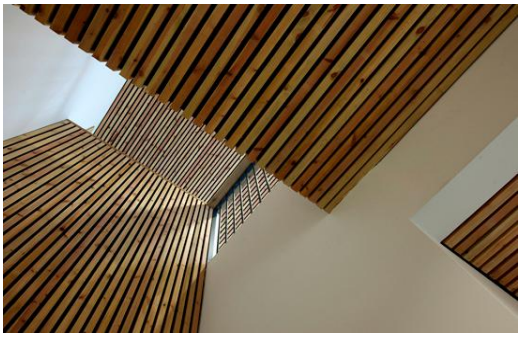
Operational success story

Oak Meadow Primary School
New Passivhaus building



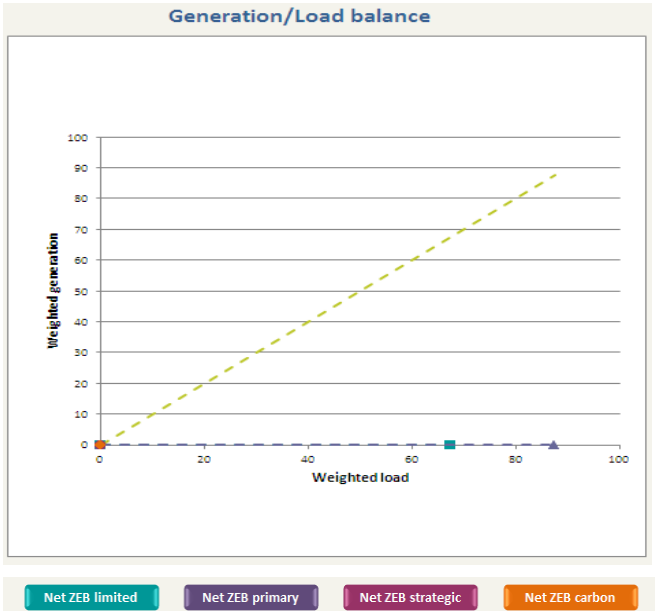
GENERAL INFORMATION

Owner:	Wolverhampton City Council
Architect:	Architype
Use :	Primary School
Surface :	2400 m²
Volume :	9000 m³
Built:	2011
Construction cost:	5.200.000 €
Design cost: *(architectonic, electronic, plans, structure and security..)*	800.000 €
Total cost:	2500,00€/m²

ENERGY PERFORMANCE

Type of certification: Passivhaus Certified:
- heating demand 14 kWh/m²y
- Hot water demand 11 kWh/m²y

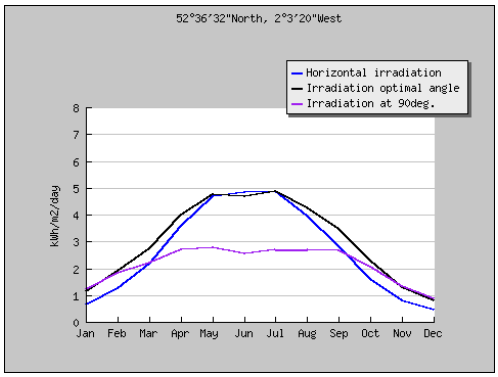
Saving of CO_2: The building has been designed to minimise CO_2 by:
- Very high levels of insulation
- Very low air leakage
- Minimisation of artificial lighting requirements



Graphic1: Monitored Import/Export calculated by Net ZEB Evaluation Tool Developed within the IEA - SHC Task 40/ECBCS Annex 52 - "Towards Net Zero Energy solar Buildings". Created by: Eurac Research within STA. Draft: V4.3

DESCRIPTION OF THE CLIMATE

Address:	Wolverhampton, UK
GPS:	Latitude = 52,60889 N Longitude = 2,05556 W
Altitude:	150 m
Yearly solar radiation: (graphic)	2650 Wh/m²*day *(average sum of horizontal global irradiation per square meter)* (http://re.jrc.ec.europa.eu/pvgis/apps4/pvest.php)
HDD_{20} : (http://www.degreedays.net/)	HDD_{20}= 3656
CDD_{26}: (http://www.degreedays.net/)	CDD_{26}= 0



SPECIFICATIONS OF THE BUILDING

1) Built Wh/m²/day

Orientation	South
The building envelope	
Compact:	S/V = 0.43 (1/m)
Heating demand	14 kWh/m²a
U-value of the opaque surface	
• Walls:	0.13W/m²K
• Roof:	0.10 W/m²K (green roof)
• Floors	0.064 W/m²K
U-value of the window surface	0.90 W/m²K

2)Construction

Ground Floor

- 250mm high density Jablite insulation
- 300mm Power floated slab
- Floor Finish

External Walls

- 12.5mm Fermacell
- 38mm Service void
- 18mm OSB (air tightness Pro Clima)
- 140mm Structural zone
- 200mm Duvet layer
- Both above fully filled with Warmcell blown recycled insulation
- 18mm Bitroc (wind tightness Pro Clima)
- 50mm Cavity
- Douglas Fir / Brick

Internal Walls

- 140mm stud(partially or fully filled with insulation dependent on acoustic requirements

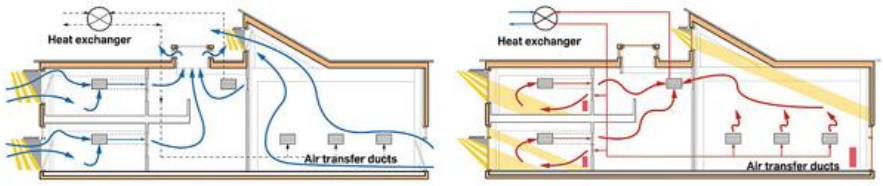
Roof

- Ceiling
- Ceiling void
- 15mm Fermcell (fire lining)
- 18mm OSB (air tightness Pro Clima)
- 400mm I joist fully filled with Warmcell
- 9.2 Panel vent
- Breather membrane
- Ventilation zone
- 18mm Plywood
- Membrane / Aluminium

CONTEXT AND HISTORY OF THE BUILDING

Planning phase – energy design concept

Overheated and stuffy classrooms are often cited as key contributors to children's drowsiness and lack of focus. But in Oak Meadow Primary School on the outskirts of Wolverhampton, the provision of a heat-recovery ventilation system will hopefully lead to happier and more alert children.



The system will pump in fresh air during winter, while high-level vents allow for night and day ventilation during summer, ensuring improved indoor air quality all year round.

Design development, technical design, feasibility study

Most of its 16 classrooms on both floors are located on the south elevation where solar shading can be provided, while the hall, kitchen and administrative areas, together with the main entrance, are on the north. Space hungry corridors have been avoided and instead, classrooms lead off multi-use areas where children can do group activities.

By rationalising building form and simplifying detailing and systems, Passivhaus certification has been achieved within the standard available budget.

September 2010

Construction phase

Oak Meadow is a two-storey timber-framed building with a 2,300sq m floor area. It incorporates high levels of insulation, timber-framed triple-glazed windows, and is clad with British-grown Douglas fir boards.

Rigorous attention to air tightness at every junction had to be achieved on site. Oriented strand board with taped joints was used to provide a robust air tightness layer. This layer is protected once the building is in use by the inclusion of a service zone inside the walls. Architype worked hard to eliminate penetrations of this – post, beams and portal frames all stand within this line. Careful attention has been given to all junctions with floors, roofs, windows, doors and internal partitions.

September 2011

Handover of the works – commissioning of building

Completed in September 2011, on time and within budget, this was the UK's first Passivhaus certified primary school.

A full-time research associate is employed to monitor the energy and water consumption, temperature, humidity and CO2 levels of 10 of Architype's recently completed buildings, alongside in-depth user feedback. Even before the research is complete, feedback is proving invaluable and being actively used to improve practice, and improve the design and performance of Architype's future projects.