



EPoSS
European Technology Platform
on Smart Systems Integration



Multiannual Roadmap for the Contractual Public Private Partnership European Green Vehicles Initiative

October 2013

Introduction

The Public Private Partnership European Green Cars Initiative was originally created in an ad-hoc manner in response to the global economic crisis of 2008 by using the instruments of the 7th Framework Programme. It evolved into a lean, fast and efficient instrument for the funding of research, development and innovation in the field of sustainable mobility. Decision makers from major European companies, representing the European Technology Platforms ERTRAC, EPoSS and SmartGrids, entered into a continuous and constructive dialogue with the involved Directorates General of the European Commission, and made recommendations for the annual FP7 Calls for Proposals of the European Green Cars Initiative published in 2009-2012. Their advice was based on intensive consultations involving industrial and academic stakeholders from all relevant technology domains, spanning the entire value chain, and rests upon the long-term roadmaps and strategic research agendas of the technology platforms. Eventually, about 100 collaborative research projects will have been jointly funded with the EC in the framework of this PPP. Due to the high degree of satisfaction from both the industrial sector and the EC sides, a continuation of the PPP is strived for under Horizon 2020, the new Common Strategic Framework for EU research and innovation funding after 2013. The wish for this continuation is supported by the proven added value of an integrated R&D&I programme at European level, and by the commitment and shared vision of the involved sectors to set objectives not only for the support of key European transport, energy and environmental policies or the sake of technical inventions, but also and in particular for the development of markets, commercialization, production and ultimately employment. The multiannual roadmap at hand reveals the vision, research and development strategy as well as the expected impact of a contractual PPP “European Green Vehicles Initiative” (EGVI) that will contribute to reach the targets set by European Transport, Energy, Environment and Climate Protection policies especially in the field of energy efficiency of vehicles and alternative power trains. The document is taking into account the roadmaps from three technology platforms (ERTRAC, EPoSS, SmartGrids) in a cross-sector approach, and is pointing out the potentially high socio-economic benefits of a PPP. All written comments resulting from stakeholder consultations as well as the discussions at a dedicated event held in Brussels on 25 September 2012 have been considered.

PART I: Vision 2030

- ***Context setting: goals, links with EU policy objectives, and societal challenges addressed***

Energy efficiency of road vehicles and alternative powertrains have been identified by the industry and by policy-makers worldwide as crucial for achieving major cuts in CO₂ emissions and moving towards a sustainable transport system. The European Commission in its 2011 White Paper for Transport¹ set the objective for delivering a competitive and resource efficient transport system which allows substantial carbon emissions cuts and lesser dependence on imported fuels. The challenge of energy efficient vehicles and alternative powertrains relates to several important objectives of the European Union: reduction of emissions and improvement of air quality, CO₂ reduction and prevention of climate change, maintaining energy security, and increased use of renewable energies. Focusing on this challenge, the European Green Vehicles Initiative will thus contribute to reach the targets set by the European policies of Transport, Energy, Environment and Climate Protection: the 20/20/20 targets on renewable energy use, the CO₂ emissions regulation, and the Euro emissions standards for road vehicles. Being by nature a cross-sectors matter, advancements for the energy efficiency of road vehicles will be built on the expertise of three European Technology Platforms, ERTRAC, EPoSS, and SmartGrids, following a system approach integrating the research domains of automotive, energy, ICT, and smart grids.

By developing energy efficient road vehicles and alternative powertrains (“green vehicles”), the initiative will address the societal challenge of sustainable transport, and at the same time have a major impact on the innovative strength and global competitiveness of the European economy e.g. in terms of protection and further growth of manufacturing basis, employment, and skills. The initiative will follow the approach of Horizon 2020² to use research and innovation activities for reaching industrial leadership positions. Considering that Europe’s competitors on the global markets – who are well aware of the leverage effect of public funding – have set up massive R&D support programmes for green vehicles development, Europe cannot afford to lack ambition or to let fragmentation reduce the efficiency of its action on this field. In its recent report³ published in June 2012, the CARS21 High Level Group, gathering European Commissioners, national Ministers and CEOs of the automotive industry, concludes that the foremost challenge for the EU global competitiveness is to launch a specific major initiative on breakthrough technologies. The European Green Vehicles Initiative has been confirmed as a follow-up of the EGCI PPP within the CARS2020 Action Plan recently adopted by the European Commission.⁴ The instrument considered the most suitable is the contractual Public Private Partnership as described in article 19 of the Horizon 2020 proposal in which both the public and private sides express their commitment to support the development and implementation of a research and innovation activity of strategic importance to the EU competitiveness and industrial leadership, and to address specific societal challenges.

The complexity of the matter requires a well coordinated combination of specific knowledge along the novel value chains of green vehicle technology, building on the involvement of SMEs, regional

¹ COM(2011) 144, White Paper 2011 “Roadmap to a Single Transport Area - Towards a competitive and resource efficient transport system”.

² COM(2011) 809, Proposal for a Regulation of the European Parliament and of the Council establishing Horizon 2020 - The Framework Programme for Research and Innovation (2014-2020)

³ CARS 21 High Level Group on the Competitiveness and Sustainable Growth of the Automotive Industry in the European Union, Final Report 2012, 6 June 2012

⁴ COM(2012) 636 CARS 2020: Action Plan for a competitive and sustainable automotive industry in Europe

innovation clusters as well as big corporations and efficiently using the diverse competencies available at companies, research institutes, and universities all around Europe. Creating efficient links between research, development and innovation with the feedback of user experience e.g. from demonstration sites will continuously be taken into account for the improvement of the initiative.

- **Overall Vision 2030 and research and innovation strategy of the industrial sectors involved.**

The three technology platforms involved in the PPP cover the research and innovation strategies of road transport (ERTRAC⁵), smart systems (EPoSS⁶) and smart grids (SmartGrids⁷). They have specific scopes but their strategies are complementary and match the PPP objectives.

ERTRAC - the European Road Transport Research Advisory Council, has recently revised its Strategic Research Agenda (SRA) by taking a system approach and addressing Grand Societal Challenges. As described in the table and figure below, objectives have been set for an overall efficiency improvement of the transport system by 50% in 2030 compared to 2010. Also specific targets for each of the societal needs are identified: decarbonisation, reliability and safety

	Indicator	Guiding objective
Decarbonization	Energy efficiency: urban passenger transport	+80% (pkm/kWh) *
	Energy efficiency: long-distance freight transport	+40% (tkm/kWh) *
	Renewables in the energy pool	Biofuels: 25% Electricity: 5%
Reliability	Reliability of transport schedules	+50% *
	Urban accessibility	Preserve Improve where possible
Safety	Fatalities and severe injuries	-60% *
	Cargo lost to theft and damage	-70% *

* Versus 2010 baseline

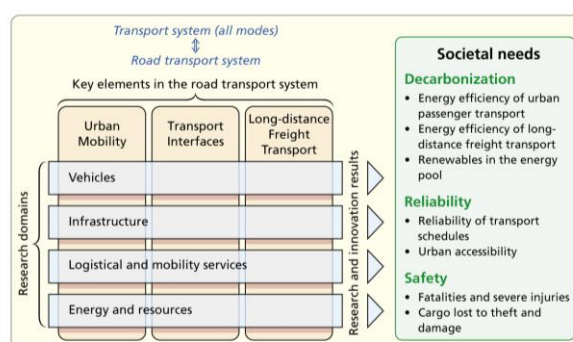


Table 1: Guiding objectives of ERTRAC for 2030

Figure 1: A systems approach to achieving a 50% more efficient road transport system

The ERTRAC SRA is being implemented through roadmaps covering topics for research, development, and innovation framework. Together, the ERTRAC roadmaps cover all aspects of the transport system thus enabling the objectives set in the SRA to be met. The approach focuses on the following three key elements of the transport system: urban mobility; long-distance freight transport; and interfaces between transport means. Together, these elements provide an integrated core transport system that serves the road transport demand of more than 80% of the population. Therefore they are essential for meeting the European societal challenges.

Thanks to its multi-stakeholders membership gathering all the actors of road transport research, ERTRAC is then able to cover the four enabling research and innovation domains: vehicles, infrastructure, logistical and mobility services, and energy and resources. A mix of these domains is usually needed in order to efficiently address one issue and be capable of delivering benefits towards the societal objectives. For the European Green Vehicles Initiative, ERTRAC will extract from its roadmaps the topics needed for the specific objective of the PPP.

⁵ <http://www.ertrac.org>

⁶ <http://www.smart-systems-integration.org>

⁷ <http://www.smartgrids.eu>

EPoSS, the European Technology Platform on Smart Systems Integration focusses on Smart Systems; defined as intelligent, often miniaturised, technical subsystems with their own and independent functionality evolving from microsystems technology. One of the most important applications of smart systems is the automobile. According to the EPoSS SRA, priorities of R&D in this area are clustered around safety, driver assistance and convenience, energy efficient and environment friendly smart power trains and subsystem. A particular focus is on enabling technologies for clean propulsion and electrification. In the electric vehicle the following functionalities will be provided by smart systems: management of energy storage systems, intelligent power electronics, active control of motors and wheels, functional safety of chassis and power train systems, smart integration of range extenders, and advanced vehicle to grid connection systems.

SmartGrids, the European Technology Platform for the Electricity Networks of the Future, focuses on research topics and priorities necessary for the advancement of the electricity networks and intelligent electric systems. It is active in the European Green Cars Initiative but also strongly involved in the European Electricity Grid Initiative (EEGI). Very recently in 2012 SmartGrids has updated its Strategic Research Agenda, covering the needs up to 2035 for research, development and demonstration initiatives both on national and European levels with the goal to advance a SmartGrids based European Energy System.

The Strategic Research Agendas of the European Technology Platforms, together with their detailed roadmaps, provide guiding objectives and milestones. These elements can be used as key performance indicators. For the topic of electric vehicles, this can be done by referring to the milestones described in the “European Roadmap Electrification of Road Transport” jointly published by ERTRAC, EPoSS and SmartGrids. These milestones describe the expected market developments under the assumption that major development technological breakthroughs can be reached thanks to a proper coverage of the technology fields described in the roadmap by R&D&I activities, and compare these with evolutionary developments. The needed advancements include the availability of next generation of batteries, performance gains of drive train technologies, synergies due to efficient system integration as well as the integration of electric vehicles with the electricity grid.⁸ Such roadmap milestones serving as KPIs will be assessed and monitored all along the PPP. Fuel cell electric vehicles and hydrogen as transport fuel are also an important element of sustainable mobility for the future. KPIs for these technologies are described in documents developed by the Fuel Cells and Hydrogen Joint Undertaking (FCH JU).

- ***Strategic objectives of the initiative and role of the PPP in the overall industrial strategy***

As recognized by the Horizon 2020 proposal, a Smart, Green, and Integrated Transport System is to be established in Europe in order to tackle the Societal Challenge resulting from global trends. Its creation implies major innovative steps in a multitude of different technology domains including transport, energy and ICT. The road transport sector is the largest one to contribute to the realization of a Smart, Green and Integrated Transport System, regarding both economic strength and potential for major innovations. In order to achieve critical mass, to deliver tangible results and to attract the required public attention, the PPP European Green Vehicles Initiative of Horizon 2020 should be incorporated primarily in this domain. At the same time, activities in other Societal Challenges, e.g.

⁸ European Roadmap « Electrification of Road Transport », joint ERTRAC-EPoSS-SmartGrids roadmap, 2nd Edition, June 2012, pp. 17-28.

Smart, Clean and Efficient Energy, and selected factors of Industrial Leadership, e.g. Key Enabling Technologies, will be essential for completing the objective, technology focus and process chain of the initiative.

According to ERTRAC, EPoSS and SmartGrids, delivering solutions for the major societal, environmental and economic challenges ahead will require well focused and coordinated research and innovation activities for the next 15 to 20 years. At the same time, a proper level of flexibility has to be kept since fundamental framework conditions in these domains may change rapidly due to adverse events or emerging opportunities. A close interaction in the decision-making between industry and public authorities such as the European Commission will be essential to generate market credibility and to justify the strategic allocation of resources. Therefore a Public-Private Partnership approach is favored. The aim is to accelerate research, development and demonstration of those technologies thus allowing the efficient use of clean energies in road vehicles. Therefore the objective of the PPP European Green Vehicles Initiative in Horizon 2020 will be **Energy Efficiency of Vehicles and Alternative Powertrains**.

Only those topics which are essential for this goal will be in the scope of the PPP European Green Vehicles Initiative. Required technologies will be considered at all product layers from modules to systems and vehicles. Neither the development of resources, nor the creation of infrastructures is in line with the objectives of the initiative, but the integration of these resources and the integration into these infrastructures are in the scope. Furthermore, not only passenger cars are considered but also two-wheelers (or other new light vehicle concepts), trucks and buses (see Figure 2)

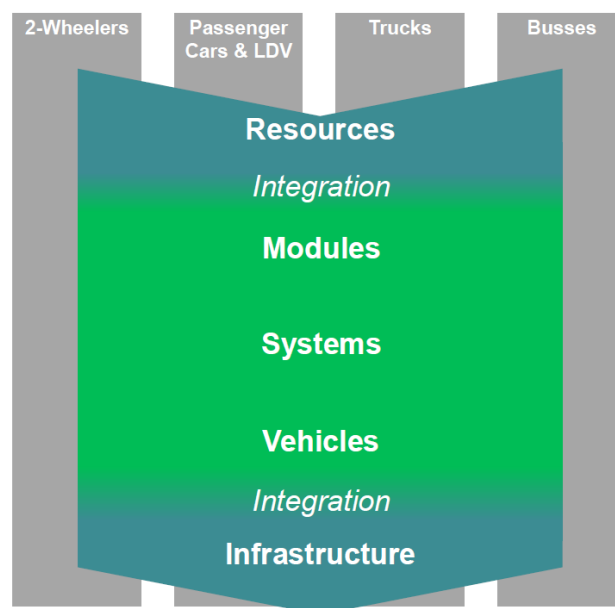


Figure 2: Technology fields covered in the PPP European Green Vehicles Initiative in Horizon 2020 (light green)

By addressing various product layers from the module to the vehicle as a whole, the integrated approach will cover the entire process chain from resource application to demonstration and creation of services, and extend research and development to innovation. Experiences made during this process will be essential for the improvement of technologies. Especially through the steps into innovation, the results of the process chain may raise new questions and feed them back into the

R&D work. At the same time, advice for EU and Member states to address policies regarding transport and energy will be delivered, e.g. indicating when standardization or public procurement would be helpful to the innovation process.

The involved European Technology Platforms have wider domains of priorities which will require substantial research, development and innovation efforts under Horizon 2020 beyond the scope of the PPP and in parallel to it. For ERTRAC, this concerns the development of fuels, the evolutionary development of internal combustion engines, priorities for road infrastructures, the creation of a multi-modal mobility system for passengers and goods, as well as other technologies leading to safety, noise reduction and performance gains. ERTRAC has developed a MAP Multi-Annual Implementation Plan for Horizon 2020, where all these priorities for research and innovation for the whole road transport sector are described and allocated to the pillars of Horizon 2020. For EPoSS, which is dealing with smart systems integration, topics to be covered by other funding programmes includes priorities in the domain of safety and driver assistance as autonomous driving, networked functionalities and human-machine interfacing as pointed out in the EPoSS strategic research agenda. As for SmartGrids, it will be all the topics concerning electricity networks and intelligent electric systems. It is essential to implement appropriate funding schemes for those topics going beyond the scope of this Multiannual Roadmap in parallel to the PPP EGVI.

- ***Commitment of the industry to the vision and objectives of the PPP goals.***

The industry is ready to commit to strategies and objectives shared with the European policy-makers. It has prepared roadmaps to achieve those targets, and is keen to establish annually research priorities and framework conditions for innovation based on a continuous consultation process involving all relevant stakeholders. A public private partnership is considered a necessary commitment from both sides to steer and drive this process forward.

Acting with a PPP at the European level is seen as an added value action complementary to national and local actions, because vehicles and mobility services have to be developed for international markets, using standardized solutions, and need to be able to compete on a worldwide basis.

Why a contractual PPP?

- To ensure a **lasting commitment** of the industry and the European Commission to address the shared objectives, with the ambition to deliver results in a timely and continuous manner;
- To guarantee **critical mass** of funding for topics that are of strategic importance for the EU, tackling specific societal challenges and aiming at industrial leadership;
- To drive forward **innovation** by integrating in a ring-fenced research programme together with actions necessary to accelerate the implementation of research results, towards the deployment of innovative solutions and pushing for production within the EU;
- To set up a **collaborative process** where private and public actors are putting together their specific competences, the public side setting European transport, energy and industrial policy ambitions while the industry identifies research and innovation priorities to fulfill them;
- To best use the **competences** of each side, the European institutions being responsible for the public funding allocation, project evaluation and management, while the private partners concentrate on setting recommendations for research topics, and to monitor and evaluate progress towards the objectives;

- To maintain **transparency** of the priority setting and **openness** for participation in the programme to any interested stakeholders, qualities which cannot be fulfilled if the PPP is further institutionalized. This is a particular requirement for the automotive industry, which includes several competitors and is based on fragmented supply chains including SMEs;
- To guarantee **flexibility** and an ability to adapt the technology coverage of the programme according to research findings, allowing the budget to be always oriented towards the best usages according to real industry situation and the state of the art research.
- To ensure a **lasting cooperation** of the industries concerned (automotive, smart systems, smart grids) and the involvement of the corresponding services within the European Commission.
- To foster the **sharing of information** throughout the network of involved companies and research organizations.

The Commitment of the industry:

The PPP EGVl will contribute to reaching objectives of major EU policies, and in particular the White Paper for Transport: by delivering innovative technologies which will help to reach the EU's target of reducing CO₂ emissions in transport by 60% by 2050.

The PPP EGVl will contribute to the deployment of green, yet affordable and safe, vehicles as described in the roadmaps for electrification, hybridization, buses and long distance trucks. Those roadmaps include milestones of vehicle deployment on the European roads, e.g. an accumulated 5 Million electric and plug-in hybrid vehicles by 2020 and further growth potential thereafter with corresponding potential CO₂ emissions reduction.

The industry is ready to match EU funding with similar private funding. Considering the scope and objectives of the initiative as outlined in this paper, a total programme budget of 3 Bn Euros is necessary for Horizon 2020 (framework 2014-2020) to represent critical mass and reach tangible results. This figure is to be compared with the 30 Bn Euros that the European automotive industry is investing each year in R&D, out of any public support scheme, 2/3 of it being allocated to energy efficiency.

The PPP EGVl shall work with principles of transparency and openness. Using the wide stakeholders basis of the European Technology Platforms ERTRAC, EPoSS, and Smart Grids, a scheme for operation and governance will be set up to organize the tasks of delivering viable research topics recommendations across the community, monitoring project progress and continuously evaluating the efficiency of the measures taken, as well as of building communication channels with the European Member States, and taking into account the user perspective. A legal entity will be created to represent the private part of the PPP, in the format of a non-profit association, to formalize the principles of work and get the commitment of the interested members to the objectives of the Initiative.

PART II: Research and Innovation Strategy

Only topics which contribute to reaching the goal of Energy Efficiency of Vehicles and Alternative Powertrains will be in the scope of the PPP, in particular the electrification and hybridization of powertrains, and their adaptation to renewable fuels. Also the functionality improvement of the vehicle, the reduction of its complexity and weight, and the management of its thermal and other energy flows play an important role. As shown in Figure 2, any technological development supporting these goals at the relevant product layers of the value chain from modules to systems and vehicles will be considered relevant.

- ***Definition of Scope***

The distinction between topics being within the scope of the PPP and those to be covered by other parts of the European funding programmes has to be based on a thorough definition directly resulting from the objectives of the PPP. In many cases, the assessment will require an expert discussion taking into account the objectives of the PPP, particularly for the integration of resources and the integration into infrastructures:

Resources integration in the scope of the PPP:

The development of resources such as new fuels and materials is generally not within the scope of the PPP as it serves a multitude of other purposes beyond the objectives of the PPP like e.g. the efficiency of usage or the independency from imports. However, the advancement and adaptation of resources for application in the green vehicle is fully within the scope of the PPP, as explained below for the case of materials.

Even though research on lightweight materials would not generally be in the scope of the PPP, the application of a new material which could lead for instance to weight reduction of a module indeed would. Within the PPP, the adaptation and processing of the material would be relevant as well as the functionality improvement of the module, the integration into the vehicle structure, the prototyping and testing, the establishment of a prototype line, and finally the demonstration of the product.

A comparable situation applies to energy storage systems: Many electrochemical systems may improve the performance, lifetime or affordability of any kind of battery. Their development starts with pure material research for anode, cathode or separator, i.e. new structures of carbon composites, powders or tubes or new chemistry for separators. Therefore such research and development should be covered by more general funding programmes. However, given the fact that the battery is a core element of electric and hybrid vehicles, any specific research on automotive batteries will be fully in the scope of the PPP, such as the further development, adaption, prototype manufacturing, and testing of a specific electrochemical system or cell design, integration of cells into batteries, integration of batteries into the vehicle structure, charge management, as well as any aspects that enable recycling or second life of batteries.

Other examples of materials integration that can fall into the PPP scope are new materials applied to electric drive train components such as electric motors, power electronics, etc. Another challenge for the energy efficiency of electrified vehicle being thermal management, new materials supporting advanced thermal management could be considered, i.e. materials which enable new highly efficient heating, ventilation and air conditioning systems for electric vehicles.

Infrastructure integration in the scope of the PPP:

The development of needed infrastructures such as electricity distribution capacity or road infrastructure is in principle out of the PPP. However, there are some necessary **interfaces** and other complementary developments that must be addressed to assure the correct **interoperability** and full **integration** to facilitate the eventual large scale deployment of electric vehicles to the power grid. The **Energy efficiency** concept must be considered as a whole including efficient charging devices and charging the EVs interacting with the electricity system in the most **efficient and sustainable** way. In this sense, the EV charging operation must be integrated in the overall electricity system operation allowing ordered and controlled charging methods that maximise the efficiency of the overall Electricity System. This implies the **interoperability** of the elements involved from the EVs to the generation sources that include the establishment of a coordinated communication along the energy chain. The smart EV charging infrastructure should be integrated as any other electricity demand into the distribution system operators' network management systems, thus a correct and coordinated ICT communication system must be developed between the EV, the charging devices and the mobility operator/ DSOs. This would avoid congestions and /or unexpected demand (demand management) that could provoke lack of efficiency and/or the increase of the operational cost of the infrastructures. These developments will directly affect environmental aspects (GHG emissions) or the improved integration of renewables with presence of EVs. As electricity is a highly regulated business, relevant consideration must be given to the impacts on the regulatory models, markets and socioeconomic issues. The **Interfaces** outside the vehicle refer to the charging functions and needs of EVs including charging points, related power electronics and different communication means. Protocols and standards are needed in this area to achieve **interoperability**. The future evolution of the vehicles is directly related to the evolution of the charging devices (quick charging, V2G aspects, contactless, etc.). All these topics will be within the scope of the PPP.

Logistics: not in the scope of the PPP

One theme that was covered by the European Green Cars Initiative PPP, and which is proposed to not be covered in the European Green Vehicles Initiative PPP, is the theme of logistics. It is a recommendation of the European Commission services to have logistics not covered under a transport mode specific initiative like the EGVI but rather to put it under the normal programme as a multi-modal thematic area. This approach is understood and accepted, but ERTRAC recommends however that strong links are kept between the vehicle development part and the logistics part. Collaboration is expected to continue and be developed further between the EGVI PPP and the activities supported by the European Commission on Logistics.

- ***The path towards innovation***

On the path towards innovation, the results of projects within the process chain may raise new questions and feed them back into the R&D work. At the same time, an additional result of the R&D activities within the PPP is advice for the EU to address policies regarding transport, energy, economic development and environmental protection in order to ensure that legislative frameworks are used to best support the goals of the PPP instead of being a bottleneck. Examples include indications when early European and global standardization in parallel to research and development could ensure the protection of sensitive knowledge. Integrating standardization issues early enough within the R&D&I process can indeed support the market uptake of innovative products and services.

Also policy measures like public procurement focused on novel technologies that can be helpful to the innovation process. Indeed, the technology focus and the process chain environment of the initiative should not be limitative but further links need to be developed like standardization activities, education programmes, infrastructure creation, and so on. In particular, efficient and continuous working relations to the other PPPs will be established to identify potential synergies in the coverage of topics from early on. There should be cooperation with the European Electricity Grid Initiative in order to ensure the coverage of integration into the grid of electric vehicles. There should also be cooperation with the PPP Factories of the Future in order to cover issues of high interest for both initiatives, such as manufacturing of cells and batteries or novel materials, modules and vehicles as well as recycling aspects. Similar cooperation activities with other PPPs and Joint Undertakings should be established when considered relevant, a case in example would be the JTI Fuel Cell and Hydrogen which is focused on the fuel cell development but not on other components of the drive train which are similar to electric vehicles e.g. on the electric machine. Another example is the European Innovation Partnership on Smart Cities and Communities which may provide important links to the applications and deployment scenarios for the technologies developed under the PPP. In parallel, the EGVI PPP will benefit from close interactions with other European Technology Platforms such as EuMaT, Manufuture or MINAM, which focus on materials, manufacturing or micro and nano-manufacturing.

- ***Roadmaps and multi-annual implementation plans***

The long-term technology roadmaps developed as part of the Strategic Research Agendas of the involved European Technology Platforms describe the course of research and innovation leading to the goals of PPP European Green Vehicles Initiative. Their milestones will ensure coherence of technology developments in the relevant technology fields and derive thematic priorities and time scales. In view of the objective of the PPP European Green Vehicles Initiative, particularly the roadmaps on electrification and hybridization are relevant, with in addition specific roadmaps for trucks and for buses.

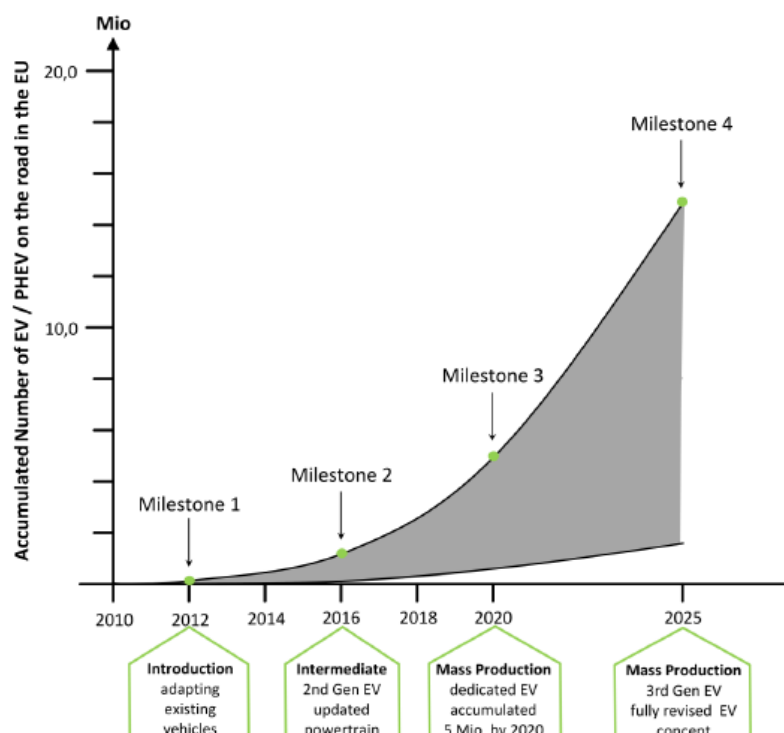


Figure 3: Milestones of the European Roadmap Electrification of Road Transport. Lower black curve: Evolutionary development of accumulated number of EV/PHEV. Upper black curve: Expected development under assumption of reaching the major technological breakthroughs.

According to the “European Roadmap Electrification of Road Transport”, a mass production of dedicated electric and plug-in hybrid vehicles is feasible by 2020 if fundamental progress is made in six technology fields: energy storage systems, drive train technologies, vehicle integration, safety, road integration and grid integration. Mass deployment of the technology will however require significant increases of energy efficiency and reductions of cost which may be provided as of 2025 by a fully revised electric vehicle concept (see Figure 3).

Future customer demands combined with legal requirements will drive the introduction of Hybrid Electric Vehicle (HEV) technologies, increasing the energy efficiency of vehicles propelled by conventional powertrains, while developing enabling technologies for the future large scale vehicle electrification. Without hybridisation, especially with Plug-In Hybrids and Range Extender Hybrids, the goals of decarbonisation cannot be achieved (see figure 4).

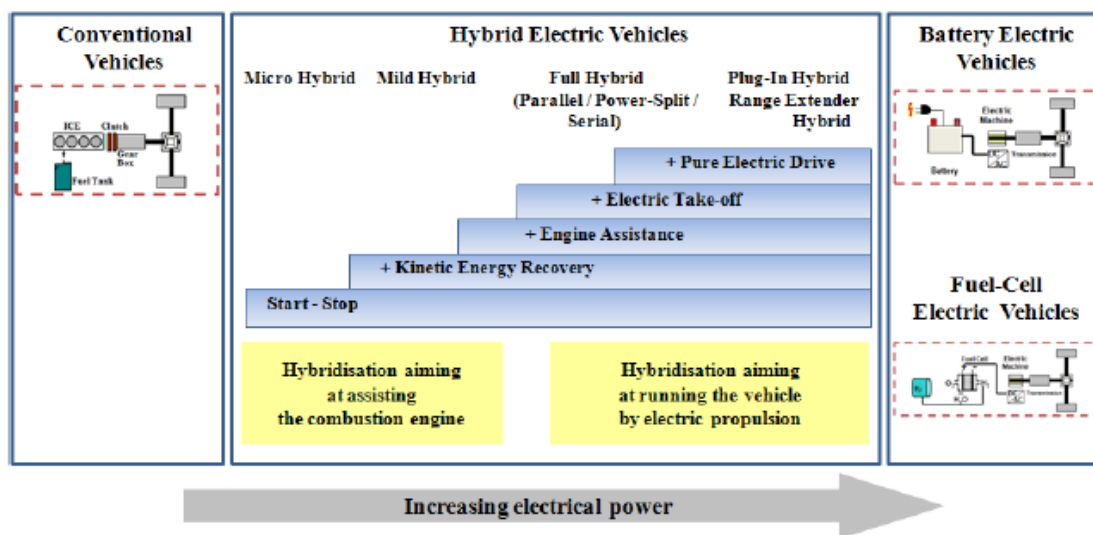


Figure 4: The classification of hybrids

The Multi-Annual Implementation Plan of the PPP EGVI is based on the relevant research and innovation roadmaps developed by the European Technology Platforms. Table 2 outlines the roadmaps which can be used as source for this content.

ERTRAC-EPoSS-SmartGrids joint roadmap Electrification of Road Transport
ERTRAC roadmap European Technology and Production Concept for Electric Vehicles
ERTRAC roadmap Hybridisation of Road Transport
ERTRAC roadmap Light-duty Powertrains and Fuels
ERTRAC roadmap Sustainable Freight System for Europe / Heavy Duty Truck
ERTRAC roadmap European Bus System of the Future

Table 2: Relevant sources of content for the multi-annual implementation plan of the PPP EGVI.

According to the Automotive part in the Transport and Mobility section of the Strategic Research Agenda of EPoSS, ICT and smart systems can provide the enabling functionalities for energy efficient powertrains and vehicles. Particularly in the electric vehicle most mechanical control functions can easily be replaced by electronic means and be supported digitally by embedded software. Thus, energy efficiency may not only be achievable by innovations in cell technology or by use of lightweight materials, but also by integrating a high degree of electronic control, adaptive capabilities and intelligence to the system. This approach enables range extension or battery downsizing in a smart way. ICT and Smart Systems also provide drivers with a more comfortable and adaptable car, permit better precision in control, facilitate active safety measures and automation and increase reliability by active material health concepts. These features compose unique selling propositions of the electric vehicle made in Europe. Smart systems also offer the possibility for synergies through smart optimization and integration and for adding harmonic interplay to the building blocks of the electric vehicle such that e.g., the drawbacks of today's batteries that lack energy density, lifetime and affordability, can be compensated. Therefore, research and development priorities in the domain of smart systems for energy efficient and electric vehicles are included in the EPoSS roadmaps for Horizon 2020.

Additional roadmaps may be developed by the technology platforms, and used by the PPP, if important missing aspects are identified. Moreover, these roadmaps will be updated periodically: they are snapshot of the situation today, and it will be a task of the partners within the platforms to monitor and continuously update them.

Electrification of Road Transport	
Energy Storage Systems	fully
Drive Train Technologies	fully
Vehicle System Integration	fully
Transport System Integration	partly
Grid Integration	partly
Safety	partly

Table 3: Coverage of roadmap Electrification of Road Transport by PPP EGVI

For the multi-annual implementation of the EGVI PPP, research priorities will be extracted from the roadmaps according to industry recommendations, and bearing in mind the scope decided for the initiative. Some subdomains of roadmaps will fully fall into the coverage of the EGVI, while for others only a part of the topics will be likely to be selected for coverage by the PPP. An example is given in table 3 for the roadmap Electrification of Road Transport.

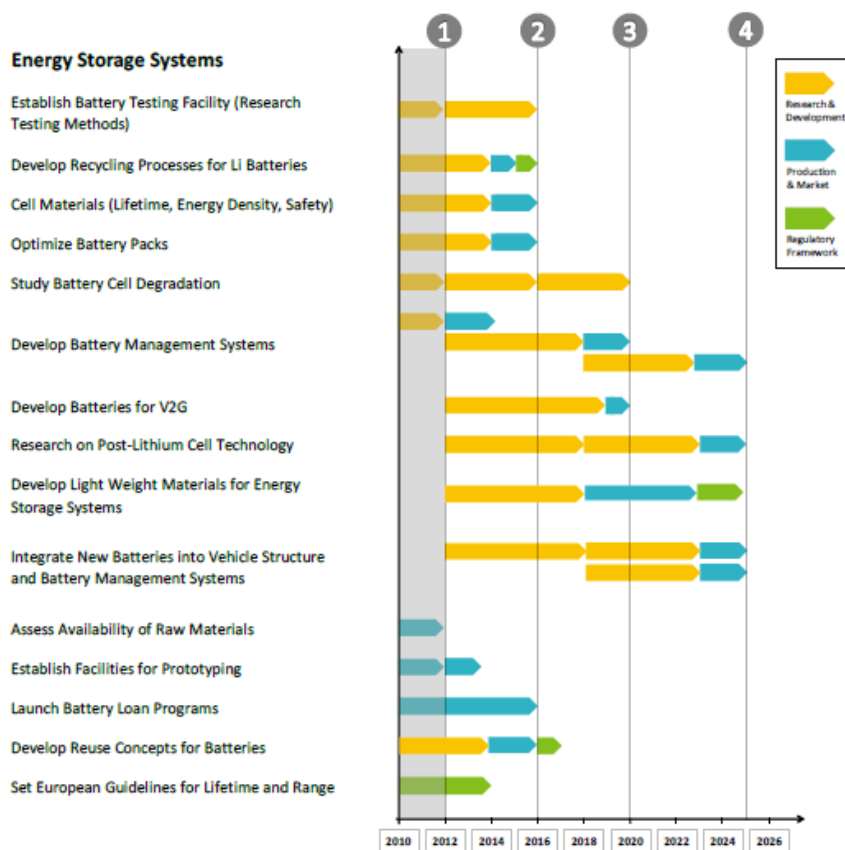


Figure 5: Chapter on energy storage systems of the electrification roadmap

On this basis, the content of the PPP EGVI can already be specified, and broken down into the technology fields covered. Concerning the timeline for coverage of the various subdomains, the PPP will base its work on the detailed roadmaps which state the different types and timelines of activities (research and development, demonstration, support to market introduction, standardization and regulation) which are necessary for the milestones and the objectives to be reached.

As an example, the detailed roadmap for the chapter on energy storage systems of the electrification roadmap is shown in figure 5. In agreement with the described focus of the PPP EGVI the pure materials research aspects in it will not be covered by the EGVI, whereas the application of new materials to cells will be fully in the scope of the R&D strategy. Such detailed roadmap for a subdomain exists for each subdomain of all the ETP roadmaps mentioned above as sources for the EGVI PPP.

The annual recommendations for funding topics will be made on this basis by the new PPP organization, with priorities selected by industrial delegates. The annual selection is therefore a matter for the future prioritization exercise, which should be open and flexible, and allow adaptation according to technology and market evolutions towards 2020. Figure 6 gives some (non-exhaustive) examples of technology content to be covered by the PPP.

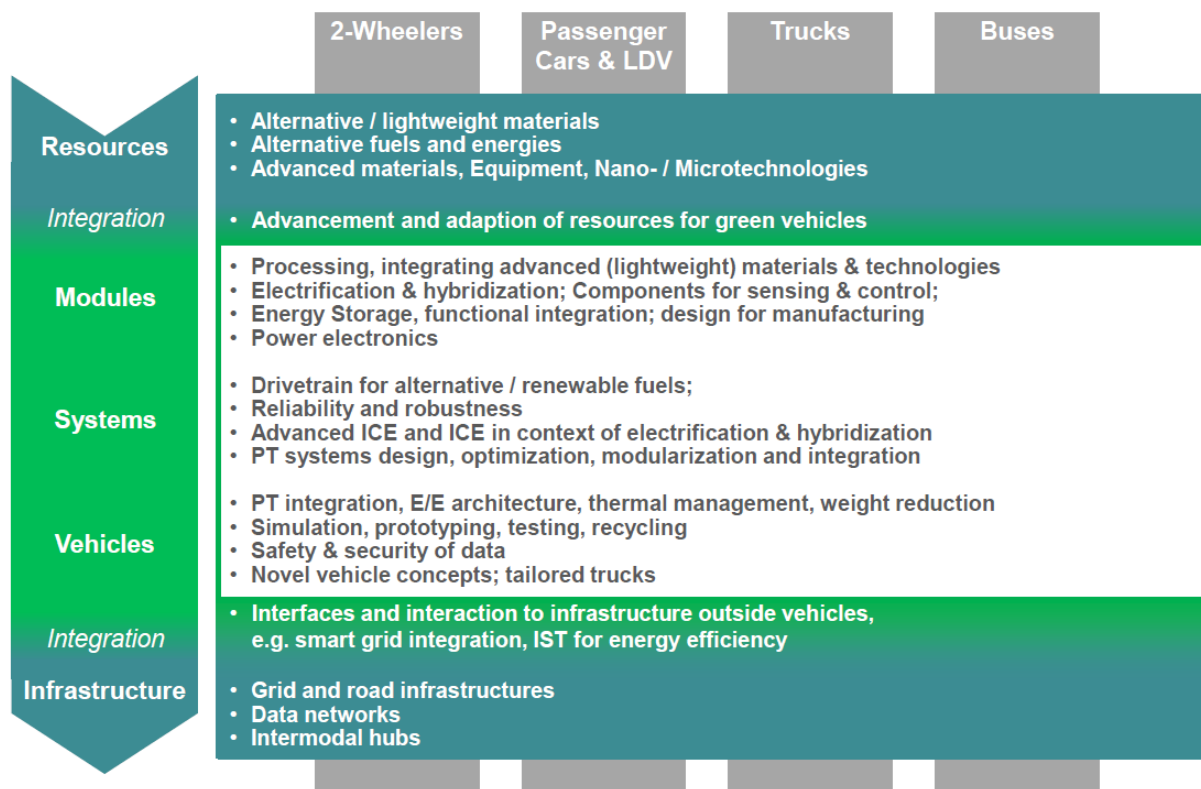


Figure 6: Examples of technology content of the PPP EGVI (light green)

PART III: Expected Impacts

- *Scale of the R&D involved and ability to leverage additional investments in R&D*

The impacts of the PPP have to be considered in relation with the general context of the industry in Europe and worldwide. The European automotive industry invests about EUR 30 Bn per year in research and development, 2/3 of it being currently allocated to improve the energy efficiency of the vehicles. This accounts for more than 12% of gross expenditure on R&D in the EU27⁹, and places the automotive industry at the first rank of the sectors investing in R&D in Europe, as shown by the report of the EC Joint Research Center (JRC) on Industrial R&D Investment¹⁰. With European automotive companies being at the top of this scoreboard of industrial R&D spending, the automotive industry can truly be considered as a European R&D champion.

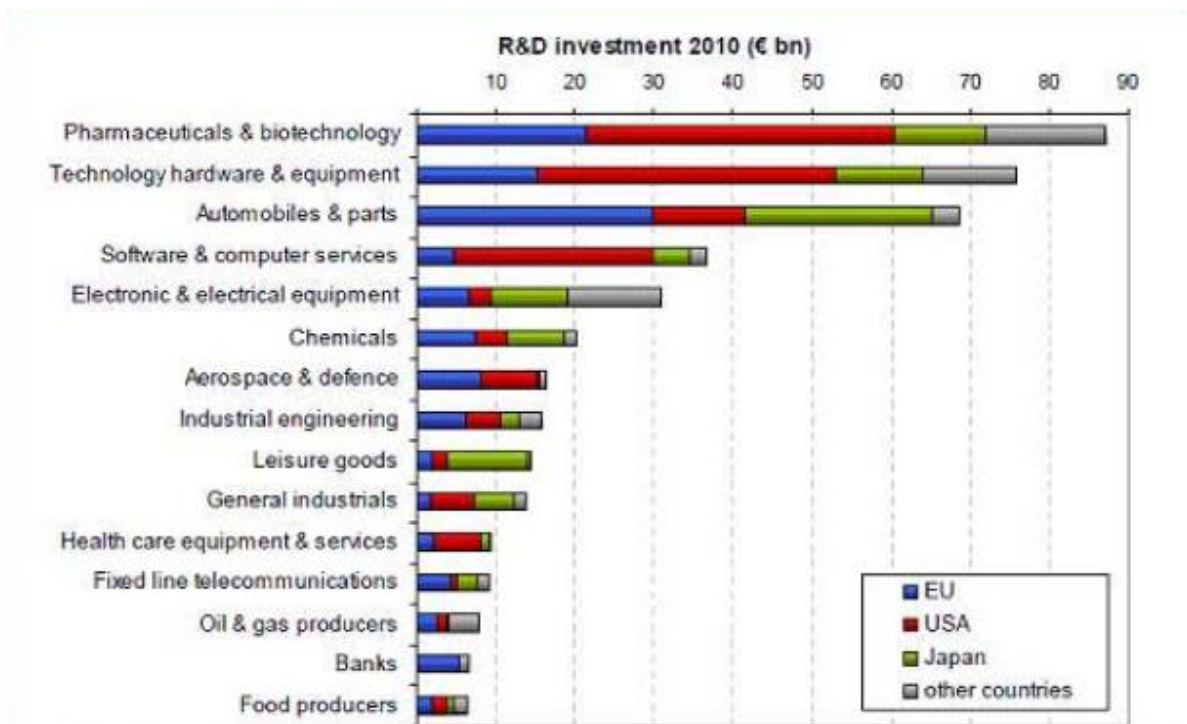


Figure 7: Ranking of industrial sectors by total worldwide R&D investment and share of main world regions for the world's top 1400 companies¹⁰

The JRC report also shows that R&D investments of the automotive sector in Europe are higher than the investments made by Europe's competitors, which proves the very high commitment of the European industry towards new technologies and innovation. The share of smart systems in the expenses for automotive R&D can be estimated to about 30% of total R&D expenses for automobile technologies, and it can be expected that it will even increase in the future.

Considering those levels of investments at European and worldwide levels, and looking at the objectives of the PPP, in the context of key European policies such as the Transport White Paper, a **total 7 years programme budget of EUR 3 Bn** seems necessary all along Horizon 2020, in order to constitute a critical mass and to bring tangible impacts. If one considers a funding rate in practice of

⁹ Eurostat, http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/R_%26_D_expenditure

¹⁰ European Commission, Joint Research Centre, 2011 Industrial R&D Investment Scoreboard

about 50%, this proposal **means a EUR 1.5 Bn EC funding**. Such EU program together with a nearly 5 times higher expected national funding by the Member States amounts to a total of 18 Bn € in public-private research program dedicated to energy efficiency. In order to illustrate the potentially high leverage effect of that funding the sum of EU and national funding can be compared with the 2/3 of the **total R&D spending of the industry** for energy efficiency and alternative drive trains which according to the JRC is **about EUR 30 Bn per year** (see figure above). It means an impact on about EUR 140 Bn of R&D dedicated to energy efficiency and alternative drive trains on average during the seven years duration of Horizon 2020: the EUR 1.5 Bn EU funding in the initiative together with the expected National funding of 7.5 Bn could therefore impact investments just on R&D up to nearly 15 times higher.

Even though there has not been much experience with the leverage effect of the novel instrument of a PPP in the domain of research and innovation so far, it can be argued that the PPP EGVI under optimal conditions could be able to achieve such **leverage effect of more than 10**, which would be remarkably higher than that achieved in regular R&D funding programmes. The reason for this assumption is the fact that the PPP is expected to spark a multitude of breakthrough technology developments. For technology developments which are much closer to market readiness, and which need little to no change in the innovation process, the leverage factor of R&D spending would be around 5 or even below for incremental improvements. In the case of the PPP EGVI, however, where many of the technical areas considered imply technology breakthroughs requiring long term and cost-intensive research and development efforts by the industry, the leverage effect can be much higher if these efforts are expected to lead to market success. Furthermore, the PPP can lead to serious efforts along the innovation chain besides R&D activities, e.g. extensive testing, which is cost intensive, and profound modifications to the manufacturing schemes, with eventually fully new production processes. A company that is spending several millions Euro in research per year on one of the breakthrough technology areas in view of the PPP EGVI is likely to spend easily 20 times more and sometimes even more than 50 times more in order to lead to that technology deployment on the market. These additional investments are secondary effects but could be particularly relevant to the establishment of a competitive electric vehicle battery manufacturing industry in Europe.

Since the EGVI PPP is focused on highly innovative technologies which require risky investments, the EU funding will make a substantial contribution to the overall innovation chain: promising results of European research projects, which are usually in a pre-competitive stage, leading to further investments within companies into in-house or other collaborative research projects, and if successful in development phases, consequently leading to massive investments in the view of production and market introduction of innovative technologies. In particular where significant breakthroughs are envisaged, the EU funding can be a substantial trigger for the overall innovation chain by covering those few % of the total R&D investments that are highly risky for the industry, but that can if successful lead to a cascade of investments towards a successful market introduction.

That funding by the EU has therefore a very important lighthouse role. One has to consider that the societal challenges driving the PPP and its projects are shared within the companies involved, which further invest in house in order to pursue the same objectives. Projects from the PPP can therefore have a high influence on the industry R&D. Moreover, the task of validating technology options by research and demonstration activities is also of very high value, especially because the EU framework programmes allow working throughout the European wide level, delivering an assessment across the

national markets, which is precious for the R&D of companies who are acting across all the EU countries.

In practice, the funding allocated by the European Commission to research and development is being complemented by funding from national and regional authorities. If one takes into account the investment of industry, public funding reaches a level of about only 3%, but of high importance particularly if focused on integration and systems approaches, as the results from this precompetitive research can later be further developed into new technologies, which resulted from a mix a funding, public and private. From this standpoint, the money spent at the European level has a multiplicative effect for the development of products, because it paves the way to investments in many companies in different countries. European research projects have the added value of reducing the R&D spending risk for the participating companies, because if a larger group is working together towards the same goal, then a risk-sharing effect takes place.

With the EGVI PPP, by setting up a well visible European programme for green vehicles, the European Commission will support the research excellence of the sectors in Europe and ensure that innovative technologies for greener vehicles will be developed by European companies within Europe. The realisation of the EGVI will offer the opportunity to strengthen the R&D base of the European automotive industry, which already files around 6300 patents per year¹¹. Also, these investments will benefit the sector of embedded systems and the energy sector, for instance boosting the development of smart grids, which are very key sectors for future growth opportunities in Europe. ICT and infrastructures industries and supply chains can also benefit from new market opportunities and new business models developed together with the deployment of electrified vehicles.

- ***Expected impacts on industry and society e.g. on competitiveness, growth, employment, trade, productivity, climate change and environment***

In addition to its leverage effect on R&D investments, the EGVI PPP will have positive economic and social impacts. In 2008 the launch of the European Green Cars Initiative was part of the European Economic Recovery Plan. Support to R&D in the automotive sector was at that time identified as a key measure to support one of the most important industrial sectors of Europe, which has major impacts on employment and economic activity. In brief, EU policy-makers had understood that supporting innovation in the automotive sector can help improve the entire EU economy and bring Europe out of the economic crisis.

The situation in 2012 is not very much different than the one in 2008: innovation is still seen as a very key aspect for the industry in order to remain competitive, to preserve its markets, and therefore to guarantee further employment and growth opportunities. Projects from the EGVI PPP and the resulting technologies and methodologies will lead to additional investments in Europe in engineering capacities, in production tools, in manufacturing facilities, in infrastructures, in new services, in maintenance services, in training, and so on, which overall constitute a very positive impact on the EU economy and society.

Looking at employment, about 12 Mn jobs, of which a majority are highly skilled, directly or indirectly depend on the European automotive industry¹². This represents about 6% of all employment in the EU. The 16 major car, truck and bus manufacturers in Europe operate 169 vehicle assembly and

¹¹ ACEA, www.acea.be/news/news_detail/automotive_sector_tops_rd_investment_scoreboard

¹² ACEA, Eurostat, mentioned in MEMO/12/419

engine production plants in 16 Member States¹³, often sustaining the economy of complete cities and regions. Automotive suppliers give direct jobs to about 5 Mn employees¹⁴, within large companies but also within a dense network of more than 3000 SMEs located all across Europe. Moreover, manufacturers and suppliers of the automotive industry are important costumers of sourcing industries such as metals, electronics, chemicals, plastics, textiles, glasses, etc, which are highly impacted by the growth rate of the automotive sector. This considerable socio-economic contribution of the automotive industry has to be sustained, and the related European value chains have to be strengthened and adapted to new challenges.

The expected innovations in the EGVI areas should contribute to supporting employment in Europe, for various levels of education: not only the R&D and engineering activities have to be retained in Europe, but also production and supporting services. Education and training can support the availability of a skilled workforce, and suitable measures will consequently contribute to improving the problematic situation in the labour market of many countries like high youth unemployment.

Another point is that only due to innovation will it be possible to compensate the future loss of employment in Europe. Today, most companies are setting production capacities in China, South America and in Europe's neighbouring countries, in particular for products based on conventional technologies and older platforms. From this standpoint, the innovation approach compensates this trend with new products integrating innovative technologies, which are designed for the European consumers, and better fit for a production in the EU. Linked to that aspect, one key target is the improvement of the productivity of the European automotive industry, defining productivity as a measure of the efficiency of production (output-input ratio), which can be impacted by targeted R&D on design and manufacturing. The scale of impact on competitiveness is difficult to quantify but, as also stated in the CARS21 report, it is clear that the technological leadership and high productivity of the EU automotive industry remain its key competitive factor on the global scale.¹⁵ The EGVI PPP will support R&D investments that have an influence on productivity and competitiveness, impacting, in turn, key economic indicators such as jobs, growth and trade.

Concerning trade, the size of the European automotive sector and its global orientation play a significant role in the Europe Union's trade balance. In 2011, there was a positive contribution to the EU trade balance of almost EUR 92 Bn.¹⁶ To a certain extent, the EGVI PPP can support this positive trend by accelerating the development of new technologies and products addressing the needs of consumers worldwide, at competitive cost, meeting expectations in aspects such as quality and reliability, fuel efficiency and emissions, connectivity and comfort, etc, outperforming competitors.

Relating to growth, producing 15.8 Mn vehicles (20% of the world market in 2010) and exporting parts and accessories from Europe worth EUR 33 Bn¹⁷, the European automotive industry involved in the EGVI has important factors for supporting growth and stabilizing the economic cycle in Europe. Growth is expected in various areas covered by the PPP and in particular within the objective of electrification of vehicles, which covers several domains where important new opportunities for growth have been identified (electric drive train components, batteries, novel architectures and

¹³ ACEA, 2011 Annual Automotive Statistics Overview

¹⁴ CLEPA, European Association of Automotive Suppliers

¹⁵ CARS 21 High Level Group on the Competitiveness and Sustainable Growth of the Automotive Industry in the European Union, Final Report 2012, 6 June 2012

¹⁶ Eurostat, mentioned in MEMO/12/419

¹⁷ CARS21 Final Report, Brussels 2012

concepts, ITS, light materials, services for e-mobility, smart grids management, amongst others). Other supporting measures than R&D support linked to the electrification can also have a high impact on economic activity in European, such as investments in infrastructure, public procurement programmes and support to production facilities..

For the overall impact of the EGVI on climate and environmental aspects, references have to be made to the ERTRAC Strategic Agenda, and to the specific roadmaps feeding the PPP. In the ERTRAC SRA¹⁸, decarbonization is considered as a Grand Societal Challenge for the road transport sector, and guiding objectives on energy efficiency improvement have been set, both for urban passenger transport (+80 % in pkm/kWh) and for long distance freight transport (+40% in tkm/kWh) in 2030 compared to 2010 levels. The contribution of the EGVI to these objectives can be assessed as very important, because the scope chosen for the PPP - energy efficiency of vehicles - including electrification, hybridization, advanced ICE's and adaptation to alternative fuels, will constitute a large part of the energy efficiency gains towards these objectives. More details about energy efficiency improvements and CO₂ saving expectations for each technology can be found within the different roadmaps.

- ***Specific objectives of the EGVI PPP***

The specific objective of the EGVI PPP is to integrate and demonstrate at least 40 innovative technologies in green vehicles and mobility system solutions on component, systems and vehicle level. Among them, 20 will concern innovative powertrain systems/technologies, including adaptation to alternative fuels and new vehicle concepts. The other 20 will be in the areas of electric storage systems, electric components and systems, and interfaces between vehicle and infrastructure. These innovative technologies shall lead to an improvement of the energy transport system efficiency by 50% from 2010 to 2030, including +80% energy efficiency of urban vehicles and +40% energy efficiency of long distance freight transport. Another goal is the deployment of alternative powertrains like electric and plug-in hybrid technologies, according to milestones in 2016 and 2020 and matching respective performance parameters, as described in the Electrification roadmap: 5 million Electric and Hybrid Vehicles in the EU by 2020 (0,5 million by 2016); battery life-time and energy density doubled, at 30% lower cost, in 2020 compared to 2009 Li-Ion technology. Moreover, these expected innovations shall lead to the creation of 10 new types of high-skilled jobs through knowledge transfer and training.

Key Performance Indicators:

A number of core key performance indicators (KPIs) have been identified at the PPP implementation level and project impact level. They will serve to analyse the progress towards the specific objectives of the initiative.

At the PPP implementation level, progress will be examined on the basis of the development of new systems and technologies, participation and benefits for SMEs, contribution to the reduction of energy use and CO₂ emissions, number of electric and hybrid vehicles, contribution to the reduction in the use of material resources, development of new high-skilled profiles and new curricula, mobilisation of private investment in relation to the PPP activities, and contributions to new standards. At the project impact level, the key performance indicators correspond to the scale of

¹⁸ ERTRAC Strategic Research Agenda 2010

reduction in energy, material resources and waste, the project results taken-up for further investments (into higher TRLs), the advance of trainings for a higher quality workforce, and the development of patents and activities leading to standardisation.

It should be noted that the assessment of R&D programmes and project according to such KPIs may be complicated due to the lack of predictability of success or failure which forms the basis of any research.

- ***Added value of action at EU level and benefits of a Contractual PPP instrument***

Acting with a PPP at European level is of added value complementary to national and local actions, because vehicles and mobility services have to be developed for international markets, using standardized cross-borders solutions, and need to be able to compete on a worldwide basis. Therefore industrial players from the automotive and energy sectors see such a programme at European level as a necessary step for the development of innovative competitive solutions ready for deployment across Europe.

The Contractual PPP model as proposed for the EGVI offers the best-possible combination of the technological needs of the European industry, the expertise of the leading European stakeholders, and the experience of the EC, in successfully managing large collaborative public research programmes for many years. The EGVI PPP will provide the right contents for the right European programmes and will develop appropriate links with national programmes and other European schemes. These include the EIB financial instruments, the ERA-NET and ERA-NET+ initiatives like as the Electromobility+, as well as if possible with the TEN-T programme; the Structural Funds; and education and skills programs.

The EGVI topics include activities offering significant opportunities but with high level of risk. Consequently it cannot be expected that all results will be achieved exactly as planned. However, without public financial support for these projects, it is likely that there would be much less or no opportunity at all to address these challenges. Furthermore European Programmes such as the Framework Programmes for Research and Innovation are today the only ones where research collaboration with practically all leading researchers worldwide is possible.

Benefits of using a Contractual PPP instrument:

- Secured commitment of industry and the EC to meet critical societal and industrial policy objectives;
- Builds on success of the European Green Cars Initiative in FP7, which has successfully demonstrated the added value of a basic PPP concept;
- Efficient management: leaner and faster organisation and governance, obtaining the benefits from a formalization of the partnership (less time to set up, reduced costs, less legal and administrative burdens) without the efforts of an institutionalization;
- Openness to the participation of a wide stakeholder group, including newcomers and smaller players, in transparent procedures, public consultations and open competitions, and enabling also a wide inclusion of particular experiences from all EU countries;
- Emphasis on defining clear directions and priorities through Roadmaps which have gained wide consensus through the activities of the underpinning Technology Platforms;

- Greater flexibility and agility, capable of responding more rapidly to emerging opportunities in terms of technological development on one hand and to unforeseen, adverse conditions and a shifting economic situation on the other;
- Appropriate structuring of programmes and individual projects in order to guarantee adequate coverage of all research priorities and provide potential synergies in order to enable the pre-determined targets and milestones to be achieved;
- Facilitating the collaboration between competitors on a wider range of topics, thus strengthening the competitiveness of the EU industry as a whole;
- Higher efficiency achieved by avoiding overlapping between smaller competing collaborative projects (CPs) while focusing on complementing rather than replacing the conventional CP programme;
- High degree of accountability, through the continuous review and monitoring of progress over the course of H2020, being a clear task of the PPP, using the roadmaps;
- More opportunities for creating coherence and complementarities with the diverse landscape of member states funding policies in the field.
- Continuity to take advantage of excellent expertise and experience of Commission in its management of collaborative R&D programmes, in view of their policy frameworks;
- Greater focus on the integration of supportive measures like standardization or training and education through dedicated actions.

- ***Proposed arrangements to monitor and assess progress towards the objectives.***

The activities of the PPP EGVI will be regularly evaluated in order to monitor and assess their performance, for example, in terms of the key performance indicators, the leverage effect or the socio-economic impact. In view of the specific structure of the PPP such evaluation needs to be carried out both internally and externally. The internal evaluation comprises a self-regulating mechanism based on the comparison of current project activities and results with the original annual implementation plan. The required steps of project monitoring and program assessment are fully integrated in the feedback loop of program consultations which constitutes the PPP operation. They are thus a core task of the PPP governance organization. The external evaluation assesses whether the impact of the PPP EGVI is progressing towards the objectives set by the European Technology Platforms and the European Commission. It may give direction for necessary adjustments in case of major deviations or changing framework conditions. Such external evaluation has to be based on evident facts about project results and credible information about their use in the innovation chain. It can only be carried out by an independent entity which is well accepted by both the public and the private sides. It will collect information on specific projects on a trust basis, and anticipate their contribution to the goals of the PPP. The findings will be published in a generalized manner as an annual progress report which may also give advice to the European Commission and the ETPs. The independent entity should refer to a group of senior experts and could be constituted by e.g. a contract with the EC and the PPP EGCI Association or in the framework of a specific Coordination and Support Action.

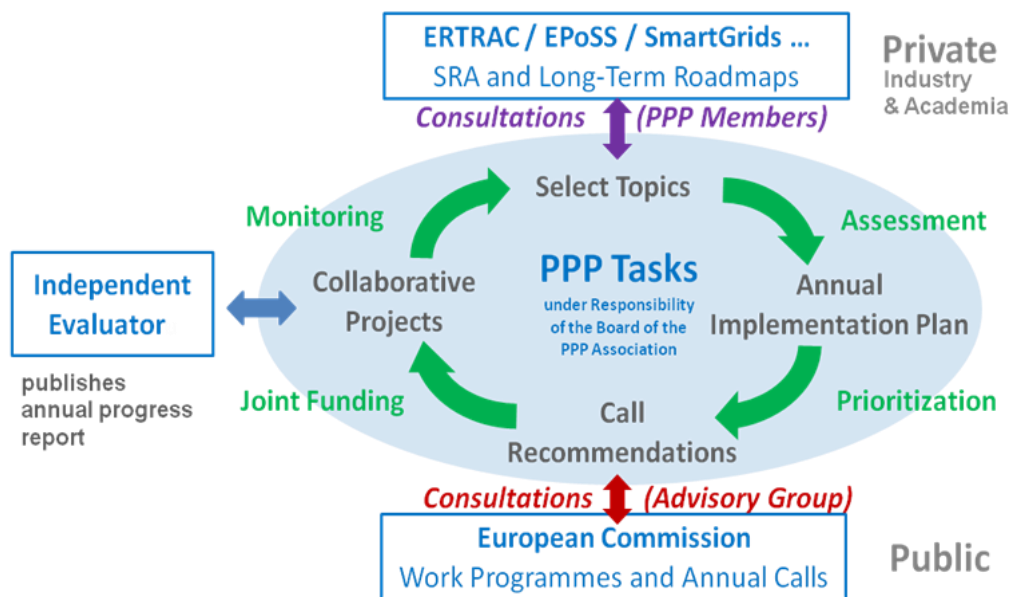


Figure 8: Feedback loop of programme consultations in the PPP

There are comparable initiatives already going on in other economies such as the US¹⁹ and to a certain but limited extend, there are also EC-funded initiatives²⁰ but without the critical mass to cover all the projects and topics in question.

¹⁹ www.starmetrics.nih.gov

²⁰ See CAPIRE report “ Impact Assessment of Publicly Funded Collaborative RTD Projects”, www.capire.eu/public/2011-capire-deliverables/CAPIRE_D12_ProjectAssessment_2012-02-27.pdf/at_download/file

PART IV: Governance

- ***Governance model of the partnership***

The contractual Public-Private Partnership ‘European Green Vehicles Initiative’ will be established based on Article 19 of the Horizon 2020 regulation, through a contractual arrangement between the Commission and the Private Side. This contractual arrangement will specify the roles and duties of the private and public parties, as well as the objectives of the partnership, the respective commitments of the partners and the indicative financial envelope for the European Commission contribution for the years 2014-2020. It will have the nature of a Memorandum of Understanding.

The Private Side of the PPP will be represented by the European Green Vehicles Initiative Association (EGVIA), a legal entity created in the form of an international non-profit association under Belgian Law. The role of the Association is to engage in the contractual PPP with the European Commission and collaborate with the EC services for the implementation of European framework programmes on research, technological development along the value chain, and demonstration. Acting as the representative of the Private Side, it will formalise the principles of work amongst the interested members with the view to developing and prioritizing its research priorities, disseminating information and promoting the partnership and its collaborative cooperation.

The Partnership Board of the EGVI PPP will be established as the governing body of the public-private partnership. It is the main mechanism for dialogue between the European Commission and EGVIA and will act to reach the aims foreseen in the contractual arrangement. Within this body, private and public sides meet on a regular basis in order to jointly prepare the Work Programmes of the European Green Vehicles Initiative PPP. EGVIA will nominate the Private Side members of the Partnership Board, who will represent the wider community of stakeholders involved within EGVIA, particularly the ETPs ERTRAC, EPoSS, and SmartGrids, and be responsible for preparing, in collaboration with the Commission, proposals for topics to be covered in the Work Programmes, as well as any updates of the PPP Multiannual Roadmap. These members will commit themselves to provide advice in their relevant fields of expertise to the best of their ability and in the best interest of Community research.

- ***Openness, transparency and representativeness***

EGVIA is committed to operating on principles of openness and fairness. Using the wide stakeholders basis of the European Technology Platforms ERTRAC, EPoSS and Smart Grids, the Association will organise the tasks of delivering viable research topics recommendations across the community, monitoring program progress and continuously evaluating the efficiency of the activities, as well as of building communication channels with the European Member States, and the research community across Europe.

Any company, institution, research organisation, university or sector association that deals with relevant activities in research & development, demonstration, industrialisation or deployment of technologies and services covered by the EGVI PPP is welcome to join the Association. Its representativeness relies on the great diversity of actors involved: the EGVIA membership includes multiple types of actors, from global companies to SMEs, universities, research organisations, regional innovation clusters and associations. All can contribute to its activities on an equal basis, independently of their size or domain. Therefore, SMEs are also encouraged to engage and be

represented in the Association, either through direct membership or via their participation in sector associations.

All membership applications are presented and considered in a fair and transparent manner at the General Assembly and decisions concerning their admission are taken by the majority of the votes expressed. Today, all categories of members are represented within EGVI: its membership is composed of 57 full members from both the industry and research sectors, and 7 associate members.

The structure of the Association guarantees that the work is carried out in a transparent manner. The decisions of the Executive Board and of the Secretariat are subject to the scrutiny of, and approval by, all the members. Meeting on a regular basis, the General Assembly is the supreme body of the Association. It approves the general policy of EGVI on the basis of proposals of the Executive Board and gives recommendations for its implementation. All members can examine, question and decide upon issues affecting the Association.

In addition, EGVI will implement the appropriate consultation processes to ensure the adequate involvement of all relevant stakeholders in the preparation of the inputs to the Commission and in the projects. Therefore, conferences, workshops and opportunities for the building of consortia will be organized with a principle of openness, all members being invited to all events. Working documents will also be spread across all the members, in order to gather the input from the whole research community working on the EGVI topics, in an open and transparent manner. A Board Observer, representing the research members and directly elected by them, will attend all Executive Board and Partnership Board meetings. Within the Partnership Board, the representatives of the Private Side will work on the basis of the inputs commonly prepared by all EGVI members and thus guarantee a proper representation of the diversity of stakeholders. They will regularly report on the activities of the Partnership Board at the General Assembly meetings of the Association.

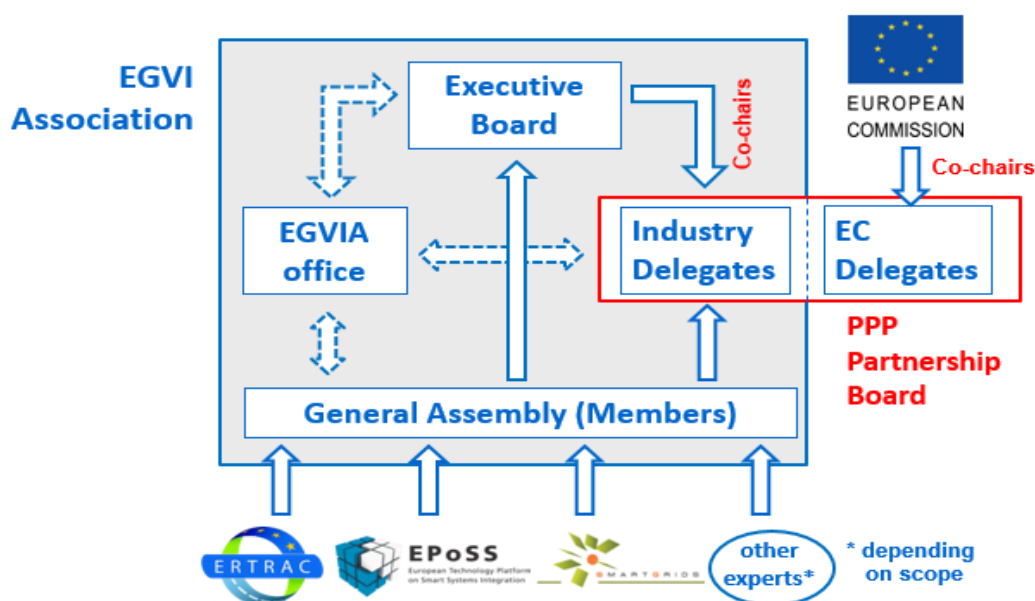


Figure 9: European Green Vehicles Initiative Association governance model

- ***Information and results sharing***

EGVIA guarantees that information is available to the public in an accessible manner, in compliance with the Horizon 2020 Rules of Participation. To achieve widespread dissemination of information on projects and activities, EGVIA will develop a number of communication tools open to the public as well as publications available for free and project reports published on an open-source basis. The findings of the monitoring and assessment process will also be published in a generalised manner in the form of annual progress report which may give advice to the European Commission and the ETPs.

Contacts:

info@ertrac.org

contact@smart-systems-integration.org

Annex: EG VIA Membership and Bodies

List of EG VIA members

- Automotive OEMs (13): BMW, CRF – Centro Ricerche Fiat, DAF Trucks, Iveco, Jaguar Land Rover, KTM Sportmotorcycles, MAN Truck & Bus, Piaggio, PSA Peugeot Citroën, Renault, Scania, Volkswagen, Volvo.
- Automotive suppliers (15): AVL List, Bosch, CIE Automotive, Continental, ESI Group, FEV, Fraunhofer LBF, Hidria, IFPEN, LMS International, Magneti Marelli, Mondragon Automoción, Ricardo, Teknia Manufacturing Group, Valeo.
- Smart Systems Industry (4): Infineon Technologies, NXP Semiconductors, Siemens, ST Microelectronics
- Smart Grid Industry (1): Iberdrola
- Research Organisations (13): AIT – Austrian Institute of Technology, CERTH – Center for Research and Technology Hellas, CONCAWE, DLR – German Aerospace Center, ERPC, Hexagon Studio, IDIADA Automotive Technology, IK4 Research Alliance, Stiftelsen Sintef, Swerea IVF, Tecnalia Foundation Research & Innovation, TNO, Virtual Vehicle.
- Universities (11): Aristotle University of Thessaloniki, Chalmers University of Technology, CMT – Technical University of Valencia, Czech Technical University in Prague, KU Leuven, Mondragon University, Politecnico di Torino, Technical University Darmstadt, Technical University Eindhoven, UNIFI - University of Florence, VUB - Vrije Universiteit Brussel.
- Associate Members (7): ACEM, CLEPA, EUCAR, FEHRL, MOV'EO, RECHARGE, Sernauto.

Composition of the Executive Board

- Chairman: Wolfgang Steiger (Volkswagen)
- Vice-Chairmen: Jean-Luc di Paola-Galloni (Valeo), Günter Lugert (Siemens)
- Secretary General: Josef Affenzeller (AVL List)
- Board Observer representing the Research Members: Klaus Kersting (IDIADA Automotive Technology)

Private Side members of the Partnership Board

- AVL List, BMW, Bosch, Continental, CRF – Centro Ricerche Fiat, FEV, Fraunhofer LBF, Hidria, Iberdrola, IDIADA Automotive Technology, IFPEN, Infineon Technologies, NXP Semiconductors, PSA Peugeot Citroën, Renault, Ricardo, Scania, Siemens, ST Microelectronics, Valeo, Volkswagen, Volvo.
- Secretariats of ERTRAC, EPoSS, Smart Grids