Opening remarks from Klaus Meder, President and Representative Director of Bosch Corporation, Japan

June 16, 2022

- Hello, everyone. Thank you for joining our press conference today. We are now in the third year of holding our press conference online. Therefore, let me start with some information regarding changing working styles. Bosch has always prioritized the health and safety of its associates. And we have flexibly adjusted the ratio of working from home, up to 100%, for those associates who can work remotely, depending on the COVID-19 situation. Here I want to express my special gratitude to those associates, who came to our production lines, test stands, laboratories and offices in person during the pandemic. On-site and off-site resulted in a hybrid working style.
- Through working in this hybrid way, we realized that it enables considerable advantages and opportunities, which can lead to positive impacts on productivity. Even in a new normal, we will adopt hybrid working models, a mix of time spent in the office and time working remotely.
- Under the concept of Smart Work, we are driving hybrid working models which offer flexible work arrangements and focus on performance instead of presence. Bosch places trust between associates and management as the guiding principle to bring out the best of all individuals to strengthen the company. We promote the concept of Smart Work globally, but it is not a one-size-fits-all guideline. It gives us the chance to accommodate business environment and the needs of each country, each business and each associate. Therefore, looking ahead, we will promote dialogue with our associates towards realizing work styles that are flexible and performance-oriented, based on relationships of mutual trust.

- This will include greater flexibility in work locations and remote work hours, as well as the introduction of working fully from remote locations, even from other countries under certain conditions. We could say, the new normal at Bosch is work smart, work from everywhere, and work from abroad.
- In addition, as one of the flexible work options, this April we introduced a new Short Work Regular Employee System. It targets associates who have difficulty working full-time due to childcare, nursing care, illness or injury, or who wish to work shorter hours for schooling or other personal development. Associates can apply for this according to their individual circumstances. It sets the weekly working hours to at least 20 hours and to at least three times a week. Three days work, or in other words, four days off per week.
- We do not go back to the old normal. The new normal at Bosch really is a new normal. A new normal to further develop a comfortable and flexible work environment for our associates, or in short to be the “Employer of Choice.”
- Now, we would like to share with you the results of Bosch Group's activities in Japan in 2021 and our outlook for 2022. Christian Mecker will now present our figures.

Bosch Global sales in 2021 from Christian Mecker, the Executive Vice President and Member of the Board of Directors of Bosch Corporation

- Hello, everyone. I would also like to thank you for your participation. Before sharing the 2021 results for Bosch in Japan, I would like to first present the Bosch Group's worldwide results.

- Despite a recovery trend in the global economy, 2021 was an extremely difficult year. Business was negatively influenced by global chip shortage, supply chain disruption related to COVID-19, cost increases in raw materials and logistics. Amid such difficulty, the Bosch Group achieved an operating results for 2021 that outperformed its initial forecasts for both, sales revenue and EBIT. The sales revenue had been affected by COVID-19, but increased 10.1% year-on-year to 78.7 billion euros, and EBIT was around 3.2 billion euros.
- All business sectors, Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology, achieved positive growth. Among these, the largest business sector, Mobility Solutions, saw a sales revenue increase by 7.6% to 45.3 billion euros. In other words, our mobility business outpaced the year-on-year growth of global automotive production, which was only slightly higher than it was in 2020.

Bosch Group sales in Japan in 2021

- The Bosch Group in Japan also achieved solid earnings. In 2021, the third-party sales in Japan were 295 billion yen, up 9.5% year-on-year. The mobility-related business makes over 90% of Bosch's business in Japan. While domestic vehicle production volume in Japan was lower than in the previous fiscal year, Bosch’s mobility-related business in Japan grew greater than our global Mobility Solutions business. Our sales result reflected contributions from a wide-ranging portfolio of products, from safety such as ESP® to the latest infotainment systems.
- 2022 looks set to be another year of numerous challenges. This includes

continued global chip shortages, global supply chain bottlenecks, further cost increases in raw materials, logistics and energy, and the impact of the war in Ukraine.

- In addition, we expect that global automotive production in 2022 will be higher than in 2021, but will not reach the level of 2019, before the coronavirus pandemic.
- We have made a good start in 2022, with sales for the first quarter exceeding those of the previous year. Though we see a slowing trend after the first quarter 2022, the Bosch Group in Japan is expecting further increase in sales compared to 2021. Now, Klaus will talk about new projects just started in Japan.

Launched new development and manufacturing projects showing strong commitment to the Japanese market

- In 2022, a number of new projects are already underway in Japan, showing our commitment to the Japanese market and its bright future. Today, I would like to introduce four projects to you.
- The first is the construction project of the new R&D facility and the Tsuzuki Ward Cultural Center, which we are undertaking in Yokohama. In order to realize the mobility of the future, it is necessary to overcome the boundaries of business divisions, promote collaboration among associates to enhance creativity and have an environment where development can proceed more freely from a long-term perspective. Based on these ideas, we began construction of a new R&D facility in January 2022.
- We will invest some 39 billion Japanese yen for this construction project. This is the largest single capital expenditure of the Bosch Group in Japan, since we

started our business here in 1911.

- The new facility will house most of the divisions and group companies that belong to the Mobility Solutions business sector. In addition, divisions and group companies of Industrial Technology, Consumer Goods, and Energy and Building Technology will also move into the new facility. We will also relocate the headquarter function, currently located in Shibuya.
- The existing R&D facility located just two kilometers from the new one will continue to be used for powertrain related research and development and as global headquarters of the two-wheeler and powersports business.
- The construction will be completed in September 2024, and the relocation to the new facility will be completed by the end of December 2024.
- The new facility will be a new home to about 2,000 associates, while the existing R&D facility will house about 700 associates.
- The two R&D facilities will combine more than 40 percent of Bosch Group associates in Japan. We will further strengthen our R&D operations in Japan by promoting collaboration and cooperation between business units centered on these two bases in Yokohama.

- We will build the Ward Cultural Center for Tsuzuki Ward on the same premises. The construction project is also the first public-private partnership project for Bosch worldwide. We expect not only to construct the Ward Cultural Center, but also to create a lively area surrounding it. That means, this construction project will contribute to the Japanese automotive industry and the local community.

- Second, Bosch is currently ramping up a new final assembly line for electric power steering products at its Musashi Plant in Saitama Prefecture. Previously electric power steering products were manufactured and assembled at overseas plants for delivery to Japanese automakers. This will be the first time final assembly of electric power steering products is undertaken inside Japan. In setting up the assembly line, we had planned to have Bosch experts from overseas to come into the country and be onsite to support this process. However, they were unable to enter Japan due to strict border control measures. We therefore decided to use mixed reality goggles to enable the experts to provide directions remotely from outside Japan. This has resolved the issue. We are now moving forward with setting up the line and we could even recover much of the delay. We are introducing the same mixed reality goggles for usage in several projects all over Japan from now on. And we are convinced that this technology will stay and will make us more competitive in the future.
- The electric power steering that we are now ramping up in Japan is a next-generation product targeting mid-size vehicles. It is the first project in Japan where we will undertake all steps from product design through to final completion. By optimizing the software in Japan near our customers, we will be able to create the steering feel that matches customer preferences more quickly. Bosch's redundant electric power steering ensures that power assist will continue without a sudden loss, in the event of a failure in the electrical system. The system is compliant with vehicles of automated driving SAE level 2 and above. With advances towards electrification, Bosch sees increasing demand for electric power steering with fail-operational function.

- Third, at the Tochigi Plant, we are making preparations to begin volume production of Bosch's electro-mechanical brake booster, the iBooster. In order to cater to the needs of Japanese automakers for compact vehicles, we will also start production of a smaller variant, the iBooster Compact, within 2022.

- Fourth, at our Yorii Plant in Saitama Prefecture, we have started using AI for product inspections. From 2025 at the latest, Bosch aims to have AI contained in every product, or to use AI in product development and manufacturing. Inspection of common rail products at Yorii plant is now conducted by AI image processing instead of human operators. AI image processing helps eliminate differences in individual judgement among human operators and improves product quality. Moreover, using AI for the inspection relieves burden on human operators and allows them to focus on other tasks. This year, we are aiming to increase the number of products and plants that incorporate AI image processing in inspection. Using AI will ultimately enhance plant efficiency, increase productivity, and improve product quality.
- These four projects are just some examples how we will increase our development and manufacturing capabilities in Japan. The strengthening of our local development and manufacturing capabilities shows our dedication to Japanese automakers. We will continue to carry out our mission of providing local support for Japanese automakers, who supply 30% of global automotive production. I will later talk about engineering and development activities in Japan.

Promoting initiatives for carbon neutrality

- Now I would like to share our initiatives on climate action. We are seriously taking measures against climate change. It is not only our responsibility – we see it as a chance to create our future. In 2020, Bosch achieved carbon neutrality for Scope 1 and 2 at all of our over 400 locations worldwide. In the next step for Scope 3, we are now reducing our carbon footprint along the entire supply chain, from purchasing to the use of our products. By 2030, we will reduce carbon emissions by 15 percent, relative to the 2018 baseline - along the upstream supply chain and all the way downstream through the entire life cycle of our products.
- More than 90% of Scope 3 corresponds to CO2 emitted at every stage of the life cycle of our products. From shipment from the factory to disposal and recycling after use. Therefore, the most effective approach is to improve our products.
- For example, we manufacture many products for automobiles. But until now, most of them have been for vehicles that use fossil fuels. The electrification of these products and the conversion of cars themselves to electric vehicles will help to reduce our carbon footprint. Mobility business accounts for 60 percent of our total global sales. This means, that the larger the percentage of products for electric vehicles in our portfolio becomes, the smaller the CO2 emissions from us will be.

Accelerating upfront investment in areas with growth potential

- Now, let me tell you how Bosch is moving forward with its eMobility initiatives. In recent years, global efforts to combat climate change are boosting electrification

and hydrogen strategies. Bosch operates in over 60 countries worldwide. Needs for electrification differ from country to country, and depend on the individual customer. With a broad portfolio of electric powertrain solutions, we will continue to provide climate-friendly solutions for all kinds of mobility, for all countries and for all customers, emerging and established customers. In 2021, our orders relating to eMobility exceeded ten billion euros for the first time.

- Bosch has also expanded its product portfolio for mobile hydrogen applications and is making considerable upfront investments in this area. From 2021 to 2024, we plan to invest one billion euros in mobile fuel-cell applications. The portfolio for vehicles ranges from individual sensors to core components, such as the electric air compressor and the stack, to the complete fuel-cell module. We have received many inquiries from Japanese customers about our core components for fuel cell vehicles. Those include components for a wide range of mobility applications, from passenger and commercial vehicles to construction equipment.
- In addition to mobile fuel-cell applications, we are also developing stationary solid oxide fuel cell systems. So called SOFC. Up to 2024, we plan to invest over 500 million euros in SOFC. SOFC generates electricity and heat, and can be operated with various energy sources from city gas, bio gas to hydrogen.
- If the fuel cell is operated with hydrogen, there are no direct CO_2 emissions at all. We will install city-gas based SOFC systems at our new R&D facility in Yokohama to be completed in 2024. This will be the first installation at a location in the Asia Pacific region.

- And late last year, Bosch started volume production of power semiconductors made of silicon carbide at its Reutlingen plant, to supply for eMobility use. The demand for silicon carbide power semiconductors is growing worldwide due to the increasing demand for electrification. A forecast indicates that, between now and 2025, the silicon carbide market as a whole will grow on average by 30 percent a year to over 2.5 billion dollars. At around 1.5 billion dollars, silicon carbide for mobility is expected to account for the lion’s share.
- Bosch is a pioneer and the world's leading supplier of MEMS sensors. In 1995, Bosch started volume production of MEMS sensors for the automotive market, and now, there’s five Bosch MEMS sensors on average in every new car. Bosch has applied the MEMS processing technology, called Bosch Process, to silicon carbide power semiconductors. Deep Reactive Ion Etching, known as the Bosch Process, is a high-aspect ratio plasma etching process, which makes it possible to create deep, steep-sided holes and trenches in wafers. This contributes to shrink the cell design, save area and cost of our silicon carbide chips.
- Silicon carbide power semiconductors support higher switching frequencies than pure silicon chips. What’s more, they lose only half as much energy in the form of heat, thereby increasing the range of electric vehicles by six percent. Alternatively, automakers can make the battery smaller for a given range. In parallel, Bosch is currently developing the second generation of silicon carbide and plans to further improve efficiency with the aim of starting volume production in 2022.

Expanding production to alleviate semiconductor shortage

- Furthermore, we are taking additional steps to alleviate the global semiconductor shortage. In 2022 alone, Bosch plans to invest more than 400 million euros in expanding its wafer fabs in Dresden and Reutlingen, Germany, and building a test center for semiconductors in Penang, Malaysia. Additionally at the Reutlingen facility, more than 250 million euros is to be invested in creating new production space and the necessary clean-room facilities between now and 2025. By expanding our manufacturing capacity at the Reutlingen facility, we are responding in particular to increased demand for MEMS sensors and silicon carbide power semiconductors.

Focusing on development in the automotive software area

- Now, I would like to introduce Bosch's initiatives in the software area that we are focusing on. In the mobility sector, software is gaining in prominence. Bosch expects double-digit annual growth in the market for vehicle software until 2030, worth well over 200 billion euros. Bosch is taking further strategic steps toward a leading position in the software-dominated future of mobility. In 2021, Bosch established a new division, the Cross-Domain Computing Solutions. It is a powerful unit for application-specific vehicle software with specific hardware for numerous vehicle areas such as driver assistance and infotainment.
- Now, the portfolio of application-independent software for vehicles and the cloud will be bundled at ETAS by merging a total of 2,300 experts from different development areas of Bosch and ETAS. The resulting central platform will allow for a quicker and more efficient development of software together with partners.

- The partnership between Bosch and Microsoft will also be continued in the new organization. This partnership aims to develop a comprehensive software platform for seamless connectivity between vehicles and the cloud. It will make it quicker and easier to develop vehicle software throughout the vehicle's lifetime, as well as to download it to the control units and vehicle computers via the cloud.
- The overall goal is to provide existing and new customers with an integrated, horizontal, cross-domain platform that will allow them to realize software-defined vehicles. With this new set-up, Bosch wants to become the leading provider of application-independent vehicle software.
- But that's not all. At the same time, Bosch is strengthening its position as a supplier of application-specific software. As an example, one of application-specific software that we are focusing on is the development of automated driving functions. To take a great step forward in this area, we have formed a comprehensive alliance with Cariad, Volkswagen's software subsidiary. The goal for both companies is to make partially and highly automated driving in everyday vehicles a reality. Specifically, this is about functions that allow drivers to temporarily take their hands off the wheel. In addition, the alliance will develop a system that takes over all driving functions on the highway – this system will be known as the Highway Pilot. We want to introduce the first solutions as early as 2023. This solution is for all VW Group brands, and we are considering to offer it later to other automakers as well.
- The focus of the project's work will be data-driven software development on the basis of information from 360-degree surround sensing. This also involves feeding the data gathered in real traffic conditions into the development process

– continuously and in real time. This means a bigger pool of data and a better basis, to make even higher levels of automated driving a reality and get them safely onto our roads.

- Furthermore, just recently, Bosch extended its portfolio by acquiring Atlatec, a specialist in the field of high-resolution digital maps, and Five, Europe's leading startup in the field of automated driving. Bosch is now the only company that can offer its customers all the necessary building blocks of automated driving from a single source - from actuators, sensors, and maps to software and the engineering environment.
- At Bosch, development is under way on vehicle dynamics control 2.0 software which integrates various actuators required for vehicle dynamics control. Vehicle dynamics control 2.0 is the core controller of next generation electronic stability program and integrated power brake. While ESP® intervenes to improve stability when the system detects that the vehicle starts skidding, vehicle dynamics control 2.0 predicts vehicle behavior based on information from the vehicle dynamics sensors. It then intervenes in advance when it predicts the danger of skidding, and also supports in normal driving situations such as driving in curves.
- As a result, the driver is able to control the car for smoother driving, contributing to better vehicle safety, comfort, and agility. The software integrates various actuators for vehicle dynamics control, such as braking, chassis, steering, and powertrain systems, and makes the best-possible use of future by-wire systems. Coordinated control of the steering and braking, for example, allows for cornering as if the car was on rails, and reduced braking distance on slippery surfaces.

- Vehicle dynamics control 2.0 not only contributes to safety, but vehicle control can also be customized to the desired driving feel of each automaker. We will now take a look at examples of driving in Conservative Mode and Sportive Mode. Conservative Mode delivers appropriate turning performance in regard to the amount of steering, and is unique for its tendency to understeer and provide stable control over the body. On the other hand, Sportive Mode provides increased body turning performance rather than the amount of steering, and tends to oversteer for more dynamic body control. I believe you will notice even more differences when comparing the two modes. Vehicle dynamics control 2.0 is compatible with all types of vehicles, from compact cars to premium, and light commercial vehicles, including manual and automated transmission. We will begin production of the next-generation ESP® at the Tochigi Plant in 2023.
- At Bosch, in 1995, we were the first in the world to begin series production of the ESP®, giving us many years of experience in vehicle dynamics control. This has resulted in the development of vehicle dynamics control 2.0 software, which predicts vehicle movement for feedforward control.
- As such, Bosch is accelerating software development for the mobility of the future. To further strengthen its development capabilities, Bosch is increasing the number of software engineers by 10% per year globally. In Japan, the Cross Domain Computing Solutions division alone, which pools its software and electronics expertise, plans to recruit more than 250 software engineers from within and outside the automotive industry over the next two years.
- Bosch is also promoting the development of a range of solutions for preventing traffic accidents, aiming to realize safe, accident-free mobility. One of these

projects is the development of a system equipped with a camera and AI to monitor drivers. In future automated vehicles, it is necessary to constantly monitor whether the driver is in control of the vehicle. Automakers are currently working to develop driver monitoring systems, and according to an external study, the global market for such systems is expected to grow by more than 10% per year through to 2027.

- However, since the testing and verification of these systems is carried out with actual people, it takes an enormous amount of time and cost. The reason for this is that driver monitoring systems need to constantly detect the driver's gaze. This means there are countless numbers of extremely important test scenarios depending on different driver heights and postures, and driving operations that cause the gaze angle to change.
- In light of this situation, the Bosch Group company ITK Engineering developed a simulation software to assist the development of driver monitoring systems. This software was developed using a platform called iVESS, a framework for generating environments used for testing driving functions and other sensor based systems in a virtual world. The system uses a gaming development platform to build a virtual environment, incorporating data from sensors and cameras used in the actual driver monitoring system. It can run simulations of various conceivable cases. To conduct testing, no special equipment is needed, only an ordinary PC with a powerful graphic card. Most test scenarios can be verified using this simulation software, enabling significant efficiency gains in testing. Automakers will be able to significantly reduce their development lead times ahead of market launch.

Securing the company's competitive edge by investing in associate training and re-skilling programs

- Last but not least, I would like to introduce a few of our measures for human resource development such as reskilling of our associates. Bosch has always considered human resource development to be an important management task since its foundation, and has continued to promote it over the years. In recent years, the overall automotive industry has been facing a period of major structural change. To respond to this rapidly changing environment, associates must acquire new expertise and knowledge in order to secure our competitive edge. At Bosch, we are continuously investing in associate training and re-skilling, investing one billion euros over the past five years. In Japan, the Human Resource Department, including the Bosch Training Center, is coordinating with our business divisions to proactively build programs that help associates clearly identify their target career paths and obtain the necessary learning opportunities to realize them.
- In particular, the Cross-Domain Computing Solutions Division is focusing on providing re-skilling programs. Also within the company, we respect associates' aspirations and desire to take on challenges. So even if they have never worked with software before, we encourage them to transfer to a software division. Training programs for associates new to this field are designed by units within the business division, such as automated driving and advanced development, in collaboration with the Bosch Training Center.
- The Bosch Training Center is expanding its training programs to enable associates to acquire the necessary knowledge in software development now

and in the near future, regardless of their past experience. In addition to our traditional training programs in the technology field, such as data analysis and product engineering, we are accelerating the delivery of training programs in software and AI to meet the needs of our associates. Last year alone, a total of approximately 800 associates participated in training programs in this technology field. In addition to introducing new training programs tailored to the needs on the field, we are also focusing on creating an environment in which associate can voluntarily take on the challenge of acquiring knowledge in new technological fields.

- To tackle the transition of the automotive industry, software plays a major role. The described reskilling of associates together with hiring new graduates and mid career professionals will help us to achieve our target. And let us repeat here again, in Japan the Cross Domain Computing Solutions division alone plans to add more than 250 software engineers over the next two years. The highly dynamic business environment in which we operate requires flexible and adaptable organizational structures and ways of working.
- In Japan, the combination of the new facility to be completed in 2024, and Smart Work will play a pivotal role in this regard. We will continue to build a work environment that unleashes the full potential of our associates, in our quest to be an even more attractive, future-proof, and high-performing organization. We will continue to engage proactively with promising areas going forward, maintaining a strong presence in the market by sparking innovation and differentiating ourselves from other companies. Thank you all for giving us the opportunity

today to introduce how Bosch is growing its business amid various challenges and how we are responding to changes in the market.

- Thank you for your time and now I am looking forward to having your questions.