



Press-Information
15. Oktober 2018

BMW Group, Northvolt and Umicore join forces to develop sustainable life cycle loop for batteries.

Munich/Stockholm/Brussels. The BMW Group, Northvolt and Umicore have formed a joint technology consortium in order to work closely together on the continued development of a complete and sustainable value chain for battery cells for electrified vehicles in Europe. The project is seeking to press ahead with the sustainable industrialisation of battery cells in Europe and the associated acquisition of skills, from cell chemistry and development through to production and ultimately recycling. The development activities of the pan-European consortium will help to create high-tech jobs, thereby fully supports the EU Battery Alliance, founded by European Commissioner Maroš Šefčovič, stating: “Batteries are instrumental in our transition to clean mobility and clean energy systems. Thanks to genuine involvement of actors from all segments of the battery value chain, Europe is becoming the lead player in this strategic area. I therefore welcome that key actors of our automotive sectors are investing in the future of European battery innovation and manufacturing.” The chief objective is to make battery cells sustainable by establishing a closed life cycle loop. This starts with a recyclable cell design and continues with a manufacturing process that mostly uses renewable energy. The next step is a long period of primary use as a drive battery, possibly followed by another phase of secondary use as a stationary energy storage device. At the end of its life cycle, the cell is recycled and the raw materials reused, thereby completing the loop.

In view of the growing numbers of electrified vehicles, establishing a broad basis for procuring battery cells is becoming a matter of greater strategic significance for manufacturers. With Northvolt as a partner focused on sustainable production and the BMW Group in its capacity as a carmaker that is already developing its own battery cells today, this can be achieved to great effect. Because battery cells contain essential resources and materials, feeding these back into the loop becomes more and more important as electric vehicles multiply in number. As Umicore is a global leader in the development and production of active materials for battery cells and resource recycling and the BMW Group boasts tremendous expertise in material and cell design, there are high hopes for some major

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achievements in this area too. Sustainability and efficiency are both crucial factors for Umicore.

Development.

In order to accelerate the development of battery cells and make further progress in terms of cell chemistry and cell design, the BMW Group's new battery cell centre of excellence will be inaugurated in summer 2019. Besides battery cell development, other key skills will be pooled there too, from the production of battery cell prototypes to build-to-print expertise. This is important for the BMW Group as a way of endowing potential suppliers for cell production with the necessary skills to meet its own requirements. The BMW Group is already investing heavily in the entire value chain today and, by so doing, is blazing a trail when it comes to sustainability. Consequently, ensuring that raw materials come from environmentally and socially responsible sources, obliging cell suppliers to reduce their carbon footprint, using recycled materials, and creating battery concepts that can be serviced and easily recycled are already high priorities for the BMW Group, which intends to continue strengthening its capabilities and expanding its activities in this area.

Production.

"The sustainability approach of Northvolt makes it a highly appealing company for us, that was furthermore very receptive to our ideas," remarked Klaus Fröhlich, Member of the Board of Management of BMW AG, responsible for Development. For this reason, the BMW Group and Northvolt have been collaborating for some time now as part of a strategic technology project. The collaboration will leverage the capabilities of Northvolt Labs, a scale-up line and research facility which will be used to test and industrialize battery cells before large-scale production, with the aim of developing cutting-edge green battery cells. The collaboration has been supported by BMW Group through an investment to enable the initial phase of the partnership. Sustainability is at the core of Northvolt's business and its ambition is to become one of the first fully circular industrial companies. This is why all the electrical power for its future production of battery cells originates from renewable resources. Another

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important consideration for Northvolt is local and responsible sourcing of the raw materials needed. Sustainability has also been one of the BMW Group's central strategic targets for many years, meaning that the two companies operate based on a similar ethic.

"BMW and Northvolt have a shared commitment to reduce CO2 emissions from transportation. As batteries are becoming a key strategic question for car manufacturers, this partnership does not only mark a key milestone for Northvolt, it also highlights the importance of sustainable battery cells in the coming wave of electrification", said Peter Carlsson, Co-Founder and CEO, Northvolt.

Materials development and recycling.

Umicore is the partner responsible for active anode and cathode materials development and recycling in the technology alliance. This collaboration will enable innovative and highly efficient production technologies to be applied to the production of active materials based on recycled metals. In addition, this project covers smart battery pack disassembly, screening for reutilisation of the battery cells and feeding the recycled resources back into active material production. As electric mobility continues to expand, growing needs will not be limited to sustainable extraction of raw materials – recovering materials that have already been used will also become increasingly important in easing the burden on raw material production.

"It is rewarding to see that Umicore's product technologies and recycling services are key enablers for this technology alliance with BMW and Northvolt. By jointly demonstrating a closed loop for high performance, green and EU-based batteries, we are underlining the future potential and importance of a European supply chain for the success of car electrification in the region", said Marc Grynberg, CEO of Umicore.

The collaboration.

When it comes to key technologies of the future, the BMW Group often works together with established specialists and suppliers, young companies and start-ups. This enables faster access to specific solutions. With this particular technology project, the BMW Group, Northvolt and Umicore are laying the basis

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for a sustainable value chain for automotive battery cells in Europe, from development and production right through to recycling.

In Europe, the BMW Group has already been manufacturing modules with supplied battery cells before using these modules to build complete batteries for plug-in hybrids and battery-powered electric vehicles. With its battery cell production, Northvolt provides the final element needed for purely European production of complete batteries for electric mobility applications in future, resulting in a substantial reduction in carbon emissions at the same time.

The BMW Group is already demonstrating now how batteries can be used as energy storage devices in both domestic and industrial applications once the battery cells reach the end of their vehicle life cycle.

Umicore has recently announced it will soon start building a cathode material manufacturing facility in Europe and already runs a recycling plant for lithium-ion batteries in Europe. Umicore is advancing the technology for recycling battery cells and returning the recycled resources to the material production cycle, thereby making a vital contribution to the future of sustainable mobility.

About Northvolt

Northvolt was founded in 2016 with the mission to build the world's greenest battery cell, with a minimal carbon footprint and the highest ambitions for recycling, to enable the European transition to renewable energy. Northvolt's team of experts is building the next generation battery cell factory focused on process innovation, scale and vertical integration. Once completed, it will be Europe's largest battery cell factory and produce 32 GWh worth of capacity annually. For more information visit northvolt.com

About Umicore

As Umicore is a global leader in the development and production of active materials for battery cells and resource recycling and the BMW Group boasts tremendous expertise in material and cell design, there are high hopes for some major achievements in this area too. Sustainability and efficiency are both crucial factors for Umicore.

Umicore is a global materials technology and recycling group. It focuses on application areas where its expertise in materials science, chemistry and metallurgy makes a real difference. Its activities are organised in three business groups: Catalysis, Energy & Surface Technologies and Recycling. Each business group is divided into market-focused business units offering materials and solutions that are at the cutting edge of new technological developments and essential to everyday life.

Umicore strategy focuses on clean mobility materials and recycling with the overriding goal of sustainable value creation based on an ambition to develop, produce and recycle materials in a way that fulfils its mission: materials for a better life.

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Umicore's industrial and commercial operations as well as research & development activities are located across the world to best serve its global customer base. The Group generated a turnover of €6.4 billion (€1.7 billion excluding metal) in the first half of 2018 and currently employs 9,800 people.

The BMW Group

With its four brands BMW, MINI, Rolls-Royce and BMW Motorrad, the BMW Group is the world's leading premium manufacturer of automobiles and motorcycles and also provides premium financial and mobility services. The BMW Group production network comprises 30 production and assembly facilities in 14 countries; the company has a global sales network in more than 140 countries.

In 2017, the BMW Group sold over 2,463,500 passenger vehicles and more than 164,000 motorcycles worldwide. The profit before tax in the financial year 2017 was €10.655 billion on revenues amounting to €98.678 billion. As of 31 December 2017, the BMW Group had a workforce of 129,932 employees.

The success of the BMW Group has always been based on long-term thinking and responsible action. The company has therefore established ecological and social sustainability throughout the value chain, comprehensive product responsibility and a clear commitment to conserving resources as an integral part of its strategy.

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