

The SEVA logo consists of the letters 'SEVA' in a bold, white, sans-serif font. The 'S' and 'E' are connected, and the 'V' and 'A' are also connected. The background of the logo is a dark green, semi-transparent image of an electric vehicle chassis with a battery pack and motor.

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The AVERE logo features the word 'AVERE' in a bold, white, sans-serif font. The 'A' and 'V' are connected, and the 'E' and 'R' are also connected. The background is a dark green, semi-transparent image of an electric vehicle chassis.

The European Association
for Electromobility

EU Battery Regulation: Implications for Slovakia and the Auto Reliant Countries of Central & Eastern Europe

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Key takeaways

Slovakia's five OEMs alone will need at least 80 GWh of annual battery capacity in 2035. By including OEMs in the other V4 (CZ, SK, PL, HU), this could grow to hundreds of GWh per year in the 500 km radius.

If Li-ion batteries are mainly produced where the vehicles are assembled, particularly due to logistics limitations, one could expect a **strong push for new battery cell production capacities by 2030.** There is already major battery production capacity in Poland and Hungary today, with plans to grow it significantly by 2030. In Slovakia, at least two large projects in battery production are under discussion.

The new regulatory act sets demanding requirements for end-of-life and mandatory targets for recycling which will **necessitate the creation of an entire recycling industry.** As it is almost nonexistent, it must be developed quickly.

The requirements for labeling, end-of-life, reclamation, and recycling are new and complex, and the Regulation itself foresees the need for over 40 additional secondary acts on technical topics. These will **require a complex understanding of various technical details** and will structure the development of this emerging industry.

The significant scaling of battery production, and the creation of a new recycling industry both **require the buy-in of the local policymakers and a skilled workforce** – which must be priorities for countries to truly seize the opportunity.

Batteries are a key element of the transition to a clean energy economy and electrified transport system. They are what powers electric vehicles and stores renewable energy that is not immediately used. However, the vast majority of the development along the battery supply chain occurs in China. In addition, the US Inflation Reduction Act is also luring substantial battery investment towards the USA.

Europe needs to develop its own continental battery supply chain and a domestic manufacturing base for the technologies of the electrified economy, to provide jobs and energy independence for its people while

continuing on its path toward a carbon-neutral economy.

Slovakia is the world's largest auto exporter, per capita. The neighboring Czechia follows it in second position, and three other Central & Eastern European (CEE) countries are among the world's top 10 per capita auto exporters. All of these countries stand to benefit from the development of a European battery industry – and a CEE battery cluster. These are needed to develop local expertise, create local jobs and continue to service the increasingly electric portfolios of the automotive manufacturers (OEMs) which manufacture here.

The Coming EU Battery Regulation

The European Union (EU) recognizes the need for an EU battery industry, and in a very positive development, the institutions recently agreed on a new regulatory framework for batteries that will be produced and sold in the EU.

The new framework will cover the entire life cycle of all types of batteries. Indirectly, it will regulate the mining, refining, and origin of raw materials. It will directly regulate all critical parts of the battery value chain, including assembly and recycling of battery

materials, to ensure that these processes are done sustainably, safely, and in a way that builds up Europe's industrial and manufacturing capacities and strengthens its internal market.

The new law will update the Batteries Directive, which came into law in 2006. As a Regulation, it will be directly legally binding without the need to be transposed into national law. This will make it enter into force far more quickly, simultaneously, and in the same manner throughout the EU.

The EU Battery Regulation will include elements such as:

Extended producer responsibility requirements for the sourcing, processing, and trading of raw materials and secondary raw materials, as well as the assembly of battery cells and packs, to address the associated human rights, labor, and environmental risks

Safety and labeling obligations, including passports (for EV batteries), carbon footprint declarations & QR codes, to provide information specific to that battery, such as its performance, durability, chemistry, and history, and separate collection labels to help consumers recycle them

Circular economy elements such as minimum amounts of recovered and recycled content, which will increase over time, and the requirement that batteries can be removed and replaced

Requirements for end-of-life management to ensure batteries are properly removed, disposed of/given their 2nd life, and raw materials, especially - copper, cobalt, lithium, nickel, and lead - are put back into circulation

Welcome and significant as they are, the recycling requirements in the Battery Regulation are complex, distributed across different actors and will be very challenging to comply with, especially for an industry that doesn't even exist yet. Financing and collection rest with producers – or consortia of producers, possibly even cross-border - but verification and certification with public authorities. The amounts of each element to be recycled - cobalt, copper, lead, nickel, and lithium - are specific and grow over time. It's possible that these explicit percentages will have unintended consequences on still usable batteries. While the goals of the Regulation here are very admirable – reducing waste and creating a circular economy for raw materials - the

extremely prescriptive nature of these requirements for a nascent industry could make it a lot harder to get started.

This complexity is illustrated by the Regulation itself, which sets targets, based on in some cases still-to-be-defined methodologies and procedures in a long list of upcoming delegated acts. While it is common for technical topics to be dealt with in these 'delegated acts' the large number of them on so many topics - again, for a brand-new sector - makes it hard for companies to begin without know what they will say. All of this together, makes compliance with the Battery Regulation seem daunting, especially in the short term.

Why this matters for Slovakia

The area where the greatest need for high-capacity batteries comes from is the electrification of transport. This is especially important for Slovakia, home to four major OEMs (VW, Kia, Stellantis, and JLR), as well as over 300 automotive suppliers. All four OEMs have already launched the production of battery electric and plug-in hybrid vehicles and have been steadily expanding their electrified product

portfolio to almost 20% of all vehicles produced.

Based on relatively conservative modeling assumptions in a joint Study developed by SEVA, Globsec, and Slovakia's Automotive Industry Association (ZAP), the annual demand for batteries by the existing four OEMs in Slovakia will grow to at least 38 GWh in 2030 and 62 GWh in 2035.

Data from the Study:
Slovakia Automotive Industry 2.0: The time is now to
retool for the e-mobility era, March 2022



Forecast for battery demand in Slovakia by existing four OEMs	2030	2035
Total vehicle production	1,000,000	1,000,000
Share of EVs from the entire production	54%	89%
EVs produced	540,000	890,000
Average battery size (kWh)	70	
Total demand for battery capacity (GWh)	38	62

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With new production site of Volvo Cars coming in 2026-27, Slovakia's five OEMs will need at least 80 GWh of annual battery capacity in 2035”



On top of this, Volvo announced plans to build a new factory in Slovakia with a yearly production of 250,000 battery electric vehicles. The total annual demand for the battery capacity in Slovakia may thus grow to a staggering 60 GWh in 2030 and 80 GWh in 2035. Depending on the size, this equals the production capacity of 1 to 2 battery gigafactories.

This is in addition to the vehicle OEMs manufacturing in the Czechia, most

notably Skoda, Hyundai, and Iveco, in Hungary with EV production by Mercedes and Audi, and the electric bus and vans manufacturers in Poland (Solaris, Mercedes) and Hungary (BYD), all within an approximately 500 km radius.

Therefore, Slovakia, and the entire V4 region, have a great interest in developing the battery industry in Europe and their own domestic and regional supply and skill clusters.

State of the Slovak Battery Sector

While Slovakia has no significant mining capacity for battery materials and no operational cell production capacity, there is a large capacity for producing aluminum which supplies the automotive industry. Some gigafactory-scale battery cell plants might soon be located in Slovakia – with InoBat publicly disclosed as the first upcoming project. Unofficially, at least two other battery projects are under discussion

between the potential investors and the government. Furthermore, several companies already do or plan to produce battery packs, battery systems (e.g., sensors, battery cooling), and materials.

Slovakia's public and private entities are involved in battery-related R&D projects and technology development. However, the focus is relatively concentrated on a few areas of expertise:

Current focus of Slovakia's battery R&D

new battery materials and chemistries for 3rd (optimized Li-ion) and 4th battery generation (Li-ion and Li-metal with solid electrolyte)

advanced BMS (battery management systems) and advanced sensors

deployment of artificial intelligence and automation in the recycling process and battery's second-life application

These initiatives are driven mainly by Slovakia's Academy of Sciences, some technical-oriented universities, and a few private companies. A substantial part of this R&D is implemented as part of publicly financed projects, and only a handful of projects are privately driven and funded. As of today, no large multinational enterprise directly localized the R&D capacity in the battery value chain in the country.

In 2021, the Slovak Academy of Sciences founded the National Battery Center (NBC) with key technical universities and industry clusters (including SEVA).

The NBC aims to develop and commercialize battery technologies and systems at the EU Technology Readiness Level 1 to 6.

NBC strives to contribute to the technology transfer between public R&D and private industry. The key objective is to deploy and commercialize battery technologies in the market. The aim of the activities is the real-life testing and validation of results in an industrial environment and the transfer of technologies and intellectual property into industrial deployment.

In other V4 countries, different battery developments are taking place as well. CATL has announced the development of a 100 GWh gigafactory in Debrecen, Hungary, to provide cells for Mercedes, Stellantis, BWM, and VW. This is in addition to BMW's own battery production facility in the same city and the SK ON Hungary facility in Komárom.

Meanwhile, in Poland, the battery cluster is the most developed, with LG Energy currently being the biggest battery cell

plant in Europe and with plans to expand to 115 GW by 2025. The Polish Alternative Fuels Association (PSPA) recently started the first CEE-based European Battery Academy, franchised by EIT InnoEnergy.

However, most of these sites are for cell or pack assembly rather than R&D or innovation work, which is an area where the V4 countries need to do much better to seize the opportunity from the energy transition.

Priorities and next steps

The imminent passage of this new EU Batteries Regulation is very welcome. The rules will build a circular ecosystem for batteries and materials in Europe and establish the legal conditions for a competitive, innovative, high-quality battery market to emerge here. This means more opportunities for that work to be done in each EU country and cluster.

We see many opportunities to enable Slovak companies to build off our existing sectoral strengths into a broader portfolio of companies, servicing more parts of the battery supply chain – which will be very welcome by the EV OEMs working here.

Still, for Slovakia and the countries of CEE, there needs to be more knowledge and awareness of the consequences of this critical regulation. The complexity

of Battery Regulation and its 40+ secondary acts is immense, and more information and education about its requirements and implications will be needed.

What will it mean for how battery cells and packs are assembled now? Where will the material reclamation and recycling be done, and under what conditions, and, in reality, how much material will be recycled?

Policymakers and the industry stakeholders will need to understand better the impact of these changes, to buy-in to this agenda (there are still skeptics and opponents to electrified powertrains in general, throughout the CEE), and then work with companies and regulations to create the enabling conditions and support the businesses operating in these fields.

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At the top of the agenda for SEVA is to work to develop the knowledge and skills to ensure that the R&D for this emerging sector takes place in Slovakia and the CEE. While we have strong assembly and manufacturing skills and companies, we still need more innovation capacity in the battery value chain - this is evident by the work that international companies have done in CEE versus their home countries.

This is primarily a task for our policymakers to prioritize. 2023 is the EU Year of Skills. The Battery agenda for Europe is clear, but it will take lots of ingenuity to achieve the objectives. To encourage this ingenuity, we also need competent, well-trained engineers in our countries. Only in this way will Slovakia, the CEE region, and all of Europe achieve, and benefit from, the goals which the coming Battery Regulation seeks to achieve.

About



The Slovak Electric Vehicle Association (SEVA) is a cluster representing most of the e-mobility ecosystem in Slovakia. Founded in 2012, SEVA represents its members and partners - technology and hardware companies, charging infrastructure operators, the automotive industry, utilities and energy industry players, and others. SEVA is a member of the European Association for Electromobility (AVERE).



The European Association for Electromobility (AVERE) is the association that promotes electromobility and sustainable transport across Europe. The pool of members consists of companies, national associations, and research institutions supporting and encouraging the use of electric vehicles across Europe.

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