

Battery Innovation System of USA



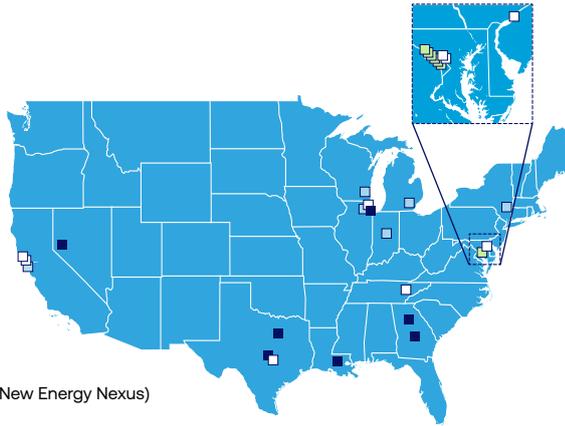
Main Players

POLITICAL ORGANISATIONS

- Federal Consortium for Advanced Batteries (FCAB): Collaboration of DOE, DOC, DOS and DOD
- Funding: Department of Energy (DOE)
 - Office of Energy Efficiency and Renewable Energy (EERE)
 - Vehicle Technologies Office (VTO)
 - Advanced Research Projects Agency-Energy (ARPA-E)
 - Office of Basic Energy Sciences (BES)
 - Loan Programs Office (LPO)
 - Office of Electricity (OE)

INDUSTRY ASSOCIATIONS

- Li-Bridge Alliance (NAATBatt International / NY-BEST / New Energy Nexus)
- United States Advanced Battery Consortium (USABC)
- Responsible Battery Coalition



RESEARCH ORGANISATIONS

- National Laboratories:
 - Joint Center for Energy Storage Research (JCESR)
 - Battery500 Consortium
 - Berkeley Lab Energy Storage Center
 - Oak Ridge National Laboratory (ORNL)
 - ReCell Center
- Universities:
 - UT Austin
 - Drexel University
 - UC Berkeley

COMPANIES

- Albemarle (Refining)
- BlueOvalSK (Batteries)
- Ecobat (Recycling)
- GM General Motors (Batteries)
- SK Battery America (Batteries)
- Tesla (Batteries)
- Redwood Materials (Recycling)

Strategic Documents



Policy Goals

2030*

- **Domestic supply chain:** A secure domestic battery materials and technology supply chain that supports long-term US economic competitiveness and job creation, enables decarbonisation, meets national security requirements, and is capable of meeting its own demand for energy storage capacities
- **Critical materials:** Independence on critical materials such as cobalt, nickel, and graphite, reducing battery supply chain vulnerability
- **Recycling:** Re-introducing 90% of key materials into the battery supply chain
- **KPIs for battery technologies** (incl. solid-state and Li-metal): Achieve a production cell cost by 50% to < \$60/kWh, 500 Wh/kg, 1,000 charge/discharge cycles and cobalt- and nickel-free by 2030 (almost no specific KPIs on energy densities and technologies)
- **Carbon emissions** reduced by 40%
- **Electrified vehicles:** 30% ZEV sales for all new medium- and heavy-duty commercial vehicles

2050*

- **Climate neutrality**
- **Electrified vehicles:** 100% ZEV sales for all new medium- and heavy-duty commercial vehicles

* Under Trump administration focus on fossil fuels and depriorisation of net-zero emission goals

Country Specific Information

Under the Biden Administration, the US were providing large-scale investments in the development of the battery value chain. The main funding instruments were the Infrastructure Investment and Jobs Act (IIJA) as well as the Inflation Reduction Act (IRA). These instruments aimed at creating a sustainable and competitive battery value chain. They were motivated not only by economics, but also by national defence, which requires reliable, secure and advanced energy storage technologies. Regarding novel cell chemistries, the US has adopted a more technology-open strategy in its R&D funding

programmes. Directly after the inauguration of Donald Trump, a series of executive orders were signed, marking a departure from net-zero emission goals and clean energy initiatives and prioritising fossil fuels and rolling back environmental regulations.

Research Priorities

First-generation or advanced lithium-ion batteries
 + elimination of cobalt and nickel in Li-ion battery cathodes
 + aqueous batteries (alternative batteries such as a Fe-air battery), non-aqueous batteries, solid-state batteries and multifunctional batteries
 + high-performance separators and electrodes built with solid-ion-conductors for LIB and fuel cell use
 + dry coating of electrodes + sodium-ion batteries

Main Funding Instruments

TIME	FUND	FOCUS	BUDGET
2019-2023 (ongoing)	Continuous R&D funding (DOE, VTO)	Grants for R&D, demonstration, and deployment of new, efficient, and clean mobility options that are affordable for all Americans	USD 601 million
2021-ongoing	Electric drive vehicle battery recycling and second-life applications program (DOE, EERE)	Research, development, and demonstration program for electric drive vehicle battery recycling and second-life applications	USD 200 million
2022-ongoing	Battery Materials Processing, Manufacturing and Recycling (DOE, MESC)	Investments in selected projects for battery manufacturing, processing and recycling (funding related to IIJA)	Up to USD 16 billion
2024-ongoing	Battery and Critical Mineral Recycling (DOE, MESC)	Grants for R&D and demonstration projects to create innovative and practical approaches to increase the reuse and recycling of batteries (funding related to IIJA)	USD 125 million
2023-2032	Advanced Manufacturing Production Credit (Internal Revenue Service and Department of Treasury)	Tax credits for production of electrode active materials, cells and modules (funding related to IRA)	Estimated up to USD 197 bill. till 2032
2007-ongoing	Advanced Technology Vehicles Manufacturing Loan Program	Direct loans to manufacturers of eligible advanced technology vehicles or of qualifying components and critical materials projects. Recently upgraded by IRA by USD 3 billion (EUR 2.7 billion).	Loans up to USD 40 billion

