Carbon Fibre in Mass Automotive Applications
Challenges and Drivers for composites

Robert Crow CEng MIMM
Materials Innovation Manager

Franco-British Symposium on Composite Materials 28th April

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Agenda

- Drivers for Automotive Weight Saving
- JLR Light Weighting Strategy
- Composites Challenges – Cost and Sustainability
- Innovate UK Varcity Project
- Summary

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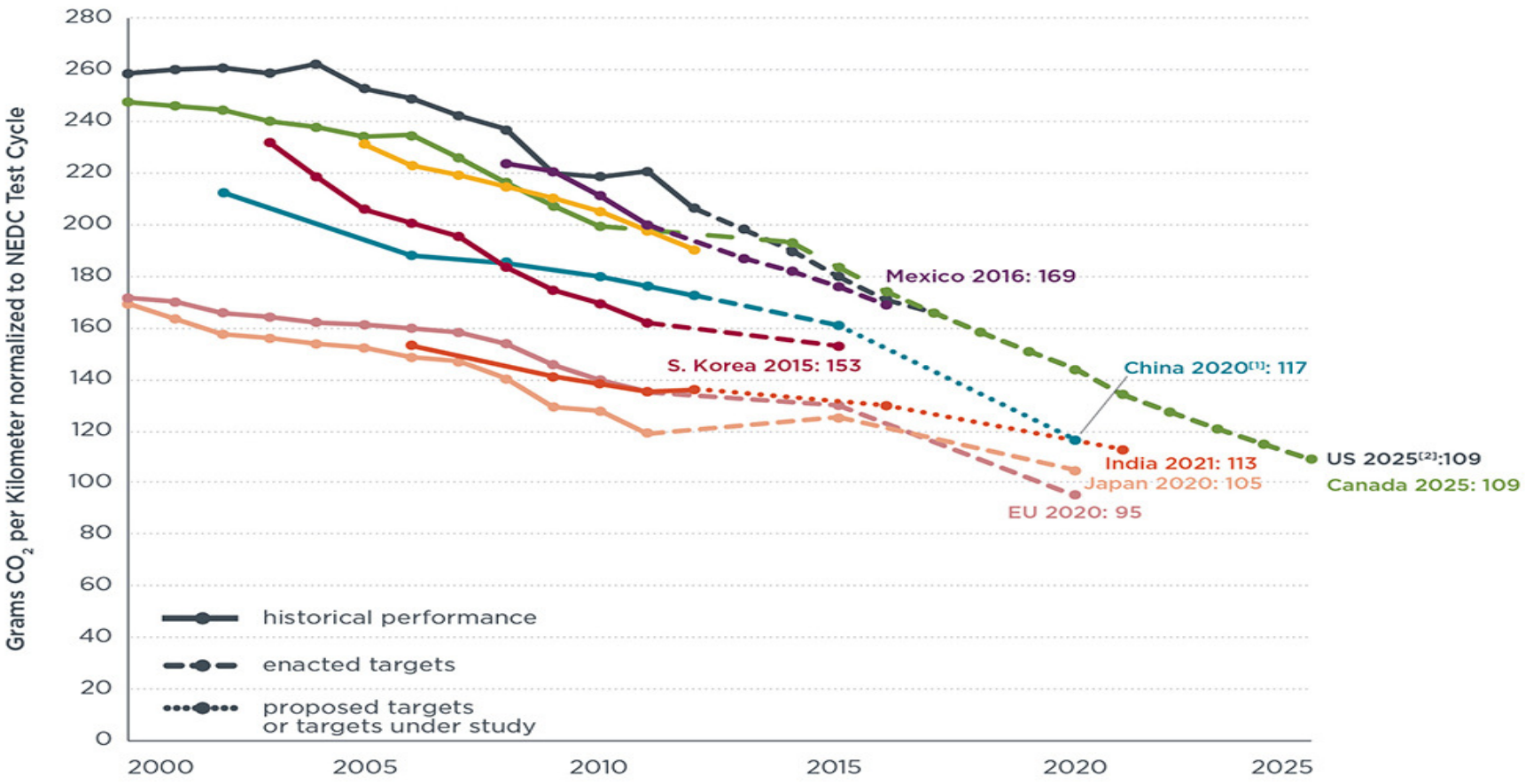
The CO_2 Challenge



[1] China's target reflects gasoline vehicles only. The target may be higher after new energy vehicles are considered.
[2] US, Canada, and Mexico light-duty vehicles include light-commercial vehicles.
[3] Supporting data can be found at: http://www.theicct.org/info-tools/global-passenger-vehicle-standards

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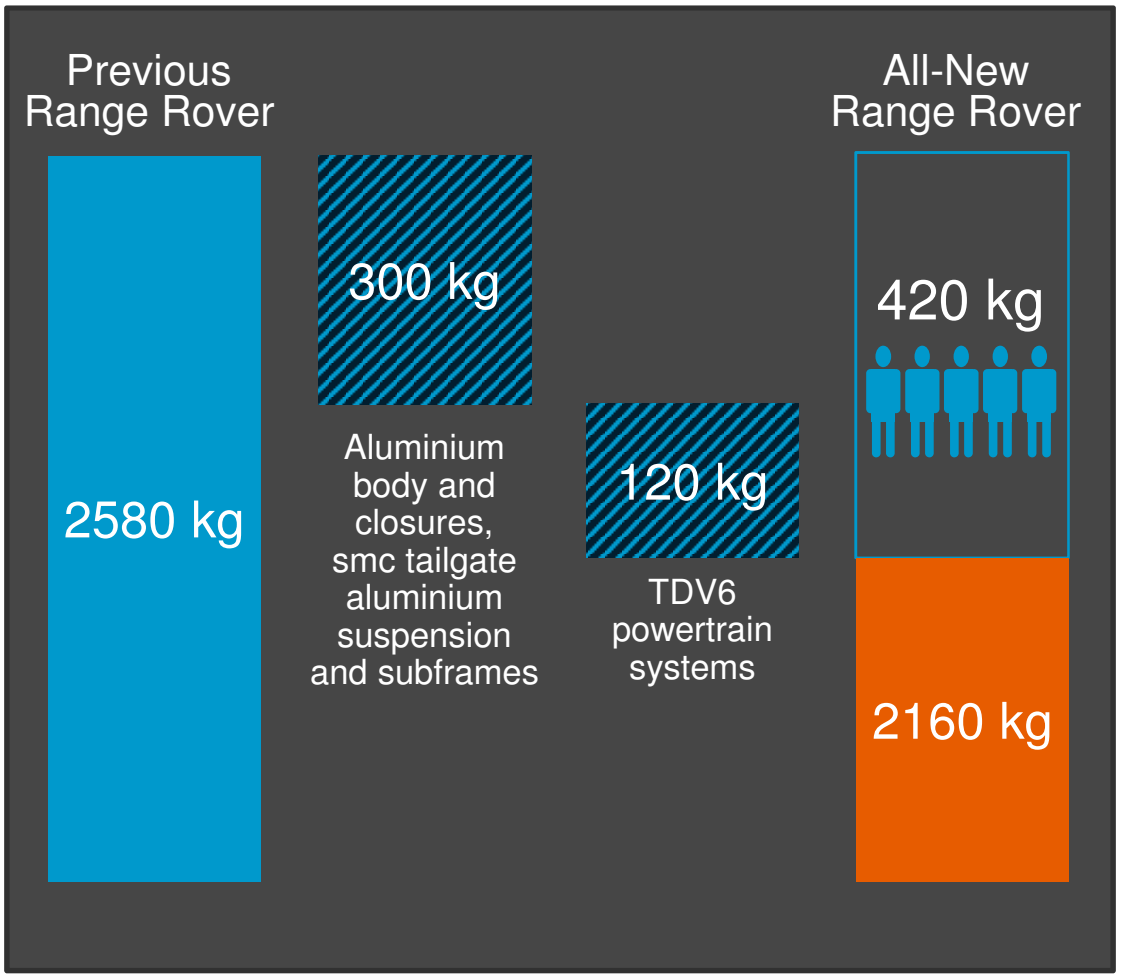
JLR Lightweighting Strategy



Target 400+ kg weight save

Reduced weight improves vehicle dynamics: agile, responsive handling on and off road

Aluminium and lightweight materials reduce overall carbon footprint

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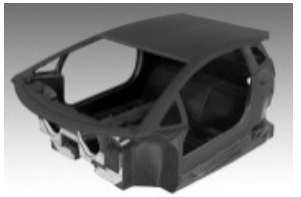
CFRP - Historical Perspective

Historically little has been done to reduce CFRP System cost on Motor racing & Supercars due to low production volumes & exotic complexity of products used to manufacture parts



















Focus on Performance – not CO2 reduction

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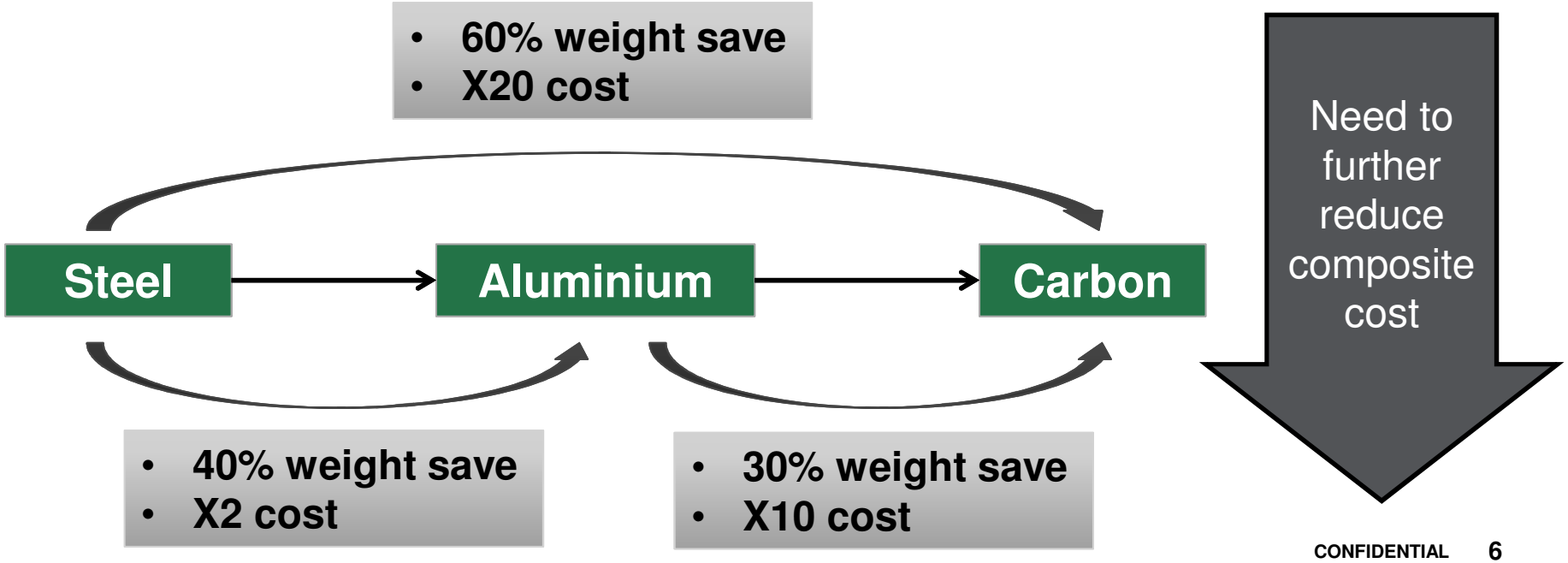
Weight save vs. cost increase

- The key driver is weight save due to the increase in specific strength and stiffness that carbon fibre composites offer
- The key enabler to using carbon fibre is lower cost – high cost generally makes carbon fibre components prohibitive unless additional revenue can be made (e.g. cosmetic parts).



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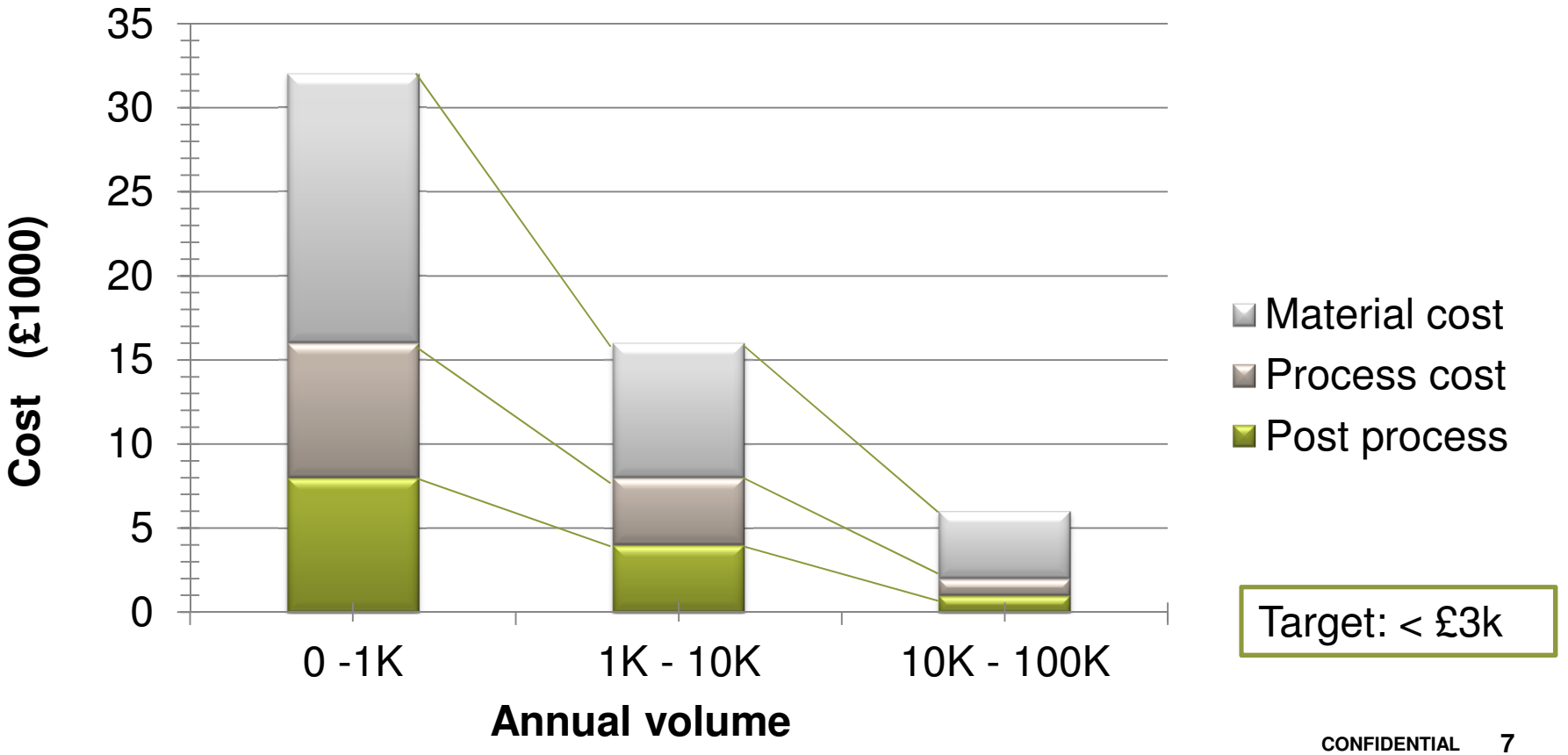
Cost vs. annual volume

To enable CFRP structures to be used is mass-produced vehicles, costs need to be further reduced



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- Lower in-use CO_2 , the most significant % of Life Cycle Analysis (LCA)
- The light-weighting possibilities support the electric / hybrid vehicles need for super lightweight structures
- However, overall LCA and End of Life Vehicle (ELV) impact not as favourable as current BIW construction; JLR use up to 50% recycled aluminium which is easily recycled with current infrastructure and is infinitely recyclable

- Scrap rates of (some) manufacturing processes too high – pre-preg off cuts are challenging to up-cycle
- Alternative Solutions - Natural fibres, Thermoplastics, Glass,

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Varcity

Varcity: Vehicle ARchitectures CITY Cars

- 36 Month, Innovate UK Funded project total value £17million
- Premium city car for 2020
- Sustainable and economically viable proposition for volume production of Carbon Fibre Reinforced Plastic based composites
- A major goal of the project is the establishment of leading UK supply chain comprising the core industry partners
- The project also acts as a catalyst to stimulate the science, engineering and technology base to support the CO_2 and sustainability challenges facing the UK's automotive industry

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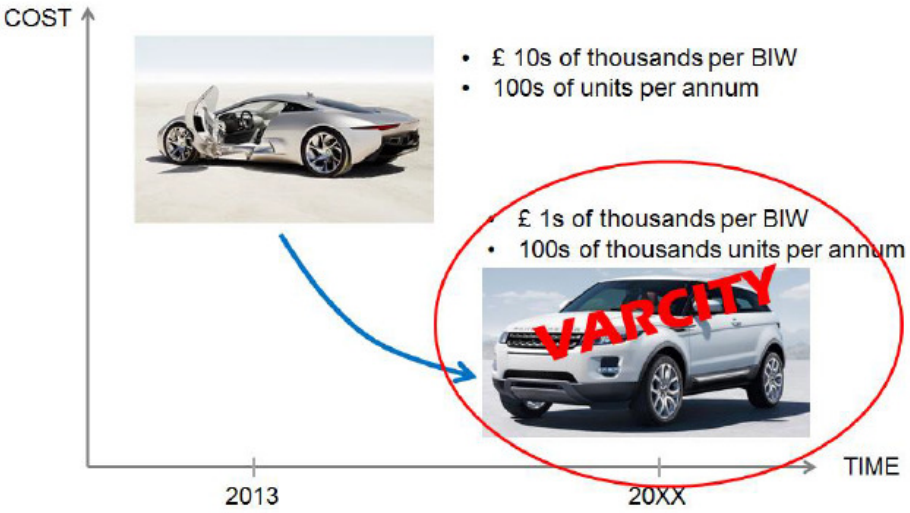
Varcity

Varcity: **V**ehicle **AR**chitectures **CITY** Cars



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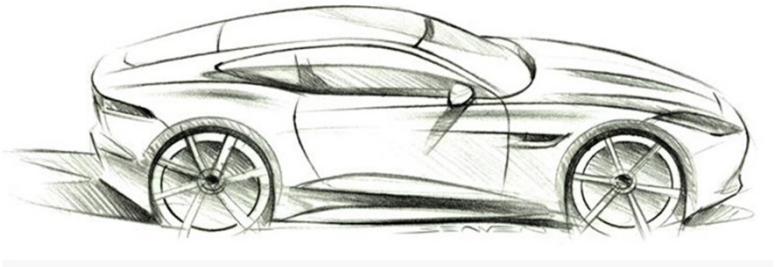
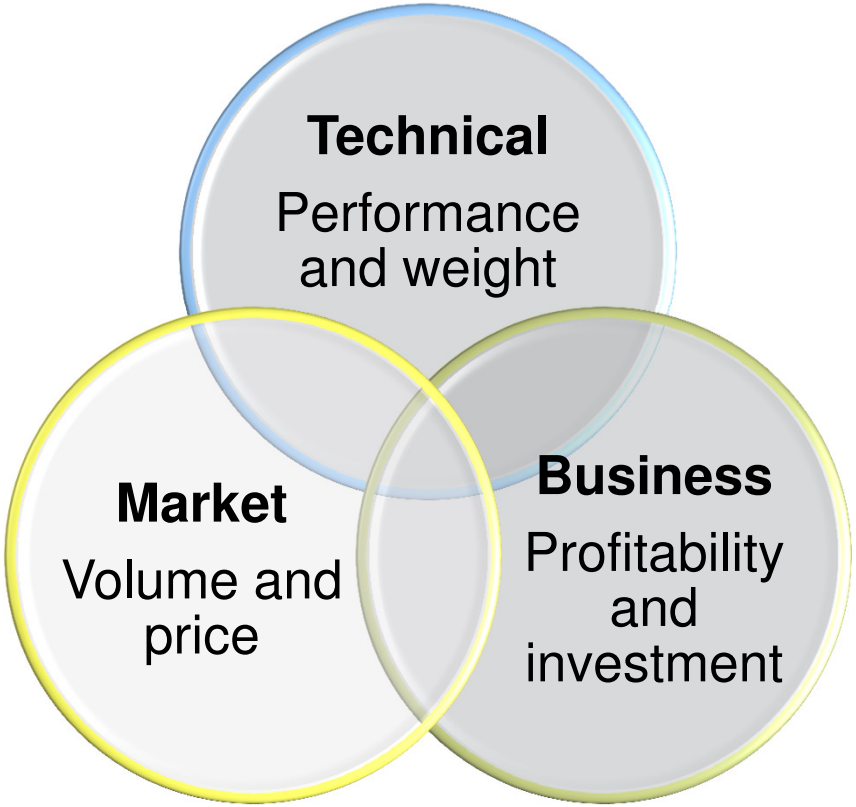
Summary

“The right material for the right part”

The aim of all JLR material choices is to develop product propositions that balance the technical, business and market equations whilst delivering CO_2 offset for the JLR fleet average





Thank you

Robert Crow
rcrow4@jaguarlandrover.com