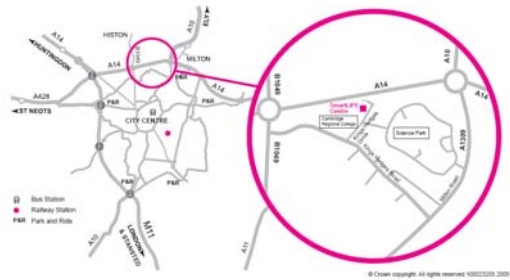


SmartLife Centre



Location on map



- location:** Cambridge, UK
- dates:** Ground works on site began April 2005 and construction was started May 2005. The centre took approximately 10 months to build and was completed March 2006.
- type:** New Construction
- use:** Business and Training Centre
- size:** The building footprint is 1500 m²
- people:**
- actors:** Cambridgeshire County Council; City of Malmo; Tu-Tech Innovation; Cambridge Regional College
- goals:**
 - The building should encompass sustainability the life-cycle is to be carefully assessed throughout the duration of the project and beyond.
 - The building needs to incorporate energy and carbon efficient design.
 - The building design should minimise energy and resource consumption, incorporate effective insulation, low-values, efficient heating and cooling systems and appliances.
 - The building should meet a BREEAM rating of 'very good'.

energy use	KWh/m ²	construction	amenities
heating&electricity, goal heating&electricity, achieved heating&electricity, best		<ul style="list-style-type: none"> ▪ Insulation: recycled newspaper ▪ Roof fabric: from PVC coated cotton ▪ Wall clad with aluminum sheets ▪ laminated Glulam timber frame supporting ▪ timber-based internal floors, external walls and roofs ▪ roofing insulation is CFC free polyurethane foam ▪ windows and doors are made from FSC-certified timber 	<ul style="list-style-type: none"> ▪ classrooms ▪ practical workshops ▪ reception/foyer area ▪ canteen ▪ staff offices ▪ car parking
systems		site ecology	special project features
wind power	x		<ul style="list-style-type: none"> ▪ Energy efficiency measures ▪ rainwater collection tanks ▪ water reduction technology ▪ waste management
passive solar gain,	x		
Solar shading	x		
solar panel heating system.	x		
photo-voltaic (PV) modules			
reversible ground source heat pump	x		
naturally ventilated	x		
passive solar gain	x		
Solar shading	x		

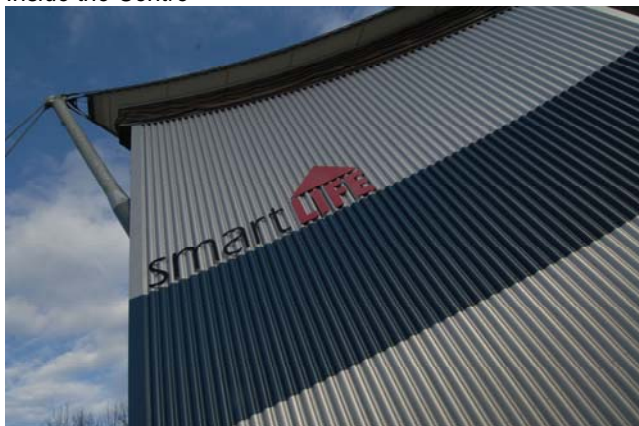
process and history

There are large variations across Europe in tenure rates, the UK for example has a culture for home ownership and the aspiration to purchase a home remains strong. Over the past 30 years, the European average real house price growth has been approximately 1.1%, In the UK it was 2.4%. The shortage of housing is most severe in UK, it is estimated by Government that up to 140,000 extra homes a year need to be built if supply is to keep up with demand. According to estimates there are between 220,000 and 230,000 new households being formed annually, yet there were only 165,000 homes being built annually. In the Cambridge region, the annual shortfall of affordable housing is estimated to be 5020 units, nearly 12 times the current level of supply to be delivered.

A plot of land was located on the Science Park Campus of Cambridge Regional College (CRC) and was selected for the UK SmartLIFE business and training centre. This site was chosen as it benefited from the existing facilities provided by CRC and was in a good central location. The College is a well-established further education college, with relatively new buildings (phase 1 opened in 1993). It has on-site amenities and facilities already in place which are typical of an establishment of this nature, for example classrooms, practical workshops, canteen, staff offices, reception/foyer area and car parking. The College is also part of the Centres of Vocational Excellence (CoVE). As SmartLIFE was looking to develop courses in MMC it was a perfect match to be situated on the same site as the further education college that already teaches construction. The high demand for places on the colleges existing construction course's means they were also looking to develop courses further and increase their capacity. The goal of the project was to train around 1,300 people over three years in modern, sustainable methods of house building. The site also benefits from good infrastructure, with effective road, rail and bus networks.



Inside the Centre



Wind turbine powering the centre

description of special project features

The building was designed to incorporate as many sustainable features and materials as possible. As noted the main structural elements, of structural frame, walls, floors and roofs are all timber-based. This wood was responsibly sourced and is FSC or PEFC certified. Timber frame has the lowest CO₂ cost of any commercially available building material and at the end of its life it can easily be recycled. Strength for strength, concrete uses 5 times and steel uses 6 times more energy to produce than timber. For every cubic meter of wood used instead of other building materials, 0.8 tone of CO₂ is saved from the atmosphere. The energy used in extraction and production of a material or product is called "embodied

energy". In general terms the higher the embodied energy, then the higher the CO2 emissions. Wood compared to other materials such as steel, concrete, plastic and aluminum has low embodied energy. Even if these materials are recycled the process can involve high amounts of energy.

Building Description

The design of the centre incorporates many of the modern methods it hopes to promote.

The building can be split in to 3 sections:

The Practical Training Centre:

The Practical space, within which the students will construct two-storey houses using MMC techniques is covered with a large fabric roof manufactured from a recyclable PVC. Of its type it is the largest in Country. It is supported by four large steel masts; one at each corner and covers an area approx 24mx24m.

The walls are extend up to 12m high and constructed from a FSC certified timber frame using 356 deep engineered timber studs up to 12m long. The walls are clad with aluminium sheets which is preferred to steel on environmental and sustainability grounds. Windows and doors are made from FSC accredited timber.

The visitor centre, conference room and office space:

These sections were constructed with a laminated Glulam timber frame supporting timber based external floors, external walls and roofs. The pre-finished pitched roofing panels are from Milbank. They are 8m long structurally insulated panels (SIP's) spanning across the Glulam frame. The pitched roofing insulation is CFC free polyurethane foam. It has been finished off with aluminium sheeting.

The majority of the external wall finishes are untreated Western Red Ceder cladding from FSC certified sources. The 150mm thick insulation for these external walls is warmcel recycled newsprint (cellulose insulation), which was sprayed in to the walls. Windows and doors are made from FSC accredited timber.

The Classroom block and student areas:

This was constructed with pre-fabricated structural wall, floor and roof panels made from solid laminated timber panels (Lenotech system). They arrived on site as complete walls, floor and roof sections.

These areas require no insulation and are clad in a light-weight mineral spun fibre wall panel. Windows and doors are made from FSC accredited timber.

funding

The centre cost approximately £2.5m to construct. Funding came from the European Union (Interreg IIIB funding stream) (£0.5m) and from the Department for Communities and Local Government's (£2m).

results

In the UK centre it has been estimated that the 3 renewable energy systems working at minimum efficiency in the SmartLIFE Centre will contribute 38% of the buildings energy requirements. This figure is an estimate. SmartLIFE is also implementing a smart-metering policy. This gives real time figures on a live website that show how much at any one time the renewables are contributing to the energy usage within the building. The website <http://smartlife.sentec.co.uk/status.php> shows the current energy status, energy balance (for hour, day, week, month, year, at the moment of observing and from a selected staring time). At the web-site CO2 emission savings are also calculated and compared to UK emissions per person and 2010 target for emissions per person.

contacts: Further information is also available from www.smartlife-project.net

sources: <http://www.smartlife-project.net/smartlife/DisplayArticle.asp?ID=7817>

More about the project: http://www.ukswedensustainability.org/se/projects/smartlife_details.jsp

How the building was built: <http://www.smartlife-project.net/smartlife/DisplayArticle.asp?ID=4521>

Smart monitor: <http://smartlife.sentec.co.uk/status.php>

SECURE: www.secureproject.org

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