

Case Study 1

HOW TO FUTURE-PROOF YOUR DULWICH HOME

Why Retrofitting Matters

Dulwich housing stock includes Victorian terraces, Edwardian semis, 1930s homes, and post-war infill—many of which were built long before modern insulation standards. As a result, they often lose heat quickly and rely on carbon-intensive heating systems. Retrofitting these homes is one of the most effective ways to support local climate goals while reducing energy bills.

Our Mission

The goal of this series of retro-fit case studies, is to empower Dulwich residents with clear, trustworthy information to help:

- Reduce household energy use
- Lower carbon emissions
- Improve comfort and indoor air quality
- Protect the character of local homes
- Make informed decisions about retrofit investments
- Navigate Scheme of Management and Local Authority planning rules



Renovated 1960s house

Case Study 1

MODERNISING A MID-CENTURY HOUSE INTO A LOW CARBON FAMILY HOME

A pioneering retrofit that transformed a dated mid-century house into a technically smart, light-filled, low-allergen, low carbon family home.

Energy saving impacts:

85% reduction in energy use

97% reduction in carbon emissions

Powered by on-site renewables



Pre-renovation view

BACKGROUND

Built in 1963, this mid-century modern home by Austin Vernon & Partners enjoys striking views of the London skyline but was cold, draughty and poorly connected inside and out. The owners commissioned RDA Architects, experts in sustainable retrofit, to transform it into a light-filled, family-friendly, low-allergen home.

Using natural materials, the design minimised new build, retrofitting the original structure and excavating the garden to improve access and setting. Energy-saving upgrades, a new roof, loft conversion and renewable technologies were delivered within The Dulwich Estate's Scheme of Management guidelines.

SUSTAINABILITY OBJECTIVES

The project set out to create a light-filled, family-friendly home while addressing the client's allergy concerns through natural, low-VOC materials. It was designed to meet Passivhaus low energy standards (certification pending), radically improving energy performance while respecting the property's distinctive mid-century character.

Sustainability goals included minimising embodied and operational carbon, cutting reliance on fossil fuels, and integrating renewable technologies, including solar panels and an air-source heat pump. A smart AI-driven Eddi system manages solar energy distribution, diverting power to heat water and exporting surplus back to the grid. By reusing the existing structure, the retrofit reduced energy bills by over 80% and delivers long-term value.



The battery storage is fixed to the wall of the garage



The MVHR system and hot water tanks are installed in the garage

TECHNICAL STRATEGY

A fabric-first approach underpinned the retrofit, maximising insulation, airtightness and thermal efficiency, and using natural materials. Measures included adding blown wood fibre insulation to walls and floors, installing triple-glazed windows, and an airtight construction achieving $0.61\text{m}^3/\text{m}^2\text{h @}50\text{Pa}$.

A highly insulated new roof incorporated solar slates, chosen to comply with Estate guidelines and preserve local character. Renewable energy systems comprised an air-source heat pump, Mechanical Ventilation with Heat Recovery (MVHR), and battery storage linked to solar generation. Sustainable materials such as Accoya timber and low-VOC finishes were specified to deliver durability, performance and improved indoor air quality, supporting both environmental and health objectives.



Blown wood fibre insulation being installed

PROJECT ACHIEVEMENTS

The retrofit has delivered outstanding energy performance while dramatically improving liveability. Energy use now measures just 25 kWh/m²/year, surpassing the project target and reducing running costs by over 80%. Annual CO₂ emissions have fallen from 7,700 kg/m²/year to just 260 kg/m²/year, exceeding both RIBA 2030 and LETI targets for embodied carbon. Renewables were central to this performance: solar slates now generate an average of 28.5 kWh per day, with surplus energy stored in batteries or exported to the grid.

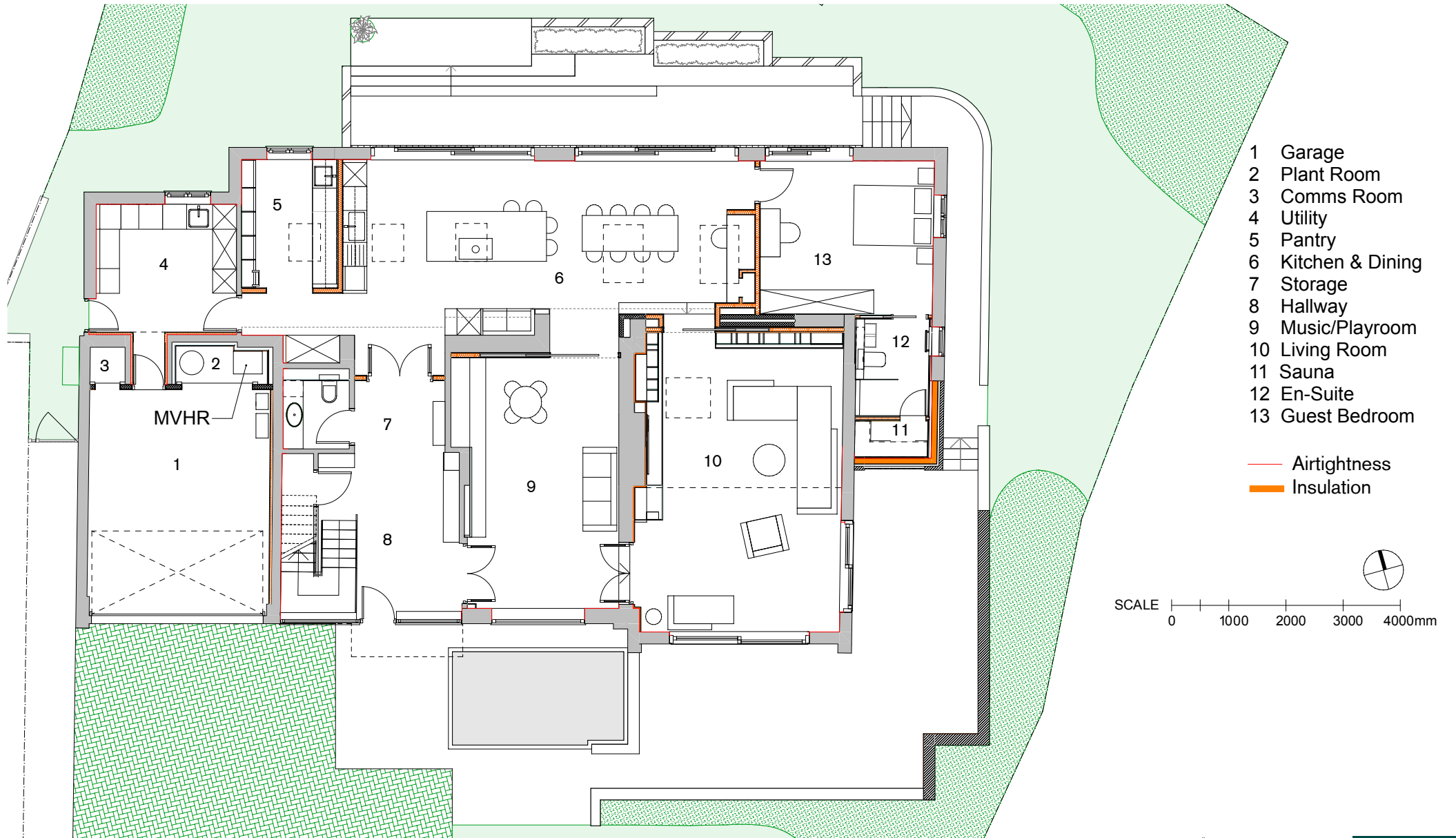
Equally important are the lifestyle improvements. The design created light and open interiors with a fluid layout, improved connection to the garden and woodland views, and a loft conversion that provides a quiet home-working space without compromising family areas. Reconfiguring the rear extension rather than demolishing it avoided waste, showing how reuse and adaptation can be a sustainable approach.

As the owners note:

'The fact that we no longer pay energy bills and the house now meets modern efficiency standards suggests that the investment will pay off in the long run. Plus, the improvements have made the house so much more comfortable and enjoyable to live in.'



Replacing the roof enabled extra insulation to be installed and solar slates were added to the front south facing roof.



Ground floor plan

LESSONS LEARNED

Integrating new technologies into existing buildings is always demanding. Installing MVHR and heat pump systems required specialist expertise, with the architect coordinating routes for pipework and ensuring adequate space for installation. Early planning and close coordination were essential to avoid clashes with structure and fit-out.

Achieving airtightness was another priority. A continuous barrier was created using airtight boards, vapour membranes, tapes and sealants, with RDA Architects providing detailed design. Once practically complete, an airtightness test was undertaken: a fan pressurises or depressurises the building to measure leakage.

The solar installation also posed challenges. Estate guidelines prohibited visible photovoltaic panels on the south-facing front roof, but this restriction prompted innovation. RDA proposed GB-Sol solar slates, approved after a Committee review, which determined that it was sympathetic to the 1960s house. Finally, retaining and reworking the extension reduced waste and embodied carbon, while delivering modern, functional and light-filled spaces.

SUMMARY OF RETROFIT IMPROVEMENTS

Element	Before	After	U-Value / Performance
Floors	Poor insulation	Upgraded insulation	0.237 W/m ² K
Walls	Single brick	Wood-fibre insulation	0.332 W/m ² K
Windows	Single-glazed	Triple-glazed	0.95 W/m ² K
Roof	Original slate (4.94 W/m ² K)	New slates + solar tiles	0.11 W/m ² K
Draughtproofing	None	Airtight	0.61m ³ /m ² h @50Pa
Heating	Gas boiler	Air source heat pump	Renewable
Cooling	None	Passive MVHR	Low energy
Energy Use	165 kWh/m ² /year	25 kWh/m ² /year	85% reduction
CO ₂ Emissions	7,700 kg/m ² /year	260 kg/m ² /year	96.5% reduction

TOP TIPS

- Maximise what you already have – reconfigure and retrofit before considering demolition.
- Prioritise health and wellbeing – daylight, air quality and comfort are as valuable as energy savings.
- Underused areas such as cellars or garages can be useful for plant installation.
- Chimneys can be repurposed for new ventilation systems.
- It is important to use qualified installers and architects to avoid pitfalls in the retrofit process. Integrate systems carefully. Renewable systems need space, planning and coordination.
- Plan the project thoroughly with detailed drawings being prepared for you and consider access and maintenance requirements in the design process.
- For MVHR installations, key considerations include the thickness of pipes and the need for adequate space for installation.

FURTHER GUIDANCE

RDA Architects
rdauk.com

Eddi solar power diverter
myenergi.com/product/eddi

Solar power battery solutions
givenergy.co.uk

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