

ArcelorMittal Multi Part Integration™ for Scalable Vehicle Architectures for Multiple Powertrains

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GREAT DESIGNS IN
STEELTM

OEM Challenge Yesterday & Tomorrow

GDIS

1990

Vehicles on road

193 M

LV sales per year

13.8 M

Models for sale

300

Vehicles produced

9.8M

cars

trucks

SUVs

2,200 – 5,500 lbs

10 - 15

0

20.2 – 27.5 mpg

<500 MPa

2030

290 M

16.4 M

530

15.5M

2,800 – 6,500 lbs

20+

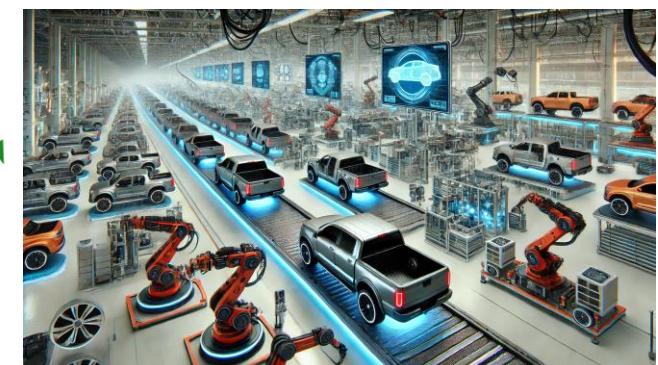
11

50.4 mpg

> 800 MPa

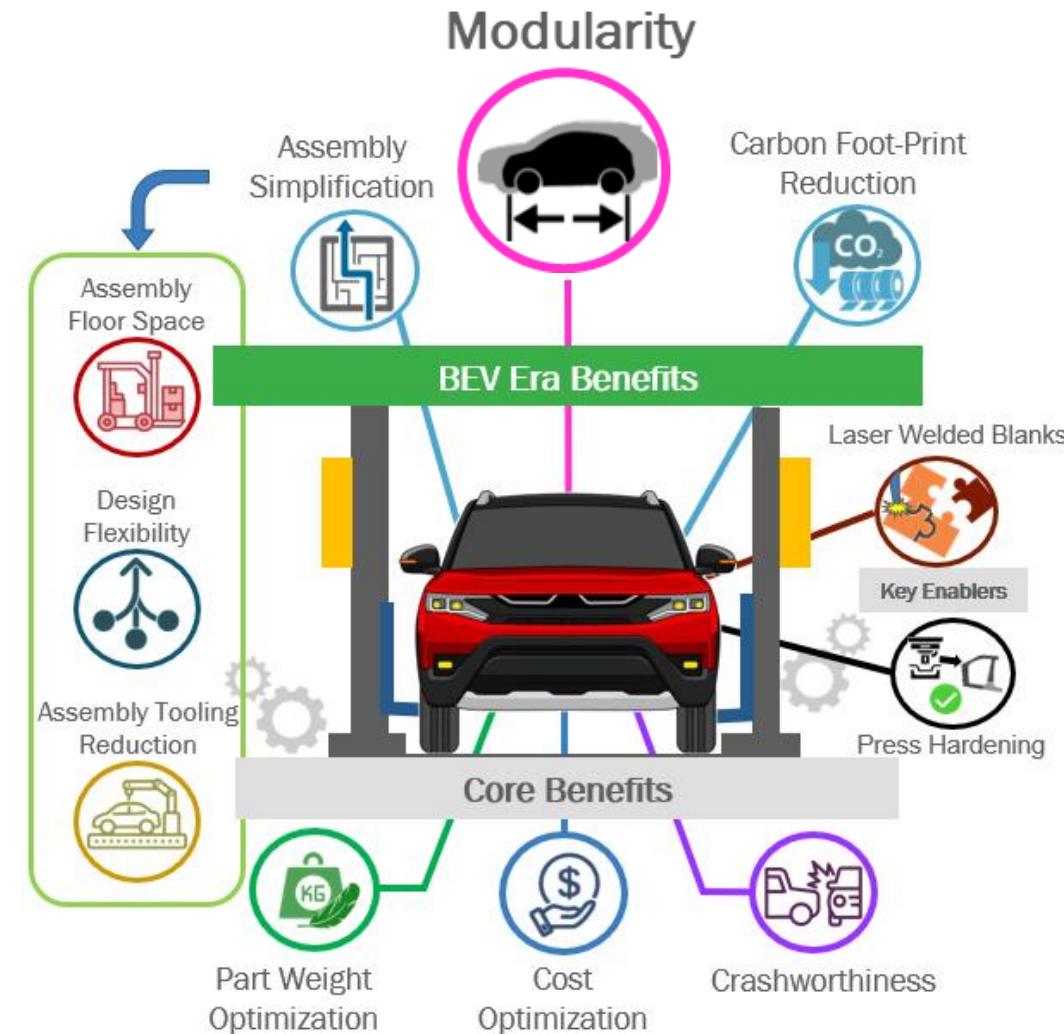
Data For NA Market

Steel has played a pivotal role in offering crash safety, lightweighting and cost-effective solutions

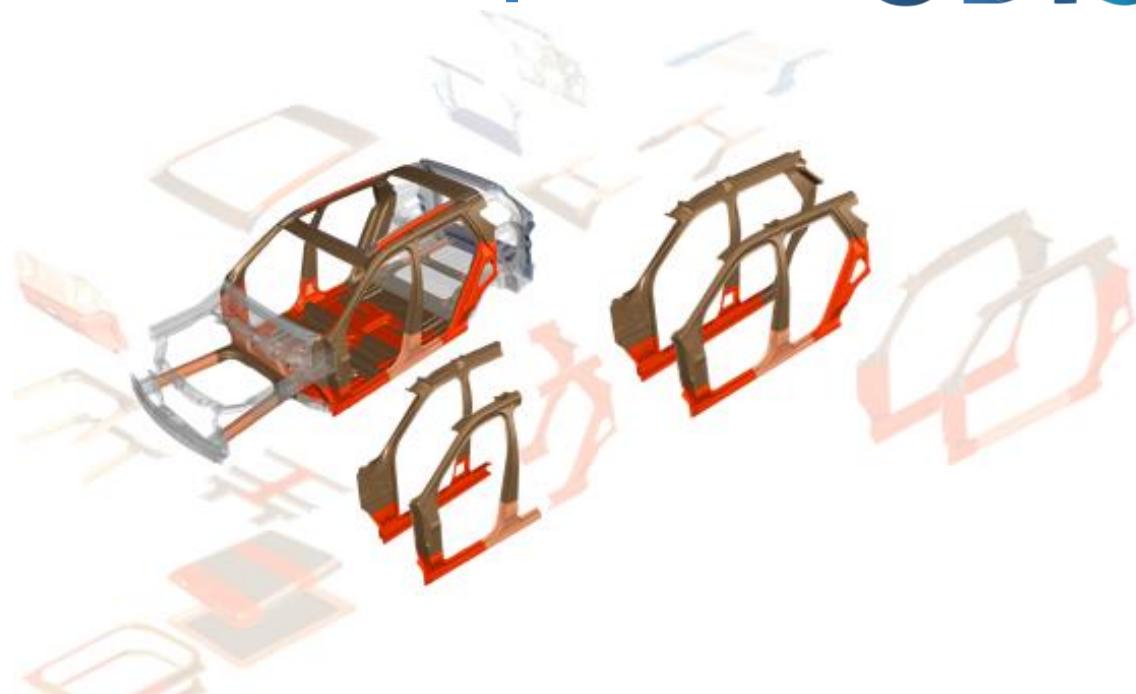


ArcelorMittal Multi Part Integration™ Concepts

GDIS



- PHS 2000
- PHS 1500
- PHS 1000
- AHSS
- HSS
- Mild steel



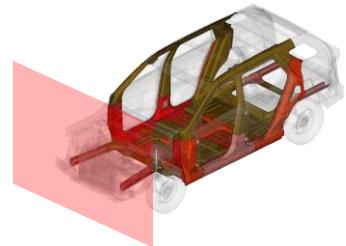
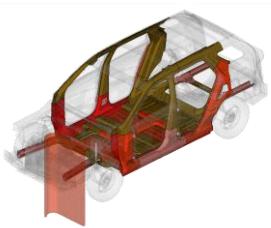
MPI concepts show promise to meet the key challenge of part consolidation & crash safety

DDR MPI Concept Validation – Crash Load Cases

GDIS

IIHS SORB

FMVSS 208 Full Frontal



FMVSS 214 50th Pole

FMVSS 214 5th Pole



IIHS Side Impact

FMVSS 301 Rear Impact



- PHS 2000
- PHS 1500
- PHS 1000



Crashworthiness

Source: [IIHS Vehicle ratings](#)

1-2: 2024 Jeep Grand Cherokee (ICE)

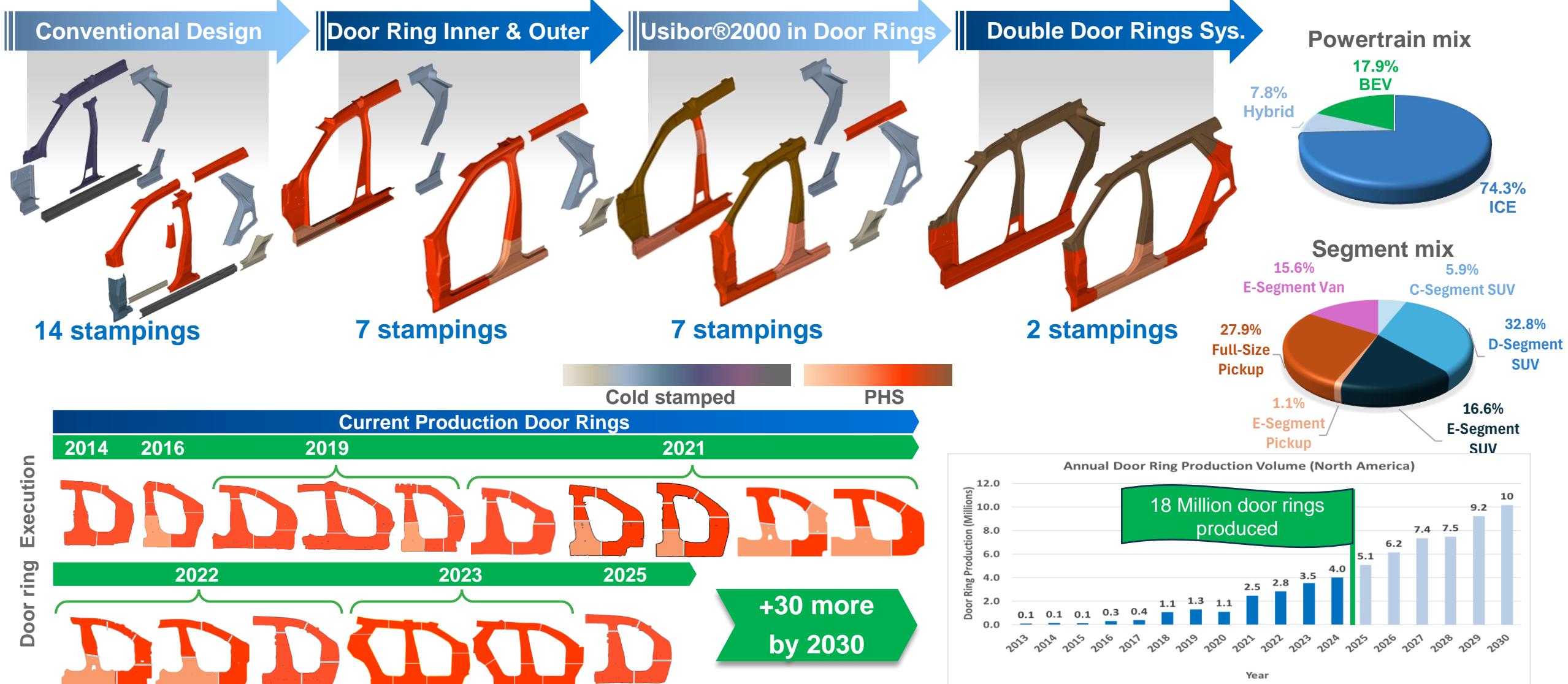
3-4: Volvo XC90 (PHEV)

5-6: Volkswagen ID.4 (BEV)

DDR MPIs play a critical role in vehicle safety with the updating needs of modern vehicles & standards

Door Ring Evolution + Current Door Rings in Production

GDIS



OEMs have implemented multiple Door Rings across multi-powertrains & vehicle sizes

AMTB Vision: Door Ring Modularity Evolution

GDIS

2014 - 2017

2018 - 2024

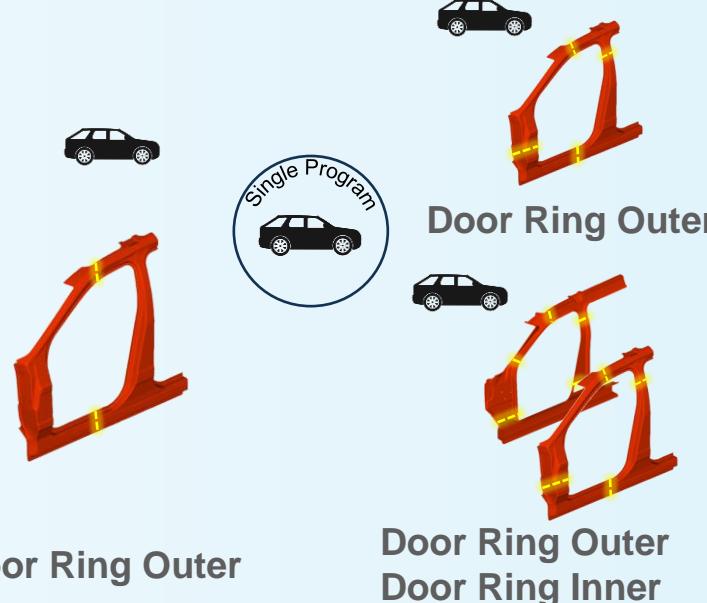
2025 - 2029

2030+...

Current design architecture

Future Architecture Vision

PHS 2000
PHS 1500
PHS 1000



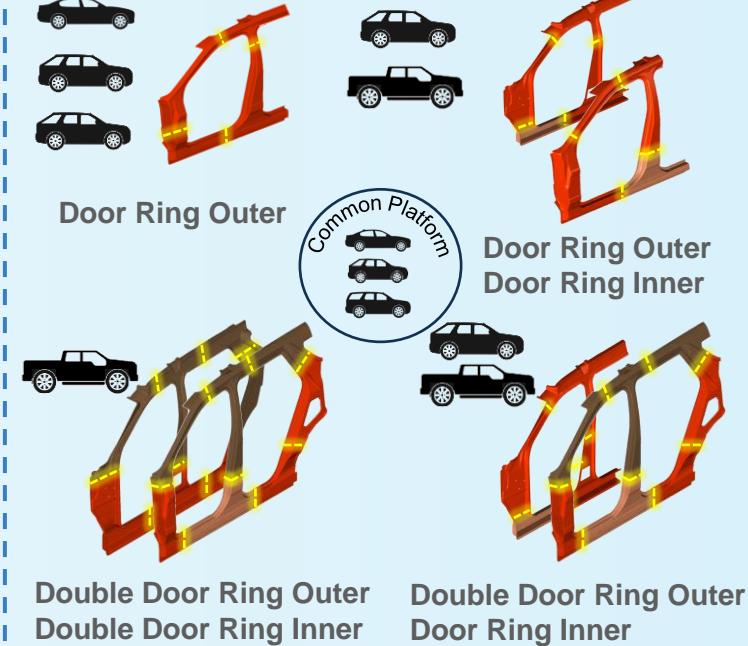
Vehicle Type SUV - Minivan SUV - Minivan - Truck

Segment D D

Category Luxury Luxury - Mass Market

Volume Low - Med Low - Med - High

Powertrain ICE ICE & BEV



Sedan, CUV, SUV, Truck, Minivan



Modular Double Door Ring Outer
Modular Double Door Ring Inner

Sedan, CUV, SUV, Truck, Minivan

B C D

Luxury, Mass market

Low, Med, High

High

ICE & BEV ICE & BEV ICE & BEV

AMTB visualizes future double door ring as a common modular part design across powertrains

Side Structure Part Modularity

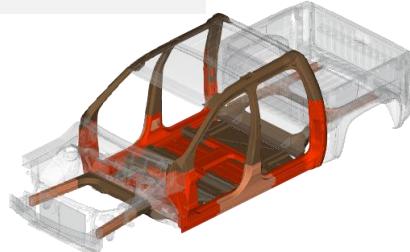
GDIS

NBEV SUV

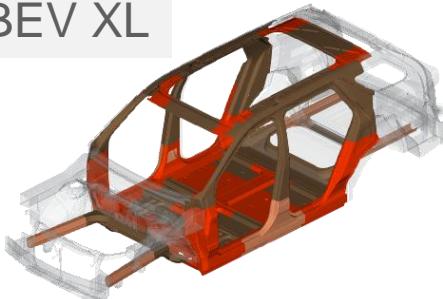


PHS 2000
PHS 1500
PHS 1000

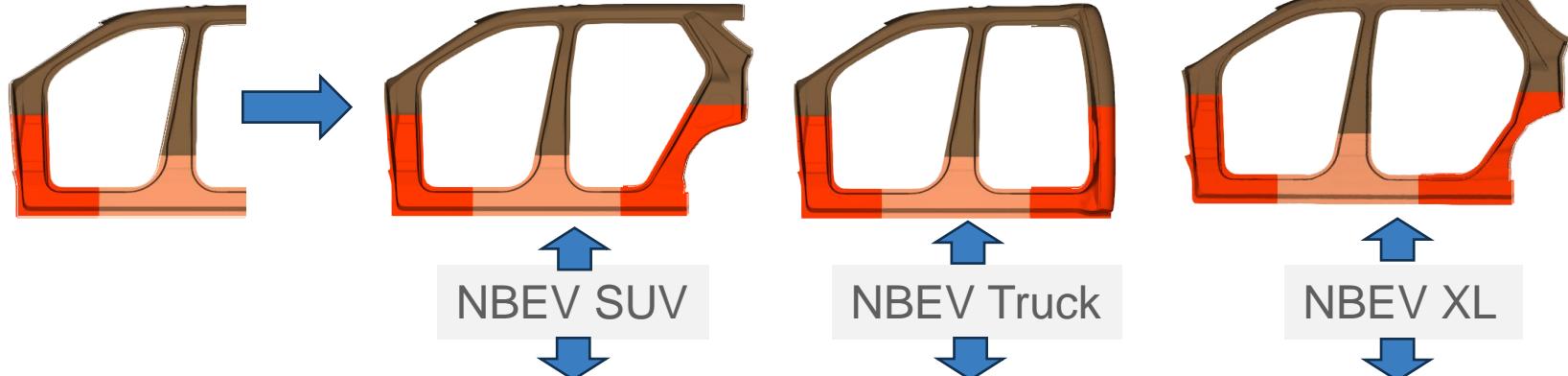
NBEV Truck



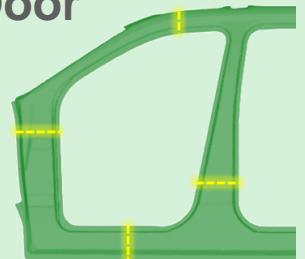
NBEV XL



Door Ring Outer + 3 C-Pillar Variations = 3 Double Door Ring (DDR) MPIs



Common Door Ring



+

2 unique sub blanks for each vehicle



Mass Optimization



Assembly Tooling Reduction



Design Flexibility



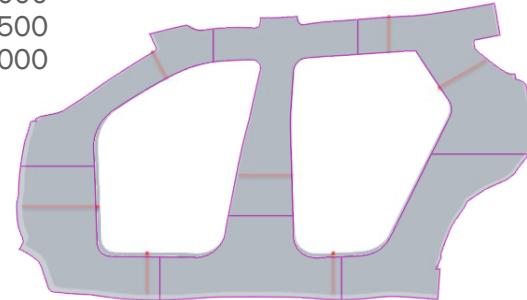
Modularity

DDR MPI design allows application across segments with high modularity

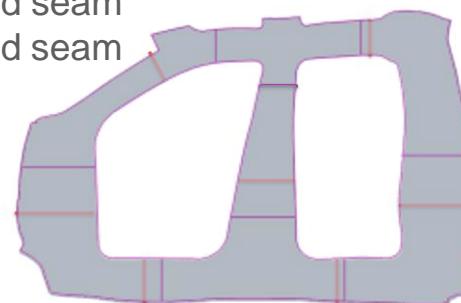
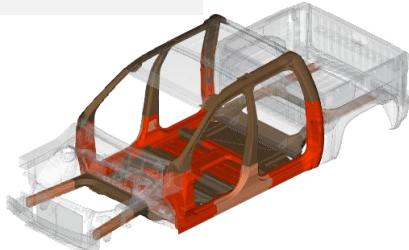
Modularity Benefits – DDR Weld Tool Commonization

GDIS

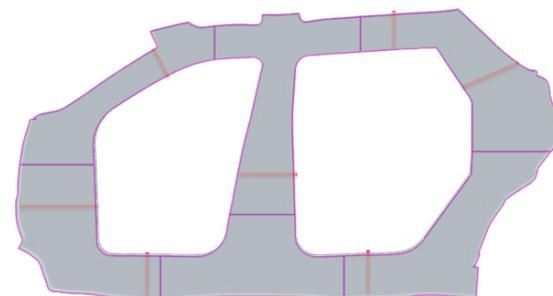
NBEV SUV



NBEV Truck



NBEV XL



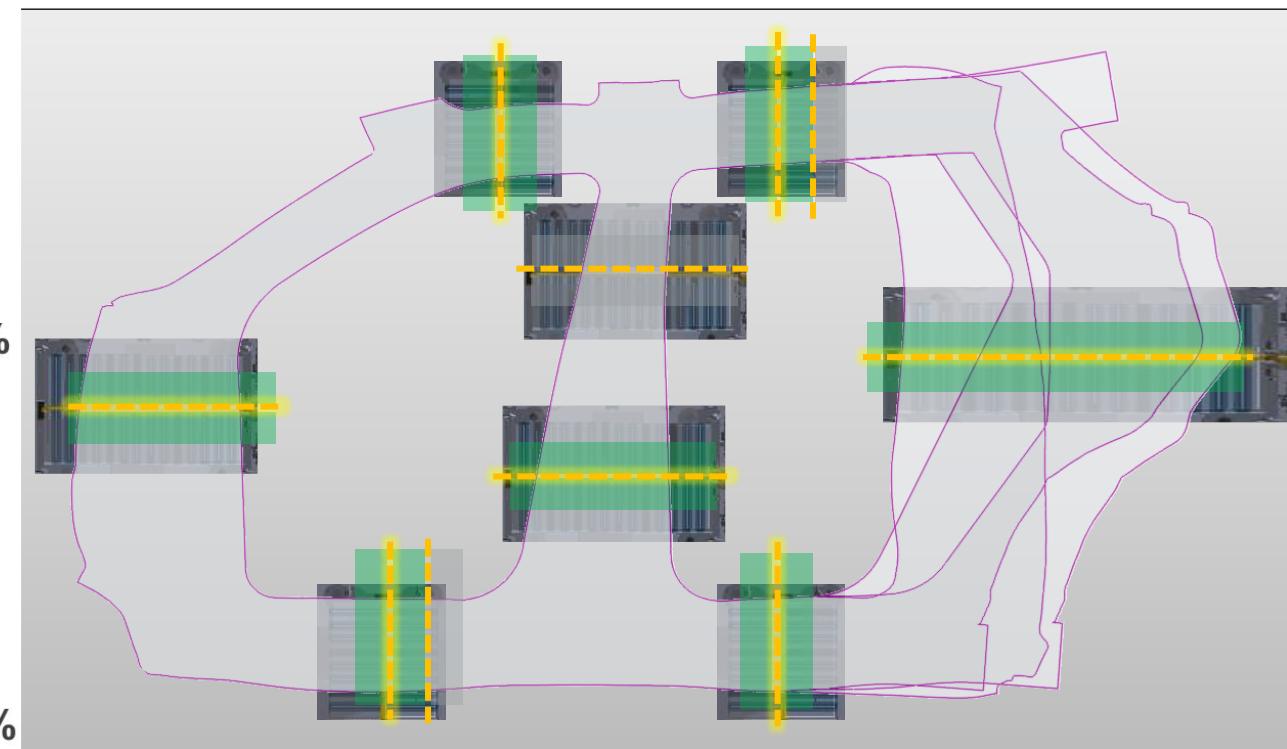
PHS 2000
PHS 1500
PHS 1000

— Unoptimized seam
— Optimized seam

67.3%

70.2%

67.5%



Representative Weld Tool



Mass Optimization



Investment Reduction



Design Flexibility



Modularity

We need flexible weld tooling to achieve Door Ring Modularity

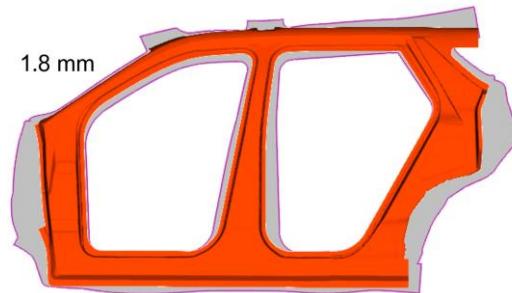
Modularity benefits – Gauge-Grade Flexibility

GDIS

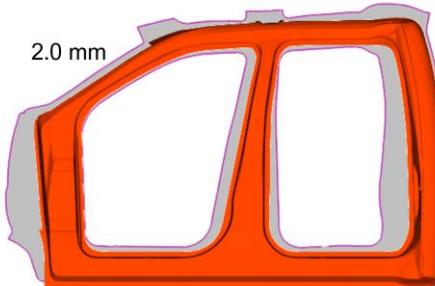
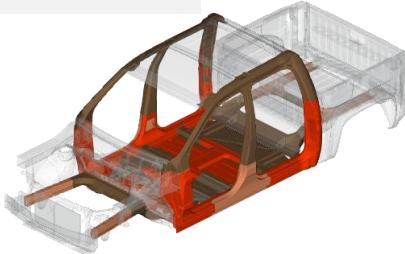
NBEV SUV



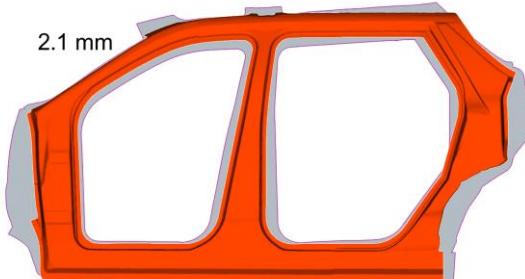
PHS 2000
PHS 1500
PHS 1000



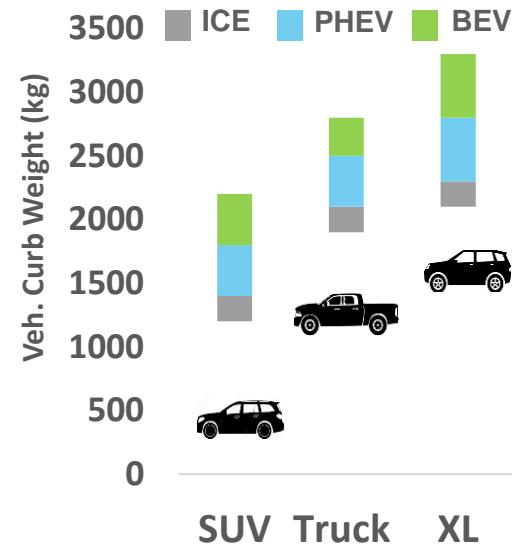
NBEV Truck



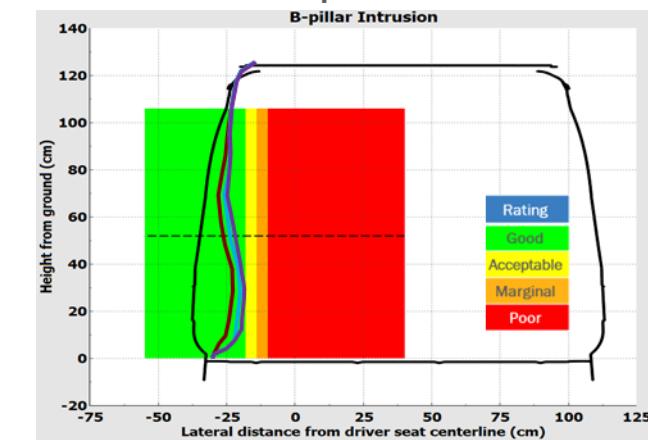
NBEV XL



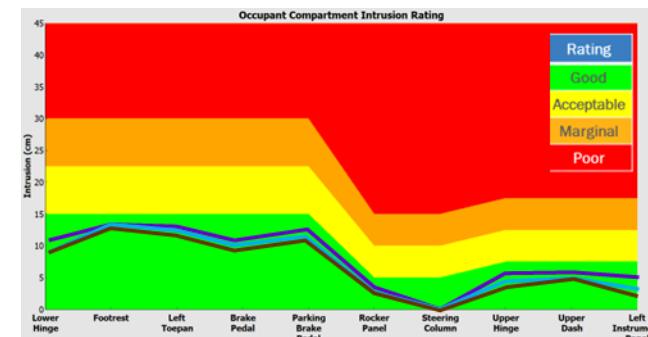
Powertrain variants



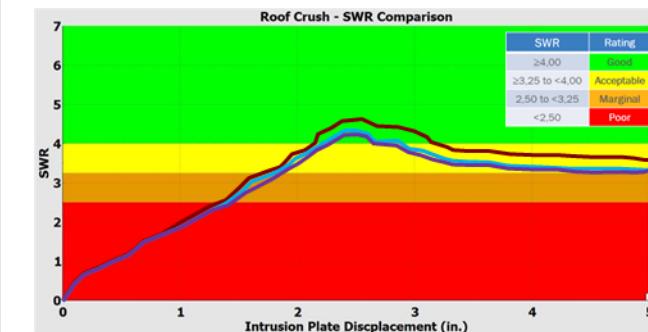
IIHS Side Impact Intrusions



IIHS SORB Intrusions



Roof Crush SWR



Local patches might be needed to meet crash while keeping the door ring common

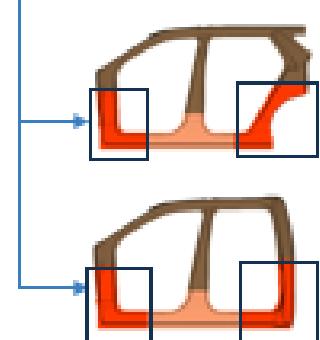
Modular Laser Welded Blanks with unique gauge and grade tuning will help meet crash requirements

Modularity Through DDR Supply Chain

GDIS

Vision for the Future!

Material Coils



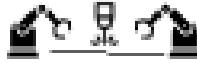
Common Material Coil

Blanking



Common Blankning Dies

Welding



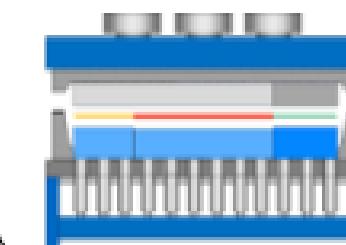
Common Weld Tooling

Hot Stamping

How do we achieve modularity in Hot stamping?



Pressure Controlled Hardening (ANDRITZ Schuler)



Laser Cutting

How do we achieve modularity in laser cutting?

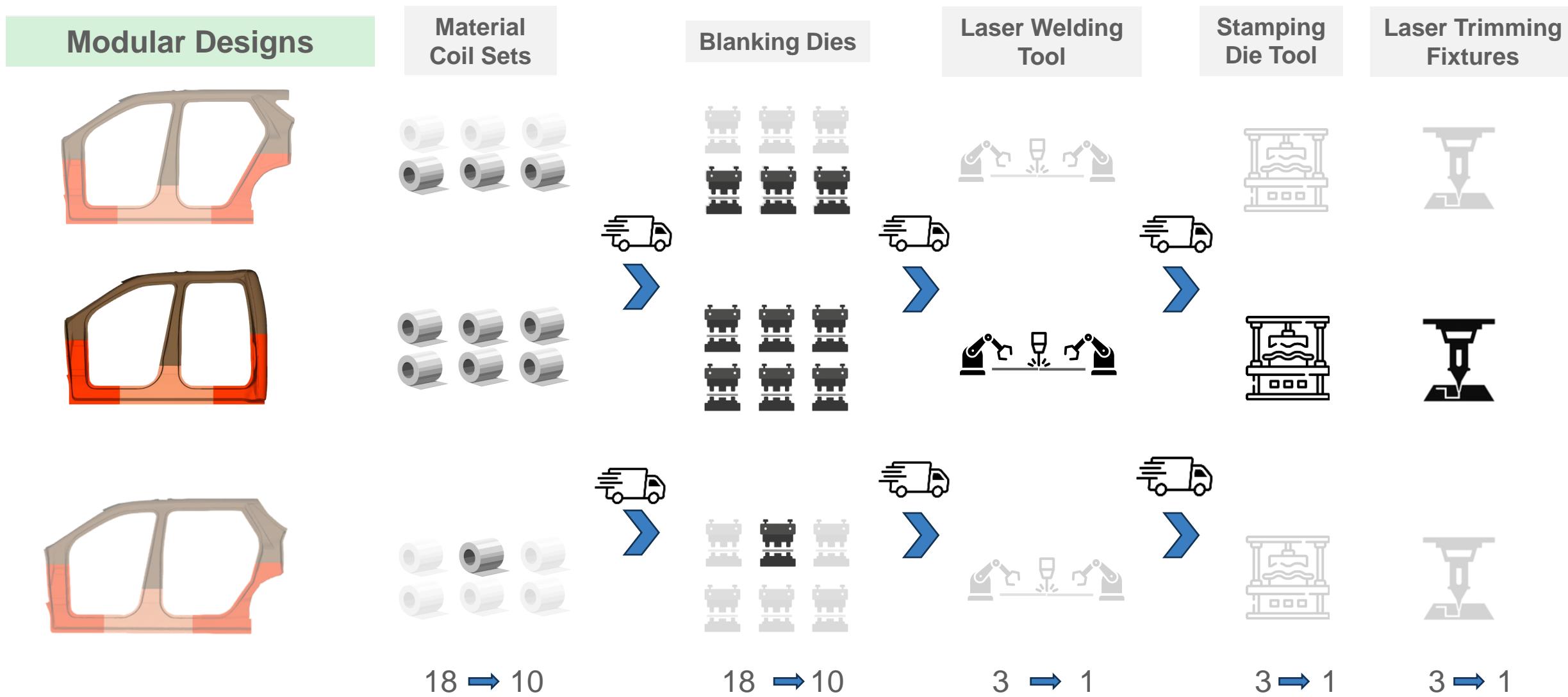


Automatic Fixture Exchange (Shape Process Automation)

Modularity across the supply chain will enable OEMs integrate door rings across their platforms

Modularity benefits – Streamlined Supply Chain

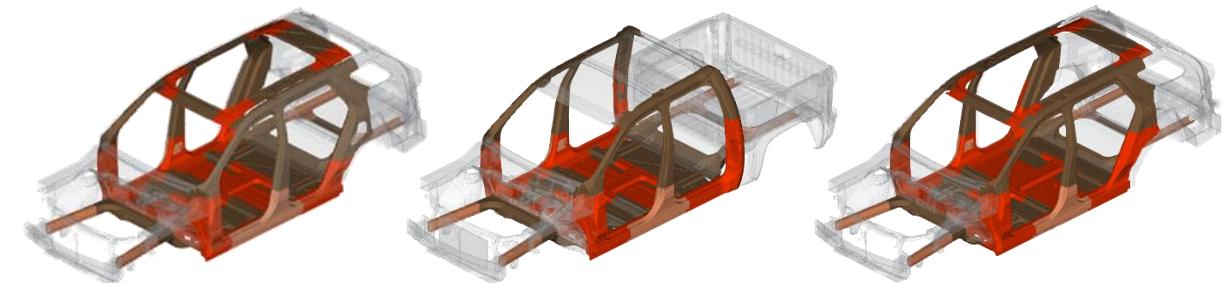
GDIS



Modular designs can significantly simplify the supply chain reducing upfront OEM investment for tooling

Modularity benefits – Costs & Sustainability

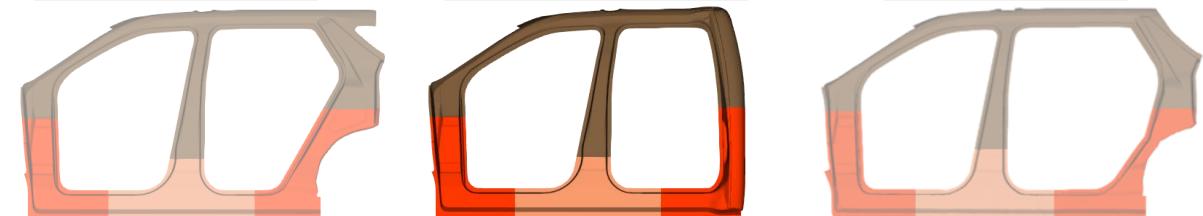
GDIS



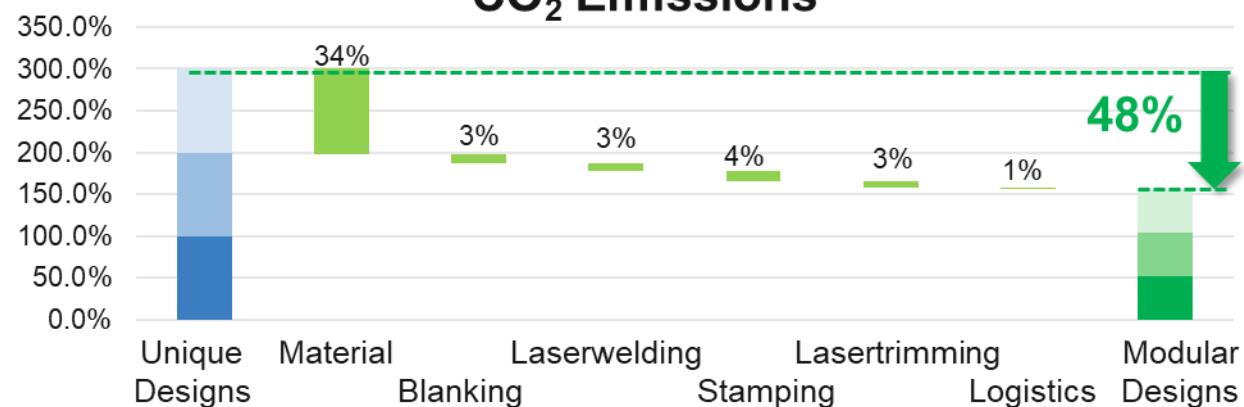
NBEV SUV

NBEV Truck

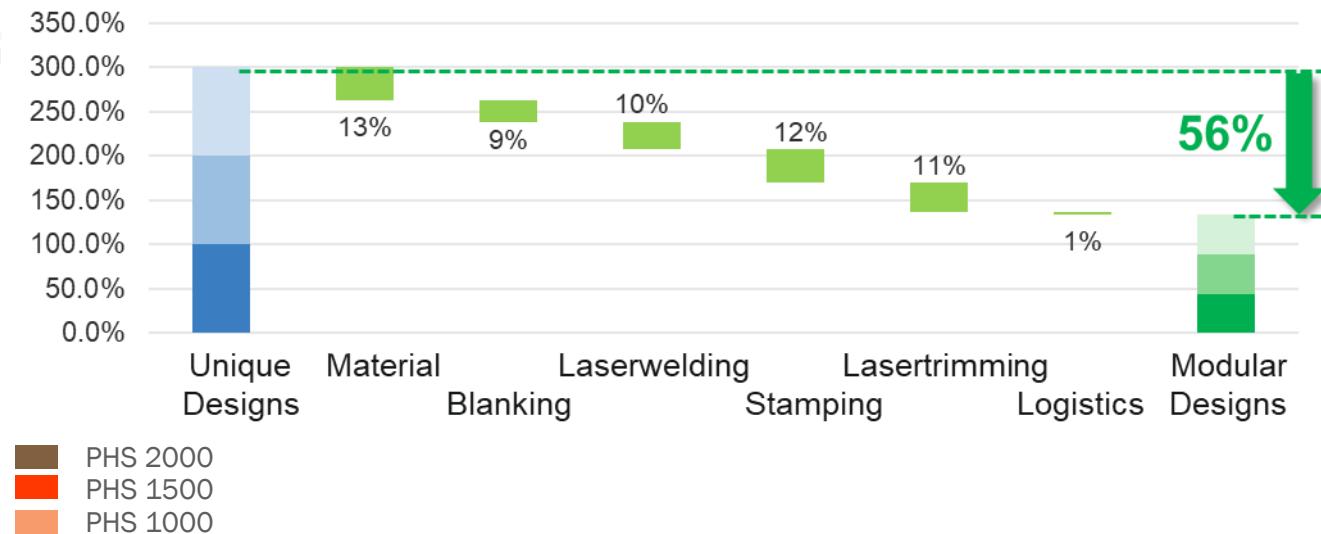
NBEV XL



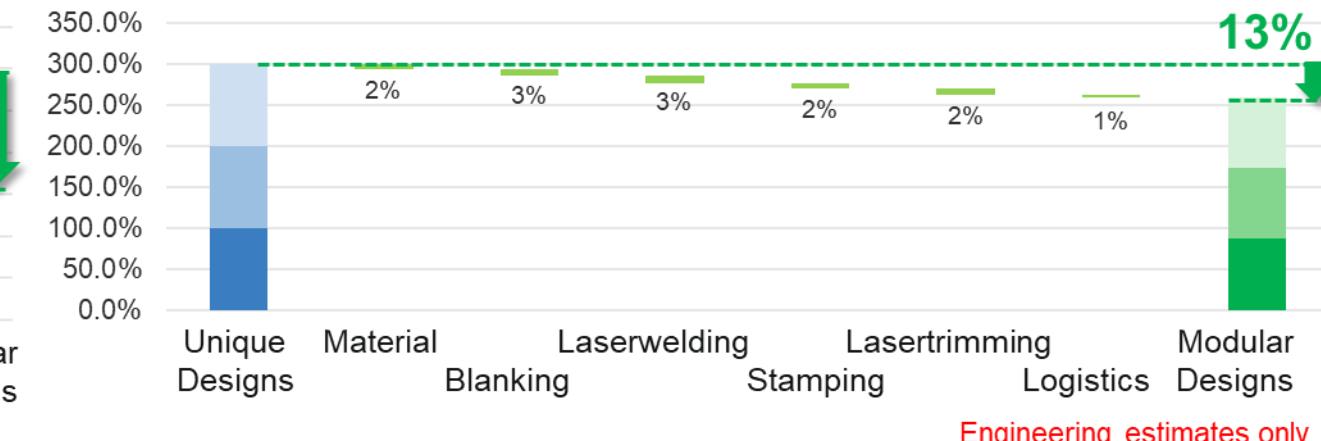
CO₂ Emissions



Investment Costs



Part Production Cost



Engineering estimates only

Modularity in Double Door ring designs supplements the benefits of LWBs

Achieving economies of scale without limiting consumer choice



Reimagine Assembly

Multiple vehicles and power-trains on one assembly line



Common Underbody

To achieve scalability, modularity and efficiency



Modular DDRO & DDRI

Provide crashworthiness and can enable commonization



Collaboration

Co-Engineering the Future



Spread Investment

Lowers cost without limiting choice



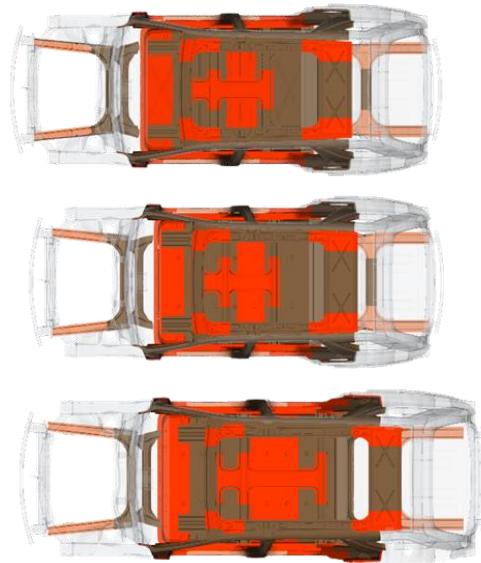
Commonality

Modularize all possible manufacturing steps

Unlearn the past to envision the future

Future Role of MPIs in Modular Architecture

GDIS

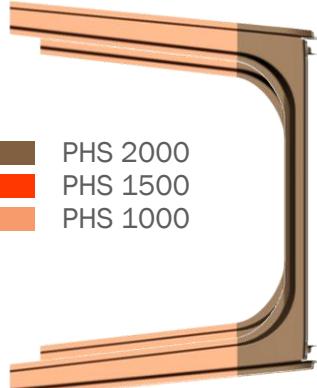


NBEV SUV

NBEV Wide

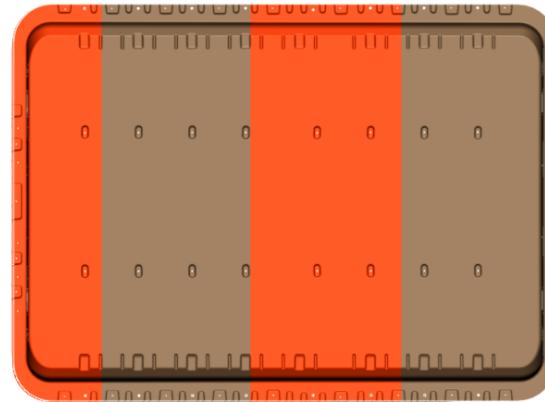
NBEV XL

Front U-frame Upper

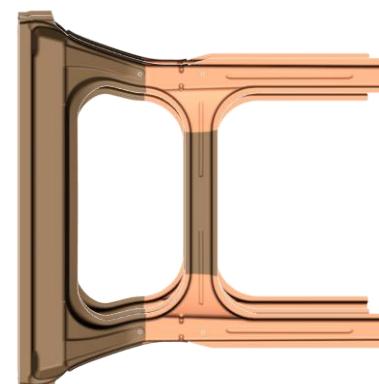


■ PHS 2000
■ PHS 1500
■ PHS 1000

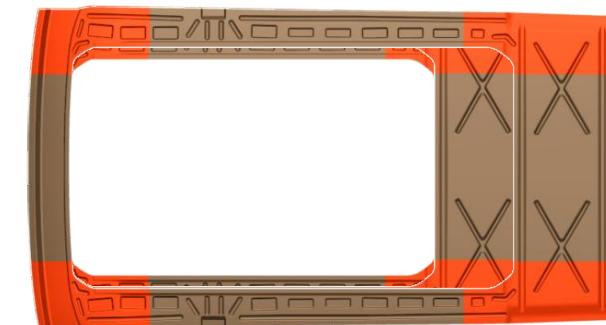
Battery Enclosure



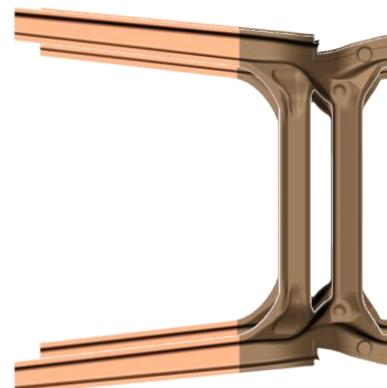
Rear O-frame



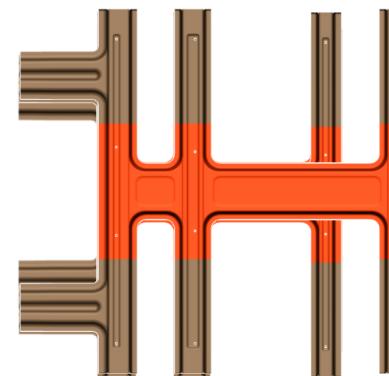
Roof Ring



Front U-frame Lower



Floor Reinforcement



Design Flexibility



Assembly Tooling Reduction



Modularity



Part Weight Optimization



Crashworthiness

Modularity at part level re-imagined thanks to MPI – Power of Less!!!

Conclusions & Summary

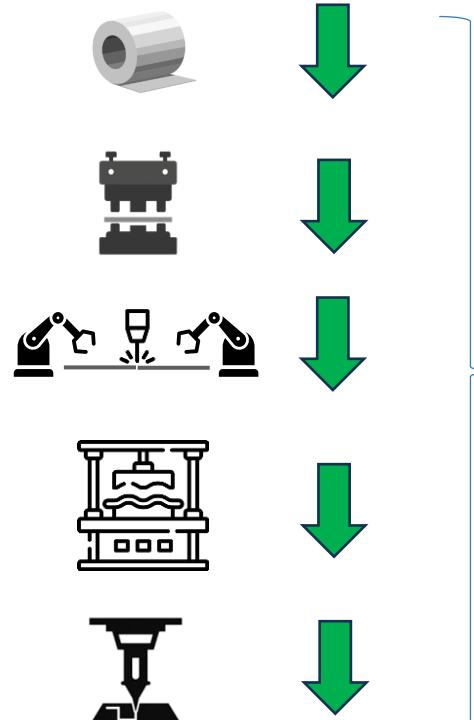
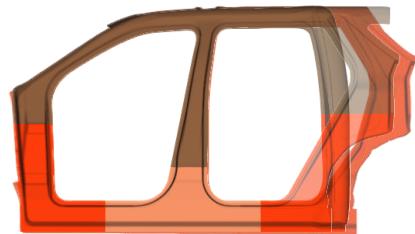
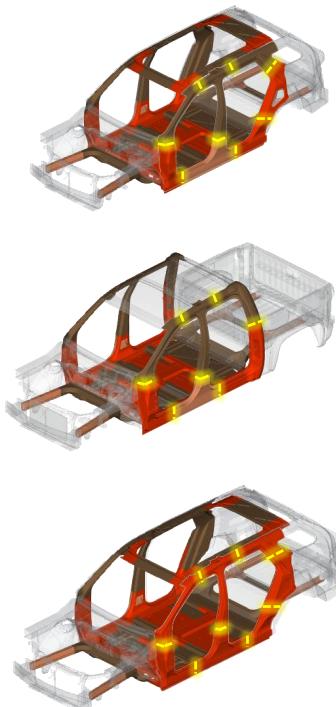
GDIS

OEM
Challenge

Common
assembly

Multiple
vehicle sizes

Multiple
Powertrains



- Shorter design cycles
- Investment share across programs
- Lower overall investment
- Flexibility to manage market demand
- Excellent crash performance

Co-engineering is key!

Modular laser welded door ring designs give OEMs the flexibility to manage changing market demands



ArcelorMittal Tailored Blanks

Driving a **Safer** and **Greener** Tomorrow

4 locations in North America

- ✓ Concord, ON
- ✓ Woodstock, ON
- ✓ Detroit, MI
- ✓ Silao, MX

16 locations in Europe and Asia

Stop by our booth for more information!



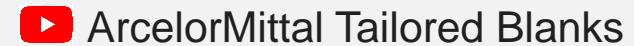
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AMTBNA



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AMTB is a leading global supplier of tailored (laser welded) blanks – safer, stronger, lighter and greener solution