EURELECTRIC's Vision For The Development Of The Necessary Electric Infrastructure For Electric Vehicles

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Structure

1. Benefits of electric vehicles
2. Effects on the electricity system
3. EURELECTRIC and industry actions

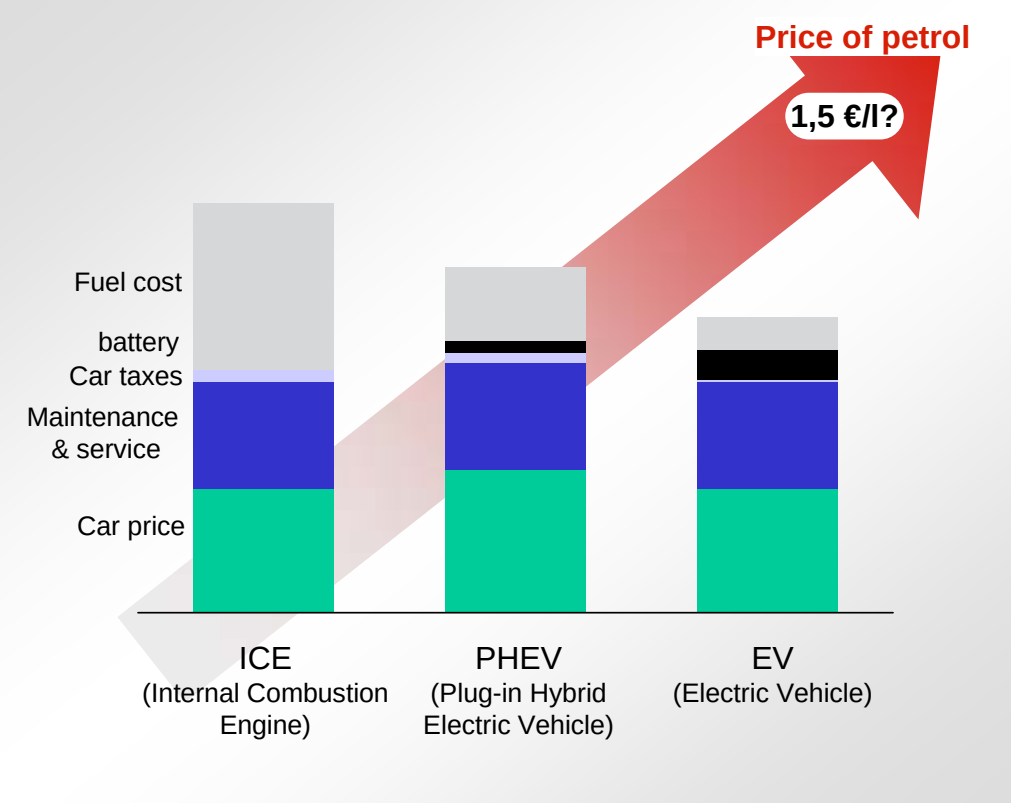
1. Benefits of electric vehicles

In contrast to other new individual transport concepts the “refuelling” infrastructure for electric vehicles (EV) is already in place

1. Benefits of electric vehicles

The low overall costs of electric vehicles are attractive to customers

Comparison TOTAL COST OF OWNERSHIP (TCO)[1)], 2020

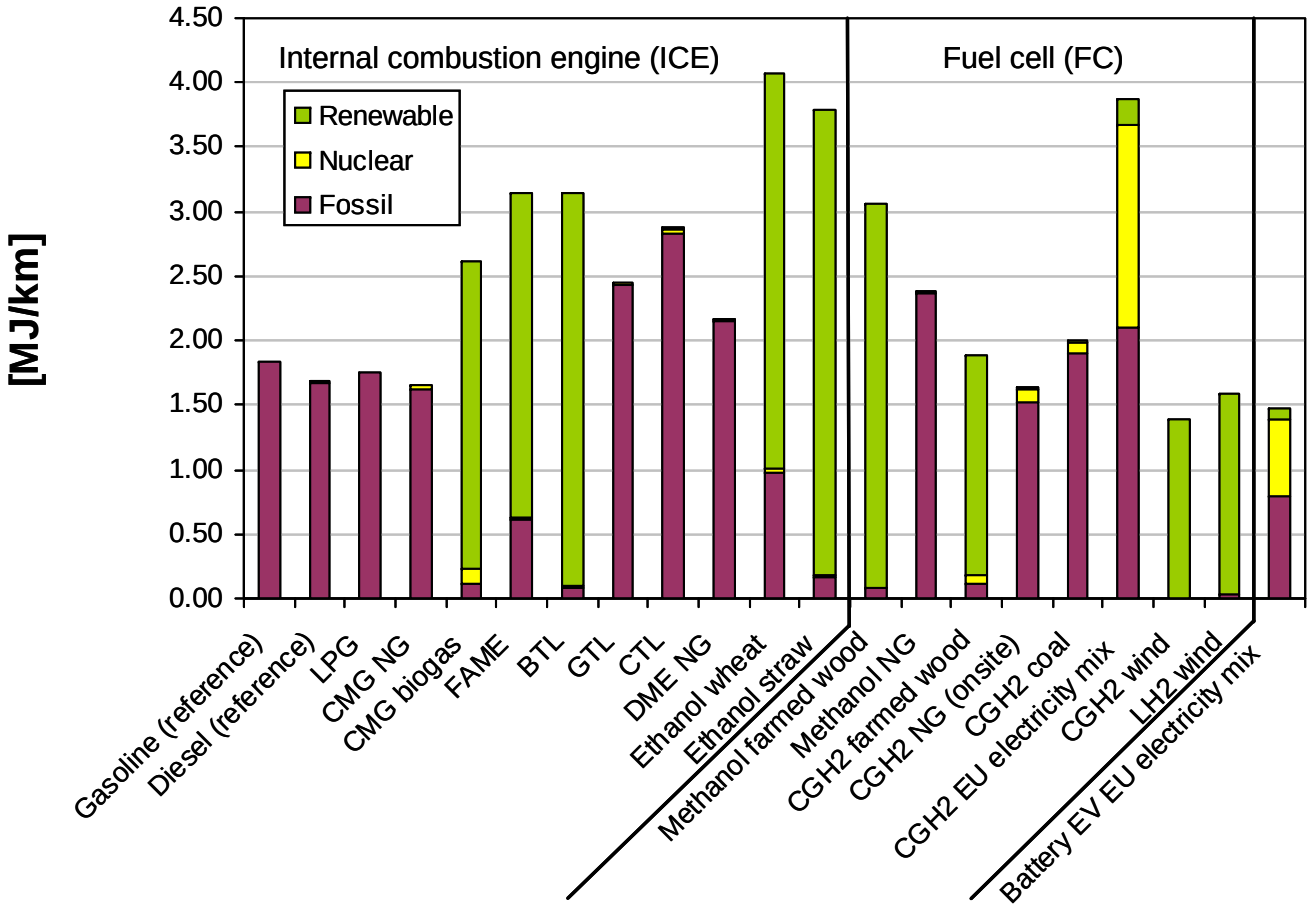


- With a petrol price of 1,50 €/l already significant cost advantages are achieved
- Higher cost advantages are possible
  – Drivers: oil price, tax breaks, battery costs

1) assumption out of Fraunhofer ISI Study 2008

1. Benefits of electric vehicles

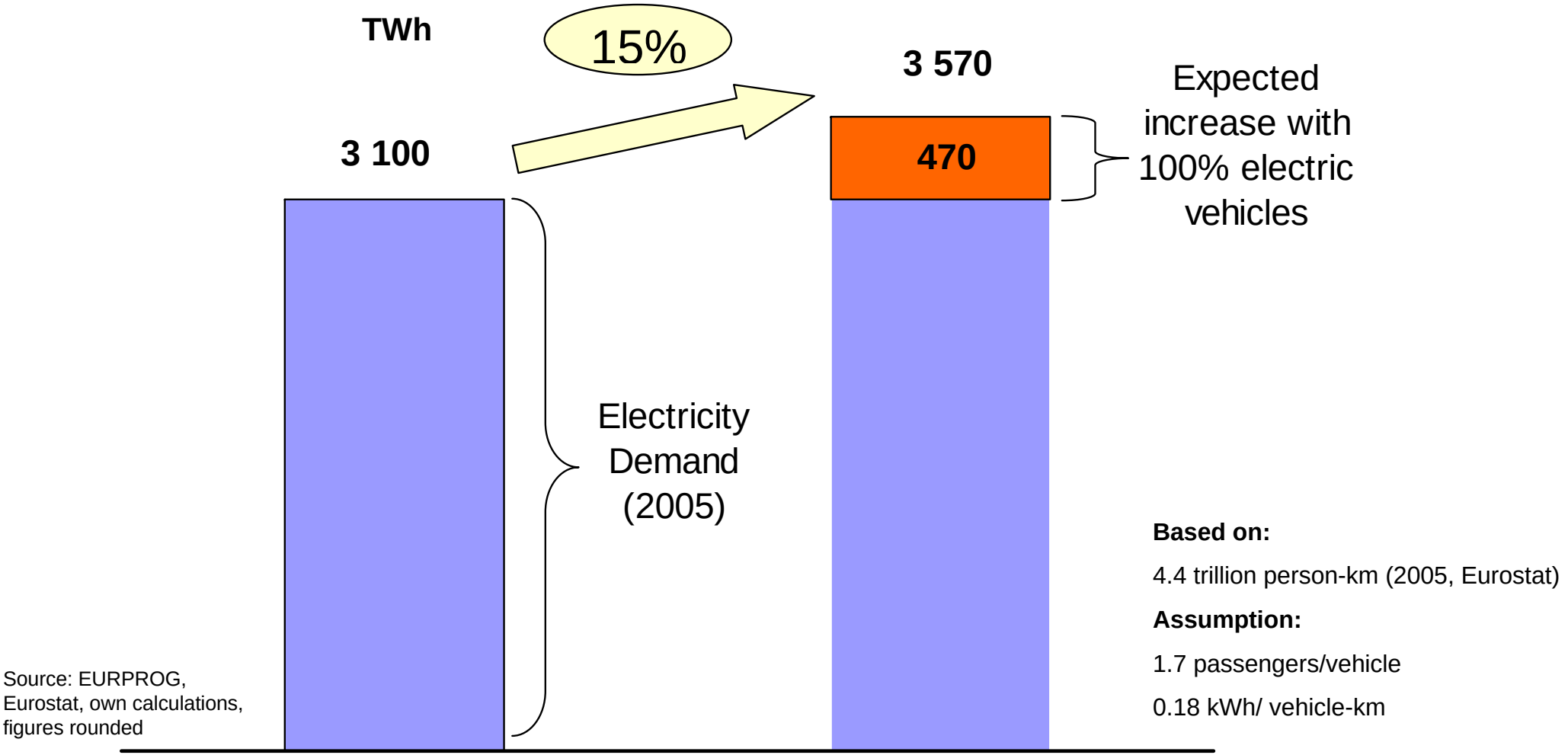
The snap shot of all Alternative Fuel Chains shows electricity as the best choice – a greater introduction of RES will further improve this advantage



Scource: CONCAWE et al. 2007; LBST 2007

1. Benefits of electric vehicles

100% electric vehicles as of tomorrow would increase EU-27 electricity demand by 15%



Based on:

4.4 trillion person-km (2005, Eurostat)

Assumption:

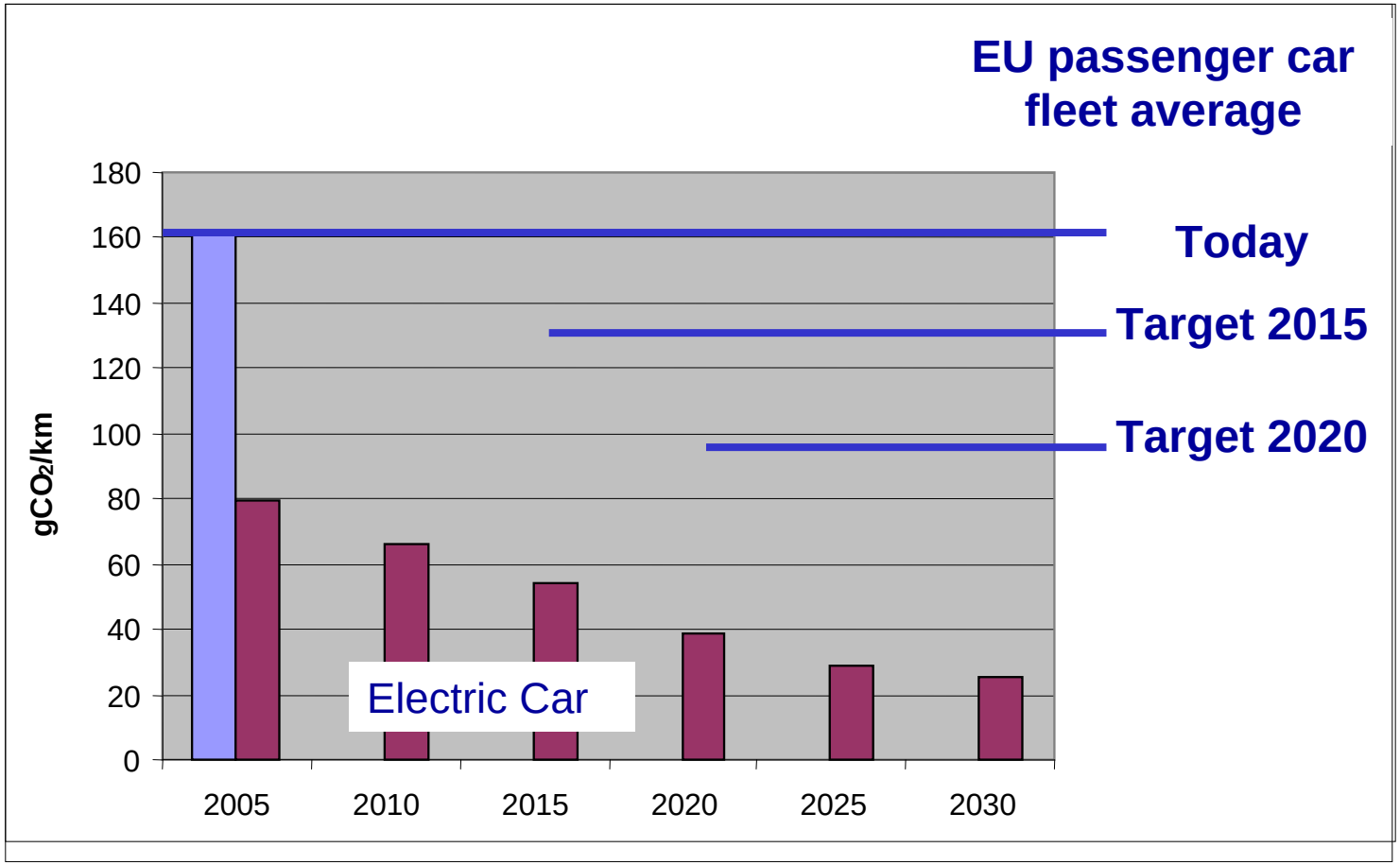
1.7 passengers/vehicle

0.18 kWh/ vehicle-km

Source: EURPROG, Eurostat, own calculations, figures rounded

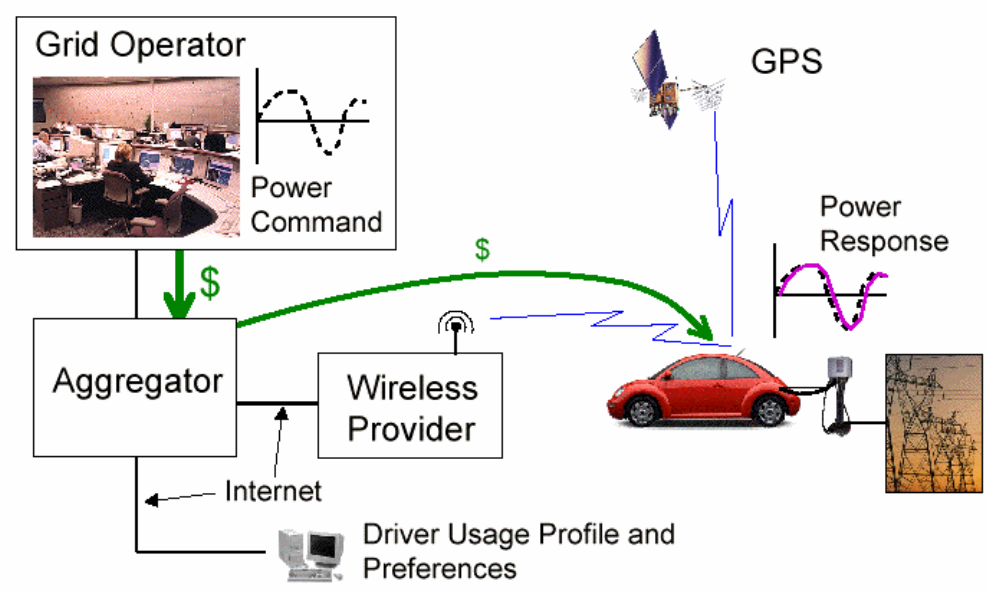
1. Benefits of electric vehicles

The reduction of CO_2 emissions in the electricity industry will improve the environmental performance of EVs further



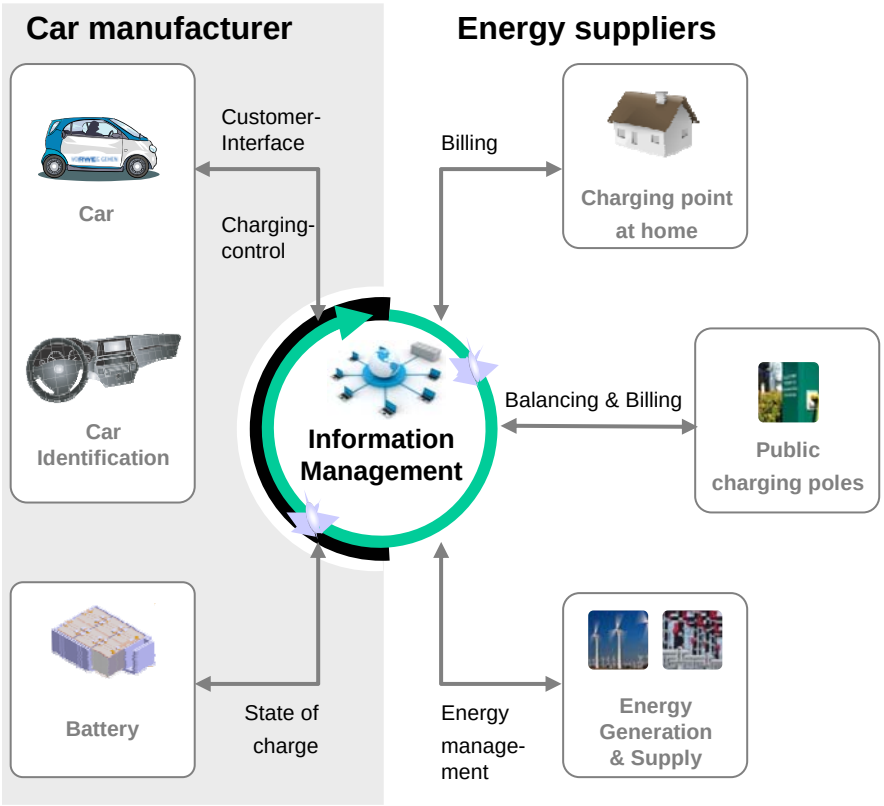
EV IMPLICATION ON ELECTRICITY SYSTEM (1/2)

- A great number of EV´s can be supplied by the existing grid structure
- An intelligent connection of the car to the grid will ensure
  - the security of supply under mass volume conditions
  - an optimum overall cost scenario
- Possibilities of System Services have to be investigated
- New business models will be conceivable



EV IMPLICATION ON ELECTRICITY SYSTEM (2/2)

- A mass market of EVs requires:
  - Innovative interactions between customer and several stakeholders
  - A common hardware solution for maximum customer convenience (socket – connector- charging point)
  - Innovative communication and data handling based on standardized metering protocols



2. Effects on the electricity system

Standardisation is needed to enable the EV user to re-charge at any charging station without different connectors

Hardware

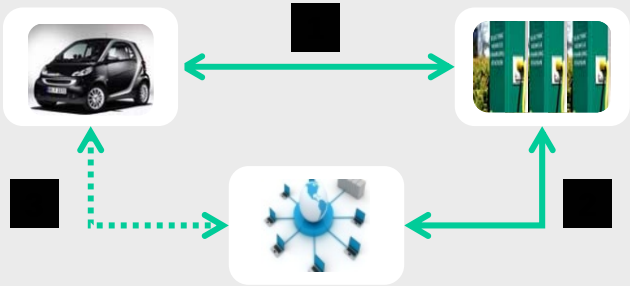
Cable/ connection

> On the basis of the load needed

Mechanical protection

Communication

Communication protocols



- TCP/IP (e.g. Powerline)
- Communication via TCP/IP in the grid (e.g. DSL via concentrator) or wireless communication TCP/IP (e.g.. GSM)
- Optional: wireless communication TCP/IP (e.g. GSM)

3. EURELECTRIC and industry actions

An OEM/Utility standardization initiative was started end of 2008 to accelerate and improve standards definition

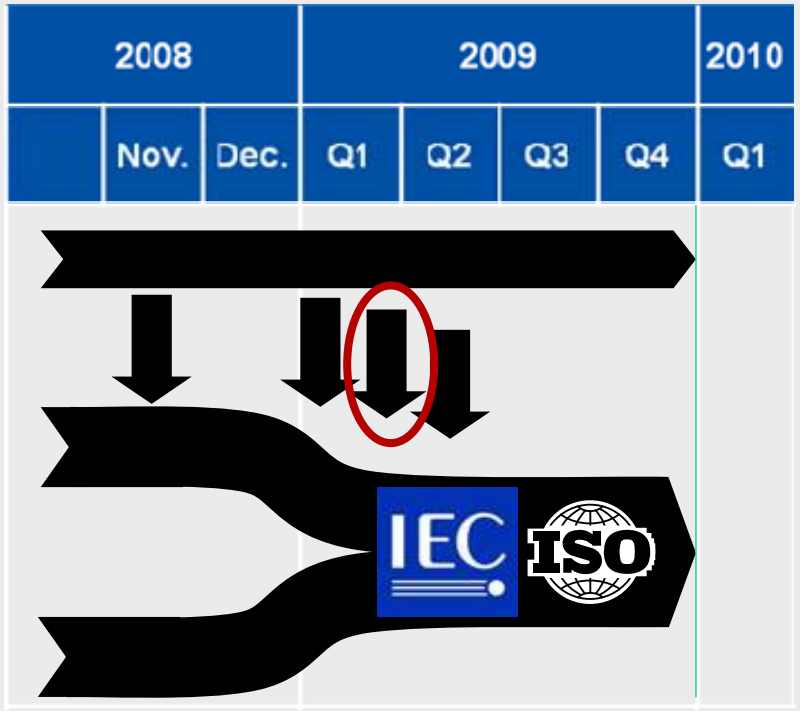
Audi · essent · OPEL · EnBW · endesa · FIAT GROUP · Enel · Ford · e·on · PSA PEUGEOT CITROËN · RENAULT · VATTENFALL · MITSUBISHI MOTORS · edp · NISSAN · BMW · TOYOTA · RWE · EDF · VOLVO

3. **EURELECTRIC and industry actions**

OEM/Utility standardization initiative will ensure a common technical approach

REASONS FOR IMPLEMENTING THE OEM/UTILITY STANDARDIZATION INITIATIVE

OEM/Utility standardization initiative process



Benefits of OEM/Utility standardization initiative

- **One single position** to speed up the standardization process
- **One common standard** already **for the first generation infrastructure/ vehicles**
- **Clear development roadmap**

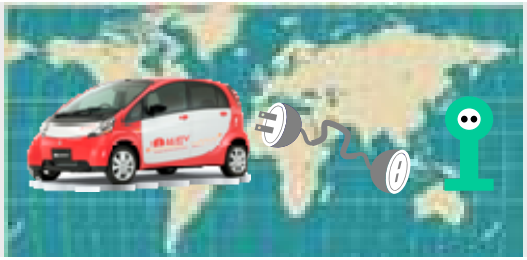
3. EURELECTRIC and industry actions

Standardization benefits customers, utilities and OEMs

BENEFITS FROM STANDARDIZATION FOR CUSTOMERS, UTILITIES AND OEMS

Benefits from standardization

For customers



- **High convenience**
  - **One single solution worldwide**
  - **No adapters** or different cables needed
- **Faster** electric vehicle **run-up/market success**
- **No retrofit costs** for adopting to new charging systems

For Utilities/OEMs

- **Cost benefits**
  - **No sunk costs** for proprietary interim solutions
  - **Shared** development and standardization **costs**
  - **Economies of scale**

3. EURELECTRIC and industry actions

Set aside technical details, we have to develop a joint picture for the future – for us and for customers

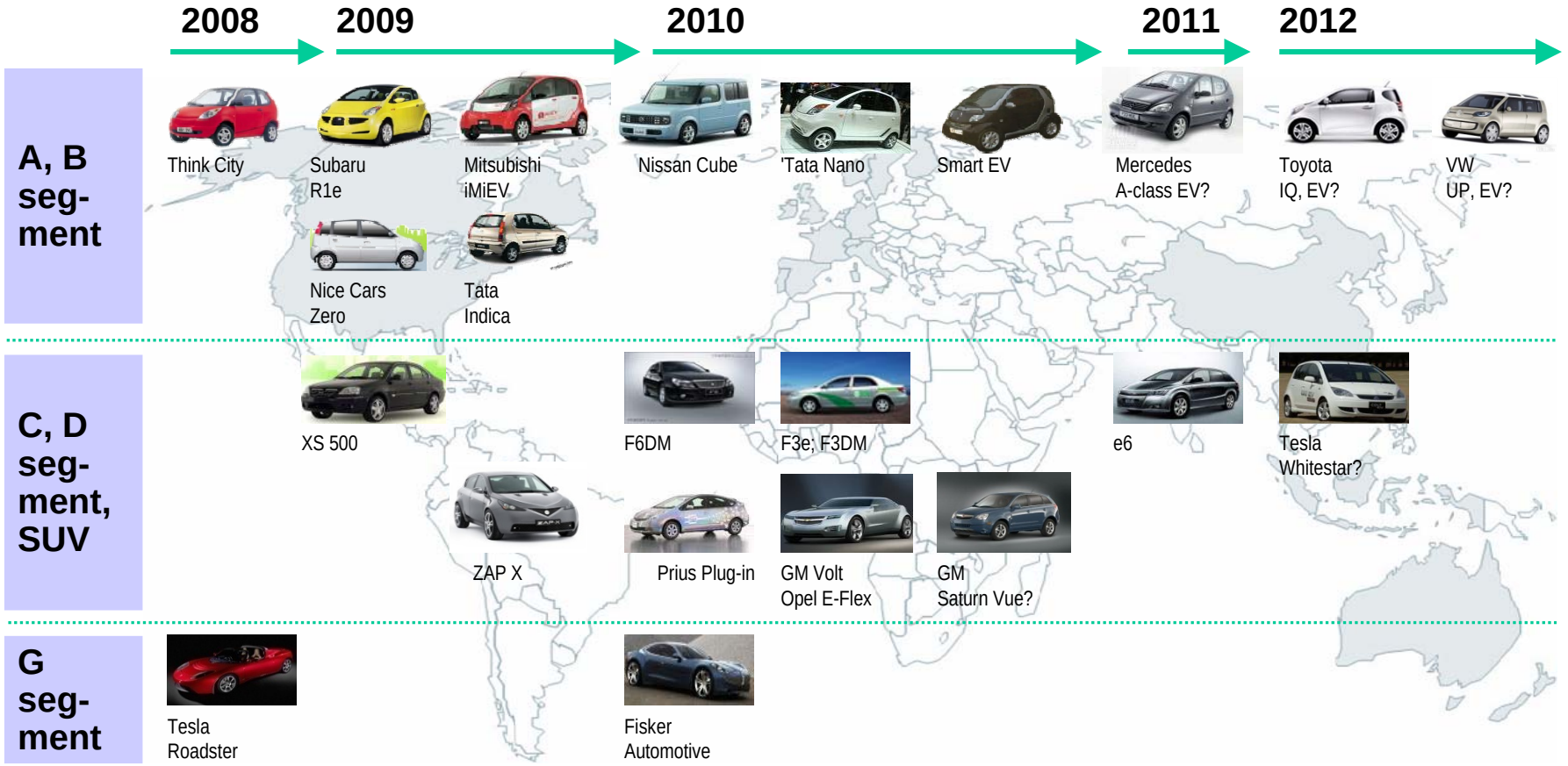
EU Energy Commissioner Andris Piebalgs

(in front of the EU-Commission building fuelling up to meet the European Energy Council on 8 Dec 2008)

3. EURELECTRIC and industry actions

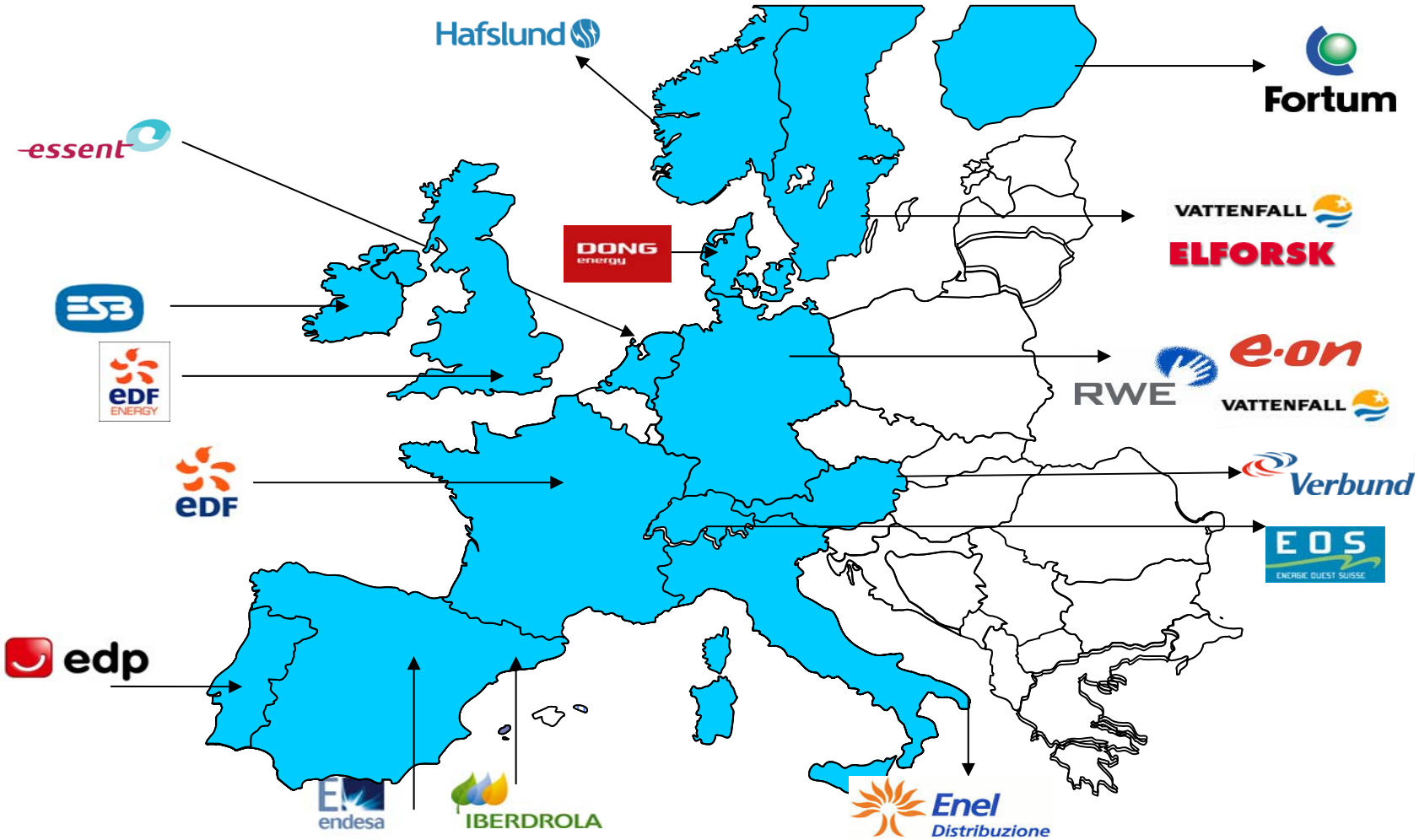
Over 20 EV/PHEV models from leading OEMs and newcomers expected to enter market before 2012

OVERVIEW OF EV/PHEV GLOBAL OFFERING (ANNOUNCED) – 2008 TO 2012



3. EURELECTRIC and industry actions

European electricity companies are engaged in several pilot projects with electric vehicles



3. EURELECTRIC and industry actions

EURELECTRIC is taking a central role to make EVs a success story