

## SUSTAINABILITY REPORT 2014/15

JAGUAR LAND ROVER AUTOMOTIVE PLC

# WELCOME TO JAGUAR LAND ROVER'S FIFTH ANNUAL SUSTAINABILITY REPORT

This report describes how we are future-proofing our business and embedding Environmental Innovation in everything we do to create strong foundations for responsible, profitable growth.

## FEEDBACK

We welcome feedback on our approach to sustainability – please email:

✉ [SReport@jaguarlandrover.com](mailto:SReport@jaguarlandrover.com)

## FURTHER INFORMATION

For more detailed information and news please visit:

📄 [www.jaguarlandrover.com/responsiblebusiness](http://www.jaguarlandrover.com/responsiblebusiness)

Cover image: Our Euro 6 standard Ingenium diesel engine.

📄 *Find out more on page 21.*

Unless stated otherwise, the data in this report is for Fiscal Year ending 31 March 2015.

📄 *Reporting scope and boundaries, page 51.*

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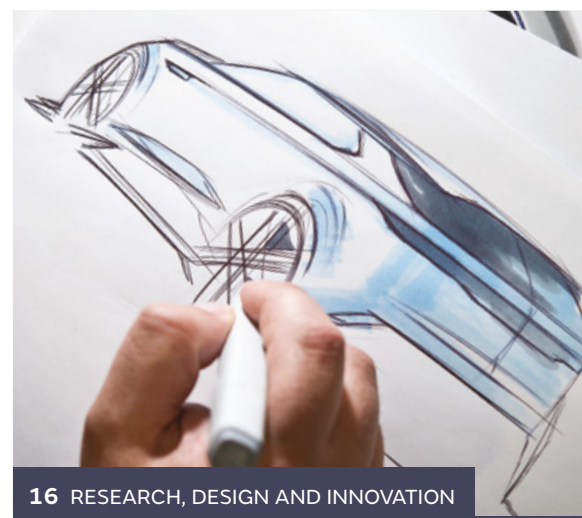
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# BUILDING A SUSTAINABLE FUTURE



## A MESSAGE FROM OUR CEO



Delivering experiences our customers love for life is our business purpose, and is underpinned by three key business drivers: producing world-class vehicles; putting the customer at the heart of our business; and future-proofing through Environmental Innovation.

We are committed to growing the business responsibly and sustainably, adding value to our customers and stakeholders and the wider communities in which we operate. This year, we were honoured to be recognised with the Queen's Award for Enterprise in Sustainable Development, which acknowledges our commitment to the environment and society.

Significantly, we achieved a major milestone in our vehicle emissions performance a year ahead of schedule. A 25% reduction in our European fleet average tailpipe CO<sub>2</sub> emissions (compared to 2007) shows our serious intent to perform ahead of evolving legislation. However, we recognise that driving sustainable growth relies on us continuing to break new ground. In 2014/15 therefore, to build on our research and development in electric, hybrid and conventional powertrains, we invested over £3 billion in technology, design, engineering and manufacturing to help us continue to provide what our customers, and the next generation, expect from us.

It is important that we consider environmental impacts over the whole life cycle of our vehicles and we have reduced our manufacturing facility CO<sub>2</sub> emissions by more than 30% per vehicle (compared to 2007). Our strength in design, engineering and manufacturing gives us the capability needed to shape our vehicles of the future. Two important new vehicles encapsulate our commitment to environmental performance. The new Jaguar XE is our most advanced and fuel-efficient saloon to date, while the new Land Rover Discovery Sport is delivering enhanced performance and fuel economy in the premium compact SUV category, and has been created

with end-of-life and recycling considerations as an intrinsic part of the design process.

We are using our leadership in aluminium to enable closed-loop recycling processes and deliver lightweight solutions. The ultra-efficient Ingenium engine exemplifies our commitment to innovation and performance. Our joint venture in China has extended our international operational footprint and our manufacturing facility in Brazil, currently under construction, will provide further potential for responsible growth in that region.

Passionate, engaged people drive our business and help our communities to thrive. Developing our talent pipeline and inspiring the next generation are therefore a vital part of Environmental Innovation. Our Global Corporate Social Responsibility (CSR) Programme sets us apart in terms of our commitment to making a wider contribution to society and creating the right opportunities for people to make a positive change.

The Company today is expanding. There will, of course, be challenges ahead; however, the ambitious goals we have set ourselves provide a clear roadmap and give us the confidence to achieve sustained future success."

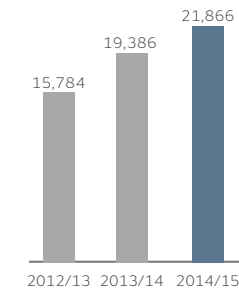
**DR RALF SPETH,**  
CHIEF EXECUTIVE OFFICER

Find out more about our Company and business performance in our Annual Report 2014-15.

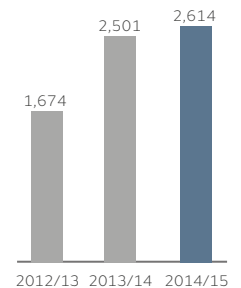
## ECONOMIC VALUE

£21.9 billion  
revenue generated in 2014/15

### REVENUE (£m)



### PROFIT BEFORE TAX (£m)



462,209  
vehicles sold on a retail basis\* –  
a 6.4% increase compared to 2013/14

\* Including sales from the Chery Jaguar Land Rover joint venture.

## OUR YEAR AT A GLANCE

### OUR WORKPLACE

500

graduates and apprentices recruited,

joining almost 2,500 others recruited in recent years.



### AWARDS

The Queen's Award for Enterprise in Sustainable Development 2015 was one of approximately

200

honours

received during the year for our vehicles and operations.



### TWO KEY ALL-NEW MODELS

The new Jaguar XE saloon (left) is the best-performing Jaguar to date for environmental performance, delivering reduced impact over its lifetime. The new Land Rover Discovery Sport (right) switches seamlessly between two- and four-wheel drive for lower emissions, and achieved the best overall New Car Assessment Programme (NCAP) crash test score of all vehicles tested in 2014.



### GLOBAL CSR

Added 17 projects to our Global CSR Programme, including an exciting technology-led initiative with ClimateCare, bringing safe water to communities in western Kenya via LifeStraw® water filters.

Expanded our Inspiring Tomorrow's Engineers schools programme and extended our support for HITS Rugby, which helps disadvantaged young people.

Extended our partnership with the International Federation of Red Cross and Red Crescent Societies (IFRC) until 2018.

30% ↓

### OPERATIONAL IMPACTS REDUCED

Reduced CO<sub>2</sub> emissions and water use by 30% (per vehicle vs 2007 baseline).

### SIGNIFICANT IMPROVEMENT IN TAILPIPE CO<sub>2</sub> EMISSIONS

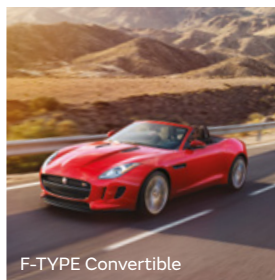
Achieved a 25% reduction in our European fleet average tailpipe CO<sub>2</sub> emissions (vs 2007), helped by our continuing investment in advanced vehicle technologies, including the new lightweight, fuel-efficient Ingenium engine.



## ABOUT JAGUAR LAND ROVER



F-TYPE Coupé



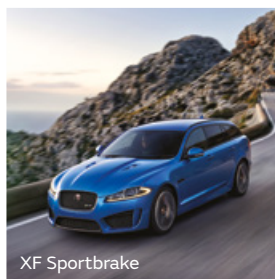
F-TYPE Convertible



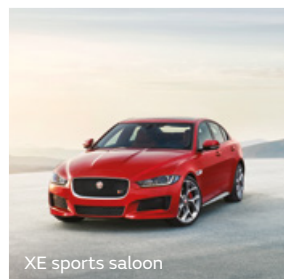
XJ saloon



XF



XF Sportbrake

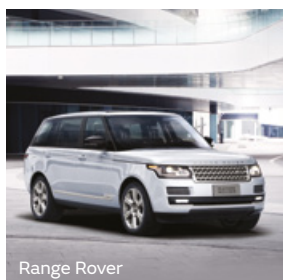


XE sports saloon

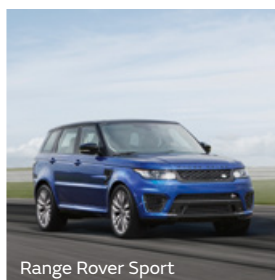
Founded on two iconic British vehicle brands, Jaguar and Land Rover, we are the UK's largest premium automotive manufacturer.



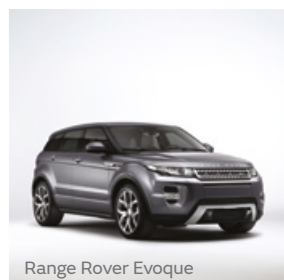
Premium vehicles recognised for their design, performance and quality. Jaguar's range comprises the F-TYPE Coupé and Convertible two-seater sports vehicles, XJ saloons, the XF and XF Sportbrake, and the new XE sports saloon.



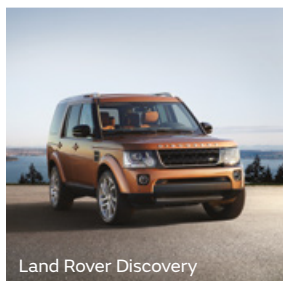
Range Rover



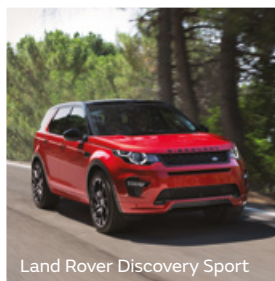
Range Rover Sport



Range Rover Evoque



Land Rover Discovery



Land Rover Discovery Sport



Land Rover Defender



Premium, all-terrain vehicles that differentiate themselves by their capability, design, durability, versatility and refinement. Land Rover's range comprises the Range Rover, Range Rover Sport, Range Rover Evoque, the Land Rover Discovery, Land Rover Discovery Sport and Land Rover Defender.

### KEY FACTS

#### LARGEST INVESTOR

in automotive research, development and engineering in the UK

More than

80%

of the vehicles we produce are exported

More than

35,000

people employed worldwide

19

national sales companies

2,640

franchised dealers

## ABOUT JAGUAR LAND ROVER

## OUR OPERATIONS

## UNITED KINGDOM

Halewood  
Vehicle Manufacturing

Solihull  
Vehicle Manufacturing

Castle Bromwich  
Vehicle Manufacturing

Whitley  
Global Headquarters,  
Engineering & Design

Coventry  
Special Vehicle Operations  
Technical Centre

Gaydon  
Engineering, Design & Test facility  
UK national sales company

Wolverhampton  
Engine Manufacturing Centre

Warwick University  
Advanced Research Centre at  
University of Warwick

## BRAZIL

Rio de Janeiro  
Manufacturing site  
under construction

## INDIA

Pune plant (Tata facility)  
Components currently imported for  
local assembly of vehicles

## CHINA

Changshu factory  
Joint venture with Chery  
Automobile Company Ltd

## OUR THREE BUSINESS PASSIONS

Our corporate strategy revolves around three fundamental passions. These form our commitment to creating “Experiences Customers Love, for Life”.

- CUSTOMER FIRST**  
 Our goal is to delight and exceed the expectations of our customers by delivering unrivalled experiences through engaging products and services.
- GREAT PRODUCTS**  
 We continue to invest in outstanding new products, international expansion and groundbreaking technologies that will deliver long-term stakeholder value.
- ENVIRONMENTAL INNOVATION**  
 Delivering sustainable growth and continued innovation is at the heart of our continued transformation to become a world-class premium automotive manufacturer.

For an overview of our Environmental Innovation strategy, see pages 8 and 9.

# GLOBAL CHALLENGES

A variety of environmental and social challenges have shaped the development of our Environmental Innovation strategy.

## 2050

**POPULATIONS ARE GROWING AND 75% OF THE GROWTH IS IN CITIES\*.**

How do we keep our cities moving and healthy?

\* UNEP

### CUSTOMER NEEDS

Increasing expectations of product performance and environmental responsibility.

### PUBLIC TRUST

Communities expect big companies to make a wider contribution.

**BY 2050 IT IS ESTIMATED THAT WE WILL NEED THREE PLANETS' WORTH OF RESOURCES TO SUSTAIN THE GLOBAL POPULATION\*.**

How can we consume more sustainably?

\* WWF

### NATURAL RESOURCES

Increasingly under pressure as the world grows and develops.

**ENERGY DEMAND IS SET TO RISE BY AROUND A THIRD OVER THE NEXT 20 YEARS\*.**

How can we be more energy efficient?

\* UN Water

### LEGISLATIVE FRAMEWORK

Tightening environmental legislation is a factor in many countries.

### CHANGING CLIMATE

New challenges requiring both mitigation and adaptation.

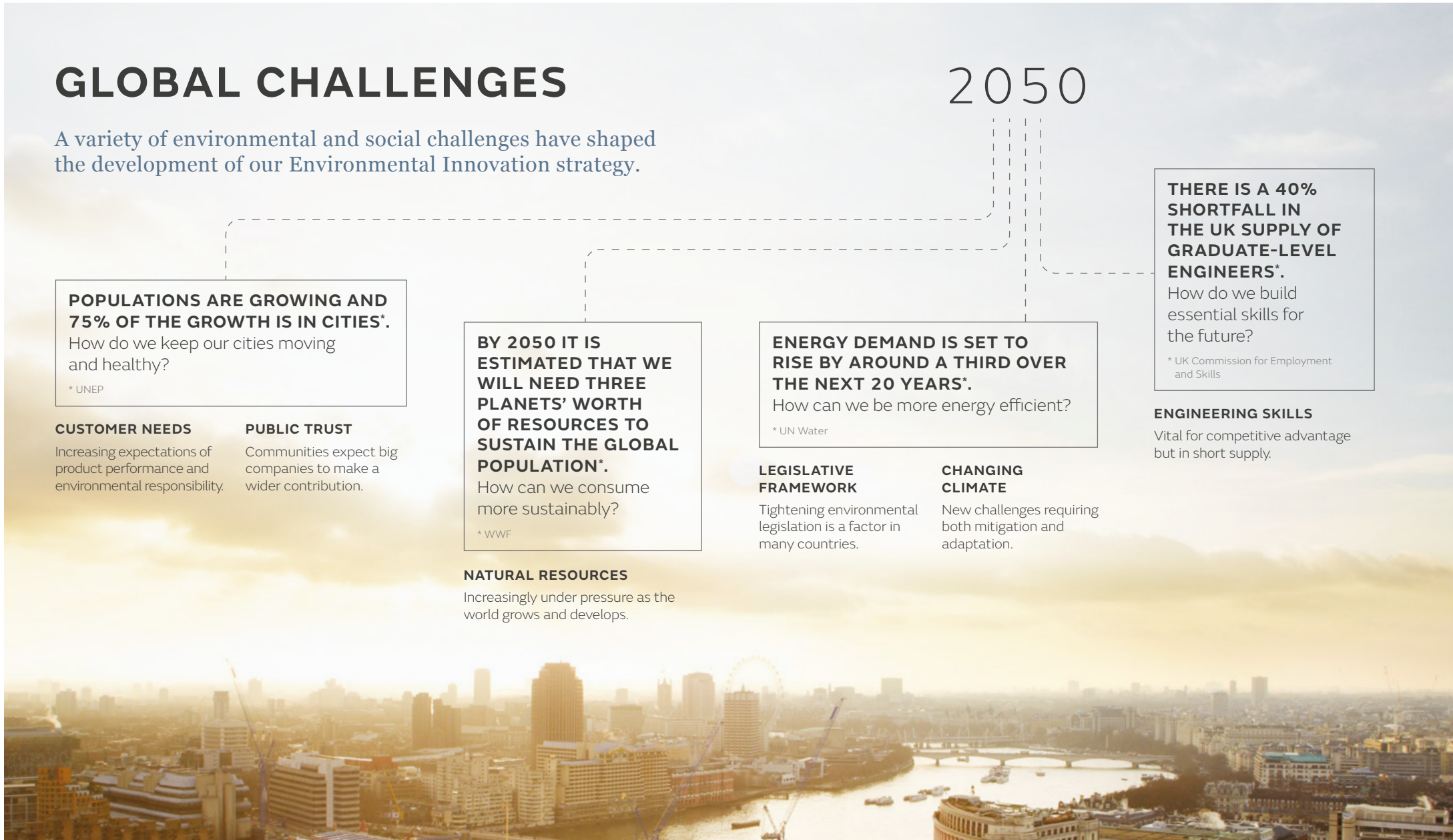
**THERE IS A 40% SHORTFALL IN THE UK SUPPLY OF GRADUATE-LEVEL ENGINEERS\*.**

How do we build essential skills for the future?

\* UK Commission for Employment and Skills

### ENGINEERING SKILLS

Vital for competitive advantage but in short supply.





Growing our culture:  
our people



Shaping sustainable  
vehicles



Driving world-class  
manufacturing and  
operations



Our brands and  
reputation



Creating opportunities  
for 12 million people

## OUR MOST SIGNIFICANT SUSTAINABILITY CHALLENGES

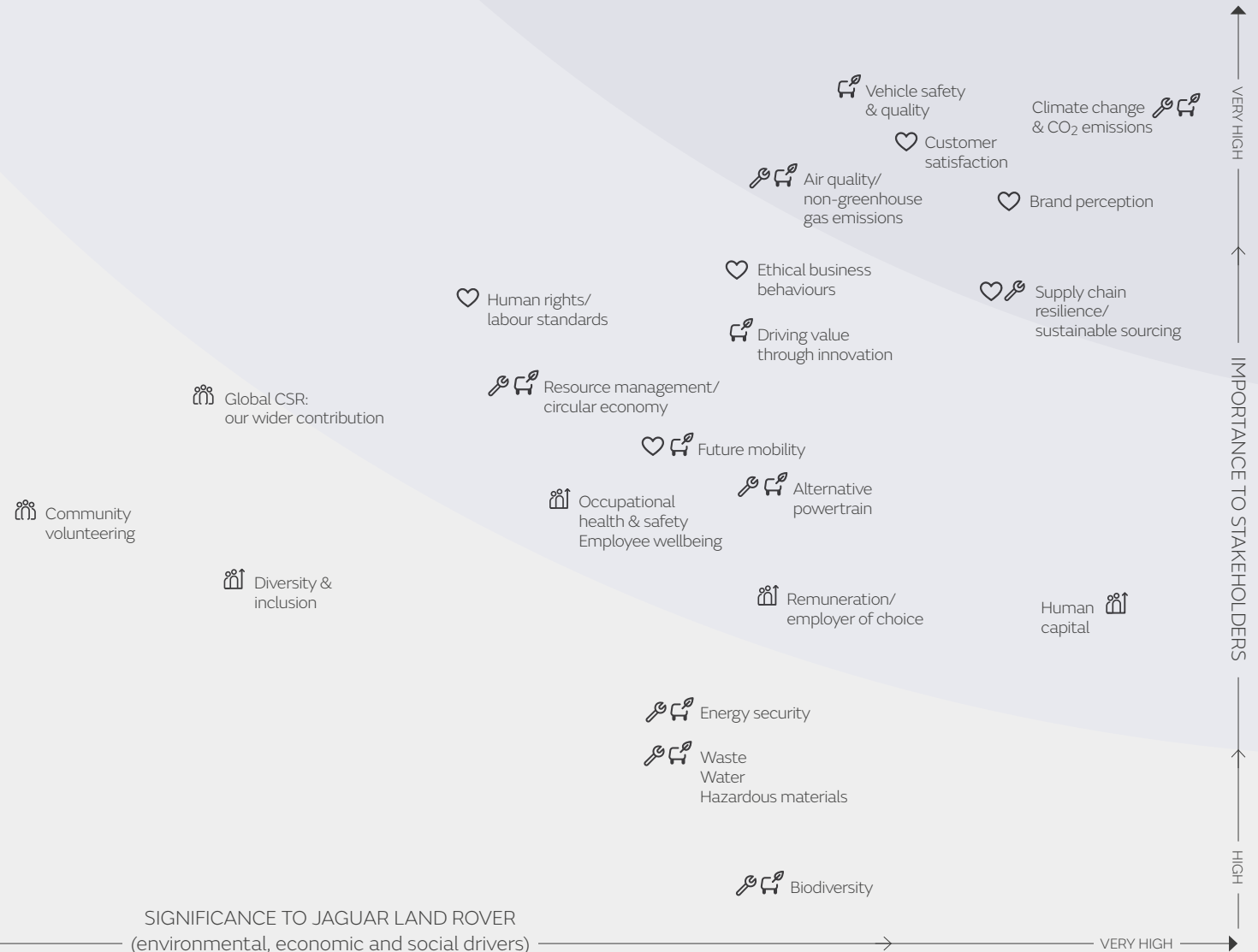
At Jaguar Land Rover we take a holistic approach to sustainability, reflected in our matrix of material issues. It's a snapshot of significant drivers for the Company and its stakeholders over the long term.

We have identified these issues through dialogue with customers and investors – and with many other external stakeholders and industry bodies – in the course of our business. The matrix also reflects conversations that happen every day across the Company, from boardroom to bodyshop.

It's this combined insight which has helped us understand where to direct our effort and resources. But one thing is certain: nothing stands still. As our markets and operating environments evolve, we are tracking global trends and making sure we address those environmental, economic and social issues with the greatest impact on our business.

As shown in the matrix, there are a wide range of sustainability issues on our radar, and every one of them matters. Although they're not all under our direct control, we can make a positive contribution to addressing the challenges while making the most of the opportunities.

For a full analysis of risks and mitigations (macroeconomic, geopolitical, industry-specific and Company-specific), see the Annual Report 2014–15, pages 76 to 81.



# ENVIRONMENTAL INNOVATION: FUTURE-PROOFING OUR BUSINESS



## OUR STRATEGY



Our global operating environment is changing, with tighter legislation and consumer demands that reflect the environmental and social concerns of a growing, urbanised and digitally connected global population.

The automotive industry has a significant contribution to make in helping to address these challenges, through innovation and collaboration all along the value chain.

Jaguar Land Rover intends to be a leader and an innovator in meeting future needs responsibly. Mobility and digital technologies are key enablers, and as the world develops and grows, we aim to harness these to play our part as a key solutions provider for the future.

Environmental Innovation is one of three key business passions, which connect everyone at Jaguar Land Rover. Alongside “Customer First” and “Great Products”, this core element of our business strategy is helping us deliver experiences our customers will love for life. More specifically, Environmental Innovation is helping us future-proof our business, by offering more sustainable choices for our customers and building our business resilience to changing global trends.

The key pillars of our strategy bring an innovation-led approach to everything from growing our culture, to reducing vehicle life cycle impacts, improving the eco-efficiency of our manufacturing and supplier base. Underpinning this strategy is the recognition that embedding a new level of environmental awareness and urgency for action starts with cultural change.

With environmental criteria integrated into decision-making, we can drive exciting innovations in our product design and business operations, and further strengthen the way we support our communities.”

**MIKE WRIGHT,**  
EXECUTIVE DIRECTOR

## OUR 2020 TARGETS

Vehicles among the leaders for tailpipe

CO<sub>2</sub> EMISSIONS  
PERFORMANCE

CARBON  
NEUTRAL  
manufacturing

ZERO  
WASTE  
across our operations

OPPORTUNITIES  
FOR 12 MILLION  
people in our communities

GLOBAL  
RECOGNITION  
as a responsible business



I believe the obligation of management is not only to plan for the immediate future but also to work on the sustainability of the business in the far future.”

MIKE WRIGHT, EXECUTIVE DIRECTOR

## WE CAN'T PREDICT THE FUTURE BUT WE CAN BE PREPARED

At Jaguar Land Rover we're always looking to the future. And today we're already thinking about what the next five, ten and twenty years will mean for our customers, the industry and our company as a whole.

We've already come a long way on our journey to being a responsible, sustainable business and we have set ourselves stretching targets in this area to push these achievements to the next level.

Our Environmental Innovation strategy provides our business a clear roadmap, and with key milestones to 2020 that will help us build upon our progress to date, we are confident that it will also open doors for a successful future.

Ultimately our ambition is to maximise the efficiency of our vehicles, our manufacturing and supplier base, to minimise our environmental impacts and to optimise the wider positive benefits we can bring to society in the process.

# ENVIRONMENTAL INNOVATION AT THE HEART OF OUR BUSINESS STRATEGY

By focusing on five strategic pillars, we're future-proofing our business and generating value from Environmental Innovation at every step.

## OUR STRATEGY AND VISION

1

### OUR BRANDS AND REPUTATION

#### Global recognition as a responsible business

where sustainability considerations are an integral part of the "customer voice" in the development of our vehicles.

2

### SHAPING SUSTAINABLE VEHICLES

#### Vehicles fit for the future

Achieving environmentally sustainable performance and capability through world-leading design, engineering and technology.

3

### DRIVING WORLD-CLASS OPERATIONS

**Deliver environmental excellence** in business and manufacturing processes and supply chain.

4

### CREATING OPPORTUNITIES

#### Trusted by global and local communities

Leveraging our business strengths and resources to improve 12 million lives.

5

### GROWING OUR CULTURE

#### Workforce and partners inspired and supported to implement

Environmental Innovation as a natural part of our mindset, behaviour and decision-making process.

## VALUE CREATION

**GLOBAL RECOGNITION**  
*as a responsible business*

**PROFITABLE, SUSTAINABLE**  
*business growth*

*More*  
**SUSTAINABLE VEHICLES AND CHOICES**  
*for our customers*

**REDUCED ENVIRONMENTAL IMPACT**  
*and conservation of resources*

*Long-term economic*  
**DEVELOPMENT**

*Local and global opportunities for*  
**COMMUNITIES**

**TOP TALENT**  
*attracted*

**EXPERIENCES OUR CUSTOMERS LOVE, FOR LIFE**



## OUR PEOPLE AND CULTURE

# GROWING

## OUR CULTURE OF ENVIRONMENTAL INNOVATION

### IN THIS SECTION

- ▶ 12 Introduction
- ▶ 12 Our people vision
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## 2020: WHAT WE'RE AIMING FOR

Establish Jaguar Land Rover as an employer of choice, with sustainability being a key feature of

**OUR CULTURE.**

Embed Environmental Innovation at the heart of our  
**DECISION-MAKING.**

Nurture a robust pipeline of

**NEW SKILLS  
AND TALENT**

that will help us create and deliver Environmental Innovation to support a sustainable future.

Targets are for Fiscal Year 2020/21.

## PROGRESS HIGHLIGHTS



ENVIRONMENTAL INNOVATION ENGAGEMENT DELIVERED THROUGH AN **INTEGRATED, MULTI-CHANNEL COMMUNICATION CAMPAIGN** FOR RESPONSIBLE BUSINESS WEEK.



**£2.3 MILLION INVESTED** IN PERSONAL SKILLS TRAINING ALONE IN 2014/15.

**HIGHEST-RANKING** AUTOMOTIVE MANUFACTURER IN THE TIMES TOP 100 GRADUATE EMPLOYERS LIST.



**ENVIRONMENTAL INNOVATION OBJECTIVES** INTEGRATED INTO ALL BUSINESS FUNCTIONAL SCORECARDS.



## INTRODUCTION

Jaguar Land Rover continues to develop and transform, supported by a talented workforce, which has increased in number by around 50% since 2012.

Our international reach is also growing, reflected in a 78% year-on-year increase in our directly employed international workforce and a 33% increase in international assignments.

To deliver our business passions of Customer First, Great Products and Environmental Innovation we need people with the right skills, vision and courage.

We know that our performance will continue to be powered by the great people we have working for and with us. Their expertise and talent are key to unlocking our full potential and delivering responsible, sustainable growth in the coming decades.

## OUR PEOPLE VISION

Our business is our people. Reflecting and supporting the Jaguar Land Rover purpose, our people vision is focused on great people delivering experiences our customers love, for life. The way we achieve this is through our strategic pathways of having great people in every role, working exceptionally together, with everyone giving their best.

### GREAT PEOPLE IN EVERY ROLE

We are investing significantly in the future through recruitment, training and development. During the year, we launched a new talent review and development process for senior managers, ADVANCE, our leadership excellence programme targeting individuals with senior leadership potential, and created the Jaguar Land Rover Academy, which offers learning and development for all levels of experience.

We also offer a unique and innovative Technical Accreditation Scheme (TAS), which brings together seven top universities to deliver skills development in specific, key technical disciplines.

People leaving the military have valuable transferable skills. In July 2014, we signed up to the UK's Armed Forces Corporate Covenant and began work with the Career Transition Partnership to raise our profile as an employer of choice. Our Invictus Games work placement programme saw the first five successful participants offered a permanent position. We recruited a total of 100 ex-military personnel in 2014/15 and are aiming for a 50% increase year on year.

For Jaguar Land Rover, improving gender balance in the automotive industry is a high priority, which we are addressing through targeted programmes to promote engineering careers among young people. Women account for 11% of our workforce and 10% of our leadership roles (slight increases compared to the previous year). Females made up around 21% of the graduate intake and 29% of undergraduate placements. We run a number of initiatives to attract female school pupils, undergraduates and graduates to our business, which are helping us increase our talent pool and recruit more women.



More than  
**35,000**  
employees worldwide

**1,800**  
Jaguar Land Rover  
employees work outside  
the UK

**8%**  
of our apprentices are  
female compared to a  
national average of 5%

**200,000**  
learning hours  
committed by our  
engineers to TAS master's  
degree-level modules



## OUR PEOPLE VISION

## HELPING TO ADDRESS THE SKILLS AGENDA IN THE UK

Having a pipeline of people with the right skills to enable research, development and manufacturing is crucial for us to grow in the UK and for us to compete globally. We continue to lead the dialogue with Government, suppliers and skills agencies in the UK to help address the skills agenda for our industry. We have joined with other employers to play a central part in the skills Trailblazer initiative led by the UK Department for Business, Innovation and Skills, which is focusing on designing world-class apprenticeships.

200,000

shortfall in qualified engineers in the UK by 2020

Royal Academy of Engineering.

We are the principal sponsor of the £10.5 million Warwick Manufacturing Group Academy for Young Engineers and are also providing financial support for the building of a second Academy in Solihull, due to open in 2016.

We have also announced the Jaguar Land Rover Academy, the first of its kind in the UK automotive sector to be set up, which offers all of our workers the opportunity for continuous development. The Academy will give renewed focus to our £100 million annual investment in skills and will strengthen the links between training and business needs. All training provided through the Academy will meet the quality levels defined by a recognised and standardised accreditation process.



## INVESTING IN THE FUTURE

Our investment in award-winning apprentice and graduate programmes is key to attracting and developing the brightest talent to secure our future. Our apprenticeship programme provides students with a strong blend of academic learning and real-world work experience in cutting-edge product development and manufacturing environments, while graduate joiners get a great start on our two-year personal and professional development programme. We're the highest-ranking automotive manufacturer in the prestigious Times Top 100 Graduate Employers list and sixth in The Guardian Top 300.

£2.5 million invested in apprentices in 2014/15

More than £500,000 invested in graduate development in 2014/15

2,500 graduates and apprentices taken on in the past five years

## OUR PEOPLE VISION



I feel confident that I'm competent and enabled to make a positive and meaningful contribution in my role."

Onboarding survey at 6 and 12 months' service.

## WORKING EXCEPTIONALLY TOGETHER

Working together is essential to our long-term future.

We are striving to reduce the waste of resources by streamlining many of our business processes and policies. Projects like the Jaguar Land Rover Way ensure that our employees and partners have the information they need to do the right things at the right time, and we continue to invest in and increase our use of social technology, reducing the need for people to travel and

encouraging smarter working among our employees. In our work environments we have multiple projects under way to build, expand and refurbish facilities to enable better ways of working.

We have a clear focus on measuring and rewarding performance for delivering business behaviours, as well as corporate objectives aligned to the Company's balanced scorecard.

We are committed to working in partnership with employee representatives and supporting employee development.

## EVERYONE GIVING THEIR BEST

We're committed to treating our people with respect, promoting equal opportunities and ensuring a safe, pleasant and welcoming workplace for all. We have a good level of employee engagement – reinforced through regular communication – ensuring that business information is shared appropriately, and that our people and/or their representatives are given every opportunity to participate in discussions on key business issues.



77%

employee engagement score

Average Pulse survey score. Comparable with upper quartile high-performing benchmarks.



97%

positive response

Onboarding survey at 6 and 12 months' service.



## KEY AREAS FOR OUR PEOPLE FOCUS

We have a number of focus areas in 2015/16. As we expand our Company and develop our culture, we will continue to manage workforce growth and ensure that new hires are integrated effectively into the workforce. As part of identifying and nurturing talent, we will continue to develop processes to support this. Finally, we aim to build on our training success to offer more technical and leadership training.

# ENVIRONMENTAL INNOVATION AT THE HEART OF OUR BUSINESS CULTURE

## Embedding the principles of Environmental Innovation into our collective mindset and behaviours is an important part of our sustainability strategy.

We communicate regularly with employees and run campaigns to involve and engage them with this key business passion. We are raising the priority of environmental criteria within our decision-making, forming multi-disciplined teams to try out new ideas and approaches and rewarding employees who demonstrate the right behaviours. This is also achieved by ensuring that all functions across the business have targets addressing Environmental Innovation, as part of their own functional and personal annual objectives.

## ENGAGING THROUGH SPECIAL CAMPAIGNS

Following our award win as Business in the Community's (BITC's) Responsible Business of the Year 2013, we ran an integrated, multi-channel engagement campaign for Responsible Business Week 2014 to communicate our achievements, encourage discussion and offer ways for people to contribute further to our journey. During the week, we ran various activities and events across five UK sites.

### 800 BITC MEMBERS ENGAGED

Our campaign for Responsible Business Week 2014 had a strong external focus, including representation to 800 BITC member companies at the London Responsible Business Week conference.

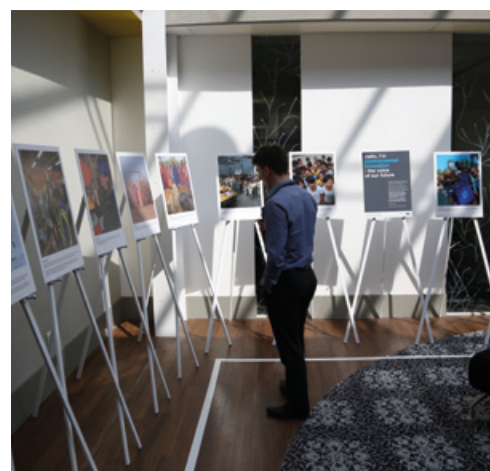
**BUSINESS  
IN THE  
COMMUNITY**

Activities included:

- **Online daily comment and broadcast footage** hosted via our intranet;
- A desktop login screen which targeted **15,000 people** with daily messaging;
- More than **50 interviews** conducted with a wide variety of employees and key stakeholders to gather and record opinion from across the business;
- **Debate on topical issues**, with a Battle of Ideas event and talks; and
- Large format, outdoor LED screens displaying our core messages, **to reach people on day and night shifts** at our manufacturing sites.

## ENGAGING EVERY DAY

As well as targeted campaigns to coincide with specific events such as Responsible Business Week, we communicate our Environmental Innovation strategy on an ongoing basis. For example, we have large format wall signage and messaging across multiple sites; a specially created suite of digital communications and assets, including our interactive strategy map; and a Google+ community where employees can share topics, ideas, views and external content.



RESEARCH, DESIGN AND INNOVATION

# SHAPING SUSTAINABLE VEHICLES

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## 2020: WHAT WE'RE AIMING FOR

### REDUCED FLEET AVERAGE TAILPIPE EMISSIONS AND IMPROVED FUEL ECONOMY

in line with evolving legislation, through lightweighting, internal combustion engine improvements, alternative powertrain research, and energy-saving technologies (see page 58 for our tailpipe CO<sub>2</sub> emission and fuel economy targets).

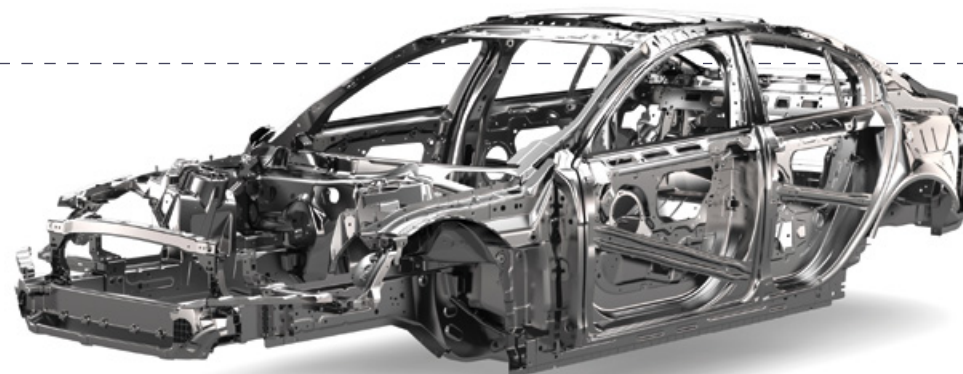
Achieve 30% reductions in key  
**ENVIRONMENTAL  
IMPACTS OVER  
THE LIFE CYCLE**  
of our vehicles (vs 2007).

Targets are for Fiscal Year 2020/21.

## PROGRESS HIGHLIGHTS



XE IS THE **BEST-PERFORMING JAGUAR TO DATE** FOR ITS LIFE CYCLE IMPACT. IT HAS 12% LOWER CO<sub>2</sub>e IMPACT THAN ANY OTHER JAGUAR MODEL OVER ITS LIFETIME.



LAND ROVER DISCOVERY SPORT HAS LIFE CYCLE IMPACTS IN CO<sub>2</sub>e TERMS MORE THAN **10% LOWER** THAN THE MODEL IT REPLACES.



CONTINUED OUR COLLABORATIVE RESEARCH PROGRAMME – PURSUING **INNOVATIONS IN MATERIALS, DESIGN AND ENGINEERING** TO DELIVER LIGHTER AND MORE FUEL-EFFICIENT VEHICLES.



# INTRODUCTION

Combating emissions is one of the biggest challenges for the automotive industry today. For a manufacturer like Jaguar Land Rover, who produces high-performance premium vehicles, the challenge is to significantly reduce the carbon footprint of the vehicle fleet while maintaining the capability, performance, refinement and comfort our customers expect.

Our focus is on managing whole life impacts through leading-edge research, design and technology. This has already helped us reduce our European fleet average tailpipe CO<sub>2</sub> emissions by 25% since 2007, delivered through lightweighting, advanced aerodynamics, hybrid powertrains and low-friction technologies.

Our future vision is to continue to reduce emissions and improve fuel efficiency while still delivering the luxury, performance, refinement and comfort our customers expect. From optimising the internal combustion

engine, to advanced hybrid and battery electric propulsion systems, the introduction of new, lightweight materials or the improvement of energy conservation through more efficient heating and ventilation technologies, we are exploring every avenue.

Taking a holistic approach, we are combining both design and engineering to drive innovation in propulsion systems, weight reduction and vehicle energy conservation, to reduce the real-world emissions of Jaguar and Land Rover vehicles by 2020 and beyond.



Any innovation needs to create an experience our customers love for life: it either produces a smile on their face, simplifies their life or makes them talk about it. This approach drives our collaborative research programme, enabling us to make vehicles of the future that are even more desirable, capable, cleaner, connected and smart.”

DR WOLFGANG EPPLER, DIRECTOR OF RESEARCH AND TECHNOLOGY



## FOCUSING ON OUR CUSTOMERS: FIVE KEY TECHNICAL RESEARCH PILLARS

- 1 DESIRABLE**  
A hugely important quality in the premium vehicle market. Jaguar Land Rover's success is built on its design strength, brand appeal and corporate reputation.
- 2 CAPABLE**  
The ability to go places, and do things, that other vehicles can't.
- 3 CLEAN**  
Driving towards low- and zero-emission vehicles. For tailpipe CO<sub>2</sub> emissions performance, see page 41.
- 4 CONNECTED**  
Staying in touch with the world, even when driving.
- 5 SMART**  
Intelligent vehicles that can even drive themselves.



# WHOLE LIFE THINKING

Environmental Innovation is at the heart of our approach to vehicle design and production, today and for the future. Our focus is on measuring, managing and reducing CO<sub>2</sub> alongside a whole range of other environmental considerations across the lifetime of the vehicle.

## PERFORMANCE THROUGH INNOVATION

Our whole life knowledge has helped to make the XE (below) the best-performing Jaguar to date for its life cycle impact. It has a 12% lower CO<sub>2</sub>e impact than any other Jaguar model over its lifetime, is more than 20% lower in CO<sub>2</sub>e terms than the previous Jaguar of this type and 10% better in terms of resource efficiency.



20%  
lower in CO<sub>2</sub>e terms  
than the previous  
Jaguar of this type



## OUR APPROACH

It is important that we consider environmental impacts over the whole life cycle of our vehicles. Life Cycle Assessment (LCA) enables us to understand the total environmental impact of a vehicle, identifying where our biggest impacts lie and then using this to inform future research and product development. [Read more about the Discovery Sport LCA on page 20.](#)

We've continued to develop our Rapid Life Cycle Assessment tool, which enables engineers to assess the environmental impact of various components during the design process. The tool's scope has been extended beyond CO<sub>2</sub>, enabling us to consider other important emissions, from air and water, to resource use. Combining results from LCA with environmental profit and loss calculations allows us to identify and prioritise key commodities to focus on, according to their impacts.

We have fed our learning around resource efficiency and closed-loop processes into the Sustainable Value Chain Programme at the University of Cambridge Institute for Sustainability Leadership (CISL). The programme runs annually, bringing our multi-functional teams of specialists together to collaborate with experts from across our supply chains. We are systematically addressing the impacts of our top 12 commodities through Cambridge and Warwick Universities, as well as numerous other academic and industrial partnerships. Findings from the programme, to date, will be published in 2016.

We're also collaborating and sharing knowledge through the global Aluminium Stewardship Initiative (ASI). As part of this group, we have been working on a performance standard for the whole supply chain, with the aim of raising the bar not only in materials stewardship but also in labour standards and human rights. The ASI Performance Standard was developed through a multi-

stakeholder process and launched in December 2014. We are working with a growing membership to support the development of a governance model, an assurance model and a chain of custody standard for ASI's independent third-party certification programme.

## CLOSING THE LOOP: NEW CIRCULAR ECONOMY MODELS

The Company has a long history of leadership in aluminium. Through the REALCAR project (REcycled ALuminium CAR), we have created a unique closed-loop process by teaming up with our key supplier (Novelis) to ensure maximum use of the aluminium alloys in our vehicles, reduce reliance on virgin material and lower the environmental impact. The REALCAR2 project was a further two-and-a-half year programme, which looked at building lightweight automotive body structures using aluminium sheet derived from lower-cost, energy-efficient sources, with an increased amount of aluminium scrap from post-consumer waste streams. The project also considered the longer-term potential of end-of-life vehicle waste.

A key goal was to develop a high-performance, lower-cost automotive aluminium alloy with a modified chemistry that is a product of carefully developed scrap recovery and separation processes. The target is to enable up to a further 25% of recycled aluminium to be sourced from post-consumer sources through developing a cost-effective separation process to exploit aluminium-rich, non-ferrous waste sourced from mechanical biological treatment plants. We are taking the learning and groundwork forward from these projects into future programmes.

[For more about our REALCAR project, including the work we have done to achieve full segregation and a high rate of recycling from press shop aluminium scrap, see page 31.](#)



## VEHICLE END OF LIFE

Our vehicles are designed to be 85% recyclable and 95% recoverable at the end of their life.

We want to ensure our vehicles are disposed of responsibly, and that the materials and components that can be reused or recycled are salvaged at the end of their life. Our dealerships in the European Union advise customers on how to dispose of their vehicles through our free take-back programme. In the UK, there are 250 take-back points, all of which are operated by a supplier, CarTakeBack, and licensed by the Environment Agency as authorised treatment facilities. You can find a list of these facilities at [www.cartakeback.com](http://www.cartakeback.com).

We have teamed up with the Materials and Design Exchange (MaDE) on an industry study to review the processes and stages that materials go through at the end of a vehicle's life, with the aim of improving opportunities for reuse and enabling the automotive industry to more fully exploit the potential of these materials.

# VEHICLE LIFE CYCLE ASSESSMENT: LAND ROVER DISCOVERY SPORT

To achieve the breakthroughs we're seeking, we use the knowledge we gain through LCA, independently verified scientific studies of vehicle life cycle impacts in alignment with international standards.

It's an integrated approach that provides the technically rigorous data we need to deliver step changes in sustainability. Jaguar Land Rover was one of the first UK vehicle manufacturers to complete such an assessment.

Land Rover Discovery Sport has life cycle impacts\* in CO<sub>2</sub>e terms more than 10% lower than the previous model and is the lowest life cycle impact vehicle ever in the Discovery family of vehicles.

## MATERIALS REUSE

Reuse of materials in components such as wheel arch liners, engine covers, carpets and speakers will help to divert approximately 7,000 tonnes of materials from landfill.

## IMPROVED FUEL EFFICIENCY

Our new engine range in Discovery Sport improves fuel efficiency and reduces corresponding CO<sub>2</sub> emissions by up to 14%.

## WHOLE LIFE DESIGN

Discovery Sport is the first in the Discovery family to benefit from being virtually dismantled before manufacture, to ensure that it can be dismantled and its materials safely recycled at end of life.

## INNOVATIVE THINKING

Reuse of plastic and natural cotton in the rear loadspace reduces life cycle impacts by over 50% when compared with virgin plastic, kilogram for kilogram.

## ADVANCED ENGINEERING

The vehicle switches between two- and four-wheel drive to improve mpg performance.

## LIFE CYCLE ASSESSMENT STAGES



### VEHICLE DESIGN

Reducing life cycle impact means building sustainability into vehicle design from the beginning.



### RAW MATERIALS AND COMPONENTS

We work with our suppliers on improvements that deliver sustainability win-wins.



### TRANSPORTING COMPONENTS TO OUR FACTORIES

Truck fuel efficiency is one of the key ways our inbound transport suppliers can help us reduce CO<sub>2</sub> emissions.



### MANUFACTURING

Efficient factories that save energy, water and waste help drive down the life cycle impact of the vehicles we create.



### TRANSPORTING VEHICLES TO CUSTOMERS

We're switching from road to rail or sea where possible and supporting our service providers to obtain the precise data that will help drive even more efficient operations.



### OUR VEHICLES IN USE

From lighter, more efficient vehicles and investment in hybrid and electric vehicles, we're pursuing innovation on every front.



### END OF LIFE

Before the vehicle exists in physical format we can use the virtual world to design, engineer and assess key systems for recycling and reuse – which could be 30 years before the vehicle actually reaches the end of its life.

\* Discovery Sport LCA will be third-party verified in line with all other vehicle LCA's completed to date.

# OPTIMISING THE INTERNAL COMBUSTION ENGINE

Alongside our electrification and hybridisation research, we're developing cutting-edge technologies that improve the low carbon performance of conventional powertrains, including diesel.

Diesel is valued by customers for its fuel economy and cost efficiency. For Jaguar Land Rover and the industry as a whole, efficient diesel is an important enabler in meeting CO<sub>2</sub> obligations. However, the current debate about diesel and air quality could have a significant impact on the industry's ability to contribute to a significant reduction in emissions and meet its carbon reduction commitments in Europe.

## HOW DOWNSPEEDING REDUCES EMISSIONS

Downspeeding reduces the internal friction and pumping losses incurred by all internal combustion engines, increasing fuel efficiency and reducing CO<sub>2</sub>. To support the aggressive downspeeding strategy in our Provoque research prototype, Valeo (a project partner and multi-national automotive supplier based in France) is providing its 48-volt mild hybrid belt starter generator (BSG) and electric supercharger technology while RAICAM is providing an innovative clutch-by-wire solution to mitigate the noise, vibration and harshness issues normally associated with downspeeding.

## JAGUAR LAND ROVER PROVOQUE: EFFICIENT DIESEL RESEARCH

The Provoque collaborative research project, with Jaguar Land Rover as lead partner, is exploring how today's Range Rover Evoque could be developed into a sub-100g CO<sub>2</sub>/km vehicle.

Using advanced hybrid and diesel technology, the goal of our Provoque research is to drive down emissions with no compromise on drivability or noise, vibration or harshness. The key concept is engine downspeeding.

In this case, we have integrated a low-cost, 48-volt electric motor system with our four-cylinder two-litre diesel Ingenium engine to produce a mild hybrid diesel powertrain prototype.

The use of an e-compressor is another Provoque innovation. This works like a turbocharger, but is driven by an electric motor rather than exhaust gas, in contrast to a conventional diesel engine. The design produces high levels of torque even at very low engine rpm – another advance on conventional diesel.

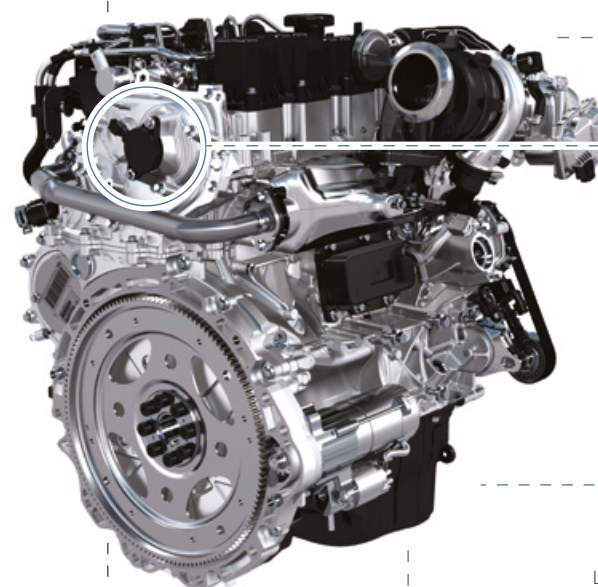
**DATA** For tailpipe CO<sub>2</sub> emissions performance, see page 41.

**80%**  
lower NOx emissions vs 2007\*,  
in line with industry standards,  
from our Euro 6 diesel engines

\* Relates to on cycle limits.

## INGENIUM: FLEXIBLE FUTURE-PROOFING

The design brief for our new Ingenium engine family included rapid and cost-effective configuration and the ability to use it in rear-drive, all-drive and four-wheel-drive vehicles. Beyond that, we also looked 10 years ahead and designed Ingenium to be able easily to accept new technologies as they are developed – such as our electric drive module (eDM; see page 22), giving us the potential to extend Ingenium into hybrid powertrains.



### LOW-PRESSURE EXHAUST RECIRCULATION

Feeding cleaned, cooled exhaust gases back into the engine improves efficiency, reduces fuel consumption and CO<sub>2</sub> emissions and helps the new XE achieve Euro 6 compliance.

### VARIABLE EXHAUST CAM TIMING

All Ingenium diesel engines feature variable exhaust valve timing to make sure the catalysts reach optimum operating temperature as fast as possible, to reduce exhaust emissions.

### LOW-FRICTION DESIGN

Roller bearings, variable-flow oil and coolant pumps and an offset crankshaft enable the Ingenium diesel to reach benchmark low levels of friction, giving the new Jaguar XE the capability to emit just 99g/km CO<sub>2</sub>.

### SELECTIVE CATALYTIC REDUCTION

The Ingenium engines use selective catalytic reduction (SCR) technology to cut NOx emissions to very low levels.

## COLLABORATIVE RESEARCH

Our collaborative research and development (R&D) programme brings together some of the best engineering minds in the UK. The funding provided by Innovate UK, the UK innovation agency, is matched by Jaguar Land Rover across a number of projects. This allows us to multiply the effect of our investment and helps develop the next-generation technologies and skills that benefit the UK's low carbon economy.

More than  
**£3 billion**  
invested in 2014/15.  
**Jaguar Land Rover is the  
biggest investor in the UK  
manufacturing sector**

### CENTRES FOR ADVANCED RESEARCH

Jaguar Land Rover is investing in the new **National Automotive Innovation Centre (NAIC)**, pictured, currently being built at the University of Warwick. This will serve as a generator of new skills and new thinking, providing a perfect, collaborative environment for all partners to learn, research and develop new designs and technologies. We will more than double the size of our advanced research team to 500 people by the time the NAIC opens.



## ALTERNATIVE POWERTRAINS

Since 2008, we have doubled the number of powertrain engineers in our organisation and invested in the R&D of future solutions for both the internal combustion engine and alternative powertrains.

We are pursuing a bold electrification research strategy and, for the last seven years, we've been carrying out extensive R&D in advanced hybrid and battery electric propulsion systems.

In 2013, we announced Evoque\_e, a long-term, pure research project looking beyond 2020 to explore all aspects of future hybrid and advanced battery technology in vehicles, part-funded by Innovate UK, the UK's innovation agency.

Evoque\_e brings together 12 UK technology partners with leading engineers and technologists from academia, the supply chain and industry to collaborate on creating a number of unique and innovative solutions.

### KEY DEFINITIONS

**Battery electric vehicle** – a type of electric vehicle (EV) that uses chemical energy stored in rechargeable battery packs.

**Mild hybrid electric vehicle** – generally internal combustion engines equipped with an electric machine allowing the engine to be turned off whenever the vehicle is coasting, braking, or stopped, yet restart quickly.

**Plug-in hybrid electric vehicle** – uses rechargeable batteries, or another energy storage device, that can be restored to full charge by connecting a plug to an external electric power source.

## ELECTRIC DRIVE MODULE: PIONEERING LOW- AND ZERO-EMISSIONS POWERTRAIN RESEARCH

Through Evoque\_e, our team has developed a unique new design of high-performance, electric drive module (eDM) that could be used to create future low- and zero-emissions vehicles. Unlike most current production hybrids, the eDM architecture is also independent of the transmission and can be used in conjunction with any proprietary transmission. This allows it to be inserted between any engine and transmission to create a mild hybrid electric vehicle or plug-in hybrid electric vehicle, or used alone for a battery electric vehicle. Our prototype eDM can produce twice the power and torque of any electric motor generator in production today.

The team has also looked at the use of alternative materials to reduce the use of rare-earth materials and to optimise performance. More sustainable versions of the eDM are being developed which do not use rare earth materials for the magnets or copper for the windings. Instead, aluminium windings are used in place of copper, and steel-based ferrite magnets replace rare-earth neodymium magnets.

## ALTERNATIVE POWERTRAINS

### CONCEPT\_E RESEARCH DEMONSTRATORS

The Evoque\_e Project has produced three Concept\_e technology demonstrators, enabling project partners to evaluate and develop battery electric vehicle technologies that could form the basis of a range of future electrified powertrains, from hybrids to pure battery electric. The mild hybrid electric vehicle and plug-in hybrid electric vehicle demonstrators are unique designs with the electric motor generator integrated with the engine and transmission.



▲ **With our Concept\_e battery electric vehicle demonstrator** we're evaluating the use of two different types of electric motor generator and both single- and two-speed transmissions. A two-speed transmission allows motor downsizing, while delivering increased torque at the wheels – for efficiency and hill-climbing capability. Electrical energy is supplied by an advanced lithium ion battery pack designed by Jaguar Land Rover. This is equipped with both AC charging for use at a domestic supply and DC fast charging. Fully charged, the battery delivers high performance and a competitive range. Although it resembles a Range Rover Evoque, the demonstrator is a research vehicle not a design concept.



▲ **The Concept\_e mild hybrid electric vehicle demonstrator**, based on a Range Rover Evoque, features a prototype three-cylinder diesel engine (90 PS). The motor generator is powered by an advanced 48-volt electrical system and 48-volt lithium ion battery pack. The mild hybrid electric vehicle is designed to maximise energy recovery and reduce fuel consumption and CO<sub>2</sub> emissions to a minimum using sustainable low-cost, electric motor generator technology.



▲ **The Concept\_e plug-in hybrid electric vehicle demonstrator** has a similar architecture as the mild hybrid electric vehicle but the engine (Ingenium four-cylinder petrol, 300 PS) and eight-speed transmission are longitudinally mounted. The electric motor generator fits neatly between the engine and proprietary transmission. A unique brake-by-wire system developed in-house at Jaguar Land Rover maximises energy recovery through all four wheels – through regenerative braking when the vehicle is decelerating (also used in the Concept\_e battery electric vehicle demonstrator).

## REDUCING WEIGHT

Jaguar Land Rover is a world leader in the use of aluminium to reduce weight and improve handling, fuel efficiency and emissions.

Our Ingenium family of aluminium engines and our leadership in the application of lightweight technologies have already produced vehicles that are lighter and more efficient. Recent introductions include the Jaguar XE, the all-new Jaguar XF and Jaguar's all-new performance crossover, the F-PACE.

But it doesn't stop there. Research and innovation in new designs, technologies and materials are the key to driving even more weight out of our vehicles, not only from engines and body structure but from every part of the vehicle.

### CARBON FIBRE INNOVATIONS

Carbon fibre is an ideal material – both extremely strong and light. Two Jaguar Land Rover projects are researching how we could make carbon fibre more environmentally friendly and cost effective, while improving its noise, vibration and harshness properties and making it easier to manufacture.

The CARBIO project is looking at combining carbon fibre with flax, a natural plant material, to improve its sound-deadening properties. The project is also looking at how to make carbon fibre more sustainable by replacing epoxy resin with a more sustainable resin derived from the shells of cashew nuts.



The Varcity project is investigating the construction, bonding and volume manufacturing process of entire bodyshells from carbon fibre (pictured above), with enhanced noise, vibration and harshness properties compared to current carbon fibre applications. The Varcity project is evaluating how we could introduce carbon fibre materials into our existing mixed-material strategy for body structures.

Another project is investigating how to reduce the weight of soundproofing materials in our vehicles. The LANDS project is developing innovative new lightweight sound-deadening materials. The team has developed a new material from post-consumer recycled plastic combined with a filler sustainably sourced from the sugar refining process. It has been used to create a prototype wheel arch liner that is 9% lighter than the component in use today, but with the same high levels of soundproofing.

## REDUCING WEIGHT

## LIGHTWEIGHT SEAT STRUCTURE

As part of a £2 million research project, part-funded by Innovate UK, we're leading a consortium to develop a prototype thermoplastic, lightweight seat architecture that weighs 30% less overall than an equivalent steel seat. With the PLACES prototype (premium lightweight architecture for carbon efficient seating) the seat structure and the comfort system are one and the same. This integrated design reduces the volume and depth of foam needed and provides a slimmer, lighter-weight seat without impinging on comfort.

## PRINTED ELECTRONICS

Today's vehicles are smarter and more connected than ever before. There are more than 175 electrical features available on our current vehicles, not including connected vehicle and infotainment features. This is why we're investigating whether a vehicle's wiring loom and electrical components could be replaced with innovative, wafer-thin printed electronic circuits. As well as saving weight, these would save space and give our customers more room in the cabin. Our research project is testing under low temperatures, assessing how the circuits and the materials used in them stand up to the harsh operating conditions of a vehicle in use.



► Our PLACES prototype: 30% lighter compared to steel, with no compromise on comfort.

## SAVING ENERGY

Developing new ways to conserve vehicle energy and avoid parasitic losses is another important strand of our low carbon research and development.

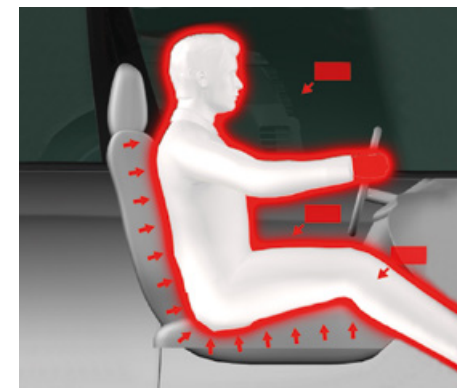
## REDUCING ENERGY LOSSES

Heating, cooling and air conditioning (HVAC) systems use substantial energy. In today's conventional powertrains, along with drag and friction, the potential energy loss can have significant adverse effects on fuel economy and emissions. In electric vehicles, the impacts are different but just as important. Energy demand from HVAC can reduce a battery electric vehicle's range by up to 40% if used continually, affecting everyday use and creating range anxiety.

## ENERGY-EFFICIENT HEATING AND COOLING

These challenges have led us to completely rethink how we heat and cool the cabin of a car. In one of our research projects, we're looking at innovative techniques that focus on the occupants themselves.

Instead of more energy-hungry conventional HVAC, which heats the cabin air, our Warm Air Blanket is designed to deliver warmth directly to the occupant through porous seat surfaces and infra-red panels. Special radiating panels are invisibly embedded in sun visors, door tops, glove box door and other surfaces, effectively surrounding each occupant in their own microclimate. The steering wheel is also heated.



## WARM AIR BLANKET RESEARCH

The Warm Air Blanket produces an almost immediate sensation of warmth on the skin – without having to wait for the engine to heat the car. User trials will investigate whether it's possible to provide the same sensation just by warming the face, hands and feet without having to heat the whole body. It's one of the many research areas we're working on to cut parasitic energy losses and reduce the carbon footprint of our vehicles.



50%  
reduction in  
energy demand

Using a combination of techniques, early results show it's possible to reduce the consumption of an HVAC system by half, from 8–12kW, to 4–6kW.

## THE CHANGING URBAN SCENE

As the world is growing and changing, so are people's expectations, and this is causing a rapid evolution in technological innovation. Vehicles are advancing in intelligence and capability, and we are discovering the potential of how we might travel in the future.

### GROWING CITIES

There are two main drivers for change. First, the world's population is growing and becoming more affluent, bringing opportunities and challenges, including pressure on transport systems, fuel prices and natural resources. The second driver is the growth of the megacity. Today, there are 24 megacities, each with a population of more than 10 million. Their number is set to double by 2025.

Our customers already spend more time commuting in their vehicles than ever before and we are looking at new ways to help our customers travel in future. We want to enable our customers to be more connected, using technological innovation to help them communicate with their vehicle and the vehicles around them, to increase their awareness of the external environment and to offer a personalised driving experience. Through these and other innovations we aim to enhance the urban driving experience and reduce accidents on the road in an increasingly challenging environment.

For more about connected vehicle innovations, see page 43.



The future of mobility is abstract, undefined and open to innovation. It's not about throwing away the products we love. Ours is a parallel track of ideas to future-proof the business and seek long-term growth. Invention in the digital space is our most creative frontier."

ADRIAN HALLMARK,  
GROUP STRATEGY DIRECTOR



### A FUTURE TRANSPORT VISION

In the far future, there will be a shift from individual mobility towards a more collective vision. Vehicles will be connected with each other. Places will be connected to each other in different ways. Autonomous vehicles will also be part of the solution to mobility challenges.

Smartphones and connectivity are already enabling this more mobile and urban lifestyle. More and more consumers use their smartphone to decide when and where to travel and plan door-to-door journeys, viewing real-time traffic and transport information to provide greater freedom and flexibility.

Technology and connectivity will enable increasing take-up of new services focusing on the access to goods and services when and where these are wanted.

### HOW WE'RE RESPONDING

Going forward, we recognise that a number of internal and external factors will influence the automotive market. This is likely to present major challenges for mobility but will also present future opportunities, which we will continue to monitor and assess to shape our future business.

Connectivity will play an important role in the development of technology such as InControl infotainment and Head-Up Display enables greater connectivity and enhanced experiences for Jaguar Land Rover's customers.

Furthermore, the increase in driver assistance and active safety features are major steps on the journey to autonomous driving. To support the development of other future innovative technologies, Jaguar Land Rover has opened its first overseas R&D facility in Portland, Oregon.

### OUR NEW OPEN SOFTWARE TECHNOLOGY CENTER

Our \$3 million (£2 million) Open Software Technology Center will focus on the development and application of advanced connected technologies and will help lead the development of future Jaguar and Land Rover infotainment systems, providing exciting new in-vehicle experiences for our customers of the future.

This entrepreneurial unit is moving at a fast pace, and has already started to explore new services to identify levels of customer interest and appeal.

The 15,000 square foot facility features a multimedia creative suite, innovation spaces, a development laboratory and a six-bay vehicle workshop. It employs a team of around 30 infotainment specialists, including 16 highly experienced software engineers.

OPERATIONS AND SUPPLY CHAIN

# DRIVING

## WORLD-CLASS MANUFACTURING AND OPERATIONS

### IN THIS SECTION

- ▶ 28 Introduction
- ▶ 29 Carbon neutral manufacturing
- ▶ 31 Managing natural resources
- ▶ 34 Building a sustainable supply chain
- ▶ 35 Reducing transport impacts
- ▶ 37 Occupational health, safety and wellbeing

2020:  
WHAT WE'RE  
AIMING FOR

## CARBON NEUTRAL

manufacturing operations.

## REDUCED CO<sub>2</sub> EMISSIONS AND WATER USE:

30% reduction (per vehicle vs 2007 baseline). ACHIEVED ahead of schedule.

## ZERO WASTE

across our operations.

## SUSTAINABLE SOURCING:

key criteria applied to all purchasing decisions.

## EFFICIENT LOGISTICS:

environmental impacts stabilised.

Targets are for Fiscal Year 2020/21.

## PROGRESS HIGHLIGHTS

### MET OUR 2020 TARGETS

FOR CO<sub>2</sub> EMISSIONS AND WATER USE AHEAD OF SCHEDULE (30% REDUCTION PER VEHICLE VS 2007).

▶ **79% REDUCTION IN MANUFACTURING WASTE** LANDFILLED PER VEHICLE SINCE 2007.



▼ **BEGAN CONSTRUCTION IN BRAZIL** OF OUR FIRST WHOLLY OWNED OVERSEAS MANUFACTURING FACILITY.



◀ WE'VE **REDUCED OPERATIONAL CO<sub>2</sub> EMISSIONS** PER VEHICLE BY 30.5% SINCE 2007.

**£36 MILLION TO BE INVESTED** IN REDUCING OPERATIONAL CO<sub>2</sub> EMISSIONS OVER THE NEXT THREE YEARS IN THE UK.

**100% UK MANUFACTURING ASSEMBLY CO<sub>2</sub> EMISSIONS** OFFSET IN 2014/15.

## INTRODUCTION

Although most environmental impacts in the vehicle life cycle come from the use phase, manufacturing and other business activities still account for a significant proportion. We have a clear roadmap for driving down our operational impacts, with a particular focus on energy, carbon, water, waste and the use of raw materials.

To help deliver our 2020 goals of carbon neutral manufacturing and zero waste, we work closely with our suppliers and partners, from the companies who supply us with components to the transport providers who deliver vehicles to our customers.

Operating to high standards also includes a strong focus on health, safety and wellbeing, to reduce risk and encourage a safety first culture in all our workplaces.

Environmental Innovation in our operations and decision-making is not only key to reducing adverse operational impact and risk but also to helping Jaguar Land Rover become a more competitive, efficient and agile business.

# 462,209

vehicles sold on a retail basis in 2014/15



### RECOGNITION

Awarded the **2015 Queen's Award for Enterprise in Sustainable Development** for reducing the environmental impact of our products and operations.



We continue to develop the foundations of our global manufacturing footprint, creating a stronger, more sustainable business with an unrelenting focus on process excellence and quality."

WOLFGANG STADLER,  
EXECUTIVE DIRECTOR,  
MANUFACTURING



# 130,000

vehicle production capacity in our joint venture manufacturing facility in China

# x3

Our Solihull plant has trebled production in five years

# ISO14001

All our sites are certified to the ISO14001 environmental management systems standard

# CARBON NEUTRAL MANUFACTURING

Our vision is for Jaguar Land Rover manufacturing operations to be carbon neutral by 2020. We're making good progress and are already experiencing the benefits through reduced costs, decreased reliance on natural resources and wide-ranging operational improvements.

## REDUCING MANUFACTURING EMISSIONS

Ahead of schedule, we've met our 2020 target for a 30% reduction in operational CO<sub>2</sub> emissions per vehicle (vs 2007). Having reached this milestone, we will be reviewing the target as part of our drive for continuous improvement.

Absolute emissions have risen by 12% in the context of rapid business expansion. This increase is decoupled from the actual scale of business growth through our continuing focus on energy efficiency, waste reduction and operational excellence.

We are planning to invest £36 million over the next three years in improving energy performance, through an integrated approach of efficiency, process change and renewable energy. As we invest in new and existing manufacturing facilities around the world, we're drawing on our expertise in Environmental Innovation to reduce the energy and natural resources we use to build our vehicles.

We're also investigating significant opportunities to reduce emissions through low carbon technologies such as heat recovery and combined heat and power, by optimising our manufacturing processes and through driving cultural behaviour change across our whole business.



32.3%

reduction in energy use per vehicle since 2007



30.5%

cut in operational CO<sub>2</sub> emissions per vehicle since 2007

(compared to 2007 carbon factors)

£36 million

to be invested in reducing operational CO<sub>2</sub> emissions over the next three years

OUR 2020 TARGET

**CARBON NEUTRAL**

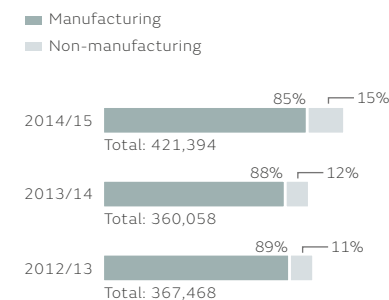
manufacturing operations

## SWITCHING ON THE LARGEST ROOF-MOUNTED SOLAR ARRAY IN BRITAIN

Our new £500 million Engine Manufacturing Centre near Wolverhampton was officially opened in October 2014 by HM The Queen. Covering an area equivalent to 14 football pitches, it will create 1,400 new jobs at full capacity. The building was commissioned with 21,062 solar panels (5.8MWp), and subsequently expanded to 22,622 panels (6.2MWp), which are capable of supplying 30% of the site's energy needs (equivalent to the energy required to power 1,600 homes) and reducing the plant's CO<sub>2</sub> footprint by over 2,400 tonnes per year.

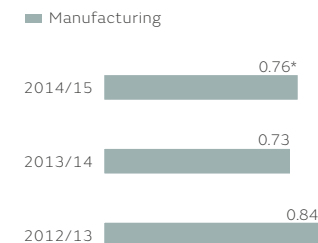


## TOTAL CO<sub>2</sub> EMISSIONS\* (tonnes)



\* Carbon emissions calculated using Jaguar Land Rover Carbon Reduction Commitment (CRC) Scheme data and DEFRA conversion factors for electricity and gas.

## CO<sub>2</sub> EMISSIONS PER VEHICLE PRODUCED (tonnes per vehicle)



DEFRA conversion factors have been used to calculate the CO<sub>2</sub> emissions associated with our electricity and gas use.

\* The UK CO<sub>2</sub> conversion factor for electricity deteriorated in 2014, resulting in an increase in CO<sub>2</sub> emissions from our use of electricity. When compared to the 2007 conversion factors, our performance was 0.73 tonnes per vehicle for our three vehicle manufacturing plants, representing a 30.5% reduction in CO<sub>2</sub> per vehicle. We track internal performance against the 2007 conversion factors so that we neither receive any benefit or adverse impact from varying external conversion factors.

## CARBON NEUTRAL MANUFACTURING

## ENERGY EFFICIENCY

As more customers around the world continue to choose our vehicles, our energy demands will increase. To reduce our impacts, we follow a holistic approach based on a total energy management hierarchy, shown below.

As part of our journey to carbon neutral manufacturing operations by 2020, investments in energy-efficiency projects across manufacturing and R&D operations

are made through a dedicated low carbon investment fund, managed by the Carbon Working Group. In 2014/15, the group invested in 19 projects – from employee engagement and training to oven burner replacements, metering upgrades and air flow optimisation technology. These projects are on target to deliver annualised savings of over 5,000 tonnes CO<sub>2</sub>e and cost savings of £1 million.

### OUR ENERGY MANAGEMENT HIERARCHY

Reduce our energy consumption through great design and innovation, efficiency measures, sustainable procurement and behaviour change.

Adopt technology and source energy through more sustainable opportunities such as heat recovery and energy from waste.

Investigate opportunities to generate renewable energy on a site-by-site basis.

Compensate for emissions from the residual energy we use, by investing in social and environmental projects that also benefit communities.

USE LESS

BUY WELL

RENEWABLE ENERGY

OFF-SETTING

### INVESTIGATING HEAT RECOVERY

We're investigating opportunities to recover heat lost from chimney stacks at our Solihull plant so that it can be reused as an energy source.

### SHARING OUR EXPERIENCE

We're one of 20 pioneers of The Curve, an experiment in peer-to-peer sharing of data and experience, designed to allow people looking at energy investments to see what their peers are doing. The aim is that this will help to accelerate investment in energy demand measures.

### INVESTING IN ENERGY-EFFICIENT LIGHTING

In 2014/15, we replaced over 700 light sources at our Solihull press shop with more efficient LED lighting technology. The savings totalled £98,000, including energy and maintenance. This is part of our largest single lighting project to date across various areas of our Solihull site.



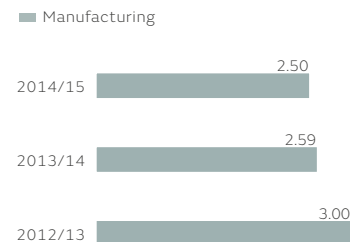
100%

manufacturing assembly CO<sub>2</sub> emissions offset to support sustainable development projects around the world

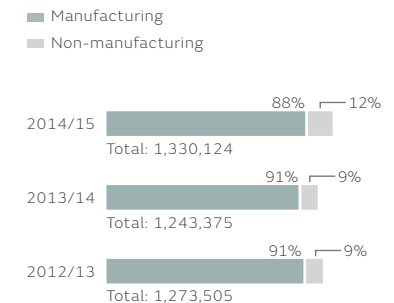
364,696

tonnes CO<sub>2</sub> emissions offset in 2014/15

### ENERGY USED PER VEHICLE PRODUCED (MWh/vehicle)



### TOTAL ENERGY USE (MWh)



While total energy use has risen in the context of major business expansion, our drive for greater energy efficiency has enabled us to decouple this level of increase from the full scale of business growth.

## MANAGING NATURAL RESOURCES

As we increase production, reducing the raw materials we use and the waste we send to landfill is a vital but complex challenge. We also see it as an opportunity – driving innovation and reducing costs. We want to lead our industry in finding innovative ways to use recycled and reclaimed materials.



### RECOGNITION

Commended at the **2015 Circular Economy Awards** in the “Leadership” and “Pioneer” categories for our commitments

### CLOSED-LOOP MANUFACTURING

As a responsible business we intend to use more sustainable materials – not only to help conserve natural resources, but to help secure our resilience as global demand for natural resources increases.

We believe the circular economy is an important strategy – placing a value on waste materials so that they are reused in place of natural raw and non-renewable materials. Jaguar Land Rover is a world leader in aluminium vehicle manufacture and we’re constantly increasing the amount of recycled aluminium we use in our vehicles through innovations such as REALCAR (opposite) and REALCAR2 (page 19). Now we’re looking at viable opportunities to apply the same model to other materials. We’re also switching to responsibly sourced organic materials where we can, such as wood, leather and natural rubber, in place of synthetics and plastics.

### CLOSED-LOOP WASTE MANAGEMENT IN ACTION

We’ve invested significantly in closed-loop waste recovery and recycling at our Halewood, Castle Bromwich and Solihull production plants. We now segregate all metal waste from the three press shops to maximise what can be recycled.

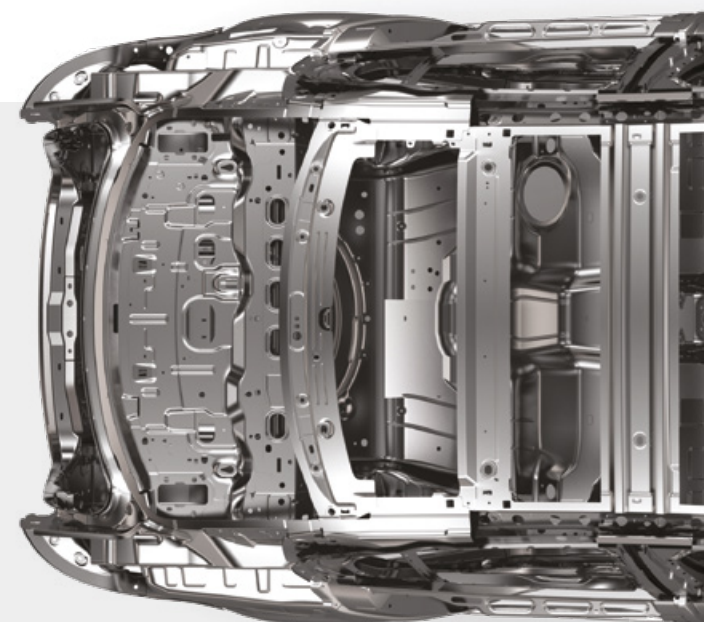
### OUR 2020 TARGETS

**75% RECYCLED ALUMINIUM** material to be used to make Jaguar and Land Rover vehicles

**ZERO WASTE** across our operations

**95%** greenhouse gas emissions associated with primary aluminium production are avoided by using recycled material

**£6 million** invested in a closed-loop system in our press shops to capture aluminium scrap for reuse



### JAGUAR XE AND REALCAR

REALCAR (REcycled ALuminium CAR) is our long-term and constantly evolving closed-loop materials model that makes use of a recycled aluminium alloy “RC5754”. The Jaguar XE is the first car in the world to make use of this new grade of high-strength aluminium, which was developed by our teams in partnership with Innovate UK.

Our supplier and partner Novelis has invested £6 million in expanding its UK Latchford Plant, and Jaguar Land Rover has invested over £6 million in its Press Shops, to ensure full segregation of waste metals to create the closed-loop system. During the period August 2014 to July 2015, we captured in excess of 30,000 tonnes of press shop aluminium scrap to be recycled back into our vehicles.

Using alloy RC5754 to build future Jaguar models will take us a significant step towards our goal of 75% recycled aluminium materials in our vehicles by 2020.



## MANAGING NATURAL RESOURCES

## WASTE

Our long-term aim is to avoid waste, through the efficient use of resources and by developing closed-loop processes in manufacturing and production.

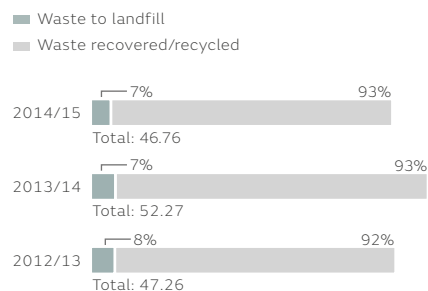
## LEADING THE INDUSTRY

We achieved a 79% reduction in manufacturing waste to landfill per vehicle since 2007, by raising awareness among employees to improve waste segregation and using recycling facilities that accept mixed waste material.

Our zero waste working group comprising of champions from across all operational facilities continues to work on identifying opportunities to reduce waste streams, driving reuse of materials and embedding “waste as a resource” philosophy.



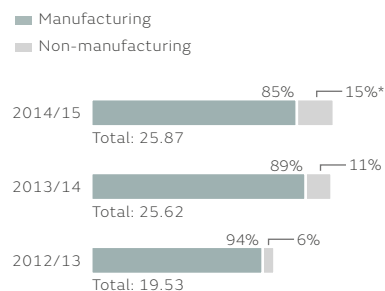
## MANUFACTURING WASTE PER VEHICLE PRODUCED (kg/vehicle)



79%  
reduction in  
manufacturing waste  
landfilled per vehicle

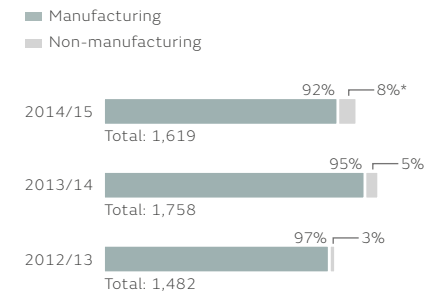
2014/15 vs 2007, excluding  
contractor building wastes  
and metals.

## TOTAL WASTE (thousand tonnes)



\* Total waste from our non-manufacturing operations has increased because of significant infrastructure changes (construction and demolition) as we expand our business. Waste to landfill has increased because of changes to the scope of data included.

## TOTAL WASTE TO LANDFILL (tonnes)


REDUCING THE  
IMPACTS OF  
SOUNDPROOFING

Our scientists and engineers have developed a new lightweight sound-deadening material using recycled plastic, combined with a filler sustainably sourced from the sugar refining process. We've also developed a highly effective prototype wheel arch liner that is 9% lighter than the component we use today.



## MANAGING NATURAL RESOURCES

## WATER EFFICIENCY

Ahead of schedule, we have beaten our 2020 target and achieved a 34% reduction in water use per vehicle produced (vs 2007) although absolute water use has risen in the context of significant business expansion. We will be reviewing our water-efficiency targets in light of projected business growth.

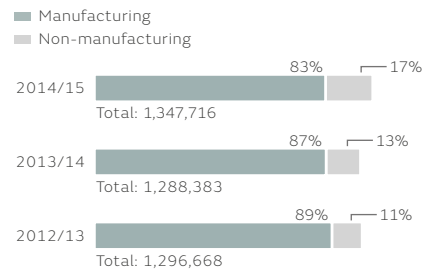
As rising demand and the impacts of climate change put increasing pressure on water resources, reducing our water consumption and that of our supply chain is critical for protecting the environment, reducing costs and ensuring our future resilience, especially as we expand operations into water scarce regions such as Brazil.

We're working to identify water-efficiency measures across all our sites. Some areas of our manufacturing operations – such as paint shops – depend on large volumes of water, and here we're making the most of opportunities to recycle and reuse water to reduce our impacts.

### LOOKING AHEAD

In 2015 and beyond, we are assessing the water-related impacts, risks and opportunities across our entire supply chain.

#### TOTAL WATER USE (m<sup>3</sup>)



#### WATER USE PER VEHICLE PRODUCED (m<sup>3</sup>/unit)



### OUR 2020 TARGET

**30% REDUCTION**  
in operational water use per vehicle produced  
based on 2007 levels.



2020 target achieved ahead of schedule

**34%**  
reduction in water use per vehicle produced  
based on 2007 levels

### AIMING FOR ENVIRONMENTAL EXCELLENCE IN BRAZIL

Our new manufacturing facility in Brazil is aiming to achieve the LEED (Leadership in Energy & Environmental Design) Gold standard. The site is located adjacent to watercourses which are designated as Permanent Preservation Areas – so minimising our water impacts is key.

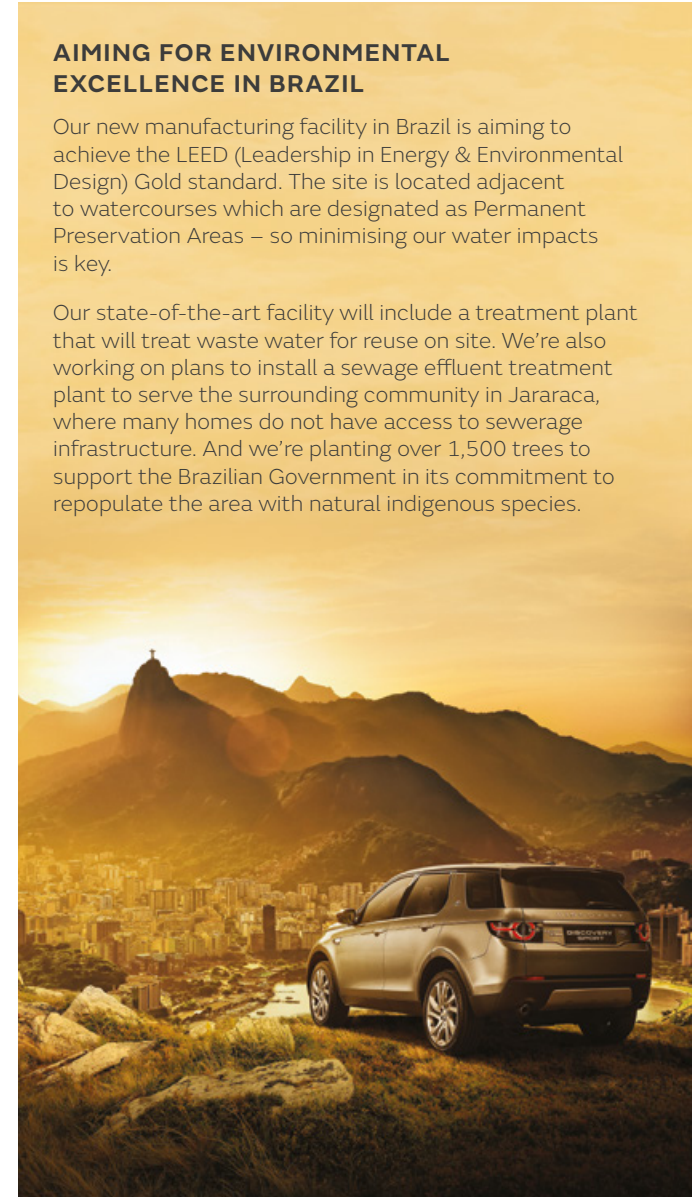
Our state-of-the-art facility will include a treatment plant that will treat waste water for reuse on site. We're also working on plans to install a sewage effluent treatment plant to serve the surrounding community in Jararaca, where many homes do not have access to sewerage infrastructure. And we're planting over 1,500 trees to support the Brazilian Government in its commitment to repopulate the area with natural indigenous species.



## PROMOTING BIODIVERSITY

As we continue to grow our operations in the UK and globally, our ecological footprint has also increased and we are developing ecology strategies for all our sites. We understand that early consideration of biodiversity is essential and allows for opportunities to effectively manage and, where possible, enhance biodiversity.

We're working on plans to create an ecological corridor for wildlife across the bottom of our Engine Manufacturing Centre site (pictured) near Wolverhampton. The corridor will be designed to encourage the natural movement of species from one side of the site to the other. We are also installing features such as bat boxes, habitat piles, dead wood stumps and insect houses to encourage small mammals, invertebrates, amphibians, bats and birds to the site.



## BUILDING A SUSTAINABLE SUPPLY CHAIN

As we expand our global network of suppliers, we want to work with people and companies that share our values on human rights, ethics and environmental responsibility.

### WORKING WITH OUR SUPPLIERS

Developing a supply chain that is responsible and that meets our high ethical and human rights standards is an ongoing challenge. We need to work with our suppliers to ensure high standards are met and to make the most of opportunities to reduce shared impacts.

The environmental, human rights and labour standards we expect of our suppliers are set out in our Supplier Sustainability Web Guide that forms part of the Jaguar Land Rover Global Terms & Conditions and the Supplier Code on Sustainability.

We require all strategic suppliers to be certified to the international environmental management standard ISO14001 and to demonstrate the ability to accommodate the requirements of our Supplier Code on Sustainability.

In 2014/15, we updated the Supplier Sustainability Web Guide with a new policy on Protecting the Environment, the 2014 Environmental Innovation Scorecard, Policy on Conflict Minerals and Achilles Automotive registration.

### LOOKING AHEAD

We are communicating with our suppliers on the Anti Bribery and Modern Slave Labour Acts, Due Diligence on Conflict Minerals legislation, our updated Environmental Innovation Scorecard and the addition of the Waste Hierarchy.

### SUPPORTING LOCAL BUSINESSES

Approximately 50% of our production suppliers (by spend) are in the UK. If non-production suppliers are included, the proportion of our UK spend is 54%. By 2016, we expect to spend an additional £1 billion with UK suppliers.

We plan to apply the same principles to new markets as we grow our global operations. In Brazil, we've secured commitment from food suppliers for our on-site canteen to supply locally sourced provisions – encouraging investment in agricultural and farming activities and supporting non-manufacturing-related employment in the area.

### DEVELOPING A SUSTAINABLE INDUSTRY-WIDE SUPPLY CHAIN

As a member of the CSR Europe European Automotive Working Group on Sustainability, we're developing the Self-Assessment Questionnaire, which aims to help the automotive industry better understand where key sustainability risks lie in the supply chain. The questionnaire enables companies to identify and select suppliers which comply with global regulations and industry-wide sustainability requirements. We're using the Self-Assessment Questionnaire as part of our pre-qualification requirement for new suppliers through the Achilles platform.

We purchase over  
**£12 billion**  
in goods and services  
every year through  
some **2,600** suppliers

### AVOIDING CONFLICT MINERALS

We support the main objectives of the Dodd-Frank Conflict Minerals Act, which aims to prevent the use of conflict minerals from the region classified as the Democratic Republic of Congo and the nine surrounding countries. Our current focus is on strengthening our due diligence by asking suppliers to complete a Conflict Mineral Reporting Template through the Achilles platform.



### ENGAGING WITH SUPPLIERS TO REDUCE EMISSIONS

We engage with suppliers to address climate change risks and opportunities through the Carbon Disclosure Project (CDP) Supply Chain Programme. In 2014/15, we invited 143 strategic suppliers, representing over 90% of our total spend, to submit information to the programme. 69% responded, with nearly all of them reporting their operational emissions and 76% reporting action to reduce emissions totalling 144 million tonnes of CO<sub>2</sub>e.

We also joined the CDP Action Exchange Programme to bring environmental service providers together with our suppliers to reduce emissions and improve their carbon footprint.

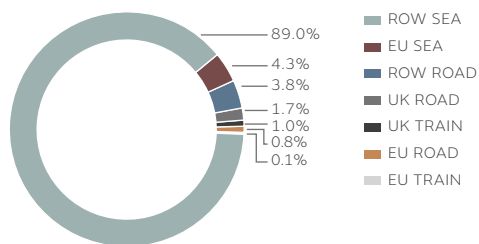
## REDUCING TRANSPORT IMPACTS

Whether we're delivering finished vehicles to customers or receiving components at our manufacturing facilities, our transport operations represent a significant challenge and an opportunity to reduce our environmental impacts.

### A BUSINESS ON THE MOVE

As our Company expands, our logistics operations must move with it. To minimise the impacts of transport, we look at every opportunity to reduce the number of miles we travel and adopt more efficient modes of transport. Our long-term goal is to stabilise our logistics CO<sub>2</sub> emissions, even as we expand the business.

#### TRANSPORT TYPES (%)



More than

170

countries around the world in which our vehicles are sold



48%

of total corporate CO<sub>2</sub> emissions arise from transport operations 2014/15



36%

of our total vehicle transport in the UK is by rail – equivalent to 25 million vehicle miles, which reduces emissions by around 30% compared to road

### BRINGING ENGINE MANUFACTURING HOME

Our new Engine Manufacturing Centre (EMC) has put engine production at the heart of our UK operations. Ideally located no more than 20 miles from our other advanced manufacturing plants in the Midlands, this is good news for customers and for our transport impacts. Previously these engines were produced in southern Spain and shipped to the UK.



## REDUCING TRANSPORT IMPACTS

### INCREASING RAIL CAPACITY

Rail innovation in the last three years, including increasing capacity out of Halewood and Castle Bromwich, has enabled us to save 1,500 truck journeys. Increased volumes on rail since 2010 have allowed us to mitigate 8,000 transporters.



### UNDERSTANDING OUR IMPACTS

Per vehicle, we have held our CO<sub>2</sub> emissions from logistics steady compared to the previous year. Compared to our baseline of 2008, there has been an increase of 7.3% in CO<sub>2</sub> emissions from logistics (0.66 to 0.83 tonnes per vehicle). Changes to the calculation methodology, a greater understanding of our impacts and our increasingly global profile with a larger proportion of our vehicles travelling to more distant markets have contributed to this.

Over the last year, we have been working closely with our transport service providers and have benchmarked with Odette (the pan-European collaboration platform for the automotive industry) to establish a more accurate understanding of carbon emissions from logistics.

In doing this, we discovered that the CO<sub>2</sub> from vehicle freight on roll-on/roll-off ships was actually significantly greater than when the DEFRA conversion factors for sea freight were used. DEFRA has recently provided conversion factors specifically for the transport of vehicle freight by sea, which support our new calculations.

We are now confident that we have a more robust calculation methodology in line with industry, and a better understanding of our logistics emissions, which will help us identify the most appropriate solutions across our supply chain.

#### TOTAL CO<sub>2</sub> EMISSIONS FROM LOGISTICS (tonnes)



#### CO<sub>2</sub> EMISSIONS FROM LOGISTICS PER VEHICLE (tonnes)



### EXPANDING OVERSEAS OPERATIONS

As we expand our international operations, we are making the most of opportunities to reduce transport impacts. By manufacturing in China for example – a recent development – we've so far been able to avoid 30,000 to 40,000 Jaguar Evoques being transported from the UK – saving around 0.5 tonnes of CO<sub>2</sub> from transport emissions per vehicle.

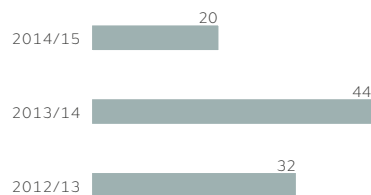
# OCCUPATIONAL HEALTH, SAFETY AND WELLBEING

We aim to provide an inclusive and welcoming environment that promotes the wellbeing of all our employees and places safety and health at the forefront of our people management approach.

## DEVELOPING OUR SAFETY CULTURE

In 2014/15, we maintained OHSAS18001 accreditation with zero major non-compliances recorded. We've continued to drive down lost time cases. A Safety Management Workshop for Managers was attended by 531 leaders from across the business during the year and has now been attended by over half of all managers. They have been encouraged to take their learning forward and embed it in the behaviours of their team, leading to improved engagement with safety advisors across the business.

### NUMBER OF REPORTABLE INCIDENTS (under RIDDOR)



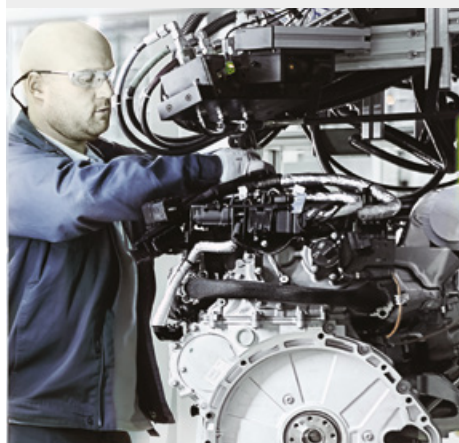
# 47%

year-on-year reduction in lost time cases

For health, safety and wellbeing data, see page 55.

## DESTINATION ZERO: A JOURNEY TO ZERO HARM

Our ongoing campaign is designed to engage managers, employees and contractors in taking personal responsibility for their own, and their fellow workers', safety and wellbeing. Developing this culture is part of our strategy of raising awareness of individual responsibility and reporting, including among teams working in lower-risk functions and environments such as offices. Evidence of success can be seen in our much-reduced lost time accidents and RIDDOR reportable incidents in the last year.



## PROMOTING HEALTH AND WELLBEING

We actively encourage and support our people to live a healthy lifestyle and to balance their work and family commitments. It's good for our employees and it's good for business – reducing absence and improving productivity.

In 2014/15, we piloted a number of smarter working initiatives to make lasting improvements to how we work – such as sit-stand desks, giving employees the option of spending more time standing during their working day.

### LOOKING AHEAD

We're aiming to achieve external accreditation for our wellbeing standards across all our sites in 2014/15 and beyond. This aspiration is encouraging functions to set wellbeing objectives and to establish their own focus groups to engage people in looking at wellbeing in their area of the business.

# 1,300

employees reached with our Health-Needs assessment



## IMPLEMENTING A NEW WELLBEING CHARTER

Launched in 2014/15, our new Wellbeing Charter is a framework for excellence in wellbeing activities. Over the past year, initiatives have included:

- A companywide Health-Needs assessment involving over 1,300 employees, which has helped to prioritise wellbeing needs and inform our people strategies;
- Safety and wellbeing events on topics, including substance misuse, obesity, fitness and health, with a week dedicated to Wellbeing in December; and
- Large-scale events at each site, comprising practical interventions for alcohol misuse, musculoskeletal issues and glucose and cholesterol testing.

## WELLPOINT KIOSKS

Our "WellPoint Kiosks" give employees round-the-clock access to key health checks, designed to encourage preventative health improvement.

There are now 17,083 registered users, with over 6,500 new users registered in 2014/15 – that's over half of all our employees.



## OUR VEHICLES IN USE

# DELIVERING

## EXPERIENCES OUR CUSTOMERS LOVE



## IN THIS SECTION

- ▶ 40 Introduction
- ▶ 41 Enabling customers to make sustainable choices
- ▶ 43 Making roads a safer place

## 2020: WHAT WE'RE AIMING FOR

Responsibility forms a key element of the Jaguar and Land Rover **BRAND PROMISE** and messaging.

Our vehicles to be among the leaders for **TAILPIPE CO<sub>2</sub> EMISSIONS PERFORMANCE**, fuel economy and cost of ownership.

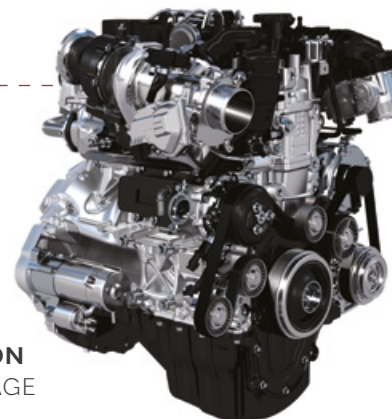
Sustainability considerations are an integral part of the **CUSTOMER VOICE** in the development of our vehicles.

A retail network that reinforces our leadership approach to **EXCELLENCE** in sustainability through the **RETAIL EXPERIENCE**.

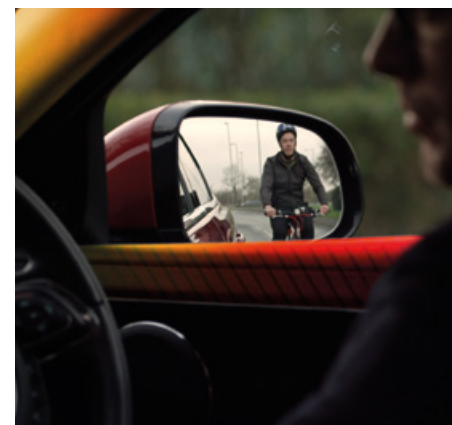
Targets are for Fiscal Year 2020/21.

## PROGRESS HIGHLIGHTS

▶ **25% REDUCTION**  
EU FLEET AVERAGE  
TAILPIPE CO<sub>2</sub>  
(VS 2007 BASELINE).



▲ LAND ROVER DISCOVERY  
WINNER OF THE **WHAT CAR?**  
**CAR OF THE YEAR 2015**  
**SAFETY AWARD.**



▼ **BETTER MILES**, OUR CUSTOMER  
ENGAGEMENT RESEARCH THAT AIMS  
TO REDUCE CO<sub>2</sub> EMISSIONS.



▼ **BIKE SENSE**, OUR  
CUTTING-EDGE RESEARCH  
AIMS TO SAVE LIVES ON  
THE ROADS.

▼ LAND ROVER  
DISCOVERY SPORT  
AWARDED **FIVE**  
**STARS FOR SAFETY**  
BY EURO NCAP.

# INTRODUCTION

Our long-term success depends on creating innovative solutions that better customers' lives – both now and in the future. That means understanding how our customers' needs are changing, and committing the expertise and resources required to drive technological advancement in a responsible way.

Globalisation and digital connectivity have increased customer awareness and expectations of 21st century business. These, along with increased competition, have driven our industry to become more customer-centric.

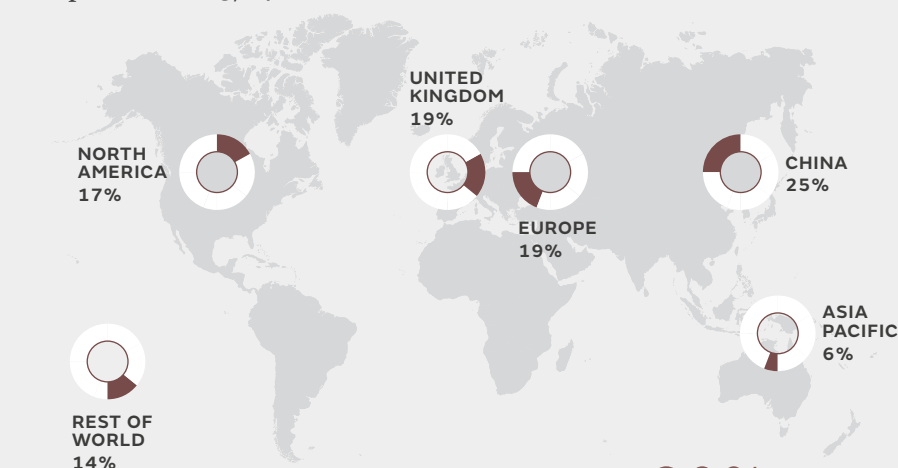
Consumer preferences towards more environmentally sensitive and technologically advanced vehicles continue to evolve – partly driven by legislation and taxation that provide financial incentives for fuel-efficient vehicles, and partly driven by new levels of consumer awareness and growth in digital technology.

We understand that, for a company that specialises in premium performance and all-terrain vehicles, this poses both challenges and opportunities. To remain a leader in our industry, we need to keep abreast of customer expectations and market trends – meeting demand for exceptionally high standards while recognising differing environmental priorities and social variables around the world.

## OUR INCREASINGLY GLOBAL CUSTOMER BASE (retail sales per region)

462,209

vehicles sold: +6.4%  
compared to 2013/14



Retail sales figures by region include sales from the Chery Jaguar Land Rover joint venture.

More than 80%  
of the vehicles we  
produce are exported



We believe the next 25 years will be the most exciting and dynamic the automotive industry has ever experienced. There will be huge strides in Environmental Innovation, in safety and capability. The vehicle of the future will become more desirable, more capable, cleaner, more connected and smarter.”

DR WOLFGANG EPPLER, DIRECTOR OF RESEARCH AND TECHNOLOGY



## CUSTOMER FIRST: LISTENING TO OUR CUSTOMERS

We carry out in-depth market research to understand customers and anticipate emerging market trends. This feedback helps to shape the development of new vehicles, the customer experience, aftersales service and consumer relationships with our brands.

Our design, engineering, process planning, manufacturing, supplier management and supply chain teams work closely through our vehicle development programme, engaging with customers and other industry partners to ensure we develop the class-leading vehicles and solutions that our customers expect. In 2014/15, we interviewed over 300,000 existing and potential customers across 155 markets to gather valuable feedback on our brands and vehicles.

We're also developing online engagement communities as another channel for our customers. Ultimately, every Jaguar Land Rover model will have a community of 50 customers who will share their unique experiences to help inform the future development of each vehicle.

## ENABLING CUSTOMERS TO MAKE SUSTAINABLE CHOICES

To successfully tackle our impacts while our vehicles are in use, we're focusing on reducing vehicle emissions and engaging with customers so that they have the options and tools they need to make more sustainable choices.

More than three-quarters of CO<sub>2</sub> emissions (70–80%) occur during the driving phase of the life cycle, for vehicles that use conventional powertrain technology. Designing fuel-efficient vehicles (and offering customers support in adopting fuel-efficient driving styles) is therefore key to reducing our impact on the environment and delivering cost savings for customers.

### REDUCING VEHICLE TAILPIPE EMISSIONS

Combating emissions is one of the biggest challenges for the auto industry today. Our latest vehicles are the cleanest to date and are fully compliant with all EU and US emissions regulations – meaning that customers can be confident that we're using the latest technology to reduce emissions and help improve air quality.

We've cut European fleet average tailpipe CO<sub>2</sub> emissions by 25% vs 2007, a year ahead of schedule. This is good news for customers, with lower CO<sub>2</sub> emissions meaning lower tax bands and greater fuel efficiency.

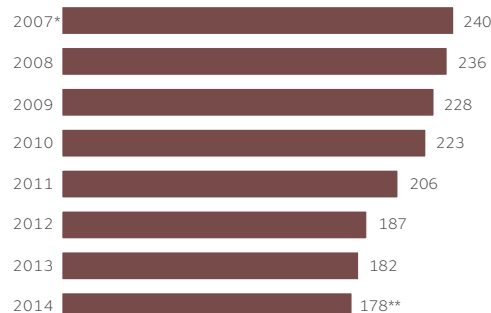
For more about how we're using the life cycle approach to continue to reduce vehicle emissions, see page 16.

# 25%

tailpipe CO<sub>2</sub> emissions  
reduction 2014 vs 2007

Achieved ahead of schedule (see graph below).

**TAILPIPE CO<sub>2</sub> EMISSIONS**  
(European fleet averages g/km CO<sub>2</sub>)



\* Baseline. \*\* Pending final confirmation from the EEA.

**DATA** For tailpipe CO<sub>2</sub> emissions targets, see page 58.

Our significant improvement in fleet average tailpipe CO<sub>2</sub> emissions has been helped by our innovative Ingenium diesel engine. This is used to power the Jaguar XE, which is capable of achieving just 99g/km CO<sub>2</sub> – the first in its segment to go below 100g/km – without any electrification. The Range Rover Evoque, at 109g/km of CO<sub>2</sub> and 68mpg, is the most efficient Land Rover ever.

For research projects and technologies focused on driving further improvement, see pages 21 to 24.

### OUR EMISSIONS REDUCTION JOURNEY

**2008**

Launched multi-billion pound technology research programme

**2014**

EU fleet average tailpipe CO<sub>2</sub> emissions **REDUCED BY 25%** since 2007, a year ahead of schedule

**2015–20**

We will continue to invest in new and innovative vehicle technologies to reduce real-world emissions by 2020 and beyond

**2020 VISION**

Tailpipe CO<sub>2</sub> emissions performance among the leaders by 2020



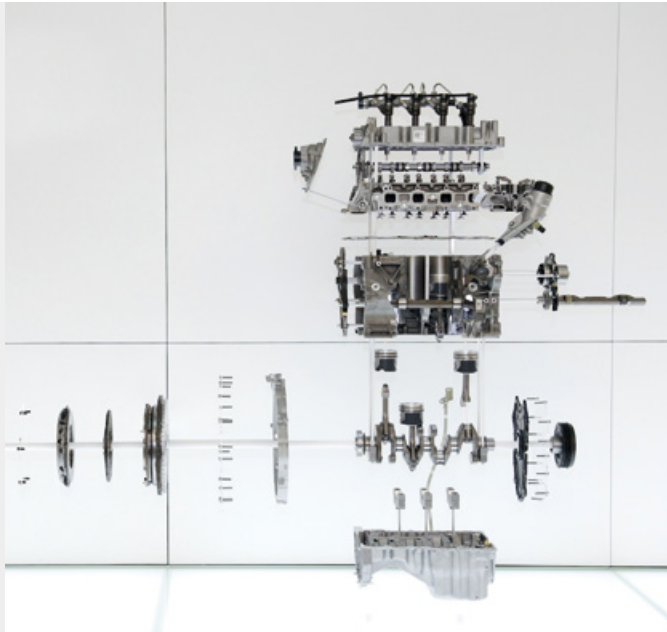
▲ The Jaguar XE (top) and Range Rover Evoque (bottom) are our most efficient vehicles to date, with the potential to achieve 99g/km CO<sub>2</sub> and 109g/km CO<sub>2</sub> respectively.

## ENABLING CUSTOMERS TO MAKE SUSTAINABLE CHOICES

### OUR MOST FUEL-EFFICIENT ENGINE TO DATE

Our Euro 6 standard Ingenium diesel engines have reduced NOx emissions by 80% vs 2007\*. Variable exhaust valve timing shortens the catalyst light-off phase and improves diesel particulate filter (DPF) regeneration. The cooled low-pressure exhaust gas recirculation (EGR) system reduces combustion chamber temperatures, inhibiting NOx formation, and selective catalytic reduction (SCR) technology cuts NOx emissions to very low levels.

\* Relates to on cycle limits.



### ADVANCING NOx CONTROL TECHNOLOGY

Diesel remains a key technology for our customers, and a key enabler for meeting our CO<sub>2</sub> commitments – with diesel engines emitting significantly lower levels of CO<sub>2</sub> than petrol engines. However, we recognise the issue of air quality and its impact on health. To reduce the levels of NOx emitted from our diesel engines, we've invested heavily in advanced

clean diesel technology, engineered to meet the most stringent global regulations, across our entire vehicle range. This includes the development of the new Ingenium engine and our advanced selective catalytic reduction (SCR) exhaust after-treatment for NOx control, which features on all 16 Model Year vehicles. All Jaguar Land Rover Euro 6-standard diesel engines are equipped with diesel particulate filters (DPF) and selective catalytic reduction (SCR).

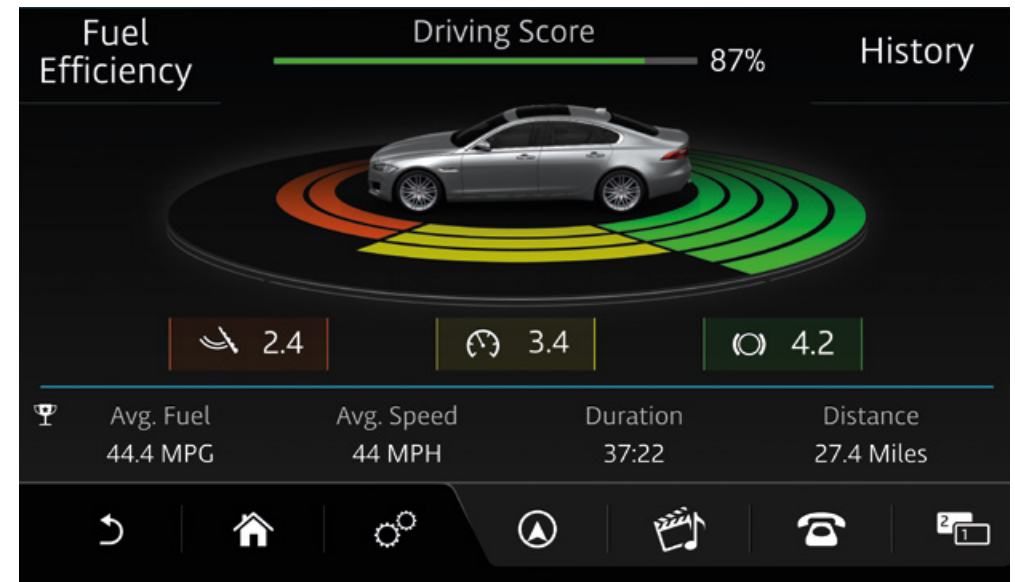
### BETTER MILES CUSTOMER ENGAGEMENT RESEARCH

Studies show that adopting certain driving techniques can result in lower fuel consumption and drive a reduction in CO<sub>2</sub> emissions. To help realise this potential, we are undertaking research to explore the feasibility and effectiveness of a proposed new customer engagement concept known as Better Miles.

Designed to assist drivers to adopt smarter driving techniques, Better Miles is looking at how we could use the innovative ECO-data system, already featured in some of our vehicles, to enable drivers to receive real-time feedback on how efficiently they are driving – alongside a smartphone app enabling performance to be viewed and analysed over time.

This information-led approach would be designed to help customers adjust their driving style to maximum effect and combined with a range of different incentives and rewards, to encourage positive change for both our customers and our environment.

While still embryonic in its current format, Better Miles is an example of Environmental Innovation in action. The innovation process demands rigorous testing and the current research phase will give us a clear idea of the potential of this concept for helping influence customer driving behaviour, and how it could be designed to achieve the best results.



## MAKING ROADS A SAFER PLACE

Safety is important to our customers, and it's a top priority for us in the design and use of our vehicles. With over 700,000 road casualties every year in the UK alone\*, researchers at our Advanced Research Centre are working on a suite of groundbreaking new technologies that aim to prevent future accidents on our roads.

### DRIVING SAFETY STANDARDS

We prioritise safety considerations at every stage of a vehicle's design and development. Increasingly, we evaluate how intuitive and user-friendly new safety features are anticipating customer interaction and responses to enhance their effectiveness. All our vehicles undergo rigorous assessment, both by our own safety teams and by Euro NCAP, the independent assessor of vehicle safety in Europe. Even as Euro NCAP tests become more demanding, our vehicles have continued to score highly. In 2014, the Land Rover Discovery Sport was awarded five stars and achieved one of the highest-ever overall Euro NCAP scores.

From 2014, autonomous emergency braking systems were being introduced across our whole model range. Using stereo cameras located above the rear-view mirror, the system helps to identify an imminent risk of colliding with another vehicle – reducing the severity of impact or avoiding the impact happening at all.

### HARNESSING INNOVATION IN TECHNOLOGY

Almost five people were killed on the roads every day in reported incidents in 2013 – with around 20% of accidents involving pedestrians and 26% involving either cyclists or motorcyclists. "Driver error or reaction" was listed as the cause by police in 65% of fatal road traffic accidents\*.



#### ▲ Research Project: Bike Sense

To help save lives in the future, we're developing a range of new technologies that use colour, sounds and touch inside the vehicle to prevent accidents involving bicycles and motorbikes.

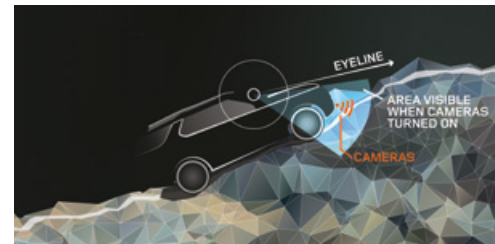
Sensors on the vehicle detect when a bicycle or motorbike is approaching and Bike Sense makes the driver aware of the potential hazard before they see it. Bike Sense could potentially "tap the driver on the shoulder" using a device inside the seat cushion, and door handles could buzz to prevent doors from being opened in the path of a cyclist.

\* RoSPA



#### ▲ Research Project: 360° Urban Windscreen

In 2014/15, we revealed our 360° Urban Windscreen research, which uses transparent roof pillars to give the driver a 360° view outside the vehicle, so that pedestrians, cyclists and other vehicles are visible, even in blind spots. The technology combines cameras outside the vehicle with the advanced, high-quality Head-Up Display to highlight the movement of other road users, while enabling the driver to keep their eyes on the road.



#### ▲ Research Project: Transparent bonnet

We're developing pioneering technology that will give Land Rover drivers a digital vision of the terrain ahead by making the front of the car "virtually" invisible. This technology is breaking new ground in visual driver assistance. Cameras located in the vehicle's grille capture data and feed a Head-Up Display, effectively creating a "see-through" view of the terrain through the bonnet and engine bay.



### FIVE-STAR SAFETY

In 2014, the Land Rover Discovery Sport (pictured above) was awarded five stars for safety by Euro NCAP and was awarded the *What Car?* Car of the Year 2015 Safety Award.



### THE SELF-LEARNING INTELLIGENT CAR OF THE FUTURE

Researchers at Jaguar Land Rover are pioneering a truly intelligent car that will have its own on-board "Smart Assistant" to carry out a host of functions that allow the driver to concentrate on driving, reducing the potential for accidents. State-of-the-art intelligent software will be capable of recognising the driver and learning their preferences – so that it can predict their routine and change preferences based on variables, such as weather conditions, and even apply their driving style to the Auto Cruise Control function.

## OUR WIDER CONTRIBUTION

# CREATING OPPORTUNITIES

FOR 12 MILLION PEOPLE TO  
MAKE A POSITIVE CHANGE

## IN THIS SECTION

- ▶ 46 Introduction
- ▶ 46 Our Global CSR Programme
- ▶ 48 Education and Talent
- ▶ 49 Design and Technology
- ▶ 49 Wellbeing and Health
- ▶ 50 Our employees in the community

## 2020: WHAT WE'RE AIMING FOR

Creating opportunities for  
12 million people through:

Long-term **EDUCATION**  
business partnerships that inspire  
the workforce of the future.

Leading with carbon-for-  
development projects that deliver  
UK manufacturing assembly  
CO<sub>2</sub> offsets and use

**TECHNOLOGY TO  
TRANSFORM LIVES**  
in developing countries.

Focusing on local issues  
that matter, to build

**STRONGER  
AND HEALTHIER  
COMMUNITIES.**

Targets are for Fiscal Year 2020/21.

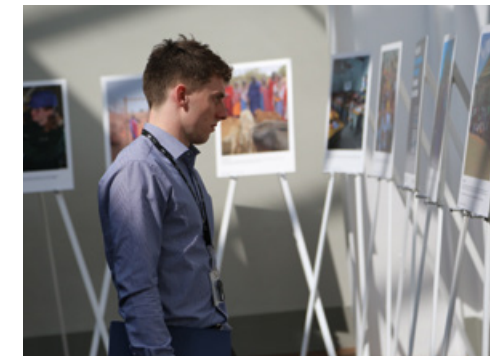
## PROGRESS HIGHLIGHTS

ALL PROJECTS  
**DELIVERED AN  
"IMPROVED LIFE"  
IMPACT** BASED  
ON THE LONDON  
BENCHMARKING  
GROUP MODEL\*.



▲ OPPORTUNITIES FOR **1.3 MILLION PEOPLE**  
DELIVERED IN 2014/15, BRINGING THE TOTAL  
TO 2.9 MILLION SINCE 2013.

▲ **BEST-EVER EMPLOYEE  
VOLUNTEERING YEAR.**



▲ **35 GLOBAL CSR PROJECTS  
LAUNCHED TO DATE.**

PROJECTS IN **19 COUNTRIES** –  
EUROPE AND THE US, ASIA, AFRICA,  
AND AUSTRALIA.

\* London Benchmarking Group model provides a global standard for measuring and reporting on community investment.

## INTRODUCTION

We want to deliver lasting, positive impacts for society by tackling issues pertinent to both our industry and the communities in which we operate.

Given our strengths and field of expertise, we're focusing our efforts on inspiring and educating tomorrow's engineers and designers, as well as supporting innovation and technology to reduce environmental impacts and boost health and wellbeing in our local and global communities.

The bold ambition of our Global CSR Programme is to create opportunities for 12 million people to make a positive change in their lives by 2020.

### OUR 2020 TARGET

Create opportunities for

**12  
MILLION  
PEOPLE**

## OUR GLOBAL CSR PROGRAMME

Part of being a responsible business is creating the right opportunities for people to make a positive change to their lives.

Our innovation-led Global CSR Programme has set a bold target of reaching 12 million people by 2020, reflecting the increasing scale and scope of our business and our commitment to leveraging this opportunity to make a wider contribution to society.

Jaguar Land Rover has been investing in social, educational and environmental projects for communities for over 60 years. Our Global CSR Programme forms a key part of our Environmental Innovation strategy.

Our programme has continued to evolve (see the timeline on page 47). We have refined the focus to reflect our core business strengths and increased the scale and scope of projects to enable the involvement of all our national sales companies. We're also improving the consistency and rigour with which we measure our impacts, using a model informed by the London Benchmarking Group.

To reach 12 million people, our Global CSR Programme focuses on three key areas:

1

**Education and Talent** – inspiring and educating the workforce of the future.

2

**Design and Technology** – encouraging technological innovation for social good.

3

**Wellbeing and Health** – improving the wellbeing of disadvantaged communities.

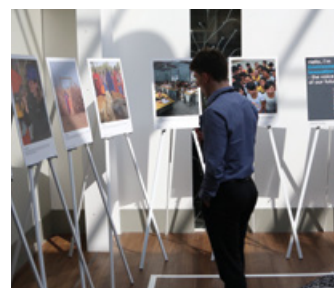


## OUR GLOBAL CSR PROGRAMME

## OUR CSR JOURNEY

We have greatly extended the scope and reach of our Global CSR Programme since it first began more than 60 years ago.

The timeline shows some of the key steps on our journey, which continues today with projects that aim to make a long-term difference to communities in the areas of Education and Talent, Design and Technology, and Wellbeing and Health.



▼ Photo courtesy of:  
ClimateCare/Vestergaard



1953

**Our earliest partnership:** Land Rover and the British Red Cross. Today, Land Rover is committed to a global humanitarian partnership with the International Federation of Red Cross and Red Crescent Societies until 2018.



1998

Opened our **first Education Business Partnership Centre** at our Castle Bromwich facility.



2009

**Recognised for our wider contribution** with the CommunityMark awarded by BITC.

**Launched our Environmental Innovation strategy** – began investment in offsetting projects that deliver dual impact to environment and society.

Projects included provision of efficient cook stoves in Uganda to reduce CO<sub>2</sub> emissions and improve lives.

**First million tonnes CO<sub>2</sub> offset and 1 million lives improved.**

2012

Getting to **75 global Carbon for Development projects** offsetting **100% of our manufacturing assembly CO<sub>2</sub> emissions**, and our customer programme covering **75% of global vehicle sales**. (Total 10 million tonnes offset by programme end 2013).

2013

Launched the next phase of our **Global CSR Programme**, refocused to leverage our business strengths and resources.

LifeStraw® Safe Water project – **1.2 million lives impacted** through Family LifeStraw® in western Kenya.

Launched **initial nine, locally developed projects** within our Global CSR framework.

**Winner of the 2013 Responsible Business of the Year Award** from BITC in recognition of our Environmental Innovation and Global CSR Programme.

2015

**Winner of the 2015 Queen's Award for Enterprise in Sustainable Development.**

Opened our **sixth Education Business Partnership Centre** at our Wolverhampton site.

Continuing focus on the future workforce: launched our **first 4x4 In Schools world finals**.

**2.9 million** beneficiaries of our Global CSR Programme since 2013

## EDUCATION AND TALENT

We're taking a lead in tackling the skills gap facing our industry – investing directly in the development of expertise that is core to our business.

In other areas, we're helping to support people simply to gain the skills, vision and courage to reach their potential.

We see both of these focus areas as investments which will help underpin a successful future – both for our Company and for society as a whole.

Jaguar Land Rover is a business driven by design, technology and innovation. If we're to deliver the solutions society needs for the future, it is critical that we attract talented young people who will become the next generation of engineers to support our growing business.



### EDUCATION CENTRES AND PARTNERSHIPS

In Calendar Year (CY) 2014 alone, 447,000 young people directly participated in education initiatives supported by Jaguar Land Rover.

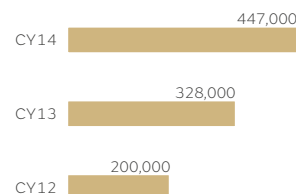
The Education Business Partnership Centres at our manufacturing and engineering sites are an important part of our approach and offer plant tours, classroom activities and work placements. In 2015, we opened a new Education Business Partnership Centre at our Engine Manufacturing Centre near Wolverhampton, one of six centres in the UK which showcase cutting-edge manufacturing to inspire children from primary school age to 18+. We're also building a new Education Partnership Business Centre at our new plant in Brazil, a first for our overseas operations.

### INSPIRING TOMORROW'S ENGINEERS

Our Inspiring Tomorrow's Engineers school education programme is well established in the UK and has engaged almost 900,000 young people since 2013. As we work towards our target of engaging three million young people by 2020, we're expanding the programme's global reach to encourage more young people around the world to consider a career in engineering or manufacturing.

Inspiring Tomorrow's Engineers won BITC's national Education Award in 2013, in recognition of the positive impact its long-term school partnerships are having on increasing employability skills and promoting engineering careers to young people.

#### NUMBER OF YOUNG PEOPLE PARTICIPATING IN EDUCATION PROGRAMMES



Data shown is for the Calendar Year (CY).

# 18,000

schoolchildren visited our Education Business Partnership Centres in CY 2014



### HITZ RUGBY

Building on Land Rover's partnership with Premiership Rugby, we support HITZ – an award-winning social change programme designed to support disadvantaged young people to address personal and interpersonal problems, unemployment and lack of career direction through a structured programme of rugby, life skills training and education.

In 2014/15, 2,903 people benefited from the programme. In 2015, we're using the Rugby World Cup as a platform to inspire other companies to get involved in the HITZ programme, and are supporting the programme to expand into Brazil, Argentina and China.

## DESIGN AND TECHNOLOGY

As a technology and innovation-led business, we recognise the value and impact that can be delivered by smart investment in innovative technology which has the potential to improve people's lives.

As a responsible business, which is pioneering new technologies and innovations to reduce the impact of our vehicles, it makes sense for us to invest in technologies that are tackling other sustainability issues around the world.

We will help around six million people, half of our overall target, with projects that use technology to deliver solutions for local communities.

### PROVIDING ACCESS TO SAFE WATER WITH LIFESTRAW®

LifeStraw® is a smart and innovative water purification technology, which removes 99.9% of bacteria, protozoa and viruses – providing safe drinking water in any environment.

Since 2013, our investment in the LifeStraw® Carbon for Water project with ClimateCare has given 1.9 million people in western Kenya access to safe water at home. By reducing the need to boil dirty water, leading to less indoor air pollution from home fires and less deforestation from firewood collection, the project also delivers a carbon saving of around 2.5 tonnes of CO<sub>2</sub> a year for every filter used.



We have been working with ClimateCare since 2007, investing our resources in projects that help address climate change, tackle poverty, improve health and build better futures for millions of people around the world.



**1.9m**  
lives improved via LifeStraw® water filters since it started in 2013

## WELLBEING AND HEALTH

We depend on the health and stability of the communities in which we operate, and we recognise that we have both a responsibility and an opportunity to make a positive contribution.

Creating a lasting legacy takes real, long-term commitment and effective collaboration with third parties – relationships that we believe need to be developed at both global and grassroots levels. Many of our wellbeing and health activities are delivered through global partnerships, including those described below.

**120+**  
vehicles loaned and significant funding provided to support global Red Cross initiatives since 2007

### INTERNATIONAL FEDERATION OF RED CROSS AND RED CRESCENT SOCIETIES

We are celebrating the 60th anniversary of our relationship with the British Red Cross, and subsequently the International Federation of Red Cross and Red Crescent Societies. We've provided significant funding support and loaned over 120 vehicles to support global Red Cross initiatives since 2007, reaching over 900,000 vulnerable people. Our three-year joint global initiative, Reaching Vulnerable People around the World, has sustained life-saving work in 17 countries.

### CREATING OPPORTUNITIES FOR YOUNG PEOPLE IN CHINA

We're also investing in projects that will provide opportunities and improve quality of life for communities around our new manufacturing facility in China and beyond. In 2014/15, we launched the China Youth Dream Fund in partnership with the Soong Ching Ling Foundation. The fund, which has already benefited some 60,000 children in its first year, will help disadvantaged young people reach their goals and make their own personal contributions to society.

Other projects in China include Journey for Vision (a project providing free eye care for schoolchildren in remote and underprivileged areas, with 35,000 beneficiaries to date); rebuilding Hope School, badly damaged in the major earthquake that rocked Ya'an in Sichuan province in April 2015; funding football and rugby for social change projects; and developing a national Road Safety Campaign.



## OUR EMPLOYEES IN THE COMMUNITY

Employee volunteering plays a pivotal role in enabling us to deliver wider positive benefits through our business. Not only does this add value for our communities, it also helps our employees gain valuable skills and team-building experience that enhances their personal development and benefits our business.



I believe that Jaguar Land Rover's commitment to the community is second to none. The initiatives that they are involved in have a real impact on the lives of local people."

STEPHEN HOWARD, CHIEF EXECUTIVE,  
BUSINESS IN THE COMMUNITY

Jaguar Land Rover has held the BITC CommunityMark since 2009 for leadership and excellence in community investment.

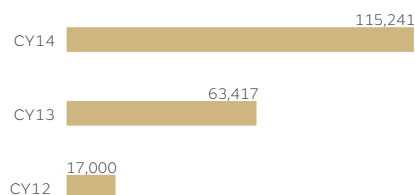


### ADDING VALUE IN OUR COMMUNITIES

All Jaguar Land Rover employees have the opportunity to spend two days a year supporting community projects that focus on regeneration, education, working with young people, protecting the environment and supporting local charities.

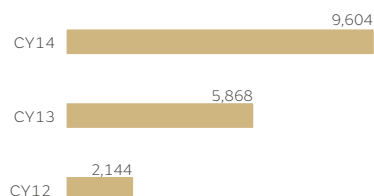
In Calendar Year 2014, we celebrated a record-breaking year of employee volunteering with a 36% increase in employee participation and a 45% increase in time donated compared to 2013. Almost 10,000 Jaguar Land Rover employees, a third of our UK workforce, donated over 115,000 hours.

#### NUMBER OF HOURS VOLUNTEERED

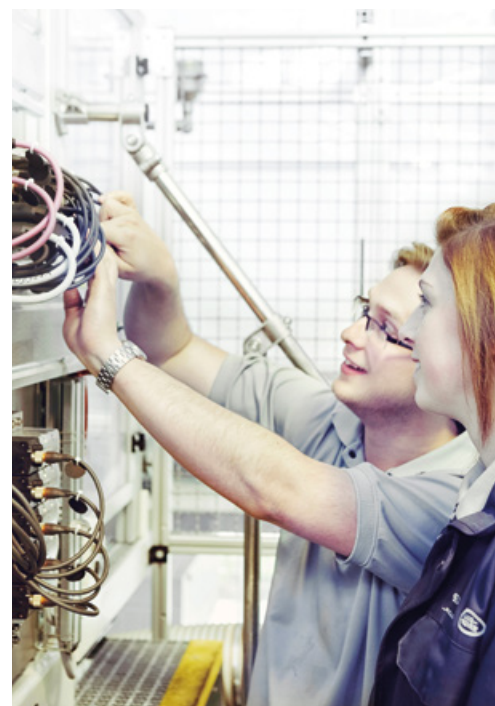


Data shown is for the Calendar Year (CY).

#### NUMBER OF EMPLOYEE VOLUNTEERS



Data shown is for the Calendar Year (CY).



### HELPING TO INSPIRE TOMORROW'S ENGINEERS

Around 85% of volunteers supported Jaguar Land Rover's Inspiring Tomorrow's Engineers programme last year and 8,140 employees donated 98,600 hours. Employees get involved in Education Business Partnership Centres, by developing curriculum materials, delivering presentations, supporting external careers events and mentoring young people on work experience placements.



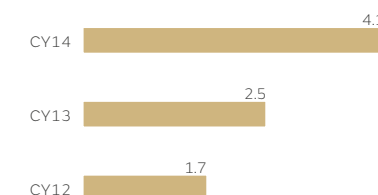
The fact that the majority of volunteers supported Inspiring Tomorrow's Engineers demonstrates the passion and commitment of our workforce to help the next generation gain the skills and experience they need for successful working careers."

JONATHAN GARRETT, CSR DIRECTOR

### CHARITABLE DONATIONS

In addition to our Global CSR Programme, we make direct charitable contributions to a number of selected charities, including the International Federation of Red Cross and Red Crescent Societies, Royal Geographical Society, NSPCC, Born Free Foundation and BEN – the UK's dedicated charity for those who work, or have worked, in the automotive and related industries, as well as their dependants.

#### AMOUNT DONATED (in cash and in kind; £m)



Data shown is for the Calendar Year (CY).

## APPENDIX

# PERFORMANCE

## IN DETAIL

### REPORTING SCOPE AND BOUNDARIES

The data in this report relates to the time period 1 April 2014 to 31 March 2015, unless otherwise stated, and to all our manufacturing and product development operations in the UK. It excludes all national sales companies and joint venture assembly plants outside the UK where complete knock down (CKD) kits of Land Rover components are painted and assembled. It also excludes the joint venture manufacturing site in China, which began operating in 2015 but which was optimising plant performance during the reporting period.

Jaguar Land Rover reports on an annual basis. Our most recent previous report was published in November 2014 and can be found on our [corporate website](#).

This report has been prepared in accordance with the Global Reporting Initiative's (GRI's) G4 Sustainability Reporting Guidelines at the Core level.

View our GRI Index at: [www.jaguarlandrover.com/gl/en/responsible-business/performance-reporting/](http://www.jaguarlandrover.com/gl/en/responsible-business/performance-reporting/)

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- ▶ **52 Managing sustainability**
- ▶ **53 Our stakeholders**

##### TARGETS AND PERFORMANCE DATA

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- ▶ **56 Operations and supply chain**
- ▶ **58 Our vehicles in use**
- ▶ **60 Our wider contribution**

# EMBEDDING SUSTAINABILITY

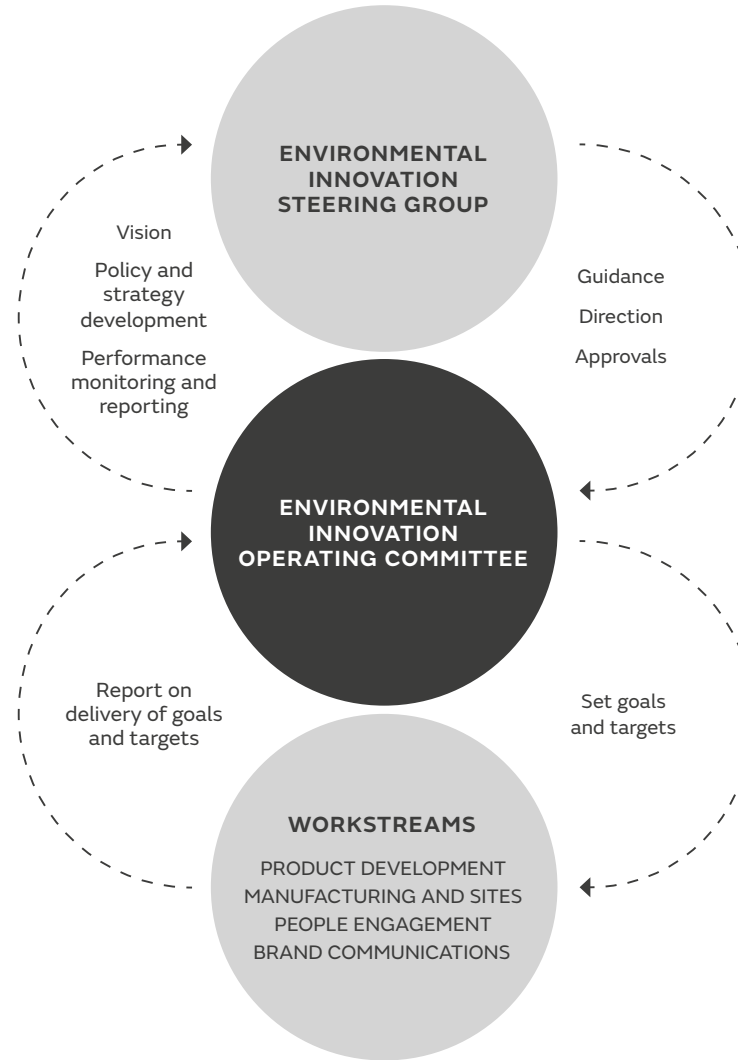
## GOVERNANCE STRUCTURE

Our CEO and Board of Directors are ultimately responsible for sustainable business development at Jaguar Land Rover.

Members of our Executive Committee participate in our Environmental Innovation Steering Group, which reviews sustainability strategy and progress at an executive level, while senior representatives from core functions across the business form the Environmental Innovation Operating Committee. This committee provides input into the development of our policies and long-term strategy and, supported by a number of working groups, ensures our sustainability strategy and objectives are implemented.

The Executive Directors' Office, supported by the Corporate Sustainability and Compliance team, oversees the embedding of sustainability across the business.

Above and beyond these governance arrangements, everyone at Jaguar Land Rover is expected to consider sustainability in their everyday work.



## MANAGING SUSTAINABILITY

All Jaguar Land Rover employees, at all levels of the business, are required to comply with the Company's Code of Conduct. The code clarifies the basic rules and standards we expect our people to follow and the behaviour expected of them, enabling them to put our business principles into practice.

Our approach to sustainability is guided by several policies, covering issues such as energy efficiency, environmental due diligence for business transactions, waste minimisation and resource efficiency, environmental management systems and compliance. We have also rolled out an e-learning course on our Anti-Bribery and Corruption Policy to all employees globally.

We welcome dialogue with our stakeholders on sustainability issues. Employees, contract staff, third parties, such as dealers, suppliers and agents, and members of the public may raise concerns or ask questions via our Global Helpline or via [legalcom@jaguarlandrover.com](mailto:legalcom@jaguarlandrover.com).

Our Code of Conduct Handbook and policies are available at [www.jaguarlandrover.com/gl/en/about-us/legal-compliance](http://www.jaguarlandrover.com/gl/en/about-us/legal-compliance).

OUR STAKEHOLDERS

Through a variety of communication channels we engage with our stakeholders on topics of interest or concern. The perspectives and insights we gather from opinion formers, experts, pressure group leaders, investors and consumer representatives help us monitor trends, understand our sustainability impacts and ensure that our strategy addresses these in the most effective way.

	CUSTOMERS	COMMUNITIES	EMPLOYEES	NON- GOVERNMENTAL ORGANISATIONS (NGOs)	POLICY MAKERS AND REGULATORS	BUSINESS AND INDUSTRY ASSOCIATIONS	PARTNERSHIPS AND CHARITABLE ORGANISATIONS	SUPPLIERS
TYPE AND FREQUENCY OF ENGAGEMENT	We hold regular customer feedback sessions, brand clinics and online surveys. Our marketing and sales operations also hold regular high-level meetings with importers and dealers to share feedback on sustainability and other issues.	Every Jaguar Land Rover site has an active liaison group and we hold regular community meetings to build relationships and address any impacts affecting people living near our manufacturing sites.	Our employees have access to regular, multi-channel communication, including skip level meetings, where employees can ask questions to senior managers, team meetings, live Town Hall events, senior leadership conferences, a quarterly magazine, and regularly refreshed online content.	We engage with a range of NGOs to share our strategy and aspirations. Jaguar Land Rover has now been a member of Forum for the Future since 2000.	We regularly meet policy makers in all our main global markets, such as ministers, other parliamentarians, government departments, and members of the European Parliament and the European Commission. Jaguar Land Rover is also a member of the Confederation of British Industry's Energy Committee and Environmental Affairs Committee.	Key memberships and collaborations on sustainability and sector issues include the Aldersgate Group and Cambridge Leadership Group; the European Automobile Manufacturers' Association (ACEA); Business in the Community (BITC); the Confederation of British Industry; the Skills Funding Agency; and Chambers of Commerce.	Our long-term brand partnerships with the IFRC, ClimateCare and other community-based and charitable organisations are crucial to helping us deliver our sustainability goals and maximise our contribution in society.	We engage with suppliers to address climate change risks and opportunities through the Carbon Disclosure Project (CDP) Supply Chain Programme. During the Fiscal Year, we invited 143 strategic suppliers, representing over 90% of our total spend, to submit information to the programme.
EXAMPLES OF KEY TOPICS	Vehicle quality, performance, customer service.	Local traffic impacts and site developments.	Company performance, future plans, product developments, other key business issues, CSR initiatives.	Environmental, economic and social impacts.	The economic and environmental role of Jaguar Land Rover and the automotive industry, and its wider contribution in society. Emerging legislation around environmental, social and economic impacts.	The role and impact of Jaguar Land Rover and the automotive industry, particularly our contribution in the areas of education, training and employment.	The role and impact of Jaguar Land Rover and the automotive industry in helping to address and alleviate issues affecting communities, including humanitarian crises.	Environmental, human rights and labour standards.

# TARGETS AND PERFORMANCE DATA

## OUR PEOPLE & CULTURE

KEY: ● Achieved ✓ Pass ○ Partially achieved ➤ On track

## ROADMAP TO 2020

ENVIRONMENTAL INNOVATION CHALLENGES	VISION	2014/15 TARGETS	2014/15 PERFORMANCE	2020/21 TARGETS
Grow our culture to put Environmental Innovation at the heart of the business	All our people and partners aligned to our Environmental Innovation mindset and behaviour	Roll out Environmental Engagement Plan and measure impact	● Environmental Innovation engagement delivered through Responsible Business Week and visual thinking map	Consistently deliver more sustainable outcomes from business decisions
		Include Environmental Innovation in all functional scorecards and personnel objectives	● Environmental objectives are considered and balanced against all other business objectives set out in the company's balanced scorecard	Establish Jaguar Land Rover as an employer of choice where sustainability thinking is part of the culture

## 2014/15 PERFORMANCE DATA

		2014/15	2013/14	2012/13	2011/12 BASELINE
<b>OUR PEOPLE</b>					
Employees	Average number of employees	32,127	27,953	24,913	23,848
Apprentices	Apprentices taken on	193	149	189	114
Graduate Development Programme (GDP)	Graduates joining the GDP	285	273	312	337
Undergraduate placements	Undergraduate industrial placements started (3–15 months)	148	89	95	66
<b>TRAINING AND DEVELOPMENT</b>					
Employee development	Number of days training provided	45,749	53,014	51,682	42,425

TARGETS AND PERFORMANCE DATA

		2014/15	2013/14	2012/13	2011/12 BASELINE
EMPLOYEE ENGAGEMENT					
Overall employee engagement score from Pulse survey	Salaried employees	83%	84%	81%	79%
	Production employees	73%	73%	74%	72%
TRADE UNIONS					
Percentage of employees belonging to a recognised trade union	Salaried employees	24%	23%	45%	31%
	Production employees	82%	79%	82%	89%
DIVERSITY					
Gender diversity	Percentage of women in workforce	11	10	9	9
	Percentage of women in management <sup>1</sup>	16	15	7	5
	Percentage of women in senior management <sup>2</sup>	10	8	7	5
Ethnic diversity	Percentage of ethnic minorities in workforce	12	10	8	8
	Percentage of ethnic minorities in management <sup>1</sup>	5	6	5	6
	Percentage of ethnic minorities in senior management <sup>2</sup>	2	2	2	3
HEALTH, SAFETY AND WELLBEING					
Reportable incidents	Number of reportable incidents (under RIDDOR)	20	44	32	47
Lost time case rate	Number of lost time cases per 200,000 hours worked	0.15	0.31	0.17	0.20
Occupational absence rate	Number of days lost per 200,000 hours worked	5.42	3.96	1.60	2.64
Occupational health	Number of first time visits to occupational health centre	882	973	701	716

1

From 2013/14 this includes approx. the top 240 employees. Previously approx. top 125.

2

From 2013/14 this includes approx. top 3,000 employees. Previously, approx. top 1,800.

TARGETS AND PERFORMANCE DATA

OPERATIONS & SUPPLY CHAIN

KEY:

● Achieved

✓ Pass

⦿ Partially achieved

▶ On track

ROADMAP TO 2020

ENVIRONMENTAL INNOVATION CHALLENGES	VISION	2014/15 TARGETS	2014/15 PERFORMANCE	2020/21 TARGETS
Drive our operations to deliver environmental excellence in business, manufacturing process and supply chain	Leadership in sustainable business, manufacturing process and supply chain operations	Achieve reductions in operational environmental performance (vs 2007): - CO <sub>2</sub> : 0.75 tonnes emissions per vehicle - Water: 2.6m <sup>3</sup> per vehicle - Waste: no more than 5% total to landfill - Logistics: stabilise logistics emissions	<div>●</div> - CO <sub>2</sub> : 0.73 tonnes emissions per vehicle <sup>3</sup> <div>●</div> - Water: 2.39m <sup>3</sup> per vehicle <div>●</div> - Waste: 46.76 kg per vehicle <div>●</div> - Logistics: 0.83 tonnes per vehicle	Achieve 30% reduction (vs 2007 baseline) in: - Global operational CO <sub>2</sub> emissions per vehicle - Operational water use m <sup>3</sup> per vehicle Achieve carbon neutral manufacturing operations (efficiency, renewables, offset) Achieve zero waste across our operations Stabilised logistic CO <sub>2</sub> emissions decoupled from business growth
		75% of strategic production suppliers are fully registered on the Achilles Automotive platform <sup>4</sup>	<div>⦿</div> 43% of suppliers registered (see page 34) <sup>4</sup>	Sustainability criteria applied to all sourcing decisions in purchasing
		Develop a long-term energy strategy	<div>●</div> 10-year energy strategy developed and plan in place to invest £36 million over the next three years	Achieve carbon neutral manufacturing operations (efficiency, renewables, offset)

2014/15 PERFORMANCE DATA

		2014/15	2013/14	2012/13	2007 BASELINE (CY)
MANUFACTURING IMPACTS					
Energy <sup>5</sup>	Total energy use (MWh )	1,170,895	1,131,786	1,159,988	1,072,691
	Energy used per vehicle produced (MWh per vehicle)	2.50	2.59	3.00	3.69
Emissions	Total CO <sub>2</sub> emissions (tonnes)	356,252	317,906	325,440	305,581
	CO <sub>2</sub> emissions per vehicle produced (tonnes per vehicle)	0.76 <sup>3</sup>	0.73	0.84	1.05
Waste <sup>6</sup>	Total waste (thousand tonnes)	21.91	22.84	18.27	19.03
	Waste per vehicle produced (kg per vehicle)	46.76	52.27	47.26	62.23
	Total waste to landfill (tonnes)	1,497	1,670	1,442	4,359
	Total waste to landfill per vehicle (kg per vehicle)	3.12	3.82	3.73	15
Water <sup>7</sup>	Total water use (m <sup>3</sup> )	1,119,233	1,122,037	1,150,263	1,052,208
	Water use per vehicle produced (m <sup>3</sup> per unit)	2.39	2.57	2.98	3.62
Solvents <sup>8</sup>	Total solvents used (tonnes)	1,908	1,635	1,542	1,484

TARGETS AND PERFORMANCE DATA

		2014/15	2013/14	2012/13	2008 BASELINE (CY)
LOGISTICS IMPACTS					
Emissions from logistics <sup>9</sup>	Emissions from logistics total CO <sub>2</sub> (tonnes)	382,124	356,215	291,871	222,403
	Emissions from logistics per vehicle (tonnes)	0.83	0.83	0.79	0.74

		2014/15	2013/14	2012/13	2007 BASELINE (CY)
NON-MANUFACTURING IMPACTS					
Energy	Total energy use (MWh)	159,229 <sup>10</sup>	111,589	113,517	95,471
Emissions	Total CO <sub>2</sub> emissions (tonnes)	65,142 <sup>11</sup>	42,152	42,028	35,719
Waste	Total waste (thousand tonnes)	3.96	2.78	1.26	1.76
	Total waste to landfill (tonnes)	122	88	40	593
Water	Total water use (m <sup>3</sup> )	228,483	166,346	146,405	131,601

3 The UK CO<sub>2</sub> conversion factor for electricity deteriorated in 2014, resulting in an increase in CO<sub>2</sub> emissions from our use of electricity. When compared to the 2007 conversion factors, our performance was 0.73 tonnes per vehicle for our three vehicle manufacturing plants, representing a 30.5% reduction in CO<sub>2</sub> per vehicle. We track internal performance against the 2007 conversion factors so that we neither receive any benefit or adverse impact from varying external conversion factors.

4 75% Achilles registration was a stretch target and significant work took place throughout 2014/15 to improve the system and train internal buyers. Many commodity areas achieved 66% registration.

5 Since 2010, manufacturing has delivered year-on-year performance improvements in MWh per vehicle, with output increasing from 241k (2010) to nearly 469k (2014). The Fiscal Year 2014 incorporated plant changes such as new press lines and CHPs. The target was then converted to MWh per vehicle to avoid the impact of changing carbon factors and to support the transition to a resource-efficiency vision. The Fiscal Year 2015 target is a significant stretch from the Fiscal Year 2014 position and supports the next step change in delivering a 2020 leadership position in energy per vehicle performance of sub-1.6MWh per vehicle.

6 In 2007, manufacturing produced 15kg of landfill per vehicle. By end of Fiscal Year 2014, this reduced to 3.12kg per vehicle (down 79%) excluding contractor wastes and metals. Data from waste managed by Primary Waste Management Contractor.

7 In the 2007 baseline manufacturing used over a billion litres of water and 3.62m<sup>3</sup> per vehicle. At the end of the Fiscal Year 2014 manufacturing increased vehicle output by 61%, while absolute water use rose by just over 6%. By the end of the Fiscal Year 2014, manufacturing water use per vehicle reduced by 34% compared to the 2007 baseline, achieving the 30% reduction target for 2020 six years ahead of schedule.

8 Data in Calendar Years.

9 Over the last year, we have been working closely with transport service providers and benchmarked with Odette to establish a more accurate understanding of carbon emissions from logistics which resulted in an increase in calculated CO<sub>2</sub> emissions. In doing this, we discovered that the CO<sub>2</sub> from vehicle freight on roll-on/roll-off ships was actually significantly greater than when the DEFRA conversion factors for sea freight were used. DEFRA has recently provided conversion factors specifically for the transport of vehicle freight by sea which support our new calculations. We are now confident that we have a more robust calculation methodology in line with industry, and a better understanding of our logistics emissions, which will help us identify the most appropriate solutions across our supply chain.

10 Energy use in 2014/15 reflects growing Jaguar Land Rover operations and is aligned to reporting under the Carbon Reduction Commitment (CRC) Scheme for the Company's energy use.

11 Carbon emissions calculated using Jaguar Land Rover CRC data and DEFRA conversion factors for electricity and gas.

TARGETS AND PERFORMANCE DATA

OUR VEHICLES IN USE

KEY: ● Achieved ✓ Pass ○ Partially achieved ➤ On track

ROADMAP TO 2020

ENVIRONMENTAL INNOVATION CHALLENGES	VISION	2014/15 TARGETS	2014/15 PERFORMANCE	2020/21 TARGETS
Shape our products to meet the needs of our customers of the future	All our products offer competitive environmental credentials and meet future customer needs	Achieve tailpipe CO <sub>2</sub> and fuel economy of: - EU CY2014 fleet average of 180g CO <sub>2</sub> /km - US EPA GHG 2012 Model Year – 2016 Model Year in Cumulative GHG credit - China Stage III CY2014 fleet average fuel consumption at 10.4L/100km	<div> <div></div> <div>- EU CY2014 fleet average of 178g CO<sub>2</sub>/km</div> </div> <div> <div></div> <div>- US 2012–16 Model Year GHG credits</div> </div> <div> <div></div> <div>- China CY2014 fleet average of 9.3L/100km</div> </div>	All products to deliver “among leaders” position for CO <sub>2</sub> emissions, fuel economy and cost of ownership
		Derive LCA targets for all 2017 Model Year vehicles	<div> <div></div> <div>LCA targets set for all 2017 Model Year vehicles Targets are tracked and managed through all product development phases and key vehicle systems responsible for LCA reductions</div> </div>	Achieve 30% reductions in key environmental impacts over the life cycle (vs 2007 baseline) Embed LCA methodologies in supply chain
		Complete Life Cycle Assessment (LCA) studies on Jaguar XE and Discovery Sport to confirm a reduction in environmental impact of more than 10% from previous models	<div> <div></div> <div>XE = 20% reduction in CO<sub>2</sub>e Discovery Sport = 10% reduction in CO<sub>2</sub>e</div> </div>	
		Create response plans for resource scarcity and commodity price volatility	<div> <div></div> <div>Supplier risk management team established and risk mapping tool developed</div> </div>	Implement closed-loop processes, to secure resources
Build our reputation as a responsible business	Global recognition as a responsible business	Put environmental performance and social responsibility at the heart of our brand promise and engage consumers	<div> <div></div> <div>Engagement through Better Miles programme (see page 42) and Global CSR Programme (see page 46)</div> </div>	Ensure end-to-end consumer experience reflects Environmental Innovation
		Reinforce sustainability principles through dealer network	<div> <div></div> <div>Engagement through Responsible Business Week (see page 15)</div> </div>	

2014/15 PERFORMANCE DATA

	2014 (CY)	2013 (CY)	2012 (CY)	2007 BASELINE (CY)
European fleet average tailpipe CO <sub>2</sub> emissions (g/km)	178	182	187	240

TARGETS AND PERFORMANCE DATA

CO<sub>2</sub> G/KM FOR EACH VEHICLE MODEL

CY 2014		FUEL	G/KM
LAND ROVER			
Defender	2.2L (110/130) Station Wagon	Diesel	295
	2.2L (90) Station Wagon	Diesel	269
Freelander	2.2L TD4 4WD Auto	Diesel	185
	2.2L TD4 4WD Manual	Diesel	165
	2.2L ED4 2WD Manual	Diesel	158
	2.0L Si4 GTDi 4WD Auto	Petrol	224
Discovery 4	3.0L TDV6 Auto	Diesel	207
	3.0L SDV6 Auto	Diesel	213
	3.0L V6 Supercharged Auto	Petrol	269
Range Rover Evoque	2.2L ED4 2WD Manual	Diesel	133
	2.2L TD4 4WD Manual	Diesel	149
	2.2L SD4 4WD Manual	Diesel	149
	2.2L SD4 4WD Auto	Diesel	159
	2.0L Si4 4WD Auto	Petrol	181
	Coupé ED4 2WD Manual	Diesel	129
	Coupé SD4 4WD Auto	Diesel	153
Range Rover Sport	3.0L TDV6 Hybrid	Diesel	164
	3.0L TDV6 Auto	Diesel	182
	3.0L SDV6 Auto	Diesel	185
	4.4L SDV8 Auto	Diesel	229
	3.0L V6 Supercharged Auto	Petrol	243
	5.0L V8 Supercharged Auto	Petrol	298
Range Rover	3.0L TDV6 Hybrid	Diesel	169
	3.0L TDV6 Auto	Diesel	182
	4.4L SDV8 Auto	Diesel	229

CY 2014		FUEL	G/KM
JAGUAR			
XF	2.2L i4 163PS Auto	Diesel	129
	2.2L i4 200PS Auto	Diesel	139
	3.0L V6 Auto	Diesel	159
	3.0L V6 Supercharged Auto	Petrol	221
	3.0L V6 Supercharged Auto AWD	Petrol	229
XF Sportbrake	5.0L V8 Supercharged Auto	Petrol	270
	2.2L i4 163PS Auto	Diesel	135
	2.2L i4 200PS Auto	Diesel	139
	3.0L V6 Auto	Diesel	163
XJ	3.0L V6 Auto	Diesel	154
	3.0L V6 Supercharged Auto	Petrol	220
	3.0L V6 Supercharged Auto AWD	Petrol	234
	5.0L V8 Supercharged Auto	Petrol	270
XK	5.0L V8 Auto	Petrol	264
	5.0L Supercharged Auto	Petrol	292
F-TYPE	3.0L V6 Supercharged 340PS Auto	Petrol	205
	3.0L V6 Supercharged 380PS Auto	Petrol	209
	5.0L V8 Supercharged Auto	Petrol	259

TARGETS AND PERFORMANCE DATA

OUR WIDER CONTRIBUTION

KEY: ● Achieved ✓ Pass ○ Partially achieved ▶ On track

ROADMAP TO 2020

ENVIRONMENTAL INNOVATION CHALLENGES	VISION	2014/15 TARGETS	2014/15 PERFORMANCE	2020/21 TARGETS
Create opportunities in our communities for positive change	Thriving local and global communities, helping to underpin our growth and secure our place in society	Deliver opportunities for 1.2 million people via CSR programmes (education, humanitarian, environmental)	● Opportunities for 1.225 million people delivered (see page 45)	External recognition for Jaguar Land Rover's Global CSR Programme, creating opportunities for 12 million people
		Achieve 15% participation in paid employee volunteering activity per annum	● >30% (see page 50)	Achieve leading levels of employee volunteering

2014/15 PERFORMANCE DATA

		2014 (CY)	2013 (CY)	2012 (CY)
Beneficiaries of the Global CSR Programme Numbers reflect the beneficiaries attributed to impact level 2 in the London Benchmarking Group CR Index, where level 2 is achieved if beneficiaries can demonstrate a measured improvement in their lives	Young people participating in education programmes	447,000	328,000	200,000
		2014/15	2013/14	2012/13
	Global market projects	174,000		
	Through the CO <sub>2</sub> offsetting programme	847,000	1,200,000	2,000,000
		2014 (CY)	2013 (CY)	2012/13
Charity support	Amount donated (in cash and in kind) (GBP millions)	4.1	2.5	1.7
	Hours volunteered	115,241	63,417	17,000
	Number of employee volunteers	9,604	5,868	2,144

**JAGUAR LAND ROVER AUTOMOTIVE PLC**

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