



United Kingdom - Technical Framework

When considering an energy efficiency retrofit within your national housing market, a wide plethora of consideration needs to be made. Below, we list key findings to facilitate your analysis of the retrofit investment. More details and backgrounds can be found on the website www.rentalcal.eu.

Residential buildings and building types in the UK:

- Of the 8.3 million rented dwellings in England and Wales, 4.65 million or 56 per cent were houses while the remaining 3.65 million or 44 per cent lived in flats.
- This is to be contrasted with the owner-occupation market in which 15 million (64 per cent) of all dwelling in England and Wales were owner occupied, bought either outright or through a mortgage. Within owner-occupied dwellings, 91% lived in a house with only 9% living in flats.
- Owner-occupied homes also tend to be larger and have more bedrooms than rented dwellings, with 74 per cent of owner occupied households having at least three bedrooms.
- In the UK, single family homes are dominated by masonry construction with either solid wall or cavity wall construction. Multi-family homes, on the other hand, are masonry and concrete for low rise dwellings and pre-1960's buildings.
- In 2011, 64% of all homes in England were built with traditional cavity walls and 27% were built with solid masonry walls with no cavity using brick, block, stone or flint.
- Similarly, almost all dwellings in England had a mains electricity supply and a considerable majority of the dwellings were also connected to the gas network.
- 82% of homes use gas for space heating, Oil is used in 8% of dwellings, mainly in rural areas. Electric heating systems are used in 7% of dwellings often via night-storage heaters. Approximately, 90% of homes had central heating.
- The UK housing stock is dominated by older properties and in recent years the housing sector has experienced major reforms to incorporate sustainability and energy efficiency through modernisation efforts.

Energy saving measures and investment costs in the UK:

- One of the measures to improve the energy efficiency in existing buildings is adding insulation in the different elements that form the thermal envelope, or in the elements which separated heated and unheated areas such as corridors, common areas or attics/cellars.
- One of the most common systems measures is the installation of new gas condensing combi-boiler replacing an older model.
- Installation of new electric heating system (electric storage heaters and electric immersion) to replace an older one is also a common energy efficiency improvement.
- This is followed by installation of solar water heater with electric immersion back up.
- The best cost-effective method of organising energy-efficiency improvements of a building is a thorough planning process accounting for future maintenance and repair of the construction.
- There are many measures that can be coupling with a regular repair or maintenance, for example the application of insulation on walls while renovating the render in its surface, especially in façades or the insulation of roofs at the same time as replacing or repairing the roof tiling.
- Average investment costs are available for a large number of typical building and system measures. These investment cost values are based on empirical cost functions.
- Data about to the share of pure maintenance and repair ('anyway costs') of energy saving measures are applicable.

Energy performance calculation methods in the UK:

- The Standard Assessment Procedure (SAP) is the recommended calculation method used to assess and compare the energy and environmental performance of dwellings (DECC 2014). SAP gives a relative measure of the intrinsic efficiency features of the dwelling, based on physical characteristics of the building and visible installations. It measures energy costs associated with space heating, water heating, ventilation and lighting.
- SAP is now mainly used to produce the Energy Performance Certificates (EPCs). The EPC certificate calculates annual estimates of energy consumption per unit of floor area, CO2 emissions per unit of floor area and an environmental impact index rating. The estimated energy consumption ratings are then used to assign bands from A (highly efficient) to G (very low efficiency).
- In the UK, emission factors and primary energy factors are postulated in the Climate Change Act of 2008. These factors are generally derived from measurements made on a number of sources representative of a particular emission or energy sector.
- There is no formal national retrofit tool available to UK investors other than the SAP calculation tool. Different national tools and documentations covering some aspects of energy efficiency retrofits are available through several UK based charities and organisations.
- In calculating energy savings of retrofit measures, the following two issues are of a great concern and relevant in modelling the optimal retrofit scenario. First, efficiency gains predicted ex-ante could be offset by a rise in energy demand through behavioural changes (i.e., rebound effect). Second, a potential proxy for energy efficiency in residential buildings is the readily observable energy efficiency score or rating contained in the EPC and produced from the SAP. The estimated SAP rating of the building is thus likely to be a proxy and not a perfect estimate of the true energy efficiency of the building.