Press release IAA Mobility 2023

Back to the woods!
Future Mobility Region Upper Austria
presents sustainable mobility solutions

Dynamic development in the automotive industry has prompted several fields of action for Upper Austria as an automotive region – that is, for companies, research facilities and economic and research strategists, – such as the technological development in the area of new drivetrains and the diversification and internationalisation of markets and market players.

One of Upper Austria's clear strengths as a location is that the entire value chain is in place within a radius of 50 kilometres. In other words, anyone looking to develop and produce sustainable vehicle solutions, especially in the field of commercial and special vehicles, will find virtually all the expertise they need in Upper Austria's companies and research facilities.

The Future Mobility Region Initiative is making these capabilities more visible and usable in order to support companies in the region in the transformation process. At the same time, this is also a clear message beyond the borders intended to point out that anyone looking to develop or implement sustainable vehicle solutions will find know-how, infrastructure and highly trained specialists within that radius in Upper Austria.

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Companies, research facilities and best-practice examples in the fields of

- ➔ Simulation & digital twins
- ➔ Power electronics
- ➔ Material technologies
- ➔ Energy storage & electric drivetrains
- ➔ Test and inspection infrastructure
- ➔ Prototyping lab

will find interested OEMs and suppliers on www.futuremobilityregion.com.

Factbox: Automotive sector Upper Austria

The Upper Austrian automotive industry includes some 280 companies. However, they directly and indirectly add 7.9 billion euros of value and secure more than 86,000 jobs. The indirect effects are particularly noteworthy: one euro of value added in the companies under consideration prompts 2.2 euros of total added value, and one job in these companies secures a total of 2.7 jobs.

Current investment projects:

BMW Steyr: Motor plant/electric mobility
TIZ Grieskirchen: Test centre (electric mobility and environmental simulation)
Wacker Neuson Linz: Test arena for functional testing, road, braking and noise tests of construction machinery
Miba Battery Systems – Battery production plant Bad Leonfelden

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Future Mobility Region

Best practices #1: Battery tray solution with a high level of sustainable, biologically-based material content

Reducing weight, saving energy and protecting the environment and climate, this is the overriding mission, especially in the automotive industry. This is why components for electric vehicles need to increasingly shed weight in order to save electricity and increase range. The “Bio!LIB” project consortium is developing battery trays made of a steel-wood laminate composite. The intent is to meld the advantages of legacy, metal materials with those of biologically-based materials in a symbiotic relationship.

Steel-wood hybrid design

One aspect is that of taking a close look at the circumferential frame structure of the battery tray; this is usually composed of moulded steel tubes or extruded aluminium. Solutions for a steel-wood hybrid design of this frame structure are being developed and tested in the scope of the project. The motivation for this design approach is the comparatively low weight of wood and wood-based materials combined with a relatively high energy absorption capacity under compressive stress. The energy absorption capacity of a structure is essential in crash scenarios where critical areas such as battery modules or the occupants need to be protected against intrusion or high acceleration.

Improved damping

In addition to the mechanical and environmental benefits, a steel-wood hybrid design offers significant improvements in vibration damping behaviour along with extremely low thermal conductivity. The latter can have a very positive effect, especially in the event of a cell fire where it is essential to contain the fire as closely as possible and gain time to evacuate the occupants.

Various combinations tested

In the course of the project, the Institute for Vehicle Safety at the Graz University of Technology investigated various combinations of steel alloy-wood material using crash simulation supplemented by experimental testing. In addition to this, the institute looked into the question of what happens to battery trays with a metal-wood hybrid design, and hence to the batteries, in the event of an accident. Excessive deformation of the battery cells releases thermal energy. In the event of a crash, the wood-based elements are thermally stressed, that is, heated.

Confirmation by physical tests required

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The results indicate that wood as a material could meet the requirements for a battery tray fire, physical tests on battery boxes to confirm this are still outstanding.

Best practices #2: A second life for batteries

By 2040, the demand for battery cells for electric vehicles in Europe is expected to be five times higher than the production volume. Raw materials are scarce, cost-efficient recycling is one potential solution. But only between eight and 22 percent of the required metals are recovered. The "BattBox" project is looking to make the battery value chain more circular.

The "BattBox" project has laid down an important path for future battery recycling for the consortium, consisting of FILL, Graz University of Technology, AVL and the Automotive-Cluster. The research project aims to establish multi-stage recycling strategies. Due to the lack of standardisation in terms of chemical make-up, design and dismantling capability, the project partners are looking to develop a wide range of potential processes. Each stage of the process includes diagnosing and disassembling the exposed components as well as performing checks on economic and safety-critical aspects. The intent is for recycling to yield high-quality and unmixed raw materials to ensure maximum re-usability.

Optimum recycling strategy

The battery circular process flow project has been set up to have a wide scope and be detailed at the same time. It will lay the foundation for efficient and effective recycling of electric vehicle batteries. “We will sustainably shape the developments of future battery systems in terms of their circular economy capability. Because we are developing the best possible solutions for recycling electric vehicle batteries – in line with the FILL slogan: If you're looking for the best solution, develop your future together with FILL,” says Josef Ecker, project manager at FILL, with conviction. After this project, there will be an optimum recycling strategy for every electric vehicle battery which exists in Europe – that is the objective. “No electric vehicle battery is too difficult for us. The more complex the batteries under investigation are, the more exciting and far-reaching the results of the project will be,” Ecker adds.

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Leveraging unused potential

“For electromobility to achieve its potential with a view to more environmentally friendly mobility, much work is still needed along the entire value chain – from extracting primary raw materials to recovering the materials used and re-using used but functional batteries. The ‘BattBox’ project is taking important steps to leverage the still untapped and unused potential for improving the sustainability of electromobility,” as Florian Feist from the Vehicle Safety Institute at the Graz University of Technology points out.

Recycling as the objective

Alexander Harrich, project manager at AVL List GmbH, explains his company's motivation for participating in the project as follows: “The number of end-of-life electric vehicles is going to grow massively. This poses a major challenge for waste and recycling management. Many lithium-ion batteries in end-of-life vehicles can still be used as stationary accumulators. It would be a pity not to do this. The BattBox project is helping to make the reuse and recycling of batteries more efficient”.

Project partners

FILL Gesellschaft m.b.H.: FILL has the resources to handle the BattBox project professionally with its own R&D department employing experts from the specialist areas of design, process simulation, plant planning and modelling. www.fill.co.at

Graz University of Technology – Vehicle Safety Institute (VSI) and Production Technology Institute (IFT): TU Graz has know-how in the field of battery module production and in the handling and testing of battery cells. In the form of the Battery Safety Centre (BSCG), VSI has a laboratory for characterising electrical energy accumulator systems. www.vsi.tugraz.at www.ift.at

AVL List GmbH: AVL is the world's largest company for developing, simulating and testing drivetrain systems in the automotive industry. AVL develops innovative systems for CO2 reduction – from hybrid to battery electric and fuel cell technologies. www.avl.com

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Automotive-Cluster: Within the project, the Automotive-Cluster is responsible for the dissemination and communication activities intended to maximise the impact of “BattBox” on the industrial and public levels. www.automobil-cluster.at

Best Practices #3: Powering Building Sites

In the scope of the “maxE” project, Miba Battery Systems has, for the first time, successfully tested a newly developed buffer accumulator. The measurements demonstrate that the accumulator saves electricity costs and protects the grid.

The first successful measurements were taken at the Trumau site of the Linz-based Swietelsky construction company in Lower Austria. The VOLTstation PS250 buffer accumulator developed by Miba Battery Systems not only significantly reduces grid connection costs, but also ensures that the power grid is protected. This is because cranes, in particular, require huge amounts of electricity during operation and often disrupt the power grid around the building site.

Demonstrating sector coupling

The “maxE” project is developing and demonstrating sector coupling, including the electrical energy supply system and storage, for mobile and stationary mobility applications intended to meet the daily energy requirements of large and daytime construction sites with their battery electric vehicles and machines, while at the same time ensuring voltage quality at the connection to the public power grid. The intent is to have results which are applicable and repeatable for other, predominantly temporary, large-scale users and help to ensure overall power quality and contribute to grid stability through new emission-free forms of mobility.

The project is funded by the Climate and Energy Fund in the scope of the Zero Emission Mobility programme. The project partners are Miba Battery Systems, the Automotive-Cluster, Swietelsky AG, Netz Oberösterreich GmbH, ConPlusUltra GmbH and the Energy Institute of the JKU Linz.

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