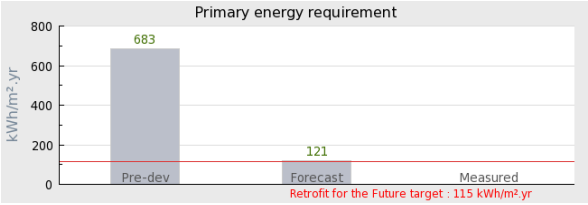
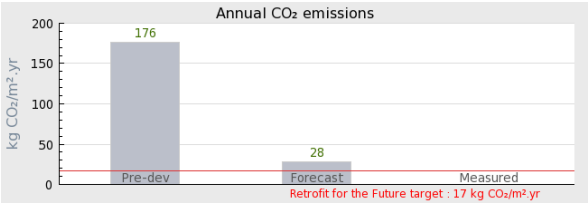
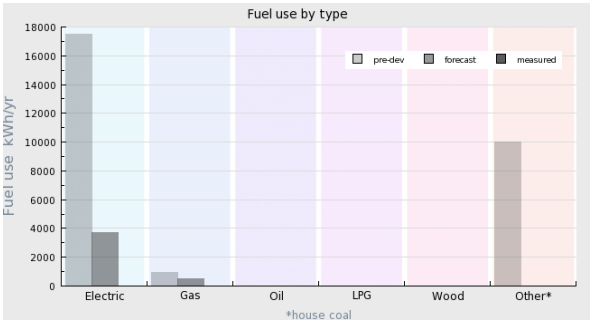
http://lowenergybuildings.org.uk

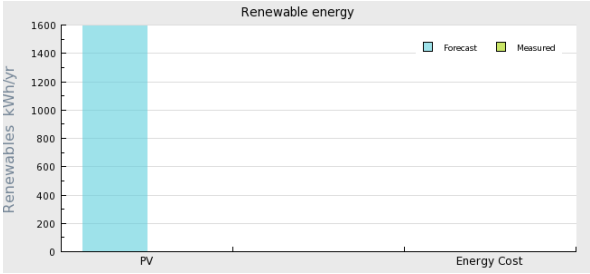
Project name 2050 Now! Achieving the standards for 2050, and the potential role for innovative heating solutions in thermally improved homes

Project summary The project will be improving four homes to different levels and exploring the performance of new heating solutions to achieve the optimum balance of energy performance vs. heating input for these different technologies. The three main innovative heating technologies in this project are Baxi's Ecogen domestic CHP (dCHP), Baxi's Ambiflo ASHP and Nuaire's Sunwarm (combined positive input ventilation, solar thermal heating and solar hot water). The dCHP units will be installed in relatively worse performing households and the ASHP units in well insulated houses to understand the level of performance needed from homes to create the right environment for these technologies to achieve significant carbon savings.









Project Description

Projected build start date	01 Mar 2010
Projected date of occupation	31 May 2010
Project stage	Under construction
Project location	Newark, Nottinghamshire, 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	
Existing party wall construction	
Floor area	81.4 m²
Floor area calculation method	PHPP

Project team

Organisation	Nottingham Community Housing Association
Project lead	Nottingham Community Housing Association
Client	Nottingham Community Housing Association
Architect	
Mechanical & electrical consultant(s)	
Energy consultant(s)	Camco
Structural engineer	
Quantity surveyor	
Other consultant	Parity Projects
Contractor	Baxi, Nuaire, NCHA's own contractors

Design strategies

Planned occupancy	Three people
Space heating strategy	Air source heat pump with radiators will be installed in the main house with advanced measures (2050 house) and another property with medium measures. The two other houses will be installed dCHP units. On the superhouse, Sunwarm will also be contributing to space heating.
Water heating strategy	Water heating will be provided by the Sunwarm system, feeding hot water to the house through the solar panels.
Fuel strategy	Mains Electricity for properties with ASHP and Mains Gas for the properties with dCHP.
Renewable energy generation strategy	2 kWP PV panels to be installed in the 2050 house in the south facing roofs.
Passive solar strategy	The properties have south facing windows. In addition, the superhouse with the Sunwarm system will be collecting heat from the solar panels on the roof.

Space cooling strategy	Natural ventilation in all properties and Sunwarm in the super house supplying continuous filtered fresh air during day. On warm nights SUNWARM will either supply air in a similar way to a warm day or if more advantageous will pass the outside air through the solar collectors providing low energy air cooling to the property.
Daylighting strategy	Large windows
Ventilation strategy	Sunwarm will be providing ventilation throughout the year. Natural ventilation can also be used during summer.
Airtightness strategy	Reducing air-tightness down to 3. Experience from other projects shows that this is achievable. The pressure tests will be run in conjunction with the measures to ensure that the target figure is achieved.
Strategy for minimising thermal bridges	All junctions will be assessed during internal wall insulation.
Modelling strategy	NHER SAP software was used to model the different measures through collaborating with suppliers and feeding in information to the software regarding the performance of the different measures. The unregulated emissions were modelled through the SAP extension worksheet provided by TSB.
Insulation strategy	- Application of solid wall insulation (Spacetherm) to achieve u-value of 0.24. - Loft insulation (u-value: 0.13) - Solid floor insulation (u-value: 0.4)
Other relevant retrofit strategies	The planned measures will be installed whilst the properties are void and in a particular sequence to avoid to additional costs.
Other information (constraints or opportunities influencing project design or outcomes)	

Energy use

Fuel use by type (kWh/yr)

Fuel	previous	forecast	measured
Electric	17487	3717	
Gas	964	482	
Oil	0		
LPG			
Wood			
house coal	10035		

Primary energy requirement & CO2 emissions

	previous	forecast	measured
Annual CO2 emissions (kg CO2/m².yr)	176	28	-
Primary energy requirement (kWh/m².yr)	683	121	-

Renewable energy (kWh/yr)

Renewables technology	forecast	measured
PV	1595.199951	
-		
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	-	64	-

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