

Methodological notes and disclaimer

Summary

These PDFs contain the results of Options Appraisals conducted for 31 buildings in the London Borough of Lambeth.

Buildings were chosen as being broadly representative of different archetypes of the stock within the Borough.

The provision of this financial model or any advice in connection with it is indicative only and does not constitute financial advice or recommendation regarding any financial product.

How packages of measures were chosen for each building

For each building, the Carbon Trust assessed the impact of installing four different combinations of thermal fabric measures and heating system upgrades.

In all cases, the first option for each building, scenario 1 was to replace the existing heating system with a modern, efficient like-for-like equivalent. This represents the BAU scenario.

For scenarios 2, 3, and 4 different packages were chosen based on the Carbon Trust's assessment of potentially suitable packages of measures for each building. Scenarios 2, 3 and 4 always involved the electrification of heat

Please note that the choice of packages was subjective, although always routed in an assessment of the practical applicability of measures to each context.

The range of scenarios was designed to show the relative impacts of different approaches to retrofit.

E.g. in scenario 2, we often looked at electrifying heat with no improvements to the fabric.

In scenario 3, we often looked at the installation of fabric measures that were likely to have a positive payback within 30 years.

In scenario 4 we often looked at maximising fabric improvements.

However, these guidelines were not applied as a rule. Where it was deemed that there were no further worthwhile upgrades to buildings, we used the scenarios to assess different options for heating system, such as different types of electric heat.

Calculating heat and other energy demand

Space heating demand within the buildings both pre-and post installation of measures has been assessed using a heat loss calculator according to standard BS 12831 with building dimensions ascertained from secondary sources and physical measurements on google maps.

Water heating demand within the buildings was modelled using standard assumptions based on building size and type, informed by CIBSE benchmarks and EPC records.

Non-heating electricity demand was modelled using building size, type and CIBSE benchmark data. Where possible, actual records from DEC data were used.

Cooling demand was modelled based on building size and type and CIBSE benchmark data.

Calculating system performance data

The performance of energy systems has been modelled using a bespoke Carbon Trust model which assess likely performance of different heating technologies according to core parameters such as predicted flow temperatures. The data for the model was informed by manufacturer published data on SCOPs and field trial data on Seasonal Performance Factors.

The performance and capacity of heat distribution systems was modelled using manufacturer published data.

Calculating the costs of measures

The costs of measures has been assessed using a Carbon Trust cost model that utilises a variety of input data sources.

Primary sources for the model include: BEIS Domestic Cost Assumptions (with construction price inflation applied); RHI system costs data; BCIS alterations and refurbishment price book, SPON's Architect's and Builders Price Book; SPON's Mechanical and Electrical Services price book and bespoke primary and secondary industry research undertaken by the Carbon Trust.

Calculating fuel bills

Fuel bills are calculated by multiplying annual energy use by fuel by the Treasury Green Book Central Domestic and Central Commercial forecasts for gas and electricity prices 2021 - 2050.

For specialist electricity tariffs, such as time of use tariffs, the Carbon Trust researched tariffs available on the market in September - November 2021.

This included Economy 7 tariffs and the best available time of use tariffs such as 'super off-peak tariffs' with very low rates for a short period over-night.

A half hourly energy use profile was developed for each building for one calendar year and this profile was matched to tariff rates on a half hourly basis.

Calculating CO2 emissions

CO2 emissions are calculated by multiplying annual energy use for each fuel by the relevant Treasury Green Book Marginal Factors for Carbon Intensity 2021 - 2050.

Calculating peak electricity consumption and winter time 6:00pm peak consumption

Energy use from all sources is profiled on a half hourly basis across a single calendar year. This information was used to ascertain estimates for peak demand and peak demand at winter 6:00pm peak.

For individual buildings, we assumed that there were no constraints on the peak supply to the individual property. Therefore, it was possible to condense heat demand in to short periods of time to charge storage heaters.

However, for larger buildings such as blocks of flats, we assumed that connection constraints would apply. Therefore, tariffs that required charging storage heaters over a very short time were not considered for these buildings.

Calculating the impact of Solar PV

The impact of solar PV was modelled for all buildings. This model assumes a standard solar generation profile with no shading.

The standardised generation profile was matched to the demand profile for each building to ascertain the level of on-site utilisation.

A standard export tariff was assumed for any electricity not utilised on-site.

Caveats

The results provided in these Options Appraisals are based on remote assessments of each of the buildings.

In some cases, only limited data was available and no site visits were undertaken to verify the information available from secondary source such as Energy Performance Certificates.

As such, the results are intended to be indicative and should not be used as the basis of retrofit designs for the buildings in question.

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