



‘Green Britain’: A scientific superpower for a new era

By William Young

In an era of growing geopolitical competition and accelerating climate change, the United Kingdom (UK) ought to strengthen its resilience and ability to shape the world around it. To achieve these objectives, Her Majesty’s (HM) Government should address three pressing domestic problems:

1. It needs to ‘level up’ the country by unifying disparate economic regions to provide growth and opportunities, particularly in former industrial areas and coastal towns.¹
2. It needs to lead in science and technology as a foundation for British power and influence, as outlined in the Integrated Review.²
3. It needs to regenerate the virtuous circle that gave rise to Britain’s emergence as a global power.

¹ Sarthak Agrawal and David Phillips, ‘Catching up or falling behind? Geographical inequalities in the UK and how they have changed in recent years’, Institute for Fiscal Studies, 03/08/2020, <https://bit.ly/3rEb4W5> (found: 16/07/2021).

² ‘Global Britain in a Competitive Age: Integrated Review of Security, Defence, Development and Foreign Policy’, Cabinet Office, 16/03/2021, <https://bit.ly/3vX8RGY> (found 16/07/2021).



Critically, the UK is David not Goliath.³ Britain has always been forced to compete in an environment in which competitors have had greater geographic size and, at times, economic mass. British power has never come from size and mass. Instead, the UK's strength has been derived from its density and intensity – particularly from the early adoption of innovation. For example, it was the first to develop copper-bottomed ship hulls which gave the Royal Navy a speed advantage and the first to implement uniform guns and small-wheeled gun carriages, which enabled an increase in the rate of fire.⁴

Moreover, not only was the UK often the first to innovate, but it was often the first to systematise new technology alongside business, society and the state. Systematisation was primarily driven by the easy passage and adoption of new ideas, of new ways of doing things – of innovation – supported and not resisted by HM Government. The iterative recombination of ideas and their implementation by many individuals willingly – or unwittingly – collaborating drove innovation and its adoption.⁵

Finally, the British state was itself innovative by continental standards, often acting not only as an 'entrepreneur' but also as one of the primary customers for innovation and its primary translator into power, taking the systematisation of innovation to its logical conclusion and rendering the UK the world's first modern industrial nation.⁶

Thus, if the UK – with its open liberal culture, educational institutions, enabling infrastructure, and vibrant business community, and the state's commitment across multiple political cycles⁷ – can regenerate this virtuous circle of the systematisation of innovation, it has a fighting chance not only of achieving the status of a 'science and technology superpower', but also of upholding its position as one of the world's most powerful countries. In doing so, it will compete effectively as David, not Goliath, and distribute the gains from this approach across former industrial areas and coastal towns.

³ James Rogers, 'Britain could do better after Brexit by acting more like David, and less like Goliath', *Daily Telegraph*, 05/04/2019, <https://bit.ly/3ldQWZP> (found 16/07/2021).

⁴ Nicholas A. M. Rodger, *The Command of the Ocean* (New York City: Penguin, 2004).

⁵ Matt Ridley, *How Innovation Works* (New York: Fourth Estate, 2020).

⁶ Mariana Mazzucato, *The Entrepreneurial State* (New York: Penguin, 2013) and John Brewer, *The Sinews of Power War, Money and the English State, 1688-1783* (Cambridge, Massachusetts: Harvard University Press, 1990).

⁷ Dominic Cummings, Speech: 'The Hollow Men', Institute for Public Policy Research (Youtube), 19/11/2014, <https://bit.ly/3rJPM9E> (found: 16/07/2021).

Enter, climate change

There are a number of contenders for the title of the ‘next’ industrial revolution: digital, biotech, green, and so on. However, a single driving force is unlikely to spark the next economic period of change; instead, a ‘fusion of technologies’ appears to be ‘blurring the lines between the physical, digital and biological spheres’.⁸ Alongside accelerating technological change are the acknowledged societal challenges which absorb the attention and resources of the state. It is clear that if the state is a significant customer of innovation, and one of the primary translators of technological change into power, government priorities ought to be examined. Combating climate change and preparing for its effects is one of these. By May 2021 66% of global GHG emissions were covered by Net Zero targets (either legislated, in process, a government’s stated position or under discussion up) from 34% the year prior.⁹

Dealing with climate change is a government priority not only because it is a significant threat but also, as is the nature of threats which can be foreseen and where there is commitment around the world to address them, an opportunity. Many investors, businessmen and policy makers have recognised that green technologies can often follow the same dramatic cost reduction profiles of high volume commoditised industries such as microchips, and as such the possibility of building new, economically competitive industries, and claiming valuable market share, is significant.¹⁰

To date, the People’s Republic of China (PRC) has been the most adept at this, establishing a dominant position in solar photovoltaics by capitalising on a European boom as well as an early lead in lithium ion batteries due to domestic demand driven by a need to address Chinese air quality.¹¹ The UK has only recently begun to capitalise on industry disruption in order to reinvigorate its own industries, with the two headliners, offshore wind and electric vehicles, making the greatest progress. There has been growing manufacturing investment supported by clear political commitment and substantial industry driven cost reductions, clearing the path to economic competitiveness.

⁸ Klaus Schwab, ‘The Fourth Industrial Revolution: what it means and how to respond’, World Economic Forum, 14/01/2016, <https://bit.ly/3l7ZcKH> (found: 16/07/2021).

⁹ Jon Moore, ‘India, a Key Moment’, *BloombergNEF*, 2021, <https://bit.ly/3jfYEjx> (found 16/07/2021).

¹⁰ Much of the debate regarding the economic opportunity in climate change mitigation has moved beyond ‘solutions are too expensive’ and towards a recognition of the cost savings of new technologies. See: ‘The Sixth Carbon Budget’, Climate Change Committee, 09/12/2020, <https://bit.ly/2TI7X2T> (found: 16/07/2021), p. 106. The discussion remains active in specific sectors such as UK residential heating and is used by low income countries such as India to bolster their negotiating positions.

¹¹ Sarah Ladislav and Ethan Zindler *et al.*, ‘Industrial Policy, Trade, and Clean Energy Supply Chains’, Centre for Strategic and International Studies, 24/02/2021, <https://bit.ly/3xhOy6I> (found: 16/07/2021).

The key thing about the threat and opportunity of climate change though is that it is far wider and more complex than one or two manufacturing industries. It encompasses everything: from how goods are transported around the world to the adaptation of agriculture to more extreme temperatures, and from revolutionary human health treatments against the spread of tropical disease to how businesses are financed so that climate risks are adequately priced into asset valuations and insurance premiums.

As such, although the PRC may have taken an early lead on discrete industries, solutions to the multiplicity of challenges thrown up by climate change and the optimal responses to each are not 'owned' by anyone yet, and the opportunity remains for the UK to play a leading role.

HM Government strategy: 'science and technology superpower' and 'green industrial revolution'

In August 2019, Boris Johnson, the Prime Minister, introduced in a speech on Facebook the concept of 'science superpower' and announced that the Home Office would collaborate with the Department for Business, Energy and Industrial Strategy (BEIS) to introduce new immigration routes, something which later evolved into the Global Talent Visa.¹² In March 2020, Rishi Sunak, the Chancellor of the Exchequer, announced an increase in public investment in research and development from £9.6 billion in 2018 to £22 billion annually by 2024-2025. This went beyond a manifesto commitment to double funding to £18 billion and included a commitment to increase funding in 2021-2022 by 15%.¹³ This commitment was reiterated in the spending review in November 2020 where the increase was confirmed, placing the UK on track to meet the publicly funded portion (26%) of the 2.4% GDP commitment.¹⁴ The remaining 64% will be met by the private sector.

In July 2020, Alok Sharma, then Secretary of State of BEIS, introduced the UK Research and Development Roadmap which gave a broad outline for government thinking. It outlined the goals of cutting unnecessary bureaucracy, ambitious 'moonshots', the establishment of an Innovation Expert Group and

¹² 'PM sets out vision to cement UK as a science superpower', Prime Minister's Office, <https://bit.ly/3zLopOZ> (found: 19/07/2021).

¹³ Rishi Sunak, Speech: 'Budget Speech 2020', HM Treasury, 11/03/2020, <https://bit.ly/3y724Lv> (found: 16/07/2021).

¹⁴ James Tooze, 'Analysis of 2020 Spending Review', Campaign for Science and Engineering, 26/11/2020, <https://bit.ly/3jfZOGT> (found: 16/07/2021).



that having the best regulatory system to support research and development was critical. It also recognised that there were such things as ‘key industries’, technologies and ideas where the UK could lead. It was also an introduction to a wider consultation the results of which were published in January 2021.¹⁵

In November 2020, Johnson announced a ‘ten point plan for a green industrial revolution’, which highlighted ten focus areas with the potential, alongside government investment, to mobilise ‘potentially three times as much from the private sector, to create and support up to 250,000 green jobs.’¹⁶ This was followed in March 2021 by the Integrated Review which placed ‘sustaining strategic advantage through science and technology’ as ‘an essential foundation for all the objectives in this Strategic Framework’.¹⁷ It declared that HM Government’s primary role would be to

create the enabling environment for a thriving S&T [science and technology] ecosystem of scientists, researchers, inventors and innovators, across academia, the private sector, regulators and standards bodies, working alongside the manufacturing base to take innovations through to markets.¹⁸

In the same month the Innovation Expert Group responded to a green paper by the Cabinet Office on how the UK’s £292 billion of annual public procurement could be redesigned to support innovation,¹⁹ whilst the Cabinet Office in June announced that ‘firms must commit to net zero by 2050 to win major government contracts’.²⁰ This was rapidly followed by the wide ranging UK Innovation Strategy published by Kwasi Kwarteng, Secretary of State for BEIS in July.

From these steps it is clear that HM Government is rhetorically and financially committed to this course. However, what is required next?

¹⁵ ‘UK R&D Roadmap survey: summary of responses’, Department for Business, Energy and Industrial Strategy, 21/01/2021, <https://bit.ly/3f7xNVA> (found 19/07/2021).

¹⁶ ‘The ten point plan for a green industrial revolution’, Department for Business, Energy and Industrial Strategy, 18/11/2020, <https://bit.ly/3iaEibR> (found: 16/07/2021).

¹⁷ ‘Global Britain in a Competitive Age: Integrated Review of Security, Defence, Development and Foreign Policy’, Cabinet Office, 16/03/2021, <https://bit.ly/3vX8RGY> (found 16/07/2021).

¹⁸ Ibid.

¹⁹ Innovation Expert Group, ‘IEG Response to Cabinet Office’s Green Paper: Transforming Public Procurement’, Cabinet Office, 10/03/2021, <https://bit.ly/3xbapfV> (found: 16/07/2021).

²⁰ Theodore Agnew, ‘Firms must commit to net zero to win major government contracts’, Cabinet Office, 07/06/2021, <https://bit.ly/2VgAkFQ> (found: 16/07/2021).

Leading the green revolution

The steps required next touch on two areas: firstly, economy wide issues and, secondly, sector specific issues. These should be addressed over the next twelve months, both with the UK Innovation Strategy, and work being done by related departments such as Education, Transport, HM Treasury, the Cabinet Office, and others. There should be some degree of coordination by the new ministerial level National Science and Technology Council which is supported by the new Office for Science and Technology Strategy, led by Patrick Vallance, Chief Scientific Advisor and now National Technology Advisor.²¹

In every significant shift in government policy there are competing voices; however, it is notable in this area that although there are differences over detail, there is broad agreement on a large swathes of decisions that need to be made and actions taken. This is important because things will likely move a lot faster if they are not held up by fundamental disagreements.

Economy wide opportunities: 1% improvements, towards a new consensus

There have been four significant papers over the last 24 months addressing the 2.4% target, research and development, and touching on growth and the green industrial revolution – from the Royal Academy of Engineering, David Willetts, BEIS, and the Taskforce on Innovation, Growth, and Regulatory Reform (TIGRR).²² Taken together they made 137 recommendations and identified around 54 areas of importance for government, business and the research community to work through. Strikingly, government funding, perhaps because of confidence in the Chancellor’s commitments, is not a major issue. There is an emphasis on surety on existing financing mechanisms such as tax credits but specific new funding is only requested for late stage development and demonstrators.

²¹ ‘Prime Minister sets out plans to realise and maximise the opportunities of scientific and technological breakthroughs’, Prime Minister’s Office, 21/06/2021, <https://bit.ly/3C2bhHx> (found: 16/07/2021).

²² See: ‘Increasing R&D investment: business perspectives’, Royal Academy of Engineering, ‘Increasing R&D investment: business perspectives’, 2016, <https://bit.ly/3r1LLXr> (found: 16/07/2021); David Willetts, ‘The road to 2.4 per cent: Transforming Britain’s R&D performance’, The Policy Institute at King’s College, London, 12/2019, <https://bit.ly/2VjcRDE> (found: 16/07/2021); ‘UK Research and Development Roadmap, Survey results summary’, HM Government, 01/2021, <https://bit.ly/2VkCO5L> (found: 16/07/2021); and ‘Taskforce on Innovation, Growth and Regulatory Reform Independent Report’, Cabinet Office, 16/06/2021, <https://bit.ly/3f4nKQL> (found 19/07/2021).



Far greater import is placed on two areas: firstly, on market pull for innovation through the use of public procurement and a more flexible and responsive legal and regulatory environment; secondly, on the skills available to and collaboration possible for researchers, business, universities, schools, and more. It is thus reasonable to conclude that reaching the spending target of 2.4% is less about ploughing taxpayer funds into research institutions and instead now far more about ploughing political capital into ‘doing a hundred things 1% better’,²³ while ‘creating the enabling environment for a thriving S&T ecosystem’. Some who work in HM Government have argued that it is easier to get one big thing done than many small things. However, when the small things are aligned to two overarching goals, one in the Integrated Review – ‘science and technology superpower’ – and the other in legislation – ‘Net Zero’ – then making many small changes to align this should become a lot easier.

With this foundation there is now an opportunity for HM Government to help domestic and international audiences understand the multifaceted web that is the UK’s innovation ecosystem. Just telling people that things like the catapult network, industry councils, technology institutes, university collaborations, business partnerships, regulatory innovation, UK Research and Innovation and new Advanced Research and Innovation Agency exist and work together would be highly valuable. Enough dumbing down; this is exciting stuff! It also happens to be a concrete-proof point in the ‘Global Britain’ narrative with the UK as a model moderniser aligned to national and global interests.

Sector specific opportunities: green industrial research and development

The UK’s ‘ten point plan for a green industrial revolution’ identified a series of technologies and sectors of special import. It focused on the major emitting sectors of power generation (offshore wind, advanced nuclear), transport (zero emissions vehicles, Jet Zero and green ships), buildings and industry (low carbon hydrogen, heat pumps), agriculture (environmental land management), and the services needed for each sector (green finance and innovation).

Ultimately, what the ‘green industrial revolution’ approach does is almost as important as what it does not. What it does do is lay the rhetorical foundations for a green ‘revolution’ and broad commitment to it from HM Government. What it does not do is commit to the industrial strategy and highly structured ‘challenge’ approach of the previous government. In doing so it reframes this as an opportunity, despite many underlying policy mechanisms likely being similar.

²³ Clive Woodward, ‘Doing a hundred things 1% better’, Harvey Thorneycroft Limited (Youtube), 13/08/2018, <https://bit.ly/3rEsxh9> (found 16/07/2021).

The TIGRR report built on this, with its emphasis on an innovation friendly legal and regulatory environment, removing barriers to and fostering innovation in specific sectors, and trusting the ecosystem of individuals, institutions and industries to deliver.

The sectors that both the legacy industrial strategy, green industrial revolution announcement and wider systems thinking perspective of the TIGRR report do align on are: offshore wind, low carbon hydrogen, new and advanced nuclear power, green finance and innovation, and the natural environment. Less widely embraced – in part because of real or perceived lack of market demand and a genuine concern in some quarters of a grass roots backlash²⁴ – though supported by HM Government, are zero emissions vehicles (ZEVs), Jet Zero and green ships, greener buildings, and carbon capture, usage and storage.

The challenge and opportunity in the less widely embraced sectors is to establish a virtuous circle of deployment goals, regulatory frameworks and industry lead research and development. This has been achieved in both offshore wind and battery manufacturing; there is no reason it cannot be replicated.²⁵

For Jet Zero and green ships, the ‘innovation’ key lies in technology, industry engagement and market demand. In technology it is the reconfiguring of propulsion technologies and fuels. For ZEVs, short haul flights and small commercial vessels (including autonomous or remotely navigated) this is most likely to include batteries and hybrid power trains. For long haul flights and large commercial shipping, this is likely to require engine reconfiguration to consume alternative fuels such as biofuels and synthetic fuels such as clean ammonia.

The model for this exists in the automotive sector with the Advanced Propulsion Centre and government’s commitment to phasing out internal combustion engines. In Jet Zero the Aerospace Technology Institute is making clear advances on technology and will soon need some form of market demand mechanism. In marine the newly formed Maritime Research and Innovation UK (MarRI-UK) needs to recruit more industry participants to its cause – including key marine engine manufacturers, fuel providers and consumers.²⁶ This will put it in a stronger position to industry match any government funding granted in

²⁴ Emma Gatten and Edward Malnick, ‘Lecturing meat eaters about climate change not the solution, says Environment Secretary’, *The Telegraph*, 26/06/2021, <https://bit.ly/3ybNP81> (found: 16/07/2021).

²⁵ While much of the intellectual property (IP) for battery manufacturing is currently foreign owned, the establishment of the Faraday Institute, HM Government’s clear end date for combustion vehicle sales, and mindfulness of domestic manufacturing through EU negotiations, has led to significant investment to meet the resulting market demand. A research and development ecosystem and concomitant investment has both supported this but will likely also follow.

²⁶ ‘Clean maritime plan: Maritime 2050 environment route map’, Department for Transport and Maritime Coastguard Agency, 11/07/2019, <https://bit.ly/3x9eWzh> (found on 16/07/2021).

the spending review²⁷ and in due course pitch for a market demand mechanism. MarRI-UK may also in due course wish to indicate how its research and development and other proposals aligns to the Ministry of Defence’s 2017 National Shipbuilding Strategy and potentially other priorities such as the offshore wind industry and the monitoring of Maritime Protected Areas in the UK and the Overseas Territories.²⁸

Table: Selected UK sector based research and development and market demand mechanisms

	Research and development coordination vehicle	Industry co-funding	Market demand
Automotive	Advanced Propulsion Centre, Faraday Institute	Yes	Zero emissions vehicle mandate under discussion
Aerospace	Aerospace Technology Institute	Yes	Not yet – initial focus likely on domestic flights
Marine	Marine Research and Innovation UK	In progress	Not yet – initial focus likely to be on short sea shipping

Supplementing these classic industrial sectors are others in particular are those less commonly associated with ‘industry’ including finance.

In finance, the capabilities of the Bank of England and its role as a widely respected prudential regulator gives the UK a special advantage in designing integrated and streamlined regulation which effectively incorporates the risk of climate change into financial decision making. The mandatory reporting of material financial risks in line with the guidance of the Taskforce on Climate Related Financial Disclosure (TCFD) will establish the UK, alongside other financial centres which adopt this, as a leading centre of climate finance and the evaluation and pricing of companies, assets and insurance. The Chancellor’s announcement that it would require the reporting of ‘opportunities’ as well as

²⁷ MarRI-UK ‘submitted a Comprehensive Spending Review bid in 2020 seeking £530 million of HM Government co-investment for a programme that aims to encourage greater use of safe, zero-carbon short sea shipping network.’ By comparison this would be broadly equivalent to HM Government’s commitment to the Advanced Propulsion Centre £500m over ten years, with matched industry funding. See: ‘Zero-carbon coastal highway’, Maritime Research and Innovation UK, No date, <https://bit.ly/3BUqMAY> (found: 16/07/2021).

²⁸ ‘National Shipbuilding Strategy’, Ministry of Defence, 06/09/2017, <https://bit.ly/3BRIjdo> (found on 16/07/2021).

risks begins to set it apart from continental rivals, as will its ability to effectively streamline regulation after this period of innovation, and potentially further enabled by the effective use of data from a new breed of satellites.²⁹

Mentioned in other reports are other significant opportunities from agri-environment and agricultural genomics to data, hydrogen, satellites and nutraceuticals. All have some application to levelling-up, improving the UK's position in the world, and addressing climate change.

Knowing that many countries around the world will be facing similar challenges to the UK, anchored and made common in the face of climate change, also gives British companies more visibility on potential export markets than they have had in the past. These companies should not be fussy about the shape these opportunities come in. It could be the export of best practices in regulation and governance to British allies and partners, or of manufactured goods such as electric vehicles, aerospace engines or in future marine engines to high income countries, or advanced financial services to all, or licensed intellectual property in agriculture or health to markets which respect it.

Cautions

With the breadth of opportunity afforded by both the effort to minimise climate change and the need to adapt to its ill effects it is important to not get fixated on narrow opportunities that may or may not bear fruit in a given time frame. With this in mind there are three cautions:

1. The definition and the way 'climate' research and development is understood ought to be updated. The National Audit Office's 2017 report on cross-government funding of research and development studied climate as one of six funding areas totalling £3 billion annual funding.³⁰ Its findings that climate was receiving £90 million per annum reflect an unnaturally siloed evaluation of the importance of public funding in human health, animal and plant health, energy and advanced materials in addressing climate change. The new 'Innovation Missions' and technology families where the UK can develop strategic advantage which the Innovation Strategy states will be developed should also consider 'climate' in this

²⁹ Tom Gockelen-Kozlowski, 'Could satellite data propel finance industry into greener orbit?', *Business Green*, 19/07/2021, <https://bit.ly/3j2NI8q> (found: 19/07/2021).

³⁰ 'Cross-government funding of research and development', National Audit Office, 15/11/2017, <https://bit.ly/3l7N8Jf> (found: 16/07/2021).



broad approach.³¹ Furthermore, should the National Audit Office re-run a study on cross government funding of research and development, it should not only take into account the cross-cutting nature of ‘climate’ but also have an entire chapter on ‘matched funding’ – the ratio of HM Government to business funding across identified industries. Currently at 71%, a goal to increase this to match Japan’s 79% – or even higher – is something HM Government might wish to have examined.³²

2. The complexity and cross-cutting nature of the 2.4% goal might suggest a past approach to this: make it law! However, as with the Official Development Assistance spending target – and will likely be seen at some point with climate legislation – legislating in this area with insufficient flexibility can be counterproductive, undermining public support. The preferable approach is to invest sufficient resources into the new Office of Science and Technology, led by Patrick Vallance, and the Council on Science and Technology, to support the coordination of ministries, budgets, legal and regulatory reform. The breadth and flexibility this model gives HM Government to adapt, coupled with the Prime Minister’s backing, the Integrated Review, and the forthcoming Innovation Strategy makes the office particularly important in the coming five years. To enable effective decision making from funding through to regulatory innovation and educational promotion, the Office of Science and Technology needs to supplement – but not replace – the industry level roadmaps, often owned and maintained by catapults, institutes and industry specific centres, with its own horizon scanning, as recommended by the Integrated Review. These horizons will likely have multiple time frames – short, medium and long – but will be an invaluable tool for HM Government to develop, maintain and, importantly, be audited on the accuracy of.
3. Focusing solely on the 2.4% research and development spending target where the primary responsibility sits with BEIS, is necessary but insufficient. To achieve the goal and realise the wider societal benefits, an educated and enthused community and workforce will be needed. This immediately takes this into the remit of the Home Office (and Office of Talent) for immigration, and the Department for Education and devolved administrations for education. It is this area of the wider community of

³¹ ‘UK Innovation Strategy: Leading the Future by Creating it’, Department for Business, Energy and Industrial Strategy, 22/07/2021, <https://bit.ly/3f7FZoI> (found 27/07/2021).

³² Helen Pearce, ‘The UK’s 2.4% R&D Target’, Innovation Policy Platform, 04/2019, <https://bit.ly/3j2B3To> (found: 16/07/2021).



school children and families across the nation that the genuinely exciting narrative of what the UK is up to should be told.

Conclusion

The UK needs to ‘level-up’ and do the work to safeguard its interests globally. To do so it needs to re-embed the virtuous circle that has empowered it in the past and think of itself as David, not Goliath. The density, intensity of research and economic activity as well as the early adoption of innovation is key – particularly in a time when ‘a fusion of technologies’ appears to be ‘blurring the lines between the physical, digital and biological spheres’. This is an age when the fluid transfer of ideas within and between innovation ecosystems will be critical and the role of the state as a customer of innovation and the translator of this into power. In doing so it will not only leverage the UK’s open liberal culture and educational institutions, but it will also strengthen them. This should be further bolstered by the maintenance of government support over multiple political cycles – enabled by the strong domestic and cross-party support for both the science and technology and green industrial revolution agendas.

HM Government’s strategy is making progress on this and by implementing the hundreds of small changes around which there is broad consensus – at both economy wide and sector specific levels – the UK is in with a fighting chance of re-establishing the virtuous circle which first gave rise to its emergence as a global power. Simultaneously, it is also in with a chance of being the first climate-aligned science and technology – ‘green’ – superpower.

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