

Battery Innovation System of South Korea



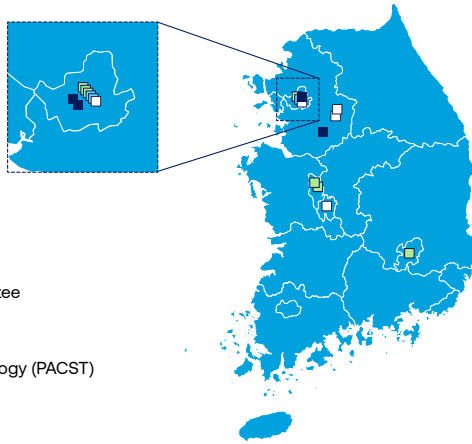
Main Players

POLITICAL ORGANISATIONS

- Ministry of Trade, Industry, and Energy (MOTIE)
 - Korea Energy Technology Evaluation and Planning (KETEP)
 - Korea Evaluation Institute of Industrial Technology (KEIT)
- Ministry of Science and ICT (MSIT)
- President's Office and Presidential Transition Committee

INDUSTRY ASSOCIATIONS

- Presidential Advisory Council on Science and Technology (PACST)
- Korean Battery Industry Association (KBIA)
- Battery R&D Association of Korea (KORBA)



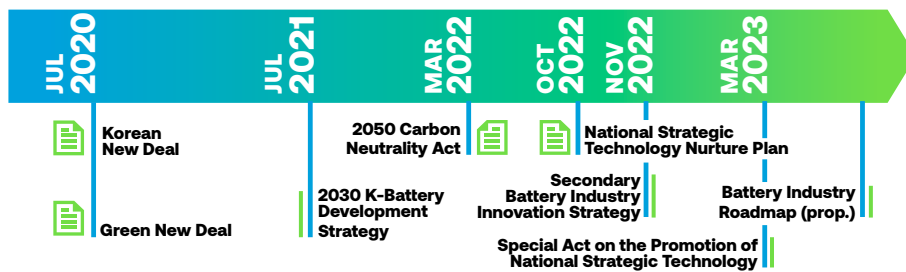
RESEARCH ORGANISATIONS

- Korea Institute of Science and Technology (KIST)
- Samsung Advanced Institute of Technology (SAIT)
- Korea Electronics Technology Institute (KETI)
- Electronics and Telecommunications Research Institute (ETRI)

COMPANIES

- These three entities invested in the K-battery-programme:
- LG Energy Solution (lithium-sulfur batteries, all-solid-state batteries)
 - Samsung SDI (cobalt-free nickel-manganese batteries)
 - SK Innovation

Strategic Documents



Policy Goals

2025–2028

- Second life:** Create a 2.2GWh public ESS market to expand demand for second use batteries
- Recycling:** Cobalt sulfate – 22.000 tons/year, nickel sulfate – 62.500 tons/year, manganese sulfate – 7.100 tons/year, lithium hydroxide – 26.800 tons/year
- Commercialisation of next-generation batteries:** lithium-sulfur, solid-state, and lithium-metal batteries by 2025, 2027, 2028, respectively

2030

- World's leadership:** Become the undisputed global leader for next-generation secondary batteries
- Sales:** Batteries – KRW 166 trillion (40% of the global market), materials/parts/equipment – KRW 60 trillion (20% of the global market), battery exports – USD 20 billion
- Recycling:** cobalt sulfate – 32.300 tons/year, nickel sulfate – 122.500 tons/year, manganese sulfate – 10.800 tons/year, lithium hydroxide – 26.800 tons/year
- GHG emissions** reduced by 40% below 2018 levels
- Electrified vehicles:** 1.8 million FCEVs on the road

2050

- Carbon neutrality**
- Electrified vehicles:** 100% emission-free vehicles

Country Specific Information

South Korea is the centre of global secondary battery R&D and a leading manufacturing base, but it is still necessary to ensure a stable supply chain and core competencies. The next ten years will be crucial for the development of next-generation secondary batteries, such as all-solid batteries. Battery policy or programmes are set by the central government and the Korean President, who is the ultimate authority on research matters. However, industry is strongly involved in the decision-making process and investment measures. The level of battery manufacturing technology, such as energy density, is currently similar in China, South Korea and Japan, but Korea has a slight advantage in productivity (quality control level). On the other hand, South Korea has a weak domestic materials ecosystem and is highly dependent on imports. Therefore, it is

necessary to diversify the supply chain and expand the domestic production base in order to achieve the goal of global leadership. The K-Battery development strategy shows a clear R&D focus on commercialising three types of advanced batteries: solid-state, lithium-sulfur and lithium-metal batteries by 2027, 2025 and 2028 respectively.

Research Priorities

+ All-solid-state, lithium-sulfur and lithium-metal batteries + next-generation element technology to increase ion conductivity, lifespan, safety, cell performance + lithium metal-air batteries + innovative technologies (e.g. organic matter) + high nickel cathode and silicon anode materials + single-walled carbon nanotube + intelligent batteries (self-detection, suppression and healing of risk) + streamlining of the drying process + cutting-edge technologies such as AI and digital twins + nanocoating for silicon anode materials

Funding Instruments

TIME	FUND	FOCUS	BUDGET
2020–2025	Korean New Deal – the pillar Green New Deal – upgraded in 2021 (Green New Deal 2.0)	Strengthening climate action and realize a green economy. Focus on green infrastructures, renewable energy, and fostering green industry.	Total for Korean New Deal: KRW 220 trillion (KRW 73,4+ trillion for the pillar Green New Deal)
2020	Tax Exemption Restriction Act	Key battery technology recognised as a national strategic technology → tax support up to 50% for R&D expenditures and up to 20% for facility investment (machines, infrastructure, laboratories, etc.)	KRW 17.1 billion
	Incentive Programmes of Export-Import Bank of Korea and Korea Development Bank	High safety, long cycle life, low-cost LIB, solid state LIB as well as metal-sulfur based batteries for energy storage and smart grid	KRW 1.5 trillion
2023–2030	Public-private joint R&D innovation fund (MOTIE + Battery Industry + private investment sector)	Key industry sectors, including semiconductors, secondary batteries and nuclear power generation (40 R&D projects in 11 major industry fields); development and early commercialisation of advanced battery technologies, including solid-state batteries	KRW 13.5 trillion (KRW 6.2 trillion by 2027, KRW 7.3 trillion by 2030) industry: KRW 20.5 trill.