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of the Future

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Total building solutions | Building Energy efficiency | Fire Safety and Security

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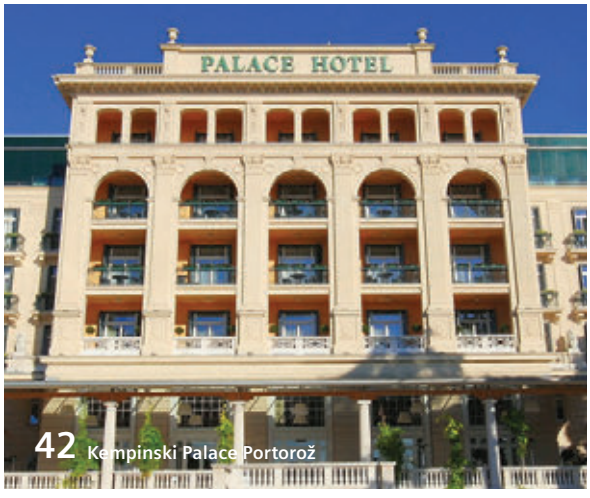
26 Sarajevo City hall



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Dear reader,

If I ask you to think about the first association that comes to mind when I say premium technology, what would it be?

And what is your first association when I say high environmental efficiency?

The majority of the people I work with associate these two notions with high price.

With Desigo CC, a new building technology by Siemens, we will change these stereotypical associations and prove that in price, Siemens technology is comparable with other vendors – but taking one important fact into consideration. Integral, high quality solutions are affordable only when different building systems are approached comprehensively.

We asked many reputable players in the field of building management how they feel about this issue and they agree: well begun is half done. The shift in mentality starts with the early planning phase. They also gave us many interesting, relevant and informative insights into what are the trends, priorities and best practice cases in building technologies and building management. They showed us that there is a high degree of expertise and know-how in the Adriatic region, reflecting in the references that our region can be proud of.

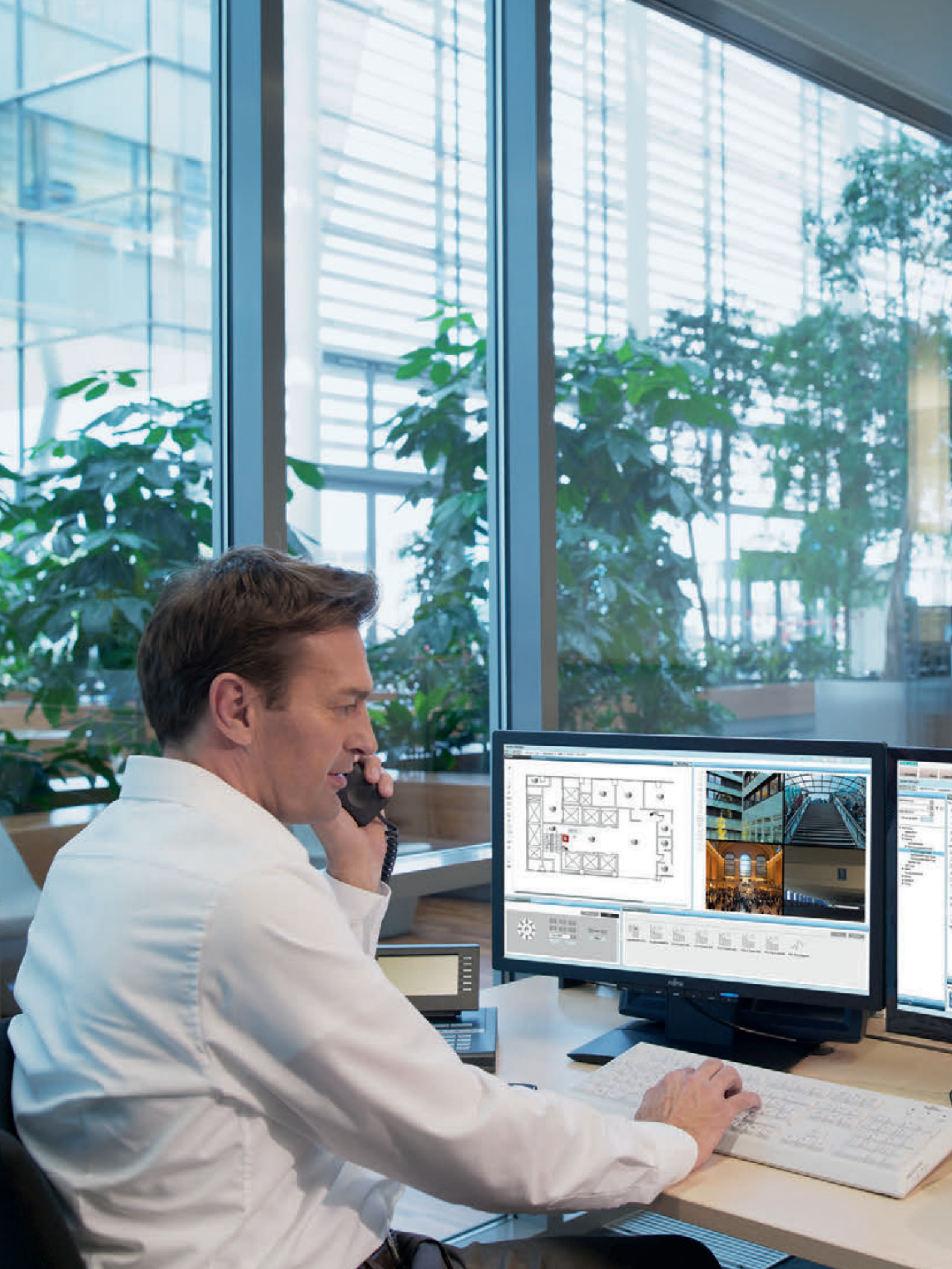
All this content, combined with inspiring global stories, can be found on the proceeding pages of this magazine.

Wish you a good reading and many successful building development projects!

Mag. Igor Kulašić

Building Technologies

Division Lead, Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro



Desigo CC

A building management system that is writing history

The requirements placed on buildings are growing. 40 percent of global energy consumption can be attributed to buildings, and operating costs account for 80 percent of total building costs. Economists estimate that building-related occupational illnesses reduce the gross national product by as much as 1.0 percent. Legal risks, scarcity of resources, high safety and security standards, competition for market shares: all of these factors present significant challenges to managers and investors, building operators and facility managers, users and building occupants.

"Buildings have a variety of stakeholders, and each of them has a different interest. Investors want to be ahead of their competition in attracting buyers and tenants – in their view a building must therefore possess a unique selling proposition, which is either in location, design, technology or, in an increasing number of cases, lower environmental footprint. Building managers want to minimize operating costs and save resources, as well as have the analytical tool that can help them make smarter decisions. Considering the fact that buildings are huge energy users, decreasing energy costs has a very high priority in this respect. End users want to keep the costs down, without having to sacrifice their comfort or safety," says **Igor Kulašić, head of Siemens Building Technology Division for Slovenia, Croatia, Serbia, Bosnia and Herzegovina and Montenegro**. "Up to now, as suppliers of technology we could only address separate issues of those stakeholder groups. But with Desigo CC we have a technology that can comprehensively combine different requirements of very diverse stakeholder groups, which greatly increases the space in which we can support our customers regardless of what is their role in a building," explains Kulašić.

Integrated solution for greater efficiency

With Desigo, Siemens offers an integrated building management system that covers all requirements – both now and in the future. Desigo is the most extensive building management system currently available on the market worldwide. It is an integrated solution that provides managers, CEOs, users, facility managers, and building occupants with all relevant information for all aspects of properties and building portfolios – enabling them to make viable decisions that will safeguard the future of their companies and institutions over the long term. "Digitalization is a strong phenomenon that already disrupted many established businesses. Desigo is not a disruptive technology, but is certainly the one that makes better use of building data, provides user friendly analytical tools contributing to the decision-making process based on real empirical data. Even small adjustments, if they are made in a timely manner, can greatly increase building efficiency, not only economically, but also environmentally," adds Kulašić.

This is made possible by Desigo's broad product portfolio and the innovative Desigo CC platform, a milestone in the history of building technology. With Desigo CC, it is possible to control and optimize all systems in a building: heating, ventilation, air conditioning, lighting, shading, room automation, energy management, and fire safety as

»With Desigo CC we have a technology that can comprehensively combine different requirements of very diverse stakeholder groups, which greatly increases the space in which we can support our customers regardless of what is their role in a building," emphasizes Igor Kulašić, head of Siemens Building Technology Division for Slovenia, Croatia, Serbia, Bosnia and Herzegovina and Montenegro.

Desigo CC highlights

- An intelligent platform that simplifies daily building operation in a comfortable way
- Simplifies and streamlines navigation by preventing overlapped workspace and focuses attention on operator's assigned tasks
- Easy interaction of single and multiple disciplines such as building management, power, lighting, shading, fire safety and security
- Implements a new user interface and workflows for efficiency
- SCADA platform based for a variety of integrations

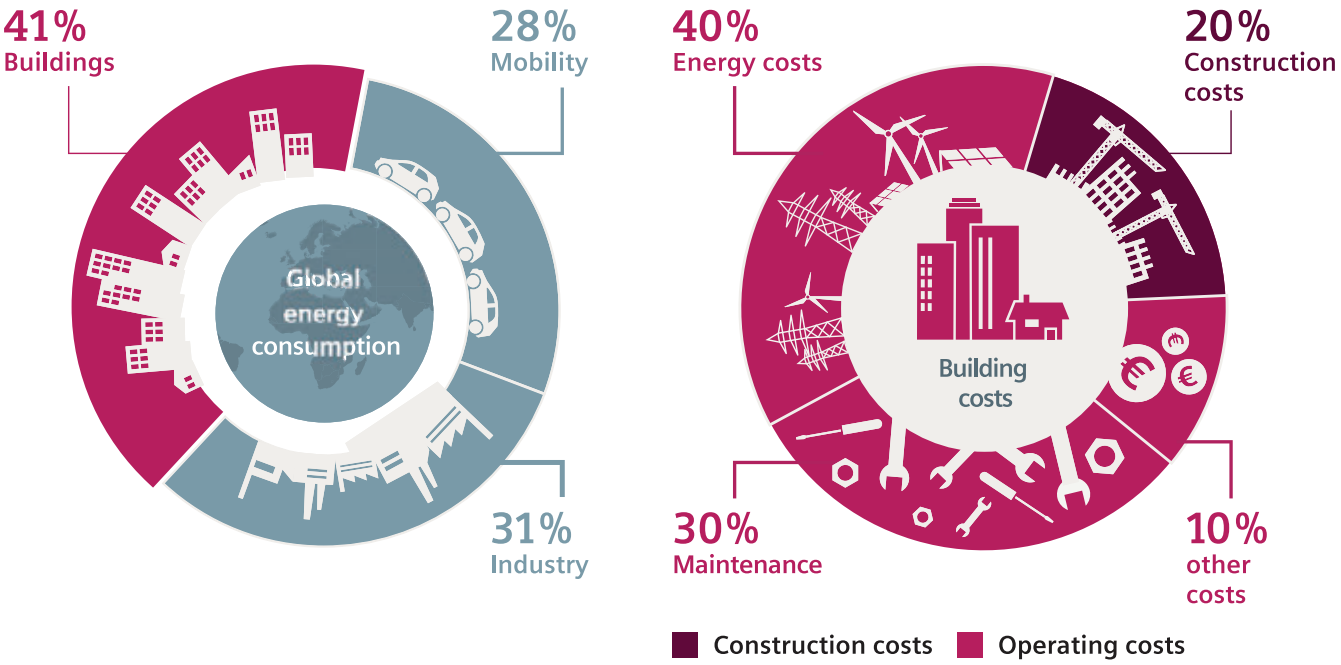
Building owners, facility managers and investors face a multitude of challenges: regulatory and safety requirements are increasing, especially in the growing volatility of the modern society. So is resource scarcity, and buildings play a significant role in global environmental footprint: not only do they consume 40% of the world's primary energy, we also spend more than 90% of time indoors. That's why for end-users it is extremely important that indoor environment is safe, comfortable and healthy. For facility managers, it is important that it's profitable and economically efficient. With Desigo CC all these different and interrelated challenges can be addressed successfully.

well as security services like video surveillance and intrusion protection. Desigo CC adapts to the needs of various building stakeholders and can be used to manage multiple systems as well as individual services.

Integrated approach makes the difference

Kolektor Koling is an established Slovenian solution partner with references in a number of buildings. **Brane Brelih, Managing Director of the PC Instalacije department**, is well aware of the fact that technologies can make a difference in building efficiency, especially if there is tight connection between the solution partner and the investor and if there is sufficient expert know-how on the side of the investor: "We managed to achieve more than 30% savings in the usage of water and heat for the retirement home in Podbrdo, Slovenia. The main factor contributing to this success was our intense and direct contact with the investor. We have made simulations on how the investment in technologies reflects in the building management costs and now we are constantly expanding the system into other areas. The other example is Chemical Institute in Ljubljana, where we used Siemens technology for the integrated approach to building automation. Here, the technical staff of the investor played a key role with a high level of expertise and know-how."

Brane Brelih



Buildings consume 41% of global primary energy, but very few investors are aware where the most cost in the building lifecycle occur – in the maintenance and energy consumption.

Tomislav Slaviček, director of SBT, an established building technologies solution provider in Croatia, believes "that only premium brands can deliver total building solution. This can also mean that the price with all the advantages that a total building solution brings, may not be the lowest one, an here we touch the point of what is the purpose of a construction project: if the real estate is for further sale on the market, the price will be the most important factor, but if an investor builds a "house" for himself, the chances are better for a total building solution approach."

Tomislav Slaviček

An integrated approach is key to maximizing the return on investment into building technologies. By integrating the technologies for building heating, ventilation, air conditioning, lighting, security and other systems into one, facility managers get higher quality data to adjust the settings and make decisions, the building is easier to manage and the tenants and end-users get better quality for less. "The main advantage of Desigo CC is in integrating different technologies, even from different vendors, into one comprehensive system," says Kulašić. According to Brelih, "some investors are already looking for total building solutions, as they realize that they cannot manage so many different challenges, brought by different technologies and vendors. They have a number of service staff that they need to constantly educate and keep updated with new advancement of technologies. One of the specifics of the Slovenian construction market is that especially in the public sector investors do not have in-house expert know-how that would help them maximize building investment and minimize the operative expenses."

Pavle Banić, director of Smart Building Technologies, the leading system integrator for building technologies in Serbian market, and a company with a long tradition in Serbian building technologies market, stresses that "users are only partly interested in total building solutions, mostly due to the fact that the departments that manage different systems in the buildings are still divided. Fire safety and security is taken care of by one supplier, whereas comfort systems are operated in-house by the building owner. With the education of end users this trend can be turned more in favor of total building solutions which bring about less complexity in facility management, reduce the cost of education of building operators and increase building system reliability."

There are some exceptions, points out Slaviček: "Investor who builds real estate for his own needs likes to be informed and tends to choose integrated solution with as few suppliers as possible. On the other hand,

Security
Integrated security systems allow for minimized response times.

Power
The average costs of downtime for mid-size companies are around

US$ 70,000

per hour.

Lighting
Efficient lighting management can save up to

80%

of costs.

HVAC
Energy monitoring combined with lighting, shading and power on demand can reduce up to

20%

of energy costs.

Fire safety
70%

of companies involved in a major fire never recover. We offer unique detection reliability and protection against false alarms.

Advantage™ Services
We protect your investment and increase efficiency, while managing your risks and costs.

All different systems enabling building operation can be integrated into one building management platform – making it more efficient, more profitable and more comfortable at the same time.

the general contractors usually prefer solutions at the lowest price and are not interested in the concept of total cost of ownership." Slaviček uses the case of Musical Academy in Zagreb to illustrate his case: "In this project the construction was managed by the team appointed directly by the investor and they possessed a high level of expertise. They were well informed and they knew what are the right solutions for their demands, which were realized in all project segments, not only with building technologies."

Pavle Banić

Most costs occur after the building opens its door

Kulašić stresses the importance of the fact that in a lifecycle of a building, most costs occur after it opens its door to tenants, owners and end-users. "The initial investment only represents roughly 20% of the total cost of ownership; everything else is the operative cost associated to the facility management, maintenance and resources needed for the building's smooth operation. And that's where the right technologies come into the picture. Imagine building your own home in which you will spend at least 30 years of your life. The first 6 years you pay for the loan needed to erect and finalize the house, but the other 24 years you pay for its maintenance and operation. What would you prefer – having lower cost in the first 6 years or in the remaining 24?" says Kulašić.

A well known saying that "nobody is wealthy enough to buy cheap" is no longer valid with best available technologies, as they can reduce the initial investment as well as operative costs. Why are then the cases where the investors would follow such integrated approach to their benefit, so rare?

"Money is the most important factor in choosing building technologies. It is very often the construction company (a contractor chosen by the investor) who decides which technologies will be implemented in a building and the main decision factor is price. Installation companies are not specialized for building technologies and are again looking only for the lowest price solution. By fragmenting tenders or enquiries to separate systems, each provider only follows a fragmented goal, whereas the quality information that would enable a more efficient management of the building as a whole usually doesn't even get to the investors," explains Brelih.

Andrej Škorc, M. Sc. E.E., director of Serbian company SIPATEC buildings, one of the leading providers of building technology solution on Serbian market, agrees: "In our market, the demand for integrated building technology solutions has yet to become a regular practice. Unfortunately, price is the prevailing factor when looking for suppliers. In public tenders,

Andrej Škorc

price is the only factor. The concept of total cost of ownership is known to different players in this field, but usually, building technology solutions are procured by construction companies, not investors. And operating costs occur after the contract with the construction company has already been executed, and the technologies that can lower operational expenses are not a relevant subject in our negotiations."

Total cost of ownership can only be addressed when an investor or a building manager has a sufficient know-how and in-house specialists that would systematically and continually deal with this issue. "In this region, the cases where a company would have one dedicated person or a department that would monitor, control and manage all building related costs, are still very rare. The awareness is gradually building through the increasing availability of energy related cost and the energy managers in some companies," adds Brelih. "Maybe this will change with the market entry of larger international investors and asset management funds," speculates **Eduard Nothig, director of Aeroteh, a reputable solution provider of building technology solutions in Croatia**.

"The Total Building Solution approach is mainly used by investors who set long-time sustainability and easy-to-handle, cost-effective maintenance throughout the entire lifecycle of the building in the forefront of their investment. That goes especially for investors who intend to use the building for their own needs and

Eduard Nothig

the price of initial investment is not the only criteria for choosing the technology vendor," adds Nothig, according to whom, the times are, at least partly, changing: "Technologies are increasingly chosen by the younger generation experts who are themselves daily surrounded by technical gadgets, they use them for their business and there is no need to explain the benefits. When it comes to public investment, we see a different story. In the planning

Desigo CC app

Mobile access to building automation

The Desigo CC integrated building management platform is now also available as an app for smartphones and tablets. The new Desigo CC app provides building managers with remote access to all their building automation functions. This means they can access systems quickly and easily at any time, optimize settings, and monitor performance. Alerts are also sent to the app, enabling managers to take immediate action when needed. This helps to ensure uninterrupted availability of all building systems. The app features an intuitive user interface, and runs on any smartphone or tablet, with Android or iOS.

The new version of Desigo CC also features additional communication protocols and subsystems, as well as further IT security related upgrades.

Ajdin Buljubašić
Most investors and building managers in Bosnia and Herzegovina are not yet aware of Total Building Solutions, but we assume that when they are properly educated and see the benefits of this technology, they will change their priorities. The construction market in Bosnia and Herzegovina is no exception to the rule that the price is the most important factor in erecting a building. The investors' first way of thinking is to get as many square meters of rentable or sellable space as possible. Only in the second step they consider all the technical systems in the building and calculate total cost per square meter. In this respect, the solution providers can play a significant role in providing all necessary information to Investors and architects, propose solutions to planners and support building managers and end users upon completion of solution. However, we need to be aware of the fact that in a construction of the project, the architect is the one who draws the first line, but the investor has the last word.

phase there is a tendency to design modern, many times even extravagantly expensive solutions, which at some point in time have to face the reality: the public procurement procedures which value the cheapest offer as also the most economical one. After the cheapest bidder has been chosen, a lot of improvisation is needed to finalize the project. The public procurement rules do a lot of harm in this respect."

Croatia is no exception to the prevailing trend that the price is the most important factor in choosing a supplier. "Even if the investor is aware of our quality, at the end of the day, we are forced to work within the budget dictated by the cheapest bidder. This situation is gradually changing, but the harm it leaves on the market will have long-term effects, mostly visible in the prices that are too low to enable the development of those few companies that survived the crisis," Nothig explains.

Important role of solution providers

How influential is the role of solution providers in the cooperation between different stakeholders: investors, building managers, planners, architects, end users?

Pavle Banić believes that solution providers are a "chain that connects all players in a construction and building operation project: architects need to be convinced that moveable shades will not degrade a beautiful facade, but will make the living in a building more comfortable. Planners need help in designing the system that will operate the shades, and the end-users need to be educated on how to use these shades efficiently, whereas with the investors a battle needs to be fought and won in promoting the most modern technologies which will enable the building a long lifecycle. This connecting power is also the most important market advantage of Smart Building Technologies, which consistently builds its competences and provides services for more than 25 years."

Tight collaboration is key

Awareness about the benefits of tight collaboration between investors who have a complete picture and solution partners who have in-depth know-how of the technology is gradually increasing in the region. "If we are in direct contact with the investor, then we can influence important decisions to help the investors reach their business goals. If this is not the case, then our role is significantly decreased and so is the value we can add to a project. Working through Kolektor Koling's own construction company makes it easier for us to understand this bigger picture, and for the investor to get the maximum return on their investment," concludes Brelih. Slaviček adds: "A solution provider can have a significant impact on different stakeholders in a construction project, on all levels. Of course, the end-effect is proportional to the time you dedicate for this topic and the readiness of the stakeholders to accept new technologies and solutions."

High Tech Hut Magic on Monte Rosa

The new Monte Rosa Hut of the Swiss Alpine Club is already considered to be the alpine hut of the future. The hut also represents a research project of the Swiss Federal Institute of Technology (ETH) in Zurich. It develops and tests new concepts for increasing energy efficiency in extended use under difficult conditions, using new technologies to optimally design such buildings so that they can be operated on a sustainable basis. This also includes the building automation from Siemens Building Technologies. Its employee, engineer and amateur mountain climber Ivan Loetscher monitors the plants on site and keeps the operating stations in working order. The entire hut is to produce only a third of the toxic substances in comparison to the smaller hut that preceded it. The interim result after a couple of years of intensive operation: The hut and its technology have already proven themselves to be sustainable.

A self-sufficient power and water supply, an innovative new facade according to the principle of a thermos bottle, and the outstanding life cycle assessment from construction to disposal make the new Monte Rosa Hut into a peerless ecological pioneer. A development step to come is the inclusion of occupancy numbers and weather forecasts in the system. The operating costs of the alpine hut could be reduced even more with anticipatory control concepts.

At an altitude of 2,883 meters above sea level, the new Monte Rosa Hut looks like a rock crystal embedded in the glacial moraine (the Matterhorn is in the background on the left). This altitude is generally characterized by extreme conditions. Storms and sudden drops in temperature from plus 20 degrees to minus 30 degrees Celsius are almost normal.

The hut is considered to be exemplary in terms of its energy and resource efficiency. Everything is geared toward sustainability, from the building materials in use to its generation of power using photovoltaic installations on its external surfaces to its storage and repeated reuse of water. If necessary, a CHP plant using canola oil starts up. This allows the hut to be largely self-sufficient.

The alpine hut has proven itself to be a comfortable lodge as well as an important testing ground for energy-efficient building technology and building automation. The brains of the plant use Siemens technology to ensure that everything is working together perfectly around the clock.

For example, the software for building automation controls the heating and ventilation in the building, collects measurement data from the photovoltaic installation and the rechargeable batteries, and records data from heat sensors and energy meters. Of particular interest are the inner workings of the new hut, which already produce up to approximately 90 percent of the required energy thanks to energy-saving features, sophisticated solar power systems, and a supplementary CHP plant.

The alpine hut is operated largely on a self-sufficient and automated basis, even when the hut is not occupied or hardly occupied outside of the season. Individual functions can be easily checked at the operating stations. Roughly 150 data points of the Monte Rosa Hut are measured and controlled. The data is transmitted to Zurich via satellite on a continuous basis, where it is evaluated for research purposes.

Energy management services

Deep dive more important than hardware

Imagine a tender for a pilot project in the field of energy management for a company that manages a large number of buildings. Three providers are competing, but one of them manages to realize three times larger savings than the other two. Although it may sound unreal, this is where the imagination becomes a true story. The provider that eventually won the tender is MAKED-Energea, a young Slovenian company with a proven effective approach to energy efficiency. As they manage more then 550 buildings that spend more than EUR 30 million worth of energy annually, this is very important. Miha Matlievski, project manager, and Matej Boltavzer, director (not pictured), told us their story.

Let's talk about the state of energy management service market first. MAKED Energea is a young company, but how mature is the market?

Matej: The market for energy efficiency services is currently far from being mature. Most providers still rely heavily on hardware, which is of course important, but many opportunities are missed when it comes to collecting, analysing and using soft data. For effective energy management, proper hardware is just one of the prerequisites, but to fully exploit the savings potential, it necessary to dive deeper into the business processes, the context, and also the behaviour patterns behind the most important energy users.

Miha: We still don't see this approach very often, not only in this region, but also in the Central and Eastern Europe as a whole.

Why is your approach different?

Miha: Before the financial crisis in 2008 nobody cared about the costs anyway, let alone making additional investments in reducing them. In this respect, the crisis was a game changer. There are estimates that for every euro saved thrugh energy efficiency measures, the company needs to create more than 60 EUR additional revenue for the same net effect through income. In my past jobs I noticed many opportunities for energy efficiency, but my suggestions to my clients went directly into the drawer. Later on, I took some time to study the patterns of energy users in business buildings and just by this private monitoring I noticed

Miha Matlievski

that even with small adjustments, and upgrading already implemented tehcnology, we could make a big difference.

Matej: The first step is to start collecting data, but data alone doesn't help much if you don't know how to use it properly and for what. Close systematic monitoring with sensory equipment that is already part of Scada DESIGO and with the help of our proprietary business intelligence tools is the platform for savings exploitation. Our most important added value is our know-how and ability for interdisciplinary approach. Energy management needs many different expert profiles, from construction physics, machinery, electrical engineering, to finance, business process management. Each of those profiles is usually in love with his or her expertise, and our task is to combine those different expertises into a bigger picture, only then can we secure energy efficient solutions for our clients.

What is the business model behind your co-operations with clients, and how does the market respond? Isn't it the growing trend for large corporate energy users to have in-house energy managers?

Matej: Even before we make the first proposal, we want to make an energy audit for our own purposes. This is our own investment into a project, but we are willing to accept this risk as it contributes to better results in the future. Our business model is that we finance all necessary investments, we make a detailed agreement on the methodologies for calculating the energy savings, and then set the ratio according to which these savings are shared between us and our client.

Miha: The priorities of our clients should always be to focus on their core business. Those that want to establish in-house energy management soon find out that this is financially and human resource-wise a complex and expensive task, because the success is so tightly connected to the interdisciplinary nature of energy management. For energy management to yield proper results to the company it is of atmost importance that it is acknowledged by the top management and widely accepted in the company structure, than to have a dedicated person for energy management. Some companies already understand this, some have yet to embrace this notion.

Matej: Therefore we are putting a lot of effort in soft measures, working closely with PR and HR departments, where a lot can be done by introducing some innovative measures, for example competitions for energy efficiency between similar facilities, or bonuses to middle management who go the extra mile in energy efficiency utilising people and soft measures.

In your market segment, what is the importance of total cost of ownership?

Matej: All of our contracts are long-term, therefore we cannot afford to buy cheap. For us, the primary capital investment is not an issue, we make a difference in operational costs, so everything we do is judged through the prism of total cost of ownership. To have good results, our primary concern is a good technology, and not a price. That doesn't mean we are not tough negotiators when we make the selection, but the quality related criteria come first. Siemens also has great network of system integrators that provide us with excelent support and deep knowledge of equipment. We are very happy that in our projects we work closely with Avtoma d.o.o. who is an excelent system integrator and great help to us.

Miha: One of the advantages of working with Siemens is that we can be sure that there are serious investments into R&D backing up every product. Now that we want to expand our services into smart grids and demand side management, we already know that Siemens equipment implemented in the buildings we manage is ready to support this ambition.

Close data monitoring and small adjustments can bring signifcant results.

Desigo CC - Technical perspective

More liveability, cost efficiency and environmental friendliness

In spring 2016 Siemens presented a new version of its Desigo CC building management platform which supports the digitalization of buildings and infrastructures. This platform is able to consolidate heating, ventilation and air conditioning (HVAC), room automation, lighting and shading, intrusion detection, fire safety and access control systems as well as protective devices for electrical installations. The new version of the platform offers a more intuitive display and interfaces to Simatic S7. An app for mobile operation via smartphones and tablets meets the needs of today's customers.

Room automation system

A pleasant working environment increases well-being and boosts performance. Optimized room climate, lighting and shading as well as easy user operation are essential aspects of that. Siemens' enhanced room automation system optimizes all room functions. New compact and modular controllers offer efficiency class A applications, easy operation and flexible integration of light and shading. All components can be integrated into the Desigo CC building management platform.

Connecting energy distribution to building management

The full potential of infrastructure data management can be leveraged only when energy and building management systems cooperate seamlessly. To ensure this is the case, Siemens demonstrated the connection of its communicating 3VA molded case circuit breakers to the Desigo CC building management platform. They protect cables, electrical consumers and equipment from electrical damage and failure and capture current, voltage and energy data. Standard bus systems such as Modbus RTU can be used to transfer the data directly to the building management system where it is available for additional analysis and building management tasks.

Protection concepts for electrical installations

At light+building, Siemens will showcase special pro-

Desigo Total Room Automation

Desigo TRA consists of programmable and configurable room automation stations, sensors and actuators. Siemens has expanded its portfolio for this field and presents suitable components for all applications – from small administrative buildings to large variable-use properties. These components include both compact and modular room automation stations: Desigo DXR2, a compact room automation station with preprogrammed standard applications, is particularly easy to install and commission. In contrast, Desigo PXC3, a modular room automation station for programming HVAC, shading and lighting applications, is suitable for more complex building infrastructures.

The existing feature set of Desigo TRA includes demand-driven control of heating, activation of air volume controllers and automatic adjustment of blinds based on the angle of the sun. Presence-dependent light control ensures that the amount of light available at each workplace remains constant throughout the day. A new feature, annual shading correction, simulates the incidence of sunlight on a building during the course of the year and includes it in the control of Desigo TRA. This allows even better daylight utilization, which in turn improves the building's energy efficiency and comfort. "A pleasant working environment in the building increases the occupants' well-being and has a positive impact on performance. Optimized room climate, lighting and shading are essential aspects of that," said Boris-Johannes Nehr, Room Automation Promoter at Siemens.

Room users are able to operate the HVAC, shading and lighting systems from room operator units equipped with a touch display. At light+building, Siemens will show other ways to control the disciplines within a room: The Smart Room Operator solution allows operation from a PC, smartphone, tablet or phone. All solutions include the RoomOptiControl feature, which helps users achieve energy-efficient room operation. RoomOptiControl detects unnecessary energy consumption and visualizes it using the Green Leaf symbol. If energy consumption is too high, the Green Leaf symbol on the operator units or the Smart Room Operator solution switches from green to red. A simple push of the symbol returns room control to energy-optimized operation, and the Green Leaf switches back to green. This allows room users to actively save energy and costs – without any technical skills.

Since Desigo TRA uses the standard BACnet communications protocol, it can be incorporated seamlessly into the Desigo CC building management platform. The integration of data from Desigo TRA makes it easier to manage multiple disciplines from a central location. For example, room data is displayed graphically in the Desigo CC user interface. The interplay between room and building automation via Desigo CC makes it possible to achieve energy-efficient, comfortable and reliable building operation.

tection concepts for electrical installations. They are designed to ensure the safety and availability of the power supply in buildings while creating the prerequisites for efficient building operation. The concept involves assessing potential risks and planning effective countermeasures. The goal is to minimize any residual risk through the appropriate use of interoperating smart components and to reliably cover three essential areas: protection of people, protection of facilities and fire prevention.

The 5SM6 arc-fault detection device (AFDD) – the first device on the European IEC market able to detect serial arc faults, one of the most common sources of fires – is part of this concept. Serial arc faults can be the result of defects in the electrical installation, for example when cable insulation is damaged or cables are pinched, and lead to dangerous smoldering fires. This field-tested arc-fault detection device meets the latest national and international standard specifications and is part of a comprehensive, precisely coordinated Siemens product spectrum, including housing technology.

The product offerings are rounded out by planning software, tender documents, detailed engineering data as well as qualified consulting and support services. This allows electrical planners, switchgear manufacturers and installers to benefit from simplified, faster and error-free planning and standard-compliant implementation of safe electrical energy distribution systems.

From big data to smart data

Aspern: The city next door

Austria's capital is spawning a new city in which buildings, the electrical grid and the electricity market will be networked to create and evaluate synergistic efficiencies. The vision behind the project: Creation of a world-class living laboratory in which energy-saving technologies and new distribution grid solutions can be tested and optimized according to the requirements of future electricity markets.

A former airfield on the northeastern outskirts of Vienna, Austria is providing a test bed for technologies that could make cities increasingly energy efficient. Today, approximately two years after construction began, the airfield has been transformed into a small city – perhaps the first ever to be built so that scientists and urban planners can learn how buildings, renewable energy sources, local electrical distribution networks, and the entire grid can optimize their interactions in order to maximize their efficiency and minimize their collective energy use. Known as "Aspern – Vienna's Urban Lakeside," this new citadel of technology could be important for cities everywhere because, if the battle to contain climate change is to be won, it will be fought in cities, which is where 75 percent of the world's energy is consumed and 85 percent of its greenhouse gases are produced.

At 240-hectares, Aspern is one of Europe's biggest urban development projects. Already, it includes approximately 3,420 apartments, part of a school campus, dormitories, and a research center for the analysis of advanced manufacturing technologies (see insert). By 2028 it is scheduled to have around 8,500 apartments, 20,000 jobs, and a commercial campus – all within a 25-minute subway ride from downtown Vienna and a 28-minute train trip to Bratislava's central station in the Slovak Republic.

Measuring Urban Energy Efficiency

Aspern is not just another big real estate development project. What sets it apart from dozens of other major projects around the world is a € 40 million joint venture (JV) between the City of Vienna, the city's utility companies (Wien Energie and Wiener Netze), and Siemens – the only industrial partner involved in the project. Indeed, a coordinated research plan driven by Siemens Corporate Technology (CT), and the company's Energy Management and Building Technologies divisions calls for the city to be a test bed for the integration of technologies that support energy efficiency and sustainable urban development.

At 240-hectares, Aspern is one of Europe's biggest urban development projects.

Already Number 1 on the UN's Livable Cities Index and heading the list of "The Top 10 Smart Cities on the Planet," Vienna wants to learn how to further reduce its environmental footprint. But meeting that goal in a meaningful way calls for it to objectively determine its current level of energy efficiency, which is the first step on the road to measuring improvements over time.

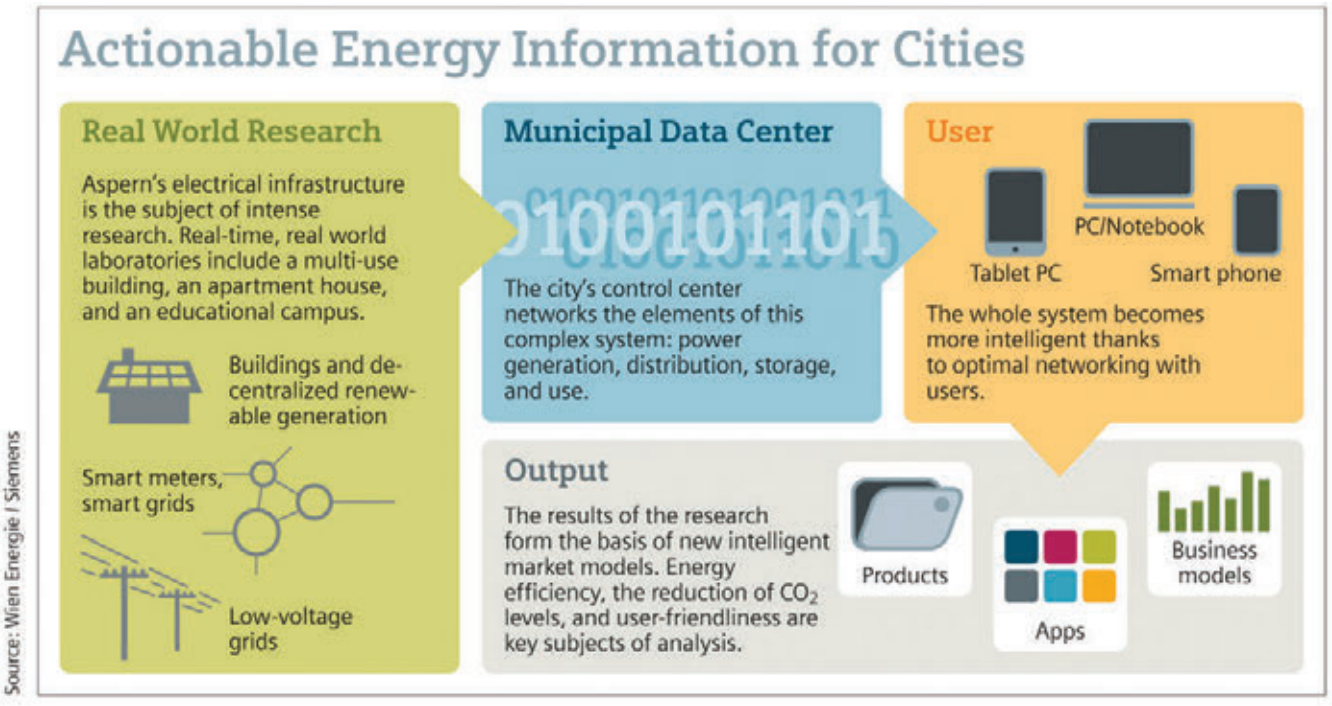
And that's exactly what Siemens is aiming for in Aspern. The company has assembled a three-part package, the essential components of which are technologies for power management in smart buildings, solutions for the low voltage grid – the electrical distribution system from transformers down to individual buildings and apartments – and solutions for managing "big data" that include the establishment of a City Data Center. Unlike virtually any other large-scale urban development project, in Aspern all of the elements in these systems – regardless of manufacturer – must be able to communicate with one another in the interest of sharing data.

When Buildings Speak

But overcoming this challenge has a price – at least in terms of initial capital outlays. That's why the Aspern JV is covering the difference in cost between conventional and smart components – as well as the installation of many renewable energy systems – and why such systems are being installed in only a representative selection of Aspern buildings. In order to maximize what it can learn about energy use optimization, the JV is therefore supporting installation of different "mixes" of technologies ranging from photovoltaic panels and heat pumps to a variety of energy storage solutions. Aside from optimizing energy use in buildings themselves, this research is being focused on the potential of buildings to flexibly generate energy for the grid. In order to accomplish this goal, two systems are required. The first is an onboard Building Energy Management System (BEMS) that calculates a building's electricity use and level of energy flexibility at regular intervals. The second is an Energy Pool Manager that acts as an interface between individual buildings and an electricity exchange system.
With the express permission of more than 100 households, data for this research is now being generated. The data, which covers factors such as power consumption, air quality and room temperature, is collected and linked with data from the power grid, as well as real-time weather and public event-related information. In addition, Aspern's new low voltage grid, which consists of twelve grid stations and 24 transformers, is equipped with a network of sensors for real-time measurements of its behavior. Eventually, all of the data generated by the above systems will flow into a City Data Center. All in all, by analyzing the most efficient mixes of technologies and their influence on end-user behavior, the Aspern JV expects this advanced combination of IT infrastructures to shed light on the correlations among underlying systems with a view to optimizing a wide range of services.

Making Sense of Hybrid Data

Understanding those correlations will, however, pose significant challenges in terms of interpretation. For



Aspern's planned energy management system will integrate and coordinate information as well as energy.

instance, monitoring of the low voltage grid is basically a new area of research. Indeed, scientists are already beginning to evaluate the data generated by building systems in order to understand the relationships between variables and the factors affecting both the grid and the buildings. That, in turn, calls for the development of specialized algorithms capable of making sense of the new data. The resulting information will be particularly important because plans call for a high level of integration of renewable energy systems. Researchers will therefore be analyzing how different energy sources, working in different mixes, and under changing weather conditions will affect the grid and buildings – a line of research designed to lead to forecast optimization and steadily improving levels of energy efficiency.

Among the many unique features of Aspern's "living lab" concept is that the cost efficiency of its electrical grid will not be based on a classic demand-response system. Instead, the idea is to maximize local generation, storage, and energy use. After that, the next level of research will focus on enhanced interaction of local generation and demand with the smart, low voltage grid, which will open the door to energy coordination between buildings and the grid.

Thus, in buildings equipped with energy-saving technologies from Aspern's joint venture, a building management system will coordinate energy supply from photovoltaic or solar-thermal systems to the building's heat pumps. Such systems will accomplish this by including data from energy forecasting, generation, and storage management – a huge data integration challenge.

In short, Aspern is on the road to becoming a very important proof point for smart grids – a living laboratory in which buildings, production plants and multi-modal energy systems are integrated, and a final proof of concept that the smart city really can work.

Arthur F. Pease

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ThyssenKrupp, Essen, Germany

Sustainable, safe, and energy efficient

The ThyssenKrupp Quartier in Essen is the new headquarters of the global company, featuring a distinctive architectural design and providing workspace for some 2,000 employees.

Requirements

Sustainable use of resources: efficient use of energy; convenient workplaces; protection of people, data, and business processes from intrusion, theft, and fire.

Solution

The integrated overall concept includes Total Building Solutions for electrical and security technology as well as building automation. The security and building control center monitors the technical systems of the entire campus. The hazard management system coordinates 350 video cameras, 490 card readers, and the intrusion detection system with 2,750 intrusion detectors. The concept also includes a newly developed non-contact and video-based person identification and counting system as well as a fire alarm system including aspirating smoke detectors and voice-based alerting.

Facts

Total Building Solutions with

- Integrated security and building control center
- Hazard management system
- Intrusion system
- Access control system
- Fire alarm system
- Energy management solution including Green Building Monitor
- Innovative operating concept for more than 1,100 rooms

As part of Total Building Solutions the Green Building Monitor information system monitors the consumption data of the ThyssenKrupp headquarters, providing information for the consequent responsible use of resources. A specially developed operating concept individually controls the room functions via telephone.

Benefit

Thanks to Total Building Solutions, the ThyssenKrupp headquarters building technology is managed by custom-tailored and easy-to-use systems that provide efficient access control and comprehensive protection, for example. Telephone operation is used to create optimal workplace conditions in every room. And, the Green Building Monitor ensures maximum energy efficiency.

Zagreb Music Academy

Symphony of state-of-the-art technologies

Keeping the city noise out and the music within while providing maximum comfort

The University of Zagreb Music Academy is the oldest and largest college of music in Croatia. Its graduates have conveyed and confirmed the Academy's reputation for providing a high level of musical education throughout the world. The city of Zagreb has recognized the importance and role of the Music Academy in public life and for the next hundred years allocated one of the most attractive locations in the center of town for the Academy where the new building was opened in 2014. In this building that was put into use in 2015 high level of musical education is combined with state-of-the-art technology. Desigo PX automation stations and operator units that efficiently control and monitor building systems were used, along with room regulation RDG100KN. Cerberus PRO fire safety system was integrated into Desigo Insight management station.

Tomislav Slavičeк, director of SBT that provided Siemens solutions for the Music Academy project, emphasizes: "In this project the construction was managed by the team appointed directly by the investor and they possessed a high level of expertise. They were well informed and they knew what are the right solutions for their demands, which were realized in all project segments, not only with building technologies."

Building of the Future editorial team talked to investor's representative **Hrvoje Pollak, Maintenance department.**

What was the main factor for choosing state-of-the-art technologies?
Construction works for the new Zagreb Musical Academy building started in 2009. The main projects were prepared in 2007, however, during the construction the planned parameters were partly changed (as much as the main planner allowed) along with partial change of planned equipment which resulted from public tender.

Hrvoje Pollak

The building is specific because of its location and purpose. It is situated in the center of the capital city along with all the city noise that needs to be isolated from the building. And the sound cannot exit the building. This is why it was planned with special emphasis on sound isolation and comfortable air-conditioning with 100 % fresh air. The initial project provided for two control systems (electrical and machinery part separated), but during the construction they were replaced with Siemens' unique control system for the entire building.

Total integration of different systems in the building is important for its efficiency. What kind of benefits do the implemented technologies bring?
By using a centralized control system it is possible to control all the integrated systems – HVAC system, lighting, fire alarm etc. It is possible to change operational parameters according to current needs, to plan how the system works according to user demands and to control the system's efficiency.

From talking with different profiles from the area of building technologies we can conclude that the awareness and knowledge of available technologies are very relevant so that all building potentials can be realized in full. What is your view of that?
It is very important to know the installed equipment, the possibilities it offers (along with control system options) and user's requirements so that we can reach the best possible result. To respect the planned parameters while enabling maximum possible comfort of the users and minimum possible operational costs.

Energy-Efficient Solutions Help Carnegie Hall Secure LEED Silver Certification

In August 2015, Carnegie Hall, the nearly 125-year old iconic New York City music venue, proudly announced its award of a Leadership in Energy and Environmental Design (LEED) Silver Certification from the U.S. Green Building Council, making it one of the oldest and most notable buildings to achieve such distinction. This milestone was achieved in part through a close collaboration with Siemens, which was enlisted as one of Carnegie Hall's technology partners to modernize almost 165,000 square feet of non-performance space.

The certification came to fruition following the fall 2014 completion of Carnegie Hall's Studio Towers Renovation Project (STRP), an infrastructure upgrade for two towers originally added atop the famed concert hall at the end of the 19th century. A central focus of this comprehensive renovation was the addition of the new 60,000 square foot Resnick Education Wing, located on the Hall's upper floors, as well as the refurbishment of the Hall's backstage areas. In addition to its programmatic importance to the Hall, the project created an extraordinary opportunity to highlight the importance of sustainable design and its positive impact on New York City, providing an inspiring example of the adaptive reuse of a historic building.

"With the Studio Towers Renovation Project and creation of our new Resnick Education Wing, we aimed to build on Carnegie Hall's amazing history, ensuring that our building continues to revitalize itself for the 21st century as a place as important to the future of music as it has been to the past," said Clive Gillinson, Carnegie Hall's Executive and Artistic Director. "An important component of the project has been the opportunity to upgrade our building's infrastructure, and we are thrilled to say, as we approach our 125th anniversary, that Carnegie Hall is more energy-efficient and environmentally-friendly for staff and visitors than ever before."

As part of the Studio Towers renovations, Siemens supplied building automation, fire and life safety, and security systems to make Carnegie Hall more energy-efficient, safe and secure. Technology highlights include:

- **Centralized control**: Siemens Apogee building automation system integrates heating, venting, and air conditioning controls onto one platform that can be controlled both locally by end-users and from one central location by building engineers, or remotely, if desired. It also continually analyzes electricity demand and usage to manage overall building energy performance.
- **Enhanced security**: Siemens Sipass access control system addresses Carnegie Hall's complex security needs by ensuring that only the right people have access to the right places at the right time. This is crucial, as Carnegie Hall has various access points and levels of clearance for building staff, students, and performers, among others.
- **Fire and life safety system**: Siemens XLS Fire Alarm Systems' advanced technology allows Carnegie Hall to ensure the safety of its occupants. If a fire is detected, the command-and-control station is instantly alerted and emergency control operations are engaged, including fire door closure, elevator capture, and air handler turn-on/shut-off, among other critical functions.

"We are honored to have been involved in this project and help Carnegie Hall to achieve its vision of providing a music learning space for students, families, young artists, and people from across New York City," said Dave Hopping, President of Siemens' North American-based Building Technologies Division. "It was a challenge retrofitting a nearly 125-year old building that had no original blue prints with technology that would modernize its energy efficiency, fire and safety systems, but as a result of these efforts, Carnegie Hall is now one of the oldest buildings to receive a LEED Silver Leadership certification."

An additional component of the overall project that helped Carnegie Hall achieve its LEED certification is a new 10,000-square-foot roof terrace with reflective pavers and plantings that reduce the heat island effect and the building's overall carbon footprint. Thanks to the Hall's 450 original windows on its upper floors, natural light has been maximized in the building's renovation and design, which also incorporates the use of LED bulbs and occupancy sensors. Within the facility, low-flow plumbing fixtures also reduce the building's water consumption.

The Carnegie Hall project stands out as one of the most notable building technology and energy efficiency projects Siemens has ever completed. To date, Siemens technology has played a role in hundreds of buildings achieving LEED certification in the U.S.

About Carnegie Hall

Since 1891, Carnegie Hall has set the international standard for excellence in performance as the aspirational destination for the world's finest musicians. Today, Carnegie Hall presents a wide range of performances each season on its three stages – the renowned Stern Auditorium / Perelman Stage, intimate Weill Recital Hall, and innovative Zankel Hall – including concert series curated by acclaimed artists and composers; citywide festivals featuring collaborations with leading New York City cultural institutions; orchestral performances, chamber music, new music concerts, and recitals; and the best in jazz, world, and popular music.

Complementing these performance activities, Carnegie Hall's Weill Music Institute creates extensive music education and community programs that are expected to serve more than a half a million people in the New York City area, nationally, and internationally next season, playing a central role in Carnegie Hall's commitment to making great music accessible to as many people as possible.

Symbol of Sarajevo rebuilt in an energy-conscious way

Sarajevo City hall, the most representative building of the Austro-Hungarian period in Sarajevo, with Siemens Total Building Solution

Building from Austro-Hungarian period, reopened in 2014

Sarajevo City Hall, known as Vijećnica, was designed in 1891. It was initially the largest and most representative building of the Austro-Hungarian period in Sarajevo and served as the city hall. Destroyed during the Bosnian War in 1992, the building was renovated with the help of donations and reopened in 2014.

Total City Hall solution

The new Sarajevo City Hall features the Total Building Solution from Siemens. This BMS system manages and controls thermo-technical installations (HVAC), energy installations and lighting. “Thermo-technical installations consist of air-conditioning, heating, sanitary water, boiler room, and heating circles,” explains **Ajdin Buljubašić from Electra company**, Siemens Solution Partner that provided the service. “Energy installations include measuring energy costs per zones, control of the state of the main switches and measuring the amount of energy sources. Centralized management and control of the lighting is also foreseen,” adds Buljubašić.

Siemens temperature and pressure sensors, sensors against freezing, regulatory valves, shades drives were used, along with frequency converters for the drives of motor consumers. DCC controllers Climatix with Modbus TCP protocol towards the control center were also installed and connectedto 3rd party equipment, while all necessary signals were brought to the control center. The management and control of resources has been centralized and is being run from one computer where all needed technologies for BMS system are implemented.

Radisson Blue Plaza Hotel Ljubljana

The highest level of safety, security and comfort

The Radisson Blue Plaza Hotel Ljubljana – the largest and most modern hotel in the capital city of Slovenia – needed a combined safety, security and energy efficiency solution to ensure the highest level of comfort and protection for their guests.

The project

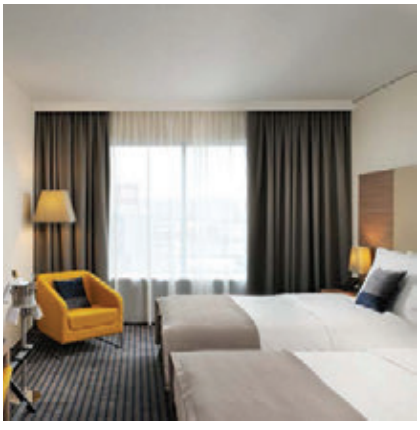
Built in 2012, the Radisson Blue Plaza Hotel Ljubljana is a stunning and ultra-modern luxury hotel – right in the middle of the entertainment, shopping and business district BTC in Ljubljana. In close proximity, there's also a large water park with a variety of pools and saunas. The hotel's facilities include a restaurant, conference rooms and a fitness studio. The hotel has 208 Superior and 25 Junior suites, two Business suites and a 155 m^2 Executive suite. To increase the safety and comfort of their guests, the Plaza Hotel needed a smart, integrated solution.

The challenge

Hotels always have an increased risk of fire and other hazards. Guests, however, expect the highest level of safety, security and comfort – especially in a best-inclass hotel. All installed devices have to be highly reliable and efficient. At the same time, they should also be invisible to the guests. Because the Radisson Blue Plaza Hotel Ljubljana wanted solutions with cutting-edge technology inside and a comprehensive service contract, they decided for the Cerberus™ PRO fire protection system as well as a range of building automation solutions from Siemens.

The solution

Cerberus PRO proved to be the ideal choice for the Radisson Blue Plaza Hotel Ljubljana. This smart fire protection system's detectors provide a high level of immunity to false alarms. The hotel has a total of 750 OP720 smoke detectors, 9 HI720 heat detectors, 53 manual call points and 12 monoxide gas detectors. In spring of 2012, experts from Siemens Slovenija installed, tested and handed over the Cerberus PRO installation. The Siemens Solution Partner A koda plus, Ltd. took over service and maintenance. The Radisson Blue Plaza Hotel Ljubljana was also equipped with the Desigo™ Insight system – as well as more than 250 fan coil controllers that use



Highlights

- Implementation of state-of the-art safety, security and energy efficiency systems
- Discreet and architecturally harmonized solutions
- Successfully completed within deadlines
- Regular maintenance from reliable Siemens Solution Partner

Konnex communication, supervision and control for the hotel's heating stations, air handling units and more. The solutions from Siemens increase the comfort level for guests and energy efficiency for the hotel at the same time.

All installed devices also blend with the architecture of the Plaza Hotel and are designed in the colors of their environment. This means that security cameras and fire detectors, for example, are invisible to the hotel guests.

The benefit

Everyone involved was very happy with the outcome of the project. "To equip the hotel, we chose a recognized and reliable technology partner with proven great service who was willing to adapt to our specific needs. This helped us ensure the safety performance of the project, which was successfully completed within the defined deadlines," says **Urša Radanovič, Executive Director at the Radisson Blue Plaza Hotel Ljubljana**. And **Roman Zaletel, the founder of A koda plus**, comments, "For demanding customers and high safety requirements, Siemens technology is without a doubt the only reliable solution. We also have complete confidence in our long-standing collaboration."

LEED Platinum Certificate for TAIPEI 101

Tallest building, highest standards

TAIPEI 101, at 508 meters one of the world's tallest structures to date, has been awarded the LEED Platinum certification for energy efficiency and environmental design. LEED (Leadership in Energy and Environmental Design) is the most important Green Building rating system in the world.

The Siemens Building Technologies Division played a key role in helping TAIPEI 101 attain the certification. Over the past years, TAIPEI 101's building automation and energy efficiency were optimized to achieve a 10% saving in electricity usage, water consumption and garbage production. Indoor air quality is now meeting the highest standards as laid out by LEED. Thus, TAIPEI 101's energy consumption is 30% lower in comparison to that of an average building, leading to annual energy cost savings of approximately US$700,000.

With a height of 508 meters and 101 floors (plus an additional five floors below ground), TAIPEI 101 is Taiwan's tallest building and the most prominent landmark of the capital city of Taipei. It is the world's first building of its size to receive the LEED-EBOM Platinum certification (Leadership in Energy and Environmental Design for Existing Buildings: Operations and Maintenance). This recognition can only be attained by buildings which fully meet the energy efficiency and environmental sustainability requirements defined by the standard.

Raising the "green" bar even higher

As LEED consultant and initial supplier of building control & management systems, security solutions and lighting for the Taiwanese high-rise, Siemens played a critical role in raising TAIPEI 101's building automation, which already was very energy efficient, to the "Platinum" level.

Substantial energy, water and garbage reductions

Siemens' Energy Monitoring and Control System (EMCS) facilitated the streamlining of the operation and control of the HVAC equipment throughout the complex, optimizing the entire energy usage. Applying improved algorithms for the chiller plant and changing the sequence of operation also considerably increased the efficiency of the cooling system. TAIPEI 101's energy consumption is now 30% lower compared to average buildings. This was achieved by using Siemens' EMCS as well as through energy modeling, energy audits, commissioning services and the installation of additional sensors. The indoor air quality is now meeting the highest standards as laid out by LEED.

In gaining LEED Platinum certification, TAIPEI 101 now achieves annual savings of 2,995 metric tons in reduced CO_2 emissions – the equivalent of preserving over 9 acres of woodland from deforestation, or 239 cars from being driven for the whole year. In addition, 28,000 metric tons of water as well as 1,261 metric tons of garbage are now saved each year. Power consumption is 4.8 million kWh lower than prior to implementing the measures required to meet the LEED criteria. Efficiency gains translate to cost savings of approximately NT$20 million or US$700,000 a year. After reaching the LEED-EBOM Platinum level, TAIPEI 101 becomes the tallest Green Building in the world.

Westgate Shopping City, Zagreb

Tight time frame for TBS

In one of the largest shopping centers in Croatia an integrated Total building solution was successfully delivered in a very tight time frame.

One of the largest shopping centers in Croatia

Opened in 2009, Westgate Shopping City in Jablanovec on the outskirts of Zagreb is one of the largest shopping centers in Croatia, with 226,000 square meters of gross floor area and 93,000 square meters of retail space. Westgate Shopping City is also a home to one of Croatia's largest indoor amusement park for children.

Integrated solution delivered on time

The operator wanted to ensure maximum comfort and safety, including reliable fire protection for the numerous customers and employees as well as energy-efficient operation of Westgate Shopping City. An integrated solution for this was sought. A particular challenge was the very tight time frame for the project.

Siemens convinced the operator with competence and good references as well as resources and on-site support. The integrated Total Building Solution was installed on time and includes the building management system Desigo Insight, the danger management system, and the fire detection system Sigmasys Sinteso. The customer also entered into a service contract with Siemens.

Maximum safety and comfort ensured

The integrated Total Building Solution provides maximum safety and comfort to the user, staff, and property in the shopping center, with its high number of visitors and large number of employees. Building automation with Desigo enables energy-saving indoor lighting through intelligent energy management and special energy-saving features without compromising on comfort. Danger management system brings together many data sources into a comprehensive, efficient danger management system that always conveys to the users regardless of location all the essential information and functions for a smooth process. Finally, as a proven fire detection system, Sigmasys Sinteso provides optimal protection against fires and intrusion. On-site service from a competent source is also provided at Westgate Shopping City.

Details

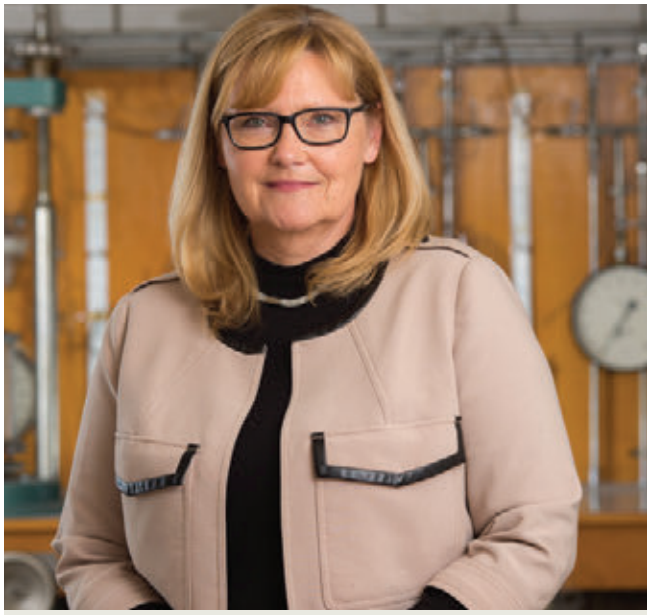
- Desigo Insight building management system with 11,500 data points and 75 Desigo PXC automation stations
- Danger management system
- Fire detection system Sigmasys Sinteso with 7500 smoke, heat, and fire detectors as well as 17 fire alarm panels

Environmental and economic effects hand in hand

Buildings represent 40% of energy use globally, and energy consumption in buildings is projected to rise sustainably. At the same time, increasing resource scarcity, legal gaps and growing operating costs, as well as stringent performance requirements from different users, are just some of the challenges that need to be taken into consideration when thinking about energy efficiency and sustainable buildings.

With systematic approaches adapted to the lifecycle of their buildings, supported by services, products and technologies from Siemens, building owners benefit in the long-term not only from lower energy costs but also from a higher building value and a positive public image.

"A large, almost 75% share of buildings in the region were constructed before 1985, which represents an extraordinary energy savings potential," says **Marjana Šijanec Zavrl, Head of centre for indoor environment, building physics and energy at Building and Civil Engineering Institute ZRMK**. "In Slovenia, we estimate that 40-50% of buildings need deep renovation and the primary energy savings we can achieve are between 60 and 80%. Solely by monitoring different indicators and by timely adjustments of a building's operational systems, energy savings of 10-15% can be achieved," she adds.



Marjana Šijanec Zavrl

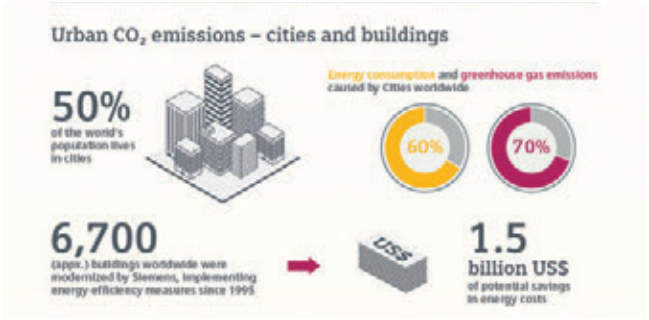
Certification schemes need to take local context into account

There are different global certification schemes that classify buildings according to their efficiency, such as LEED, BREAM and DGNB. Marjana Šijanec Zavrl argues that these certificates, when implemented in a local environment, need to take the local specifics into account. "We need an open certification scheme for sustainable buildings which would be a welcome balance for commercial certificates where the performance indicators are available only to those that want to invest in obtaining the certificate and thus gain market advantage. On a country level we thus have a complex task to equally treat all aspects of sustainable construction, but we need to weigh them according to national priorities. The certification schemes need to reflect that and steer the decision making in the direction of green and efficient buildings.

If the savings are so significant, why is then the pace of renovations still relatively slow? "The problem is in additional investment associated with the deep renovation: energy renovation represents only a fragment of the total cost, whereas a significant portion of the investment needed does not directly contribute to energy savings. Buildings are usually deeply renovated every 30 years, and if this opportunity is missed, it is highly likely that energy renovation will be postponed for the next couple of decades," Šijanec explains.

Energy-efficient buildings are high on European policy agenda: the European Union requires all new buildings to be nearly zero-energy by 2020, whereas all new public buildings need to be nearly zero-energy already by 2018. EU funding plays an important role in improving energy efficiency in buildings. "Based on our experience in Slovenian market, investments into energy efficiency are in high correlation with EU funding. The decision to start and execute projects is made faster if there are funds available, and so is the execution, as such projects usually have to be finished within a specified time frame," says **Bojan Dobaj, director of Slovenian solution provider Feniks PRO.** Although additional funding may come as a push into the direction of greater energy efficiency, and,

Bojan Dobaj



Eduard Nothig

Tomislav Slaviček

closely associated with more expensive construction, more quality, it also brings about additional administration, warns **Eduard Nothig, director of Croatian solution provider Aeroteh**: "The process of obtaining EU funding can be long and complex, it requires additional engagement of consultants that do not guarantee success, and people see it as something rather inaccessible and distant."

Regulation and funding – levers or obstacles?

Putting EU funding aside, the demand for energy efficiency in buildings is still on the rise, especially in Slovenia and Croatia. According to Dobaj, the challenges of large business systems and real estate owners come in different categories: they have to deal with rising energy costs, competition, technology downtime and ever stricter regulation. "The motivation for increased energy efficiency comes from one or a combination of these challenges. To prosper in today's market, companies have to be lean, and sooner or later they have to start searching for answers on how they can reduce costs, find savings potential and decrease downtime. The companies that have a big picture on these issues are already looking for energy efficient solutions. They do not yet represent the majority of organizations, but they are on the increase," says Dobaj. In Croatia, the first driver for energy-efficiency solutions is an economical one, but it is also a question of image, as being ecological and green is very popular in different spheres of life, and construction is no exception, adds Nothig. Šijanec agrees: "The investors can be segmented, and there are always some of them, usually those with a good business performance, who want their buildings to correspond with their environmental image. Some best practice cases can also be found in the public sector which needs to follow the guidelines of efficient construction. However, in Slovenia, the technologies are not the problem; the issues we face are of a different nature: the ownership of buildings is still widely dispersed and the owners have hard time in agreeing on most important decisions. In the past, government schemes supporting energy efficiency were geared towards a few specific measures, i.e., window replacement, whereas a more systematic, holistic approach was not in place." According to **Tomislav Slaviček, director of SBT, a building technologies solution partner active in Croatian market**, "foreign investors are much more sensible in this respect. Any investor who goes for energy efficiency solutions wants financial savings, but at the same time also a presentation of this move toward the society."

The regulation is ever stricter in the field of building construction and operation. "The laws are important and they definitely moved some processes and initiatives in the right direction, but they cannot contribute to significant improvements in the field marked by continuous savings and cost cutting, as a result of long-term recession. Tax policies do not follow the investments into energy efficiency, therefore everything is reduced to good intentions and environmental awareness of investors," says Nothig. Slaviček provides another view: "The effect of the regulation is usually proportional to the penalties for non-conformance. Unfortunately, the awareness is not high enough to push the decisions in the direction of greater energy efficiency. The current economic situation is also not in favour of such investments." Šijanec adds: "The economic recession has had a significant impact on the construction market, which has shrank significantly in the past year, and those companies that managed to survive are forced to provide their services by dumping prices. However, as we can learn from some demonstration projects, the expertise is still being gathered. The construction company contracted for the building of one demonstration multi-dwelling building in Ljubljana

needed to properly educate all its employees and subcontractors to guarantee that they were really working in accordance with all agreed standards and parameters of the nearly zero-energy building." Not all regulatory moves are equally well accepted by different stakeholders on the market, says Dobaj: "The introduction of energy performance certificate in Slovenia increased the transparency. Tenants now have a much clearer picture on how high the energy costs for their home will be. Although building owners did not accept this regulatory move with cheering, the market as a whole responded with a greater demand for energy efficient buildings, and the prices for inefficient buildings dropped."

With the right education only the sky is the limit

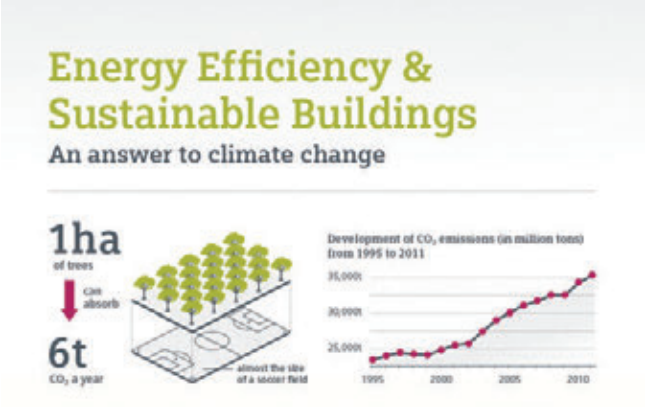
How can general awareness of energy efficiency in buildings be improved? The most desired effects by investors and end users are still the economical ones (savings), and environmental and image effects come as a welcome bonus. "Because of low energy prices the savings themselves are not a sufficient decision-making factor for investments. The law also does not enable energy contracting," **Andrej Škorc, director of Sipatec** explains the situation in Serbia.

Andrej Škorc

"Every investor who lends real estate on the market should take account of energy efficiency, especially in view of the recent decline in real estate prices. The same goes for market verticals, i.e., hospitality business, where water, air conditioning and lighting represent the largest portion of direct costs. During times of high oil prices, energy saving was high on priority list; with low oil prices this is currently less important, but things can change quickly. Companies with high accountability of resource costs will be more competitive in the future," says Nothig.

According to Slaviček, who argues for cautiousness related to the expected energy savings, there are some misconceptions that do not necessarily come true and need to be overcome: "The society also needs to realise that the technologies for energy efficiency must be properly used, as the savings do not come by themselves, but are the result of the change in behaviour and the readiness of end-users to give up some of their comfort. With these preconditions fulfilled, the savings are feasible."

"The main lever for energy efficiency is the proper education of investors and planners. They need to be aware that cutting-edge technologies that can save energy and boost comfort at the same time already exist, all we need is a good plan and a good execution. The stereotype that higher energy efficiency equals higher investment must be broken. With the right education, only the sky is the limit," adds Dobaj.



Standard EN 15232

Huge energy saving potential

EN15232 makes it possible to qualify and quantify the benefits of building automation and control systems. The entire standard is based on building simulations using pre-defined building automation and control functions. Parts of the standard can be used directly as a tool to qualify the energy efficiency of building automation and control projects.

The European standard EN15232: »Energy performance of building – Impact of Building Automation, Control and Building Management« was introduced to better leverage the energy saving potential for control and operation of buildings in the member states of the EU. It specifies methods to assess the impact of Building Automation and Control System and Technical Building Management functions of the energy performance of building, and a method to define minimum requirements of these functions to be implemented in buildings of different complexities.

It clearly shows the huge potential energy savings that can be achieved in the operation of technical building systems. Consequently, all planners should apply the EN 15232 standard as they are the one who are able to provide constrution owners with information on the benefits of building automation. Manufacturers of building automation facilities should also use the EN 15232 standard or assesment purposes when carrying out modernization work.

Efficiency class C describes functions that are used on a standard basis in building automation. Efficiency class B consists of more enhanced functions as well as applications to monitor the energy consumption with the building automation system. Building optimization and individual room controllers with a consistent demand control are a prerequisite for ensuring hihgly efficient energy systems. With these, energy will only be released when the user requires comfort conditions in the room. Thus, only the amount of energy that is really needed, along with the require temperature, will be generated and distributed.

The eu.bac certification stands for tested quality, control accuracy, and energy efficiency.

eu.bac Cert

BACS efficiency classes – EN 15232

High energy performance
BACS and TBM — A

Advanced
BACS and TBM — B

Standard
BACS — C

Non-energy-efficient
BACS — D

BACS Building Automation and Control System
TBM Technical Building Management System

Siemens building automation systems meet the requirements
Siemens offers building automation and control systems and products that achieve a high degree of energy efficiency conforming to EN 15232.

Reaching goals through a long term partnership

After the hotel had operated successfully for 14 years, it was time to evaluate and improve how the HVAC plants at the Radisson Blu Palace Hotel are run and operated. Persy Control Services, a long-time certified Siemens partner, took on this task and helped the hotel establish a basis for reducing its energy usage by as much as 25% – decreasing operating costs significantly while strengthening the hotel's ambitions in terms of sustainability and energy efficiency.

Located close to the Dutch capital of Amsterdam, the Radisson Blu Palace Hotel in Noordwijk aan Zee is directly on one of the country's beautiful long beaches. The hotel's idyllic location is definitely on point.

Beyond that, the four-star hotel goes a long way to ensure that guests enjoy every minute of their stay. From a variety of leisure experiences to exquisite cuisine to rooms decorated with style – no customer wishes are left unfulfilled. The same is true for indoor climate, energy efficiency and sustainability. The Radisson Blu Palace Hotel achieved the "Green Key Gold status in 2011 and has been improving its own green footprint ever since. Green Key is an international eco label awarded to leisure organizations and facilities that meet an extensive array of environmental requirements. As part of its efforts, the hotel even provides a special parking area for recharging electric cars – at no additional costs.

The hotel also takes part in the Think Planet initiative started by the Radisson Group to encourage their hotels to reduce energy consumption by 25% within 5 years. This initiative includes actions to minimize operating costs and increase energy efficiency while optimizing guest comfort and hotel performance.

To maintain the Green Key Gold status as well as to reach the ambitious goals of the Think Planet initiative, the Radisson Blu Palace Hotel needs a modern, reliable building automation system that controls the numerous heating, ventilation and air conditioning (HVAC) plants and the main heating and cooling plants in an energy-efficient way.

Long-term partnership of cooperation and trust

The 6-story building was constructed in 2001 and has approximately 120 guest rooms, two restaurants and a lounge, 13 conference rooms and a wellness area, including an aquatic center. Because of their usage, each area requires a different climate, depending on the time of day, the outside temperature and other factors. Conse-

Sustainability and energy efficiency are key players for the four star hotel

quently, after 14 years in operation, it was time to take a closer look at the installed HVAC plants and the way they were being controlled and operated. Originally, the hotel's building automation system had been planned, installed and commissioned by Persy Control Services, a certified Siemens Solution Partner for building technologies.

For this reason, hotel management once again turned to its long-term partner in 2014 to review the existing building automation infrastructure. As a Solution Partner, Persy Control Services was able to evaluate the current status of the plant operations in the hotel with the support and technologies provided by Siemens. This includes not only product support. More importantly, Persy Control Services has access to multiple calculation tools which help analyze the building automation functionality of the HVAC plants as well as the new "best case" efficiency status after modernization. The Energy Performance Classification (EPC) tool, for example,

The hotel is commonly booked for leisure or business travel

allows for an initial assessment of the current control strategies and an estimation of potential energy savings and payback time thanks to improved building automation functionality. This assessment is fully based on the standard EN 15232:2012 "Energy performance of buildings – Impact of Building Automation, Controls and Building Management." If required, additional tools and means are available to analyze the savings potentials of selected plants and building areas in more detail. This helps uncover the largest savings potentials and set implementation priorities.

Following the outcome of these estimations and calculations, both hotel management and its Solution Partner could decide which steps to take first and how to prioritize the modernization measures. What's more, the tools could also be used to show possible energy savings and thus energy cost reductions. This made it possible to directly correlate the modernization costs with potential savings, emphasizing the benefits of a modern building automation system.

Moreover, this would also give a preview of how far the hotel has come in reaching its goals for the Think Planet initiative.

Starting the project – modernize multiple ventilation plants

At the beginning, the current state of the hotel's HVAC plants had to be evaluated by sight. An initial walk-through of all plants produced an overview of settings, products and dependencies between the plants. In this case, it was expected that the main air handling units were the key causes of high energy consumption. Due to the variety of areas in the hotel, multiple ventilation plants are installed to serve the different parts of the hotel. Although this is a common way to organize ventilation in a hotel, in this particular case it was found that not all timer programs, setpoints and control strategies of the plants were aligned with the actual usage of the rooms and facilities.

Using the findings from the initial walk-through, the EPC tool was used to obtain more detailed insight into the improvement potential of the plants. All recorded settings of the HVAC plants, timer programs and other relevant factors were considered to provide a first analysis of the current state.

Energy savings of up to 25%

The estimated potential energy savings for the hotel based on a relatively small investment was remarkable. The results not only impressed the owners of the hotel but also increased awareness for potential reductions in CO_2 emissions. Energy costs could be reduced by as much as 25% solely with improvements to the building automation functions. The high energy-savings potential also results in a shorter payback time for the investor – and a better sustainability and energy efficiency record. After all, plant modernization will bring the hotel one step closer to reaching its energy efficiency goals.

Based on a more detailed analysis of certain plants, it was then decided in which areas to start and how to prioritize the required modernization steps. As already seen during the initial walk-through, the most urgent step was to improve the controls of the main ventilation plants. It was crucial that the project would not impair the comfort of the hotel guests at any time. For this reason, the plants were upgraded one after the other.

The building automation system of the Radisson Blu Palace Hotel was migrated from the existing Unigyr system to modern Desigo controllers and a BACnet communication-based system which offers state-of-the-art building automation functionality. Variable speed drives, sensors and actuators were installed or replaced where necessary. Going forward, ventilation will be demand-based, i.e. only as much air as needed is provided to the individual rooms while maintaining the required comfort and

indoor air quality conditions. In addition, the existing individual room controllers in the hotel rooms were easily integrated into the new Desigo system. This allows for improved supply control of hot/cold water to the rooms for heating or cooling purposes. These improved control functions save a remarkable amount of energy, thus lowering energy costs and improving the green footprint of the hotel.

Ready for the future

During the planning phase, both the hotel and Persy Control Services kept the future in mind. Thanks to backwards compatibility and open communication standards such as BACnet and KNX, upcoming changes, modernizations (e.g. hotel room renovations) or adaptations can easily be integrated into the new Desigo system.

The upgrades within the ventilation system are a key step toward more efficient building automation management in the hotel. The benefits not only include cost savings and a short payback period. More importantly, the hotel has managed to get closer to its goal of achieving a green footprint in its community.

The first modernization measures were completed in 2014. Other system improvement opportunities will be evaluated in the future to get the most out of the building automation system.

View at the hotel at night

Chris Kopp
Picture credits: The Radisson Blu Palace Hotel

Energy performance classification tool

Reliable tools for in-depth analysis

Significant energy efficiency assessment of building automation and control systems in existing or planned buildings

Using the EPC Tool, you can straightforwardly apply the European Standard EN 15232 “Energy performance of buildings – Impact of Building Automation, Controls and Building Management” to your projects. The tool allows a quick analysis of the installed plant and an estimation of potential energy savings and payback time.

Energy Efficiency Calculator

For a selected building with HVAC plant, the tool offers an in-depth analysis of the potential energy savings and the CO_2 emission reductions made possible by BACS functions.The EEC tool uses a thermal building model and applies location specific building constructions and weather data as part of the energy simulation calculation.

The EEC tool is a sales support tool that shows potential energy savings resulting from various energy efficiency functions applied to the buildings and plants as well as comparison of the calculated energy cost savings with the required investments. It also provides information on payback time.

Specification Text Selection Tool

Energy efficiency already starts in the planning phase of a building. To support professionals with specifications, Siemens developed the Specification Text Selection Tool (STST).

The STST is unique as it focuses on energy-efficient building automation and control. Featuring an extensive text database, the specifier can efficiently generate a neutral and functional specification based on energy efficiency functions, particularly related to the standard EN 15232.

From congress hall and back in one day – City Cube Berlin

New event venue in Berlin is a showcase of versatility for congress halls and trade fair sites: high occupancy figures show that today, buildings need to be flexible and quickly convertible. CityCube hosts medical congresses, corporate events and fairs, to name just a few, in one venue. Demand is high: the venue has the enquiries and bookings for events up to ten years in advance.

Life at the CityCube Berlin began with the demonstration of a symbolic heartbeat on 5 May 2014. One year after the opening of the new congress and exhibition hall this newcomer to the ranks of the national and international market for events is in excellent health and thriving. That is due not only to the medical congresses that have taken place here over the last twelve months, attended by tens of thousands of delegates. With its many large-scale congresses, leading international fairs and all types of events this multi-purpose venue in Berlin has been able to make its mark on the international market for events very soon after its launch.

Since May 2014 events in the CityCube Berlin have been attended by more than 52,000 delegates from around the world as well as tens of thousands of visitors to trade fairs. Congress events and trade fairs make up 70 and 30 per cent of occupancy respectively. “This venue has achieved very respectable figures“, said **Dr. Ralf G. Kleinhenz , who heads the Guest Events division of Messe Berlin**. “Including construction and dismantling periods the venue has been occupied 81.5 per cent of the time, an excellent statistic for its first year on the market. Our customers from Germany and abroad appreciate the versatile nature of this venue. What is more, the ability to switch between trade fairs and congresses or corporate events and AGMs in no time at all is one of our team’s strong points.“

Technology is key

The secure, economic operation of the center is made possible with the intelligent networking of power distribution, building automation and fire safety using Siemens technology.

Quick conversions for different fairs, congresses and events with ever-changing demands as well as the parallel use of floor space requires flexible building architecture and an integrated approach to power, security and fire alarm systems. Thanks to Siemens' complete concept, CityCube is able to meet all these demands, and achieve the highest possible fire and safety standards. In addition, CityCube is networked with Messe Berlin GmbH's existing fire protection and building automation systems.

The challenges of this complex project were overcome by Siemens' innovative technologies. From early on in the project, Siemens power technology experts began planning the power supply infrastructure. The entire power connection system was designed virtually. Facilitating the quick, trouble-free installation of a comprehensive power system when the time came. At the heart of which is the low-voltage switchgear and power distribution buses.

Kempinski Palace, Portorož, Slovenia: Integrated hotel solution reduces costs

The luxurious Kempinski Palace Portorož hotel combines the very best in tradition and modernity. An integrated hotel solution from Siemens provides the basis for efficient use of energy and manpower – along with delighted guests.

Perched on a peninsula stretching out into the Adriatic Sea, Piran is one of the most beautiful cities on Slovenia's coastline. The city was part of the Venetian empire for almost 500 years and this heritage is still plain to see, not only in the architectural style of the buildings but also in the city's lively atmosphere, with its many restaurants, casinos, and hotels. One of Piran's most beautiful and luxurious hotels, the Kempinski Palace Portorož, located in the Portorož area of the city, was reopened in October 2008. The small spa resort of Portorož – whose name translates as Port of Roses – boasts one of the most modern and attractive marinas on the Adriatic, and with its rose gardens, salt pans, hilly landscape, and mild Mediterranean climate it also attracts visitors who are simply looking to unwind. The Kempinski Palace Portorož is the first five-star luxury hotel in Slovenia. Facing southwest and overlooking the Gulf of Piran, the building comprises the historic original structure and a modern wing that was added when the hotel was renovated. In addition to more than 180 extremely comfortable and well-equipped rooms and luxury suites – more than 100 of them in the original part of the building – the hotel has a conference center and several restaurants and bars serving an excellent choice of food. A 2,500-square-meter spa center in the new wing offers relaxation and rejuvenation, while the original ballroom, now fully restored, is the perfect setting for a wide variety of events.

Cutting costs while maximizing comfort

When it came to building management, the investor behind the renovation project, the Istrabenz Group, wanted a solution that would combine cost savings through efficient energy use with optimum security and maximum comfort for guests and service personnel alike. The solutions from Siemens fit the bill, and in 2007 Siemens won the order for a complete integrated solution combining room automation and energy management, room access control, guest room management, and staff and

Hotel with a fine tradition

The Kempinski Palace Portorož hotel has a fine tradition to look back on: even when it first opened in 1910, in what was then part of the Austro-Hungarian Empire, the Palace was one of the grandest and most beautiful hotels on the Adriatic. The parkland surrounding the hotel, with its unique arrangements of flowers and trees, was declared a natural monument in 1983. The hotel closed its doors temporarily in 1990 until the Istrabenz Hoteli Portorož company in 2003 to renovated the building. In addition to restoring the original structure, the company also built a new wing, with the result that the hotel now combines the very best of tradition and modernity. When the hotel reopened in 2008, the Swiss Kempinski Hotels group, Europe's oldest luxury hotel group, signed an agreement to operate the hotel for the next 20 years.

service management. The intelligent room automation system, with a total of 220 control units, establishes a comfortable room climate, offers a full overview for staff, and is very easy to use. The flexible building management system, comprising Desigo PX and Desigo Insight, integrates the hotel's two heating systems; the fan coil units; the power supply; and hotel systems such as HVAC (Heating, Ventilation, and Air-Conditioning), lighting, refrigeration units, swimming pools, elevators, and consumption measurements. Siemens also supplied all the necessary accessories, including valves, valve actuators, air damper actuators, and sensors, along with the refrigerators, stoves, and dishwashers. The solution was developed specifically for the hotel industry and is now increasingly the first choice of investors and operators thanks to its extensive range of functions and the efficient integration of building systems and services, including lighting and access control, service management, staff deployment, and air-conditioning and heating. The scalable system offers maximum guest comfort while saving energy where it is not needed. Electronic guest ID Access to guest rooms is via contactless transponders or chip cards (key cards). The multifunctional key card – electronic ID, room key, and payment card in one – also controls access to the spa center and VIP areas and can be used to pay for goods and services in the restaurants, bars, and shops. Room temperature and lighting levels can be set by the guest and also from reception. Automatic adjustment of the heating, ventilation, and air-conditioning in the rooms according to their occupation status delivers cost savings through optimized energy use. At the heart of the solution is the ultracompact room control unit, which controls all the guest room functions. It communicates via a system bus with the central control unit at reception. Here staff can check the status of any room, and information and alarms are displayed automatically on the monitor. The solution integrates easily and seamlessly into existing or new property management systems (PMSs). Check-in and check-out can be managed either directly in the solution or via the connected PMS. The PMS automatically sends guest information to the solution, ensuring optimized services and efficient control of building technology systems.

The digital transformation in buildings starts now

Digital services help extract valuable information from building data

Smart data for building operators

Today building operators can already use data to calculate, compare, and optimize media consumption of various buildings. It is equally possible to transfer process data, alarm data, operating statuses, and more from sensors to the management system and to carry out an evaluation. Digital services come into play when information that adds value for the operators is extracted from the data.

The rapid rise of new information technologies such as user interfaces, cloud computing, big data systems, analytics software, and global mobility is also making its mark on building management. Studies by Gartner predict that in five years more than 7 billion people using at least 30 billion devices will produce 44 zettabytes – that's 44 with 21 zeros following it – of digital data. Building managers know how valuable these data are when they are collected properly and quickly harvested for information. The most important thing is to keep the upper hand over the flood of data and to focus on the most important information.

Data become information

Yet data only really become an asset when they are crystallized into information by intelligent algorithms. Only then can recommendations be made about how to optimally plan, construct, and operate buildings, and how to compare and optimize buildings in terms of their energy and resource consumption. “In the future, the information produced will be a deciding factor in whether and how buildings can be operated efficiently, sustainably, and safely while adhering to standards and laws and ensuring user comfort,” explains Eike-Oliver Steffen, Head of Solutions and Services at the Siemens Building Technologies division. “Essentially this is creating precisely the transparency that generates added value and that building operators can use as a basis for sound decisions. This information also provides a foundation for digital services, for example in the fields of predictive maintenance, energy data management, or resource optimization.”

Digital services increase energy efficiency and availability

A uniform platform can offer user-oriented and context-sensitive new services. Siemens Building Technologies uses the superordinate Siemens platform Sinalytics for all data-based services. Today the platform is already gathering, analyzing, and automatically processing huge volumes of data. The data come from various buildings as well as from other sources such as weather data, energy prices, and traffic forecasts. The platform relies on proven, secure cloud computing solutions. It connects established technologies for remote operation, data analysis, and cybersecurity to new technologies from the field of building management. Unlike a system solely for building automation, the analytical tools are not limited to the disciplines of HVAC, fire safety, and security. Instead, they also incorporate a whole range of additional information into the analysis, enable benchmarking, and form a basis for optimization measures. Digital services for buildings are concerned with two areas: performance and advisory. Performance services focus on the performance of buildings and systems. Within this area Siemens offers various services, such as building performance optimization to increase the energy efficiency of a building, which can help maintain or even increase a company’s productivity. When it comes to advisory services, Siemens advises its customers, develops strategies based on simulations and forecasting, recommends appropriate energy and sustainability strategies, and helps with budgeting and planning.

»Essentially this is creating precisely the transparency that generates added value and that building operators can use as a basis for sound decisions.«

Eike-Oliver Steffen,
Head of Solutions and Services at the Siemens Building Technologies Division

Building managers benefit from the Navigator powered by Synalytics, a power ful analytical tool. Siemens provides the appropriate information as digital services in a context-sensitive, user-specific, and user-friendly format. With just a few clicks, building operators can quickly and securely access all the information relevant to them from their building – and all this using any end device. Thanks to automatic remote monitoring of systems and devices using the Siemens platform, potential failures can be predicted and steps taken before problems even occur. Using intelligent algorithms, Siemens service technicians can set clear, rule-based limits and performance ranges for the Siemens building technology. This brings about transparency, cuts costs, and increases flexibility for the operator. At the same time, the Siemens platform makes it possible to integrate intelligent buildings within smart grids. All in all the cloud platform, by linking meter values from systems and the energy supply and combining these with weather data, tariff information, and budget allowances, opens up entirely new possibilities for transparent, global building management. The customer’s expected savings can amount to a good 30 percent per year. Viewed in this light, digital services offer building managers new ways of operating their buildings even more flexibly and sustainably.

siemens.com/bt/services

Heat Cost Allocators - Pay as much as you spend

Residential building efficiency pioneers

The bigger the building, the more resources it needs for reliable, quality operation. The more resources it needs, the bigger its environmental effects. If the building managers are aware of resource savings potential, the impact can be positive. Of course, office buildings and large public objects are the first to be considered when it comes to energy efficiency. What about residential buildings? Here are some stories about how residential buildings can significantly lower their energy costs.

In Slovenia and Croatia, the payment of heat costs per actual consumption is required by law. In Slovenia, all appartment owners in multi-dwelling buildings were obliged to implement heat cost allocators already by 2014, whereas in Croatia, the deadline is the end of 2016. Some owners in Croatia decided to do that even before the final deadline, only to find out that they can save significantly without giving-up on the comfort.

Rewarding rational spenders

»Wherever we installed heat cost allocators, the total heat consumption decreased between 15 and 40 per cent,« says **Petar Fruk, director of TI-SAN, the largest Siemens Siemeca partner in Croatia**. »The introduction of heat cost allocators needs to separate the consumers who are already using heat rationally from those who still need to get used to rational heating without excessive spending. When the users get used to that, and usually it takes the whole heating season to reach this effect, then we experience their satisfaction. If the impact of individual user to the final heating invoice were 80 per cent (now it is only 50 per cent), the regulation would probably not even be necessary, as the owners would demand the implementation of heat cost allocators by their own initiative,« Fruk adds.

For TI-SAN customers, the experience with heat cost allocators is mostly positive, says Fruk. »We do not install heat cost allocators before the building fullfills the technical minimum of 80% of all flats to make the return on investment positive. Thus none of our customers return to the old way of invoicing heat costs per square meter.« There are also other success stories. One of them is an important reference for Plinoservis Kuzman, the leading provider of gas heating technologies in Croatia. Three buildings in Zagreb's Galovićeva street were using „mazut“ as a heat source, the boiler was old, and the costs high. **Nenad Kuzman, owner and director of Plinoservis Kuzman explains**: »The boiler was obsolete and we suggested to the owners that each building should be equipped with its own new boiler using gas, which is an environmentally friendlier and more energy efficient solution. In one of the buildings we also installed the best available technologies of gas condenzational heating, complemented by Siemens heat cost allocators and thermostatic sets.« The savings in heat costs after the renovation were roughly 40 per cent. »The return on investment period for such investments is between 3 and 3.5 years. The owners of flats in Galovićeva partly financed this investments from their own reserve funds, the rest of the funding was provided by us. This means that the investment is partly already financed from the savings, and the pressure to the wallets of owners is already reduced,« adds Kuzman.

With agreement reached, high savings are possible

Slovenia was the first country in the region to introduice the regulation requiring technologies for payment per consumption. **Gregor Saje from SPL d.d., the leading facility management company in Slovenia**, describes the case of a residential building with 110 flats, where despite very dispersed ownership the owners managed to come to agreement to invest in hydraulic balancing and thermostatic valves. »The savings in heat were 42 per cent, which is high above the average expected savings of 30 per cent. That means the investment payback time

was 2.5 years which is short compared to, for example, additional energy insulation of the facade,« says Saje.

According to Saje, there is a growing trend in Slovenia to consumption based invoicing of all utility services, not just the heating. »In Slovenian multi-dwelling buildings we see a growing demand for consumption based water invoicing. The owners and users want to have more control of how much they consume and how much they pay for it. The agreements are, due to dispersed ownership, hard to reach, as the owners are not completely aware that active cooperation in building management is their obligation and an investment in the value of their flat. This is exactly the reason why building managers need to objectively and expertly inform the owners of the possibilities and available technologies,« concludes Saje.

Investment in sustainability

Fire safety and security equipment is like an insurance policy: you don't really need it – until you do. However, after experiencing a fire, significant data loss or other kind of disaster, many businesses never entirely recover – losing orders, contracts, production facilities, or people. Fire safety today requires a comprehensive understanding of safety needs and innovative solutions.

This is in tight correlation to the willingness of the investor to see fire safety and security as something more than security policy – an investment in risk prevention and long term sustainability of the company. “Regulatory requirements are very important in this respect, and are also very precisely defined. However, the laws, guidelines and requirements are sometimes interpreted differently by different planners, and the investor is left to his own, not always an expert one, judgment which proposal to follow,” says **Tomaž Topole, a free-lance planner operating on Slovenian market**.

Like total building solutions and energy efficiency, fire safety and security faces the same problem: the crisis in the construction market where most decisions are ruled by

Tomaž Topole

Hasan Karabeg, director, Arcus
The biggest advantage our customers on Bosnia and Herzegovina market see in Siemens FSS solution is its quality, price-performance ratio, reliability, functionality and the possibility of integration with other equipment and vendors.

Pavle Banić, director, SBT
The most important factor for our customers is the expertise of our team and the trust in our people. A reliable and quality brand is an additional benefit. Some of our solutions have been functioning for more than 40 years.

Roman Zaletel, director, A koda plus, one of the largest Siemens partners in FSS field
Siemens is a reputable brand, which is an important selling proposition. Another benefit of Siemens equipment is the comprehensive portfolio, from fire detection to security control systems and its reliability.

the lowest bidding price. “Quality project documentation is seen more as a burden than a sincere wish of the investor to have optimum quality. Planners are perceived as people who complicate things. But it all depends on the expertise of the planner and how flexible and efficient he is in looking for variants within the scope of the legally permitted and technically conformant solution. Of course, this process is easier and more constructive for both parties if planners are included at a very early stage of the project and if they have the big picture about the goals and purposes that lead the investor in his decision-making,” adds Topole.

In companies with stable and strong business performance safety and security already attract the necessary attention. In these companies there are usually in-house experts who are well aware of the risks and what they have to do to mitigate them. “Of course, they also look at costs, but they tend to decide for premium price technologies and are well aware why price shouldn’t be the only factor,” explains Topole, who believes that planners who are part of the planning process at an early stage can provide more value: “Unfortunately this is still a rare practice. It can happen sometimes coincidentally, but is not pursued on a systematic basis.”

As standards and legal requirements in fire safety and security are strict and precisely defined, this area is well taken care of, but due to the recession price is still a decisive factor. “Therefore all players in this market tend to compete on price. My advice to investors is that by choosing premium technology their initial investment will be higher, but in the long term they will face less problems and costs, especially those caused by false alarms,” says Topole.

With such a high pressure on the price, what are some other challenges faced by planners? “Deadlines, everyone wants to have documentation yesterday” is the immediate answer of Topole. As well as lowering the price, the shortening of the deadlines to prepare project documentation is a signal that the perceived impact of fire safety and security solutions on the over-all building sustainability is relatively low, “probably because when someone invests in a building development project to resell the property on the market, they are only interested in minimizing the initial investment, which, unfortunately, makes the maintenance cost grow,” adds Topole.

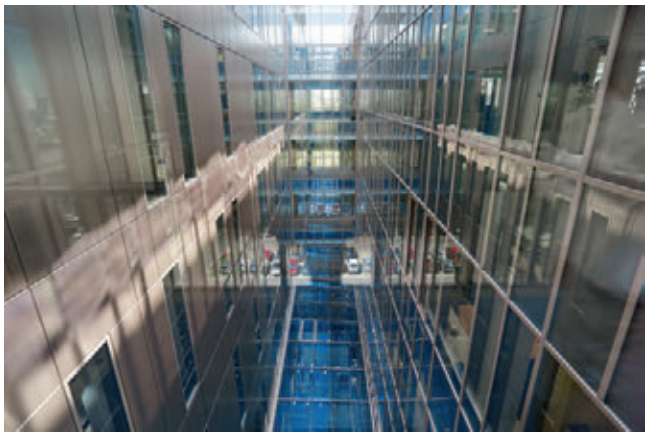
Maja Krejči, director, Tehnomobil Securitas
Special detections such as thermovision and face detection, various systems like video surveillance, anti-burglary and access control, gas and fire detection, parking systems and central control have been the pillars of Tehnomobil Securitas’ business for over 25 years. We follow high-quality standards and they also reflect in our selection of solution partners. Tehnomobil Securitas and Siemens have been cooperating for more than 10 years, which is a proof of mutual satisfaction. Besides quality and long lifecycle, integration with other technologies already implemented at our customers's locations is also of significant importance. The strong brand of high technical possibilities that understands specific market needs and offers high quality concepts of system modernization puts Siemens at the very top of the fire safety and security solutions market.

Total Building Solutions par excellence

Raiffeisenbank in Belgrade, Serbia

Customer

The new headquarters of the Raiffeisenbank Serbia, opened in the Belgrade district of Novi Beograd in 2012, represents a clear commitment to long-term involvement in the south-east European market. 1,150 people work in the 21,000 square meter building.



Total Building Solutions with:

- 3,300 data points
- 268 card readers for access control
- 2,200 fire detectors
- Extinguishing systems for nine building areas
- 21 CO_2 detectors
- 220 CCTV cameras
- 412 intrusion detectors
- Building management system
- Energy consumption metering

Requirements

The Raiffeisenbank Belgrade required an integrated, competent supplier of all the building technology systems for comfort, safety and security needed in a modern building. The supplier would then also commission and perform maintenance on these systems.

Solution

Siemens equipped the headquarters with Total Building Solutions from a single source: fire safety with fire detectors and extinguishing system, gas detectors and further safety technology with access control, video surveillance and intrusion protection are integrated, as are a building management system and energy consumption measuring. The solution was provided by team from Smart Building Technology company.

Benefit

Thanks to Total Building Solutions, the Raiffeisenbank in Belgrade received highly reliable high-end solutions both for maximum safety and security of the building, its physical assets and employees, and for the building comfort. The energy efficient building management system, an integrated element of Total Building Solutions, means that the carbon footprint of the building remains “green” over the entire year.

Fire safety and security technologies

A smart and powerful fire safety system – Cerberus PRO

With the fire safety system Cerberus PRO, you can meet any application with confidence. The fire safety system excels through fast, reliable fire detection, alarm signaling, and control. That means for you: maximum safety and optimal protection of people and assets.

- **Fire control panels** – they combine high security standards with latest technology
- **Fire detectors** – they ensure very fast and highly reliable detection thanks to intelligent detection technology
- **Peripheral devices** – they increase safety even further
- **Special detectors** – they cover applications from hazardous areas to high bay warehousing

Fire protection system Sinteso – completely safe

Top level fire protection. Complete, scalable family of products for every type of building and requirement:
- From standard to demanding and
- from compact to very large applications

The unique modularity and future-proof platform of the Sinteso fire protection system gives you the freedom for future expansions or adaptations to changing requirements. With the Sinteso fire protection system, we offer you:
- An integral system that protects your investments
- A system based on the latest technology platform for all functions, all building types, and every form of future use

If you have a different fire detection system from Siemens, the Sinteso Move extension and modernization solution helps you extend it stepwise with Sinteso detectors and panels or to upgrade it to the new Sinteso technology.

Sinorix - intelligent extinguishing solutions

A perfect fire protection solution requires technology and expertise. Sinorix™ intelligent extinguishing solutions, offer you the latest technologies based on long-term know-how and experience in fire detection and extinguishing from a global partner. The solutions are tailored to your individual needs to maximize business continuity. Fires are detected early and extinguished quickly and reliably. Sinorix high-quality solutions protect people, environment, processes, and assets.

SiPass integrated – powerful and flexible access control system

SiPass integrated is a powerful and extremely flexible access control system that enables you to manage access to anything from a single low-rise office with just a few doors to massive high-rise complexes with tens of thousands of doors, gates, barriers and elevators at multiple sites around the globe. It provides a very high level of security without compromising convenience and ease of access for system users, fits into all common state-of-the-art IT environments, and can also serve as a security management station that integrates access control, intrusion detection, and video surveillance into a single system.

- Modular system architecture enables tailoring to suit the needs of any facility
- Intuitively designed software that is easy to use and administer
- Interoperability & integration with 3rd party systems

Siveillance - intelligent video surveillance

As human observers find it very difficult to monitor the increasing number of video channels typical for today's surveillance systems, video analytics have quickly become a key element in today's security applications.

Innovative digital product and system concepts centered on intelligent video analytics and sensor input allow the best possible coordination of system functionality with operator requirements. This becomes increasingly important for extensive and complex sites with varying security needs.

Comprehensive video surveillance solutions from Siemens that incorporate extensive video analytics, such as Siveillance™SiteIQ Wide Area, Siveillance SiteIQ Analytics, and powerful IP video management software Siveillance VMS, offer a unique approach to streamlining security management for critical infrastructure, wide-area sites, public areas, buildings, and public safety agencies.

Port Manatee: where security meets efficiency

Florida's fastest-growing seaport has created new efficiencies that strengthen the port's bottom line as well as its security.

As the nearest United States deep-water seaport to the expanding Panama Canal, Port Manatee in Florida is a critical node in a global transportation network. Each year, the port handles approximately 8 million tons of cargo – ranging from fresh fruit to power plant turbines, gasoline and a host of other commodities – with hundreds of workers entering and exiting the 1,100-acre property on a daily basis. Ensuring the security of the port's infrastructure and its cargo is a critical priority, but vehicles and personnel need to move efficiently through the port, as well.

"Because of the dynamic nature of our business, finding an off-the-shelf solution that solves these issues is very difficult," says David St. Pierre, Port Manatee's Director of Seaport Security. "We needed a solution that could be configured to our specific needs."

St. Pierre emphasized that although the variation among ports encompasses different cargo types and modes of transportation - including rail, commercial truck and pipeline - security is a common denominator. Port Manatee partnered with Siemens with the primary goal of implementing an access control system to meet the requirements of the federal Transportation Worker Identification Credential (TWIC) system. But with plans to diversify its capabilities and an ambition to become one of America's premier seaports, Port Manatee also wanted to leverage its access control system to create new efficiencies that strengthen the port's bottom line while also attracting and retaining customers.

An integrated solution

Its solution was to implement an integrated access control and physical security information management system that enables staff to manage access control and systems such as video surveillance, fire safety, and lighting through a single interface. By combining two technologies – the SiPass access control system and the Vantage Physical Security Information Management (PSIM) solution – Port Manatee has been able to create a one-to-one match that enables them to monitor and document the services and cargo that users interact with.

Hundreds of workers are entering and exiting the 1,100-acre property on a daily basis.

To manage its diversity of users, cargo types and transportation modes, Port Manatee worked with Siemens to create custom workflows that create accountability trails that are specific to various scenarios. Holders of the federal TWIC card, for example, are allowed unescorted access through the port, while non-TWIC holders must receive a temporary access credential and be escorted

With its ability to create that one-to-one match between port users and cargo, Port Manatee has greater transparency into who is using what service.

Port Manatee is Florida's fastest growing port, located conveniently at the entrance of Tampa Bay.

and monitored at all times while on the port. Other workflows are specific to the type of commodity being transported, with perishable goods requiring refrigeration having their own specific workflow, to give just one example.

»We are a continuously evolving business. As our customers' needs change our needs change, and we have to be configured in a way that we can support that.«

David St. Pierre, Port Manatee's Director of Seaport Security

The implementation of the integrated system from Siemens coincided with a Wi-Fi implementation that enables security officers to access and input data into the system from anywhere on the port. The end result, St. Pierre says, is a much more detailed and robust accounting of the activities of port users than would otherwise be possible. Additional enhancements include an application known as the enhanced audit trail, which creates a long-term record of the activities of port users that helps the port to track trends and anticipate future needs. "We are a continuously evolving business," St. Pierre says. "As our customers' needs change our needs change, and we have to be configured in away that we can support that."

Bottom-line improvements

The integrated system also enables Port Manatee to better recoup and even reduce costs associated with security. When a temporary access credential is created, for example, the system is configured so that the appropriate escort fees are automatically assessed to users. The fully-automated remote operation of a port entry plaza to reduce staffing costs is now possible thanks to the system, as well.

Port Manatee is Florida's fastest-growing seaport, and its integrated access control and security information management technology helps make it one of the nation's most efficient and nimble, as well. "We have a unique geographic position and unique assets," says Deputy Executive Director Dave Sanford. "We're really very well positioned to diversify our cargoes for the future."

Sam Fahmy
Picture credits: Port Manatee

Krško Nuclear Power Plant meets strictest fire safety requirements

In a facility like a nuclear power plant, safety is high on priority list and nothing is left to chance.

Strict regulations

The Krško Nuclear Power Plant (Nuklearna elektrarna Krško or NEK) has been in operation for more than three decades. With a net electrical power of 696 MW, the plant generates over five billion kWh of electrical energy per year, which represents approximately 40% of the total electricity produced in Slovenia.

With modern organizational measures and equipment, the operational safety of nuclear power plants is guaranteed, also because of rigorous regulations governing this sector. Operational safety is also an integral part of NEK's vision, mission and strategic objectives (with fire safety as its inherent part). »Operational safety is the most important priority task within the framework of NEK's mission. Since the beginning of NEK construction we have treated every aspect of plant's operation with utmost responsibility and in a professional manner,« says NEK and acts accordingly when choosing fire safety solutions.

»NEK operates in accordance with the provisions of Slovenian law, and in accordance with U.S. standards for the areas which are not laid down by Slovenian law. In the fire safety area, the plant applies the standards prescribing the operation of fire safety equipment, in particular two current U.S. national standards NFPA-72 and NFPA-76 and compliance with the UL864 standard. These standards apply also for the fire protection of high buildings and campuses,« explains **Branko Ferk, process computer engineer at NEK.**

All NEK's active detection systems were supplied by Siemens, together with a certificate guaranteeing the operation of this equipment in accordance with the law. »Nuclear power plants in the USA must comply with the same standards. In Canada, they have slightly different compliance requirements; instead of UL864, they have ULC864 that covers certain requirements with regard to notification of persons (a prescribed beep sound). Other plants around the world may fully or only partially comply with the criteria of U.S. standards,« says Ferk.

Designing the fire protection system according to the framework document

The basis for the planning of NEK's fire protection system is a framework document laying down the level of equipment and prescribing compliance with the NFPA-72 standard. Ferk explains: »Only the candidates that were able to offer a fire protection system in accordance with this standard could qualify as suppliers.« Compliance with the existing fire protection system was also of great importance: »The essential element to consider when designing the fire protection system was compatibility with the existing system, and its upgrading to such system topology that would ensure a simultaneous data transfer to control room, to the fire fighting service room and to the ERP system.« Ferk lists a few more criteria that had to be taken into consideration during the design stage: the distribution of smoke detectors in relation to the surface area and topology of the plant, and to the structure of the equipment they protect; the distribution of detectors in ventilation shafts; the structure of smoke vents; the detection of sprinkler system trigger activation; smoke detection in special large areas with the help of beam detectors; smoke detection in areas of special importance with the help of aspirating systems (Siemens VESDA); detector separation by sectors and area coverage with different loops of different fire alarm control panels; allocation of detectors to a single fire alarm control panel (no. of detectors per control panel/loop); data transfer to control room and fire fighting service room, and management of fire alarm control panels; data transfer to the ERP system.

Compatibility with the existing system as one of the main advantages

The system supplied by Siemens was compatible with the existing fire protection system used by NEK: »The existing NEK's fire protection system was the MXL system by Cerberus Pyrotronics, a company that was acquired by Siemens. The MXL system is a generation older than Siemens fire alarm control panel system XLS. We were able to connect our MXL system with the new XLS system and thus upgrade the existing system,« explains Branko Ferk.

Since both products are also compliant with NFPA-72 and UL864, NEK chose Siemens as the supplier of fire alarm control panels and detectors.

Continuous improvement of detection system

Process computer engineer Branko Ferk underlines the importance of continuous development and progress in the area of fire protection systems. The detection system is changing constantly. The sensitivity of detectors is increasing/improving. For NEK, the important advantage for Siemens was that the company is a pioneer in detection technology: »The key advantage (emphasis) during the planning stage was a smoke detector with a temperature sensor, which was a novelty at the time, as it enabled the selection of operating mode per sector and thus prevented the activation of unwanted alarms during daily activities (welding, grinding, etc.). Such detectors are now widely used and can be found everywhere, also for other applications and with other producers.«

University Campus Rijeka

Over 13,000 signals coming to control system

Safety of personnel, students and equipment is of highest importance

Campus has given significant impetus

The University of Rijeka's image has been notably changed with the construction of the University Campus in between 2006 and 2016. University classes, the scientific infrastructure as well as the all-around standard of students living and studying there has been greatly improved. The construction of the Campus has given significant impetus to both the scientific and social interdisciplinary microenvironment, which enabled the creation of interdisciplinary study programs along with the transference of acquired knowledge into technological innovations, thus contributing to society in general. Alongside, new challenges emerged.

10 buildings and over 100,000 m² of challenges

According to **Žarko Dubrović, the Head of University of Rijeka's Technical Department**, the greatest challenge was to integrate the central control and management systems of the ten buildings constituting the University Campus into one service within the University's technical department – the Department for Control and Management: „The two existing buildings have gone through reconstruction phase during 2006 and 2009, four of them were built in 2010 and 2011, and now three new buildings intended for student accommodation are in the final phase of construction. Together with the administrative building of the Rijeka University we now have ten buildings that are managed and controlled through CNUS (central control and management system). The control center receives over 13 thousand signals through private IP infrastructure from all safety systems, protection system and access controls to highly-valuable equipment used in laboratories in some of the buildings. The entire closed surface of all highly-sophisticated buildings is more than 100,000 m².“

Žarko Dubrović, University of Rijeka's Head of Technical department

University campus Rijeka spreads over 100,000 m²

University of Rijeka's Technical department

Total solution by a professional system

At the Campus site Synova and Sinteso solutions are used for fire detection, SiPass for acces control and Siemens SPC series for anti-theft protection. The main advantage of the current fire detection system, which was supplied by Siemens, is in the total solution for surveillance and monitoring of a building complex like University Campus Rijeka that currently has 10 buildings (many more are planned), says Dubrović and adds many more advantages: „Integral approach to all systems (safety systems and systems of fire and gas protection), management of these with a small number of staff, service support and authorized licensed partners in maintenance, and reducing costs of energy consumption."

All these are all the more important since in the recent period the University Campus has enjoyed a growth tendency. "We have a growth tendency on top of approx. 20,000 users that use highly-sophisticated buildings/spaces, from parking garages, offices, lecture rooms, elevators, systems of uninterrupted power supply - UPS, laboratories with high-value equipment etc., and the safety of the staff, students as well as ensuring uninterrupted use of the mentioned rooms (approx. 100,000 m² for now) are of extreme importance. This can only be ensured by professional systems and professional personnel intended for such complexes," stresses Dubrović.

Thermal Power Plant Tuzla: Modernization with Cerberus PRO

The Tuzla Thermal Power Plant is a large industrial building in Bosnia and Herzegovina with installed power capacity of 715 MW. Existing old conventional systems for fire safety and security are being replaced with new technology that foresees all possible challenges related to the industrial nature of the complex.

Modernizing fire detection and overcoming industrial barriers

The owners of the Tuzla Thermal Power Plant decided to replace the existing, more than 30 years old conventional fire safety and security system with new technology and thus increase its safety and reliability even further. The industrial nature of the complex presented many challenges: correct detection in an industrial environment, the size of the complex and the need to connect the centrals into a network are just some of them. They had to be solved with the best possible solution – for which Cerberus PRO was chosen and special detectors of this program were implemented.

The answer is Cerberus PRO

To improve fire safety and security of the Tuzla Thermal Power Plant Siemens solution Cerberus PRO was chosen, while Siemens Solution Partner Arcus d.o.o. is providing the service. **Hasan Karabeg from Arcus** explains: "The substitution will be done in several phases. Until now two phases of fire detection system reconstruction were done and a project to replace all existing centrals while their implementation is already in progress."

The Tuzla Thermal Power Plant has its own fire-fighting service and in their building two FC726 fire control panels and one FT724 terminal were already installed. At the conclusion of the project, the facility will be monitored by 5 connected FC726 fire control panels.

The MM8000 Management System was also installed in the plant complex. "The pumping station Modrac is one of the buildings that belong to the thermal power plant complex, however it is situated 10 km away from the plant. Each event detected by the fire detection system of the Modrac pumping station is displayed on the MM8000 Management System monitors, alongside with everything that occurs in the thermal power plant," explains Hasan Karabeg from Arcus d.o.o. The transmission is ensured via optical cable.

Significant safety increase

The modernization of the fire detection system has led to significant increase in the thermal power plant's safety and enables better alarm and other event localization due to the change to addressable system. Moreover, with the new system, parts of the plant are being covered that couldn't be covered before due to technical limitations and disadvantages.

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Imprint

Publisher:

Building Technologies Division
Siemens d.o.o., Letališka cesta 29 c, SI-1000 Ljubljana

For the Publisher:
Igor Kulašić, BT Division Lead Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro

Content by:
Martina Merslavič, Head of Corporate Communications and Government Affairs, Adriatic Region
Mateja Bizjak, Communications and Government Affairs, Siemens Slovenia
Siemens global

Photographs by:
Anđela Grozdanić
Dario Njavro
Denis Ruvić
Urban Štebljaj
Siemens Global

Layout by:
Jan Jereb

Printed by:
R-tisk, Ljubljana, Slovenia