

British and German Energy Assessment Tools supervised by Prof. Udo Dietrich and Prof. Phil Banfill

This thesis analyses the complex sector of energy assessment, starting with energy policies, stakeholders and calculation methodologies in Germany and the UK. While the EPBD sets the basis for energy assessment on the European level, the national key drivers are EnEV and Green Deal. They all demand for energy performance certificates for residential dwellings, which should predict reliable energy performance. Accurate simulation is especially important, when it comes to energy cost and financial issues.

User behaviour and climatic impacts play a key role of uncertainty in energy assessment of residential buildings and often cause a difference in measured energy and consumption and calculated energy demand. Therefore the main research is an analysis of formulae and parameters inherent in the energy assessment methods DIN 4108/4701, PHPP 7 and SAP 2009, which should detect their impact on the result.

Different sets of parameters are tested in each tool against a defined baseline scenario, using a detached example building. It can be shown that the different formulae and the climatic conditions influence the resulting rating less than the set of non-geometrical parameters in the tools, while internal and ambient temperature have the most important influence. An exemplary building with SAP rating C calculated according to DIN 4108 can reach results in the spectrum of B to D and if the climatic variations are added, even results in the spectrum of B to E are possible. The same calculation in SAP would allow only results in the C to D range. Nevertheless significantly higher ratings are more probable in SAP as this calculation methodology contains more singularities. DIN 4108 and PHPP perform similar when it comes to the formulae, while SAP and PHPP have more parameters in common, which are based on the latest European standard. The findings show that only a first step of the intended European harmonisation has been realised.

