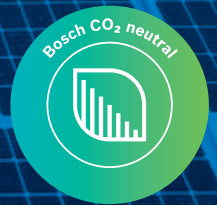




BOSCH

Invented for life

SHIFT INGPA RAD IGMS



Sustainability report 2020 | **spotlights**

Done. Made it.

Bosch is pursuing its sustainability goals systematically and vigorously. The New Dimensions – Sustainability 2025 target vision defines key topics: climate, energy, water, urbanization, globalization, and health. Selected examples illustrate what the company has achieved specifically in 2020.



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We can do it. Here and **now!**

Stuttgart, May 9, 2019, annual press conference of the Bosch Group with journalists from all over the world. CEO Dr. Volkmar Denner announces an ambitious project: by the end of 2020 all Bosch locations are to be climate neutral.



No other global industrial enterprise has formulated a comparable voluntary commitment and made a similarly ambitious promise to the environment. To put it into practice, Bosch has been using four levers: increasing energy efficiency, using renewable energies, expanding the purchase of green electricity, and – as a last resort – offsetting unavoidable CO₂ emissions with carbon credits.

The more ambitious a goal, the greater the skepticism. Journalists, customers, and even some associates were wondering: can this work? Today, barely two years later, there can be no doubt: we can do it. We can put climate action into practice – here and now. Since 2020, the Bosch Group has been climate neutral. The more than 400 locations worldwide no longer leave a CO₂ footprint with their activities (scopes 1 and 2). Around 2,000 newly launched projects around the world and a virtual team of more than 1,000 associates have helped to translate the strategic approach with four levers over the past two years into effective climate action. So what progress has Bosch made as 2020 comes to a close? Here is a brief overview.

Lever 1: Improve energy efficiency

Since 2019, more than 0.38 terawatt-hours (TWh) of energy have already been saved through efficiency measures at some 400 Bosch locations worldwide, and this figure is to be raised to 1.7 TWh by 2030. To achieve this goal, Bosch intends to invest a total of around one billion euros by 2030. The focus is primarily on electricity consumption and heat generation. This is also the starting point for the majority of projects launched since the start of climate action activities – projects like the one carried out by Miguel Morales Huerta and the Energy Management Team in San Luis Potosí, Mexico: one of a total of 16 Bosch locations in the Latin

American country. The Mobility Solutions site manufactures powertrain components. In 2019, it began to set up a systematic energy management system – from digitally collecting consumption data to targeted energy-saving measures and continuous knowledge sharing. Concrete measures were thus quickly initiated to effectively improve the site's energy balance. "For example, we have modernized our air-conditioning and ventilation system to enable demand-based control. At the same time, we have optimized the shutdown management of the plants and eliminated compressed air leaks," says energy manager Huerta. "All this was flanked by the internal campaign #BeEcoBeBosch that sought to involve as many associates as possible in the measures." The outcome: by 2019, energy consumption was already around 4,300 megawatt-hours (MWh) less than originally planned.

Same goal, different approach, some 12,600 kilometers away: in Suzhou, China, Alex Li and his eight-strong project team are committed to the goal of reducing the energy consumption of Surface Mounted Technology (SMT) soldering machines to zero outside production times. After the first step, which proved the feasibility of the approach, a digital solution was developed in 2020 to automatically shut down the 35 furnaces, which reach an operating temperature of over 220 degrees Celsius and are therefore very energy intensive. With the new solution, it

was possible to capture annual energy savings of around 1.1 gigawatt-hours (GWh). Having established that the project team's idea is best practice, Bosch can now roll it out throughout the company.

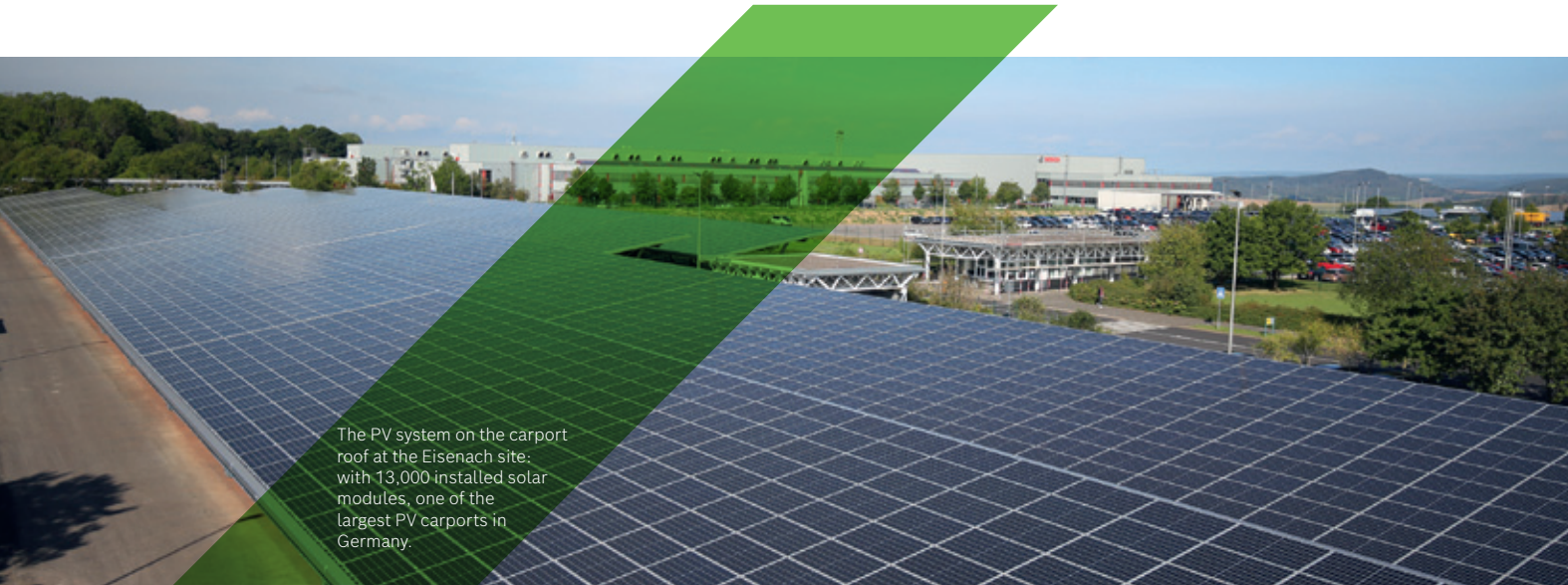
Lever 2: Generate energy from renewable sources

By 2030, Bosch intends to generate around 400 GWh of energy from renewable sources itself – primarily from photovoltaics (PV). Around 69 GWh are generated already today. Against this backdrop, an ambitious plan is currently becoming reality in Thuringia: the Bosch plant in Eisenach intends to minimize its electricity consumption by 2022 through a sophisticated energy management system. The remaining amount of energy needed is then to be covered by the company's own electricity supply from photovoltaic systems and the exclusive purchase of electricity from wind power. The PV system on the carport at the site – with 13,000 installed solar modules – is one of the largest PV carports in Germany and already contributes 1.6 megawatt peak. Bosch also relies on photovoltaics at many other locations. In Australia, for example, a system went into operation at the Clayton plant in May 2020 that will generate around 1,350 MWh of energy each year.

» WHEN IT COMES TO CLIMATE CHANGE, WORDS ARE NOT ENOUGH. WE HAVE TO TAKE ACTION | Dr. Volkmar Denner, chairman of the board of management of Robert Bosch GmbH



Bosch generates 69 GWh of renewable energy at its locations.



The PV system on the carport roof at the Eisenach site: with 13,000 installed solar modules, one of the largest PV carports in Germany.

At the same time, Bosch is investing in projects that would not have been realized by the operators without the financial commitment – and is making an important contribution to the energy revolution with New Clean Power (NCP) projects of this kind in countries such as Germany and Mexico. In 2020, for example, long-term contracts were concluded with three energy suppliers in Germany. RWE, Statkraft, and Vattenfall each supply Bosch exclusively with electricity from subsidy-free solar farms. In total, more than 100,000 megawatt-hours of electricity will flow through the public grid to Bosch locations in Germany every year – equivalent to the annual electricity consumption of up to 30,000 households. Under optimum photovoltaic conditions, the peak output

Lever 3: Green electricity

In order to reach carbon neutrality as quickly as possible, Bosch has primarily increased the proportion of green power used. In Germany, the company has been purchasing exclusively green electricity with corresponding guarantees of origin since 2019. Group-wide, the proportion of green electricity was around 83 percent as of the end of 2020. Wilhelm Relard, who is responsible for the coordination of energy procurement, explains: "Through our regional organization, we aim to cover all electricity consumption, if possible, from appropriate sources."



Lever 4: Carbon offsets

For Bosch, measures to compensate for CO₂ emissions are only an interim solution to offset unavoidable emissions from combustion processes. Also, when not enough green electricity is available in a country, the company relies on what are referred to as "carbon credits" from projects certified according to the Gold Standard or the Verified Carbon Standard, which promote both ecological

and social development. The spectrum of activities supported is correspondingly broad. It ranges from the reforestation of rainforests in South America to the distribution of climate-friendly cooking stoves to people in need in Africa, Asia, and South America.

will be sufficient to cover the entire electricity requirements of the plants in Feuerbach, Homburg, and Bamberg simultaneously at least for a few hours. Similar NCP projects are currently under consideration in various regions.

WE WERE THE FIRST LARGE INDUSTRIAL ENTERPRISE IN THE WORLD TO DEMONSTRATE HOW QUICKLY A CARBON FOOTPRINT CAN BE REDUCED TO ZERO | Torsten Kallweit, head of EHS and Sustainability



Goal achieved – what's next?

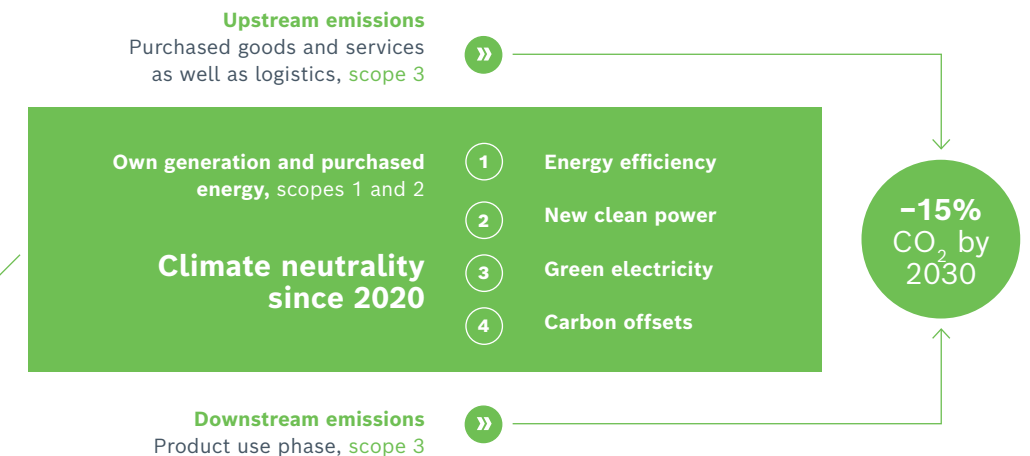
Carbon neutrality has been achieved, and Bosch is already working on the next steps. Torsten Kallweit, head of EHS (Environment, Health, Safety) and Sustainability at Bosch and thus also responsible for achieving the group's climate targets: "Carbon neutrality was our first major milestone. We were the first large industrial enterprise in the world to demonstrate how quickly a carbon footprint can be reduced to zero. The task now is to further optimize the mix of the four levers – in other words, to refine the measures used. Only then can we reduce our climate impact in the long term – and that's what really matters." Another goal is also already in focus: by 2030, 15 percent of indirect emissions are to be saved, which corresponds to more than 60 million metric tons of CO₂. These are emissions that occur outside Bosch's direct sphere of influence – for example, at suppliers, in logistics, on business trips, or during product use. The experts refer to this as scope 3. Kallweit: "Having achieved our initial targets for scopes 1 and 2, we are now tackling scope 3 emissions with the same degree of rigor – setting specific targets and milestones for the coming years. We have therefore set ourselves climate action targets along the entire value chain. Since 2020, we already use carbon offsets to make our business flights carbon neutral." The climate action targets have been externally confirmed by the Science Based Targets initiative (SBTi), which provides an independent assessment of companies' targets for reducing emissions based on scientific evidence. Bosch is the first automotive supplier to join the initiative with a concrete goal.

Scope 3 – the view outside

A 15 percent decrease in indirect emissions by 2030: compared with making the entire group carbon neutral, this might hardly appear ambitious – but only at first glance. "The scope 3 target is arguably the most ambitious of our targets," Kallweit emphasizes, "because we are largely dependent here on factors beyond our direct sphere of influence. For example, we depend on the cooperation of our partners and suppliers. We won't reach the 15 percent cut without their commitment. This is why our purchasing function is also setting itself clear goals and supporting our business partners in their development toward sustainability."

In logistics, the focus is on optimizing procurement, pooling shipments, and last but not least avoiding air transport. A large proportion of the deliveries destined for Bosch are to be shipped by sea in the future. At the same time, the in-house climate activists expect important steering effects from an internal carbon tax on business trips, and making Bosch's internal vehicle fleet environmentally friendly will also bring about visible changes soon. However, the greatest potential for reducing CO₂ emissions is in the usage phase of products. This alone accounts for around 90 percent of scope 3 emissions. Kallweit: "The divisions of the Mobility Solutions business sector as well as the Thermotechnology division, the Drive and Control Technology division, and BSH Hausgeräte GmbH face a particular challenge in this regard. Because, as always, our approach in scope 3 is to get involved wherever we can make the greatest contribution to protecting people and the environment." ◀

Bosch's climate goals: the Bosch Group has been climate neutral since 2020. In the upstream and downstream value chain, the company aims to reduce its CO₂ emissions by 15 percent by 2030.



FOUNDATION OF BOSCH CLIMATE SOLUTIONS:

The climate coaches



With the experts from Bosch Climate Solutions, companies benefit from the experience Bosch has gained on its journey to carbon neutrality.

A total of 2,000 energy efficiency projects implemented by drawing on the experience of more than 1,000 experts: with the carbon neutrality of its own locations in 2020, Bosch has reached a milestone in climate action and at the same time gained important expertise for reaching the next goals in its climate action strategy. But that's not all: Bosch is sharing its knowledge and experience.

Since the end of April 2020, the newly founded consulting company Bosch Climate Solutions has been supporting companies on their journey to become businesses that develop, manufacture, and operate in a way that conserves resources and is climate neutral. "With this consulting service, we are serving as multipliers to spread climate action beyond our own company," says Bosch board of management member Dr. Christian Fischer. He heads the Energy and Building Technology business sector, in which the new unit is organizationally anchored.

There is huge demand for consulting services of this kind: three out of every four companies in Germany aim to reduce CO₂ emissions, but only 16 percent have already implemented measures to achieve climate neutrality in their production.* The core team of Bosch's in-house start-up advises on the planning, selection, and implementation of suitable solutions from both ecological and economic perspectives, and it draws on the know-how of the more than 1,000 climate experts in its virtual network who have contributed to Bosch's carbon neutrality. The Bosch consultants take a

1,000

experts contribute their know-how.



WE PROBED THE MARKET TO SEE WHO HAS THE MOST EXPERTISE AND DECIDED THAT WE WANT TO BENEFIT FROM THE EXPERIENCE BOSCH HAS GAINED WORKING AT ITS OWN PLANTS | Reinhard Mayer, deputy chairman of the executive board of the Hansgrohe Group



holistic approach consistent with the company's own climate action activities. Such an approach includes measures to increase energy efficiency, expand the supply of renewable energy, procure more green electricity, and offset unavoidable CO₂ emissions. And because every company is different, the range of consulting services is always adapted to each customer's specific needs and requirements.

Donya-Florence Amer, CEO of Bosch Climate Solutions, explains the methodology: "In order to identify the corresponding potential, we first analyze scopes 1 and 2 of the carbon footprint – that is, the portion of CO₂ emissions that the company can influence directly. After this CO₂ audit, an initial master plan with individual scenarios is drafted that sets out the path to carbon neutrality. Next comes the concrete concept, which contains a detailed plan for the implementation of the various measures and takes into account both regional and local conditions. And, of course, it also factors in the corresponding costs that have to be budgeted for reaching carbon neutrality."

This four-week analysis is followed by a three-month detailed concept phase so that just four months are needed from the first analyses to the ready-to-implement concept. But even after that, the Bosch experts stay on board in the third phase of the consulting engagement. Amer: "If the customer wishes, we also support with execution. We capture the identified potential, drive forward the implementation of the measures, and continually optimize the new concept in the process. That way, everyone finds their personalized path to neutralizing CO₂ emissions. The concept is accompanied by comprehensive change management, including governance, performance metrics for controlling, and a communication plan."

One of the first clients was the engineering company Prettl. With the support of Bosch experts, the company developed a tailored CO₂ reduction concept. "A scenario analysis revealed where we had technological and economic room to maneuver and allowed us to define our own path toward reducing CO₂," says Willi Prettl, partner of the Prettl Group.

Based in southern Germany, the bathroom fittings manufacturer Hansgrohe has been drawing on the support of Bosch's new CO₂ consulting service since November 2020. "We probed the market to see who has the most expertise," says Reinhard Mayer, deputy chairman of Hansgrohe's board of management. In collaboration with Bosch Climate Solutions, the company has analyzed how it can optimize its manufacturing process, what can be done about packaging, and how to switch to green energy. "We want to benefit from the experience Bosch has gained working at its own plants so that we become even more energy efficient in a first step," Mayer adds.



IN ORDER TO IDENTIFY THE POTENTIAL, WE FIRST ANALYZE SCOPES 1 AND 2 OF THE CARBON FOOTPRINT – THAT IS, THE PORTION OF CO₂ EMISSIONS THAT THE COMPANY CAN INFLUENCE DIRECTLY | Donya-Florence Amer, CEO of Bosch Climate Solutions



The success of Bosch Climate Solutions' new service is already evident today – only one year since the company's foundation. "We are constantly receiving new inquiries – from medium-sized companies to major corporations," says Amer. But it's the climate that stands to win most. ◀

* Source: Boston Consulting Group

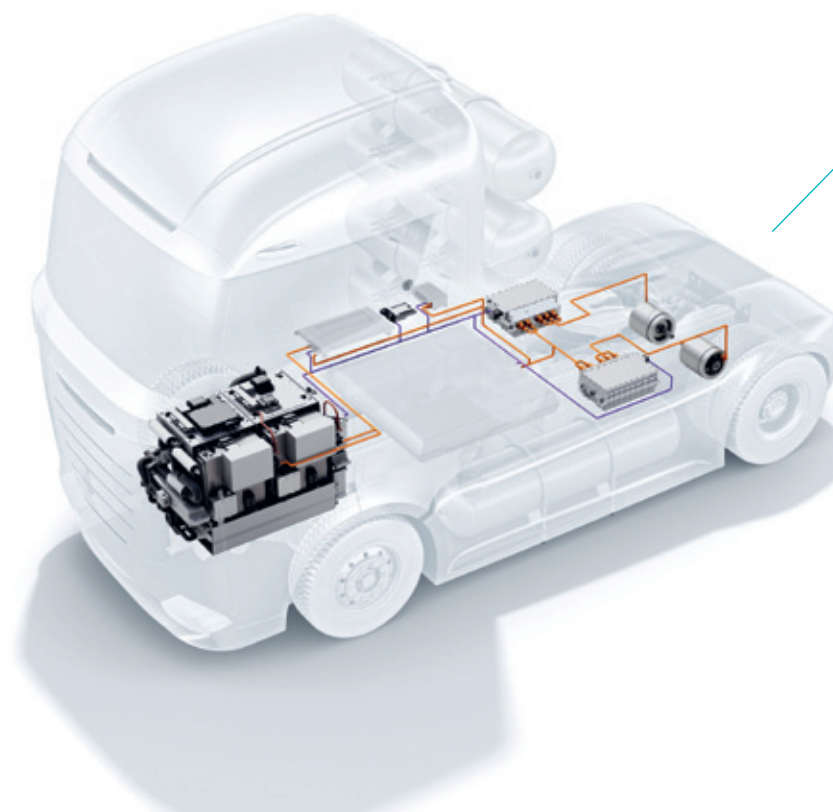
HYDROGEN:

The future starts with H



Hydrogen can secure the energy supply of the future: now is the time to set the course ahead. Bosch is driving the development of fuel cell technology in various areas of application.

At the heart of the fuel cell is the stack – an assembly of galvanic cells. Each of these cells comprises an anode (positive pole) and a cathode (negative pole), separated by an electrolyte. There, hydrogen and oxygen are converted into electrical energy.



Bosch offers a variety of solutions for mobile fuel-cell systems that address customer requirements around the world: for the stack as the core of the design, the individual components in the sub-modules, or the complete system for commercial vehicles.

It might be the lightest chemical element, but is a veritable heavyweight when it comes to the energy supply of the future: hydrogen. Safe, clean, and available in unlimited quantities, hydrogen can easily be produced by electrolysis. And if electricity from renewable sources is used in the process, the loop can be closed for a climate-neutral solution. As if that were not enough, hydrogen is also comparatively easy to store and transport – making it one of the most important energy sources of the future.

Many experts are already talking about the climate-neutral, hydrogen-based economy. And policymakers, too, are recognizing the potential of hydrogen. This is especially true of the EU, whose hydrogen strategy aims to establish a hydrogen economy by 2050. A special focus was set on transport and road traffic. Although electromobility is gaining momentum with battery-powered vehicles, it is reaching its limits in the case of trucks due to the weight of the batteries used. This is where the advantages of the hydrogen fuel cell come into play: due to the high energy density of compressed hydrogen, a good seven kilograms are sufficient for a 40-metric-ton truck to drive 100 kilometers. Once the tank is empty, the vehicle can be refueled by conventional means in just a few minutes. “The fuel cell is always the first choice for applications in which many kilometers have to be driven every day and larger loads have to be moved,” says Dr. Uwe Gackstatter, chairman of the Bosch Powertrain Solutions division. These are great opportunities, and Bosch is making

a correspondingly wide-ranging commitment – from the serial development of the stacks to the efficiency optimization of the powertrain system. For instance, in the EU-funded H2Haul project, Bosch is currently working with other companies to put a fleet of 16 fuel-cell trucks on the road and test them in the field at four locations in Europe – including the corresponding refueling infrastructure to enable rapid refueling. The results of the project should be available by 2024. And what works for trucks could also power cars, trains, ships, and even aircraft in the future.

However, it is also clear that it is not possible to reach the climate targets with alternative powertrains alone. After all, roughly half the vehicles that will be on the road in 2030 have already been sold, and most of them have a gasoline or diesel engine. Legacy vehicles will also have to play their part in cutting CO₂ emissions. One path to achieving this is with synthetic fuels that are produced exclusively with renewable



energy. In the best-case scenario, manufacturers capture the CO₂ needed to produce the fuel from the surrounding air, turning a greenhouse gas into a resource: the CO₂ released in the combustion of eFuels is essentially recycled and used to produce new synthetic fuel. It is already possible to use eFuels with today's internal combustion engines and to add them to conventional fuels without any need for retrofitting, as the chemical structures and basic properties of gasoline or diesel remain intact. From the perspective of climate action, this opens up another promising path to zero-emissions mobility, and it is yet another field in which Bosch is a pioneer.

or natural gas. When compared with the German electricity mix, it is possible to save as much as 40 percent in CO₂ emissions, even if the technology operates using natural gas. Run on hydrogen or green gas, the system does not produce any additional CO₂ emissions. Bosch is also leveraging these advantages for its own climate action strategy. SOFC pilot plants are already testing and validating the new technology at several German locations, with the most recent one in operation since July 2020 on the site of the Bosch Training Center in Wernau.

The system is made up of three fuel-cell systems for stationary applications. These will offer a low-carbon supplement to the Wernau plant's existing power supply as well as help



1 kg

of hydrogen is sufficient for a car to drive roughly 100 kilometers; a truck would need about seven kilograms.



Stationary fuel cells – the foundation for a distributed energy supply

Bosch experts are also working on the hydrogen-based future beyond the transportation sector. For example, in the form of fuel cell stacks for stationary applications with SOFC (solid oxide fuel cell) technology. These scalable systems manufactured by Bosch are to be used, among other things, as decentralized power plants, which are needed in cities, data centers, and for operating charging stations for electric vehicles. So what's the benefit? SOFC plants are particularly future-proof as they can be operated with hydrogen, biogas,

accelerate the development of distributed energy systems of this kind. "The SOFC pilot plant in Wernau demonstrates once again that a secure, environmentally friendly, and flexible energy supply is possible in a decentralized setting using fuel cells," says Uwe Glock, member of the supervisory board of Bosch Thermotechnology. Dr. Wilfried Kölscheid, head of the Solid Oxide Fuel Cell project at Bosch, adds: "The installation underscores our commitment to driving the energy transition and the associated mitigation of climate change across all Bosch energy and heating solutions while keeping an open mind as regards technology."

Climate action through research

In order to further pave the way for the hydrogen economy, Bosch has been involved in the Salzgitter Hydrogen Campus since 2020. Supported by the state of Lower Saxony and the city of Salzgitter, Bosch is conducting research there together with the Fraunhofer Institute and other local companies to determine hydrogen's potential for reducing the CO₂ footprint of factories. Each partner contributes its specific know-how in the production and use of hydrogen.

Construction work on the Hydrogen Campus has already begun. The ramp-up phase is scheduled to begin in 2021 with the goal of constructing a 50 megawatt electrolysis plant. This will produce around 7,500 metric tons of hydrogen a day, thereby saving up to 41,000 metric tons of CO₂ emissions.

The Bosch plant in Salzgitter will be trialing the use of hydrogen in supplying power to factories. Michael Gensicke, technical plant manager at the Salzgitter plant, explains:

Hydrogen is reaching competitive price points

Although the research community still has work to do, the path to a hydrogen-based, and thus climate-neutral, economy is clearly outlined. The technology for the production of hydrogen is proven and controllable; if there is suf-



In 2024, Bosch plans to start series production of distributed power plants based on solid-oxide fuel cell technology.

ficient demand, production can be increased substantially at short notice. Furthermore, fuel cells have since reached the technological maturity necessary for their commercialization and widespread use. As a result, hydrogen is increasingly catching up in competition with conventional energy sources



Testing a fully processed solid-oxide fuel cell at Bosch Bamberg site.

Bosch aims to install an annual production capacity for SOFC systems of some 200 megawatts. That would be enough to supply around 400,000 people with electricity in their households.

"For Bosch, hydrogen represents an important component of the energy transition. At the Hydrogen Campus, we will specifically research and implement the use of hydrogen to reduce the CO₂ footprint of factories."

– and will soon begin to overtake them. This is also the view of the experts at the Hydrogen Council – a global initiative of more than 100 leading energy, transportation, industrial, and investment companies with a shared, long-term vision for the development of the hydrogen economy. They are working on the assumption that the hydrogen economy can reach competitiveness in the next ten years. Dr. Uwe Gackstatter sees this as a clear sign: "The time is ripe to transition to the hydrogen economy." ◀

INTENSIFIED WATER MANAGEMENT:

Time is of the **ESSENCE**

Without water, there is no life: the Greek philosopher Thales of Miletus even referred to water as the “primary substance of being.” The United Nations would agree. Coinciding with the publication of the World Water Report 2020, the United Nations makes the same point, albeit expressed somewhat more soberly: “All areas of life depend on the availability of sufficient safe water: food, health, households, energy, industry, and ecosystems.”* As a technology company intent on operating sustainably on a global scale, Bosch has a special responsibility with its expertise and its standards.

There is no question that the situation is serious: currently, more than two billion people worldwide lack regular access to clean water. About 785 million people have no basic supply of drinking water. Insufficient water quality is one side of the problem, inadequate hygiene the other. As UNICEF notes, diseases spread particularly quickly among people living in such condi-

tions, and water shortages can quickly become a matter of survival for many people, especially as they contend with the coronavirus pandemic. Forecasts on the future development of the global climate give rise to fears that the alarming figures will continue to rise. Haste is of the essence.

-23.1 %

Absolute water withdrawal in regions with water scarcity compared to 2017.

Bosch is mounting a response. Achieving noticeable improvements quickly is a central goal of Bosch water management and also the reason why locations in regions with limited water supply are given priority. “Our first priority is to achieve the greatest possible effect as quickly as possible,” says Dr. Andreas Siegle, a water expert at Bosch. He adds: “It is in those company locations in regions with a critical water situation that we have the greatest leverage for making directly measurable progress.”

Bosch has identified three main areas for action: process improvement, recirculation, and rainwater utilization. Worldwide monitoring of water withdrawal and the compilation of data in a database enable evaluations down to company site level. In addition, water coordinators are deployed to the various business units to ensure that all local savings potential is identified and quickly captured together with those responsible locally.

In this way, Bosch has been able to reduce water withdrawal in regions where water is scarce by 23.1 percent since 2017. The significant decrease in withdrawal also partly reflects reduced manufacturing activity and the shift toward associates working from home on account of the Covid-19 pandemic.

The next targets are clear: around 50 projects that have already been launched are expected to enable us to save a total of 200,000 m³ of water – or around 80 Olympic-size swimming pools. Bosch has committed to reducing its absolute water withdrawal at 59 company locations in regions with water scarcity by 25 percent by 2025 compared to 2017. The initiative is backed by an investment volume of ten million euros per year. In addition to its commitment to combating water scarcity, Bosch has also included water quality as a key criterion in its “New Dimensions – Sustainability 2025” sustainability target and regularly tests the quality of wastewater at its locations. In addition, the guidelines for future new buildings have been defined in such a way that careful use of water is already relevant in the planning phase. The comprehensive review of the water situation conducted by Bosch at its locations as early as 2018 based on the WWF’s Water Risk Filter gave the measures introduced a solid analytical basis. ◀

* From a press release on the UN World Water Report 2020: Water and Climate Change, dated March 22, 2020

Bosch associates' commitment around the globe:

Together against water scarcity

In 2018, Bosch used the WWF's Water Risk Filter to identify those locations where water is particularly scarce. A special focus was set on Asia, where water resources are very unevenly distributed. China, for example, which has about 20 percent of the world's population, only has about seven percent of the world's water resources – and its water demand is growing. The situation is even more dramatic in India, where an estimated 18 percent of the world's population only has about four percent of the world's water resources. Bosch associates on-site are committed to the sustainable use of this scarce resource.



NASHIK, INDIA | WATER TREATMENT:

Making a difference

The Indian city of Nashik is located on the banks of the sacred river Godavari. The local climate is warm and dry; significant rainfall is limited to the summer monsoon season. Bosch has maintained a production site here for more than 50 years and places particular emphasis on the conscientious use of water.

That is because water scarcity is a pressing issue in Nashik that affects everyone. Against this backdrop, site management set an ambitious target in 2015: the Nashik

plant was to become a Zero Liquid Discharge factory fully committed to a closed water cycle. In 2020, it achieved its goal. To get there, a willingness to innovate proved crucial with the adoption of a new technology for water purification based on membrane distillation – the first of its kind at any Bosch plant worldwide. Due to surface-active substances in the process water, a special coating had to be found and applied to the membrane to reduce the surface tension and allow it to filter the process water – outright pioneering work, in other words. But the effort was worth it: the water treatment made it possible to lower the plant's fresh water requirements by 150 m³ per day.

The innovations introduced also had an impact on the wider region around the company site. Various industry platforms have recognized the project as exemplary. Policymakers, too, have acknowledged the potential: the Maharashtra State Environmental Protection Agency has expressed its appreciation and several cross-regional political delegations are already on the ground examining the possibilities for transferring the technology to other industries. "We see the broad attention that our innovations are getting as a fantastic confirmation of our work. After all, that is exactly what we wanted: improvements at our location and an impact beyond the factory gates. This success story will most certainly motivate us to continue our efforts in the future," says Aditya Awasthi, water manager at the Nashik plant. ◀

WE SEE THE BROAD RESONANCE AS A FANTASTIC CONFIRMATION OF OUR EFFORTS. THAT'S EXACTLY WHAT WE WANTED: IMPROVEMENTS AT OUR LOCATION AND AN IMPACT BEYOND THE FACTORY GATES |

Aditya Awasthi, water manager



THE PROJECT HAS HELPED TO CREATE AN AWARENESS THROUGHOUT THE PLANT OF THE IMPORTANCE OF WATER CONSERVATION: FORWARD-LOOKING, TRANSPARENT, AND DIGITALLY ENABLED | Jun Cai,

technical expert



WUXI, CHINA | INTEGRATED WATER MANAGEMENT:

Sending a signal

The Bosch plant in Wuxi is located near Tai Hu, one of China's largest freshwater lakes. Yet the plant is nevertheless on the list of 61 Bosch locations with a critical water situation because of the intensive use of natural water resources by the numerous agricultural and industrial businesses operating in the surrounding area.

The high industrial withdrawal volumes combined with the wastewater produced place the regional water systems under considerable water stress. Bosch is making an active effort to ease the situation with an efficient water management system. The system is based on an extensive data analysis of all water consumption. For the first time, the individual measures have been combined and interconnected. This integrated approach means that all data of relevance for water management can be monitored at any time. The benefits are remarkable: since the measures were introduced in 2017 and up to the end of 2020, around 155,000 m³ of water has been conserved – despite a significant increase in production volumes over the same period. In addition, the project was able to encourage associates at the site to rethink their approach: "The initiative has helped to create an awareness throughout the plant of the importance of modern water conservation measures that are no longer reactive but rather proactive, transparent, and digitally enabled," says technical expert Jun Cai, who also adds: "We are proud to have set a widely recognized example with our activities." ◀



OUR ACTIVITIES SHOW THAT SMALL MEASURES CAN MAKE A BIG DIFFERENCE | Sadashiv Hiremath,

water manager



CHAKAN, INDIA | WATER CONSERVATION:

Efficient approach

In June 2019, 70 small and large companies in the industrial estate near Chakan – 140 kilometers from Mumbai – had to have water delivered by tankers due to a drought that persisted for weeks.

The water situation in the vicinity of the small Indian town has not improved since then. Bosch also operates a plant in the region. Although it was not directly affected in 2019, it also has tankers and water reserves on standby if needed. Bosch is also taking concrete measures to help improve the situation on the ground quickly and permanently. "We have focused on fast-acting measures beyond the scope of production after identifying the main areas of water consumption and installing appropriate metering equipment," says Sadashiv Hiremath, who is responsible for water management at the Chakan site. Among other measures, efforts concentrated on the canteen, which alone accounted for 14 percent of the plant's total water consumption: the focus was on efficient use of water for washing hands, cooking, and cleaning dishes and cutlery. The initiative's success confirms the validity of this efficiency-centric approach: in 2019, the site as a whole consumed 19.3 percent less water than in the previous year. Small measures, big impact: enough water is conserved to meet the daily needs of roughly 4,000 local families. ◀

BOSCH IS DRIVING ELECTROCHEMICAL WATER TREATMENT:

Clean water – pure genius!

CIRCULAR ECONOMY:

Enough with the one-way street

Technology transfer taken literally: based on insights gained from the development of batteries for electric vehicles, Bosch is breaking new ground in electrochemical water treatment.

What may sound astonishing to a layperson is merely a logical and natural step for the experts. Indeed, electrochemical processes generally have considerable application potential due to their high energy efficiency and the ability to manage and scale them. Bosch is therefore focusing on the development of novel electrochemical devices that are capable of storing positively charged particles such as sodium, calcium, and magnesium ions – and can thus be used for water purification and softening.

The economical and as such sustainable use of water is an issue in many respects: from improving appliances' water, energy, and consumption efficiency, to providing fresh water in communities with water scarcity, and to reusing recycled water streams. Bosch's deionization technology can be used just as effectively for agriculture and

for people living in regions with insufficient access to fresh water as for water treatment in residential and industrial areas. Other possible applications are in the pretreatment of wastewater, in the production of circulating water in power plants, and in the production of process water or ultrapure water in the chemical, electrical, or food industries. In particular, the technology can be used for energy-efficient water softening for households as a whole or integrated into individual household appliances to extend their life expectancy and thus reduce their ecological footprint. And last but not least, it can serve as a key component in holistic IoT-based energy and water management solutions for smart homes and buildings.

Bosch is doing pioneering work for this energy-saving, salt-free technology for water purification and softening. The first single-cell prototypes are already being tested in several applications. Previously unresolved issues, such as the durability of such solutions, are currently being investigated in cooperation with world-leading experts in this field. ◀



“Produce, use, throw away.” That thinking has long gone unquestioned, but it has no future. After all, we are facing some of the greatest challenges of our time: the availability and distribution of natural resources, waste avoidance, energy conservation, and effective climate action. The sustainable development of our societies seems scarcely conceivable without a consistent orientation toward the principles of a circular economy. Companies face particularly tough challenges in this respect. “This is where the product life cycle begins – and ideally it ends here, too,” says Annette Wagner, head of Sustainability and Ideas Lab at Bosch.

Likewise pursuing this objective is BSH Hausgeräte GmbH's BlueMovement project, which earned the distinction of Inspiring Circular Economy Solution awarded by the World Circular Economy Forum at the end of 2020. The idea is to promote the use of resource-efficient refrigerators, washing machines, and dryers by offering attractive leasing terms and conditions, which also include the repair of the appliances. At the end of the lease period, the appliances are returned to Bosch for reuse or recycling. BlueMovement has already been tested successfully in practice in the Netherlands. Now the offer is to be made available to customers in Germany as well – closing the loop there, too.

BlueMovement is not an isolated example. Bosch has been committed to the closed-loop – or circular – economy for more than 50 years. Its activities are increasingly permeating into the supply chain. Time and again, forward-looking and often surprising projects are thus being created.

Win-win situation at the Campinas site in Brazil

One of these projects was launched in January 2019 at the Campinas site in Brazil and successfully completed in October 2020. The project was ambitious. Its aim was to establish a sustainable product cycle for power tools – from product development to disposal: “We wanted to manufacture high-quality and eco-friendly products as cost-effectively as possible and at the same time obtain higher user satisfaction,” reports the project manager responsible Fabiano Janetti.



More than resource conservation: closing the loop can also serve to strengthen positive social impacts throughout the product life cycle.



An interdisciplinary team, one mission: at the Campinas site, the proportion of recycled material in the materials mix was increased from 94 to 351 metric tons – around 50% of the plastic used in tools and over 70% of the toolboxes are now made of recycled material.

A rethink was needed. Suppliers were also involved more closely. User needs were the subject of extensive discussions and analyses and were used as a basis for making product design changes. The outcome: around 50 percent of the plastic used in tools and over 70 percent of the toolboxes are now made of recycled material. As Andre Borghi, who was responsible for the project in the purchasing department, specifies: "In total, we were able to increase the proportion of recycled materials in the materials mix used in the production process from 94 to 351 metric tons – which corresponds to around 44 percent of the annual plastics consumption."

With CO₂ savings of around 1,400 metric tons and a profitable business case – both made possible by the use of recycled plastic – the project was a success ecologically as well as from a business perspective. This, Fabiano Janetti

is sure, would not have been possible without the keen willingness to innovate and great personal commitment of all associates. "The effort was worth it. We have learned a lot about improved products and a cleaner environment and are extremely motivated to make further improvements possible," he says, describing this classic win-win situation.

Looking at the big picture – new strategy for a circular economy

The sustainability team at Bosch headquarters in Gerlingen is also highly motivated. Annette Wagner: "In our view, it's not enough for Bosch to generate more than half its sales revenue with products for which life cycle assessments have been prepared. That's why we are now tackling the entire product portfolio – with a new strategy aimed at closing loops and thus reducing negative environmental and social impacts throughout the entire product life cycle." In doing so, Bosch is going beyond the currently predominant approaches, which focus primarily on ecological aspects such as the use of resources and their maximum possible reuse. ◀



WE DEVELOPED A CIRCULAR ECONOMY STRATEGY THAT TAKES INTO ACCOUNT ENVIRONMENTAL AND SOCIAL IMPACTS ALONG THE END-TO-END VALUE CHAIN

| Annette Wagner, head of Sustainability and Ideas Lab



SMARTGROW LIFE:

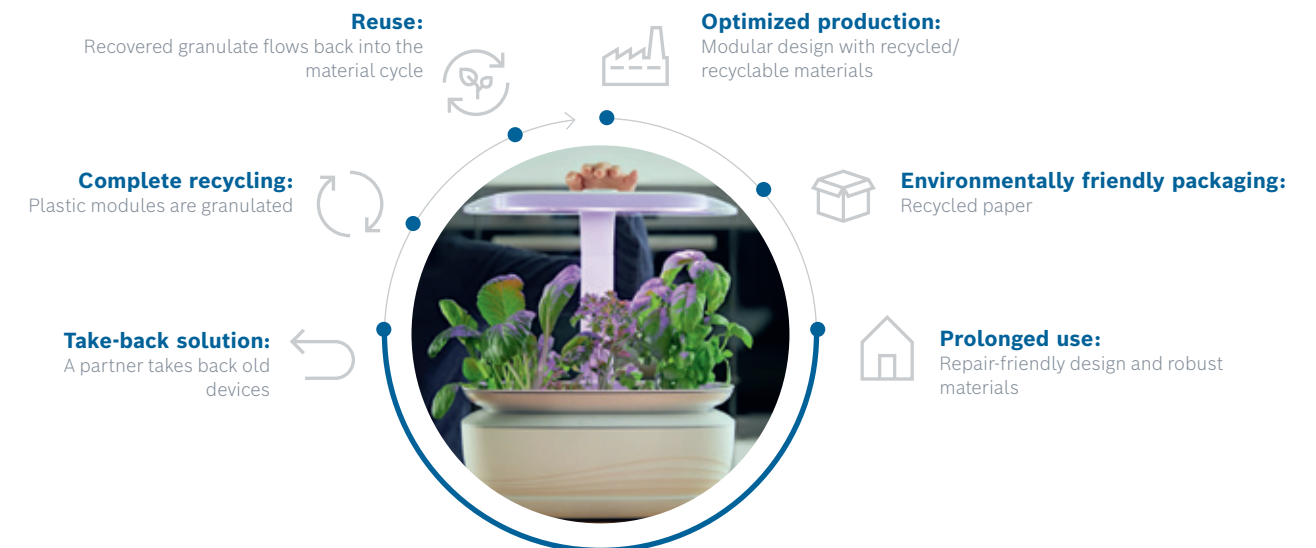
A revolution in miniature

"Grow the Wow" – that was how, at the end of 2020, Bosch launched SmartGrow Life, a fully automated indoor cultivation system for herbs, salads, and herb seedlings. With this innovative and highly sustainable product, customers can grow 50 different plants in their own home with an easy-to-use capsule system – without any need for potting soil.

All the materials used are designed for the circular economy and feature a modular design so they can be reused, reprocessed, or recycled. Many of SmartGrow Life's plastic elements are made from recycled material to minimize the product's environmental footprint over its life cycle. A repair-friendly design combined with the choice of particularly robust materials ensure a long product life.

Also in the interest of sustainability, the packaging is made of recycled paper, offering optimum protection with minimum use of materials. As early as the development phase, Bosch sought to exchange ideas with potential customers. They expressed clear expectations in terms of design, usability, and sustainability.

"We have met these requirements and developed a product that is as environmentally friendly as possible. More than that, with SmartGrow Life we wanted to demonstrate Bosch's forward-looking commitment to the circular economy in a very tangible way with a product," says E-Lin Tan, head of Smart Indoor Gardening. Her team is already planning the next step: a take-back solution for the cultivation system is currently being developed in cooperation with a supplier. This would allow the plastic parts to be processed into granulate at the end of their useful life, which means that they could serve as raw material for new devices – closing yet another loop. ◀



SMART FARMING:

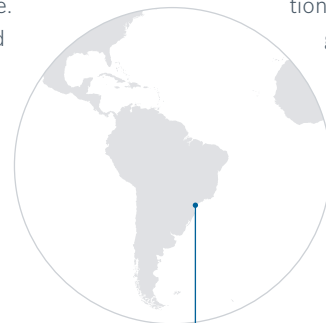
Technologies for better harvests

Together with BASF, Bosch is working in Brazil to shape the sustainable agriculture of tomorrow.



By 2050, the world's population is set to grow to roughly nine billion people. At the same time, the consequences of climate change are becoming more and more evident and the agricultural land available is shrinking. Finding ways of producing sufficient food while mitigating the negative impact on the environment is proving a global challenge. Bosch is doing its part. It is committed to using smart technology to effectively optimize crop yields and establish sustainable agriculture.

Agriculture is ripe for the leap to the digital age. With the right approach, experts are convinced that companies can not only do good but also unearth new business opportunities along the entire value chain through investments in digital technology. But here, too, there is no escaping the fundamental truth: you need to invest before you can harvest. Bosch began research and development in the smart technologies segment for agricultural machinery back in 2015. Its aim was to provide farmers with tools to increase efficiency and conserve resources. Since 2018, such technology has successfully been put to work in the field. Building on this, Bosch launched a project house for the development of digital farming solutions in Curitiba, Brazil, together with BASF's seed and fertilizer experts in 2020.



Curitiba, Brazil, where the joint project house is based.

Jointly developing solutions that create value

The joint project focuses primarily on the placement of seed and the use of fertilizers. One of the aims of the cooperation arrangement is to further develop existing solutions to obtain a comprehensive, smart system for target-based application of fertilizers and intelligent seed placement. The project house now pools the research and development activities. By bringing the two teams together, the projects can tap the combined expertise of both companies. At the same time, synergy potential can be leveraged thanks to short consultation and communication channels within the project group.

The project house combines two separate developments from BASF and Bosch: xarvio™ Digital Farming Solutions from BASF provides the joint project with the Field Manager, which has been available since 2019. Since 2020, this system has included a digital solution for nutrient management and variable application maps for fertilizers. Another approach for optimal planting of seed is currently in the validation phase. All these solutions help farmers to improve and automate their crop production in a sustainable way. Bosch contributes its proven Intelligent Planting Solution (IPS).



Depending on field conditions, it is possible to lower seed use by up to 20 percent. Over-fertilization of the soil is also avoided.

This system enables farmers to optimize seed planting in particular via automatic seeding control.

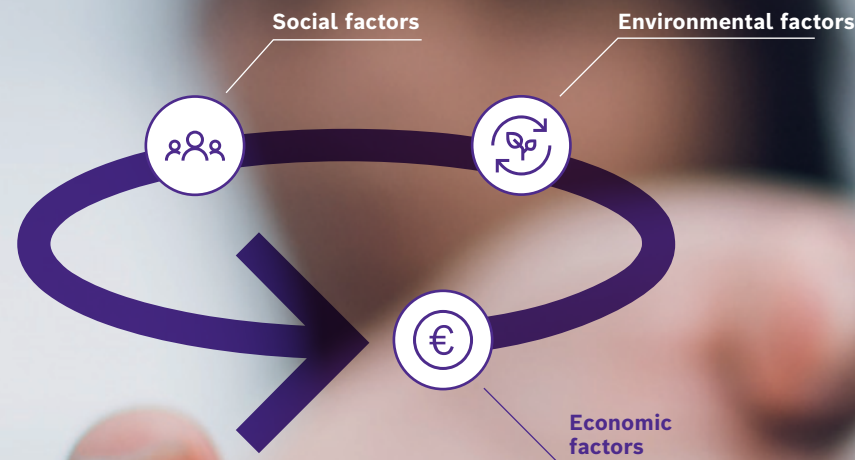
Bosch developed the necessary components and interfaces for this purpose and is responsible for the overall system integration of the planting and seeder machines. IPS is the result of comprehensive studies and was developed in Brazil by distribution experts as well as hardware and software specialists. The Intelligent Planting Solution also uses proven components from automobile production – for example, for the control unit. Adapted to the specific requirements of IPS, the solution controls the output of the dosing units based on data from speed and seed sensors and a satellite navigation system. A display allows the farmer to see all key information at a glance. Depending on conditions in the field, the solution can save farmers up to 20 percent in seed. Over-fertilization of the soil is also avoided, as fertilizer can be applied in precise doses with each plant getting exactly the amount it needs and no more. This helps to optimize harvest yields and protect nature.



BOSCH WANTS TO MAKE AN EFFECTIVE CONTRIBUTION TO A WORLD WORTH LIVING IN AND HELP SECURE THE LIVELIHOODS OF FUTURE GENERATIONS | Thomas Lengenfelder, Bosch Commercial Vehicles and Off-Road

“With our innovative solution, in the future farmers will be able to automatically take local conditions such as field layout, soil quality, and precipitation into account in their work. In this way, they minimize costs, boost their yields, and protect the environment all at the same time,” explains Sidney Oliveira, who is responsible for Bosch’s Latin America Commercial Vehicles and Off-Road operating unit. Bosch and BASF intend to further intensify their cooperation in the field of digital technologies for agriculture. With this in mind, contracts have been signed for the establishment of a joint venture that will market and sell smart farming solutions worldwide and from a single source.

In all the entrepreneurial considerations behind Bosch’s smart farming activities, the focus is also on market potential and exploiting sales opportunities. Thomas Lengenfelder, who leads the Commercial Vehicles and Off-Road operating unit at Bosch: “With its commitment to smart farming and the targeted use of corporate know-how, Bosch wants above all to make an effective contribution to a world worth living in and to help secure the livelihoods of future generations.”



VALUE BALANCING ALLIANCE:

On track to the 360° balance sheet

As a founding member of the Value Balancing Alliance, since 2019 Bosch has been committed to a holistic assessment of corporate activities that also factors in ecological and societal value contributions. What is the value created by companies that invest in climate action? By companies that consistently make their products climate-friendly? Or by companies that promote the education and training of their employees? And how can all these aspects be factored into a company's valuation?

These are the questions the Value Balancing Alliance (VBA) aims to answer. 17 international corporations have set out to develop a model that enables the holistic evaluation of entrepreneurial action – across the entire value chain. Bosch is one of the initiative's founding members. Cooperation partners representing the scientific community include the universities of Harvard, Oxford, and Hamburg. In addition, the "big four" audit and advisory services firms are supporting the project. At the political level, the initiative is supported by the European Union. Our common objective: to measure and present on a comparable basis companies' positive value contributions to and negative impacts on the environment and society. In this

way, social and ecological commitment is to be incorporated not only into corporate decisions but also into external reporting, enabling a holistic assessment of companies – in accordance with a uniform global standard.

That might sound abstract, but consider a tangible example: consider the current practice of financial reporting. For instance, any company committed to climate action today merely reports their related investments in their financial statements. A company's sustainability report might also provide information on its impact on climate change, the environment, and society, but there is no standardized means of capturing the value contribution, be it positive or negative. It's a similar story with social responsibility: when companies invest in improving the qualifications of their employees, the associated costs appear as an expense in their financial statements. The resulting added value in terms of

human capital does not appear on their balance sheets. At best, it might get a mention in the annual report under nonfinancial performance indicators. The positive effects that result from better qualified and thus better paid workers in society in the long term are not included in the analysis



Ever since the days of our founder Robert Bosch, sustainability and social responsibility have been high on the company's agenda. At Bosch, we are convinced that sustainability is not only worthwhile from an ecological or social perspective – but that it also makes business sense. That is why we are active members of the Value Balancing Alliance. Because it's important that we establish standardized methods that allow as many companies as possible to make the right decisions and create social value through their actions. | Prof. Dr. Stefan Asenkerschbaumer, deputy chairman of the board of management of Robert Bosch GmbH

either; only personnel costs are taken into account. So the external effects of social or environmental commitment are immaterial for the assessment of a company's net assets, financial position, and results of operations, which means they have no bearing on a company's valuation. The corresponding value created – or destroyed – for the environment and society is neglected. What emerges is a one-sided picture that ultimately leads to less than optimal decisions.

To change this, the VBA is working on putting a monetary value on the individual contributions – positive as well as negative – and thus making them compatible with current accounting. That's what the experts refer to as "impact valuation." Christian Heller, CEO of the Value Balancing Alliance, describes the long-term benefits of the new approach: "If it is possible to establish a holistic assessment of companies, the incentive and decision-making structures in companies will also change. New performance indicators will come into focus, and sustainability will become an equally important decision-making criterion: value optimization rather than simply profit maximization."

In order to achieve this goal, we need standardized methods first and foremost. The aim is to ensure transparency and comparability between the most diverse companies. However, while there are already initial approaches in practice for the assessment of CO₂ emissions or other environmental impacts, a similar basis is still lacking for many other topics. How should prevented occupational accidents be valued? What is the value of a healthy workforce for the company and for society? What effect do the fair wages paid by one company have on social stability?

So these are no small tasks the VBA is tackling. But its members are convinced: in times of global challenges, there is no alternative to a holistic view that includes social and ecological value contributions – in other words, 360° company reporting. CEO Heller: "It's no longer a question of whether sustainability issues should be included in reporting. The question today is rather how to achieve the transformation. That's our core mission, as we see it." In pursuit of this mission, the Value Balancing Alliance seeks cooperation with national and international financial reporting institutions. It is essential that they pave the way if the new 360° approach is to become an established accounting standard.

The VBA's counsel is also increasingly in demand at a political level: on behalf of the EU Commission, the VBA is working on the development of Green Accounting Principles. In the future, these are to serve as a uniform standard for the assessment of companies' environmental risks and opportunities. They are thus a central prerequisite for the implementation of the EU Green Deal – and at the same time another important step on the way to the 360° balance sheet. ◀



In the future, a company's lasting success in business will hinge more than ever before on its ecological and social performance. Our goal must be to develop pragmatic approaches, ingrain sustainability considerations in the decision-making process, and report externally on a comparable basis companies' true value contribution. | Christian Heller, CEO of the Value Balancing Alliance

Social commitment as a corporate obligation: for our company's founder, Robert Bosch, social responsibility and in particular the promotion of education and science were already central corporate concerns that he pursued with great dedication. Numerous initiatives at Bosch locations around the world are testament to the way his principles continue to be upheld today and how they are brought to life time and again.



Act with decisiveness, help long term!

Promoting STEM education at an early age to arouse curiosity, discover talents, and get kids interested in technology-related professions: Girls' Day in Jihlava.

USA | IMMEDIATE SUPPORT FOR PEOPLE IN NEED DURING THE CORONAVIRUS PANDEMIC

Founded in 2011, the Bosch Community Fund focuses its work on improving the lives of individuals through a long-term commitment to sound education and thus also supporting local communities. It is one of a total of six charitable institutions founded by various Bosch regional companies. In addition, the Fund also gets involved in acute emergencies. For instance, the Fund provided the organization Feeding America with a sum of 100,000 U.S. dollars to cushion the repercussions of the Covid-19 pandemic. This contribution allowed food banks in the communities in which the Bosch locations in the United States are embedded to continue to provide free meals to those in need despite a huge increase in demand. "Thanks to the help of partners such as the Bosch Community Fund, we were able to distribute three times as many meals to the food banks as last year," Elizabeth Marquardt of Feeding America was pleased to report. ◀



Staff member of Alternatives For Girls (AFG) – the U.S. organization helps young women at risk and is supported by Bosch under the Covid-19 assistance program.



The manual production line for face masks was designed and built within three weeks.

GLOBAL/BRAZIL | 30 YEARS OF PRIMAVERA – MAKING HISTORY WITH A GLOBAL INITIATIVE

In 1990, ten Bosch associates decided to join forces to help children from urban slums in the vicinity of Bosch locations in Brazil. From its humble beginnings 30 years ago, Primavera – Hilfe für Kinder in Not e.V. has grown into a global initiative. Today, the association has roughly 1,500 members and runs some 50 aid projects in 16 countries. At present, it supports around 8,000 children and young people worldwide. The funds needed are raised in charity events and from the sale of calendars. But Bosch associates also make donations to Primavera time and again, thereby demonstrating their solidarity. Recently, Andrea Urban and Franz Lärmer, two Bosch researchers and winners of the Eduard Rhein Foundation's Technology Award 2019, donated their entire prize money of 20,000 euros to support Primavera's activities. ◀

GERMANY | BOSCH DONATES MANUAL SYSTEM FOR THE PRODUCTION OF MASKS

At the beginning of 2020, there were practically no medical-grade masks available in many parts of the world. Bosch quickly decided that it needed to manufacture masks to medical standards itself in order to eliminate the bottleneck. To bridge the time needed to bring the automated mask production to operation, a team at the Feuerbach site developed a manual production system within three weeks. At the end of 2020, Bosch donated the system to a nonprofit company that promotes the inclusion of severely disabled people and that will use Bosch's technology to produce masks for internal use. "From the very beginning, Bosch was committed to making the construction plans freely available in the interest of the public," recalls Martin Klassen, who led the manual mask production subproject. "Our donating the system now, rather than retiring it to the basement, is the icing on the cake in what has been a special project." ◀



From team building to team spirit: 1 of 200 helpers contributing to the restoration and modernization work in Cluj.

ROMANIA | “A PROJECT FOR THE HEART” – BOSCH ASSOCIATES MODERNIZE OLD SCHOOL BUILDINGS

Four trucks, 200 people, 700 liters of paint: in Romania, an initiative originally conceived by the Bosch Engineering Center Cluj as a team-building measure has become an exemplary relief effort thanks to the great commitment of associates. The idea was to extensively modernize two schools in need of renovation in small communities in Transylvania. Two days were planned for the work. Andrei Hüttner, coordinator of Bosch’s regional CSR projects, was not concerned: “With good organization and plenty of heart and soul, no problem.” And sure enough, new flooring, new paint, new school furniture, new sports equipment for the gym, and new computers for the computer room – 48 hours later the two schools were shining in a new light. Exhausted but pleased with the work done, the team concluded: “For us, it was a project for the heart. We wanted to create something sustainable – something that would last.” ◀

SPAIN | AGAINST YOUTH UNEMPLOYMENT AND FOR THE DEVELOPMENT OF CAREER PROSPECTS

With a persistently high unemployment rate of over 40 percent among the population aged between 15 and 24, integration into the labor market in Spain is not only important for individuals but also crucial for the future of the country as a whole. That is why Bosch is involved in several initiatives to protect young people from social exclusion and encourage them to build a self-determined life through a good education: for more than three years, the Bosch Construye tu Futuro (Shape Your Future) program has brought together suitable projects to promote the career prospects of young people. Since 2016, the program has reached around 6,000 students.

Bosch associates likewise assume their responsibility and are involved as volunteers in Proyecto Coach, a coaching project run by the EXIT foundation. Through this initiative, a total of 3,400 young people have already had the opportunity to take a look behind the scenes in participating companies, allowing them to get their own impressions of a company, the people who work there, and their jobs as well as inspiration for their own professional development. Bosch is pursuing a similar goal with the continuation of the Reto Bosch (Bosch Challenge) project. Here, too, the aim is to support young people – mainly vocational school students – in their professional development and to show them career opportunities going forward. Various interdisciplinary project teams focus on topics such as connected manufacturing or the development of smart irrigation systems. In the project’s most recent edition, 37 schoolchildren took part and received support from Bosch in the form of scholarships. ◀



Bosch associates support young people in Spain as volunteers and provide them with job guidance.



CZECH REPUBLIC | SOCIAL RESPONSIBILITY IN THE REGION – JIHLAVA PLANT RECEIVES AWARD FOR THE FIFTH TIME

More than 600 charitable initiatives since 1993 speak for themselves: the social commitment of the Bosch plant in Jihlava, Czech Republic, is exceptional, and the region’s people and local politicians agree. Work-life balance is a recurring topic of the initiatives. Most recently, a new day-care center for children was built. Meanwhile, the company location has been awarded the prestigious “Governor’s Prize” for the fifth time. In their award statement, the jury of experts praised in particular the activities in the field of technical training, the healthcare provided, investment at the location, and the jobs created. Bosch is not only a key company in the Vysočina region, but also for the entire Czech industry, the jury argued. Rajendra Basavaraju, Technical Director of the Jihlava plant, expressed his satisfaction after the award ceremony: “The award confirms to us that we’re moving in the right direction.” ◀

CHINA | SPONTANEOUS ASSISTANCE IN THE FIGHT AGAINST THE CORONAVIRUS PANDEMIC

The decision was made quickly: hospitals and authorities had to be supported generously, quickly, and efficiently in the fight against Covid-19. Accordingly, the Bosch China Charity Center (BCCC) responded to the massive Covid-19 outbreak in China by providing short-term cash and noncash benefits worth a total of eight million Chinese yuan (or over one million euros) at the beginning of 2020. Bosch provided tools urgently needed for the construction of the makeshift hospital in Wuhan, which had to be built quickly. Some 700 air-purification units were sent to hospitals and about 500 washing machines, tumble dryers, and dishwashers for the sterilization of laundry and cutlery were delivered to hospitals and immediately installed. ◀



Robert Bosch Stiftung

Since it was established in 1964, the Robert Bosch Stiftung GmbH has been carrying on the company founder’s philanthropic work. It works in the areas of health, education, and global issues. With its charitable activities, it contributes to the development of viable solutions to social challenges. For this purpose, the Foundation implements its own projects, enters into alliances with partners, and supports third-party initiatives.

The Robert Bosch Stiftung holds about 94 percent of the shares in Robert Bosch GmbH and is funded by the corresponding dividends it receives on its shareholding. The Foundation benefits from over 50 years of experience and a comprehensive global network of experts and practitioners. With the Robert Bosch Academy, it supports interdisciplinary exchange between decision-makers and opinion leaders. The Foundation also supports the work of high-profile, practice-focused think tanks.



Covid-19:

Together we're **strong**

Health first: from the very beginning, this fundamental idea was behind all the measures that Bosch has taken to protect its associates since the outset of the coronavirus pandemic. As with any globally operating company, Bosch was faced with considerable challenges, especially given the research needed upfront to analyze the virus and determine how to respond. That said, it was clear that comprehensive protective measures had to be developed and implemented quickly.

Looking back on the past twelve months, the decision makers reflect on what has been achieved – but also the suffering that the coronavirus has brought on individual associates and their families despite their best efforts. A degree of humility is evident as well as the unconditional intent to do everything in the future to continue to lead associates and the company safely and as unscathed as possible through the crisis – because nobody here believes it's all over yet.

Leading the Corporate Crisis Management Team: Ulrich Schaefer, Volker Schilling, and Torsten Kallweit.

Americas: roughly 44,600 associates.

Europe: roughly 243,000 associates.

Asia-Pacific: roughly 107,000 associates.

But how does a global company like Bosch, with its close to 400,000 associates, more than 400 international locations, and customers all over the world, cope with such a challenge? “We reacted early and, above all, consistently,” says Volker Schilling, head of Global Internal Auditing at Bosch and also one of the three managers who led the company’s central crisis management group. “When Wuhan in China was quarantined on January 23 of last year, it was the starting signal for us to take action. The very next morning we convened the CCMT for the first time.”

The CCMT – which stands for Corporate Crisis Management Team – convenes whenever it is necessary to avert harm to associates and the company. Ten years ago, the Fukushima nuclear disaster made it patently clear that a team of this kind was needed. “Since then, we have learned a lot, trained protocols, and prepared associates accordingly,” Schilling says. “This foundation allowed us to make many important decisions at short notice at the beginning of the pandemic.”

Seven task forces worked as a team on individual work packages, which also constituted the most important fields of action over the course of the crisis: from the protection concept for associates to the worldwide procurement and distribution of masks and sanitizers through to the manage-

ment of the extensive supply chain and the restart of the production network. The crisis management group was supplemented and supported by experienced specialists from practically all operating units across the company, while a support team ensured the efficiency of the CCMT’s processes and organization.

Decide locally – coordinate supranationally

At an international level, the CCMT worked closely with the 62 country crisis teams and the crisis teams at the more than 400 locations around the world. This approach addressed the different responses that were needed given the differences in the way the virus was impacting individual countries. “As a crisis management group, we want to provide support for overarching issues or company-wide governance needs and, most importantly, ensure the rapid dissemination of the latest knowledge and best practices. Actual decisions have to be made locally to the extent possible,” Schilling says. And the decisions made were often of great consequence. In the first phase of the pandemic, Bosch had to temporarily shut down or at least severely curtail production at almost 100 locations worldwide.





Developed by Bosch's special-purpose machinery unit in just a few weeks, identical, fully automated production lines for face masks were set up at several company locations.

"Ensuring the health of our associates has been, is, and will remain our top priority. At the same time, it is important that we keep our business operations running to the best of our ability in the interest of our customers and to assist with the economic recovery," says Torsten Kallweit, head of EHS (Environment, Health, Safety) and Sustainability. He, too, was a member of the CCMT leadership team. Supply chain

The efforts paid off: we were able to meet all but one of our delivery commitments during the first wave of the pandemic." A major challenge in the initial months was the procurement of the necessary personal protective equipment – especially adequate face masks covering the mouth and nose. Keep in mind that, at a minimum, every Bosch associate needed at least one mask daily – absolutely a scarce commodity in March 2020. Volker Schilling: "We asked ourselves whether Bosch, with its engineering experience, could make its own masks. As soon as our colleagues in research and development confirmed that we could, we got down to work." Barely eight weeks later, the first fully automated mask production line was put into operation at the Feuerbach site. Another four production lines at various locations followed and now produce for the workforce more than 1.9 million masks to medical standards every week, with the CCMT ensuring that they are distributed as needed. In addition, more than 5,000 liters of sanitizer have been produced – by Bosch, for Bosch.

Virtual work as an opportunity

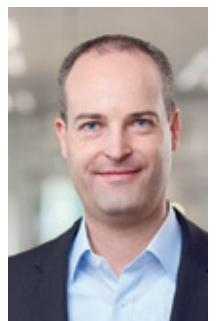
At the same time, at extremely short notice, some 150,000 associates were provided the option of working from home and collaborating in virtual teams. As a consequence, the number of daily Skype meetings rose to roughly 500,000. Some of the working methods introduced at the time have since been recognized as good practice – perhaps one of the few positive aspects of the pandemic in the longer term. Virtual collaboration likewise shaped the CCMT's work. Ulrich Schaefer, head of Global IT Operations and also a member of the CCMT leadership team: "An unbelievable team spirit has

grown that has carried us through this very intensive phase." The team defined protective measures for around 280 plants and ensured that they were properly implemented. A group-wide Covid-19 hotline dealt with over 5,000 inquiries. In general, communication has proven to be a key determinant of success. The CCMT travel portal alone, which supported all travel arrangements worldwide, was visited more than 600,000 times by associates. At the end of July 2020, after 189 days of pandemic, and with infection levels in most countries having subsided, the crisis management group



WITH VIVALYTIC, WE ARE DELIVERING CUTTING-EDGE MEDICAL TECHNOLOGY. THE RAPID PCR TEST RELIABLY CHECKS SAMPLES FOR THE SARS-COV-2 VIRUS AND ITS MUTATIONS

| Marc Meier, president of Bosch Healthcare Solutions



1.9 mn

masks are produced weekly by five Bosch production lines for associates worldwide.

management in particular faced major challenges in the early months of the crisis. Are the parts, raw materials, and operating resources available everywhere they are needed to keep production running? What delivery obligations do we have? How can they be honored under pandemic conditions? Thomas Schulte from Bosch corporate purchasing: "Day in, day out, the CCMT and the crisis teams of the business units had to inspect the entire supply chain, critically examine delivery capabilities, and come up with quick solutions to potential bottlenecks. Over this period, we lent our support to around 15,000 suppliers and 730 customer plants.

VIVALYTIC – RAPID RESULTS IN THE FIGHT AGAINST THE PANDEMIC

Deploying its own know-how to contain the pandemic: an ambition quickly followed by deeds - Bosch launched a rapid test for its Vivalytic analysis device at the end of March, after just six weeks' development. As a multiplex test, it simultaneously checks samples for the SARS-CoV-2 virus and nine other respiratory diseases in two and a half hours. A new, accelerated test exclusively designed for SARS-CoV-2 followed in late September. The test provides a reliable result in 39 minutes and is currently the fastest polymerase chain reaction (PCR) test worldwide. With the different coronavirus tests and variable analysis strategies, Bosch opens up a range of

testing scenarios with a Vivalytic device - from screening all the way to supporting differential diagnosis for diseases with similar symptoms. "One of the keys to fighting the coronavirus pandemic is to rapidly identify sources of infection. That's why we focused on following up on our first coronavirus test with an even faster one," says Dr. Volkmar Denner, chairman of the board of management of Robert Bosch GmbH. "This will now enable us to put people's minds at ease even more quickly." In addition, tests for up to five people can now be carried out simultaneously with one cartridge - saving valuable time in the fight against the pandemic.



convened for the last time for the time being. Most of the task forces were transferred to the regular line organization. A central coordination team, the coordination team coronavirus (CTC), continues to deal with the tasks previously performed by the crisis management group with the continued support of the country-level and local site teams. Have we now transitioned from crisis mode to business as usual? “No, because a pandemic cannot be planned, so it can never become routine,” says Jörg Weis, who has led the coordination team coronavirus since the handoff of responsibilities.

lenges ahead.” In the meantime, a good nine months have passed without any significant production stoppages. Weis continues: “We are clearly benefiting from the CCMT’s work setting up structures. The most important processes are in place and have become learned practice. I see the CTC’s task above all in further developing the tried-and-tested processes and adapting them flexibly to new circumstances – and also in order to better address conditions on the ground.”

Prioritizing associates’ health

That is how Weis and his eight-strong team have been managing the activities in the “new normal” for nine months now. During the first wave, economic activity came to a virtual standstill, businesses were closed, or production was at least severely curtailed. Despite the significant increase in Covid-19 case numbers in many countries since the fall of 2020, business is now up and running again in many sectors, although there is of course still some catching up to do. For the CTC this entails a new challenge. As

in the first wave of the pandemic, it is essential to honor existing delivery commitments – albeit while maintaining a high utilization of production capacity. “The health of our associates remains our first priority, and it is essential for the efficiency of our production,” says Dr. Falko Papenfuß,



OUR AIM IS TO ENSURE THAT BOSCH ASSOCIATES ARE SAFER AT THEIR WORKPLACES THAN THEY ARE IN PUBLIC | Jörg Weis, leader of the coordination team coronavirus

“We will always encounter unexpected events or developments in terms of infection trends – but also due to largely unpredictable political decisions. So swift and rigorous response remains the top priority.”

“We try to react as flexibly as possible to the highly dynamic nature of infection rates depending on the conditions prevailing on the ground,” Weis adds. “In doing so, we are drawing on past experience with the pandemic to address the chal-

head of the Bosch Medical Service. “These are two sides of the same coin. Our aim is to ensure that Bosch associates are safer at their workplaces than they are in public. Strict hygiene measures continue to be the decisive factor here.” In the meantime, the protective measures at Bosch have

reached a very high degree of maturity – and they continue to be further refined. Bosch continues to supply face masks produced in-house, and many locations are equipped with Vivalytic test devices developed by the company. If associ-

ates are infected, these rapid tests can quickly clarify the situation and contain the spread. Yet, we have good reason to be confident as we look to the future. After all, more than 10,000 associates in the various crisis teams at Bosch have proven that team spirit, commitment, and cohesion are key to effectively countering the pandemic. We can undoubtedly draw courage from this fact, even if Papenfuß, Weis, and their colleagues around the world are well aware that their work will not be done for a long time yet. “Dealing with the coronavirus is not a sprint: it’s a marathon with hurdles along the way, and we will need all our knowledge and strength to go the distance,” Papenfuß says. But we will eventually reach the finish line, and Bosch will be all the better for it, having gained certainty that the company is capable of passing a stress test of such proportions. ◀

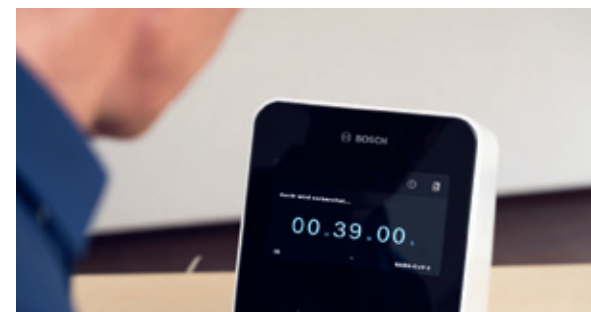


DEALING WITH THE CORONAVIRUS IS NOT A SPRINT: IT’S A MARATHON WITH HURDLES ALONG THE WAY |

Dr. Falko Papenfuß, head of the Bosch Medical Service



The coronavirus rapid test is especially well suited for decentralized deployment in mobile test centers. Medical professionals can easily carry out the tests after some brief training.



The rapid test provides a reliable result in 39 minutes. Enhanced software for Vivalytic accelerates the turnaround time for positive SARS-CoV-2 samples to less than 30 minutes.

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