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The energy-optimized hospital

With the modernization of its energy and danger management system, the Landeskrankenhaus Feldkirch assumes a pioneering role within the Austrian hospital landscape

For a clinic, there is no downtime. It operates 24 hours a day, 365 days a year. Medical technology that consumes immense amounts of energy is at work around the clock. Thus, it's no wonder that hospitals are among the buildings with the highest energy consumption – facing multi-faceted challenges. On the one hand, energy usage must be ecologically sensitive and sustainable in order to keep costs down and to remain competitive. On the other hand, patients must receive the best possible care and remain safe. Through its modernization measures, the Landeskrankenhaus Feldkirch in Austria has mastered these difficult challenges in an exemplary fashion. The implementation of innovative and integrative solutions in the area of building automation and energy management and monitoring, along with danger management, plays a key role thereby.

The clinic in Feldkirch is an enterprise of the Vorarlberger Krankenhausbetriebsgesellschaft mbH (KHBG) and part of a network of clinics, in which it holds a leading position. Not only is Feldkirch the company's headquarters, but concepts are developed here that are later implemented in the other clinics within the network. In particular, a variety of measures for building and energy management have been implemented over the past several years. Existing systems have been successfully upgraded to modern solutions, which has helped Feldkirch to achieve a remarkable improvement in efficiency.

Energy and cost transparency through innovative technology

The building automation system Desigo from Siemens Building Technologies Division (BT) has been in use for some time now. Desigo controls the complete automation of heating, ventilation, air conditioning, and lighting. For example, it controls the automatic night cooling and the temperature, depending on changing solar conditions. Moreover, the room temperature distribution on a specific floor or in a room can be controlled.

In addition, a new energy monitoring system from BT, EMC, was installed in Feldkirch. With this tool, data acquisition is managed almost completely via the building management system, which results in many benefits. “For example, the acquired meter values can be analyzed in a targeted way, thereby enabling a precise cost allocation to the appropriate cost centers and thus optimum cost transparency. Moreover, we can now clearly determine and report the decreasing CO2 emissions,” explains Herbert Sturn, technical manager of the Landeskrankenhaus Feldkirch. The interactivity of the system enables the energy consumption to be safeguarded permanently. Via the central control room, a direct cause study can be performed and possible disturbances can be fixed. “Because all hospitals of the operating company are now networked, a comparison among the clinics is now possible,” says Herbert Sturn.

In addition to EMC, Feldkirch also uses a computer-based facility management system (CAFM), which monitors all medical and building technology systems and visualizes them via a consistent user interface.

Green hospital

Thanks to its intelligent energy management and monitoring, Feldkirch has achieved high energy savings and a reduction of CO2. “Transparency and efficiency have increased markedly through monitoring, enabling us to set a benchmark in the healthcare industry,” the technical manager reports. Being a paradigm of an energy-optimized enterprise, Feldkirch is now deemed a “green hospital.” It’s a reputation that also stems from innovative measures that complete the energy concept. One example is the enormous clay wall, which stores solar energy or cold night temperatures and releases them time-delayed. Instead of releasing excess heat – including from other sources – into the environment, it is used for radiant floor heating, to preheat the outside air with technical support, and to cover part of the heating of potable water. It’s an approach that underscores the environmentally friendly ideals of the clinic.

Intelligent danger management

Operating rooms, blood banks, pharma inventory or access control – the safety and security requirements in a clinic are immense. That is why Feldkirch uses intelligent danger management. “Our danger management system not only helps us fulfill legal regulations. It goes far beyond the minimum obligations and significantly raises our security standard. Thus, we not only can provide additional protection for our patients but also save money. For example, our refrigerators in which we store medication are monitored via the central building control technology. An outage that renders expensive medication unusable can cost us up to €30,000. We now can prevent this kind of loss.”

In the field of fire protection – a crucial safety topic for clinics as well – Feldkirch uses Sigmasys and Sinteso fire detectors. In case of a failure, they transmit a signal to the control panel. There, it is displayed directly and documented immediately. This “self diagnosis” not only provides

increased safety, but also saves personnel costs, as the on-site permanent detector control is not needed. For the future, the possibility of integrating a video function into the fire detection to accelerate both the evaluation of a fire alarm and the reaction is being discussed.

Modernization goals for the future

The Landeskrankenhaus Feldkirch plans to continue to pursue its progressive path in the coming years and has set itself further modernization goals. One of these is the implementation of a central alarm handling, the transfer of the building's technical data to the CAFM system, the standardization of technical systems or the implementation of a so-called Green Building Monitor, which enables transparent visualization of energy consumption and costs – and can thus also raise awareness among the staff. “Awareness through cost transparency,” as Herbert Sturn calls it. The goal is Total Building Solutions. “TBS is, of course, an ideal concept,” explains the technical manager. “TBS means overall standardized control and management of all building technology plants and the peripheral systems via a single operating level. And also integrating all the other building technology systems, such as medical systems, via standardized interfaces. The benefits are obvious: increased ease of use and energy efficiency, improved system availability, and less potential for danger. We're some distance from achieving TBS, but we have already set some milestones.”

Role model for clinics in Austria

The ambitious goal of TBS has not yet been achieved in Feldkirch, but it is within reach. In particular, technical barriers must be overcome, such as bridging interfaces that connect existing systems with the new solutions. Right now, energy and danger management are still running parallel in Feldkirch. “Interfaces,” Herbert Sturn says, “are a problem in general. Solutions from low-price vendors may be cheap, but their interfaces are often incompatible. When it comes to integration, you lose out in the end. You are only really efficient on a high integration level, which only a few vendors can offer.”

As far as integration and energy efficiency is concerned, Feldkirch has already come a long way. In fact, so far that the hospital is not only a pioneer for the associated clinics: the principles for the implementation of TBS at clinics, written by the technical department at Feldkirch, are already so advanced that these recommendations are being adopted by other Austrian clinics for their integration measures. “A reasonable approach,” Herbert Sturn says, “because a consistent structure and language are the path to increased efficiency – and ultimately the prerequisite for higher profitability and better patient care.”

[Interview]

Engineer Herbert Sturn, technical manager of the Landeskrankenhaus Feldkirch, on the optimization measures in his clinic.

Mr. Sturn, modern energy management – a recipe for success for a secure future for clinics?

“Without doubt, energy management is one of the most important prerequisites for that. The ability of clinics to survive depends on the decision makers’ willingness to invest in the latest technology. Today, no clinic can afford to be without effective energy management.”

Is the success of your investment measurable?

“Absolutely. When you significantly increase the size of a building, and the energy consumption does not rise – then you did something right. It’s the proof for a coherent energy concept that brings evident results.”

Where does the concept begin?

“Basically with the monitoring. In the past, we did not have enough data on energy-relevant factors. Now we obtain detailed and transparent information that helps us answer crucial questions: Where is energy consumption too high? Where can cost-cutting measures be implemented? Using this as a basis, we can develop best-practice solutions and achieve massive energy and cost savings. We profit immensely from the new energy monitoring.”

For energy monitoring, you are using the EMC software solution. Did you have specific reasons for this choice?

“Yes. First, it is a Web-based solution and very user-friendly. It allows for standardized reporting, and the electronic report transfer is automatic – just to mention the most important reasons. The aspect of integration was also very important. We already work successfully with Desigo from Siemens, and we could perfectly tie into the existing solution. EMC pulls its data directly from Desigo – that’s of course optimum.”

In addition to energy monitoring, you have also modernized your clinic in the area of danger management ...

„Right. Fire protection is one example. In the control room, we have a separate, superordinate system. In case of a fire, we are immediately informed in-house, and the fire department is informed simultaneously. All relevant persons receive instructions and important information, for example on possible risk potentials in a room, such as combustible substances.”

Compared to the past, what's the improvement?

“In the past, everything was much more cumbersome. The fire department was informed via our national control system. After their arrival at the main entrance, the firemen had to be given a precise report where the fire was. Then they had to drive to the respective building sector before they could act. All this takes a lot of time – time you don't have in such an emergency. With our new system, the fire department is automatically informed immediately in which room on which floor the fire is, how to get there directly, and what to do. Everyone can act quickly and in a targeted way.”

When it comes to the bottom line – are you satisfied with the results of the modernization of your clinic?

„Absolutely. Results have shown that the effort expended over many years to optimally utilize energy and waste heat as well as to adopt targeted measures was the right thing to do – and will remain so. The experts view our experiences very positively and value them as best practice projects. This shows that Feldkirch is a pioneer in Austria. The fact that we obtained the 'Ökoproofit' certification is another superb acknowledgement of our successful strategy.”

[Info-Box]

Landeskrankenhaus Feldkirch – facts and figures

Staff	1,600
Beds	606
Stationary cases	35,500
Specialized departments	23
Occupied bed days	168,364
Length of stay	4.9 days
Ambulance contacts	148,000
Surgical procedures	18,000

Hospitals of the Vorarlberger Krankenhaus-Betriebs-Gesellschaft mbH clinic network

Facts and figures

Staff	3,300
Beds	1,568
Stationary cases	approx. 81,000
Chargeable stationary days	approx. 529,000

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