



### ■ Motivation and Objectives

E<sup>3</sup>Car is a project of the ENIAC program that was conceived in 2008 when oil prices skyrocketed. Awareness of peak oil reached the citizen in the street and the promise of electro mobility was widely criticized for problems of short driving range, high cost and overall limited efficiency. E<sup>3</sup>Car develops nanoelectronics-based systems to fully exploit the potential of Full Electrical Vehicles (FEV), and to address these main concerns. The consortium comprises 33 partners from 11 countries. The E<sup>3</sup>Car supply chains are driven by OEMs, Tier1 suppliers, and semiconductor suppliers in cooperation with universities and institutes. These supply chains are ideally positioned to develop holistic approaches towards energy efficient Electric Vehicles (EV), from research-based approaches to demonstration and production capabilities. An important feature of the project has been the recognition and exploitation of synergies with other EV projects, enabling fast innovation cycles between such aligned projects.

Objectives:

- Build a solid nanoelectronics technology base for Europe,
- Establish standard designs and platforms for electrical/hybrid vehicles with a significant industrial, economic, innovation and societal impact to enable the path to the Full Electrical Vehicle,
- Development of efficient and smart semiconductor components for the first industrial generation of energy efficient electrical vehicles.

### ■ Deliverables

Besides 148 reports on innovations, 22 outputs of relevance have been delivered, amongst these:

- Power conversion: E<sup>3</sup>Car inverter roadmap with contributions from various partners,
- Power conversion: IGBT 400V semiconductor technology, module and inverter: Infineon,
- Power conversion: 650V IGBT module and inverter: VALEO,
- Smart dynamic monitoring: Zero insertion loss current sensor: STI,
- Power distribution: Solar panel integration: AMS/FHJ/TUW,
- Power management: Starter battery: AUDI,
- Power management: Energy efficiency and range of operation WP2 D2.12: Bosch,
- Roadmap of driver IC technologies and sensor technologies STI, OnSemi, AMS, Okmetic,
- Battery management systems matching world wide competition: OnSemi, AMS, Atmel.

### ■ Technical Approach

Improve the efficiency of the electrical vehicle using advanced semiconductor components in the areas of:

- Power Conversion,
- Power Management,
- Power Distribution Network,
- Smart Dynamic Monitoring.

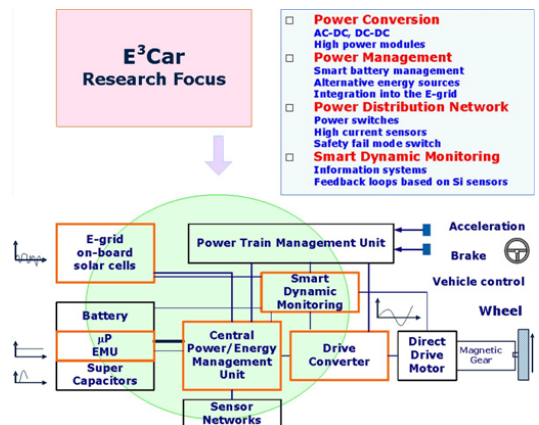
### ■ Achievements

The results cover all major EV systems and subsystems :

- Battery management,
- Battery charger,
- Inverter,
- Smart solar,
- Sensor technology for current measurements,
- Sensors for low frequency EMF.

E<sup>3</sup>Car is a parent-project that has created

a cluster of EV projects with over 100 partners with an overall budget of 180Mio€. This leverages the competitiveness of the European nanoelectronics and embedded systems technology, aiming at European leadership in the electro-mobility sector.



Budget	44.1 M€	Funding	20 M€
Duration	36 months	Start	March 2009
DG	ENIAC	Contract n°	12001
Coordinator	Reiner John, Infineon AG	Contact	reiner.john@infineon.com
Partners	33 partners, among them Audi, CRF, Bosch, Valeo, Siemens, ST, Infineon, Atmel, AMS, Onsemi, CEA, 3-5 Lab		
Website	www.e3car.eu		