EUCAR PERSPECTIVE ON SUSTAINABLE MOBILITY

INTRODUCTION

EUCAR is fully committed to achieving the Green Deal target of a climate-neutral continent by 2050. Our highest priority is to mitigate the impacts of climate change by reducing greenhouse gas emissions from our products and operations.

We develop sustainable mobility solutions, by means of energy and resource-efficient technologies that are carbon-neutral over the entire life cycle and contribute to an enhanced quality of life for European citizens.

We develop processes that contribute to a circular economy while reducing the environmental footprint along the value chain.

We constantly innovate mobility solutions and specifically the propulsion systems using today's and tomorrow's renewable energy carriers to be globally competitive, while ensuring European sovereignty and resilient supply chains.

KEY STATEMENTS

Energy System

⇒ **Vehicles in carbon-neutral mobility and their sustainable propulsion systems will have to use renewable energy sources (RES). For achieving the global GHG reduction targets all aspects regarding the energy and mobility system needs (e.g. energy production, storage and transportation) have to be considered over the entire life cycle.**

- The main challenge for the energy system is to transform from fossil to renewable energy in all sectors. This transformation has many facets since the production of renewables is often decoupled from consumption in time and location. Hence, large-scale storage and transportation of energy in an efficient way is important, in addition to energy efficiency.
- Resource efficiency is equally important for sustainability, as demand for green tech will rapidly increase and supply will lag behind. The potential gap will affect affordability and market uptake. In order to achieve a fast and affordable transition, all available technologies will play a role and shall be employed in a resource-efficient manner.
- Before renewable energy is used (i.e. transformed into kinetic energy or heat) we need to have the capability to store and transport it which comes at the cost of resources and energy as losses. Different energy carriers have different needs for transport (e.g. grid, by vehicles) and storage.
- As a consequence, energy and resource-efficient solutions for sustainable use, consider not only the volatile availability of RES and the overall system efficiency but also the energy and resources needed for storage and transportation and the overall product Life Cycle Assessment (LCA).

Sustainable mobility needs LCA

⇒ **Future sustainable mobility solutions will further reduce greenhouse gas emissions towards Net Zero. To understand the real climate impact of technologies and energy pathways, we consider the entire life cycle.**

- We develop mobility solutions for an enhanced quality of life, with energy and resource-efficient technologies that are carbon-neutral over the entire life cycle.
- Only a holistic understanding of all system aspects, including emissions from propulsion, energy production and distribution, and vehicle manufacturing will allow for assessing the real climate impact of technology choices.
- LCA offers an established and globally standardized methodology to help quantify and compare the environmental impact of products, processes, and services along the supply chain in a transparent way. However, depending on the goal and scope, different models and data are used to produce different results. Background knowledge of the data and methodology is necessary to correctly understand and apply vehicle LCA.
- The performance and sustainability depend not only on all vehicle components and parts but on the full vehicle integration. We improve the component integration at the vehicle level to provide even more energy-efficient and sustainable solutions.
- Finally, the real climate impact depends on the adoption of sustainable mobility solutions at a large scale by addressing affordability.

Zero-emission vehicle technologies

⇒ **The future zero emissions vehicle solutions are already rapidly increasing. However, large-scale adoption of sustainable mobility solutions depends on user experience and meeting customers' expectations. We advance zero-emission technologies for vehicles (BEV, FCEV) to increase performance and sustainability.**

- We improve battery electric vehicle performance regarding range, durability, affordability and safety, by innovating sustainable battery technologies and management systems with present and future cell chemistries.
- For a smooth and effortless user experience, regarding the availability and convenience of charging we innovate and harmonise charging solutions to better integrate vehicles into the grid, enabling quick, smart and affordable recharging.
- We develop new FCEV technologies and solutions for increasing the sustainability, affordability, reliability and safety of fuel cell systems and hydrogen storage.
- All technologies and materials used in BEVs and FCEVs have to meet regulatory requirements e.g. regarding substance restrictions (REACH regulation). We innovate technologies and substitute materials to reduce dependency on critical raw materials and increase resilience, affordability and sustainability.

Circular Economy

⇒ **Sustainable mobility requires processes that contribute to a circular economy while reducing waste and the environmental footprint along the value chain. We develop the necessary technologies and processes that contribute to the circular economy in the automotive industry.**

- We develop technologies and processes for the efficient use of our resources, boosting material recycling quotas, increasing secondary material use, and decreasing the product carbon footprint. Return facilities (especially for end-of-life EVs) are key for global recycling loops across markets and regions. Establishing closed-loop recycling, especially for critical raw materials (e.g. Li, Ni, Mn, Co, Mg, Gr) is a geopolitical necessity.
- Research is needed to identify feasible processes (e.g. separating, sorting and tracing) for polymers, electronics and electronic components as their recycled material contents are crucial in the future.
- The main goal for materials is the decoupling from fossil sources, based on new process technologies, recycled material, bio-based sources, or even carbon capture. Due to rising global demand for metals, decoupling from mining is a major sustainability challenge. However, due to the large metal content in vehicles increasing the recycling rate is a necessity.
- Repairability and upgradability of vehicles by means of refurbishment, and repurposing parts and components will increase their lifetime and sustainability.
- The lifetime and durability of products, in a circular economy, are affected by repairability and upgradability through means of refurbishment and repurposing.
- Digital Product Passports, digital twins and other digital tools will play a crucial role in advancing the circular economy in the automotive industry.

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ABOUT EUCAR

EUCAR (European Council for Automotive R&D, www.eucar.be) is the association for collaborative research and innovation of the major automobile manufacturers in Europe. These manufacturers contribute to sustainable mobility and a competitive European industry, investing more than €62bn per year in research and development. The industry's investments are leveraged by the collaborative work performed with the support of the European Framework Programmes, currently Horizon Europe. The EUCAR Council comprises the heads of research and advanced development of the member companies