



PROJECT
CLIENT
VALUE
CONSULTANT

RETROFIT FOR THE FUTURE: 61 WARWALL
EAST THAMES GROUP
£82K
PENYOYRE AND PRASAD



RETROFIT FOR THE FUTURE

This project is one of 87 demonstration projects for the 'Retrofit for the Future' programme, sponsored by the government's Technology Strategy Board, which was set up to explore innovative technologies to reduce carbon emissions. The programme targeted low-rise houses drawn from the UK's social housing stock, and sought innovative whole-house solutions to achieve an 80% reduction in CO2 emissions, compared with 1990 emissions.

ESTATE, TERRACE AND HOUSE

The house at 61 Warwall is a mid terrace, two storey, three bedroom house on the Windsor Park Estate in London's Docklands, and is tenanted under the ownership of the East Thames Group. The house was originally built in 1992, with masonry cavity walls, double glazing and a pitched roof with loft insulation.

The terrace has an east-facing frontage, with the rear facing west. This orientation was chosen as posing a harder challenge to capture solar energy, compared with a more favourable south-north orientation.

WORKING IN OCCUPIED HOMES

The family remained in their home throughout the build process, creating the usual challenges of keeping disruption to a minimum. Work had to be programmed carefully with provision for movement and storage of the residents' possessions.



NATURAL VENTILATION

A pre-retrofit occupant feedback survey identified higher than average consumption of electricity, including higher usage from the washing and drying of clothes. It also revealed frequent opening of windows and doors to provide rooms with fresh air.

From this feedback, it became apparent that a natural ventilation strategy, allowing the opening of windows to provide higher levels of ventilation, would be more suitable than a mechanical ventilation strategy providing lower levels of ventilation.

Lakehouse has installed openable windows for incoming air and a high-level opening rooflight in a newly-created lightwell above the internal stairs for exhaust air. The lightwell also serves as a clothes drying space to allow the residents dry their clothes naturally, instead of using a powered tumble drier.

Fresh air enters the house through ventilating panels by the new triple glazed windows. Security louvres to the front of the panels allow the residents to leave them open even when the house is not occupied, providing daytime ventilation. These panels have been developed specifically for this project.

The natural ventilation strategy for the house also incorporates the use of a real time monitoring system, giving the tenants information on whether the windows and louvres should be opened or closed. The monitoring system is linked to CO₂ and internal and external temperature sensors to ensure that comfort is optimised, without excessive heat loss.

The project features a breathing roof, designed to future proof the project. Should the residents decide not to use the



natural ventilation; this breathing roof will allow moisture to be dispersed preventing condensation. Natural insulation products, hemp and wood fibre, were chosen for their properties of high thermal mass, moisture permeability and low embodied CO₂. An additional 125mm of insulation has been incorporated between the joists with 350mm above, giving an increased u-value of 0.1W/m²K.

THERMAL EFFICIENCY

The architect, Penoyre and Prasad, aimed for minimal demolition and removal of waste from site. The existing ground floor construction was retained and insulation was added. The solid ground floor was overlaid with vacuum insulation panels. These provided a high level of thermal efficiency for a minimal 25mm increase in floor level.

NATURAL LIGHT

One of the largest changes to the house has been the introduction of a light well. This brings natural light into the previously dark centre of the house whilst providing natural ventilation. An opening rooflight at the top of the light well provides the exhaust for stale warm air. The light well has also provided a space for clothes drying.

OTHER ENERGY SAVING MEASURES

Other measures include flue gas heat recovery, single point mechanical ventilation with heat recovery to the kitchen and bathroom, low energy lamps and light fittings, low energy appliances and standby energy savers. A proposed waste water heat recovery system has been omitted due to insufficient mains water pressure.