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# Foro Innotransfer Automoción y Movilidad Sostenible

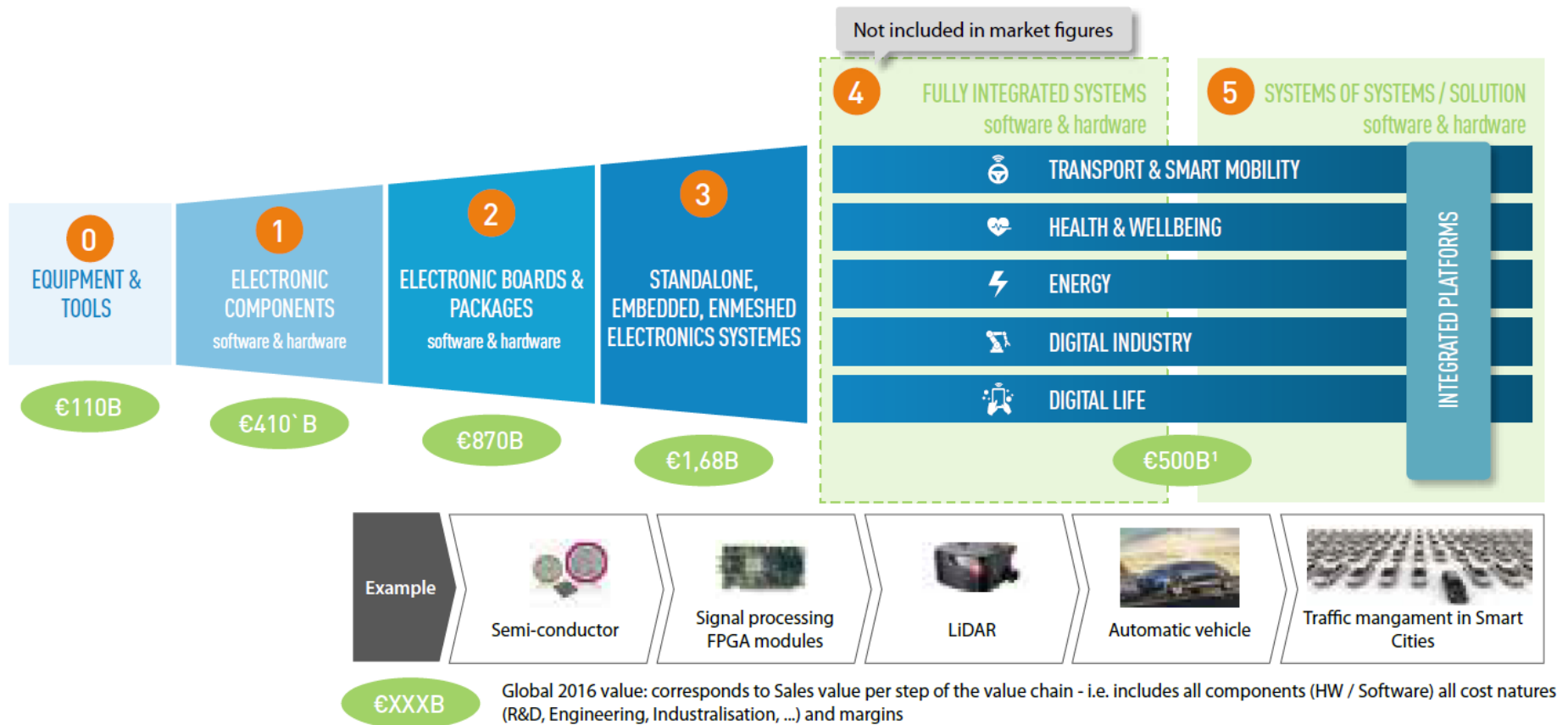
## New paradigms to adapt to a changing road transport eco- system

*Jean-Luc di Paola-Galloni*  
*Webinar, 8<sup>th</sup> October 2020*

# Value is shifting from value chain to ecosystems

	PHYSICAL WORLD	DIGITAL WORLD
PARADIGM	Value chain	Ecosystem
KEY SUCCESS FACTORS	<i>Invest in the right set of proprietary technologies and attract volumes and reach critical mass</i>	<i>Expand the ecosystem of applications and integrate breakthrough services from start-up and SMEs</i>
STRATEGIC FOCUS	<i>Maintain Europe's sovereignty to ensure it can independently carry-out this social &amp; industrial revolution</i>	<i>Capture growth, productivity and value by the deployment of innovative, application specific solutions in a European ecosystem of large, SME and start-up companies</i>
IMPLICATIONS ON RESEARCH AGENDA	<i>Secure hardware and software capabilities that can meet application-specific context</i>	(i) <i>Design application-specific architectures that are HW agnostic, SW rich, Interoperable, re-usable and easily updated</i> (ii) <i>Develop the application-specific know-how in AI &amp; analytics to deliver value at solution level</i>
BUSINESS MODELS & KEY PLAYERS	<i>Transportation business models Suppliers / OEMs business model</i>	<i>Mobility business model Fleet operators / Mobility providers / Cities</i>

# Value is shifting along the value chain: from 75% upstream today ...

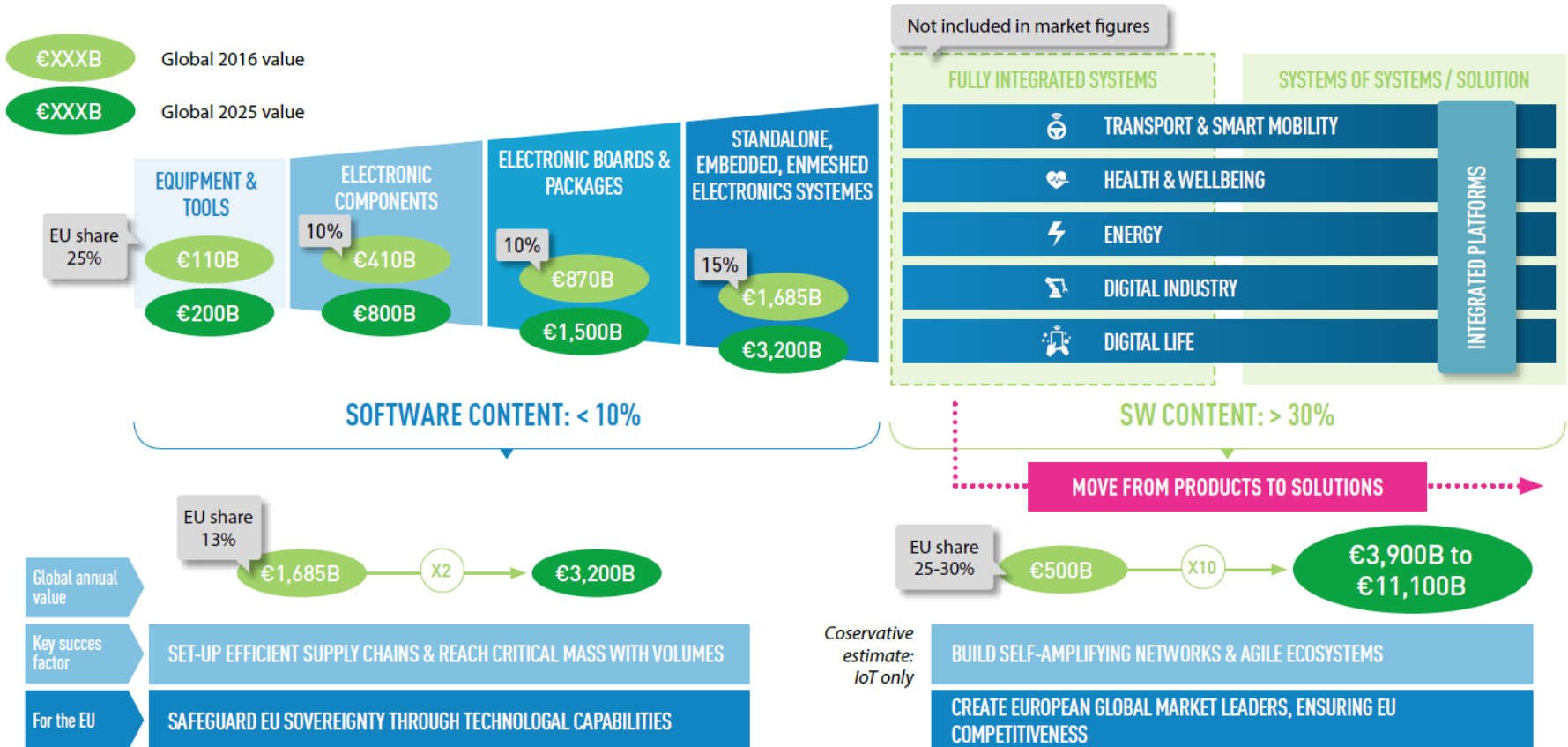


Note: rounded figures. (1): 2025 estimate value potential for the Internet of Things, not the full potential for ECS end-applications.

Source: Decision, IDC, MGI, Advancy analysis

**Figure 3:** Global value chain in 2016 and worldwide market estimates<sup>3</sup>

# ...2/3<sup>rd</sup> of the value will be captured downstream by 2025

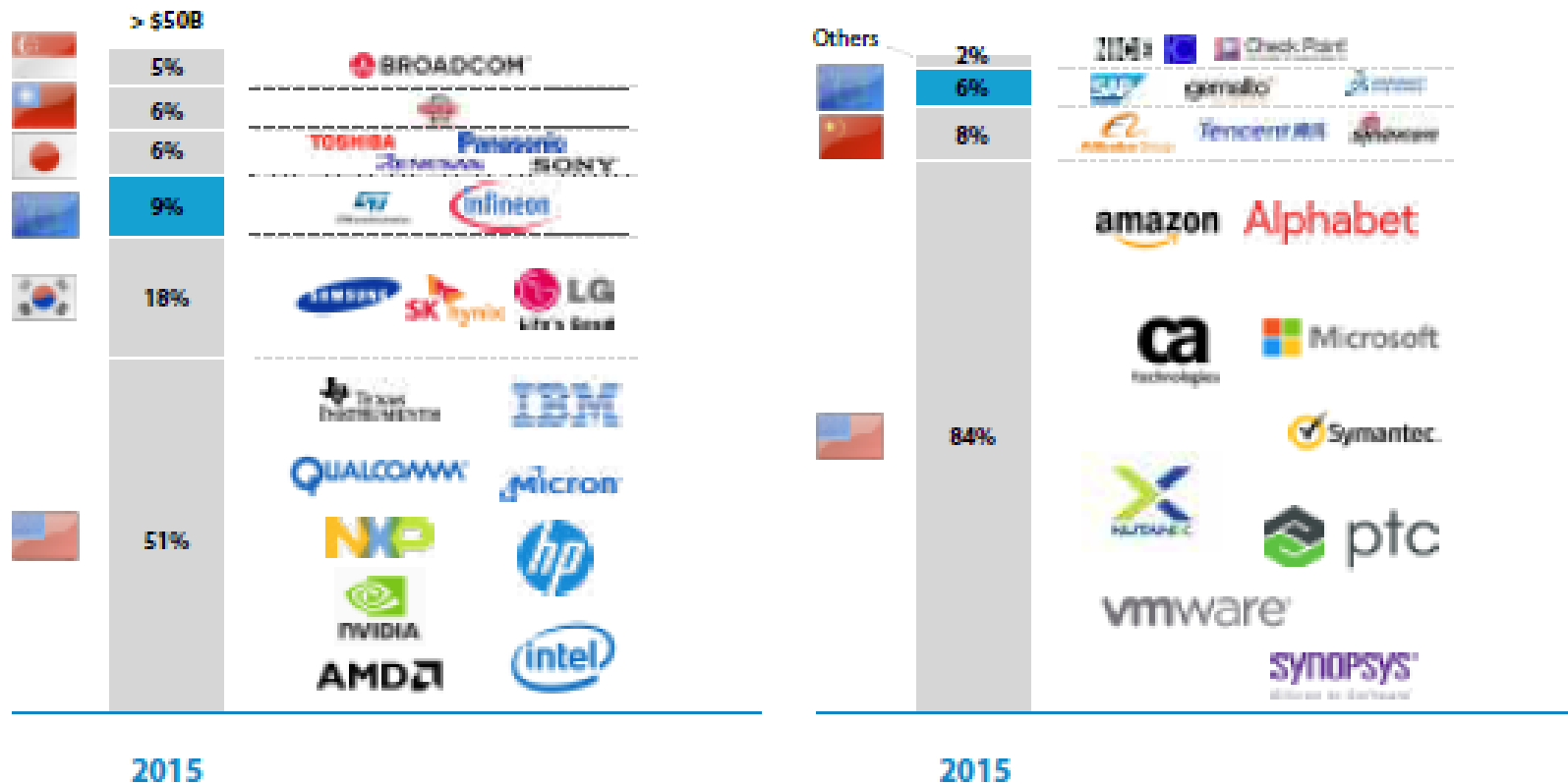


Note: rounded figures. (1): 2025 estimate value potential for the Internet of Things, not the full potential for ECS end-applications.

Source: Decision, IDC, MGI, Advancy research & analysis

Figure 4: Global and European value chain 2016-2025

# Value is also shifting geographically



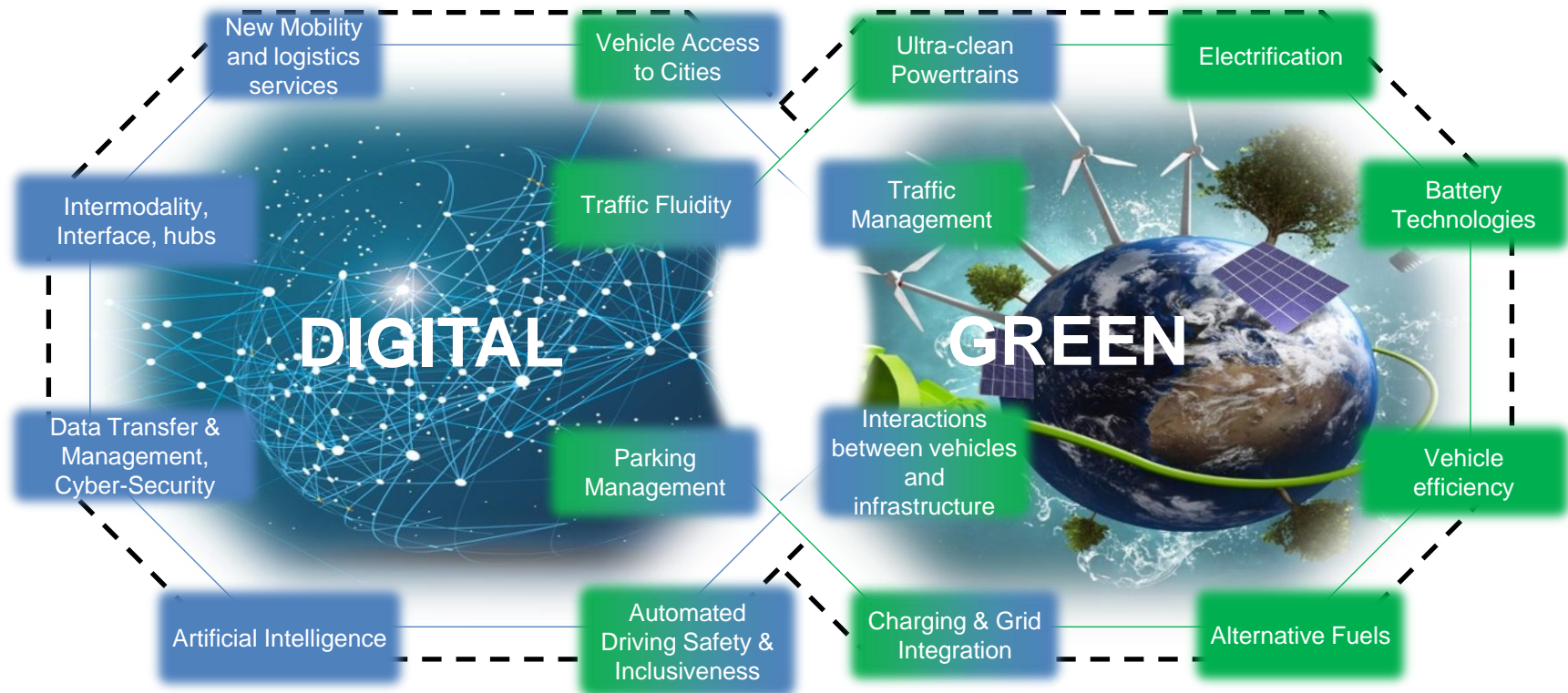
Source: IC Insights, Annual Report, Advancy analysis, Strategy & Top 1000 Innovators survey

Figure 13: Private R&D, the example for hardware (semiconductors) and software



# Upcoming challenges in road transport

## ROAD TRANSPORT LANDSCAPE



## Jobs & Growth for Europe



**EPoSS**  
European Technology Platform  
on Smart Systems Integration



**ETIP SNET**  
EUROPEAN TECHNOLOGY  
INNOVATION PLATFORM  
SMART NETWORKS FOR  
ENERGY TRANSITION

**alice**

Alliance for  
Logistics Innovation  
through Collaboration  
in Europe



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# Mobility revolutions are happening

- They will come faster than expected
- To take most benefit from these revolutions, we need to act at European level



# Electric mobility: a revolution pushed by regulation



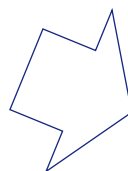
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**Air quality is a worldwide issue**

Access to the city center

Diesel regulation

Combustion engine regulation



**-CO<sub>2</sub>**

- GLOBAL WARMING

- DIESEL

**-NO<sub>x</sub>**

+AIR QUALITY

- DIESEL

**+ ELECTRIFICATION**



# Things go faster than expected



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## Things go faster than expected

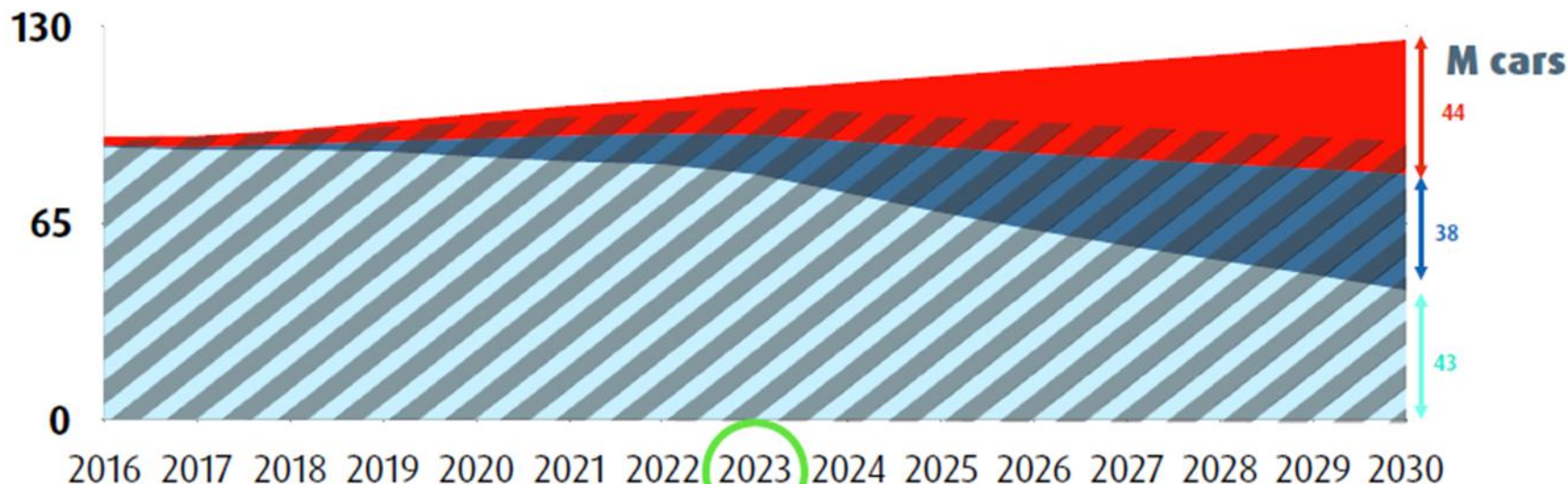
ICE

High Power (PHEV, Full hybrid & BEV)

Mild Hybrid (12V+48V)

Conventional ICE (incl. Stop-Start)

### ICE Peak in 2023?



# Decarbonisation: from a vehicle focus to a system approach



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## Green Cars 2008-2013

- Focus on electrification
- Cars, Long distance / Trucks and logistics

## Green Vehicles 2014-2020

- Energy efficiency of vehicles using alternative powertrains, including electric powertrain
- 2 wheelers, cars, vans, buses, coaches and trucks

## 2Zero 2021 - 2027

- System approach for zero emission road mobility for people and goods
- Support carbon-neutral EU by 2050: strategies and roadmaps for 100 % renewable energy in transport
- All type of road vehicles
- Sector interconnection and interoperability (vehicles, energy, logistics, infrastructure ...)

# 2Zero partnership will bring a key contribution to the Green Deal

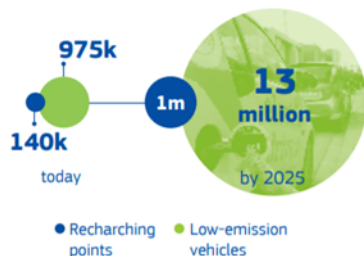


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Vehicle technologies and vehicle propulsion solutions for BEV and FCEV

Integration of the battery electric vehicle into the energy system and related charging infrastructure

Alternatively fuelled cars and public recharging points in the EU



## Go digital

- Automated mobility and smart traffic management systems will make transport more efficient and cleaner.
- Smart applications and 'Mobility as a Service' solutions will be developed.



**90% reduction**  
greenhouse gas  
emissions in  
transport by 2050

## Reduce pollution

The Green Deal will address emissions, urban congestion, and improve public transport.

Innovative concepts, solutions and services for the zero tailpipe emission mobility of people and goods

LCA and circular economy approaches for sustainable and innovative road mobility solutions

# Working beyond silos



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## Clean Hydrogen

- Hydrogen production
- H2 energy storage
- Infrastructure deployment
- Fuel cells systems

## 2ZZero

Vehicle integration  
Mobility solutions  
System approach

## CCAM

- Automated driving
- Connected and cooperative mobility
- New mobility and logistics services

## Batteries

- Materials
- Electrochemistry
- Cell design
- Cell manufacturing
- Second use

## Key digital technologies

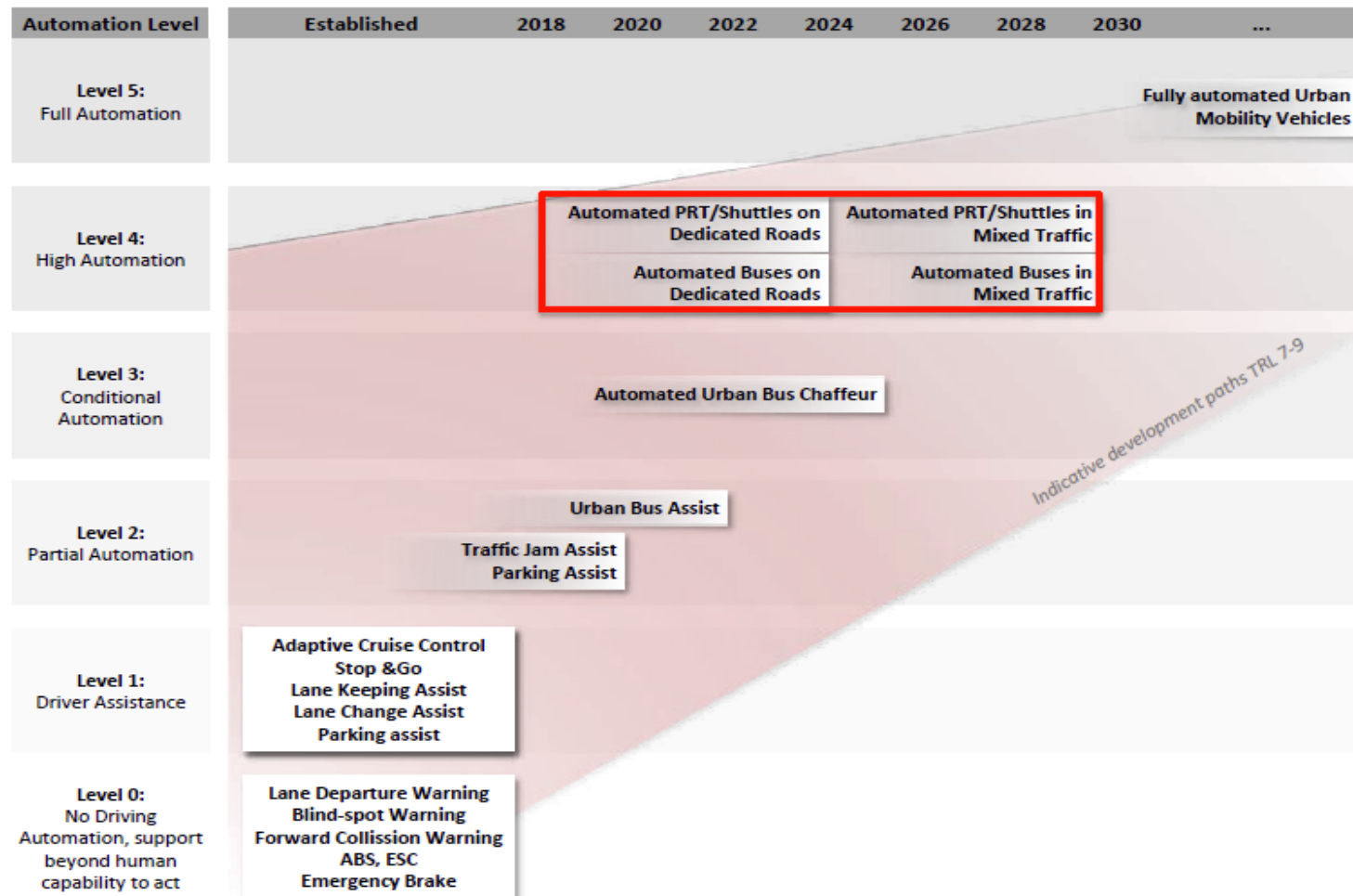
- Electronic components and systems
- Software



# Automated urban mobility at the tipping point: technology is going faster than expected



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PRT (Personal Rapid Transit) incl. Urban Shuttle  
City Bus/Coach: M2 < 5 tonnes < M3

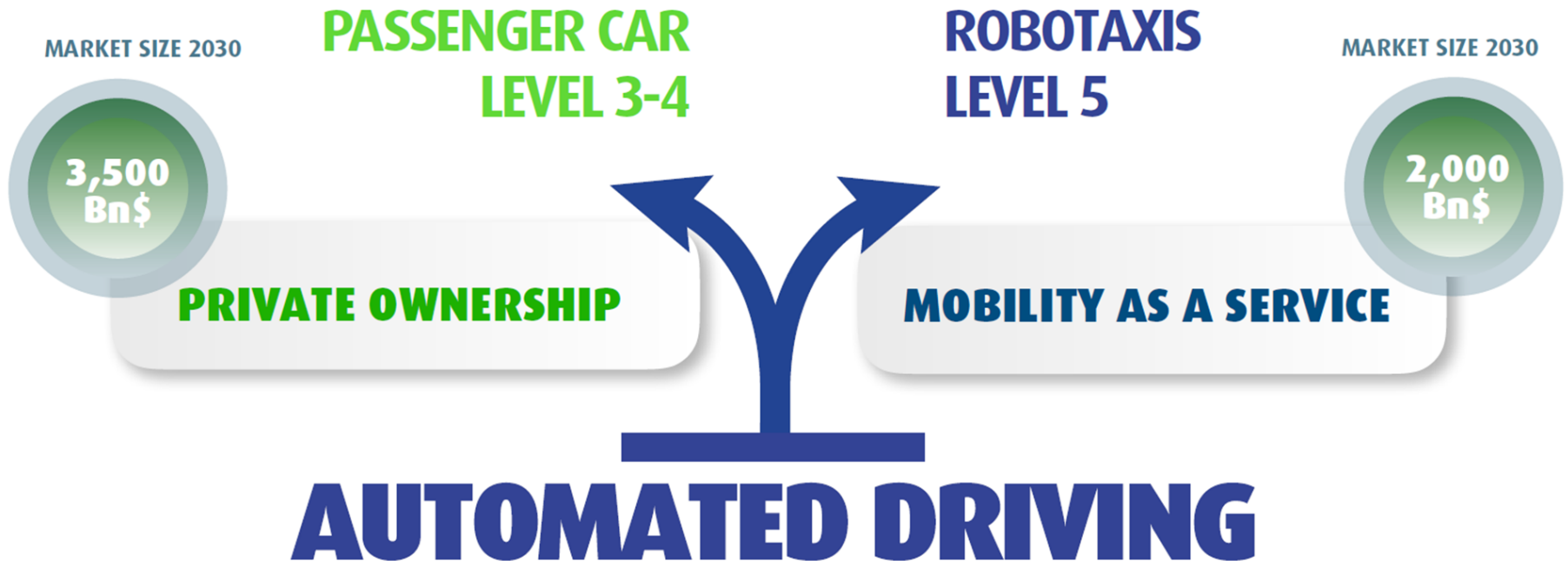
ERTRAC Roadmap on  
Urban Mobility (2018)



# A reshuffled paradigm ...



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# ...automated driving for fleets is already a reality

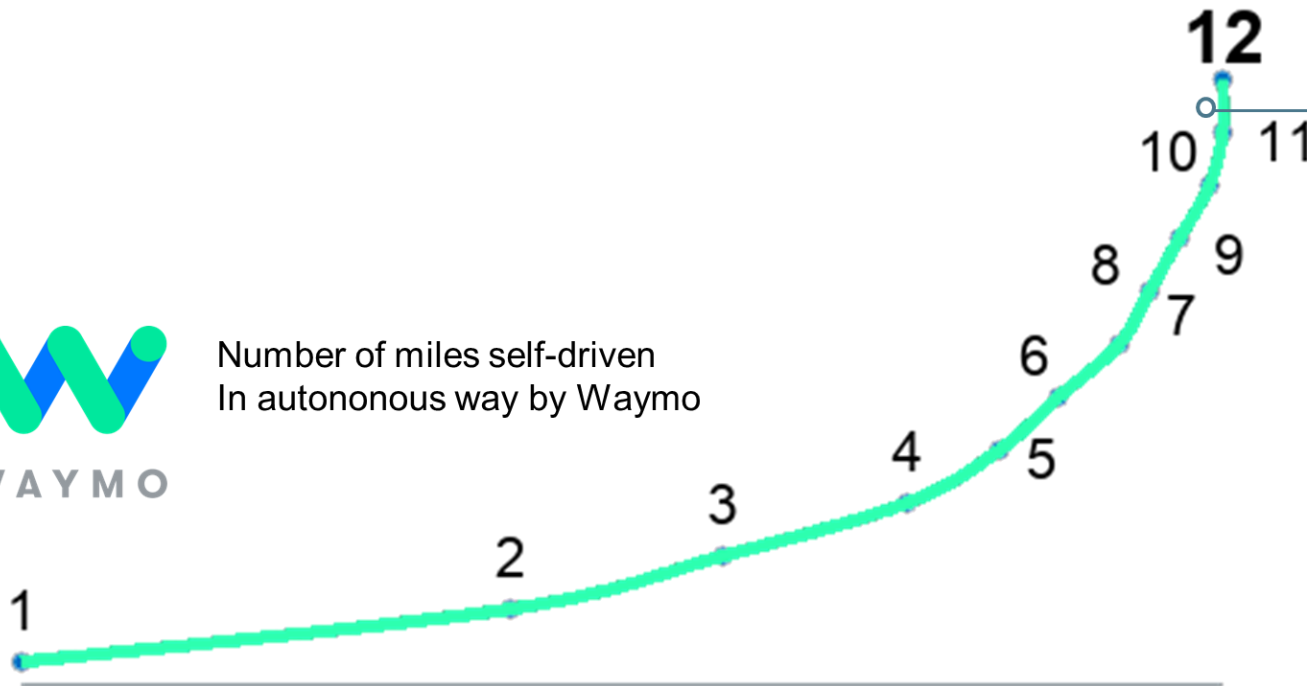


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## ROBOTAXI / FLEET MOBILITY as shared / automated / digital reality



Number of miles self-driven  
In autonomous way by Waymo



Self driving service  
Waymo One operating

# Ecosystems have been created to capture value



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# A new partnership to answer the digital challenge: CCAM



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## CCAM main objectives



Reduced number of fatalities and injuries in road transport



Safe and efficient co-existence between automated and non-automated “conventional” traffic for a long transition period of mixed traffic



High public acceptance and adoption of CCAM with clear understanding of its benefits and limits



Increased efficiency of transport flows (people and goods) leading to better use of infrastructure capacity and preservation of public space



Reduced transport emissions and congestion



Making Europe a world leader in the deployment of connected and automated mobility for people and goods



More focused and long-term investments in R&I, development and pre-deployment of CCAM



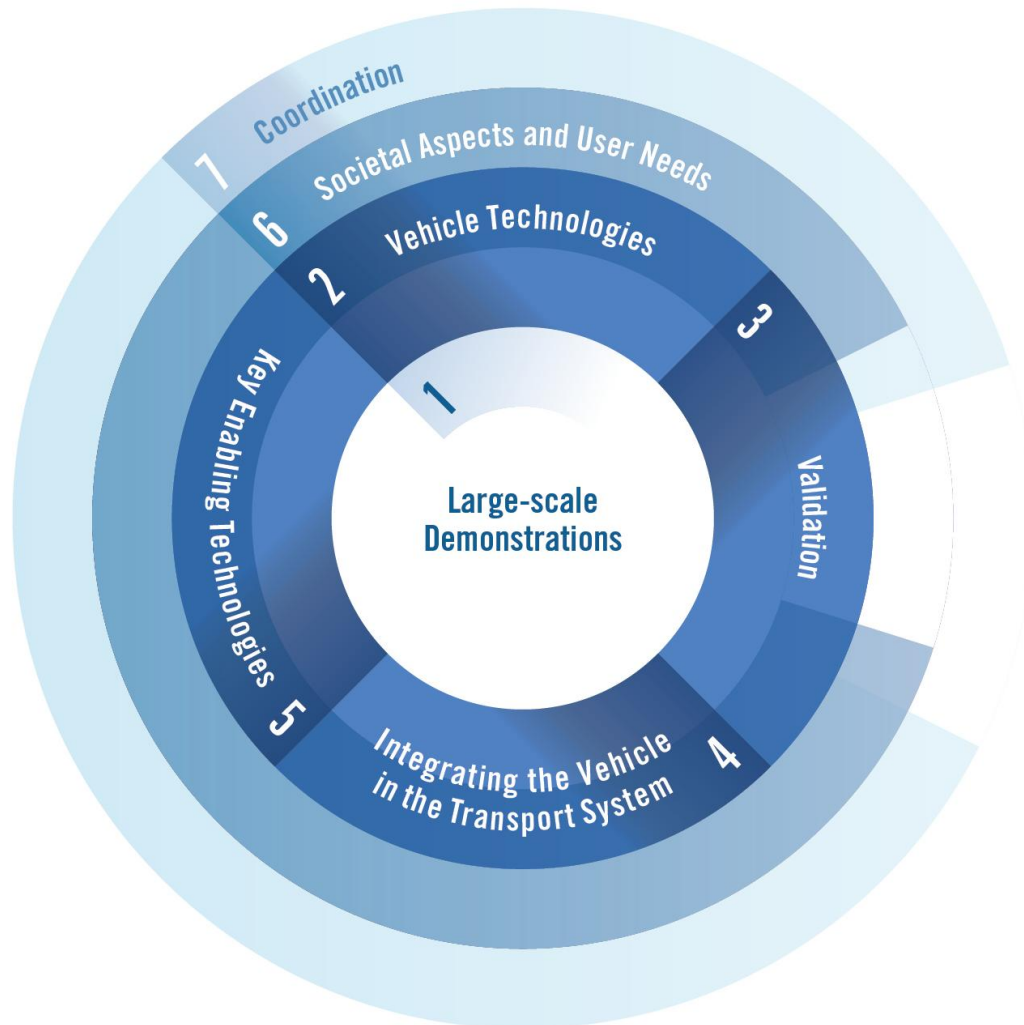
Support the creation, dissemination and capitalisation of knowledge to accelerate the development and improvement of CCAM enabled solutions



# CCAM Clusters



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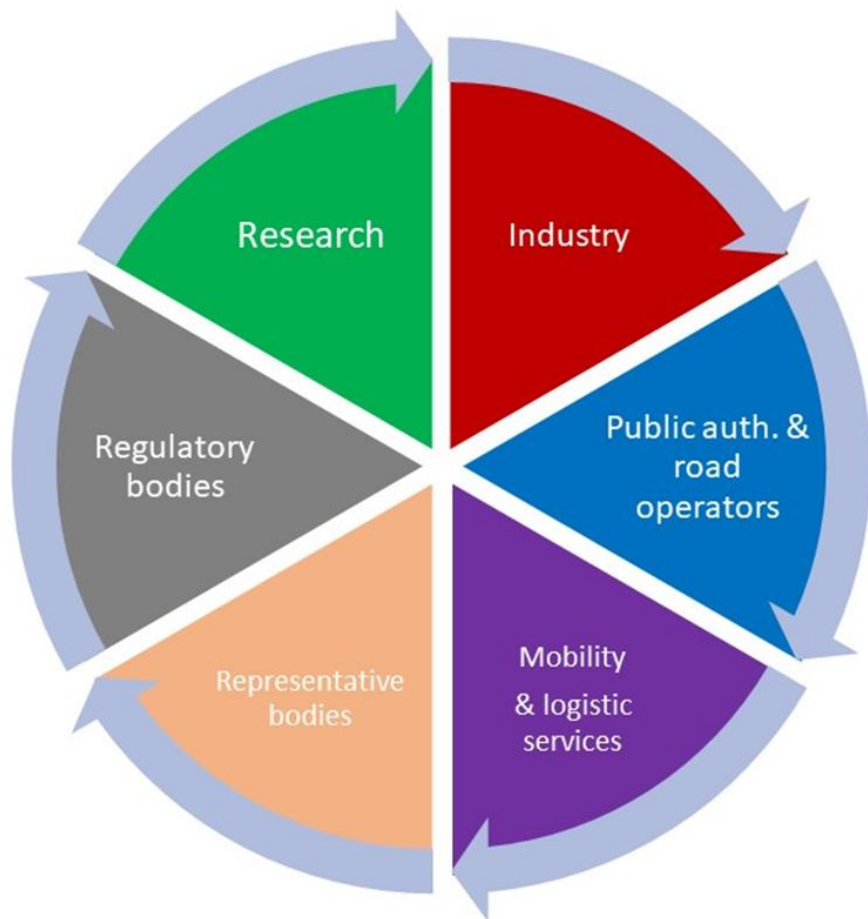




# CCAM Partnership Sectors and Stakeholder



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<b>Industry</b>	<ul style="list-style-type: none"> <li>- Automotive industry, including supply chain</li> <li>- ITS solutions, telecom providers, connectivity</li> <li>- Data handling and storage industry, ...</li> </ul>
<b>Public authorities &amp; road operators</b>	<ul style="list-style-type: none"> <li>- Cities and regions</li> <li>- Transport authorities, road authorities and operators</li> <li>- Member States</li> </ul>
<b>Mobility &amp; logistic services</b>	<ul style="list-style-type: none"> <li>- Public transport providers</li> <li>- Mobility and logistics service providers</li> <li>- Insurance, maintenance, ...</li> </ul>
<b>Representative bodies</b>	<ul style="list-style-type: none"> <li>- Road users</li> <li>- Stakeholder associations</li> <li>- Road safety, society, the environment, ...</li> </ul>
<b>Regulatory bodies</b>	<ul style="list-style-type: none"> <li>- National, European and international</li> </ul>
<b>Research</b>	<ul style="list-style-type: none"> <li>- Universities</li> <li>- Public research institutes</li> <li>- Private research institutes</li> </ul>

# Take aways - we have a common vision



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- People and goods can reach their destination in cities in a way that is healthy, safe, affordable, reliable and comfortable
- CO<sub>2</sub>-neutral road transport with minimal environmental impact including circular economy for vehicles and infrastructure
- Infrastructure and traffic management provide high efficiency road network services at competitive cost with minimized congestion
- Digitalization enables people to get the best service at highest level of comfort and safety
- Safe and secure at any time
- Europe as a world leader in innovation, production and services

# Take aways - how to implement our vision



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- Collaboration is key at EU level, but also at a more local scale.
- Reinforcing the local value chain and building the regional eco system is key to be successful in tackling future challenges.
- Be pro-active in identifying potential partners, and get in touch with stakeholders outside of your standard suspects.



# Example Valeo Spain

“

Good and deep collaboration gives  
value to both companies, collaboration  
since 2000, +20 projects (2.5M€)

”



## Last collaborative projects between Valeo and Valencia Univeristy

01

ADVANCED GASOLINE AIR SYSTEM – [HR]

02

2018 FOULING IMPACT WITH LOW COOLANT T°

03

2016 EGR SYSTEM ON GASOLINE ENGINE, FOULING AND CORROSION

# ADVANCED GASOLINE AIR SYSTEM – [HR]



RENAULT  
Passion for life



## ■ Aim of the 2018-20 test campaign :

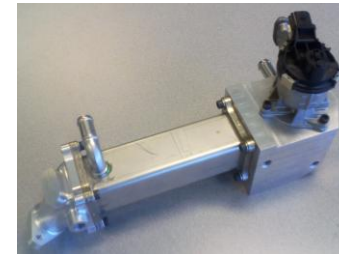
- Evaluate **various** EGR layouts and air path routing (WCAC By-Pass), **with transient conditions**
- Use the engine test results to evaluate EHRs benefit on gasoline engine (RSA)
- Understand at component level, the impact of each EGR layout.

## ■ Status :

- CMT installed the HR13 engine on dyno in September 2018
- Design activities done (LP EGR module + HP EGR module + WCAC)
- All prototypes delivered
- 1D model updated according to new EGR layout
- Engine test still on going up to end of 2020

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WCAC Gen3



EGR HP/LP coolers  
Greco 2 technologies

### Actuators:

- EGR valve
- Fresh air by-pas
- Admission valve



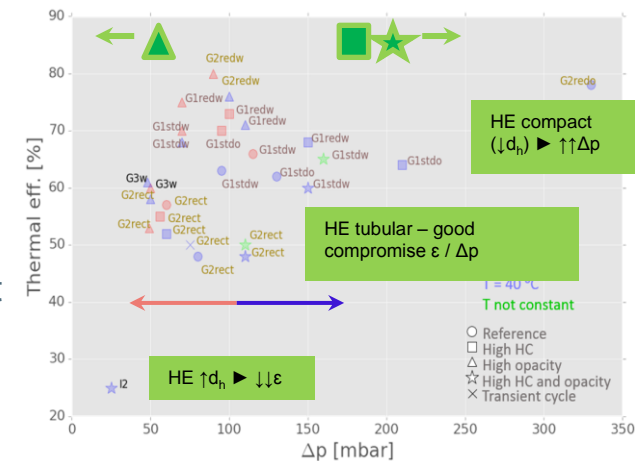
## 2018 FOULING IMPACT WITH LOW COOLANT T°

### ■ Aim of the project :

- Impact on EGRc of fouling with high hydrocarbon & soot content
- Cooler technologies influence on fouling

## ■ Conclusions :

- Most severe condition: combination of high HC & soot, main effect on  $\Delta p$
- Conditions with higher condensation expected (HC content) are more severe for lower hydraulic diameter.
- Severity of LT coolant conditions depends also on geometry, offset > wavy > rectangular tube.
- Very high hydraulic diameter leads to very acute decrease in thermal efficiency.
- A very compact solution can block the EGR function.
- Compactness of heat exchanger design must be confronted with the potential increase in pressure drop.



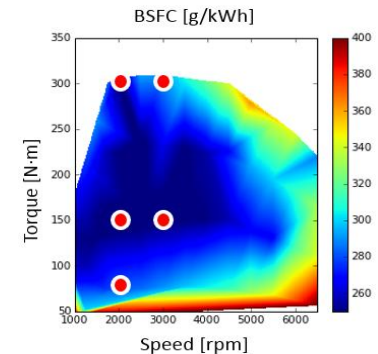
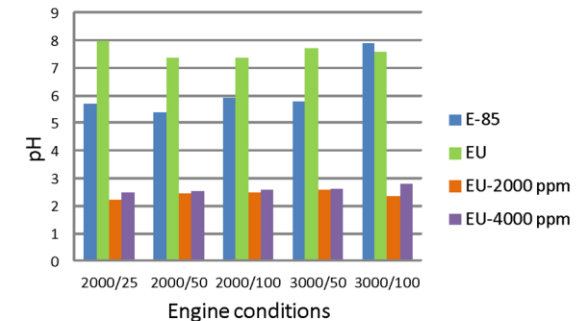
# 2016 EGR SYSTEM ON GASOLINE ENGINE FOULING AND CORROSION

## ■ Aim of the project :

- Prove benefits of EGR system for gasoline engine
- 2 fuel evaluation std gasoline and E85(85% ethanol)
- Asses durability for EGR cooler: fouling and corrosion

## ■ Conclusions :

- The benefits of using cooled EGR have been proved. Maximum reduction in fuel consumption around 14% has been measured for full load operating conditions.
- As for fouling (for gasoline), the effect in thermal efficiency and pressure drop is negligible for both LP and mixed configurations.
- As for condensates, an important decrease in pH values is observed with the use of high sulfur fuels mainly linked with the condensation of sulfuric acid.



“

New collaborative opportunities  
and challenges for new green,  
safe and smart mobility

For more information, get in touch with Maria Luisa  
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CDTI/ Horizon Europe)

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your attention !**

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