

The achievement

When commissioning the design and construction of its new corporate headquarters in Coventry, Powergen wanted a building which was energy efficient and which provided a top quality working environment. In just 17 months, architect Bennetts Associates and design/build contractor Laing Midlands completed an innovative, open plan, office unit, using mostly natural heating and cooling systems, covering an area of 15,500m² and housing approximately 750 staff. The scheme achieved a BREEAM rating of excellent at the design stage.

Creating a greener corporate identity



Why change was needed

In the early 1990s, Powergen was aware that, generally speaking, power producers had a 'dirty' image among consumers. That negative image was largely due to the power producers' use of fossil and other environmentally degrading fuels. Powergen wanted to create a greener profile by making its own new headquarters a sustainable and energy efficient building.

The second reason for change arose from problems of communication. Powergen's existing headquarters was spread over two sites and subdivided into departmental offices. It became clear that the existing physical layouts of its sites, both external and internal, were contributing to working group fragmentation. The client wanted one purpose-built, pleasant, modern unit.

Key benefits

- the building is designed to be efficient in terms of workspace and flexibility over its whole life-time
- the building's actual, annual energy consumption (£969 per 100m² of gross floor area), including the running costs of a computer suite which is air-conditioned 24 hours a day, is half that of traditionally air-conditioned offices (£2000 per 100m²) and at a similar level to non-air-conditioned offices (£900 per 100m²)
- a perceived increase in staff motivation and productivity, thanks to a comfortable and pleasant working environment and ease of communication
- the building contributes to Powergen's 'greener' corporate identity.



Theme of case study:
**sustainable construction/
culture and people**

Sector represented:
offices

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RETHINKING



CONSTRUCTION

Creating a greener corporate identity

Success step by step

1 Establish a clear brief

In 1993 Powergen decided to commission a new headquarters which would help create a cultural change and signal its move away from the traditional departmental approach of a public organisation to an integrated, modern, entrepreneurial PLC.

As well as promoting itself as a 'clean' green company, Powergen wanted to create a quality working environment, which would meet three criteria: first, to enhance employees' sense of well-being and secondly, to increase productivity through improved team-work. Thirdly, Powergen wanted to achieve a paperless office. It was also crucial to avoid any design feature which might be perceived as corporate extravagance.

2 Appoint specialist consultants

Powergen appointed a number of specialist consultants to advise on the design of its new building, which was commissioned on a design/build contract. Consultants included Space Syntax at University College London's Bartlett School of Architecture. This group addressed the relationship between spatial layout and staff integration. By modelling the circulation layout of the design as it developed, Space Syntax could 'fine tune' details which would promote interaction between the client's 38 departments.

3 Co-ordinate the building design and orientation

Efficient use of energy and a pleasant working environment were achieved through co-ordination of the building's design and orientation.

3.1 The roof structure

The roof structure is based on a high thermal mass design, made of very dense concrete cast in situ. This structure is designed to act as a heat sink, so that when the roof is cool, the building below it is cool. This is achieved by having a large number of vents on either side of the roof. These vents release the warm air built up from the floors below. The system works well approximately 95% of the time, moving only slightly outside guideline parameters for the remaining 5%.

3.2 Natural lighting

Natural lighting, with no direct sunlight on the work surface, is mainly used; high levels of daylight enter the building through the strip windows at office levels and through the glazed roof over the atrium. Glare is avoided thanks to the orientation of the building, with main elevations facing north and south. The south face is also shaded by brises-soleil and internal, translucent roller blinds.

3.3 Natural ventilation

Natural ventilation is provided by a building management system which, sensing the difference in temperature between the interior and exterior, controls high level vents. In addition office staff can open windows manually on both sides of the building.

Key management issues

- productivity increases when staff feel valued, as demonstrated by the client's provision of a pleasant, modern working environment
- the long-term efficiency of the building's performance needs to be addressed in design decisions
- commercial property market forces need to be considered if sub-letting has to remain an option.

The system incorporates mixed mode heating and cooling through four central heat exchangers connected to radiators, under-floor ventilation and water-filled coils. The heat exchangers also enhance energy efficiency.

The benefits of natural ventilation are both financial and environmental in terms of minimum energy use and pleasantness of ambiance for staff. The build costs for the site, including fit-out but excluding furniture, were £900 per m², similar to conventional design.

3.4 Open plan interior

The open plan interior allows free air movement. Concerns about excessive noise were addressed by the artificial emission of background white noise which provides a hushed ambiance.

The most important benefit of open plan design is freer movement, which encourages communication and team-work. Staff interaction is further encouraged by high quality facilities, including a café, restaurant and fitness centre, along with landscaped wetland gardens.

4 Review success

Space Syntax returned to the project a few months after occupation to carry out a study of patterns of space use, movement and interaction. The consultants found that the building was successful in the levels of communication that it generated between business units. Moreover, staff, visitors and other observers were quick to voice their appreciation of their comfortable surroundings to colleagues and managers. Staff described easier networking and a relaxed atmosphere where people can share information and a few jokes.

In terms of comfort, the building performed as forecast in one of the UK's hottest summers on record. Its actual performance matched closely predictions derived from thermal modelling. In addition, annual energy consumption has been maintained at levels equivalent to benchmarks for non-air-conditioned offices (ref: Building Maintenance Information).

Further developments

The design of the building fully met the client's requirements; however, by 1997 Powergen needed an extension for 330 more staff. Although the original building was regarded within the construction industry as groundbreaking and has been much copied, the development of the annexe followed a more traditional design. Nonetheless, energy consumption in the annexe was kept as low as possible by the thermal mass of the floor-slabs and an investment of £500,000 in well-insulated glazing, which incorporated external sunshades.



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Possible next steps

Workshops, seminars and visits to explore sustainable construction topics are held regularly by Construction Industry Environmental Forum.

Tel: 020 7222 8891

Fax: 020 7222 1708

Website: www.ciria.org.uk

You can book visits to best practice companies to discuss business improvement topics, by contacting the IUKE team.

Tel: 01730 235015

Website:

www.iuke.co.uk/construction

Workshops on a range of best practice business topics are held regularly by the Construction Productivity Network

Tel: 020 7222 8891

Fax: 020 7222 1728

Website: www.ciria.org.uk

Fact sheets on a range of best practice topics are available from the Construction Best Practice Programme

Website: www.cbpp.org.uk

Guidance notes on preparing your own case study are provided on the website

Information on sustainable construction is available from BRE

Website: www.bre.co.uk

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