



# **Smart Systems for Safe, Clean and Automated Vehicles**

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# Overview

- *Context*
- *The importance of and for electronics*
- *Work in hand – statistics and examples*
- *Ongoing Initiatives*
- *Issues for the Future*

# Context – Europe's transport challenges – targets 2020-2050

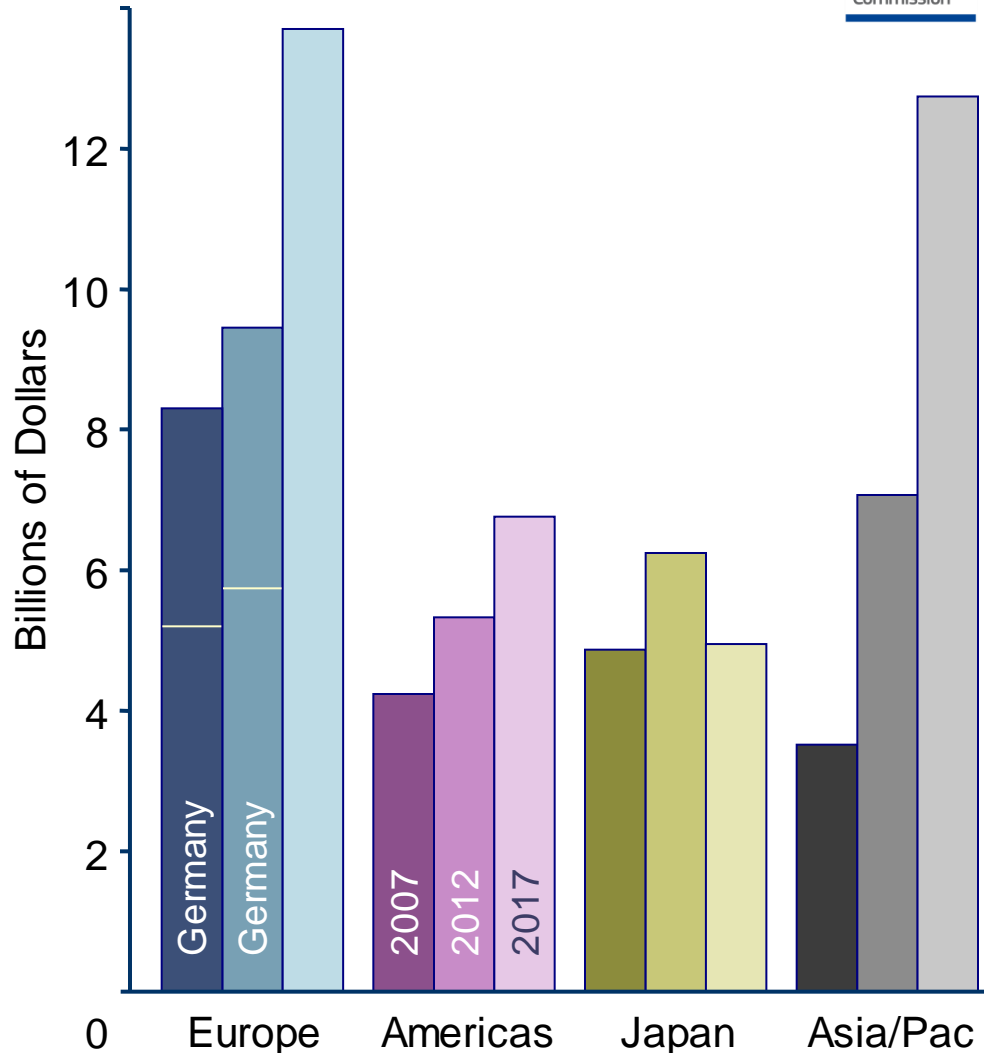
- *Road safety: -50% by 2020, towards zero fatalities in 2050*
- *Reducing congestion: estimated -2% GDP*
- *Energy efficiency and emissions: - 60% by 2050*
- *Addressing growth in demand and increasing urbanisation, ageing population*
- *Integration of different transport modes*
- *Make use of R&D including ICT*
- *Reducing dependence on oil and impact of increasing oil prices*
- *Reducing noise and air pollution in cities*

# Context – Autonomous vehicle

- *Human errors in attention and vigilance are the sole cause in 57% of all road accidents and are a contributing factor in over 90% of road accidents and near-crashes*
- *Main potential benefits*
  - **Increase comfort**
  - **Increase safety**
  - **Increase road capacity**
  - **Contribute to green mobility**

# Automotive Semiconductors – share 2007/2012/2017

European  
Commission



- Europe dominates the market for automotive semiconductors (34% share)
- Japan & Germany are the top automotive semiconductor countries (together ~45% share)
- Essential qualification for the European success (amongst others)
  - Close vicinity to the customers
  - Highest qualified development engineers
  - ASICs in More-than-Moore technologies

**Till 2017 (at least): good further growth**

- 6.3% - CAGR for total world
- 7.7% - CAGR for Europe
- Share of Europe up to 36%

# Automotive Semiconductors – Driving Forces



## FURTHER POTENTIAL OF SAFETY ENHANCEMENT

### Driver Assistance



Vehicle stabilizing



Brake functions



Vehicle dynamics

### Active Safety

Radar based systems



Ultrasonic based systems



Video based systems



### CAPS (Combined Active/Passive Safety)

- Preventive information
- Coordinated interaction
- Added value functions

#### Targets:

Accident mitigation and reduced accident severity



Detection & sensing



Occupant protection



Pedestrian protection

### Communication

Navigation systems



Visualization



Car-to-x communication



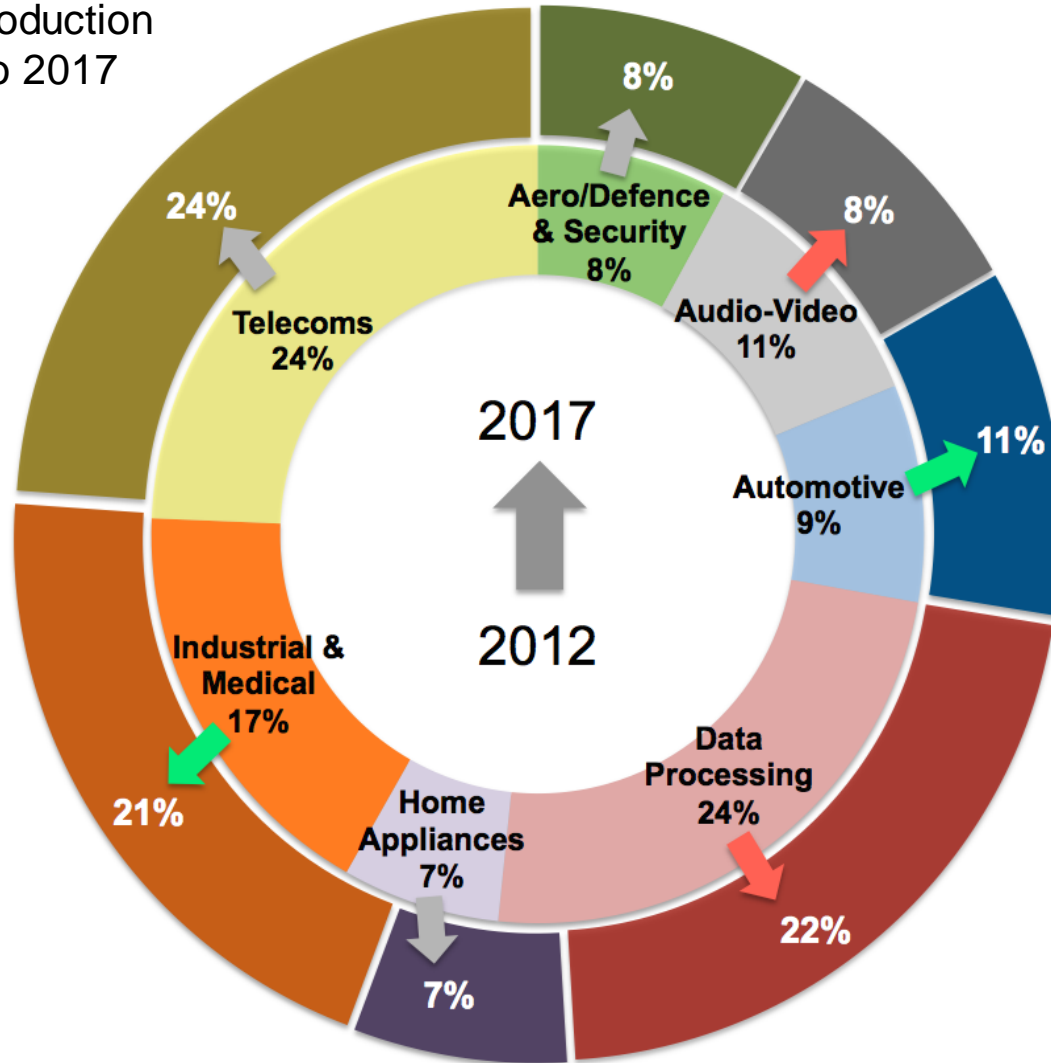
### Passive Safety

# Electronic equipment production trends by sector



Evolution of the production share from 2012 to 2017

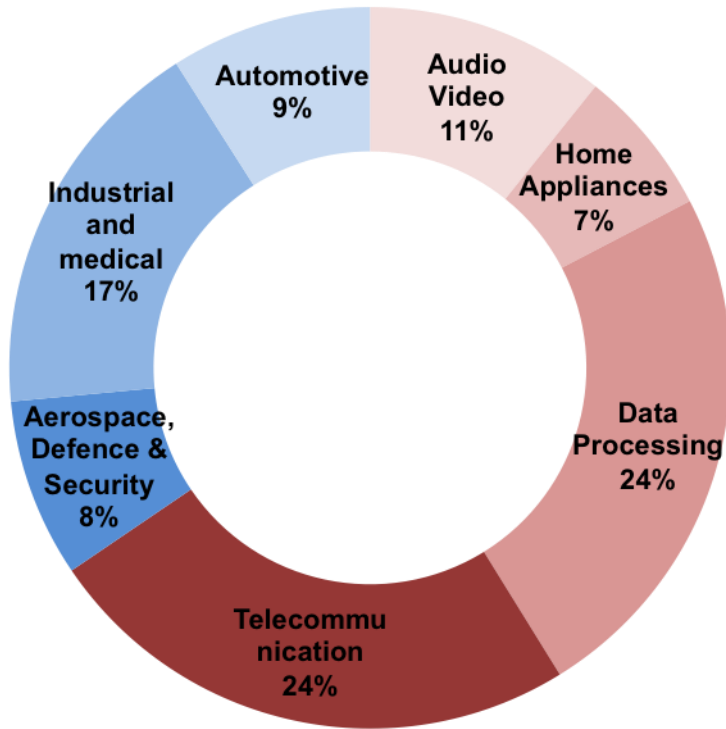
- ↑ Positive
- ↑ Negative
- ↑ stable



# Regional specialisation of the electronics industry

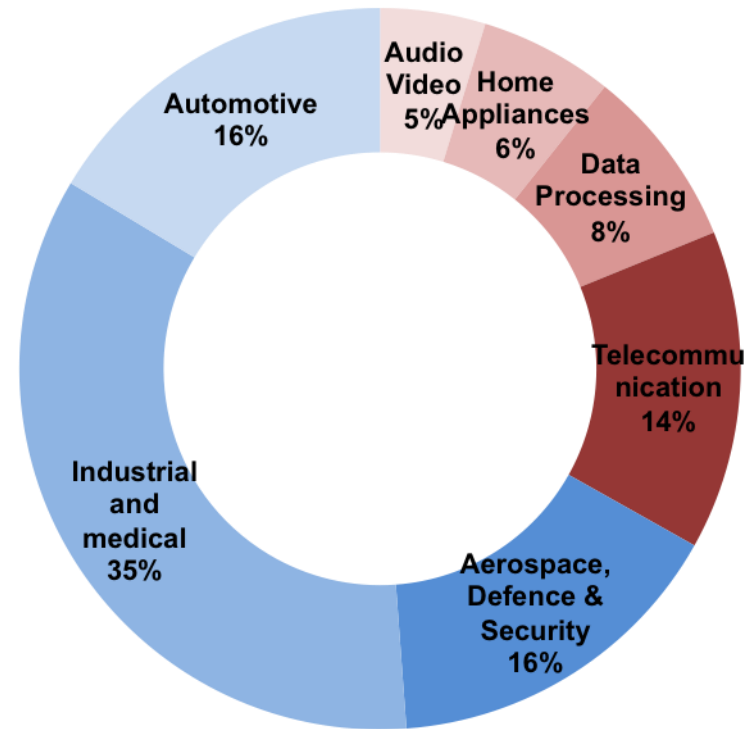


## World Electronic Production in 2012



**1 412 billion euros**

## European Electronic Production in 2012



**197 billion euros**

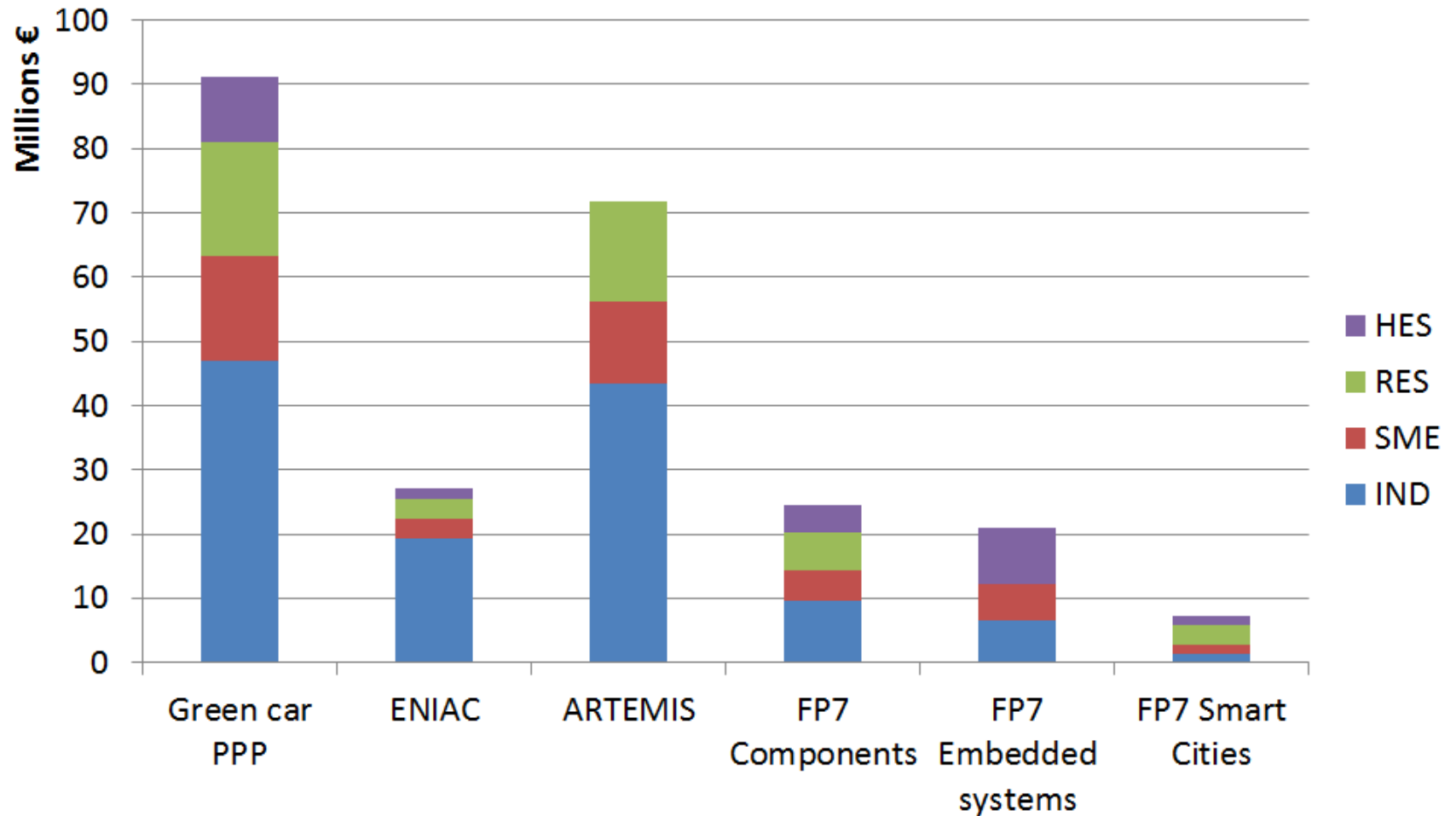


# Work in hand - statistics

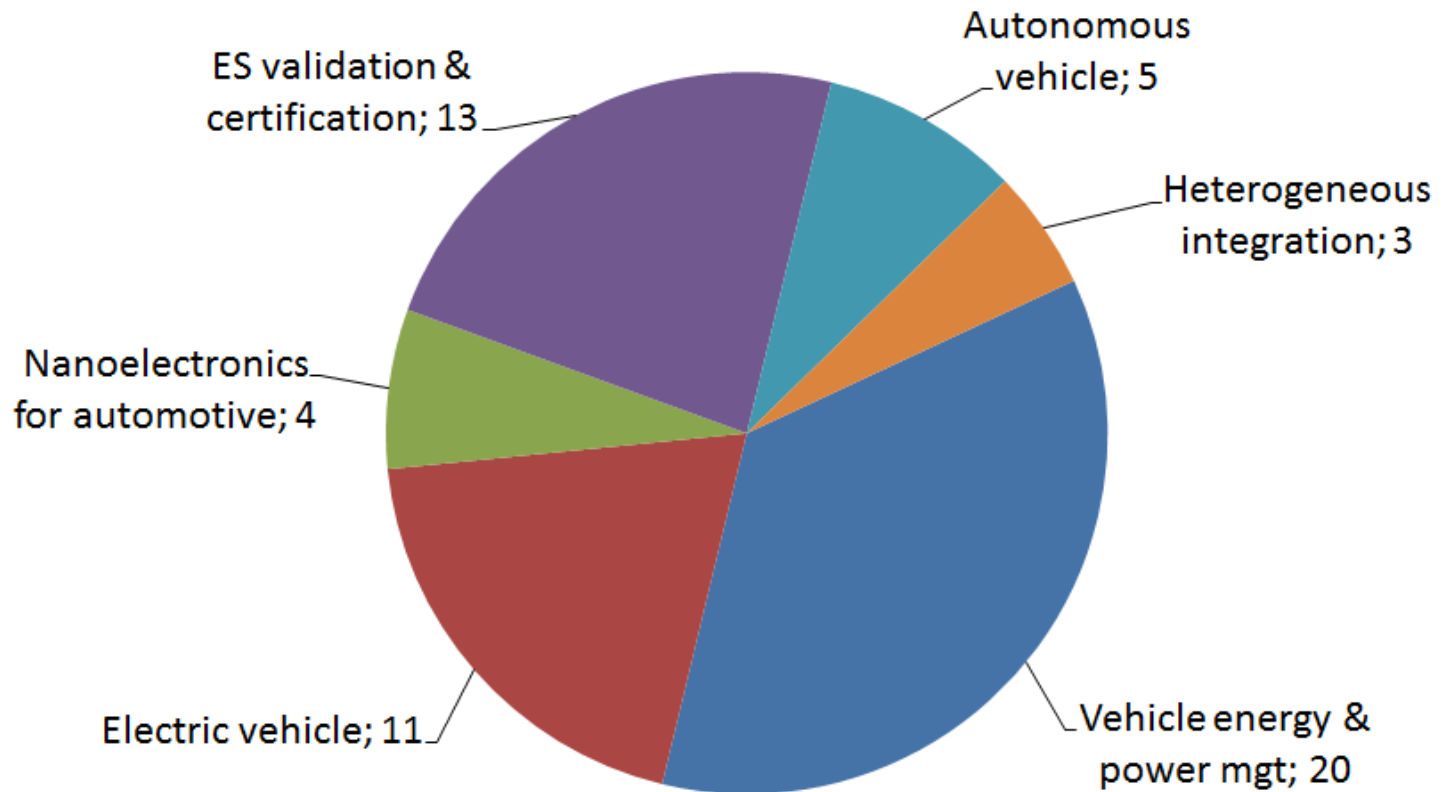
*ICT for clean, safe and autonomous vehicles have been funded by the EU through 6 streams*

- **European Green Car PPP**
- **FP7 Components**
- **ENIAC JU**
- **FP7 Complex Systems & Advanced Computing**
- **FP7 Smart Cities**
- **ARTEMIS JU**

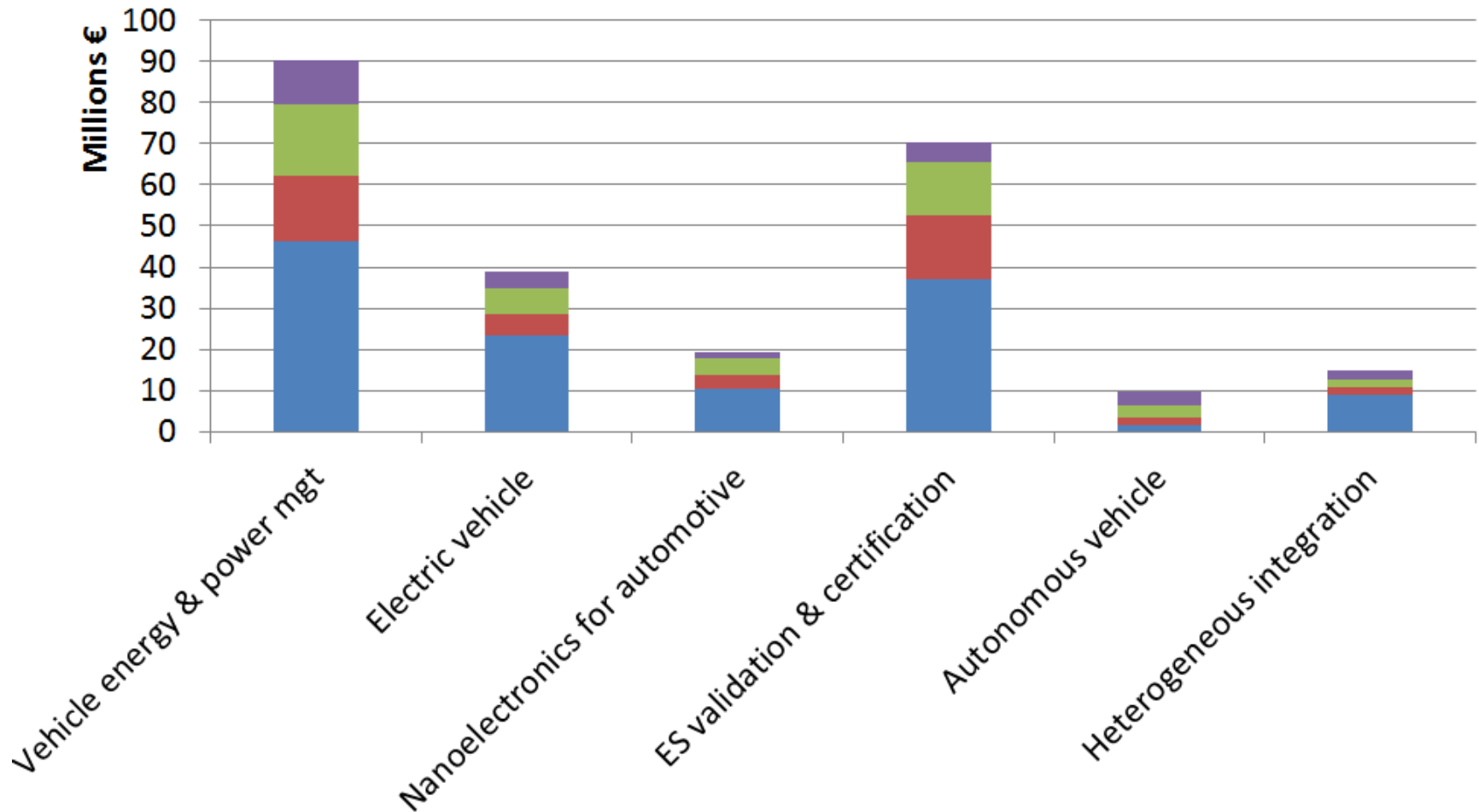
## EC funding of projects related to safe, clean and automated vehicles



## Projects related to safe, clean and automated vehicles



## EC funding of projects related to safe, clean and automated vehicles



# Work in hand – example projects



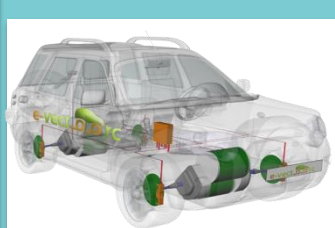
European  
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## Electric Powertrains



Sustainable fully electric cars made in the EU with high volumes

## Vehicle Dynamics



Improving vehicle stability control

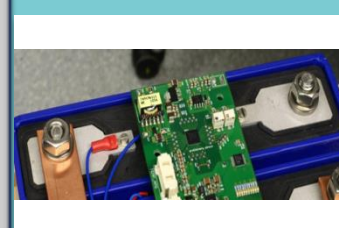
## Vehicle ICT and energy controls



New driving strategies and driver assistance systems to increase efficiency, driving range, and safety

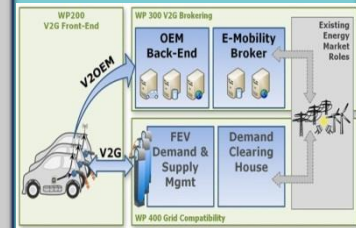


## Battery Management



Increased performance of building elements at reduced costs for energy storage in FEVs

## Vehicle-to-Grid



Intelligent charging system supported with near real-time exchange of charge related data between EVs and the grid

- Context-aware energy efficient e-vehicle with driving assistance
  - Exploring the full ICT and energy controls over a vehicle in synergy with the driver HMI interface in communication with the surrounding infrastructure
- Project aim:
  - New driving strategies and driver assistance systems to significantly increase the efficiency, driving range, and safety of electric vehicles
  - Increase of ICT functionality in future cars
- Results/demonstrators:
  - 20 to 40% energy savings demonstrated in ITS corridor
  - Short term implementation of project results in hybrids



## Some ongoing initiatives

- *HORIZON 2020 – Research and Innovation funding*
  - **First calls being evaluated**
- *Implementation of the ITS Action Plan*
  - **Six actions completed**
- *European Innovation Partnership on Smart Cities and Communities*
  - **Invitation to Commitment**
- *The European Green Vehicle Initiative, ...*

## Some ongoing initiatives

- *European strategy for the Electronic Components and Systems*
  - **Industrial Roadmap covering demand, supply and infrastructure measures delivered on 14 February 2014 –**
    - Automotive identified as one of the main markets
  - **Implementation plan expected on 30 June 2014**
    - Concept of trailblazer projects – autonomous mobility a possible example



## Some ongoing initiatives

- *ECSEL – Electronic Components and Systems for European Leadership*
  - **A 5B€ initiative with the financial contribution of industry, Participating Member States and the EU**
  - **Coverage micro- and nanoelectronics, embedded/cyber-physical systems and smart systems**
  - **Strategic plan includes an application trust on smart mobility**

# Issues for the Future

- *Technology development, experimentation and deployment; Interconnection infrastructure and vehicle, ...; Role of ICT (big data, cloud services, location, ...)*
- *Legal and regulatory framework*
  - **Including liability, security and privacy concerns**
- *Standardisation*
  - **Including certification and verification**
- *Spectrum*
- *International co-operation*

# Conclusion

- *Europe is well positioned*
- *Need for further cooperation and collaboration across the value and the innovation chain*
- *Essential to establish the right framework conditions*

# Collaboration



# Thank you

