ENERGY AND BUILDING

SOLUTIONS

2023

A Magazine About Security, Comfort and Efficiency in Commercial Buildings

Leuphana University: Building Automation in the Central Building

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Digital Cockpit for Fire Safety

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Invented for life

BOSCH

ABOUT THE COVER
Bosch's building and room automation make a key contribution to efficiency at Leuphana University's Central Building.

Dear readers,

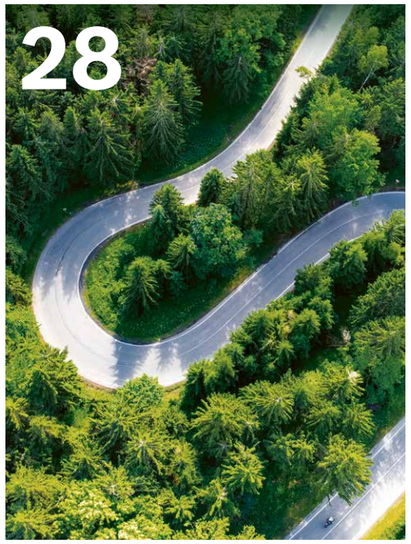
Three out of four people worldwide believe that technological progress will make the world a better place. 83% of them also consider technology to be the key to fighting climate change. That's what this year's Bosch Tech Compass is telling us. And these findings dovetail perfectly with our mission of 'building solutions for a better life'.

Digitalization and artificial intelligence are opening up new possibilities, offering more security, creating comfortable living environments and worlds of work, and making building management more efficient while producing fewer emissions. Their continued success requires one thing above all else: an exceptional team like ours at Bosch Energy and Building Solutions. Around 6,000 competent and motivated associates – from the junior talent to experienced professionals – develop, implement and manage state-of-the-art building solutions, combining an excellent customer orientation and technological expertise with high level of enthusiasm. It gives me a great deal of pleasure to see our team continue to grow and work together to make the world a safer and more sustainable place.

This year's edition of our magazine illustrates the trust you have placed in our technological solutions and, above all, the trust you have placed in us as your long-standing partner.

I wish you an interesting read!

THOMAS QUANTE
CEO Bosch Building Technologies



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More Than 95,000 Square Meters of Sustainability

Leuphana University Lüneburg is the first and only university in the German-speaking world to have a sustainability faculty. When it constructed its new Central Building, it asked Bosch Building Automation GmbH to design an efficient and resource-saving building and room automation solution.

Sustainability is a guiding principle for all activities at Leuphana University Lüneburg. Its research faculties include a ‘School of Sustainability’ offering a range of degree paths relating to this field. And the university is also involved in several public sustainability projects. Its 95,000-square-meter campus is designed to make sustainability an integral part of everyday life for the 9,700 students and more than 1,000 employees who live and work at the university.

Leuphana is located on the site of a former army barracks. Its futuristic Central Building – designed by the architect Daniel Libeskind – forms a striking counterpoint to its 28 other brick buildings. As the new campus hub, this spectacular building is the ideal place for members of the university to study and research and for guests to enjoy concerts and gala events as well as other university functions. The innovative Central Building – opened in 2017 – is not the only structure on campus with a sustainable energy concept that makes an impression. Over the past few years, Leuphana University has introduced many measures to make the entire campus more sustainable and climate friendly. And it can point to many successes: the university has been European EMAS-certified since 2000, and has been carbon neutral on its own initiative since 2014. Two key elements of its sustainability strategy are its efficient use of renewable energy and resources, and its energy revamp of existing buildings.

Bosch’s intelligent building and room automation solution plays an important role at the Central Building. It controls the heating and cooling provided by an adjacent biogas-fueled combined heat and power plant, which also heats the university’s central campus. The system also controls the ventilation systems and the adjustable window panes, which automatically darken in response to sunlight (e-control). In the evening, on weekends and during vacations, heating is automatically reduced or switched off. The ventilation systems in the areas used for events and the large lecture halls are equipped with CO_2 sensors: they measure the CO_2 content in the air in the rooms, providing not only better air quality and better concentration for the students, but also energy savings.

The futuristic 13,200 square-meter Central Building houses students, seminars and three centers for research as well as the auditorium, which can hold up to 1,200 guests.

WAVEFRONT STUDIOS

Preventing Media Data Leaks

IF YOU'RE A FAN OF MOVIES OR SERIES, hearing spoilers can ruin your day. To make sure this never happens, an immense amount of energy is invested in keeping media data confidential by the time a film enters into post-production at the latest. Our team has implemented a comprehensive security concept for the Munich-based audio post-production specialist Wavefront Studios GmbH – one that fully satisfies the requirements of this major provider of streaming content.

In their ten sound studios and editing suites, which offer complete audio post-production for films, made-for-TV movies and series, the experts from Bosch have installed a solution that provides access control as well as time and attendance management both for employees and third-party companies – while also providing a fire and intrusion alarm system. If a fire or a break-in ever occurs, the Bosch control center is informed immediately and can take appropriate measures. A local video feed also monitors the entrances to and exits leading out of the studio, which means that endings to movies and series finales stay secret. It also means that you are treated to an untarnished viewing experience, which is great news for our long-term cooperation with Wavefront Studios as well as for the company's own success. The reduced administrative expenses when it comes to access privileges and time and attendance management also have enormous benefits for the company.

ONLINE RETAILER NEWSHA

SECURE PROCESSES

Process security is an important success factor for online retailers like NEWSHA. When parcels with high-quality hair-care products are sent to customers, they have to be complete and contain the right products as well as being attractively packaged. For several years now, NEWSHA has relied on security technology from Bosch, which allows it to monitor the company's entire premises, including the truck unloading station. To increase in-house process security further, NEWSHA is now documenting the entire packaging and return process in the distribution center using video technology from Bosch in full compliance with the General Data Protection Regulation. It allows the online retailer to easily retrace complaints or potential inventory discrepancies.

TK ELEVATOR ROTTWEIL TEST TOWER

Innovations at Lofty Heights

SIX MINUTES AND FIFTY-SIX SECONDS FOR 1,390 STEPS: every year, hundreds of runners make their way to the top of the TK Test Tower during the annual Tower Run – the course record is under seven minutes. The actual purpose of this imposing structure, owned by TK Elevator in Rottweil, is to test and certify elevator innovations that have the potential to significantly shorten development times for future skyscrapers throughout the world, as well as those already under construction. And part of the tower right from the beginning: an intelligent building automation solution from Bosch Building Automation GmbH. This system makes an important contribution to sustainable and efficient operation of the test tower – which is also the highest observation deck in Germany and a real tourist magnet.

The visually imposing tower is 246 meters tall and has a diameter of 21 meters. It houses twelve elevator shafts in which, among other things, high-speed elevators are tested – ones that can reach top speeds of up to 18 meters per second. Some of the shafts extend almost the entire 200 meters up to the top of the tower; others stop at 120 meters. The adjacent space is used as energy storage for thermal exhaust air and features a control system that makes use of the air in a unique way. The exhaust heat is recycled by heat exchangers and made available to two heat pumps that are used to heat administrative buildings, events areas and the observation deck. The test tower is also covered in a sheath made of fiberglass fabric, which reflects the light at different times of the year or different times of day. Depending on the weather and the time of day, the tower can adopt a completely different appearance.

Planning engineer Felix Böttcher from Bosch Energy and Building Solutions talking to Michael Danner-von Wilpert, business manager at the Sozialwerk.

The 100-Percent Project

In the Black Forest, Bosch Energy and Building Solutions supplies Sozialwerk Am Bruckwald and the neighboring residential district with local heating from renewable energy.

The idyllic community of Waldkirch is located at the edge of the Black Forest. The road in and out of town leads to Sozialwerk am Bruckwald. Three hundred people live at the site, and there are two hundred and fifty jobs for adults with special needs in a large number of workshops that produce high-end foods, do gardening work and devote their energy to crafts and manual work. “The site was built just under 25 years ago. Back then, our wood chip-fired system made us pioneers in the area of renewables,” says Michael Danner-von Wilpert, business manager at the facility. “Even then, it was important to us to ensure that our energy supply was sustainable and our carbon footprint small.”

The Sozialwerk has continued to grow over the years, which ultimately necessitated an expansion. The old system just didn’t have the capacity any more and a new solution was required to supply newly constructed buildings and the adjacent site with a decentralized heating network. Infrastructure was built that allowed five new buildings to be connected to the existing local heating network. “It was clear that we wanted to continue using wood as a fuel. The existing wood chip-fired system was unable to supply the new buildings with both heat and warm water,” recalls Felix Böttcher from Bosch Energy and Building Solutions.

As a planning engineer, he managed the project throughout the consultancy, planning and final implementation stage before handing the project over to the Bosch Operations Team. The on-site work was something special for him. “The Sozialwerk is a wonderful thing. We felt like we really belonged to the community right from the beginning.” As Michael Danner-von Wilpert adds: “People who come here are part of our community, whether they’re a visitor, craftsperson or, as on this project, an energy expert. That means, for instance, that we all sit down to lunch together – everyone talks to everyone. This allows us all to get to know each other. And once the Bosch Team got down to work, our residents found it exciting and interesting.”

100% TEAM POWER FOR THE NEW WOOD CHIP HEATING SYSTEM

The new solution is based around a 500 kW wood chip-fired boiler system. “Right from the moment we first contacted the engineers at Bosch up to the inventory analysis, everything proceeded quickly, and we soon had the foundations for a grant proposal. In the future, we’ll have the means to supply the special accommodation, which is currently being developed at the periphery our site, with energy. That’s in keeping with our philosophy of opening up spaces for development within the community,” explains Michael Danner-von Wilpert. These ideas and goals remained front and center during the planning phase. “This is how the site will develop and change. How will people live and work here in the future? Factoring in these considerations allowed us to extrapolate our power requirements and adapt our supply of heat to our future needs,” says Böttcher, describing the planning phase. “The required capacity will continue to grow, but the building where the heating system is located won’t. This meant we had to get creative.” Böttcher and his team planned a new heat distribution system. Three pipelines supply heat to the different building clusters that have gone up over the years. One line, sections of which were newly laid,

> “The required capacity will continue to grow, but the building where the heating system is located won’t. This meant we had to get creative.”
>
> **FELIX BÖTTCHER, BOSCH ENERGY AND BUILDING SOLUTIONS**

Consistent teamwork from the initial idea right through to implementation and now operation: (from left to right) business manager Michael Danner-von Wilpert, facilities managers for the Sozialwerk, Reinhard Donner and Ewald Weindl, and Peter Buehler and Felix Böttcher from Bosch.

A 500 kW wood chip-fired boiler system forms the heart of the new solution. For this photo, Peter Buehler from the Bosch Operations Team gives us a look inside the combustion chamber.

supplies the new buildings on the other side of the road. Each of these lines is supplied by a new, high-efficiency pump of its own. When modernizing the energy center, the control and regulation systems were updated, and the Energy Platform from Bosch was installed. Since then, the central heating station and the substations of the individual buildings have also been equipped with heat flowmeters. These are all measures that are critical to increased efficiency and a reliable monitoring system.

“Using the Energy Platform, we receive data from all users, providing us with a comprehensive overview. If anything should go wrong because, for instance, a valve is defective, we’ll see it and pass that information along to the facilities managers,” explains Böttcher. The Energy Platform from Bosch is a cloud-based software service that allows energy data from several sources to be recorded and analyzed in real time. For the Bruckwald site, for example, the platform gives us a picture of the wood-fired boiler and measures the fill level of the bunker and the heat storage units on the heat generation side, as well as key parameters on the consumer side.

“Our employees have remote access to the building control system and the Energy Platform. Even the on-site facilities managers can ⟶

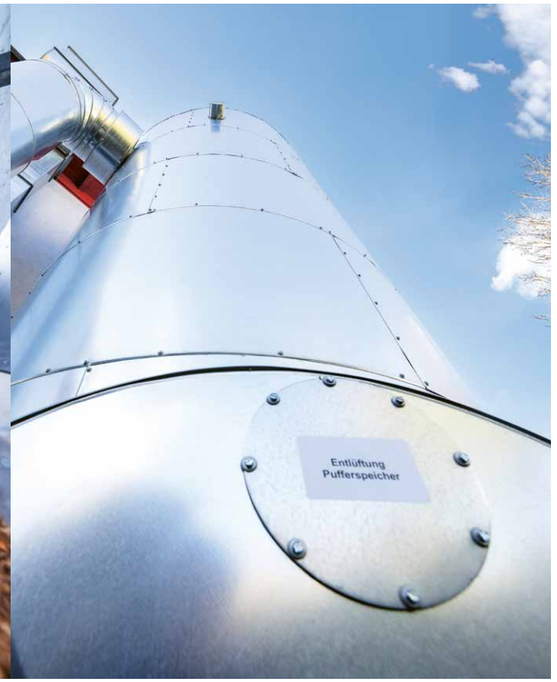
use their computers for direct access to information about whether everything is running smoothly," says Böttcher. In the background, the Energy Platform is supplying even more information to the Operations Team from Bosch. Over the long term, data can be evaluated that could point to potential new approaches to energy efficiency. This will allow the energy and resource requirements to be monitored and managed precisely to ensure optimal use. The Bosch Operation Team monitors the system parameters, optimizes the system during operation, and manages maintenance, thereby ensuring that the energy supply is 100% reliable.

Meanwhile, in the central heating system, almost nothing has been left untouched. The 10,000-liter hot water container is a thing of the past, having been replaced by a new storage tank – located outside the facility – that has double the capacity. "This provided more space for a new, larger wood-fired boiler in the central heating system, the new pressure maintenance system and a new gas condensing boiler," explains Böttcher. An old, now-dismantled gas boiler was used for the interim to ensure a supply of heat until the new wood-fired boiler could be installed. In the future, the new gas condensing boiler will provide a reserve. "We've installed an intelligent control system that can monitor the temperature and fill level. If the values are too low, the gas boiler is automatically activated," explains Böttcher.

BIOMASS FACILITIES TO REDUCE CO_2

The untreated wood chips are transported short distances by truck from regional sources and dumped directly into the underground bunker. "Our team has years of experience in planning and operating biomass facilities. Using wood chips as fuel remained the obvious solution here in Sozialwerk Breisgau," Böttcher explains. A push floor

The untreated wood chips used in the wood-fired boiler are sourced regionally.



The new storage tank was set up outdoors and has a capacity of 20,000 liters of hot water, creating room for a larger wood-fired boiler in the central heating system.

is used to transport the wood chips onto a screw conveyor, which carries the material into the central heating system and, from there, into the combustion chamber of the furnace. The ash produced is collected in special containers and later added to lime as fertilizer for the forest. A high-efficiency electric filter is used to reduce the particulate matter which the flue gas contains.

Sozialwerk am Bruckwald made doing more than the bare minimum its mission right from the beginning. "It's not about doing what's necessary, but doing the maximum possible," says Böttcher. The engineering team gave 100%, and the result is that the regenerative heating is produced using nearly 100% renewable energy sources.

Different types of certified organic baked goods are produced in the Sozialwerk's own bakery and sold in the region.

Bringing More Energy Efficiency to Facilities Management

For nearly 50 years, Hörburger AG has specialized in building automation and efficient energy use in facilities management. The company has belonged to the Bosch family since 2022. Together, they now intend to shape and build up the growing market for intelligent building solutions.

Hörburger AG headquarters in Waltenhofen.

Crises are often motors of innovation. Motivated by the 1973 oil crisis, Kurt Hörburger from the Allgäu region in Germany began seeking solutions to the problem of self-contained control systems for the various technical systems in a building – control systems that ensure resources are not wasted. And 50 years later? “In all sectors, energy efficiency is the topic on everyone’s mind. With our automation solutions, we – together with Bosch – have our finger on the pulse of the times,” says Christian Hörburger, who is the son of the company founder and also the CEO of Hörburger AG. At the moment, only one in eight companies is using digital building technologies to reduce consumption, even though savings of 10% to 30% are possible, and an investment pays itself off in three to five years.

With more than 200 employees, Hörburger AG is one of the leading automation companies in Germany and can boast a comprehensive product and solutions portfolio in the areas of building automation, switch cabinets, retail facility management, energy management as well as machine automation. It also has decades of experience in planning, implementation and service. Together with Bosch Energy and Building Solutions, it has been able to leverage more synergies between the various plants and exploit the potential of IoT, connectivity and artificial intelligence. “We share the same vision of the future. Together we’d like to shape and expand the fast-growing market for intelligent building solutions, thereby bringing more efficiency and sustainability to facilities management,” says Hörburger.

“The customers want the best technology and only one contact person.”

CHRISTIAN HÖRBURGER, CEO HÖRBURGER AG

A FOCUS ON CUSTOMER-ORIENTED FLEXIBILITY

Office buildings, research institutions, event venues, hospitals, chain stores, industry – Hörburger AG serves a broad range of sectors. Well-known firms such as Liebherr, Nestlé, Vetter Pharma, the KfW Bank Group, REWE and the drugstore chain dm trust the company’s expertise. The thing that makes Hörburger AG’s solutions so special is that the company is a systems partner that works independently of specific manufacturers, which means it can find just the right make for the job and use nearly any technology. Customers receive an automation concept perfectly suited to the building and its users’ routines, so they can be certain that the use of resources has been optimized. Hörburger AG itself also designs and builds a wide range of individualized switch cabinets for building automation, so the specific demands of both the building and systems engineering can be translated into an optimally integrated technology. “Because we’re open to any technology, we can perfectly adapt our services to the existing technology and also integrate new solutions. This means we can provide sustainability and the greatest possible flexibility,” explains Hörburger. If usage patterns change and new challenges present themselves, Hörburger AG can react without having to invest a lot of additional money in technology – which is good for its customers’ bottom line.

A VALUED FULL-SERVICE PARTNER

Building automation is more than just the sum of its individual systems. “The heating technician builds the heating system, the ventilation specialist does the ventilation and air conditioning. But the intelligence – how everything works together, how it’s all implemented – that comes from us,” says Hörburger. Beside consulting and the creation of solution concepts, the automation specialist also provides operational support. “Customers want the best technology and only one contact person,” says Hörburger. Another reason that customers demand this is that all the technology has to be monitored while it is in operation – that is another thing that Hörburger can do, thanks to modern IoT platforms also made by the company itself. “The most important thing is satisfied, loyal customers and our top-notch team.”

Comparability is the Key

REWE International AG has been relying on the expert knowledge of the Bosch subsidiary Hörburger in the areas of building automation and energy management since 2017. All the energy consumption data from over 2,000 branches of the brands Billa in the Czech Republic, Bulgaria and Slovakia, Penny in Italy, the Czech Republic, Romania and Hungary as well as Iki in Lithuania are recorded and monitored using the cloud-based IoT platform QBRX. Christoph Utikal, energy management representative (CEE) at REWE International AG, and Markus Müllenberg, head of the Hörburger Erfurt Branch, explain how this works.

Are you on target?
Christoph Utikal: We are. REWE's goal is to reduce 30% of our emissions relative to 2019 levels by 2030 and, by 2040, to be climate neutral.

Christoph Utikal,
energy management representative (CEE)
at REWE International AG.

How does QBRX help with that?
Markus Müllenberg: Penny in Italy wanted to know how it could save more energy. We saw a lot of potential in air conditioning. Now the systems are automatically switched on and off in sync with store opening hours using the tool.

Markus Müllenberg,
head of the Hörburger
Erfurt Branch.

REWE has an ambitious sustainability strategy. Could you say: the better the data, the bigger the potential savings?
Christoph Utikal: Yes, for us, the data give us the leverage to create savings.
Markus Müllenberg: REWE International has recorded all of its energy consumption figures since 2010. That's truly unique. The data are integrated into our proprietary energy management software QBRX, which we use to generate analyses, reporting and documentation. REWE can quickly map and monitor its CO_2 footprint. Other companies only know how much power they use.
Christoph Utikal: The platform allows us to see if we're on target for reaching REWE's climate goals.

Christoph Utikal: This helps us to ensure store managers develop a greater awareness of energy efficiency.

What sort of savings are possible?
Markus Müllenberg: Ten percent savings are possible with measures that are easy to implement. But the data needs to be recorded and made transparent.
Christoph Utikal: Comparability is the key.

Can this approach be applied to other industries?
Markus Müllenberg: Yes. REWE International is a strong driver of innovative uses for the platform. We've developed a lot together. Other companies will also benefit from this.
Christoph Utikal: For us, working with a partner like Hörburger, which learns from a lot of different industries, is an advantage. A perfect example for how to best exploit synergies.

How quickly does the investment pay off with a solution like this one?
Christoph Utikal: For us, the investments were recouped within a year.
Markus Müllenberg: A major advantage of QBRX is that it's an open system and it's flexible. We can use practically all the technologies already installed by the customer, integrate third-party data, and create interfaces. That saves on new investments.
Christoph Utikal: The openness of the system is an important advantage.

Where are future developments heading?
Christoph Utikal: In the future, more areas will be automated so that issues can be dealt with proactively.
Markus Müllenberg: That's right, there are going to be more forecasts. We'll be comparing future data with real data in order to detect anomalies and further reduce energy use.

ALL IN ONE:

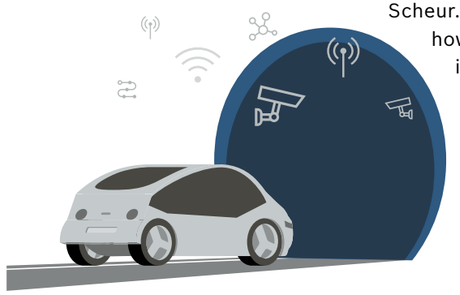
QBRX is a cloud-based platform that unites solutions for energy management and technical facility management as well as a range of building technology functions in one software. All processes, units, systems and devices are interconnected, organized and coordinated in the IoT Service Desk. As such, QBRX connects data analysis, remote administration and workflow management, thereby making separate interfaces unnecessary.

Discover the advantages of QBRX:

ROTTERDAM BLANKENBURG CONNECTION

Optimal Communication Between the Tunnel and Traffic Control Center

The current construction of the Blankenburg Connection west of Rotterdam brings with it the new A24 freeway, which will link up the existing A20 and A15 motorways and optimize the flow of traffic around the port. The construction project comprises a freeway with two interchanges as well as a land tunnel and an immersed tunnel under the river Het Scheur. When considering how to develop and implement an integrated audio/video communications system, which is designed to help road users connect to the traffic control center, the construction consortium BAAK, on behalf of Rijkswaterstaat, found a partner in Hacusto Protec – part of Bosch Building Technologies since late 2021.

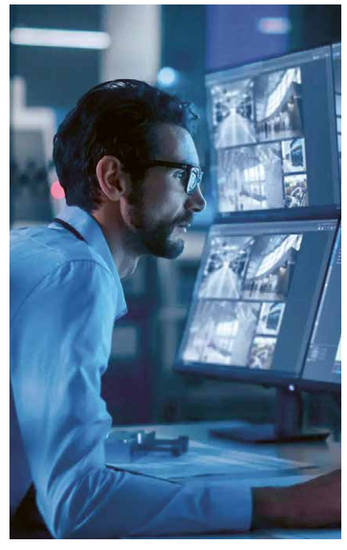


When the tunnel opens in 2024, its users will be able to count on high security standards: camera footage can be monitored both on site and in the traffic control center. The communication system in the tunnels consists of emergency telephones and two-way intercoms both along the route and close to the technical equipment. That means that in an emergency, road users and technical personnel can quickly contact the traffic control center, which will be able to use the public address system to announce instructions to road users, as needed – both in the tunnel and at the entrances.

VALUABLE VIDEO TECHNOLOGY AND AI-BASED INSIGHTS

Buildings Perfectly in Sight

Video technology has been a standard feature in facility management for several years now. Apart from filming things, cameras also capture a lot of data that can be used to secure a building and increase its efficiency, as well as improve the conveniences it offers. Today, cameras are a part of AIoT infrastructure and are also used as sensors. So when you see a camera in a parking garage, it is not only filming what the vehicles are doing, but also how many there are coming and going. Video technologies can therefore help to better manage waiting lines in a building or even to identify license plates and couple them to access rights. When AI is integrated into camera technology, it makes predictive analyses of image data possible – which means that incidents can be prevented before they even occur. With machine learning, cameras are taught to detect patterns so they can analyze situations in real time both faster and with greater precision, and use this to recognize trends.



Sound and Security Perfectly Combined

Outstanding bass, deafening goal celebrations and crystal-clear announcements: in the Kia Metropol Arena in Nuremberg, the Bosch Team has implemented a complete digital solution that is about to totally revolutionize the world of public address and voice alarm systems.

Sporting events at the level of Premiere League matches, cultural events, conferences, company events and shows: since it opened in 2021, the Kia Metropol Arena in Nuremberg has delighted audiences and participants with its flexibility and versatility, providing plenty of seating and great sight-lines for over 4,000 viewers on four grandstands. This solution – planned and implemented by Bosch – offers top-notch safety and security over the entire arena grounds along with a professional sound system for a wide variety of events. Beside the newest IP technologies for video monitoring, intrusion and fire safety, integrated public address and voice alarm system is another smart highlight of this modern arena, which uses no analog transmission technology at all.

> “This combination has never existed before. And of course, this solution satisfies all applicable standards.”

MORE THAN EFFICIENT: GREAT SOUND AND A VOICE ALARM IN ONE SYSTEM

Great sound for shows and events, rapid voice alarms and perfect comprehensibility in dangerous situations, all while offering easy-to-use and sustainable everyday operation – the sound and voice alarm solution for the arena in Nuremberg leaves nothing to be desired when it comes to larger events and sets a new standard for future projects. Its technological core is the IP-based Praesensa System by Bosch, which is particularly versatile and failureproof, and features an innovative multi-channel loudspeaker architecture. For this solution, Bosch connected a digital mixing console as well as wireless microphones to the system and installed a total of 56 certified full-range speakers made by Electro-Voice throughout the interior of the Kia Metropol Arena.

The reverberation times resulting from the architecture of many sports halls make room acoustics a particularly tricky challenge. This is why the sound engineering experts and acoustic designers at Bosch first conducted exhaustive simulations using 3D models and then did the fine tuning on site. The result: a perfect sonic pressure for the 20,000-watt sound system along with an exceptional acoustic experience and comprehensibility of announcements – all of which conforms to requirements in the relevant standards, and remains flawless no matter where you are seated in the arena. The sound concept encompasses all buildings and areas and includes additional speakers in, for example, the VIP lounges, press boxes, catering area, changing rooms and training zones. This ensures that all announcements are audible in unparalleled verbal quality everywhere.

“This combination has never existed before. And of course, this solution satisfies all applicable standards,” explains David Ziegler from Bosch Energy and Building Solutions. “The system is completely digital and features clear and easy-to-use controls, and it’s also flexible and scalable. It’s just as well suited to a school setting as it is to an office building or an airport.”

Let’s Get DIGITAL!

Buildings with advanced digital technology provide strategic advantages and stand on a particularly solid foundation. That not only makes them fit to withstand any potential future challenges, it also equips them for the present. After all, digitalization is now helping to make flexible and intelligent facilities management a reality, and is therefore also helping to find solutions to the most significant challenges already being faced.

The balancing act between economic viability and sustainability in building and property management and the increasing demands of building users present owners and operators with a difficult task. Recent changes have made it crucial to be able to react faster than ever before. Existing processes and systems must be scrutinized and adapted to new realities. If it was not apparent before, the pandemic made it crystal clear: the future is all about data-driven solutions. How can owners and operators use the potential of digitalization to prepare buildings for times to come?

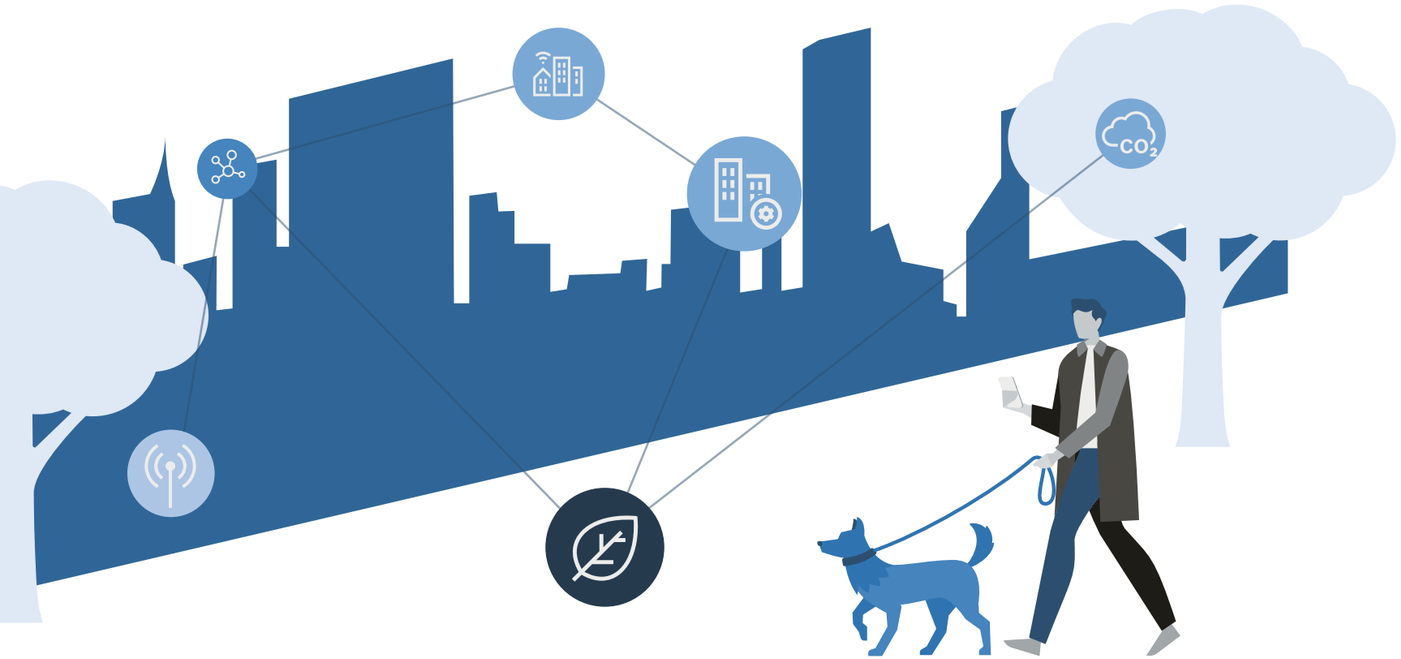
CHALLENGE #1

MAKING NEW WORLDS OF WORK A REALITY

Who still remembers open-plan offices with cubicles, uncomfortably cool cafeterias and colorless conference rooms? Once upon a time, workplaces were supposed to be functional above all else; today, an environment that caters to its users and prioritizes individual satisfaction is the way forward. Between New Work philosophy and economically viable flexibility, new worlds have emerged that are defined by activities. Hybrid working has become a norm in many sectors, while formerly rigid concepts have morphed into inspiring co-working spaces and tedious, manual processes are or are becoming ever more digital. The transformation of the work environment is oriented toward the requirements of the digital generation, which, since 2020, makes up more than 50% of the workforce (German Federal Statistical Office). The logical consequence is not only a change to floor plans, but also smaller ones that cater to demands for more flexibility. Digital solutions help to reduce costs for the operator, while ensuring user satisfaction: efficient floor-space management is aided by sensors – and it is convenient for employees to book conference rooms and workspaces, and record work hours using a smartphone, among other things. This also saw improvements being made to aspects related to security, and it is now possible to link access control equipment with intrusion alarm systems and control them using a mobile access solution. Today’s automation solutions help facilities to adapt to new demands quickly by ensuring that temperature, air conditioning and lighting provide comfortable and healthy environments, which are appropriate to the situation and incur minimal operating costs.

“Flexible open-office concepts, work from home and telecommuting, population pyramids and sustainability goals are all projected to contribute to further reductions in floor space requirements. Digitalization in the form of workspace management systems and the integration of IoT applications with integrated sensors will become an important instrument in the intelligent management of floor space requirements and availability, as well as its partial automation. Regarding the occupancy situation, the migration of daily and potential load conditions into systems that use predictive modulation of building control technologies will promote energy use optimization.”

MATTHIAS MOSIG, HEAD OF THE GEFMA WORKING GROUP DIGITIZATION, HEAD OF DIGITAL TRANSITION AT TÜV SÜD ADVIMO GMBH



CHALLENGE #3
PROMOTING SUSTAINABILITY

Buildings are currently responsible for 40% of CO_2 emissions worldwide. Intelligent buildings can make a major contribution to reducing these emissions.

Connected energy management solutions make energy use, savings made, and the CO_2 footprint of the building fully transparent, while also enabling increased energy efficiency and emissions savings of up to 30%. Building automation uses presence-based climate control, ventilation control, intelligent lighting and shade control, among other systems, to save energy. Many existing commercial buildings already make use of building automation systems, which, even in their current form, are easy to modernize and upgrade. More potential savings can be identified using information from access control and video systems. Cloud-based IoT services for remote use improve the performance of HVAC systems by analyzing use and proposing optimizations. That not only saves energy but also time, while simultaneously helping to prevent long commutes – for external technicians too – and to lower CO_2 emissions.

Which digital foundation does a building need to have in order to overcome the challenges it is facing? Our CTO, Andreas Mauer, on the four pillars of a transparent building:

CHALLENGE #2
LOWERING OPERATING COSTS

More than ever before, the optimization and reduction of costs is a priority when it comes to the construction and operation of buildings. 80% of all building costs are generated by operating expenses, while the costs of energy and specialist personnel – which is becoming more and more difficult to find – are increasing. Investors and operators are demanding efficiency and flexibility, maximum comfort with minimum use of energy and personnel, as well as the ability to tweak fluctuating operating costs. The intelligent use of data from building technology, diverse systems, and software and sensors allows costs to be reduced, processes to be simplified and sped up, and scenarios and prognoses to be developed. The latest cloud-based building management system uses real time data and help from a digital twin to ensure full transparency and optimized operating processes without a requiring significant manual intervention: remote monitoring, as well as optimization and malfunction management, become less time-intensive and more predictable; adverse operating conditions are detected early and corrected before disruptions can occur.

29%
of the CO_2 savings
out of the total 51-million-ton CO_2 emission reductions goal for 2030 can be achieved by means of digitalization in the building sector.
Source: Bitkom

Building automation is not a ‘nice-to-have’ but rather a ‘must-have’ for sustainable management. With an investment equivalent to only 1% to 2% of construction costs, it provides enormous leverage over the entire life cycle of a building and is also a good starting point for digital property modernization. As concerns building security, artificial intelligence and new technologies help operators to better understand anomalies and take proactive measures. For instance, operators receive ‘intelligent insights’ from software that is able to evaluate video images captured in real time using several cameras, and generate recommendations for action based on the data.

DIGITALIZATION OF BUILDINGS – WHICH POTENTIAL IS THERE?

Level 0:	Level 1:	Level 2:	Level 3:	Level 4:
Non-digital building	Digital building	Connected building	Smart building	Autonomous building

Whereas there was previously a focus on individual elements of building technologies, smart digital buildings represent a decisive step forward, enabling a holistic view of an entire building. Using networking and digital services, entire ecosystems are created in which disparate disciplines in building technology all work in tandem. This allows data to be merged, which creates the greatest possible added value for owners, operators, users and the environment. The digital transformation of buildings is a step-by-step process. How is your building progressing?

Security for Unique Cultural Treasures

National Heritage Board

The museums and other facilities managed by Singapore's National Heritage Board (NHB) contain unique cultural treasures. To safeguard these, a Bosch team developed and implemented a tailored security approach for four of the island city-state's most important collections.

Singapore's National Heritage Board (NHB) oversees several museums and other facilities housing unique cultural treasures – jewelry, textiles, paintings, and artifacts – that tell this multicultural island nation's story. Bosch, which was sub-contracted, equipped four important facilities managed by the NHB with a new security system: the National Museum of Singapore, which is the country's oldest; the Peranakan Museum, which holds one of the finest and most comprehensive public collections of Peranakan objects; the Heritage Conservation Center, where paper, objects, paintings, and textiles are stored and conserved; and the Sun Yat Sen Nanyang Memorial Hall. "We won the client's confidence in an early planning stage by presenting highly detailed proposals geared to the unique requirements of the individual buildings," recalls Bosch project manager Toh Hong Lee.

MUSEUMS AND SECURITY: INVESTMENTS FOR PRESERVING CULTURAL TREASURES

Bosch developed and implemented solutions for access control, face recognition, intrusion protection, and video surveillance, which were deployed where required. The networks are interlinked and the connected security system can be flexibly expanded at any time. It is intuitive to operate, which facilitates the work of security personnel. In addition to installing security systems such as intrusion alarm systems and motion sensors that pinpoint the location of the intrusion, Bosch also needed to meet certain special


© National Museum of Singapore

requirements, including training the cameras to identify and provide alerts about any unauthorised movements. Areas with stricter security requirements are now protected by access control systems with individually assigned access codes. For certain facilities in the Heritage Conservation Center, integrated facial recognition systems even allow authorized individuals to enter contactlessly. In this way, the National Heritage Board in Singapore has successfully worked with Bosch to safeguard irreplaceable cultural treasures.

Fire Safety in the Entertainment Industry

Dynamo in Eindhoven is a youth center, music venue, school and workshop all in one – a place where young talent can learn their craft. A variety of activities that appeal to a wide audience are held in the complex, including dance, music and new media.

The Dynamo Youth Center in the Dutch city of Eindhoven is a popular venue that accommodates a large number of people. Optimal fire protection is essential to their safety.

The managers of Dynamo were on the lookout for a fire safety solution that met the specific demands of the location while ensuring safety at a variety of events – for instance, concerts or performances in which fog machines or pyrotechnics are used. "Bosch developed a fire safety solution that was tailor-made to our specific needs and wishes," says Dries Noppe, facility manager at Dynamo. The certified fire alarm system with its extensive monitoring functions also meets the requirements of the fire department as well as the municipal offices responsible for the venue. One challenge was to find a suitable solution for rapid detection of fire and smoke in the roughly 16-meter-high atrium of the youth center, so Bosch installed special optical smoke alarms that can be stationed high up on a structure and monitor an extensive area using an invisible infrared beam. To allow drumming courses to be held at Dynamo without the noise being heard throughout the entire building, Dynamo has been equipped with soundproofed rooms. Bosch therefore implemented an evacuation system that uses both acoustic and visual signals throughout the complex to make sure that participants in the courses are able to hear the evacuation signal in the event of a fire – something that helps employees and visitors alike feel safe.

A Climate-Neutral Company: How to Make Your Own Energy Transition a Success

Climate protection is a challenge – for the economy, for technology, and for many other domains. At the same time, climate protection also presents a major opportunity for companies that are willing to address this important issue.

Ice shelves are melting, sea levels are rising, and extreme weather events are occurring more frequently. Climate change is reshaping our world and impacting the environment as well as our societies and economies. The consequences can already be clearly felt and will only increase over the coming decades. It is high time to take action. The path to a sustainable future with effective climate protection can only be achieved through collective action. With the Green Deal, the European Commission has laid out a road map to a climate-neutral Europe by 2050. The goal is to change the economy and society to make them sustainable and to provide Europeans with better and healthier lives: the plan aims to achieve a 55% reduction in greenhouse gas emissions within the EU by 2030.

Companies that make sustainability and climate protection a cornerstone of their strategy and are resolute in its implementation can do much more with much less, something that Lisa Reehten at Bosch Climate Solutions is well aware of. “The pressure to act will only increase, not just due to the political framework, but because employees, customers, partners and investors are already demanding that companies commit to increasingly sustainable business practices and activities by introducing transparent climate protection programs and by providing evidence of successful reductions. Climate protection will increasingly become a competitive advantage. Therefore, investing in the path to climate neutrality means making a long-term investment in economic viability, growth and the future of the generations both today and tomorrow.”

MISSION ZERO: STEP BY STEP TOWARD A CLIMATE-NEUTRAL FUTURE

In order for a company to reliably implement its own energy transition, it is important that it takes concrete steps in the right direction right from the beginning. Before any measures are put into place, correctly determining the current status of the carbon footprint is a must. The Greenhouse Gas Protocol – one of the most widely used standards for the categorization of direct and indirect emissions sources – provides a general orientation point. These emission sources are divided into scopes 1 to 3 according to their origin: scope 1 comprises direct emissions from burning fossil fuels in the company’s own plants, scope 2 involves emissions related to purchased energy such as electrical power, while scope 3 is made up of indirect emissions due to purchased goods or services, such as travel.

“The path to climate neutrality means making a long-term investment in economic viability, growth and the future of the generations both today and tomorrow.”

LISA REEHTEN
GENERAL MANAGER, BOSCH CLIMATE SOLUTIONS

If emissions sources are identified within a company’s operations, it can concentrate specific measures on the optimization of scopes 1 and 2. “Keeping the following mantra in mind – ‘eliminate and reduce’ – companies can now define where they have opportunities to increase their energy efficiency and, for example, use regenerative energies or green power,” explains Reehten. Scope 3 can be dealt with in subsequent steps. When a company makes a commitment to full climate neutrality, this means its processes, products and services do not increase the amount of CO_2 in the atmosphere any further. “It’s also clear that, despite anyone’s best efforts, manufacturing companies in particular cannot completely avoid producing CO_2. These companies can implement compensatory measures to reduce emissions.”

READY FOR TAKE-OFF ON YOUR CLIMATE JOURNEY?

Reehten offers four key questions to help companies assess their current situation: “Do you know the CO_2 footprint of your company? Is your competition already climate-neutral? Do you know which expectations your customers and suppliers have? Do you have a concrete road map for the year to come? The answers to these questions indicate how far the company has come on its path to climate neutrality, and which steps must be taken next.” ●

Contact Bosch Climate Solutions now and let us advise you:

solutions___2023

The Digital Cockpit for Fire Safety

Is a building systems check an integral part of your daily routine? For some building control and security systems, this check, as well as status and notifications monitoring, are integrated into the system. Thanks to digitalization and remote connection, fire alarm systems can now be accessed and monitored conveniently by means of an app. The new solution by NEXOSPACE Fire System Analyzer from Bosch provides a complete overview and seamless monitoring of all fire alarm systems in your building.

"The Fire System Analyzer is the digital cockpit for modern, intelligent fire protection," says Holger Behrens, Portfolio Management and New Services at Bosch Energy and Building Solutions. An uncomplicated and intuitive user interface provides information about the status of the entire fire alarm system at all times. All of your systems and their current status are available to you all in one place, and irregularities such as malfunctions or shutdowns are immediately visible. Using floor plans as a basis, you can precisely locate neuralgic points and immediately take the necessary measures. This includes information about malfunctions and shutdowns, or smoke detectors and batteries that may need replacing. The Fire System Analyzer informs you when action needs to be taken, providing a new standard in safety. It helps you avoid damage and reduce costs. You can view the system status in your browser, just as you would see it on your control panel. You can also access your event and notification history, making it easy to reconstruct problems. And a smoke detector replacement list shows which elements will need to be replaced when. This brings major advantages for budgeting: any purchases due over the next few years can be previewed and accounted for in advance. "The system offers one hundred percent transparency," says Behrens, "and accessibility at all times, from anywhere." The digital web dashboard is not the only place where all notifications appear at once – a mobile app makes it possible to access your NEXOSPACE Fire System Analyzer on your smartphone or tablet.

> "Our solution provides absolute transparency."
>
> **HOLGER BEHRENS PORTFOLIO MANAGEMENT AND NEW SERVICES AT BOSCH ENERGY AND BUILDING SOLUTIONS**

The functions that the Fire System Analyzer currently provides are only the first step in digital fire alarm systems: more exciting features are in the works. In the future, the Fire System Analyzer will form the access point for digital maintenance.

THE ADVANTAGES:

- **A complete status overview:** you have an overview of all the fire alarm system control centers and devices at your sites.
- **Time savings:** you can detect malfunctions more quickly and correct them immediately. The event history allows you to identify anomalies quickly.
- **Straightforward budget planning:** you receive a detailed list of all elements in need of replacement, and can plan these according to time intervals.

THE ENTIRE COSMOS OF BUILDING MANAGEMENT IN ONE DIGITAL PLACE

The NEXOSPACE Fire System Analyzer is part of the NEXOPSPACE Service Suite from Bosch. The suite provides a comprehensive portfolio of intelligent, connected and integrated services for digital building management. These services are ideal for the digitalization of new and existing buildings – IoT services not only help you to protect people, assets and infrastructure, but also increase the attractiveness and value of the property.

Sustainable Cities: Ontario is the New Must-See

Faced with record heat waves, water shortages, and wildfires, California is starting to feel the strain. In response, some of the state's major energy consumers – cities with a heavy carbon footprint – are joining the battle to fight climate change. One municipality has emerged as a new pioneer: Ontario, a community of 185,000 inhabitants located east of Los Angeles. Thanks to smart technology and a little help from Bosch, Ontario has slashed greenhouse-gas emissions by 10,000 tons a year. Michael Johnson, Ontario's director of municipal services, takes us on a tour of the smart city's hot spots.

It's early in the morning, the start of another scorching day in the Greater Los Angeles metropolitan region. We meet Michael Johnson outside one of Ontario's new charging stations for electric vehicles. First things first – make sure the battery is fully charged. "After all, we have a lot to do today," he says. As municipal services director, Michael is responsible for planning and maintaining Ontario's infrastructure. We're joined by Jeff Bartel, business development manager at Climatec. The Bosch subsidiary advises businesses and municipalities on how building automation systems, improved energy efficiency, and sustainability services can help them become more eco-friendly. And this is what happened in Ontario. "We looked at every city building, every park, and every streetlight here," Jeff explains. The aim was to help Ontario realize its vision. "We want our city to be the premier and most sustainable community in the entire Inland Empire," Michael says as he smoothly plugs the cable back into its socket at the charging station – one of many things that Climatec has installed on this major project.

First things first:
a fully charged battery.

10,000 tons

in greenhouse gas emissions a year have been eliminated by Ontario through the installation of sustainable technology.

CLIMATEC
A Bosch Company

The best of the worlds of Climatec and Bosch combined: starting in 2023, this will also be visible in the logo.

NEW SOLAR PANELS

A further highlight in the city's program of sustainable urban development is a new photovoltaic system installed at the Ontario Convention Center. Where cars once parked beneath the blazing California sun, there now stands a new covered parking lot with a rooftop installation of ultramodern solar panels. The event center is able to meet up to 69% of its own electricity needs through solar power.

Today, a roof provides shade – and solar panels supply renewable electricity.

THE ONTARIO CONVENTION CENTER – COOL AND EFFICIENT

Aboard Michael's fully charged electric car, we drive to the Ontario Convention Center, the first of the city's new hot spots in urban sustainability. The 225,000-square-foot event center has already featured in a number of movies. Now, thanks to Climatec, directors from nearby Hollywood could also shoot a documentary here on the benefits of smart urban development. "Jeff and the Climatec team designed and installed brand-new heating and cooling equipment along with a building automation system for us," Michael explains. "We can now regulate the temperature in each part of the building at the push of a button and adjust the operating hours to match the building occupancy. Maintenance of the system also works from anywhere by computer."

"We only have one planet. All we can do is take care of it. And that's what we're doing. We want future generations to benefit from what we build here."

MICHAEL JOHNSON, DIRECTOR OF MUNICIPAL SERVICES IN ONTARIO, CALIFORNIA

Before 2020, parking at the Ontario Convention Center was on a large concrete parking lot.

WESTWIND COMMUNITY CENTER POOL – SOLAR-HEATED WATER

It's now midday: 35 degrees Celsius in the shade, and high time to cool off. We're headed for the Westwind Community Center pool, where we meet lifeguard Sophia Lara. She points proudly to the building's roof: "See those dark-colored mats up there? Our pool water is heated by a solar-thermal heating system." This brings annual savings in natural gas of up to 50%.

“The first step in our work is analysis,” Jeff explains. “We look at the existing infrastructure and calculate what the equipment consumes and how costly it is to maintain. This was also the case here at the Westwind Community Center pool. Then we show customers how they can become more efficient with smart, regenerative technologies.” The team installed new equipment in a total of 26 public facilities and also helped the City of Ontario find funding for the project.

SAVINGS OF 75 MILLION DOLLARS – A GOOD DEAL FOR ONTARIO AND FOR THE CLIMATE

Ontario has put 35 million dollars into the renewal of its energy infrastructure by Climatec. It’s an investment that is expected to save the city more than 75 million dollars over the lifetime of the new equipment. “Climatec came up with a creative financing plan for us that uses funds from the California Energy Commission, rebates from local utilities, and below-market private-sector financing. The whole project is funded from savings out of current operating costs,” Michael says with a smile.

EUCLID AVENUE – SMART LIGHTING FOR A SUSTAINABLE CITY

At the end of a long day, Michael drives down Euclid Avenue. We are now in downtown Ontario. The sun has set, and the city is bathed in the warm light of nearly 13,000 LED streetlights. “Climatec has upgraded our streetlights for all city facilities and streets,” he explains. This new lighting reduces energy usage by up to 80% and is connected to a smart system that monitors and controls each light individually. “These lights – they’re my personal highlight,” says Michael, lost for a moment in reverie. He and Jeff are at the R. Jack Mercer Ontario Community Bandstand, where Ontarians can take in open-air jazz, swing, and blues concerts on balmy summer nights.

In other words, it’s a great deal for Ontario, for Climatec, and for the climate. “We only have one planet. All we can do is take care of it. And that’s what we’re doing. We want future generations to benefit from what we build here,” says Michael as he prepares to head home beneath the city’s smart streetlights.

Quickly and safely from one end of London to the other

Since 2022, the Elizabeth Line has been in operation – thanks to the Bosch subsidiary Protec Fire and Security Group (Protec UK), which provided the 113-kilometer transport link with a wide range of life safety solutions.

The new ‘Elizabeth line’ was opened in London in May 2022. The railway line, named after Queen Elizabeth II, stops at 41 stations and offers commuters a quick and easily accessible east-west connection between the suburbs and the center of the British capital. The line is designed to transport more than 200 million passengers per year. Years of construction and modernization measures have now been completed, allowing passengers to enjoy a relaxed and pleasant journey in the trains, whilst also benefitting from shorter travel times. The issue of safety played a very important role in this project, as strict standards and stringent requirements had to be met when it came to fire safety, fire detection, and evacuation in particular.

Our subsidiary, Protec UK, supplied and installed a range of life safety systems to meet Transport For London’s (TFL) strict requirements. It was particularly important that the technologies used were suitable for operation both in the above-ground stations and below the surface.

"For me, it's always about presenting the customer with the best idea – one that's intuitive, reliable and long-lasting."

BERNARD GIJZEN,
SOLUTIONS ENGINEER

"Bosch offers freedom that can't be taken for granted. Anyone with an idea can try it out. That pays dividends for the company – because these ideas are essential to remaining a driver of innovation."

DAVID ZIEGLER,
LIFE SAFETY PORTFOLIO MANAGER

BRIDGE BUILDERS

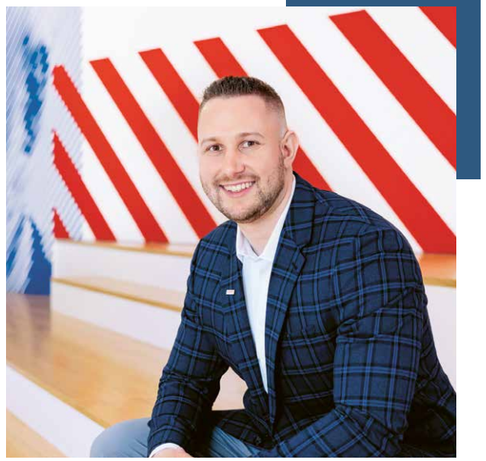
ENABLERS

CUSTOM TAILORS

PIONEERS

#buildingtogether

It takes more than technology alone to make buildings better. It is people who take technology and make individual solutions out of it – perfectly customized for our customers. With passion, commitment, technical know-how and a 100% customer focus, we are working for you every day.



"We supply technical solutions that the customer will be using far into the future."

MARIUS KAISER,
HEAD OF PROJECT MANAGEMENT
CENTRAL/SOUTHERN REGION

"It fascinates me to start from nothing and create an innovative solution for someone else."

KAJETAN FRITZ,
SOFTWARE ARCHITECT

"I work with customers to pinpoint what's important to them – both now and in the future."

HEAD OF SALES,
COLOGNE/DÜSSELDORF REGION

"Energy and climate are important to all of us. Everyone can make a contribution. And nothing makes me happier than helping a customer become carbon-neutral."

SABRINA RUIS,
HVAC TECHNICIAN

Learn more about our team:

CARBON-NEUTRAL PRODUCTION

Leveraging Unused Resources with Intelligent Energy Concepts

There is an enormous potential for more energy efficiency in companies – it just needs to be leveraged. Reusing waste heat created during industrial processes is often considered too complex or uneconomical. Robert Bosch Fahrzeugelektrik Eisenach GmbH demonstrates the fallacy that lies behind this assumption. The plant is considered a lighthouse project, demonstrating how an existing industrial site, which produces large amounts of waste heat, can become nearly carbon neutral. Heat pumps play a key role in this process. According to Johannes Oltmanns, an energy efficiency project developer at Bosch Energy and Building Solutions, “Heat pumps are an exceptionally efficient technology for the provision of heating and cooling, especially when both are required at the same time and place.” Using heat pumps, waste heat can be transformed into useful heat to warm spaces in low-temperature areas or for the generation of warm water. They simultaneously function as a cooling unit for air conditioning or other processes that require cooling. What should be emphasized here is the associated reduction of CO_2 emissions. Leveraging them consistently is a key step on the path toward carbon neutrality.

> “Heat pumps are an exceptionally efficient technology for the provision of heating and cooling.”
>
> **JOHANNES OLTMANNS, ENERGY EFFICIENCY PROJECT DEVELOPER**

BOSCH

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built on Partnership

As your reliable partner, we provide connected and integrated solutions that make your buildings more secure, more comfortable and more efficient. Our experts support you as consultants, installers, and service providers with tailor-made safety and security systems, building automation solutions as well as individual energy services.

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