

CASE STUDY NO. 1

ST THOMAS OF AQUIN'S HIGH SCHOOL, EDINBURGH:

Designed by: The City of Edinburgh Council, Building Design Services



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BACKGROUND:

A new build secondary school for 1100 pupils.

KEY SUSTAINABILITY FEATURES:

- A welcoming, non-institutional, environment with central 'commons' space. Quality of design and build contributes to sustainability. Asset-creation
- Flexibility a key feature for the short, medium and long-term with a number of loose-fit strategies incorporated to facilitate various levels of future change.
- Wide span modular, clear span structure allows change of layout to respond to curriculum change or even radical change of use. Modular glazing can have partitions connected at 600mm intervals.
- Expansion strategy incorporated, including infrastructure built in for IT expansion, including 100% laptop use. Space built in to allow further accessibility adaptations as required
- Full predictive computer energy modelling applied to design with increased ceiling heights and larger classrooms to give greater air volumes for improved comfort.
- Increased window heights for maximum natural daylighting and ventilation with a proportion of acid-etched glass to diffuse natural daylighting deeper into classrooms. Dim-out blinds throughout to adjust natural daylighting whilst allowing natural ventilation.
- Neutral tinted solar control glass where required to supplement solar shading.
- Individual room temperature sensing for close energy control and energy savings/CO₂ reduction. Perimeter lighting automatically dims in response to daylighting, to reduce CO₂ emissions. Mechanical ventilation plant minimised to reduce energy demands and running costs.
- Careful creation of relationship between internal and external spaces; visual links to trees of adjacent convent garden.
- Maximum use of sustainable and renewable materials including recyclable aluminium roof and sustainable timber.
- Design also considered 'green' transport links.

CASE STUDY NO. 3

SLATEFORD GREEN HOUSING, EDINBURGH

Designed by: Hackland and Dore, Edinburgh.



BACKGROUND:

Competition winning 120 house project,
Client: Canmore Housing Association,
Funding: Scottish Homes/Communities
Scotland.

KEY SUSTAINABILITY FEATURES:

- 'Car free' housing concept with cycle facilities, city car club base and close public transport links.
- Social facilities include community lounge / club room.
- Sheltering courtyard design, responding to topography.
- Passive and stack ventilation.
- Photovoltaics proposal.
- 'Warmcell' cellulose insulation with panel vent sheathing.
- Artificial wetland, filters roof and road drainage run-off to SEPA guidelines.
- Native planting, low maintenance species chosen to encourage habitat for wildlife.
- Recyclable aluminium roof, breathing wall membrane/ engineered timber structure.
- On site high-efficiency district heating boiler on low tariff.
- Grass paved service strips.
- Partnership working on innovative products/systems.
- Formal post-occupancy studies/ monitoring.

CASE STUDY NO. 4

NATURAL POWER BUILDING, DUMFRIES: THE GREEN HOUSE:

Designed By: Organic Buildings, Inverness



© Don Mackenzie



BACKGROUND:

This building, set in the hills of Dumfries, is the headquarters of Natural Power, a wind farm development consultant. It was financed directly by investment already moving away from oil/gas-based energy sources and moving towards renewable energy.

KEY SUSTAINABILITY FEATURES:

- Engineered timber frame using locally sourced Douglas Fir constructed by specialist oak-frame builder, external timbers in Scottish oak.
- Maximum free heating obtained from solar gain through south orientated glazing, with natural ventilation via double-height space.
- Concrete slab and masonry partitions provide thermal storage.
- Site chosen to maximise rural economic regeneration.
- Orientation of building minimises visual impact of built volume on the surrounding scenery.
- Facilities for making use of locally available hydro-power.
- Sensitive provides high quality office accommodation with full IT facilities in rural environment.
- Grass roof sown with local species, provides moderation/ filtering of drainage flow.
- Natural grass landscaping of surrounding site/ indigenous and self-sown species, available for grazing.
- High quality of working environment contributing to regeneration of rural population.
- Promotes and publicises sustainability via links with local schools and other interest groups as well as via events held at the building.

CASE STUDY NO. 5

NEW HEADQUARTERS BUILDING: CITY OF EDINBURGH COUNCIL

Designed by: Building Design Partnership, Glasgow



© Hamish Taylor

BACKGROUND:

New administrative headquarters for the City of Edinburgh Council. Commercial development funded by Morley/NULAP in city centre brownfield site. Contractors - the Miller Group.

KEY SUSTAINABILITY FEATURES:

- Building volume minimised by adoption of extensive 'flexible working' policies for staff.
- Transport energy savings/ reduced pollution/CO₂ by 'flexible working' strategy in building brief.
- Green roofs for heat gain protection, rainwater filtering and flow moderation, biodiversity in urban context.
- High level of insulation.
- Waterless urinals.
- Low water-usage appliances.
- Natural ventilation, including management system proposed to educate staff on use of the building's natural systems, to minimise energy use by the heating/ ventilation systems and ensure reduced CO₂ emissions.
- Existing parking minimised to allow landscaped boulevard route.
- Use of 'brownfield' site.
- Lighting responsive to daylight level and to room occupancy.
- Maximum use of materials to reduce embodied energy.
- All timber from sustainably certified sources.

Project in progress.

CASE STUDY NO. 6

SOLAR PANEL HEATING AT SHELTERED HOUSING COMPLEX, SAUGHTON MAINS TERRACE, EDINBURGH

Design by : The City of Edinburgh Council, Building Design Services.



BACKGROUND:

To supplement the temperature of the Complex's domestic hot water system with wet system solar panels. Installed under the City of Edinburgh's 'Warmburgh Plan' to secure 31% overall energy efficiency improvement by 2007. Funding secured through Scottish Community Household Initiative (SCHRI) grant.

KEY SUSTAINABILITY FEATURES:

- Photovoltaic panel incorporated on the main panel powers the circulating pump.
- Each twinned panel serves two properties.
- LCD display panel in each house provides useful visual indication to residents of the operational efficiency of the system.
- Financial savings returned to tenants via 'Heat with Rent' scheme.
- CO₂ savings of 3.5 tonnes per annum.
- Outcomes being promoted to other local authorities and Housing Associations.

CASE STUDY NO. 7

MINI COMBINED HEAT AND POWER UNITS:

Design feasibility study by : The City of Edinburgh Council,
Building Design Services.



BACKGROUND:

To assess the use of mini CHP units to provide base-load heat at sheltered housing project

KEY SUSTAINABILITY FEATURES:

- CHP unit also provides landlord's electrical supply.
 - Thermal output 12.5kW.
 - Electrical output 5.5kW – can be exported.
 - Mini CHP systems of this type can offer 48% reduction in CO₂ emissions when compared with centralised power generation equipment and conventional gas-fired boiler plant.
 - Project being evaluated with a view to application city-wide.
- Feedback and assessment includes possibility of utilising new micro-sized CHP units for single dwelling units. Micro CHP units are sized at or below 5KW electrical output.
 - Matching funding raised.

CASE STUDY NO. 8

ST MARGARETS ACADEMY, LIVINGSTON

Designed by: The City of Edinburgh Council, Building Design Services.



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BACKGROUND:

New build secondary school

KEY SUSTAINABILITY FEATURES:

- Sunspace for solar input in northern climate.
- Atrium optimises natural ventilation in deep-plan area of the building.
- Automatic temperature and rain sensing controls to hydraulically operated passive stack ventilation louvres.
- Combined heat and power unit.
- Maximum natural ventilation by use of courtyard configuration.
- Maximum daylighting by barrel vaulting.
- Wide span structure allows long-term flexibility.
- Flexible loose-fit format supported by clear services strategy.
- Expansion strategy.
- Contraction/diversification of use strategy.
- Attractive and welcoming for community/adult use.
- External landscape design includes grass embanked 'amphitheatre'.

