ALDERSGATE GROUP
LEADERS FOR A SUSTAINABLE ECONOMY

BUILDING A NET ZERO EMISSIONS ECONOMY: NEXT STEPS FOR GOVERNMENT AND BUSINESS

CONTENTS

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ALDERSGATE GROUP

The Aldersgate Group is a politically impartial, multi-stakeholder alliance championing a competitive and environmentally sustainable economy.

The Aldersgate Group is an alliance of major businesses, academic institutions, professional institutes, and civil society organisations driving action for a sustainable and competitive economy. Our corporate members, who have a collective turnover in excess of £550bn, believe that ambitious and stable low carbon and environmental policies make clear economic sense for the UK.

Our policy proposals are formed collaboratively and benefit from the expertise of our members who span a wide range of industry sectors and public interests. Our breadth and collegiate approach allows us to formulate progressive policy positions to benefit all organisations and individuals.

ORGANISATION MEMBERS

Recommendations made in this response cannot be attributed to any single organisation and the Aldersgate Group takes full responsibility for the views expressed.

EXECUTIVE SUMMARY

Delivering the net zero target and recovering from COVID-19 go hand in hand

It is now widely accepted that a successful recovery from the coronavirus pandemic is one that puts climate and environmental provisions at its core. Lessons from the 2008 financial crisis show that green stimulus packages (such as those supporting clean energy, transport or infrastructure projects) have been more effective than traditional ones at supporting increased economic activity, generating higher numbers of jobs and long-run cost savings.[1]

With the overlap between societal[2] and business demands for an environmentally sustainable recovery and the political commitment to deliver it, this Parliamentary term is a critical time to press ahead with cutting emissions, improving the state of our natural environment and leading on these efforts at the global level.

Government and businesses have taken important steps over the past few months to make progress towards reaching a net zero emissions target by 2050 and align initial economic recovery efforts with this target. This has included the Government rightly committing £3bn of funding to support energy efficiency improvements in homes and public buildings as part of its economic stimulus measures, publishing a Transport Decarbonisation Plan policy paper and providing innovation funding to test the potential of hydrogen and Carbon Capture and Storage in areas such as industry and transport. Whilst these steps are important, **further policy commitments are needed in the near future to put the UK on a credible pathway for achieving its net zero emissions target.**

The UK needs a comprehensive net zero delivery plan

Based on the Aldersgate Group's recent work on economic recovery,[3] **this report sets out some of the key policy decisions that government needs to take in this parliamentary term to put the UK on track for net zero emissions and support businesses and investors as they seek to cut emissions across supply chains, develop new business models and invest in low carbon infrastructure.**

This report makes the case for these policy priorities to be brought together as part of a comprehensive net zero delivery plan, which would build on the already existing Clean Growth Strategy and which would provide visibility on upcoming policy actions from government and how these actions will interact with one another.

1 Oxford Smith School of Enterprise and the Environment (May 2020) *A net zero emissions economic recovery from COVID-19*

2 www.climateassembly.uk/report

3 Aldersgate Group (June 2020) *Seize the moment: building a thriving, inclusive and resilient economy in the aftermath of COVID-19;* and Dimitri Zenghelis & James Rydge (July 2020) *Rebuilding to Last: designing an inclusive and resilient growth strategy after COVID-19*

A strategy for getting to net zero emissions by 2050 should map out the immediate and longer-term steps that are needed to cut emissions across different sectors of the economy, the innovation prerequisites, as well as the market mechanisms needed to support competitiveness in a low carbon economy. The strategy should also consider the wider framework to enable net zero including the role of private finance in accelerating the transition, the skills requirements, the need to deliver a just transition for the whole of the UK, as well as how trade and international diplomacy can facilitate meeting the net zero target.

Importantly, a comprehensive strategy should take a whole economy and systems approach to achieving net zero and consider the interaction between all these different components. As recommended by the Council for Science and Technology, such an approach will enable government to better understand the dynamic between mitigation, adaptation and resilience, better guide the behaviour of citizens, businesses and investors, and achieve net zero in a cost-effective way, supporting the delivery of wider socio-economic benefits.[4] With the development of an updated Industrial Strategy, government has an important opportunity to achieve these objectives.

The existing Clean Growth Strategy has most of the right building blocks to put the UK on a pathway for achieving net zero emissions, but it needs to be updated in policy detail and level of ambition in some key areas. **This is especially the case given that current policies are not enough to deliver the emission reductions demanded by the fourth and fifth carbon budgets, which were based on the previous 80% emission reduction target for 2050.**[5] Building on this, a net zero delivery plan should lay out a clear strategy to press ahead with emission cuts in priority sectors such as buildings and surface transport where solutions to cut emissions are well known. It also needs to accelerate the development of innovative technologies and business models which could play a key role in the coming years to cut emissions in hard to treat sectors such as heavy industry.

4 Council for Science and Technology (30 January 2020) "Achieving net zero through a whole systems approach"

5 Committee on Climate Change (July 2019) *Reducing UK emissions – 2019 progress report to Parliament*

Putting forward such a plan well ahead of the start of COP26 and at a time when the world economy seeks to recover from COVID-19 will help unlock private finance, allow the UK to host the summit in a position of strength, and help it encourage other key emitters to align their economic recovery plans with the need to achieve net zero emissions.

Policy priorities for this parliamentary term

A credible net zero delivery plan should focus on the following main pillars, with clear policy commitments attached to each of them.

Key recommendations:

1. **Press ahead with smart regulations, incentives and targeted infrastructure funding to significantly cut emissions in buildings, surface transport, power and waste sector.** These are low regret areas where the required technological solutions to cut emissions are well known. Recommendations include introducing binding energy efficiency standards for new and existing buildings, incentives for energy efficiency retrofits such as stamp duty rebates, maintaining grant support for EV purchases until cost parity is reached, delivering a regulatory framework under RIIO-2 to support completing the decarbonisation of the energy sector and setting a clear carbon price trajectory for the 2020s.

According to analysis by the Green Alliance,[6] making progress in these low regret priorities will deliver reductions of 275 $MtCO_2$ out of the 313 $MtCO_2$ needed for the UK to be on track for net zero and more than the 116 $MtCO_2$ reductions needed to achieve the fifth carbon budget. To achieve these reductions, priorities should include a 2030 ban on the sale of petrol and diesel cars, better product design and reuse to reduce waste and a nationwide home energy efficiency programme.

6 Green Alliance (May 2019) *Acting on net zero now*

2 **Accelerate innovation to cut emissions in hard to treat sectors, such as heavy industry, agriculture and long-distance transport, by continuing support for large scale trials of critical technologies and business models.** These include at scale trials of Carbon Capture and Storage, investment in battery technology and trialling more resource efficient business models. These measures should go hand in hand with a robust carbon price trajectory, as well as developing new market mechanisms like product standards on embodied carbon and CO_2 storage incentives, which grow the demand for low carbon goods and services in these areas and make these sectors more competitive internationally.

3 **Grow the potential for negative emissions by creating a market for nature-based solutions and supporting scalable trials of potentially promising negative emissions technologies (NETs).** The use of nature-based solutions should be supported through a robust carbon price to adequately reflect their contribution to carbon removal and their co-benefits. This will attract more consistent investment from companies looking to offset emissions and deliver against environmental improvement objectives. **Nature-based solutions illustrate the importance of ensuring that the net zero delivery agenda works hand in hand with the finalisation of the Environment Bill and the Agriculture Bill.**

The Government should use its upcoming £100m competition for greenhouse gas removal technologies as the first step to trial the potential of technologies such as Bioenergy with Carbon Capture and Storage (BECCS) and Direct Air Capture and Carbon Storage (DACCS) The UK government will shortly launch an innovation programme to develop and demonstrate the potential of direct air capture and other greenhouse gas removal technologies. Projects are expected to start in April 2021[7] and identifying some of the market mechanisms needed to support their future deployment should be a particular area of focus.

Given the high cost of NETs and the limited space available for nature-based solutions, **the use of negative emission solutions should not undermine the imperative of reducing emissions across all sectors.**

7 https://bit.ly/3mmYbwy

4 **Strengthen the Green Finance Strategy (GFS) by mainstreaming green finance and growing private sector investment in low carbon infrastructure.** Government should:

- make TCFD-aligned climate risk disclosures mandatory in the near future so as to build momentum before COP26;
- establish a new **National Investment Bank** with a clear mandate to support investment in complex low carbon and environmental projects and in regions severely impacted by the COVID-19 crisis;
- support the British Standards Institute in the development of new green finance management standards;
- act on the lessons from the Bank of England's upcoming climate stress testing of the UK's largest banks and insurers;
- improve the risk profile for green investment through the introduction of a 'brown penalising factor' as part of the capital weighting requirements;

5 **Manage a just transition to a net zero economy** by directing low carbon investment in areas that have been severely impacted by the pandemic, and **investing in a national skills strategy** to embed sustainability training at all levels of the educational system and through lifelong learning.[8] This will be key in maintaining public support for an economic recovery aligned with the net zero target. In addition, collaborating with Local Enterprise Partnerships will be essential to engage businesses and SMEs and ensure they receive the adequate support to recover from the impacts of the pandemic and are well placed to seize new growth opportunities inherent in the transition to a net zero emissions economy.

6 **Devise a trade policy that supports the delivery of the UK's net zero and Environment Bill targets.** A well-devised trade policy is one that maximises export opportunities for the UK, promotes high environmental and climate standards and guarantees that the UK has the flexibility to develop more ambitious standards over time in order to reach its domestic targets.[9]

Through its network of climate diplomats and attachés and its position as host of the COP26 and G7 summits in 2021, the UK has a unique opportunity to engineer a global increase in climate ambition and grow trade in low carbon goods and services. Negotiation priorities for COP26 should include:

- putting forward a strong business case for major emitters to align their economic recovery plans with ambitious climate and environmental targets;
- agreeing on a mechanism to support developing countries already vulnerable to adverse climate impacts;
- finalising a rule book for the market and cooperation mechanisms under Article 6 of the Paris Agreement;

8 Aldersgate Group will publish an extensive policy briefing on skills investment and a just transition in October 2020.

9 Aldersgate Group (June 2020) *Aligning the UK's trade policy with its climate and environmental goals*

GETTING TO NET ZERO BY 2050
OVERVIEW OF PRIORITIES FOR THIS PARLIAMENTARY TERM

Policies, regulations and market mechanisms to put the UK on a credible pathway to net zero emissions

○ **Incomplete** ◔ **In progress** ✓ **Complete**

LOW REGRET AREAS – QUICK WINS FOR CUTTING EMISSIONS

Power

◔ Follow through on proposals to hold Pot 1 CfD auctions to bring mature renewables to market.

○ Provide sufficient volume ambition at CfD auctions and a more effective approach to project consenting, grid connections and radar interference issues.

○ Work with Ofgem to ensure that the RIIO-2 framework supports the necessary investments needed to modernise the grid and upgrade IT systems to ensure the cost-effective decarbonisation of the energy system.

Transport

◔ Bring forward the ban on the sale of new diesel, petrol and hybrid cars to 2030 or as soon as possible thereafter.

◔ Follow through with the Transport Decarbonisation Plan policy paper commitments to develop an integrated transport strategy covering all transport modes to ensure all spending and policy decisions support infrastructure that delivers the best environmental and economic benefits.

Built environment

○ Roll out minimum energy efficiency standards for all buildings and adopt fiscal incentives that accelerate take-up of retrofits.

Waste

○ Roll out Extended Producer Responsibility schemes and product standards that incentivise better product design.

SETTING THINGS IN MOTION FOR HARD TO TREAT SECTORS

Shipping/Aviation

- Formally include shipping and aviation emissions in the UK's carbon budgets to send a clear market signal.
- Collaborate closely with and invest in international and EU partners on the development of key technologies like batteries, plane design or alternative fuels.
- If government is to offer bailouts to airlines, these should be conditional on decarbonisation, so that jobs can be protected without locking in emissions, in line with the bailout conditions attached by the French Government to funds for Air France.

Industry

- ✓ Launch a hydrogen supply funding competition and announce winners.
- Announce/consult on strategies for deploying key technologies like Carbon Capture and Storage at scale and decide on priority applications.

Agriculture

- Aligning subsidies in the Agriculture Bill to incentivise environmental improvements and create a comprehensive framework for nature restoration, bringing together the net zero and the Environment Bill agendas.

SETTING THE FRAMEWORK FOR CUTTING EMISSIONS AND GROWING SUPPLY CHAINS

Finance

- Make TCFD-aligned disclosures mandatory for all companies to understand the level of exposure to climate-related risks across the economy.
- Establish a new National Investment Bank (NIB) with £20 billion paid in capital – £5 billion per year for 4 years – that support the delivery of complex low carbon projects and help direct low carbon investment to regions in need of economic regeneration.

Climate diplomacy

- Build on strong domestic progress to deliver more ambitious global pledges at COP26. Focus negotiation efforts on aligning persuading key emitters to align rescue packages with plans to deliver net zero emissions, finalising Article 6 rulebook and agreeing a viable support mechanism for vulnerable countries.

Skills

- Consult on the implementation of a national skills strategy to embed sustainability across all levels of the educational system and address labour shortages.

Trade

- Enshrine right to regulate in UK's new trade policy to guarantee the ability to develop ambitious regulations to meet domestic targets. These regulations should apply equally to all businesses active on the UK market.

THE BUSINESS CASE FOR GETTING ON WITH DELIVERING NET ZERO

There is mounting evidence that sustainable, resilient and inclusive investments have some of the highest short- and long-run multipliers in a recession, meeting the most important criteria for a strong and sustainable recovery. In the short run, green investments perform substantially better on jobs than traditional stimulus investments: for instance, clean energy infrastructure is particularly labour intensive, creating twice as many jobs per dollar spent than fossil fuel investments. Construction projects like insulation retrofits and building wind turbines (or installing broadband networks, planting trees and restoring wetlands) are less import intensive than many traditional stimulus measures and lead to higher multipliers.[10] Embedding net zero delivery in recovery strategy is a clear way for delivering short and long term economic growth.

Even with the previous 80% emissions reduction target, there were already significant opportunities for economic growth. By the government's own calculations, the low carbon economy could grow by 11% per year between 2015 and 2030, four times faster than the projected growth of the economy as a whole.[11]

Under a net zero emissions target, the opportunities could be even greater. Aldersgate Group's recent engagement with companies across a range of different economic sectors shows that businesses believe there to be greater potential for innovation and industrial growth under a net zero target compared to an 80% target, due to the truly transformative approach the new target requires.

With 46% of UK businesses already having plans in place to become carbon neutral by 2050[12] and 961 companies globally having adopted science-based emissions reduction targets,[13] government actions will be crucial in sustaining this effort and amplifying action through comprehensive policies, regulations and market-based mechanisms.

In addition to building on these opportunities, government policy will play a key role in ensuring that the impacts of this economic transformation are well-managed and that society and businesses can recover from the impacts of the pandemic and manage the net zero transition in an effective way. While some sectors will become increasingly competitive as a result of the transition (offshore wind, green finance, the low carbon automotive sector), others will need support in transforming their business models to adapt to a net zero emissions economy. A good example comes from heavy industry, where significant early investment, a targeted industrial strategy and support to reskill workers will be required in the near term to ensure that the net zero transition can lead to a revival of UK industries, such as steel or cement.

10 Oxford Smith School of Enterprise and the Environment (May 2020) *A net zero emissions economic recovery from COVID-19*

11 HM Government (October 2017) *The clean growth strategy: leading the way to a low carbon future*

12 YouGov https://bit.ly/32hL7AC

13 www.sciencebasedtargets.org

Addressing deepening social and regional inequalities

Following the surge in unemployment and the uncertain future of many businesses and sectors of the economy in the aftermath of the pandemic, the opportunities for levelling up afforded by the net zero target are crucial. With the right combination of investment in skills, innovation and a clear policy framework, cutting emissions can go hand in hand with creating employment opportunities, ensuring these are fairly distributed across the country, and supporting workers from declining sectors by equipping them with the necessary skills to enable them to integrate in the low carbon economy.

Looking only at the energy sector, it was estimated that the transition to a 100% renewable energy system by 2050 could create 52 million full-time jobs globally and result in the loss of 27 million jobs across non-renewable and carbon-based energy options.[14] We were already witnessing a significant shift towards low carbon business models, even before the COVID-19 crisis. For example, Ørsted, formerly DONG Energy, made the transition to a 100% renewable energy business model by divesting its upstream oil and gas business in 2017 and growing its offshore wind and bioenergy portfolio and increasingly investing in other renewable technologies.[15] More recently, oil giants Shell[16] and BP[17] have taken on net zero targets, in support of which renewable energy will become a larger part of their portfolio and, in the case of BP, the upstream oil and gas business will gradually wind down over the years.

In light of these developments, the social impacts of a transition to a net zero emissions economy need to be carefully considered in order to both support job creation and offer a safety net to those in occupations that are in decline. Through the right policy framework and close collaboration between national governments and local bodies, we have already seen industries like offshore wind taking off and creating employment opportunities in deindustrialised areas in areas such as Hull and Humberside or the Solent region.

14 *Ibid.*

15 https://bit.ly/3jnoEbz

16 https://go.shell.com/3jnoHUN

17 BP (12 February 2020) "BP sets ambition for net zero by 2050, fundamentally changing organisation to deliver"

The potential location of the UK's future industrial clusters, which are very regionally spread out,[18] provides a concrete example of how investment in decarbonising industries can help regenerate local economies and contribute to tackling regional inequality. Looking only at the Teesside Collective cluster, developing a Carbon Capture and Storage network could directly employ 2,400 people, support an additional 3,500 jobs in its UK-based supply chains, and hence directly contribute around £290m to GVA and indirectly contribute around £400m to GVA in its associated supply chains.[19] We have already seen successful examples of industrial transformations opening up new employment opportunities for the current workforce, with over one third of marine engineers working in offshore renewables transitioning from the oil and gas sector.[20]

The scope for regionally spread out, net job creation arising out of achieving the net zero target extends well beyond the energy and industrial sectors. The construction sector could see the creation of 108,000 net new jobs[21] annually between 2020 and 2030 if an EPC band C target was set for 2035,[22] as recommended to put the housing sector in line with the net zero target.

The switch to EVs is estimated to have a potential to create from 7,000 to 19,000 jobs, depending on the levels of domestic production and imports.[23] A more circular economy, more focused on recycling, remanufacturing, repairing and reusing could create more than 200,000 jobs in the UK.[24] These jobs would be distributed right across the country and are less susceptible to offshoring, thereby creating real opportunities for levelling up all regions of the UK.

18 Industrial Clusters Mission infographic: https://bit.ly/32k28dm

19 Teesside Collective (June 2015) *Blueprint for industrial CCS in the UK*

20 The Telegraph (11 September 2016) "Former North Sea oil workers are finding a second wind in renewables"

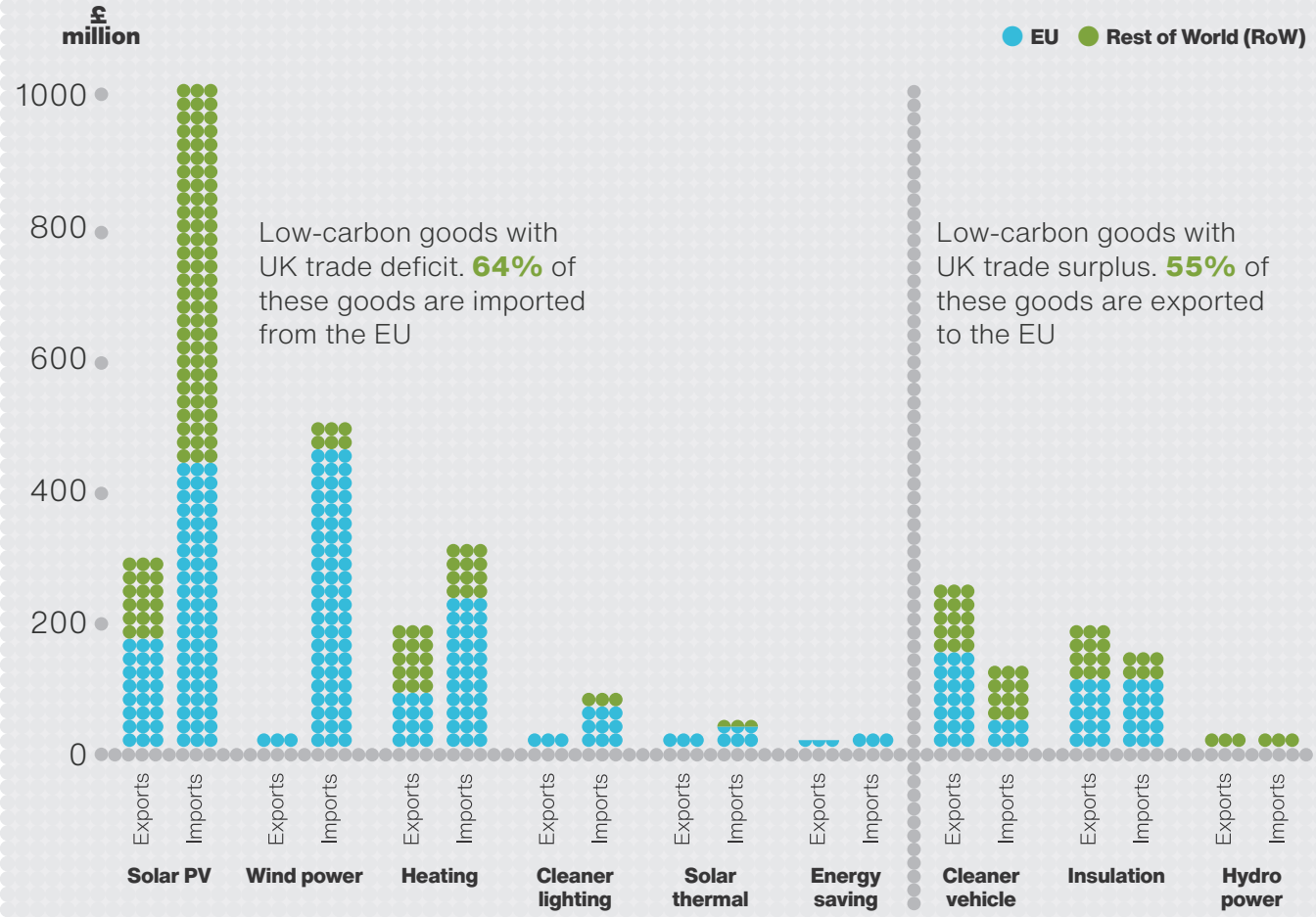
21 National Grid (January 2020) *Building the net zero energy workforce*

22 Cambridge Econometrics & Verco for Customer Focus (October 2012) *Jobs, growth and warmer homes: evaluating the economic stimulus of investing in energy efficiency measures in fuel poor homes*

23 Energy & Climate Intelligence Unit: www.eciu.net/briefings/net-zero/net-zero-why

24 *Ibid.*

UK EXPORT OPPORTUNITIES IN THE LOW-CARBON ECONOMY



Source: Grantham Institute on Climate Change and the Environment (April 2017)

Strengthening the UK's economic competitiveness in the transition to net zero

Well-developed climate policy, supported by ambitious and properly enforced regulations, offers numerous economic opportunities, chiefly in increased investment in skills, research and innovation,[25] leadership positions in new markets and job creation.[26] Robust policies and regulations around low emissions vehicles, waste reduction, low carbon power and sustainable construction have already benefitted UK industries, creating jobs and making them increasingly competitive in growing international markets.[27] Since decarbonisation trends in these sectors are set to continue, obtaining even a small market share for UK industries in these sectors would amount to a sizeable export opportunity.[28]

However, given the growing number of countries adopting net zero emissions targets and growing their low carbon exports, the UK needs to move quickly to capitalise on existing or potential competitive advantages and capture a large market share in low carbon goods and services. At present, 13 of the UK's 15 largest industrial sectors (including aircraft, spacecraft, motor vehicles and steam generators) are less effective than global competitors in low carbon innovation.[29]

Strong competition from Chinese firms (on solar generation, energy services, offshore wind and EVs)[30] and German, Danish and Portuguese firms (on wind turbine manufacturing based on patent data)[31] risk further eroding the UK's competitive advantage in the low carbon space. Therefore, having clear domestic measures in place to grow low carbon investment and accelerate innovation is necessary if UK businesses are to be globally competitive providers of low carbon goods and services.

25 Samuela Bassi and Chris Duffy (May 2016) *UK climate change policy: how does it affect competitiveness?*

26 BuroHappold Engineering (December 2017) *Help or Hindrance? Environmental regulations and competitiveness*

27 *Ibid.*

28 Grantham Research Institute on Climate Change and the Environment (April 2017) *UK export opportunities in the low-carbon economy*

29 *Ibid.*

30 BloombergNEF (16 January 2019) "Clean Energy Investment Exceeded $300 Billion Once Again in 2018"

31 Bruegel (September 2016) *An approach to identify the sources of low carbon growth for Europe*

Avoided costs

Taking concrete action to deliver the net zero target not only makes economic sense, but can also help avoid costs associated with growing emissions and adaptation to warming beyond 2°C. Research shows that the benefits of remaining within 1.5°C of warming are in the range of trillions of dollars globally, i.e. more than 30 times the costs of doing so.[32] In the UK, climate change is expected to have considerable impacts, for instance through damages caused by floods and coastal erosion. Expected annual damages from flooding are estimated at £270m by 2050 in a 1.5°C scenario, increasing by 22% in a 2°C scenario and by 78% in a 4°C scenario.[33]

Despite higher upfront costs, investing in infrastructure which is resilient to the impacts of climate change can deliver, on average, a benefit-cost ratio of 4:1 when taking into account future costs associated with maintaining and replacing less resilient infrastructure.[34] By futureproofing infrastructure in key areas and across the country, government can safeguard jobs and investments in vulnerable areas, making them more appealing for investors in the long term. As an example, London's Canary Wharf would not attract the same levels of capital were it not for the protection offered by the Thames Barrier.[35]

Cutting emissions across the economy can also help government and the NHS save on healthcare costs. The health and social care costs of air pollution alone are predicted to reach £5.3bn by 2035 in England,[36] with £42.88m spent on tackling the impact of air pollution on health and social care in 2017.[37] Cutting emissions from the transport sector alone could have a significant impact in reducing air pollution, positively impacting the healthcare budget.

32 Burke M et al (May 2018) *Large potential reduction in economic damages under UN mitigation targets*

33 Environment Agency FCERM strategy evidence www.consult.environment-agency.gov.uk/fcrm/fcerm-strategy-evidence [accessed 23 December 2019]

34 Global Adaptation Commission (September 2019) *Adapt now: a global call for leadership on climate resilience*

35 *Ibid.*

36 Public Health England (22 May 2018) "New tool calculates NHS and social care costs of air pollution"

37 Public Health England (May 2018) *Estimation of costs to the NHS and social care due to health impacts of air pollution: summary report*

ONE LOW REGRET POLICIES: CUTTING EMISSIONS IN PRIORITY SECTORS

Cutting emissions in buildings, transport, power and waste

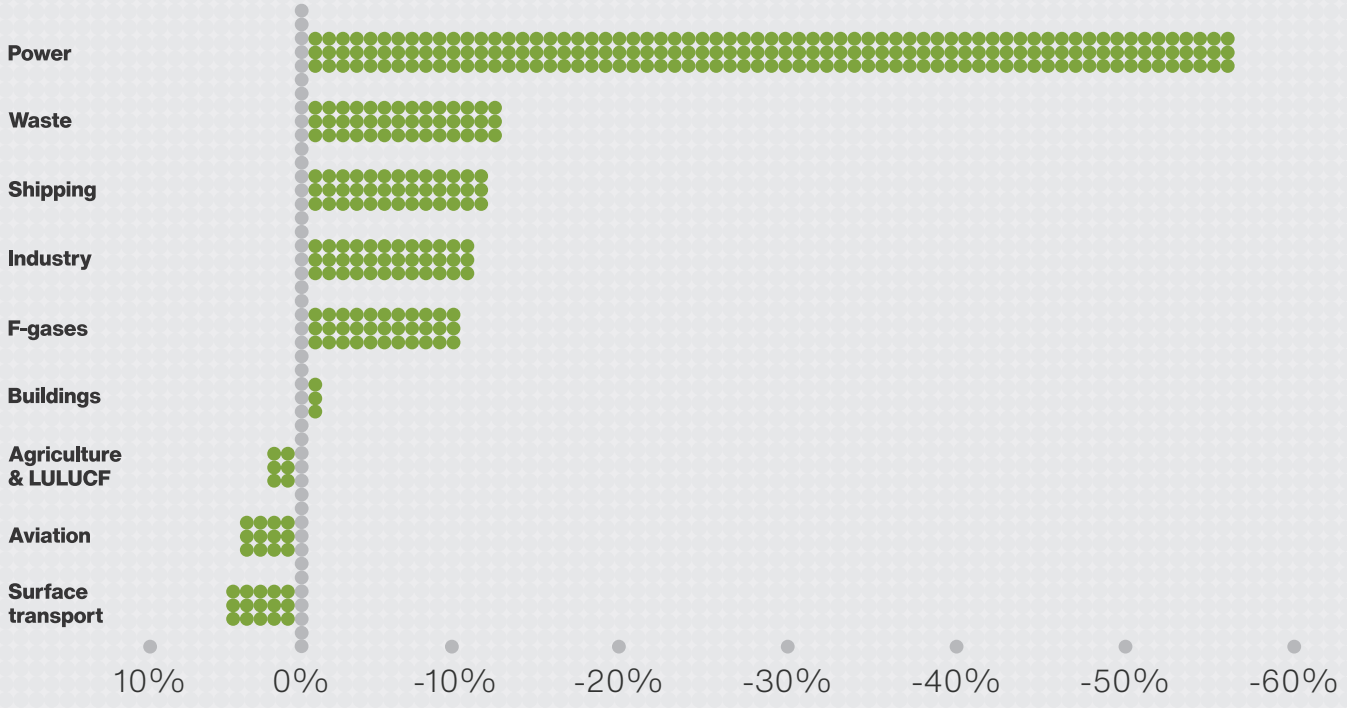
Through its Clean Growth Strategy (CGS), the government has already outlined policies and goals for decarbonising sectors with the highest proportional amount of emissions. Buildings, surface transport, power, land use from agriculture, and waste are currently the largest sources of GHGs. Whilst significant progress has been made in cutting power-associated emissions, other sectors have only seen negligible progress, and some are even reporting growing emissions year on year.

Despite the complexity of decarbonising these sectors and their foundational role in getting to net zero, a number of low regret policy options are available, which would deliver significant reductions in emissions.

While the adoption of these policies will see certain sectors of the economy getting emissions to zero or close to it (e.g. power, surface transport), others will need to build on initial measures as part of a longer, more complex journey toward carbon neutrality (e.g. heavy industry, aviation).

This chapter will examine sectors where solutions for decarbonisation are, by and large, well-established and the next chapter looks at more complex areas of the economy where reaching net zero emissions will require quickly deploying technologies that are still new and have generally not been trialled at scale.

CHANGE IN EMISSIONS 2013–2018



Source: Committee on Climate Change (July 2019)
Reducing UK emissions – 2019 progress report to Parliament

Decarbonising buildings: improving energy efficiency and delivering low carbon heating

Direct emissions from buildings account for 17% of the UK's total emissions at present, and when indirect emissions are included this goes up to 26%.[38] This covers domestic and commercial buildings and includes emissions from different life stages of the buildings. Achieving a net zero building stock is a complex challenge, given that the objective of reducing emissions needs to be taken into account at each stage of the building and planning process.

While there are many aspects of a building's design and use that contribute to its emissions intensity, three priority areas need to be urgently tackled to bring emissions from buildings as close to net zero as possible:

- Improve energy efficiency for new and existing buildings
- Improve resource efficiency in the building process and reduce embodied carbon
- Switch from fossil fuel heating to electric, biogas or hydrogen

38 Committee on Climate Change (May 2019) *Net zero – technical report*

Improving energy efficiency

Meeting the decarbonisation challenge for buildings in a cost-effective manner requires improving their energy efficiency first and foremost. Domestic buildings in the UK have an average Energy Performance Certificate (EPC) rating of D and over 19 million domestic properties in England and Wales are below an EPC C.[39] Non-domestic buildings are also a big part of the issue: with over 1.8m non-domestic buildings in the UK, they generate 12% of greenhouse gas emissions.[40] Although energy efficiency is recognised as the cheapest way of cutting emissions from buildings,[41] lack of demand and investment in energy efficiency projects has been a barrier to better insulated, more efficient buildings so far.

Improving the energy efficiency of the building stock through a nationwide retrofitting programme could be an important way to create jobs right across the country, which are less susceptible to offshoring. It would also contribute to the recovery of the construction sector, which has been one of the hardest hit by the pandemic. Support for this sector and for the contractors could have beneficial ripple effects across the economy, as it supports big supply chains from multi-nationals, SMEs to self-employed workers.

39 Aldersgate Group (March 2018) *Increasing investment for domestic energy efficiency*

40 Aldersgate Group (March 2018) *Increasing investment for commercial energy efficiency*

41 Business, Energy and Industrial Strategy Select Committee Committee: https://bit.ly/2TAu3RV [accessed 29 October 2019]

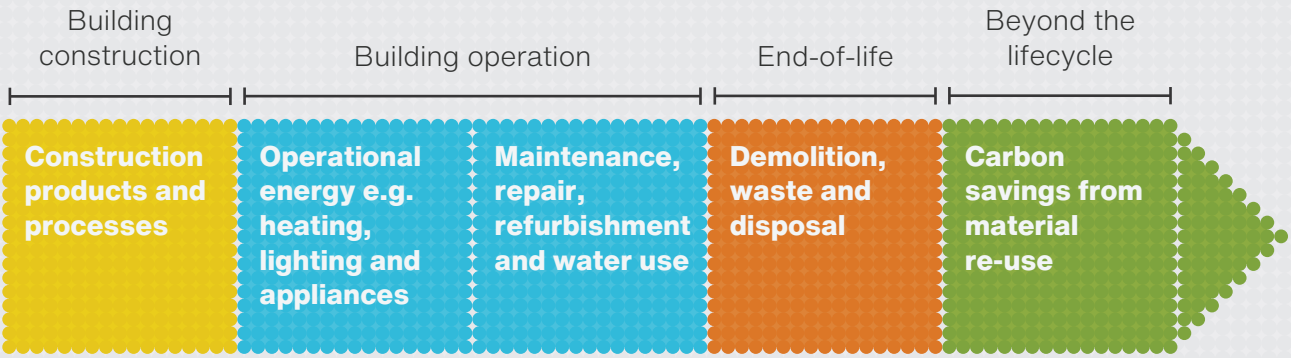
In addition to cutting emissions and creating jobs, energy efficiency improvements could deliver additional social benefits such as reduced bills for customers and alleviate fuel poverty. Warmer homes could also deliver costs for the health and social care systems, much needed in these times: it is estimated that the cost to the NHS arising from cold homes is around £1.36bn per year.[42]

Government should consider large scale energy efficiency upgrades as part of a national infrastructure programme, with appropriate investment levels and management to improve over 20 million homes by 2035. The £3bn of government grants to improve the energy efficiency of homes and public sector buildings announced in July 2020 is a good start, but continued funding in the coming years will be important given the scale of the challenge and the need to build a stable supply chain.

By framing energy efficiency uplifts as a national infrastructure programme, government can coordinate and ensure all of the relevant elements are in place for effective delivery: **the regulatory framework** (e.g. assessments, operational building standards), **delivery capability** (e.g. training for builders and engineers, sufficiently developed supply chains and consumer support), as well as **market mechanisms to attract investment** (e.g. incentives for energy efficiency improvements, grants).

42 Age UK (October 2009) *The cost of cold*

EMISSIONS FROM THE LIFECYCLE OF BUILDINGS



Source: UKGBC (April 2019)
Net zero carbon buildings: a framework definition

Policy recommendations include:

1 **Implement and properly enforce energy efficiency standards** for existing buildings. For homes and commercial buildings, this means putting in place binding regulatory standards to mandate energy efficiency improvements. Regulatory drivers include a tightening of the Minimum Energy Efficiency Standards (MEES) for privately rented domestic buildings and for commercial properties to achieve EPC band C by 2035. These standards should eventually be rolled out to privately owned homes and social accommodation as a priority to ensure that the transition to low carbon homes also benefits the whole of society and those facing fuel poverty.

2 **Develop and implement the Future Homes Standard (FHS) to uplift energy efficiency levels in new homes.** Under the FHS new homes need to be designed at much higher levels of heating and cooling efficiency. Achieving zero operational emissions in new homes by 2030[43] will be essential for meeting the net zero target and we welcome the government's plan to close the performance gap between designed and as-built homes.

However, the FHS should ensure that new buildings perform as well as possible from the start, to avoid expensive retrofits later. In addition to introducing performance metrics on energy efficiency, such as primary energy usage or CO_2 emissions, government should retain the Fabric Energy Efficiency Standard. In the absence of fabric standards, performance metrics will give a less accurate idea of how a building performs once the grid decarbonises.

Reducing the energy performance gap will be difficult in the absence of these measures. For instance, research shows that significantly closing the energy efficiency performance gap can be done through 40% higher airtightness levels.[44] This is why the FHS should commit to the highest standards of energy efficiency from the design phase, to ensure the levels achieved in practice, albeit lower, are sufficient for achieving the reductions needed.

Government should engage local planning authorities in the implementation of the FHS and remove restrictions for them to set higher energy efficiency standards for new homes compared to the national average. Local authorities should be encouraged to set ambitious requirements for new dwellings, in addition to give support to businesses and guidance to homeowners. Local authorities are vital in ensuring that planning reflects local conditions and the FHS needs to engage them fully in this process.

43 https://bit.ly/38zPqHn

44 Bioregonal (31 May 2017) "10 ways to smash the energy performance gap in housebuilding"

The government should also ensure there is training for local planning teams to implement the new standards. This will be crucial for businesses who might initially lack understanding of local specificities. For instance, companies like Willmott Dixon relied on the input and objectives of Bristol City Council in their approach to their current development at Ashton Rise, installing a system that met the city's carbon neutrality target and moved away from conventional gas fired heating. The adoption of more ambitious standards was motivated by the council's carbon neutrality target by 2030 and its ability to set these higher standards.[45] Local authorities can therefore play a key role in communicating to developers and consumers alike the importance of energy efficiency, which is instrumental to ease pressure off the grid and lower bills.

The role of local solutions in accelerating the decarbonisation of the building stock should also be taken into account in the context of planning reforms. Any reforms to the planning system should enhance rather than detract from the need to ensure the environmental sustainability of all new developments. Local authorities should also be able to suitably resource their planning functions to enforce enduring design which is climate resilient and demanding of a low carbon supply chain.

3 **Drive the market for energy efficiency investment through fiscal incentives which are carefully tailored to the needs and characteristics of the domestic and the non-domestic sectors.** Robust and consistently enforced standards are the first step towards creating a market for energy efficiency, offering a clear direction of travel for both businesses and consumers investing in retrofit.

The Green Homes Grant announced in August 2020, will provide much-needed funding to install insulation, heat pumps, draft proofing and more to help households cut energy bills.

Whilst this is a step in the right direction and an important part of driving a green recovery post-pandemic, it is a long way from the scale of retrofits that we should be aiming for to decarbonise the housing sector.

To make energy efficiency competitive on upfront cost and incentivise the rapid adoption of necessary measures, the government should also consider introducing well-timed and targeted fiscal incentives. These can include VAT and stamp duty rebates for homes adopting energy efficiency measures, which will deliver immediate savings to businesses and consumers and help strengthen the link between efficiency levels and property value. Tax breaks for businesses investing in energy efficiency should have the same effect, such as through variable business rates and consistent funding pots for energy efficiency improvements, which are easily accessible.

Investing in energy efficiency in public sector buildings should be a priority, with a clear role for government to lead by example. Initiatives such as RE:FIT (more details under point 4 on the next page) and the provision of interest-free government funding to the public sector to improve energy efficiency, reduce carbon emissions and lower energy bills through the Salix Finance Ltd[46] are models that need to be replicated more widely.

45 Willmott Dixon (21 January 2020) "Exciting new housing development in Ashton Vale, South Bristol" https://bit.ly/2PZuBi5

46 www.salixfinance.co.uk

4 **Scale up investment in energy efficiency and attract private funds.** For domestic buildings in particular, the level of investment needed to improve energy efficiency is substantial for individuals, but too small to attract capital from major investors. For example, house-by-house retrofits for a small semi-detached home average less than £600 for cavity wall insulation or around £7,000 for internal wall insulation.[47]

These projects would not come on the radar of big investors unless aggregated into larger portfolios, which has been done mainly in the non-domestic building sector through Energy Service Companies (ESCOs). ESCOs aggregate smaller projects and allow capital to be invested at scale. Similar projects are being developed for homes through approaches like Energiesprong UK[48] but need significant support to build up scale. This is likely to mean aggregating social housing retrofit projects along with initial subsidies to achieve economies of scale. In addition, the government has a role to play in boosting the use of green mortgages and loans for energy efficiency improvements, similar to the Netherlands where mortgage lending rules allow households to borrow up to €25,000 extra to purchase or refurbish to a net zero energy home.[49]

A 2016 study found that the fastest growing market for energy services was in the public sector, thanks to the introduction of public procurement frameworks such as the Carbon and Energy Fund in the NHS and the RE:FIT initiative set up by the Greater London Authority.[50] These frameworks act as specialised intermediaries between client and ESCOs, facilitating contracts, lowering transaction costs by providing templates, reducing procurement times, and extending the contracting model to smaller sites such as primary schools. **Government can support the introduction of similar intermediary frameworks through sharing public sector learnings with the private sector.**

47 Aldersgate Group (March 2018) *Increasing investment for domestic energy efficiency*

48 www.energiesprong.uk/about

49 Green Finance Taskforce (March 2018) *Accelerating green finance*

50 C. Nolden & S. Sorrell (December 2016) "The UK market for energy service contracts in 2014–2015"

With the right signals from government, these projects could scale up and deliver significant employment opportunities. However, **it will be essential to use some key announcements planned for this year, including the National Infrastructure Strategy, the Comprehensive Spending Review and the Heat Strategy to provide a clear policy trajectory to enable effective mobilisation of private capital.**

ENERGIESPRONG UK – CREATING A MARKET FOR ENERGY EFFICIENCY IN THE SOCIAL HOUSING SECTOR

Energiesprong is a whole house refurbishment and new build standard and funding approach.

The Energiesprong standard focuses on creating desirable homes by investing in retrofit using money from partner housing associations that would normally be paid on energy bills and maintenance to pay for the works.

The Energiesprong approach can do this while assuring the cost of living does not go up, because the standard guarantees real life performance for both indoor comfort and energy use for up to 40 years. The retrofits are also quick to install: a complete house makeover should take less than 10 days.

Energiesprong uses the social housing sector in the UK as the launching market for these solutions, with a view to later scale to the private homeowner market.

The independent Energiesprong UK market development team aggregates mass demand for high quality retrofits (and new build houses) and drives the right financing and regulatory conditions in parallel. With these in place, solution providers can go into a quick and transformative innovation process to deliver against this new standard.

© Energy Saving Trust

Whilst initiatives to uplift energy efficiency are numerous and the supply chains for energy efficiency in the UK are well-established, the rate of home insulation has decreased by 90% since 2012 due to changes in government policy. Given the urgency and the scale of the task, **government should provide long-term certainty by providing a detailed plan on upgrading 20 million homes and avoid stop-start policies, such as cuts to the Energy Company Obligations scheme or the Green Deal scheme, which negatively impact investors' and consumers' confidence.**

In addition, partnership programmes between the private sectors and local authorities are driving progress on at-scale retrofits throughout the UK and worldwide. The UK Green Building Council is heavily involved in delivering projects such as the Accelerator Cities Pathfinder project, which brings together some of the UK's most ambitious city authorities and other expert stakeholders to catalyse action on home-retrofit.

Another example is the Build Upon 2 project, a consortium of European Green Building Councils and partners working with cities on piloting an impact framework for building retrofit.[51] With a large number of initiatives covering urban areas, **government could play an important facilitative role by supporting knowledge-sharing and encourage the development of similar initiatives to cover rural and more remote areas.**

51 https://bit.ly/39ANBeF

Improve building resource efficiency and reduce embodied carbon

A share of emissions from buildings which is often overlooked comes from the lifecycle of the building itself: from the extraction of materials, manufacturing, transportation, assembly, maintenance, replacement, deconstruction, and disposal, to the end of life aspects of the materials and systems that make up a building.[52]

While emissions from heating, lighting and cooling are regulated in the UK (albeit insufficiently) through Building Regulations, embodied emissions tend to go unmeasured and unreported. UK Green Building Council research shows that **this can undermine efforts to decarbonise buildings, given that the significance of embodied carbon relative to operational carbon will increase as we approach 2050, with the grid decarbonising and operational emissions falling due to energy efficiency improvements.**[53]

Ambitious action on embodied emissions could also help reach other sustainability targets beyond emissions reductions including targets in the Environment Bill around water and waste reduction.. Reducing the amount of building materials that end up in landfill and using recycled or recyclable materials in construction will reduce embodied carbon whilst simultaneously contributing to waste minimisation and resource efficiency targets.[54]

To address this, government policy should build on its Resources and Waste Strategy.

Policy recommendations include:

1 **Regulating building design**. The design of a building can have a significant impact on subsequent emissions, embodied and operational. For example, the government is already committed to regulating building design to ensure new homes are not connected to the gas grid from 2025.[55] However to achieve net zero, design regulations need to reduce embodied carbon by demanding that construction materials are resource efficient and produced through low emission processes. In addition, government should regulate to reduce construction waste through the use of recycled materials insofar as possible, reward durable and repairable design and penalise design for buildings with short life spans (a full list of policy recommendations for achieving this is available under section 4 of this chapter). The following two recommendations show how these measures can be implemented in practice and can become commercially viable.

2 **Introduce product standards to reduce embodied emissions in construction materials and increase their resource efficiency.** Standards for low carbon construction materials will drive companies to innovate in this space, grow the market for low carbon goods and support the competitiveness of domestic industries which are putting products on the market that are compatible with a net zero economy. This will ensure that they are not undermined by low cost overseas imports with poor environmental standards.

3 **Introducing tax adjustments to ensure upfront price competitiveness of resource efficient building materials.** Where resource efficient construction materials, or products made with secondary materials, struggle to compete on upfront cost, pricing mechanisms need to be adjusted to reflect the longer-term, environmental and economic benefits derived from using more resource efficient methods of production.

52 UK Green Building Council & The Crown Estate (February 2015) *Tackling embodied carbon in buildings*

53 UK Green Building Council (March 2017) *Embodied carbon: developing a client brief*

54 UK Green Building Council & The Crown Estate (February 2015) *Tackling embodied carbon in buildings*

55 Committee on Climate Change (May 2019) *Net zero: The UK's contribution to stopping global warming*

Reduce emissions from heating

Heating UK homes and providing access to hot water amounts for 40% of national energy consumption and 14% of GHG emissions, which is in addition to emissions from home electricity consumption.[56] The majority of UK residential and non-residential homes rely on gas or oil for heating, so simply improving their energy efficiency and designing them in a smarter way will only go so far in reducing their carbon footprint. Getting the building stock to net zero will require moving away from fossil fuel boilers and using either electric heat pumps, low carbon district heating schemes or a significant switchover of the gas grid to hydrogen.

Policy recommendations include:

1. **Trialling at-scale zero carbon alternatives to natural gas and quickly rolling out established alternatives.** These include low regret options and mature technologies such as electric heat pumps or low carbon district heating for new and existing homes, which should be prioritised whenever possible as the more cost-effective option for cutting emissions. For houses connected to the gas grid, newer technologies like injecting clean hydrogen into the grid could play a significant part in cutting emissions, although this needs to be trialled at scale first.

We welcome recent announcements in the Budget, such as the launch of the Green Heat Network Scheme, the Clean Heat Grant, the Low Carbon Heat Support Scheme and the introduction of the Green Gas Levy, all of which will be essential to support the the use of clean fuels in the gas grid and the wider installation of low carbon heating.

However, these initiatives are currently insufficient, as they only provide short-term support and, in the case of the Clean Heat Grant, offer limited funding that overwhelmingly prioritises the installation of individual heat pumps, even in densely populated areas where low carbon heat networks might be the more effective option. This is why these initiatives need to be urgently accompanied by a coherent, long-term policy framework to send a clear signal to the low carbon heat supply chain, improve skills, cut costs and ensure that low carbon heating technologies are deployed efficiently and at scale. According to the Committee on Climate Change (CCC), alternative technologies will need to be deployed at scale by 2030 if the UK is to meet its net zero target by 2050,[57] which means that trials should commence now so that policy decisions to roll out technologies at scale can be made by no later than 2025.

2. **Engage consumers to facilitate the transition to low carbon forms of heating.** Government should set up a reliable system of certification for technologies unfamiliar to consumers, such as heat pumps and hybrid systems, which will help build trust and overcome the perception of gas boilers as the default purchase. This could be achieved through the recently launched Green Homes Grant, Each Home Counts Quality Mark scheme, and by harnessing trusted voices and organisations, for example, by expanding the role of the Energy Savings Trust to share information on technologies and respond to any concerns.

3. **Where technologies are at very early stages of deployment, such as the roll-out of hydrogen to replace natural gas or carbon capture and storage (CCS), government should commit to early, genuine, open and transparent public engagement to ensure public acceptability,**[58] with ongoing monitoring and feedback to consumers about the performance and reliability of technologies in practice. It is crucial to avoid the perception that concerns are not being acknowledged, or that decisions have been made ahead of adequate public engagement.

56 Committee on Climate Change (October 2016) *Next steps for UK heat policy*

57 Committee on Climate Change (May 2019) *Net Zero: The UK's contribution to stopping global warming*

58 Vivid Economics and UKERC (April 2019) *Accelerating innovation towards net zero emissions*

4 **Government should collaborate closely with business and local authorities** to assess the best technological choices based on cost, local specificities and existing infrastructure. Regardless of the technology mix, government will play a fundamental role in coordinating the nationwide roll-out of low carbon heat infrastructure, potentially through a coordinating institution modelled on the Gas Council, which managed the transition from town gas to natural gas. The Gas Council facilitated the development of bulk gas supplies at the same time as rolling out a gas network, and the conversion to gas boilers and central heating in homes. Similarly, the low-carbon heat transition requires coordination of energy supply and new infrastructure, so government should consider setting up a body to oversee these developments.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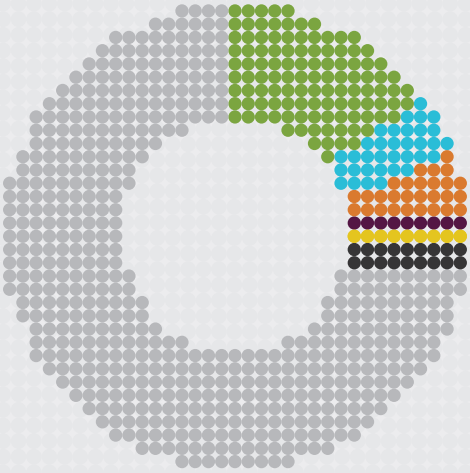
Cutting surface transport emissions

Surface transport has only seen marginal falls in the level of emissions year on year[59] and is currently the largest emitting sector in the UK, accounting for 23% of total UK emissions. Thus, decarbonising this sector should be a top priority for government.

Cutting transport emissions can deliver co-benefits, most importantly around improved air quality, the subsequent reduction of pollution-related illnesses and reduced pressure on NHS and social care resources.[60] At present, transport emissions are the biggest contributors to poor air quality in some regions of the UK,[61] which is considered the biggest environmental risk to public health. According to a Public Health England estimate, the health and social care costs of air pollution in England could reach £5.3 billion by 2035 for diseases strongly associated with air pollution.[62]

SHARE OF UK SURFACE TRANSPORT EMISSIONS IN 2016 AND THEIR BREAKDOWN



Total UK GHG emissions were 468 $MtCO_2$ in 2016
(with domestic transport 27% of total emissions)

- **Cars – 15%**
- **HCVs – 4%**
- **Vans – 4%**
- **Buses – 1%**
- **Rail – <1%**
- **Other transport – 2%**
- **Other sectors – 73%**

Source: Shifting emissions into reverse gear, March 2019, page 7

59 Committee on Climate Change (July 2019) *Reducing UK emissions: 2019 progress report to Parliament*

60 C40 Cities & BuroHappold Engineering (October 2019) *Toward a healthier world: connecting the dots between climate, air quality & health*

61 HM Government (July 2018) *The road to zero*

62 Public Health England (22 May 2018) "New tool calculates NHS and social care costs of air pollution"

Curbing these emissions will require, in the short term, setting out the right regulations and incentives to accelerate the transition to clean vehicles and fleets and make these the obvious choice for consumers, while at the same time investing in infrastructure to support this shift. **Longer-term decarbonisation of surface transport will require improving the overall efficiency of the transport system, minimising emissions, congestion and demand for transport,** as set out in the Transport Decarbonisation Plan (TDP) policy paper. To achieve this, government policy will need to set out a vision for an integrated transport system, with better support for public transport at a local and national level, and a more efficient freight transport system based on reduced mileage.[63]

Upholding all of these commitments in the TDP and publishing it as soon as possible will send an important market signal and concentrate private sector efforts in delivering against these objectives.

Policy recommendations include:

Shifting to electric and low emission vehicles

1 **Accelerate the roll-out of electric / zero emission vehicles.** Aldersgate Group welcomes government's plans to bring forward the phase out date for the sale of petrol, diesel and hybrid cars and vans to 2030 or as soon as possible thereafter as a necessary step in this direction. The policy commitment will need to be turned quickly into concrete regulatory standards that manufacturers, businesses and individual consumers can rely on.

In order to provide a stable market signal to consumers and manufacturers, government should guarantee the availability of plug-in vehicle grants maintained to at least October 2018 levels[64] until upfront cost parity is reached. In the meantime, continuing initiatives that grow business and consumer confidence in the new technology (e.g. through providing better information to consumers, clarifying the fiscal incentives and taxation regimes that early buyers can expect and through clarity of policy) would help support the transition. Should the market not move fast enough towards a full transition to net zero emissions vehicles, the government should consider measures to mandate minimum sales of zero emissions vehicles as has been done in California and China.[65]

63 Aldersgate Group (March 2018) *Shifting emissions into reverse gear: priorities for decarbonising transport*

64 House of Commons Business, Energy and Industrial Strategy Committee (October 2018) *Electric vehicles: driving the transition*

65 https://bit.ly/2Izawee

2 **Continue to support investment in charging infrastructure** across the country, focusing public funding where market conditions are more difficult, such as in rural areas or residential areas without off-street parking, to provide equitable access to charging facilities. Delivering on the objectives of the government's vision for the rapid chargepoint network in England published in May 2020 as well as the Budget £500 million commitment for EV charging infrastructure should be a key priority. Moreover, investment in charging infrastructure could offer important returns in terms of job creation: **even a moderate uptake of around 35% new car sales being EVs by 2030 could create 200,000 permanent jobs, with 57% of these coming from the installation, operation and maintenance of charging points.**[66]

It is also crucial to follow through with initiatives on smart charging and building regulations to ensure charging infrastructure solutions developed by the private sector benefit a diverse range of consumers. Moreover, government should invest in raising awareness of charging infrastructure roll-out to overcome the psychological barriers standing in the way of wider EV adoption. This could be done through effective communications campaigns in partnership with consumer and private sector organisations already investing in charging infrastructure.[67]

3 **Facilitate innovation to accelerate the roll out of low emissions Heavy Commercial Vehicles (HCVs).** HCVs accounted for 4% of total GHG emissions in 2016,[68] but zero emissions technology is not yet deployed at scale to enable companies to upgrade their fleets. Whilst decarbonising HCVs can be difficult at present, given that the weight of these vehicles makes battery an inefficient option, **working with industry to understand the most effective low carbon options** will be essential. For example, ongoing hydrogen trials have seen industry players setting a longer-term ambition to produce clean hydrogen to power buses and lorries. The use of biofuels could also be a potential alternative, and trialling these technologies at scale as soon as possible will be essential, so that policy decisions about decarbonising freight can be made well before 2050.

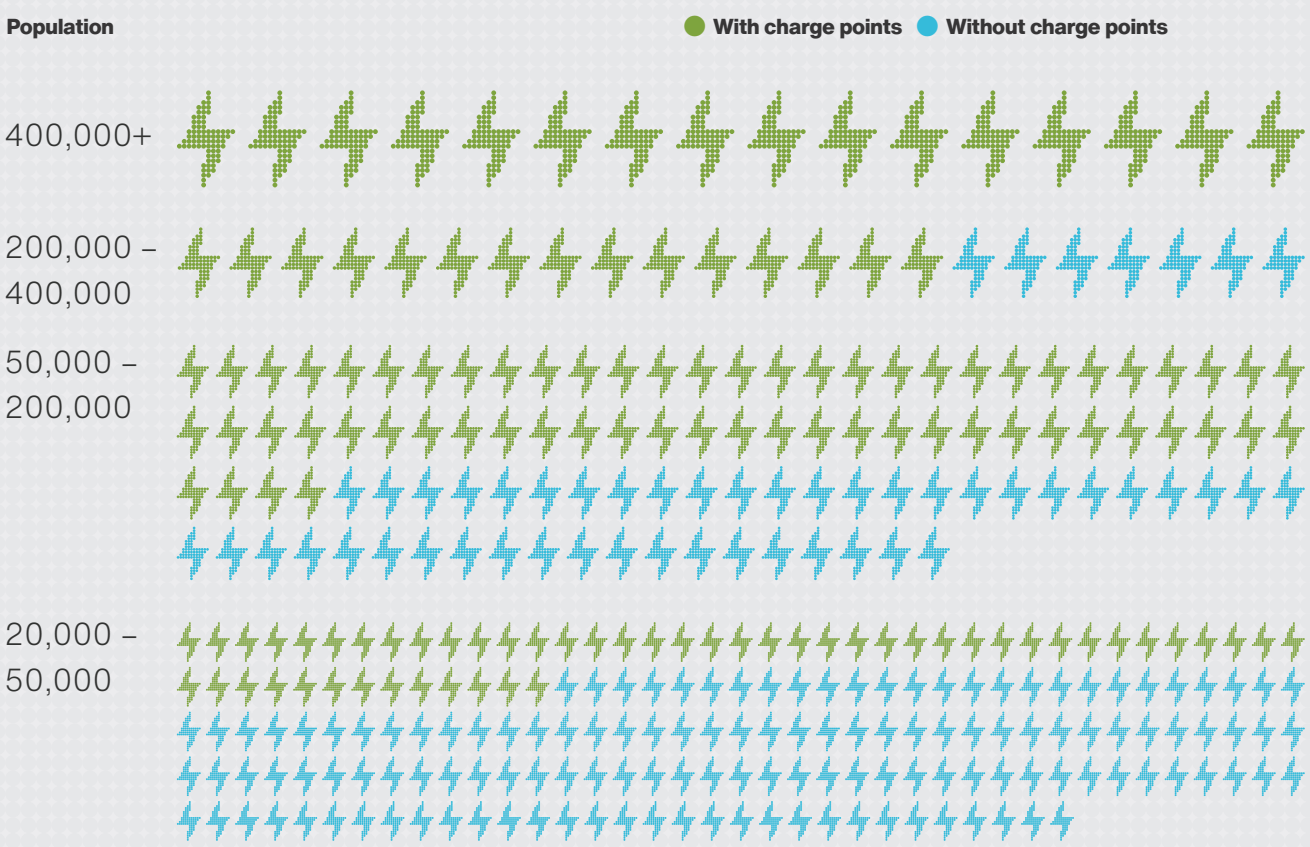
4 **Enhance efforts to decarbonise fleets.** Central government, councils, NHS and other public sector fleets should take the lead in the transition to electric vehicles to support the government's commitment to decarbonisation. This will lead to growth in the second hand EV market, widening access to the benefits of zero emissions vehicles technology and business confidence.

66 AIE (November 2018) *Powering a new value chain in the automotive sector: the job potential of transport electrification*

67 www.bbc.in/2VZxaEy

68 Aldersgate Group (March 2018) *Shifting emissions into reverse gear: priorities for decarbonising transport*

RAPID CHARGE POINTS: PROPORTION OF TOWNS AND CITIES WITH AT LEAST ONE RAPID CHARGE POINT (JUNE 2018)



Source: National Infrastructure Commission Assessment 2019

Re-thinking the transport system: moving away from car dependency

5 **Deliver on the TDP commitments to deliver an integrated transport strategy,** which brings together road, rail and bus strategies and directs public investment towards infrastructure choices which will deliver the most efficient economic, passenger travel and emissions outcomes. Aldersgate Group welcomes the £5bn funding over five years to boost bus services, which is an important step forward following gaps in services and poor reliability resulting from funding cuts of nearly £800m over the past decade.[69] The funding now needs to be focused on improving bus services in poorly connected areas including rural areas and small towns.

According to UKRI research, a 10% increase in accessibility of a region leads to a 3% increase in the number of businesses and employment,[70] which is why projects increasing connectivity of all communities across the country should also be a priority in the context of the economic recovery strategy.

This should be developed alongside an **active travel strategy that increases the uptake of cycling and walking in urban areas** through investment in a high-quality cycling and walking network and investing in a national public health communications campaign that highlights the co-benefits of active travelling, including tackling obesity, depression and preventing chronic health conditions.[71] Sustrans, a transport charity, has estimated that between 2017 and 2040, cycling could avert 34,000 long term health conditions, saving the NHS £319m.[72]

The government should also strengthen the next Cycling and Walking Investment Strategy by investing in hard infrastructure, such as separate safe cycling and walking infrastructure, as part of the government's forthcoming Comprehensive Spending Review. We welcome the May 2020 announcement of a £2bn package to improve active travel infrastructure across England. Close collaboration with local councils to ensure the funding can achieve the best outcomes will be key.

6 **Better urban planning and housing development planning rules to reduce reliance on vehicles, promote better public transport and active travel.** This should mean creating fewer settlements with poor public transport connections or options for active travel to avoid car dependency and locking in emissions indefinitely for future residents.

Various cities around the world have taken such an integrated approach to urban design, infrastructure building and emissions reductions as illustrated by the regeneration of Nordhavnen in Copenhagen.

The need to better integrate new developments with access to public transport should also be central to the proposed planning reforms, using these as an opportunity to drive good quality development in well-connected places.

69 BBC (11 February 2020) "Bus funding: Where would it make most difference?"

70 UKRI (December 2013) *Road networks and local employment*

71 Aldersgate Group (March 2018) *Shifting emissions into reverse gear: priorities for decarbonising transport*

72 Sustrans (January 2019) *Bikelife: Transforming Cities, the potential of everyday cycling*

7 **Promote key modal shifts** to incentivise greater transport efficiency, such as through moving freight from road to rail. HCVs are responsible for 17% of the total share of surface transport emissions, while only making up 5% of the miles.[73] By shifting freight to rail emissions and congestion could be reduced, as an average freight train removes the equivalent of up to 76 HCVs from the roads.[74]

NORDHAVNEN – HOW SMART URBAN PLANNING CAN CUT TRANSPORT EMISSIONS

With its unique positioning and area covering the size of 625 football grounds, Nordhavnen (or Nordhavn) in Copenhagen, Denmark, aims to become the sustainable city of the future.

To promote liveability and sustainability, Nordhavnen has been designed as a '5 minute city' making it possible to reach shops, institutions, work places, cultural facilities and public transport within 5 minutes' walk from any point in the district. The district is being planned so that it is more attractive to walk, cycle and use the metro than to use a car.

During the next 50 years, Nordhavnen is to be extended to accommodate 40,000 inhabitants and 40,000 workplaces. The area will be serviced by an elevated metro track and a bicycle network which together create a green artery. The elevated track functions as a cover for the bicycle motorway, so that cyclists will be able to stay dry all year round in all weathers.

© Byoghavn

73 Department for Transport (February 2017) *Freight carbon review 2017*

74 Arup (September 2016) *Future potential for modal shift in the UK rail freight market*

Reducing congestion

8 **Work with local government to introduce ambitious Clean Air Zones (CAZs) across the UK.** Certainty around the location of CAZs, charging levels, exemptions and support packages will send a clear policy signal, driving the demand for cleaner forms of transportation and enabling behaviour change. It is important to pursue all options to accelerate related efforts to ease congestion in our cities. In addition, government has a coordinating role to play in overseeing the implementation of CAZs, to ensure that they operate coherently next to each other and manage the impacts they may have on residents and businesses.

9 **Develop a new road tax system to cut emissions, reduce congestion and demand for travel.** The current fuel duty system has been insufficient to incentivise a switch to electric vehicles, in spite of the UK being one of the most expensive European countries for fuel prices.[75] To finance the transition to low carbon surface transport, government should develop a new system of road taxation that reduces emissions and congestion instead of raising fuel duty, which will disproportionately impact the population in less connected rural areas, who may also be less able to bear the cost increases.

Furthermore, as the take-up of EVs increases, an effective and socially fair taxation mechanism to cover all vehicles becomes more urgent. **Government should consult on new road taxation options,[76] including the potential effectiveness of a single levy for road usage and transport emissions, and charges based on distances travelled and trips taken during rush hour.** [77]

75 S&P Platts (24 June 2019) *UK needs fuel tax reform to pave the way for mass EV adoption*

76 https://bit.ly/333b6uc

77 https://bit.ly/3aGAJDW

Completing the decarbonisation of the power sector

The power sector is an area where substantial gains have been made over the past few years, especially since mature renewables came on the grid and the phase out of coal commenced. Emissions from the power sector are now down 68% on 1990 levels[78] thanks to well-designed government policies including the introduction of a carbon price floor and the Contracts for Difference (CfD) auction system.

Completing the decarbonisation of the power sector needs to be a priority for the next ten years, considering the increased electrification of heating and transport. In addition, more can be done to supply consumers with low carbon power for competitive prices.

The offshore wind sector offers on the whole a positive example of best practice for decarbonising power, with a mix of innovation support, policy clarity and market mechanisms, leading to historically low strike prices for offshore wind at the latest CfD auction.[79]

Policy recommendations include:

1. **Secure a route to market for mature forms of renewable energy such as onshore wind.** We welcome government's recent announcement to include onshore wind and solar in the next round of Pot 1 CfD auctions, guaranteeing market access for the cheapest forms of renewable energy. This will be essential to deliver competitive industrial electricity prices whilst completing the decarbonisation of the power sector.[80]

2. **Build on the success of the offshore wind sector** by continuing to run competitive auctions, with a sufficiently predictable and ambitious volume of projects so as to deliver the ambition of 40GW of offshore wind by 2030.

3. **Grow the supply chain through concrete opportunities for investment so the sector can catch up with its European competitors.** The rapid and cost-effective scale up of offshore wind requires a more effective consenting and grid connection regime and greater cross-government collaboration to solve civil and military radar interference issues.

   Support for offshore wind is conditional on suitable market access for the onshore wind industry. In other European countries like Germany and the Netherlands, simultaneous investment in both industries helped them leverage skills and supply chains, which are quite similar. **Continuing to invest in key port infrastructure** is essential for allowing supply chains for offshore wind to continue developing.

78 https://bit.ly/2wCwDOh

79 Energy Live News (20 September 2019) "Record low price for offshore wind in clean energy auction"

80 A UCL report commissioned by Aldersgate Group looks at industrial energy prices and the market barriers for mature forms of renewable energy and shows how government can play a role in keeping electricity prices competitive. UCL (February 2018) *UK industrial electricity prices: competitiveness in a low carbon world*

© MHI Vestas

4 **Develop a supportive RIIO-2 regulatory regime.** It is essential that Ofgem's final determinations regarding the regulatory and incentives framework for the RIIO-2 price control period from 2021 to 2026 facilitate the delivery of a secure, flexible and fully decarbonised energy system by the end of the decade. In particular, the final regulatory framework must support the necessary investments and first of a kind innovation that will be required to accelerate the roll-out of renewable projects, reinforce the grid network and modernise the system operator's IT systems.

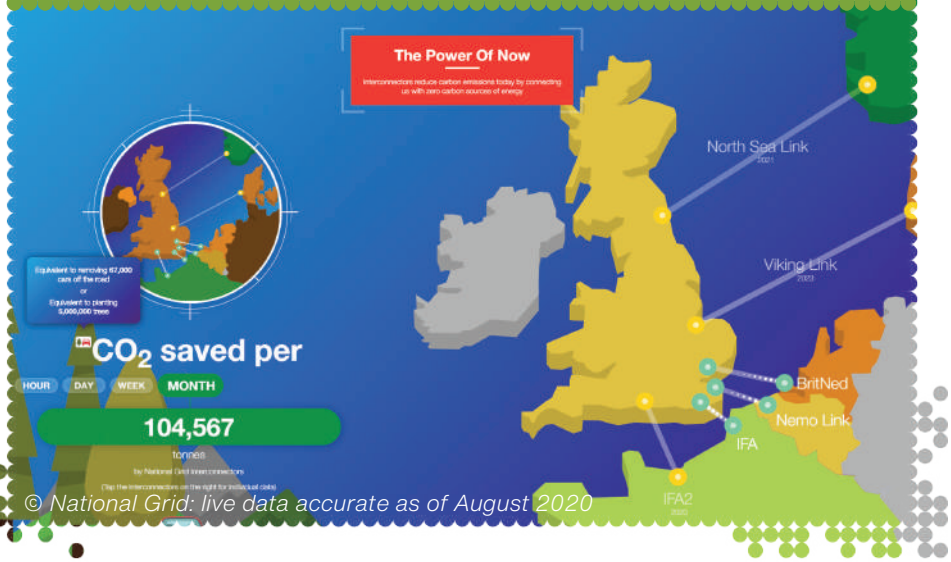
5 **Grow the market for flexible options,** such as increased power storage capacity, increased interconnection and greater use of demand side response to create a reliable and low carbon power network as more renewable energy is deployed.

6 **Maintain good access to the EU Internal Energy Market after EU exit and support continued investment in interconnection,** so that the UK remains plugged into the much larger EU market, thereby ensuring price competitiveness and reducing GHG emissions.

THE ROLE OF INTERCONNECTORS IN GETTING TO NET ZERO

As well as providing flexibility to the UK power market, interconnectors – the subsea cables that run between the UK and Europe – play a key role in supporting decarbonisation. National Grid's *The Power of Now* carbon dashboard provides by the hour information on the CO_2 emissions interconnectors are reducing.

For example, the site shows us that in August 2020, National Grid's operational interconnectors saved over 104,567 tonnes of CO_2 – that is equivalent to removing 67,000 cars from the nation's roads or adding 5 million trees.



© *National Grid: live data accurate as of August 2020*

7 **Resume the carbon price escalator in the 2020s as coal is phased out** to provide a clear direction of travel for businesses and offer long-term incentives for investment in low carbon alternatives. A continued focus on the future of carbon pricing will be crucial. As coal comes off the system, government needs to ensure that the price of carbon does not reach an artificially low level and continues to send an important investment signal. Priorities should include:

- **A resumption of the carbon price escalator in the 2020s,** starting at around £40 per tCO_2 in 2020 and rising to £100 per tCO_2, or more in 2050.[81]

- **Ensure that the proposed UK Emissions Trading Scheme (UK ETS) is as closely aligned to the EU ETS as possible** to avoid disruption and keep the costs of compliance low for businesses. Government's intention to amend the cap of the UK ETS to better align with net zero is a welcome proposal.

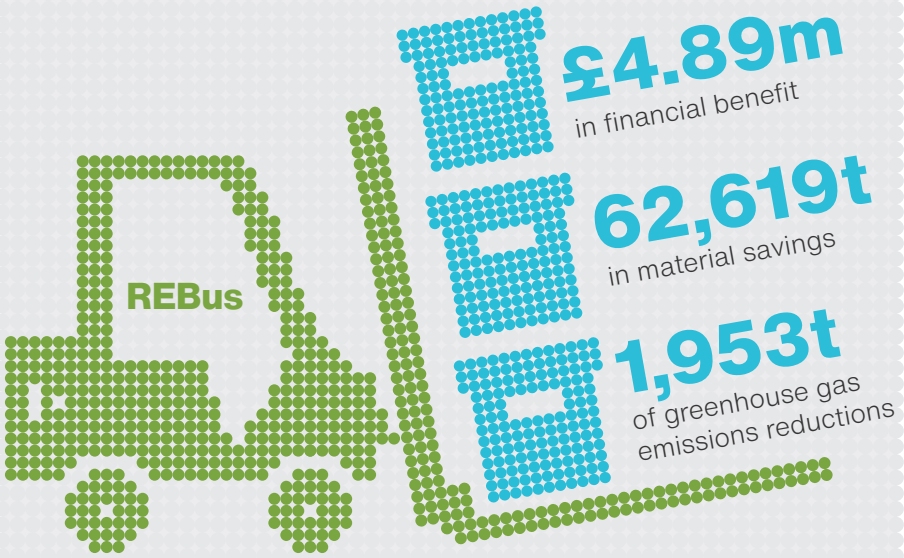
81 Dimitri Zenghelis & James Rydge (July 2020) Rebuilding to last: designing an inclusive and resilient *growth strategy after COVID-19*

Cutting emissions from resource use and waste

The UK waste and resources sector is currently responsible for 4% of UK GHG emissions and current classifications of waste have a negative impact on the ability of the wider economy to retain resources and energy in production processes.[82] A smarter approach to waste treatment and resource reusability is therefore essential for achieving net zero, and it can also bring economic benefits: there is evidence that UK businesses could realise resource efficiency savings of at least £3bn per year at low or no cost.[83] In addition, business trials that the Aldersgate Group was involved in recently through the REBus programme show that the move to a more resource efficient economy can have significant positive impacts on the UK economy. It could deliver an increase of up to £76bn in Gross Value Added by 2030, whilst also improving resource security.[84]

RESOURCE EFFICIENCY DELIVERING ON THE GROUND

Across its pilots, REBus has delivered:



Source: AG report (Jan 2017)
Amplifying action on resource efficiency (UK version)

82 Imperial College (December 2018) *An exploration of the resource sector's greenhouse gas emissions in the UK, and its potential to reduce the carbon shortfall in the UK 4th and 5th carbon budgets*

83 Oakdene Hollins for Defra (May 2017) *Business resource efficiency quantification of the no cost / low cost resource efficiency opportunities in the UK economy in 2014*

84 Aldersgate Group (19 June 2018) "No Time to Waste: the government must use Brexit to make the UK a world leader in resource efficiency"

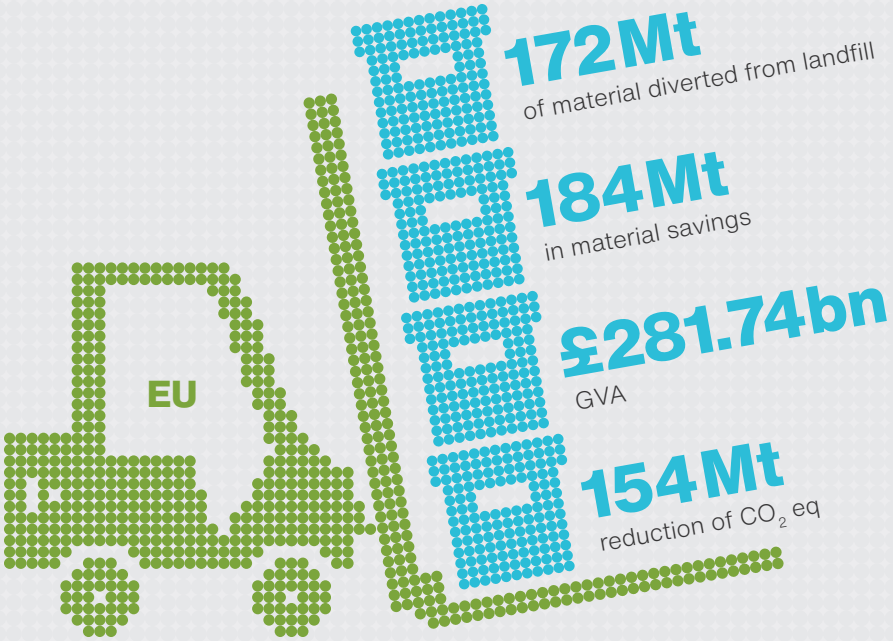
Moving to more circular methods of production and consumption would also mean relying less on complex global supply chains which can cause major supply issues as we have seen over the course of the pandemic, making UK businesses more resilient in the face of disruptions.

The coronavirus crisis has also highlighted the need for shorter producer-to-consumer models, which have seen a sudden rise in uptake, especially in the food sector. More emphasis on a circular economy would also create a market for remanufacturing in the UK, not only saving natural resources but also creating local quality jobs across the country.

However, the value of material resources is currently not fully exploited. In the UK, landfill is the second most used waste treatment, with 52.3 million tonnes of waste disposed at landfill in 2016.[85] A further 29.8 million tonnes go to energy recovery, incineration or backfill. While the government's Resources and Waste Strategy (RWS) is an encouraging move towards reversing this trend, more regulatory and fiscal measures are needed to cut emissions from waste and progress towards genuinely circular business models and consumption patterns.

RESOURCE EFFICIENCY SCALING UP ACROSS THE EU

When REBus results are scaled up across the EU economy, it shows that by 2030, the adoption of resource efficient business models could deliver:



Source: AG report (Jan 2017)
Amplifying action on resource efficiency (UK version)

85 Defra (March 2019) *UK Statistics on Waste*

PEOPLE ARE WILLING TO DO THEIR BIT

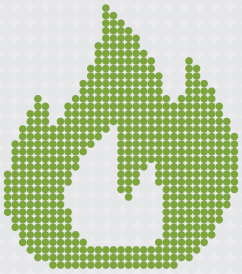
50% would pay £30 a year for more recyclable packaging

79% of people would be willing to separate their food waste

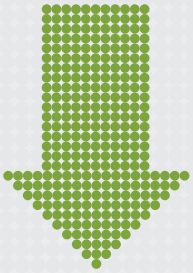
BUT THEY FIND THE CURRENT SYSTEM TOO COMPLICATED

Higher recycling, especially of plastics could:

Save £6.2 billion from 2020 to 2050



Avoid the need to build 20 additional incinerators.



Reduce greenhouse gas emissions

Source: National Infrastructure Commission Assessment 2019

Policy recommendations include:

More sustainable waste treatment

1 **Standardise waste treatment and recycling practices.** Building on the recent consultation on standardising business and household waste collections, government should work with local authorities and the waste management industry to drive greater standardisation of waste and recycling policy across administrative borders. This would improve not only the efficiency of collecting waste but would also make recycling practices easier to understand for citizens.

2 **Develop the necessary infrastructure to collect waste and to treat it in the most low carbon and cost-effective way.** Effective treatment of waste can deliver emissions savings, cut costs and contribute to GHG emissions reductions in other sectors. However, this often requires developing supporting infrastructure ranging from heat recovery systems to more integrated recycling infrastructure for industries and households. For example, instead of being incinerated, food waste could be treated in anaerobic digesters, which produce biogas and low grade fertilisers at a lower cost.[86] However, food waste needs to be collected separately so that it may be composted and turned into biogas. At present, separate food collection is not mandatory in England, with the lowest capture rates in the UK: only 10% of food waste gets recycled and only 44% of households having access to food recycling infrastructure.[87] Higher capture rates leading to higher biogas production can have positive impacts on the decarbonisation journey of other sectors, with biogas having potential uses in low carbon heating, alternative fuels for vehicles or planes, and in supplying low carbon energy to the grid.

3 **Regulate emissions from municipal solid waste plants.** CO_2 emissions from municipal solid waste plants with energy recovery are estimated to release between 49 and 119 million tonnes of CO_2 across the EU in 2017.[88] Yet these emissions are not covered by the EU ETS, nor by the proposed UK ETS. Government should consult on the future of regulatory schemes to progressively curb emissions from waste incineration and develop an equivalent emissions trading system that allows businesses to invest in waste prevention as soon as possible.

86 National Infrastructure Assessment 2018

87 Environment, Food and Rural Affairs Select Committee (April 2017) *Food waste in England*

88 Zero Waste Europe (December 2019) *Waste incineration getting away with CO_2 emissions unscathed*

Introducing measures to drive better product design and phase out waste at the outset

4 **Introduce regulations and incentives to drive greater resource efficiency and GHG emissions reductions in product design.** This is essential, especially since 80% of a product's environmental impact is determined at the design stage.[89] Moreover, with component parts of most products coming to the UK from international supply chains, resource efficiency measures can help reduce the UK's imported emissions and lower its carbon footprint.

- Product standards that incorporate resource efficient design criteria can play a key role in driving better product design, focused on lower embodied carbon, greater durability, better repairability and greater potential for reuse and recycling. This could have important implications for critical product types such as batteries, tyres and electronic goods – as is currently done under the EU EcoDesign Working Plan.[90] It is also important that government builds on the enabling powers set out in the Environment Bill currently before Parliament. Rolling out Extended Producer Responsibility schemes (see below), whereby producers of less recyclable / re-usable products pay more for the waste processing costs of their products, could send a strong pricing signal to producers to improve the design of their products.

5 **Introduce mutually compatible pricing / tax adjustments** where resource efficient products, or products made with secondary materials, struggle to compete on upfront cost. Pricing mechanisms need to be adjusted to reflect the longer-term environmental and economic benefits derived from using more resource efficient methods of production. These should include:

- **VAT and other tax rebates** for resource efficient products. This could help make more durable products with a higher upfront cost more appealing and accessible to consumers.

- Resuming the **Landfill Tax escalator** to continue diverting waste from landfill. With the landfill tax already quite high and alternative, more cost-effective waste treatment options available (see above), an escalator of £5/tonne over a ten year period would send a clear signal that diverting waste to landfill should only be adopted as a last resort. In addition, government should ensure that the police, local authorities and the Environment Agency have adequate resources to tackle waste crime.

- The inclusion of powers to introduce **Extended Producer Responsibility (EPR) schemes** in the Environment Bill is a step in the right direction. Government should now finalise the work on the development of an EPR scheme for packaging and then focus on rolling out similar schemes to other critical types of products such as batteries, tyres, vehicles and electronic products. EPR schemes with fee modulation have an important role to play, ensuring that producers of items that are easier to re-use or recycle pay less towards end of life treatment costs compared to producers of goods that are harder to recycle and treat.

  EPR schemes need to be designed to work together with other tax incentives for more resource efficient products. Whilst both mechanisms can help achieve similar outcomes, EPR fees are more effective in driving innovation as they are hypothecated and remain within the system to fund solutions.

89 Aldersgate Group (June 2018) *No time to waste: an effective resources and waste strategy*

90 https://bit.ly/3aQW3Xt

Adjust public procurement rules to increase the size of the market for resource efficient goods. We welcome the fact that government has made progress on this through the Greening Government Commitments, and has committed to increase ambition in this space in the Resources and Waste Strategy. With the public procurement market valued at £284bn in 2017/18,[91] there is real scope for government to further drive demand for more resource efficient infrastructure, goods and services, and lead by example. To this end, government policy should embed sustainability factors and resource efficiency in procurement and commissioning guidelines. It is also important to ensure that procurement teams have the necessary expertise to be able to identify more resource efficient business practices and assess their long-term benefits.

6 **Support innovation in resource efficient business models and manufacturing processes by providing targeted public funding and free technical support.** For example, government should offer funds for resource efficiency innovation trials, modelled on the Faraday Challenge, which was set up to provide UK manufacturers with sufficient research funding to improve the sustainability of vehicle batteries by making them fit for re-use. In addition to difficulties in accessing finance, lack of access to technical advice is also often a barrier for businesses – especially SMEs – who require support in developing new business models. **Government should therefore consider introducing a scheme similar to the Dutch Green Deal, whereby government-backed institutions provide free technical advice to businesses** and other organisations to run more resource efficient business models.

7 **Support knowledge sharing across economic sectors on the model of the National Industrial Symbiosis Programme (NISP).** Knowledge sharing between businesses operating within and across different sectors can generate cost-effective ways of reducing the amount of waste that ends up in landfill. It can also enable particular businesses to provide their waste to others that have the technology and expertise to reintroduce it into their production cycle (known as industrial symbiosis). The government could play an important facilitative role by establishing a supportive knowledge sharing forum, following the example of the previous National Industrial Symbiosis Programme.

91 The Institute for Government & Gowling WLG (December 2018) *Government Procurement: The scale and nature of contracting in the UK*

TWO NEXT STEPS FOR REDUCING EMISSIONS IN HARD TO TREAT SECTORS

Whereas for sectors like power or transport there is substantial agreement on how to achieve net zero emissions, other sectors of the economy have a more complicated roadmap to decarbonisation. Though these sectors are major contributors to GHG emissions, some are either not included in the net zero target at all (e.g. shipping or aviation) or are not subject to comprehensive policies to support them in significantly reducing emissions (e.g. heavy industry and agriculture).

Many of the hard to treat sectors that play a key role in getting the UK to net zero were already facing competitiveness issues before the pandemic. However, the halt in economic activity has hit sectors like heavy industry or aviation even harder, with many relying on financial assistance from government to remain afloat.

It is essential that any recovery plans for these sectors focus, in the short term, on avoiding bankruptcy and protecting the workforce, as some of these sectors are the main employers in certain areas of the UK, for instance industrial clusters. However, in the longer term, ensuring that the economic recovery package is aligned with decarbonising these sectors will be essential.

It is important that the UK government responds to the crisis by supporting the technologies and business models of the future, which will play a key role in cutting emissions from hard to treat sectors. Putting these sectors on a credible path to net zero will also enable the UK to capture as large a share as possible of a growing market.

In addition, many of the technologies and business models needed to cut emissions further in these hard to treat sectors have not yet been trialled at scale and, as a result, the right policy framework and overarching strategy to drive further decarbonisation in these sectors is not yet in place. The key role of a net zero delivery plan is to support large scale trials for new technologies and, based on the lessons learnt, put in place an appropriate policy framework that facilitates their commercial roll-out.

Decarbonising heavy industry

The pandemic has had severe consequences for heavy industry, with steel considered one of the UK sectors most in need of financial assistance post-pandemic, fast approaching a cashflow crisis.[92]

In addition, manufacturing is considered one of the worst affected industries at the global level, with sluggish demand exacerbated by fears of a second wave. Helping these industries recover in line with the net zero emissions target holds important opportunities to boost their competitiveness, create jobs across the country, and tackle the ongoing issue of exported emissions from industrial processes.

Global emissions from industry and industrial energy use grew by 1.4% in 2017 after remaining flat for several years.[93] Domestically, industrial emissions reductions have occurred at a time when there have been significant closures of industrial sites due to competitiveness issues. This creates the risk that the UK ends up importing industrial products with a higher carbon footprint and simultaneously contributes to rising global emissions. For example, the closure of Redcar steelworks in 2015 led to UK emissions from industry being nearly halved[94] in a way that cannot be attributed to low carbon policy incentives or technological advances.

However, there has been some progress in industrial energy efficiency and gains in switching to low carbon fuels, which contributed towards UK territorial emissions from industry falling 52% below 1990 levels.[95] At the same time, UK demand for industrial products has increased considerably, with the net value of imports more than doubling for manufactured products – pointing to an increase in consumption emissions, but a decrease in territorial industrial emissions.[96] A robust decarbonisation roadmap for the industrial sector therefore needs to look at reducing territorial and consumption emissions at the same time, and regulating for measures beyond energy efficiency and fuel switching to achieve deeper emission cuts. A comprehensive framework for industrial decarbonisation can re-energise sectors that have been in decline for years and badly affected by the pandemic and make them more competitive in a global market that will become increasingly focused on low carbon goods and services.

92 BBC (7 April 2020) "Coronavirus: six industries crying out for help"

93 Committee on Climate Change (June 2018) *Reducing UK emissions: progress report to Parliament*

94 Watson & Gross (2018) *Technologies for meeting Clean Growth emissions reduction targets. Written evidence from the UK Energy Research Centre to the House of Commons Science and Technology Committee*

95 Committee on Climate Change (June 2018) *Reducing UK emissions: progress report to Parliament*

96 *Ibid.*

Policy options to decarbonise heavy industry

Heavy industries in the UK are responsible for around a quarter of GHG emissions, which come from manufacturing practices and processes, waste, energy intensity and reliance on fossil fuels to generate power.[97] Some of these trends have started to reverse in recent years, with lower non-electric energy use in the residential and industrial sectors being responsible for 31% of emissions reductions in 2017 and energy savings in industry accounting for the largest part of this.[98] However, significant reductions in emissions from heavy industry have coincided with the 2008 financial crisis and they have not dropped substantially since then.[99] **This shows the need for a framework conducive to more systemic decarbonisation that can work in tandem with industrial growth and productivity.**

While efforts to decarbonise heavy industry are within the remit of existing policy frameworks, most notably under the current CGS, further policy granularity is needed to achieve quick wins around energy efficiency and fuel switching. At the same time, **more joined-up strategies are required to trial and deploy technologies that are essential for delivering deep cuts further down the line in emissions from heavy industry.**

Moreover, the past few months have seen a notable series of funding announcements, including most recently the allocation of £350m to cut emissions from industry by investing in hydrogen, clean power and CCS.

97 Energy & Climate Intelligence Unit (September 2018) *Heavy industry and net zero*

98 https://bit.ly/2vQjocL

99 Department for Business, Energy and Industrial Strategy (March 2019) "2017 UK greenhouse gas emissions: final figures — data tables", Table 3

Whilst investing in these technologies is necessary, accelerating, consolidating and simplifying existing funding schemes, bringing them under a unifying strategy for industrial decarbonisation will be essential.

NET ZERO CONCRETE BY 2050 – AN AMBITIOUS CLIMATE ACTION STRATEGY FROM CEMEX

Cement and buildings material multinational CEMEX has recently pledged to reach net zero globally across its operations and products by 2050. Having already reduced its emissions by 22% compared to a 1990 baseline, CEMEX has increased its interim 2030 target to reduce emissions from 30% to 35%.

Alongside these commitments, a delivery roadmap to 2050 provides details on areas that will deliver emissions cuts:

- Electrification, where possible, of industrial processes using energy from renewable sources and use of alternative fuels for machineries and processes where electrification is not feasible.
- Investment in energy efficiency.
- Substitution of clinker with alternatives with 20%-30% lower emissions and lower heat consumption.
- Investment in Carbon Capture Utilisation and Storage to tackle residual emissions.
- Moving towards a more circular business model, using more concrete waste as recycled aggregates and transforming waste into fuel. CEMEX already consumes as either alternative fuel or alternative raw material 32 times more waste from other industries than the waste it generates and sends to landfill.

Low carbon urban planning and infrastructure will be essential for reaching the net zero target, which is why CEMEX's ambition to produce carbon-neutral concrete and cement will be so important in enabling that.

© CEMEX UK

Policy recommendations include:

Delivering quick wins

First, government should support industry in **taking up low regret actions** that can cut emissions rapidly and are already available for wide-scale deployment. Two immediate priorities jump out:

1 **Stimulate investment in energy efficiency to reduce emissions.** The economic case for energy efficiency in energy intensive industries is very strong, partly due to industrial electricity prices being higher in the UK compared to the rest of Europe.[100] **While energy intensive industries have always taken steps to reduce their energy use, there is a role for government to play in making energy efficiency products and services competitive on a larger scale.** Facilitating market access for energy efficient industrial machinery, processes and buildings through a combination of incentives, regulation and policy certainty will in turn generate a robust pipeline of investment ready projects and private investment. For example, easy and consistent access to funding pots to invest in energy efficiency (Industrial Energy Transformation Fund, Climate Change Agreements) would greatly facilitate industry action on energy efficiency.

2 **Secure access to sources of low cost renewable power to support industries to decarbonise in a cost-effective way.** Continuing to increase renewable power generation capacity will help accelerate the decarbonisation process for heavy industry so it can rely less on fossil fuels and increasingly on cleaner sources of electricity. Securing a route to market for mature renewables (such as new onshore wind projects) and facilitating industry access to these low cost sources of renewable electricity will help ensure that industrial electricity prices remain competitive[101] and support the economics of decarbonisation for large industrial companies.[102] See the power decarbonisation section above for a full list of policy recommendations.

100 A UCL report commissioned by the Aldersgate Group explains how the network and (until recently) the policy cost recovery model differs in the UK compared to neighbouring countries like France, Germany or Italy. In the UK, the cost is spread evenly across consumers, based on consumption. The costs thus have a larger impact on energy intensive industries in the UK. In other EU countries, these costs are recovered proportionately more from less energy intensive users, reducing the burden on industries. UCL (February 2017) *UK industrial electricity prices: competitiveness in a low carbon world*

101 UCL (February 2018) *UK Industrial Electricity Prices: competitiveness in a low carbon world*

102 *Ibid.*

Accelerating innovation

Secondly, government should support industry in **trialling critical technologies at scale,** which could play a fundamental role in delivering further deep cuts in emissions in the medium term.[103] This needs to include urgent and high-scale trials of Carbon Capture and Storage (CCS) and a strategy for establishing the role of greater electrification of some industrial processes and potential uses of clean hydrogen. The role of CCS is likely to be vital to bring emissions from heavy industry as close as possible to net zero and is likely also to play an important role in enabling carbon-removal technologies. The CGS identifies that around half of the current emission reduction opportunities in industry are from CCS.

Government's ongoing investment in these key technologies is also a central plank of its green recovery package. Fast tracking these kinds of innovation projects in industrial clusters will provide great contributions to job creation across the country, local growth and emission reductions.

The recent funding announcement of £350m targeted at cutting emissions in hard to treat sectors including heavy industry is a step in the right direction. It will be key in creating jobs and increasing the competitiveness of industries that tend to be regionally spread out and are important to the UK's long-term levelling up agenda.

In addition, as the cost of producing clean hydrogen is set to fall by almost two-thirds by 2040 according to Wood Mackenzie, accelerating the development of UK's own hydrogen plants will be essential. The government £90m funding package announced in February includes funding to advance development of Europe's first large scale low carbon hydrogen plants. In addition to support for capital spend, fast tracking these projects and making low carbon hydrogen competitive requires a business model to support them. Funding for capital costs will help, but what will be most important to realising these initial deployments will be support for operational costs.

103 Vivid Economics & UKERC (April 2019) *Accelerating innovation towards net zero emissions and Aldersgate Group (April 2019) Zeroing in: capturing the opportunities from a UK net zero emission target*

In addition to this, government should focus on the following set of key priorities:

1 **Set a robust carbon price trajectory to reflect the real value of low carbon innovation whilst taking advantage of the drop in oil prices.** A significant drop in the price of oil compounded with the urgent need to save jobs and get back to normal means that there is a possibility that carbon intensive business models may become artificially cheap in the near term, thereby delaying investment in low carbon solutions and technologies. This would not reflect the true cost of emitting carbon, so these externalities need to be adequately priced in. We welcome the recent government announcement on aligning the future UK Emissions Trading System (ETS) with the net zero emissions target, but more clarity on the price trajectory is urgently needed.

Given the low price of oil, expanding the applicability and level of carbon pricing would have a limited fiscal impact. The price should be starting at around £40 per tCO_2 in 2020 and rising to £100 per tCO_2, or more in 2050.[104] According to calculations from The Zero Carbon Commission, a carbon price of £75/tCO_2 in the 2030s would generate £27bn in revenue, which could be reinvested to cushion the impact of carbon pricing on consumers and fund the key technologies needed to get to net zero emissions.[105]

2 **Develop an ambitious and strategic innovation policy focused on trialling critical technologies at scale.** It is clear from Aldersgate Group's engagement with a wide range of sectors that innovation funds in the UK have often been too small and lacking in long-term strategy and stability, thereby negatively impacting investment and undermining the development of ambitious, large projects. To look at an example from CCS, energy companies such as Scottish Power, E.ON, National Grid, Royal Dutch Shell and Drax have sought to build full-scale carbon capture and storage projects in the UK since the mid-2000s but two government subsidy bidding competitions, in 2007 and 2012, were later cancelled over cost concerns.[106]

104 Dimitri Zenghelis & James Rydge (July 2020) *Rebuilding to last: designing an inclusive and resilient growth strategy after COVID-19*

105 The Zero Carbon Commission (September 2020) *How carbon pricing can help Britain achieve net zero by 2050*

106 Financial Times (1 July 2019) "Carbon capture schemes urged to be more ambitious"

Lack of at-scale trials to date can also be attributed to policy makers' fear of failure, which has sometimes influenced its approach to innovation. When trialling such complex and cutting edge technologies, the government should recognise that successful and unsuccessful trials offer equally important lessons for good policy making. Both can improve our understanding of best practice and develop governance principles to roll out new technologies, when accompanied by strong evaluation methodologies. It enables government and innovators to draw the right conclusions from what has and has not worked during technology trials.

An innovation policy designed along these lines will facilitate the development of key technologies to decarbonise other hard to treat sectors. Priority technologies include CCS in both industrial clusters and non-clusters, testing the potential use of hydrogen for heating provision and long-distance transport, the development of sustainable waste-based biofuels for aviation and shipping, and next generation of offshore wind turbine designs. Government should also begin exploring the potential of negative emission technologies such as Direct Air Capture plants which could play an important role in achieving net zero emissions economy-wide.[107]

3 **Align the UK's innovation policy with market mechanisms that grow the demand for new ultra-low carbon goods and services.** This could include incentives aimed at accelerating the take-up of technologies like CCS, for example by rewarding industry for capturing and storing carbon emissions. Clarity on the development of long-term market creation measures, such as power-CCS CfD, regulated asset based financing, or revenue for stored carbon for industrial CCS, is essential to increase private sector appetite for investment. An example of best practice in market creation is the 45Q policy in the United States, which pays a credit of $50 per tonne of carbon dioxide permanently sequestered to help establish a market for CCS and allow the cost to come down as the market matures.[108]

4 **Introduce market mechanisms that include measures at the product level.** For example, product standards driving down embodied carbon in building materials, such as steel and cement, could help grow the market for ultra-low carbon industrial goods whilst also protecting UK businesses from high carbon imports. Government should update its procurement rules with mandates for investing in infrastructure to buy low carbon steel or cement from plants using CCS, thereby attracting more investment in this technology from the private sector. **Establishing a robust carbon price escalator will also help improve the investment signal for industrial decarbonisation.**

5 **Facilitate cross-sector collaboration to share innovation best practice.** Some of the technologies and business models that industries need to decarbonise may be tried and tested in other sectors. It is essential that companies learn best practice in reducing carbon emissions and have a good overview of how sharing services and assets with other businesses can be instrumental in their own decarbonisation journey. Government can play a central role in facilitating cross-industry collaboration, such as by providing funding for industry initiatives or setting up organisations like the National Industrial Symbiosis Programme.[109]

107 Vivid Economics & UKERC (April 2019) *Accelerating innovation towards net zero emissions*

108 Congressional Research Service (August 2018) *Carbon Capture and Sequestration (CCS) in the United States*

109 Aldersgate Group (April 2019) *Zeroing in: capturing the opportunities from a UK net zero emission target*

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Decarbonising shipping and aviation

Aviation is the one of the sectors where the severe economic impacts of the pandemic have been most rapidly felt. With an estimate of 25 million jobs at risk in the sector from the lockdown[110] and 23 airlines having already collapsed across the world[111] it is imperative that the urgent need to cut emissions in this sector goes hand in hand with helping airlines recover in a sustainable way and safeguarding jobs.

The role of ambitious innovation in getting to net zero and boosting the competitiveness of hard hit sectors like aviation and shipping is well-understood. For instance, the recently announced government funding of £350 million to cut emissions in hard to treat sectors and support a green recovery is a step in the right direction. However, given the complexity of reducing aviation emissions, a comprehensive strategy on bringing together R&D, enforceable emissions and efficiency targets, as well as upskilling the workforce is an urgent priority.

The International Maritime Organisation (IMO), the International Coordination in Aviation Research (ICARe) and the Advisory Council for Aviation Research and Innovation in Europe (ACARE) are overseeing the decarbonisation of the two sectors and setting voluntary targets. However, the lack of regulatory or pricing measures, and allocation of responsibilities and accountability if targets are missed, means that not enough progress has been made to ensure these sectors are on a credible pathway to deliver the large scale decarbonisation needed in the near future.

The scale of investment needed to decarbonise shipping and aviation is considerable. For example, in the case of aviation, between £100–£200 million investment in R&D is required to improve fuel efficiency for an airplane engine by 1%.[112]

Despite the scale of the challenge, urgent action is needed to put both sectors on the right track. The UK has played an important role in persuading ICAO to agree on a global offsetting scheme for aviation to 2035 and the IMO to reduce emissions by at least 50% by 2050 compared to 2008 level.[113] **However, international efforts to decarbonise these sectors need to be accelerated, and more can be done to reduce and offset emissions from aviation domestically.**

110 https://bit.ly/2Fay0sj

111 The Telegraph (21 July 2020) "The 23 airlines that have collapsed since Covid-19"

112 Ricardo (October 2017) *Carbon abatement in UK aviation*

113 Committee on Climate Change, Lord Debden (24 September 2019) *Letter: International aviation and shipping and net zero*

COMMITMENTS TO DATE – THE ICAO AND IMO DECARBONISATION FRAMEWORKS

INTERNATIONAL MARITIME ORGANISATION (IMO)

In 2018 adopted an initial strategy on the reductionof GHG emissions from ships and phasing them out as soon as possible. Key commitments include:[114]

Reducing carbon intensity of ships through energy efficiency: Reviewing with the aim to strengthen the energy efficiency design requirements for ships with the percentage improvement for each phase to be determined for each ship type.

Reducing carbon intensity of shipping through reducing CO_2 emissions per transport work (referring to the distance covered by ships), as an average across international shipping, by at least 40% by 2030, pursuing efforts towards 70% by 2050, compared to 2008.

GHG emissions from shipping to peak and decline: IMO will endeavour to peak GHG emissions from international shipping as soon as possible and to reduce the total annual GHG emissions by at least 50% by 2050 compared to 2008. At the same time, it will pursue efforts to phase them out on a pathway of CO_2 emissions reduction consistent with the Paris Agreement temperature goals.

INTERNATIONAL CIVIL AVIATION ORGANISATION (ICAO)

Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) is a decarbonisation framework adopted in 2016.[115]

Mitigation: Reducing net CO_2 emissions to half of 2005 levels by 2050 through advances in technology, fuels, operations and infrastructure (offsets are not intended to replace these mitigation efforts).

Measuring emissions reductions: the ICAO council will adopt a list of emissions units that can be used for compliance, meant to ensure the environmental integrity of CORSIA. These will be based on principles commonly applied under trading mechanisms and carbon offset certification standards (e.g. offsets must represent a permanent reduction, be measured against a baseline to determine what would have happened had the project not been implemented, and have safeguards in place to address social and environmental risks).

Reporting emissions: All operators with annual emissions greater than 10,000 tCO_2 are required to report their emissions on an annual basis, with monitoring starting from 1 January 2019 for international flights only. These should be calculated based on fuel use and fuel type and verified by a third-party independent body.

Offsetting requirements: Offsetting requirements will apply from 2021. At the end of each 3-year compliance period, operators will have to demonstrate that they have met their offsetting requirements by cancelling the appropriate number of emissions units. Until 2026, these requirements will apply only to states that volunteer to participate in the scheme, and from 2027 all international flights are to be subject to offsetting requirements.

114 https://bit.ly/38ClRVF

115 https://bit.ly/2v6Lbp3

Policy recommendations include:

1 **Formally include shipping and aviation emissions in the UK's carbon budgets to offer a clear direction of travel for companies investing in reducing emissions from these sectors.** Given that both need considerable levels of R&D investment to reduce emissions and that the upfront investment for developing new plane and ship models is considerable, long-term policy and regulatory certainty will be essential in sending a clear signal to manufacturers to invest in ultra-low carbon plane and ship models.

An example of best practice comes from Sweden's Fossil Free Roadmaps, where industry-led roadmaps to decarbonisation set out the technological solutions that need to be developed, what investments need to be made and what obstacles need to be removed for each sector to become fossil free. Domestic aviation, for instance, is to become fossil free by 2030 through the use of biofuels and international flights departing from Sweden are to be fossil free by 2045.[116]

Domestically, there have also been announcements from companies including Airbus to develop the world's first zero emissions commercial aircraft by 2035 through investment in electrification and hydrogen.

Formally including these sectors in the net zero target will concentrate efforts and mobilise supply chains to deliver in time for 2050.

2 **If government is to offer bailouts to airlines, these should be conditional on decarbonisation, so that jobs can be protected without locking in emissions.** These could require achieving net zero emissions by 2050 with intermediate targets set at 5- or 10-year intervals, starting now with the adoption of a range of existing and cost-effective technologies. Similar conditions have been attached to bailouts for airlines including Air France and Australian Airlines. If airlines are unable to meet these targets, bailout funding would be converted to equity at today's very low stock market spot prices.

Airlines should also work with the UK's universities, aviation and engine manufacturing expertise to develop sustainable aviation fuels industry. This is a priority area for helping to tackle this sector's emissions and strengthen UK capabilities and competitiveness in new technologies. In this context, it is welcome that the Department for Transport recently announced the 'Jet Zero Council' to decarbonise aviation.

116 Aldersgate Group (April 2019) *Zeroing in: capturing the opportunities from a UK net zero emissions target*

3 **Collaborate with the EU to ensure coordination on cutting emissions from shipping and aviation,** as announced under the European Green New Deal. Keeping these channels open will be crucial given the international nature of the industry and distribution of supply chains. Since R&D investment in low carbon technologies for this sector incurs significant costs for the industry, cooperating with key partners from across Europe who are innovating in this space will be crucial in reducing costs for UK companies and sharing best practice.

4 **Capitalise on fuel efficiency and electrification gains from the transport sector to cut emissions from aviation and shipping.** For example, the Driving the Electric Revolution Challenge supported by the Industrial Strategy Challenge Fund is predicted to deliver spill-over benefits for other sectors, such as the development of hybrid aircrafts. Government should facilitate cross-industry collaboration and encourage companies in this space to share R&D gains without fear of losing their competitive advantage. A successful model of such collaboration is NISP (see the section on reducing emissions from waste above).

5 **Invest in innovation for alternative fuels** and explore the applicability of technologies like hydrogen to power ships and planes (see policy recommendations under Section 3). Some progress has already been made on this front, with airline Virgin Atlantic having already completed its first flight powered by biofuels made from industrial waste gases converted to ethanol in October 2018, going from Florida to London. The use of biofuels is estimated to have the potential to reduce emissions by at least 65% compared to conventional jet fuel, and all Virgin Atlantic UK outbound flights aim to fly with a 50% biofuel mix by 2025.[117]

6 **Secure a first mover advantage in sustainable fuels**, **the production and use of hydrogen, batteries and other technologies essential for sustainable shipping and aviation.** The UK is already investing in R&D to develop advanced technologies through schemes such as The Faraday Challenge and the Industrial Strategy Challenge Fund.

We also welcome the recent government investment of £200 million through the Aerospace Technology Institute, to be matched by £200m from the private sector to help the aviation sector recover from the pandemic and develop high-performance engines, new wing designs, and ultra-lightweight materials to reduce fuel consumption.

The launch of FlyZero, the BEIS-supported project to help UK aerospace develop a zero carbon emission aircraft by 2030 is another essential step in the right direction. The programme will pull together expertise from across the UK supply chain and universities in an initial 12-month programme to look at the design challenges and market opportunity of potential zero-emission aircraft concepts.

As more countries adopt net zero targets and impose similar targets for the shipping and aviation sectors, the UK needs to move quickly to capture a large share of this growing market. For example, a growing number of shipping companies are already adopting technological and operational measures to become more sustainable, including Nippon Yusen Kaisha, Royal Caribbean Cruises, Carnival, Maersk and Wilhelmsen.[118]

7 **Invest in skills** to ensure that future engineers are well-equipped to design, build, run and repair future low carbon ship and airplane models (more recommendations on skills for a green economy can be found in Section 5).

117 *Ibid*.

118 https://bit.ly/2TUySnY

Cutting emissions from agriculture

Tackling emissions in farming and wider land use will be essential to achieve a net zero emissions economy. Moreover, the pandemic has exposed the fragility of agricultural and food supply chains, which are currently over-reliant on imports. Cutting emissions from agriculture can therefore also be an opportunity to develop shorter producer-to-consumer models, create more resilient supply chains and invest in jobs and opportunities for local farmers. **Although agriculture makes up 9% of UK GHG emissions, there has been no fall in emissions in this sector over the past seven years.**[119] The cost of not tackling emissions from this sector is significant: the estimated cost of land degradation is more than 10% of annual GDP and by 2050, soil degradation in combination with climate change are predicted to reduce crop yield by 10% globally and 50% in certain regions.[120]

Whereas CO_2 represents the main share of emissions in most other sectors of the economy, the main GHGs from agriculture are methane (CH_4) and nitrous oxide (N_2O). These gases are more difficult to reduce given that they result from complex and not fully understood natural soil and animal microbial processes, pressures from climate change and the limitations of measurement methods.[121]

This is why cutting emissions in this sector is less dependent on quick wins and more reliant on longer-term changes in land management practices and better valuation of the benefits from natural capital investment, including carbon storage.

119 Committee on Climate Change (January 2018) *An independent assessment of the UK's Clean Growth Strategy: from ambition to action*

120 Earthwatch Institute (2019) *Soil health, biodiversity and the business case for sustainable agriculture*

121 NFU (September 2019) *Achieving net zero: farming's 2040 goal*

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Policy recommendations include:

1 **Improving the productive efficiency of farming,** combining farmers' expertise with research and investment that brings innovation and new technologies more rapidly into supply chains.

2 **Incentivising land use change for greenhouse gas removals,** such as tree planting, through the new environmental land management scheme when the UK is no longer covered by the EU's Common Agricultural Policy at the end of 2020. The Agriculture Bill should provide further policy detail on how farming subsidies and the application of Environmental Land Management (ELM) schemes can be tied to the delivery of environmental improvement targets. This should work alongside support for pilot schemes to trial new farming practices that have lower environmental impacts.

Importantly, proposals on tying farming subsidies to wider environmental improvement goals need to be linked up with related proposed government legislation and strategies, including the Environment Bill and the Planning White Paper.

As the remit of the Office for Environmental Protection (OEP) is now also set to cover mitigation, meaning it can monitor progress against emissions targets and take enforcement action where public authorities are not meeting legal climate-related duties, it is essential that the OEP and the CCC work together to ensure that land use for GHG removals is a key are of cross-government effort and that regulation in this area is as consistent as possible.

3 Government must consider how best to **kickstart a private investment market in natural capital and nature-based GHG removal solutions,** working with farmers to develop collaborative solutions. Ramping up investment in these areas provides co-benefits, such as increased crop productivity, biodiversity enhancement, improved soil carbon sequestration and habitat restoration. At the same time, government policy must ensure that subsidies to the sector are aligned with the delivery of positive environmental and social outcomes like better air and water quality, enhanced landscapes, thriving plants and wildlife and benefits to the rural economy. This approach will help meet the net zero target whilst delivering against environmental improvement targets under the Environment Bill.

4 **Encourage businesses to invest in practices enabling sustainable land management,** including through due diligence to ensure that the impact of supply chains on soil quality through unsustainable farming practices is better understood and that genuine steps are taken to mitigate this. Improper use of soil through excessive farming and inadequate agricultural practices is the top direct driver in the decline of nature, followed by climate change, pollution and invasive alien species.[122] In this way, a plan for getting the agriculture sector to net zero would guard against the possibility that land use is only valued for its carbon storage potential, and that co-benefits, such as improved resilience to climate and water stress, improved food security and protection of biodiversity, are all reflected in business practices.

122 Earthwatch Institute (2019) *Soil health, biodiversity and the business case for sustainable agriculture*

THREE: TACKLING RESIDUAL EMISSIONS

Innovation and nature-based solutions

Efforts to reduce emissions in line with the policy options outlined above could lead to a reduction in UK emissions of up to 95% compared to 1990 levels.[123] However, the hard to treat sectors discussed in Section 2 will not be able to achieve zero emissions given current practical and technological limitations. Negative carbon emission solutions will therefore be needed in order to offset these residual and remaining emissions.

According to the IPCC, keeping to 1.5°C means that 590 billion tonnes of CO_2 will need to be removed globally from the atmosphere between 2020 and 2100, representing 18 years' worth of emissions at current levels.[124]

Removing GHGs from the atmosphere can be done in two ways, and reliance on both is critical, given the volume of emissions that will need to be removed from the atmosphere:

- **Nature-based solutions** that can absorb greenhouse gases and are usually more cost-effective (e.g. afforestation, restoring peatland, saltmarshes, meadows, improving soil quality).

- **Negative Emission Technologies (NETs),** developed in conjunction with CCS (see heavy industry section). These include Direct Air Capture with Carbon Storage (DACCS) and Bioenergy with Carbon Capture and Storage (BECCS) being the most commonly proposed ones.

The policies that need to be put in place to accelerate GHG removal will vary according to the type of solution proposed. However, both methods of tackling residual emissions will firstly require an adequate carbon price for them to be economic and pursued at scale. According to Royal Society estimates, a price of $100 per tonne of CO_2 would make NETs feasible from an economic perspective, while the cost of removing one tonne of CO_2 through nature-based solutions such as peatland restoration starts at $10.[125]

123 The Committee on Climate Change (May 2019) *Net zero: the UK's contribution to stopping global warming*

124 Grantham Institute for Climate Change and the Environment, https://bit.ly/38CCdO2

125 The Royal Society & Royal Academy of Engineering (September 2018) *Greenhouse gas removal*

The critical role of nature based solutions: joining up the net zero and Environment Bill agenda

The role of nature-based solutions in capturing and storing carbon is often underplayed. A lack of investment in nature-based alternatives demonstrates that these solutions are not considered a serious alternative to NETs. Their potential is often overlooked by investors, regulators and policy makers, in spite of their cost-effectiveness and their ability to absorb an estimated 28 Gt CO_2 per year by 2030.[126] The consequences are quite noticeable when considering that natural carbon sinks (saltmarshes, forests, peatlands, and meadows) have been depleted over the past decades, and due to improper management are now emitting rather than storing carbon. As an example, degraded peat in the UK releases the equivalent emissions of 140,000 cars per year when it ought to be a net carbon sink.[127]

Restoring these carbon sinks will enhance a range of ecosystem services, in particular regulating services including water regulation, erosion regulation or pollination. **In addition to their role as carbon sinks, nature-based solutions offer benefits in terms of climate change adaptation, flood prevention, wellbeing, biodiversity enhancement and air quality, which is why policy should not take a unilateral approach to nature restoration.** For instance, monoculture forests planted to maximise the goal of storing carbon are unable to support the same level of biodiversity, and can be more vulnerable to pathogens, compared to native forests.

A recognition of the additional benefits of nature-based solutions needs to be accompanied by an acknowledgement that investment in natural processes may not always deliver entirely predictable outcomes. In the case of regulated industries for example, **it is important that the regulatory framework incentivises utilities to invest in nature-based solutions in a way that does not penalise businesses when these solutions do not always deliver the predicted and targeted performance requirements.** This flexibility is important to ensure that businesses are not disincentivised from investing in natural environmental improvements in the first place.

In the case of nature-based solutions, policies should primarily aim to rectify a market failure and, through incentives and a robust carbon price, set out a way to monetise the gains they deliver, leading to better land management practices and restoration of natural capital.

126 Energy & Climate Intelligence Unit (September 2018) *Negative emissions: why, what and how?*

127 The Telegraph (October 2019) "Nature should be our greatest ally in the fight against climate change"

Policy recommendations include:

1 **Setting a robust carbon price** that adequately reflects the carbon storage value of natural capital. At present, a low carbon price for domestic offsets acts as a market barrier for investment in restoring and improving natural carbon sinks. This should be developed in tandem with a robust measurement system for bio-carbon storage substantiated by better analysis tools. These approaches need standardisation and backing by government to underpin market confidence.

THE WOODLAND CARBON CODE – NATURAL SOLUTIONS TO CARBON SEQUESTRATION

The Woodland Carbon Code (WCC) encourages investment from companies in offsetting emissions through woodland creation, by providing assurance to customers about the measurement of the carbon savings they can realistically achieve.

WCC looks for woodland creation projects that are responsibly and sustainably managed to national standards, can provide reliable estimates of the amount of carbon that will be sequestered or locked up as a result of tree planting, are publicly registered and independently verified, and meet transparent criteria and standards to ensure that additional carbon benefits are delivered.

This gives confidence to carbon buyers that woodland creation provides a legitimate way to secure emissions removals which can then be reported against their carbon footprints. Adherence of projects to the UK Forestry Standard also underpins the provision of a range of other social and environmental benefits.

Buyers can purchase verified carbon units called **Woodland Carbon Units (WCU)**, which can be used immediately to report against their carbon footprints. They can also invest in **Pending Issuance Units (PIU)**, which are effectively a 'promise to deliver' a Woodland Carbon Unit in the future. PIUs cannot be used to report against emissions until they are verified and are converted to WCUs. However, it allows companies to plan to compensate for future emissions.

Over 300 companies have invested in WCC projects by purchasing PIUs and WCUs, drawn from a range of sectors including retail, travel, manufacturing and finance. Over 3.4 million tCO_2 have been validated to date as PIUs. A smaller number of WCUs have been verified as the woodlands have grown, and this will increase significantly in the coming years.

2 **Kick start investment in nature-based solutions.** Setting the right carbon price is the first step. Government should also clarify the role of domestic offset options, enabling companies buying carbon to do so by investing in woodland creation, for example, and offsetting their emissions this way. A different way to attract investment is through the creation of a nature-based emissions trading scheme which would also be instrumental in tackling residual emissions.

Moreover, through the proposed planning reforms, government has an opportunity to mandate the delivery of biodiversity net gain in the planning system, by creating markets underwritten by developers, creating new biodiversity and ecosystem services in excess of those unavoidably lost through development. The planning reforms must be used as a complementary mechanism alongside carbon markets to facilitate the multilateral approach to nature based solutions and investments.

3 **Regulate and incentivise for investment in co-benefits of nature-based solutions, such as improved air quality, drainage, and support for biodiversity in addition to carbon storage.** The long-term horizons for returns from nature-based solutions can act as an effective market barrier for investment. For example, companies looking to offset their emissions are more likely to buy international credits that they can use now, rather than pay for woodland creation which will only start offsetting carbon after a few years. However, the co-benefits of using nature-based solutions should be adequately priced in. When it comes to improving physical resilience, calculations on avoided costs are already available.

In the UK, it is estimated that adequate tree cover saved London more than £5bn in 2014–2018 through air cooling and prevented productivity losses of around £11bn by preventing overheating in the summer.[128] The value of benefits delivered by UK trees is estimated at £270bn.[129]

Moreover, the value provided by coastal wetlands in terms of buffering the effects of storms and flood control has been estimated at £1.5bn annually.[130] According to calculations by the Natural Capital Committee, if woodland was planted on the periphery of major towns and cities it would deliver net economic benefits of nearly £550m per annum[131] once a range of non-market values such as recreation and impacts on greenhouse gases had been taken into account.

This is why the broader environmental improvements delivered by an investment in nature need to be priced separately from the carbon savings so that these investments become attractive from the start. Distinct pricing of the services provided by negative emissions and of the co-benefits will allow for these elements to be sold either separately or together. Regulations need to consider a wide range of environmental objectives beyond carbon reduction, so incentives for nature-based solutions need to be developed on that basis, with clear certification in place to ensure that the claimed benefits of particular investments have been adequately verified.

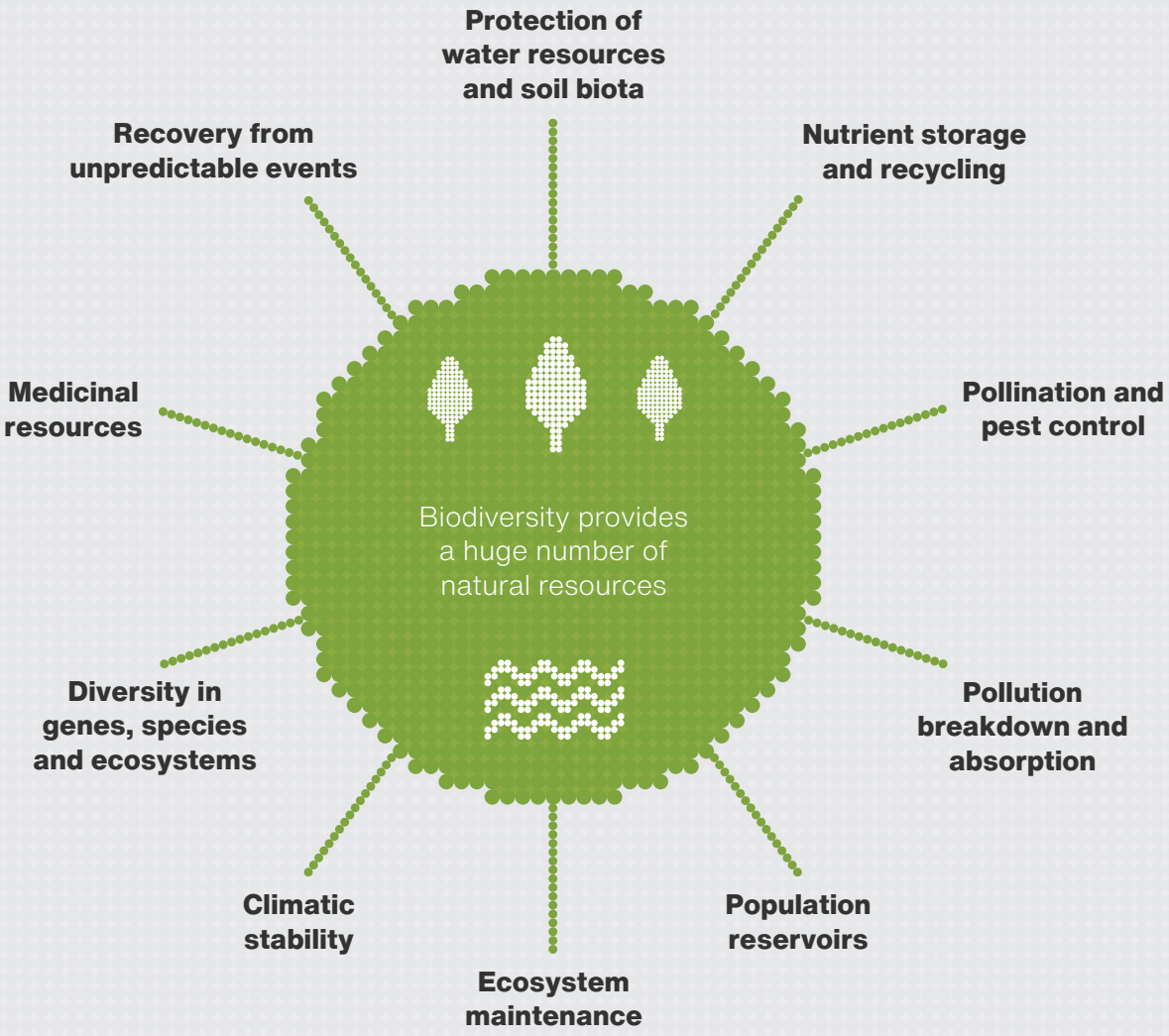
128 UK Green Building Council (May 2020) *Green recovery position paper*

129 Woodland Trust (January 2017) *The economic benefits of woodland*

130 HM Government (June 2011) *The Natural Choice: securing the value of nature*

131 Natural Capital Committee (2015) *The State of Natural Capital: Protecting and Improving Natural Capital for Prosperity and Wellbeing*

CO-BENEFITS OF NATURE-BASED SOLUTIONS



Source: Earthwatch Institute (2019)
Soil health, biodiversity and the business case for sustainable agriculture

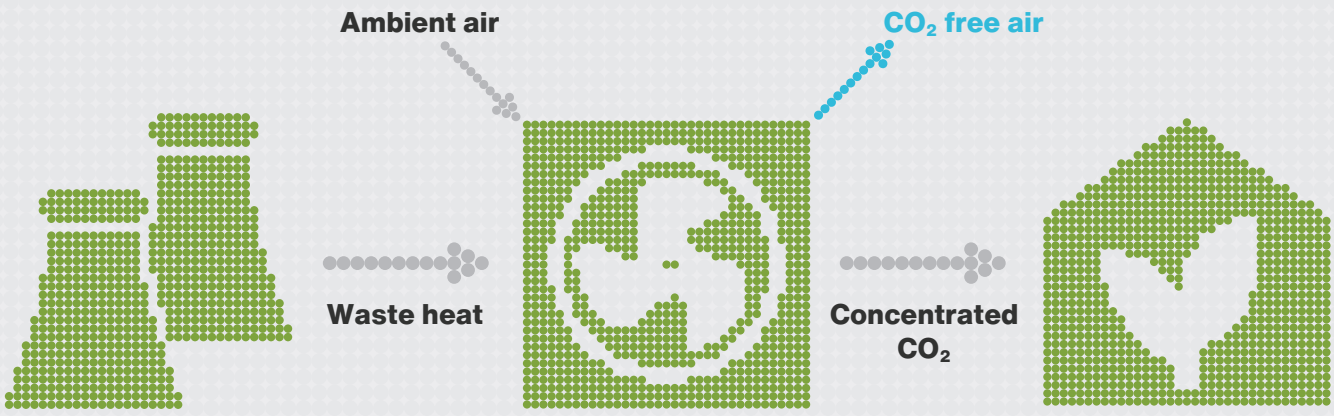
4 **Create better land stewardship practices through the Agriculture Bill.** It is important that a policy framework for boosting the use of nature-based solutions is integrated with the new ELM scheme, which rewards land managers for delivering environmental benefits and contributing to mitigation efforts through their practices.

To be effective, this framework must work hand in hand with the development of environmental improvement targets under the Environment Bill and other related policy developments such as the planning reforms envisaged in the Planning White Paper.

5 **Support innovation** by investing in and rolling out practices that facilitate carbon storage and sustainable food production, such as the use of sustainable biomass with carbon capture instead of feedstock.

The R&D funding package proposed under the Agriculture Bill is an important step in this direction, and better interdepartmental policy integration will be required to ensure that innovation helps us deliver against sustainable agriculture objectives and climate change mitigation.

THE CLIMEWORKS MODEL FOR CAPTURING CO_2



Source: Carbon Brief (22 June 2017)
"The Swiss company hoping to capture 1% of global CO_2 by 2025"

Negative emissions technologies (NETs)

Much discussed when considering pathways to net zero, NETs are considered essential in tackling residual emissions, especially as natural carbon sources become saturated.

However, many of the technologies that will play a central role in tackling residual emissions have not yet been commercialised and deployed at scale, and capacity for carbon storage in the UK at the moment is one thousandth of what it needs to be.[132] The extent and speed to which the UK can achieve net zero will also depend on the acceleration of innovation cycles for these emerging technologies.[133] This is why government should focus on developing an ambitious innovation policy which includes at scale trials for NETs and then creating appropriate market rules to support their deployment.

Policy recommendations include:

1 **Facilitate at scale trials for NETs.** At this critical time for the transition to net zero, the role of government – in collaboration with academia and the private sector – is to enable a learning-by-doing approach, in order to better understand how to deploy complex NETs and what their spill-over benefits might be for other parts of the economy.

2 **Link up innovation trials with a viable commercialisation strategy.** In encouraging the adoption of NETs and carbon removal technologies, creating new markets is equally important in making them competitive. A clear view on the availability of future revenue streams gives a concrete indication to NETs developers and consortiums that their investments would be rewarded, if they succeeded in bringing the technology to market at scale.[134] This will be essential to supplement the upcoming £100m competition for GHG removal technologies recently announced by government, which is set to include technologies such as Bioenergy with Carbon Capture and Storage (BECCS) and Direct Air Capture and Carbon Storage (DACCS). A clear price on stored carbon, as implemented in the US through the 45Q scheme is a good example in this sense. (See the section above on industrial decarbonisation for further details.)

3 **Create a strategy to communicate and encourage acceptability and rapid adoption of carbon removal and NETs.** The rapid roll out of unfamiliar forms of technology may elicit public concern and government should therefore devise an appropriate communications strategy that addresses this from the start. A successful example of this is the management of communications during the UK's transition from town gas to natural gas, where time and resources were dedicated to address consumer concerns through initiatives including the Conversion Strategy handbook and the 'Guaranteed Warmth' campaign.[135] Rapidly moving towards achieving net zero gives government significant responsibility in gaining public acceptability for these technologies and ensuring there are as few impediments as possible to their wider adoption.

132 Reuters (September 2019) "Carbon capture struggles to accelerate in race to avert climate crash"

133 A Vivid Economics & UKERC report (April 2019) *Accelerating innovation towards net zero emissions*, commissioned by the Aldersgate Group, looks at case studies of accelerated innovation in various industries and across different countries. It reflects on the policy, market and technological conditions that determine rapid innovation and adoption, and talks about how the lessons learnt can be applied to technologies that are key to achieving net zero.

134 Vivid Economics & UKERC (April 2019) *Accelerating innovation towards net zero emissions*

135 *Ibid.*

FOUR ACCELERATING GREEN FINANCE

Harnessing private investment to fund the transition

Getting over the recession and putting the UK economy on track for net zero emissions will require significant investment over the next few years. This is why creating a framework for supplementing government funding with private finance is absolutely essential as a way to restore confidence, create quality jobs and grow the UK economy out of post-COVID-19 recession and debt. Public and private investment should focus on supporting activity in the short term and expanding productive capacity in the medium term, ensuring that fiscal and monetary policy work together to guide liquidity and savings towards the growth of productive sectors of the economy. Up to £693bn of investment in low carbon infrastructure will be needed by 2031 in the UK and $90tn worldwide by 2030.[136] New regulations, fiscal incentives and market mechanisms will all have a vital role to play in delivering this.

Following the green finance commitments made in the Clean Growth Strategy, government published a Green Finance Strategy (GFS) that sets an ambition to grow private sector investment in low carbon and climate resilient infrastructure. However, the GFS must be accompanied by more ambition and policy detail to galvanise private investment in low carbon infrastructure at the pace and scale needed to achieve net zero emissions within three decades. [137]

Policy recommendations include:

Strengthening the framework for 'greening finance'

1 **Make TCFD-aligned reporting mandatory on a 'comply and explain' basis ahead of COP26.** The GFS took an important step forward by setting the expectation that all listed companies and large asset owners should disclose their climate-related risks and opportunities in line with the TCFD recommendations by 2022. However, to ensure a level playing field, meaningful and comparable information for investors and improved decision-making, it should be made mandatory for all companies reporting to the Streamlined Energy and Carbon Reporting regime, with a view to making disclosures mandatory for all market players in the medium term.

136 Aldersgate Group (March 2018) *Towards the New Normal: Increasing Investment in the UK's Green Infrastructure*

137 This recommendations in this section have been developed as part of the Aldersgate Group's work with the Centre for Understanding Sustainable Prosperity (CUSP).

Funded by the Economic and Social Research Council (ESRC), CUSP is an international research project, led by Professor Tim Jackson at the University of Surrey. The research addresses not just the economic aspects of sustainable prosperity, but also its social, political and philosophical dimensions.

Working closely with business, social enterprise, civil society and government, CUSP aims to develop pragmatic steps towards an inclusive economy that works for everyone.

In parallel, government should support quality disclosures by providing economy-wide guidance and creating a safe forum for businesses and trade groups to develop the necessary sector specific guidance.[138] **Government should establish a Corporate Reporting Lab to help industries pilot approaches and identify best practice,** which can gather input from trade associations and industry while remaining independent in producing sectoral guidance.[139]

In the longer term, government should support companies in developing suitable methodology for reporting the wider climate and environmental impacts of their decisions. Many financial institutions are already exploring this as part of the Partnership for Carbon Accounting Financials,[140] so it will be essential to support this effort to facilitate financial sector alignment with the Paris Agreement.

CORE ELEMENTS OF RECOMMENDED CLIMATE-RELATED FINANCIAL DISCLOSURES 2013–2018

Governance
The organisation's governance around climate-related risks and opportunities

Strategy
The actual and potential impacts of climate-related risks and opportunities on the organisation's businesses, strategy and financial planning.

Risk Management
The process used by the organisation to identify, assess and manage climate-related risks

Metrics and Targets
The metrics and targets used to assess and manage relevant climate-related risks and opportunities

Source: BEIS (July 2019)
Green finance strategy: transforming finance for a greener future

138 The Aldersgate Group published a detailed briefing on how government action can best support the take-up of TCFD-aligned reporting on 10 October. Aldersgate Group (October 2019) *Using TCFDs to manage climate risk: next steps for UK government, investors and businesses*

139 *Ibid.*

140 carbonaccountingfinancials.com

2 **Government should work closely with the Bank of England and support their stress-testing exercise when this is resumed,** which assesses the impact of climate-related risk on the UK financial system. Government will also play a key role in collaborating with the Bank of England to explore how to best reflect the findings of the stress testing in future policy making and review of financial regulations.

3 **Introduce measures, such as a brown penalising factor, that require banks to back up any lending to carbon intensive projects and infrastructure with additional capital. This will make high carbon loans less attractive, with a view to discourage companies from investing in carbon-intensive projects and infrastructure and limit their exposure to climate-related risks form these investments.** Adjusting fiscal rules and regulations to tilt the investment balance from high carbon to green will avoid considerable economic losses and contribute to avoiding increased levels of warming. Undeterred investment in high carbon projects and infrastructure will leave businesses and investors with assets on their balance sheets which are worth less than the amount initially invested – probably close to zero in the case of unburnable carbon. The losses from these stranded assets are estimated at $1tn–$4tn when considering fossil fuels alone, or up to $20tn when looking at a broader range of sectors.

Conversely, businesses and investors with a low carbon portfolio will be in a better position to withstand future climate shocks, and we have already seen climate solution providers and high-ESG rated stocks outperform during equally volatile periods like the start of the COVID-19 crisis.

4 **Continue working with the British Standards Institute in developing sustainable financial standards.** We encourage government to promote recently developed standards, including PAS 7340 on sustainable finance principles. Government should also encourage more investor and corporate engagement in the development of new standards, such as PAS 7341, which aims to set out criteria for responsible investment management and sustainable investment management.

At the same time, government should ensure complementarity of BSI's work with relevant standards being developed as part of the EU Sustainable Finance Action Plan, the ISO and other international standards.

5 **Introduce and roll out a Green Finance Education Charter,** developed in partnership with professional bodies. This charter should be rolled out across the public and private sectors to ensure that organisations are well equipped to identify and understand the benefits of green investment opportunities.

Establishing long-term policy frameworks for financing green and removing market barriers that stand in the way of greater investment

1 Establish a new **National Investment Bank (NIB)** with £20 billion paid in capital – £5 billion per year for 4 years – to support the delivery of complex low carbon projects and help direct low carbon investment to regions in need of economic regeneration.

The NIB should have clearly defined green objectives, including creating platforms for going to scale in new green technologies such as hydrogen and help overcome capital market failures around managing large and complex projects / programmes, with large perceived risks, long term horizons, and government induced policy risk and other political risks. By overcoming many of these market failures a NIB can make a major difference in unleashing private finance.

To effectively support the development of all areas of the UK, the NIB requires **a strong governance structure for infrastructure that joins up and empowers local authorities.** This will involve strengthening the capacity of local, regional and devolved governments to attract and deploy capital, given that much of the emerging, sustainable economy is inherently decentralised (transport, renewables, land use) and requires granular, ground-up solutions, particularly for SMEs. It should also channel investment in regions where productivity and wellbeing would be most responsive to higher capital intensity, and where network and agglomeration effects can be exploited to support low carbon innovation hubs.

2 **Devise a comprehensive net zero delivery plan which, accompanied by an updated GFS and set of regulatory drivers, fiscal incentives and market mechanisms can de-risk private investment.** These measures are urgently needed to ensure that measures to 'green' the financial system actually result in growing private investment in new green infrastructure. Some of the key policy measures needed are set out in Sections 1 to 3 above.

3 **Work closely with the Green Finance Institute (GFI) to identify key market barriers and gaps to investment in green infrastructure and technologies.** This should lead to targeting public funding and demand to catalyse private sector investment in complex technologies or types of projects. The £5m Green Home Finance Fund is a good example of what needs to be done across key complex investment areas, though the scale of the fund is far too limited when compared to the scale and urgency of decarbonising the building stock. This is why financial innovation to attract private capital will be essential.

One example of it is the recently launched GFI Coalition for the Energy Efficiency of Buildings (CEEB), which designs, develops and launches a portfolio of scalable demonstrators of new financial solutions that unlock investment into the low carbon and resilient building sectors. Government should collaborate with the GFI to identify lessons learnt from CEEB's demonstration projects and decide how best to incorporate these into future policy decisions.

FIVE: INVESTING IN SKILLS FOR A GREEN RECOVERY AND A JUST TRANSITION

Addressing the risks and maximising the opportunities

The global COVID-19 pandemic has been causing economic and social disruption, with high levels of unemployment, many more jobs with an uncertain future and worse prospects for those just entering the job market.

In the UK, the number of claimants for Universal Credit rose by 856,500 in April and by June almost 9 million people had been enrolled in the government's Coronavirus Job Retention Scheme, and 2.6 million claims had been submitted for the Self-Employed Income Support Scheme.[141]

The pandemic has also highlighted vulnerabilities within the UK labour market and exacerbated existing inequalities. Understandably, the immediate focus for government has been on rescuing jobs insofar as possible and keeping the worst-impacted sectors of the economy afloat. Beyond the short term, strategic decisions will need to be made, balancing the need to create jobs with the imperative of disrupting business as usual to achieve net zero emission by 2050.

The recent government announcement looking to expand post-18 education and training, with a stronger focus on lifelong training, technical qualifications and developing skills that are in high demand represent a key opportunity to reintegrate workers in the post-COVID-19 economy and address prevailing regional inequalities. In addition to this important step, a particular emphasis needs to be placed on cultivating the skills and competencies necessary to enable all sectors of the economy to reach net zero emissions by 2050 and boost their competitiveness in a low carbon economy.

Getting to net zero emissions by 2050 offers two major opportunities: **firstly, the job creation potential of this transition is significant.**

Looking only at the energy sector, it has been estimated that the transition to a 100% renewable energy system by 2050 could create 52 million full-time jobs globally and result in the loss of 27 million jobs across non-renewable and carbon-based energy options, a net gain of 24 million jobs.[142] A recent report from National Grid revealed that the UK energy industry needs to recruit for 400,000 jobs between now and 2050 to get the UK to net zero. There is also substantial motivation from young people to work towards net zero, with the research finding that 78% of young people think it is important to play their part.[143]

Beyond energy, the construction sector could see the creation of 108,000 net new jobs annually between 2020 and 2030 if an EPC band C target was set for 2035. In the transport sector, between 7,000 and 19,000 jobs could be generated by switching to EVs, depending upon the balance between domestic production and imports. There is also the potential to create over 200,000 jobs from the shift towards an economy focused on recycling, remanufacturing, repairing and reusing resources more efficiently.

Secondly, adequately equipping the workforce to operate in a low carbon economy will enable the UK to tackle existing skills shortages already very prevalent in the economy and boost the competitiveness of its industries.

141 HMRC "Coronavirus (COVID-19) statistics" [accessed on 28 June 2020]

142 Nick Robins et al (June 2018) *Investing in a just transition*

143 National Grid (January 2020) *Building the net zero energy workforce*

Skills shortages have already been pervasive across many parts of the economy, with 67% of hard-to-fill vacancies being caused, at least in part, by a lack of skills, qualifications and experience among applicants. Over most of the decade there has been a steady increase in skills shortage-related vacancies, more than doubling between 2011 and 2017. Even before the coronavirus crisis hit, 91% of businesses were experiencing skills shortages. Additional recruitment costs, increased salaries to attract the required talent, temporary staffing to plug skills gaps, and training to upskill existing employees are costing UK businesses an estimated £6.3 billion per year. These skills shortages have also led to organisations being less agile and less able to adapt to a changing political, economic and technological climate.

With a number of large UK industries facing financial difficulties even pre-pandemic, government should consider whether their rescue and future competitiveness will depend on embracing new business practices, requiring different skill sets. Preparing for this inevitable transition ahead of time will make UK businesses more competitive and equip the workforce with the right skills and expertise to seize upcoming employment opportunities.

Close to half a million people are employed today in the UK's low carbon economy. **It is estimated that the UK market size for this sector could grow by almost 15% every year to 2030 and that by 2030, the global market for low carbon goods will be worth more than £1 trillion a year, representing an increase of 7 to 12 times on today.** As markets for low carbon goods grow, so do low carbon service markets: in the 2020s, it is anticipated that the 50% increase in investment in renewables (on 2012 levels) will likely more than double spending on insurance for the sector.[144]

In addition to providing increasing numbers of employment opportunities at home, supporting the low carbon economy through adequate investment in skills will create a competitive advantage for the UK and sizeable export opportunities in goods and services as more countries take on net zero emissions targets.

Supporting workers affected by the pandemic with targeted skills provision should be the policy priority in the short term. In the longer term, as some industries become increasingly specialised, the focus should be on securing an adequate pipeline of skilled workers with expertise in sustainability to meet demand across the sectors.

The Aldersgate Group will shortly publish a policy briefing with more detailed recommendations on closing the skills gap and the importance of investing in education and training as part of the levelling up agenda: *Developing the skills to rebuild a sustainable economy.*

144 Maria Carvalho (August 2017) *At your service: how exporting more low-carbon services could enhance the UK's future prosperity*

Key recommendations include:

1 **Develop a national low carbon skills strategy,** which integrates sustainability at all levels of the educational system in the national curriculum – apprenticeship programmes, higher education and particularly through lifelong learning. This will ensure the UK has an attractive pipeline of skilled workers for new and growing industries in the long run. More widely, everyone entering the workforce, irrespective of their sector, should be equipped with skills for the low carbon economy and core knowledge of sustainability issues, as all job roles will require this knowledge to deliver the step change needed by employers to get to net zero.

A good example is around project management skills, traditionally focused on delivering against a pre-defined set of objectives, with an emphasis on short-term gains and immediate end results. Behavioural change is often considered outside the scope of a project, even though it is essential to transform society, and project management professionals often lack the necessary skills and competencies to advocate for better outcomes for society and the environment. Responsible Project Management[145] is an international academic-industry collaboration that aims to address this skills shortage by supporting and developing project managers to advocate for beneficial project outcomes and deliver value for the environment and society.

It is clear from engagement conducted by Aldersgate Group members that project managers are keen to behave responsibly but often do not feel empowered and lack the knowledge, skills and support to do so.

Government should demand that Higher Education and Further Education Institutions develop and implement yearly skills action plans, requiring institutions to disclose the ways in which climate, circular economy and biodiversity principles are integrated in their curricula.

145 www.bournemouth.ac.uk/responsible-project-management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2 **As per the recent government announcements, apprenticeships standards should be updated and new qualifications should be introduced to integrate climate and sustainability and give businesses the flexibility they need to teach their workforce skills that go beyond their current organisation's remit.** Current Apprenticeship standards do not directly refer to climate change, circular economy or biodiversity, and the Apprenticeship Levy has had mixed results. Since its introduction, employers with a workforce in more than one UK nation have experienced different national government approaches to managing the Levy and the use of funds. Many employers have found this inconsistent approach has generated additional work and created perverse incentives in terms of recruitment and access to training.

In addition, leaving apprenticeships to be employer-led creates a risk that training is insufficiently broad and becomes focused on short-term demands and in-house priorities, not delivering what is needed for the economy more widely. On the whole, the total number of apprenticeships across the UK has not yet recovered to pre-Apprenticeship Levy levels. We therefore ask for a revision of Apprenticeship standards that give businesses the flexibility they need to teach their workforce the required skills and the need for employees to learn about climate change and be provided with core sustainability skills beyond their current organisation's remit.

3 **Take a strategic approach to direct low carbon investment to regions in need of opportunities and with transferrable skill sets.** This will require identifying parts of the low carbon economy where the UK is particularly well placed to grow its supply chains, and in which geographic areas could be well positioned to host these supply chain and employment opportunities. These opportunities should be mapped against how sectoral transition pathways are likely to impact on employment, with plans made accordingly to support the growth of new industries with similar skill sets as those prevailing in declining industries in the same parts of the country. There are already successful examples of well-managed transitions, with over one third of marine engineers working in offshore renewables transitioning from the oil and gas sector.[146]

146 The Telegraph (11 September 2016) "Former North Sea oil workers are finding a second wind in renewables"

4 **Provide sustained public funding for local authorities, ensuring they have the capability to maximise local growth and job creation.** Local authorities have a key role to play in sourcing funding for skills and training from a variety of sources to support the local economy. These include existing European funding, its successor – the UK Shared Prosperity Fund, and other national initiatives and programmes in addition to private investment. It is crucial that they are adequately equipped to attract these funds and maximise their local impact to support the creation of new jobs and develop a pipeline of local skills.

However, at present, funding is mostly uncoordinated, which has been cited by local authority stakeholders as a key challenge today. **The National Skills Fund should bring together all different funding initiatives and provide long term policy direction and investment in industrial clusters and local projects.**

Similarly, as argued in our recent report *Rebuilding To Last*,[147] the existing Industry Strategy and the Clean Growth Strategy should be brought together to create a single, forward-looking and coherent plan to strengthen the UK's workforce for the recovery in the long term.

5 **Enhance dialogue between businesses, local and national government through the establishment of a National Skills Commission** which will enable businesses to better understand the specific future skills requirements for their organisation in a low carbon economy. **Local authorities must be given the resources and powers to implement local or regional skills strategies.** The knowledge that local governments and LEPs have of local SMEs and supply chains means they are best placed to understand the needs of local businesses and industries at a more granular level.

A **National Skills Commission** could coordinate between different government departments and teams, with businesses, and with similar local institutions and could coordinate the National Skills Fund to be introduced in 2021.

147 Dimitri Zenghelis & James Rydge (July 2020) *Rebuilding to last: designing an inclusive and resilient growth strategy after COVID-19*

ØRSTED'S APPROACH: SECURING A ROBUST SKILLS PIPELINE FOR AN EMERGING SECTOR

The offshore wind industry is still a relatively new sector and has generally grown in areas which have seen economic decline from traditional industries of the past. At Ørsted, recruiting a suitably skilled workforce is essential as the sector expands. The Offshore Wind Sector Deal sets out that there are 11,000 people working in the industry today and this number is set to grow to 27,000 by 2030 with large increases in new offshore wind capacity. Consequently Ørsted takes a proactive approach to developing a pipeline of skills and talent, not just for their benefit but for the wider sector and the broader supply chain. It has been achieved through different approaches:

Teach First partnership
Teach First is a charity that recruits, develops, places and supports teachers and school leaders in the communities where they are needed the most. Ørsted's funding has enabled the recruitment and placement of the 2019-2021 cohort of young teachers for the Grimsby area, and they are now developing a programme of engagement with those teachers and the schools they represent.

University Technical College (UTC) relationships
Ørsted has supported the two University Technical Colleges in the Humber Region – the Engineering UTC Northern Lincolnshire, Scunthorpe and the Ron Dearing UTC, Hull, through sponsorship and co-development of workshops, and also through the provision of funding for a library, librarian and resources.

Supporting MSc Renewable Energy programme students from University of Hull
Ørsted engages with their local university to highlight careers in the industry and have supported the MSc Renewable Energy students on an annual basis. They organise field days at their site and explain how their business works, organising discussion on careers in the sector. They also provide an industry lecture once a year to students around aspects of offshore wind and project management.

Apprenticeship Programme
Ørsted now have 22 Apprentices who will become wind turbine technicians when fully qualified.

East Coast Community Fund

Through their community benefit fund, Ørsted give grants to organisations delivering science, technology, engineering and maths (STEM) related activities. For example:

- The Grimsby Institute will receive a grant to build on existing investment and expertise and create an annual programme of events designed to excite, inform and spark curiosity in over 2,000 students in junior, secondary, higher education across the coastal zones of North East Lincolnshire, North Lincolnshire, East Riding of Yorkshire and East Lincolnshire.
- The Teacher Scientist Network is receiving a grant to provide 12 schools in the area free access to all the necessary components to run a four week, after-school, STEM club focused on the assembly of a working wind turbine.
- Ørsted is an active participant in their careers fairs, which are well attended by local schools.
- A grant has gone to STEM Learning to fund an ENTHUSE Partnership in the East Riding of Yorkshire. The Partnership will bring together 8 schools and colleges from the eligible funding area to develop a two-year intensive improvement programme to raise achievement and aspiration in STEM subjects.
- Franklin College were awarded a grant to support students in their STEM academy to undertake paid internships, enabling them to gain vital work experience.
- Women into Manufacturing and Engineering, a project and partnership designed to showcase industry careers to women and to encourage businesses to recruit a diverse workforce and employ more women in manufacturing and engineering roles.

SIX: DRIVING INTERNATIONAL ACTION ON NET ZERO THROUGH TRADE AND CLIMATE DIPLOMACY

Globalising the net zero agenda

The adoption of ambitious policies and regulatory measures at the domestic level needs to be complemented by a suitable trade policy that enables the UK to further its climate and environmental ambition, ensures minimal business disruption and promotes a race to the top of standards with our trading partners. When done right, Free Trade Agreements (FTAs) or bilateral trade agreements can be an opportunity to share environmental best practice, support the delivery of domestic policy goals, grow trade in low carbon goods and services, and support British exports in the process. Future trade deals can, however, also pose unintended risks. These include UK environmental and climate standards being diluted by provisions to reduce regulatory barriers, and the competitiveness of some UK industries being undermined by foreign industries not abiding by similar standards. To maximise the opportunities and minimise the risks, FTAs must be negotiated in a way that does not undermine current environmental and climate standards and instead support the UK's long-term environmental and policy goals.[148]

Having an ambitious agenda on climate change through its domestic, trade and diplomatic policy will mean the UK can maximise its influence at the G7 and COP26 summits it will be hosting in 2021. Such a coherent and ambitious approach could also help it influence the shape of economic recovery packages adopted by other emitters by encouraging them to align these with the goals of the Paris Agreement.

Policy recommendations include:

1. **Using trade policy to maximise low carbon trading opportunities for UK businesses.** Today, close to half a million people are employed in the UK's low carbon economy, with much of the growth driven by existing UK and EU environmental standards. **Far from being a barrier to growth, high environmental standards represent an opportunity to promote growing trade in low carbon environmental goods and services.** It is estimated that the UK market size for this sector could grow by almost 15% every year to 2030.[149] The UK has competitive advantages in several sectors of the low carbon economy such as climate finance, law and accountancy, with further strengths in IT and telecommunication services, engineering consulting and the development of environmental and green finance standards.[150] All of these skills are vital to supporting the low carbon transition and have an important export potential.[151]

148 Aldersgate Group published a more detailed policy briefing on aligning trade policy with climate and environmental targets. For a more extensive list of recommendations see Aldersgate Group (June 2020) *Aligning the UK's trade policy with its climate and environmental goals*

149 Committee on Climate Change (March 2017) *UK business opportunities of moving to a low carbon economy*

150 Grantham Research Institute on Climate Change and the Environment (April 2017) *UK export opportunities in the low-carbon economy*

151 London School of Economics and Political Science (August 2017) "Low-carbon services can enhance the UK's economic prospects". Available at: https://bit.ly/3cC01EO

2 **Removing barriers and lowering tariffs to grow trade in low carbon goods and technologies,** for example through joining the Agreement on Climate Change, Trade and Sustainability (ACCTS). Given the importance of services to the UK's economy, the UK government should ensure that its trade agreements and engagement at the WTO level **minimise barriers to the trade in low carbon and environmental services.**

Well-designed FTAs offer the opportunity to reinforce supply chains for low carbon industries. Removing tariffs on low carbon technologies, services or goods from foreign markets will be key for enabling economies of scale and optimising supply chains. **The UK should use its new position as an independent nation represented at the WTO to support negotiations under the Environmental Goods Agreement (EGA), seeking to eliminate tariffs on a number of important environment-related products.** These include products that can help achieve environmental and climate protection goals, such as generating clean and renewable energy, improving energy and resource efficiency, controlling air pollution, managing waste, treating waste water, monitoring the quality of the environment, and combatting noise pollution.[152]

3 **Looking beyond FTAs and also using bilateral trade negotiations and multilateral fora to boost low carbon trade.** Beyond negotiating FTAs, the UK government should not overlook the role of bilateral trade negotiations or multilateral fora like the WTO or the UN to increase trade and grow export opportunities for UK businesses in low carbon goods and services.

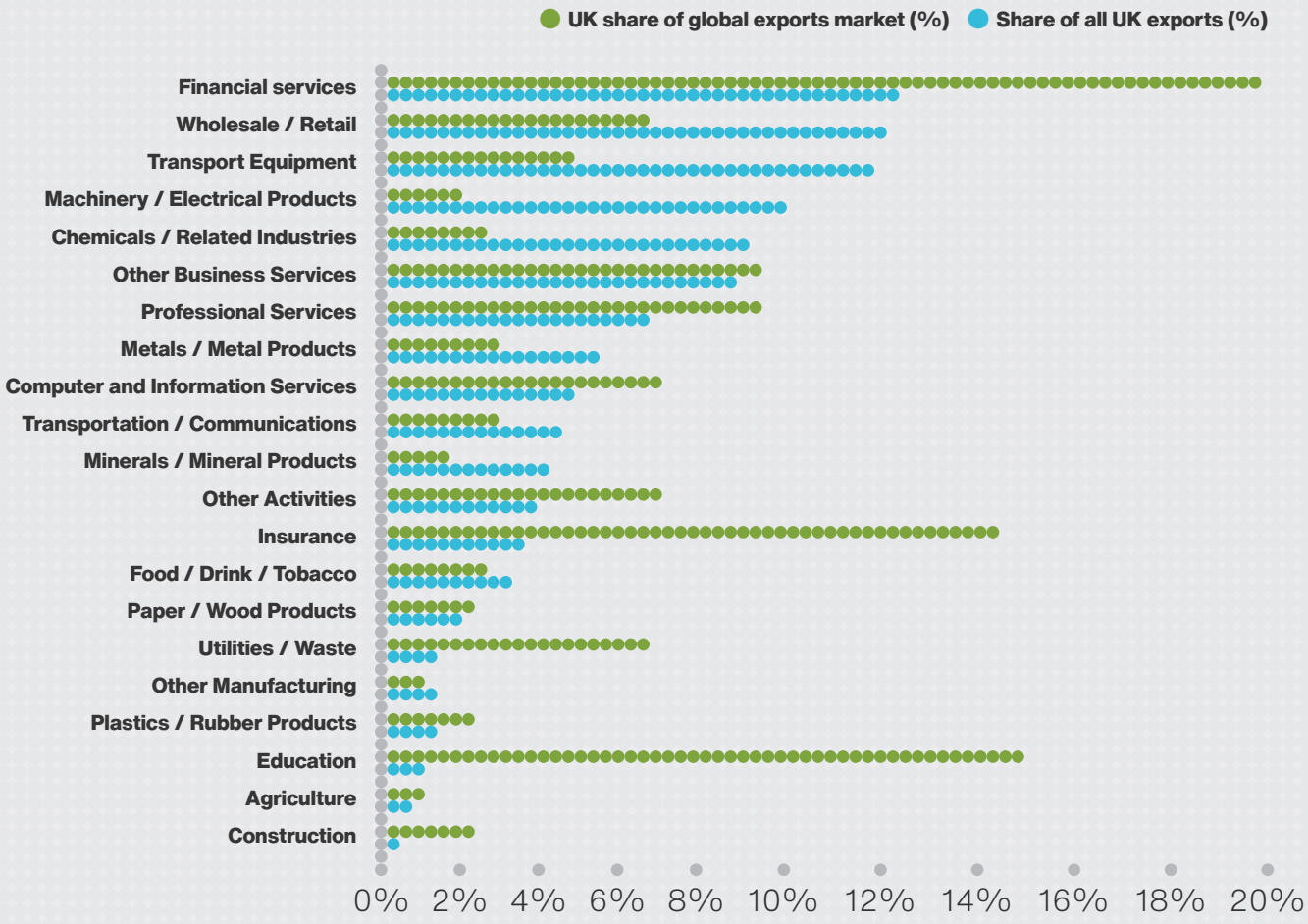
For instance, bilateral negotiations between India and the UK in 2015 secured more than £9 billion in commercial deals, 1,900 UK jobs have been created or safeguarded, playing on the competitive advantage of UK industries including healthcare, finance or energy.[153] These are often quicker routes to increase trade and offer clear opportunities for exploiting the UK's competitive advantage in sectors of the low carbon economy.

4 Develop **domestic policy tools** which increase the UK's environmental and climate ambitions over time and **apply to all businesses selling goods and services on the UK market.** This will help grow the market for low carbon goods and services whilst also providing a level playing field for businesses. Policies could include the development of low carbon product standards for heavy industrial goods such as steel and cement, an update to public procurement rules, and the development of carbon pricing adjustment measures in collaboration with trading partners.

152 WTO (2016) Environmental Goods Agreement

153 HM Government Press release (2015) "More than £9 billion in commercial deals agreed during Prime Minister Modi visit"

ANALYSIS OF UK EXPORTS AND UK SHARE OF THE GLOBAL EXPORT MARKET BY SECTOR GROUPING



Source: The Committee on Climate Change (March 2017)
UK business opportunities of moving to a low carbon economy

5 **Guaranteeing adequate parliamentary scrutiny and stakeholder engagement on negotiating mandates** well ahead of ratification, via the Trade Bill. The use of sustainability impact assessments should be mandated, to analyse the expected impact of a trade agreement on the environment prior to ratification and monitor post-implementation impacts.

6 Providing the parties in all future FTAs and investment agreements with a **legally binding right to regulate to increase environmental and climate standards** and put in place a **dispute settlement mechanism which does not threaten the UK government's right to regulate.** This could build on the precedent provided by the Intra-Mercosur agreement as an alternative to the Investor-State Dispute Settlement (ISDS) provision.

7 **Utilising the UK's diplomatic network of climate attachés and its position as host of COP26 and upcoming president of the G7 in 2021** to encourage other emitters to take on net zero targets and to agree to more ambitious pledges under the Paris Agreement.

A successful outcome for COP26 means utilising UK climate diplomacy to make progress against key objectives, including:

- Influence other countries to align their own economic recovery packages with the goal of net zero emissions.
- Getting agreement on a viable mechanism to support vulnerable countries when they are impacted by climate-related events.
- Reaching agreement on a rulebook for the contentious international cooperation and carbon market mechanism under Article 6 of the Paris Agreement.
- Demonstrating how greater take-up of low carbon technologies and more demanding emissions reductions targets can be aligned to the economic interests of big emitters such as China or India.

8 **Ensuring that trade deals do not create a framework for cutting domestic emissions by exporting polluting manufacturing chains overseas.** Achieving our net zero target at home should go hand in hand with reducing the UK's international footprint as the government has committed to under the 25 Year Environment Plan. FTA provisions should include due diligence obligations to ensure that businesses have to assess, address and report the environmental and climate impact of their operations abroad. This provision would guarantee that domestic environmental and climate gains are not made at the expense of deteriorating international standards, and would also have positive impacts for businesses; it would level the playing field between British and foreign businesses, improve environmental resilience throughout supply chains and increase board-level literacy of environmental impacts.

9 **Introducing a declining cap on financial support for international fossil fuel projects through UK Export Finance (UKEF) and increased transparency requirements for overseas investments in fossil fuel extraction.**

The UK should set a positive example in its trade policy by introducing a cap on financial support to international fossil fuel projects. UKEF is the UK's export credit agency, helping companies access export finance that enables international trade to take place. **While there has been an increase in the proportion of support given to renewable projects, the majority is still awarded to fossil fuel projects, with 96% (£2.5 billion) of export finance support going to fossil fuel projects in 2017/18.**[154]

While the initial intention behind fossil fuel subsidy schemes is often positive, such as providing vulnerable communities with access to energy or supporting economic development in least developed economies, they have been shown to be rarely effective in helping the poorest households.[155] Research from Carbon Tracker has shown that **UKEF supports upstream projects that are very likely to become stranded in a Paris-compliant world.**[156] **Greater focus of export finance towards clean energy access would reduce long-term financial risks, aid the delivery of developmental goals and further progress towards meeting climate goals.**

154 House of Commons Environmental Audit Committee (2019) *UK Export Finance*

155 World Bank (2017) *The political economy of energy subsidy reform*

156 Carbon Tracker (2020) https://bit.ly/2YPxCoz

The Government has already made welcome commitments on UKEF in its Green Finance Strategy, chiefly that UKEF will make climate-related financial disclosure on its accounts, in line with the TCFD recommendations. As per recommendations by the Environmental Audit Committee in its inquiry into UKEF,[157] government could go further by **capping lending to fossil fuel lending, reporting on the forecast of emissions of its entire portfolio (including scope 3 emissions) and integrating climate change considerations into UKEF's mandate.** In doing so, the UK would send a clear signal to the wider investment market about the importance of the net zero transition, and leverage its position to ensure accelerated multilateral action towards climate neutrality.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157 House of Commons Environmental Audit Committee (2019) *UK Export Finance*

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