

Prospects for the electrification of passenger cars

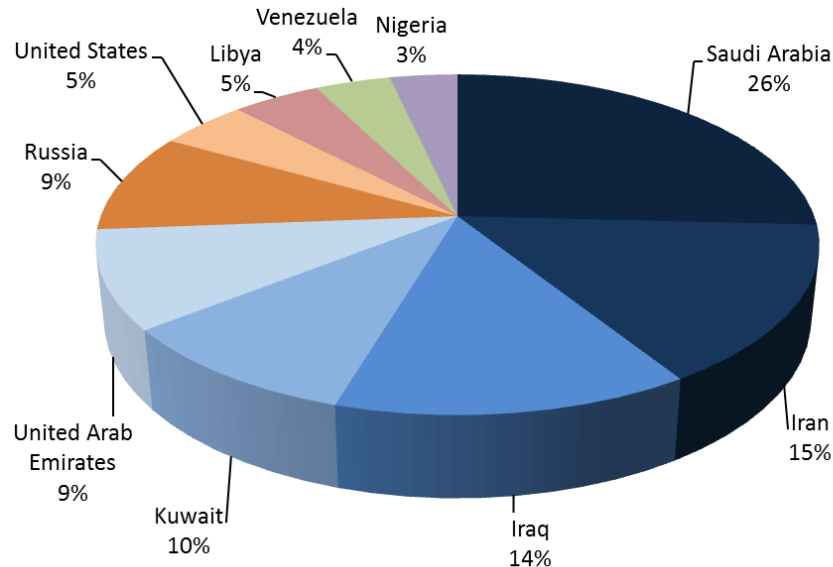
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SES, Copenhagen, 10.9.2019

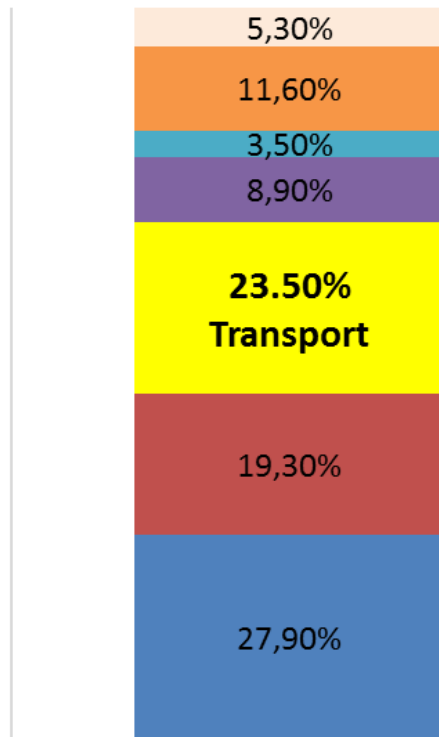
- ✓ Introduction
- ✓ Electric vehicles
 - ✓ Economic assessment
 - ✓ Environmental assessment
- ✓ Conclusion

- **93%**

oil products' share of final energy consumption for transport, making the sector the **least-diversified**



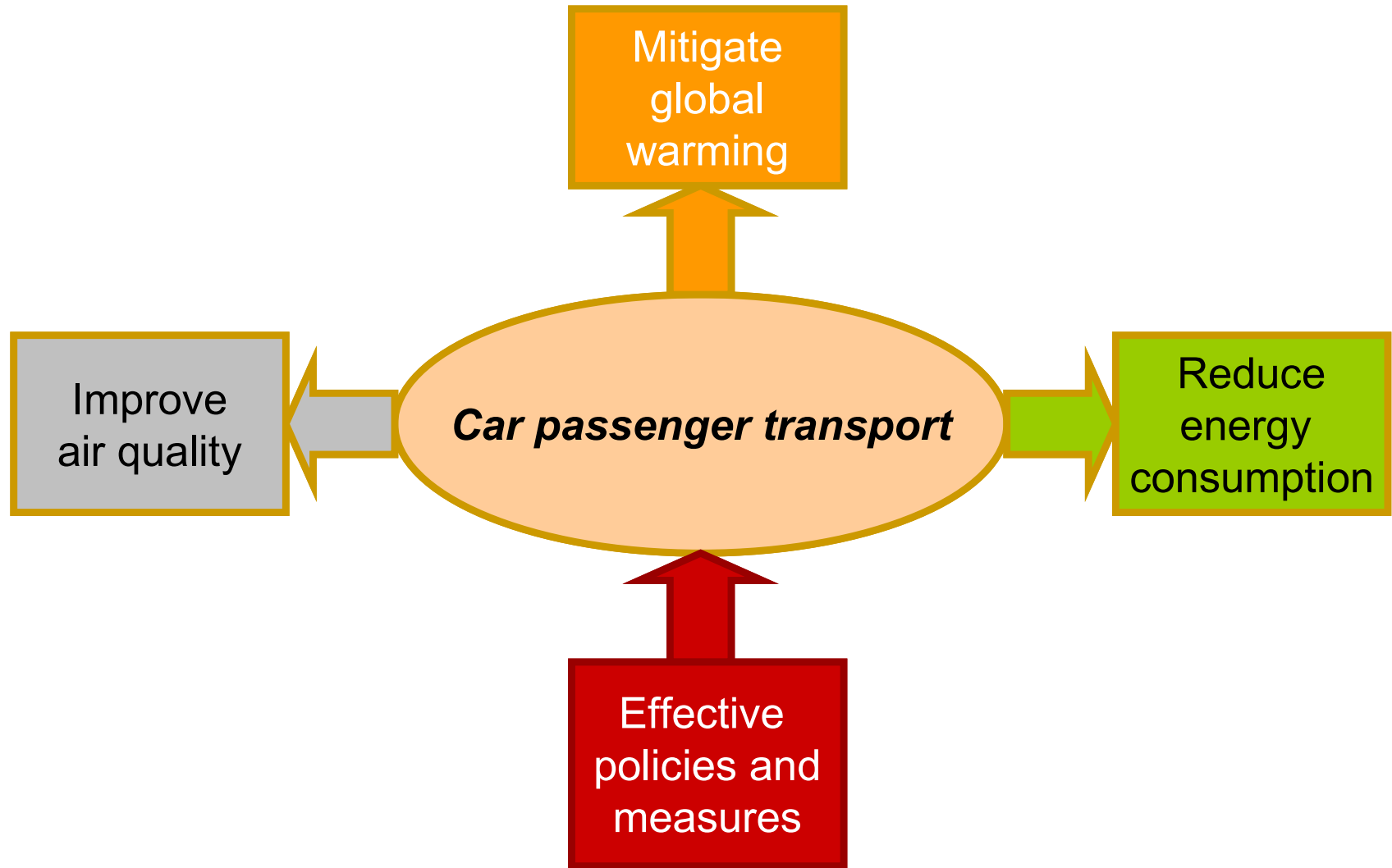
Countries with largest
conventional oil
reserves



ALL SECTORS

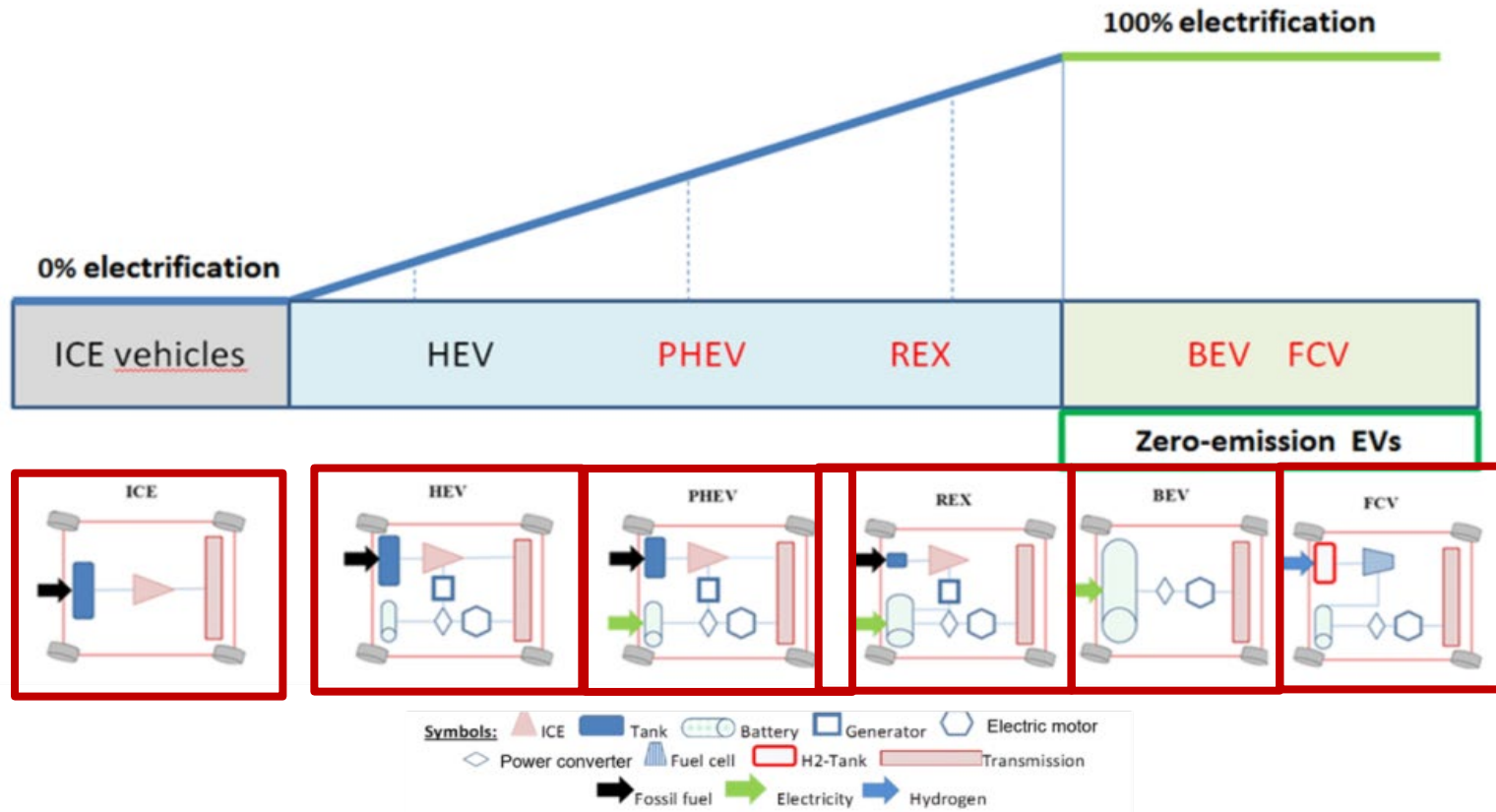
- | | | | |
|----------------------------|----------------------------------|-------------------------|-----------------------|
| ■ Energy industries | ■ Industry | ■ Transport | ■ Residential |
| ■ Commercial/institutional | ■ Agriculture, forest, fisheries | ■ Other sectors | ■ Road transportation |
| ■ Other transport modes | ■ Cars | ■ Other transport means | |

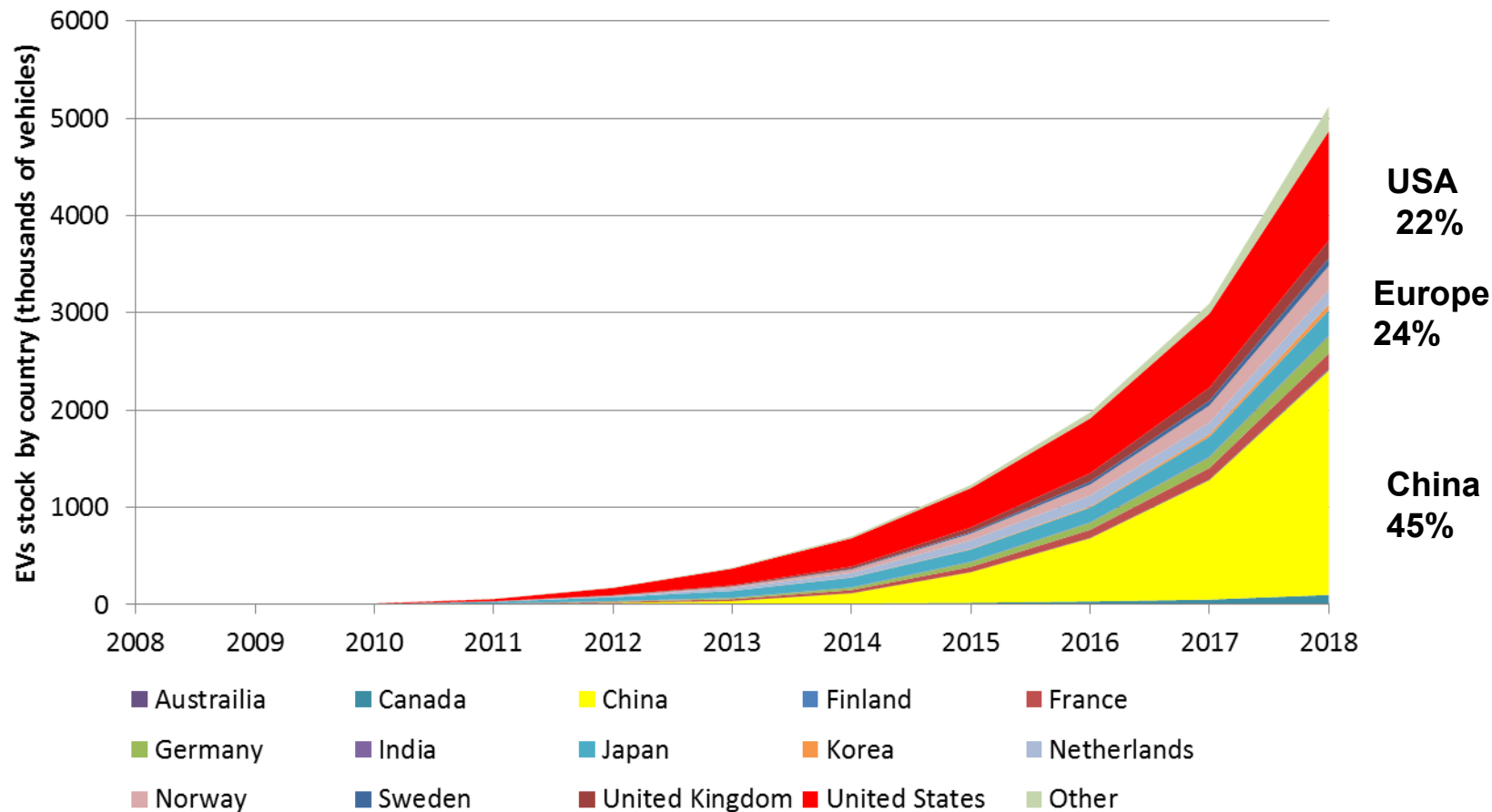
The challenges for EU climate and energy policies



Paris Declaration on Electro-Mobility and Climate Change & Call to Action:

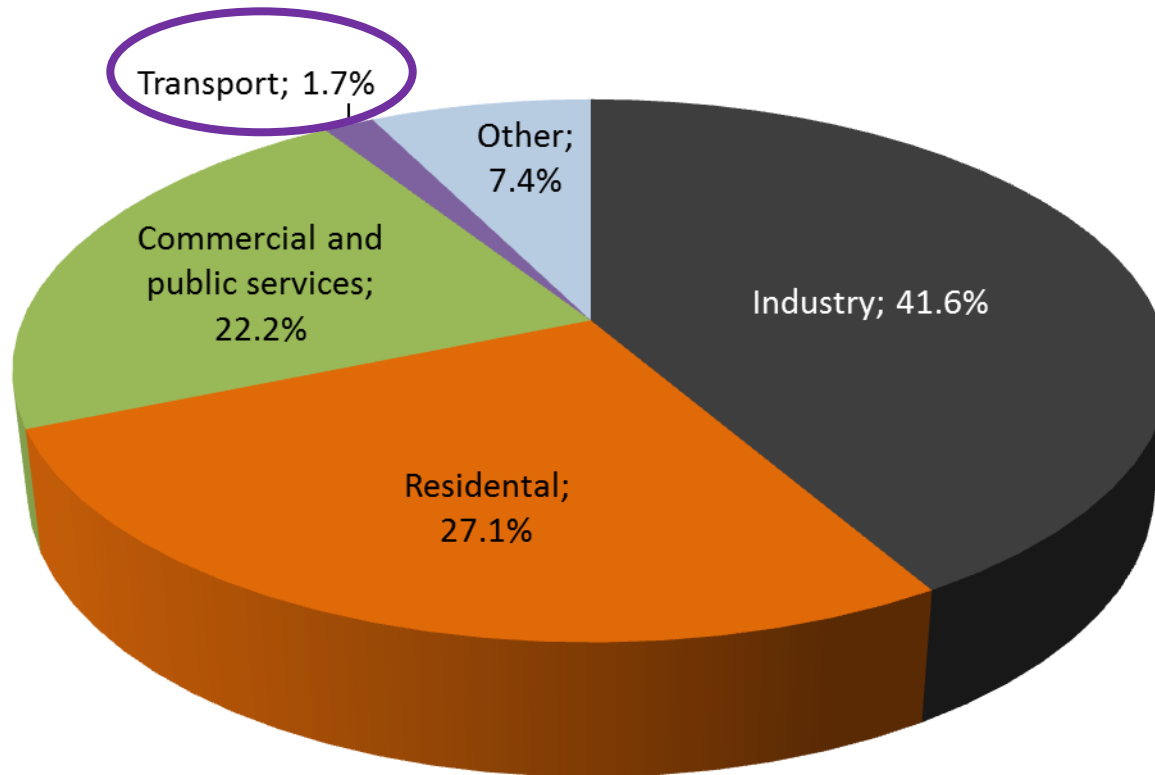
- more than 100 million EVs
- 400 million two and three-wheelers



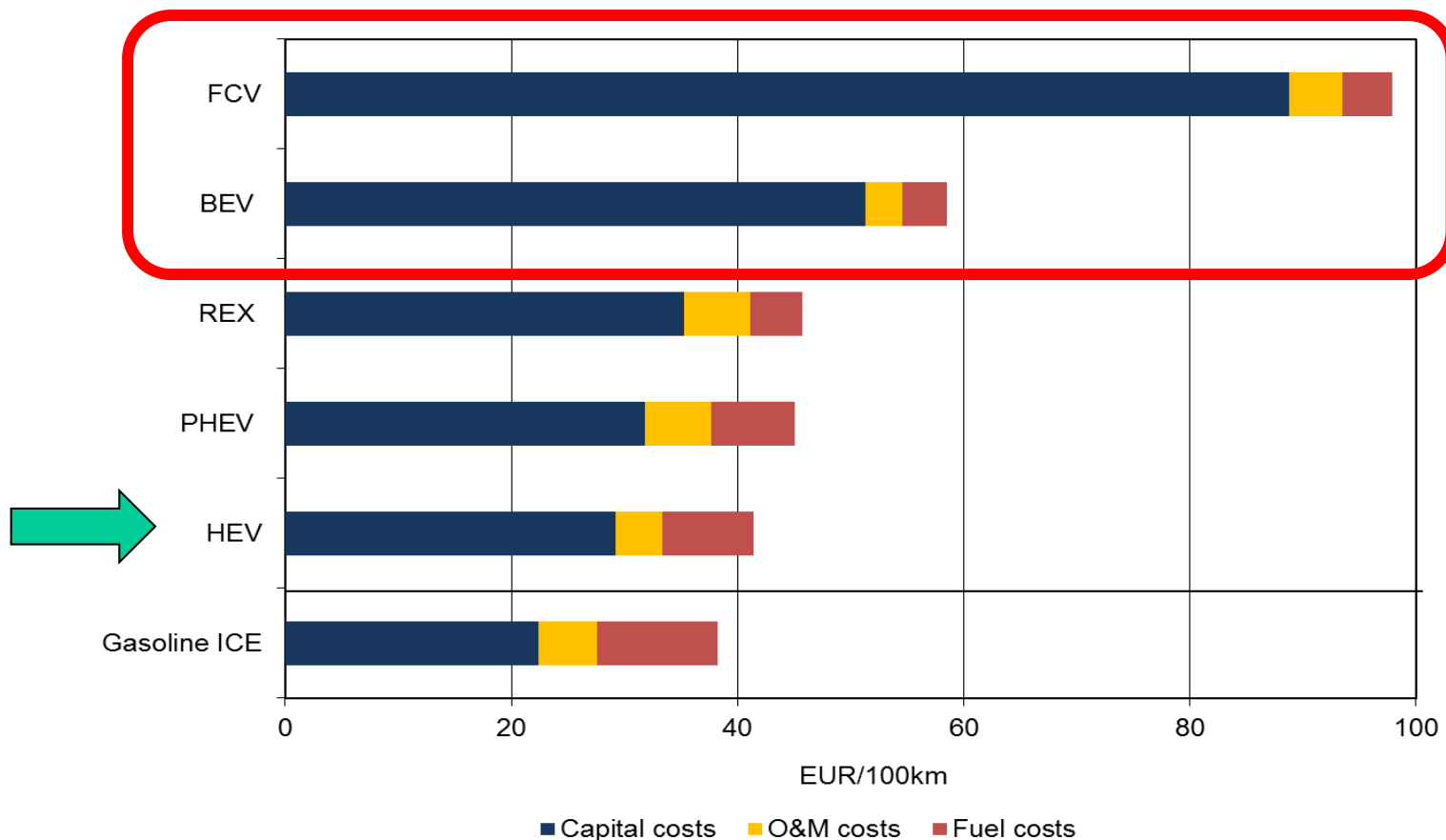


Development of the global stock of rechargeable EVs

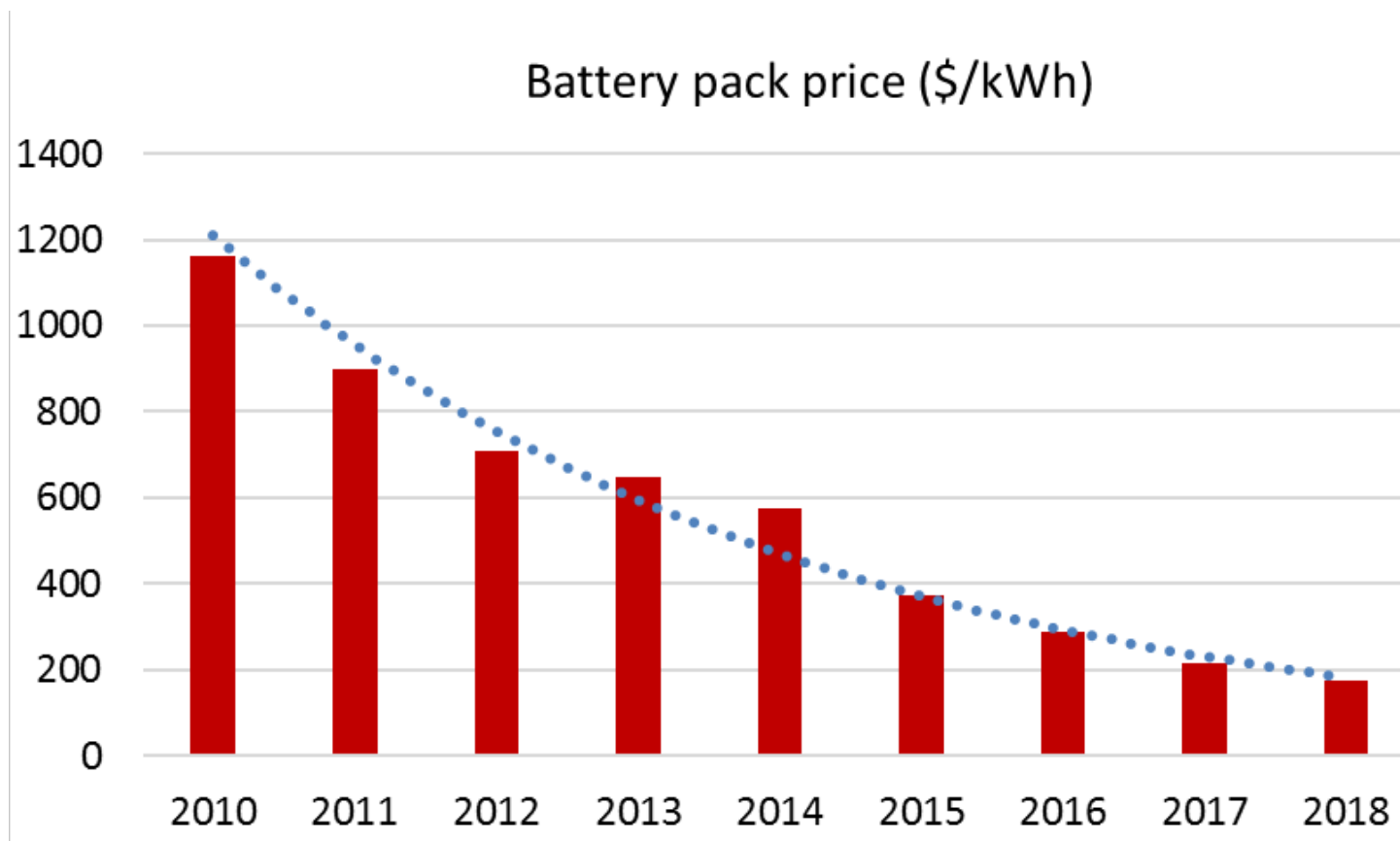
World total final electricity consumption by sector



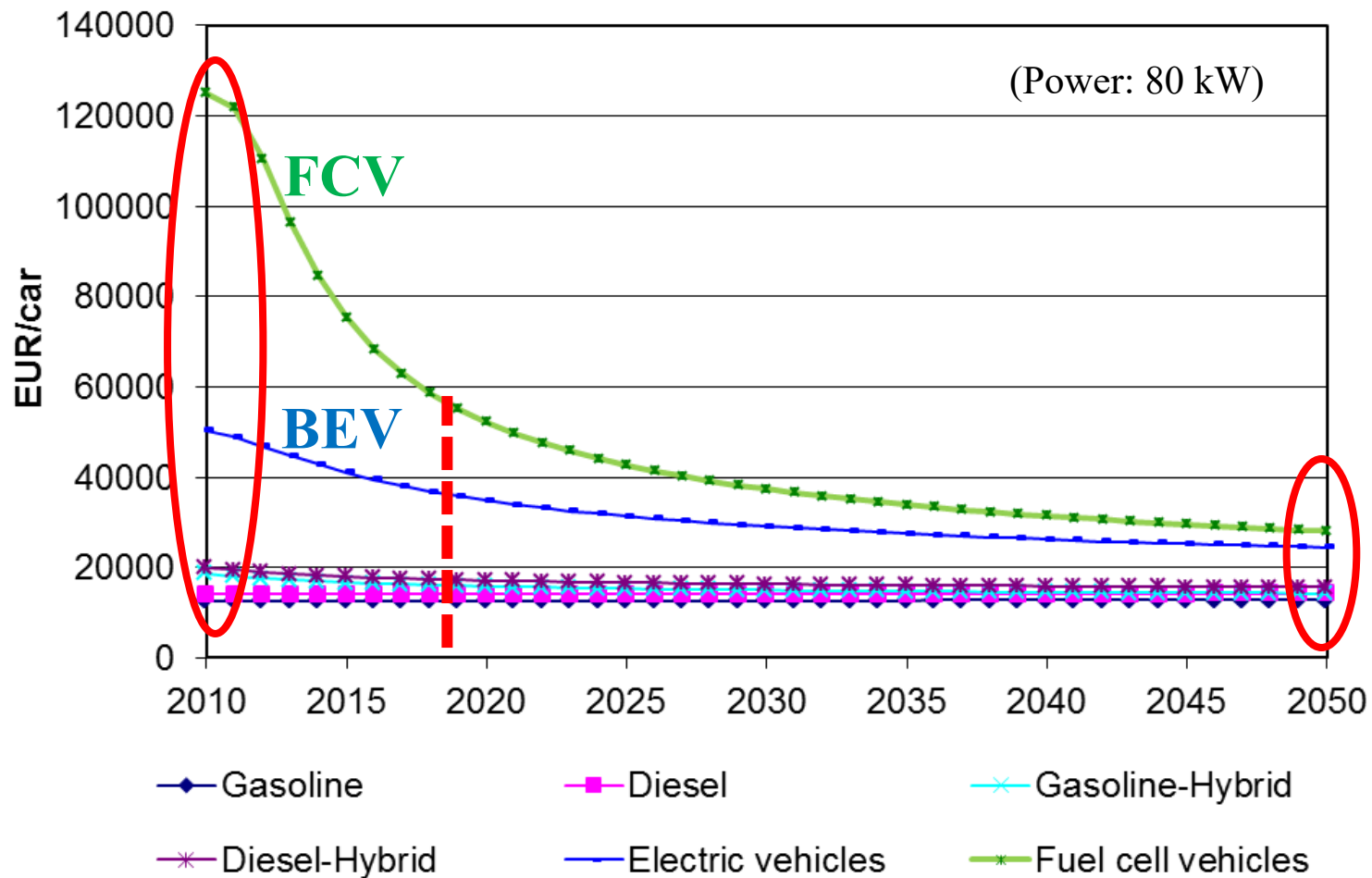
- Costs
 - Driving range
 - Charging time
 - Infrastructure
- ✓ If the destination is beyond the range of the electric vehicle, the driver will need to plan the journey.



Total costs of service mobility of various types of EV in comparison to ICE cars



Scenario for development of investment costs



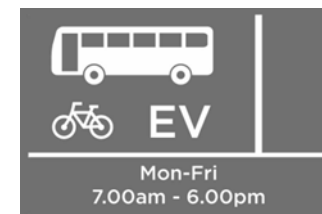
Monetary measures

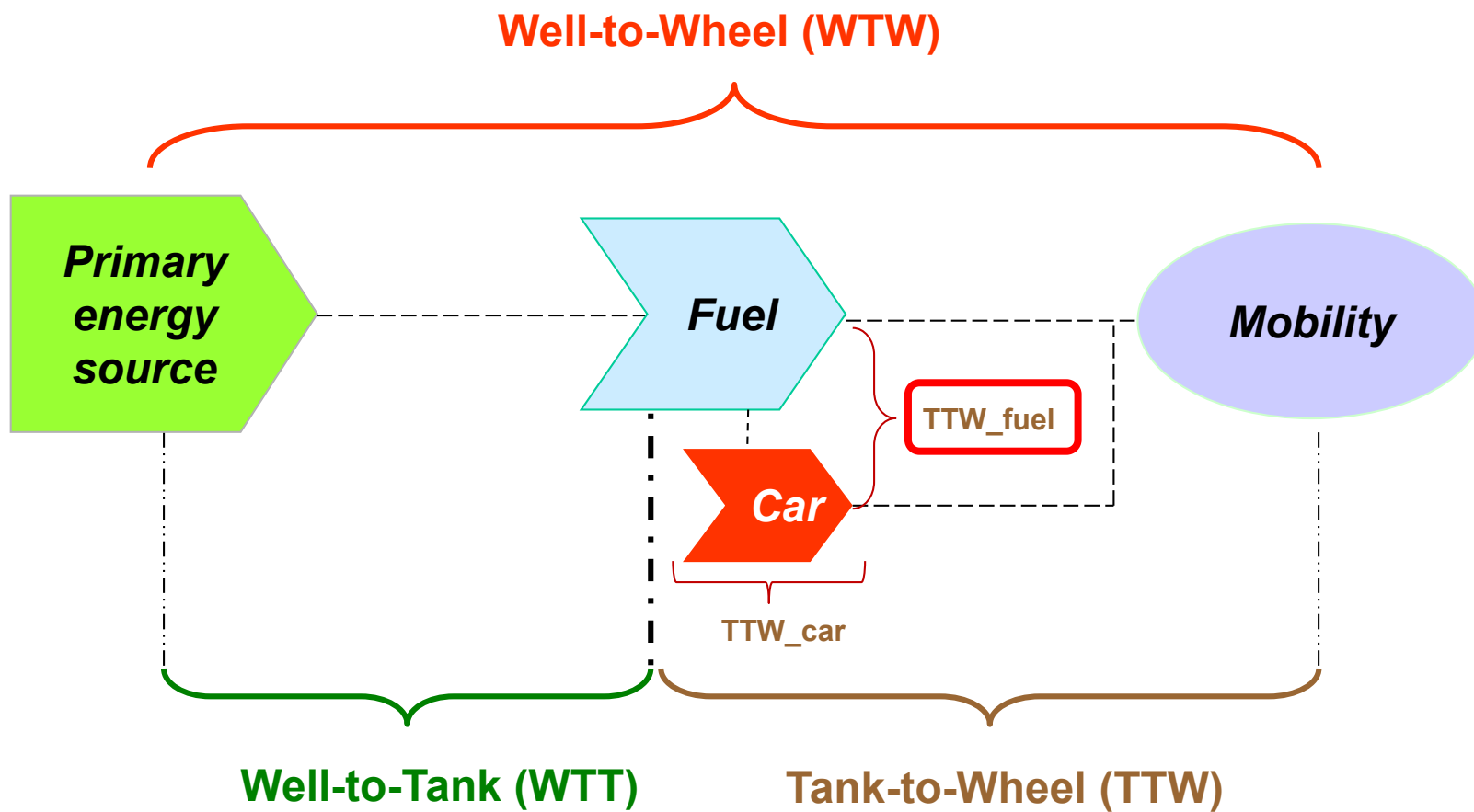
- road taxes
- annual circulation tax
- company car tax
- registration tax
- fuel consumption tax
- congestion charges

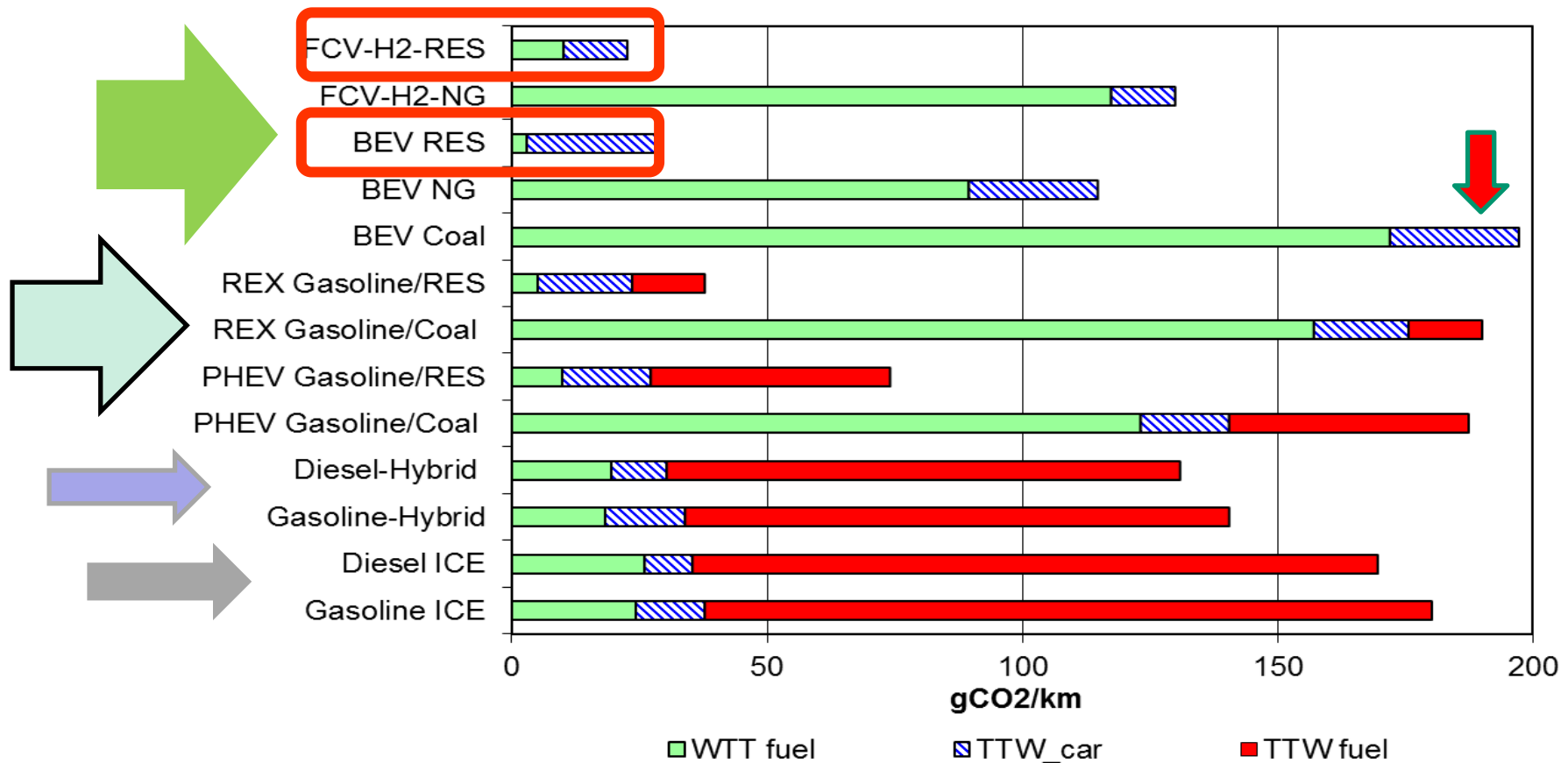


Non-monetary measures

- free parking spaces
- possibility for EVs drivers to use bus lanes
- wide availability of charging stations
- permission for EVs to enter city centers and zero emission zones

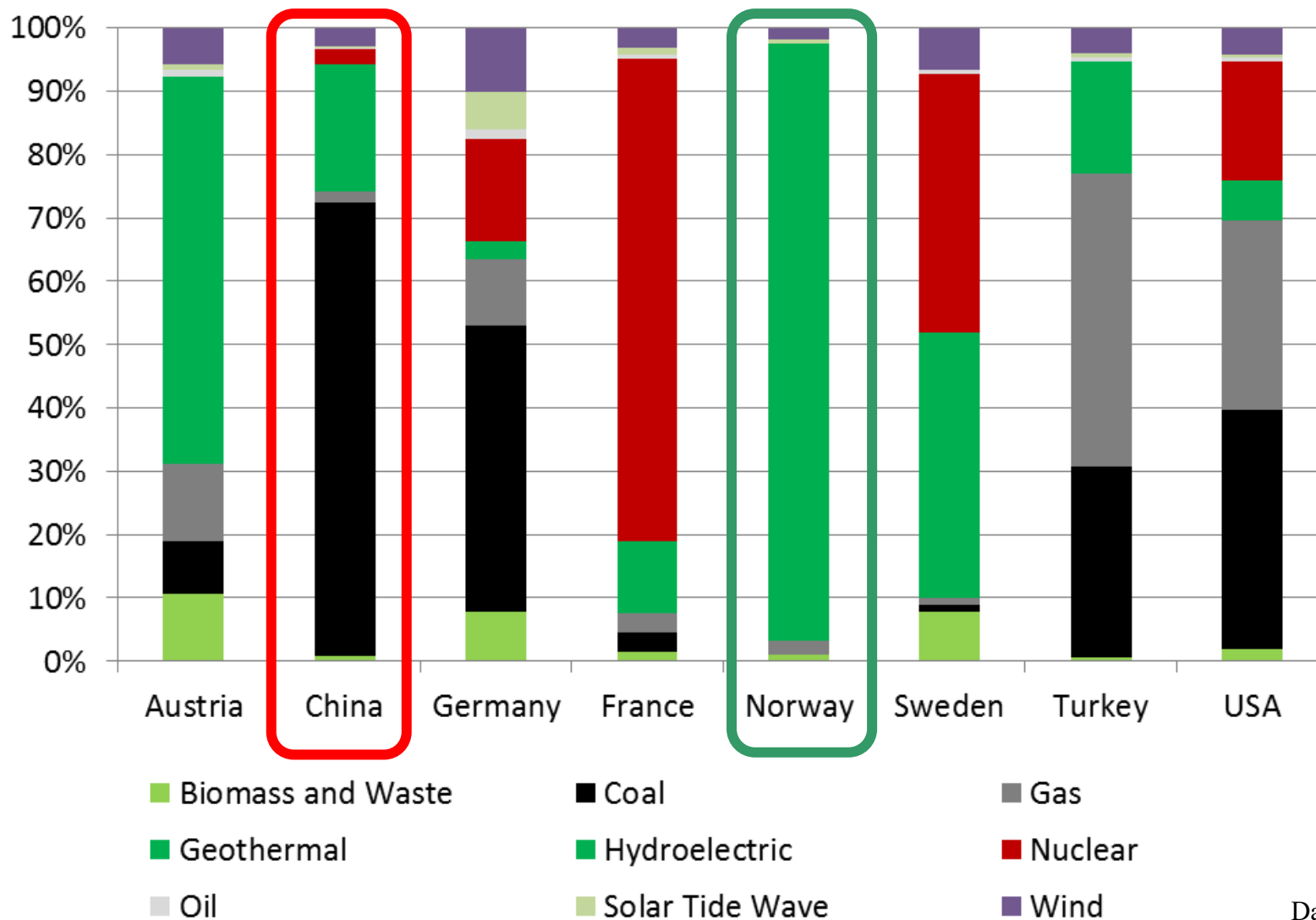


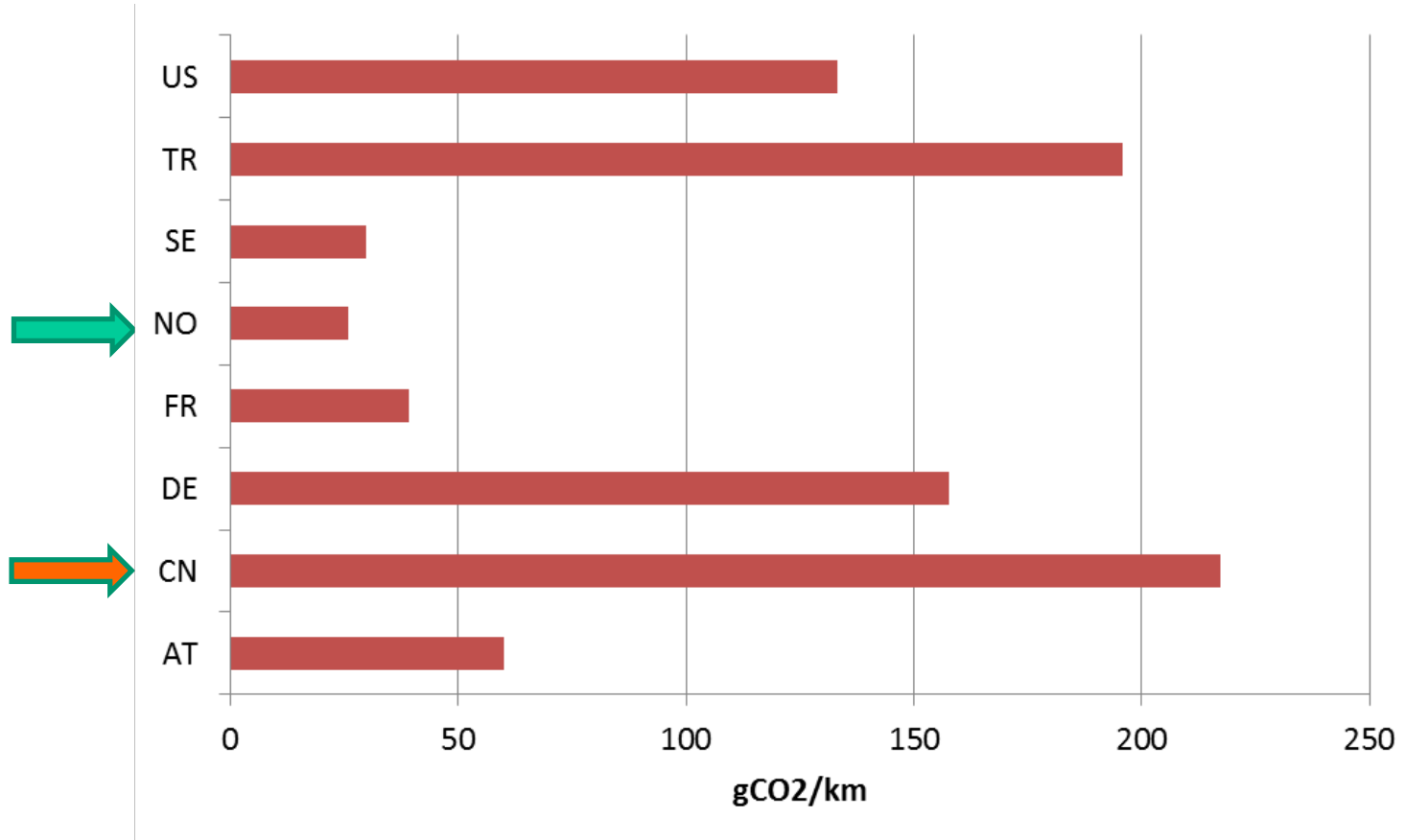




CO₂ emissions per km driven for various types of EV in comparison to conventional cars (power of car: 80kW)

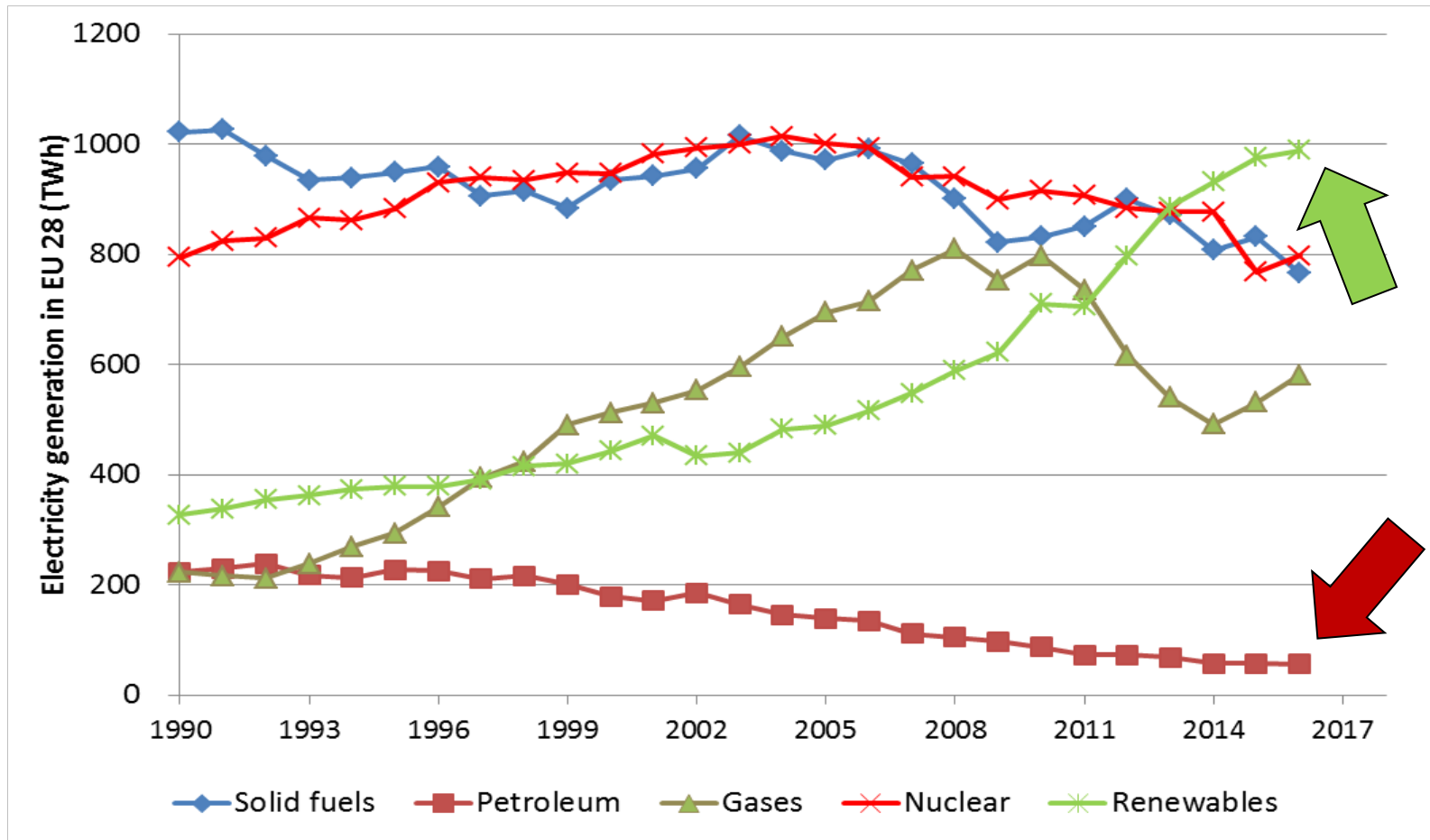
Electricity mix



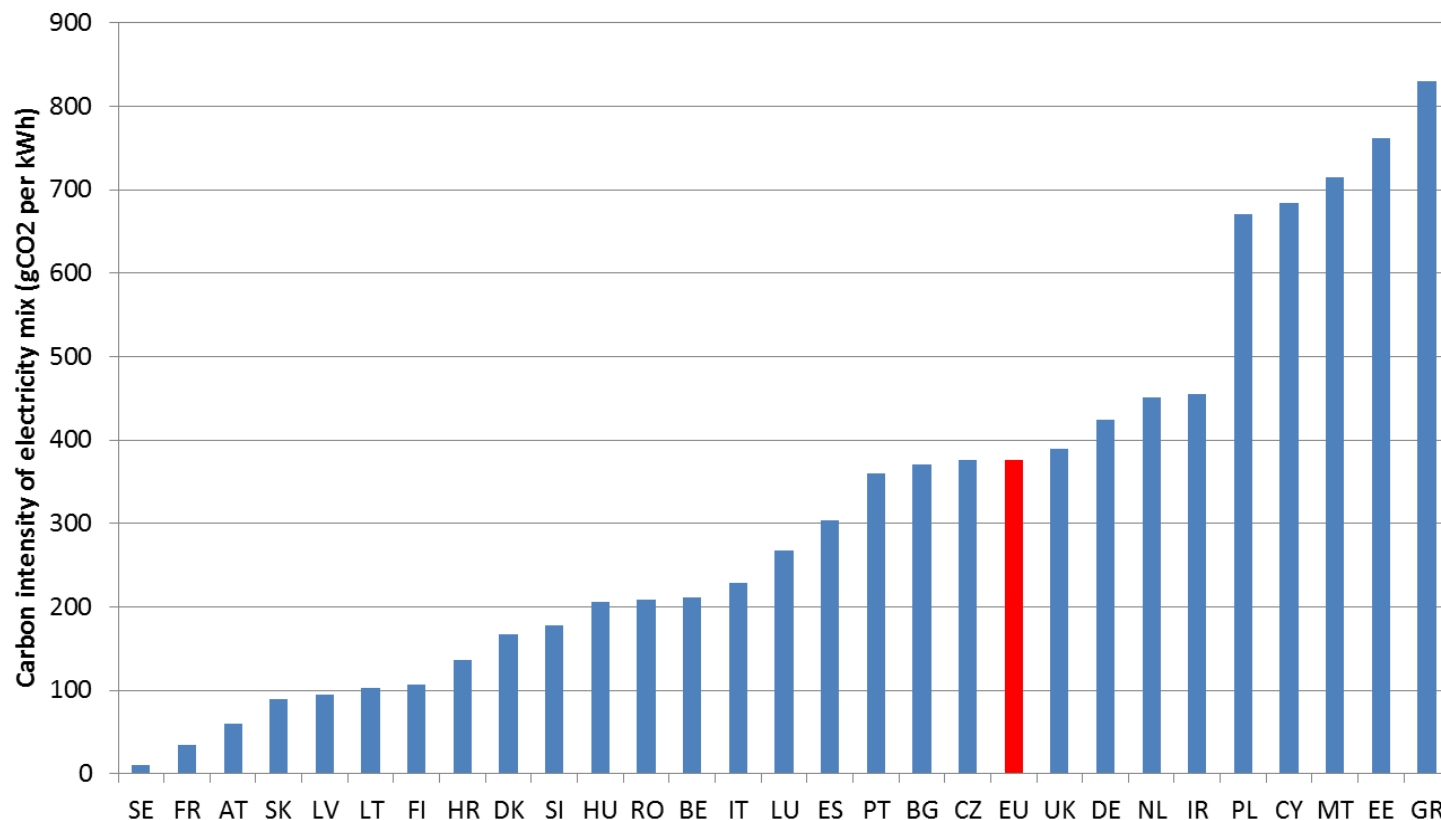


CO₂ emissions per km driven for BEVs powered by grid electricity in different countries

Electricity generation in the EU 28



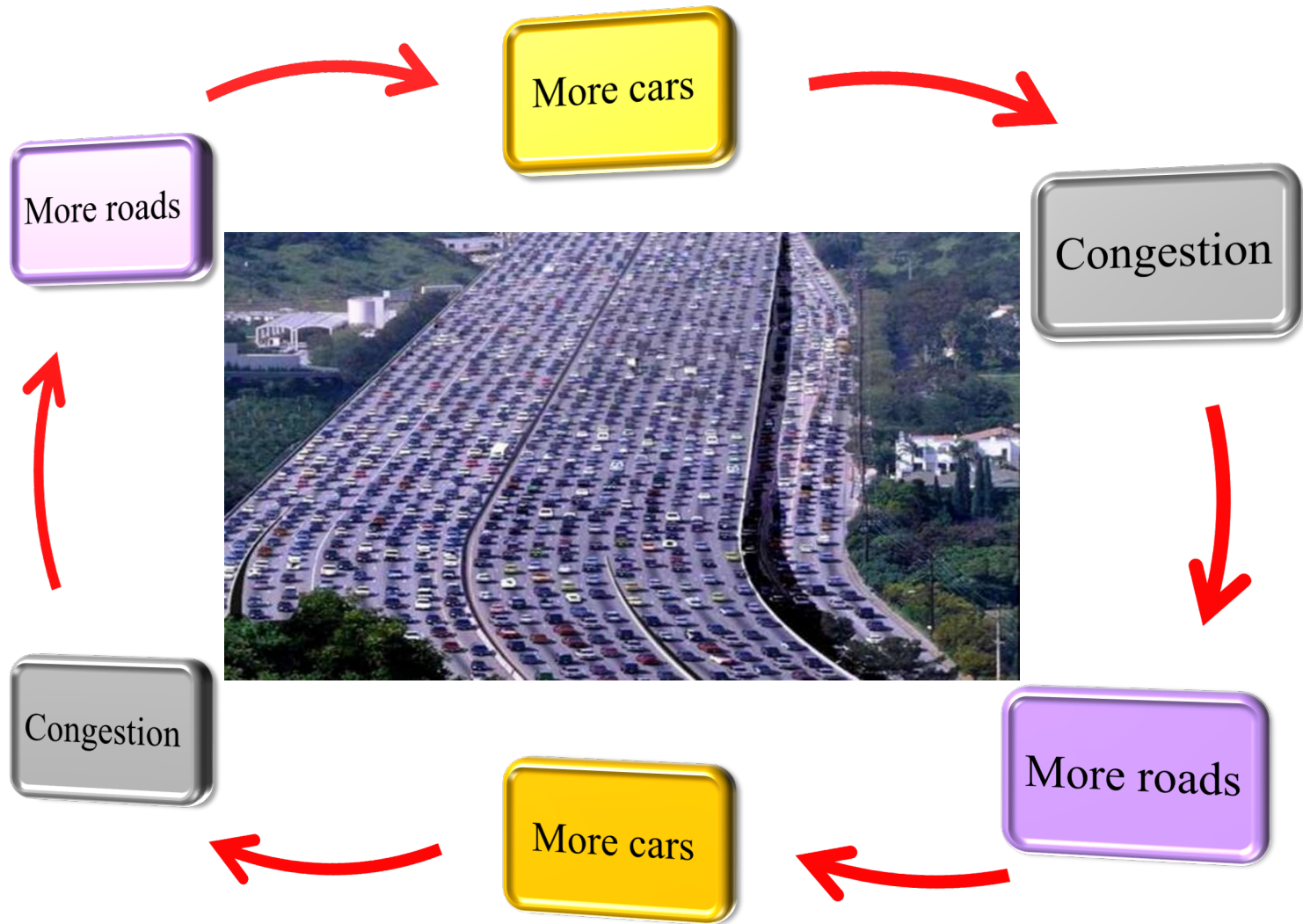
The carbon intensity of electricity mix



CO₂ per kWh electricity generated in different European countries, 2014

- EVs ...cost reductions, improvement of battery characteristics as well as development of infrastructure
- New policy design....most of the policies implemented will be abolished with the increasing number of EVs
- Full environmental benefit – only if EVs are powered by electricity generated from renewable energy sources

Car-oriented mobility



AVOID

unnecessary travel and reduce trip distances

SHIFT

towards more sustainable modes

IMPROVE

transport practices and technologies

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Ajanovic A., Haas R. (2018). **Economic prospects and policy framework for hydrogen as fuel in the transport sector**. Energy Policy 123 (2018) 280–288. <https://doi.org/10.1016/j.enpol.2018.08.063>

Ajanovic A., Haas R. (2018). **Electric vehicles: solution or new problem?**. Environ Dev Sustain (2018). <https://doi.org/10.1007/s10668-018-0190-3>

Ajanovic A. (2015). **The future of electric vehicles: prospects and impediments**. WIREs Energy Environment 2015. doi: 10.1002/wene.160, 2015