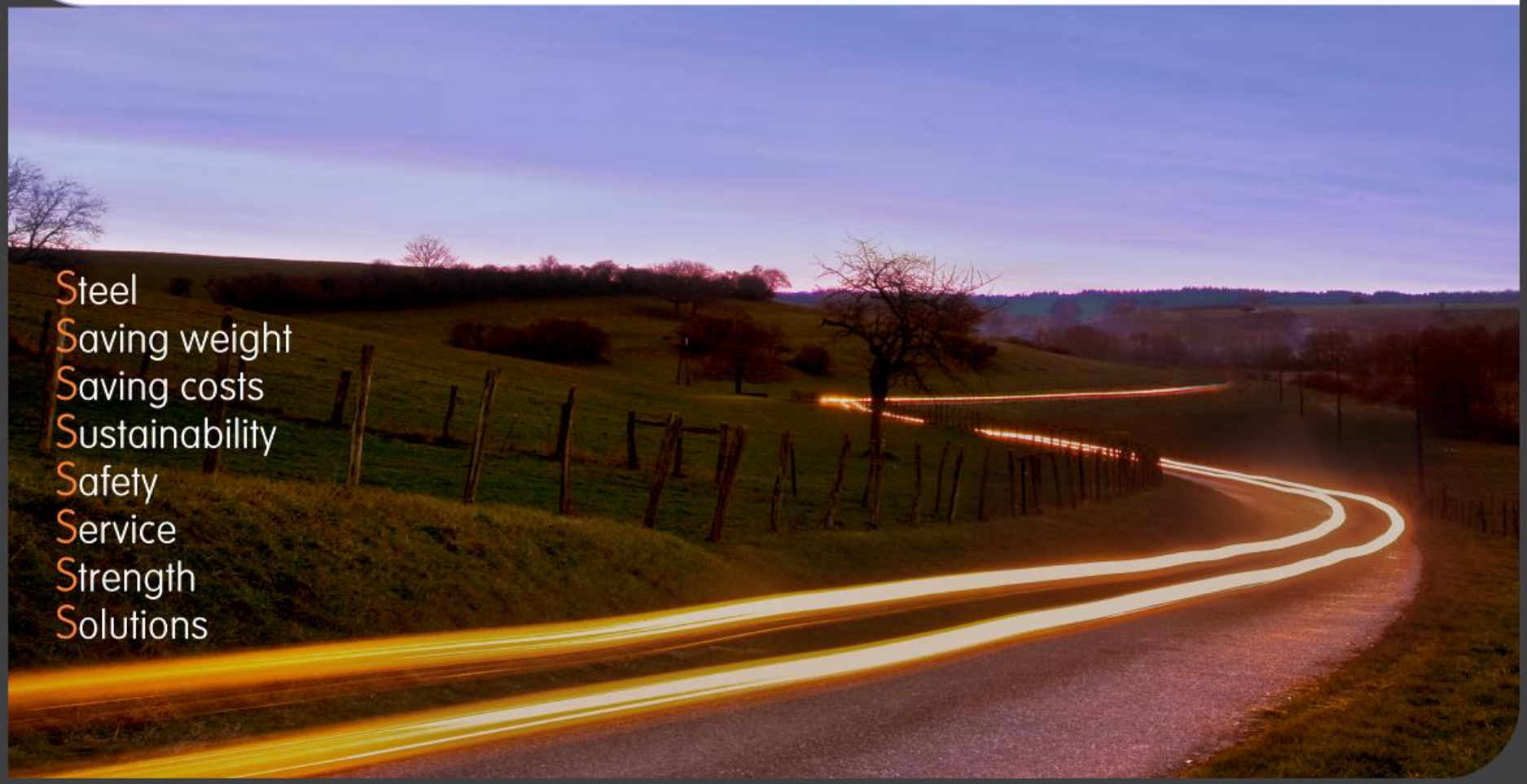
ArcelorMittal

S-in motion



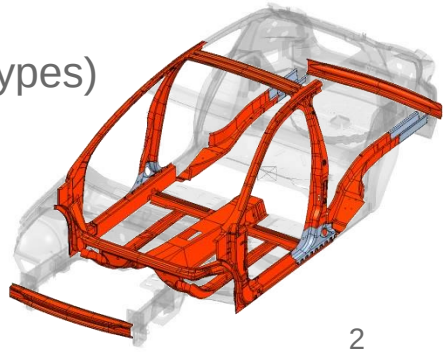
S-in motion

- **Objectives**
  - **Lightest vehicle with currently available AHSS grades** relative to a modern baseline C-class vehicle
  - Build a **catalogue of worldwide solutions** per sub module
  - Including worldwide crash and stiffness requirements & performance ratings
  - **At the lowest possible cost**

- **Use of worldwide available ArcelorMittal products**
  - ⇒ Solutions ready for implementation on new vehicle projects
  - ⇒ Including tubular products, stainless steels, long and forged products

- **Scope** Body In White, Hang on parts and Chassis

- **Worldwide ArcelorMittal R&D teams** involving:
  - **automotive suppliers** (engineering offices, diemakers, prototypes)
  - and industrial partners



Methodology

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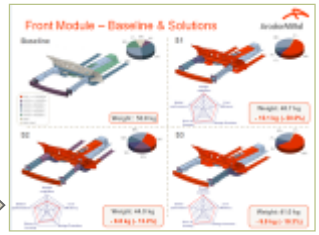
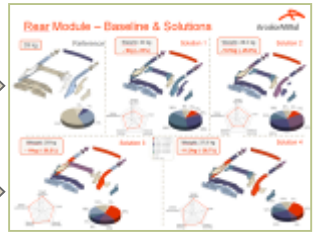
Baseline Meshing
Baseline Set-up

Baseline

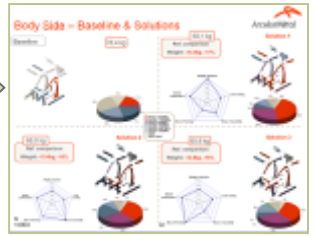
Innovative Design Proposal
Sub-module approach



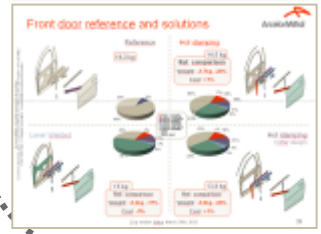
3 Solutions
Front Module
(-10.1 kg)



4 Solutions
Rear Module
(-11.2 kg)



3 Solutions
Body Side
(-13.3 kg)



3 Solutions
Door Module
(-3.7 kg)

Weight Saving Optimization

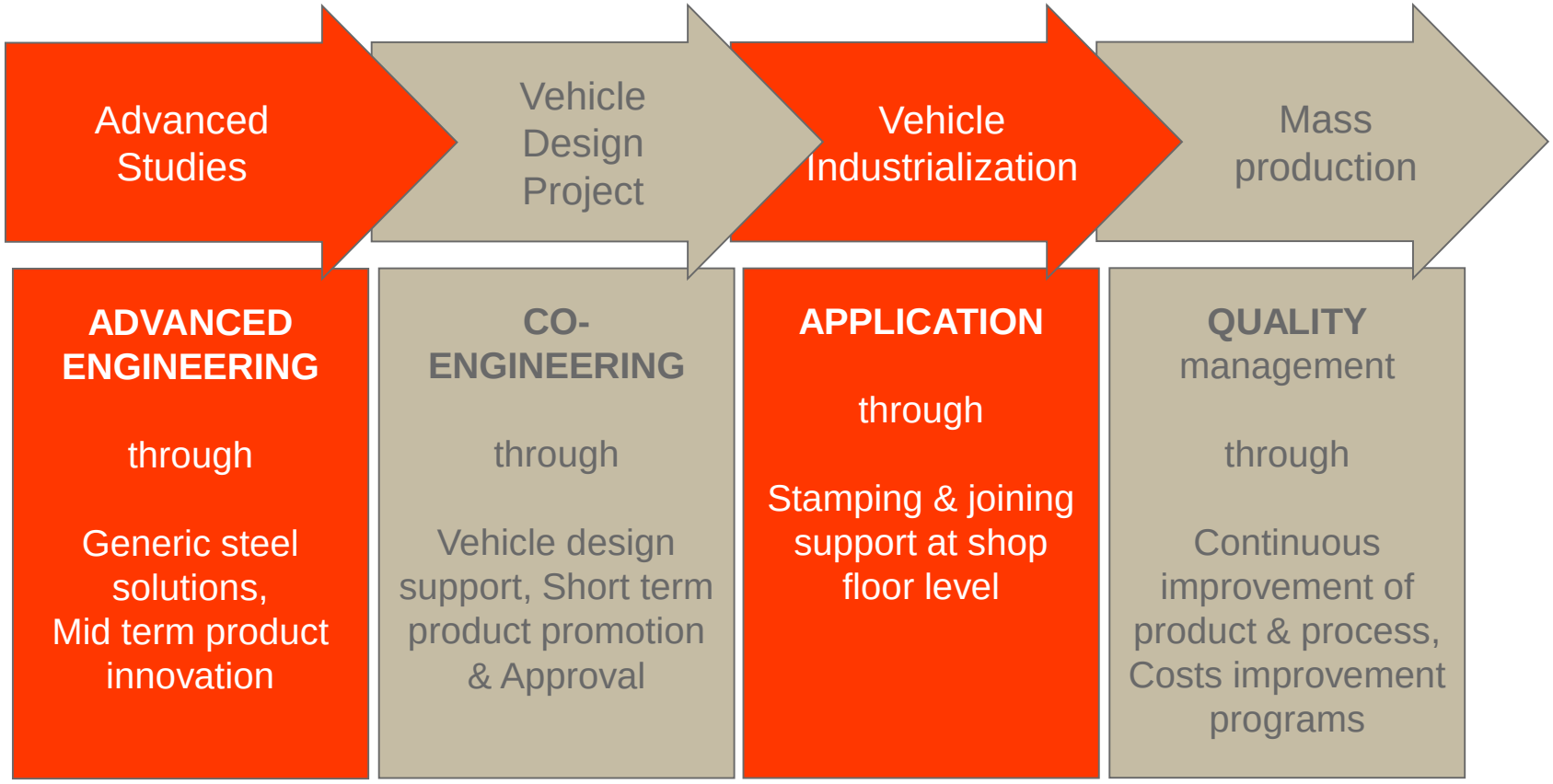
Lightest vehicle

Constraints:

- **5* EuroNCAP**
- **Benchmark level NVH performance**

Support to customers

from advanced engineering to mass production

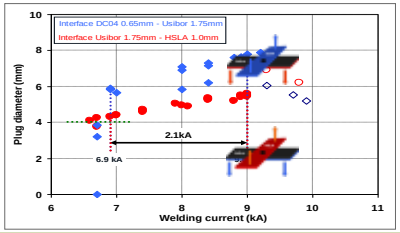


Assembly validation methodology

Weld stackups validation based on ArcelorMittal methodology

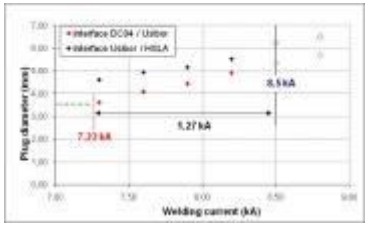
Experimental validation

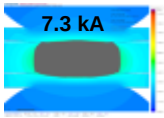
Experimental weldability range and cross tensile tests

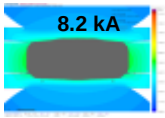


Numerical validation via Sorpas

Numerical weldability range

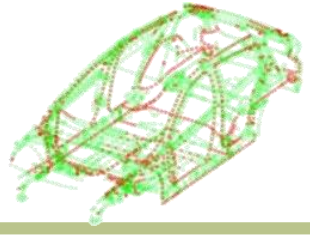


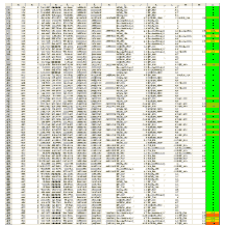




OEM acceptance criteria

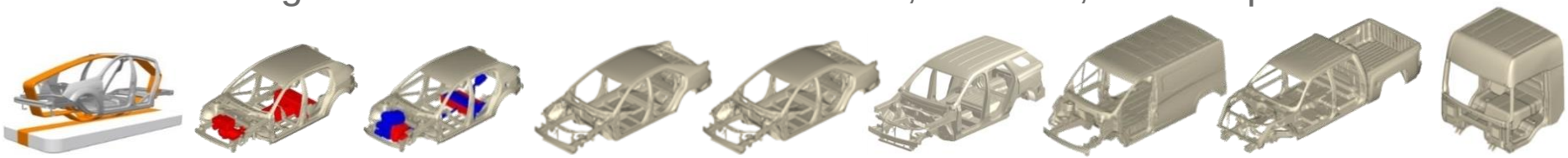
Exhaustive assessment





S-in motion® suite of lightweighting solutions

› ArcelorMittal generic steel solutions include BIW, closures, chassis parts and seats



S-in motion® ICE C-Segment	S-in motion® Electric C-Segment	S-in motion® Plug-in Hybrid C-Segment	S-in motion® D-Segment *EU market*	S-in motion® Mid-size Sedan *NA market*	S-in motion® Mid-size SUV	S-in motion® Light Commercial	S-in motion® Pick-up Trucks	S-in motion® Truck Cabs
-70kg (-18%) vs current ICE baseline	-60kg (-15%) vs current ICE baseline	-50 kg (-16%) vs current PHEV baseline	-98 kg (-25%) vs BIW and closures current baseline	-86 kg (-23%) vs current Mid-size sedan baseline	-102 kg (-20%) vs current SUV baseline	-45kg (-20%) About 140 parts upgraded	-174 kg (-23%) vs current Pick-up baseline	-54 kg (-17%) vs current cab baseline

Steel grades breakdown - BIW & Crash management system

✓ Baseline

36% AHSS

Processes

- Hot stamping 4 parts
- Stamping of LWB 8 parts
- Roll forming 1 part

300 kg

S- in motion

✓ Solution

54% AHSS

Processes

- Hot stamping 29 parts
- Stamping of LWB 16 parts
- Roll forming 2 parts

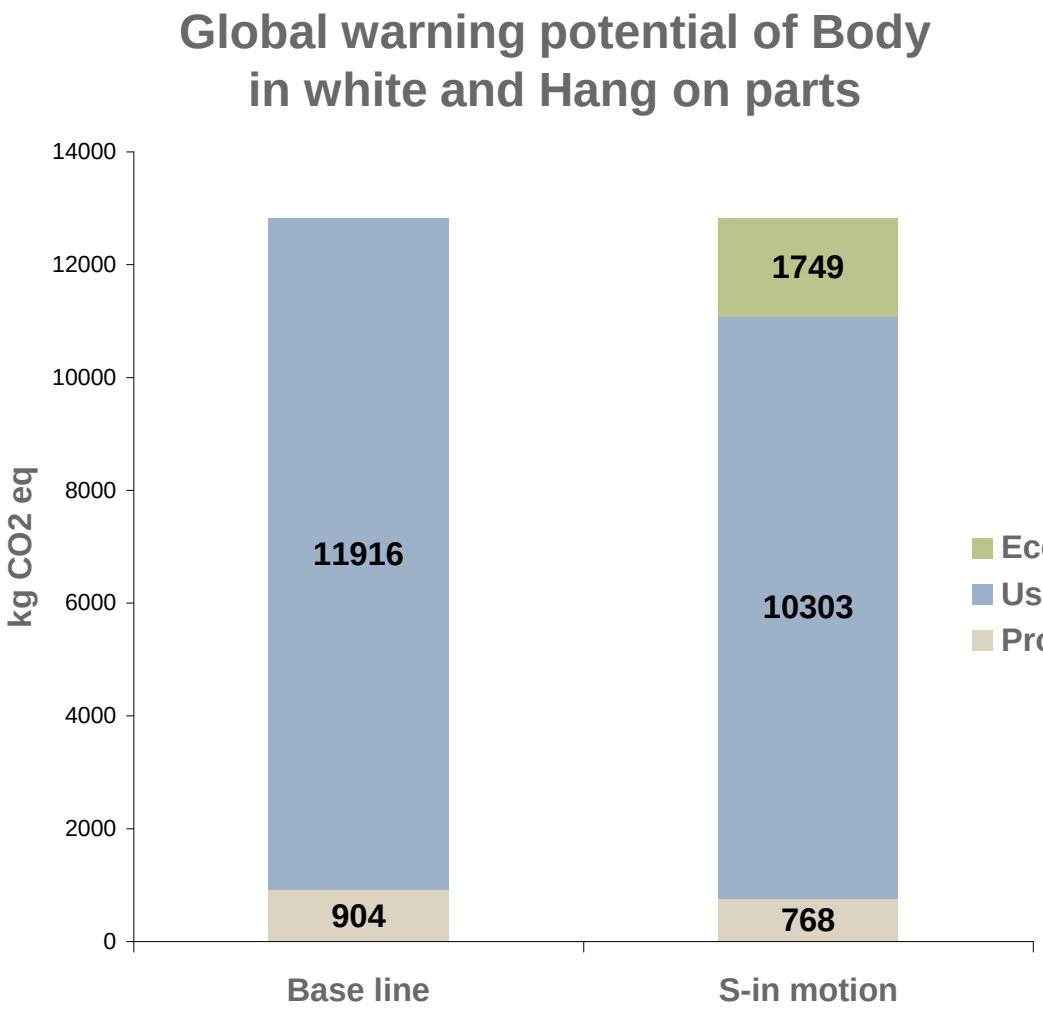
259 kg

Worldwide Modules Catalogue

Comparison of all solutions per module and sub-module in terms of:

- performances
- weight reduction
- freedom design
- cost efficiency
- assembly compatibility

Life Cycle Analysis Results



Reduction in GHG emissions during the use phase of the whole vehicle
→ **6.23 g CO_2 / km**

Use phase
- Fuel used: gasoline
- Lifespan: 200 000 km
- Fuel consumption: 6.6 l/100 km

Lightest BIW: Cost Summary

Weight saving is achieved at neutral cost !