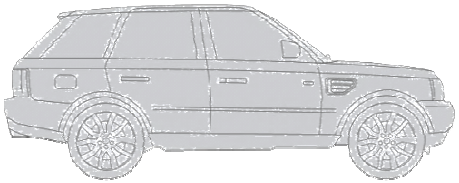

# REALCAR Project

Adrian Tautscher
8th November 2016

# RANGE ROVER SPORT
## LIGHT WEIGHT VEHICLE STRATEGY

Achieved weight saving of 420kg – equivalent to the weight of six adults

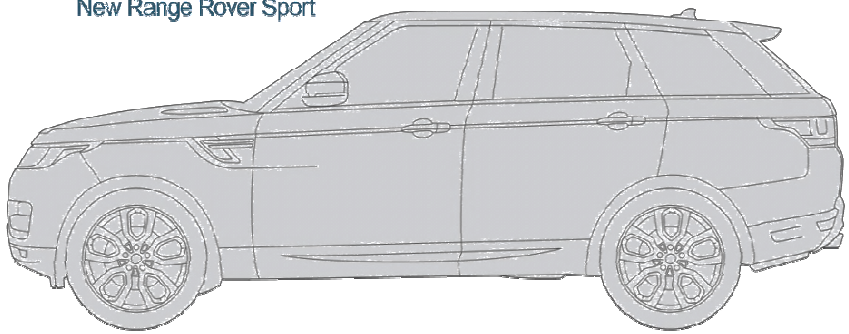
Every 100kg saved in the vehicle mass saves around 2% in fuel consumption



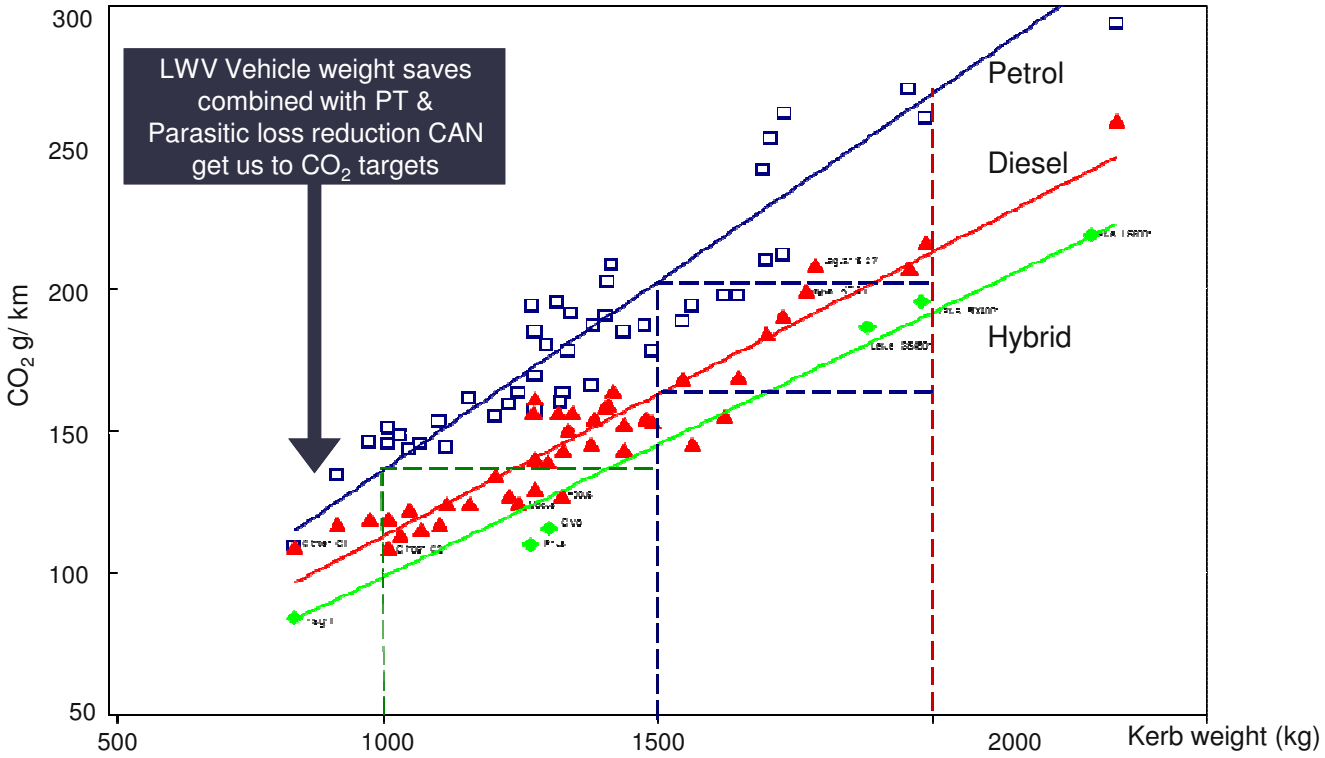
**2535kg**
Previous Range Rover Sport

**– 420kg**
Achieved weight saving

**= 2115kg**
New Range Rover Sport

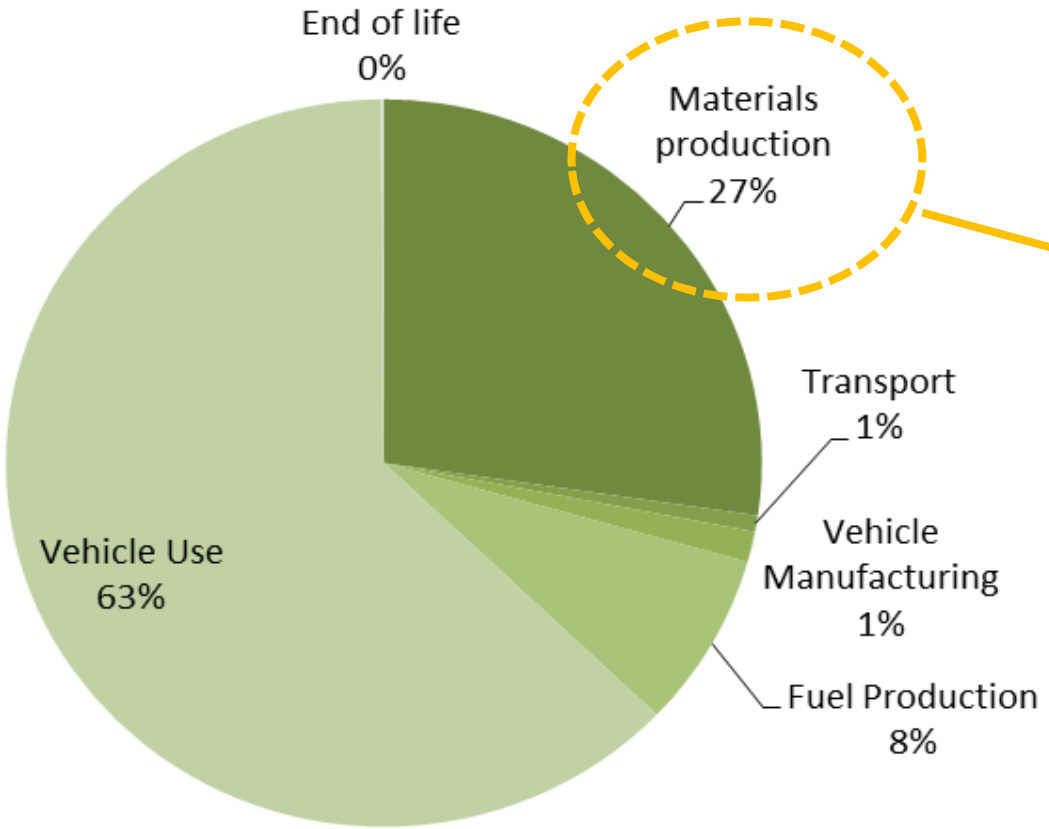


# SUSTAINABILITY CHALLENGE
## $CO_2$ EMISSIONS BY VEHICLE WEIGHT




Reduction in Kerb Weight can be Equivalent to Improving Drivetrain Technology

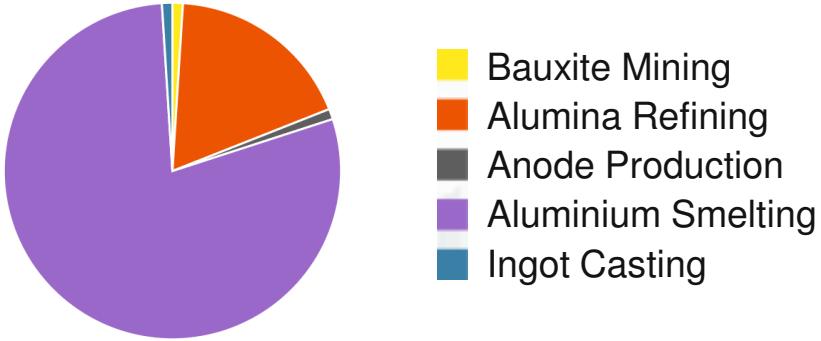
# SUSTAINABILITY CHALLENGE
## LIFE CYCLE ASSESSMENT



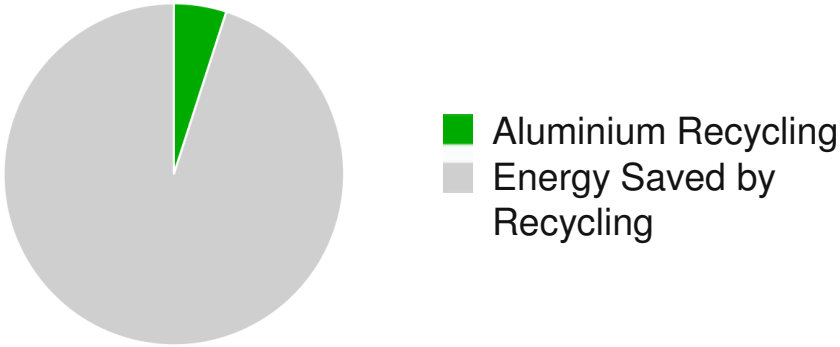

Increased focus on $CO_2$ emissions in the production phase. For Aluminium, this means **Increased Recycling**.

# ALUMINIUM PRODUCTION
## RECYCLING BENEFITS

**Energy required for Primary Aluminium Production**




**Energy required for Aluminium Recycling**




- Aluminium recycling requires **up to 95% less energy** than primary aluminium production
- Aluminium recycling saves over **90 million tonnes of $CO_2$** annually
- 75% of all aluminium ever produced is currently still in **productive use**
- Aluminium can be recycled **over and over** again without any loss of quality

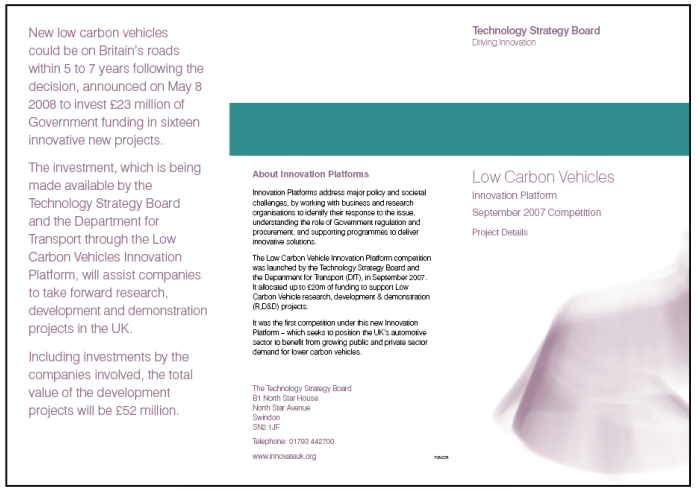
**Source: IAI (http://recycling.world-aluminium.org/home.html)**

# REALCAR
## PROJECT BACKGROUND

- Research project with **Innovate UK**
- 'Low Carbon Vehicle' call
- Budget £2m
- Partners: JLR (lead), Novelis, Innoval, Norton Aluminium, Brunel University, Stadco, Zyomax
- Duration: 3 years

**REALCAR evaluated a range of aluminium recycled sources and alloys and delivered a high recycled tolerant grade (RC5754) to support closed-loop recycling of press shop scrap**

REALCAR


New low carbon vehicles could be on Britain's roads within 5 to 7 years following the decision, announced on May 8 2008 to invest £23 million of Government funding in sixteen innovative new projects.

The investment, which is being made available by the Technology Strategy Board and the Department for Transport through the Low Carbon Vehicles Innovation Platform, will assist companies to take forward research, development and demonstration projects in the UK.

Including investments by the companies involved, the total value of the development projects will be £52 million.

Technology Strategy Board
Driving Innovation

About Innovation Platforms

Innovation Platforms address major policy and societal challenges, by working with business and research organisations to identify their response to the issue, understanding the role of Government regulation and procurement, and supporting programmes to deliver innovative solutions.

The Low Carbon Vehicle Innovation Platform competition was launched by the Technology Strategy Board and the Department for Transport (DfT), in September 2007. It allocated up to £20m of funding to support Low Carbon Vehicle research, development & demonstration (R,D&D) projects.

It was the first competition under this new Innovation Platform – which seeks to position the UK's automotive sector to benefit from growing public and private sector demand for lower carbon vehicles.

The Technology Strategy Board
B1 North Star House
North Star Avenue
Swindon
SN2 1JF

Telephone: 01793 442700

www.innovateuk.org

Low Carbon Vehicles
Innovation Platform
September 2007 Competition
Project Details

Innovate UK

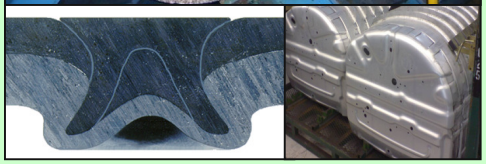
**Consortium Partners**

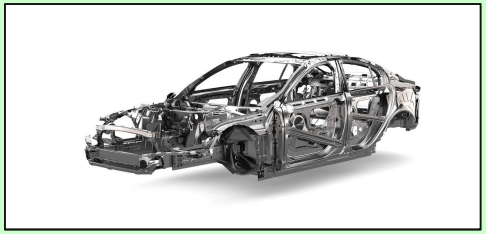
JAGUAR · LAND ROVER · ADITYA BIRLA NOVELIS · Brunel UNIVERSITY WEST LONDON · NORTON ALUMINIUM · innoval technology · STADCO · Zyomax

**REALCAR**

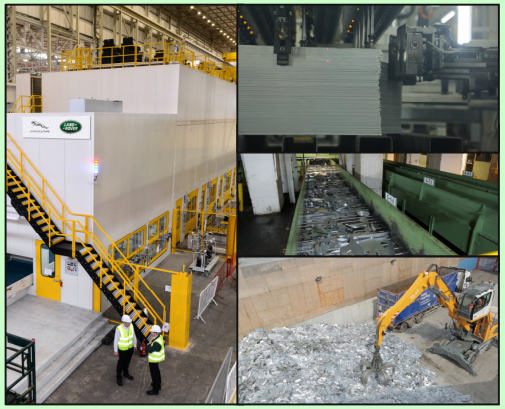
# THREE PILLARS OF INNOVATION

## Materials Innovation



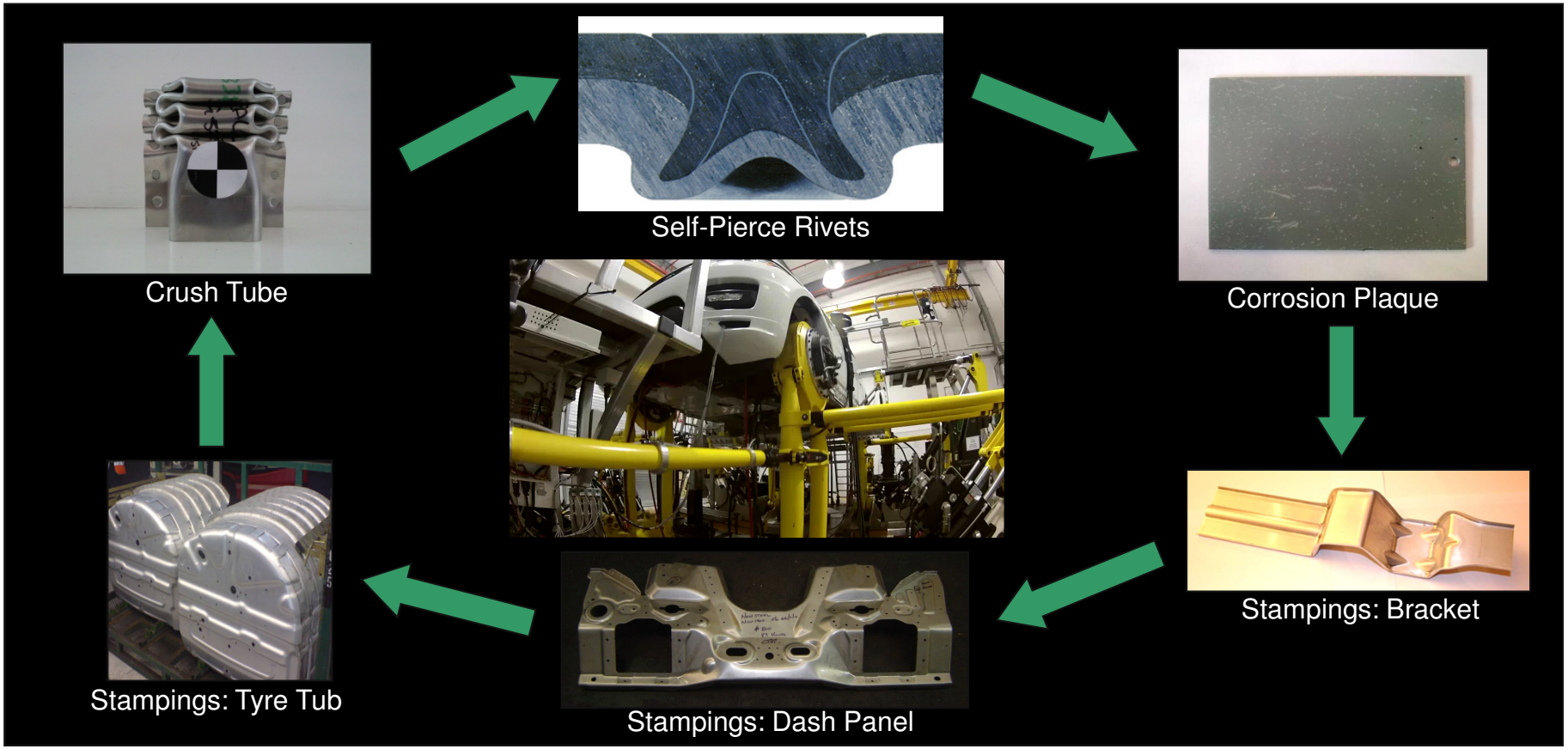


## Press Shop Strategy

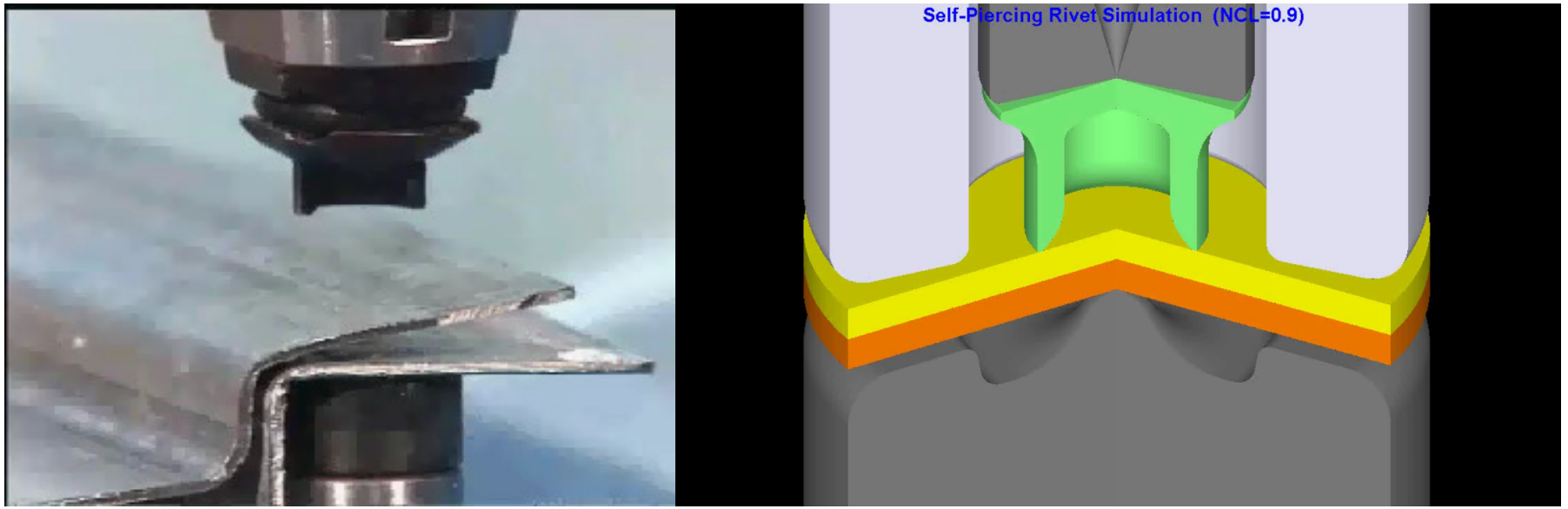
## Supplier Strategy


**REALCAR**
MATERIALS INNOVATION



## SELF-PIERCE RIVETING (SPR)

## Video Demonstration of SPR Technology



# REALCAR
## MAUNFACTURING LINE INVESTMENT

**Jaguar Land Rover Halewood press shop:**

– £5.8 million investment

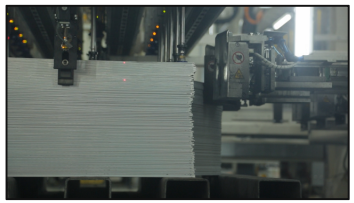
– Over 1.8 kms of conveyors

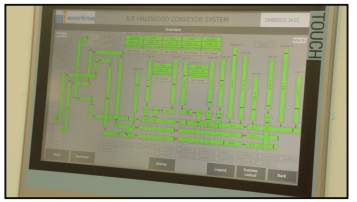
**Developing strategy:**

– 12 press shops currently in the closed-loop

– Evaluations to extend to further press shops

– Lessons learnt document with case studies

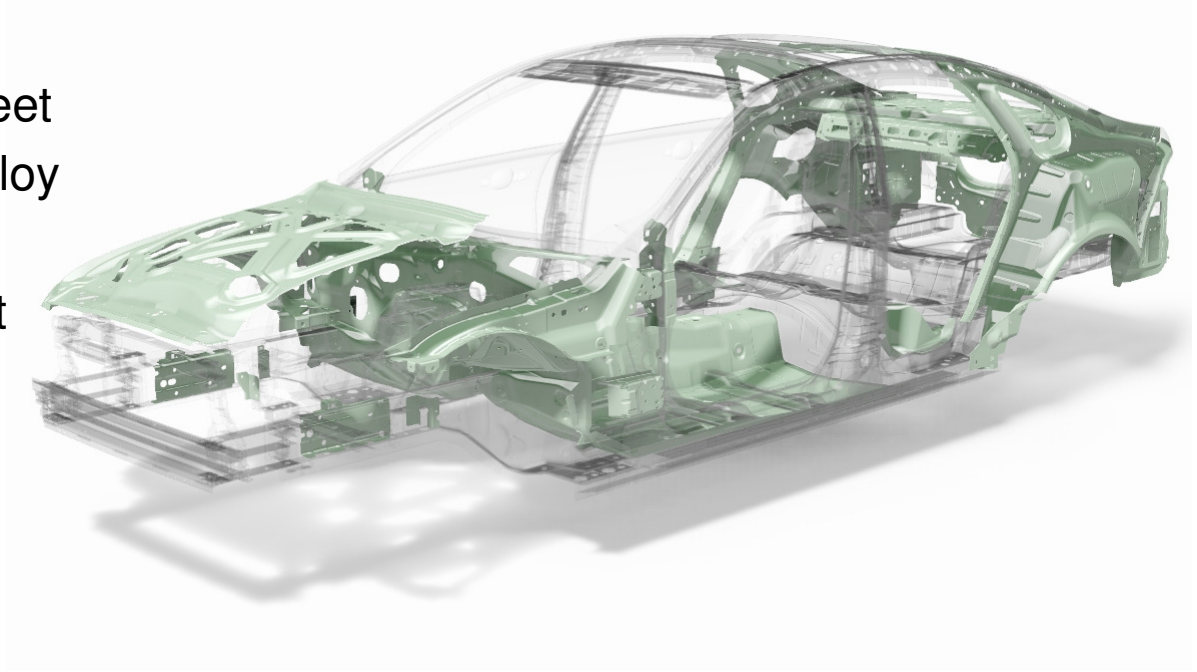





**JAGUAR XF**
5XXX ALUMINIUM ALLOYS

Following the research project ‘REALCAR’, a new 5xxx aluminium alloy was developed for XE; RC5754

All 5xxx body structure sheet on XE is made from this alloy and all future Jaguar Land Rover vehicles will utilise it



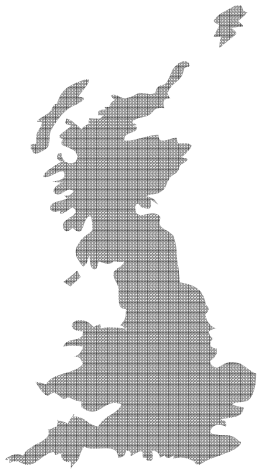
**REALCAR**
INNOVATE UK FILM

https://youtu.be/pt5QqXSUhdQ

# REALCAR
## BENEFITING THE UK ECONOMY

50,000 tonnes of Aluminium scrap = 200,000 XE body shells, captured as closed-loop during 2015/16

500,000 tonnes CO2e emissions avoided compared to using primary Aluminium*

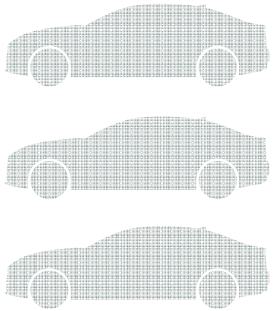


12 UK press shops

Over £7m invested by JLR in press shops

£6m invested by Novelis in their UK recycling plant

REALCAR



*Note: Claimed saves by Novelis along their aluminium supply chain

# REALCAR
## OUTREACH REALCAR 2

- Research project with **Innovate UK**
- 'Technology inspired innovation' call
- Category: Advanced Materials
- Budget £1m
- Partners: JLR (lead), Novelis, Innoval, Real Alloy, Warwick University
- Duration: 2.5 years

**REALCAR 2 target is to supplement process scrap with post consumer non-auto scrap to achieve higher recycling rates, up to a further 25%**

REALCAR 2


Innovate UK

**Consortium Partners**

JAGUAR LAND ROVER ADITYA BIRLA NOVELIS REAL ALLOY THE UNIVERSITY OF WARWICK innoval technology

**REALCAR 2**
FUTURE MATERIALS CHALLENGES

## Current waste separation technologies evaluated

| Site A | Site B | Site C | Site D |
|---|---|---|---|
| MBT processing | Shredder<br>Electro- magnetic sorting<br>Eddy current | Flotation sorting | Shredder<br>Electromagnetic sorting<br>Eddy current<br>Air knife separator |
|  |  |  |  |
|  |  |  |  |

## NEXT PROJECT PHASE
FUTURE RESEARCH

REALITY

Developing the aluminium Circular Economy model:

- Continue path to achieve higher recycling rates 75%+
- End-of-Life Vehicles (ELV) source for aluminium
- Application of the next generation scrap sortation technologies to achieve separation by alloy
- Melt processing technologies for impurity tolerance
- Engagement of an entire supply/value chain

**Target is to deliver both <u>Environmental</u> and <u>Commercial</u> benefit**

Scrapped vehicles

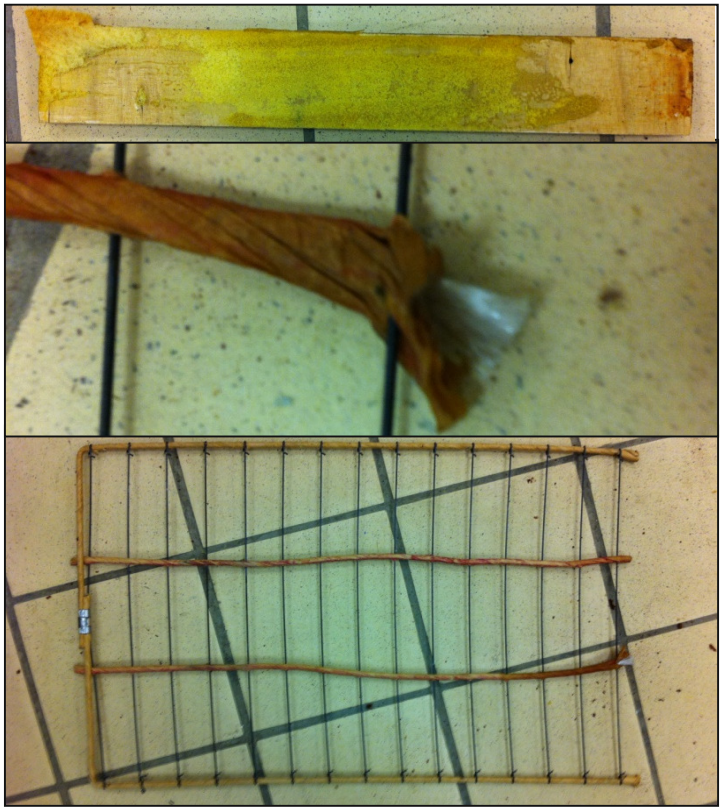
Vehicles post crushing

Vehicle shredding

Shredder output

# MaDE-ELV PROJECT
## FUTURE MATERIALS CHALLENGES

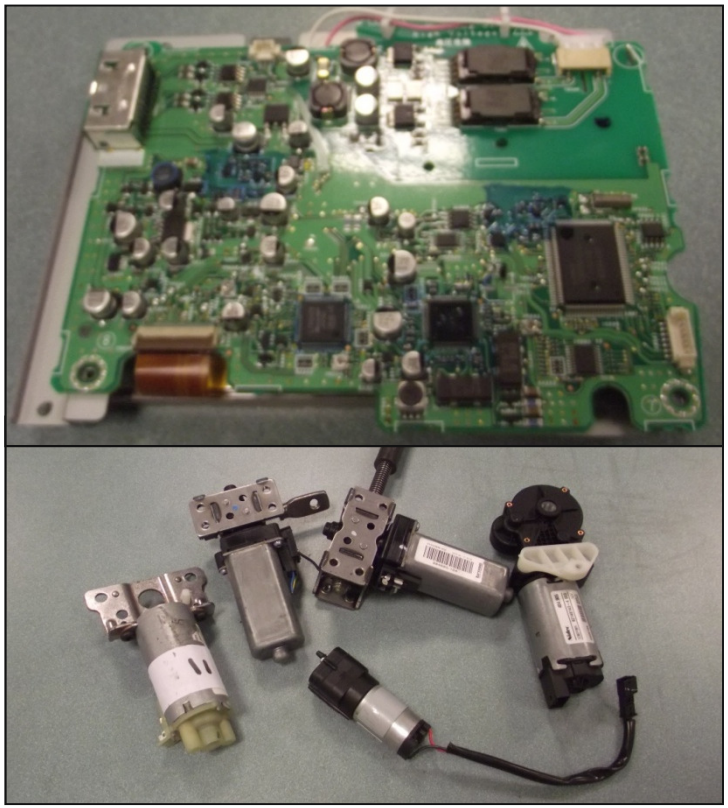
### 1988 Range Rover



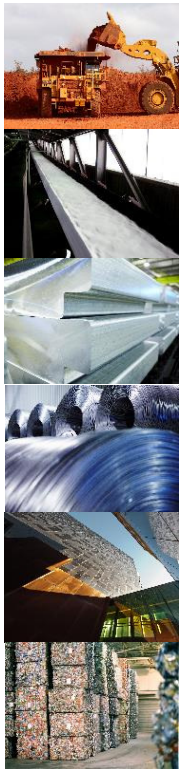
KTN
the Knowledge Transfer Network

The Institute of Materials, Minerals and Mining

### 2010 Range Rover



# REALCAR
## OUTREACH



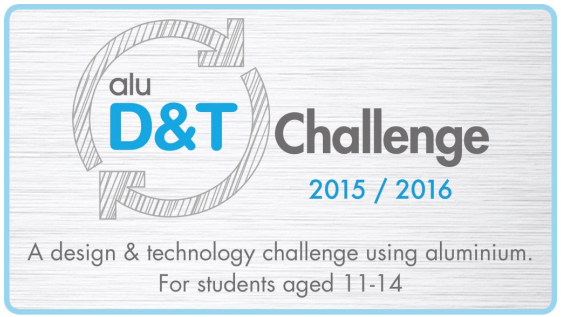
Aluminium Stewardship Initiative

Sustainability

Responsible sourcing

Material stewardship

Images © Rio Tinto and Novelis





**REALCAR**
RECYCLED ALUMINIUM CAR

REALCAR