

The Performance Gap

What is The Performance Gap?

There is significant evidence to suggest that buildings do not perform as well as anticipated at design stage. Findings from the PROBE studies (Post Occupancy Review of Buildings and their Engineering) demonstrated that actual energy consumption in buildings will usually be twice as much as predicted. This was based on post-occupancy reviews of 23 buildings previously featured as 'exemplar designs' in the Building Services Journal (BSJ) between 1995 and 2002. More recent findings from the Carbon Trust's Low Carbon Buildings Accelerator and the Low Carbon Buildings Programme have demonstrated that in-use energy consumption can be 5 times higher than compliance calculations. Both studies suggest that lack of feedback following occupancy is one of the biggest contributors to this gap. Another key factor is that calculations for regulatory compliance do not account for all energy uses in buildings. These calculations are commonly misinterpreted as predictions of in-use energy consumption, when in fact they are simply mechanisms for compliance with Building Regulations. Unregulated sources of energy consumption such as small power loads, server rooms, external lighting, etc, are rarely considered at design stage. Yet these typically account for more than 30% of the energy consumption in office buildings, for example.

In essence, the performance gap can be regarded as a combination of poor assumptions when predicting energy consumption at design stage (e.g. non-inclusion of unregulated loads, standardised assumptions for occupancy hours and controls) followed by a lack of monitoring post occupation. In other words, current predictions tend to be unrealistically low whilst actual energy demand is typically unnecessarily high (but this is rarely flagged up due to lack of monitoring).

Key Issues

- Buildings typically consume 2 to 5 times more energy than predicted at design stage.
- Compliance modelling does not account for all energy uses in the building, dealing solely with 'regulated' energy loads (i.e.: fixed building services and internal lighting).
- Designers are rarely required to predict in-use energy consumption.
- Lack of guidance for modelling unregulated energy loads makes it harder for designers to consider these at design stage.
- Lack of feedback regarding the in-use energy performance of buildings is likely to result in an increase in the performance gap.
- Discrepancies between design specification and as-built are also observed to significantly contribute to the gap in performance.
- In order to obtain more accurate predictions, design assumptions must reflect in-use performance of buildings.

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Links

- PROBE studies archive - <http://www.usablebuildings.co.uk/Pages/UBProbePublications1.html>
- Carbon Trust's Closing the Gap Publication - <http://www.carbontrust.co.uk/publications/pages/publicationdetail.aspx?id=ctg047>
- CarbonBuzz – www.carbonbuzz.org