Belgium

Building Stock Characteristics

The average age of buildings and the share of new buildings in the total stock represent good indicators of the average efficiency of the building stock: the higher the share of recent dwelling, i.e. built with more efficient standards, the higher the energy performance of the stock.

Figure 1: Residential buildings according to construction date (2014)
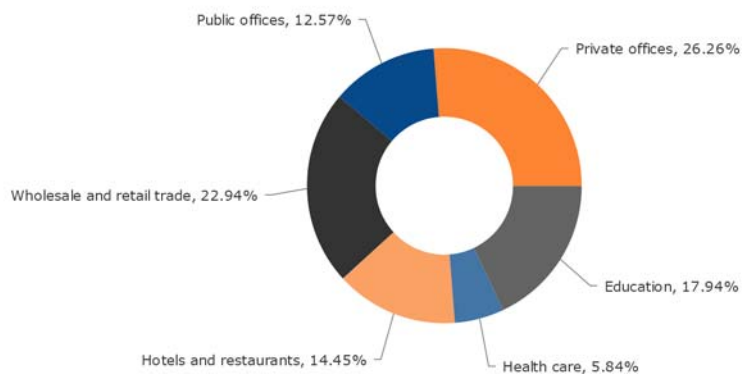Copyright European Commission 2016

< 1945, 33.86%
1945-1969, 24.62%
> 2010, 3.34%
2000-2010, 8.99%
1970-1979, 12.03%
1990-1999, 8.17%
1980-1989, 8.99%
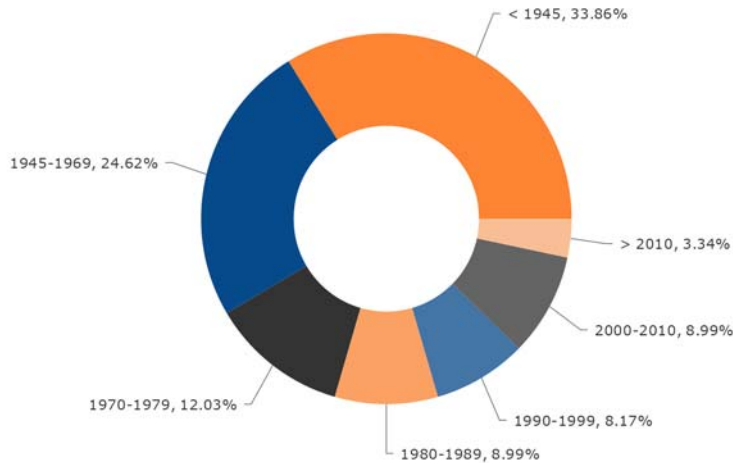
Sources: Estimation   Notes

Figure 2: Breakdown of non-residential floor areas by sector (2013)
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Public offices, 12.57%
Private offices, 26.26%
Wholesale and retail trade, 22.94%
Education, 17.94%
Hotels and restaurants, 14.45%
Health care, 5.84%

Sources: Estimation   Notes

The EPBD requires all new buildings from 2021 (public buildings from 2019) to be nearly zero-energy buildings (NZEB). According to Article 2 "nearly zero-energy building" means a building that has a very high energy performance, as determined in accordance with Annex I. The nearly zero or very low amount of energy required should be covered to a very significant extent from renewable sources, including sources produced on-site or nearby.

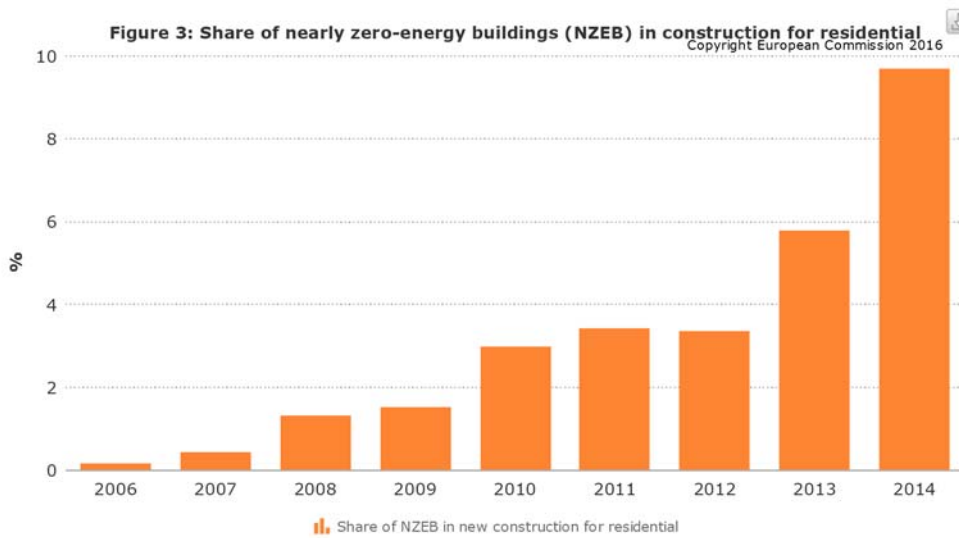Belgium (-Flanders) has a nearly zero-energy buildings (NZEB) in the legislation.

As concrete numeric thresholds or ranges are not defined in the EPBD, these requirements leave room for interpretation and thus allow Member States to define their nearly zero-energy buildings (NZEB) in a flexible way, taking into account their country-specific climate conditions, primary energy factors, ambition levels, calculation methodologies and building traditions. This is also the main reason why existing nearly zero-energy buildings (NZEB) definitions differ significantly from country to country. It is thus a challenging task to find a common denominator to define nearly zero-energy buildings (NZEB) at a European scale. The EU-project ZEBRA2020 sets a clear methodology for how nearly zero-energy buildings (NZEB) are defined in the context of market tracking: the nearly zero-energy buildings (NZEB) radar graphic*. The nearly zero-energy buildings (NZEB) radar allows combining qualitative and quantitative analysis of building standards in a specific region. The nearly zero-energy buildings (NZEB) radar clusters energy efficiency qualities in 4 different categories that have been defined at national level by experts:

1. Net zero energy buildings / Plus energy buildings
2. Nearly zero-energy buildings (NZEB) according to national definitions
3. Buildings with an energy performance better than the national requirements in 2012
4. Buildings constructed/renovated according to national minimum requirements in 2012

The following graph shows the amount of nearly zero-energy buildings (NZEB) in construction for residential, and hence sums up categories 1 and 2 as

defined above.

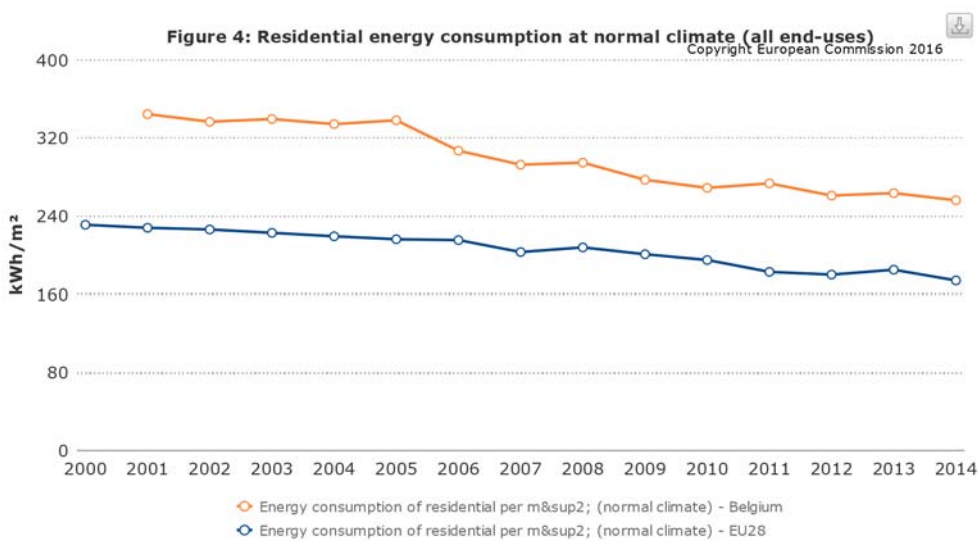* More information on the methodology are available here : http://www.zebra-monitoring.enerdata.eu/ (http://www.zebra-monitoring.enerdata.eu/)

Figure 3: Share of nearly zero-energy buildings (NZEB) in construction for residential
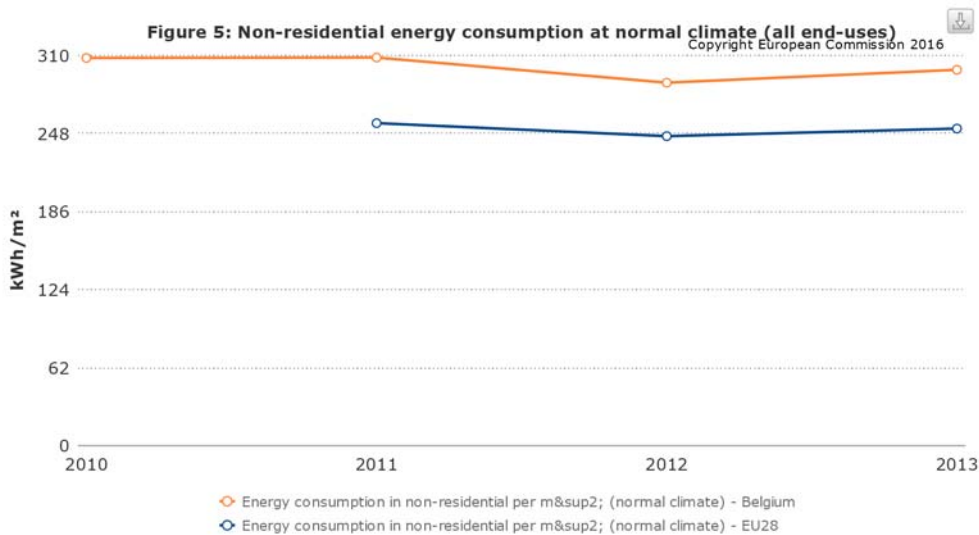Copyright European Commission 2016

Sources: ZEBRA2020   Notes

Energy Use in Buildings

The following graphs display the energy consumption of households for all end-uses, namely space and water heating, cooling, cooking, lighting and appliances. Energy consumption is measured at normal climate (i.e. corrected for climatic variations) to avoid yearly fluctuations due to climatic variations from one year to the other, and thus to have consistent trends.

The energy consumption in residential buildings is higher compared to the EU average. The energy consumption in non-residential buildings is higher compared to the EU average.

Figure 4: Residential energy consumption at normal climate (all end-uses)
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Sources: Calculation - Estimation   Notes

Figure 5: Non-residential energy consumption at normal climate (all end-uses)

kWh/m²

y-axis: 310, 248, 186, 124, 62, 0

x-axis: 2010, 2011, 2012, 2013

◇ Energy consumption in non-residential per m² (normal climate) - Belgium
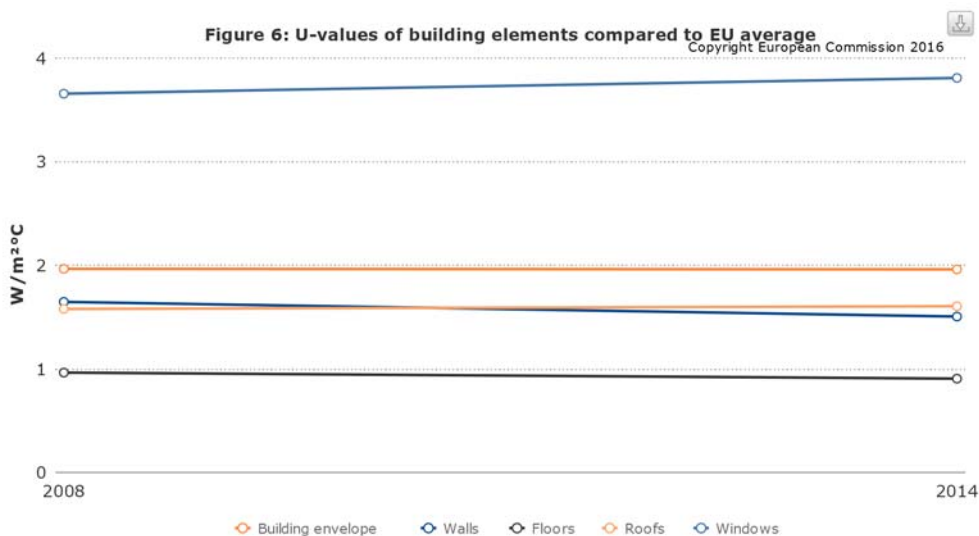◇ Energy consumption in non-residential per m² (normal climate) - EU28

Sources: Calculation   📖 Notes

Envelope Thermal Properties

Heat demand of buildings and dwellings is significantly dependent on the thermal quality of the building envelope. This level is expressed in U-values which are indicators for the heat lost through building elements. National building codes set - based on the EPBD's requirement on cost-optimal minimum performance standards- thresholds at building and/or component level for new buildings and in case of major renovation that indirectly (building level) or directly (component level) influence the U-values realized in new buildings and renovation. But the largest share of the building stock were built before these standards were implemented. The degree of refurbishment of these existing buildings is important for the quality of thermal envelopes.

Figure 6 shows the average U-values per building element in 2008 and 2014 for the total housing stock in Belgium. The change between U-values in 2008 and 2014 is due to the combined effect of new construction and refurbishment of the existing stock and related national requirements.
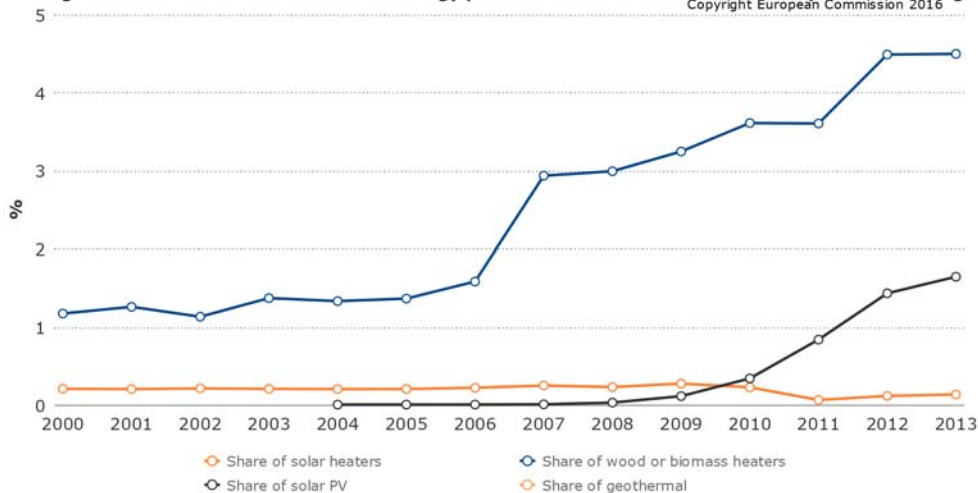
Figure 6: U-values of building elements compared to EU average

W/m²°C

y-axis: 4, 3, 2, 1, 0

x-axis: 2008, 2014

◇ Building envelope   ◇ Walls   ◇ Floors   ◇ Roofs   ◇ Windows

Sources: Calculation - Entranze   📖 Notes

On-site Renewable Energy

On the long run the building stock in EU must be energy neutral, meaning that all the energy demand is covered by on-site renewable energy generation. The Renewable Energy Directive (RES Directive) establishes an overall policy for the production and promotion of energy from renewable sources in the EU. It requires the EU to fulfil at least 20% of its total energy needs with renewables by 2020 - to be achieved through the attainment of individual national targets. Belgiumhas not set national renewable energy requirements per specific renewable energy source.

Figure 7: Trend in on site renewable energy production as share of total consumption of buildings

Legend:
- Share of solar heaters
- Share of wood or biomass heaters
- Share of solar PV
- Share of geothermal

Sources: Own calculations [Notes]

Renewable energy generation is increasing rapidly in Europe as well as in Belgium. Due to a strong cost decrease of solar PV, since 2005 solar electricity production in Europe has grown with on average 56% per year. In Belgium thisgrowth is even bigger

Figure 8: On-site renewable energy generation (2013)

Legend:
- Belgium
- EU28
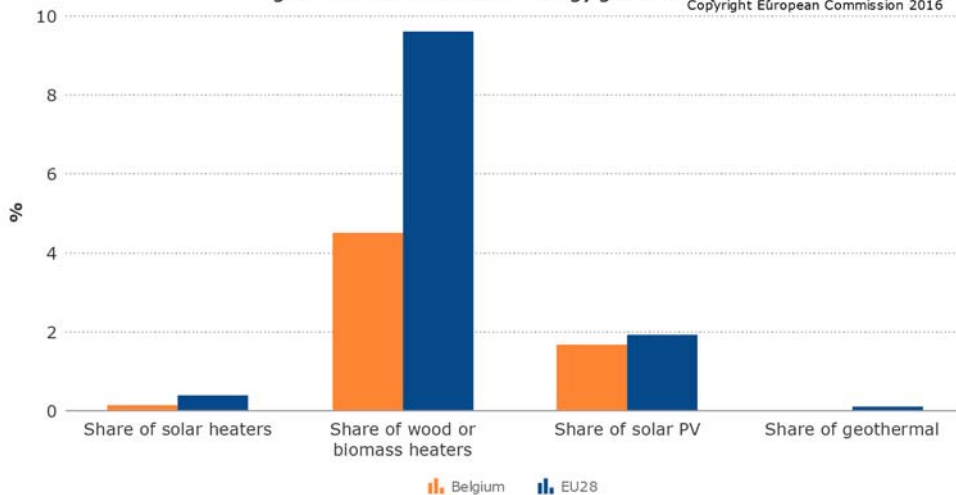
Sources: Own calculations [Notes]

Appliances

The introduction of eco-design requirements has compensated for the growth of appliances' energy use by demanding more efficient appliances. Following eco-design requirements for appliances like refrigerators, freezers, washing machines and more, energy consumption of these individual appliances has decreased significantly.
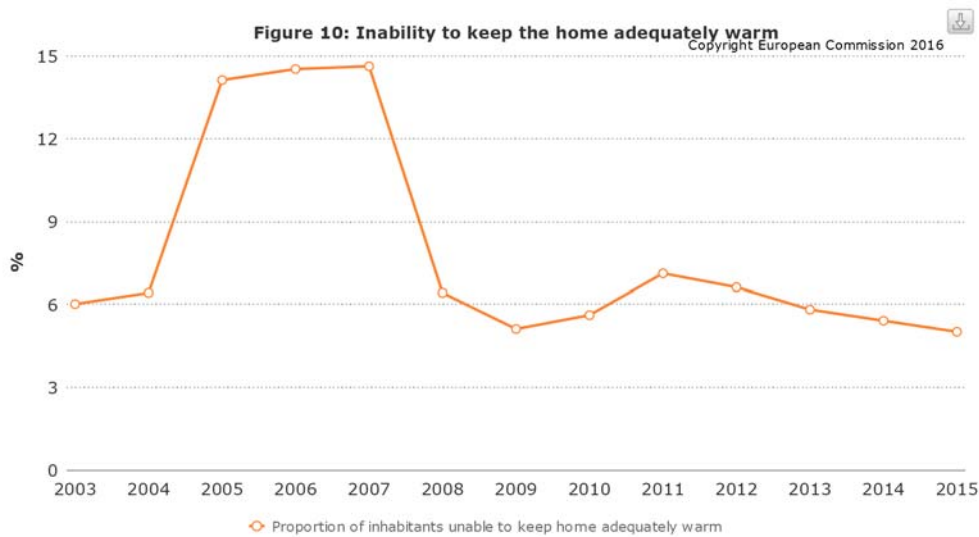
Like in most countries in Europe, the energy consumption of appliances in Belgium is relatively small compared to heating. The number of appliances in Belgium is rising. For 'standard' equipment, like refrigerators and television sets, the penetration is close to 100%. The owner ship rate of more luxurious equipment like dishwashers and dryers is steadily rising. The average number of computers in households is rapidly growing.
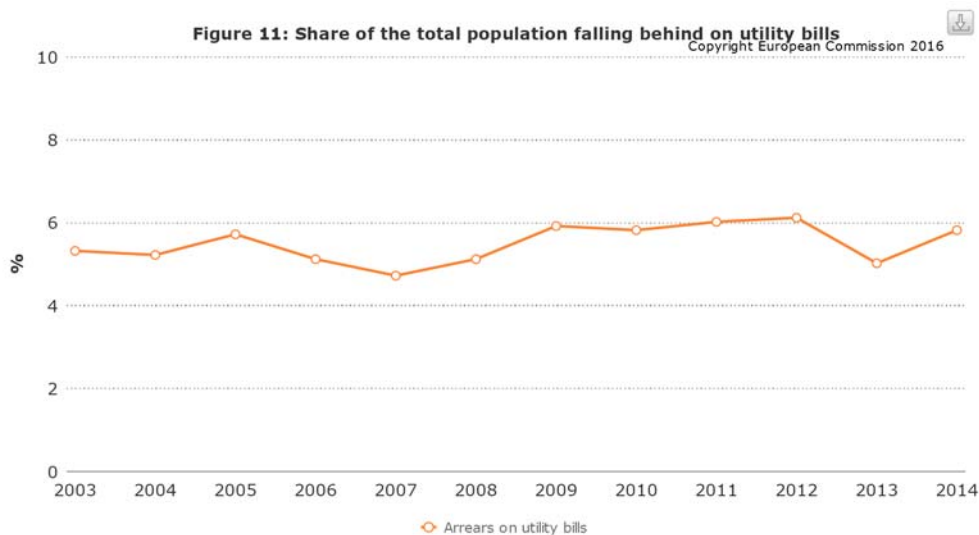
Figure 9: Average number of appliances in households
Copyright European Commission 2016
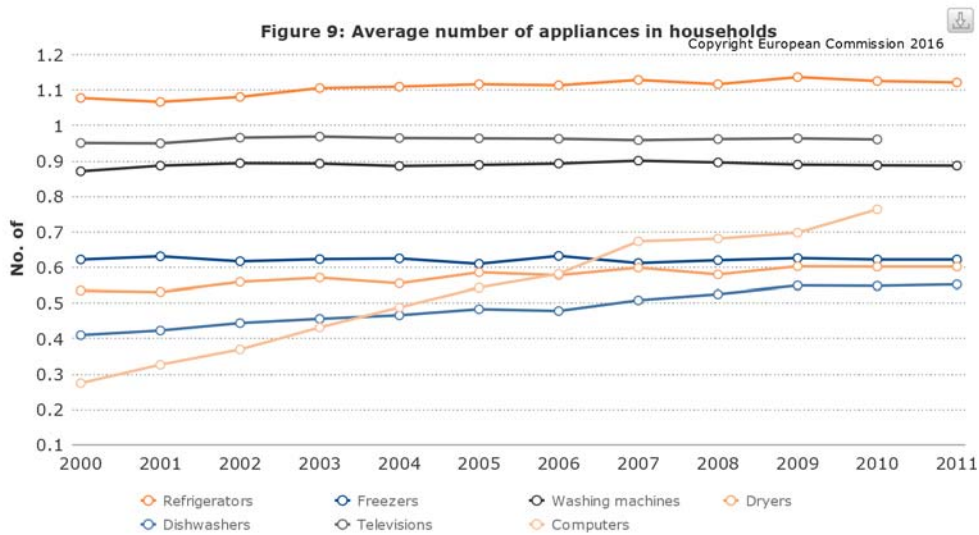
Sources: JRC-IDEES - Odyssee ▤ Notes

Social Aspects

Belgium is one of the countries without an official definition for "energy poverty". Energy poverty is generally described as the "inability to keep homes adequately warm", an indicator monitored by EU statistics on income and living conditions (EU-SILC), which can be correlated with a low household income, high energy costs and energy inefficient homes. Data shows that in 2014, 5.4% of the total population in Belgium was unable to keep an adequate level of warmth in their houses and 5.8% of the population faced difficulties in paying their utility bills. The corresponding EU28 average values were 10.2% and 10.2%. The evolution of the two indicators since 2004 is displayed in the following graphs.

Figure 10: Inability to keep the home adequately warm
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Proportion of inhabitants unable to keep home adequately warm

Sources: Eurostat ▤ Notes

Figure 11: Share of the total population falling behind on utility bills
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Arrears on utility bills

Breakdown of dwellings by ownership & tenure

This indicator shows the shares of multifamily dwellings by ownership & tenure: owner occupied, rent at market price and rent at reduced price or free. In the EU the largest group of inhabitants live in the owner occupied dwelling - they represent 70% of dwelling users (EUROSTAT, 2014). In Belgium it is 72% of inhabitants (EUROSTAT, 2014).

The ownership of a dwelling defines among others whether the users can influence the energy performance of the building which has crucial environmental and social impacts (e.g. Landlord/Tenant Dilemma). Further social impacts are defined by the share of rent at reduced price or free that averages within overall housing stock across the EU about 11% (EUROSTAT, 2014).

Rent at market price represent 19% of the inhabitants in Belgium (EUROSTAT, 2014), they have less possibilities to influence the current state of the building stock as the owners.

General issue is, whether the ownership of a comfortable dwelling is affordable for the inhabitants and if the number of rent at reduced price or free, that form 9% of the building stock in Belgium (EUROSTAT, 2014), is enough to meet the existing demand or not. As the largest part of the building stock is owner occupied in Belgium, we can assume that affordability of housing is relatively high.

Figure 12: Breakdown of dwellings by ownership & tenure (2014)
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Owner occupied, 72%
Tenant (rent at reduced price or free), 8.7%
Tenant (rent at market price), 19.3%