KNX Award 2008
Category: Energy Efficiency
Winner: Andromeda Telematics (UK)

New "SciTec" building at Oundle School, Peterborough – KNX drastically reduces energy consumption and CO2 emissions

Oundle School's new "SciTec" centre brings together science, art and technology. Thanks to integrated building and room automation with KNX, the English school's vision for the future has become a reality. The project won the KNX Award 2008, category: Energy Efficiency.

The new science, art and technology centre is a superb example of a "green building". The system integrator, Andromeda, estimates that the building consumes 40 – 60% less energy than conventional school buildings. It is calculated that the building's "as-needed" lighting system alone will reduce annual CO_2 emissions from 8 m tonnes to 2.8 m tonnes!

The peaceful market town of Oundle, where the famous school is based, is located about 120 kilometres from London. Here, over 1,000 pupils are educated in more than a dozen buildings spread across the whole town. The school caters to pupils between the ages of 10 and 19, who can be either boarders or day pupils. The history of the school can be traced back to 1556. Despite its long history, the school is not tied down by tradition, but looks very much to the future. The management of the school reasserted its confidence that it will remain one of the top schools in the British Isles when, at the beginning of the new millennium, it commissioned the planning of a new centre for science, art, design and technology. The resulting modern, bright building, known for short as "SciTec", was completed in 2007.

Sustainable development is the top priority

Right from the start, the project aimed to adhere to the principles of "green building", be environmentally friendly and sustainable, and use energy-efficient technologies. This aim was never neglected throughout the design/planning and construction phases, and in the management of the project. The building automation system used was chosen on the basis of these aspects, but economy and flexibility also played an important role in decision-making. Other key criteria influencing the decision were that the system should be sufficiently standardised, reliable and robust to ensure a high level of investment security, that it should be simple to install, and that it should require a minimal amount of cabling work. The KNX system ideally met all of these requirements, and thus the company Andromeda Technology Ltd., which is highly experienced in the use of KNX and its integration into overall systems, was entrusted with the project. The fact that all of the installation work could be carried out by just one supplier as part of a single order meant that further considerable cost savings could be achieved.

Control of all decentralised building engineering systems

KNX is used to regulate the natural ventilation, which itself allows an energy reduction of 78% compared to conventional ventilation systems. The natural ventilation is achieved with automatic window ventilation and mechanical ventilation using small air quantities, regulated by air quality sensors. The underfloor heating is automated in 16 individual zones, thus allowing a saving of 50% compared to a conventional heating system. During the summer, hot water is heated exclusively via solar panels on the roof, and during the winter it is at least preheated in this way.

The lighting system, which uses constant light regulation with additional presence sensors to ensure that a target value of 400 lux is adhered to, uses 60 -70% less energy than lights that are switched on and off by hand. All light fixtures are activated via DALI/KNX gateways, and the emergency lighting also uses this technology. A photovoltaic system on the roof generates enough energy to heat the building's hot water supply during the summer, while any excess power produced is used for the lighting.

Uniform operation and management

Thus all facilities in the building are controlled and regulated via KNX – in the case of the lighting, via gateways to DALI. The various system components are integrated into the overall system via KNX/IP gateways. The consumption data for gas, water and electricity are captured at various measurement points and transmitted via KNX to the building management system. The Web-based building management system allows control and parameterisation, as well as detailed energy monitoring. Monitoring is also possible online with Internet Explorer from any PC, as the system functions on an IP basis. Thus, when required, modifications and updates can also be made directly from the offices of Andromeda Technology Ltd. Because the system is fully integrated and easily manageable, on a day-to-day basis the school's own building systems engineering team can reliably control and optimise the level of comfort, energy efficiency and CO_2 emissions of the building.

Parties involved:

Architect: Fielden Clegg Bradley, London, UK
Electrical design: Max Fordham, London, UK
M & E: Briggs & Forrester, Northampton, UK
KNX system integrator: Andromeda Telematics Ltd, Byfleet, Surrey, UK

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Box 1

Impressive savings in energy with KNX

Thanks to integrated control and regulation via KNX, in this project the following reductions in energy consumption were possible:

- 78% due to use of natural ventilation
- 50% due to regulation of underfloor heating in 16 zones
- 60 -70% due to constant light regulation and additional presence sensors
- 40 – 60% energy saved in total compared to a conventional school building

Box 2

Use of KNX in this project

- A very high level of energy efficiency and a drastic reduction in CO_2 emissions thanks to "as-needed" control and regulation of all facilities.
- Reduced installation costs and embodied energy consumption due to the use of KNX for all trades.
- Integrated operation and visualisation of all subsystems via a building management system, via any PC inside or outside the building as system is Web-based.

Box 3

Technical highlights of this project

- Integration via KNX of all decentralised, energy-optimised heating and ventilation systems, including components such as gates, valves, zone regulators, window drives etc.
- Integration, via KNX/IP gateways, of all KNX controls and regulators with the Web-based building management system in order to optimise total energy efficiency and allow easy management of the system by the in-house building systems engineering team

Box 4

Andromeda Telematics Ltd. – a leading KNX system integrator
Chris Glasow discovered EIB 15 years ago, while he was working as an independent technology consultant for Norman Foster Architects in Germany. Inspired by the possibilities offered by this bus technology, in 1996 he founded Andromeda Telematics and opened the first EIB training centre in the United Kingdom. The company grew quickly, involved in projects such as the 42-storey Citigroup Tower at Canary Wharf, various large residential buildings, and Harrods. The Andromeda team quickly realised that there was a demand in the British building automation market for a new standardised technology which would permit interoperability between different manufacturers.
One of the key factors behind Andromeda's success is its culture of learning and development. This approach, combined with the diversity of experience and solid engineering knowledge of its employees, has allowed the company to deliver world-and class KNX solutions. This is particularly evident following the company's work on Heathrow Terminal 5 –Andromeda's flagship project and one of the largest KNX installations in Europe: KNXnet/IP is used there to control more than 150,000 light fixtures. For this project, Andromeda won the KNX Special Award 2006. So how does the future look for Chris Glasow's 15 year-old company? "We definitely want to be the best in our field, and retain our position as the world's leading KNX system integrator," says Chris. Andromeda is already working on expanding

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overseas – the global market, with its focus on sustainability and saving energy, is currently perfect for KNX.

Photos:

Figure 1. Oundle School's SciTec centre, which brings together science, art and technology, and which has been built with the help of future-oriented sustainable technologies such as KNX. Source: Andromeda

Figure 2. Energy efficiency 1: constant light regulation with KNX in the laboratories. Source: Andromeda

Figure 3. Energy efficiency 2: plenty of daylight and presence sensors controlling the lighting. Source: Andromeda

Figure 4. Sustainable resources: solar panels for the hot service water supply. Source: Andromeda

home and building control with a single, manufacturer independent design and commissioning tool (ETS), with a complete set of supported communication media (TP, PL, RF and IP) as well as a complete set of supported configuration modes (system and easy modes). **KNX** is approved as a European (CENELEC EN 50090 and CEN EN 13321-1) and an International standard (ISO/IEC 14543-3). This standard is based upon more than 18 years of experience in the market including its predecessors, EIB, EHS and BatiBUS. Over 140 member companies worldwide from different application domains have almost 7000 **KNX** certified product groups in their catalogues. The **KNX** Association has partnership agreements with more than 30,000 installer companies in 80 countries.

www.knx.org

For more information / material please contact:
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Pictures can be downloaded at:
http://www.knx.org/knx/knx-projects/knx-award-projects/