



Germany - 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 Germany:

- Germany's total housing stock comprises about 40.5 million units, of which 55 % or roughly 22 million are rental housing.
- Relevant building types for the rental housing sector are mainly all multi-family houses (17.2 million rental units are located in MFH) but also single-family-houses are rented out (4.4 million rental units are located in SFH).
- More than 60 % of German residential buildings are of [single-leaf brickwork](#), about 30 % of cavity walls.
- About 86 % of the residential buildings are supplied by central building or apartment heating systems.
- About 49 % of the dwellings are mainly heated by natural gas, 28 % by oil, 13 % by district heating.
- Energy consumption rates vary over construction periods. The highest annual consumption can be observed in residential buildings of the inter-war and post-war periods.

Energy saving measures and investment costs in Germany:

- One of the most common procedures is the installation of insulation in roofs, floors and ceilings. For the application of wall insulation, the method is chipping off the old render, attaching the insulation to the wall and applying a new render.
- In the case of windows the most common measure is the replacement of the old window by a double glazing or triple glazing window with a plastic or wooden frame.
- The usual system measure is the replacement of a conventional boiler for a gas condensing boiler.
- Future trends building measures: Increasing relevance of insulation measures, increasing shares of triple glazing.
- Future trends system measures: Increasing relevance of heat pumps, biomass, solar system and combined heat and power plants, ventilation systems with heat recovery.
- 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 the share of pure maintenance and repair ('anyway costs') of energy saving measures are applicable.

Energy performance calculation methods in Germany:

- In the case of residential buildings two alternative calculation methods can be used (DIN V 18599:2011 and DIN V 4108-6:2003 + 4701-10:2003 (A1: 2012-07) [DIN V 4108-6 / 4701-10]).
- The basis of the primary energy factors given in the German standards is GEMIS, a public domain life cycle and material flow analysis model and database which is maintained and further developed continuously.
- Several retrofit tools for energy balance calculation and/ profitability calculation either EXCEL or web based are available.

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