

## **EUCAR Statement to the European Commission on Clean and Energy Efficient Vehicles**

EUCAR is the European Council for Automotive R&D from the major European passenger car and commercial vehicle manufacturers. EUCAR facilitates and coordinates pre-competitive research and development projects and participates in a wide range of collaborative European R&D programmes. The European automobile manufacturers are the largest private investors in R&D in Europe with around EUR 20 billion investments per annum, or 4% of turnover. EUCAR members are BMW, DAF, Daimler, Fiat, Ford Europe, GM/Opel, Porsche, PSA Peugeot Citroën, Renault, Scania, Volkswagen Group and Volvo. EUCAR is closely connected to ACEA, the European Automobile Manufacturers Association.

The EUCAR statement detailed below is structured to address the current status and potential of automotive technological research, the framework conditions for performing that research and the resources and further actions needed to facilitate effective research. Where the text can provide answers to the Commission's questions, this is indicated by the insertion of the questions in the text at the appropriate points. The questions are therefore not in their original order.

### **2. What is the potential of different clean automotive propulsion technologies (improved fuel efficiency, hybridisation and alternative powertrains) for contributing to decarbonisation objective in the short, medium and long term?**

**What is the decarbonisation potential of the complementary measures in the short, medium and long term (e.g. guidelines on eco-driving, application of Intelligent Transport Systems) and how reliable are these potentials?**

### **4. What are the state of play and the future scenarios of technological developments in alternative powertrains (electric and hydrogen) and their market penetration? What are major risks and opportunities associated for different stakeholders? What will be the economic, societal, employment and environmental impacts brought by these developments?**

#### **Research ideas for future sustainable road transport**

EUCAR's members are currently performing research on many technologies, which will enable clean and efficient vehicles in the medium and long term future. These include:

- Propulsion technologies for passenger and goods vehicles
  - Advanced internal combustion engines, as the dominant current technology, still possess substantial potential for efficiency improvement. This includes diesel and gasoline engines as well as advanced combustion concepts.
  - Hybrid vehicles include an electric motor integrated into the ICE drivetrain. They can be micro (stop-start), mild or full hybrid, with or without all-electric drive capability.
  - Alternative fuels such as natural gas (methane, including biomethane), methane-hydrogen blends, or liquid petroleum gas yield reduced CO<sub>2</sub> emissions compared to conventional fuels and dedicated engines can be tuned to optimise the combustion process; furthermore, future generations of biofuels, including bioethanol, hydro-treated vegetable oil and biomass-to-liquid promise to reduce well-to-wheel CO<sub>2</sub> emissions substantially. The

implications of alternative fuels on engine performance and operation, and the potential for offering flex-fuel solutions, are being researched intensively.

- Electric vehicles (EVs) include battery EVs, which are starting to become viable in restricted usage profiles and are expected to expand their scope of viability as the technologies for on-board energy storage evolve, as well as variants such as plug-in hybrids and extended range EVs. EVs offer the potential for zero-emission driving based on low-carbon electricity, for which advances in battery technology through further research are necessary to reduce cost and increase vehicle performance, utility and range.
  - Hydrogen fuel-cell EVs ultimately promise the same utility and range as current vehicles. Research is underway to improve fuel cell cost and performance.
- ❑ Associated technologies contribute substantially to efficiency
- Advanced materials and structures materials enable new efficient vehicle design concepts. In particular they offer lightweight vehicle structures, reducing overall vehicle weight and therefore fuel consumption.
  - Intelligent transport systems integrate the vehicle with cooperative infrastructures, improving information and traffic flow, thereby reducing congestion. Collaboration between many research stakeholders is necessary. Autonomous and semi-autonomous driving concepts are also under investigation as a branch of this topic.
  - Efficient interfaces between different transport vehicles and modes allow mobility and transport users to select the most efficient method to complete their overall journey. Again these concepts require broad collaboration between stakeholders.
  - Improved logistics reduce unnecessary freight journeys

New ideas are being investigated in all these technological areas. This is a parallel development of the full range of vehicle technology options, including propulsion systems, fuels and materials, leading to flexibility in the use of fuels and to the continued electrification of the vehicle from hybrids through to fuel cells and electric vehicles.

In addition to their own proprietary technological research and development, EUCAR's members are currently working on collaborative projects in all these areas of research.

### **1. Should the vision agreed in the CARS 21 mid-term review be now adjusted? (i.e. 2020 perspective of improved combustion engine's market dominance combined with growing market penetration of electric and hydrogen vehicles and hybridisation conceived as the bridging technology and 2050 perspective of transport decarbonisation)**

#### **Ideas need time to become viable products**

For the foreseeable future, meaning well beyond 2020, the internal combustion engine (ICE) will remain the dominant propulsion system for road vehicles. In the case of long distance heavy goods vehicles, there is currently no known viable alternative to the ICE due to range and performance requirements. For passenger cars, the ICE can be expected to be the dominant power source. Efficient ICEs will in fact remain the sole power source for a large proportion of vehicles. For an increasing share of passenger and light goods vehicles, the ICE will be combined with an electric motor in a hybrid vehicle, ranging from micro to plug-in versions.

Pure battery electric vehicles and hydrogen fuel cell vehicles are advancing in terms of utility and cost. The technologies available will enable a full spectrum of combinations of conventional and electric drive, from pure ICE vehicles to pure electric.

Continued research into all these technologies is therefore necessary.

Time is necessary to bring the research ideas to a stage where they can be exploited in the market. Research on new technologies being performed today may deliver technologies which achieve market launch around 2020. Substantial market penetration of these technologies, if they prove competitive, can then be expected around 2030 or later.

In addition to time, parallel priorities in the research and development of vehicles have an influence on the effectiveness of efficiency technologies and the ability of manufacturers to invest in them. In particular, affordability, competitiveness and safety of clean and energy efficient vehicles are prerequisites for their penetration in the market:

- Efficient manufacturing techniques are a further priority area of research and new ideas in this area will be needed to support the future affordability of clean and energy efficient vehicles, to ensure that consumers can afford them.
- Passive, active and cooperative safety systems are an essential area of research. In some cases, safety and vehicle efficiency are competing objectives (for example more safety equipment can mean heavier vehicles and higher fuel consumption). Cooperative safety systems, as an element of an intelligent transport system, can however be complementary to enhanced efficiency.
- Research resources must therefore be directed towards a number of parallel technological objectives.

The framework conditions for the development and penetration of new technologies detailed above remain consistent with the existing CARS 21 vision, representing an evolution in time of that vision, but the vision itself remains valid.

### **5. How can a trade-off situation be avoided where electrifying the power train would reduce or reverse improvements made in conventional technologies in the framework of existing and upcoming legislation on the CO<sub>2</sub> emissions of road vehicles?**

The nature of research is to investigate possibilities offered by new ideas. It is therefore necessary to set the right conditions to allow these ideas to flourish. A prerequisite is to avoid preordaining the results of research and prescribing specific solutions, which in the automotive sector means remaining technology neutral. The priority goals should be established, whether these be environmental, economic, relating to safety or to society. Scientists and engineers will then be engaged in investigating solutions to meet the objectives.

It must also be recognised that there is an inherent risk involved in research into new technologies. Some ideas may simply not make it to market, sinking the original investment with no prospect of a return.

### **6. What actions should be best taken at regional/ national /European or international level to promote technology development and market uptake of alternative powertrains (electric and hydrogen)?**

**(This answer refers to all technologies with potential for making cleaner, more energy efficient vehicles)**

### **Research requires resources**

The automotive industry is the largest EU investor in R&D, spending approximately €26bn per year. It is also a highly competitive industry and this competitiveness which spurs our engineers to develop new processes and technologies to make ever more accomplished vehicles that customers can afford.

As well as reaping the benefits of competition, we must also take advantage of collaboration where this can add value. Research is enhanced through collaboration in the pre-competitive domain, where the foundation for new technological development can be established and shared between participants. This allows a wider exploitation of the results of research, which can be implemented by manufacturers to make competitive products, providing a broad gain for those manufacturers and their customers.

This is the rationale behind the European automotive industry's participation in the European Union Framework Programmes for research. The current Seventh Framework Programme includes the European Green Car Initiative and makes public funding available for collaborative research into vehicle and mobility technologies. National research programmes perform a similar function in the EU member states.

The public funding made available by these research programmes helps to mitigate the investment risk inherent in development of new technologies. EUCAR's members typically receive 50% of the funding for EU Framework Programme projects and have to match this with their own funds.

It is important to enhance the potential of the EU research programme by removing any barriers which may hinder companies and institutes in taking part. Improvements in administrative procedures have been made by the Commission in recent years. However, the administrative burdens involved in applying for and managing projects in the Framework Programmes are still substantial and for some of our members represent a solid barrier to participation.

### **Societal demands on road vehicles necessitate support for research**

The demands of society for continued mobility, both of people and goods, and therefore the projection of these demands on the road transport system and automotive vehicles are substantial. These demands are economic, societal and environmental and meeting them requires ideas to be researched, developed, made viable and then marketed successfully.

With these great demands, EU policy should therefore be ready to support their fulfilment. In particular, policy should ensure sufficient support for automotive research. This must ensure favourable conditions for private investment in research and development by companies and institutes of all types. Further, publicly funded programmes should be enabled to provide substantial and effective support for collaborative automotive research, through sufficient funding levels and low administrative burdens.

In particular, road transport and automotive research should be set as a priority theme in the Eighth Research Framework Programme.