FONDAZIONE PER LO SVILUPPO SOSTENIBILE
Sustainable Development Foundation

# THE FUTURE OF ROAD VEHICLES

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*Beijing, January 17th 2017*

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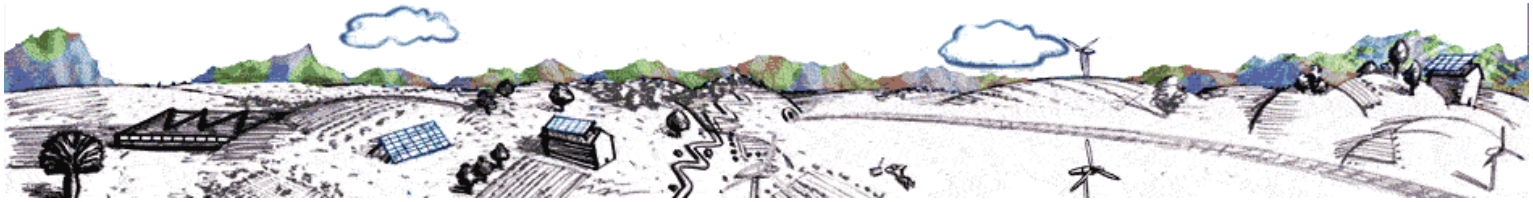
# The Sustainable Development Foundation



- Not-for-profit think-thank, focused on the development of the green economy, founded in 2008.

- 120 companies/associations of companies and 50 experts as members.

- Staff: 28 people. Headquarters in Rome, Italy.

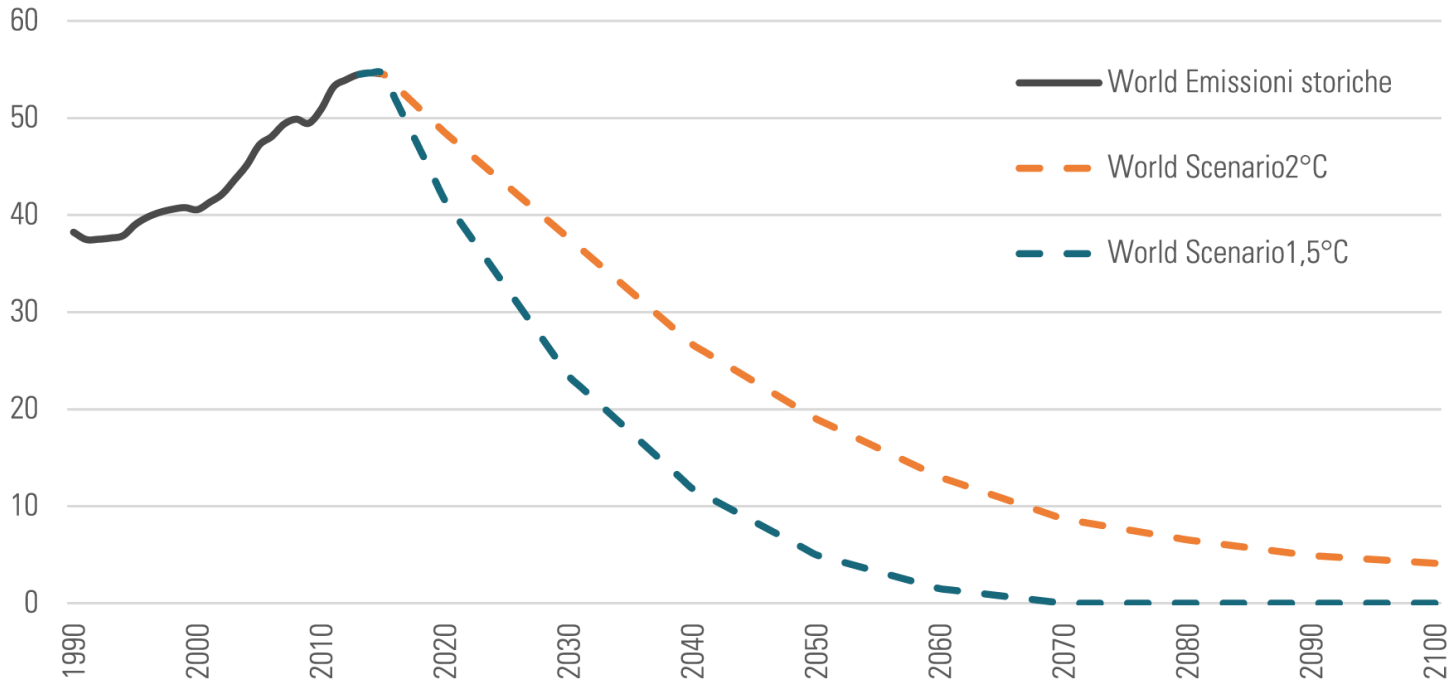
- Main areas of work: Climate change, Renewable energy, Sustainable mobility, Waste recycling/circular economy, Biodiversity/Natural capital, Reporting and Ecoinnovation.

- More than 80 published reports, 200 events, and 145 projects from 2008 to 2016.

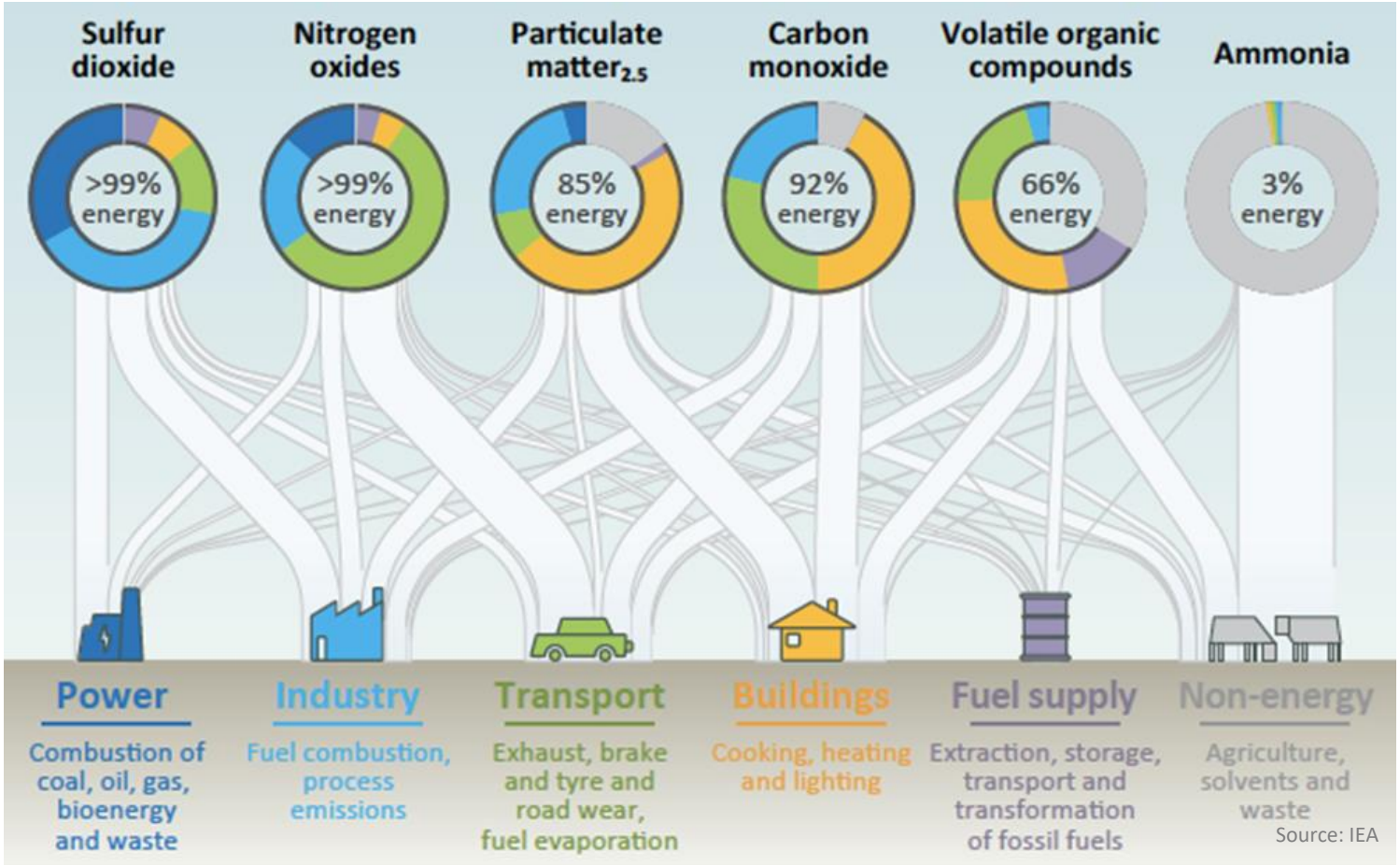
- Member of *UN Global Compact*, *Global Reporting Initiative*, *Transport and Environment*. Cooperation with: *Italian Ministery of environment, International energy agency (IEA), International Union of Railways (UIC), German Institute for energy and environment (IFEU),* etc.

# THE BIG CHALLENGE: CLIMATE CHANGE

World scenario of GHG emissions (GtCO2eq), coherent with reduction tearget of average temperature increase to 2 and 1,5 degrees

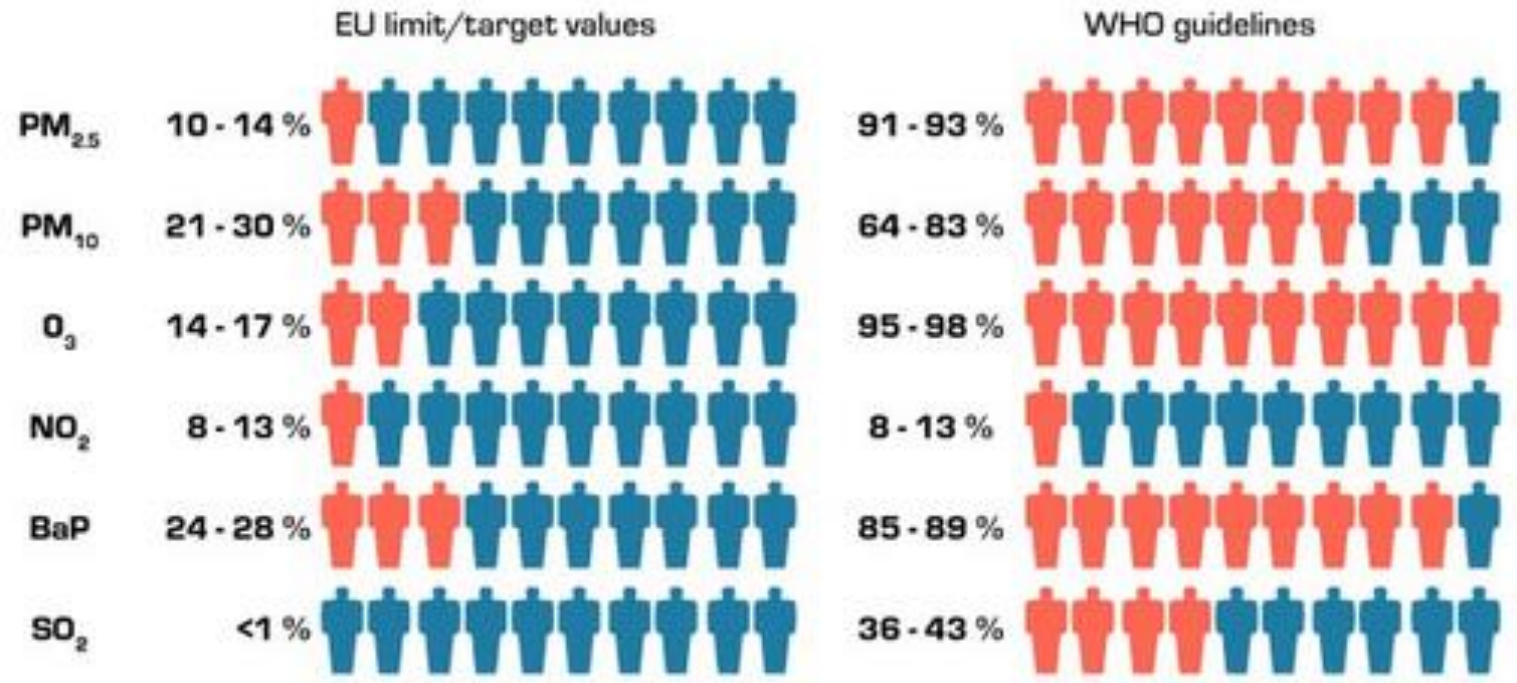


# THE BIG CHALLENGE: AIR POLLUTION



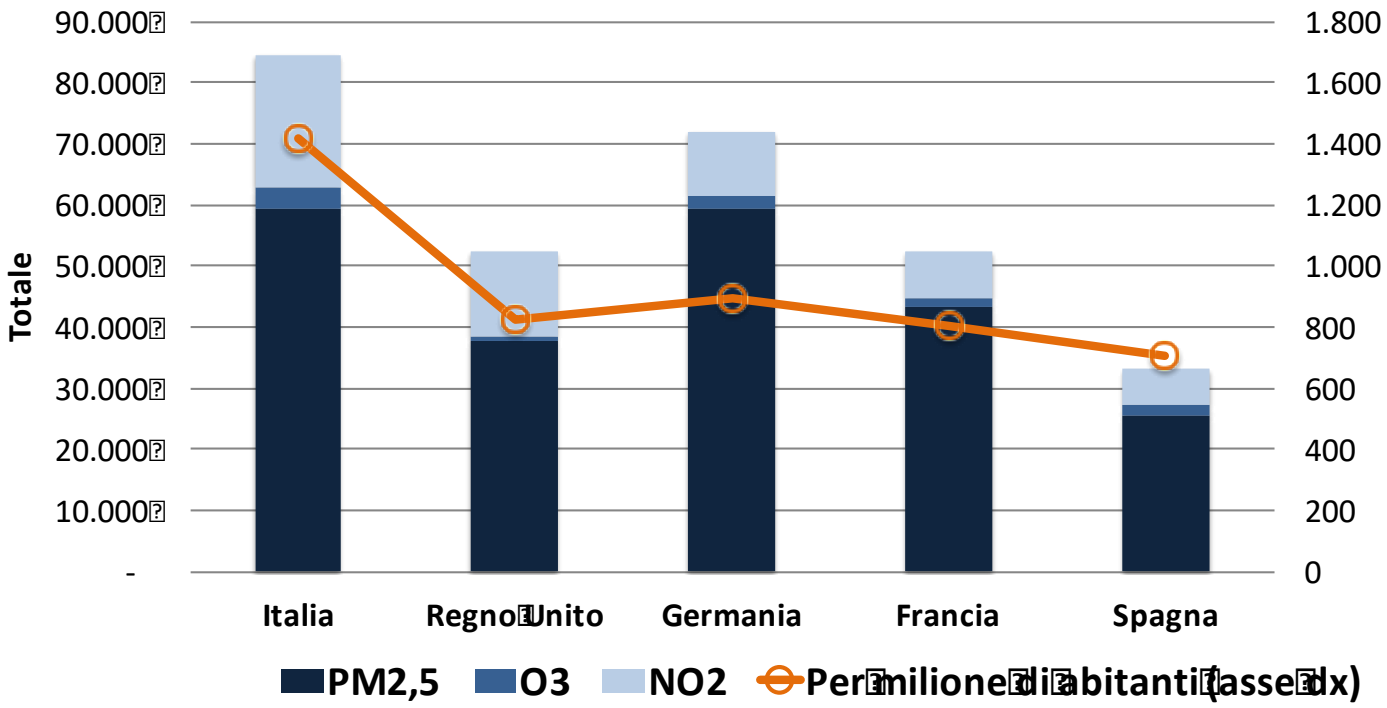
# THE BIG CHALLENGE: AIR POLLUTION

In 2012, almost 500.000 premature deaths in Europe can be attributed to exposure to main air pollutants (PM2.5, NO2 and O3), ten times more than fatalities from road traffic accidents



# THE BIG CHALLENGE: AIR POLLUTION

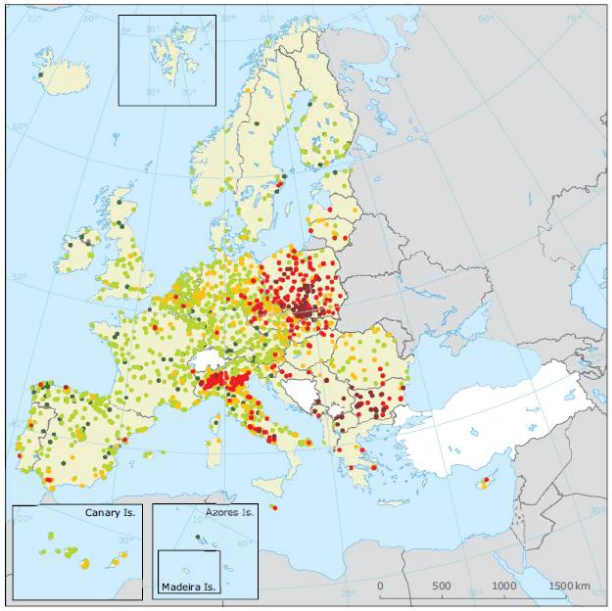
Number of premature deaths due to air pollution in some European Countries, total value (left) and for million of inhabitabts (right)



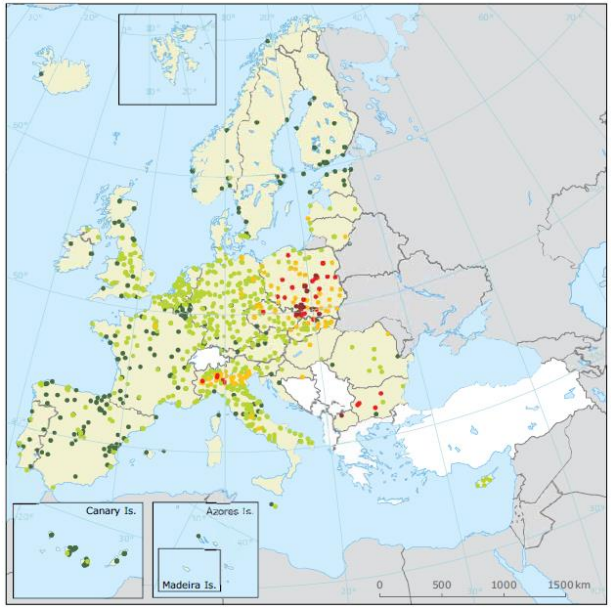

Source: EEA

# THE BIG CHALLENGE: AIR POLLUTION

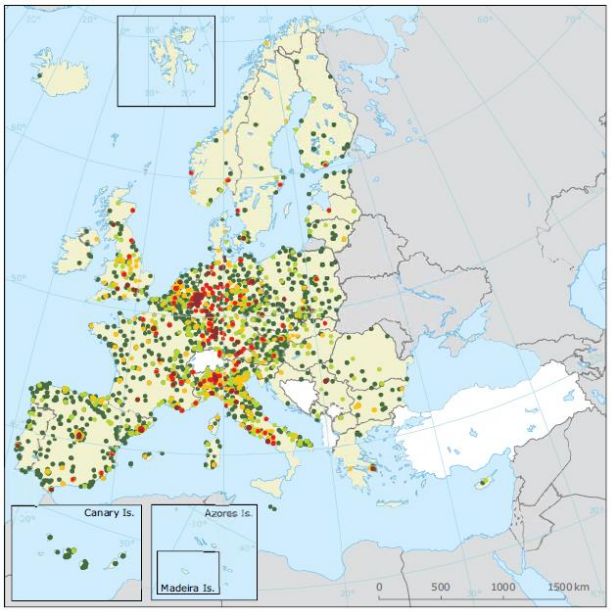
Concentrations of PM10 in 2014




Concentrations of PM2,5 in 2014



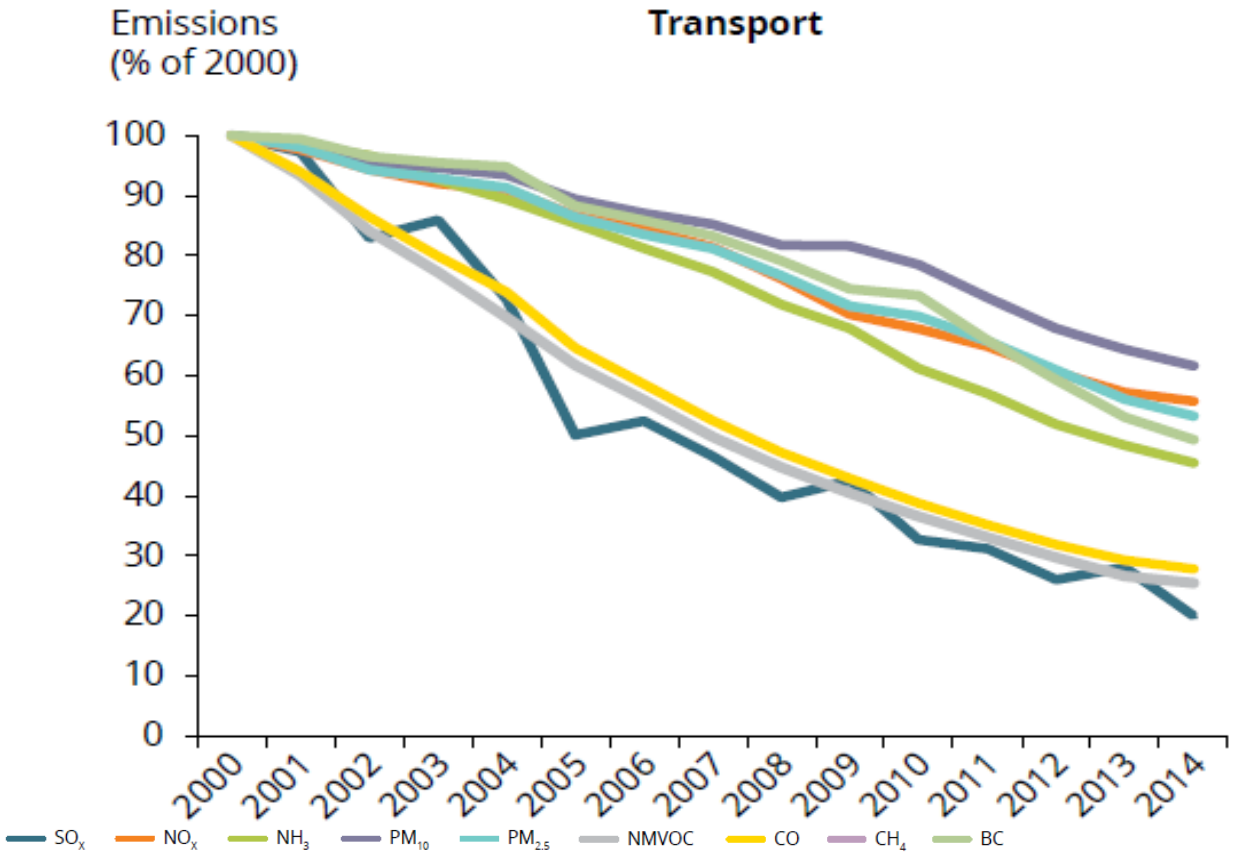

Concentrations of NO2 in 2014




Source: EEA 2016

# PROGRESS MADE SO FAR…….

Development in EU-28 emissions from transport of SOX, NOX, NH3, PM10, PM2.5, NMVOCs, CO, BC and CH4, 2000–2014 (% of 2000 levels)



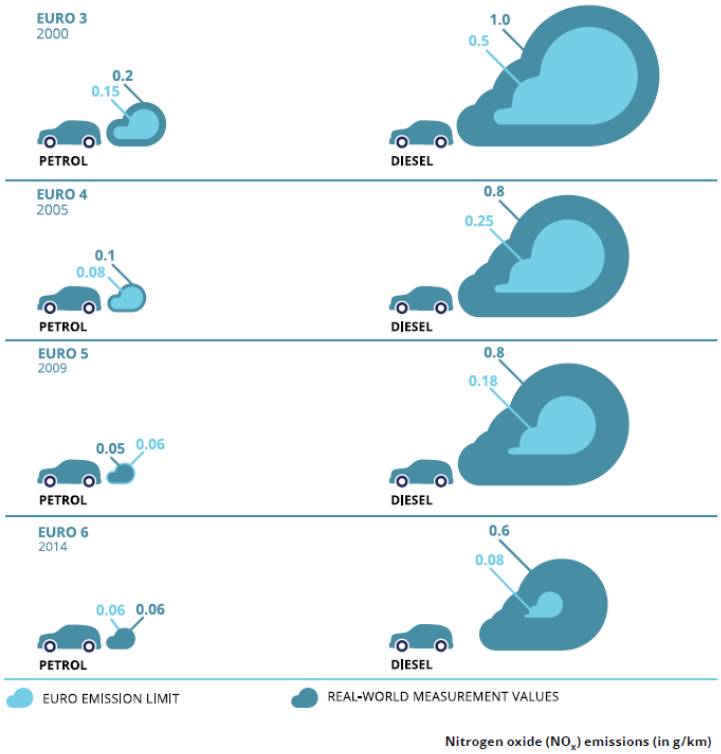

Source: EEA 2016

# .....REAL EMISSIONS ?

Divergence of “real-world” CO2 emissions from manufacturers' type approval CO2 emissions


Source: ICCT, 2015a.

Comparison of NOx emissions and standards for different Euro classes




Source: Adapted from: ICCT, 2014a; Emisia, 2015.

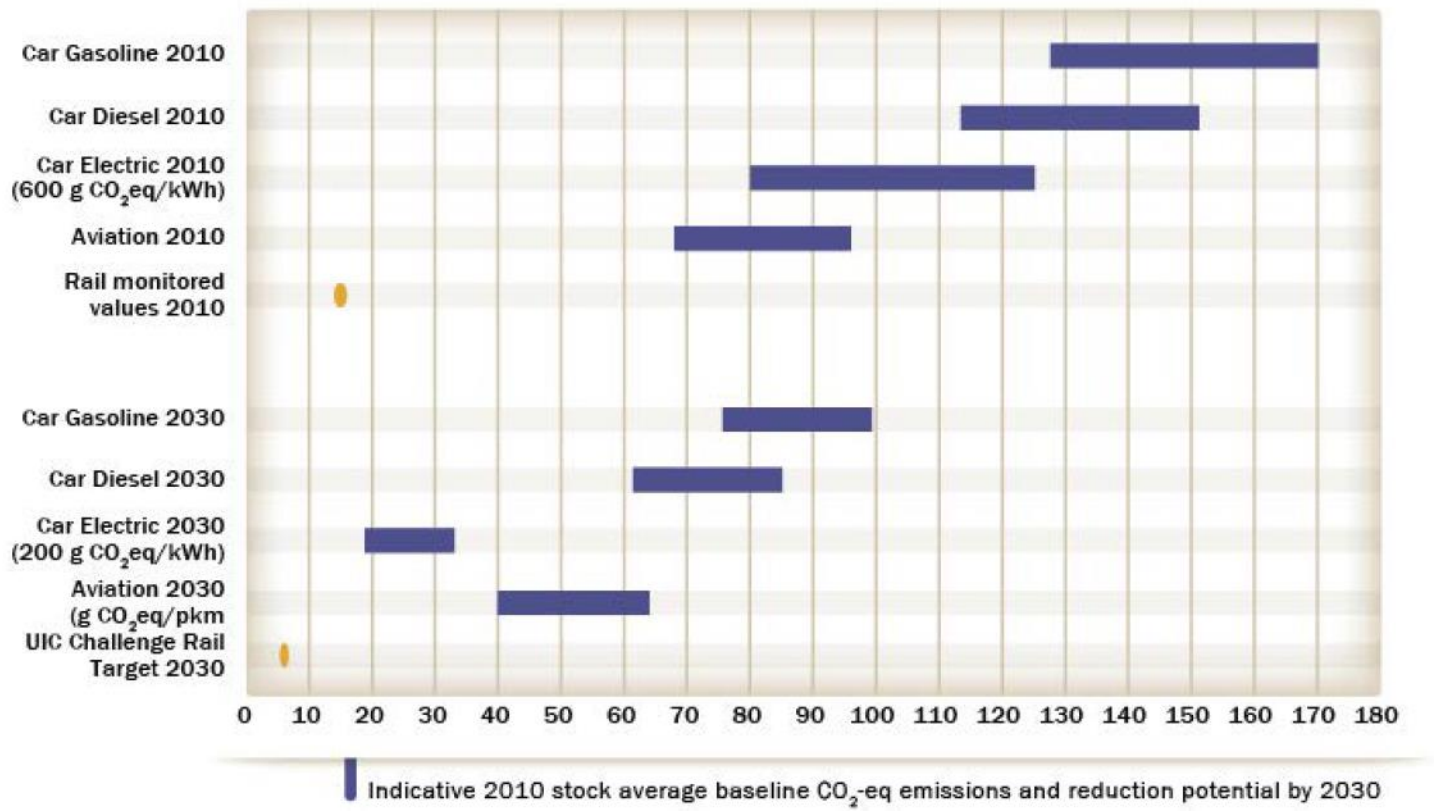
# A WORLD STRATEGY FOR LOW CARBON MOBILITY

European Environment Agency and United Nations Environment Program developed the ASI strategy (Avoid-Shift-Improve) in order to overcome the existing situation and lead to a mobility that will be: **socially inclusive, resource-efficient and low carbon.**



# EV offers the highest improvement potentials to car industry

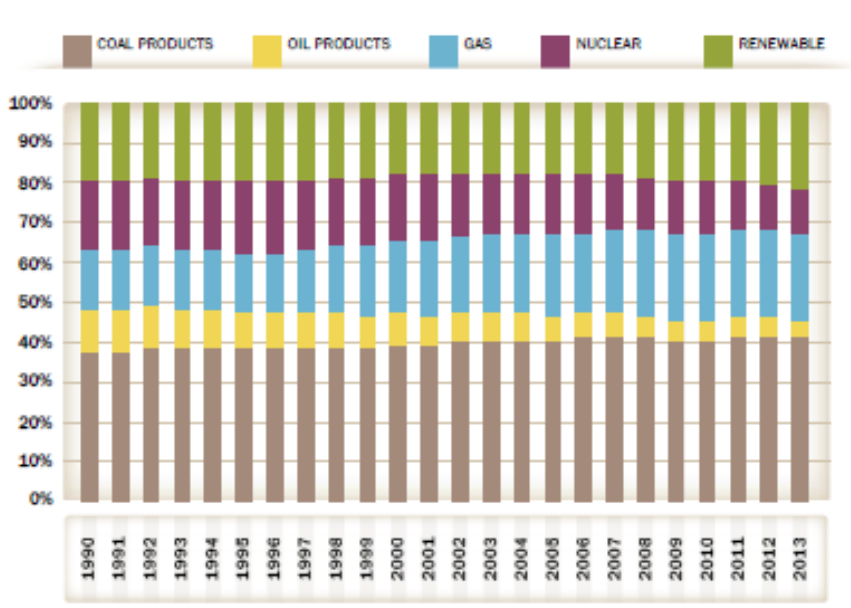
CO2-eq mitigation potential by 2030 – Passenger (gCO2-eq/pkm)




Source: IPCC

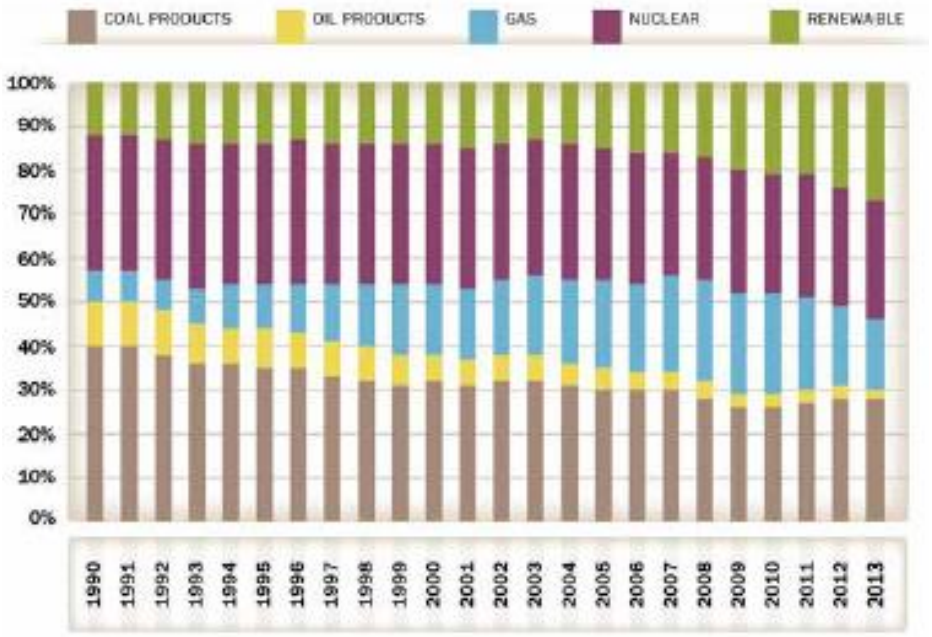
# .....IF POWERED BY RENEWABLE ENERGY !

World electricity production mix evolution, 1990-2013




Source: IEA (2015b)

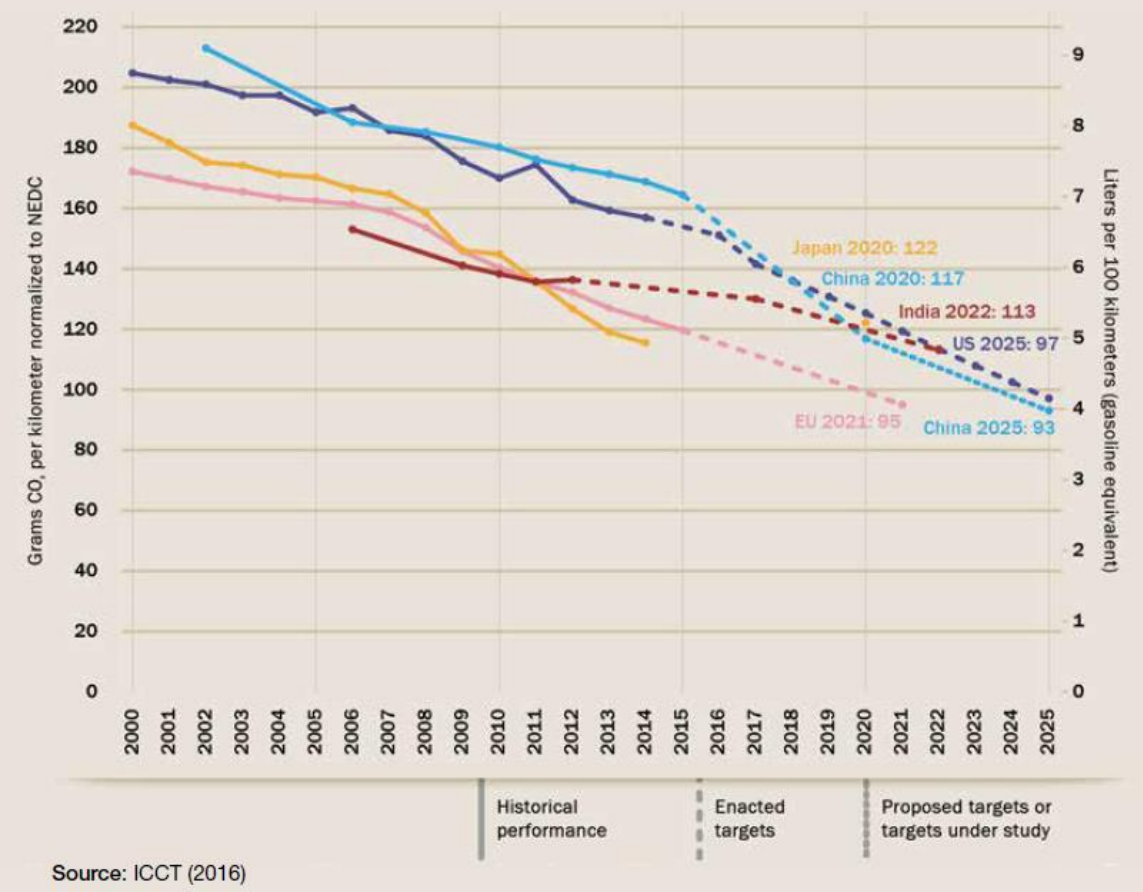
EU electricity production mix evolution, 1990-2013




Source: IEA (2015b)

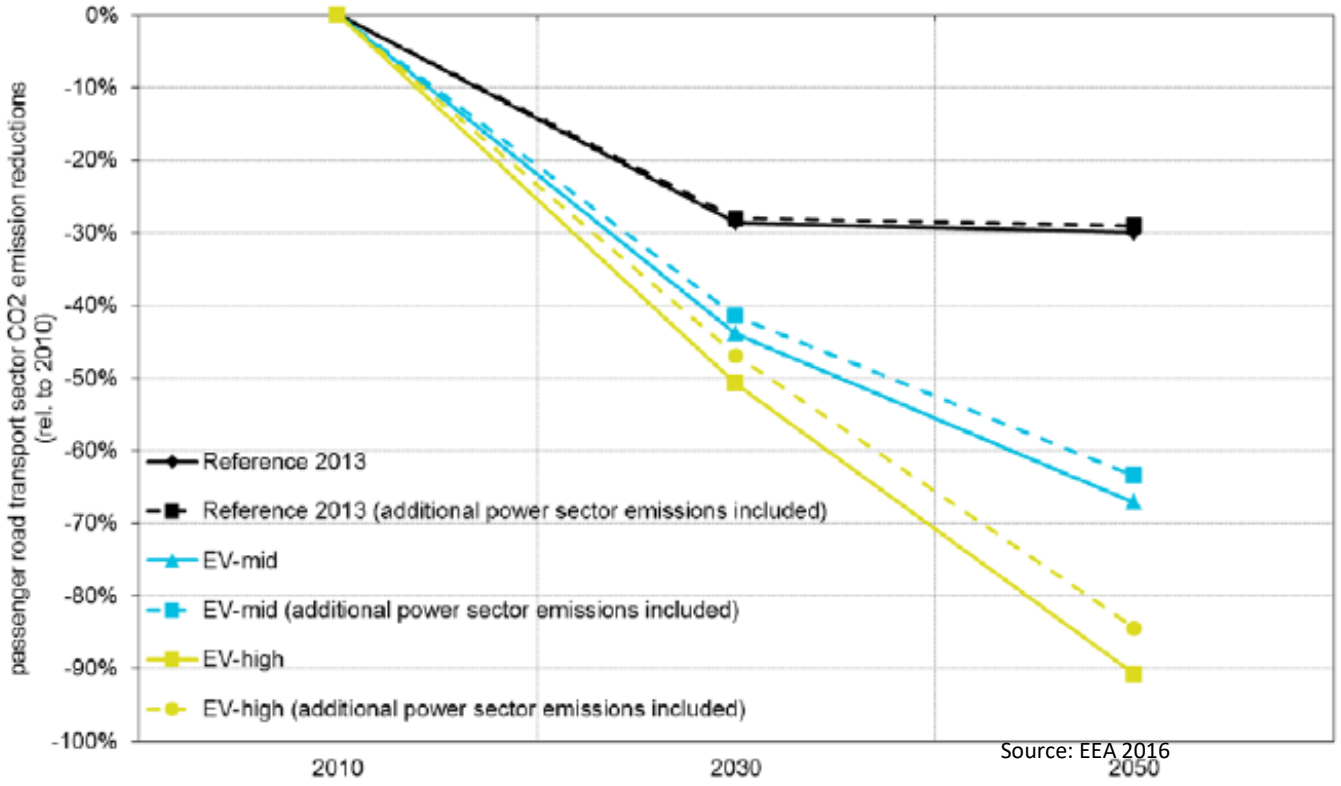
# WORLD TARGETS FOR CARS

Fuel consumption and CO2 reduction (g CO2/vkm) performance, existing and planned targets for passenger cars at world level.



# THE POTENTIALS OF EV CARS

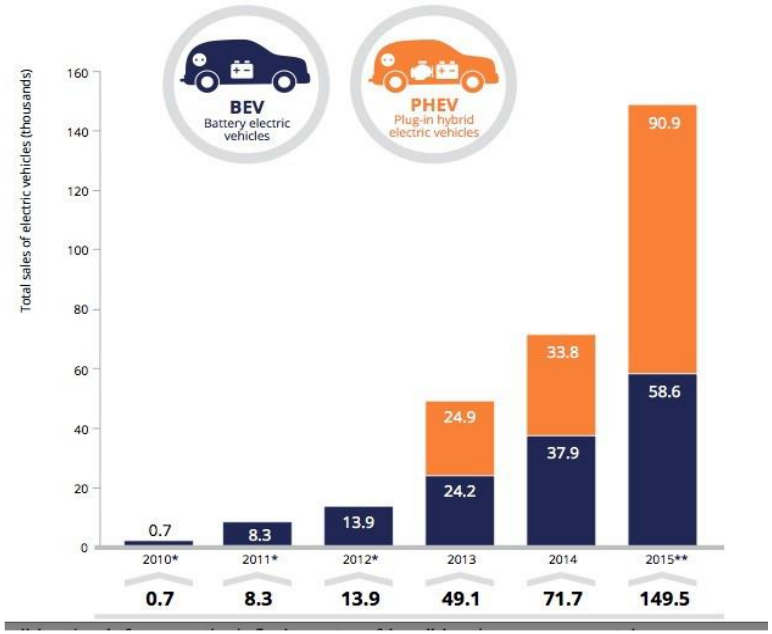
EEA 2016 Scenario: passenger road transport sector CO2 emission reductions (WTT and TTW emissions) relative to 2010 (EU-28 aggregate) compared to EC Reference scenario 2013



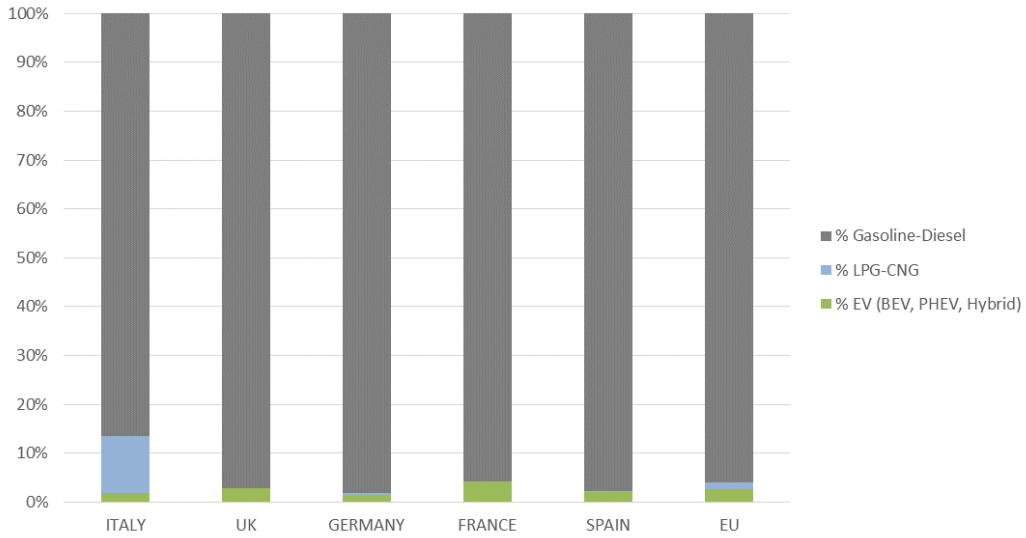

Source: EEA 2016

# A PICTURE OF THE MARKET

Electric vehicle sales on the EU-28



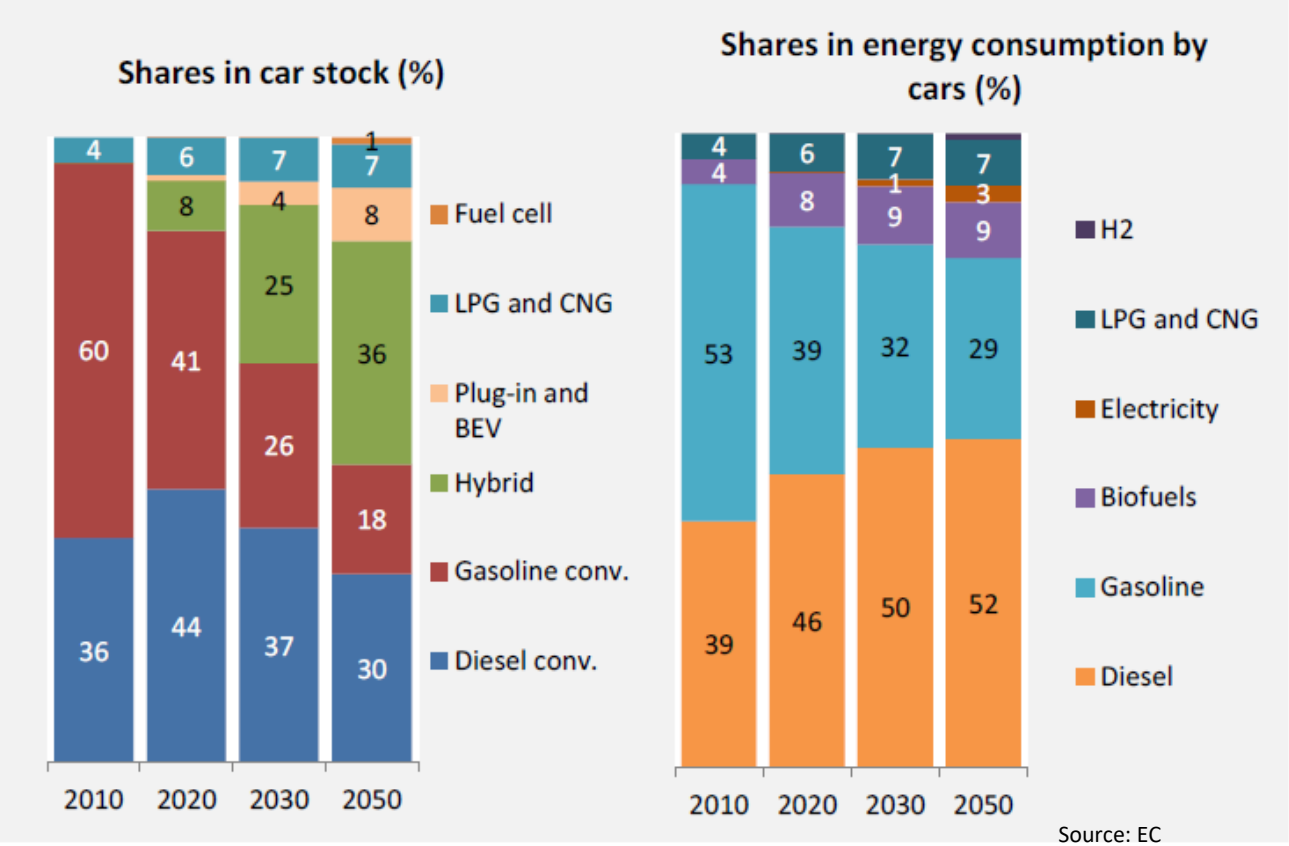

New car sales by type on the EU-28 (2016)




Source: ACEA

# The EU Reference Scenario 2013 exhibits a slow market penetration of electric vehicles. Correct ?

STRUCTURE OF PASSENGER CARS FLEET AND FUEL CONSUMPTION - EU ENERGY, TRANSPORT AND GHG EMISSIONS TRENDS TO 2050 - REFERENCE SCENARIO 2013




Source: EC

# Other European long-term scenarios. Most are target-driven

| Different Scenarios for EU | EV market penetration |
|---|---|
| World Energy Outlook 2015 (International Energy Agency) | Small share of electric cars and share of electricity in transport energy demand: 4% |
| Energy [r]evolution (Greenpeace/ European Renewable Energy Council) (2012) | 100% sales share of electric and fuel cell passenger cars<br>Share of electricity in transport energy demand: 12% in 2030; 50% in 2050 |
| Roadmap 2050 (European Climate Foundation) (2010) | All passenger cars electrified in 2050 (80 % BEV /20 % PHEV)<br>Electricity consumption from road transport in 2050: 740 TWh |
| EEA EV-mid scenario (2016) | 2030 EV total share: 20%, BEV share in EV: 50% , PHEV share in EV 50%<br>2050 EV total share: 50%, BEV share in EV: 60% , PHEV share in EV 40% |
| EEA EV-high scenario (2016) | 2030 EV total share:30%, BEV share in EV: 60% , PHEV share in EV 40%<br>2050 EV total share: 80%, BEV share in EV: 80% , PHEV share in EV 20% |

# The threefold future of cars

## Electric

**(…powered by RES)**

## Shared

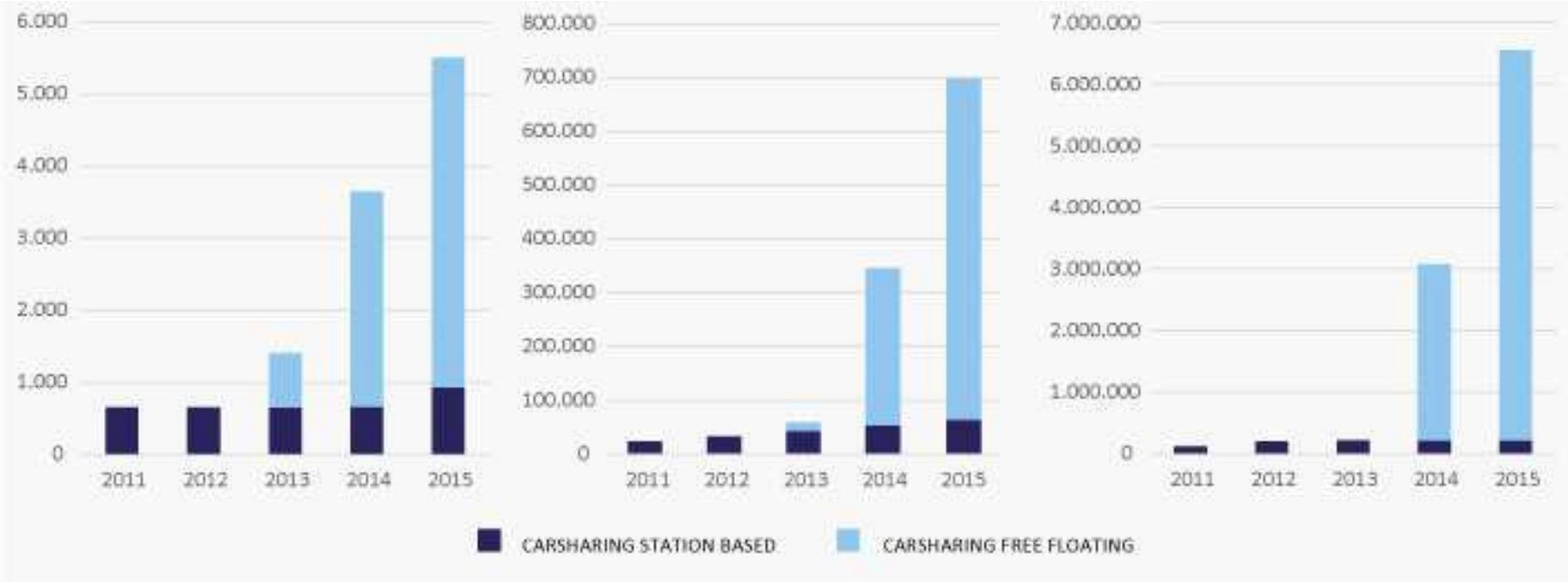
## Driveless

# Car Sharing in Italy

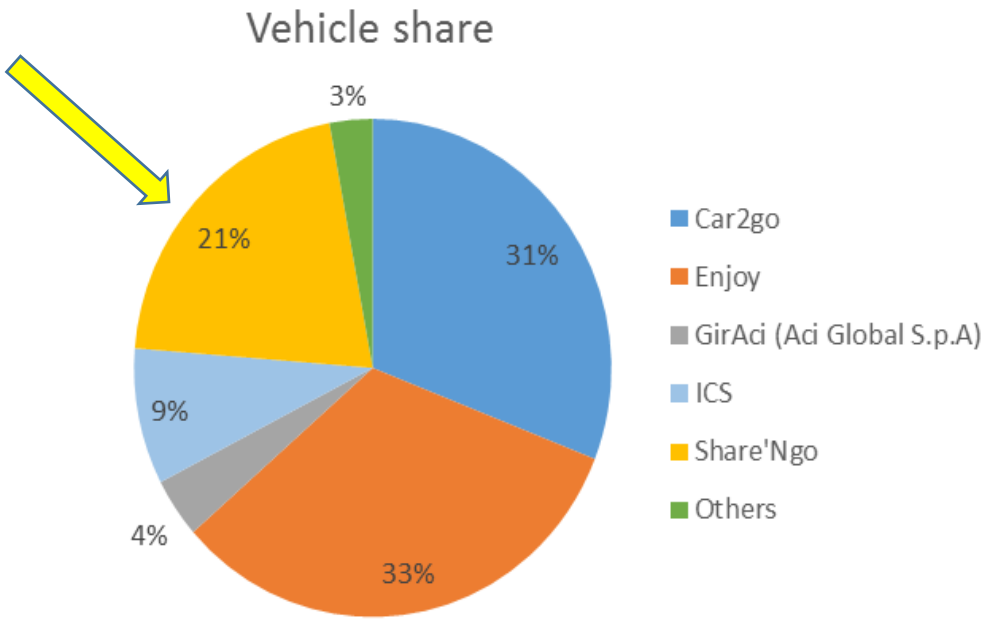
Shared vehicles

Users

Trips



# Electric Car Sharing in Italy

# E-mobility growth: key issues

## Economical

- **Subsidies.**
- **Incentive & disincentive (feebates schemes).**
- **Regulation (banning, command & control, technical standard).**
- **R&D stimulus packages.**
- **New E-Infrastructure and E-service stimulus packages.**

## Technological

- **Battery (Cost, weight and energy density).**
- **EV type: BEV, HEV, PHEV, FCEV.**
- **Recharging system (Conductive charging, Battery swap, Wireless charging).**

## Behavioural

- **Range anxiety.**
- **Change in operation.**
- **Awareness of total cost of ownership.**
- **Sensitivity of environmental issues.**
- **Welcome innovation**

# Thanks very much!

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