

## Energy Performance Certificates – The Fundamentals

Energy Performance Certificates (EPCs) were introduced by the European Union (EU) Energy Performance of Buildings Directive (EPBD) and implemented by national legislation (for England and Wales by the Energy Performance of Buildings (England and Wales) Regulations). Their purpose is to provide a standardised metric for the energy (or carbon) performance of a building when compared to that of national “typical” buildings – a relative efficiency metric for prospective buyers and renters. They have a maximum validity of 10 years and must be available whenever a building is constructed, sold, or let. They must also provide an initial list of potential improvement measures. They can also be used in policy instruments such as minimum energy efficiency requirements for privately rented buildings.

Several ways of producing EPCs are permitted by the EPBD. The United Kingdom (UK) and several other European countries use a scale that compares the calculated consumption of a building with that of one with the same geometry and use, which is exposed to the same weather conditions, but with standardised thermal properties. (There are one or two divergences from this aspect). The thermal properties are chosen so that the EPC scale is centred on buildings that have “typical” consumptions. Although there is no formal requirement for Building Regulation requirements to have the same form as EPCs, however, they do in practice in most European countries. The comparator building in this case just meets the required performance requirements. In the UK, consumptions for dwellings are calculated by the Standard Assessment Programme (SAP) while non-domestic buildings may use either the Simplified Building Energy Model (SBEM) or approved dynamic simulation tools.

Roger Hitchin, January 2022

### Key Issues

- The EPC rating is, in effect, an efficiency metric: it is **not** a consumption measure. Consumption and EPC rating is only likely to be well-correlated for buildings of similar form.
- Most EPCs are produced for buildings for which the reliability of the data is uncertain.
- The use of a reference building:
  - Removes the need to produce separate reference consumption values for different types of building, or compound values for mixed-use buildings (such as hotels).
  - Reduces the impact on the rating of differences of weather, building size and some types of data errors (such as dimensions or orientation), and makes it possible to use alternative calculation methods.
  - However, also reduces the impact of the building’s shape.
- The use of standardised calculations and possible data errors mean that the improvement recommendations based on EPC calculations can only be initial suggestions.
- Although the standardised consumption calculations may be helpful to designers, this is not their primary purpose.

### Links

- Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L0844&from=EN>
- The Energy Performance of Buildings (England and Wales) Regulations 2012: <https://www.legislation.gov.uk/uksi/2012/3118/contents/made>
- National Calculation Methodology modelling guide (for buildings other than dwellings in England): [https://www.uk-ncm.org.uk/filelibrary/NCM\\_Modelling\\_Guide\\_2013\\_Edition\\_20November2017.pdf](https://www.uk-ncm.org.uk/filelibrary/NCM_Modelling_Guide_2013_Edition_20November2017.pdf)
- A Technical Manual for SBEM: [https://www.uk-ncm.org.uk/filelibrary/SBEM-Technical-Manual\\_v5.2.g\\_20Nov15.pdf](https://www.uk-ncm.org.uk/filelibrary/SBEM-Technical-Manual_v5.2.g_20Nov15.pdf)