

ENERGY AND BUILDING

# SOLUTIONS

2018

A Magazine about Security, Comfort, and Efficiency in Commercial Buildings

## Focusing on People

Page 8



**BOSCH**

Invented for life

Bosch Netherlands:  
A Reliable and  
Holistic Partner

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UWC Freiburg:  
The School  
for Optimists

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Dear Readers,

iPhones were not yet around when the 2006 Football World Cup took place. They didn't come onto the market until one year later. Since then, they have had a sustained impact on our lives. The latest technology was not the decisive factor in this development. Instead, it was the new features that catered to people's needs and which provided all sorts of new benefits from a single source.

Today, smartphones accompany us wherever we go. They make our lives easier in many respects, and offer convenient solutions we would no longer want to do without. We now take them for granted.

This is just one example of how quickly digitalization is leading to change. And as ever more devices are able to communicate with each other using the Internet of Things (IoT), ever more possibilities and benefits open up.

Connectivity is changing how individual items of technical equipment interact with each other. New functions and services are appearing that allow processes to be improved, accelerated, and automated.

As your partner for integrated building solutions, we are using all the potential of the IoT to offer you new, value-adding services. Solutions that allow us to make people's everyday lives in commercial buildings safer, more convenient, and more efficient. Solutions that also allow both assets and the environment to be protected.

This issue of our magazine shows what this might look like for an entire industry, by using healthcare as an example. Around the world, digitalization is making major inroads into hospitals and medical centers. Integrated and connected solutions can improve processes sustainably in many ways, for example by reducing the workload of the personnel, and providing better care for patients. And this places a central focus on people and their needs.

On this note, I wish you much pleasure reading this issue.

THOMAS QUANTE

Executive Vice President,  
Integrator Business  
Bosch Sicherheitssysteme



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ABOUT THE COVER

The UWC College in Freiburg was extensively modernized and now boasts cutting-edge energy and safety technology from Bosch.



## BOSCH GETS JUVENTUS MOVING

The record-breaking Italian football champion, Juventus Turin, is building a city of its own behind its stadium at the Continassa site. The J-Village will house new club headquarters, a modern training center, an international boarding school for 300 junior footballers, a four-star hotel and a gigantic concept store over an area extending to 180,000 square meters, and will provide the perfect infrastructure for this top European club. The partner providing an efficient supply of heating and cooling energy is Bosch Energy and Building Solutions Italy. To do this, an integrated energy solution was planned, financed and put into operation. For the next 15 years, Bosch experts will also assume responsibility for maintenance and monitoring of systems, and for securing the energy supply.

 Read the whole story at  
[www.boschbuildingsolutions.com](http://www.boschbuildingsolutions.com)





## SAVING ENERGY

## School Modernization Pays Off

**BOSCH SUBSIDIARY CLIMATEC** has been carrying out a series of comprehensive upgrades for the Poway Unified School District near the city of San Diego. Covering the city of Poway and several suburbs of San Diego, this district includes 25 elementary schools plus six middle schools and six high schools, attended by a total of approximately 33,000 students. Climatec, which is responsible for Energy and Building Solutions for the North American market, designed a tailor-made energy-conservation program that included the following retrofits: heating upgrades, ventilation upgrades, lighting systems, the use of renewable energy, and also a district-wide energy management control system. The work so far has been completed on schedule, and there is an additional construction phase currently underway. An estimated five million kWh is being saved annually, in addition to lower operating costs for the Poway Unified School District. And the environment is benefiting from lower CO<sub>2</sub> emissions.

## PREDICTIVE MAINTENANCE

## Knowing Now What Will Happen Later

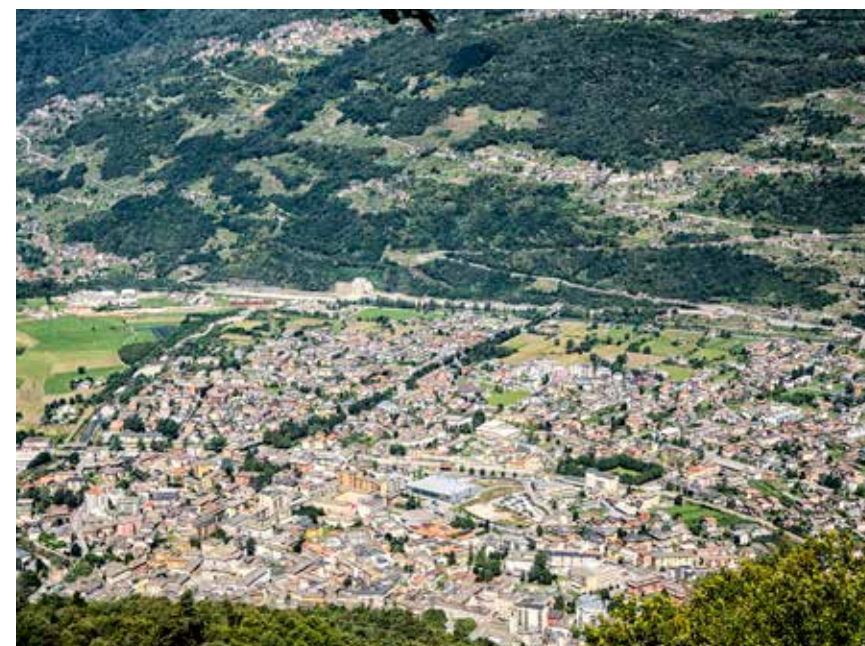
**AS CITIES GROW**, their people, buildings, and technical systems are becoming more connected. This encompasses new options for providing predictive maintenance for elevator systems. The 24/7 monitoring systems issue an advance warning to draw attention to any potential technical problems. This saves time and eliminates the need for expensive on-site services. Bosch Service Solutions GmbH has launched two pilot projects that are currently undergoing practical tests in Frankfurt am Main. One solution developed in cooperation with Indian colleagues at Robert Bosch Engineering and Business Solutions India is based on identifying “energetic signatures.” It registers consumption data on a step-by-step basis for different events such as door openings, and allocates them to individual items of electrical equipment. Algorithms are used to identify deviations from standard values and any threshold values that have been set. This enables maintenance and repair work to be carried out before faults occur. The second pilot project is based on the use of a sensor box installed on the elevator cabin. Optoelectronic and micro-mechanical sensors measure the number of trips, distances covered, door openings, and atypical vibrations, which are used to assess critical events before they occur. Info at [www.boschservicesolutions.com](http://www.boschservicesolutions.com).



## MORBEGNO, LOMBARDY

## Using Energy Optimally

**THE TOWN OF MORBEGNO** in Lombardy has commissioned Bosch Energy and Building Solutions Italy to increase the energy efficiency of its public buildings and facilities. A project financing agreement has been signed that defines the framework within which the company will plan, install, and operate a variety of systems over a period of 20 years. These include LED technology in all public lighting systems and the interiors of municipal buildings, modernizing the town's heating plants, and maintaining its district heating system. In addition to fire protection equipment, Bosch will be responsible for posting safety signs in all public buildings, modernizing the electrical distributors, and replacing 15,000 meters of electrical cables. Among other things, this will also involve installing a new solar energy system, an air-to-water heat pump, and smart-city functions such as remote operation and a 24-hour call center for operation of the energy



plants. “The agreement with Bosch enables us to equip the town with sophisticated and efficient systems. We are sure that the municipality can save money over the long term by having Bosch operate and maintain the systems,” says Giorgio Ciapponi, who is the project director for the Morbegno municipality. The cooperation has been made possible by the fact that Bosch is a certified Energy Service Company (ESCO). The company is in-

vesting a total of €2.63 million in the project. In late 2017, Bosch Energy and Building Solutions Italy received special recognition for the Morbegno project. At the Ecomondo trade show, the Oasis industry journal awarded Bosch an “Environment Oscar” in the “Carbon Footprint” category. The award is presented to companies operating in Italy which make an outstanding contribution to sustainability and social responsibility.

## FIRE PROTECTION

## Safe and Sound Vacations

**THE FOUR-STAR** Küstenperle Hotel in Büsum opened its doors in September 2017. Boasting an idyllic location at the North Sea, it has rooms and suites with a total of 216 beds, along with spa and wellness facilities, a restaurant, and a bar. Experts from Bosch Energy and Building Solutions Hamburg were responsible for the fire protection equipment. They developed a modern fire safety solution that provides the greatest possible protection and harmonizes perfectly with the hotel's design language.



## Top Communication

**THE 185 000 BUSINESS TRAVELERS AND VACATIONERS** departing from Bern Airport will now be better informed. They will now be able to benefit from a better information system. Bosch has installed the PAVIRO public ad-


dress and voice alarm system, which is used for both general announcements and emergency alerts. In Germany, Bosch's building experts already ensure the safety of more than 180 million passengers a year is maintained.



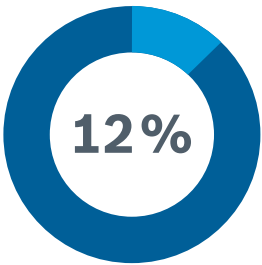
# Focusing on People

Hospital 4.0 – Digitalization in the healthcare sector is advancing in leaps and bounds. Bosch Energy and Building Solutions help hospitals to become smart hospitals with its holistic measures. It also puts connected and integrated complete solutions in practice in order to improve safety, convenience and efficiency.

A care center for cancer patients in Bangalore, India, a good two dozen hospitals in several US states, more than 500 projects in Europe – when it comes to improving safety, comfort and efficiency, a large number of clinics, hospitals and health facilities now rely on the expertise of Bosch Energy and Building Solutions. The industry is undergoing profound changes.

Hospital 4.0 – Digitalization is advancing in leaps and bounds in hospitals and clinics all over the world, which are increasingly evolving into smart hospitals. Safety, communication, energy efficiency and facility management (including logistics) have become the key terms in this age. While this offers major opportunities, it also makes innovative solutions necessary. That is because smart hospitals operate from within their technical infrastructure. The Internet of Things (IoT) now allows essential areas of building technology to be interconnected more closely than has ever been possible before. 





energy savings when compared to before, and a decrease of 364 tons of CO<sub>2</sub> emissions per year

Digitalization facilitates the improvement, acceleration and intelligent control of procedures, helps optimize everyday processes for the operators, staff and patients – and can thereby result in greater levels of safety, comfort, and efficiency. But the increasing complexity and connection of building, communication, IT and medical technology means that more and, above all, more specialized, staff are required. At the same time, there are major investment backlogs when it comes to modernization, with the field of technical infrastructure representing just one of these. This is why operators interested in converting normal hospitals into smart ones are turning the focus of their efforts to migration concepts that can be implemented in stages and be financed flexibly.

Hospitals and clinics rank among those commercial buildings that are subject to the most stringent requirements in relation to safety, communication, convenience and energy efficiency. To future-proof these areas, new service models are required, often in conjunction with financing options. “This is not

a matter of individual measures – a few fire detectors here, a few video cameras or a new boiler there,” as Jens Mack says. “The focus needs to be directed at solutions that combine the latest technology with services, and are integrated into the infrastructure,” continues Mack, Head of Sales at Bosch Energy and Building Solutions in Europe. The solutions are just as varied as the customer requirements are. Bosch is aiming to improve processes across domains and to use this to generate advantages for operators, staff and patients.

Jens Mack describes the Herculean task his company is facing: “Our connected and integrated solutions ensure that facilities become safer, more efficient and more convenient to run. And this in a way that ensures the high efficiency and sustainability standards of hospital managers are satisfied while facility managers, safety officers and energy managers receive support with their daily work. Last but not least, we also aim to take the pressure off nursing staff and provide greater comfort for patients.” Focusing on people: This is exactly what the transformation into

smart hospitals is aiming to do. The result will be that physicians and nursing staff have more time for working with patients, technical staff receives support, and patients will feel they are getting the best possible care.

NH Hospital in Bangalore in India, for example, was grappling with high energy consumption levels. Bosch has been the energy partner to the cancer care center with its 700 beds and about 300,000 patients a year since 2017. “Even though it is a state-of-the-art facility, the energy technology has predominantly been operated manually, without there being any exchange of information to reconcile the supply of cooling with actual demand,” says Venugopalan C M, who is responsible for Bosch Energy and Building Solutions in India. The building experts optimized energy efficiency in the areas of cooling and thereby gave management and staff a sensor and software-based monitoring system to use. According to Venugopalan C M, this generated savings of up to twelve

“The Internet of Things has finally arrived at the hospital.”

percent over previous consumption levels, as well as avoiding 364 tons of CO<sub>2</sub> emissions yearly. A connected energy management and monitoring system now helps facility management to master its daily work. Staff can access energy data at any time using their computers, allowing them to react to incongruities immediately.

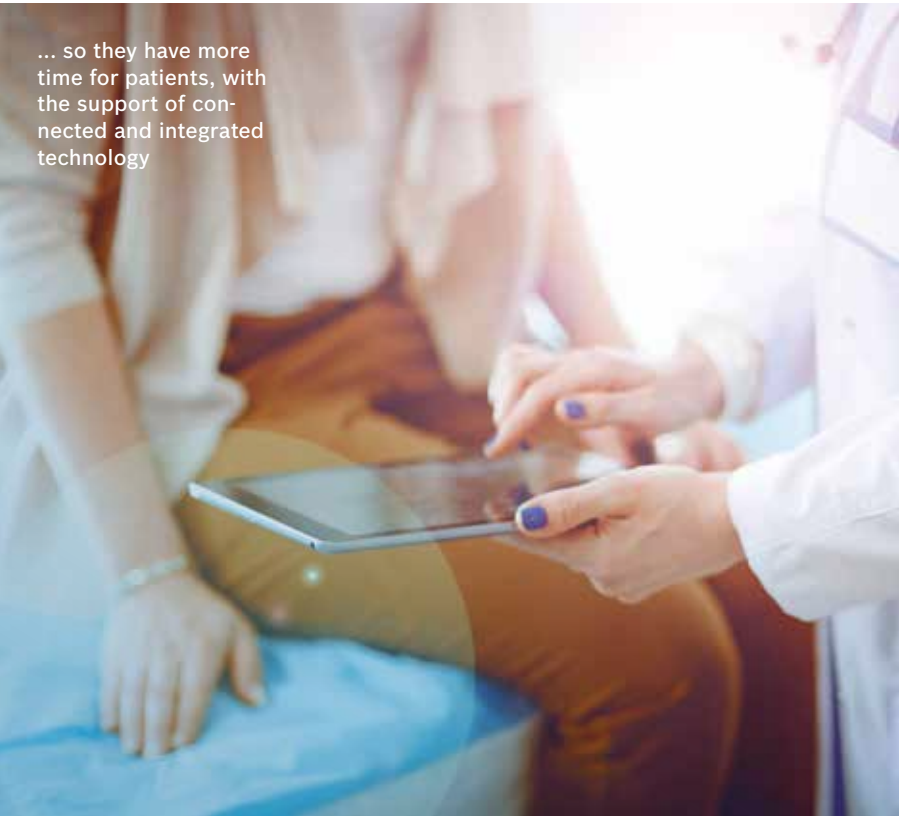
The showplace is the USA: In North America, Bosch subsidiary Climatec is a long-term partner to Banner Health, one of the largest healthcare providers in the USA. The building experts are currently planning, developing and integrating solutions at more than 15 sites. These range from building automation to air conditioning and fire safety, as well as nurse call systems for patients and real-time

localization: integrated, connected and from a single source.

“Our services are essentially about providing buildings with infrastructure that permits the best possible human interaction, and therefore serves both patients and employees,” says Marty Applebaum, Vice President Business Development at Climatec. The company has also made a name for itself with other businesses as a service provider and system integrator for highly complex types of buildings. Around two thirds of its project business involves existing buildings, and returning these businesses, some of them decades old, to profitability and operational safety again – and this in regions where the sun shines 300 days a year and temperatures range from sub-zero to 50 degrees Celsius in summer. An exciting task for our American colleagues in terms of technology deployment, integration and connectivity. ➔

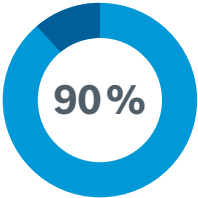


Smart hospitals also relieve staff of technical and administrative tasks ...



... so they have more time for patients, with the support of connected and integrated technology





of all hospitals have a digitalization strategy

The advent of digitalization and resulting transformation into smart hospitals has opened up many new opportunities for the building specialists. A current study published by Roland Berger confirms that the Internet of Things has well and truly arrived in the hospital sector. It concludes that around 90 percent of hospitals now have a digitalization strategy. Lack of prioritization is the smallest hurdle, especially as, according to Berger, 31 percent of the facilities surveyed stated that their economic situation

had been improved by connected products and services, an increase of 14 percent from the previous year.

The pressure, however, is enormous. Despite the rising costs, physicians and nursing staff still have to care for patients, protect valuable equipment and keep people safe, not to mention attend to technical infrastructure. Providing financial relief to clinic operators and easing staff of the burden of technical and administrative tasks does not necessar-

Unity AG helps clinics with their digital transformation, and combines experience from the healthcare industry with best-practice approaches from industry.

**Mr. Eusterholz, what will healthcare provision look like in future?**  
It will definitely be digital. Some studies say that 200 billion devices will be connected within a network in a few years' time. In principle, every product costing 100 dollars or more will then be smart.

**What does that mean for hospitals?**  
The expectations will increase, particularly for patient rooms, which will be the best-equipped rooms, along with the operating theater and intensive care. Essential processes such as therapy and diagnostics will take place in the actual

rooms. Fewer bed movements save money, reduce errors involving medication and protect patient privacy.

**How else will patients benefit?**  
All processes will be automated, from admission to treatment and release. Optimized control processes and intelligent sensors, for example, will allow emergencies to be identified quickly. The right staff will be informed, which saves time and, in extreme cases, lives.

**Will on-site treatment even be necessary in every case?**  
Over the medium term, we envisage virtual care centers with round-the-clock monitoring provided by a central control room. Or patients that can be examined and monitored by remote diagnosis; this is when we speak of telemedicine.

**What about data protection?**  
On principle, the patient decides what information to reveal, as is the case in the USA. There physicians access the same data pool as the hospital. In Germany, for example, every office still has its own data repository.



MEIK EUSTERHOLZ

As the head of this business segment, Meik Eusterholz is an advisor to the healthcare industry, for which he increasingly also devises digitalized processes in and around the hospital of the future. Before he joined UNITY, he studied commerce and then worked in the automotive industry and in machine and systems engineering.

ily require huge investments. "It doesn't all have to happen at once," says Jens Mack, Head of Sales at Bosch. "We offer a number of different migration scenarios that can be implemented in stages. As a full-service partner, we provide services ranging from planning, implementation, commissioning and maintenance to long-term operation and other services. And we offer attractive financing models," says Mack.

The fact that facilities benefit from their investments is shown by the following example: A Climatec project saw nurses being given network cellular devices to transmit their real time location and allow for direct

Last but not least, physicians, staff and patients want hospitals to provide convenient new functions.

communication with patients via the nurse-call system during their rounds. The tracking system provided management with valuable insights into staff movement patterns, as business strategist Applebaum reports. The aim was not to monitor staff, but to make processes better and more efficient. As a consequence, rooms were changed and staffing levels were adapted to satisfy actual requirements.

Patients also benefit as a consequence of a hospital becoming smart, because staff have more time to provide excellent care, and because of new technologies such as interactive infotainment systems or indoor localization. In addition, IoT-based services help prevent the theft of expensive medical equipment while also helping to pinpoint where important equipment, free patient beds and suitable staff can be found in an emergency. In an interview (from page 14 on), Jens Seeliger from the Health Care Competence Center at Bosch Energy and



Convenience during admission, for example by means of infotainment systems for patients

Building Solutions states: "In order to manage buildings intelligently, more and more data are being captured by innovative sensor technologies, collected centrally, processed and evaluated."

All of this hinges on platforms that are able to record all the data and that are accessible to everyone involved both inside and outside the building. As well as allowing malfunctions to be identified and rectified at an early stage, this real-time information also provides consistent insight into essential components of the technical infrastructure. Ultimately, it allows them to be given a structure that maintains a focus on the customer, or, in this case, the patient.



Thanks to the IoT, building technology can be connected and controlled centrally

A real trump card, and one that particularly stands out in complex environments such as hospitals. In this case, the aim is to satisfy the needs of many different interest and user groups. A sales manager wants to get his business ready for the future and reduce costs, for example by introducing efficient logistics processes. A facility manager handling between five and ten different systems on average is looking for high levels of efficiency at low operating costs, as well as a central tool that accurately reflects a building's maintenance requirements, energy usage patterns and control system. A security officer, on the other hand, values intelligent video analysis to swiftly identify and prevent aggressive behavior towards staff members and unauthorized access to security zones.

Last but not least, physicians, staff and patients long for relief and new services. Medical staff would like more time to care for patients, and to be relieved of the burden of administrative tasks. And patients expect communication technology, starting right from when they are admitted to hospital: in the form of an infotainment system, for example, that addresses them in their native language and provides them with information. This includes connecting patients straight to the Bosch Service Center when they have questions, where an associate can advise patients on how to operate the system.

Patients experience greater comfort and the staff experience less stress, allowing them to concentrate on their essential work – so they can again start focusing on people. ●

# “We show what we’re capable of”

When it comes to the emergence of smart hospitals, Jens Seeliger considers Bosch to be a system integrator providing all services from a single source.

Mr. Seeliger, everyone is talking about Industry 4.0, yet Hospital 4.0 is a relatively new term. What does it mean for companies like Bosch Energy and Building Solutions?

The healthcare market will benefit from this development. Industry and the manufacturing sector are already characterized by a much greater degree of digitalization. All the more reason for me to consider our task to be adapting our Bosch know-how to the clinical market and implementing it there. This offers a lot of potential.

How do you proceed with this?

We show what we’re capable of. We already offer the industry an extensive portfolio of solutions in the areas of safety, energy efficiency and communication. Customers are familiar with the individual topics: video monitoring, energy supply, theft prevention and patient infotainment – all these are different processes that we offer in an integrated form from one single source. We have the opportunity to implement everything in one

and the same value chain and be a reliable partner to our customers.

Where do you get involved?

Ideally, we should be involved in deliberations at a very early stage. We combine our experiences and skills in relation to system integration and building technology maintenance with our knowledge of our customers’ needs. This expertise allows hospitals and clinics to benefit when they work on projects with us.

Is there a magic formula?

We always say that a smart hospital is based on powerful digital infrastructure. This is the only way to integrate and manage safety, building and communication technology comprehensively.

And you do all that yourself?

We also get solution partners involved, and communicate with colleagues around the world, even across Bosch divisions. Collaboration is an important component. But the essential thing is a partner who can link up and integrate everything in one single integrated concept.

How do you score with customers?

First, we offer everything from a single source; not many are able to do that. As a system integrator, we want to find the best solution for our customers; above all, we provide them with support for secondary processes, these being the fields that are



JENS SEELIGER

Jens Seeliger is responsible for the Health Care Competence Center at Bosch Energy and Building Solutions. Before working in this function, he studied business administration and then spent more than 20 years in the healthcare sector, assuming responsibility for business development and sales of IT and communication technology.

not our customers’ area of expertise. Then we score points with our technological solutions, flexible future-proof concepts, our extensive experience in the industry and our building specialists.

What about synergies within the company?

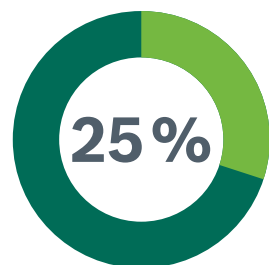
New solutions always involve a knowledge transfer as well. When it comes to indoor localization, the know-how used to find tools on a construction site can also be applied to the health market. Or there is the information such as air pressure, temperature and illumination intensity obtained from connected sensors and devices, which we can also use for a connected building platform. ●



decide

# Profiting From Innate Advantages

At Bosch Energy and Building Solutions in the Netherlands, the focus has been directed at building safety solutions. This portfolio is now being successively expanded.



**market share for Bosch Energy and Building Solutions Netherlands in the field of public notification systems for fire alarm systems**

**170**

**associates work for Bosch Energy and Building Solutions Netherlands**

Tulips, cheese, windmills and bicycles – for most of us, these things are typically Dutch. And yet this nation, despite its small size, is also one of the five largest export nations worldwide, and its logistical position makes it an attractive location for doing business. The Bosch Group has been active here since 1903, and now maintains 19 locations in the Netherlands, with more than 3,837 associates.

## HOLISTIC PARTNER

Bosch has also been active in the Netherlands in the field of building safety for many years now, regularly providing services for high-end customers. Among other things, our Dutch colleagues have already turned the country's largest airport, numerous chemical companies, government buildings and the FC Utrecht stadium into much safer places using smart technologies.

Bosch Energy and Building Solutions Netherlands also specializes in public notification systems (OMS). In the event of a fire, these systems ensure that alerts issued by the fire alarm system in a building are relayed to the local fire brigade. Bosch has a market share of 25 percent in the Netherlands in the field of OMS, which translates to approximately

5,000 users. Our Dutch colleagues have, however, set themselves even higher goals: "We want to continually increase this market share," says Frank van Olphen, Head of Sales & Marketing in the Netherlands.

**"We know what our customers need."**

## FRANK VAN OLPHEN

Since 2016, he and his team have not only been catering to high-end customers, but also a growing number of local small and medium-sized companies. Their new customers include operators of commercial buildings, owners of large private properties, and also hotels and nursing homes.

## DON'T WAIT – ACT!

"Our customers value the fact that we know what they need," says van Olphen in relation to the holistic approach, adding: "They don't want to have to spell everything out for us; they want to be surprised." The different experts working locally have excellent knowledge of their respective industries and their demands, he explains. The advantage is obvious: This allows customers to concentrate on

their actual work. One example is the chemical industry, in which safety plays an even greater role than in many other areas. Strict laws and regulations apply in this industry

**Entrepreneurial quality coupled with first-class quality and service.**

and must be observed without fail. In order not to put business operations at risk, these companies are obliged to obtain the latest safety certificates. As their partner, Bosch ensures that the customers don't have to

think about the certificates, and will always be up-to-date in terms of safety technology.

Van Olphen and his team are already thinking about the next steps to take: "We want to continue to impress existing and potential customers," as the Head of Sales & Marketing at Bosch reports. "Our connected and integrated solutions to increase safety in commercial buildings will allow us to satisfy requirements in future as well."

Bosch is currently positioning itself to ensure it is optimally prepared for new developments. Van Olphen: "The Dutch are demanding. They want a reliable partner who takes care of everything." It's good that the Dutch not only embody the typical entrepreneurial mentality ("Don't wait – act"), but also value first-class quality and services.

In short: Bosch Energy and Building Solutions Netherlands delivers innovative solutions from one source, and will remain, in the future, a reliable partner for companies from all different industries. ●



**Frank van Olphen, Head of Sales & Marketing, Bosch Energy and Building Solutions Netherlands**



**The FC Utrecht stadium is one of the places that Bosch Netherlands ...**



**... has made a safer place – thanks to smart technology**



# So Remote, and Yet So Close

Its cloud-based platform EffiLink makes Bosch a pioneer when it comes to comprehensive remote and online services for safety systems.

How long have you been in operation, fire detector, and how are you today?" "I have been operating for 45,556 hours and my dirt level has meanwhile reached 51.6 percent." A dialog like this is a vivid example of what is otherwise the seemingly abstract Internet of Things. A private cloud platform makes the query, a fire detector responds – contact is made between the virtual and physical worlds. In this case, the fire detector is connected to the cloud-based Bosch platform EffiLink. The new service which Bosch will soon be offering is called Condition Monitoring. With its market launch planned for the first quarter of 2018, Bosch will be the world's first service provider to not only offer classic remote services such as remote maintenance for safety systems in buildings, but also value-added services based on them.

**DIGITALLY EXTENDED ARM**

People will remain the main protagonists in scenarios like this, as Marcus Nadenau says with confidence. He is the Head of Technology and

Engineering for Bosch's Integrator Business Europe. "Our customers are typically owners of commercial buildings, for example office blocks. However, we only take action if we have been given the authorization to do so. The owner – or in operational business, what is usually the Facility Manager – has to grant us permission to set up a remote connection to the fire detector." In the case of the fire detector in which dirt has accumu-

“By 2020, we intend to connect up every electronic product.”

**MARCUS NADENAU, HEAD OF TECHNOLOGY AND ENGINEERING**

lated, this might involve the following activities: The Bosch technician, working remotely, disconnects the equipment from the power supply with a few clicks or replaces its detector earlier, preventing potential false alarms. This means that he acts as a digitally extended arm for the facility manager. "Whereas classic

Bosch's new service, Condition Monitoring, proactively establishes the maintenance requirements of fire detectors – so that nothing burns



remote services operate on the basis of reaction, our Condition Monitoring is proactive. We don't wait for a fire detector to become so dirty that it actually sounds an alarm. EffiLink asks, figuratively speaking, each fire detector how it is every day." And the fire detector can respond very precisely: "I will continue to work flawlessly here for another 34,300 hours."

**SECURE VPN CONNECTION**

In this example, EffiLink ensures that nothing catches fire – literally. This service allows Bosch to analyze, configure and fix any potential faults to all systems installed on site – even those belonging to other providers – remotely and extremely efficiently. Access to the system is exclusively enabled by means of a secure VPN connection, and only after prior authorization by the customer. The new Service Condition Monitoring system provides multiple benefits at the same time: The Bosch technician is not only able to view the system status in real time but also use a dashboard to establish whether, and at which point in time, unscheduled servicing is required. This allows any disruptions to the system to be avoided right from the start. It also allows any investments required to be planned well in advance.

**MORE SERVICES PLANNED**

Along with the classic remote services and its new Condition Monitoring system, Bosch is currently developing additional service levels: Predictive Maintenance and Services Beyond Maintenance, these being services

that provide far more than just maintenance. "The future belongs to web-enabled products and data-based services, and connected building solutions are already allowing the future to be experienced today," says Nadenau. After the fire detection systems, Bosch will successively link up the rest of its product portfolio to Condition Monitoring as well. This will include, for example, video surveillance or access control systems. "The Bosch Group has set itself the goal of connecting every new electronic product by 2020, and using this as a basis for developing services. EffiLink is a good example of how hardware can become even more useful thanks to added sensor technology, software and services," says Nadenau.

**ADVANTAGES**

- Overview: A Bosch technician immediately sees the status of your equipment – and this in real time.
- Transparency: A dashboard shows the technician whether unscheduled servicing is needed. This prevents any disruptions right from the start.
- Ability to plan: Necessary investments can be budgeted for at an early stage.



## Virtual Reality in Architecture I See in 3D

Efficient building design and valuable assistance for maintenance and accident prevention: Virtual reality applications provide all sorts of advantages during construction and for facility management.

Architects, engineers and construction companies can now explore their structures in three dimensions with the help of virtual reality applications (VR). According to Dr. Alexander Rieck, an engineer at the Fraunhofer Institute for Industrial Engineering, the cost of solutions like this is no longer an issue. Rather, it all depends on “the willingness of planners to engage with them.” The main developments are the improved and less cost-intensive hardware (computers, glasses and screens) and the 3D software, which is now in frequent use. “Young architects are now well-versed in with working in 3D environments. Existing interfaces now allow VR and augmented reality (AR) to be integrated directly into the work process,” says Alexander Rieck.

CAD data allow buildings to be visualized in 3D on a computer with relatively little effort. Construction companies and architects can therefore appraise the future appearance of

different planning alternatives. At this stage, it is easy to make changes and any imperfections can be removed at little expense. VR solutions create a completely immersive version of a construction project. Building contractors, construction companies and manufacturers of construction products are given the opportunity to experience, analyze and assess a simulated reality by means of a VR headset. VR also benefits investors and facility managers. Investors can quickly familiarize themselves with the scope and details of planned projects, and gain a better understanding of the problems involved or potential available. For facility managers, augmented reality is a technology that enables them to locate non-visible elements such as sensors or pipes. Rieck, the researcher from the Fraunhofer Institute, also mentions energy-related aspects: “We are already very good at calculating air flows. Complex eddies develop in the space, and they are best analyzed with the help of VR.”

VR solutions will also be able to be used to prevent accidents on construction sites. Engineering agency Bouygues Construction is working with HTC Vive to develop a training course covering virtual reality. One of the first test modules deals with the risks involved in positioning formwork elements. With the help of VR, which allows dangerous situations to be simulated in near real-life conditions without any risk, the awareness of the associates at Bouygues of the dangers is raised, and they receive training on the basis of realistic examples. ●

### BASED ON BIM

A building information modeling cloud platform (BIM) provides all the data needed to plan, operate and manage buildings. The parties involved can access the virtual model from anywhere. This guarantees a continuous exchange of information, ensuring everyone is always up-to-date.

### KRAKOW

## Baptism By Fire

ALMOST 2,000 DELEGATES and 1,000 service providers and journalists convened at the International Conference and Entertainment Center (ICE) in Krakow in 2017. The occasion was the UNESCO General Conference of the World Heritage Committee. Bosch lent its support to this major event; it recently assumed responsibility for managing all safety and communication systems at the ICE. Multilingual communication and simultaneous interpretation during the UNESCO conference was made possible using conference technology from



Bosch, consisting of the *Integrus language and audio distribution system* and the DCN conference solution (designed for up to 1,500 users). An access control system meant that the event organizers needed no additional staff to control access to anything from the event location to the car park. Other technology that Bosch has installed in the ICE Krakow: *Praesideo*, a public address and evacuation system with inconspicuous, yet powerful, hemi-directional speakers, and systems for video monitoring, intruder alarms and fire detection.

### INDIA

## A Greener Seaport

### MANGALORE IS A MAJOR PORT CITY

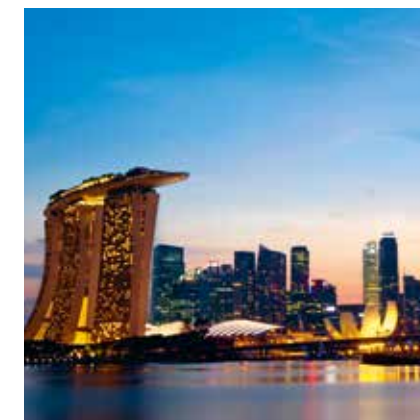
in south-west India. The company that operates the port, the New Mangalore Port Trust, commissioned the team at Bosch Energy and Building Solutions India with the planning, construction and implementation of a photovoltaic power plant – thereby reducing their carbon footprint and becoming a green port. The system has a capacity of four megawatts and is designed as a greenfield ground-mounted system. It now provides up to 20,000 kWh per day to the port, which is equivalent to the daily consumption of 5,000 households in India. CO<sub>2</sub> reductions are estimated to be 4,100 tons per year. “Sustainable infrastructure is a key element in India’s development. We are proud that we could make one of the leading ports in India greener,” says Venugopalan C M from Bosch Energy and Building Solutions India. Bosch has installed around 120 solar projects in the country so far, with a total output of almost 100 megawatts, and is thereby contributing towards greater energy efficiency and climate protection.



### SINGAPORE

## From Megacity to Smart City

WITH 90 ASSOCIATES AND AROUND 200 CUSTOMERS, the team at Bosch Energy and Building Solutions in Singapore is considered one of the region’s leading installation contractors. The skyline of the island and city state makes an impression with its imposing skyscrapers and colorful buildings with brilliant façades. Although the republic is the smallest state in South-East Asia, measuring just 719 square kilometers, it is home to around five million people. Singapore is always at or near the top of the worldwide rankings, especially those that assess safety and cleanliness. Building safety is a major priority – and this is where the team from Bosch Energy and Building Solutions comes into play. With more than 30 years of experience, the South East Asian team is one of the region’s leading service providers in the megacity. As well as developing, implementing and servicing integrated building solutions in the security and life safety sector, Bosch also offers first-class care to customers in a wide range of industries.






perform

# The School for Optimists

UWC Robert Bosch College in Freiburg is a very special boarding school. Students from all over the world live and learn together here, with a focus on intercultural understanding and sustainability. The technical equipment featured by the school's buildings is as interesting as its students – a heritage-listed former monastery and an adjacent residential village are home to cutting-edge safety and energy systems.

If you ask Ncamiso Mkhonta (19) what he really likes about the Black Forest, he says, “the great views.” In his home country of Swaziland, a small kingdom that borders South Africa, he had always lived on low-lying terrain. Freiburg's United World College (UWC), in contrast, stands on a hill. “The views from here are spectacular,” he says with a big smile. Sitting on a stone retaining wall around the old monastery garden, he gazes out over Dreisam Valley. Behind him towers a venerable former Carthusian monastery that now houses the classrooms and administrative offices of UWC Robert Bosch College.

One year ago, Ncamiso said farewell to his parents and five siblings and set off to attend this upper-level senior boarding school. It is the first and, to date, the only United World College in Germany. 





Laurence Nodder,  
Rector at UWC Freiburg  
in Breisgau

**N**camiso is one of the school's 200 students. Aged 16 to 19, they are enrolled in a two-year International Baccalaureate program that qualifies them for admission to universities all over the world. The current students come from 93 countries – including ones as far-flung as Fiji, Angola, and Nepal. Around a quarter of the students come from Germany. They live together in rooms with four beds, and speak English with each other. The far-sighted Ncamiso did not, however, primarily come to Freiburg for either his high-school diploma or for the international flair. He intends to dedicate his life to making the world a better place to live. “UWC Robert Bosch College attracts people from all parts of the world who want to do the same,” he says with evident pleasure. The school even offers sustainability as a subject in its own right.



600

fire detectors and  
loudspeakers from Bosch  
are installed on the  
campus

**TRADITION MEETS MODERNITY**

Applicants for one of the 17 United World Colleges around the world must first attend an interview with a selection committee. It is not their parents' income that matters, but rather their own personal attitude and approach. “If you're passionate about social and environmental issues, we're the right place for you – whether you're a son of a refugee or a daughter of a professor,” says Laurence Nodder (58), Rector of UWC Robert Bosch College. Having grown up in South Africa, he experienced the apartheid regime, and as a young man resolved to work to combat racism. When the Robert Bosch Stiftung, the company Robert Bosch GmbH, and the Deutsche Stiftung UWC decided to convert a former Carthusian monastery in Freiburg into a World College, they selected Nodder as its principal.

“If you're passionate  
about social and environ-  
mental issues, we're the  
right place for you.”

**RECTOR LAURENCE NODDER**

The monastery was converted and modernized over a period of three years. A residential village was also built just a stone's throw away, with 12 energy-saving houses for faculty members and students, as well as a building for the dining hall and auditorium. This has produced a harmonious ensemble that combines an old Baroque building and modern design.

The UWC that bears the name of Robert Bosch was officially opened late in the summer of 2014 – right on time to mark the 150th birthday of the company's founder. However, before this could happen, a huge amount of effort was poured into the project.



12

energy-saving  
buildings provide a  
home for students and  
faculty members in  
the residential village

Both the construction department at Robert Bosch GmbH, which was in charge of the project, and its subcontractors had their hands full. Yet today the site is a campus equipped with modern energy and safety systems from Bosch. All the new buildings meet Freiburg's strict standards for energy-efficient construction, and the old monastery was also modernized in compliance with the high energy standards.

**EFFICIENT HEATING**

Before the UWC moved in, the monastery was used as a nursing home for a century, and most recently served as a municipal art storage facility. As might be expected, a fair amount of modernization work was required. In keeping with UWC ideals, the construction project focused on using efficient and sustainable technology. The monastery's old

oil-based heating system was replaced by a natural gas-powered CHP system from Bosch Thermotechnology that generates an output of 70 kW<sub>el</sub> and 109 kW<sub>th</sub>. A pellet boiler and natural gas boiler were also installed for medium and peak loads.

“When you can measure  
something, you can also  
understand it better.”

**TOBIAS KELLNER, COORDINATOR**

“We supply the heat that we generate to a local network, and therefore also heat the residential buildings, dining hall, and auditorium,” explains Ivica Drndelic, one of the college's maintenance experts. “It's a combined heat and power system so it ➔

93

countries are  
represented at  
UWC Freiburg





1  
central control unit for  
the safety and energy systems  
allows full control over the  
entire property

produces not only heat, but also electricity. We also have solar panels on the roofs of four of the residential buildings, with a combined daytime output of 32 kWp.” This combination allows the boarding school to cater to some of its electricity needs by itself.

The old monastery building was not an easy place to install the requisite safety systems. The individual wings of the complex had to be separated by fire doors, and extensive alterations were made to its roof. Moreover, 600 Bosch fire detectors and the same number of loudspeakers for the public address system had to be installed throughout the campus. “The construction team did, however, manage to install the systems so they’re hardly visible from outside,” says Drndelic. “That means

they don’t detract from the appearance of the historical architecture.” And because of their high audio quality, the Bosch loudspeakers can even be integrated into the classroom media systems.

Two heritage-listed vaulted halls that now house a music room and classrooms initially presented something of a challenge. “We weren’t allowed to install wiring there,” reports Drndelic. Two wireless Fireray smoke

“The building management  
system saves money.”

**IVICA DRNDELIC,  
MAINTENANCE EXPERT**

detectors from Bosch ultimately provided a solution that is as safe as it is elegant. The access control solution that Bosch designed for the various facilities and levels of authorization is also a perfect fit. Faculty members and other staff use transponders to gain entry to the different buildings and rooms, while students use their ID cards to enter the residential spaces and classrooms. The benefits of this system are obvious: Access rights for new individuals can be added at any time, and the system can be easily modified if someone loses an electronic key.

A real highlight can be found in the cellar of the monastery, this being the central control unit for the safety and energy systems. It takes the form of a cabinet roughly the height of a person, and features an integrated touchscreen. In addition to the headings and menus, the screen shows consumption levels, control elements, and a 3D map of the campus. It ensures the technical staff has a full overview at all times. “All the buildings are integrated into this control system,” says Drndelic. “If there’s a problem with the technical systems anywhere on campus, an SMS is sent to our work phones, and we can see detailed error reports on this monitor.”

The unit can also be used to regulate the heat for each building. “That saves money,” notes Drndelic. “For one thing, it’s very easy to determine when the individual heating systems should switch to the lower night-time mode.” Bosch assembled this central control unit specifically for UWC. It provides a full overview of the entire property: Utility levels, error warnings for all the systems, remote monitoring – everything can be registered and rendered on the display, enabling the technical staff to respond immediately when necessary.

**DATA HELP WITH UNDERSTANDING**

The central control unit offers yet another advantage. It records the electricity and water consumption levels for the individual residential buildings, and allows readings to be taken at any time. Inspired by this monitoring function, Tobias Kellner, UWC Freiburg’s Sustainability Coordinator, who is in charge of the social-environmental curriculum, held a contest. The students competed to see which residential building could use the least energy in winter. “They ran with the idea, and learned how to use less power in their everyday lives,” he says.

Each of the residential communities wanted to win the contest, so they made sure to do things like close the doors to heated rooms

“Technology can help us live  
in more sustainable ways.”

**TOBIAS KELLNER, COORDINATOR**

and turn off the lights when not in use. This is nothing new for energy-conscious communities, of course, but can be easily neglected on an everyday basis. “Technical systems can help raise our awareness of things like this,” says Kellner. “Because when you can measure something, then you can also understand it better.”



Even such seemingly trivial matters receive attention at UWC Freiburg, where the eyes otherwise seek the expansive vistas of the world’s cultures and concerns. This is not a school for moralizers, but rather for multipliers who want to spread practices that encourage mindfulness in interpersonal relations, and to protect the environment. Ncamiso Mkhonta is a good example. He doesn’t yet know which studies he will pursue after leaving UWC. But he does want to help other people improve their lives, and the world at large. At UWC he has gained a concrete understanding of what sustainability is all about. Thanks in part to technology from Bosch.

200

students live at  
UWC Robert Bosch  
College in Freiburg



# Leading by Example

As the lead plant for almost two dozen sites worldwide, the Bosch factory in Bamberg functions as a role model. It also keeps setting new standards for itself. The latest example: energy-efficient production.

**BOSCH PLANT  
BAMBERG,  
GERMANY**

-  Founded 1939
-  Lead plant for 21 factories in 12 countries
-  235,000 m<sup>2</sup> floor space
-  7,700 associates
-  16.5 MW cooling output
-  4 GWh saved per year

With a floor space of 235,000 square meters divided into five plant sections and around 7,700 associates including 300 apprentices, the site in the Upper Franconian city of Bamberg is the Bosch Group's second largest plant in Germany after Stuttgart-Feuerbach. And it is one of the plants that function as a role model for the production of automotive components in other countries. Associates at Bamberg coordinate and develop the production processes for 21 plants around the world. They also support these plants along the entire value chain in their internal development, production, sales, and not least, customer services.

But why should a new cooling system be needed at the Bamberg site? Hundreds of thousands of precision components, such as spark plugs, sensors, high-pressure injection valves, and common rail injectors, are produced here daily and a lot of energy is needed to do so. Too much, according to Bosch. This is why a project was launched to modernize the cooling system and simultaneously increase energy efficiency in production.

Associates at Bosch Energy and Building Solutions contributed their expertise to give the Bamberg site a holistically integrated solution from a single source that included the technical concept, planning, and implementation. The result is an efficient and future-oriented cooling system with an overall total output of 16.5 megawatts. It has allowed energy consumption at full capacity to be reduced by four gigawatt hours a year.



Efficiency-oriented (from left): Ulrich Ziegler, Project Director Bosch Energy and Building Solutions, Joachim Schlüter and Ferdinand Simanek, Facility Management Bamberg Plant

WE SPOKE WITH JOACHIM SCHLÜTER, FACILITY MANAGEMENT DIRECTOR AT THE BOSCH PLANT IN BAMBERG:

**The Bamberg plant continues to set new standards in organization, management, and production. What was the impetus for the latest project?**

In addition to ensuring our energy supply, we also wanted to take steps to sustainably reduce our energy consumption.

**What role does energy efficiency play at the Bamberg site?**

By reducing production costs, we can remain competitive on the international stage. In addition, we can also actively help to achieve the goals set by the Bosch Group, such as lowering CO<sub>2</sub> emissions by 35 percent by 2020.

**What was it like to work with your colleagues from Energy and Building Solutions?**

I'd say that it didn't take much time to coordinate the processes, or, in other words, that it was efficient to commission, fund, and carry out the project.

**You'll be using the Energy Platform for energy management. What do you expect this to achieve?**

It's an intelligent system for monitoring energy consumption that allows us to manage our facilities in significantly better and more energy-efficient ways. It gives us an overview of all the output and consumption data for the individual assemblies at the cooling center, so we can make the right diagnoses promptly – and take steps to increase energy efficiency. For example, we can ensure optimal cooling even during heat waves. ●

 More information about the project: [www.boschbuildingsolutions.com](http://www.boschbuildingsolutions.com)



# A Perfect Fit

India’s dairy industry is booming – but also consumes a lot of energy. A connected solution is the remedy.

India’s dairy industry has grown unabated since the mid-1970s. At over 155 million metric tons per year, the country has grown to become the largest milk producer in the world. However, given that its energy has, to date, been primarily generated using coal-fired power plants, India is currently still the world’s third-largest emitter of CO<sub>2</sub>. This is just one of the reasons why the country is appealing to its companies to invest in efficient technologies and sustainable solutions to lower energy consumption in the long term.

## CUSTOMIZED ENERGY SOLUTION

The “Sri Mahalakshmi Dairy”, known in India for its Aroma brand of milk products, aims to set a good example in the industry and forge ahead with energy-efficient production. With an annual production volume of 200,000 liters of milk, the company is currently one of the largest private dairy operations in India. The dairy has placed its trust in the problem-solving expertise of Bosch Energy and Building Solutions to keep operations running sustainably. The Indian experts studied the industry’s requirements in detail and developed an Integrated Heating and Cooling Solution for dairies, which is currently being implemented at the Sri Mahalakshmi Dairy facility in the city of Coimbatore in southern India.

In the first step, a five-member team working with project manager Prakash Krishnan analyzed the value creation chain and energy

“Our experience allows us to complete projects like this in just six months.”

**VENUGOPALAN C M, BOSCH ENERGY AND BUILDING SOLUTIONS INDIA**

consumption of the dairy plant – and found a number of points for improvement: A large quantity of the steam used in daily operations was lost due to the condensate lines and formation of flash steam. Limited process controls resulted in further energy wastage. The Bosch team used its detailed analysis as a basis to develop a customized energy solution that can be utilized at other dairies in the future as well.

## INTEGRATED ENERGY CONCEPT

The processes in dairies utilize energy for both heating and cooling. While heating processes employ steam generators, chillers are installed to meet cooling requirements. The core of the new solution’s performance lies in how demand from the dairy processes and supply of energy from the heating systems are integrated and synchronized to achieve substantial energy savings.



450

metric tons of CO<sub>2</sub> are saved annually



Project manager  
Prakash Krishnan

14%

less energy is consumed by the dairy thanks to the integrated solution



155

million tons of milk are produced by Indian dairies per year, including Sri Mahalakshmi

Bosch’s system captures heat from system elements, such as the boiler and heat pumps, or waste heat. The heat energy is then stored in a stratified storage tank. Instead of steam, many high-temperature processes now use pressurized hot water. “This allows us to minimize energy consumption while simultaneously cutting energy losses caused by the condensate lines,” says Venugopalan C M, Head of Bosch Energy and Building Solutions in India. “We even make use of the temperature of the used cleaning water to heat up the water for the next cleaning procedure, which also helps to conserve water,” he continues. The energy from the recuperator is also used in the milk and curd pasteurization processes, in the drying room and in the dehydrator for production of milk powder. Another building block of the solution is the extensive employment of heat pumps which are used for heating purposes with temperatures less than 75° C and also help save large amounts of electricity for cooling processes.

## MILKING THE DATA

An energy management platform is used to ensure that the complete potential that the system offers is exploited to maximize efficiency. It captures all consumption data and visualizes it in a meaningful manner. “The platform helps us identify which processes generate excess heat or cooling, and where, in turn, this heat and cold can be used. This allows us to manage requirements and demand efficiently,” says project manager Prakash Krishnan. To enable precise recording of energy consumption, Prakash and his team installed temperature and pressure sensors, as well as energy meters, at various points in the system, such as the stratified storage tank and the milk pasteurization facility. Thanks to the energy management system, these data are now available directly on the portal. For the Bosch experts and their customers, the data provides a basis for tapping further potential for efficiency. The connected solution also has a preventive

## THIRSTY FOR MILK

In India, dairy products like the clarified butter known as ghee, or yogurt (used to make lassi), have an extremely important role to play, not least because they serve as a source of protein for the many vegetarians in the country. According to the Food and Agriculture Organization of the United Nations, with 72 million metric tons of milk produced, India ranks third in milk production behind the EU and USA. If one includes, as is common in Asian countries, the amount of buffalo milk produced as well, India ranks first with a total of 155 million metric tons.

function. As soon as critical values are detected that could affect systems processes, the platform issues an alarm – the service team can then respond immediately, to maintain the systems at the required efficiency levels.

## SAVING COSTS

“Thanks to the integrated solution, the dairy’s energy consumption has been decreased by 14 percent. This not only reduces the annual costs for our customers, but also helps protect the environment; at present, we’re able to save 450 metric tons of environmentally harmful CO<sub>2</sub> annually,” says Venugopalan C M. The scope of delivery included the planning, detailed engineering, installation and calibration to ensure optimal operation. “The most important thing when working on a project like this is having an experienced partner at your side who combines and integrates all of the technical components in a complete system to ensure full functionality. This makes it possible to achieve the optimum in terms of performance and service life,” as Venugopalan C M concludes.



# “Smart City is not just a vision, but already reality”

Connected technology for livable urban spaces: Bosch is working with 14 metropolises on Smart City lead projects. Bosch project manager Paulo Ferreira talks about old problems and new solutions.

**The term ‘Smart City’ is on everyone’s lips. Why is it important to connect cities and turn them into interactive places?**  
Because urbanization is one of the major challenges of our time. According to the United Nations, around two-thirds of the world’s population will live in cities by 2050. Every 16 months, a metropolis crosses the 10-million inhabitant mark and therefore qualifies as a Megacity. These urban conglomerations consume vast quantities of water, electricity and heat, not to mention all the transport and waste problems that occur. And all this in the smallest of spaces. By 2035, worldwide energy requirements are expected to rise by 30 percent, and three quarters of this will be accounted for by cities.

**And smart cities are the solution to all these problems?**  
We want to create urban spaces which improve the quality of life in the long term. Smart connectivity solutions will help achieve this, whether through new kinds of mobility, improvement in air quality, energy-efficient use of buildings, higher levels of security or intelligent homes.

**What role does Bosch play in this?**  
With our broad portfolio of products and services, and as a system supplier for energy and building technology, we can contribute to making cities learn to think, so to speak. The Internet of Things enables us to find lots of fascinating new solutions. Connecting one’s own four walls with the outside world was just the beginning. Smart City is not just a vision for the future; it has long since existed.

**Can you name a few examples?**  
We are currently working on Smart City lead projects together with 14 metropolises. In California, we have set up street lighting which is only active when needed; at 5,000 street lights, this will save the city up to seven million euros in 15 years. Together with the city of Ludwigsburg, near Stuttgart, we are currently testing a system which monitors the water level of rivers when floods occur – thanks to cameras, sensors and an IT platform to analyze the data. And in India, colleagues have developed a solution to make better measurements of air quality possible. Climo, affordable and compactly shaped, won the Innovation Award at CES 2018 in Las Vegas. By the way: This city in the

desert will be investing half a billion US dollars in smart city development over the next few years.

**An impressive sum.**  
Yes; this does, however, assume a different dimension given that American drivers sit in traffic jams for around 40 hours per year. This results in the waste of up to 120 billion dollars in fuel alone.

**That’s surely not the only challenge.**  
The problem is that the infrastructure is being overtaxed with the growing number of city-dwellers. More people mean more traffic jams, fewer parking spots, and also a higher crime rate. The need for security at home and in public buildings is growing.

**What are the implications for data protection if cities make greater use of cameras and motion sensors?**  
We only process, store and analyze personal data if the customer explicitly agrees to this, and delete the data again at the customer’s request – or after a defined period of time. The aim is to be secure, transparent and legally compliant.

**What benefits will increasing transparency have for citizens?**  
A city in which life is efficient, uncomplicated and designed to be pleasant is simply more user-friendly and more livable: The key word here is eGovernance. Estonia and Denmark are already quite advanced in this area. The reality, unfortunately, is often that you can have a pizza in your hand 15 minutes after ordering it online, but when I recently applied for a

new ID card, I had to sit around and wait at the authorities for an hour.

**Might we even have smart marriage and smart divorce someday?**  
(laughs) Perhaps not that, but take topics such as waste disposal, multimodal transport, or our community-based parking system: The vehicle detects a parking space while driving by, either for itself or other users, who receive the information by means of the cloud. Waste collection will become similarly easy to structure, since garbage cans will soon know of their own accord when they need to be emptied.

**The aim is, therefore, to optimize what already exists?**  
Exactly. We are planning a partnership with the Chinese city Tianjin to implement our smart solutions. These include the virtual power station, software which collects energy from a range of predominantly regenerative sources, stores them and feeds them into the grid when demand is high. The consequence is a significant reduction of CO<sub>2</sub> emissions. Currently, cities are responsible for 75 percent of worldwide electricity consumption.

**This has enormous potential, not just for smog-ridden cities in Asia.**  
In the long term, Smart City technologies, meaning sensors, software and services, will improve the quality of life for the inhabitants of urban areas at the same time as conserving finances. Connected solutions will increase urban energy efficiency alone by 30 percent within 20 years. ●

**PAULO FERREIRA**



Paulo Ferreira is the Vice President of Project Management for worldwide Cross Selling and Smart Vertical Solutions at Bosch. The economist has been a member of the Group since 1992. Ferreira has held various management positions, including that of General Manager for Bosch in Thailand. After stations in Europe, South America and Asia, in 2011 the native of Portugal began building up the company’s Cross Selling division, which, among other activities, integrates Smart City technologies from energy and building technology into large-scale project planning.





# Working Together to Make Things Better

Many new aspects of fire protection are emerging due to digitalization and the Internet of Things (IoT). This presents challenges for planners and operating companies.

Network-capable safety systems are increasingly replacing the existing proprietary systems used in many businesses. A shared IP platform that integrates fire detector systems with voice alarm, intruder alarm and access control systems, as well as video monitoring, is opening up all sorts of new potential.

Information provided by video cameras, fire detectors or even door control systems can be combined centrally with the aid of safety-relevant network technology components and by using standard protocols and standardized interfaces. This allows central operation and standardized administration of the safety technology – which, as well as having a beneficial effect on efficiency and operating costs, also allows faster and more systematic intervention by correlating events. This, in turn, considerably improves safety levels.

The Building Integration System (BIS) from Bosch combines fire detector systems with voice alarms, as well as with intruder alarm systems, access control systems or the necessary video technology, into one central operator station. The systems can then be operated, monitored and

evaluated from there with their full scope of functions. As well as reducing operating costs, an intelligent system design like this creates the prerequisites for an automated and concerted response in the event of an alarm, while also improving safety. Having the relevant video sequences displayed allows the control room and emergency personnel to assess any alarm.

All these activities are almost certain to be automated and documented in a way that allows assessment at a later stage as well. It is even possible for diverse information to be transmitted to specific mobile systems. In the event of an alarm, safety and emergency personnel know what to expect on site before they even arrive. System data and system messages can also be transmitted to mobile devices. In addition, digital technology makes it possible to utilize innovative detection procedures, such as video-based fire detection, which Bosch offers under the name of AVIOTEC (also see page 37).

Issues relating to data protection and IT security are of great importance, and it is important to factor them into the early planning stages. Video

technology and access control in particular can involve the collection and processing of personal data.

However, sensitive data are also gathered in maintenance groups such as fire detection. Planners and operating companies should make sure they address this issue with due diligence. ●

## QUALIFICATIONS AND INNOVATION ARE ESSENTIAL

**Connection and the IoT offer many advantages to those planning and operating fire detector systems – assuming they have made sure they understand the technology properly and hire qualified staff. This is not a matter of becoming an IT expert. And yet the transition can only succeed if everyone involved is able to understand and apply the new concepts.**

# Tunnel Vision

Tunnels are complicated structures requiring extensive safety measures to protect road users. So it's good that plenty of them feature the latest safety systems from Bosch.

Many tunnels are considered marvels of engineering, partly because they have to satisfy particularly stringent requirements in relation to traffic and operational safety. Whether it's a matter of lighting, ventilation, communication, fire protection or video monitoring, user safety always has top priority.

Some clever people have worked out that one fire breaks out for every 50 million kilometers traveled. A road tunnel that is 2.5 kilometers in length and used by 20,000 vehicles a day should, statistically speaking, experience a fire every one thousand days, leaving aside any other emergencies.

This is why it is hardly surprising that the technical regulations are just as detailed as the marvels of engineering are sophisticated. Take the Berg

Bock tunnel, for example, one of the longest road tunnels in Germany. Bosch modernized its existing technical equipment and upgraded it with additional components relevant for safety while the tunnel was in operation. The tunnel was promptly voted the safest of its kind in Europe when ADAC conducted its major tunnel test.

Another example is the new Eurasia Tunnel in Istanbul. 5.4 kilometers long, it crosses the Bosphorus at a depth of 106 meters and connects the European and Asian sides of this 15-million-inhabitant metropolis. Bosch spent four years refining the safety concept for this double-deck tunnel, which has two lanes on each deck and spans terrain that is at risk of earthquakes and flooding. It used to take more than an hour to cross this strait in Turkey using one of the

chronically congested bridges; now, this has been cut to just 15 minutes. 500 intelligent video cameras monitor and analyze the traffic.

Fire protection is managed by a system consisting of 5,500 automatic and manual smoke detectors. There are also 100 emergency telephones and an access control system at both entrances. All systems are controlled by means of a central platform, which is a safety center equipped with huge monitors located directly by the tunnel.

Commuters and tourists remain oblivious to this. They can simply enjoy their journey during the "blue hour", which costs them about €4 in tolls; this experience is one that can actually be enjoyed all day, as the sections of tunnel that run under the water feature ceilings illuminated in blue. ●



In the new Eurasia Tunnel in Istanbul, security, planned and installed by Bosch, is always on board





MALL OF SWITZERLAND

The Smart Bouncer

**THE NEW “MALL OF SWITZERLAND”** shopping and leisure center in the town of Ebikon (Lucerne canton) has more than 150 shops plus a cinema and a fitness center. It also has around 110 doors that lead to non-public parts of the complex and therefore require special monitoring and access. The mall operators rely on Bosch to provide this authorized access. Bosch building experts installed the MATRIX entry system, which is based on central surveillance and control. A specially developed online interface gives security personnel a diagrammatic overview of the state of the doors. Individuals can receive one-time or continuous access, and also have access denied. This maximizes security at the mall, which is expecting to welcome up to five million visitors a year.

ENERGY EFFICIENCY IN PRODUCTION

Bosch Experts Lower Energy Consumption

**MAGNA GETRAG IN NEUENSTEIN** has already taken many steps to increase energy efficiency; however, its management is determined to reduce energy consumption and CO<sub>2</sub> emissions even further. Its plant in Neuenstein, which employs around 900 people, produces and assembles manual and automatic transmissions. Working on the basis of a partnership with on-site specialists, the experts at Bosch identified energy-saving measures on 30 machines. “Production consumes an overwhelming share of the energy, and this offers unused potential,” explains Sven Sautter, who heads the local Energy Services organization of Bosch Energy and Building Solutions Germany. “So that’s why we started by analyzing energy use in production.” A lot of potential for savings was found in the pusher furnaces used for heat treatment of the transmission components. In this area alone, energy costs were reduced by around €100,000 – with the investment paying off in about 2.5 years.



SAFETY IN THE MOUNTAINS

Skiing in Safety

**AUSTRIA’S MOST POPULAR DAYTIME SKI RESORT**, Stuhleck in Styria, offers not only unparalleled skiing pleasure with fabulous panoramic views, but also the highest level of safety for vacationers thanks to a partnership with Bosch. To counteract the risk of fire on the lifts, its 4-seat chair lifts were equipped with cutting-edge fire detector systems from Bosch. The site now has five connected fire detection centers and 66 fire detectors, which ensure rapid detection, alerting, and management of firefighting measures.



MESSE FRANKFURT

578,000 m<sup>2</sup> of Safety

**THE MESSE FRANKFURT** trade fair organizer and exhibition grounds entered into a long-term partnership in 2014 with the Frankfurt branch of Bosch Energy and Building Solutions to provide customized safety solutions for its visitors and exhibitors. All the relevant safety functions – police, firefighters, regulation and security services, medical station, control center, and building technical systems – have now been united under one and the same roof at its Operation & Security Center. Bosch realized this holistically integrated safety solution, and is also responsible for maintenance and service. In the event of an emergency, the police can access the Bosch video system with its approximately 300 IP cameras inside and outside the buildings, while the live images remain visible for all other users. The control center has a video wall and twelve user stations equipped with the Bosch video management system (BVMS).

For more information, see [www.boschbuildingsolutions.com](http://www.boschbuildingsolutions.com)

New Video Analyses for the Retail Sector

**BOSCH SECURITY SYSTEMS** is offering a new software solution that will enable retail stores to analyze customer interactions. The knowledge gained from in-store analytics can be used to improve the store’s layout, product selection, customer service, and operational processes. With their 360-degree field of vision, video cameras from the FLEX-IDOME IP panoramic family have a good overview of the retail area and can generate anonymous positional data on customer movements. One advantage of this Bosch solution is that the cameras generate data in a decentralized system, which features intelligent sensors that make the system easy to scale up and use for large store retail spaces. Successful sales often depend on where products are placed and when customers notice them when moving through the shop. The flow analytics provided by the new Bosch system therefore register how customers move around, and where they stop.



DIGITAL MODELING

Safety and Comfort

**THE SHERATON HOTEL** in the heart of Phoenix, with its 1,000 guest rooms, 16 adaptable meeting spaces, and two ballrooms, is a popular venue for conventions. Bosch subsidiary Climatec was responsible for extensive infrastructure work that improves both safety and comfort in the 31-storey building complex. At a cost of around four million US dollars, and over a planning and construction period of 20 months, it put a comprehensive solution into place which includes a modern fire alarm system, an energy management system, and a modernized water supply system including heat exchangers, boilers, ventilators, and remote-control pumps. The Bosch subsidiary completed all of the project work on a Building Information Modeling (BIM) cloud platform, which provides everyone involved with digital access to the building data as 3D computer models during all development phases. It ensures changes are convenient to make, potential problems are identified early, and it allows both time and money to be saved – all of which also benefits the everyday management of the systems once they are up and running (see page 20 for more on BIM).



2018 EUROPEAN TOUR

Where Cities Meet the Future

The commercial buildings of the future will be safe, comfortable, efficient, and smart. But what makes buildings smart buildings? And how will we live and work in smart cities? Which new opportunities, and which challenges, will this result in for you as decision-makers, doers, and forward thinkers?

Our series of events offers cutting-edge talks by futurologists and Bosch experts. Join us for lively infotainment and networking at exclusive venues in five cities guaranteed to inspire you: Amsterdam, Berlin, Milan, Vienna, and Zurich.

Reserve your place today.

We look forward to welcoming you!



For more information on these and other events  
[www.boschbuildingsolutions.com](http://www.boschbuildingsolutions.com)

2017 CUSTOMER SATISFACTION

Many Thanks!

**THE BIG 2017** customer satisfaction survey benefited from a high response rate, with nearly 800 business partners from Germany, Austria, Switzerland, the Netherlands, and Italy taking part. One especially positive result is that most partners surveyed expect to remain customers of Bosch in the future. The company's image has also improved significantly: 80 percent of respondents state that they primarily consider Bosch Energy and Building Solutions to be a partner. This is welcome praise, because Bosch places a high value on trust-based customer relations.



PUBLISHER INFORMATION

The magazine *Bosch Energy and Building Solutions* is aimed at customers, partners, and other interested parties. It provides information on issues and projects related to improving security, convenience, and efficiency in commercial buildings. The 2018 issue is published in German and English in Germany, Austria, Switzerland, Italy, India, and the US.

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BEYOND THE NORM

Total Dedication

Tobias Risch is fire chief at Munich's volunteer fire brigade. While it is a time-consuming hobby, it is one that he enjoys, and also proves useful in his job.

It is three o'clock in the morning when his pager sounds the alarm. The shrill sound of the small device is very effective at getting Tobias Risch up and out of bed; he's wide awake within a split second and knows exactly what to do. The 25-year-old immediately drives to the appliance room at the Munich Moosach volunteer fire brigade in order to don his firefighting equipment and inform himself about the situation. Luckily, it's "only" a small fire, and his mission is soon over.

Nights like this are not a rare event for Tobias Risch, who, in "real life," works as an engineer for occupational safety, fire safety, and environmental protection at Bosch in Munich. Even after a night-time assignment, he's fit during the day. Risch: "I don't need a lot of sleep. And, if I do have bags under my eyes after a long night-time assignment, then my colleagues are happy to drink an extra cup of coffee with me."



Risch completed a bachelor's degree in Security and Safety Engineering at Furtwangen University and considers that his hobby makes a useful contribution to his job. "When we are deployed, we are ripped out of our daily lives at a few seconds' notice, and confronted with any number of scenarios that we have to master. That automatically makes you very solution-oriented and resistant to stress. This, of course, is a great help to me at work," says Risch. He also says that firefighting training has helped him to broaden his technical knowledge of fire safety.

When he was 14, a friend more or less dragged him along to the fire brigade. The friend soon lost interest, but Risch stayed, and he is still there. He's also very happy about it: "The fire brigade had a major influence on what I studied and what job I went on to do. Now I can say that it was the right decision."

TOBIAS RISCH

As a specialist for occupational safety, fire safety and environmental protection – as well as being a dedicated fireman – the engineer is able to combine his job and his hobby perfectly.



# Performance Built on Partnership

As your reliable partner, we provide connected and integrated solutions that make your buildings more secure, more efficient, and more comfortable. Our experts support you as consultants, installers, and service providers.

Take advantage of our extensive expertise and integrated solutions based on the latest technologies — all from a single source located near you. Feel free to contact us at any of our many sites.

**We look forward to providing tailored advice!**



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