

# Boost for the Future

How to realise a strong European battery and automotive industry. Innovative smart factory concepts fuel the success of battery cell production “made in Europe”.



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## Part 1: Overview E-Mobility and Green Energy

### Introduction: The European e-mobility market urgently needs fresh ideas and sustainable strategies

Where will the journey of the European automotive industry lead to? What will the energy of the future look like? The COVID 19 pandemic, falling sales, ever-stricter emissions regulations, digitalisation, a shortage of skilled workers and changing consumer needs are presenting the automotive and other industries, such as the battery sector, with unprecedented challenges. They can only manage all these tasks if they develop sustainable concepts now. Furthermore, they need to transform their production lines and act more flexibly and innovatively. Never before has it been so important to stand up to international competition and secure important competitive advantages. If not, "Automotive Excellence made in Europe", which has been so successful for many years, will have had its day.

As a long-standing expert and visionary in the field of robotics and automation technology, as well as an innovative pioneer and partner in smart battery manufacturing, OMRON would like to assist you in this essential task. In this whitepaper, you'll read what will be increasingly important in the future in terms of e-mobility and battery production. You will also learn which technologies and approaches are becoming increasingly more important.

While the COVID pandemic has hurt vehicle markets worldwide, sales of electric vehicles have risen, especially in Europe. It is important to address this market in a more targeted way, to recognise and exploit unused potential. Asian countries like China, Japan and Korea still dominate the battery industry. Of 70 announced "Giga factories" worldwide, 46 are planned for China.<sup>1</sup>

McKinsey predicts that the battery demand of e-vehicles produced in Europe will reach a total of 1,200-gigawatt hours per year by 2040. At the same time, the experts say that the battery demand of e-vehicles produced in Europe is more than five times the volume of currently confirmed projects in Europe.<sup>2</sup> These include Northvolt in Sweden, LG Chem in Wroclaw, Samsung SDI in Göd and CATL in Erfurt.

So either more batteries will have to be imported or new battery factories will have to be built in Europe. It is high time to act!

Learn in this white paper how to achieve a more efficient and sustainable battery production in Europe.

Hope you'll gain some useful insights!

Henry Claussnitzer, Business Engagement Manager Automotive EMEA



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<sup>1</sup> <https://www.mckinsey.com/industries/oil-and-gas/our-insights/recharging-economies-the-ev-battery-manufacturing-outlook-for-europe#>

<sup>2</sup> <https://www.mckinsey.com/industries/oil-and-gas/our-insights/recharging-economies-the-ev-battery-manufacturing-outlook-for-europe#>

## Lithium-ion batteries: A gigantic growth market

Lithium-ion batteries fuel our economy. They come in different sizes and designs but also differ in the composition of their components and the voltage ranges. Lithium-ion batteries are mostly used in mobile applications as electrical energy storage. Incidentally, the first commercial lithium-ion battery was used in 1991 in the CCD TR 1 video camera from Sony.

From cordless screwdrivers to e-bikes, from tablets to aeroplanes: today there you'll hardly find an area in which lithium-ion batteries are not used, and the numbers are rising. The importance of this industry is also underpinned by the 2019 Nobel Prize in Chemistry, which went to the scientists Whittingham, Goodenough and Yoshino for the development of the lithium-ion battery.

But while in the 1970s it was still scientists from the Technical University of Munich who were working on key battery principles, Europe has been in danger of losing out for some years now and urgently needs to develop strategies to secure itself pieces of the big battery pie. Especially since the European market has an immensely growing demand for batteries. In the coming years, a cell production capacity comparable to that of China is to be built in Europe.<sup>3</sup>

- According to Fraunhofer ISI, around 7.5 million electric cars were in use worldwide at the beginning of 2020.<sup>4</sup> By 2030, their market share could rise to 25 to 75 percent. Even a pessimistic 25 percent already means huge growth.
- The e-mobility sector accounts for around 85 percent of battery demand.
- According to the VDMA, battery cell production will bring 155,000 new jobs to meet demand in Europe. Mechanical and plant engineering supplies the necessary production technologies.<sup>5</sup>
- The capacity of lithium-ion batteries is expected to increase from 500 to 1,500-gigawatt hours (2025) to 1,000 to 6,000-gigawatt hours (from 2030).<sup>6</sup>
- By 2030, there should be almost 600 GWh of cell production capacity in Europe. This corresponds to an average share of 20 per cent of the global battery cell demand.<sup>7</sup>

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<sup>3</sup> [https://battprod.vdma.org/documents/7411591/59580810/VDMA%2520Batterieproduktion\\_Roadmap\\_2020\\_final\\_1610705214701.pdf/71d468a2-6981-41ab-b20b-b5d8c001fa9a](https://battprod.vdma.org/documents/7411591/59580810/VDMA%2520Batterieproduktion_Roadmap_2020_final_1610705214701.pdf/71d468a2-6981-41ab-b20b-b5d8c001fa9a)

<sup>4</sup> <https://www.isi.fraunhofer.de/content/dam/isi/dokumente/cct/2020/Faktencheck-Batterien-fuer-E-Autos.pdf>

<sup>5</sup> <http://battprod.vdma.org/viewer/-/v2article/render/27173109>

<sup>6</sup> <https://www.isi.fraunhofer.de/de/presse/2020/presseinfo-02-Faktencheck-E-Autos.html>

<sup>7</sup> <https://www.elektroauto-news.net/automobilindustrie/batterien-elektroauto-faktencheck-antworten-wichtigste-fragen#:~:text=In%20Europa%20sind%20bis%202030,Nachfrage%20europ%C3%A4ischer%20Automobilhersteller%20gedeckt%20w%C3%BCrde.>

- Worldwide, the share of battery-powered electric vehicles and plug-in hybrids will be around 20 percent by 2030.<sup>8</sup>
- From 160 gigawatt-hours (GWh) of lithium-ion battery production capacity in 2018, Avicenne expects this to increase to at least 1,200 GWh by 2030.<sup>9</sup>
- A single battery cell assembly line produces 400 to 500 MWh / year (depending on cell format and chemistry). 3,200 lines will be needed by 2025.
- Each production line requires automation technology and robotics worth between 1.8 and 2.5 million Euros. OMRON addresses this need with its extensive i-Automation portfolio.
- A typical battery cell plant is built for 24 to 36 GWh (limited by the space available per plant). So by 2025, 55 plants will be needed worldwide. Currently, there are 10 plants planned in Europe.<sup>10</sup>



<sup>8</sup> <https://www.heise.de/newsticker/meldung/Elektroautos-Merkel-will-bis-2022-die-Millionengrenze-knacken-4503187.html>

<sup>9</sup> [http://www.avicenne.com/reports\\_energy.php](http://www.avicenne.com/reports_energy.php)

<sup>10</sup> Roland Berger E-Mobility Index 2021 sowie eigene Untersuchungen OMRON.

<sup>11</sup> <https://www.pveurope.eu/energy-storage/green-economy-battery-manufacturing-coming-europe>

<sup>12</sup> [https://battprod.vdma.org/documents/7411591/59580810/VDMA%2520Batterieproduktion\\_Roadmap\\_2020\\_final\\_1610705214701.pdf/71d468a2-6981-41ab-b20b-b5d8c001fa9a](https://battprod.vdma.org/documents/7411591/59580810/VDMA%2520Batterieproduktion_Roadmap_2020_final_1610705214701.pdf/71d468a2-6981-41ab-b20b-b5d8c001fa9a)

## Global battery suppliers and their strategies

Forecasts predict that Europe's share of this global manufacturing business will rise from around 6 per cent at present to between 16 and 25 per cent in 2030<sup>11</sup>. The USA, Europe and other countries will build up further production capacities between 2025 and 2030. Chinese companies such as CATL, BYD and well-known Korean and Japanese players will also be involved. For example, the Chinese battery manufacturers SVolt Energy and CATL are planning their plants in Germany. CATL will build a 24-gigawatt-hour production facility in Erfurt by 2022. SVolt will also have a capacity of 24 gigawatt-hours.

Electrification through batteries is seen as the best possible way to drive the energy transition in Europe. As a direct response, demand for batteries continues to grow rapidly despite Corona. By September 2020 alone, 600 GWh have been announced for the European market. By 2030, a global relocation of battery cell production is on the horizon. The ultimate goal: The cells should be transported quickly and easily to the users and companies (OEMs).<sup>12</sup>

A prominent example: the US car manufacturer Tesla wants to build the world's largest cell factory in Grünheide near Berlin in addition to vehicle production. Planned production capacity there: 250-gigawatt hours.

Here are a few more examples of recent announcements:

- February 2020: Samsung SDI announces the second Gigafactory in Goed, Hungary.
- March 2020: Inobat IPM announces 10 GWh/a factory near Bratislava.
- May 2020: Morrow Batteries plans 32 GWh/a factory in Agder, Norway.
- May 2020: AMTE and Britishvolt plan 35 GWh/a factory in the UK.
- Summer 2020: FARASIS and Daimler confirm strategic partnership.
- January 2021: FARASIS to build battery cells in its plant for TOGG.
- January 2021: Li-Tec to build a 10 GWh factory.
- February 2021: ItalVolt to build 45 GWh factory (later 70 GWh).
- March 2021: Volkswagen acquires a Nissan battery cell plant in Spain.
- March 2021: Volkswagen Group announces six new plants for the production of battery cells. 36 billion to be invested preferably in European ecosystems and supply chains.
- Beyonder builds a factory in Norway.
- Joint battery initiative in Norway by Panasonic, Hydro and Equinor.
- TBC

## Automotive requirements

Sustainability efforts, consumer demands and political requirements have led to a change of mindset within the automotive and supplier industry gaining momentum since 2020. Many companies accept that it makes little sense, from an economic as well as an ecological and customer perspective, to continue to drive on two tracks. Topics such as e-mobility no longer lead to a niche existence but are increasingly outpacing the old combustion strategies.

Particularly due to the growing pressure from politicians, electrification is being promoted. However, Asian battery production cannot sufficiently meet European demand. Above all, sustainability and environmental protection, but also traceability play a much more important role in the European context than in the Asian environment. This applies, for example, to energy requirements or the disposal of waste during battery cell production, which is subject to completely different regulations in Europe than in China, for example. Good examples are provided by the construction of the Tesla plant near Berlin, where there are repeated delays due to strict environmental regulations.

For many Asian companies, requirements to adapt machines to European standards are far too expensive and lengthy. Instead, they prefer to help European companies financially in setting up production facilities of their own. The European partners know the local conditions better. However, the factory remains under Chinese or Japanese management.

What is needed, therefore, are European, holistic and seamless strategies and solutions with interlocking, innovative technologies. Processes should be constantly optimised with the help of smart technology and data analyses, and the cooperation between man and machine should become safer and better. In addition to these process innovations, advanced digitalisation options paired with artificial intelligence (AI) are required to link processes, minimise errors and increase performance.



## Battery or fuel cell: What matters now

Economist Tony Seba from the University of Stanford predicts that by 2025, no more new vehicles with (pure) combustion engines will be sold.<sup>13</sup> But whether battery or hydrogen-powered fuel cells will prevail is not yet clear – it will probably be different types of drive.

Battery cell production, as the key technology for modern battery-powered vehicles, has so far almost completely bypassed Europe, even though it has the best technological prerequisites. European companies have done a lot of groundwork and built up know-how, but have failed to commercialise it. Today, there are more and more battery cell factories in Europe that produce locally. But these hardly offer any added value for the European economy. The same was true before in other industrial fields such as solar energy.

It would be conceivable for the European automotive industry to focus on fuel cells and their further development in the current structure, as they represent a real alternative to pure battery vehicles. In fuel cells, too, the battery is a fundamental element, albeit much smaller. Efficient and sustainable battery cell production, therefore, plays a very important role here too, should this type of drive become more popular soon.

In addition, hydrogen is refuelled in a similar way to fuel, which is in line with the typical user behaviour. The crux of the matter is that here, too, there is no appropriate infrastructure to make fuel cell technology suitable for the mass market. Therefore, political framework conditions must now be created to ensure that the price of green hydrogen is kept low. The taxation model must also be adapted. In the future, a mix of different propulsion technologies will establish itself on the market. The EU has the task of playing a proactive role. Not only the technology must work, but also the framework and production conditions must be right.

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<sup>13</sup> <https://www.carthrottle.com/post/nzpkqrp/>



## Automation and industry expertise support growth

OMRON has been active in the field of battery cell production for many years. As early as 2000, the company started to expand its know-how step by step with all the well-known names in the industry – at a time when the comparatively few batteries for the European market came entirely from Asia. No other company in this field can boast such a long experience in the battery environment and no other company has worked with all battery manufacturers like OMRON.

Around 2016, the battery market picked up speed – Asian companies increasingly shifted production for the European market to Europe, primarily Poland and Hungary. Faster and more efficient production processes for an ever-growing market were required and OMRON was actively involved – supporting with industry expertise and advanced process technology.

In addition to expertise, OMRON scores with global strategy, local support and solutions adapted to the needs of the respective companies. OMRON actively supports European innovation efforts.

2021 saw a further acceleration in the European battery market: more and more European companies are venturing into the battery environment due to European regulations – OMRON can support them in their plans. European companies are increasingly producing battery cells for European customers. In addition, production cycles are getting faster and consumer demands are changing, which automotive companies need to address by becoming more flexible and agile, adapting production lines and more. Partnerships with innovation leaders as well as customised and rapidly changeable production lines provide valuable support in this regard. The technologies and strategies that are particularly advisable are discussed in the second part of this white paper.



## Recommendations for more efficiency and sustainability

### Chances and possibilities in the European battery ecosystem

A survey by the Chemnitz Automotive Institute CATI in cooperation with AMZ predicts that by 2025 one in four cars from European factories will be e-driven.<sup>14</sup> In addition to battery electric vehicles, this also includes hybrid and fuel cell drives. According to the study, more than 50 percent of all fully electric passenger cars manufactured in Europe will be produced at German locations in 2025. Also, there are non-automotive e-mobility applications such as buses, trams, ships, underground mining machinery, trucks, agricultural machinery, bicycles, forklifts, motorbikes and more. Currently, the European economy is too dependent on imported e-mobility technologies such as battery cells. To strengthen its international position, it is essential to catch up, expand its production sites and drive innovation.

The strong competition from Asia and bureaucratic hurdles are the biggest challenges here. As in many other sectors, European car manufacturers are finding it difficult to keep up with Asian competition. In particular, a low-cost industrial base gives them significant advantages. Combined with manufacturing strategies aimed at mass production of standardised products – to compensate for difficulties such as process instability – this advantage has been aggressively exploited in recent years. As a result, Asian manufacturers now dominate the global production of many critical e-mobility products. European Union studies show that a lion's share of the world's battery cells come from Asian production.<sup>15</sup> The competitiveness of the European e-mobility industry is therefore closely linked to its ability to identify and implement new, transformative production technologies to enable the cost-effective manufacture of high-quality e-mobility products.

Battery cell manufacturers, line manufacturers, automation specialists and other partners such as laser and digitisation experts must pull together in this complex undertaking, coordinate approaches and ideally learn from and with each other. This is all the more successful if they pursue similar goals and perhaps already know each other. The common ecosystem is more important than the idea of competition. Instead of focusing on products, it is about value contributions to advance the ecosystem as a whole, to stand up to other ecosystems and then also to profit as a company.

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<sup>14</sup> <https://vision-mobility.de/news/studie-europa-loest-die-handbremse-bei-der-e-mobilitaet-64380.html>

<sup>15</sup> Li-ion batteries for mobility and stationary storage applications. <https://ec.europa.eu/jrc/en>. 2018

## Secure competitive advantages with the help of innovative smart factory approaches

The electrification of vehicles as a central trend is indispensable for efforts in environmental protection and sustainability, keyword “zero emission”. At the same time, however, mobility is to be preserved and the growing needs of consumers and the market are to be addressed: For example, vehicles are to be manufactured ever faster, more individually and cheaper. In this context, politicians have already enacted various framework conditions and regulations, for instance concerning emissions, CO2 targets, CO2 fleet limits, low emission zones or particulate matter guide values. In addition, there are regulations on traffic telematics, i.e. the collection, transmission and use of traffic-related data to organise, inform and directing traffic using information and communication technologies. End-of-life directives, i.e. requirements for taking back and recycling, must also be mentioned at this point. The catalogue of tasks is long and varied. Since the automotive industry will not be able to cope with it alone, other sectors will have to join in and provide political support. One basis for future-oriented strategies that enable European automotive players to secure advantages is the approaches and technologies of the “Smart Factory”. They enable you to comprehensively modernise production and rationalise supply chains while also expand and convert to new drive technologies.

Smart Factory, in summary, are future-oriented and flexible approaches that reconcile the production of the future with familiar topics such as continuous digital supply and value chains, more agile process flows and the close linking of manufacturing, quality (avoidance of rejects and waste), customer needs and life-time traceability. These are all tools that help you to survive in the market, to act more profitably, more sustainably, faster and safer and to stand out from the competition. Besides, there are other trend topics such as digitalisation, track and trace, value chain participation and improved networking. Predictive maintenance, predictive quality, integrated production planning and process visualisation are also taken into account in the smart factory of the future. OMRON answers this need with its i-Automation! model.



## Political Framework

- The European Union has approved €2.9 billion in subsidies from 12 member countries in early 2021 for a second pan-European project to strengthen the electric battery industry – in particular, to end dependence on Asian imports.
- The EU Executive Commission had already approved a €3.2 billion plan in December 2019, subsidised by seven countries, to support research and innovation in this key sector. The European Battery Innovation (EuBatIn) project allows companies, including Tesla, to benefit from EU investment.<sup>16</sup>
- The approval of the state aid paves the way for the funding of battery projects by ACI Systems, Alumina Systems, BMW, Cellforce Group, ElringKlinger, Liofit, Manz, Northvolt, SGL Carbon, Skeleton Technologies and Tesla.
- According to a study commissioned by the European Commission, electric vehicles can be almost CO<sub>2</sub>-free by 2050 – taking into account the entire lifecycle from production to use and recycling. To achieve this, the electricity, also for vehicle production, must come from renewable energies and the recycling of batteries must be covered.
- At the end of 2020, the EU Commission drew up a binding sustainability directive, according to which 35 percent of lithium must be recycled by 2026 and 70 percent by 2030.<sup>17</sup>
- If the EU Commission has its way, whose new recycling directive is to be transposed into national law by 2024, a significantly larger proportion of materials will have to be recycled in future than has been the case up to now. To this end, car and battery manufacturers are to set up a comprehensive collection and recycling system. Around half of the weight of lithium-ion batteries (LiB) is to be recycled in future.
- The development of batteries for electric vehicles fits into the Commission's plan to make the EU CO<sub>2</sub>-neutral by 2050 and to reduce net greenhouse gas emissions by at least 55 percent by the end of the decade.

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<sup>16</sup> <https://www.manufacturing.net/automotive/news/21244485/eu-approves-funding-for-ev-battery-industry>

<sup>17</sup> <https://www.handelsblatt.com/unternehmen/industrie/elektromobilitaet-volkswagen-startet-batterie-recycling-in-salzgitter/26863106.html?ticket=ST-7506772-xGcpQdxNe561FdrhIAJs-ap6>

## Factory of the Future: Aim for more performance and efficiency

Digitalisation and artificial intelligence (AI) can help to achieve a breakthrough here. Used in a well-thought-out way, digital solutions and AI release new efficiency potential from highly complex production chains. They help manufacturers to better understand their workflows. The data collected with the help of AI-based technology leads to new insights to optimise processes inside and outside the company. One example is predictive maintenance, which can be used to identify wear patterns, peculiarities and anomalies and thus prevent machine failure, downtime and errors. AI and sensor technology help European manufacturers to create a level playing field and drastically reduce the cost advantage that Asian competitors enjoy today.

At the same time, AI can help capture market share in blue ocean segments (new innovative markets). Central data management is also of great importance in this context: The presentation of KPIs and OEE data, the visualisation of sensor data and the storage of process data in a virtual environment are gaining importance. By increasing process quality and agility, AI can create opportunities for the production of highly customised, complex and thus high-value products in the field of e-mobility, a market segment for which the business model of most Asian manufacturers is not suitable. The important thing here is that the automotive industry must become bolder, less hesitant and more innovative when it comes to new technologies. The best way to counter the wait-and-see attitude is to involve the employees in the factories in the design of a new solution at an early stage and convince them of the possibilities.

### Five tips for more future strength

What should automotive companies pay attention to in order to make their production more innovative and competitive?

1. Rely on edge computing: machines can be coupled better than ever before, and data can be collected, structured and analysed at the edge using powerful sensor technology.
2. Use sensor technology: Remote services and the integration of additional sensor technology for missing data points, machine identification, cybersecurity, but also the use and conversion of data and communication protocols are advisable.
3. Drive human-machine collaboration: mechatronics and IT solutions are increasingly merging and, in interaction, support more efficient and flexible production processes. Concrete examples of applications are smart new industrial robots, mobile robots but also cobots that work hand in hand with the employees in the plant.
4. Bring together components of modern production processes in the cloud: By doing so, you benefit from central and transparent monitoring of all machines, systems and components through control-based software modules or cloud-based functions, for example in terms of asset management, condition monitoring, predictive maintenance or remote services.

5. Use Augmented Reality (AR) as a further building block of the smart factory: You can gain additional computer-generated information and virtual objects complement live images or videos, which gives you an extra level of information, support and know-how.



### Focus on sustainability: Tips for more sustainability in production

Currently, the capacity for LiB recycling is less than 100,000 tonnes worldwide. China is not only a leader in cell production. It also ranks first in the world for the recycling of cells, cathode, and anode materials.<sup>18</sup>

A few “giga-factories” are currently planned or under construction in Germany, Poland, Sweden, and Hungary. This, in combination with increased recycling, opens up good opportunities for European industry to gain market advantages.

According to Roland Berger, four drivers help to significantly reduce plant investment costs per gigawatt-hour: improved processes, scaling through larger factories, optimised cell chemistry, and improved overall plant effectiveness.<sup>19</sup>

#### Here are some tips for more sustainability in production:

1. Implement a Big Data-driven system to efficiently collect and manage industrial data.
2. Promote better interaction between people and smart machines.
3. Consider security, privacy and ethical issues supported by smart manufacturing networks.
4. Build a detailed and comprehensive system that links all aspects and data to achieve a decentralised management system.
5. Link product knowledge, data and decision making.
6. Rely on qualified and well-trained employees to effectively apply Factory 4.0 concepts.
7. Remember that implementing the principles of Factory 4.0 requires a high level of investment.
8. Use sophisticated and advanced solutions for storing, retrieving, processing and analysing data.
9. Work closely and trustfully with all stakeholders.
10. Data-driven intelligent algorithms are needed for sustainable manufacturing, sustainable supply chain, sustainable recycling and lifecycle assessment.

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<sup>18</sup>[https://www.rolandberger.com/de/Insights/Publications/Zukunftsmarkt-Batterie-Recycling-Verpasst-Europa-\(wieder\)-den-Anschluss.html](https://www.rolandberger.com/de/Insights/Publications/Zukunftsmarkt-Batterie-Recycling-Verpasst-Europa-(wieder)-den-Anschluss.html)

<sup>19</sup><https://www.rolandberger.com/en/Insights/Publications/Lithium-ion-batteries-for-the-global-automotive-industry-and-beyond.html>

## Digitisation: What companies should consider – From Edge Computing to AR

As digitalisation is a cornerstone of innovation in manufacturing, it should be a key topic on your agenda. Basic technologies here are, for example, information and communication technology (ICT), photonics, sensors or machine control. Digital technologies can support flexible, adaptive, agile manufacturing for fast, responsive production. There needs to be a faster deployment of digital technologies throughout the manufacturing cycle (production, distribution, and recycling), enabling better supply chain management, quality improvement, and customer service. AI, simulation and additive manufacturing, data analytics, data-driven business models and machine learning are key drivers in this regard.

So what should automotive companies look for to make their production more innovative and competitive? For one thing, so-called edge computing offers them numerous opportunities: Machines can be connected better than ever before, and data collected, structured, and analysed via powerful sensor technology at the machine level (“at the edge”). Also, there are remote services and the integration of additional sensor technology in the case of missing data points, machine identification, cybersecurity, but also the use and conversion of data and communication protocols. But that’s not all, because mechatronics and IT solutions are also increasingly merging and, in combination, support more efficient and flexible production processes.

Concrete examples of applications in this context are smart new industrial robots, mobile robots and cobots that work hand in hand with the employees in the factory. Besides, the various components of modern production processes can now be brought together in the cloud: Here, companies benefit from central and transparent monitoring of all machines, plants, and components through control-based software modules or cloud-based functions, for example in terms of Asset Management, Condition Monitoring, Predictive Maintenance or Remote Services. Another component of the smart factory is Augmented Reality (AR). It helps companies to gain additional computer-generated information, virtual objects complement live images or videos, which gives them a plus in information, support and know-how. The flexible, autonomous control and optimisation of production processes are still in their infancy in many places. But those who already explore the possibilities today and take the first steps in this field can position themselves well for future requirements.



## Part 3: Strong automation partner with a sustainable vision: OMRON

### OMRON helps you to master current and future challenges

OMRON is the ideal partner to strategically and successfully tackle the challenges in battery cell production, but also future fuel cell production, in Europe, as the company has been working in these areas for years to constantly improve processes. In the European context, aspects such as human-machine cooperation, flexibility, digitalisation and AI for process optimisation and sustainability are particularly important – fields in which OMRON has been able to build a lot of expertise in recent years. Today, there is no single battery manufacturer that does not rely in some way on OMRON technology.

OMRON's global automation experts focus on integrating cutting-edge AI technologies into electromobility manufacturing and production systems to improve stability and flexibility. These manufacturing qualities are critical to ensuring the industry's productivity and competitiveness so that Europe can maintain its leadership in providing high-quality technologies and products for electromobility. OMRON and its partner network offer established technologies as well as transformative solutions that meet the specific needs of the European e-mobility manufacturing industry. AI-driven predictive quality and response capabilities help machine operators to detect and respond to changes in critical parameters in real-time before product quality suffers. In addition, AI helps uncover interrelationships between product and process steps, providing valuable insights that can be incorporated into new product designs and optimised production strategies. Flexibility is achieved through AI-driven production line changeovers that help operators configure lines to accommodate new product formats. Reduced changeover time between product formats increases line uptime and reduces waste.



## About us: OMRON

### **About “innovative-Automation”**

Recently, OMRON has developed a manufacturing innovation concept called “innovative-Automation”. With this concept, OMRON is currently committed to bringing innovation to manufacturing sites through three key innovations, or three “i’s.” Through these innovations in the area of automation, OMRON aims to enable significant productivity improvements in manufacturing sites to achieve high-value-added manufacturing. With the first “i,” “integrated” (control evolution), OMRON will seek to advance automated control technology so that virtually any operator, even inexperienced operators, can effortlessly perform work that previously required the expert skills of experienced workers. With the second “i,” “intelligent” (development of intelligence by ICT), OMRON seeks to create constantly evolving equipment and production lines. By adopting a wide range of control devices and artificial intelligence (AI), machines can learn through experience and maintain themselves in optimal condition. For the third “i,” “interactive” (new harmonization between people and machines), OMRON pursues the development of a new harmonious relationship between human operators and machines; as they work together in the same workspace, machines will be able to assist human operators by recognizing human thoughts and behaviour in a way that only OMRON, a specialist control equipment manufacturer who knows production floors inside and out, can realize.

### **About OMRON**

OMRON Corporation is a global leader in the field of automation based on its core technology of “Sensing & Control + Think”. OMRON’s business fields cover a broad spectrum, ranging from industrial automation and electronic components to social systems, healthcare, and environmental solutions. Established in 1933, OMRON has about 30,000 employees worldwide, working to provide products and services in around 120 countries and regions. For more information, visit OMRON’s website: <http://industrial.omron.eu>

**Any questions? Get in touch with us! We look forward to hearing from you.**

#### ***Henry Claussnitzer***

Business Engagement Manager Automotive EMEA

[henry.claussnitzer@omron.com](mailto:henry.claussnitzer@omron.com)

Office: +49 30 668 653 90

#### ***Marion Beekhuizen***

Team Leader Marketing Promotions

Phone: +31 (0)6 1177 3151

E-Mail: [marion.beekhuizen@omron.com](mailto:marion.beekhuizen@omron.com)

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Omron Europe B.V.

Wegalaan 67-69

2132 JD Hoofddorp

Netherlands

Tel: +31 (0)23 568 13 00

Fax: +31 (0)23 568 13 88

Website: industrial.omron.eu

Editors:

Henry Claussnitzer

Susanne Collins

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