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Top class building controls for Educational Village

John Nicholls, Director, BG Controls

In September 2009, the opening of Gainsborough Educational Village brought together four old schools from the Lincolnshire town of Gainsborough into one state-of-the-art facility shared by two schools. These are the Trent Valley Academy providing secondary education for 1,200 mainstream pupils and the Aegir Community School. Aegir Community School is a special needs school catering for 112 pupils with a broad range of learning disabilities including autism and physical impairments.

Centred around a four-storey purpose-built construction, Gainsborough Educational Village is located in a semi-rural environment with playing fields and open spaces.
The philosophy of the building is one of two schools under one roof, with one main reception area for visitors and community use, alongside separate pupil entrances.

Largely funded by the County Council, with additional Government funding, the Village provides improved learning opportunities for pupils in modern surroundings that are purposely designed to limit the impact on the environment through low and zero-carbon technologies. By reducing its carbon emissions and maximising its energy savings, the Village strives to keep running costs down whilst ensuring the comfort and safety of its occupants is maintained.

Building controls specialist, BG Controls were appointed to install an intelligent building management system (BMS) that would coordinate and control the sustainable technologies and building services that supply the school. In addition, the system needed to be custom designed and installed to support optimum energy efficiencies.

To meet these challenges, BG Controls installed a sophisticated BMS system with 18 control panels that are distributed throughout the building and operated via LonWorks networking technology.

The BMS is networked to an energy centre situated in the grounds of the premises which houses the main plant including an integrated heating system that comprises of a wood pellet biomass boiler and two ground source heat pumps. There are also three conventional gas boilers that provide backup heating when required. The reclaimed heat that is generated by the low-carbon biomass boiler and ground source heat pumps is pumped from the plant to supply the school with under floor heating and domestic hot water. BG has ensured that the BMS can be easily accessed either on site or remotely in order to monitor or adjust the localised heating schedules in all parts of the building when necessary.

To cater for its special needs pupils, the Village also has a hydrotherapy pool room that requires precise temperature and humidity control. To manage this, BG has customised the BMS to enable the controls to automatically activate the Air Handling Units (AHUs) in the pool room for ten minutes every hour when the pool is not in use. The AHUs quickly dissipate excessive humidity to prevent condensation from forming on the walls and ceilings whilst checking on the overall humidity levels in the space.

During the day, zero-carbon natural ventilation is enabled by ventilation stacks, which are situated on the side of the main building. When the internal sensors record a rise in temperature or an increase in CO_2 levels then the BMS activates the controllers to the dampers on the vent stacks to open and draw stale air up and out of the classrooms. In turn, the controllers on the windows automatically open to allow the fresh air to be drawn in and circulated throughout the building.

At night when the school is closed, the sensors continue to monitor internal temperatures. When temperatures exceed the designated setpoints the system activates the dampers and the windows to release any warm air so that the building fabric retains an optimum temperature ready for the start of the next working day.

At any time on site facilities personnel can easily check and analyse all the building operations via intuitive graphical software, which allows them to control and monitor any part of the system.

To provide further peace of mind and added versatility for the Village's facilities team, the site is remotely monitored from Rotherham-based BG Controls' in-house bureau. Whilst the bureau technology continuously monitors the site's BMS, its skilled engineers regularly check and interrogate the system to diagnose and rectify any faults.

In addition to enhancing the control and performance of the energy saving technologies that are on site, BG helps to maximise the site's energy efficiencies via its bureau. For example, the Village's facilities management team can contact bureau engineers to advise them of forthcoming changes to occupancy levels. If a meeting takes place outside of normal school hours or if there is a closure then BG engineers can remotely access the BMS to adjust the heating schedule accordingly. Proactive and remote programming of the control system means that energy can be conserved - and with minimal involvement from onsite facilities staff.

"Gainsborough Educational Village is committed to lowering its impact on the environment and reducing its energy consumption through its many eco-friendly technologies," says Facilities Manager, Andy Smith. "BG Controls has designed a system which ensures all these technologies work smartly together to save energy and create a comfortable working environment for staff and students."

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