

### Case Study

### Industry Sector Building Technologies Division

Zug (Switzerland), February 23, 2010

#### Better health for hospitals

**Hospital administrators and operators get their facilities in top shape for the future: The goal is to increase efficiency and reduce cost without lowering the quality of treatment and care. What may sound unrealistic becomes possible, using ground-breaking technologies from Siemens.**

Drastic budget cuts, demographics shifting toward an aging population and increasing healthcare demands by patients present enormous challenges to hospitals. Many facilities have already shut down. In Germany, the number of hospitals has dropped by 10% in the last 10 years, to approximately 2,100. The German Hospital Association (DKG) does not anticipate a reversal of this trend, just the opposite: "The financial resources available to hospital operators will shrink even further." A scary scenario indeed. The Building Technologies (BT) division of Siemens enables hospitals to keep their costs under control in order to achieve profitability that is so desperately needed.

The BT portfolio includes fire safety, security, heating, ventilation, climate control and energy efficiency solutions as well as energy management contracting. Siemens provides financing for energy savings measures, guarantees its customers a pre-set yearly energy savings rate and allows them to pay back their investments from the money they save.

The goal of efficiency measures, however, goes beyond simply reducing hospital expenditures. They also aim at increasing patient well-being and promoting rapid healing. The "Hospital of the 21st Century" opened in early 2009 in the Dutch city of Sittard shows that these lofty requirements can be met. Here, at Orbis Medisch Centrum, advanced technologies from Siemens are contributing to above-average patient care while keeping costs down (see box "Siemens technology at Orbis Medisch Centrum"). Hospital management is expecting to offer healthcare services at rates that are approximately 10% lower than in traditional hospitals – in an environment that looks more like a first-class hotel than a hospital.

It doesn't come as a surprise that patients are referred to by staff as "guests" – and they feel that way.

Siemens technology helps doctors and nurses to work more efficiently. Siemens has networked the entire hospital complex, which includes digitizing of all incoming mail, identity and access management, integration of terminals at patient beds, workplace virtualization, IP networks and VoIP telephony. With electronic patient files and state-of-the-art document management, Orbis Medisch Centrum is the first nearly paperless hospital in Europe. Thanks to its custom ICT architecture, the hospital is able to tailor complex treatment processes even more closely to each patient while saving costs.

A RFID (Radio Frequency Identification) system – that also could be used for people and asset tracking – ensures the security of personnel at the Orbis Medisch Centrum: In case of emergency, staff can trigger an alarm through the RFID tag integrated in their personal badge. The wireless tracking system is easy to use: Readers installed on the ceilings and above doors report the location and identity of each transmitter to a central server which forwards an alarm to the personnel in charge.

Fire safety, including the safety of all persons in the facility, was another important issue for the hospital operator. Siemens installed an innovative fire safety system consisting of detection, evacuation and suppression components. It is mapped in a danger management system in the hospital's command center. In an emergency, patients, visitors and personnel can be directed from the hazard area to an exit outside of the fire zone by means of visual indicators and loudspeaker announcements. In addition, the floors most affected by the fire can be evacuated first, followed by less critical areas.

At Orbis Medisch Centrum, Siemens' contributions go beyond the safety and security of patients, caregivers and medical equipment. Compact Monitoring Technology (CMT) is used to monitor the production of ready-to-use cytostatic agents in the hospital pharmacy. To complement factory-made drugs, hospitals often produce customized agents themselves. Because of the environmental conditions involved, this requires significant safety measures.

Using CMT, a total of 15 temperature, 8 relative humidity and 9 pressure differential values are displayed online and archived. The monitored areas include aseptic preparation, packaging/storage and access interlocks. An uninterruptible power supply ensures uninterrupted operation. CMT integration into the hospital's building automation system has other advantages as

well. Within Siemens, CMT is considered an exemplary technology and was awarded the 2009 Siemens Innovation Award.

At Orbis Medisch Centrum, advanced technology also contributes to the well-being and comfort of patients and staff. Each bed is equipped with a HiMed Bedside Terminal which can be used by patients and nurses to control room temperature and lighting and to open and close blinds and curtains. The terminal also serves as a remote control for radio and TV and provides Internet access. In addition, the terminal allows doctors and nurses to access a patient's digital file using a chip card.

The Dutch hospital of the future is just one of many projects successfully implemented by Siemens. The Bremerhaven/Reinkenheide Clinical Center in Northern Germany is another facility where Siemens Building Technologies has demonstrated that it is possible to operate hospitals more efficiently. Under an energy management contract, Siemens was able to reduce the hospital's energy costs by EUR 520,000 Euro annually and to lower its CO2 emissions by 4,130 tons. This corresponds to a reduction in energy consumption of more than 25%. To ensure sustainability and economic efficiency, the contract runs for 12 years.

The required facility upgrades and the associated construction work began in April of 2006 and were completed within 12 month. During this time, Siemens completed approximately 120 individual measures across all facilities (see box "Siemens technology at Bremerhaven/Reinkenheide Clinical Center"). "The energy savings we have been able to achieve are remarkable," says Jürgen Breuer, the hospital's technical director. The district-steam consumption for heating, cooking and sterilization was reduced by 6,200 MWh or 72%. Climate control systems outside of surgery and intensive care do not come on until the outdoor temperature drops to 2°C. However, before the temperature reaches this threshold, a heat recovery system extracts enough heat from the exhaust air that no additional heat generation is required.

Another way to save energy is on-demand heating across all areas of the building. High-efficiency circulating pumps use approximately 50 MWh less energy each year. The upgraded heating circuit control system enables room temperatures in certain parts of the building to be reduced during the night, i.e. outside their hours of use. The bottom line is impressive: Room heating now requires approximately 5,000 MWh less than before – a savings of 50%.

The use of Siemens technology has helped Hospital da Luz in Lisbon to achieve significant cost savings: Completed in early 2007, this hospital in the Portuguese capital ordered Building

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Technologies' complete building automation portfolio for comfort and energy efficiency. The goal was to network as many areas as possible and to allow the hospital to operate as efficiently and cost-consciously as possible. Siemens was able to meet these requirements. All projects in the healthcare sector have two distinct areas of emphasis: First, to increase the hospital's economic efficiency through a state-of-the-art building infrastructure. Second, to support rapid healing for patients and to create an optimized work environment for doctors and nurses.

## **BOX**

Siemens technology at Orbis Medisch Centrum (selection):

- Fire alarm and extinguishing control panels allow for cost-effective monitoring and make it possible to respond rapidly in emergencies. Installed equipment: 11 fire alarm control panels, 4 fire extinguishing control panels XC10, 1 voice alarm system E100 with 526 speakers and 1 MM8000 danger management system
- Monitoring systems such as access control, intrusion detection and video monitoring provide maximum security. Installed equipment: 385 cardreaders, 31 SiPass controllers, 53 PTZ cameras and 76 fixed cameras.
- HiMed Bedside Terminals installed at each patient bed allow patients to control the room temperature and lighting, open and close blinds and curtains, and call a nurse. A touchscreen is used to control radio and TV. The terminal also offers Internet access.
- Electronic patient files allow doctors and nurses to access patient records anywhere in the hospital using chip cards.
- An innovative building automation system for heating, ventilation and climate control provides exceptional energy efficiency, using 3400 Desigo RXC controllers, 103 PXR11 controllers and 22 Desigo PXC controllers.
- Compact Monitoring Technology (CMT) allows comprehensive monitoring of the production of ready-to-use cytostatic agents.
- Low-voltage power distribution was achieved using Sikus 3200 and Sivacon bus bars, Sentron 3WL and devices from the Beta low-voltage circuit protection line.

## **BOX**

Siemens technology at Bremerhaven/Reinkenheide Clinical Center (selection):

- Upgraded and modernized the heating infrastructure, cooling equipment, cafeteria dishwashers, main low-voltage supply and steam sterilizers.
- Integrated a management system and energy optimization programs into building automation.

- Completely disassembled and rebuilt more than 70 air conditioning systems to meet state-of-the-art requirements.

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The **Siemens Building Technologies Division** (Zug, Switzerland) is the world's leading provider of safe, secure and energy efficient solutions for buildings („Green Buildings“) and building infrastructure. As a service provider, system integrator and product supplier Building Technologies offers building automation, HVAC, fire safety, security, electrical installation technology and low voltage power distribution. With around 36,000 employees worldwide (September 30), Building Technologies achieved a turnover of €5.9 billion in fiscal year 2009. [www.siemens.com/buildingtechnologies](http://www.siemens.com/buildingtechnologies)