



**EGVI**

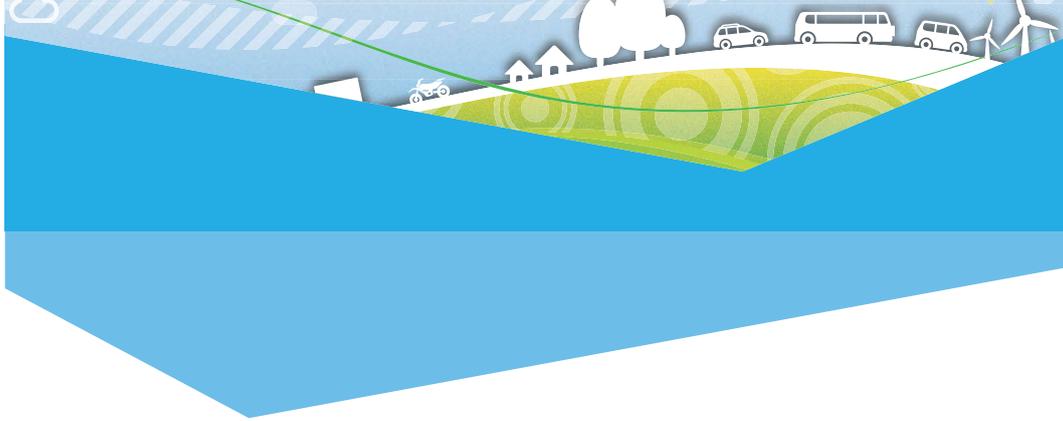
European Green  
Vehicles Initiative

# Impact Assessment of the European Green Cars Initiative

*Executive Summary*

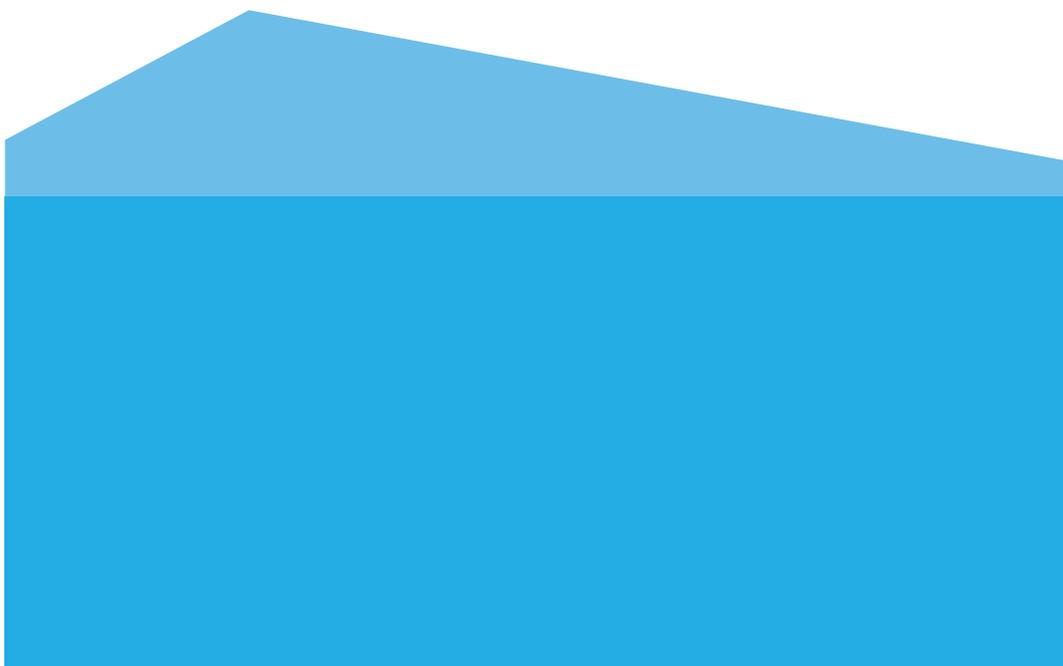






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## Impact Assessment of the European Green Cars Initiative

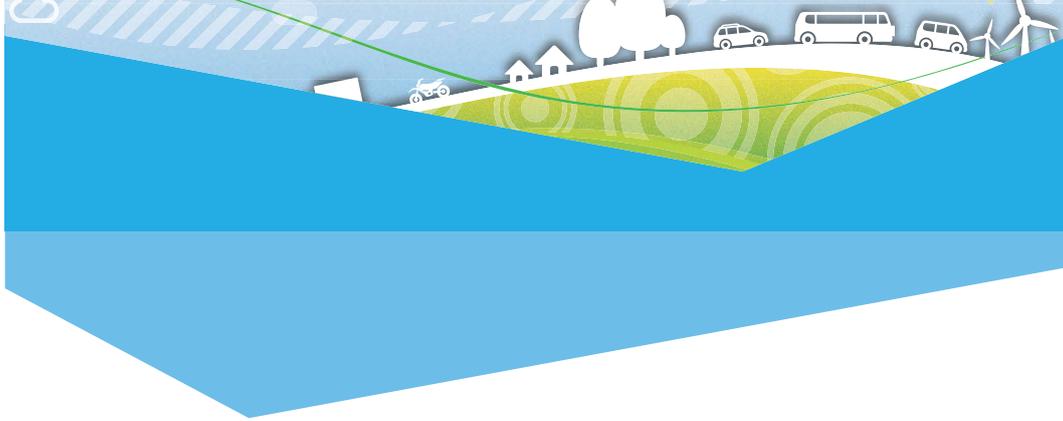
This document presents the results of the **Impact Assessment** of European Green Cars Initiative (EGCI). The assessment was performed between end of May and end of December 2015. As a reminder, EGCI is one of the three **Public Private Partnerships (PPPs)** launched by the European Commission in 2008 as part of the European Economic Recovery Plan. The purpose of the EGCI PPP is to **support Research & Development (R&D) activities** that are able to bring **alternative powertrain technologies** for the development of the Electrification of Road Transport in Europe **with efficient use of clean energies**. This impact assessment of EGCI activities is the result of a joint effort of the European Green Vehicle Initiative Association (EGVIA), its member companies & the European Commission.

We designed and implemented an approach combining:

- > **Bulk data** from European Commission, EGVIA and the different European Automotive Associations (notably ACEA, CLEPA, EUCAR & EARPA)
- > **44 answers from ad-hoc questionnaire**
- > **40+ interviews** with project coordinators and senior managers from the automotive industry ecosystem
- > **3 workshops** organized during the following events: EGVIA, EARPA and EUCAR Annual General Meeting.

Therefore, our approach combined a bottom-up scheme complemented by a top-down scheme.

<sup>1</sup> TRL : Technology Readiness Level



EGCI PPP used an approach with complementary and **clustered projects** focused on families of technologies related to EGCI Roadmap and addressing TRLs<sup>1</sup> **3 to 6**, corresponding to **pre-competitive research activities**. The latter were performed in a multi-stakeholders environment representing the **baseline for the development & industrialization activities** of the organizations involved for the next 5 to 10 years. The level of participation was particularly high with 1379 public & private stakeholders involved in **113 EGCI projects**.

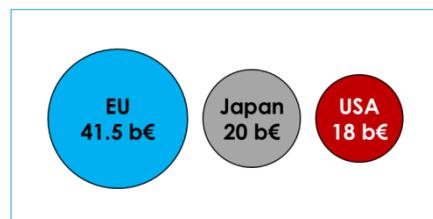
## EXECUTIVE SUMMARY CONTENT

European automotive industry landscape

1. Fuelling innovation & putting the European automotive industry at the leading-edge
2. Significant economic impacts on European automotive industry
3. Multi-stakeholders approach fostered significant technological achievements for the whole value chain
4. Maintaining, preserving and whenever possible creating jobs in the European automotive industry
5. Promoting Electrified Vehicles for Environmental benefits
6. Extended positive impacts of the EGCI through replication at national levels
7. PPPs such as EGCI are unique for the performance of pre-competitive R&D

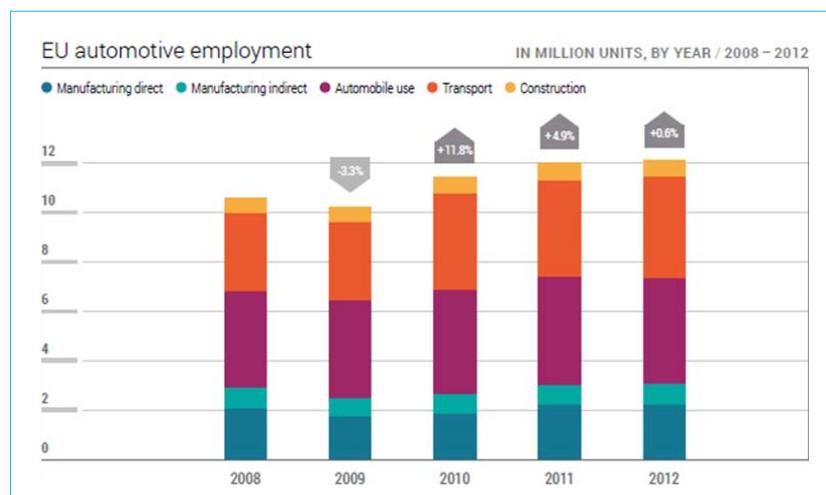
## European automotive industry landscape

The European automotive industry is the **world leader in terms of R&D expenditure** with a budget of 41.5 billion € per year<sup>2</sup>.



It represents **12.1 million jobs** in the EU, among which 3.1 million are high-skilled jobs in automotive manufacturing.

**17.2 million motor vehicles** were manufactured in the EU in 2014, out of 90.6 million worldwide. 87% were passenger cars.

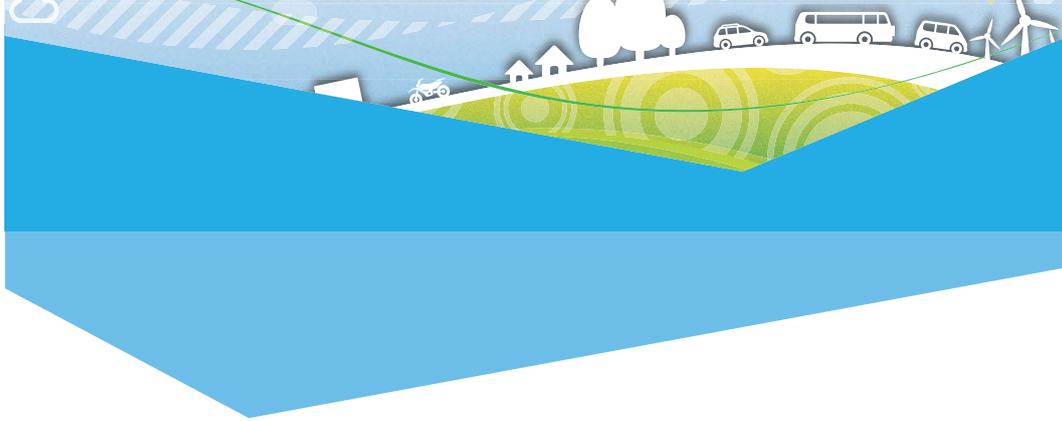


Between 2010 and 2014, 153 000 Electric Vehicles (EV) were registered in the EU<sup>3</sup>, distributed between:

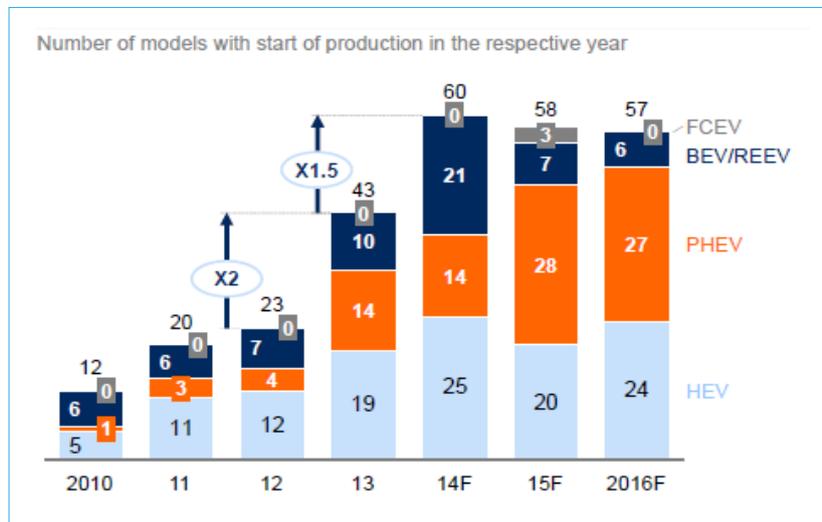
- > 86 000 Battery Electric Vehicles (BEV)
- > 67 000 Plug-in Hybrid Electric Vehicles (PHEV).

<sup>2</sup> European Automobile Manufacturers Association, The Automobile Industry Pocket Guide, 2015-2016

<sup>3</sup> JRC Science & Policy Report, Electric Vehicles in the EU from 2010 to 2014 – is full scale commercialisation near?, 2015



2013 represented a key time for the capacity production of OEMs in terms of electrified vehicles: **the number of EV model launched** (including hybrid vehicles) **almost doubled** between 2012 (23 models) and 2013 (43 models). The projections for 2016 are a total of 57 new EV models<sup>4</sup>, testifying the dynamism of the value chain in this area.



In terms of environmental issues, the **EU's CO<sub>2</sub> reduction targets** for passenger cars **are ambitious**:

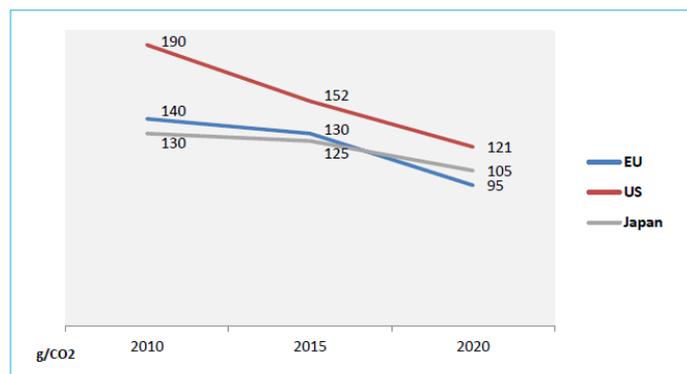
> 95 g CO<sub>2</sub>/km by 2020,

compared to:

> USA: 121 g CO<sub>2</sub>/km,

> China: 117 g CO<sub>2</sub>/km

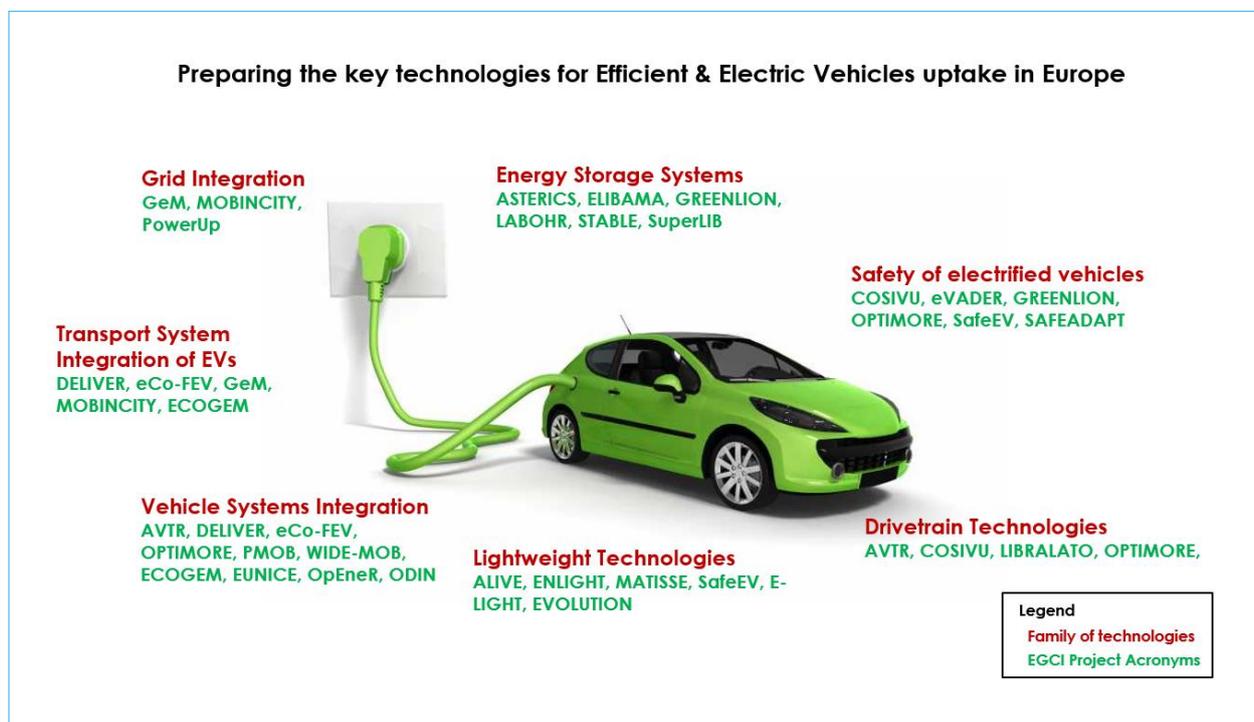
> Japan: 105 g CO<sub>2</sub>/km.



<sup>4</sup> The Amsterdam Roundtables Foundation & McKinsey, Electric Vehicles in Europe: gearing up for a new phase?, 2014I

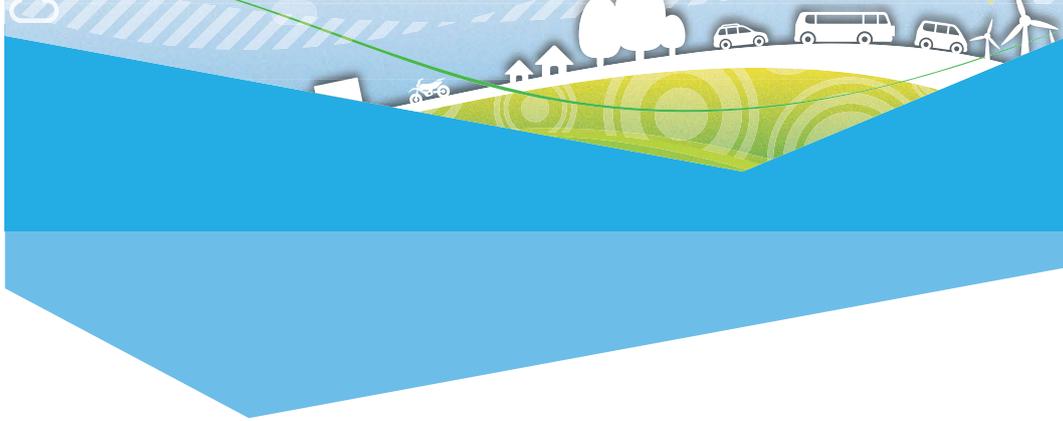
## 1. Fuelling innovation & putting the European automotive industry at the leading-edge

EGCI created momentum in the whole European automotive industry to share common views on the future and stakes of electrification. It established a baseline for further in-house developments and put the European automotive industry at the leading-edge.



### BUILDING A COMMON VIEW AND PAVING THE WAY OF R&D IN ROAD ELECTRIFICATION

With 4 calls for proposals launched between 2010 and 2013, EGCI fostered the **sharing of common views** and the set-up of **R&D roadmaps** commonly shared by industry, research partners & policy makers, giving some structure to the **automotive industry ecosystem at European level**. EGCI enabled public & private stakeholders to co-define innovation policies, work together on pre-normative standards,



and **align their research priorities** in electrification of road transport at European level. In addition, EGCI constituted a unique opportunity for the OEMs, SMEs, Tier 1s & 2s, RTOs and universities involved in the automotive industry at European level to be part of a **community of practice** and develop R&D schemes in an **Open Innovation ecosystem**. EGCI created a **baseline for further in-house developments** and **vitalize the European automotive industry** competitiveness at worldwide scale.

### Preparing key technologies for Efficient & Electric Heavy-Duty Vehicles uptake in Europe

#### Energy Management & Efficient Auxiliaries

AVTR, Convenient, Deliver, ICE, Maenad, NO WASTE, OpEneR, PMOB, PowerUp, SMARTOP, SuperLIB

#### Matching Vehicle to Operation

DELIVER, TellSys

#### Hybrid Powertrain

LIBRALATO, Convenient, Core

#### Driver Efficiency

eCo-FEV, Convenient, Deliver, GeM, LORRY, OpEneR



#### Innovative High Efficiency Energy Conversion

AVTR, Convenient, eCo-FEV, ICE, NO WASTE, PMOB

#### Design Dimensions for Optimised Load Capacity

DELIVER, TellSys

#### Waste Heat Recovery

NO WASTE

#### Low Rolling Resistance

LORRY

#### Friction

Core, LORRY

#### The Safe & Intelligent Truck

Convenient, LORRY, MAENAD

#### Legend

Family of technologies  
EGCI Project Acronyms

## SIGNIFICANT INCREMENTAL AND BREAKTHROUGH TECHNOLOGY CO-DEVELOPMENT

The 113 EGCI **pre-competitive collaborative research** projects **spurred innovation** putting the European automotive industry **at the leading-edge**. **Significant incremental and breakthrough technologies** were **co-developed** by the automotive industry and research partners in several **areas**, notably:

### > *Battery Technologies*

Several breakthroughs and incremental innovations have been achieved in this area thanks to the 54 projects covering those topics. Significant advancements have been made in the improvement of battery lifetime (increase of life time of the battery by up to 30% in realistic driving situations) and energy density (148 Wh/kg at system level demonstrated), contributing to reduce range anxiety for end users; reduction of the Total Cost of Ownership of electric vehicles, reduction of the cost of cell production; development of wireless charging solutions ...

### > *Lightweight design*

The 13 Green Cars projects covering this area allowed significant improvement in the introduction of lightweight materials such as hybrids, CFRPs or thermoplastics, cost reduction thanks to volume savings. The Life Cycle Analysis (LCA) was also taken into account under this particular area.

### > *Safety systems*

Funded projects will contribute to achieve a similar level of safety as the one of conventional vehicles. Among the 30 projects covering this item, several improvements have occurred in the pedestrian warning and detection systems, new procedures for testing (also thanks to modelling and simulation tools) as well as the interlink with scarce materials and lightweight of electric vehicles.



> *Smart grid development*

The 10 projects funded under Green Cars allowed development of the Vehicle to Grid and Vehicle to Infrastructures common interfaces as well as development of pre-normative standards for interoperability.

> *Drivetrain technologies*

Covering both passenger cars and heavy-duty vehicles, promising results have been achieved in engine downsizing, hybridisation, optimisation of electric drivetrain ...

> *Energy management and recovery*

Significant improvements have been achieved both for passenger cars and heavy-duty vehicles in steady heat recovery potential, development of vehicle individual energy consumption model that considers specifics of electric drives including recuperation, improvement of energy efficiency of auxiliaries ...

**Technological innovations** most often were derived from **cascading EGCI projects**.

The latter engendered several **incremental innovations** addressing mainly TRLs 3 to 6. These incremental innovations are easier to integrate in the electric car architecture and even in the whole vehicle fleet within 5 to 10 years.

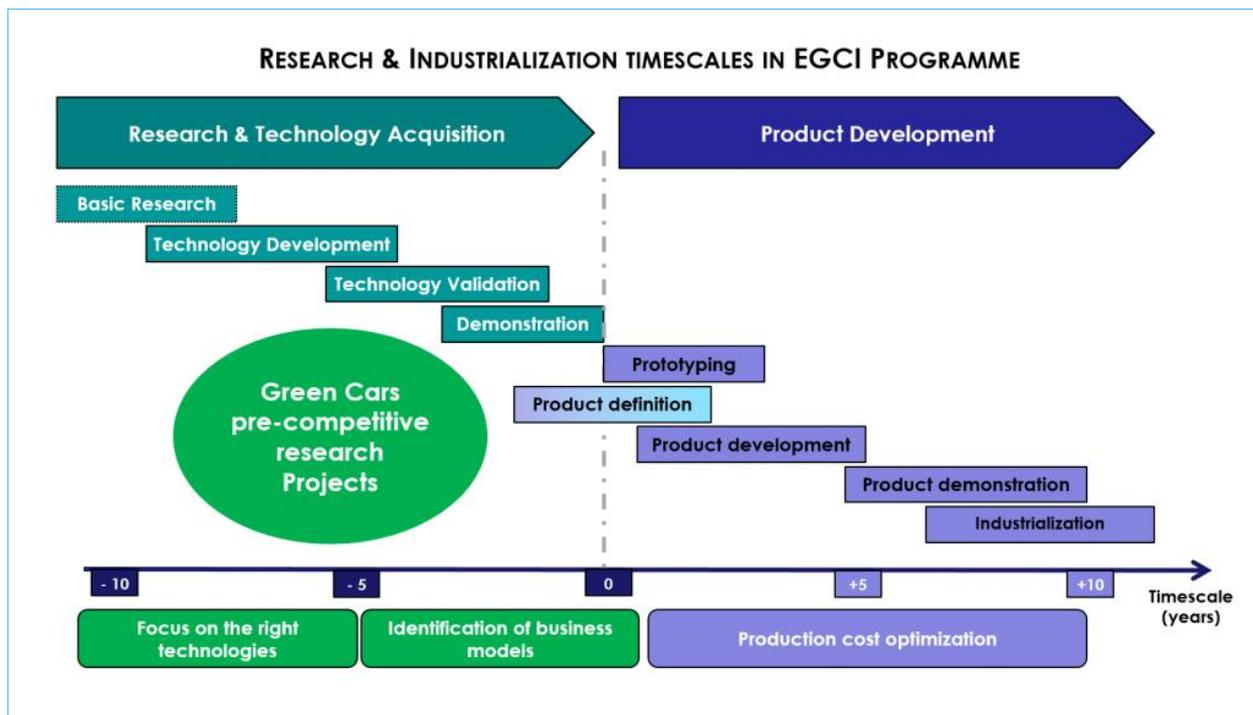
EGCI projects contributed to create a **knowledge base in the electrification** field and improved the understanding of industry partners in terms of battery costs, energy density and the lifetime of the components.

## OPTIMIZED PATENTS POLICY

These technological outcomes enabled industry & academic partners to submit **72 patent applications** in the technologies highlighted in the EGCI roadmap; the industry partners generally shared some of their patents portfolio as a **background asset**. This approach with Intellectual Property fostered the cooperation of the partners and **enabled them to co-develop and exploit new patents**.

## 2. Significant economic impacts on European automotive industry

EGCI contributed to significant economic impacts for the whole value chain of the European automotive industry. However, research in the automotive industry takes time and the market uptake of technological innovations derived from EGCI will be visible in 5 to 10 years time. Therefore, a sustainable mid-term funding strategy is of pivotal importance.



### SHARED R&D EXPENDITURES - LEVERAGE EFFECT OF EGCI ACTIVITIES

Over the four years of EGCI, the European Commission provided a financial contribution to project partners to a total amount of **€418 million**, which has been complemented by **private stakeholders' co-investment in EGCI pre-competitive research projects**, to a total budget of **€662 million**. Nevertheless, **OEMs & research partners invest about 3 to 5 times** the funding coming-in from European programmes.

In parallel to the participation to EU collaborative research project, the automotive & parts sector is investing a lot in R&D activities; for the year 2014 alone, it spent **€41.5 billion in Research & Development** activities, putting it as the first sector for R&D investment in the EU. The research activities of the **OEMs & TIERS 1** represent **about 5 to 10% of their total R&D budget**, the rest being dedicated to the Development activities (TRL 6 and above).



Moreover, less **than a third of the research budget is dedicated to new powertrain technologies**. Therefore, the European funding received through EGCI is extremely important for the pre-competitive research activities of the industry partners to bring new ideas and solutions from research & development to innovation.

### COST OPTIMIZATION

**Pre-competitive and collaborative research** is a necessary scheme at a European level within a multi-research-actors framework. It brings the advantage of open research to help avoid **duplication of research work**.

EGCI funding also enabled industry partners to be more competitive and lower the costs related to the development & industrialization stages by **focusing from the very beginning on the most promising technologies** thanks to the upstream work of preparation of the EGCI roadmap. It is also a way for OEMs & suppliers to **optimize the costs of technologies** and identify the **right business models** to adopt for their in-house development & industrialization processes.

### ECONOMIES OF SCALE THANKS TO CROSS-FERTILIZATION & SETTING-UP VALUABLE STANDARDS

EGCI projects enabled industry partners to realize **economies of scale** thanks to the **cross-fertilization of projects** and the set-up of standards that decreased the costs of technologies & components, such as the battery cells costs (down by 27%) or the EV charging infrastructures.

EGCI projects represented a huge opportunity for the competitors to have **a common compliant approach** in terms of **standardization activities**, which is extremely important to harmonize European markets.

### EARLIER LAUNCH OF RESEARCH ACTIVITIES

EGCI permitted the associated public & private stakeholders to tighten their relationships and to **launch earlier research activities** in the scope of the PPP. The participation in EGCI projects enabled industry partners to save time by performing research activities **1 to 2 years earlier than if self-performed**.<sup>5</sup> The **reduction of time to-market** for the implementation of technologies in the car architecture is a huge benefit derived from EGCI projects with respect to US and Asian competitors.

In the battery field, EGCI accelerated the setup of the **European Battery Manufacturing Industry** & the **dissemination of related skills** across Europe. These research activities in the battery field will support the **catch up of Asian and American counterparts**, which have currently a much **higher production capacity** than Europe.

<sup>5</sup> Outcome based on several interviews with industry participants

### 3. Multi-stakeholders approach fostered significant technological achievements for the whole value chain

The EGCI PPP represented a crucial seed-funding mechanism for the pre-competitive research activities of the whole European automotive industry value chain. The collaborative and multi-stakeholders approach of EGCI generated networks of competences in electrification, which enable industry partners to experiment with clean technologies and avoid the duplication of work within the partners involved.

#### MULTI-LATERALITY BEYOND COOPERATION AS USUAL

While OEMs, suppliers and research/academic partners are used to collaborating in a bilateral or tri-lateral way, EGCI offered a great opportunity for industry & research partners to cooperate **at multi-lateral level** with a large access to key competences & know-how.

EGCI boosted the creation of a **community of practice** in the electromobility field through a multi-stakeholders approach along the whole value chain.

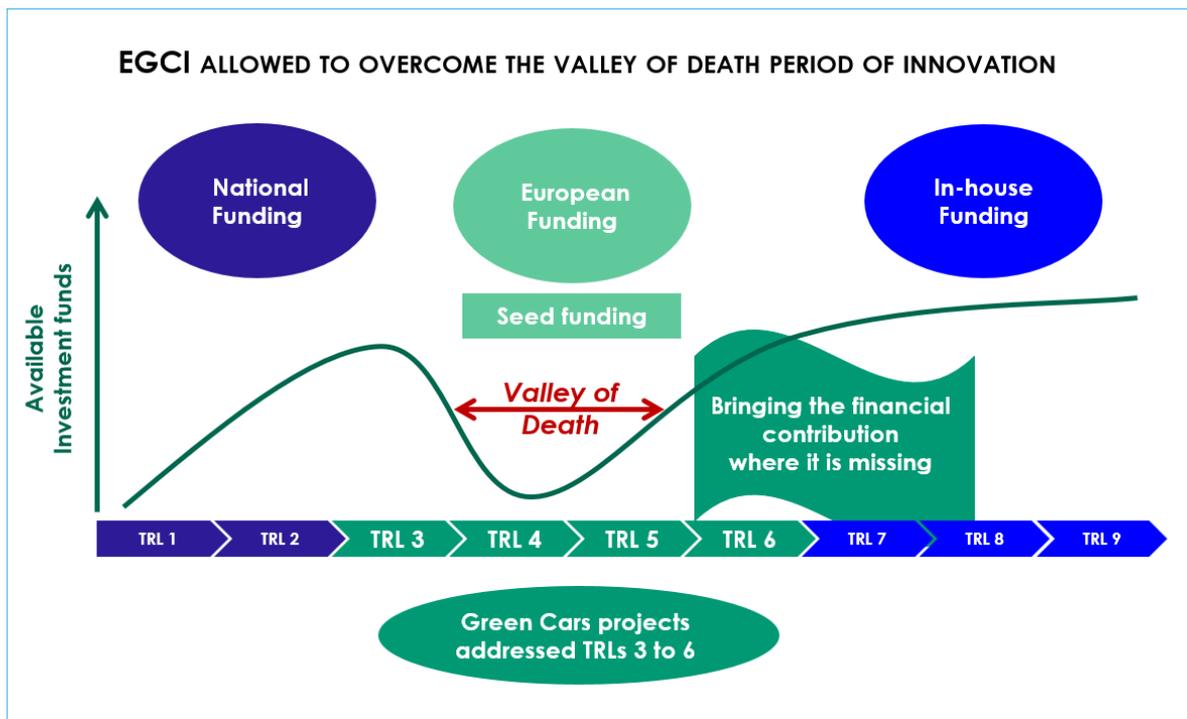
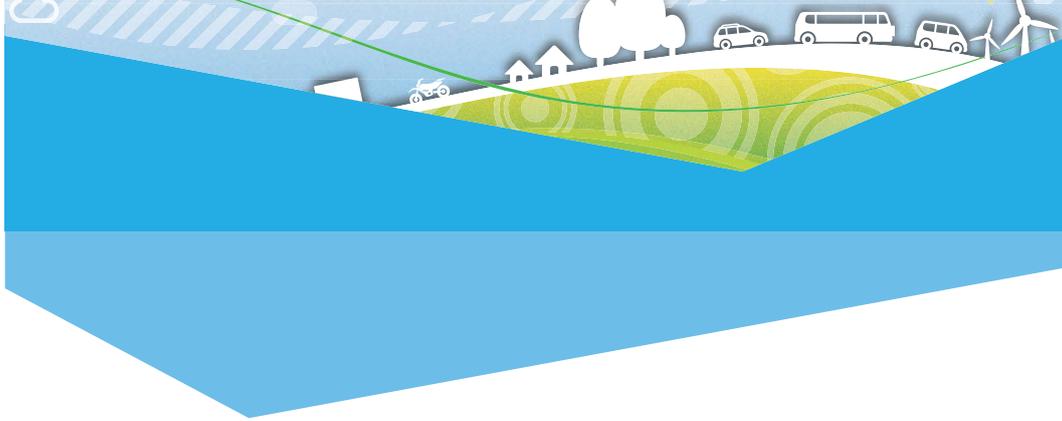
EGCI was extremely important for industry partners who considered that their **national/regional supply chain is limited** in terms of **R&D capabilities** and highlighted the need for external partners. The **intensification of the network of partnerships** for large companies, SMEs, RTOs & academic institutions represented also a key outcome of EGCI projects.

#### PPP AS A KEY LEVER TO ENHANCE COLLABORATIVE AND PRE-COMPETITIVE RESEARCH

The early launch of research activities enabled suppliers to take into account OEMs specifications **at collaborative & pre-competitive stage** more strongly and, therefore, to anticipate co-developed, targeted & efficient innovations. EGCI projects enabled OEMs & suppliers to enhance their **learning and experience curves** related to electrification. This even closer level of collaboration, between OEMs, suppliers & academics in EGCI pre-competitive research projects, helped establish the new networks needed for electrification and thus enhanced the **speed of the development of demonstrators/prototypes**, which will be **visible on the market in 5 to 10 years time**.

#### NECESSARY CONTRIBUTION FOR RTOs & ACADEMIC PARTNERS

EGCI is perceived as a **seed-funding** essential to **overcome the valley of death period in innovation** funding, particularly for RTOs and academic institutions with fewer financial resources.



## POSITIVE OUTCOMES FOR SMEs

SMEs acknowledged the critical importance of the PPP in the **development of their R&D and business activities** through **networking** with industry partners, the co-conception of **technological solutions** with potential customers (OEMs, Tier 1s ...) and the **spread of their business activities at European and worldwide levels**.

SMEs benefited strongly from their involvement in EGCI projects in a win-win approach: they brought **key expertise** during the projects, identified more accurately **customers' expectations**, improved and demonstrated their **in-house technological solutions** and capabilities & accessed several **European markets and beyond**.

## BEYOND EUROPE

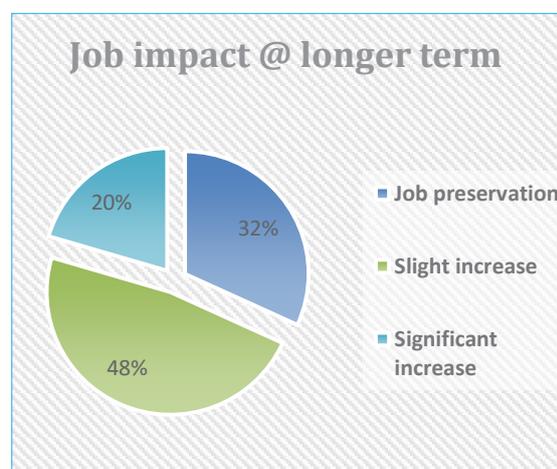
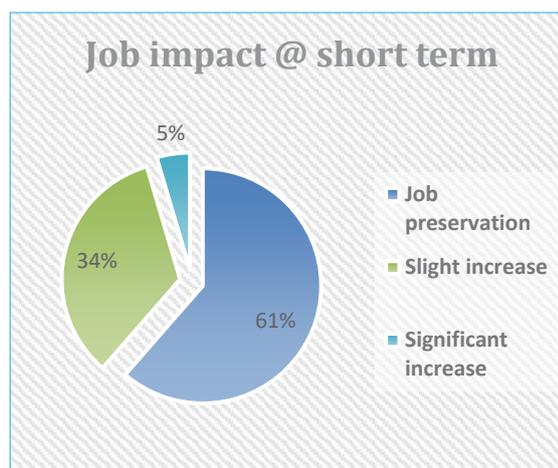
EGCI strengthened the **networking** between the stakeholders **throughout Europe and beyond**.

EGCI represented an example of multi-stakeholders environment in which the results of the projects are disseminated and exploited by the whole European automotive industry on **European markets and beyond**.

## 4. Maintaining, preserving and whenever possible creating jobs in the European automotive industry

Launched at the peak of the world economic crisis, EGCI contributed to create new R&D jobs with a multiplier effect of about 5 on induced employment, it maintained in Europe a high-level of expertise and expenditure in the field of electrification.

EGCI contributed to enhancing the attractiveness of the European automotive industry among industry and academic organizations inside and outside Europe.





## JOBS IMPACT

In the period 2010-2013, EGCI projects enabled OEMs and suppliers to **preserve and upgrade R&D jobs** in order to sustain national European automotive industries. EGCI contributed to support pre-competitive research activities in European countries and, consequently, to maintain core jobs such as R&D and design in the countries where the car manufacturers are located.

EGCI contributed to **brighten the European Automotive industry** and its R&D activities: in the period 2008-2014, **R&D teams of Tier 1s** have been multiplied by a **factor of 2** and the **OEMs** have seen their **R&D staff** increased by a **factor of 1.5**.

It is also important to mention that **non-European OEMs** such as Ford, Kia, Nissan or Toyota have production facilities and R&D centres in Europe, which also **contribute to maintaining jobs at a European level**.

## MULTIPLIER EFFECT OF R&D JOBS

The automotive industry represented 2.3 million direct and 9.8 million indirect jobs in the EU in 2013.<sup>6</sup>

The cumulated creation of over **200,000 high-skilled jobs in R&D**<sup>7</sup> for cleaner vehicles is expected by 2025. Keeping in mind that **1 R&D job has a multiplier effect of about 5 on employment within the region**<sup>8</sup> where it is created, EU-wide employment could increase by **850,000 to 1.1 million in 2030** for the scenarios in which Europe moves rapidly to a fleet of advanced hybrid, battery-electric and fuel-cell vehicles.<sup>9</sup>

The European automotive industry has a **catapult effect on other sectors**; the development of low-carbon technologies will contribute to promote high-skills jobs & **boost the creation of new jobs outside the automotive industry**, such as services, chemicals, electrical & electronical equipment & construction.

<sup>6</sup> The Automobile Industry Pocket Guide 2015-2016, ACEA

<sup>7</sup> EU Skills Panorama, Focus on Automotive Sector & Clean Vehicles, 2014

<sup>8</sup> The Multiplier Effect of Innovation Jobs, Leslie Brokaw, MIT Sloan Management Review, 2012

<sup>9</sup> Fuelling Europe's Future - How auto innovation leads to EU jobs, Cambridge Econometrics (CE), in collaboration with Ricardo-AEA & Element Energy, 2013, Brussels

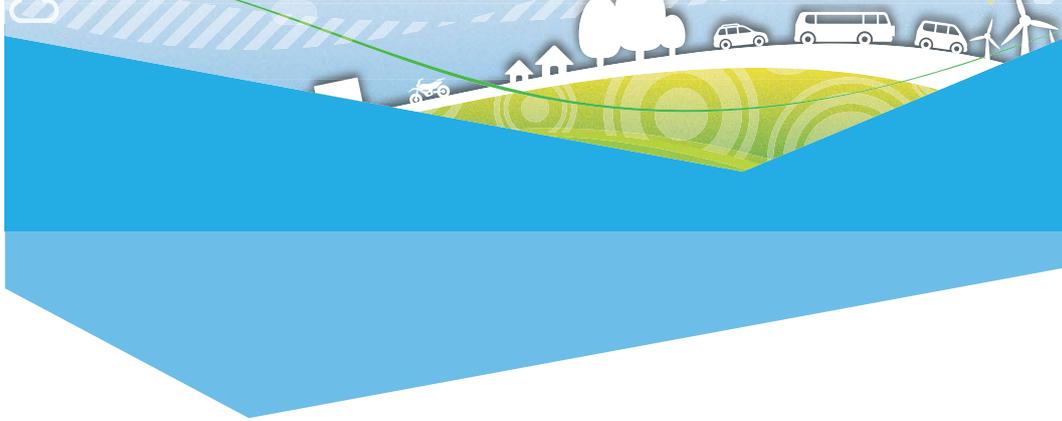
### NEW SKILLS IN KEY ENABLING TECHNOLOGIES

The shift towards advanced hybrids and battery electric vehicles implies the **need for new high-skills**. EGCI projects enabled industry partners to acquire **new skills & competences** in several fields: battery technologies, lightweight design, nanomaterials, manufacturing of vehicle charging stations & drivetrain technologies. The initiative also enabled the **set-up of new curricula in universities oriented towards automotive industry requirements**. Academic institutions benefited from EGCI projects in terms of **PhDs recruitments** thanks to the **deep and trusting relationships** with industry partners.

### ENHANCED KNOWLEDGE EXCHANGE & ATTRACTIVENESS

EGCI represented a **huge opportunity for academic institutions & RTOs** to enhance their **attractiveness towards students** and PhDs, avoiding the need for them to leave Europe and **preventing “brain drain”**.

Scientific publications for the industry partners, RTOs & universities have to be stressed: in total, **393 scientific publications were issued** which contributed to the track record of European universities & RTOs. **Dissemination of the results** of the projects through more than **825 conferences** across Europe was also well performed by the industry and research partners.



## IMPROVED AUTOMOTIVE SECTOR ATTRACTIVENESS AND SKILLS RENEWAL

Students and PhDs benefited strongly from EGCI activities in terms of **research topics, internships and career opportunities within companies**. Around **20,000 young people**<sup>10</sup> completed their postgraduate degree in Engineering in 2010: this represented a major attractive talent pool for the benefit of the European automotive industry.

EGCI projects stimulated the implementation of **new curricula in universities** required by the manufacture of electric vehicles.

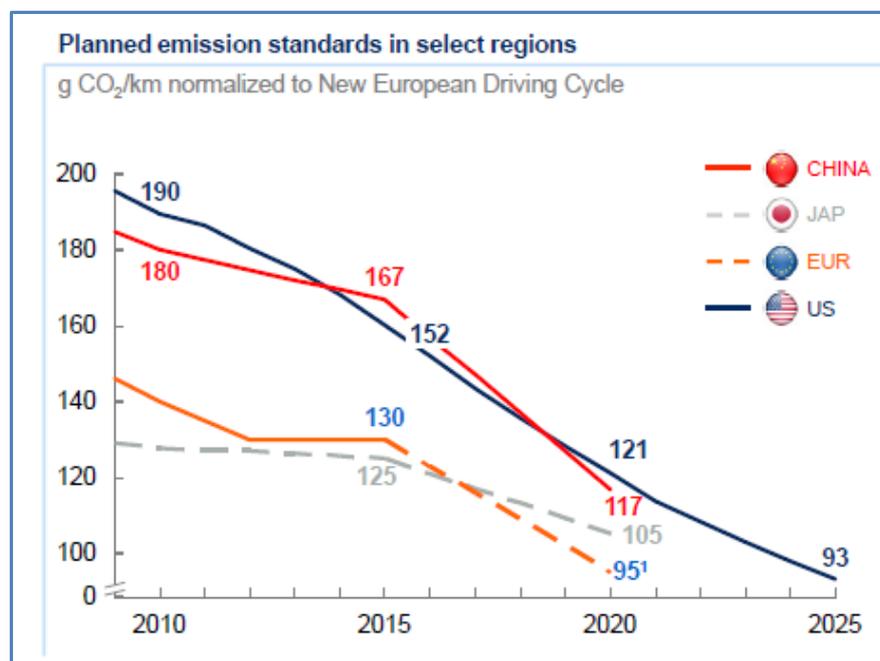
EGCI projects enabled academic organizations, RTOs and industry partners to **upgrade and acquire new skills and expertise in several families of technologies**, notably **Drivetrain technologies, Energy Storage Systems, Grid Integration or Safety Systems**.

EGCI activities contributed to **speeding-up the sharing of knowledge** between academic institutions as well as between industry partners & academic institutions and **vitalised to some extent the European Research Area (ERA)**.

<sup>10</sup> Fuelling Europe's Future – How auto innovation leads to EU jobs, Cambridge Econometrics (CE), in collaboration with Ricardo-AEA & Element Energy, 2013, Brussels, p. 67

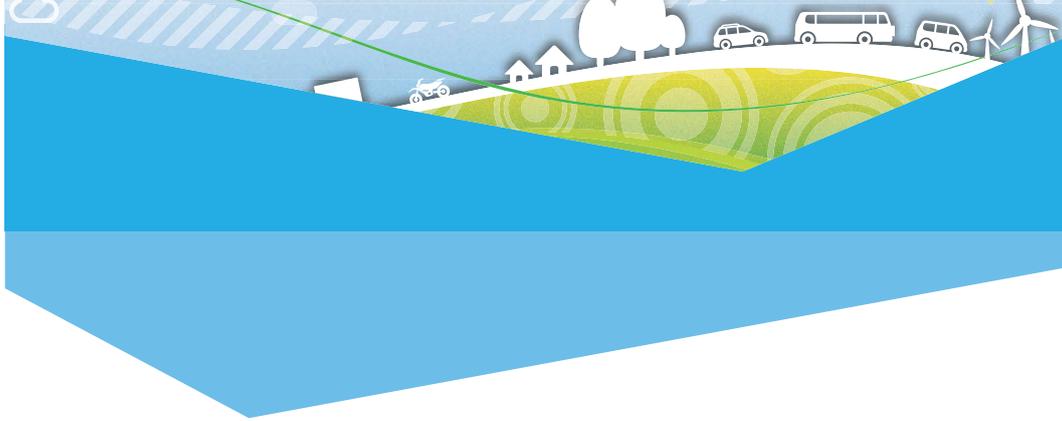
## 5. Promoting Electrified Vehicles for Environmental benefits

Environmental issues are particularly important in the different EU countries, these promote Electric Vehicles by providing a range of subsidies for a quicker uptake.



Source: The Amsterdam Roundtables Foundation & McKinsey, Electric Vehicles in Europe: gearing up for a new phase?, 2014

EGCI clustered projects contributed to developing innovative methods, tools, recycling processes, lighter & safer components, all targeting the reduction of fuel consumption and CO<sub>2</sub> emissions.



## BEYOND PROJECT RESEARCH, EGCI CONTRIBUTED TO SPEEDING-UP THE DEVELOPMENT OF INDUSTRIAL PROCESSES

Under the regulatory framework, the **EU target of 95 g CO<sub>2</sub>/km** for light-duty vehicles relies on Electrification & Hybridization covered by EGCI activities. **85% of EGCI panel projects portfolio** stressed that incremental & breakthrough technologies developed during the projects have significant impacts in terms of **CO<sub>2</sub> emissions** reduction, meeting the EU **environmental standards** once the technologies will be implemented in vehicles.

## THE ENVIRONMENTAL ASPECTS ADDRESSED BY EGCI SCOPE

**As a baseline of Electrification research activities** in Europe, EGCI projects took into account the environmental aspects in terms of:

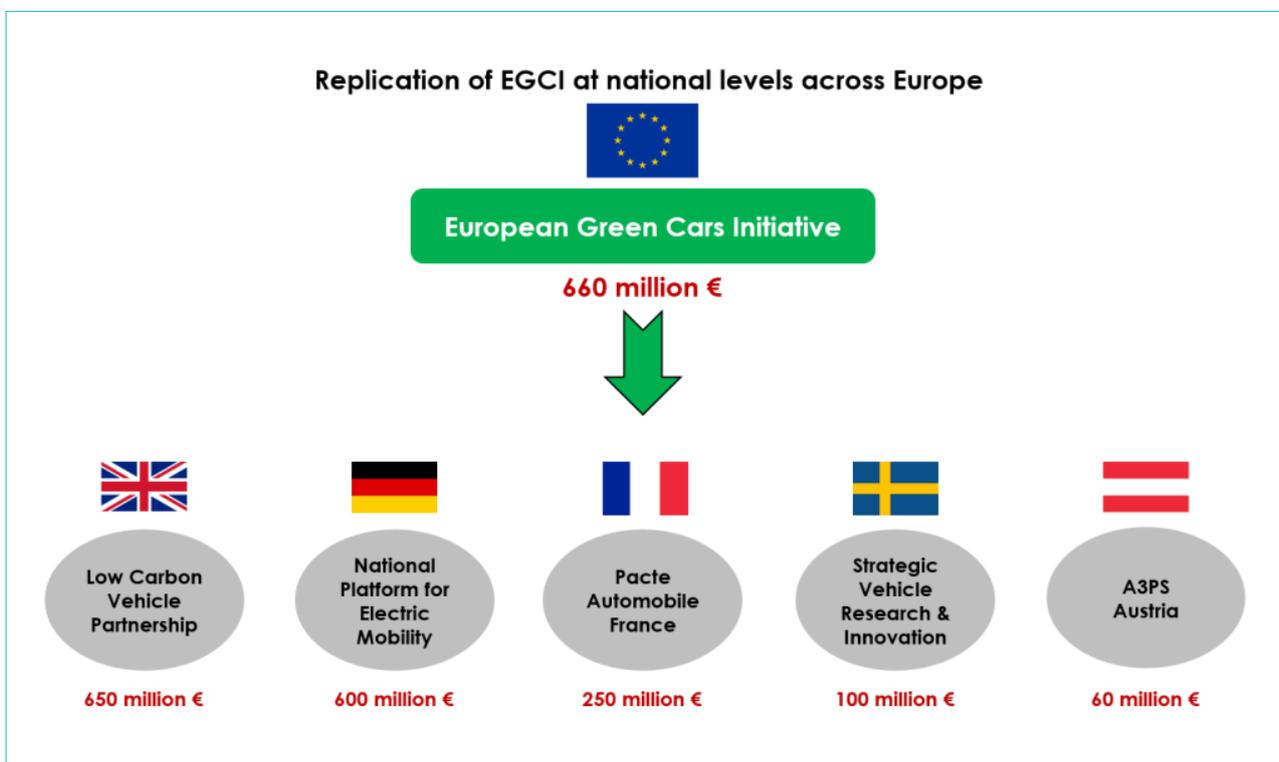
- > air quality enhancement
- > energy management
- > the reduction of noise pollution, without compromising pedestrian safety thanks to the development of artificial noise devices

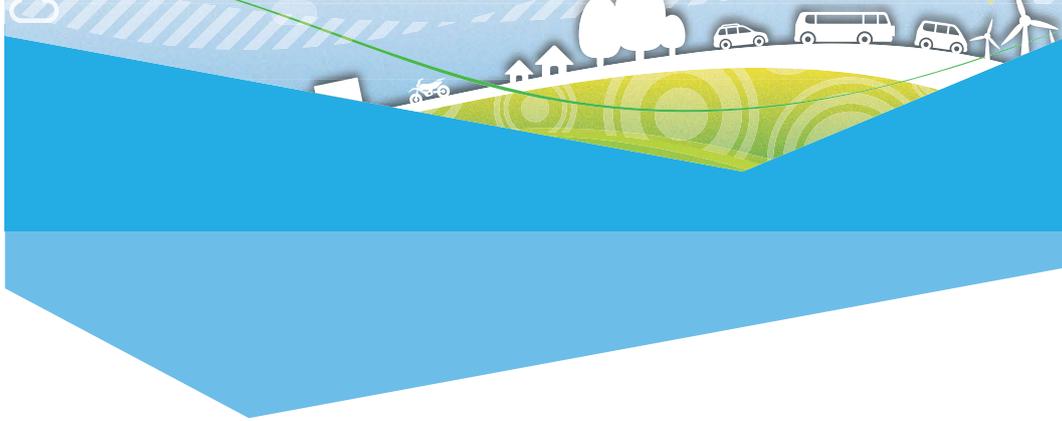
through the commercialization in the subsequent years of EVs in urban environments.

In terms of weight reduction, a set of **EGCI projects** contributed to the development of **lightweight and low-embedded** CO<sub>2</sub> materials for their application in medium-volume automotive production (50,000 units/year), a 20% weight reduction is expected in each considered module.

## 6. Extended positive impacts of the EGCI through replication at national levels

EGCI funding fostered additional investments made by manufacturers and suppliers. In addition, EGCI activities contributed to a replication at national levels and significant additional investments in Electrification programmes.





## TRIGGERING THE REPLICATION OF EGCI AT NATIONAL LEVELS ACROSS EUROPE

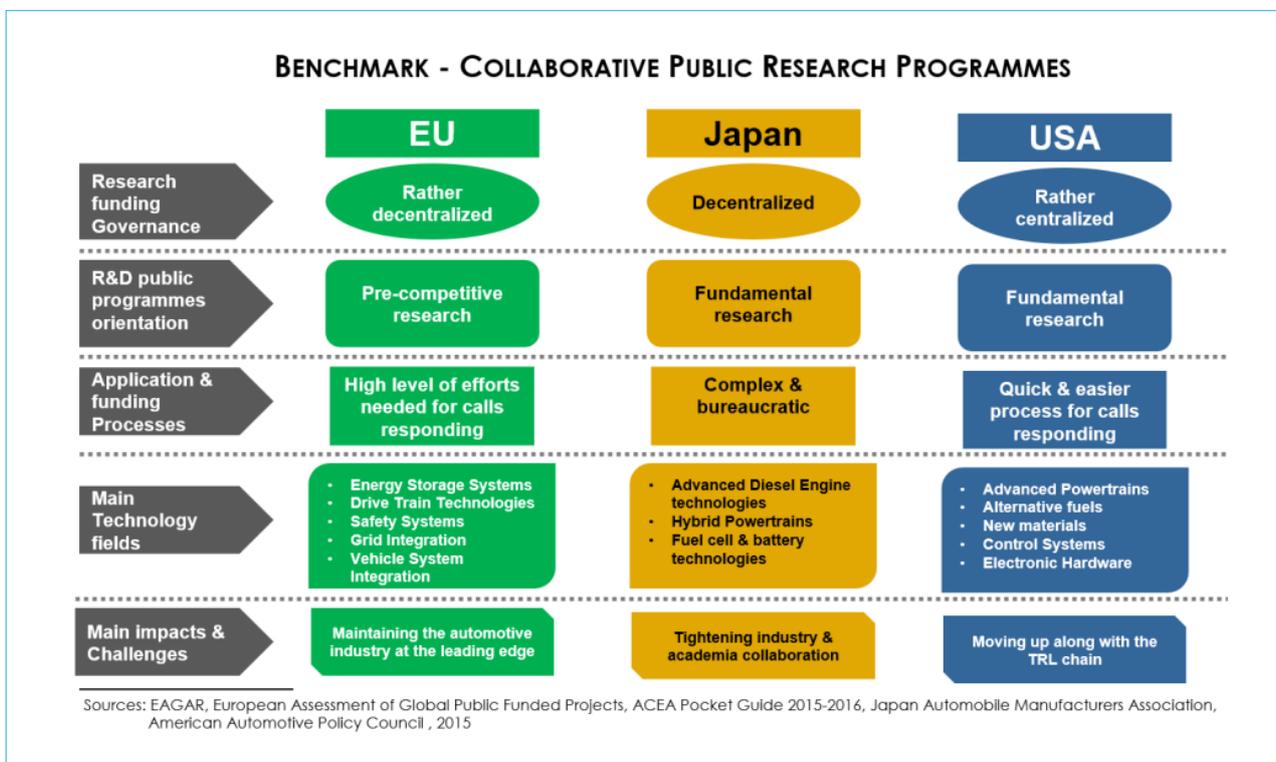
**Significant investments at national levels** were dedicated to the electrification of road transport in parallel to or at the end of the EGCI PPP, fostering some European countries to launch or maintain Electromobility programmes, for instance in:

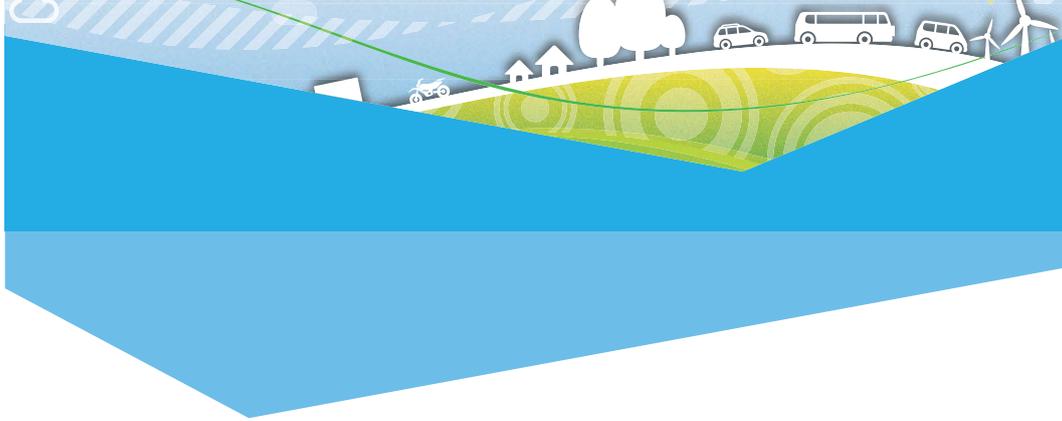
- > **Germany**: which allocated **€600 million to a programme** on **battery** developments, **electrification of drivetrain** and **power electronics**
- > **France**: with the “**Pacte Automobile**”, started to actively support the domestic market back in 2009. **€250 million** dedicated to **Green projects** and the creation of a modernization fund of about **€600 million** to sustain the automotive suppliers
- > **UK**: which invested **£500 million** to support the development of **low emission vehicles** through the Low Carbon Vehicle Partnership (LCV)
- > **Sweden**: with its Strategic Vehicle Research & Innovation PPP, which devoted **€100 million** per year on automotive research (covering Production, Automation, Logistic, Software and Energy). About 20% of this amount, i.e **€20 million** per year, being dedicated to **Electrification** since 2009
- > **Austria**: focus on **propulsion** family of technology through Austrian Association for Advanced Propulsion Systems (A3PS); **€60 million** devoted all along the programme duration.

This **replication** is extremely important for the **whole value chain** at a national level, in order to sustain & finance **the maturation of technologies** and the industrialization process.

## 7. PPPs such as EGCI are unique for the performance of pre-competitive R&D

While OEMs in the USA and in Japan conduct R&D in competition, thanks to EGCI, European industry competitors are encouraged to collaborate in pre-competitive research activities in order to accelerate the development of clean technologies and standards.





## A TYPICAL EUROPEAN APPROACH – UNIQUENESS OF EUROPEAN PUBLIC-PRIVATE COMPLEMENTARITY RATHER THAN COMPETITION

European projects are much more collaborative than in the USA, in which competitive programs are more common: in Europe, public & private stakeholders try to find **complementary activities** rather than competing activities.

Unlike USA or Asian programmes, EGCI projects enabled industry & Research / Academic partners to cooperate in a **contractual & long-lasting way** thanks to the European Commission **contractual & financial framework in creating a positive trusting ecosystem mixing European & non-European partners**. Therefore, public & private European stakeholders **agreed to extend and renew their collaboration through** the **EGVI cPPP**, which has been extended when compared to the EGCI to all types of vehicles (buses, vans, commercial and L-category vehicles etc).

## LOW TRL RESEARCH PROGRAMMES OUTSIDE EUROPE

US & Asian programmes mainly address **fundamental research with low TRL** ( $\leq 3$ ) while European projects are more focused on **pre-competitive & collaborative research** addressing TRLs 3 to 6.

## LACK OF CYCLICAL APPROACH OUTSIDE EUROPE

The **cyclical approach**, i.e. funding of **low TRL programmes followed by higher TRL programmes** and so forth, has been implemented within the scheme of EGCI followed by EGVI cPPP, making it unique with respect to the USA and Asian countries.

The participation of **non-European industry partners** in European projects is a success indicator for openness and attractiveness of EGCI. It is valuable for the European automotive industry in terms of **sharing technological issues, learning from different approaches & cultures** in order to access to non-European markets.

## Conclusion

Amongst the other European research funding schemes, requested by CARS 2020, the European Green Cars Initiative has truly proven to be a useful tool in the very difficult context of the financial and automotive crisis of the years 2007-2009. EGCI contributed to **preserve key jobs and create new R&D jobs** with a multiplier effect of about 5 on induced employment, and it **maintained in Europe a high-level of expertise & expenditure** in the field of electrification.

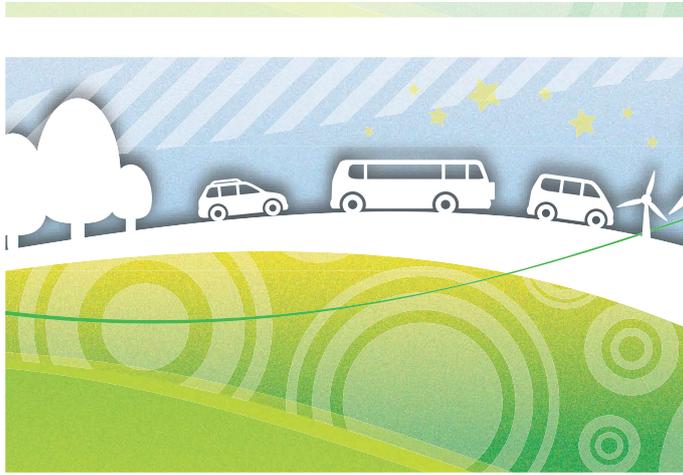
EGCI, as a PPP, has reinforced the **multi-stakeholders practice** of collaborative research. This collaborative research is pushing towards more and more **open research**, which is a very challenging scheme of approach in one of the **most competitive transport industry sectors**: competition occurs amongst all actors **horizontally & vertically at a country, European and at worldwide scales**.

This PPP has contributed to accelerate co-developed R&D deliverables. Each project has been a valuable opportunity to explore the complementary angles of the different research partners, with the aim to deliver **efficient & decarbonized surface mobility solutions**. All the partners together could take advantage of the latest knowledge of the academic partners: **this virtuous approach has indeed created added value**.

- ✓ In order to accelerate the electrification it has optimised the advanced research in the field of integration of the electrified components in the powertrains.
- ✓ It has contributed to **speed-up the full electrification research** and deployment of the different industrial and research actors.
- ✓ It has reinforced the coherence between European initiative and national schemes. Hence, it has reinforced the dissemination and deployment aspects of electrification

This PPP has very well satisfied the different partners due to its implementation and its agility. It is a very important lesson learnt shall the commission would like to examine a new PPP for other thematic of new mobility topics.

Last but not least, the whole scheme of PPP has contributed to **preserve overall the automotive European automotive R&D** (activities, jobs, skills, R&D value-chain) and brought **important opportunities for collaboration** with other continents. The EGCI PPP has also contributed to secure the leading edge of Europe in **new powertrain technologies**.





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