



LEADING THE TRANSITION TO NET ZERO CARBON

EXECUTIVE SUMMARY



INTRODUCTION

At Rolls-Royce, we believe in the positive, transforming potential of technology. We pioneer the power that matters. Power that has an impact and is central to the successful functioning of the modern world.

In June 2020, Warren East, Chief Executive Rolls-Royce, joined the UN High Level Climate Champions to launch the Race to Zero, the UN's campaign to mobilise leadership of the world's businesses, cities and investors to commit to achieve net zero emissions by 2050 at the latest. As part of this, Rolls-Royce committed to align our business and value chain to the Paris Agreement climate goals, to limit global

temperature rise to 1.5°C; and to using our technology capabilities to play a leading role in enabling vital parts of the economy to get to net zero carbon by 2050, including aviation, shipping, rail, and power generation. Here we set out further detail on what our commitment means, including the short term actions we are taking to progress our journey to net zero.



OUR DECARBONISATION STRATEGY

Through our decarbonisation strategy, we will become a net zero carbon company across our value chain by 2050, at the latest, and play a leading role in enabling the sectors in which we operate to get there too.

Our decarbonisation strategy has three interconnected pillars:

1. Making Rolls-Royce a net zero carbon company through how we operate;
2. Decarbonising complex, critical systems at the heart of global society, by:
 - a. enabling our products to be used in a way that is compatible with net zero, and;
 - b. pioneering new breakthrough technologies that can accelerate the global transition to net zero;

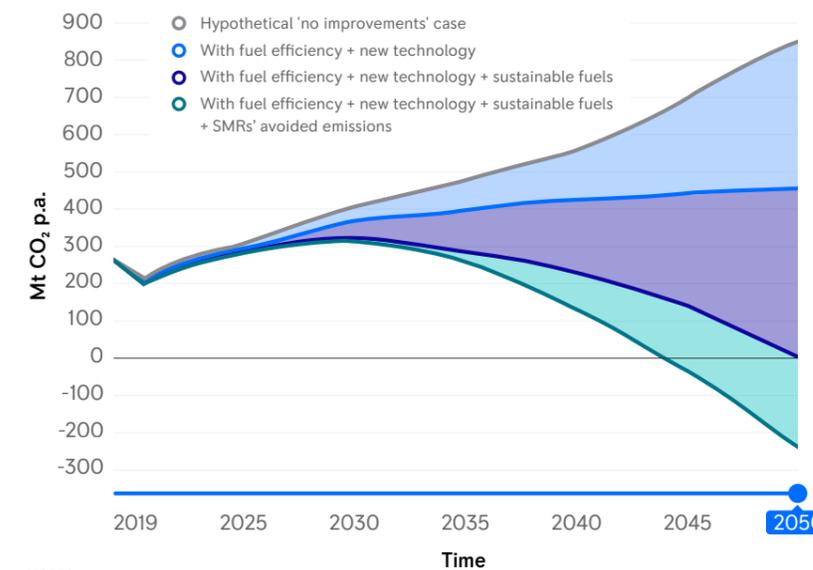
3. Advocating for the necessary enabling environment, with public and policy support to achieve this ambition

We are committed to ensuring our new products will be compatible with net zero operation by 2030, and all our products compatible by 2050.

Our decarbonisation pathway aims are to reduce the emissions associated with our products to net zero; and, to pioneer breakthrough new technologies that can accelerate the transition to a net zero carbon future.



Technology pathway to net zero



Technology assumptions:

These pathways are based on our best understanding of the technological solutions available to us today, and our current understanding of the potential future market application for those technologies.

We have calculated our GHG emissions footprint in accordance with the WRI/WBCSD GHG Protocol Scope 3 Standard (2011). Scope 3 emissions accounting includes estimates and assumptions, in this instance these assumptions include the life cycle CO₂ saving of sustainable fuels will reach 100% by 2050, from approaching 70% today.

In this chart we have depicted future business growth opportunities in new low, or net zero, technologies that serve markets in which we are not currently present (e.g. SMRs for large scale power generation). They are therefore depicted as additional compensation actions as they do not abate emissions within Rolls-Royce's current scope 3 footprint but instead support the decarbonisation of other sectors.

NOTES:

The hypothetical 'no improvements' line depicted indicates a potential emissions growth through increased demand for power – in reality, we know this emissions growth will never be realised as we continue to improve engine efficiency. The avoided emissions line takes account of 100% share of the expected energy output from SMRs built by consortium and under licence. This chart assumes that the electricity produced by SMRs is used to decarbonise activities not currently carried out by Rolls-Royce products, including large-scale fossil-based power generation, and/or other sectors such as road transport, space heating etc. which are currently largely based on fossil fuel consumption but are amenable to electrification. In this chart we have assumed that each kWh of electricity produced by SMRs avoids 400 grams of CO₂ being emitted. The actual amount will depend on the particular combustion activity that is being displaced and could be greater or less than this assumed figure. In the event that some output from the anticipated SMR fleet is used to manufacture sustainable fuels specifically for use by Rolls-Royce products, the lower line would need to be adjusted upwards to avoid double counting with the reductions shown for sustainable fuels.

Technology pathway to net zero

Achieving these aims will require us to ensure all our existing fleet can be operated in a net zero carbon manner, and to introduce new low and net zero carbon products to the market which can abate emissions in areas we are not present in today. The pathways above are based on our understanding of the technological solutions available to us today, and our current understanding of the potential future market application for those technologies.

To achieve net zero carbon we must ensure that our fleet is compatible with net zero carbon operation by 2050, at the latest. This will be achieved through further advancing the efficiency of our engine portfolio through next generation technologies and introducing new low or zero emission products, including fuel cells, microgrids, hybrid-electric and all-electric technologies. These new technologies represent a significant commercial opportunity. By 2030 new products will be compatible with net zero operation.

Beyond that, the scale up of sustainable fuels will play a crucial role in reaching net zero carbon. To accelerate this,

we will make all the commercial aero engines we produce, and our most popular reciprocating engines, fully compatible with sustainable fuels by 2023 and support our defence customers to achieve the same goal for the Rolls-Royce engines they use, subject to customer engagement.

As we pivot to become a net zero carbon business, we will enter new markets and sectors where we can offer technological solutions that can abate emissions outside of our current emissions footprint. This will help further drive our future innovation and growth. These technologies are depicted as additional compensation actions (in the chart above) as they do not abate emissions within Rolls-Royce's current scope 3 footprint but instead support the decarbonisation of other sectors. Our strategy includes the development and deployment of small modular nuclear reactors (SMRs) which will play a vital role in supporting the decarbonisation of the energy grid and meeting increased demand for clean electricity.

Making Rolls-Royce a net zero carbon company

Our short term target is to eliminate emissions from our own operations (scope 1 & 2); we will achieve net zero GHG emissions from our operations and facilities by 2030 excluding product testing and development, and will work to abate our remaining scope 1 & 2 emissions to ensure we are a carbon neutral, climate resilient business by 2050.

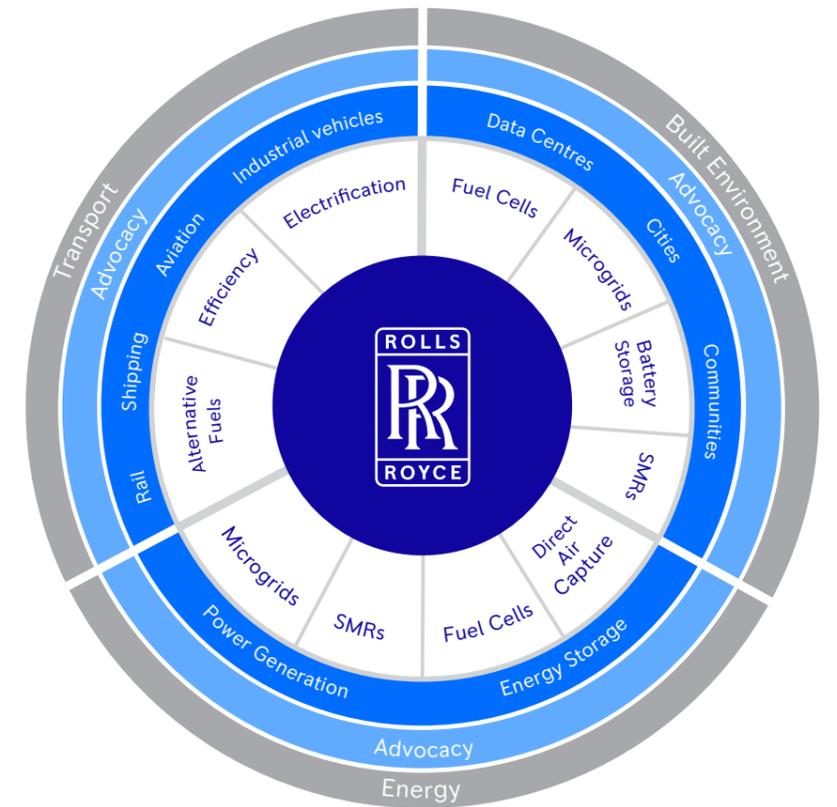
Action along our value chain

Meeting the challenge of net zero will require us to look across our emissions profile, rethinking how we design, manufacture, procure materials and treat our products at the end of their life. To enable us to meet this challenge we are seeking to enlist the support of our entire value chain to join us in the Race to Zero, working with our supply chain partners to identify opportunities to reduce carbon impacts will be a key priority over the short to medium term.

Decarbonising complex, critical systems

Achieving net zero carbon will require a wholesale transformation of the systems that make up the backbone of our global economy. To keep pace with increasing demand for power, society must expand the availability, lower the cost, and scale-up the deployment of low, net zero and zero carbon technologies in the most critical sectors: power, transport and the built environment. As a company, we must also be prepared and able to adjust our decarbonisation ambitions in the context of this changing landscape¹.

The transition of these sectors will not be easy; it will require a combination of technology and policy levers and, while some of these technologies are known today, others we must continue to



explore, develop and ultimately scale. To support this, we are already boosting our research and development (R&D) expenditure to pivot towards lower carbon and net zero technologies, moving from approximately 50% of our gross R&D spend today to at least 75% by 2025.

The suite of technologies that we have developed – and are developing – to do this, have the potential to act across the systems in which we play a part: a microgrid could be used to power a train, ship or city; small modular reactors could be used to generate urban power, or as a route to the production of sustainable fuels, including SAF for aviation, hydrogen that can be used in our fuel cells, or

other e-fuels, through the provision of reliable, predictable, low cost, low carbon energy. We are far enough advanced in the commercialisation of new net zero technologies across land and sea applications to set a science-based interim target to reduce the lifetime emissions of new sold products from our Power Systems business by 35% by 2030, relative to 2019.

¹ We are committed to playing our part in the societal transition to net zero. Undoubtedly the very nature of this transition will mean that there may be general and sector specific circumstances which will influence the output from our roadmap. These are set out in more detail in the full report publication.

CREATING AN ENABLING ENVIRONMENT

There is no one single solution to net zero, but the pace and prioritisation of technological solutions, as well as global consistency and collaboration in policy will be key.

The run up to COP26 presents a tremendous opportunity to accelerate the rate of change through stronger partnership between policy makers and industry.

We are advocating for five global policy principles for national governments to consider in their roles as customers, funders, regulators and convenors of net zero policy:

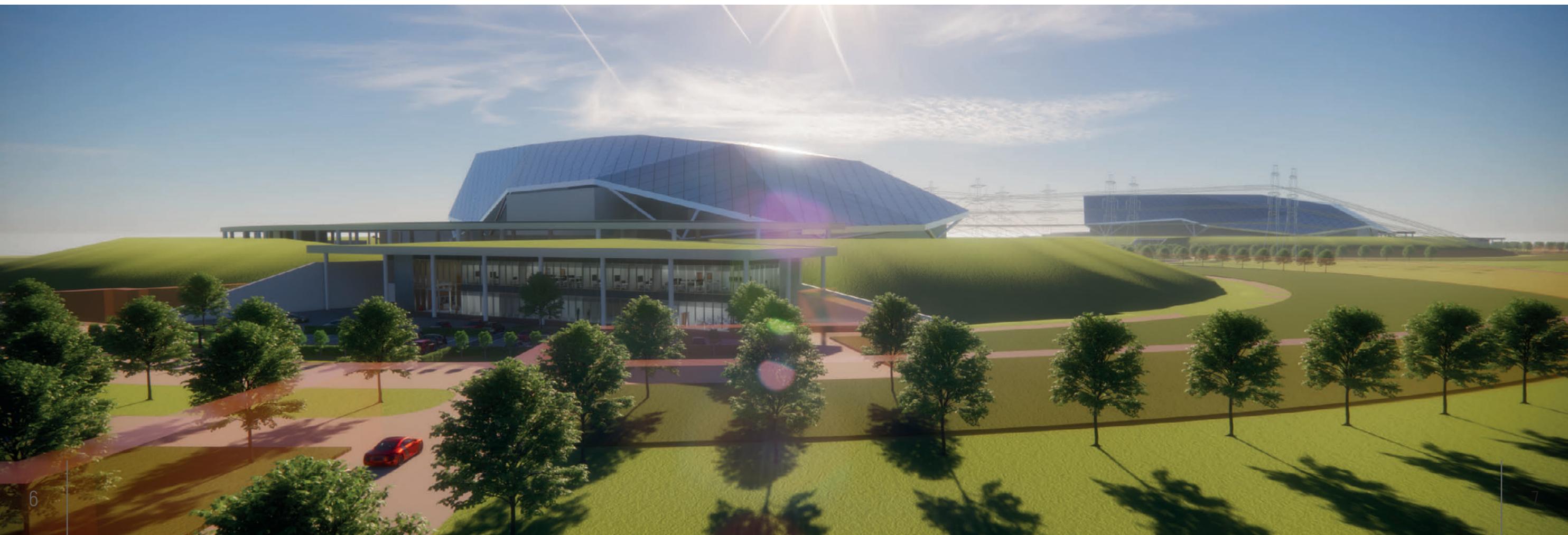
1. Global consistency and coordination on policy development
2. Prioritising technological solutions over neutralising or offset measures
3. Inclusive growth and opportunity to ensure a just transition
4. Considering the lifecycle impact of product development
5. Mobilising finance in R&D

In addition, we will use our convening power across critical industries to advocate for partners in our value chain to join us in the Race to Zero and work with industry groups and trade associations to accelerate climate commitments. We will review the climate policy positions of our membership organisations and work with partners and customers to help them realise their own net zero ambitions, as well as seeking new collaborations to accelerate our journey.

CONCLUSION

Pioneering sustainable, net zero power now sits at the heart of our strategy, future innovation and growth agenda. Our objective is that our decarbonisation strategy will ensure that Rolls-Royce is not only compatible with, but actively supporting, a net zero future.

The societal need is great. The commercial case is attractive. There are few companies better placed than Rolls-Royce to pioneer the vital solutions we need. We want to bring our capabilities as a global power group to be part of the solution to how society builds, moves and powers towards a net zero carbon future.





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