Passivhaus Trust Awards 2015

Retrofit

UK PASSIVHAUS AWARDS 2015

07 July – Residence of the Austrian Ambassador

Grangewood

GROSVENOR

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PROJECT OVERVIEW

PASSMORE STREET

STURGIS CARBON PROFILING

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Location: London, Belgravia

Building type: Solid brick, historic 1860s

TFA: 66.1m^2

Construction (u-value W/m^2.K):

Existing solid brick walls + internal breathable aerogel insulation to front (0.16)/ external EPS insulation with brick slips to rear (0.11)

Existing timber roof + PU and min. wool insulation (0.10)

Existing solid concrete floor + PU insulation (0.16)

New timber extension + PU and min. wool insulation (0.10)

Triple glazed mock-sash and casement windows (1.18/0.68)

Completion Date: January 2015

Occupancy: First privately rented EnerPHit in London, occupied since February 2015

Budget: Confidential

Key Team: Grosvenor (client)

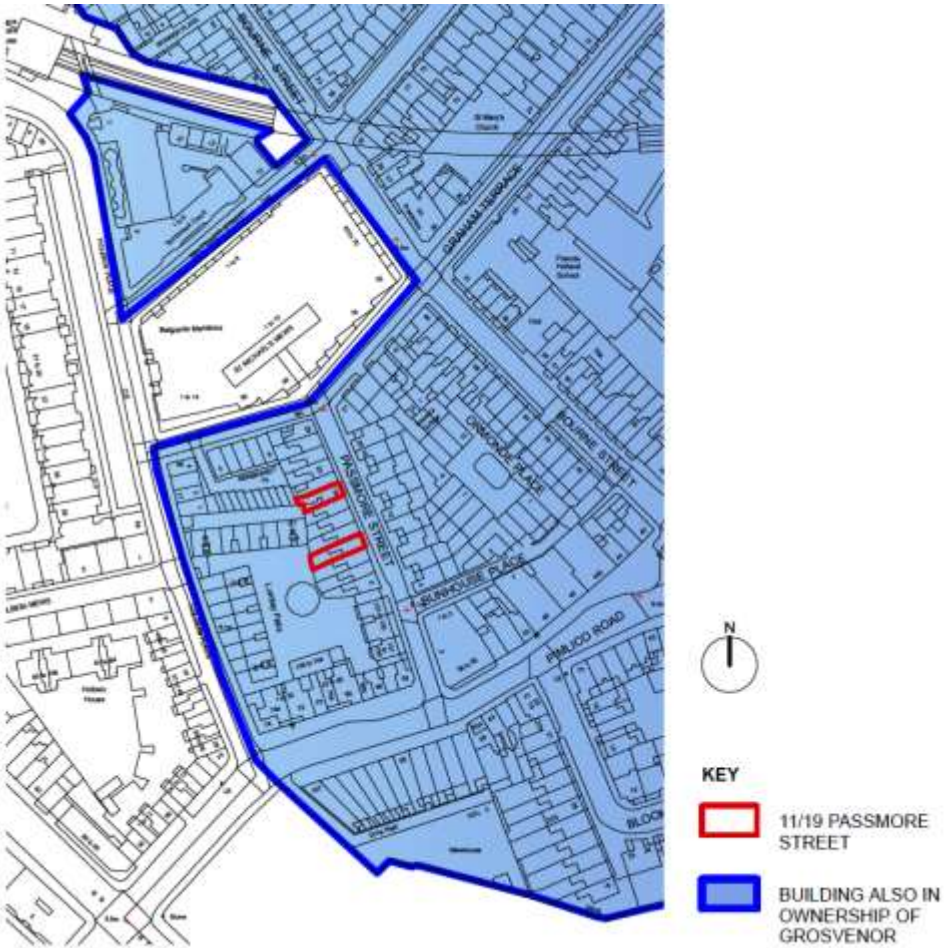
Sturgis Carbon Profiling (architect, PH designer)

Edward Pearce (M&E consultant)

Hurst Peirce & Malcolm (SE)

Grangewood (Contractor)

CoCreate (Certifier)



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DESIGN PHILOSOPHY

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11 and 19 Passmore Street are the first privately rented buildings to achieve EnerPHit standards in London.

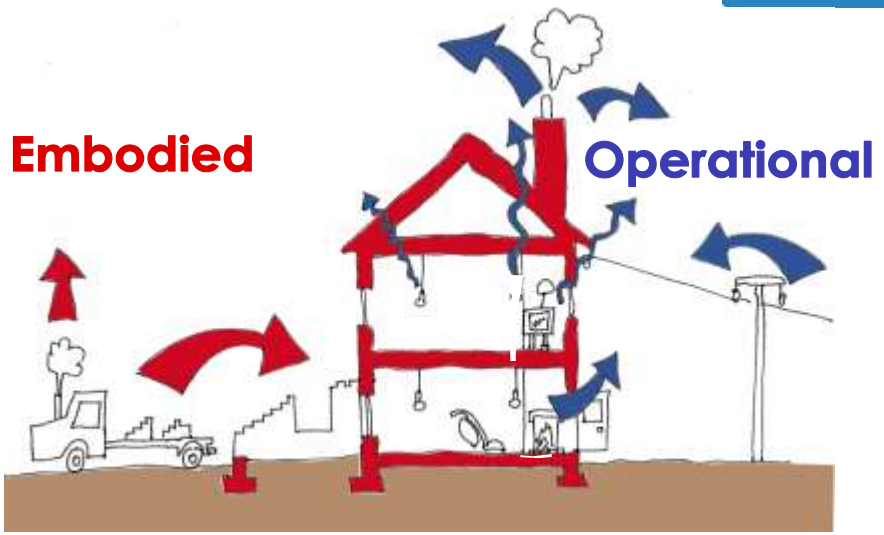
Developed by Grosvenor Britain & Ireland, they were identified as 'pilot' projects, as part of the company's commitment to reduce their carbon emissions by 50% across their directly managed property portfolio by 2024.

The historic fabric of the building was carefully preserved while being reinforced and insulated, using super-efficient breathable aerogel internal insulation to front, and external EPS wall insulation with brick slips to rear (applied to the whole street of 12 terraced houses).

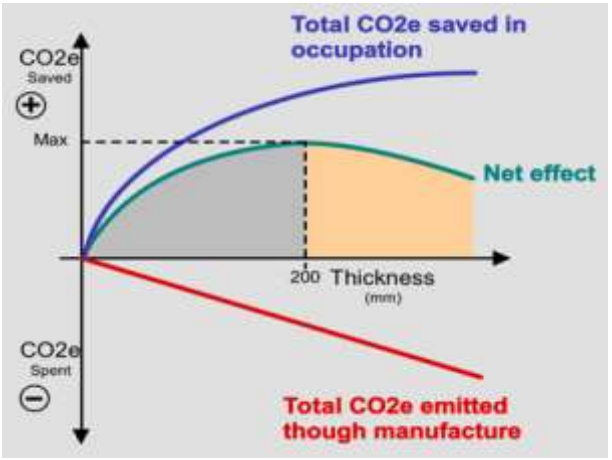
Whole Life Carbon Assessment showed that compared to existing, the two EnerPHit buildings achieve 95% operational CO2 reductions and 75% whole life CO2 reductions, giving an overall saving of 840,000kg CO2e over buildings' life (60 years).

The project has full monitoring equipment installed, including: internal/ external temperature, RH, CO2 sensors, electrical sub-metering, heat flux meters on heating and DHW pipework. We have a year of data prior to retrofit and results from 4 other houses on the street that undergone Part L compliant refurbishment.

The buildings has 12no. PV panels and achieves Zero Carbon in accordance with Standard Assessment Procedure (SAP) methodology.



Source: Sturgis Carbon Profiling



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AESTHETICS

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ENERGY PERFORMANCE

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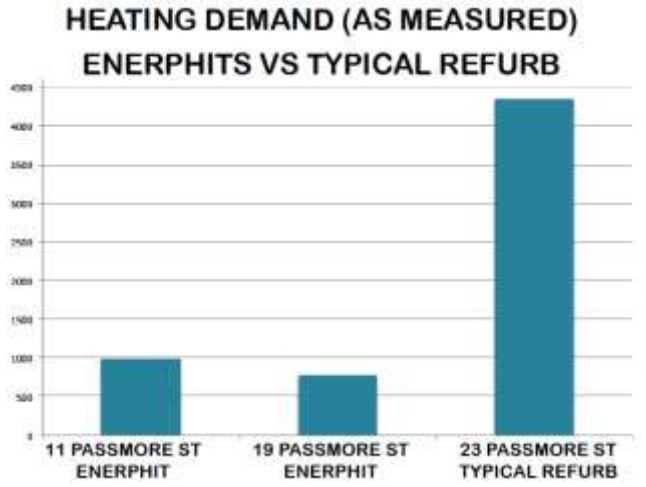
PRIMARY ENERGY DEMAND = 127kWh/(m².a)

HEATING DEMAND = 23 kWh/(m².a)

AIRCHANGES = 0.8/0.9ach@50Pa

HEATING/COOLING LOAD = 11W/m²



Headline energy results for first 3 months (Feb - Apr 2015):

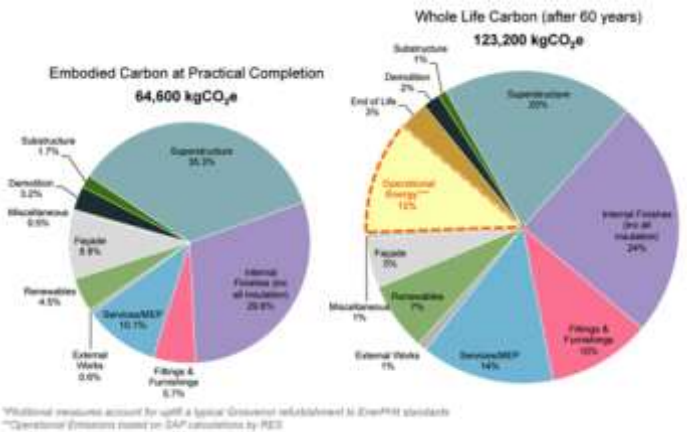
Gas heating - 14.9/11.8 kWh/m² (this is higher than anticipated, due to property being privately rented tenants receiving no training and keeping thermostat high at 21-22°C).

Total PE - 27.3/ 23.5 kWh/m² - incl. PV generation & using PHPP conversion factors (very good performance).

Compared to a typical refurbishment (no. 23 Passmore St):

No. 11 and 19 EnerPHit terraces are performing respectively 77 and 83% better than a typical refurbishment - no.23 neighbouring property received double glazing, external roof, external rear wall and internal front wall insulation – u-values 0.30, 0.30 and 0.50 W/m².K respectively (see graph).

We estimated that operational energy of the EnerPHit building is 12% of the total whole life carbon compared to 50% average. The total whole life carbon is 40% less than the typical refurbished project. The embodied energy to create an EnerPhit is 11% greater than the typical refurbishment.



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USER FEEDBACK

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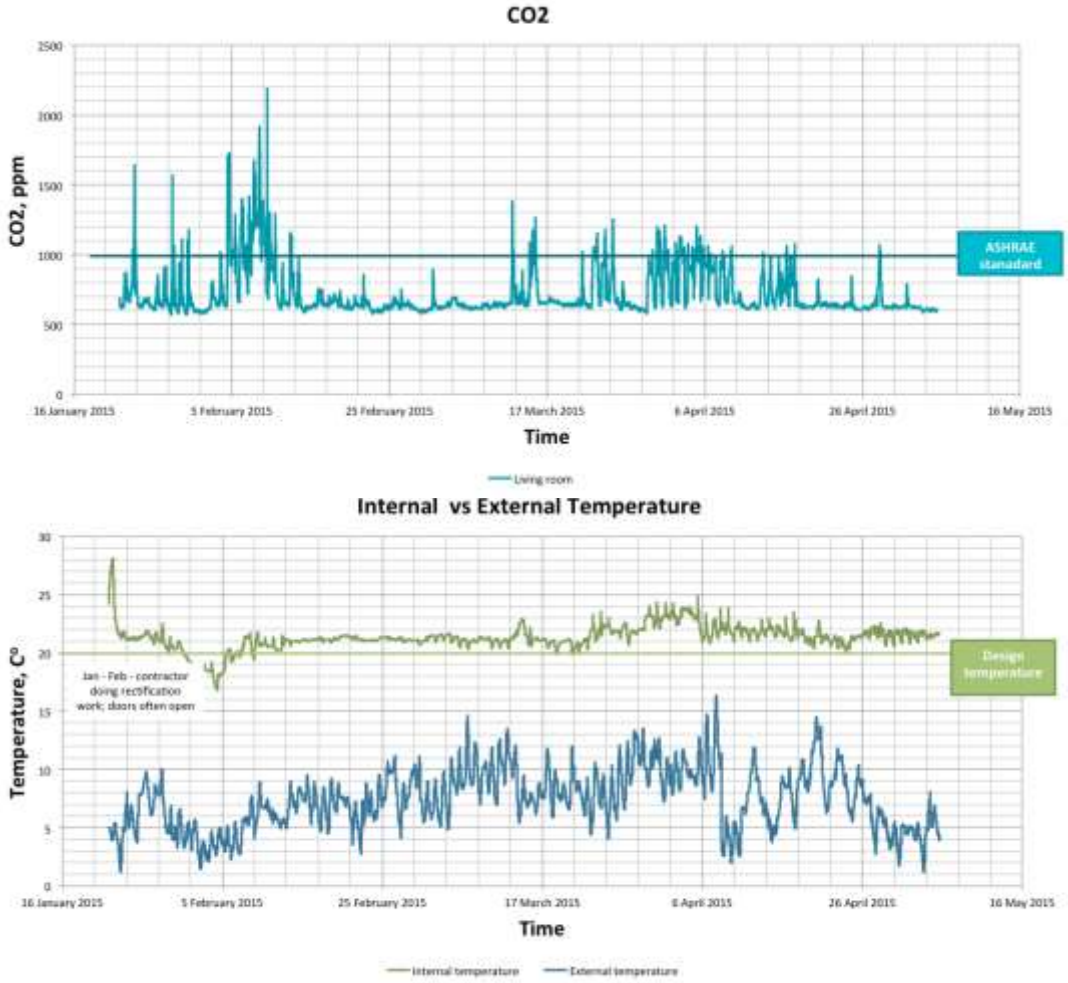

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CONSTRUCTION APPROACH

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CLEVER COSTS SAVINGS

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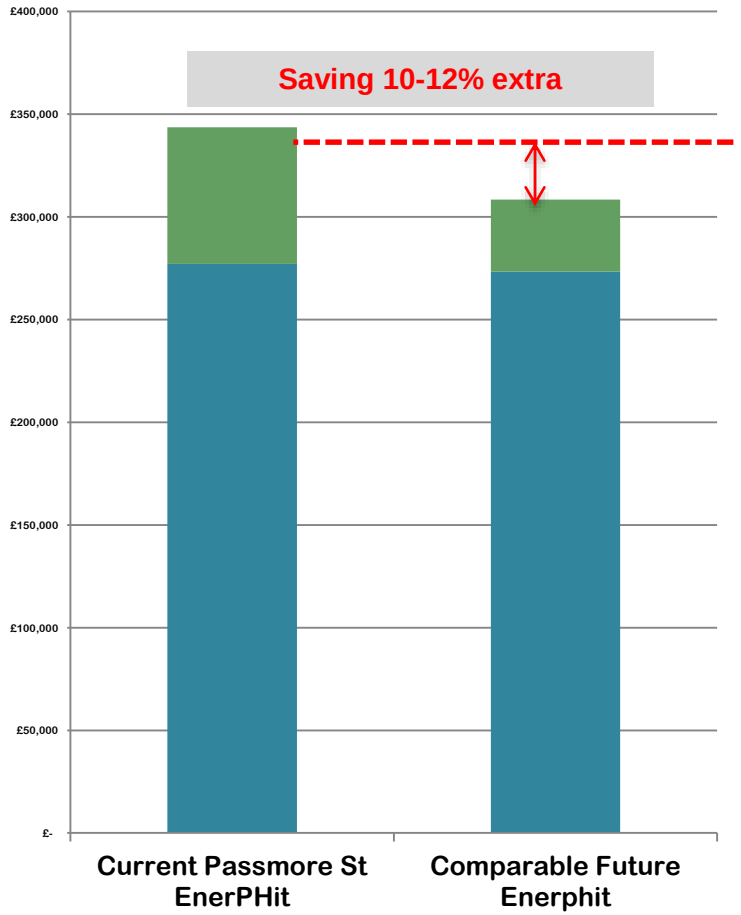
Potential cost savings, £



Project costs were 19% higher than a typical refurbishment:

EnerPHit requirements where more onerous than the given budget. However, client was happy with the final project cost.

Prelims went up to account for 4 week extension of time, mostly due to airtightness challenges.

The additional cost will be recovered through increased rent and void reduction.

It is possible to achieve EnerPHit for less, as low as 7% extra:

Providing training to the design team, contractors and sub-contractors, as well as retaining knowledge keeps the costs down.

Using robust airtightness strategy and air testing below 50Pa to avoid damage to airtightness membrane.

Smaller prelims, shorter programme as contractor becomes more experienced.

FURTHER INFORMATION

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Whole Life Carbon Assessments conclusions:

Deep retrofit to EnerPHit standard offers better energy efficiency over the Part L refurbishment, achieving 40% whole life carbon savings over 60 years.

Retrofitting to EnerPHit standard is at least 75% more energy effective than doing nothing over 60 years.

Renewables decrease overall operational energy demand further.

Our experience shows that achieving EnerPHit standard upgrades to many property types, including heritage assets is a carbon efficient way forward.

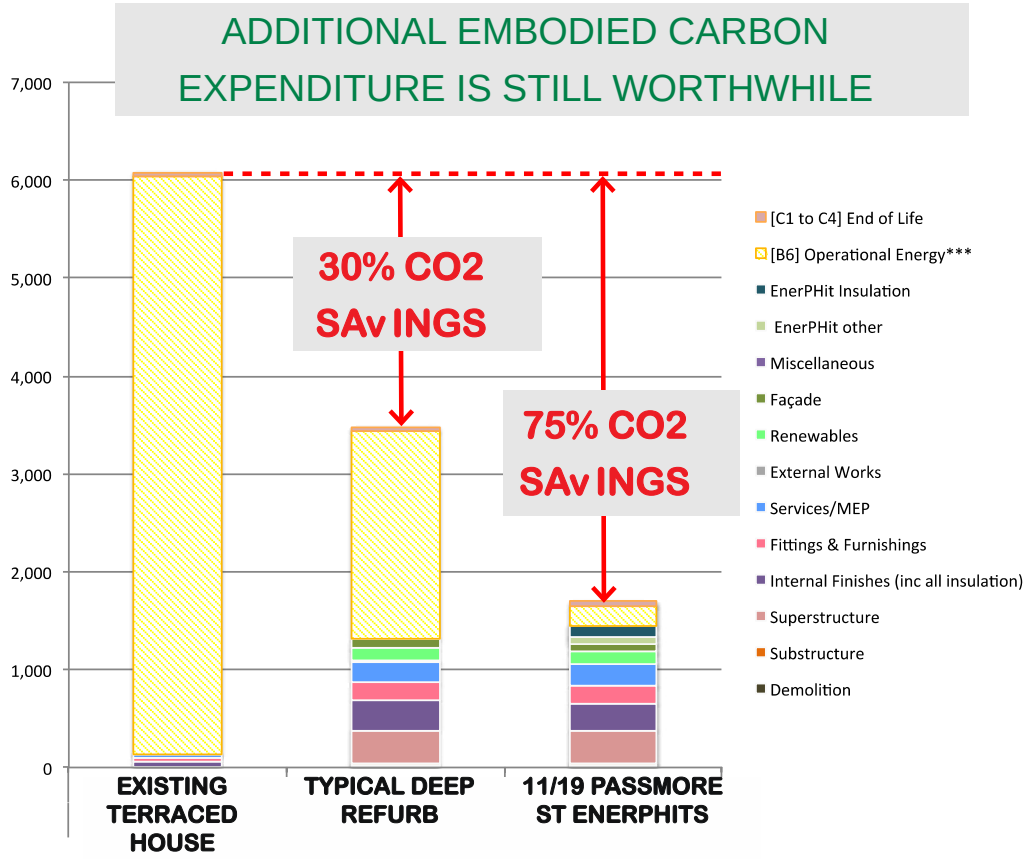
Embodied Emissions Reduction Potential:

25%-30% further Embodied Carbon Reduction Potential could be achieved at zero or low extra cost.

Preserving as much fabric, structure, sanitary ware, appliances, finishes, etc. as possible reduces embodied carbon emissions up to 25%.

Further Reduction possible by reducing maintenance cycles.

WHOLE LIFE CARBON ASSESSEMENT (60 YEARS)



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