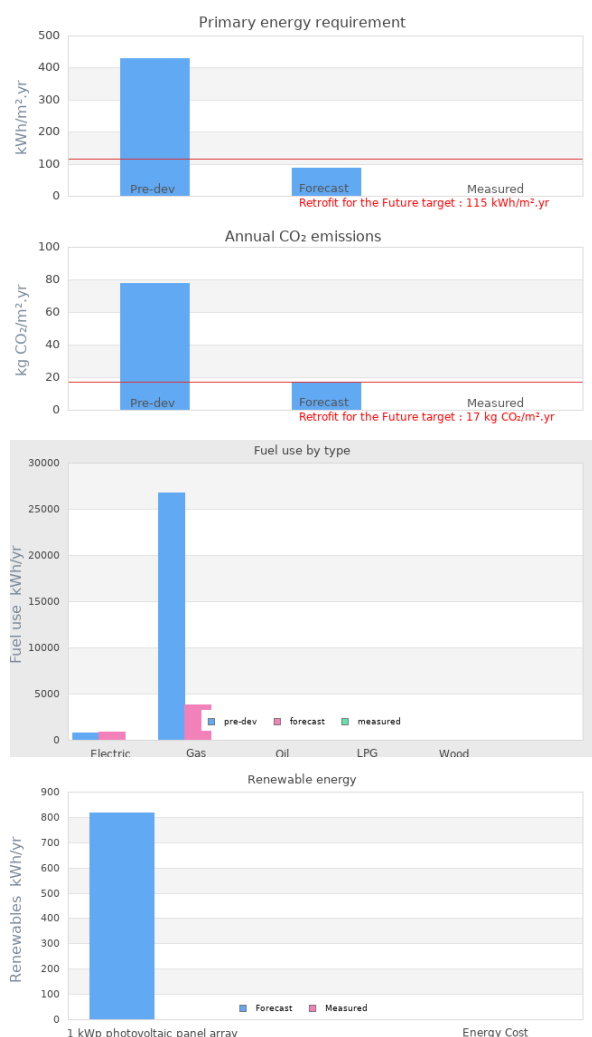


Project name Improvement to a 1930s Semi-Detached Property in Whitehaven

Project summary Low energy and low carbon retrofitting of a three- bed semi-detached house in Whitehaven, Cumbria originally built in 1930's to achieve carbon emission reductions above 80%. This reduction is achieved by following a whole house approach, and prioritising low energy demand through fabric improvements first, followed by tried and tested low/zero carbon systems, to achieve an estimated 85% reduction in carbon emissions as compared to the existing house



Project Description

Projected build start date	05 Jul 2010
Projected date of occupation	20 Oct 2010
Project stage	Under construction
Project location	Whitehaven, Cumbria, England
Energy target	Retrofit for the Future
Build type	Refurbishment
Building sector	Public Residential
Property type	Semi-Detached
Existing external wall construction	Masonry Cavity

Existing external wall additional information	285mm Wall thickness (110mm brick, 65mm clear cavity, 110mm bric
Existing party wall construction	110 mm Single brick / 285mm unfilled cavity
Floor area	76.4 m ²
Floor area calculation method	PHPP

Project team

Organisation	Roland Hill Ltd
Project lead	Roland Hill Ltd
Client	Home Group (North West)
Architect	Architects Plus
Mechanical & electrical consultant(s)	Roland Hill Ltd
Energy consultant(s)	Oxford Brookes University
Structural engineer	
Quantity surveyor	
Other consultant	
Contractor	Roland Hill Ltd

Design strategies

Planned occupancy	Default as per SAP as the property is currently unoccupied.
Space heating strategy	Heating from mains gas. High efficiency condensing boiler feeding radiators.
Water heating strategy	Solar hot water, with high efficiency gas condensing boiler back up.
Fuel strategy	Mains gas and mains electricity.
Renewable energy generation strategy	South-oriented 1 kWp photovoltaic panel array to be installed.
Passive solar strategy	Solar gains from south west facing windows. Efficient building fabric to minimise heat loss.
Space cooling strategy	Naturally ventilated house, SAP assessment shows overheating risk 'not significant'.
Daylighting strategy	Window sizes and positioning provide good levels of daylighting throughout the house.
Ventilation strategy	Natural ventilation through manually openable windows , passive stack ventilation for wet areas.
Airtightness strategy	Air - permeability of 3m ³ /hm ² @ 50 Pa is targeted, highest recommended level for naturally ventilated buildings. Upgrading of windows and doors, minimising thermal bridges and insulating and sealing all air leakage pathways will ensure an airtight fabric is achieved.

Strategy for minimising thermal bridges

Using accredited construction details, by detailing for continuous insulation and air barrier on external walls to prevent condensation. Party wall insulation to minimise the thermal bridge between the party wall (back and front) and external wall, and to reduce heat losses to the neighbouring property. Where the first floor rooms extend into the roof line, the underside of the ceiling will be lined with a thermal laminate to reduce thermal bridging.

Modelling strategy

SAP 2005 was used as the primary modelling tool. All SAP calculations were carried out in the approved SAP 2005 software SAPCalc. A PHPP analysis was also carried out for the final package of measures.

Insulation strategy

Insulating the cavity wall to achieve a U value of 0.15 W/m²K. This will include filling the 65mm cavity with extruded polystyrene and additionally using 25mm of vacuum insulated panels (VIP) as external Insulation; Insulation of the party wall to avoid heat loss from the neighbouring property; Hipped roof will be insulated with 300mm of mineral wool quilt to achieve a U value of 0.1 W/m²K; Concrete ground floor slab will be insulated with VIP to minimise the increase in the overall thickness of the floor while achieving a U-Value of 0.2W/m²K.

Other relevant retrofit strategies

Other information (constraints or opportunities influencing project design or outcomes)

Energy use

Fuel use by type (kWh/yr)

Fuel	previous	forecast	measured
Electric	752.48	874.14	
Gas	26803.87	3869.72	
Oil	0		
LPG			
Wood			

Primary energy requirement & CO2 emissions

	previous	forecast	measured
Annual CO2 emissions (kg CO2/m ² .yr)	78	17	-
Primary energy requirement (kWh/m ² .yr)	428	87	-

Renewable energy (kWh/yr)

Renewables technology	forecast	measured
1 kWp photovoltaic panel array	818.4000244	
-		
Energy consumed by generation		

Airtightness (m³/m².hr @ 50 Pascals)

	Date of test	Test result
Pre-development airtightness		-
Final airtightness		-

Annual space heat demand (kWh/m².yr)

	Pre-development	forecast	measured
Space heat demand	-	25.93	-

Whole house energy calculation method

SAP Extension for Whole House

Other energy calculation method

Predicted annual heating load

-

Other energy target(s)

Building services

Occupancy NULL

Space heating NULL

Hot water NULL

Ventilation NULL

Controls NULL

Cooking NULL

Lighting NULL

Appliances NULL

Renewables NULL

Strategy for minimising thermal bridges NULL

Building construction

Storeys

Volume

Thermal fabric area

Roof description NULL

Roof U-value 0.00W/m² K

Walls description NULL

Walls U-value 0.00W/m² K

Party walls description NULL

Party walls U-value 0.00W/m² K

Floor description NULL

Floor U-value 0.00W/m² K

Glazed doors description NULL

Glazed doors U-value 0.00W/m² K

Opaque doors description NULL

Opaque doors U-value 0.00W/m² K

Windows description NULL

Windows U-value 0.00W/m² K

Windows energy transmittance
(G-value)

Windows light transmittance

Rooflights description NULL

Rooflights light transmittance

Rooflights U-value 0.00W/m² K

Project images



