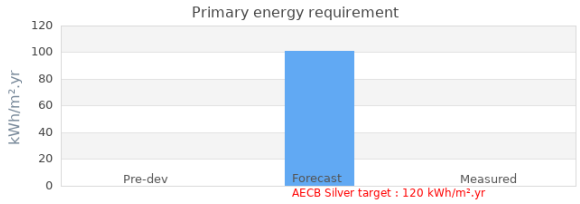
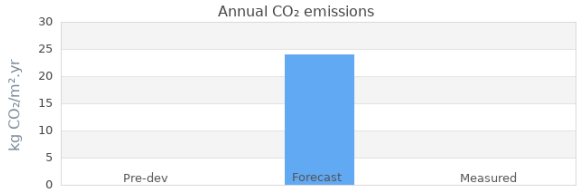
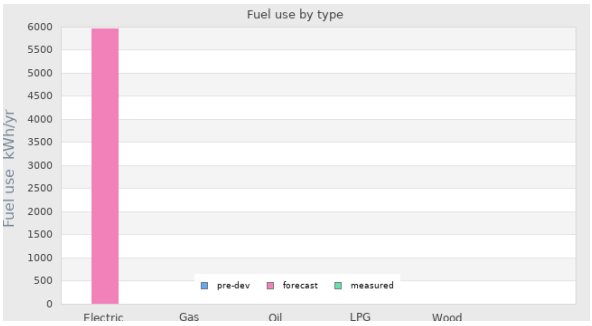
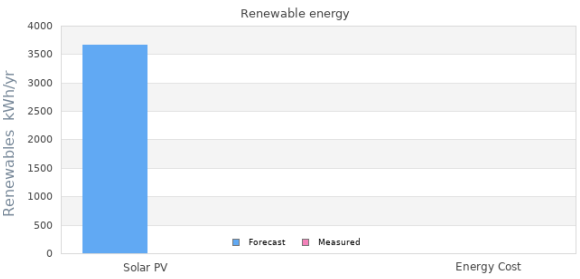
https://www.lowenergybuildings.org.uk/

Project name Orchard Field, Plot 4 (1 Beechwood Row)
Project summary Part of a development of 88 new-build dwellings to the AECB Building Standard.









Project Description

Projected build start date	05 Apr 2021
Projected date of occupation	12 Sep 2022
Project stage	Occupied
Project location	Siddington, Gloucestershire, England
Energy target	AECB Silver
Build type	New build
Building sector	Private Residential
Property type	Detached
Existing external wall construction	
Existing external wall additional information	
Existing party wall construction	
Floor area	147 m²
Floor area calculation method	PHPP

Project team

Organisation	Stonewood Homes
Project lead	Stonewood Homes
Client	Stonewood Homes
Architect	Stonewood Design
Mechanical & electrical consultant(s)	Greengauge Building Energy Consultants
Energy consultant(s)	Greengauge Building Energy Consultants
Structural engineer	JDL Consultants
Quantity surveyor	Stonewood Homes
Other consultant	
Contractor	Stonewood Homes

Design strategies

Planned occupancy	Up to 6 person occupancy (4 bedrooms) per dwelling
Space heating strategy	Air source heat pump with underfloor heating and radiators.
Water heating strategy	Air source heat pump with cylinder.
Fuel strategy	Mains electricity
Renewable energy generation strategy	Solar PV
Passive solar strategy	Windows and solar gain designed to balance useful winter solar against summer overheating using PHPP.
Space cooling strategy	Natural ventilation
Daylighting strategy	Balanced window layout.
Ventilation strategy	Mechanical ventilation with heat recovery with additional ventilation through windows.
Airtightness strategy	Floor - screed. Walls - OSB. Roof - airtight membrane. Tape between junctions and joints.
Strategy for minimising thermal bridges	Continuous insulation around junctions.Ground floor uses low conductivity block. Windows use internal reveal insulation.Psi values calculated for floor-wall (ground floor and intermediate floor) and window junctions.
Modelling strategy	Whole building modelling undertaken in PHPP.
Insulation strategy	Floor insulation above slab to achieve 0.10 W/m2K. Insulation timber frame system to achieve 0.16 W/m2K. Insulation joists to achieve 0.09 W/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		5965	
Gas			
Oil			
LPG			
Wood			

Primary energy requirement & CO2 emissions

	previous	forecast	measured
Annual CO2 emissions (kg CO2/m².yr)	-	24	-
Primary energy requirement (kWh/m².yr)	-	101	-

Renewable energy (kWh/yr)

Renewables technology	forecast	measured
Solar PV	3663	
-		
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	-	30	-

Whole house energy calculation method	PHPP
Other energy calculation method	
Predicted heating load	16 W/m² (demand)
Other energy target(s)	

Building services

Occupancy	Up to 6 person occupancy (4 bedrooms) per dwelling
Space heating	Daikin heat pump
Hot water	From heat pump with cylinder
Ventilation	Lindab MVHR
Controls	Programmable room thermostat and TRVs
Cooking	Electric
Lighting	LEDs
Appliances	Electric
Renewables	Solar PV with panels from JA solar
Strategy for minimising thermal bridges	Continuous insulation around junctions.Ground floor uses low conductivity block (Thermalite Aircrete Hi-Strength 7). Windows use internal reveal insulation.Psi values calculated for floor wall (ground floor and intermediate floor) and window junctions.

Building construction

Storeys	2
Volume	440m³
Thermal fabric area	450m²
Roof description	520 mm mineral wool between and above joists
Roof U-value	0.09W/m² K
Walls description	Sigma II wall panel with 235 mm Knauf Supafil insulation
Walls U-value	0.16W/m² K
Party walls description	Mineral wool between timber frame.
Party walls U-value	
Floor description	200 mm Xtratherm Thin-R Plus Hyfloor
Floor U-value	0.10W/m² K
Glazed doors description	Solarlux bifold doors
Glazed doors U-value	0.90W/m² K uninstalled
Opaque doors description	Rationel AURAPLUS
Opaque doors U-value	0.80W/m² K uninstalled
Windows description	Rationel AURAPLUS
Windows U-value	0.80W/m² K uninstalled
Windows energy transmittance (G-value)	53%
Windows light transmittance	73%
Rooflights description	Keylite Triple Glazed
Rooflights light transmittance	55%
Rooflights U-value	1.00W/m² K uninstalled

Project images