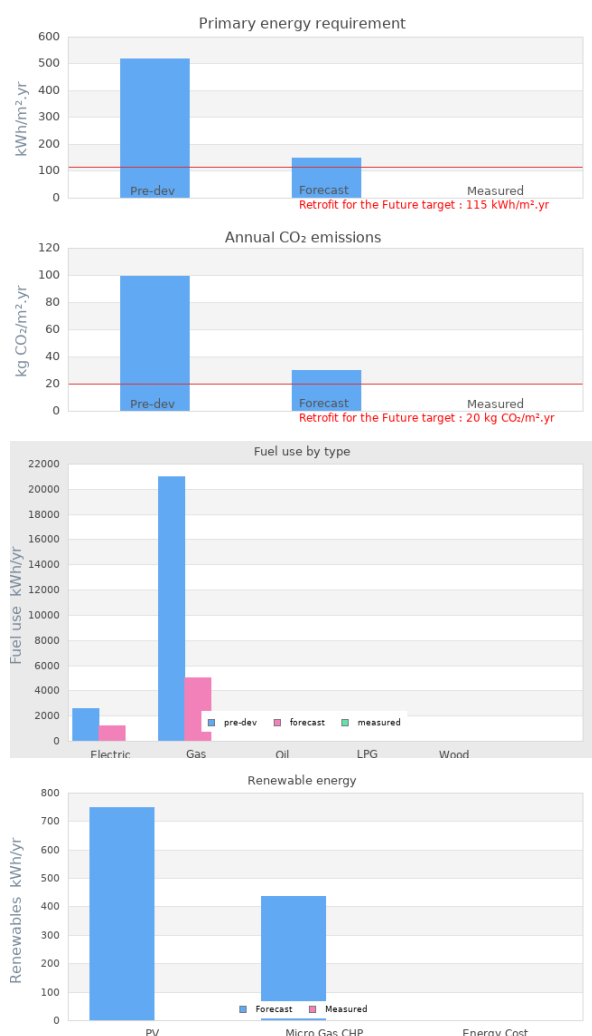


Project name City West Homes - Low Carbon Retrofit in the Queens Park Estate Conservation Area

Project summary This project will focus on a mid-terrace, 2-bed property in the heart of the Queens Park Conservation Area. This project will build on that experience, learning from both its obstacles and successes whilst seeking to apply those lessons within the more challenging context of a 59m² Conservation Area property. Our approach to energy saving and CO₂ reduction will follow a lean-clean-green hierarchy: seeking to minimise heat losses from the property thermal fabric and ventilation method; to supply residual space and water heating using replicable, low carbon technology; to minimise lighting energy loads; and finally to consider micro-generation using proven, renewable energy systems.



Project Description

Projected build start date	01 Mar 2010
Projected date of occupation	26 Jul 2010
Project stage	Under construction
Project location	Queens Park, London, England
Energy target	Retrofit for the Future
Build type	Refurbishment

Building sector	Public Residential
Property type	Mid Terrace
Existing external wall construction	Solid Brick
Existing external wall additional information	
Existing party wall construction	Solid Masonary
Floor area	59 m ²
Floor area calculation method	PHPP

Project team

Organisation	City West Homes Ltd
Project lead	CityWest Homes Ltd, 21 Grosvenor Place, London, SW1X 7EA
Client	CityWest Homes Ltd, 21 Grosvenor Place, London, SW1X 7EA
Architect	Energy Conscious design, Studio 3, Blue lion Place 237 Long Lane, London SE1 4PU
Mechanical & electrical consultant(s)	Aecom, Marlborough House, Upper Marlborough Road, St. Albans, Hertfordshire, AL1 3UT
Energy consultant(s)	ECD Project Services, Studio 3, Blue lion Place 237 Long Lane, London SE1 4PU
Structural engineer	Aecom, Marlborough House, Upper Marlborough Road, St. Albans, Hertfordshire, AL1 3UT
Quantity surveyor	United House, Goldsel Road, Swanley, Kent, Kent BR8 8EX
Other consultant	United House, Goldsel Road, Swanley, Kent, Kent BR8 8EX
Contractor	Public Participation, Consultation and Research, Studio 2, 193-197 Long Lane, London, SE1 4PD

Design strategies

Planned occupancy	The property is currently void, but suitable new tenants will be found who buy into the monitoring strategy. They will be fully briefed on their new home and given a simple home information pack to explain the various technologies and controls along with local community facilities, recycling centers and public transport.
Space heating strategy	Heating will be provided by mains gas via a micro CHP unit and new radiators. Heat will be recovered from exhaust air via the use of mechanical ventilation with high efficiency heat recovery unit.
Water heating strategy	Hot water will be provided by mains gas via a micro CHP unit and new hot water cylinder

Fuel strategy	Mains Gas, Mains electricity
Renewable energy generation strategy	Onsite electric production by 1 kWp photovoltaic slates and low carbon electricity production via gas fired micro CHP unit.
Passive solar strategy	As this is a retrofit within a conservation area, options for reconfiguration of fenestration to improve passive solar gain will not be possible.
Space cooling strategy	Sub soil heat exchanger combined with HRV unit to regulate intake air temperature. Daytime use of HRV with summer bypass and night purging during heat waves.
Daylighting strategy	As this is a retrofit of a historic building within an area of architectural merit , options for reconfiguration of fenestration to improve daylight levels will not be possible.
Ventilation strategy	Sub soil heat exchanger combined with a heat recovery ventilatiounit to regulate intake air temperature and additional natural ventilation by opening windows during summer months as required.
Airtightness strategy	All existing vents and chimneys blocked up. New air barrier created by OSB board at ceiling level with taped joints and perimeters taped to masonry walls and plastered over. Service void created bellow this to eliminated penetrations. Windows, floors, junctions and all penetrations sealed with proprietary air tight tapes, membranes and grommets. All voids such as cavities filled to mitigate thermal bypass.
Strategy for minimising thermal bridges	Continuous insulation maintained throughout. Geometric thermal bridges minimised. Junctions assessed include: Ground floor junction, external corner, party wall, party roof, party floor, eaves, verge, window jamb, head and sill, door jamb, head and threshold. Internal insulation has been returned on party walls.

Modelling strategy	Whole house modeling was undertaken in both PHPP and SAP, with the use of extension sheets for both. The results provided for existing energy usage were calculated in SAP, as this software is more suitable for modeling poor performing buildings. The proposed results were modeled in PHPP as this software is more accurate for predicating energy usage in high performing buildings. Dynamic simulation was used to assess the impact of our proposed micro CHP heating system with the results fed back into PHPP/SAP.
Insulation strategy	- The existing solid floor extesnon will be insulated with a thin layer of aerogel laminated chipboard to achieve a U-value of 0.48 w/m2K - The main existing suspended floor will be removed and replaced with a carbon enriched expanded polystyrene system p
Other relevant retrofit strategies	We propose to fit an intelligent heating controller designed to save energy and improve comfort in residential buildings. The system controls both central and water heating, reducing energy consumption by automatically monitoring and learning occupant behavior and preferences. It also provides an easy to use and simply user interface as well as covering all energy monitoring requirements. We also propose to undertake additional monitoring of Total VOC levels. This will happen before and after retrofit, before and after the commissioning of HRV system, and in rooms with different paint specifications. The results will help educate on the affects of retrofit on indoor air quality.

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

With the Government targets of 80% carbon reduction for the UK and an aspiration for emissions from domestic buildings to go beyond this, the tension that currently exists between addressing the energy efficiency of existing stock and Conservation Area planning regulations is something that needs to be resolved. There are 9080 such Conservation Areas in England alone so it is anticipated and intended that our approach to this retrofit project would be widely applicable to properties of a similar status. The project team will work closely with Westminster Council planning department to ensure that the package of measures used works within the rules in place to protect the special character of the area.

Energy use

Fuel use by type (kWh/yr)

Fuel	previous	forecast	measured
Electric	2581	1221.3	
Gas	20980	5044.5	
Oil			
LPG			
Wood			

Primary energy requirement & CO2 emissions

	previous	forecast	measured
Annual CO2 emissions (kg CO2/m ² .yr)	99	30	-
Primary energy requirement (kWh/m ² .yr)	518	150	-

Renewable energy (kWh/yr)

Renewables technology	forecast	measured
PV	750	
Micro Gas CHP	437	
Energy consumed by generation		

Airtightness (m³/m².hr @ 50 Pascals)

	Date of test	Test result
Pre-development airtightness	-	13.68
Final airtightness	-	2.94

Annual space heat demand (kWh/m².yr)

	Pre-development	forecast	measured
Space heat demand	-	42	-

Whole house energy calculation method

PHPP

Other energy calculation method

Predicted heating load

32 W/m² (demand)

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





