CASE STUDY

A new office building

Edinburgh is expanding, with some of the largest developments located towards the city perimeter rather than the centre.

This case study examines Edinburgh Park, to the west of the city, just inside the ring road.

Masterplan

Ever since the emergence of business parks as offices in the 1980s, they have been criticised for their dependence on private car travel and the energy-intensive specification of the buildings. The first phase of Edinburgh Park was largely constructed in the 1990s and, with some exceptions, conformed to this pattern. The second phase has taken on a very different character and offers a clear direction towards a lower-carbon future, with far less reliance on petrol/diesel cars. Construction is under way and is likely to continue for several years.

– The development is a dense mix of offices, housing and community facilities.

– There are new public squares, pedestrian networks, extensive landscaping and public art.

– The tram has two central stops, book-ended by two railway stations.

– It is served by several bus services.

– There is a high level of cycling and walking provision.

– A limited number of flexible spaces replace extensive surface car parking.

– 50% of the car park is able to support electric vehicle charging points.

Buildings

Carbon emissions from the buildings will be greatly reduced compared to other business parks.

Fossil fuels will not be used in the new development and an all-electric strategy is being developed. The supply will be 100% renewable.

Each building is highly efficient in its use of energy. The most advanced office building is predicting operational energy consumption of 60kWh per square metre per year. This compares with the industry average of 130kWh/sq.m/year and aligns with the UK Green Building Council's net-zero standard.

However, new buildings can also emit large quantities of carbon during the construction process – the 'embodied' carbon. At Edinburgh Park, the most advanced office building has been designed to reduce the embodied carbon to approximately 650kg/CO2e/sq.m on completion, whereas the industry average is currently around 1,000kg/CO2e/sq.m.

Taken together, the carbon emissions from the building's operational energy and construction amount to a total of 10,000 tonnes of carbon over its 60-year lifespan. This represents a reduction of roughly 35%, compared with typical emissions from a conventional commercial development, with most savings occurring before completion.

To achieve net-zero carbon, it will be necessary to offset the remaining carbon emissions, but further research is needed to reduce the embodied carbon of all construction projects further.

To achieve the reduction in carbon emissions, this building's design adopts numerous innovations that also make it a more attractive place to work.

– Taller than normal floors;

– Extensive use of timber rather than concrete;

– Re-used, recycled and recyclable materials where possible;

– Opening windows;

– High volumes of 100% fresh air supplied through the floor at low velocity and extracted at high level with minimal cooling load;

– Solar panels at roof level;

– Showers and lockers for cyclists;

– Shared café and workplace facilities.

Future challenges and opportunities:

– Reducing car dependency and switching to electric vehicles and e-bikes;

– Further reducing carbon emissions from construction and the circular economy;

– Being first in the low-carbon office market;

– Introducing first autonomous bus service to the Edinburgh area;

– Applying principles of 20-minute neighbourhoods;

– Transforming into a 24/7 mixed-use community.

Developer: Parabola
Architects & Engineers: Dixon Jones
Bennetts Associates
AHMM
HTA
Sutherland Hussey Harris
Contractor: Sir Robert McAlpine
Project Management & QS Services: Gardiner & Theobald
Engineers: Woolgar Hunter, Hulley & Kirkwood
Transport: Tetra Tech

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1 Masterplan, showing the increased density of the new phase (left) compared to the original development (right).

2 Central area, with tram.

3 Western office proposal.

4 Exploded view of Western office.

5 Central landscape with sculpture.

6 Image of lobby with timber/concrete structure.

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