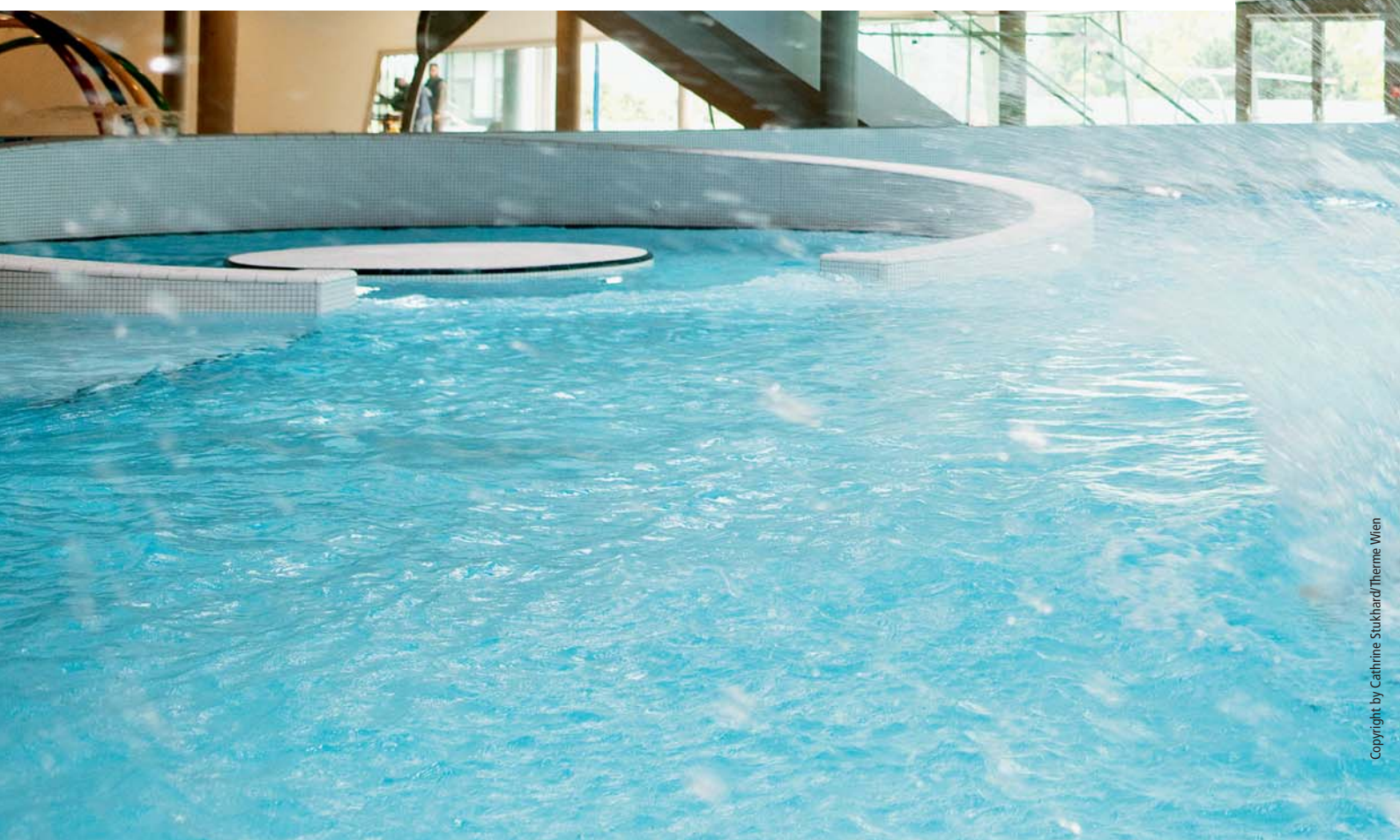
Building automation for all functions in the new »Vienna Hot Spring«

Beckhoff I/O components in ultra-modern spa help enable wellness, fun and efficient energy consumption

Wellness destinations and spa centers are very popular for vacationers to get some much needed rest and relaxation. With this in mind, VAMED Vitality World, which operates a total of eight hot springs in Austria, has made a proverbial splash with the »Therme Wien« (Vienna Hot Spring), which opened in autumn 2010. As one of the most modern urban hot springs in Europe, it offers an overall water area of about 4,000 m² as well as a generously-sized sauna, plus health and fitness zones on a 75,000 square meter site. From the varying water temperatures in the individual pools to the plays of light and sound in the water, to the control of HVAC, lights and blinds – sophisticated building automation is required to suit this comprehensive spa operation.



The Vienna Hot Spring is arranged like an elongated brook, interrupted by water cascades, small waterfalls and fountains. The heated water invites the visitor to bathe in pools with different temperatures both indoors and out. Between them, various buildings are placed like "stones" in the landscape: depending on their mood, the guest can visit the "Stone of beauty," the "Stone of quietness" or "stones" in adventure, sauna or fitness themes. In addition, extra-wide, tube and adventure water slides, diving platforms, pools, plays of light and sound as well as underwater massage jets ensure that nothing is left to be desired for wellness seekers.

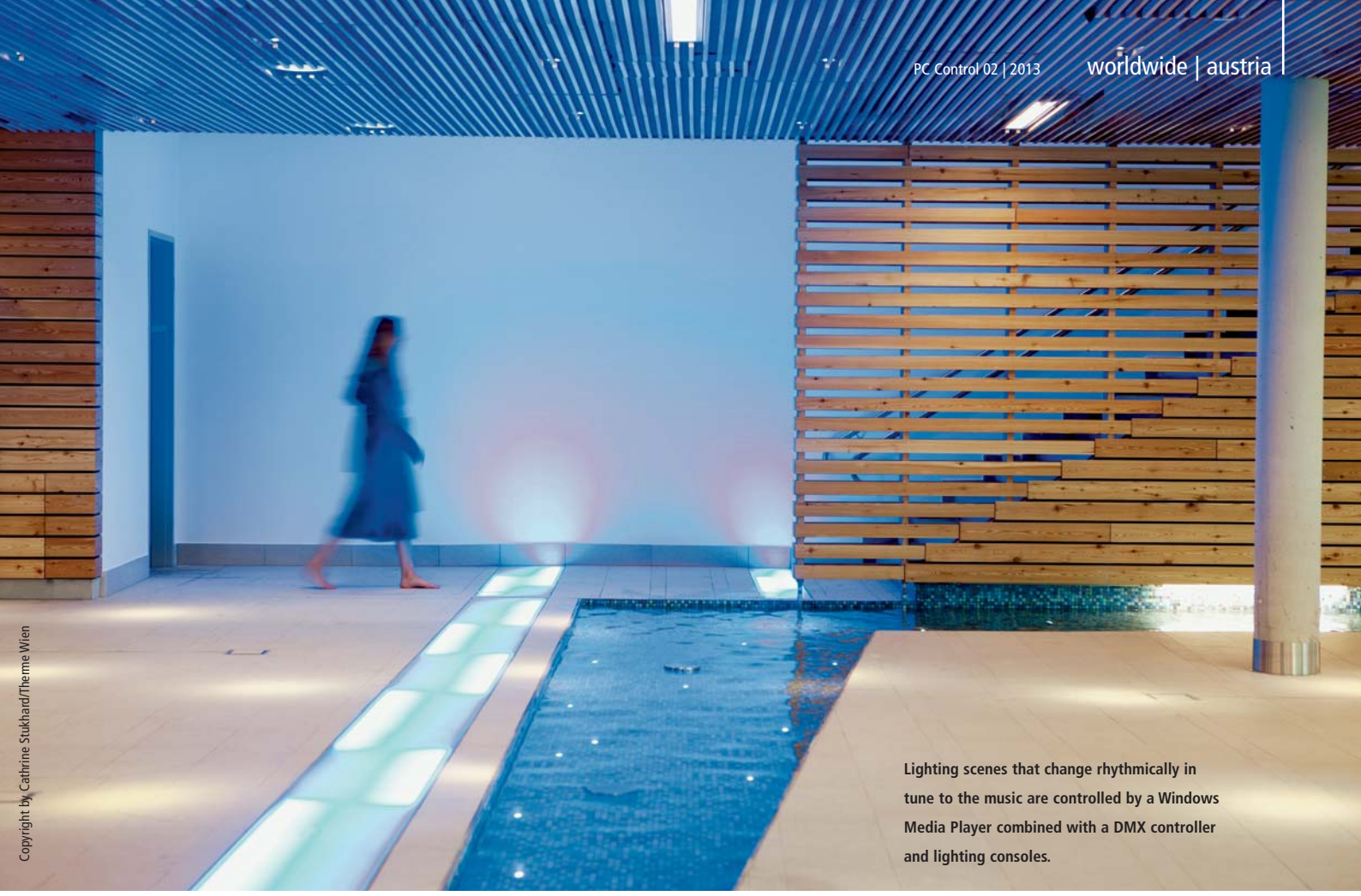
Multifaceted spa and water park experience calls for flexible technology

In close co-operation between evon GmbH and Beckhoff, a building control solution was created that fulfills all the operator's requirements with regard to energy efficiency, integration into the IT network, increased convenience and reduced cabling expense. On the basis of the higher-level XAMControl control and visualization system developed by evon and Beckhoff I/O components, the individual room conditioning and thermal water preparation were integrated into the building automation along with typical building automation tasks such as HVAC and lighting control.

6,500 data points guarantee a "feel-good climate"

The plant room at the Vienna Hot Spring houses two large industrial servers in a redundant configuration. A total of 120 BK9100 Ethernet TCP/IP Bus Couplers with about 1000 digital and analog input and output terminals form the backbone of the building automation system for the hot spring and connected health center. Around 70 % of the entire hot-spring technology is run via two main servers. Three further servers are necessary for various subsystems, such as the lighting control and the acoustics systems of the pools. A total of 6,500 physical inputs and outputs were installed in 90 control cabinets for this project. The acquired data are evaluated and stored using a central SQL-based database. "The values are written in a one-minute cycle – even more frequently in particularly important zones. This means that it can be seen immediately at any time how the individual systems interact and what the individual temperature and flow curves look like – and all of that online, of course," emphasizes project manager, Rene Hirschmugl from evon GmbH.

In total about 150,000 variables have to be processed in a cycle time of 80 ms at the Vienna Hot Spring; communication takes place without exception via standard TCP/IP network technology.



Lighting scenes that change rhythmically in tune to the music are controlled by a Windows Media Player combined with a DMX controller and lighting consoles.

Efficient energy management

The natural heat of the thermal spring is also used for heating in the Vienna Hot Spring. After all, the exclusive spa consumes 15 MW – more electricity than a large shopping center. "Efficient use of energy," says Rene Hirschmugl, "was one of the primary objectives of this project. All building systems are linked in such a way that the thermal water system interacts functionally with the heating, air conditioning and ventilation systems and energy is provided according to their requirements." For this purpose integrated requirement chains were created, which ensure that over 50 heating circuits, 30 air conditioning systems that handle a total of 350,000 cubic meters of air per hour and the thermal water system all cooperate with one another.

"The thermal water system demanded the highest planning and programming skills of all the engineers involved in the execution," says Christian Pillwein, Business Manager, Building Automation from Beckhoff Austria. After all, the challenge is to bring 200 tons of water per hour up to the right temperature – deviations of ± 0.2 degrees are allowed – and to guide them into the right channels or pools. In addition to the water conditioning, the process control must naturally also take into account the wastewater control as well as the so-called backwash processes in which the pumps, shut-off flaps and valves must process 700 or 800 tons of water within a few hours.

Controller exchange during operation

One of the project's special challenges was to replace an existing controller when it has been damaged by the sulphur-laden spring water during ongoing spa operation. Since an interruption was out of the question for the hot spring operator, the entire existing control equipment was switched over in one weekend. "No easy task," as Rene Hirschmugl says, "such an action is only conceivable with the selected Beckhoff/XAMControl platform. It is a crucial advantage of our software that every PLC program change works without interruptions. No restart is required, no configuration mode has to be switched to, nor anything else – the hardware simply goes on running."

Further Information:

www.thermewien.at
www.evon-automation.com
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