A sustainable business

We continue to invest in the resources and capabilities which underpin our future success as we transform the business.

THROUGH ENGINEERING AND INNOVATION

Our investments in world-class technology, research and engineers are essential for sustaining our competitive advantages and creating new growth opportunities. Ultimately, our innovations deliver the differentiated high-technology products and services that attract our customers.

In 2016, we spent over £1.3bn on gross R&D to develop the technology we embed in our products and deliver to market. As a result, we applied for 672 patents in the year, a Rolls-Royce record.

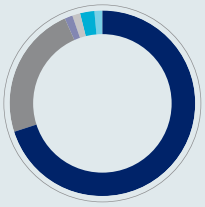
PATENTS FILED

672

Over two-thirds of our R&D expenditure is dedicated to improving the environmental performance of our products, helping our customers do more using less and minimising the environmental impact of our engines.

2016 GROSS R&D EXPENDITURE

£1.3bn

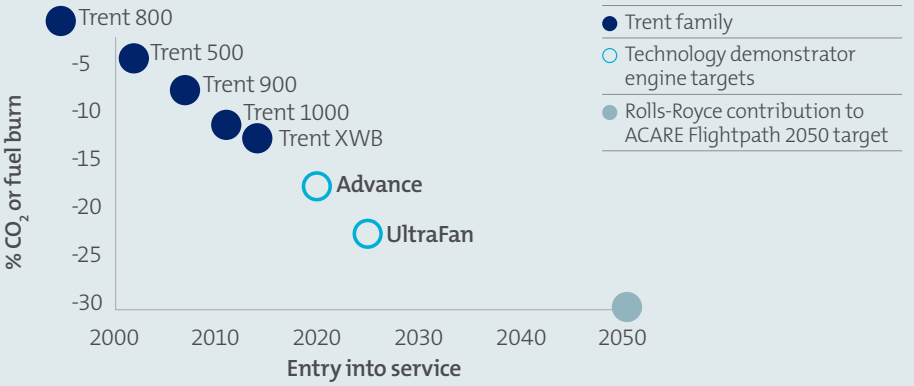


Rolls-Royce	**£936m**
UK government	**£309m**
EU funding	**£20m**
US government	**£18m**
German government	**£31m**
Other sources	**£18m**

READ MORE AT WWW.ROLLS-ROYCE.COM

ACARE flightpath 2050 goals

We continue to meet the environmental performance targets for 2050 set by the Advisory Council for Aviation Research and Innovation in Europe (ACARE).



RSS Sir David Attenborough

Rolls-Royce has designed the UK's future polar research ship, the RSS Sir David Attenborough, one of the most advanced scientific maritime vessels ever constructed. It will be equipped with highly efficient Bergen B33:45 engines, running on low sulphur fuel, and a supporting electrical system that will reduce the vessel's fuel consumption, emissions, noise and vibration, minimising the impact in the sensitive polar environment.

Research partnerships

For over 25 years, Rolls-Royce has been co-ordinating research with leading academic institutions and industry partners to harness the knowledge of renowned experts and gain the best value from our investments.

University Technology Centres (UTCs)
This global network of university research partners advances our understanding of specialist science and technologies which are core to our next-generation products.

Advanced Manufacturing Research Centres (AMRCs)
These collaborative public/private partnerships help us to bridge the gap between early research and industrial application, with a focus on developing new manufacturing processes and technologies.

Engineering expertise

We seek to attract the best and brightest engineers by providing them with world-class projects, tools and processes.

We have a culture of developing our people within the Group through opportunities such as our Specialist Academy and the Rolls-Royce Fellowship programmes. We value professional development and work closely with a number of institutes and external organisations to encourage our engineers to earn professional recognition.

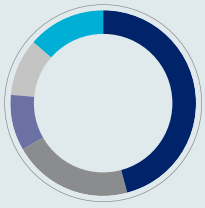
In 2016, we invested £21m to enhance our digital engineering toolset across all our businesses. These developments include:

- **DaVinci**
  This new software enables our engineers to create and test whole engine models virtually. This reduces costs, improves our designs and removes expensive physical hardware tests as we develop new products.
- **High performance computing**
  We have continued investing in upgrades to our high performance computing infrastructure to enable our engineers to make the most of the software tools we have available.

We are also growing our in-house capabilities to capitalise on emerging opportunities. In 2016, we established our digital business to leverage decades of data-driven in-service product knowledge to develop new customer services, and we are leading the way in the development of intelligent ships.

NUMBER OF ENGINEERS (YEAR END)

16,526[1]



Design	7,611
Manufacturing	3,435
Services	1,623
Electrical	1,622
Other	2,235
Total	**16,526**

Inspiring future generations of engineers

We aim to reach six million people through our science, technology, engineering and mathematics (STEM) education outreach programmes by 2020. Our activities are designed to demonstrate the life-long opportunities that STEM careers can offer, helping to secure a future talent pipeline for ourselves and the wider industry. In 2016, we reached 1.2 million people☑, 68% of whom were actively engaged in our programmes. Since launching in 2014, we are now 47% towards our 2020 target.

☑External assurance over STEM, Energy, GHG and TRI rate data provided by Bureau Veritas. See page 183 for the sustainability assurance statement.
[1] Our total number of engineers rose slightly from 15,564 in 2015. This is primarily due to reclassification of 517 roles in Power Systems, and the recruitment of around 270 roles at the new engineering campus in Bangalore, India.

THROUGH OUR PEOPLE

We continue to develop our employee base, ensuring we have the right skills for our business today and the right capabilities for the future.

The skills, knowledge and passion of our workforce are key enablers to our transformation programme. We are embedding a high performance culture across the organisation that encourages pace and simplicity.

As part of our people transformation we have simplified the organisation through management restructuring and leadership change. This has included a reduction of around 700 management positions in 2016 to drive accountability, simplicity and pace through the organisation and improve decision making. In addition, we have continued to make changes to our headcount mix to align with our markets and associated challenges. This has affected our Marine business in particular.

Our transformation is underpinned by our ongoing commitment to maintain the highest standards of ethics, safety and human rights.

In 2016, 97% of Rolls-Royce employees completed annual ethics training, focused on dealing with ethical dilemmas. We are committed to having an environment where anyone can ask questions or raise concerns without fear of retaliation, anonymously if required.

During the year, all of our management population completed Global Code of Conduct certification. We also introduced an ethics e-learning module for new employees to help familarise them with our approach and expectations. In 2016, 99% of new employees who joined us during the year completed this course within the first three months of their employment.

We regard the health and safety of our employees and those working on our premises, or on our behalf, as paramount.

In 2016, there were no fatalities in the Group, and our Total Reportable Injury (TRI) rate was 0.60 per 100 employees☑. This represents a 6% improvement since 2014.

We continue to concentrate on global improvement programmes aligned to our risk profile. Electrical safety and process safety programmes concluded this year and have now transitioned to form part of our ongoing Group assurance activity.

For more information see the Safety & Ethics Committee report, on pages 103 to 109.

We remain committed to protecting and preserving the human rights of our employees, those working in our global supply chain and those who may be impacted by our operations. Our Global Code of Conduct and global human rights policy set out this commitment. More information on our approach can be found in our 2016 anti-human trafficking and modern slavery statement, available at www.rolls-royce.com.

PERCENTAGE OF EMPLOYEES WHO COMPLETED ANNUAL ETHICS TRAINING

97%

TOTAL REPORTABLE INJURY RATE (PER 100 EMPLOYEES)☑

0.60

Headcount by business unit[1,2,3]

	2015	2016
Civil Aerospace	23,100	**23,800**
Defence Aerospace	6,300	**6,000**
Power Systems	10,600	**10,300**
Marine	6,000	**5,300**
Nuclear	4,100	**4,300**
Other businesses and corporate	400	**200**
Total	50,500	**49,900**

Headcount by location[1,3]

	2015	2016
UK	23,200	**22,300**
US	6,400	**6,300**
Canada	1,100	**1,000**
Germany	10,700	**10,700**
Nordic countries	3,800	**3,400**
Rest of world	5,300	**6,200**
Total	50,500	**49,900**

☑External assurance over STEM, Energy, GHG and TRI rate data provided by Bureau Veritas. See page 183 for the sustainability assurance statement.

[1] Headcount data is calculated in terms of average full-time employees.

[2] Other businesses and corporate includes Energy businesses not sold into Siemens in 2014 and corporate employees who do not provide a shared service to the segments. Where corporate functions provide such a service, employees have been allocated on an appropriate basis. 2015 figures have been restated on this basis.

[3] Certain joint ventures have been reclassified as joint operations from 1 January 2016. This has increased the Group reported headcount by 800 employees.

Our early career development programmes continue to attract large numbers of high-quality graduates and apprentices, providing a pipeline of talent into finance, HS&E, operations, HR and engineering.

Our programmes include technical and practical engineering, specialist sciences and corporate function programmes including accountancy, supply chain management and project management.

GRADUATES RECRUITED IN 2016

274

PERCENTAGE OF OUR GRADUATES WHO ENTERED ENGINEERING DEVELOPMENT PROGRAMMES

60%

APPRENTICES RECRUITED IN 2016

327

PERCENTAGE OF OUR APPRENTICES WHO JOINED HIGHER APPRENTICESHIP PROGRAMMES

33%

OUR APPRENTICE SCHEME HAS BEEN RUNNING FOR OVER

100 years

Our training programmes have helped employees to embrace and drive change. In 2016, we invested over £32m in employee learning and development, delivering over one million hours of employee training.

- **High Performance Culture (HPC)**
  HPC is our flagship cultural change programme. It is designed to provide insights and tools to help our people operate and collaborate with pace, simplicity and accountability. More than 80% of employees have been engaged in the programme to date.
- **Columbus Academy**
  The Columbus Academy is our principal executive development programme, run in partnership with Oxford Said Business School. It challenges our leadership teams to consider larger, strategic issues as we continue to transform our business. All our senior leaders have attended the course.

As part of our cultural change programme, we have introduced assessments of individuals' alignment to our values and behaviours into our performance management approach for all employees.

Maintaining employee engagement is critical during times of change and transformation. More than 30,000 employees took part in our employee opinion survey this year, our highest participation rate to date.

Our sustainable employee engagement index score declined slightly from 81 in 2015 to 75 in 2016, six points below the high performance norm.

We consider a subset of the results of our employee opinion survey when calculating our non-financial KPIs, recognising that an engaged workforce is a key measure of success. For more information see page 47.

We provide a variety of channels to communicate with employees and encourage participation and engagement. Our community investment and education outreach programmes are a key component of our employee involvement activities. We invested £9.5m in supporting communities in 2016, including £5.6m in cash contributions and £3.9m in employee time equivalent.

We are committed to creating an environment where every employee can reach his or her full potential, by encouraging diversity, wellbeing and development. We have employee resource groups in our UK, US and Germany operations. These bring together employees who share similar characteristics or experiences.

More information on our approach to diversity and gender distribution can be found in the Nominations & Governance Committee report, on pages 67 and 69.

THROUGH OUR OPERATIONS AND FACILITIES

We continue to develop world-class production capabilities while optimising our operational footprint.

Derby Campus, UK

As part of our commitment to retain manufacturing and engineering capability in the UK, we launched a five-year investment programme to redevelop our Derby Campus.

- Over 10,000 employees, including 7,500 engineers
- Future product development programmes
- Final assembly of our Trent XWB and Trent 1000 engines
- Our corporate functions

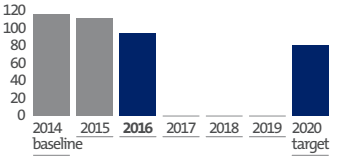
INVESTMENT IN ENERGY EFFICIENCY IMPROVEMENT PROJECTS

£10m

In 2016, we invested £50m in improvements to existing facilities and £184m in the development of new facilities, while at the same time reducing our global operational footprint by 2%.

Our investments in state-of-the-art facilities also enable us to reduce the environmental impacts of our operations.

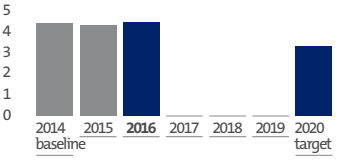
ENERGY USE (MWH/£M)☑



Target: reduce energy use in our operations and facilities by 30%, normalised by revenue, by 2020.
(excluding product test and development)

Our total energy consumption for 2016, excluding product test, was 95 MWH/£m, which represents a 17% reduction since 2014. This has been driven by continued investment in energy efficiency improvement projects, including upgrading lighting and heating systems, and building management systems. Our expenditure for 2016 totalled £10m, our highest annual investment to date.

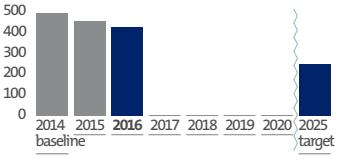
TOTAL SOLID AND LIQUID WASTE (T/£M)§



Target: reduce total solid and liquid waste in our operations and facilities by 25%, normalised by revenue, by 2020.

Our total solid and liquid waste production in 2016 was 4.48 t/£m, a 2% increase from 2014. This is largely driven by improved data collection and validation, particularly in Power Systems.
We continue to focus on opportunities to prevent and reduce the amount of waste we generate. We expect waste reduction activity to be accelerated in 2017 through a global waste action programme.

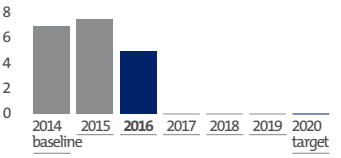
ABSOLUTE GHG EMISSIONS ($KTCO_2E$)☑†



Target: reduce greenhouse gas (GHG) emissions in our operations and facilities by 50%, absolute, by 2025.
(excluding product test and development)

Our total GHG emissions for 2016, excluding product test, was 424 $ktCO_2e$. This represents a 13% reduction since 2014. This has been achieved by investing in a number of low carbon and renewable energy projects across our global facilities, including completing two large solar power installations at our Singapore and Bristol, UK manufacturing sites.

WASTE TO LANDFILL (000 TONNES)§



Target: zero waste to landfill in our operations and facilities, by 2020.
(excluding hazardous waste)

The amount of waste sent to landfill has decreased by 28% from 6,700 tonnes in 2014 to 4,800 tonnes in 2016, with particularly good progress in our Defence Aerospace and Power Systems businesses. This has been accelerated in 2016 by a reduction in output from our two major foundries. We continue to work closely with our waste management partners to identify recycling and recovery alternatives to landfill across a variety of waste streams.

† Regulatory greenhouse gas (GHG) emissions data details on page 188.
☑ External assurance over STEM, Energy, GHG and TRI rate data provided by Bureau Veritas. See page 183 for the sustainability assurance statement.
§ Waste data for 2016 is calculated in accordance with our basis of reporting, as set out on www.rolls-royce.com/sustainability. Whilst we were able to determine the total waste production and waste to landfill for 2016, we maintain a limited degree of uncertainty in the waste categorisation and quantities which may impact our reported numbers. We will continue to review historical and source data and if a material impact is identified will restate in accordance with our basis of reporting.

THROUGH OUR SUPPLIER AND CUSTOMER RELATIONSHIPS

We pride ourselves on being trusted partners to suppliers and customers in more than 150 countries worldwide. Our long-term relationships provide insights and capabilities which enable us to deliver world-class products and services.

Our external suppliers

Rolls-Royce spends over £7bn annually with suppliers. We invest significant resources to ensure this complex supply chain is resilient, efficient and able to consistently deliver to Rolls-Royce standards. Our supply chain is built on long-term relationships, frequently based on shared investments and capability.

We also invest in developing new supplier relationships as we move into new technologies, new customer markets and geographies, particularly in the Asia Pacific region.

At the same time, we are rationalising our supply base as we continue to streamline our product portfolio and operational footprint, particularly in our Marine business where we have reduced the number of OE suppliers by 40% since 2013.

We engage collaboratively with key suppliers to drive out cost and enhance value, underpinned by full transparency and agreed joint improvement plans. Over 65% of our spend is managed through mature and collaborative supplier engagement programmes.

We remain committed to maintaining the highest levels of ethical behaviour across our supply chain. At the end of 2016, 99% of our suppliers had contractually agreed to adhere to our Global Supplier Code of Conduct. We have also introduced risk-based compliance monitoring; 22% of our prioritised suppliers have completed this assessment, covering business ethics, labour practices, anti-bribery and human rights.

ANNUAL SPEND WITH OUR SUPPLIERS

>£7bn

SUPPLIERS CONTRACTUALLY AGREED TO ADHERE TO OUR GLOBAL SUPPLIER CODE OF CONDUCT

99%

Our customers

Our customers expect outstanding product performance and reliability. They operate our products for decades, frequently in combination with aftermarket services. This leads to a deep understanding of their needs which we apply to the development of new technologies and products.

The quality of our customer relationships is based on mutual trust, as well as our engineering expertise. As a steering committee member of the International Forum on Business Ethical Conduct for the Aerospace and Defence Industry (IFBEC), we strive to implement best practice ethical business standards and continue to apply a zero tolerance approach to bribery and corruption.

In addition, we have introduced a customer delivery metric into our remuneration policy to ensure continued focus on the delivery of our commitments to customers. For more information see page 47.

50-year partnership with the Royal Navy

Rolls-Royce is a world-leader in nuclear submarine systems and support services incorporating design, procurement and operation. For the past 50 years, we have been the Technical Authority for the UK Nuclear Steam Raising Plant, responsible for powering the UK's Royal Navy submarine fleet.

A superior supplier to the US Air Force

In September 2016, the USAF recognised Rolls-Royce as a Superior Supplier. We are the only engine manufacturer to be recognised by the USAF as a Tier 1 Superior Supplier three years in a row.