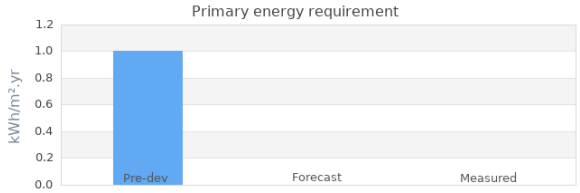
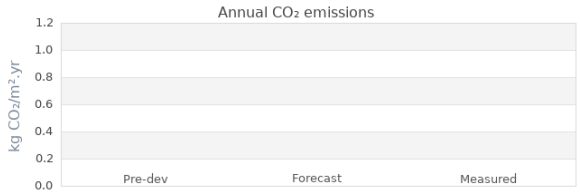
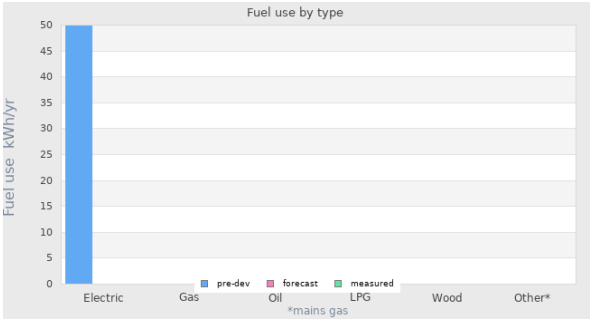
https://www.lowenergybuildings.org.uk/

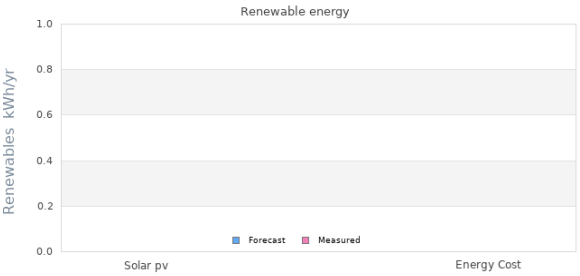
Project name Lena Gardens

Project summary Victorean Terrace, Passiv haus specification, heat demand 9 kWh/m2/annum, conservation area, triple glazed sash windows, passiv haus specification, special ground heat exchanger for ventilation, all thermal bridges removed, joists seperated from external walls. four floors plus 1/2 cellar all habitable areas.









Project Description

Projected build start date	01 Feb 2010
Projected date of occupation	16 Jul 2010
Project stage	Under construction
Project location	Hammersmith, London, England
Energy target	
Build type	Refurbishment
Building sector	Private Residential
Property type	Mid Terrace
Existing external wall construction	Solid Brick
Existing external wall additional information	
Existing party wall construction	

Floor area	235 m²
Floor area calculation method	PHPP

Project team

Organisation	Builder/Designer plus architect plus design technician
Project lead	Philip Proffit
Client	Tom Pakenham
Architect	Tom MacMillan-Scott
Mechanical & electrical consultant(s)	Ryder Strategies Europe Ltd
Energy consultant(s)	Ryder Strategies Europe Ltd
Structural engineer	Brian Jams RSJ Associates
Quantity surveyor	None
Other consultant	None
Contractor	Ryder Strategies Europe Ltd

Design strategies

Planned occupancy	16 Aug 2010
Space heating strategy	Heat Exchanger with heat recovery, pre ground to air heat exchanger, additional 1.5 kW heater in outlet from heat revovery unit, by-pass on heat recovery exchanger. Heat pump from ventilation exhaust.
Water heating strategy	Solar drain back system with back-up heat pump from ventilation exhaust. 600l storage.
Fuel strategy	Electicity, plus gas hob
Renewable energy generation strategy	Solar pv panels
Passive solar strategy	Passive gain through windows, internal blinds. Window designed andbuilt by Ryder Strategies Europe limited to look exactly like sash from the outside, but with 0.58 U value glass and insulated frames plus air-tight.
Space cooling strategy	Automatic ventilation on top floor, windows open during overheating times, air to ground heating to overide summer cooling
Daylighting strategy	
Ventilation strategy	Ground to air heat exchanger, followed by heat revovery heat exchanger driven by two balanced fans
Airtightness strategy	Very stric set of priciples and rules with drawing details at difficult connections etc Removal of all chimneys with external chimney stack outside insulation envelope above loft extension.

Strategy for minimising thermal bridges	All thermal bridges have been dealt with and calculated
Modelling strategy	PHPP used as main development tool for the design of the building
Insulation strategy	0.1 internal insulation external floor walls and roof. Insulatioon of party walls
Other relevant retrofit strategies	Complete separation of joists from external walls to eleimate condensation/thermal bridging. Kitchen side extension built with Steico studs and clad with brick.
Other information (constraints or opportunities influencing project design or outcomes)	Building has a number of unique design features. Design has not been compromised by loss of space from insulation, removal of chimney breasts almost balances out floor space lost by insulation. Windows and conservation was a major issue so we desinged and built our own windows.

Energy use

Fuel use by type (kWh/yr)

Fuel	previous	forecast	measured
Electric	50		
Gas			
Oil			
LPG			
Wood			
mains gas			

Primary energy requirement & CO2 emissions

	previous	forecast	measured
Annual CO2 emissions (kg CO2/m².yr)	-	-	-
Primary energy requirement (kWh/m².yr)	1	-	-

Renewable energy (kWh/yr)

Renewables technology	forecast	measured
Solar pv		
-		
Energy consumed by generation		

Airtightness (m³/m².hr @ 50 Pascals)

	Date of test	**Test result**
Pre-development airtightness	-	250
Final airtightness	12 Aug 2010	-

Annual space heat demand (kWh/m².yr)

	Pre-development	forecast	measured
Space heat demand	2502	9	-

Whole house energy calculation method	PHPP
Other energy calculation method	
Predicted annual heating load	-
Other energy target(s)	

Building services

Occupancy	" Adults + 2 Children
Space heating	1.4 kW heat pum in ventilation
Hot water	70% solar and reat heat 1.4 kW heat pump
Ventilation	Counterflow heat exchanger, plus pre-heat exchanger ground to air, plus auto by-pass on heat both exchangers
Controls	Central thermostat processor
Cooking	Gas/Electric
Lighting	LED, plus low energy lights
Appliances	
Renewables	Solar pv on roof by Green Tomato Energy
Strategy for minimising thermal bridges	Identify, design and modify

Building construction

Storeys	4
Volume	569m³
Thermal fabric area	
Roof description	Slate and zinc
Roof U-value	0.10W/m² K
Walls description	Solid brick plus 180mm Phenolic insulation on external walls, roof, 200mm on floor, (PU insulation)
Walls U-value	0.10W/m² K
Party walls description	double and triple solid brick, 50mm phenolic insulation
Party walls U-value	0.26W/m² K
Floor description	Various, Concrete slab with 200mm PU insulation, ventilated suspended with 200mm PU on top of joists, 150mm PU insulation in 1/2 cellar
Floor U-value	0.10W/m² K
Glazed doors description	Triple glazed air tight
Glazed doors U-value	0.80W/m² K

Opaque doors description	Not designed yet, front door identicle in apopearence to original with two triple glazed panels
Opaque doors U-value	0.70W/m² K
Windows description	Triple glazed and airtight sash look alike, insulated airtight frames
Windows U-value	0.80W/m² K
Windows energy transmittance (G-value)	
Windows light transmittance	
Rooflights description	Triple glazed Velux
Rooflights light transmittance	
Rooflights U-value	

Project images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