

Walls, windows, roofs and floors

Disclaimer: The graphs below show data available in the EU Building Stock Observatory: a country not represented only means data was not available for this specific country.

Introduction

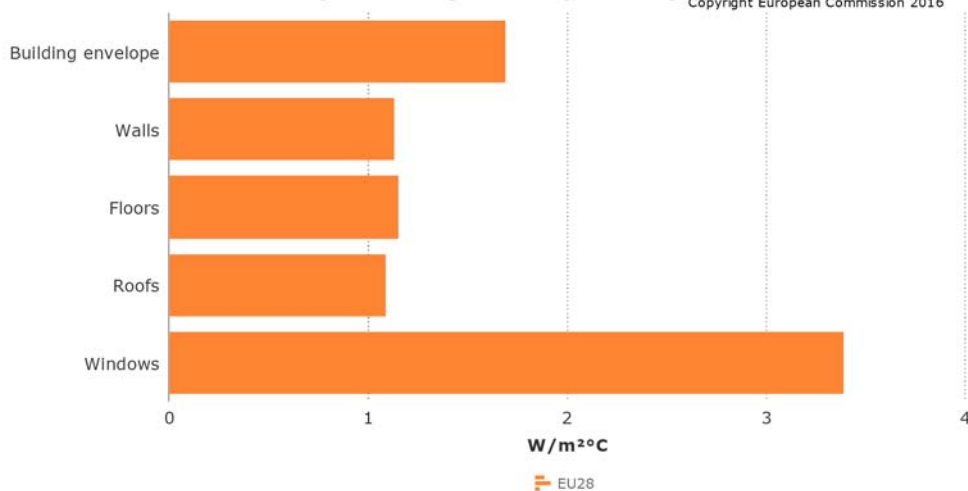
Heat demand depends on the insulating properties of the building shell. The performance of the building shell can be expressed in U-values.

U-value per building element

A U-value is a way to measure heat loss through a building shell element. It is also known as a "heat transfer coefficient". A low U-value indicates a high level of insulation. It is measured in $W/m^2\text{°C}$ which expresses the heat transfer of the envelope in watts per square meter. Figure 1 shows the European U-value average for different building elements.

Figure 1: Average U-values per building element (2014)

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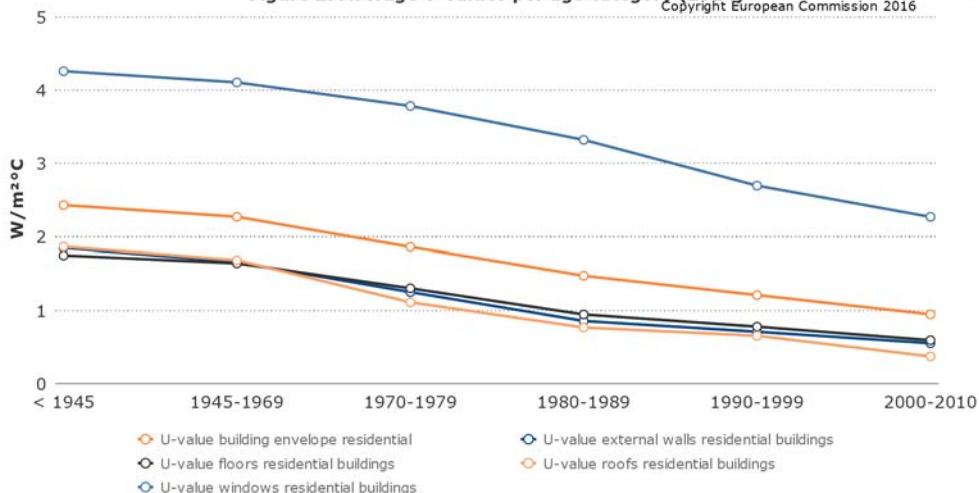
Sources: Calculation [Notes](#)

U-values and building age

The building shell performance of newer residential buildings is much better than that of older buildings. This is mainly due to the introduction of energy performance standards for new buildings. To also improve the performance of existing buildings, the Energy Performance of Buildings Directive (EPBD), foresees that Member States "shall take the necessary measures to ensure that minimum energy performance requirements for major renovations in existing buildings or building units are set with a view to achieving cost-optimal levels". The increase in energy prices has also been an incentive to construct better insulated houses. Figure 2 shows that especially the quality of windows has improved.

Figure 2: Average U-values per age category (2014)

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Sources: Calculation [Notes](#)

U values and elements per country

There are large differences in the building shell performance across European countries, as shown in Figure 3.

Figure 3: U-values and elements per country (2014)

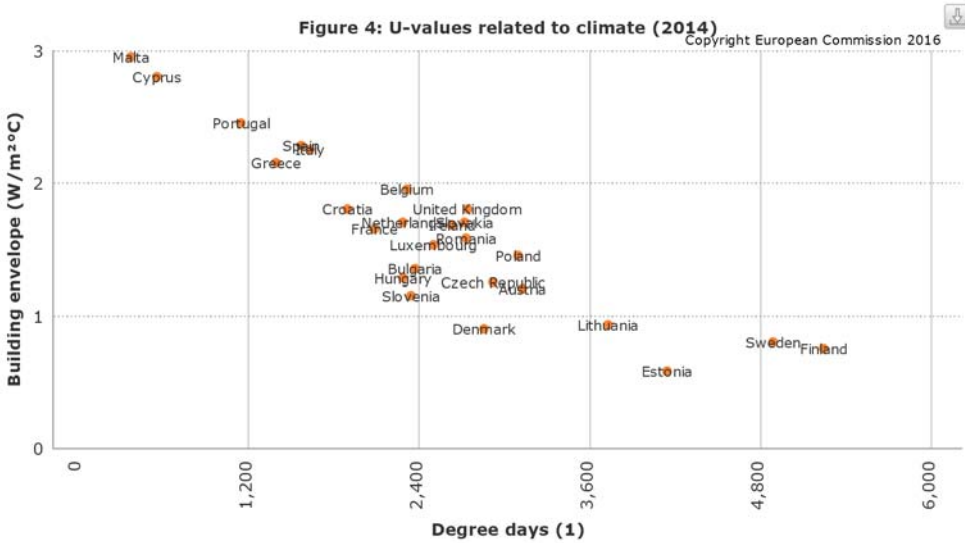
Country	Building envelope	Walls	Floors	Roofs	Windows
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Country	Building envelope	Walls	Floors	Roofs	Windows
Austria					
Belgium					
Bulgaria					
Cyprus					
Czech Republic					
Denmark					
Estonia					
Greece					
Spain					
Finland					
France					
Croatia					
Hungary					
Ireland					
Italy					
Lithuania					
Luxembourg					
Malta					
Netherlands					
Poland					
Portugal					
Romania					
Sweden					
Slovenia					
Slovakia					
United Kingdom					
Germany					
Latvia					

Sources: - Calculation - ECUK - EMO - EPC registry - Entranze - SCE Database - Tabula - INSPIRe [Notes](#)

U-values related to climate

In countries with colder climates, the building shell performance is better than in warmer countries. Figure 4 shows the link between average heating degree days in a country and the average building shell performance.



Sources: Calculation - ECUK - EPC registry - Eurostat and calculation since 2009 based on monthly-degree days - SCE Database - Tabula [Notes](#)