



# A Model for Energy Efficient Schools in Southern Sweden



**W**ith its new state-of-the-art integrated building management and security system, Klagshamn School near Malmö looks set to become the municipality's model for future school developments. TAC Sweden designed, installed and commissioned the LONWORKS networkbased system and will continue to manage it with a view to ongoing improvements in operational and energy efficiency.

Early in 2005, driven by a 40% increase in energy costs over the last four years, Malmö municipality decided to become more pro-active with regard to energy efficiency. At the same time, the city council recognized a need to improve school conditions – not only taking energy efficiency into consideration, but also the indoor climate, security and safety. Where better place to start than with a new school building at Klagshamn which was under construction at the time?

Peter Lindqvist, spokesmen for Malmö local authority explains, "The cost of technical installations in

buildings was on the rise, and we were looking for a cost-efficient solution. It made economic sense to go for TAC's integrated LONWORKS system rather than the usual three parallel systems. It also made practical sense, since with TAC as the single integrator on the project, we knew they would take full responsibility for ensuring that the system functions properly."

The Klagshamn installation, completed in the summer of 2006, uses a coordinated approach to achieve more efficient operations and thus, energy savings. Traditional building management systems that control heating and ventilation are fully integrated with the technical systems for lighting, access control and intrusion alarms. Gains have been achieved through the co-utilization of system components, the use of a single supplier to plan and build, and through the sharing of relevant information between traditionally separate systems.

"Since TAC got involved so early on in the design phase, we were able to propose a modern, holistic approach," says Staffan Ceder of TAC Sweden. He continues, "This meant we could minimize the number of components and really integrate the building management and security systems properly, leading to several new and customer focused features."

## The Klagshamn System in Practice

The degree of integration achieved at Klagshamn School owes much to LONWORKS communication. For example, LONWORKS technology makes it possible to run a truly energy efficient heating and ventilation system. Every room has a presence detector connected to the intruder alarm system (TAC I/NET). The intruder alarm system communicates over a TAC Xenta 527 which transforms the signals to LONWORKS SNVT, and relays that information to the LONMARK certified TAC Xenta controllers in the HVAC system, thereby minimizing the heating and ventilation system's energy consumption when a room is unoccupied.

Programmed to maintain pre-set conditions, the system also enables ongoing energy savings. At 7.30am all classrooms are automatically set to economy-mode,

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which means a temperature of 19 degrees Celsius and minimal airflow. When someone enters the room, the presence detector registers this and automatically sets the room to comfort-mode, increasing the airflow and raising the temperature to 21 degrees Celsius.

Should students decide to study with the windows open, the intruder alarm system registers this fact and communicates it to the heating and ventilation system. After one minute, the room goes on stand-by mode, and ventilation and radiators are turned off to save energy. When the windows are closed again, it takes another minute before the system goes back on comfort-mode. During the day, sensors continually measure the temperature and carbon monoxide levels, optimize the airflow and adjust the radiators to maintain a pre-set temperature and the correct carbon monoxide balance.



The Klagshamn system employs LONWORKS communication on many of the devices used for measuring electricity, energy and water as well as those used to control the indoor climate and lighting. This leads to all sorts of savings. For example,

communication of presence information between the security system and the lighting system means classroom lights are automatically switched off twenty minutes after the classroom has been vacated. In the evenings, as the alarm system is switched on in one segment of the school at a time, the lighting in that section is automatically switched off.

The multi-usage of components such as presence detectors, magnetic door and window contacts normally only considered relevant to the security system, also brings efficiency gains. For example, the same detectors which are used to operate the ventilation system during the daytime operate for the intrusion alarm system at night.

When the school day ends at 4pm, the magnetic contacts holding the main doors open are released so they all shut automatically. This makes life easy for the school caretaker, since doors do not have to be checked and closed manually to prevent alarms, and the building is ready to be locked up completely. To make sure everyone inside the building knows closure is imminent, a message is broadcasted over the PA-system. If they need to enter the building outside school hours, pupils and staff can use their access card and PIN code.

While LONWORKS based meters are used for measuring consumption of electricity, energy and water, the TAC Vista FM program is used for reporting and following up on all data. This suite of Facility Management software solutions, built around an integrated database, gives a window into the cost and performance of a building. Using clear, readable presentations and charts, it collects and reports the information needed to manage operational, system and technical data throughout the building's lifecycle.

Accessible either from the school itself or remotely via a web interface, TAC Vista FM makes management of the Klagshamn system easy. A TAC Vista Workstation is located at the school while the TAC Vista Server is located at Malmö municipality's facility-surveillance room. TAC engineers can connect to the server from their office or any place with an Internet connection.

How does all this impact on students at Klagshamn School? Apart from being able to study in a safe and comfortable environment, they also benefit from e.g. perfectly synchronized wall clocks – also using LONWORKS communication - so there's no longer any excuse for being late for class! And thanks to a central display screen in the canteen, students can keep an eye on their school's daily energy usage. What better way to raise awareness among the upcoming generation and ensure that the energy-saving efforts made today will be perpetuated in the future?

### Contact:

[info@tac.com](mailto:info@tac.com)  
[www.tac.com](http://www.tac.com)