GEAR 2030 Working Group 1 Project Team 1 – ' Global landscape'

DRAFT REPORT

Methodology: how did PT1 proceed?

The GEAR 2030 Working Group 1 Project Team 1, dedicated to the 'Global Landscape' of the automotive industry, had for the objective to elaborate various scenarios according to which the automotive sector is likely to develop in the future. It would allow highlighting the main challenges facing the automotive industry in 2030 due to emerging trends. The scenario described in this paper represents therefore a most probable snapshot of the sector in 2030 elaborated by the participants of Project Team 1 on the bases of available studies and best knowledge of the stakeholders.

This present report serves several purposes: first of all, it retraces the work methods and guiding principles Project Team members abided by to come to their conclusions and recommendations and, secondly, it aims at functioning as a scenario reference to other Project Teams which are still in the process of collecting and analyzing data to draft up their recommendations.

The first step was about identification of the four mega-trends, serving as a frame for the development of different scenarios: environment and health challenges, new consumer demand and societal changes, development and roll out of new technologies and economic shift with a focus on emerging business models that could have a significant impact on the auto industry.

Those four trends were then divided into sub-trends, out of which the following five have been recognized as being of key importance:

- Electrification and advanced internal combustion engine (ICE) technologies;
- Digitalization and new business environment;
- Connected and automated driving;
- Advanced manufacturing;
- New players and globalization.

This report provides a summary of the scenario which, in the view of the Project Team participants and on the basis of collected information, is the most likely to happen.

Project Team 1 members also agreed on a common set of definitions and concepts around which the different scenarios revolve. They are presented in the last part of this document.

Most likely scenario for the key trends

1. Environment & Health - Electrification of the automotive sector & development of advanced internal combustion engine

Discussions between Project Team 1 members showed that a first tendency related to the societal concerns on health and environmental protection is the development of advanced internal combustion engines and the move towards electrification (zero-emission mode) of the automotive sector.

Previsions indicate that ZEV and PHEV **market penetration** will increase and those vehicles will constitute an important share of the new registrations. By 2030, registration of new ZEVs and PHEVs in the EU should represent between 25 and 30% of new vehicle sales. This implies that internal combustion engine equipped vehicles including non-plug-in hybrids will still represent a majority of the new registrations in 2030.

According to the participants, the shift towards **zero-emission vehicles and plugs-in hybrid vehicles** in 2030 will be supported by incentivizing schemes to potential buyers and an active role of the public authorities in a development of the necessary infrastructure.

Findings show that, in the case of ZEVs, combination of financial and non-financial incentives will be the most likely option chosen by public authorities. Granting of purchase incentives and exemptions for access restrictions, for example, will be a frequently chosen option. These incentives will probably be at a level which will enable sufficient ZEVs sales increase thus making them a positive business case.

Subsequently, adequate **deployment of the infrastructure** supporting EVs will play an increasingly important role. In 2030, there will probably be an obligation for newly-built multi-family residential buildings to include a few charging points for EVs and PHEVs and an incentive system to favor implantation of more of them. To meet this new demand in 2030, initiatives are likely to come from private actors or to be implemented through public-private partnerships.

Range autonomy and charging infrastructure capacities will be extended in order to support the deployment of a greater share of ZEVs on the market. Taking advantage of sustained advances in technology, range autonomy of EVs and charging infrastructure capacities will have increased significantly. By 2030, new EVs might have an autonomy range of 600km for segment B and C and rely on a charging infrastructure of 150kW.

The **regulatory approach** towards vehicles equipped with advanced internal combustion engines will be significantly changed in 2030. These types of powertrains are very likely to be subject to new and more stringent regulations. They will probably be banned from accessing certain urban areas according to their emission performances.

The electrification of the automotive sector will also influence the European **battery production** and its localization. Leaders in the Li-ion traction battery production (at the cell level) are likely

to be mostly non-European, even though part of their production will be located in Europe. European companies might keep on playing an important role in other automotive battery applications and in the area of battery assembly.

Due to the soaring demand of ZEVs, new business opportunities related to **traction battery** will emerge. Sales from their recycled components and materials will compensate the cost of recycling operations as well as the business around battery reuse.

Public vehicle fleets should be the backbone of the electrification of automotive fleets and therefore lead by example. However, it is likely that by 2030, public authorities will only have set up low binding targets of ZEVs for their fleets.

2. Consumers & societal demands - Digitalization and new business environment

New technologies and the massive use of the internet will have a huge impact on the use and conception of mobility. This is also largely due to major changes in societal demands. New mobility solutions appear, combining various modes of transport and allowing users to find the most efficient way to reach their final destination.

A global tendency considering mobility through its use and not through the ownership of a transportation mode anymore is currently taking shape. For the coming years, it is highly probable that all modes of transport will be integrated into a single "**Mobility as a Service**" (MaaS) offer. On-demand ride sourcing into "MaaS products" will be accessible for 15 to 25% of the EU population by 2030.

Consumers will also tend to increasingly use **shared mobility** services during their traveling period in all part of the Member States' territories. A distinction should be made on that point between urban and non-urban areas. If 30% of the vehicles in urban areas should be used in the frame of shared mobility services, this percentage should only reach 5% in non-urban areas. Car ownership will be impacted by the emergence of innovative mobility solutions and will presumably stabilize at 60% by 2030.

Nowadays, customers expect more and more **customizable products and services**. This tendency could also apply when they buy a new vehicle or vehicle-related services and should be reinforced in the years to come. Thus, consumers will be able to choose between various combinations of mechanical and electronic components as well as comfort and communication devices and digital services for their vehicles.

Increasing **connectivity** of vehicles is a true game changer for the automotive market. In 2030, between 50% and 60% of newly registered vehicles will be considered as 'fully connected'. Higher connectivity will trigger the emergence of a new offer for connected services such as those related to consumer convenience, insurance, aftermarket, fleet management or health.

Higher connectivity of vehicles also means an important **generation of new data**. Due to matters of vehicle integrity, security, road safety and different operators' liability, in the long term, it is probable that only a regulated direct access to a wide set of vehicle data is envisaged to be allowed for the provision of connected services thus facilitating entrepreneurship.

The automotive sector will also enter the **e-commerce** sphere as more and more customers will be willing to buy automotive-related products on the internet. It is expected that by 2030, new vehicles purchased online will represent around 20% of the total sales. This rate will reach 50% of the total sales for second-hand vehicles purchase.

Finally, there is a strong agreement on the need for adequate physical and digital infrastructure which is essential for the deployment of connected vehicles and mobility. This deployment could be made possible in the future thanks to the installation of road-side-units on most parts of the road networks, allowing vehicles to communicate both with the infrastructure and between themselves.

3. Technological innovation - Connected and automated driving

Connected and Automated Driving (CAD) constitute the first cornerstone of technological innovation and will transform the whole value chain of the automotive sector.

It is foreseeable that, in 2030, around 15% of new vehicles registered will benefit from a **level 4 of autonomy**. Public authorities will have a key role to play in facilitating the roll-out of automated driving by proposing **incentives schemes**.

On one hand, European Union funds will likely continue to support the development of automated driving technologies in 2030. On the other hand, other kinds of incentives such as exemption from registration tax and VAT will probably be implemented by the EU Member States.

Deployment of the necessary **infrastructures** for automated driving will initially focus on motorways and as far as **financing of the infrastructure** is concerned, a clear involvement from public authorities is expected. A financing of 50% of infrastructure projects is the most probable by 2030, leaving the rest of financing to private investors. There is no clear agreement on what would be the most adequate level of involvement from public authorities in terms of financing the infrastructure for automated vehicles.

The **interoperability** between vehicles and any entity that may affect them (vehicle-to-everything communications) will be enabled through agreements on interoperability between various vehicle manufacturers.

Legal certainties will be needed, due to the rise of issues linked to the deployment of automated (e.g. liability of the vehicle manufacturers). In order to solve them, the most realistic scenario for 2030 points to a creation of a legal framework at European level on the liability of

automated vehicles. This legal framework would also encompass cross-border solutions for liability issues.

Finally, **consumers' acceptance** will strongly influence the pace to which automated vehicles will be rolling-out. In the coming years, this will constitute a real challenge since less than 40% of drivers imagine letting an autopilot steer their vehicle.

4. Technological innovation – Advanced manufacturing

The second cornerstone of technological innovation is the development of advanced manufacturing including Industry 4.0, which will affect a range of different areas.

The use of **new materials** falling into the scope of ISO standards will enable a 20% decrease in weight by 2030. Similarly, **robotisation** of manufacturing processes will also progress and will transform the way products are designed and produced. In 2030, the robotisation rate will reach 50% to 75%. It will allow for more innovative production and gains in various areas.

3D printing will also be more used than it is now in industrial processes and for the manufacturing of vehicles or spare parts. In 2030, the market is expected to be quite homogeneous: current and new market players will share the marketplace, which will essentially be revolving around the exchange of spare parts.

Greater **digitalization of the manufacturing** is foreseeable, encouraged by the rising of new technologies such as cloud computing or big data. Rationalization of the production thanks to digitalization of manufacturing is expected to trigger a 20% decrease in the total costs of production as well as a 20% decrease of defects. Moreover, some (rather minor) **economies of scale** will be achieved through advanced manufacturing.

5. Economic shift – New players

The economic shift in the automotive sector will, amongst others, be marked by the rise of new players and the adaptation of traditional ones in the global landscape of the automotive sector.

Traditional automakers are now on the verge of shifting their business models. That is why, in all likelihood, the most common traditional automakers' future business model will be focused on manufacturing of vehicles and providing of mobility solutions such as shared mobility services. Still, it is very likely that the **key domain and source of revenues** for the European automotive industry in 2030 will be manufacturing.

New business models related to connectivity will enable data-driven opportunities for new goods and services. It is expected that by 2030, these new markets will be dominated either by traditional car manufacturers or by technology giants.

In the creation of **new business models related to the deployment of autonomous vehicle**, it is most likely that current market players own a greater portion of the market value.

Finally, the **benefits** of this economic shift will probably be earned by non-European market players as the highest added value is set to be captured outside of Europe.

Concluding remarks

In 2030, the overall automotive industry landscape will have undergone significant mutations that will affect all actors of the value chain.

Electrification and decarbonization of the automotive sector will be thriving thanks to the increasing regulatory requirements, right incentivizing measures and deeper penetration of the recharging/refueling infrastructure supported by public authorities and private investors.

Emergence of necessary parts of the supply and value chain will be a natural consequence of an increasing penetration of zero-emission vehicles in Europe. It is expected that, at least in the short term, non-European companies will take the benefit of the changing powertrain landscape in Europe. On the other hand, the shift towards zero-emission mobility might turn out to be an opportunity for the Europe based recycling companies.

The emergence of highly connected and automated driving is becoming a reality and there is a clear expectation that it will be properly prepared by the decision-makers by setting an adequate regulatory framework covering new issues like liability, connectivity, interoperability and harmonization in automated driving. Supporting research by public authorities in automated vehicles technologies is expected to continue in 2030.

The automotive sector is widely preparing for the rise of alternative car usage and the massive use of mobility as a service. At the end of the day, customers, because of new needs in terms of mobility and products will influence the shift of the automotive sector towards new innovative business models.

Novel production methods will become increasingly popular in the automotive sector with a wide spread use of light-weight materials and robots reducing the costs, facilitating product customization and improving the quality of the products.

Globalization and new shifts in the automotive sector will also attract newcomers to the automotive market. Traditional automakers and new players taking the opportunities offered by data-driven opportunities will have to adapt to consumers' greater demand for connected and autonomous driving and for more customizable products.

Definitions

For the sake of clarity and mutual understanding, Project Team 1 members agreed on common definitions for the terms used during the elaboration process of the scenarios.

"**Zero emissions vehicles**" (ZEVs) should be understood as a vehicles which produce no emissions while driving (e.g., an electric vehicle, fuel cell).

"**Battery electric vehicles**" (BEVs) refers to an electrically chargeable vehicles with no other energy source than the battery, whose autonomy ranges from 110km to 600km.

"**Plug-in hybrid vehicles**" (PHEVs) covers vehicles using battery as one source of energy among other sources. The battery should be rechargeable from the grid.

"**Battery production**" relates to the production of battery cells and modules or pack assembly.

"**Automated Driving**" encompasses vehicles using on-board equipment to perform one or more advanced driving tasks automatically corresponding to level 4 of SAE International's Levels of Driving Automation for On-Road Vehicle[1].

"**Connected vehicles**" definition applies to vehicles relying on communication through external servers, with other vehicles, third party applications, personal devices (e.g. smart phones) or the surrounding traffic infrastructure to exchange information and perform driving tasks or allow companies to provide remote services.

"**Vehicle ownership**" means the purchasing & disposing of a vehicle

"**Access to data"** should be understood as the access & use by the economic operator(s) to specific data generated by the use of connected vehicles for a given purpose.

"**Car online sale"** is the situation when a car purchase is substantially initiated online

"**Shared mobility services"** relates to on-demand mobility service provided by professional service providers or private individuals.

"**Mobility as a Service"** (MaaS) refers to the integration of various forms of transport services into a single mobility service accessible on demand.

[1] Level 4 – High Automation: The driving mode-specific performance by an Automated Driving System of all aspects of the dynamic driving task, even if a human driver does not respond appropriately to a request to intervene