

Supporting European road-mapping activities for the electrification of road transport: **CAPIRE** and Smart EV-VC

EMMA BRIEC
RENAULT



CONTENTS

- 01** Introduction
- 02** EU Network, CAPIRE & SMART EV VC
- 03** Electrification Roadmaps
- 04** EGVI and H2020
- 05** Conclusions



EU Policy for Clean Transport

- **Europe 2020 Strategy**

- 20% cut of GHG emissions
 - 20% more renewable energy
 - 20% less energy consumption
(in 2020, compared to 1990)



- **Transport 2050 Strategy**

- 60% cut of carbon emissions by 2050
 - 50% less conventionally fuelled cars in cities 2030
 - no more conventionally fuelled cars in cities 2050

- **EU Fleet Emission Standards for New Cars**

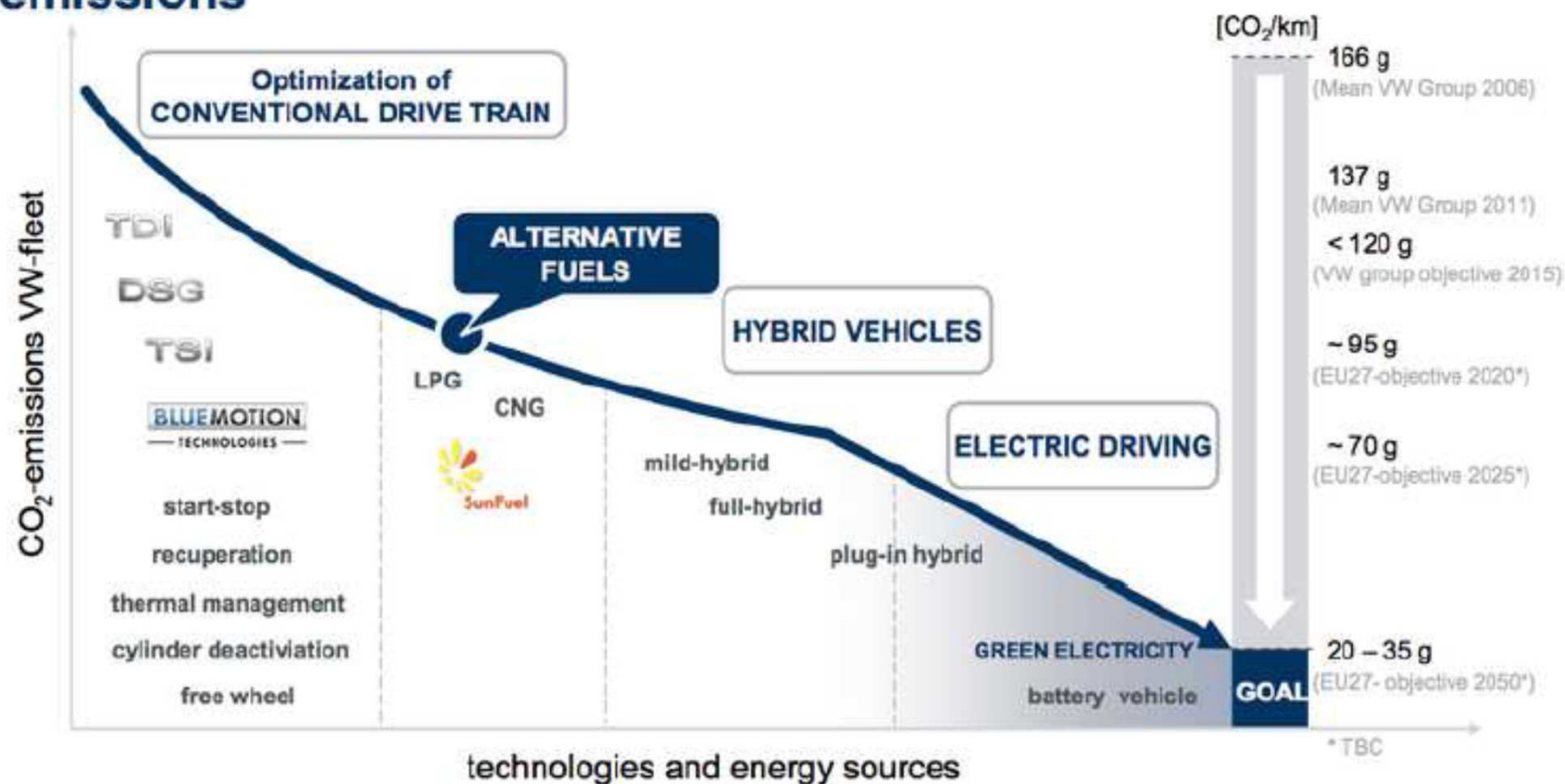
- 130g CO₂/km (2012 – 2015, phase-in)
 - 95g CO₂/km (2020)





Trends in EU transport CO₂

Powertrain technologies to minimize greenhouse gas emissions





EGVI
European Green
Vehicles Initiative

Green Vehicles Network

European Technology Platforms



All Stakeholders of the
Road Transport System



EPoSS
European Technology Platform
on Smart Systems Integration

All Stakeholders of the
Smart Systems Domain



All Stakeholders of the
Smart Grids Field

- Strategic Research Agendas
- Long-Term Roadmaps



**SMART
EV·VC**



Actors of
the
European
Green Cars
Initiative

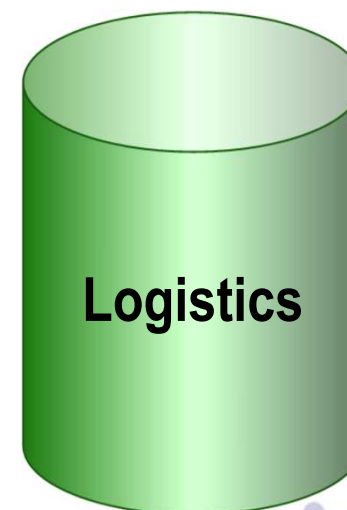
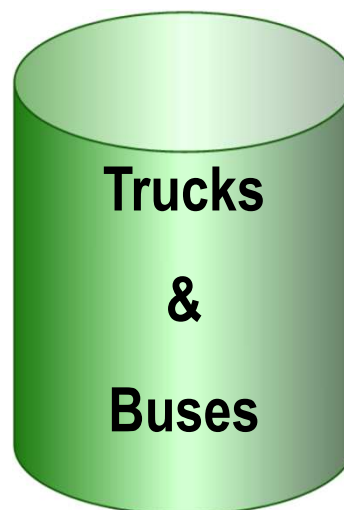
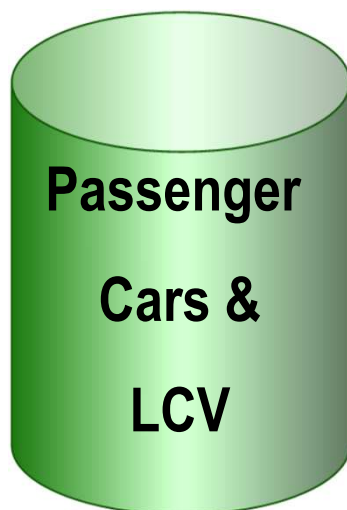
- Multi-Annual Implementation
- Annual Prioritization

Public Private Partnership



- sustains and puts into practice the European Green Cars Initiative PPP
- Propose the implementation paths of the PPP EGCI,
- Identify the technology roadblocks and framework needs,
- Describe research priorities within the framework of FP7, FP8 and afterwards,
- Facilitate the dissemination of results of the projects funded under the EGCI

Three technology pillars



- *Fourteen Partners*
- *Duration: 4 Years*
- *Started on December 1st, 2010*
- *Will finish on November 30, 2014*
- *Total Person Month: 132*
- *Total Budget: 2,2 MEuros*
- *EC Funding: 1,7 MEuros*
- *FP7-SUSTAINABLE SURFACE TRANSPORT (SST)-2010-RTD-1*



Objectives of the Project



- Sustainability goals require **paradigm shift** in the concept of the automobile regarding architecture, design, materials, and propulsion technology
- **(F)EVs** provide unique opportunities for reducing energy demand e.g. by smart integration & redesign of architecture
- Europe has to anticipate the changes of the move towards the EV and adapt its **automotive value chain**
- **Smart EV-VC** will
 - define goals in terms of ICT and smart systems related **unique selling points** of the EV
 - support related **European roadmapping activities**
 - strengthen the European EV **value chain** by by making recommendations for harmonized curricula for education and training, initiating of standards, and concepts for shared facilities as well as the inclusion of SMEs.

Consortium:

Core Partners:



Associated Partners:

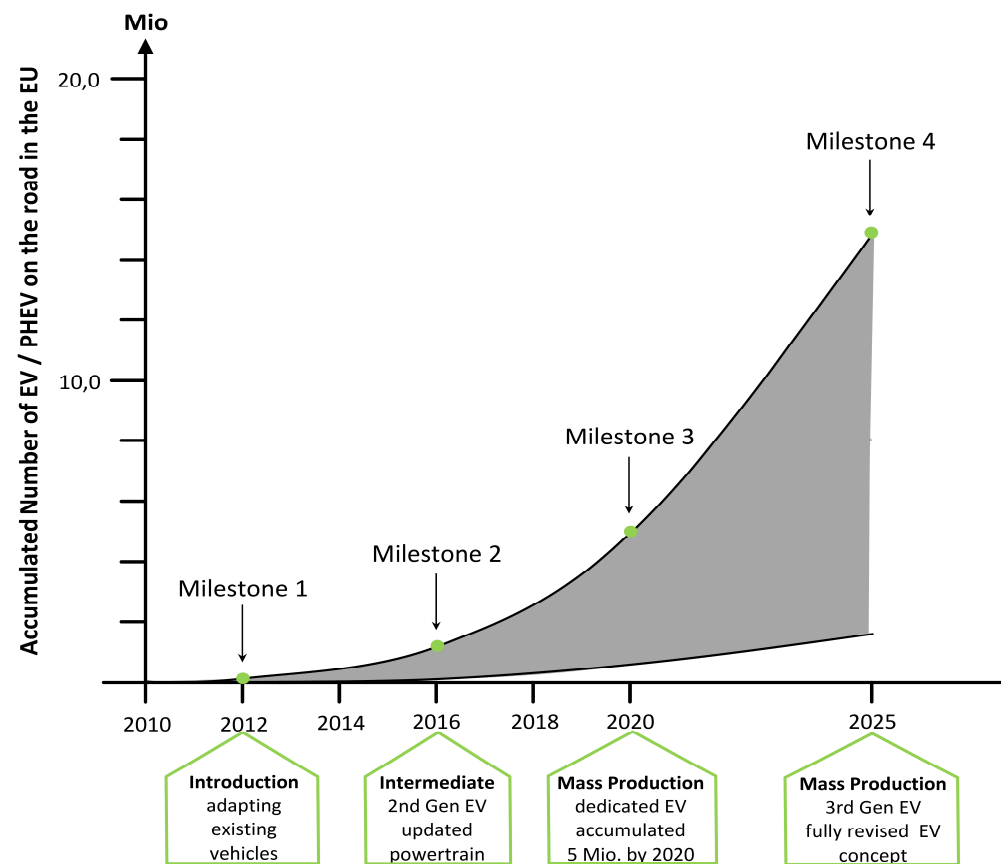
EADS, Valeo, TNO, LMS, Fraunhofer ENAS, Umicore, AVERE, MagnaSteyr, NXP Semiconductor, Ideas & Motion, University of Coventry (also representing the INTRASME project), Innovation Bridge Consulting

Duration:



EGVI
European Green
Vehicles Initiative

Electrification Roadmap



ERTRAC/EPoSS/SmartGrids



Electrification Roadmap

- **Energy Storage Systems**
(cost, performance, lifetime, safety)
- **Drive Train Technologies**
(energy recovery, range extenders)
- **System Integration**
(energy efficient interplay of components)
- **Grid Integration**
(charging, metering, renewables, V2G)
- **Safety**
(crashworthiness, HV, emergency)
- **Transport System Integration**
(road infrastructures, intermodal use)



Drive Train Technologies

Develop Low-Cost/Weight Motor
Develop Highly Integrated Motor
Optimize Combustion Engine
Develop Highly Integrated Powertrain

System Integration

Optimize System Efficiency with
Find new Solutions for Heating
Design Electrical Architecture
Create New Concepts for Space
Research Light-Weight Materials

Grid Integration

Develop Adaptive On-Board/In-Plug Charging Dev.

Create System for Info

Develop Simulation, Modeling

Develop Protocols/Dev

Investigate Quick Charge

Develop Contactless C

Develop Bidirectional C

Establish 1st Generation

Create Business Model

Connect Regions by H

Establish Business Model

Create Network of Quick

Regulate Coverage with

Standardize Billing Cor

Safety

Improve Crashworthiness of Lightweight Cars

Develop Acoustic Perception

Develop Integrated Safety Concept (HV, Fire, ..)

Setup Standards for Emergency Handling

Create & Review Standards for Safety, EMI, Health

Transport System Integration

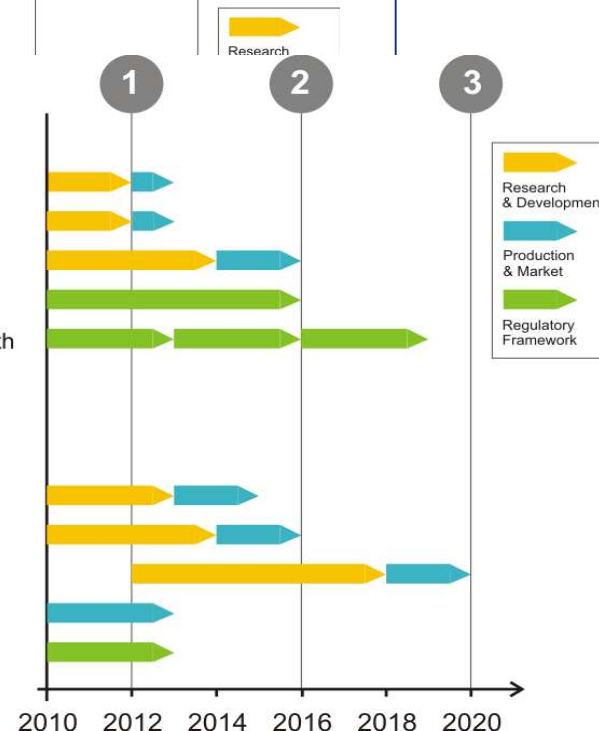
Explore Potential of ITS for Energy Efficiency

Provide Convenient Transition Between Modes

Apply Sensors & C2X for Autonomous Driving

Promote Green Image of Electric Vehicles

EU Wide Signage of Roads and Vehicles



Updated in 2012 , endorsed by ETPs



Call Recommendations

		EGCI Work Programme				
2010 Status		NMP	SST	ICT	ENV	MOVE
Industry Priorities	Energy storage systems					
	Drive train technologies					
	Vehicle system integration					
	Grid integration					
	Safety systems					
	Transport system integration					

		EGCI Work Programme				
2011 Status		NMP	SST	ICT	ENV	MOVE
Industry Priorities	Energy storage systems					
	Drive train technologies					
	Vehicle system integration					
	Grid integration					
	Safety systems					
	Transport system integration					

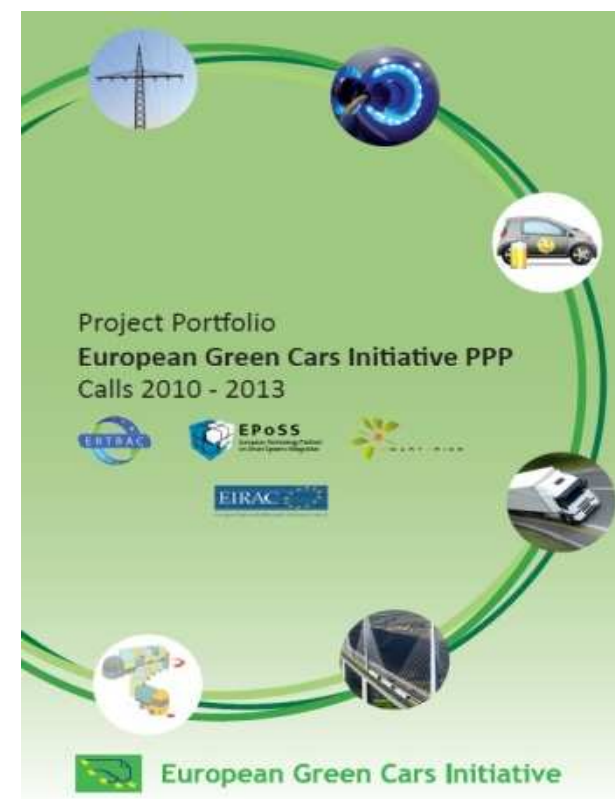
		EGCI Work Programme				
2012		NMP	SST	ICT	ENV	MOVE
Industry Priorities	Energy storage systems					
	Drive train technologies					
	Vehicle system integration					
	Grid integration					
	Safety systems					
	Transport system integration					

		EGCI Work Programme				
2013		NMP	SST	ICT	ENV	MOVE
Industry Priorities	Energy storage systems					
	Drive train technologies					
	Vehicle system integration					
	Grid integration					
	Safety systems					
	Transport system integration					



EGCI 2010-2013 Collaborative Projects

- 177 projects within EGCI and related initiatives as ARTEMIS, ENIAC, CIP
- 99 dealing with electric mobility



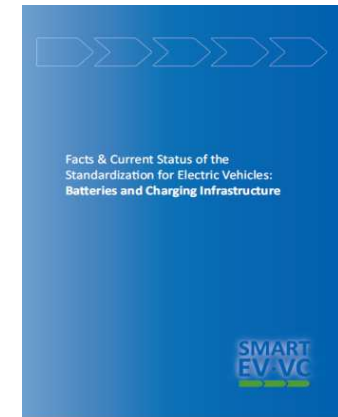
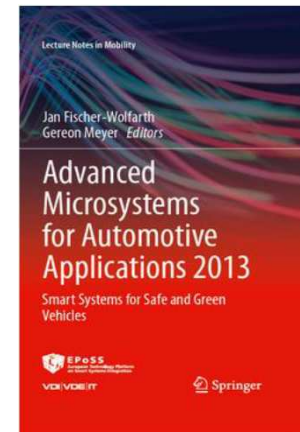
Project Portfolio



Project Highlights



- Expert Workshops 2013:
 - USP of the FEV made in Europe
 - EV Batteries: From research towards innovation
 - EV systems architecture and standardization needs
- AMAA conferences 2013/14
- Support of the European Green Cars / Green Vehicles Initiative
 - Electrification Roadmaps, Multiannual Roadmap, Project Portfolio, Draft Work Programmes..
- Standardization Brochure



What is Horizon 2020?

- ▶ Commission proposal is about €80 billion research and innovation funding programme (2014-2020)
- ▶ A core part of Europe 2020, Innovation Union & European Research Area:
 - Responding to the economic crisis to invest in future jobs and growth
 - Addressing people's concerns about their



EGVI PPP Framework

Horizon 2020 (2014-2020)

- EU Framework Programme for Research and Innovation, **financial instrument** for funding research in Europe, with dedicated budget of €70.2 billion.
- Industry, Member States and European Commission to engage in **joint funding programmes** within the EGVI PPP.
- **Initial budget proposal** of €3 billion over the seven-year period, of which €1.5 billion EU funding.
- Three rounds of **biennial calls for proposals** expected to be launched within the EGVI PPP in the period 2014-2020.



Today, EGVI is composed of 64 members:

- 13 automotive OEMs
- 15 automotive suppliers
- 4 from smart systems industry
- 1 from smart grid industry
- 13 research organisations
- 11 universities
- 7 associate members



Suggested topics for first EGVI calls

➤ Challenges for 2014

- Next generation Li-Ion / post Li-Ion batteries
- Energy and thermal management of electric vehicles
- Gas engines for light-duty vehicles
- Hybrid components and architectures for light/heavy-duty vehicles
- Electric two-wheelers and new vehicle concepts
- Innovative natural gas engines for heavy-duty vehicles

➤ Challenges for 2015

- Battery Management System
- Power electronics
- ICT and Grid integration
- Driveline control for heavy-duty vehicles

