (Dataset16), IEA Total Final Consumption by sector (Dataset17), and Hotmaps (Dataset1) [2], respectively. Please note that Datasets 14,16, and 17 are based on Eurostat data and dependent on each other. If we want to have a consistent data source, we have to ensure not to double count dependent data sources. Three different ways were followed when calculating each country's total final energy consumption value. The first of these is the summation of final energy consumption by building type (Dataset1), the second is the summation of final energy consumption by end-use (Dataset16-17) [7][8], and the last is the total final energy consumption value calculated directly in the related data set (Dataset 14) [9]. According to the calculations, it is expected that each bar should be equal to each other for every country in the graph. However, the deviations between values can be easily noticed.



The mean of the relative deviations in floor area and the number of dwellings between the data sets for each building category are shown below. It can be seen that there are significant differences between the building-stock data sources.

Furthermore, it can be noticed that the deviation between data sources increases in both the number of units and floor area from aggregated structure to disaggregated, from the whole residential sector to single and multi-family houses.

	Floor Area	Number of Buildings
Residential Sector	**9%**	**11%**
Single-Family Houses	21%	19%
Multi-Family Houses	28%	23%
Non-Residential Sector	**13%**	**30%**
Educational Buildings	24%	
Health Care Buildings	28%	
Hotels and Restaurants	26%	
Offices	19%	
Trade Buildings	18%	
Other Non-Residential Buildings	17%	

Table 2 Overall relative differences between building types (%)

Conclusion

There are considerable deviations between different building-stock-related data sources, as anticipated at the beginning of this work. However, these deviations can be explained if further investigated. The main reasons for these deviations can be differences in primary points such as the data source, base year, the scope of the building categories, climate data, type of energy use, or even the unit conversions. In addition, partly, the data is not sufficiently explained in each data source to allow for a proper comparison. It is essential to document the data sets in detail to be compared more consistently. Combining additional data sources, e.g., EPC databases, would also be important to ensure consistency.

References

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