EVIDENCE: Case study – Net Zero Carbon, Ysgol Cynefin

Ysgol Cynefin, Llanrumney & Fairwater sites

Client	Cardiff Council
Value	£23 million
GIFA	3,170m²
Capacity	36 ALN (ages 7-11)
Procurement	NEC4 Option A
RIBA Stage at appointment	RIBA Stage 3

Meets Welsh Government Net Zero Carbon Targets

Ysgol Cynefin comprises of two new-build Additional Learning Needs (ALN) Schools on two different sites, Fairwater and St Mellons. The design for the buildings for each site is the same, except for the orientation. The buildings consist of teaching and office spaces, sensory rooms, a large hall space, community spaces, as well as ancillary areas such as toilets and storerooms. The total floor area of each school building is 1,585m2. The design incorporates a range of energy efficiency measures, including a highly insulated building fabric, low levels of air leakage, energy efficient systems and lighting.

Lessons learned in relation to delivery, particularly around the maturity of established supply chains.

- Minimum monthly site inspections instigated by the sustainability team to capture best practise and ensure standards are met
- Early TM54 workshops
- Regular carbon analysis throughout the design stage
- Early design involvement with building services specialists to confirm CLT frame penetrations, e.g. builders works openings, sprinklers etc.
- Promote industry awareness of the required fire engineering test data for partitions and door sets, etc which are incorporated into the CLT structure.

EXCELLENT BREEAM (Design Stage)

GREEN ROOF AND PV PANELS

BIM Level 2

A EPC RATING

Roof mounted Photovoltaics to generate zero carbon electricity – achieving carbon savings of 94.50% (Fairwater) and 94.30% (St Mellons) under Part L (2014) Wales emission factors; and 51.50% (Fairwater), 50.00% (St Mellons) under Part L 2021 emission factors.

Utilising alternative approaches to construction delivery to meet Welsh Government's NZC targets

Cross Laminated Timber (CLT) The school superstructure consists of Cross Laminated Timber (CLT) frame installation as a lower embodied carbon option in lieu of a traditional structural steelwork solution. The CLT frame solution reduces embodied carbon A1-C4 (excluding B1-3, 6-7) by circa 11%.

Renewable technologies – Designed as a Net Zero Carbon in Operation (NZCiO) project, the buildings incorporate a range of renewable technologies including photovoltaics and Air Source Heat Pump's.

Fabric First The building is designed with a fabric first approach without the higher capital costs of Passivhaus solutions.

Air Source Heat Pumps to meet the space heating and domestic hot water demands of the building – carbon gains of 5.65% (Fairwater) and 7.39% (St Mellons) under Part L (2014) Wales emission factors; however, carbon savings of 55.54% (Fairwater) and 54.46% (St Mellons) under Part L 2021 emission factors.