

Sustainable Mobility

1. Short Description

Innovative solutions to increase the adoption of electric passenger vehicles (cars, buses, trams) and sustainable public transport. Focus topics include battery technologies optimizing cost, performance, safety or critical material use, battery traceability & recycling, battery management systems, photovoltaic solutions, charging infrastructure (incl. inductive, fast and slow charging), energy-saving drivetrains and vehicle designs.

2. The Problem

The transportation sector is responsible for about a quarter of the EU's total greenhouse gas (GHG) emissions and is the leading contributor for nitrogen oxide emissions. For most modes of transport, batteries are the best method to electrify and decarbonize.

However, there are a few challenges that need to be addressed for large scale adoption of batteries for Electric Vehicles in Europe:

- Production costs.
- Dependence on critical and scarce minerals.
- Energy density and limited vehicle range, especially for aviation and maritime.
- Fire-safety.
- Lifetime.
- Recycling and sustainable production.

3. Deeptech and Digital Innovation Potential

A wide range of Deeptech and Digital innovations will be required to address the challenges in transitioning to electric mobility. These include, but are not restricted to:

- Novel battery chemistries (Sodium-ion, Sulphur, LFP, Silicon anodes, Solid state electrolytes etc)
- Optimised battery/EV architectures (energy saving drivetrains, etc).
- Battery Management and Cooling Systems.
- Fire protection - new materials (e.g. aerogels, ceramics, foams, coatings etc.)
- Charging infrastructure esp. fast charging.
- Innovative processes to reduce battery production costs and emissions.
- Recycling of battery and EV materials.
- Supercapacitor-battery hybrid systems.

4. Sustainability and Sovereignty Impact Potential for Europe

Electrification of mobility is not only a key component of achieving a Net Zero future for the world, but also reduces Europe's energy dependence on foreign parties. Developing a fully electric local mobility market is essential for:

- Allowing sovereignty for Europe by reducing imports of fossil fuels.
- Reducing dependence on critical raw materials.
- Making full use of increasing renewable energy in Europe.
- Realising the ambitions of REPowerEU and the Renewable Energy Directive, as well as various EV adoption regulations that have passed.
- Reduce European carbon emissions and air pollution (NO_x, SO_x, etc).

5. European Market Potential

The race to electrify transportation is underway with China, Europe and the US leading the way. Europe needs to strongly compete with these countries in the production of EVs and batteries in order to prevent strategically disadvantageous dependence.

Worldwide, there were ten million electric cars on the world's roads at the end of 2020, following a decade of rapid growth. Electric car registrations increased by 41 per cent in 2020, despite the pandemic-related worldwide downturn in car sales in which global car sales dropped 16 per cent. Around three million electric cars were sold globally (a 4.6 per cent sales share), and Europe overtook China as the world's largest electric vehicle (EV) market for the first time.

Many companies have already begun ramping up their production in Europe. Tesla has set up a Gigafactory in Berlin which is now producing EVs on a large scale. Volvo Cars has announced that it will invest 860M euros in its Torslanda manufacturing plant in Sweden, in preparation for the production of that next generation of fully electric cars. Volvo Cars and Northvolt, the leading battery cell company in Europe, also announced an investment of SEK 30 billion in the development and manufacturing of high-quality, tailor-made batteries for the next generation of pure electric Volvo models.

Many Investment Funds are focusing on electrification and batteries projects. Examples are the Climate Investment Fund (CIF) expecting to co-invest over 10 B USD, Baseload Capital (with Breakthrough Energy Ventures as one of its LPs), ESFC.