Energy efficiency in transport

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Content

1. Introduction
2. Historical developments
3. Drivers behind emission trends
4. Policy targets
   - Standards
   - Electric vehicles
5. Conclusion

Introduction

Basic principle:

$$S = f(E, \eta(Tc), \eta(Tis))$$

Service:
km driven

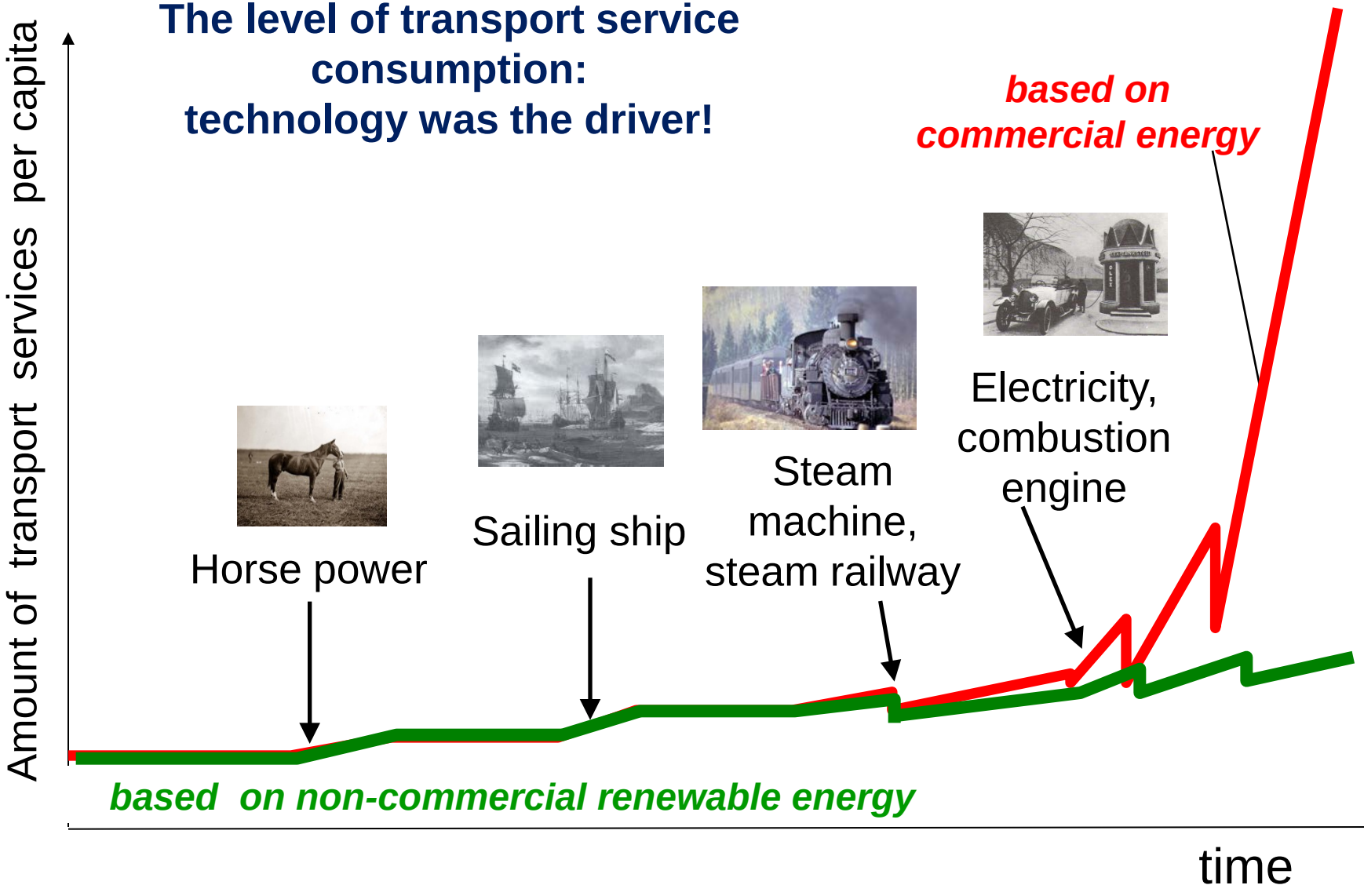
Fuel mix,
Fuel demand

Efficiency:
Liter/100 km

Infrastructur

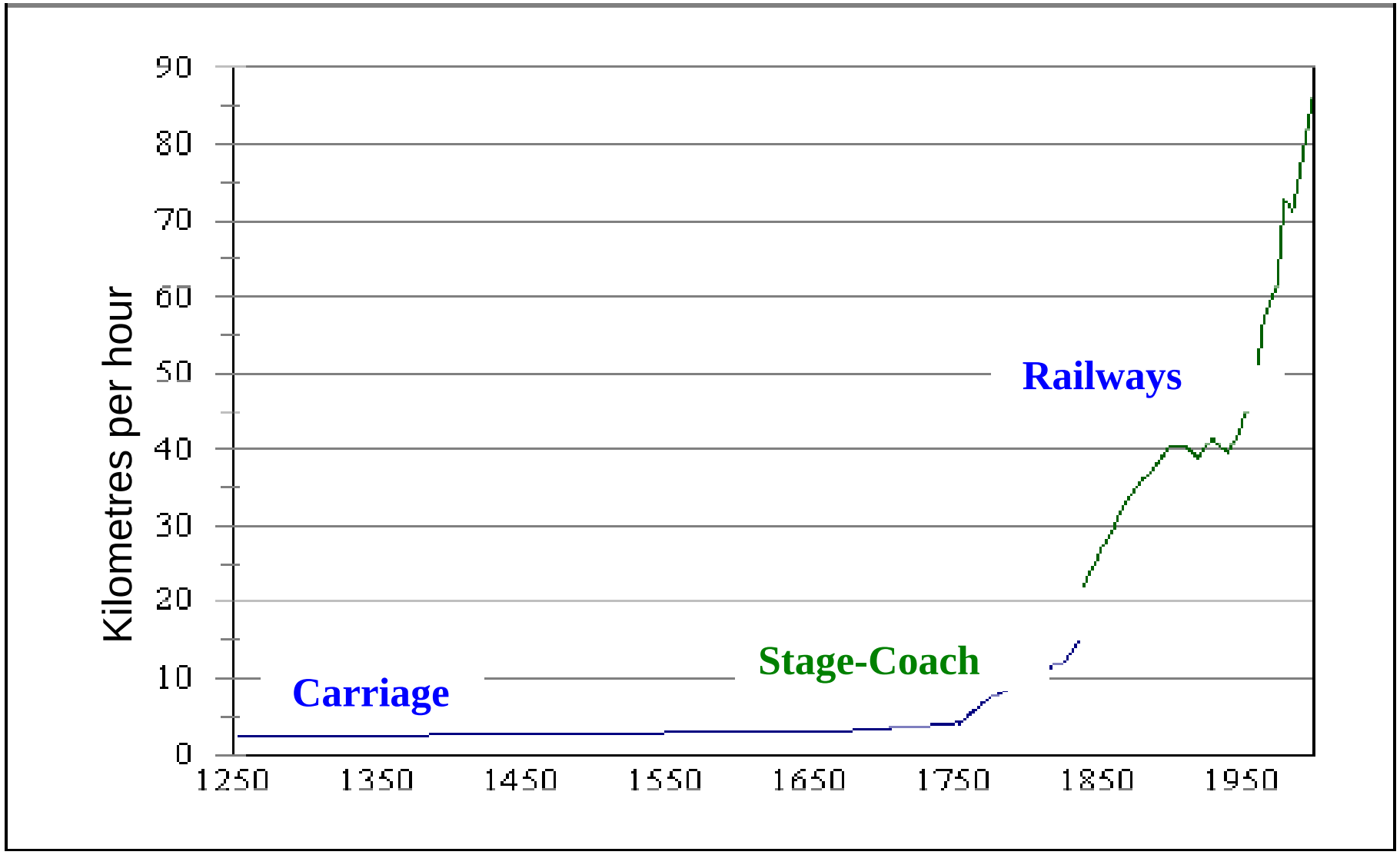
Introduction

The level of transport service consumption: technology was the driver!



The Speed of Transport

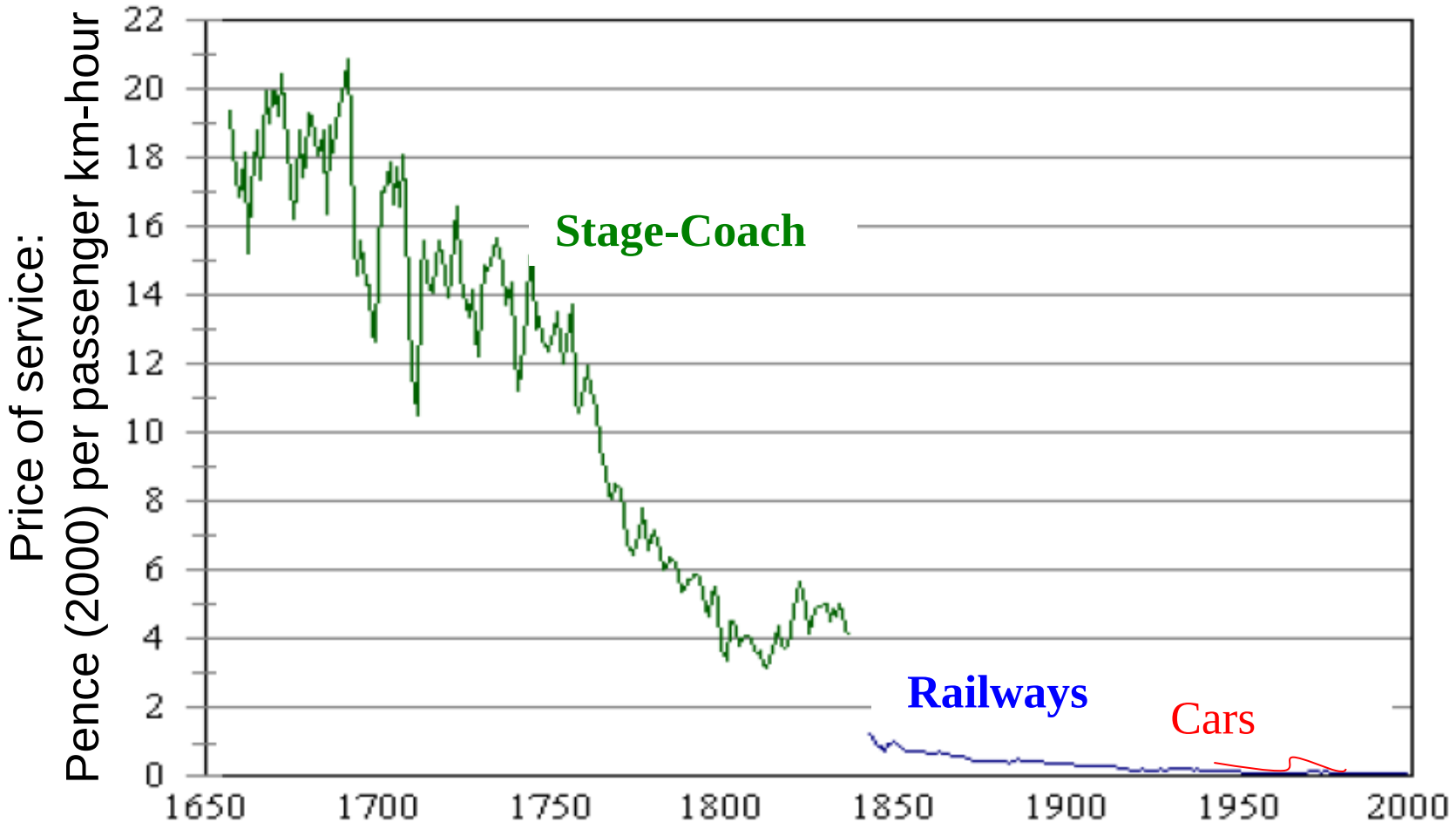
(Kilometres per Hour)



Source: Fouquet,2003

Price of Passenger Transport

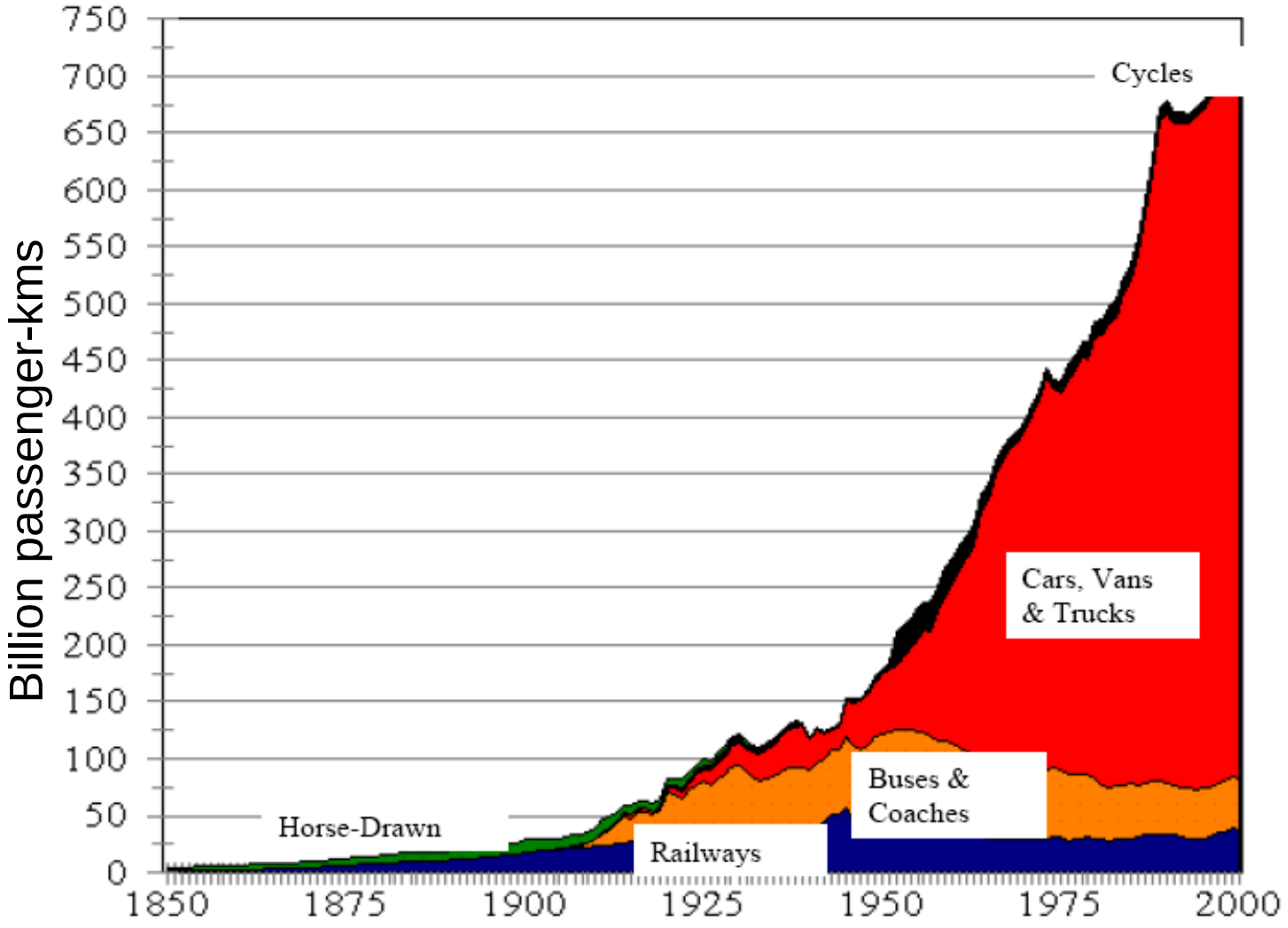
(per passenger-kilometer-hour)



Source: Fouquet&Pearson (2003)

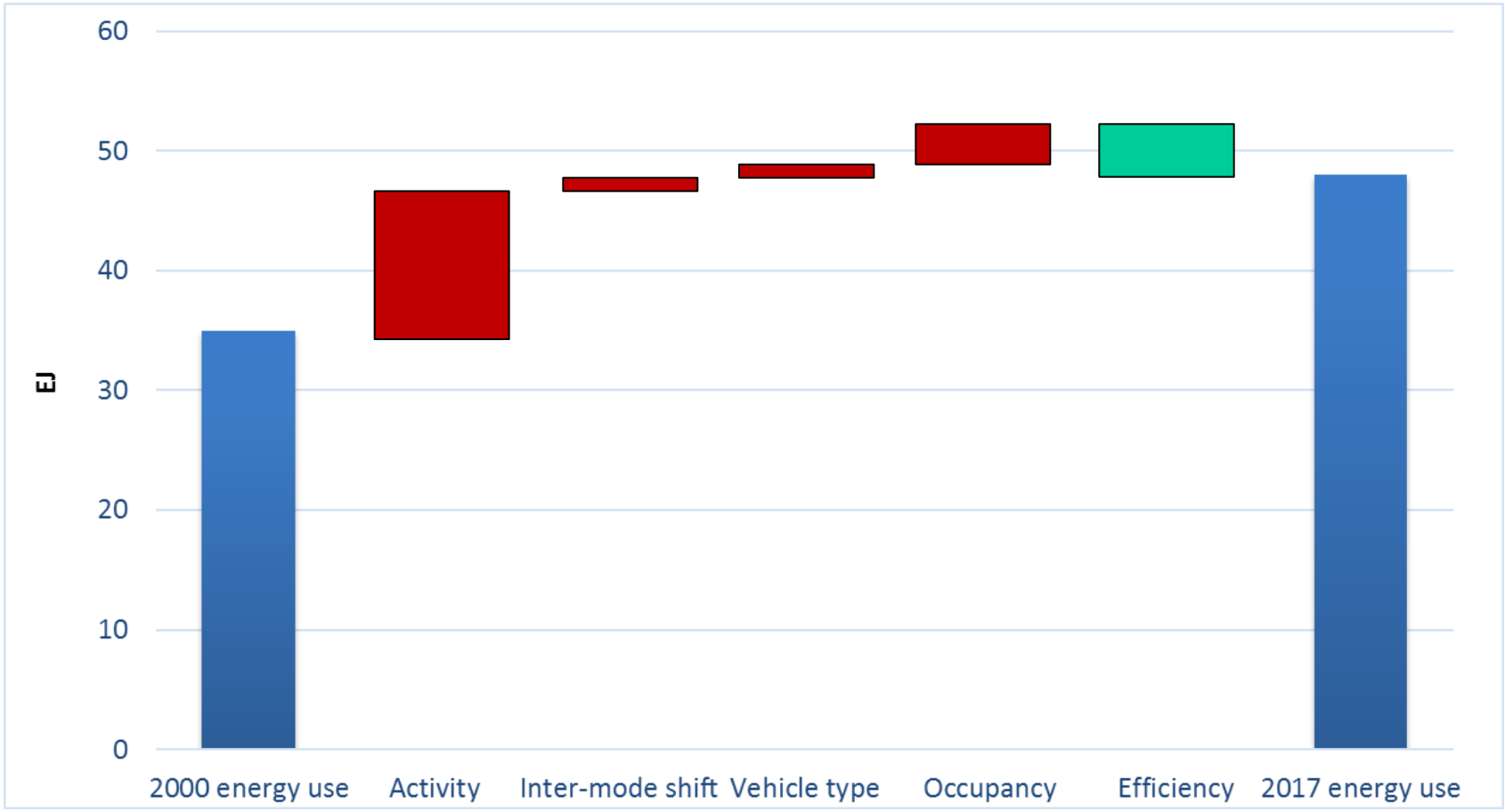
UK: The Use of Passenger Transport

(per Passenger-Kilometre), 1850-2000



Source: Fouquet,2003

Decomposition of passenger transport final energy use

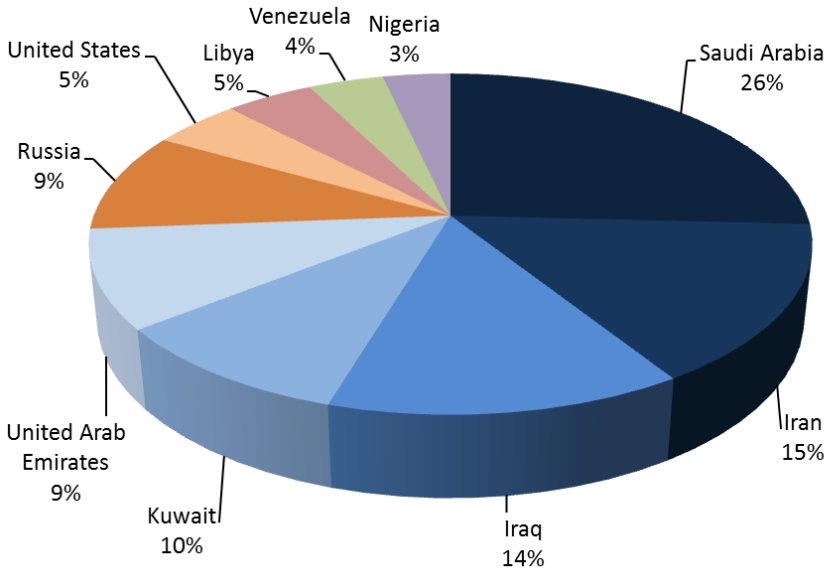


IEA, 2018

Transport sector

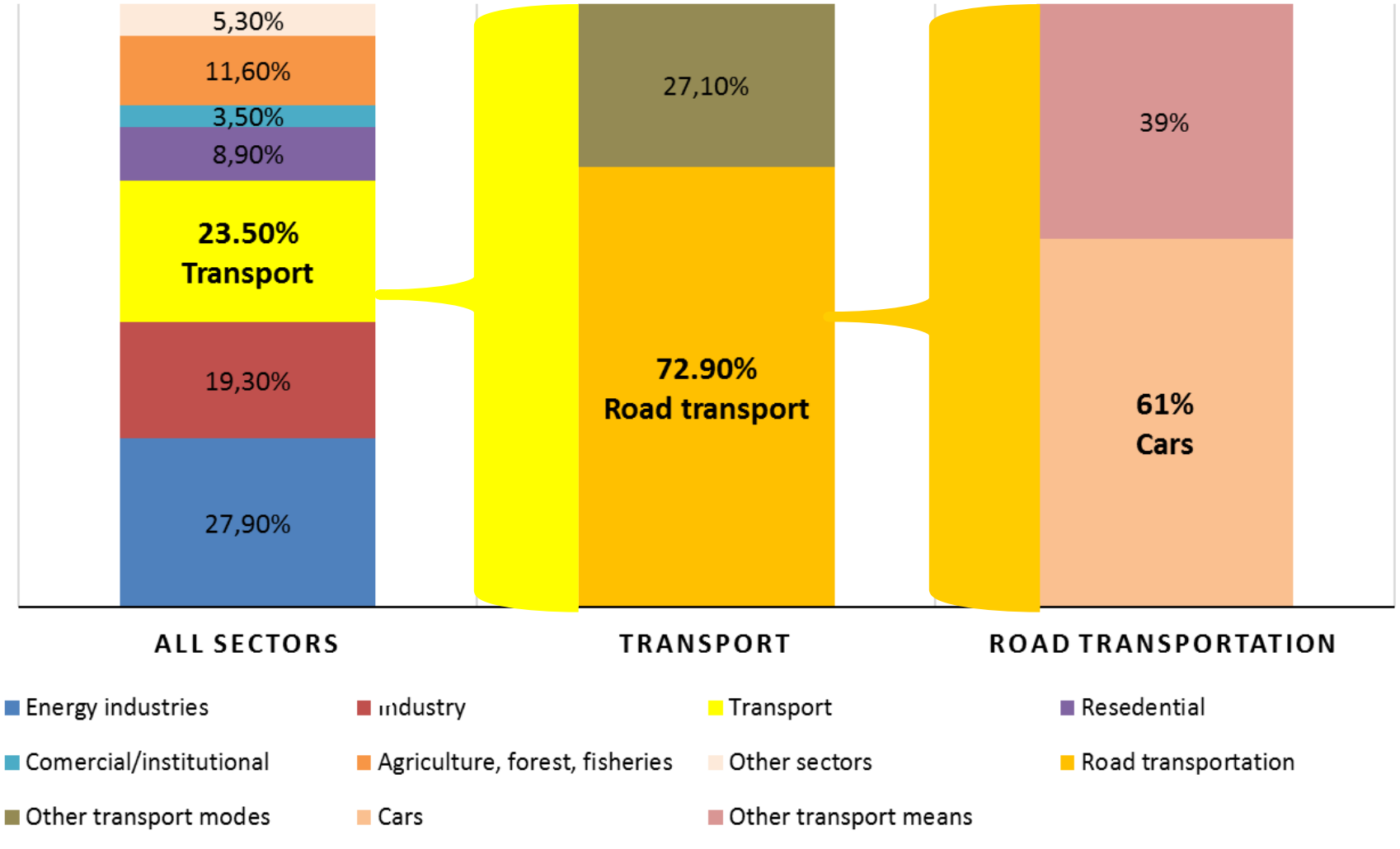
- **93%**

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



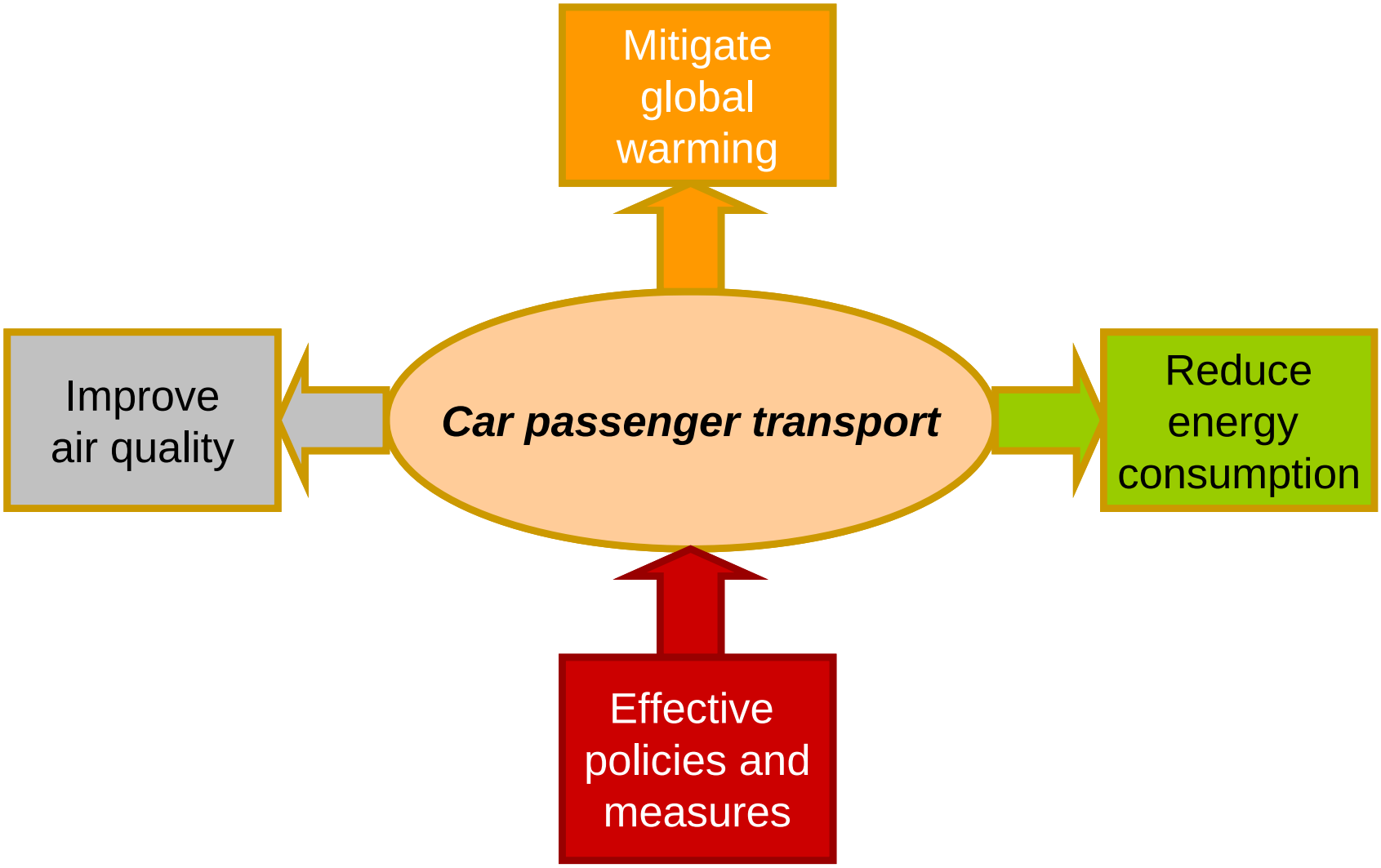
Countries with largest conventional oil reserves

GHG emissions in EU 28

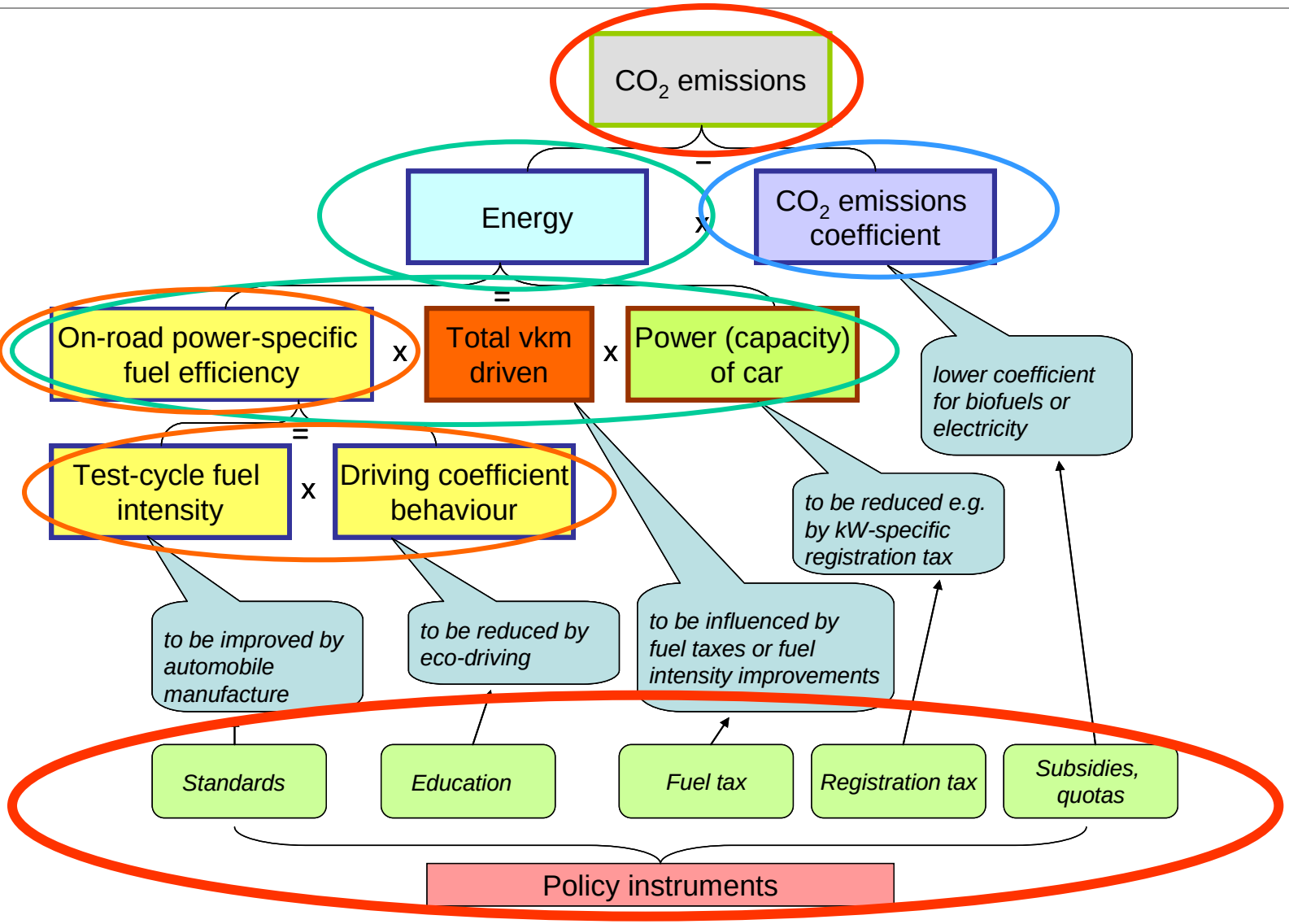


IEA,2017

The challenges for EU climate and energy policies



CO_2 emissions in passenger car transport



Impact factors on CO_2 emissions in the car passenger transport sector

EU targets

20-20-20

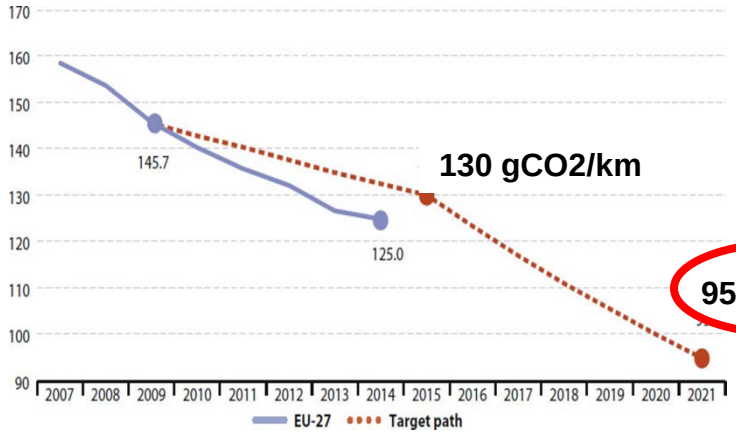
10%

40-27-27

ICE -50% in city

No ICE in city

2009 2010 2015 2020 2030 2050



20% GHG (2008)

60% GHG (1990)

The White Paper on Transport Policy

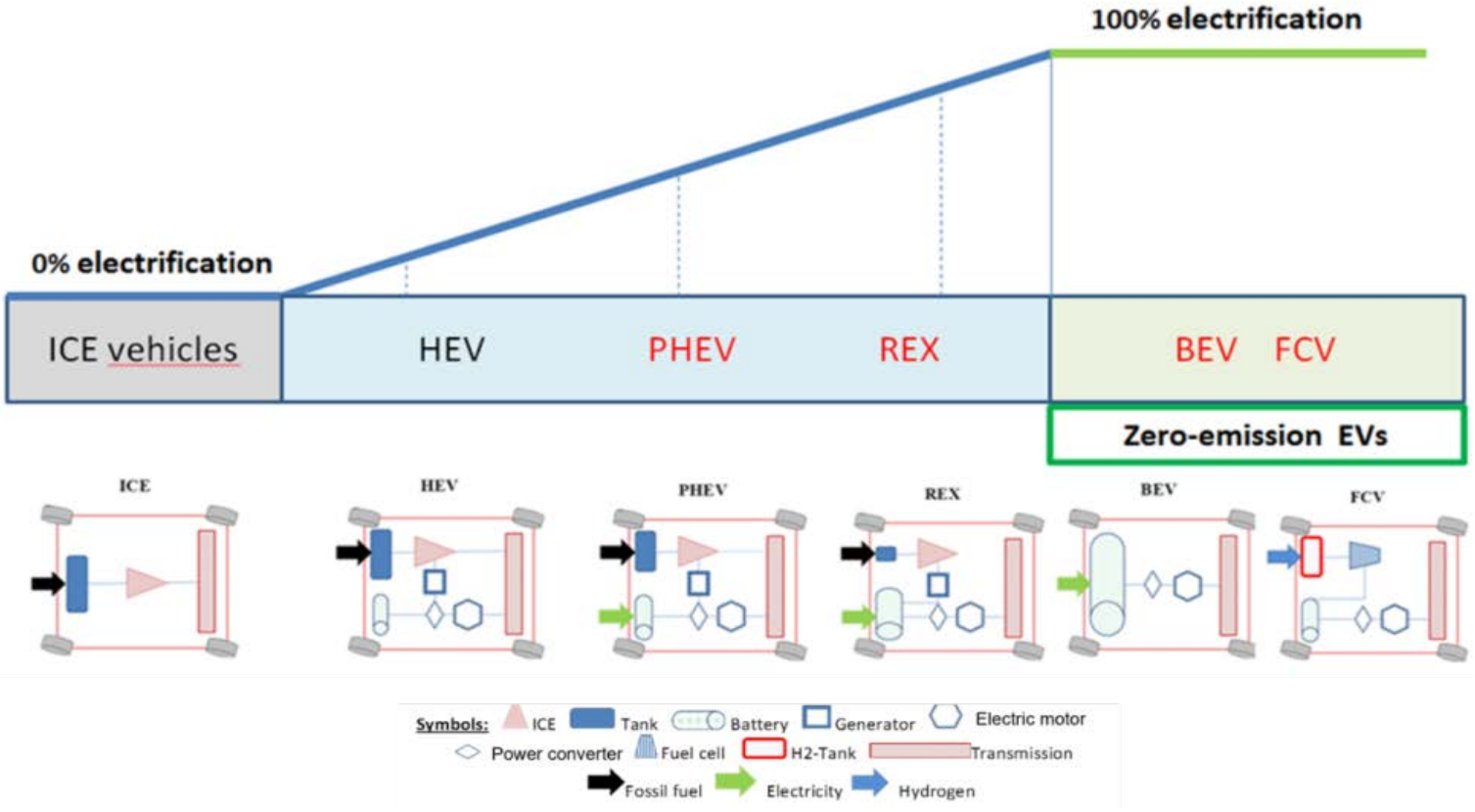
Targets and average CO_2 emissions from new passenger cars in EU countries

Electric vehicles

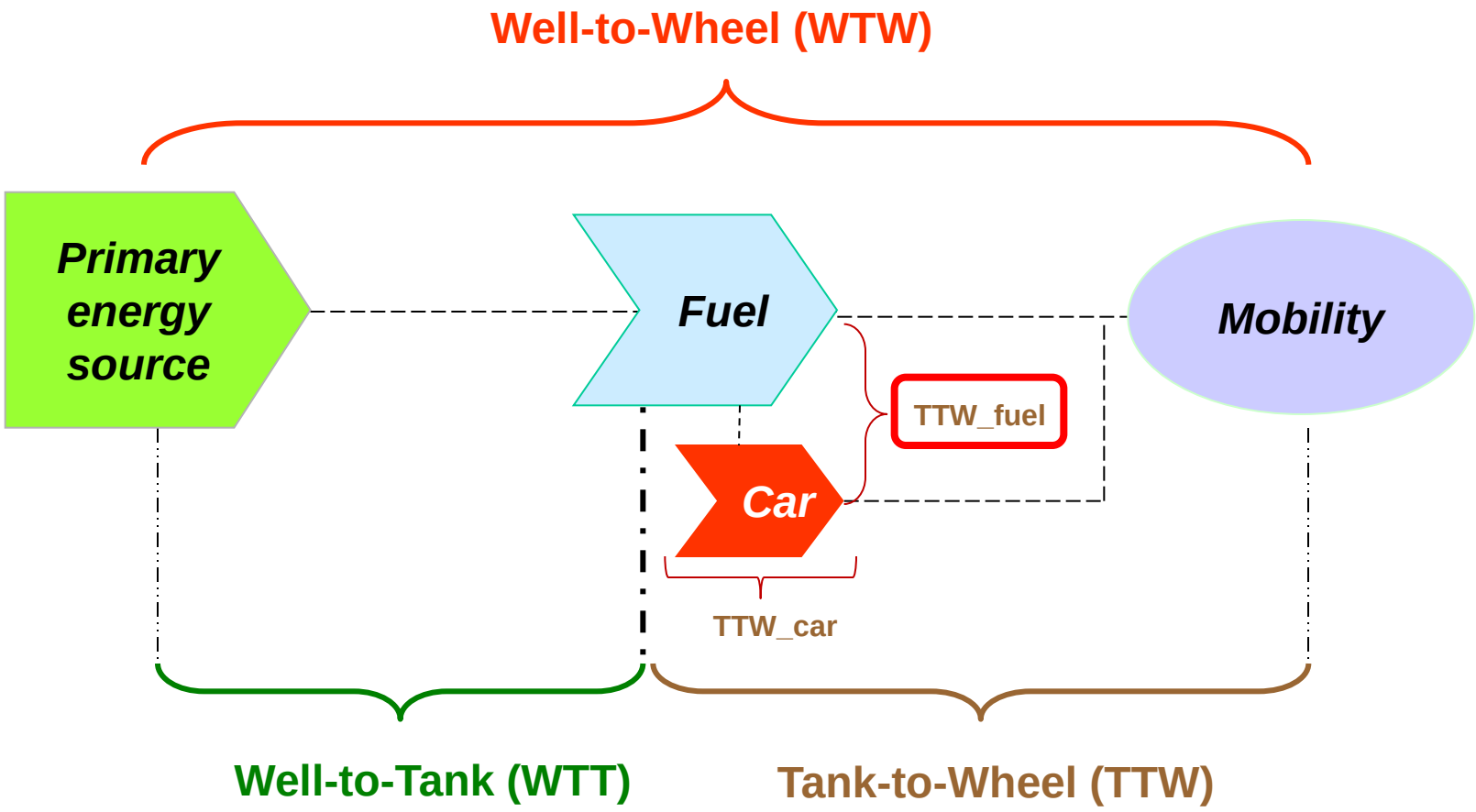
Paris Declaration on Electro-Mobility and Climate Change & Call to Action:

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

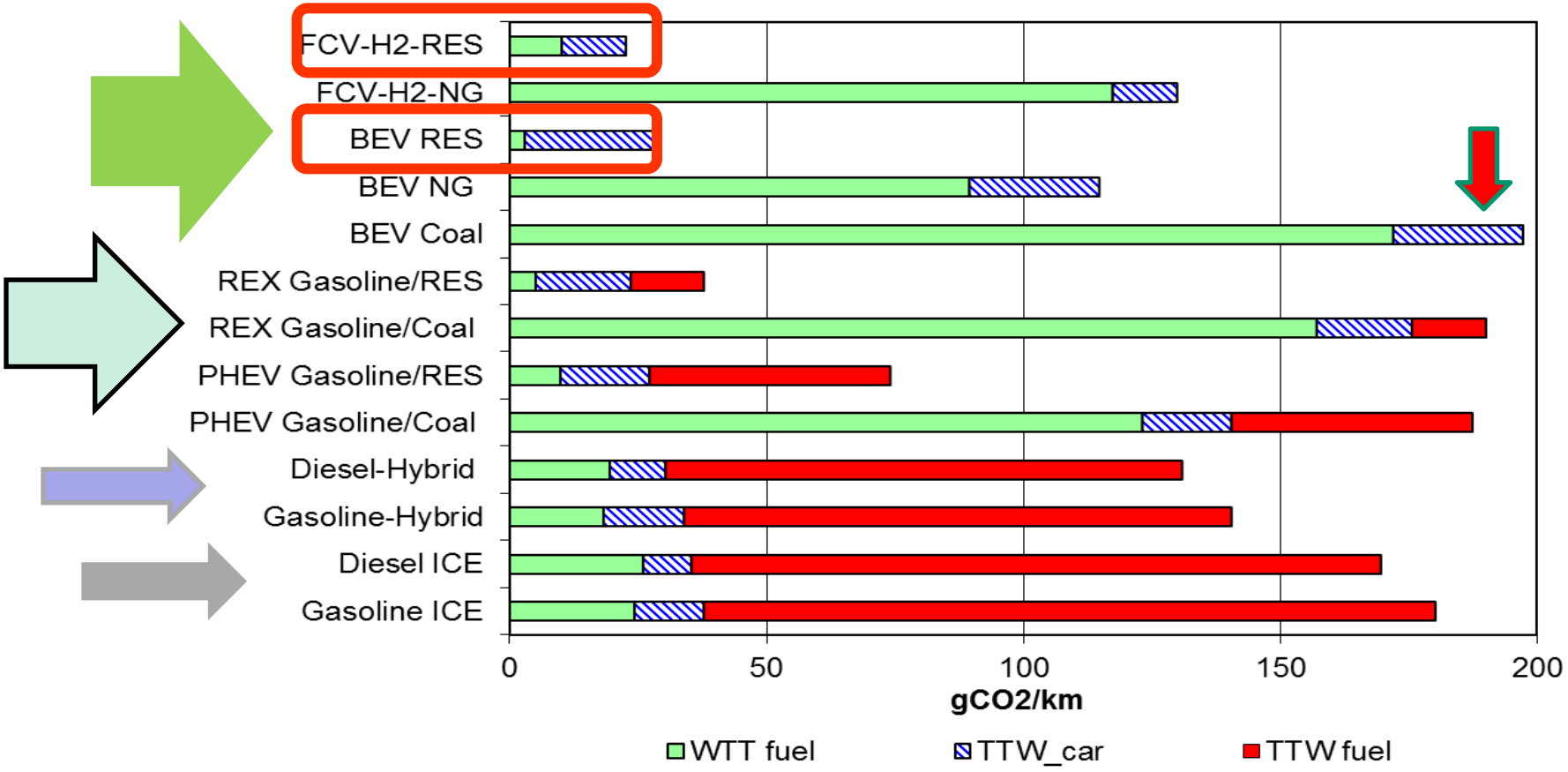
Electric vehicles



Environmental assessment



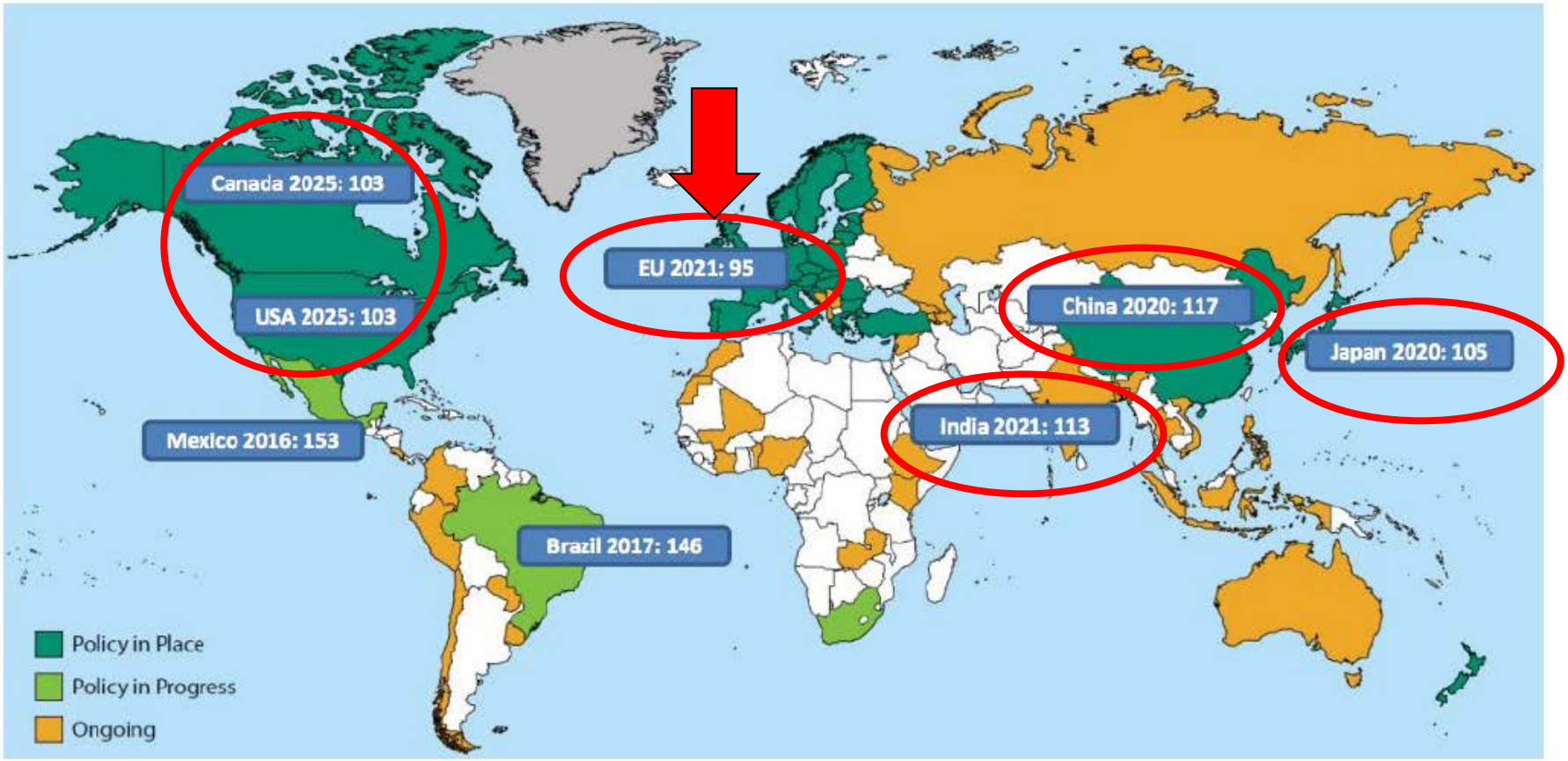
Environmental assessment



CO_2 emissions per km driven for various types of EV in comparison to conventional cars (power of car: 80kW)

Standards

Fuel economy standards have been enforced in several countries



Standards

Next targets

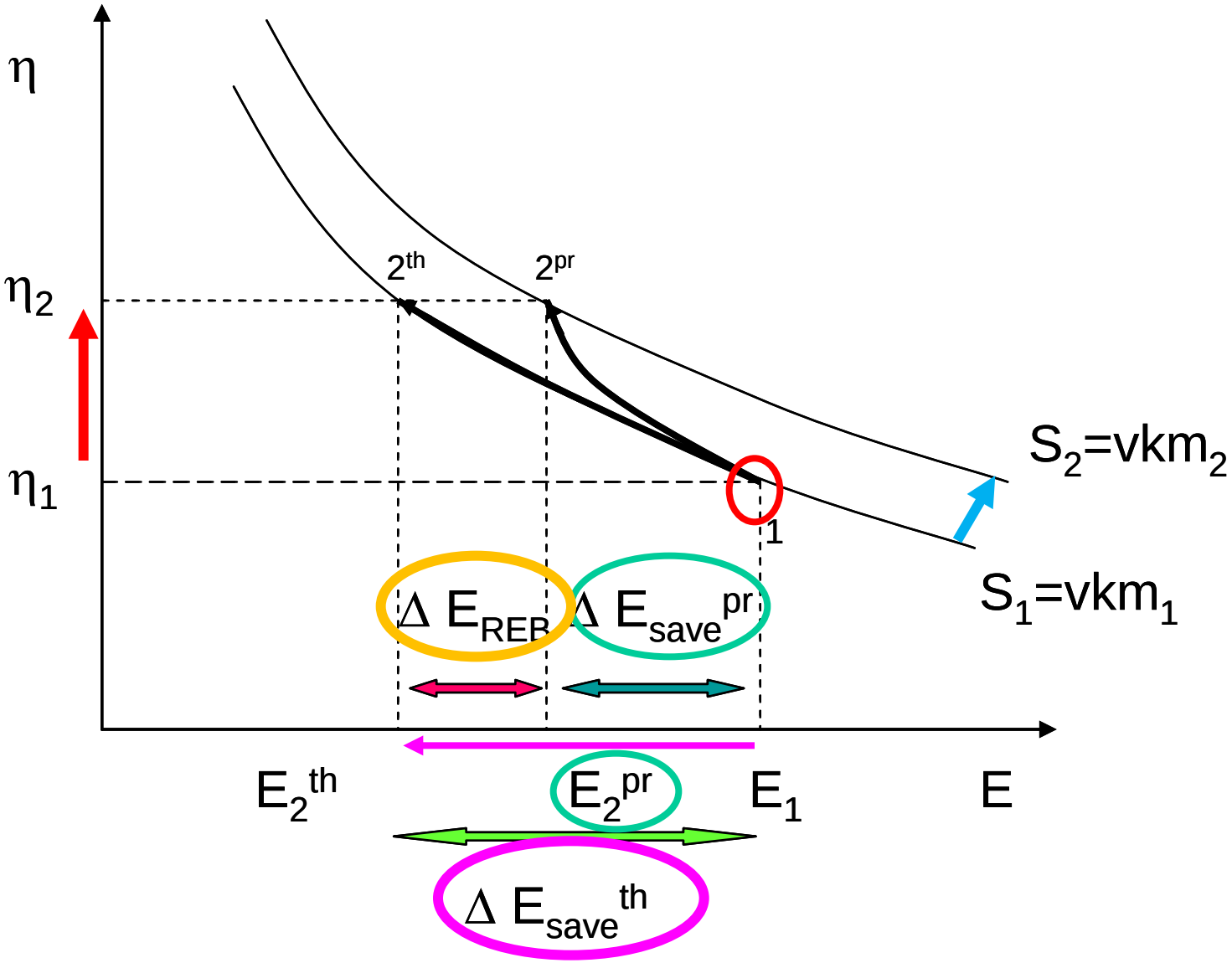
2025…. average emissions 15% lower than in 2021

2030…average emissions 30% lower than in 2021

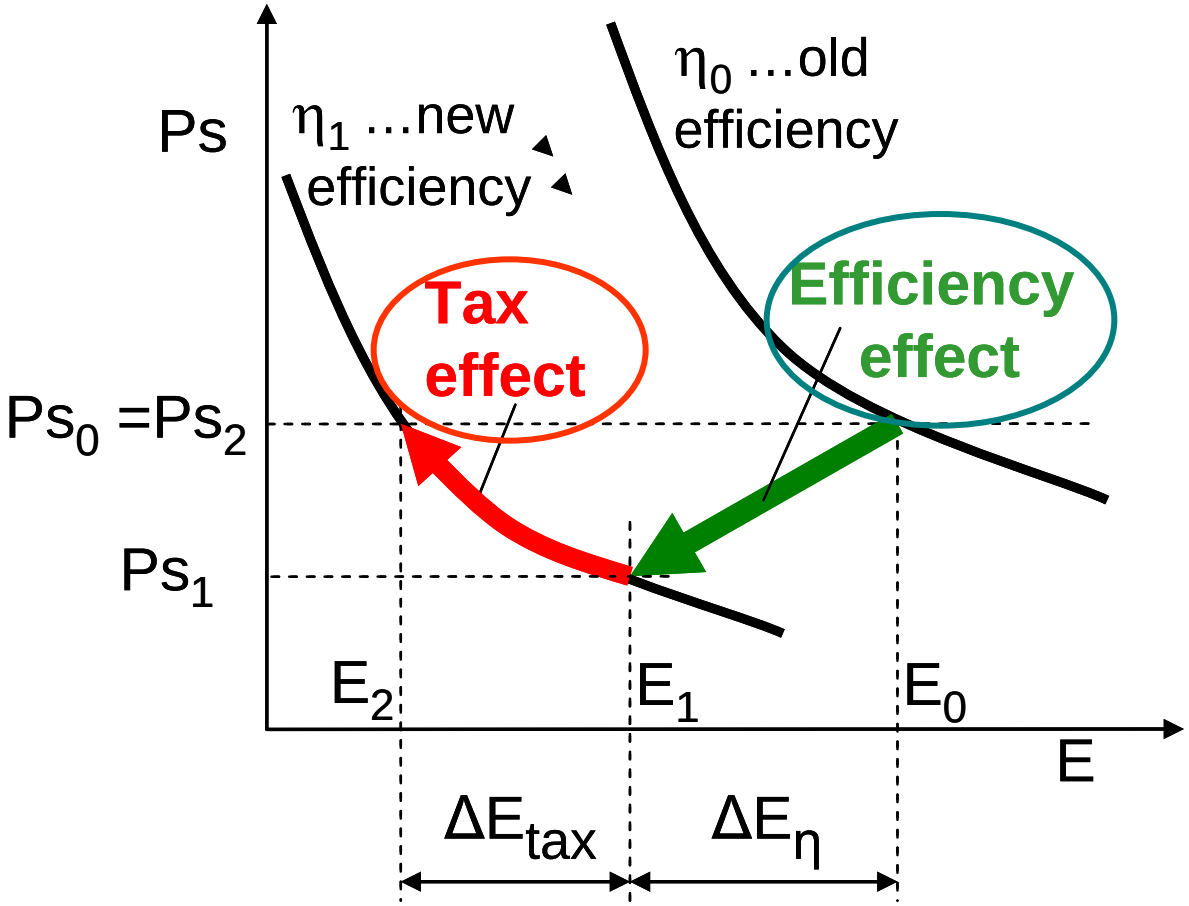
Test procedure:

New European Driving Cycle (NEDC)
Worldwide Harmonised Light Vehicle Test Procedure (WLTP)

Rebound effect

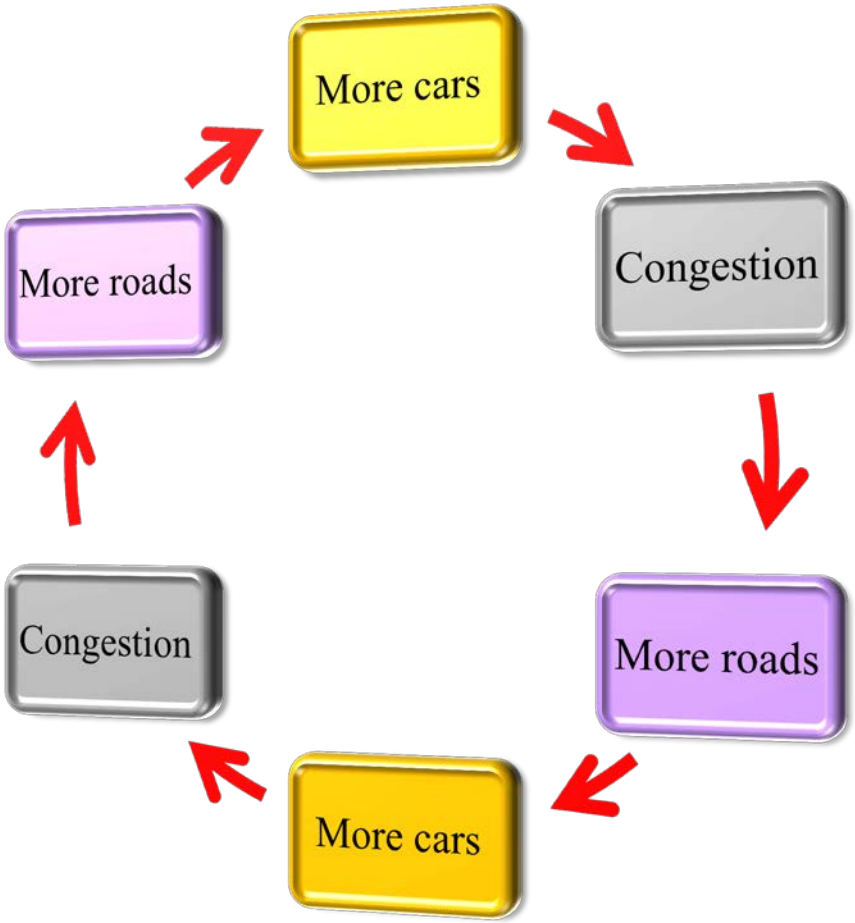


Standards & taxes



How taxes and standards interact and how they can be implemented in a combined optimal way for society

Car-oriented mobility

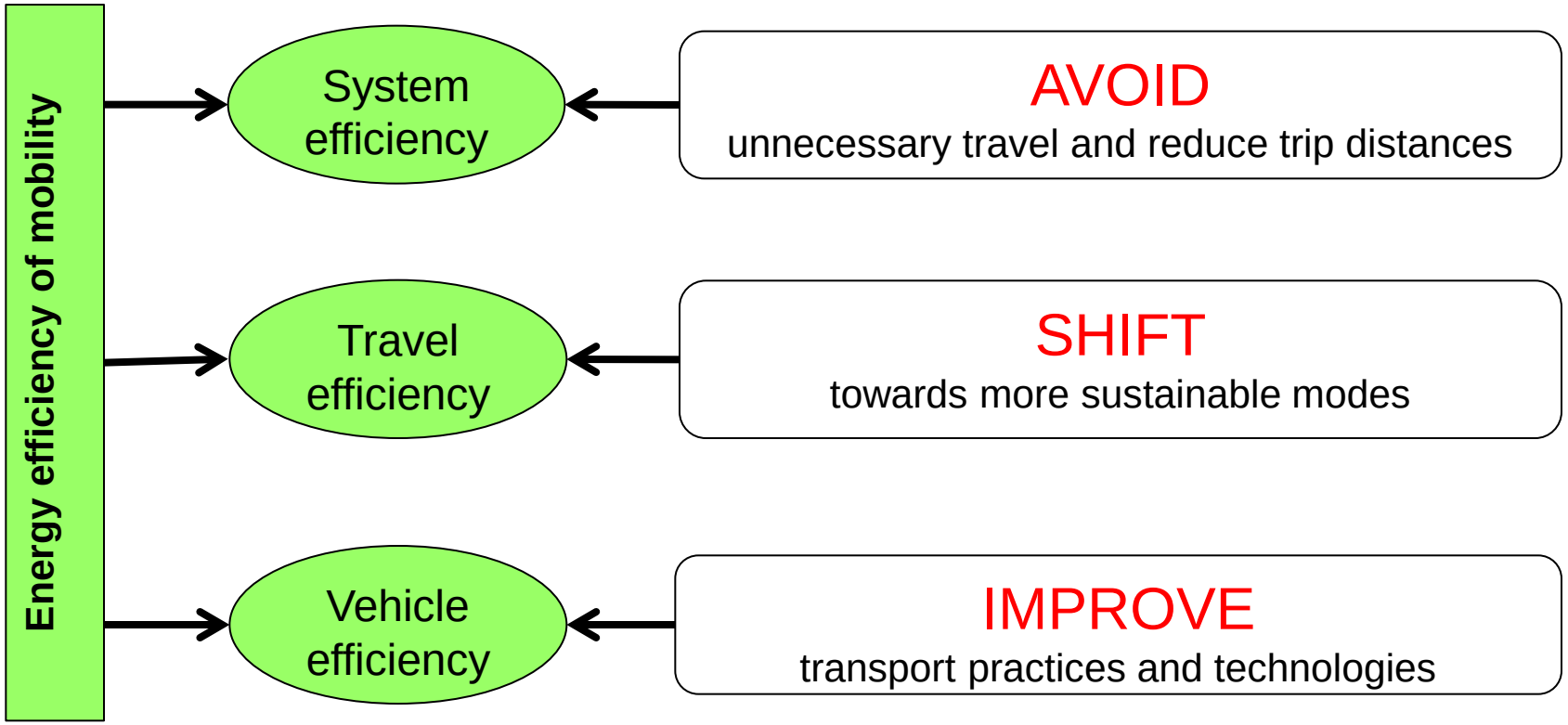


Mobility

Car-oriented transport development

https://simotron.files.wordpress.com

Strategies for energy efficient mobility



Conclusions

- Drivers of energy demand
- Standards …. rebound effect
- a harmonization of taxes in EU countries and their adaptation to the CO_2 targets …..contribution to the reduction of the negative impacts of the rebound effect
- Electric vehicles…new policy design

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