ERTRAC - European Road Transport Research Advisory Council

Position Paper - December 2021

Technology and Research Perspective on the "Fit for 55" Package Proposal

In its Strategic Research Agenda (SRA), the European Road Transport Research Advisory Council (ERTRAC) has committed to the objective of a carbon-neutral road transport system by 2050. Therefore, we support ambitious measures to reach this objective. Carbon-neutrality needs to be achieved with sustainable system solutions, meaning that all three aspects of sustainability (environmental, economic and social) must be addressed together. When looking at the Fit for 55 Proposal from the European Commission, from a technology perspective, ERTRAC identifies a number of key research and development efforts that need to be addressed to achieve the ultimate objective of carbon-neutrality in time. In order to tackle the climate change challenge as quickly and efficiently as possible, Europe needs Research and Development (R&D) on all technologies that provide decarbonisation benefits (net and absolute) in the short and medium term.

1. Carbon-neutrality needs to be addressed from a life-cycle perspective with continuous research efforts

The ultimate goal for road transport is carbon-neutrality. The Fit for 55 Proposal includes a "zero tailpipe emission" target from 2035 onwards: in practice, this reduces the technical solutions for road vehicles to only Battery Electric Vehicles (BEV) and Fuel Cell Electric Vehicles (FCEV). These technologies will be the most important contributors for carbon-neutrality in road transport, they must indeed be promoted and pushed forward as much as possible. But for some use cases, additional technologies will be needed in terms of functionality, system cost and sustainability. Research efforts should continue to look at different technologies, with a system approach and from a life-cycle perspective, whilst retaining the overall objective of carbon-neutrality.

2. For rural and long-distance transport, carbon-neutrality might be more relevant than zero tailpipe emission

As highlighted in the ERTRAC SRA, it is important to take a system approach, which includes looking at the vehicle and energy supply together, assessing the situation in the short, medium and long-terms. We support the target of zero tailpipe emission within urban areas, because of the air quality benefits in addition to decarbonisation. To meet the mobility needs of citizens living in less densely populated areas and for long-distance trips in regions less equipped with suitable energy infrastructures, we believe that targeting carbon-neutrality might be more appropriate from a Well-to-Wheel perspective, enabling the usage of renewable, carbon-neutral, chemical energy carriers, such as advanced bio-fuels, e-fuels or the direct use of hydrogen in engines. This is an important question to be addressed by research.

3. Alternative fuelling and charging infrastructures are absolutely key

Besides the cost of the vehicle, an important bottleneck for the mass market uptake of BEV is the charging infrastructure. Consumers will buy a BEV only if they have sufficient charging opportunities at home, at work and at public locations (e.g. road-side). Fast charging on highways is needed for long distance trips. Whilst this charging infrastructure must be deployed as quickly as possible, and we welcome the policy support to push objectives forward, it still has many Research and Innovation (R&I) challenges: for optimised deployment, accounting for specific user needs and the possibilities of the grid, incorporating fast charging needs and battery capabilities, the option of electrified road systems etc. The current deployment objectives for the charging infrastructure are, most likely, by far not ambitious enough to reach the mobility needs of citizens and businesses. The same challenge

applies to the availability of hydrogen for FCEV. Concepts and targets for charging and fuelling options should be further assessed, with a goal that the availability matches the user needs, as well as taking into account public authority priorities and concerns in the field of, for example, the use and quality of public space.

4. Supply chain carbon footprint and sourcing risks for Europe

There are very important R&I challenges related to assessing and improving the carbon footprint of the supply chains: climate change objectives will not be reached without looking carefully from this perspective, which is not European but global, as many materials and components are sourced from outside of the European Union. The supply of materials and components, in the required quantity and timing, will have an influence on the cost and availability of vehicles for consumers; it will impact the mass market deployment of BEV and FCEV within the next two decades. Raw materials for batteries, fuel cells and motors will be subject to international competition, in a period of very high demand growth, which is likely to bring market disruptions and shortages. This is particularly true since sectors other than transport will seek the same materials[1]. Issues of security of supply and foreign dependency for critical raw materials and components will increase and, therefore, must be addressed. Taking a life-cycle perspective to decarbonisation, the carbon footprint of the materials extraction and processing, as well as the environmental damages of mining, must be assessed.

5. Diversification: energy imports might be needed to complement EU renewable electricity

Whilst not explicitly part of the Fit for 55 Proposal, implicitly, for road transport, there are aspects related to complementary energy imports. By 2050, as evaluated in the ERTRAC CO2 Study, road transport could require a share of around 50% of the total electricity produced in the EU-28 in 2019. Yet, at the same time, all other major industrial sectors (chemistry, steel, heating etc.) will need to take a similar approach of decarbonisation, requiring renewable electricity. It is probably unrealistic that all these electricity needs can be satisfied within Europe in a renewable and sustainable way, in particular within a short timeframe and taking into account the necessary infrastructure investments. Therefore, we should assess the need for imports of renewable energies to Europe. The production of renewable fuels needs renewable electricity: this can be produced in many regions of the world but in some it can be produced much more abundantly, efficiently and economically, e.g. the equivalent solar panel or a wind turbine can have up to three times more output in Africa than in some areas of Europe. This provides the opportunity to transform widely available solar, wind and bio-sourced power into a chemical energy carrier, such as hydrogen or another liquid or gaseous fuel, and to bring these to Europe using the existing infrastructure (transport and storage capacities).

6. Diversification: study all energy carrier options, including renewable fuels

It is critical to continue to assess how renewable fuels can provide decarbonisation benefits for road transport, whether only in the short term or also in the longer term. The field of renewable fuels is currently very open and is changing quickly: much R&I effort is needed, we call especially for a careful life-cycle analysis assessment to determine the positive decarbonisation benefits of the options considered. Such renewable fuels, including advanced bio-fuel options, can be realised via several feedstocks, chemical energy carriers, in a gaseous or liquid form, and these will be used in several transport modes beyond road. Such an approach provides diversity hence security of energy supply, plus competition in the energy market. Europe needs to position itself and anticipate the economic opportunities of these global markets.

[1] https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions

7. The existing vehicle fleet provides the biggest lever for near term net-decarbonisation

Even with electrification being prioritized, the decarbonisation impact might not be sufficient in the time given. Research should support the objective of decarbonisation of the existing fleet. Only about 5% of the overall passenger car vehicle parc is replaced each year by new vehicles. This means that CO_2 reduction targets for new vehicle registrations will not provide a major short-term effect all over Europe. The existing fleet will impact the real-world CO_2 emissions of road transport for the next decades. So, net-decarbonisation of the existing vehicle fleet is and will stay an important objective to address, in order to realise overall CO_2 reductions from road transport as much as possible: technically, the main way to reduce these CO_2 emissions is to use net-decarbonised fuels, complemented with forthcoming retro-fitting solutions. Research is essential to understand how these fuels can be introduced to the market as soon as possible, and to provide a long-term perspective for the required investments.

8. Global competitiveness considering the diversity of technologies, jobs and skills

The decarbonisation and digitalisation of the mobility system require a fundamental redefinition of the jobs, skills and capacities needed in the transport sector. From a global competitiveness perspective, the automotive industry is one of the most important industrial and innovative sectors in Europe, it is still in a leading position in the world: an assessment is required to anticipate the evolution of jobs and skills in Europe, which will face important modifications along the transition. This change of competences is needed in the industry but also across the entire mobility value chain: from research to manufacturing, to logistics, infrastructures, and transport services for end users. In a worldwide context, we will still see the use of all types of powertrains for road transport in the next decades. Therefore, we should use our research and engineering capacity to provide innovation for all types of powertrains and keep pushing the technologies to obtain decarbonisation benefits from all energies, powertrains and types of vehicles.

9. Need for an open research programme

The shift to a truly carbon-neutral road transport system needs huge investments in research and innovation. The current research programme for road transport is focused on zero tailpipe emission technologies but Europe needs to pursue R&I excellence in all carbon-neutral technologies.

Conclusion

The Fit for 55 Package Proposal sets ambitious policies but might not be enough to reach our carbon-neutrality objective in the right timeframe: the climate change urgency calls us to use all decarbonisation levers and to adopt a system approach encompassing vehicle technologies, use and their energy supply. We call for more Research and Innovation efforts, especially on charging infrastructure needs and renewable fuels options. All renewable energy carriers, powertrain options and types of vehicles (new and existing) need to be addressed to decarbonise transport as much as possible, taking a life-cycle perspective and always considering the user's point of view, preserving access and affordability of mobility. Whilst reaching zero emission in all usages, especially in urban areas, is a goal for the long-term, the transition phase requires us to assess different solutions for decarbonisation in the short and medium term, for rural and long-distance transport.

We also would like to emphasise that the direction of the Fit for 55 process is directly linked with the form, function and resourcing of the successor of the Horizon Europe framework programme for Research and Innovation. Whatever the long-term policy ambitions, they will need to be supported by ambitious European R&I that helps to achieve these objectives in an efficient manner.