Lighter and Safer : a challenge

PSA GROUPE

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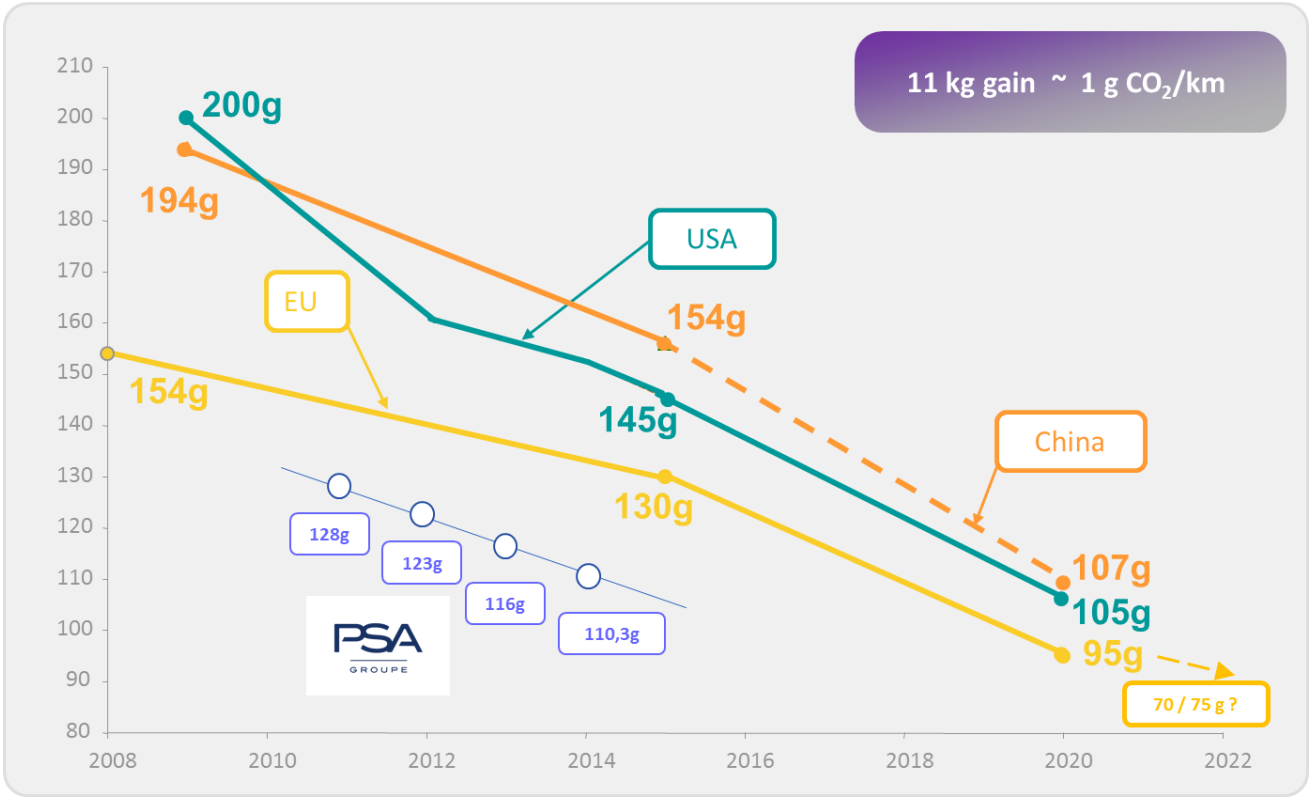
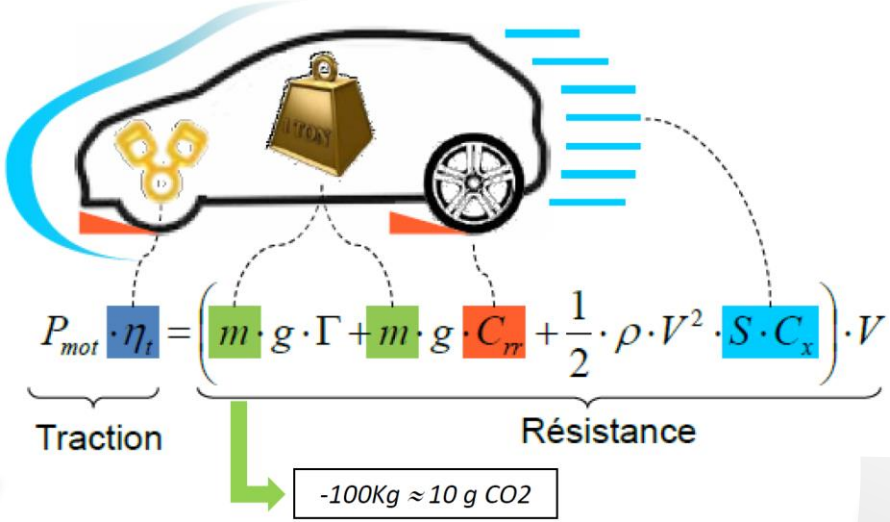
01 Lighter … why?

Worldwide convergence of CO_2 objectives



Main paths for automotive CO_2 reduction



More efficient power train
10% fuel consumption
➔ - ≈13g CO_2

EE management
Energy recovery,
kinetic and thermal

Vehicle weight
-110kg (1 IC)
➔ saving ~10g CO_2

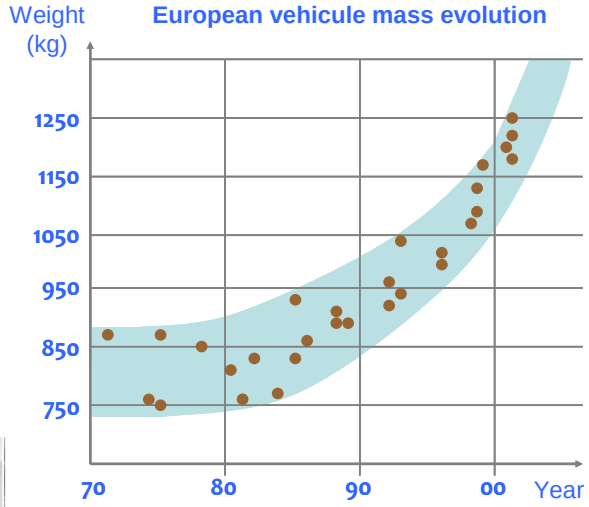
Aerodynamics
SCx ↘ 5dm²
➔ saving ~2g CO_2

Road resistance
- 10%
➔ saving ~2g CO_2

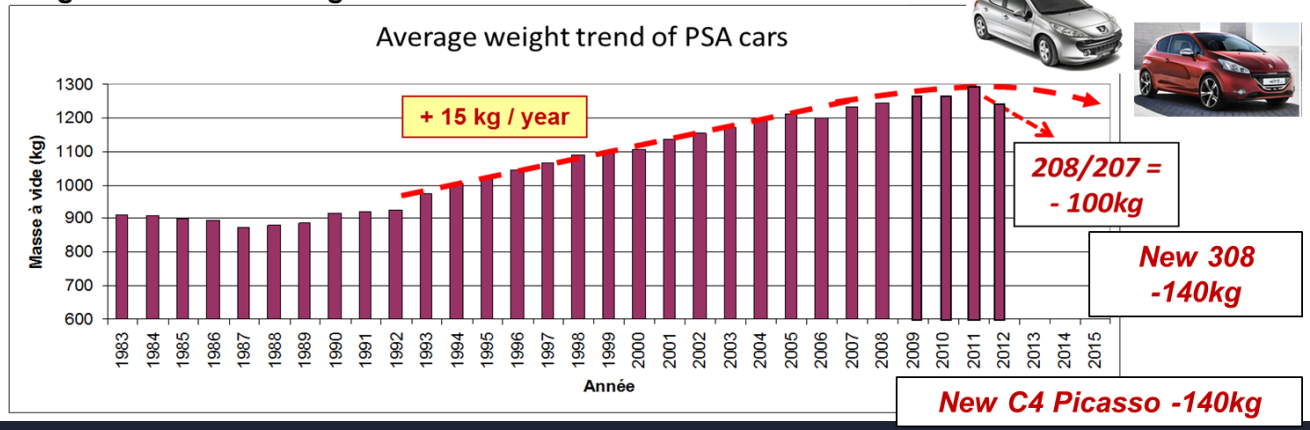
02 Safer

Towards light weight vehicles

- **Security: crash test and increasing passive safety**
- Ride confort
- Convenience, increased car size
- Increasing vehicle size
- Increasing wheels size
- Mix powertrain : Gasoline / Diesel
- More equipments (radio, ABS-ESP, air conditioning syst, elec. seats..)
- Acoustic performance/ NVH & noise insulation

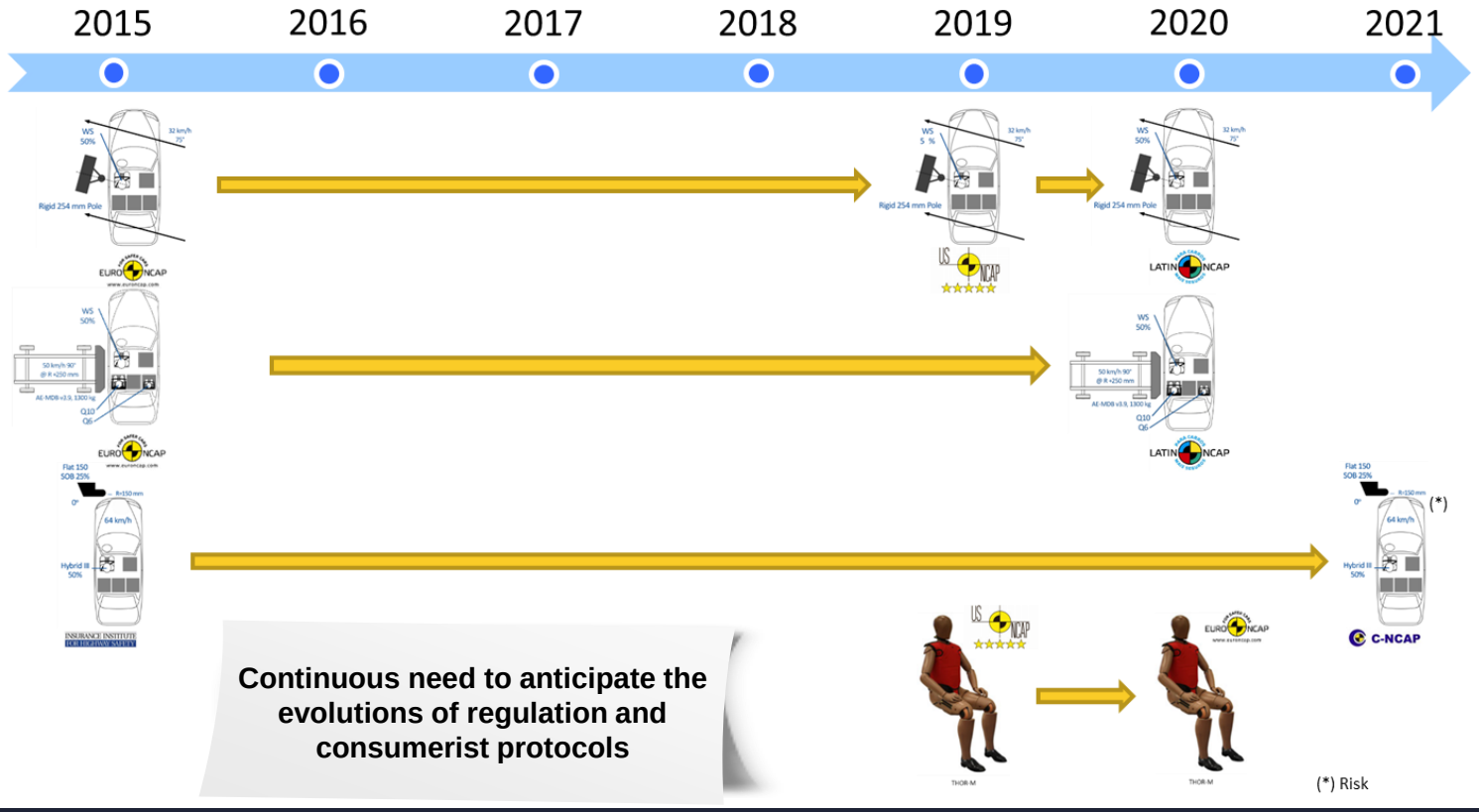


Weight increase of Peugeot and Citroën cars



Tougher standards, aligned on the most severe one

Examples:



Continuous need to anticipate the evolutions of regulation and consumerist protocols

The Challenge

Reduce CO_2 emissions
➔ reduce weight

Increase passive safety
➔ tends to increase weight

Where is the optimal solution ?

2020 MATERIAL TREND

HIGH and VERY HIGH STRENGTH COMPLEXE STEELS

Weight saving potential : **~ 50/70 kg**

material cost = reference = less than 1€/kg

Use all the potential of steel technology

ALUMINUM ALLOYS

Weight saving potential : **~ 150 kg**

Material cost increased
+ Investment impact

Use more aluminum, specially on BIW (powertrain is already in aluminium)

POLYMERS / COMPOSITES

Weight saving potential : **~ 200 kg**

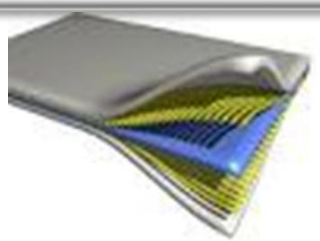
Material cost = x 2 to 10 /ref
+ Investment impact

Study like alternative to aluminum **and start to use composites for structural parts**

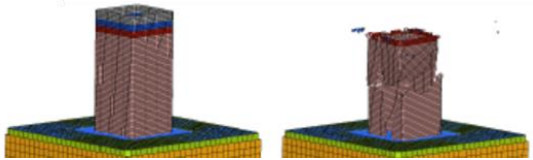
03 The challenge of numerical simulation

Virtual engineering tools for material and process simulation

Material & process choice



Physical behaviour



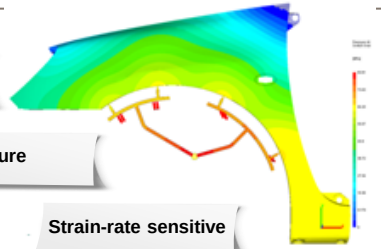
Modelling of NVH, crash, fatigue/damage tolerance

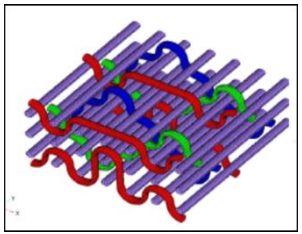
Failure | Strain-rate sensitive | Non linear | Anisotropy

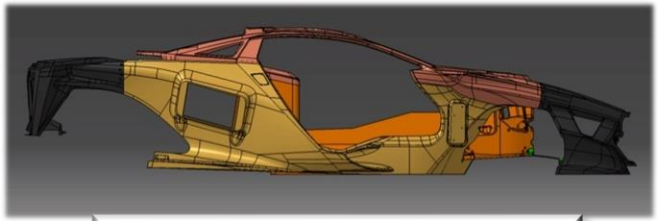
/!\ Testing

Process modelling

Anisotropy | Failure | Strain-rate sensitive | Non linear

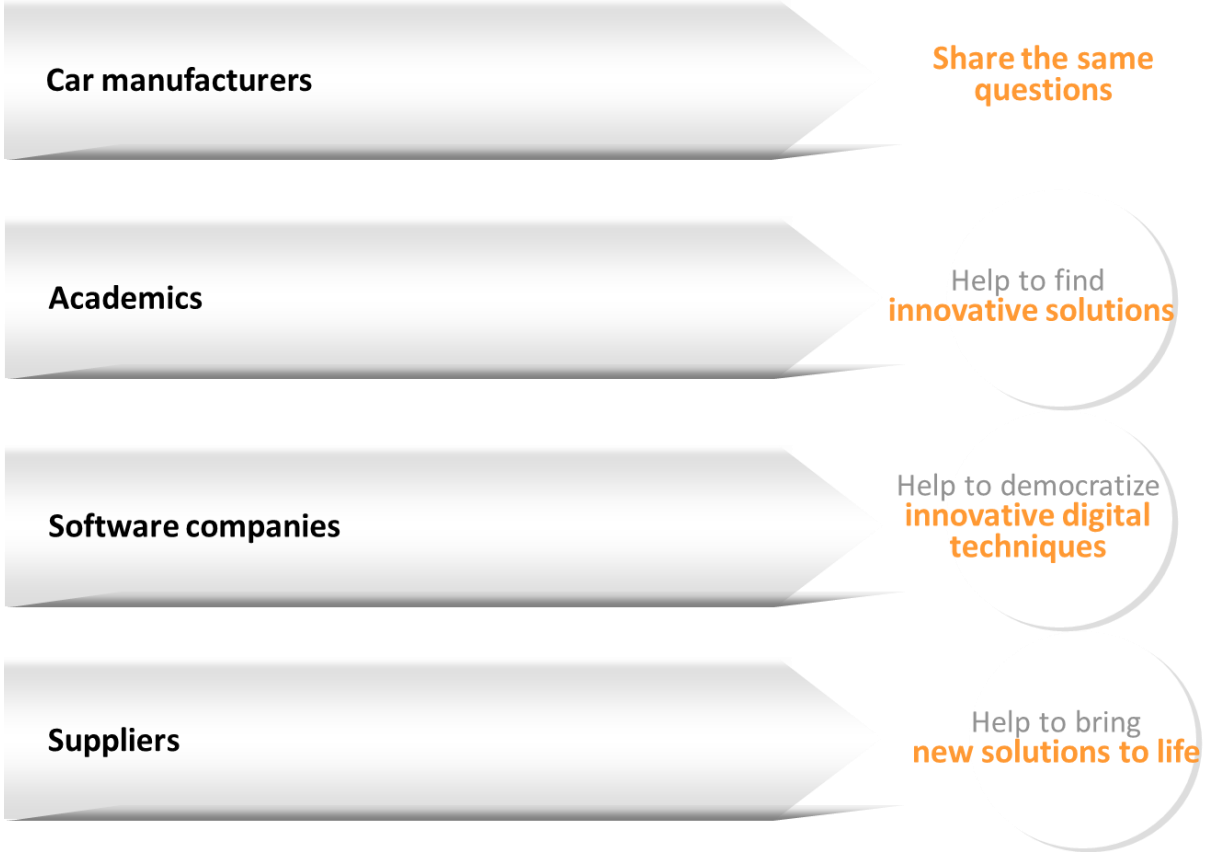






Adapted CAD tools

Developping cooperations and partnerships



Thank you for your attention