



SLOVAK BATTERY ALLIANCE

ENERGY STORAGE AND RENEWABLES



Slovak battery alliance – main activities



- ▶ the Slovak Battery Alliance (SBaA) is an **independent group** composed of legal entities and operate as an industry cluster
- ▶ executive **platform for the cooperation** among the public and private sectors, innovators, the academic community and financial institutions
- ▶ main aim is to participate in the **battery value chain** in Europe.



Slovak battery alliance – main targets

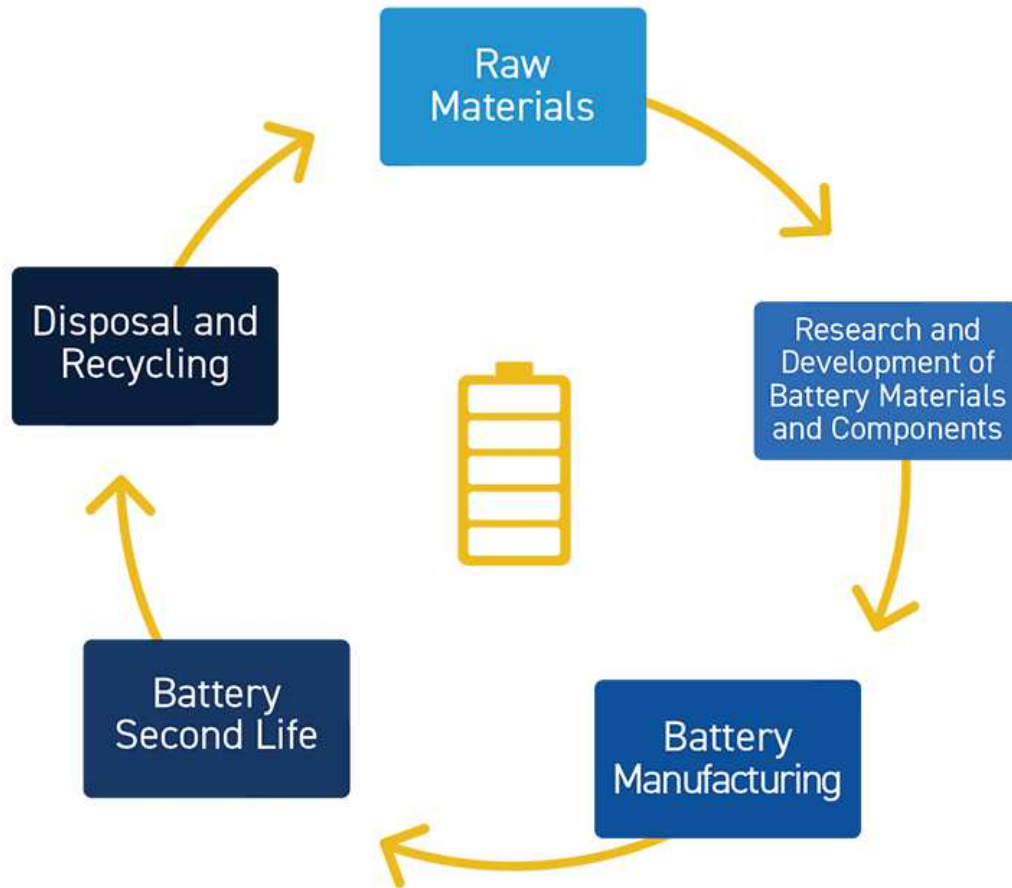


▶ Support of:

- ▶ slovak battery production
- ▶ building complete battery chain in Slovakia starting from mining activities
- ▶ activities leading to R&D of raw materials
- ▶ battery recovery, recycling and second battery life



Slovak Battery Alliance - battery value chain



Slovak battery alliance – members

▶ Founding members:

- ▶ Inobat
- ▶ IPM
- ▶ A.En. Slovensko
- ▶ MSM Holding
- ▶ GreenWay Infrastructure
- ▶ SLOVNAFT
- ▶ Matador Holding
- ▶ SAV - Centre of Excellence for Advanced Materials Application
- ▶ Technical University of Košice

▶ Cooperating entities and new members:

- ▶ SNAP Group
- ▶ UPJŠ Košice
- ▶ RepaNet
- ▶ University of Žilina
- ▶ Slovak University of Technology in Bratislava
- ▶ Slovak University of Agriculture in Nitra



- Total turnover of SBA members in 2018 **over 4,1 billion EUR**
- Over **5100** employees
- **Leading** scientific workforce
- SBA consist of companies with **strong industrial** background in Slovakia

Slovak Battery Alliance - Inobat

- ▶ **Inobat** is one of the founding members of SBA
- ▶ Inobat plans to launch intelligent EV battery with built artificial intelligence
- ▶ batteries will be developed and produced at R&D centre in Voderady next year
- ▶ intelligent batteries will deliver almost 20% more operational range for current e-vehicles
- ▶ They will be customised for any e-vehicle
- ▶ First slovak gigafactory to be in operation in 2025 to serve EU and global market



Activities within EU projects - IPCEI



- ▶ Important Projects of common European Interest (IPCEI) within European Battery Innovation (EuBatIn) currently focused on battery projects
- ▶ 4 Slovak companies active in notification phase within IPCEI project
 - ▶ **ZTS Výskum a vývoj**
 - ▶ spent-battery disassembly, assembly, recovering and development of BMS for 2nd life batteries (total eligible costs 36,5 mil. €)
 - ▶ **Energo-Aqua**
 - ▶ development of second-life battery storage systems including EMS (40,26 mil. €)
 - ▶ **Inobat Auto**
 - ▶ development of pouch cells with advanced liquid-state electrolyte with NMC 811 cathode, customer driver pouch cells development (51,61 mil. €)
 - ▶ **Inobat Energy**
 - ▶ development of iron redox flow battery systems (31,89 mil. €)

Slovak battery alliance – 3 main pillars



Electromobility



Energy storage



Hydrogen technologies



Slovak battery alliance – 3 main pillars



Electromobility



Energy storage



Hydrogen technologies



Slovak battery alliance – energy storage



- ▶ **Battery energy storage systems** are currently the most promising storage technology among others
- ▶ **Li-ion** and **LiFePO** are at present market leading chemistries
- ▶ Trend of green energy sources in EU also counts on economic and reliable **energy storage connected with renewable energy sources**
- ▶ Batteries can provide various **applications** with additional value for end customers as well as grid and market



Slovak battery alliance – energy storage



- ▶ Main battery storage applications are following:
 - ▶ **Integration with renewables** – focused on increase of local and effective usage of solar/wind or other renewable energy
 - ▶ **Ancillary services** – focused on primary/secondary regulation, support of grid parameters and quality, reduction of asymmetry
 - ▶ **Back-up source** – focused on backup power supply during blackouts
 - ▶ **Reduction of costs for consumers** – focused on reduction of reserved capacity (peak shaving), reactive power compensation, price arbitrage etc.
 - ▶ **Reducing cost of deviations** – focused on minimizing difference between purchased and consumed electricity for trading



Slovak battery alliance – energy storage

▶ Integration with renewables

- ▶ Plays an important role for **further development** of renewable capacity across Europe
- ▶ Battery storage can **smooth the power curve** of intermittent renewables, thus decrease stress for electricity grid and improve production prediction
- ▶ Accumulated electricity during **peak production** hours (for example of solar panels during noon) can cover power consumption at the evening
- ▶ Battery storage can significantly increase number **local renewable sources and communities**
- ▶ Providing more stable and balanced electricity supply



Battery energy storage projects



- ▶ **Battery storage system in Senec, SK**
 - ▶ 430 kWh
 - ▶ Located in warehouse of Gebrüder Weiss company in industry park
 - ▶ Various applications – mainly price arbitrage, back-up source, optimization of reserved capacity and reactive power

- ▶ **Battery storage system in Bachledova dolina, SK**
 - ▶ 630 kW / 1000 kWh
 - ▶ Remote area in forrest
 - ▶ Mainly as the back-up source and compensation of voltage deviations and overall grid quality



Battery energy storage projects

- ▶ **Battery storage system** in Dubnica nad Váhom, SK
 - ▶ **55 kW / 120 kWh** li-ion storage
 - ▶ Manufacturing company with photovoltaic system on the roof
 - ▶ Pilot installation focused on testing various applications:
 - ▶ Integration with PV system, increase self-consumption
 - ▶ Optimization of reserved capacity and reactive power
 - ▶ Cooperation within the balance group
 - ▶ Ancillary services (primary regulation)
 - ▶ Back-up source
 - ▶ Combinations of mentioned applications
 - ▶ Supplier: **A.EN**



THANK YOU

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