



*Explore sustainable European futures*

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# **A comprehensive database of the EU building stock and energy consumption**

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**D2.4 approach**

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### Short Description

*This report accompanies the files that build D2.4 the building stock database. These files include data files and metadata files as specified below.*

### Quality check

<b>Name of reviewer</b>	<b>Date</b>
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### Statement of originality:

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

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## List of Abbreviations

used in the data file names

- bld – buildings sector
- ots – observed time series
- fts – future time series

used within the data files

*building categories*

- sfh – single family home
- mfh – multi-family home

*energy carriers*

- oil – heating oil
- bio – biomass
- dh – district heating
- el – electricity,
- amb – ambient, which is used by heat pumps
- sol – solar thermal
- coa – coal
- geo – geothermal
- oth – other energy carriers as for example biogas or bioliquid and any other.

# 1 Executive Summary

The building stock database D2.4 contains data that describe the European building stock by country with parameters that are essential to determine its energy performance. The data is collected first from the Eurostat, gaps are filled with the help of the EU building stock database and other EU Projects. The data is used as an input to the European Calculator to calculate the energy demand and describe the building stock and evolve it until 2050. This evolution is also based on the drivers included in D2.5 "Identification of levers and levels for the building stock". The outcome will feed into the online European Calculator.

The data and respective metadata can be accessed, by request, following this link: [http://www.european-calculator.eu/?cdm\\_linkout=NzYw](http://www.european-calculator.eu/?cdm_linkout=NzYw)

## Database Content Description

The building stock database consists of five datafiles with energy relevant parameters in spreadsheet format. The files specify the building stock parameters described in [Table 1](#).

The building stocks of the countries is represented by different building archetypes according to

- building category (sfh, mfh) and
- building age class (that differ amongst countries)

Name of the spreadsheet file	Energy parameter	Unit	Disaggregation by
ots_bld_floor-area	floor area	m <sup>2</sup>	Country
ots_bld_residential-heating-efficiency	heating system efficiency	%	Heating system
ots_bld_residential-heating-share	energy mix: share of floor area for each energy carrier	%	Country, energy carrier
ots_bld_residential-energy-need	energy need per floor area	kWh/m <sup>2</sup>	Country, building category and age
ots_bld_residential-energy-share	energy share: share of floor area for each building archetype	%	Country, building category and age

*Table 1 –the five datafiles that describe the European building stock for each country*

These parameters are detailed and scoped in the following.

The **energy need**<sup>1</sup> represents the energy needed for heating and cooling of the buildings regardless of the choice of heat generation and distribution system and

<sup>1</sup> The **energy need** shall represent the **net thermal energy need** in alignment with the Guidelines accompanying Commission Delegated Regulation (EU) No 244/2012 of 16 January 2012

their additional losses. The energy need is therefore a representation of the energetic quality of the building envelope.

The buildings are distinguished by building category sfh and mfh - single and multi-family buildings, respectively. Due to the lower surface to volume ratio in multi-family building, such buildings have a lower energy need than single-family buildings, given that the envelope is of the same quality.

As there is no systematic collection of renovation activity across Europe for the different building categories and ages, the energy need per floor area is on average assumed to be constant in the historic data from 1990 to 2015.

The **energy share** describes the share of floor area in a certain building archetype. A building category and an age band, described by the construction period, characterize the building archetype. As each archetype has a specific energy need, the energy share thus describes the building mix from an energy need perspective. As the statistical data do not cover the differentiation of building category and age over time, a constant share is assumed for the past.

The **heating efficiency** describes the losses that are driven by the choice of heat generation and distribution system. It is the ration of the energy carrier that is input in the house and the energy need in the heated room.

The **heating share** represents the energy mix, as energy carriers aggregate the heating systems. For example, all gas boiling heating systems are categorized as gas. The overall efficiency is thus a mix of the different gas boiling heating systems and changes over times as their individual efficiency of the new systems improves and their mix changes.

In the current model, constant heating efficiency and share is assumed for the past, but this will be updated in the next version of the model within 2018.

**Energy carriers** used in heating systems are:

- oil – heating oil
- bio – biomass
- dh – district heating
- el – electricity,
- amb – ambient, which is used by heat pumps
- sol – solar thermal
- coa – coal
- geo – geothermal
- oth – other energy carriers as for example biogas or bioliquid and any other.

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supplementing Directive 2010/31/EU of the European Parliament and of the Council on the energy performance of buildings by establishing a comparative methodology framework for calculating cost-optimal levels of minimum energy performance requirements for buildings and building elements

<http://eur-lex.europa.eu/legal-content/EN/TXT/?toc=OJ%3A+C%3A2012%3A115%3ATOC&uri=uriserv%3A0J.C .2012.115.01.00 01.01.ENG> , which explains:

“The energy need [for example] in winter is calculated as energy losses via the envelope and ventilation minus the internal gains (from appliances, lighting systems and occupancy) as well as ‘natural’ energy gains (passive solar heating, passive cooling, natural ventilation, etc.)”

Various **sources** provided the collected data. In accordance with the overall project approach described in the Data Management Plan (deliverable 11.2), the data collection was based mainly on Eurostat data. Where necessary these data were supplemented by other sources. These sources are:

- the EU Building Stock Observatory  
(<https://ec.europa.eu/energy/en/eubuildings>)
- the Mapping Project  
(<https://ec.europa.eu/energy/en/studies/mapping-and-analyses-current-and-future-2020-2030-heatingcooling-fuel-deployment>)
- the Heat Roadmap Europe Project  
<http://heatroadmap.eu/>

## 2 Open Data Access

The data and respective metadata can be accessed by using the following link:  
[http://www.european-calculator.eu/?cdm\\_linkout=NzYw](http://www.european-calculator.eu/?cdm_linkout=NzYw)

Password: EUCalc\_2018