



ERTRAC Annual conference – 3 March 2015  
Dr. Stephan Neugebauer, Brussels

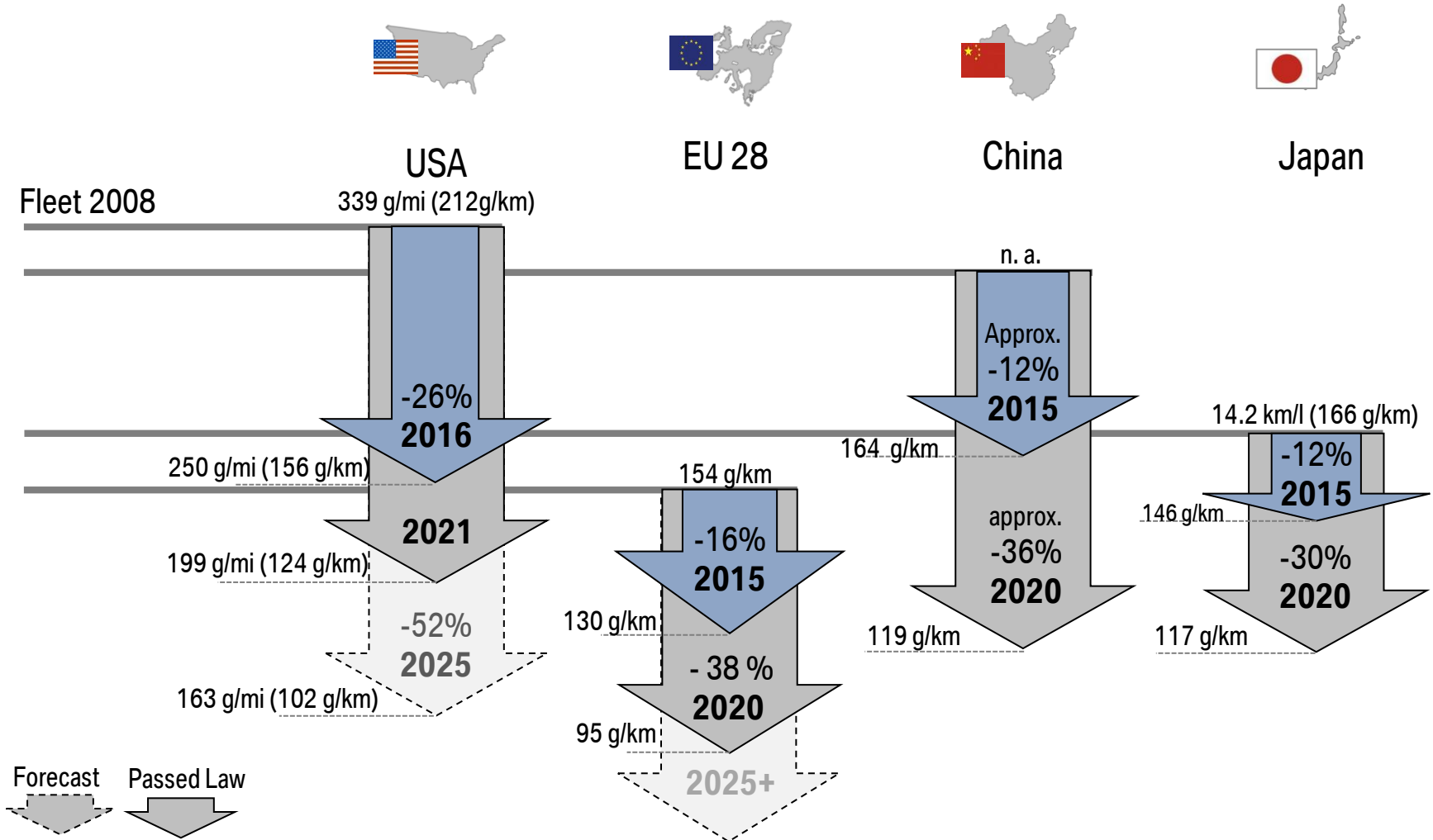
# SESSION 1: POWERTRAINS.

**ENGINES, FUELS AND ELECTRIFICATION**

**BMW  
GROUP**

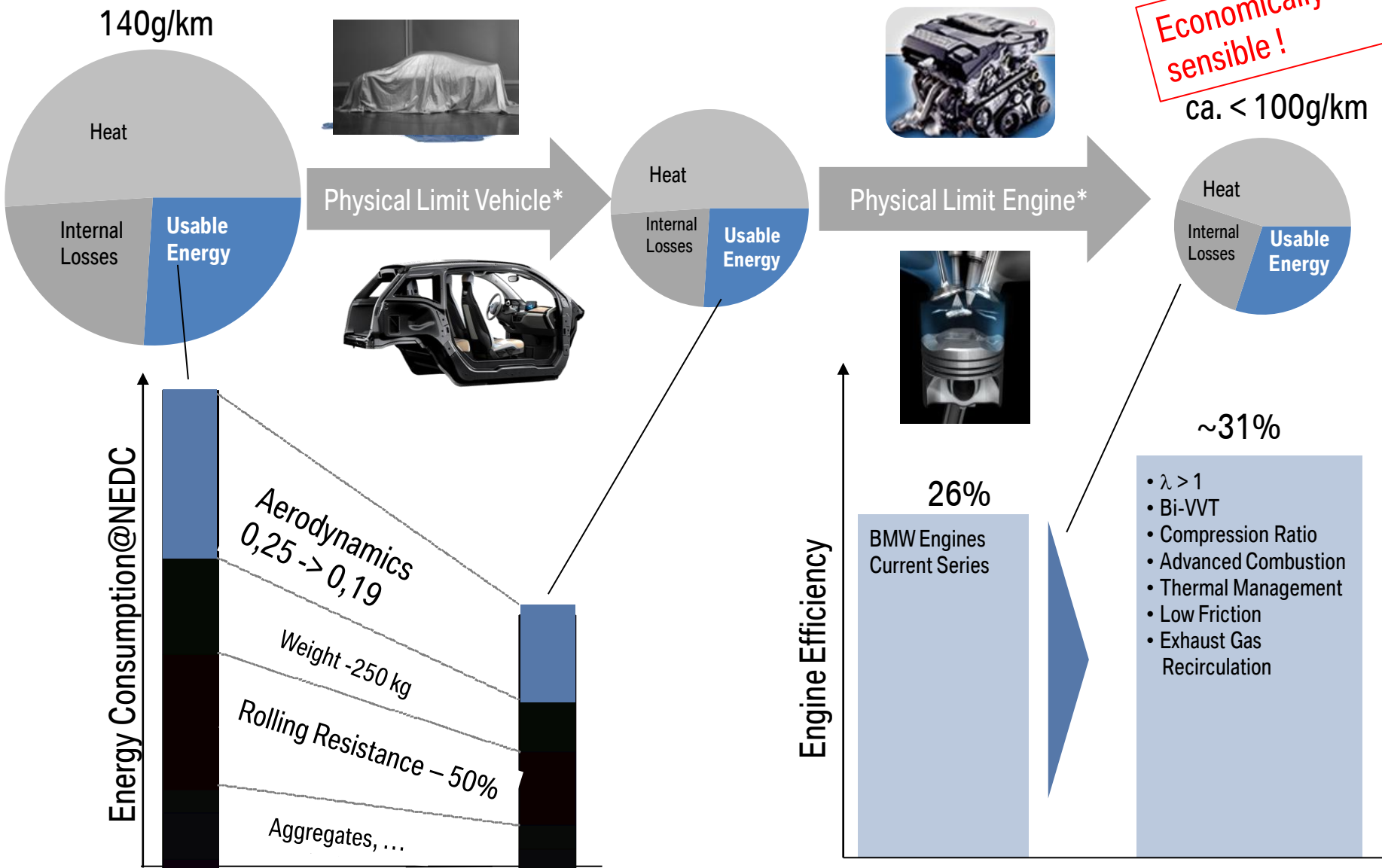


# EFFICIENCY IS A LONG TERM ECONOMIC AND SOCIAL CHALLENGE.



# AN INNOVATION POTENTIAL IS LEFT FOR CONVENTIONAL VEHICLES.

**Economically not sensible!**

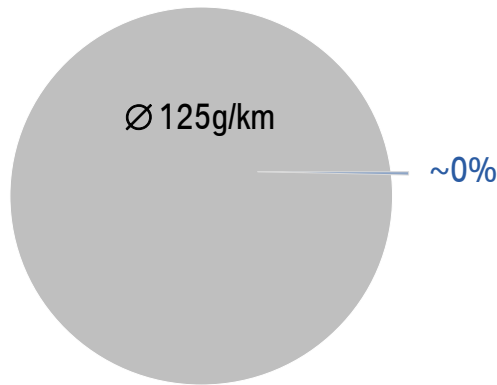


\* Energy Consumption @NEDC, midsize car, 2,0 l engine

# ELECTRIFICATION IS NECESSARY TO REACH DECARBONISATION.

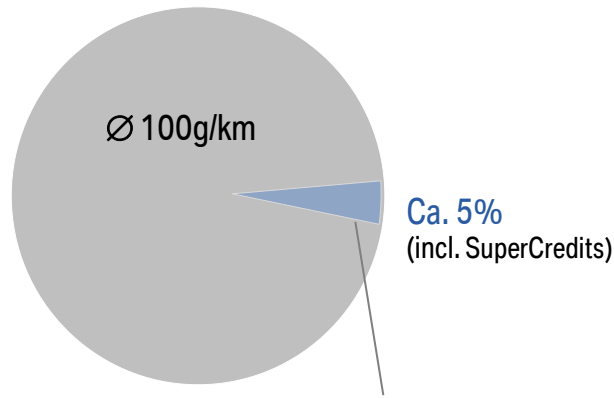
**2015**

CO<sub>2</sub> target (Fleet, EU) 130 g/km



**2021**

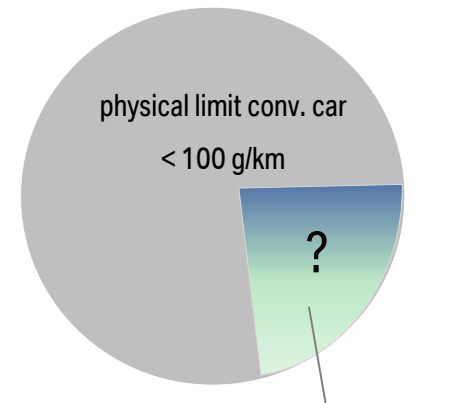
95 g/km



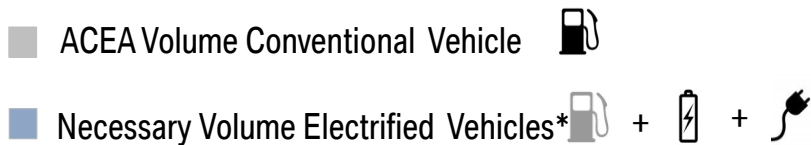
Ø 30g/km  
40% BEV/REX  
60% PHEV

**2025+**

???



Ø 30g/km  
40% BEV/REX  
60% PHEV

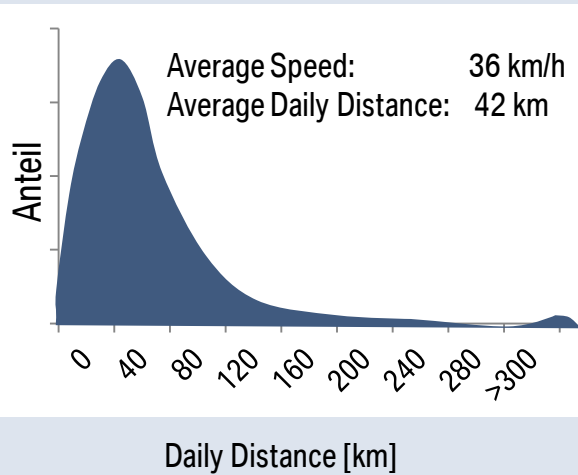


\* 2025+ ohne SuperCredits

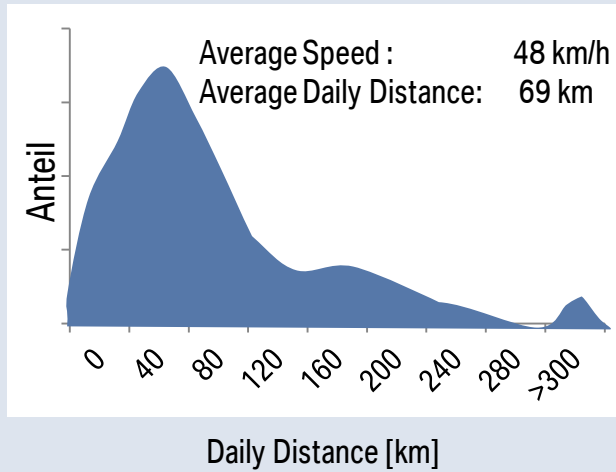
Fleet-Targets < 100 g CO<sub>2</sub>/km can only be reached by significant volume of electrified vehicles.

# MOST CUSTOMERS USE THEIR VEHICLES IN COMMUTE MODE.

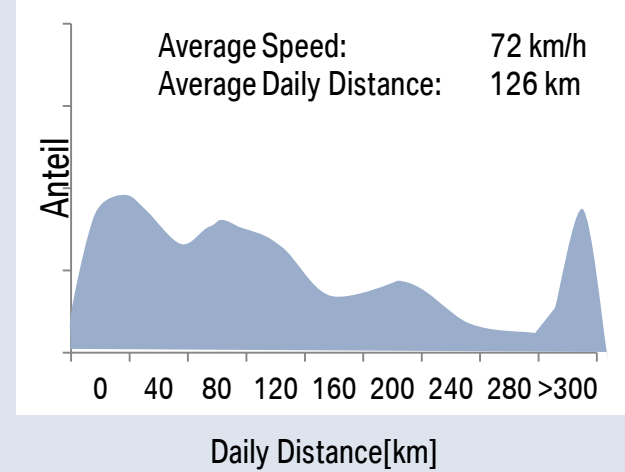
## URBAN



## COMMUTE



## ESCAPE



US



EU



CN

Market Share



Functional design must fit the use cases of the customers

# SYSTEMATIC OPTIMIZATION WILL LEAD TO CONFLICTS OF INTERESTS (EXAMPLE AERODYNAMICS VS. A/C).

**URBAN**

**COMMUTE**

**ESCAPE**



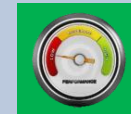
Angle Windscreen: Steep

Flat

Aerodynamics:



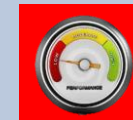
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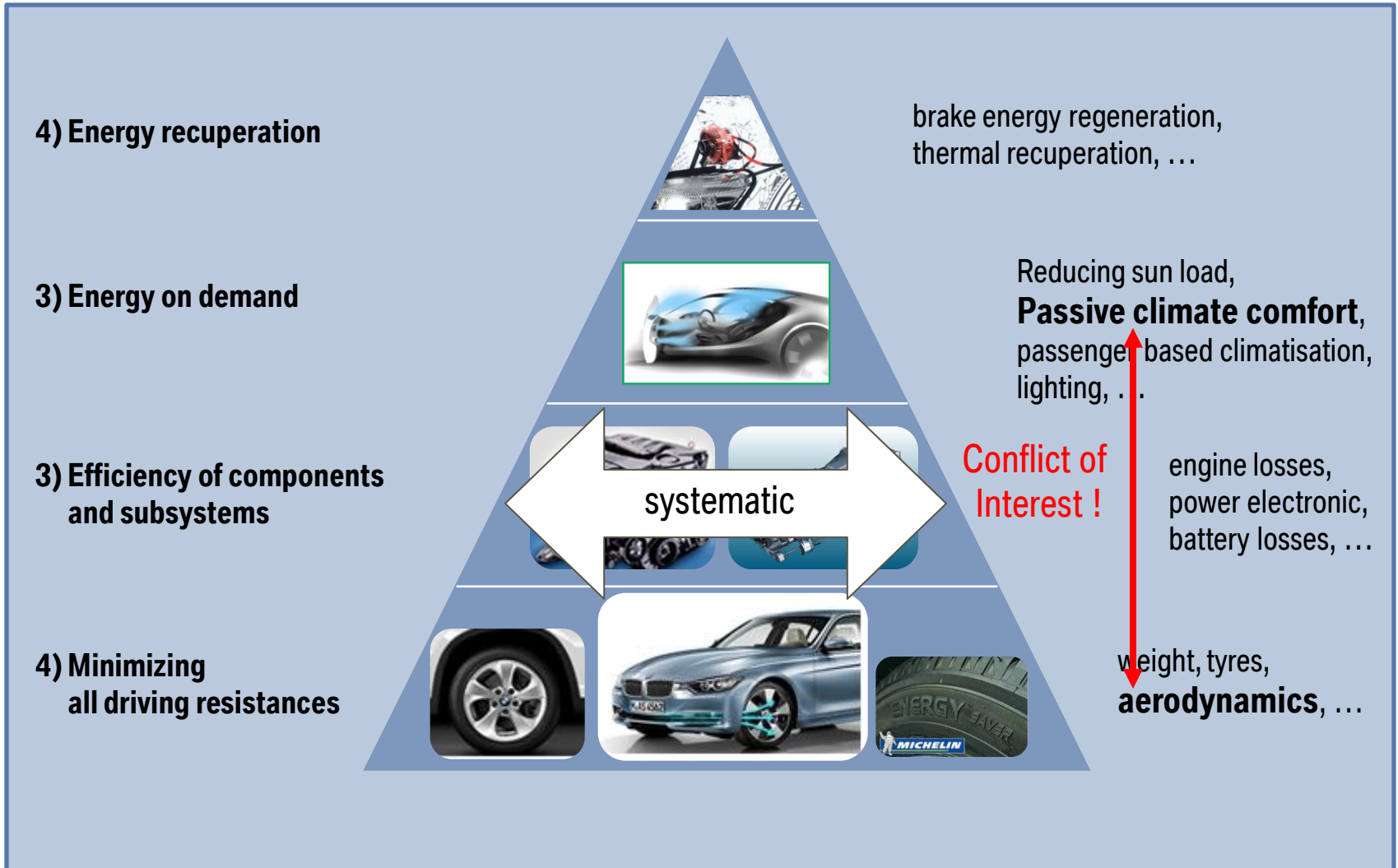
Energy demand for air conditioning:



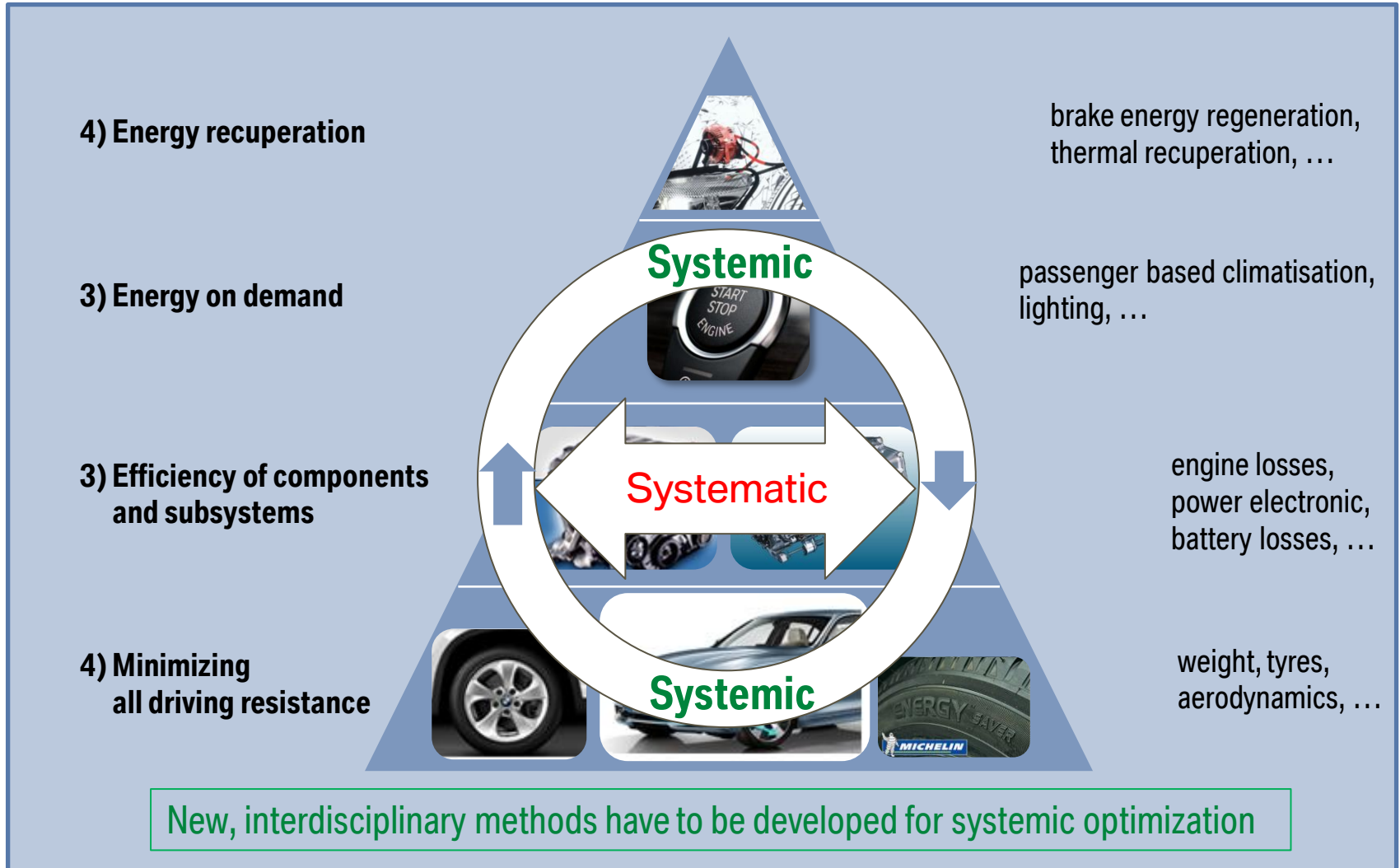
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# SYSTEMATIC OPTIMIZATION WILL LEAD TO CONFLICT OF INTEREST.

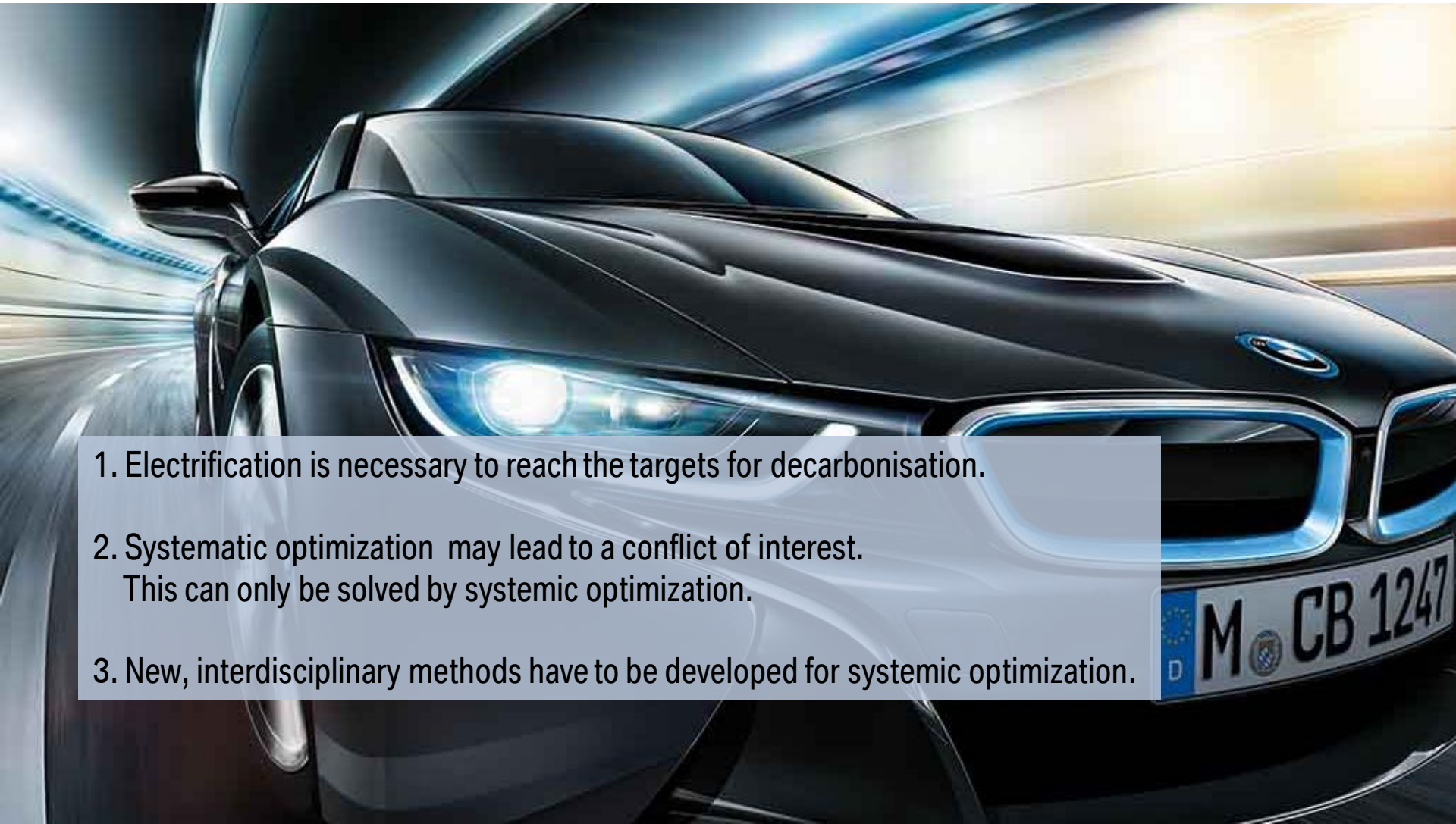


# CONFLICT OF INTERESTS CAN ONLY BE SOLVED BY SYSTEMIC OPTIMIZATION.





# CONCLUSION



1. Electrification is necessary to reach the targets for decarbonisation.
2. Systematic optimization may lead to a conflict of interest.  
This can only be solved by systemic optimization.
3. New, interdisciplinary methods have to be developed for systemic optimization.