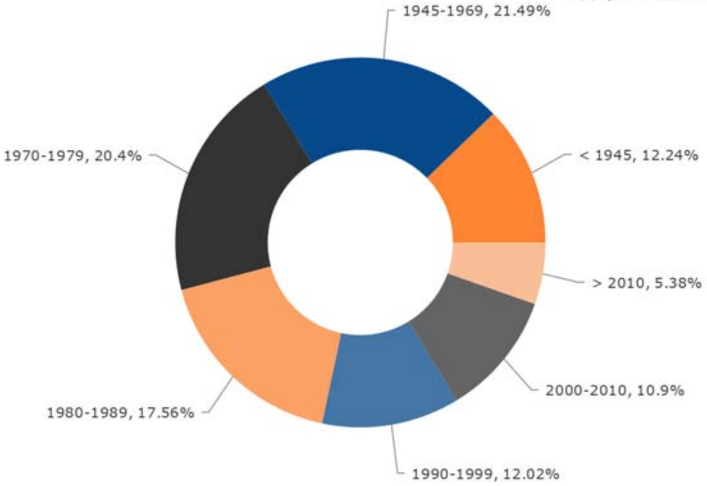
Finland

Disclaimer: The graphs below show data available in the EU Building Stock Observatory; some data was not available for this specific country.

Building Stock Characteristics

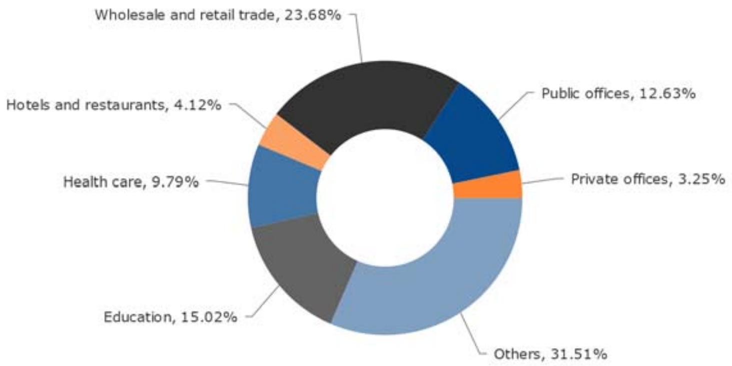
The average age of buildings and the share of new buildings in the total stock represent good indicators of the average efficiency of the building stock: the higher the share of recent dwelling, i.e. built with more efficient standards, the higher the energy performance of the stock.

Figure 1: Residential buildings according to construction date (2014)



Sources: Estimation Notes

Figure 2: Breakdown of non-residential floor areas by sector (2013)



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.

Finland has not 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

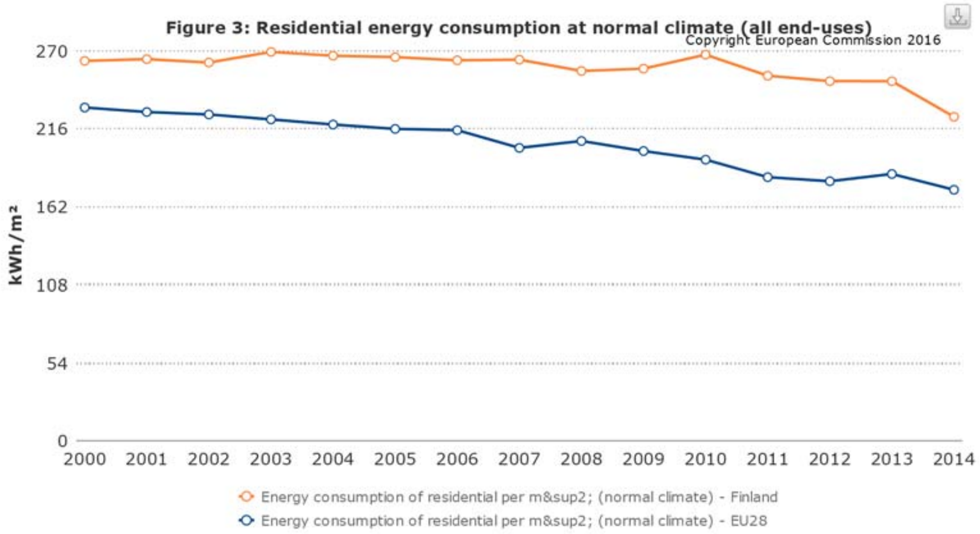
The following graph shows the amount of nearly zero-energy buildings (NZEB) in construction for residential, and hence sums up categories 1 and 2 as defined above.

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

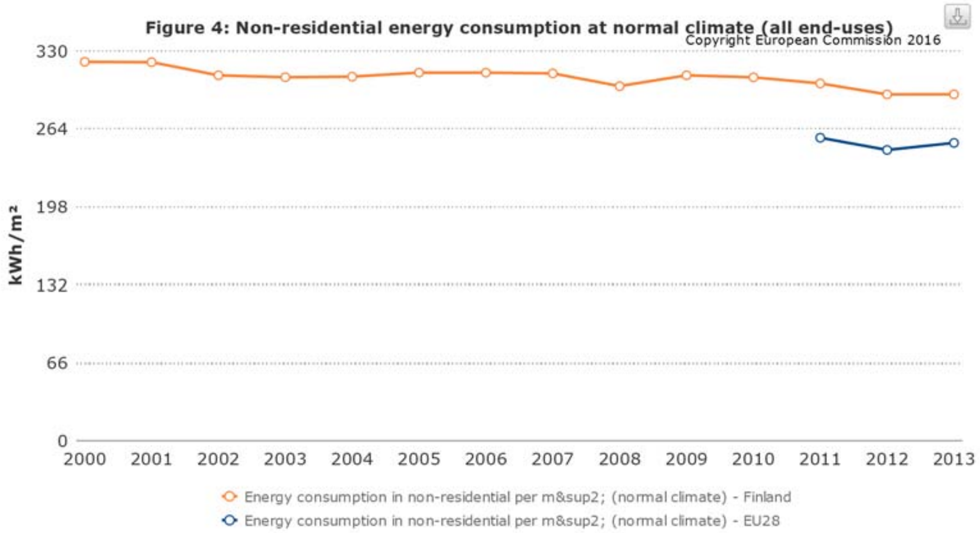
Energy Use in Buildings

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.



Sources: Calculation - Estimation Notes

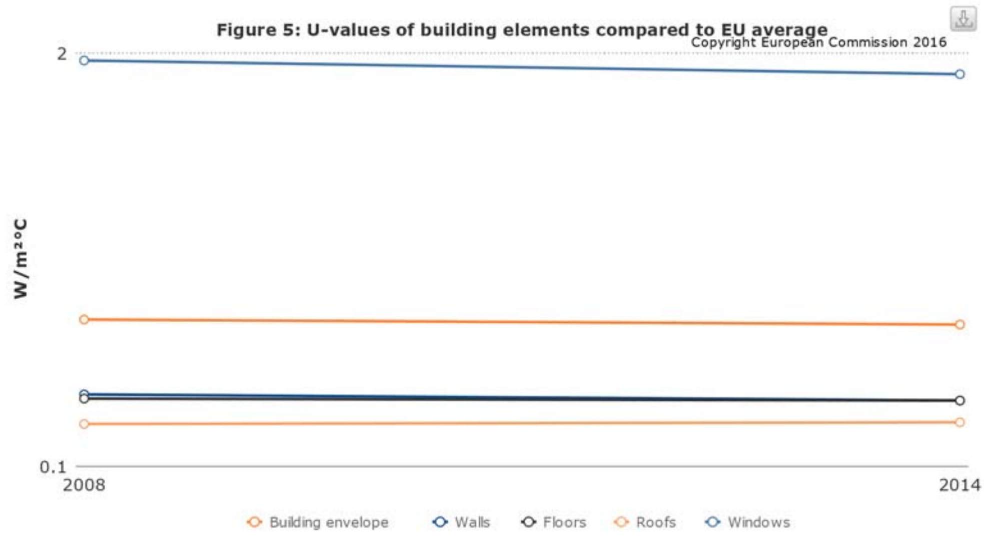


Sources: Calculation Notes

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 Finland. 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.

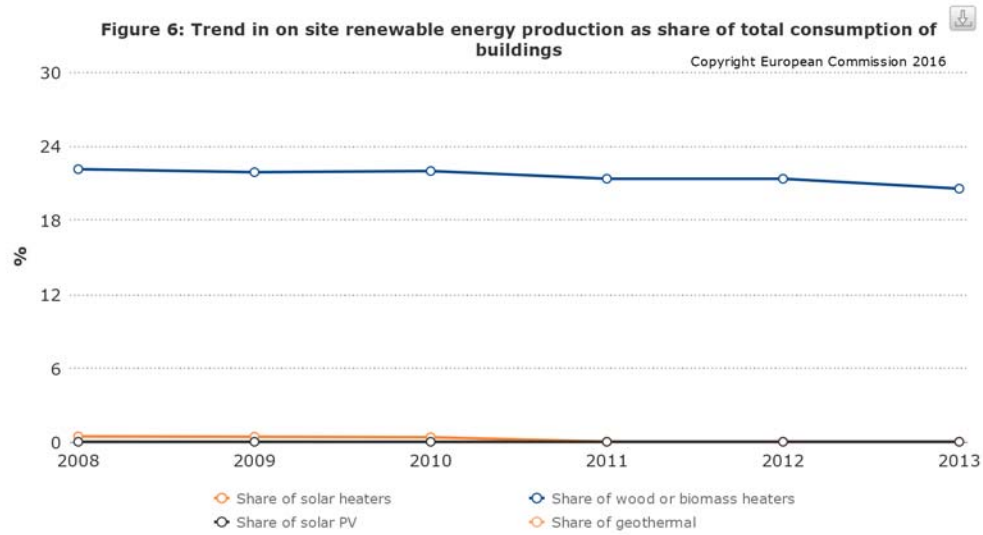


Sources: Calculation - Entranze Notes

On-site Renewable Energy

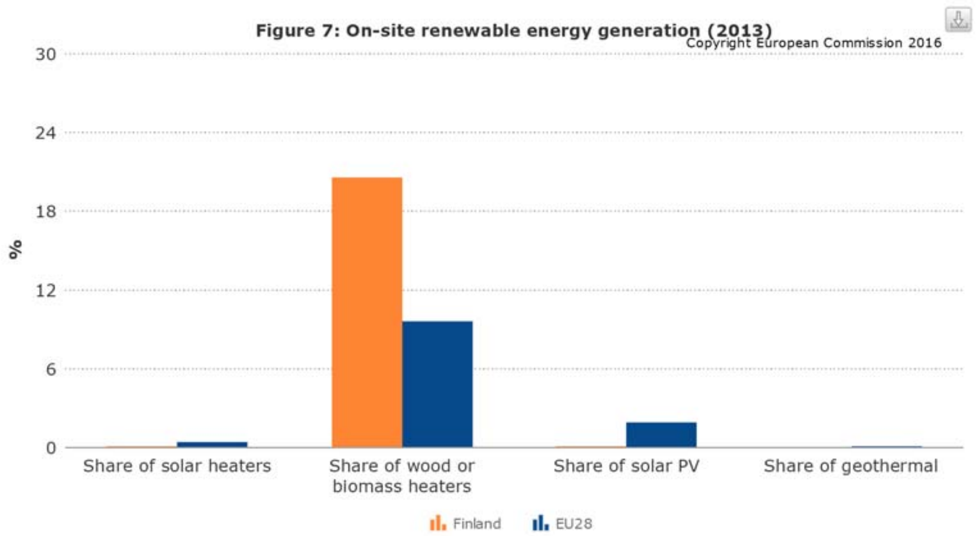
On the long run the building stock in EU must be energy neutral, meaning that all the energy demand is covered by on-site renewable energy generation. The Renewable Energy Directive (RES Directive) establishes an overall policy for the production and promotion of energy from renewable sources in the 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. Finlandhas not set national renewable energy requirements per specific renewable energy source.

Figure 7 shows the share of renewable energy generation compared to total final energy consumption of buildings. The figure shows that today on-site energy only covers a small share of total consumption.



Sources: Own calculations Notes

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

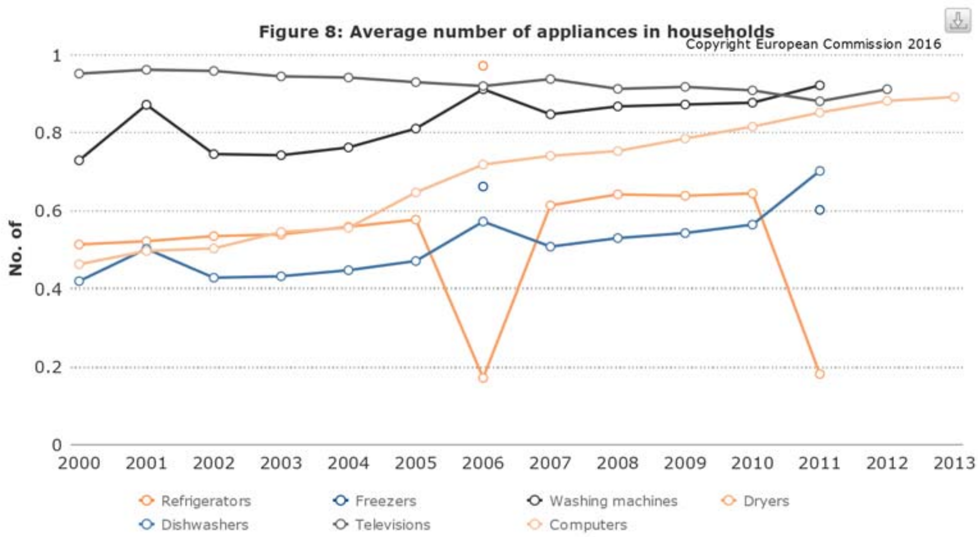


Sources: Own calculations Notes

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 Finland is relatively small compared to heating. The number of appliances in Finland 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.



Sources: JRC-IDEES - Odyssee Notes

Building Performance Certification

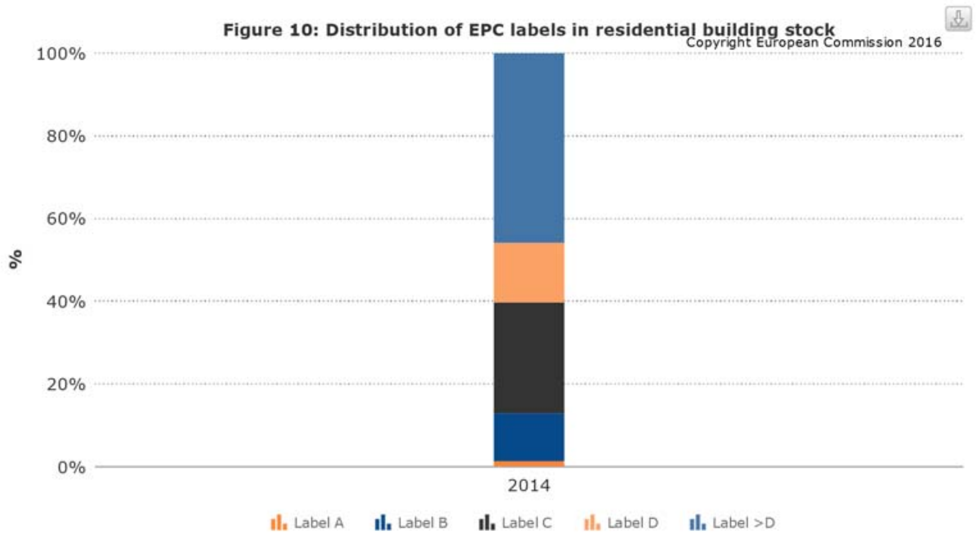
The Energy Performance Certifications were introduced by the EPBD in 2002; while implementation at the Member States level was completed beginning of 2009. The table below presents the compliance level regarding the production of EPCs for new and existing buildings reported by the government of Finland to the European Commission for the year 2014.

Figure 9: Compliance level regarding production of the EPC (2014)

New buildings	98 %
Sold buildings	No data
Rented buildings	No data
Public buildings	98 %

Sources: ICF Notes

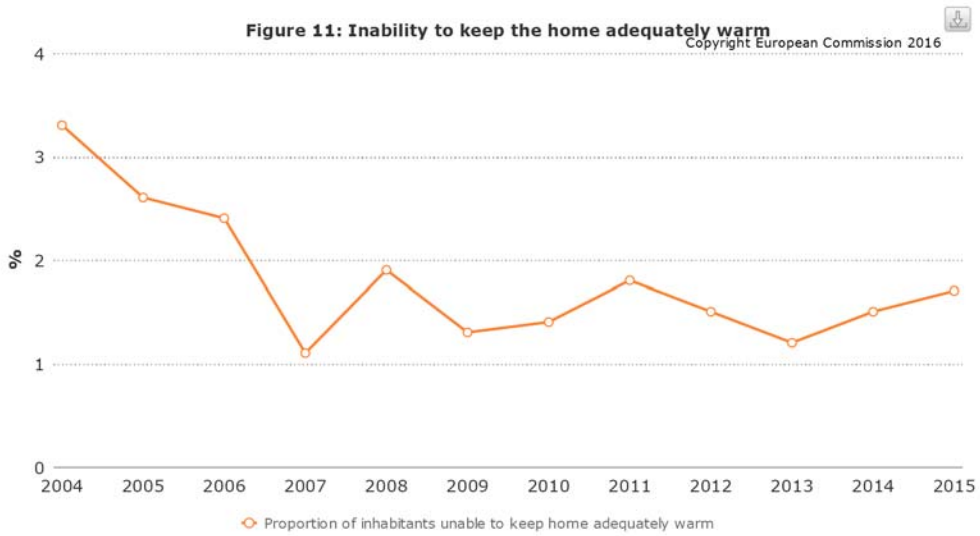
Existing buildings: Like in most countries, in Finland, over a half of all buildings with registered certificates have for energy class D or lower. The share of buildings with the lowest energy class in 2014 was 60% for residential buildings.



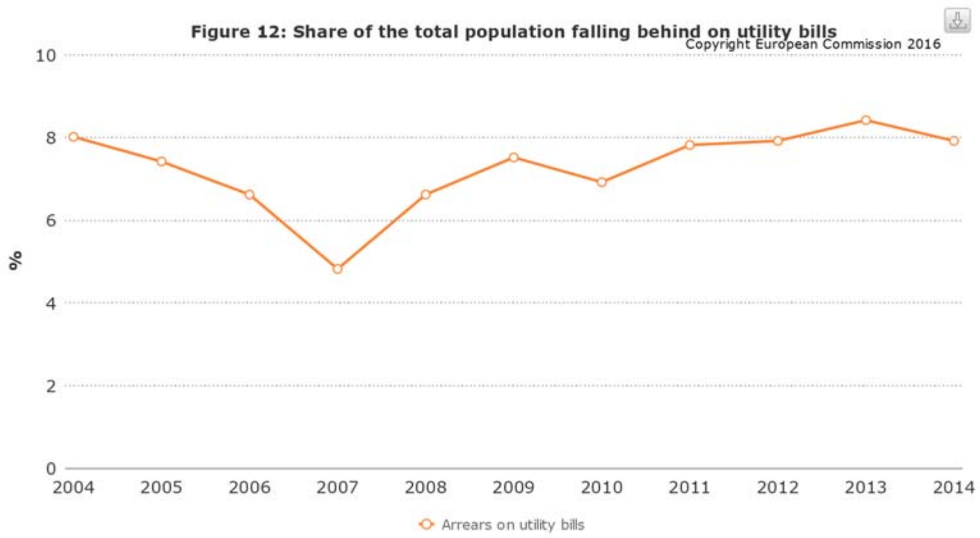
Sources: EPC registry Notes

Social Aspects

Finland 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, 1.5% of the total population in Finland was unable to keep an adequate level of warmth in their houses and 7.9% 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.



Sources: Eurostat Notes



Sources: Eurostat Notes

Breakdown of dwellings by ownership & tenure

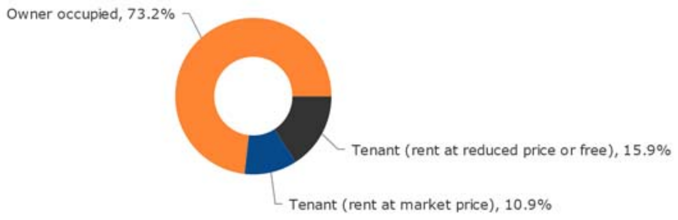
This indicator shows the shares of multifamily dwellings by ownership & tenure: owner occupied, rent at market price and rent at reduced price or free. In the EU, the largest group of inhabitants live in owner occupied dwellings - they represent 70% of dwelling users (EUROSTAT, 2014). In Finland, they make up for 73% 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 the overall housing stock across the EU at about 11% (EUROSTAT, 2014).

Rent at market price represent 11% of the inhabitants in Finland (EUROSTAT, 2014) and they have less possibilities than owners to influence the current state of the building stock.

The general issue is whether the ownership of a comfortable dwelling is affordable for inhabitants and if the number of rent at reduced price or free, which makes up for 16% of the building stock in Finland (EUROSTAT, 2014), is enough or not to meet the existing demand. As the largest part of the building stock is owner occupied in Finland, we can assume that affordability of housing is relatively high.

Figure 13: Breakdown of dwellings by ownership & tenure (2014)



Sources: Eurostat Notes