

SUPPLEMENTARY REPORT TO THE COMMITTEE ON CLIMATE CHANGE

From the

ADVISORY GROUP ON THE COSTS AND BENEFITS OF NET ZERO

By

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1. Background to this paper

In 2019, the Committee on Climate Change (CCC) set up the Advisory Group on the Costs and Benefits of Net Zero to advise on this subject as the CCC considered its own response as to whether the UK Government should adopt a Net Zero target. The Advisory Group produced a Chair's Report based on the Group's deliberations and written submissions in March 2019, which can be found on the CCC website at <https://www.theccc.org.uk/wp-content/uploads/2019/05/Advisory-Group-on-Costs-and-Benefits-of-Net-Zero.pdf>.

In April 2020 the CCC asked the Advisory Group to reconvene for a single meeting to consider whether the economic impacts of COVID-19, and the UK and global response to it, might have changed the advice we gave then, and if so how. While all members of the Advisory Group attended and contributed to the discussion at this meeting (on May 6), not all members were then able to produce follow-up papers to feed into this report.

This brief update to the Chair's report from 2019 starts from the advice the Group gave in 2019 and the letter sent by the CCC on May 6 2020 to the Prime Minister and the First Ministers of Northern Ireland, Scotland and Wales (Building a resilient recovery from the COVID-19 crisis, available at <https://www.theccc.org.uk/2020/05/06/take-urgent-action-on-six-key-principles-for-a-resilient-recovery/>) and draws from the Advisory Group's discussion and the papers subsequently submitted by some Group members. It further considers some of the considerable number of publications that have been produced in recent months on the post-COVID economic recovery, but is certainly not a comprehensive review of this material. This update has been agreed by the Advisory Group as a whole.

2. Recommendations from the 2019 Chair's Report

The 2019 Chair's Report had sections on the international context, resource costs, macro-economic costs, financing costs, co-benefits, transitional costs and policies relating to deep decarbonisation. Its conclusions and recommendations considered the costs and benefits of climate action generally, the specific case of Net Zero versus an 80% reduction target, and some reflections on the CCC's approach to the costs and benefits of assessing Net Zero.

There is no need to rehearse in detail here the material of the 2019 Report, which is still available on the CCC website. Most relevant to this update are the considerations relating to resource costs, macro-economics and co-benefits as they have evolved since 2019, especially those arising from the COVID-19 crisis and the actions that may be taken to recover economically from it. These are the subjects most discussed below. In respect of the conclusions and recommendations, the main point made in the earlier report was that the costs and benefits of deep decarbonisation are unknowable with any precision, as they are both very uncertain in themselves and depend both on the decarbonisation policies and the timescale over which they are pursued. However, that said, the following conclusions were drawn from the report:

- The climate science suggests that there are very large potential benefits of limiting the average global temperature rise to 1.5°C rather than 2°C, which provides a justification for a Net Zero as opposed to an 80% emission reduction target;
- The costs of reducing greenhouse gas (GHG) emissions have been grossly over-estimated in the past; recent modelling suggests that costs might be around 1% of GDP, but ongoing reductions in the costs of zero-carbon technologies suggest that in the future the costs might turn negative (i.e. zero-carbon electricity may turn out to be cheaper than fossil fuel generation, even if the climate benefits are not considered);
- The costs of reaching Net Zero by a certain date (e.g. 2050) will be lower the sooner the requisite policies are put in place to achieve it, to give investors certainty about the direction of travel and to fit in with investment cycles to minimise the stranding of long-lived high-carbon infrastructure;
- The health co-benefits of reducing fossil fuel use and greenhouse gas emissions could be very substantial in terms of improved air quality, active travel and healthier lower-meat diets;
- However low (or negative) the costs of Net Zero turned out to be, the transition to Net Zero would involve deep structural changes that would affect people, communities and economic sectors in very different ways. There would be winners and losers. The political acceptability of the transition would depend on it being seen to be fair, as well as this being desirable on ethical grounds;
- Achieving Net Zero by 2050 will require wide-ranging policies that are credible, consistent across government, long-term and of a stringency to transform major techno-socio-economic systems of society (including energy, food, transport, waste and resource use). The 2019 Report concludes that the required policy approach "includes a stable long-term

direction with clear governance, regular reviews for flexibility, use of markets to find the best solutions, support for large-scale deployment of new technologies as well as research and development, and approaches that are tailored to the needs of each sector, while maintaining consistency across the system.”

Such a policy approach was not in place in March 2019. It is not in place now. If the 2050 Net Zero target is to be reached at least cost (or at all), it is imperative that such an approach guides the post-COVID recovery, as will be discussed further below.

3. The CCC letter of May 2020

The CCC in its letter made six generic recommendations for the post-COVID recovery, and identified six specific areas for priority investment. The six generic recommendations were:

1. Use climate investments to support the economic recovery and jobs.
2. Lead a shift towards positive long-term behaviours.
3. Tackle the wider ‘resilience deficit’ on climate change.
4. Embed fairness as a core principle.
5. Ensure the recovery does not ‘lock-in’ greenhouse gas emissions or increased climate risk.
6. Strengthen incentives to reduce emissions when considering fiscal changes.

The priority areas for investment were:

- Reskilling and retraining programmes.
- Targeted science and innovation funding.
- Housing retrofits and building new homes that are fit for the future.
- Strengthening energy system networks and energy efficiency.
- Tree planting, peatland restoration and green infrastructure.
- Making it easy for people to walk, cycle, and work remotely.

This update will assess to what extent these lists of priorities resonate with other recommendations for the post-COVID recovery that are oriented towards the Net Zero target.

4. Post-COVID considerations on the costs and benefits of Net Zero

The most dramatic economic change since March 2019 is that the UK and global economy now seem certain to enter a period of deep recession – due to the measures taken to control the coronavirus – that will perhaps be the deepest the world has ever seen. In the UK, millions of people are likely to become unemployed as the Government’s furlough scheme is lifted, and UK GDP in the second quarter of 2020 may be 35% below the level that was expected pre-COVID. The macro-economic context, within which Net Zero policies now need to be considered, has therefore completely changed from March 2019. This has led the Advisory Group to the following conclusions on the key areas we discussed in our 2019 Report.

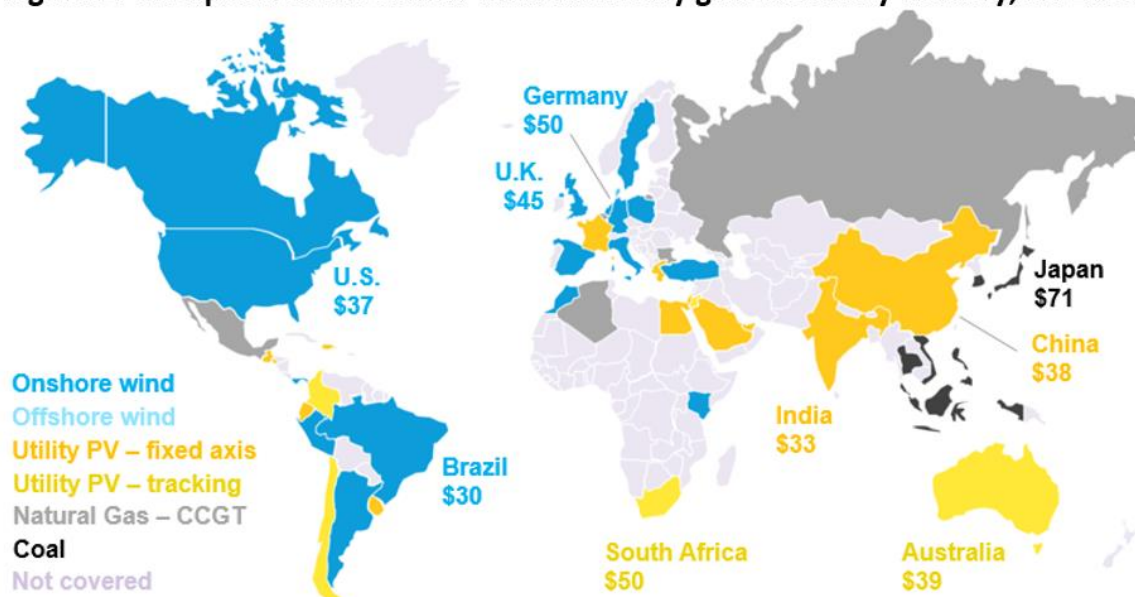
Resource costs of decarbonisation

In the Chair's Report of 2019, 'resource costs' in the context of the report were defined as "a measure intended to reflect the additional cost of all resources required to meet a carbon target (i.e. Net Zero) over a given time period". The report made the points that:

- Marginal abatement cost estimates already showed a considerable mitigation potential at negative net costs
- The costs of several zero-carbon technologies had fallen dramatically over the last 30 years, and continued to do so
- Abatement costs had been significantly over-estimated in the past
- The deployment of these technologies had been significantly under-estimated in the past
- There remained uncertainty as to how low the costs of these technologies would develop in the future.

Events over the past year have confirmed the continuing downward trend in the costs of key renewable electricity technologies. BNEF estimates in April suggest: "Solar PV and onshore wind are now the cheapest sources of new-build generation for at least two-thirds of the global population. Those two-thirds live in locations that comprise 71% of gross domestic product and 85% of energy generation. Battery storage is now the cheapest new-build technology for peaking purposes (up to two-hours of discharge duration) in gas-importing regions, like Europe, China or Japan." Figures 1 and 2 respectively show the cheapest source of bulk electricity in different countries and the cost development of onshore and offshore wind, utility-scale PV and batteries over the last ten years.

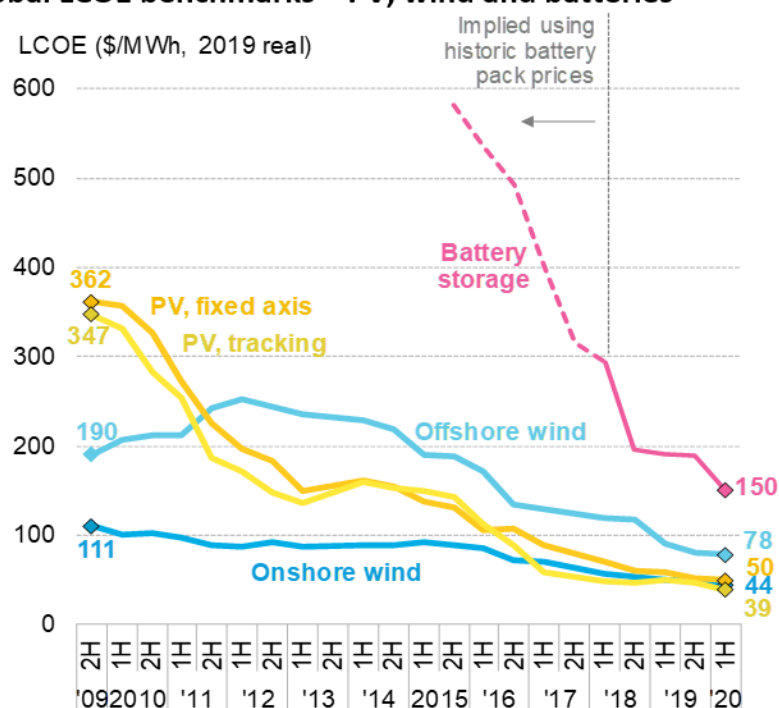
Figure 1: Cheapest source of new bulk electricity generation by country, 1H 2020



Source: BloombergNEF. Note: LCOE calculations exclude subsidies or tax-credits. Graph shows benchmark LCOE for each country in \$ per megawatt-hour. CCGT: Combined-cycle gas turbine.

Source for Figures 1 and 2: <https://about.bnef.com/blog/scale-up-of-solar-and-wind-puts-existing-coal-gas-at-risk/>. LCOE in Figure 2 stands for Levelised Cost of Electricity, which is a standard way of comparing the costs of different electricity technologies

Figure 2: Global LCOE benchmarks – PV, wind and batteries



Source: BloombergNEF. Note: The global benchmark is a country weighted-average using the latest annual capacity additions. The storage LCOE is reflective of utility-scale projects with four-hour duration, it includes charging costs.

Of course the last few months have also seen a collapse in the oil price, which, other things being equal, would increase the resource costs of getting to Net Zero. We are not going to speculate here about where fossil fuel prices might go next. However, countries, especially fossil fuel importing countries (like the UK) that have secure supplies of renewables at the prices shown in Figures 1 and 2, have the opportunity to transition to clean energy and avoid the volatilities of the oil market. In addition, low oil prices present opportunities to increase carbon pricing without imposing too high a burden on energy intensive industries.

If zero-carbon energy sources are actually the cheapest available in much of the world, then the whole notion of ‘resource costs’ as we have used it here becomes devoid of meaning. Zero-carbon electricity actually becomes the cheapest way of delivering desired services of heat, cooling, mobility and power irrespective of climate considerations, certainly once the new infrastructure has been put in place and the old infrastructure retired from service at the end of its life. The phrase ‘cost of abatement’ becomes redundant when abatement of carbon emissions through zero-carbon electricity is actually the cheapest way of delivering desired energy services.

Macro-economics of decarbonisation

The Bank of England estimated that UK GDP at the end of 2020 Q2 would be close to 30% below the level at the end of 2019 and that at the end of 2020 GDP would have fallen by 14%¹ over the year. The unemployment rate is expected to rise to 9% in Q2, and some 6 million jobs have been furloughed – many of those may not return once the furlough scheme has been removed. Under

¹ <https://www.bankofengland.co.uk/-/media/boe/files/monetary-policy-report/2020/may/monetary-policy-report-may-2020>

these conditions government financial support for an economic recovery is practically certain. What is not yet clear is the form that this support will take.

The Government's rapid economic response to coronavirus has shown that governments can raise large amounts of money, cheaply, from capital markets and, if necessary, backed by the Bank of England. There is therefore an opportunity for a large fiscal stimulus. A crucial difference between now and March 2019 is that, with all the unemployed resources in the economy, public investment will not crowd out private sector investment, which is in any case likely to be low in the short run. If anything, a government stimulus might provide the investment environment for crowding in, by providing certainty in the market. Under these conditions, whether the economy is restarted by a green recovery package or a 'brown' recovery package will not materially affect the outcome for the economy in aggregate. The difference lies in the impact on emissions in the longer term through the impact on the (energy-using) capital stock. It would be imprudent to invest in new capital that locks in high-carbon activities and goes against the grain of currently dynamic low-carbon technological development and innovation.

The key to any kind of economic recovery post-COVID is investment for growth. The resources for recovery must be invested in productive assets that will engender a return. In the current climate the bulk of the resources for investment will come from debt. If the rate of growth engendered by the investment is greater than the (currently very low) interest rate, then the debt/GDP ratio will fall and the investment will be affordable, even if initially this ratio increases markedly in order to provide the debt. Annex 1 discusses in much more detail the macro-economics behind this. The question to be addressed here is: what should the investments be in, in order to deliver the best prospects for growth?

Annex 2 identifies the key criteria for stimulus that supports both economic recovery and energy transition as:

- having a material impact in increasing the productive capacity of the economy and stimulating wider economic activity (demand, investment, jobs);
- starting to have an impact within a relatively short period (12-24 months);
- being time-limited and project-specific, to incentivise new investments and/or bring forward planned investments (and not lead to permanently higher government deficits); and
- being administratively easy to implement.

Annex 2 further identifies four broad categories of green stimulus that fit these criteria:

1. *Public investment programmes*, to stimulate economic activity in the near-term and enhance the capacity of the economy to grow in the longer-term.
2. *Fiscal incentives*, to stimulate specific clean energy investments, technologies, and products.
3. *Targeted business support* to the hardest-hit sectors of the economy.
4. *Leveraging in private investment*, in strategic sectors, by using the long-term strength of government balance sheets to reduce risks and capital costs for private investment in energy transition-critical infrastructure and technologies.

A recent academic paper² surveyed a range of economic experts and government officials to ascertain their opinion on which, out of 25 policies that had been used in economic stimulus packages in the past, would be most effective in terms of long-term economic multiplier, impact of GHG emissions and speed of delivery. They identified five measures "that are well-placed to contribute to achieving economic and climate goals. These are:

² Hepburn, C., O'Callaghan, B., Stern, N., Stiglitz, J. and Zenghelis, D. 2020 (forthcoming) Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change?, *Oxford Review of Economic Policy* 36(S1)

- clean physical infrastructure investment,
- building efficiency retrofits,
- investment in education and training to address immediate unemployment from COVID-19 and structural unemployment from decarbonisation,
- natural capital investment for ecosystem resilience and regeneration, and
- clean R&D investment.”

A parallel effort that produced a Briefing for the UK Government’s Department for Business, Energy and Industrial Strategy derived a ten-point list of policy-driven investments that were desirable from both an economic and environmental perspective, reproduced here in Table 1.

Policy Items	Description
Energy generation, storage, and distribution	Invest in zero carbon energy production, storage infrastructure, and interconnection; extend and modernise the grid to support higher renewable penetration and electrification of heat and transport
Reducing industrial emissions	Introduce financial incentives (e.g. wider carbon price floor) for industrial companies to reduce net carbon emissions and increase efficiency in production
Research and development	Invest in high impact sustainability technology research and development that includes start-ups, small and medium-sized enterprises, and large companies
Building climate-smart infrastructure	Investment in low and zero-carbon infrastructure projects, such as public transport infrastructure, that are also resilient to the impacts of climate change, such as flooding
Broadband connectivity investment	Investment in broadband infrastructure to increase full fibre coverage beyond the current set of <10% of UK homes
Nature-based solutions investment	Investment in ecosystem resilience and regeneration by enhancing green spaces, planting trees, and encouraging climate-friendly agriculture and restoring carbon-rich habitats
Electric vehicle conversion	Incentivise uptake of electric cars through financial incentives and fast-charging infrastructure and improve bike lanes to encourage wider uptake of e-bikes
Home renovations and retrofits	Higher carbon standards for new-build homes; financial support for households installing insulation and other energy efficient improvements
Education and training	Funding skills and retraining initiatives, such as through digital further education, to address structural unemployment effects resulting from decarbonisation measures
Conditional bailouts	Bailouts for struggling firms, conditional on improvements against climate-positive criteria, especially for fossil fuel intensive companies such as airlines

Table1: Policy-driven investment recommendations for a post-COVID low-carbon recovery³

Annex 2 makes six further suggestions for post-COVID investment, summarised here:

1. Bring forward private sector investment in offshore wind

Economic evidence indicates that renewable energy investments are attractive in both the short and the long run. In the short run, they create more new jobs (via a higher jobs multiplier), which in turn boosts spending, expands demand, and increases GDP.

2. Decarbonise industry, trucking and heating through Carbon Capture, Use, and Storage (CCUS)

CCUS could deliver hydrogen for home heating, industry, and transport at scale, and be a key component of a future power system, providing low-carbon dispatchable power and, with bioenergy,

³ Allan, J., Donovan, C., Ekins, P., Gambhir, A., Hepburn, C., Robins, N., Reay, D., Shuckburgh E., and Zenghelis, D. (2020). A net-zero emissions economic recovery from COVID-19. Smith School Working Paper 20-01, <https://www.smithschool.ox.ac.uk/publications/wpapers/workingpaper20-01.pdf>

negative emissions power. The UK has a rich CO₂ storage base in the North Sea and the East Irish Sea, and existing academic and industry expertise, which could provide the UK with a competitive advantage in CCUS and an opportunity to deliver zero-carbon industrial clusters, as well as potential global export advantages in the future.

3. Support the upstream oil and gas industry's transition

The Government could seek to maintain domestic energy supply in the current low oil price environment while transitioning towards a clean energy future, by planning now for the reuse of critical infrastructure and redeployment of key personnel into clean energy production with similar characteristics of North Sea oil and gas production, such as hydrogen and CCUS.

4. Develop close-to-market green technologies

Government support to commercialise close-to-market green technologies, such as floating offshore wind or advanced aviation biofuels, could deliver breakthroughs over relatively short timeframes, subsequently crowding in private investment and leading to their earlier and at-scale deployment.

5. Provide the infrastructure to support build-up of electric vehicles

Wide access to a reliable charging network will be critical to have more drivers choosing an electric vehicle (EV). Bringing forward investments in EV infrastructure could create demand and jobs while also enabling the faster take-up of EVs.

6. Incentivise private investment in nature

Natural capital investment for ecosystem resilience and regeneration, including restoration of carbon-rich habitats and climate-friendly agriculture, can deliver large economic multipliers, reasonably quickly. Investments in natural capital – such as afforestation, expanding parkland, and enhancing rural ecosystems – also perform well, particularly in terms of speed of implementation, due to low worker training requirements and minimal planning and procurement requirements.

Annex 2 goes into more detail about the kinds of policies that could deliver investments in these areas.

These broad suggestions have considerable overlap with the recommendations of the CCC, reproduced in section 3. They provide a rich menu of options that will stimulate economic recovery in the industries and technologies that will be in increasing demand in a climate-constrained world.

Co-benefits of decarbonisation

An interesting feature of the lockdown in the UK has been speculation that it might lead to long-lived changes of public attitudes to the environment (for example, there has been much discussion in the media of people noticing and appreciating nature more than they had previously, in the absence of traffic and aeroplane noise). People have certainly driven less.

There is currently no way of knowing whether lockdown will have made permanent changes to behaviour. Perhaps most likely is that there will be less business travel and more video conference calls, increased working from home and more retail going permanently online. But there is little evidence that people will want to travel less for leisure, or become more resource-efficient in their consumer habits, and there are some changes that may serve to increase energy use and emissions: home working may lead to offices *and* domestic settings being heated and cooled, travel on public transport may be reduced and switch to private vehicles and, where people have to go to workplaces, these may need to be larger to allow for physical distancing.

So there are few grounds for thinking that post-COVID there will be lower energy use and associated emissions due to behaviour change, which emphasises again the need to grow out a post-COVID recovery in ways that ensure that energy use becomes less and less carbon-intensive. In such a case, the co-benefits in terms of reduced local emissions, and active travel where this is possible, would remain as large as was suggested in the 2019 Chair's Report.

5. Conclusions

The Advisory Group was asked to reflect on whether the economic circumstances consequent on and subsequent to COVID-19 are likely to have affected the Group's conclusions in its 2019 Report, as set out in section 2. Our conclusion is that, if anything, our recommendations from that Report have been reinforced by events since.

The climate science has not changed, justifying the pursuit of a 1.5°C target. Low-carbon electricity and storage have become significantly cheaper. So have fossil fuels for the moment, of course, but the volatility of oil markets gives little confidence that this will persist over the recovery. There is now a much greater economic rationale for substantial public investment, and the right measures to crowd in private investment, than there was then. This paper has identified in more detail than the earlier report the options for investment that can be justified in terms of both contributing to the economic recovery and reducing emissions. Without explicitly stimulating the recovery in this direction, there is every likelihood that the economy will grow back into its old, high-carbon trajectory, investments in inappropriate infrastructure will be made, and this will either need to be scrapped at some cost before the end of its life, or the Government's statutory GHG emission reduction target will be missed.

COVID-19 has been a terrible tragedy, but the economic recovery from it gives the UK a chance to grow back in a way that is fit for the low-carbon future to which it aspires, and that can benefit from the industrial and economic developments that this future offers. It would be a double tragedy from the COVID nightmare if this opportunity were missed.

ANNEX 1

The new macro-economic circumstances (Dimitri Zenghelis)

Even before the pandemic, the global economy was imbalanced. For more than a decade, too much global saving was chasing too little productive investment ([Lukasz and Smith 2015](#)). The result was that the price of borrowing, the real interest rate, fell close to zero and global productivity growth languished. All this surplus saving had to find a home, and it did: corporate borrowing expanded rapidly on the back of cheap credit. The global stock of non-financial corporate debt was at record levels of \$74tn in Q3 2019 ([Tiftik et al., 2020](#)).

This allowed firms and banks to become increasingly indebted, heightening financial sector vulnerability to the systemic risk of default. Instead of going into productive new investment, the world's savings were channelled into existing assets, inflating their price. For many companies, amassing debt was a [deliberate strategy](#) aimed at maximising returns through share buybacks and large dividends ([Wilder-Smith and Freedman 2020](#)).

As the rich grew wealthier on the back of asset price inflation, earnings growth for the majority stagnated and productivity languished. Inequality and failure to invest in public services undermined the social contract, spawned popular discontent and contributed to a further rise in saving because the rich who benefitted save relatively more ([Eggertsson and Mehrotra 2017](#), [Bofinger and Scheuermeyer 2016](#)).

Avoiding a return to unsustainable and inequitable slow growth – or worse, a downward spiral into depression – will require careful management. The UK [Office for Budget Responsibility \(2020\)](#) estimate that if the deliberate action taken to limit contagion from the pandemic remains in place for three months, UK output could plunge by an unprecedented 35 per cent in 2020 Q2. The cost of the UK lockdown to fight the spread of coronavirus, is of the order of £2½ billion per day ([CEBR 2020](#)). Even with a sharp recovery, the IMF predicts that in 2021, advanced economies' GDP will be 6.1% lower than it would have been in the absence of the pandemic ([IMF 2020](#)). And such a recovery is far from guaranteed in the near term.

Even after businesses have been allowed to reopen, uncertainty and lack of confidence in the economic outlook will likely persist. Viable businesses will go bust, while skills will have atrophied, and optimism may be thin ([DeLong and Summers 2012](#)). Fear of economic depression, or of continued recession, can all too easily become a self-fulfilling prophecy as banks cut lending, businesses trim jobs, and investment and individuals curtail spending.

In the short run, the world faces a classic Keynesian paradox of thrift: this is when fear of downturn leads business to cut investment and shed labour, banks to retrench credit and consumers to claw back spending. When everyone responds in this way, expectations become self-fulfilling in generating the very downturn that was feared. Expansionary fiscal policy in a slump can arrest these negative reinforcing feedbacks. The primary macroeconomic task is to offset this and stimulate private spending/lending/hiring in the short run and this requires restoring confidence.

Pulling the world out of recession means restoring confidence. This will require public spending together with the framing of a much better vision of the future ([Gurria 2020](#)). A key objective of any recovery package is to stabilise expectations and channel surplus desired saving into productive investment ([Zenghelis 2016](#)). Restoring confidence requires harnessing the growth potential of an inclusive, resilient and resource-efficient economy. Previous studies have highlighted opportunities associated with sustainable growth ([New Climate Economy 2014](#), [Rydge et al 2018](#)), but COVID-19 increases the urgency of shifting to a better growth model.

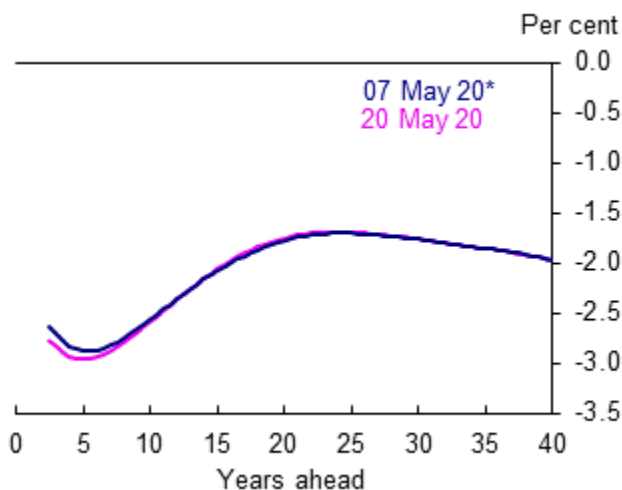
1.1. Fiscal policy: taxes; spending and borrowing

Concerns about repaying enlarged public debt and limited ‘fiscal space’ must be addressed head on. It is important to set out clearly the macroeconomic arguments and the options for fiscal and monetary policy in these unprecedented circumstances ([Llewellyn and Zenghelis 2020](#)). Public borrowing to fund investment can get people back to work and stimulate domestic spending and demand in the short run, while building capacity and supply into the medium and long run ([Zenghelis 2020](#)). It has been shown to deliver a strong bang for every publicly borrowed buck ([Auerbach and Gorodnichenko 2012](#)). In recession, when resources are under-employed, public expenditure has a large multiplier effect ([Blanchard and Leigh 2013](#)). Each percentage point of GDP spent on investment can be expected to increase GDP ultimately by around 2 to 3 percent ([Hepburn et al. 2020](#)).

Sensible people will rightly worry about the growing public sector debt required to pay for these investments. In the medium term, fiscal sustainability requires moving the current budget towards balance. Carbon pricing and environmental taxation can help tilt incentives to support green recovery strategies and generate valuable revenues while increasing economic efficiency ([Burke et al. 2020](#)).

But a premature tightening of public budgets is likely to make debt sustainability even harder by crashing growth. Into the medium term, provided recovery plans avoid depression, higher debt remains historically affordable. The fact that the market expects real bond rates to [remain below zero](#) reflects abundant investor appetite for public debt to support increased investment.

Figure1. UK instantaneous implied real forward curve (gilts)



Source: Instantaneous implied real forward curve (gilts). Source: Bank of England calculations
Available at: <https://www.bankofengland.co.uk/statistics/yield-curves>

A premature tightening of public budgets is likely to undermine debt sustainability in the long run. This can be illustrated through some simple assumptions on debt dynamics. The standard equation for debt dynamics illustrates:

$$\text{Change in } d = -p + (r - g) * d(-1)$$

Where d = debt/GDP, p is the primary balance (public borrowing after interest payments), r is the rate of interest and g the rate of nominal GDP growth. This basically says that, all else equal, if an

economy grows faster than the rate of interest charged on its stock of debt, its debt to GDP ratio will fall. This is because the numerator (debt) grows more slowly than the denominator (GDP).

If the recovery plan can restore g to its trend rate of around 4% and r is around 2% then the UK can run a primary deficit of the order of 2% of GDP while keeping debt/GDP unchanged. This can be spent on growth boosting [public investment in green infrastructure](#), R&D, skills and education which can further support growth. Once one adds back interest payments, the medium-term sustainable deficit in the UK is of the order of 4-5% GDP.

But the public sector returns to targeted investment go further still. Higher growth (g) not only reduces debt/GDP by expanding GDP, it also slows the rate at which debt is likely to increase. For example, if targeted investment generates a multiplier of 3, then 1% of GDP in extra borrowing can be expected to raise GDP by 3% thereby generating public revenues sufficient to reduce the public deficit by around 1% of GDP. This combined effect on both the numerator and denominator of the debt/GDP ratio explains why, under the right conditions, borrowing to invest can be more sustainable in terms of public debt management than seeking to directly target balanced budgets. From a political economy perspective, not to mention that of good governance, growing out of debt has the additional merit of generating more jobs, boosting productivity and wages and bestowing a more content electorate.

Financial assets however are not national net wealth (every debtor/liability has a corresponding lender/asset). In circumstances such as the present, governments are not borrowing from the future and the rise in public borrowing is matched by an almost equal and opposite rise in private saving. Total global debt is only relevant in that it reflects underlying challenges, such as growing inequality, or in so far as increased leverage creates financial and public sector vulnerabilities. So far, as noted above, the markets are not unduly concerned. By contrast, offices, factories, people as well as ideas and natural capital are real assets. The preservation, and building up, of these assets should be the priority if we are to safeguard future prosperity and ensure that there are valuable assets in people's savings and pensions.

1.2. Recovery and investment

To achieve high long run growth multipliers, there needs to be a focus on structural investment in key assets (physical, human, intangible, natural and social capital) and in [‘shovel ready’ projects](#) which can create jobs quickly and get the UK on course for net zero, such as energy efficiency improvements (these issues are covered in more detail in the Strategy and Investment webinar). With tax receipts [already below average in March](#) it will be important to consider where taxes can offer good incentives and raise revenues at a time of fiscal pressure.

The UK has lagged behind other major economies on investment over the past 25 years. Total investment (GFCF) averaged 17.1% of GDP over 1995-2018, compared with 20.8% and 21.6% in Germany and France, respectively, and 23.6% for OECD countries as a whole.

Sustainable investment policies [perform particularly well](#) in terms of fiscal multipliers. In the short run, 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, while [lowering long-term energy cost](#). By generating growth, public debt becomes sustainable and [easily repayable](#).

In the long term, the economic multipliers are also high, as the operation and maintenance of more productive renewable technologies makes them less labour-intensive, and energy cost savings are passed on to the wider economy ([Blyth et al. 2014](#)) ([Hepburn et al 2020](#))ⁱ. Clean innovation, working with the technologies of the future, is particularly effective at generating productivity [gains from discovery](#). We have already had a glimpse of this in the [dramatic declines](#) observed in the costs of renewable energy, battery storage and electric vehicles and there are many more such opportunities to come, but [credible public policy](#) plays a central role in [guiding investors](#). By contrast, using public money to prop up fossil-fuel intensive infrastructure with limited productivity potential is likely to prove [very wasteful](#).

Investment in human capital will also be required to enable workers affected by change to secure the [skills and jobs necessary](#) for the 21st century economy. COVID-19 has reminded the world of the urgent need to strengthen the quality and resilience of natural assets. Economic activity that leads to unsustainable use of natural capital [contributes to pandemics](#). Investment in [social capital](#) is also necessary to deliver effective and functional government with popular support, as well as to reinvigorate the cash-starved social sector which generated the equivalent of [10% of UK GDP](#) in recent years. Additional support will be required for statistical agencies, like the ONS, to better measure broad asset stocks as metrics for sustainability.

1.3. Monetary policy and liquidity

Minimising business failures and job losses, as well as maintaining liquidity are key priorities for monetary policy following a sharp increase in market volatility and reductions to credit supply during the initial [impact of COVID-19](#) on financial markets. The Bank of England has reduced the cost of credit via interest rate adjustments, providing assistance to increase cash-flow for borrowers during this immediate disruption and increased liquidity in the system by re-starting quantitative easing. However further measures may be required for liquidity and to boost demand through the recovery, counterbalancing some of the underlying weakness in inflation should that persist.

Moving from rescue to recovery will require action simultaneously to restore demand and bolster supply. Boosting demand will be particularly challenging in the current environment. The slowdown comes at the end of a long period of [slow productivity growth and surplus desired saving](#) pushing global policy real interest rates close to zero. With policy rates so low, and desired saving likely to rise further, the limitations of monetary policy are prompting ever more unorthodox approaches, while also putting an emphasis on fiscal support (see above), with the prospect in some countries of at least some direct monetisation of public debt.

Like many central banks, the Bank of England has been buying up new issues of government bonds by issuing reserves. As the Bank's balance sheet swells, the bank can cancel the debt or keep interest rates low to assist debt sustainability even if that causes inflation, which erodes the real value of nominal public debt. Yield curve control is also being considered whereby the Bank buys up longer-term bonds to lower long-term interest rates. All options including negative interest rates are on the table.

However, fears of debt monetisation [may be overstated](#). What matters for inflation/credibility is operational independence of the Bank of England and lack of government interference, rather than the instrument in use. Provided an operationally independent central bank can modify its stance in accordance with its objectives, in the form of a transparent reaction function, there is no reason why anti-inflationary credibility should be undermined. With inflation undershooting, radical measures are justified provided these are temporary. There remains the need to account for biases in the Bank's purchases of financial instruments which may [favour carbon-intensive sectors](#).

It is important to recognise that broad money is endogenous. Consider for example the famous question put by Professor Nicholas Kaldor on observing the annual surge in money supply each Christmas: does the money supply cause Christmas; or does Christmas cause the money supply? Thus, in a confidence crisis, and when interest rates are already near their zero bound, both the fiscal and the monetary authorities need to act to sustain spending. In such a confidence crisis, the need to address the climate challenge and build a resilient and inclusive economy, properly pursued, might prove to be the very macroeconomic medicine the post-COVID-19 economy requires.

1.4. Expectations guide investment in the long run

The importance of expectations in boosting confidence in the short run is highlighted above. But steering expectations matters in the medium term too. A net-zero transition is inevitable. It is inevitable because the extent of global warming depends on the *stock* of greenhouse gases in the atmosphere – not the *rate* of emissions. Greenhouse gases (GHGs) stay in the atmosphere for years, decades, or centuries (depending on the gas), so the stock will keep growing for so long as the flow of GHG emissions exceeds the earth's capacity to absorb them, and temperatures will keep rising. This means that to halt continual temperature increase requires transitioning to a net-zero emissions world that allows concentrations of greenhouse gases to stabilise.⁴ The alternative is that nature does this for us by creating such a hostile climate it causes vast movements of peopleⁱⁱ and then rapidly depopulates the earth.

This inevitability can guide investor actions and help overcome strategic complementarity ([Zenghelis 2019](#)) problems and inferior Nash equilibria ([Zenghelis 2020](#)).ⁱⁱⁱ They occur when the pay-off to a particular action depends on what others do. Even if the superior outcome is attainable when all act together, individuals may hold back if they fear they will be acting alone. Expectations regarding the transition, and its inevitability, are therefore crucially important. A mayor, politician or businessperson who believes that no one will invest in clean technologies is unlikely to take the risk of being the first to invest. However, if they believe others are investing at scale then they will expect the cost of the new technologies to fall, the finance to move from niche to mainstream, and substantial new market opportunities to emerge. Therefore, they will invest. But the very act of investing, if everyone does the same, means the costs of new technologies fall quickly etc., making the expectations become a self-fulfilling prophecy.

Social psychologists have long understood that solving coordination problems like this requires building expectations into models and generating 'common knowledge'.^{iv} The big innovation of the [Paris Agreement](#) is that it dropped the language of 'burden-sharing' and focussed instead on nationally determined voluntary contributions. This reflects the reality that self-interest, not shared sacrifice for the greater good, breeds cooperation. This in turn builds on a [growing appreciation of the opportunities associated with a low-carbon transition](#). Policy-makers must proactively act to identify potential co-benefits during the policy design stage and shape implementation criteria to maximise impact. The role of credible and durable policy in driving a cost-effective and productive low-carbon transition cannot be over-emphasised.

Expectations are reshaping in the light of the COVID-19 crisis. If the world is to succeed in tackling climate change it is vital that the inevitability of the net-zero transition is reinforced in the recovery. The UK can help achieve this both through its own actions at home and through leadership on the global stage.

⁴ COVID-19 is unlikely to have a significant impact on concentrations of greenhouse gases in the atmosphere, despite temporary falls in flows of emissions.

- i. Blyth, W., Gross, R., Speirs, J., Sorrell, S., Nicholls, J., Dorgan, A. and Hughes, N. (2014). Low Carbon Jobs: The Evidence for Net Job Creation from Policy Support for Energy Efficiency and Renewable Energy. UK Energy Research Centre Report. <http://www.ukerc.ac.uk/publications/low-carbon-jobs-the-evidence-for-net-job-creation-from-policy-support-for-energy-efficiency-and-renewable-energy.html>; Hepburn, C., O’Callaghan, B., Stern, N., Stiglitz, J., and Zenghelis, D. (2020). Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change?, Smith School Working Paper 20-02, Forthcoming in the *Oxford Review of Economic Policy*, 36(S1) <https://www.smithschool.ox.ac.uk/publications/wpapers/workingpaper20-02.pdf>
- ii. Recent research, assuming a scenario of unmanaged climate change, finds mean temperature rise experienced by human populations by 2070 could be as high as 7.5 °C compared to the pre-industrial, about 2.3 times the mean global temperature rise by this time. Up to 3 billion people (roughly 30% of the projected global population) would have to move. <https://www.pnas.org/content/early/2020/04/28/1910114117>
- iii. ¹ Zenghelis, D. (2020) Can we be green and grow? *Lombard Odier*, February. <https://www.lombardodier.com/contents/corporate-news/responsible-capital/2019/november/can-we-be-green-and-grow.html?skipWem=true>
- iv. ¹ Thomas, K., Haque, O.S. Pinker, S. and P. DeScioli (2014) The Psychology of Coordination and Common Knowledge, *Journal of Personality and Social Psychology* 107 (2014): 657–76.

ANNEX 2

The new macro-economic circumstances (Mallika Ishwaran)

I. Macroeconomic context

COVID-19 has plunged the world into an unprecedented crisis, in terms of both health outcomes and the economic impact of measures to manage these outcomes. It has led to widespread disruption, in domestic economic activity, in global travel and tourism, and in how we live our lives. As China starts to recover from the disease, the sheer scale of disruption is becoming apparent. China's GDP contracted by almost 7% in the first quarter, shrinking for the first time in more than 40 years of continuous growth. As the pandemic spreads to other parts of the world, a similar scale of disruption is looking likely. For example, the European Purchasing Managers Index has fallen to historic lows. US jobless claims have exceeded 22 million⁵. Overall, the International Monetary Fund now expects the global economy to contract by 3% this year (central estimate), worse than the 2009 financial crisis when growth fell to zero.

The policy response is two-stage. First, to ease financial conditions during the health emergency and limit any permanent economic damage from measures to contain the spread of infection. Second, to provide targeted support and stimulus to the economy as it recovers. The extent and nature of the second will depend on the success of the first.

Economic packages announced to-date are firmly in the first emergency response phase, focusing on easing conditions for cashflow-constrained consumers and businesses. The packages include a combination of monetary policy levers (e.g., lower interest rates, quantitative easing, and other measures to increase liquidity in the financial system), fiscal policy levers (e.g., tax reliefs, deferments, and subsidies), and government spending measures (e.g., wage guarantees, business grants, and direct cash transfers to consumers). The measures are designed to have immediate impact and are targeted particularly at small and medium enterprises with less capacity to weather the sharp and severe drop in economic activity.

However, governments are also starting to consider potential longer-term damage to the economy from the pandemic – e.g., business bankruptcies, job losses – and measures that may be required in the second economic recovery phase to boost aggregate demand. This provides an opportunity to direct resources, public and private, to support both economic recovery and energy transition. Without this, economic recovery is likely to entrench existing technologies and behaviours, potentially losing years in an already challenging time frame for achieving the goals of the Paris Agreement and increasing the economic and social cost of delayed/backloaded climate action.

Key criteria for stimulus that supports both economic recovery and energy transition are:

- i. having a material impact in increasing the productive capacity of the economy and stimulating wider economic activity (demand, investment, jobs);
- ii. starting to have an impact within a relatively short period (12-24 months);
- iii. being time-limited and project-specific, to incentivise new investments and/or bring forward planned investments (and not lead to permanently higher government deficits); and
- iv. being administratively easy to implement.

There are four broad categories of green stimulus that fit the criteria above.

- *Public investment programmes*, to stimulate economic activity in the near-term and enhance the capacity of the economy to grow in the longer-term, e.g., upgrading power infrastructure and making it smarter, developing hydrogen transportation and distribution infrastructure, public investment in close-to-market technologies to accelerate them down the cost curve.

⁵ Ten times higher than jobless claims during the worst four weeks in any previous US recession.

- *Fiscal incentives*, to stimulate specific clean energy investments, technologies, and products, against the backdrop of an overall challenging environment for business profitability and investment, e.g., through investment tax credits for renewables and other clean energy projects to incentivise investments now without immediate impact on public finances.⁶
- *Targeted business support* to the hardest-hit sectors of the economy, such as through public procurement, subsidies, cost sharing grants, and credit/loan guarantees, and concessional lending. And linking the withdrawal of emergency support and/or any new support measures to actions that make these businesses and sectors more resilient to and prepared for the energy transition, e.g., through greater business energy and materials efficiency and switching to cleaner fuels, distributed renewable generation.
- *Leveraging in private investment*, in strategic sectors, like energy, e.g., using the long-term strength of government balance sheets to reduce risks and capital costs for private investment in energy transition-critical infrastructure and technologies such as power, hydrogen, CCS, and advanced biofuels. Public-private partnerships around pilot/demonstration projects for low carbon technologies and fuels can accelerate their deployment. This could be applied to commercial scale and competitive green hydrogen projects, where renewable power generators and hydrogen producers invest in the pilot/demonstration facility, distributors and end users (such as vehicle manufacturers, ship owners, ports) commit to purchasing specified volumes over a specified time frame, and governments guarantee a minimum purchase price.

II. Proposals for supporting economic recovery and energy transition in the UK

1. Bring forward private sector investment in offshore wind

The UK offshore wind energy market is a significant success story, providing almost a tenth of the UK's electrical energy in just a decade, and at ever declining costs. Achieving the 2019 Conservative Manifesto commitment for 40GW of new offshore wind by 2030 will require three times as much capacity to be installed this decade than was installed in the last decade, at almost £50 billion in capital investment.⁷

Economic evidence indicates that renewable energy investments are attractive in both the short and the long run. In the short run, they create more new jobs, which in turn boosts spending, expands demand, and increases GDP. For example, it is estimated that government spending on renewable energy generates almost three times as many new full-time equivalent jobs compared to fossil fuel industries.⁸ These jobs are also less suited to offshoring. In the long run, renewable energy requires less labour for operation and maintenance.⁹ This frees up labour as the economy returns to capacity following the COVID19-induced recession. This more efficient use of labour combined with the fuel savings that renewables provide suggests that renewables are also able to offer higher long-run multipliers.¹⁰

⁶ Ex-post evaluations show that this was successfully done in the US to stimulate renewables investment following the 2009 Global Financial Crisis as part of the American Recovery and Reinvestment Act.

⁷ Aurora Energy Research, 2020

⁸ Garrett-Peltier, H., 2017. Green versus brown: Comparing the employment impacts of energy efficiency, renewable energy, and fossil fuels using an input-output model, *Economic Modelling* 61: 439-447.

⁹ Blyth, W., Gross, R., Speirs, J., Sorrell, S., Nicholls, J., Dorgan, A. and Hughes, N., 2014. Low Carbon Jobs: The Evidence for Net Job Creation from Policy Support for Energy Efficiency and Renewable Energy'. UK Energy Research Centre Report.

¹⁰ Hepburn, C., O'Callaghan, B., Stern, N., Stiglitz, J., and Zengel, D. (2020), Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change? *Oxford Review of Economic Policy* 36(S1), forthcoming.

The offshore wind industry is estimated to-date to have created 11,000 good quality regional jobs in the UK.¹¹ Bringing forward offshore wind investment could support jobs and demand in the near-term while driving down costs and increasing the economy's energy transition capacity in the longer-term. The Contracts-for-Difference (CfD) framework is effective for leveraging in private investment. It will need to be amended to make auctions more regular and appropriately sized, in order to frontload the 40GW goal and put UK supply chains in good stead to continue to deliver in the 2030s and beyond. The CfD framework (through the design of the CfD 'pot' structure) is also well-suited to support the development of the next generation of offshore wind technology¹², putting the UK in a strong position for future growth. The IEA predicts global offshore wind capacity could increase fifteen-fold to 2040, becoming a \$1 trillion industry over the next two decades.¹³ Through leveraging the expertise and innovation of today's UK offshore wind market – the largest in the world – UK industry could be well-positioned to lead globally.

2. Decarbonise industry, trucking and heating while creating thousands of jobs in industrial heartlands

Carbon Capture, Use, and Storage (CCUS) is essential to meet the UK's target to be net-zero emissions by 2050. It will be required for 'blue' hydrogen for home heating, industry, and transport at scale. CCUS will also be a key component of a future power system, providing low carbon dispatchable power and, with bioenergy, negative emissions power. And only CCUS can decarbonise those heavy industrial processes which rely on the unique ability of hydrocarbons to provide high temperatures, chemical reactions, or dense energy storage.

Not all countries will be able to deploy CO₂ storage, and few have as rich a storage base as the UK in the North Sea and the East Irish Sea.¹⁴ That richness of resource, when combined with existing academic and industry expertise, provides the UK with a competitive advantage in CCUS and an opportunity to deliver zero-carbon industrial clusters, and potential global export advantages in the future.

According to BEIS' Energy Innovation Needs Assessment, CCUS investments could plausibly support around £4 billion in GVA and nearly 50,000 jobs by 2050.¹⁵ Bringing forward these investments would help create jobs and growth, particularly in industrial heartlands in Scotland, Teesside, Humberside, and Merseyside.

3. Supporting the upstream oil and gas industry's transition

According to Oil and Gas UK, up to 30,000 North Sea jobs could be lost because of the oil price drop due to COVID19 – around 20% of all North Sea workers. Such job losses would have a significant impact not only on people and communities (especially in Scotland), but also on UK energy security, given the continued need for hydrocarbons as the UK transitions to net-zero. Consistent with the Government's objective to maximise economic recovery while supporting the sector's transition to net zero, the

¹¹ UK Offshore Wind Industry: Supply Chain Review, January 2019.

¹² For example, around turbine size, floating wind turbine technologies, and integration with other energy systems, such as the oil and gas sector and hydrogen production.

¹³ Offshore Wind Outlook, 2019, International Energy Agency

¹⁴ For example, Professor Stuart Hazeldine OBE - Professor of Geology and Carbon Storage at The University of Edinburgh, has said "*In geological terms the Central North Sea is as near to perfect as you will find anywhere in the world when it comes to offshore sub-surface storage of CO₂*": Building a Storage Hub in the Central North Sea, 2015.

¹⁵ Energy Innovation Needs Assessment, Carbon capture, utilisation, and storage sub-theme, Department for Business, Energy, and Industrial Strategy, October 2019.

Government could seek to maintain domestic energy supply in the current low oil price environment while transitioning towards a clean energy future by planning now for the reuse of critical infrastructure and redeployment of key personnel into clean energy production with similar characteristics of North Sea oil and gas production, such as hydrogen and CCUS. Both these objectives could also be secured through targeted business support to reduce the sector's emissions; for example, through carbon pricing, with revenue recycling, to support large-scale abatement (such as renewables-based electrification of existing oil and gas platforms) which would otherwise not be economic.

4. Close-to-market green technologies

Government support to commercialise close-to-market green technologies, such as floating offshore wind or advanced aviation biofuels, could deliver a more resilient economic recovery. These technologies could deliver breakthroughs over relatively short timeframes, subsequently crowding in private investment and leading to their earlier and at-scale deployment. Apart from enabling decarbonisation towards net-zero, it could also enhance UK's global leadership role in the development and delivery of those technologies in the future. This could be delivered through a targeted research and innovation programme, fiscal incentives such as investment tax credits, or by leveraging in private investment such as through public-private partnerships.

5. Measures to support build-up of EVs

Wide access to a reliable charging network will be critical to have more drivers choosing an electric vehicle (EV). Shell is already providing charging solutions for drivers at homes, workplaces, and a growing number of Shell forecourts. Bringing forward investments in electric vehicle infrastructure could create demand and jobs while also enabling the faster EV take-up. The Government's vision for an EV rapid charge point network for England announced on May 14 sets the direction. More detail on how the Rapid Charging Fund will operate and how industry can access funds to ensure commercial viability of network upgrades is needed to incentivise the necessary investment.

Other options for stimulating demand and supporting the transport sector to decarbonise include better coordinated purchase incentives and vehicle taxation, e.g., through reform of fuel duty and vehicle excise duty to support consumers in switching to EVs. Linking the level of taxation to the number of miles and weight driven per year would create a further mechanism to switch road transport to lower carbon modes of travel. A scrappage scheme to encourage uptake of EVs and to support car manufacturing in the UK could also be considered.

6. Support for private investment in nature

Natural capital investment for ecosystem resilience and regeneration, including restoration of carbon-rich habitats and climate-friendly agriculture, can deliver large economic multipliers, reasonably quickly, and shift the emissions trajectory towards net zero.¹⁶ Investments in natural capital – such as afforestation, expanding parkland, and enhancing rural ecosystems – also perform well in terms of speed of implementation, due to low worker training requirements and minimal planning and procurement requirements.

The March 2020 budget announced a forest “the size of Birmingham” across England, contributing to the wider UK target to plant 30,000 new hectares every year, as advised by the Committee on Climate

¹⁶ Hepburn, C., O’Callaghan, B., Stern, N., Stiglitz, J., and Zengel, D. (2020), Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change? *Oxford Review of Economic Policy* 36(S1), forthcoming.

Change. Bringing forward these investments will require the creation of new investment models for natural capital. For example, multi-investor funds that, with government intermediation and match-funding, invest in tree planting or peatland restoration. The investors could range from carbon investors interested in the offtake of carbon credits to insurance companies interested in flood prevention. Some of the £640 million for the Nature for Climate scheme, also announced in the 2020 Budget, could be used to leverage private investment, enabling the Government to reach its tree planting targets faster, or even exceed them.

ANNEX 3

Principles for a low-carbon, sustainable and net-zero aligned economic recovery post COVID-19 (Rain Newton-Smith)

This paper presents several principles and immediate to medium-term priority actions to help policy makers plan the COVID-19 recovery in a way that maximises the benefits and opportunities presented by clean technologies, improved efficiencies, and in-built resilience. CBI members view the COVID-19 recovery as a real opportunity to do things differently, by delivering the benefits of a low-carbon transition fairly around the country. Warmer, energy and water-efficient homes that are cheaper to run; cleaner air with more zero-emission vehicles that can be charged and fuelled easily around the country; hubs of industry capturing and storing CO₂, and increasing supplies of low-cost decarbonised electricity from nuclear power stations to new wind farms and even negative emissions from biomass with CCS, connected to a flexible grid. The 2020s remain a critical decade for delivering this vision that will get us on track to achieve net-zero emissions and with COP26, G7 and G20 taking place in 2021 with the UK at the helm, this is the moment to lead on the delivery of such a vision.

While the ideas set out below do not constitute a fully developed plan to meet net-zero emissions, the CBI highlighted a range of medium to long-term recommendations in the 2019 report *The low-carbon 2020s: a decade of delivery* and many of these remain highly relevant.¹⁷ The report contained a number of priorities to help deliver a coordinated cross-government strategy to deliver net-zero emissions. This remains a priority, and particularly ahead of COP26 next year, there is an urgent need to deliver a shared vision across government on how we will achieve net-zero emissions, including coordinated sector-specific roadmaps, underpinned by a positive environment for investment, regulation that prioritises net-zero, incorporating climate and environmental action into new trade policy, and a focus on delivering a just and fair transition.

Summary of principles

- Prioritise public spending and policy on low-carbon programmes that deliver short-term economic and social benefits and lay the foundations for a resilient, net-zero economy
- With the help of the private sector, deliver on existing fiscal commitments from the Budget to leverage investment and cut emissions
- Look beyond the fiscal remit to drive investment and stimulate a green recovery through smarter regulation and clear policy
- Build the foundations of a green economic recovery into plans to support companies recovering from the pandemic
- Coordinate a global response to the climate crisis

As the coronavirus pandemic continues to drastically impact societies around the world, governments are facing the twin challenge of restarting economies, and recovering from the impacts of the virus and economic shutdowns it has triggered. Tackling the direct health impacts of the pandemic remains a priority, but it is right to also consider the best way to recover from the crisis, learning from its lessons, and building a better future.

The pandemic has highlighted how dependent our society is on a sustainable relationship with our environment and natural world, and it is clear that we will have to do things differently if we are to avoid similar pandemics in the future. This lesson applies to the ongoing climate crisis. The global economic downturn has resulted in improvements to air quality and reductions in carbon emissions that bring the challenge of responding to climate change into sharp focus. Despite a fall in global emissions forecast for this year as a result of the pandemic,¹⁸ it is highly likely these will increase again as economies reopen, so the need to act urgently on climate change will remain just as important as before the outbreak of coronavirus. Former and current Bank of England governors Mark Carney and Andrew Bailey have jointly said that we have a “once-in-a-lifetime opportunity” to rebuild the economy and prepare for the shock of climate change.¹⁹ Crucially, acting on climate change can also be a tool for

¹⁷ <https://www.cbi.org.uk/media/3716/cbi-low-carbon-2020s-report-4-november-2019.pdf>

¹⁸ <https://www.iea.org/reports/global-energy-review-2020/global-energy-and-co2-emissions-in-2020>

¹⁹ <https://www.theguardian.com/commentisfree/2020/jun/05/world-climate-breakdown-pandemic#maincontent>

delivering economic recoveries. Investment in low-carbon technologies and infrastructure programmes can offer significant economic benefits from job opportunities to spending, while at the same time building clean and resilient economies that help us towards our climate goals.

In this context, the UK's target to achieve net-zero emissions by 2050 remains a vital objective. The fall in UK emissions resulting from our lockdown does not diminish the urgency of making progress towards net-zero, and this must remain a government priority as an economic renewal is executed. Crucially, the tools needed to achieve net-zero can also help the UK economy get back on its feet, and tackle challenges like unemployment, lagging productivity, and levelling-up regions.

Since the recession of 2008/09, major cost reductions have been achieved in low-carbon technologies, such as renewable power and batteries, and new technologies like hydrogen and carbon capture are now ready to be scaled up. Meanwhile, the pressing need to deliver a national energy efficiency programme, and the opportunity to transition industries and communities currently reliant on fossil fuels, means that a major employment opportunity presents itself at a time when many thousands will be seeking new jobs. As a result, any recovery programme must include the transition to net-zero emissions and climate resilience at its heart to ensure we build a better future with a clean economy that is resilient to future economic and environmental threats. Doing so also represents an opportunity to do things better, and it is important we plan our recovery around the future we want to achieve.

Businesses understand that any fiscal support from government needs to be rigorously targeted. This can best be done as part of a shared plan across government to deliver net-zero emissions and all its benefits. As it was before the pandemic, significant spending on infrastructure and innovation will need to come from the private sector. This will help deliver large-scale low-carbon infrastructure, alongside the investment needed to ensure flexibility of the power system.

This paper identifies the near-term employment and economic benefits that government can best support, highlights the government spending already committed that should be prioritised, and makes recommendations on how to best unleash the power of business to invest and deliver a clean and resilient future, starting now.

The CBI is calling upon the Government to:

1. Prioritise public spending and policy on low-carbon programmes that deliver short-term economic and social benefits and lay the foundations for a resilient, net-zero economy

Any plans to deploy public spending to help restart the economy and create jobs should include low-carbon programmes that have the potential to deliver quick economic and social benefits as part of the recovery. Many low-carbon investments can deliver quick payback, such as spending on energy efficiency, and it is possible to identify spending priorities that will deliver new employment opportunities that also contribute to building a resilient economy and accelerating progress towards net-zero emissions.

Now is the moment to deliver a national energy efficiency programme that is long overdue. This is an essential element of reaching net-zero emissions and is a 'no-regrets' solution as it helps reduce domestic and business energy use and enables deployment of much-needed low-carbon heat solutions like heat pumps. The social benefits of improved energy efficiency directly relate to the COVID-19 pandemic, as poor energy efficiency linked to fuel poverty contributes to respiratory health issues.

An energy efficiency programme would represent a major employment opportunity, providing much needed jobs across the UK as part of the economic recovery. Renovating buildings is labour-intensive, and frequently delivered by SMEs which dominate the energy efficiency market and are under threat during the pandemic (at the start of 2019 more than three quarters of the industry was made up of the self-employed and firms with fewer than 50 employees). The Energy Efficiency Industry Group (EEIG) has estimated that an energy efficiency programme could support over 150,000 jobs to 2030 spread across all regions of the UK.²⁰ A conservative estimate in the recent WWF/Vivid Economics report of

²⁰ Energy Efficiency Infrastructure Group, 2020

direct jobs in green building retrofits stands at 85,000 by 2030, which could increase by a further 7,000 if low-carbon heating and cooling installations are included. Some of these jobs could be made available for the large numbers of young people expected to be unemployed as a result of the coronavirus pandemic (an estimate of 600,000 has been made by the Resolution Foundation²¹). Government-backed training programmes, such as the CBI's proposal for a Future Skills Programme, could offer routes to work in growing low-carbon industries which would help reduce unemployment, improve productivity, and support the transition to net-zero emissions.

Investment in infrastructure that reduces carbon emissions should also be prioritised, including changes which support active travel. A rolling programme of rail electrification should be implemented, and support provided for other zero-emission rail technologies, such as battery and hydrogen fuel-cell powered trains.

Targeted government action can also support the restart of the economy, by encouraging increased consumer and business spending on products and commercial projects that will help reduce emissions and build domestic supply chains. The uptake of electric vehicles, domestic heat pumps and battery storage are good examples of where increased domestic and commercial spending, encouraged by government intervention, can support labour-intensive manufacture, installation, and servicing.

Priority actions:

- Of the £9.2bn spending on energy efficiency promised in the Conservative manifesto, the £3.8bn allocated for a Social Housing Decarbonisation Fund should be prioritised to deliver immediate employment opportunities from projects delivered by local councils and housing associations that are able to progress quickly. For example, an initial spend of £300m over the next two years could leverage an additional £300m from Registered Social Landlords²². This spending would support the goal for all social housing to achieve EPC rating C by 2030 and help build the capabilities of the energy efficiency sector, which will be vital for reaching the Government's target of improving the EPC rating of all homes to C or higher by 2035. Taking forward plans for the £2.5bn funding of a new Home Upgrade Grants scheme focussed on those in fuel poverty would also help in delivering energy efficiency improvements and low-carbon heating to those most in need, whilst supporting jobs and growing the low-carbon heat sector.
- The Government should also focus on programmes of energy efficiency improvements within the schools that remain closed until the autumn, using the opportunity created by empty buildings to carry out this disruptive work. Some of the £2.9bn allocated for the Public Sector Decarbonisation Scheme to improve energy efficiency in public buildings could achieve immediate impact by funding existing energy efficiency plans through tried and tested delivery architecture. With a phased return to schooling likely, there is a clear opportunity to target buildings that will be empty until the autumn, delivering immediate employment over the summer months. This is also an opportunity to save some of the £3.4bn spent annually by the public sector on energy.²³
- Bring forward the two-year £100 million Clean Heat Grant scheme currently being consulted on to start this March 2021 (rather than March 2022) and operate in addition to the Renewable Heat Incentive. This will help build the market for heat pumps, supporting jobs during the recovery and accelerate progress towards the long-term challenge of heat decarbonisation. The early introduction would also create an opportunity to support projects that would help develop the low-carbon heat industry.

²¹ Resolution Foundation, Class of 2020, 2020

<https://www.resolutionfoundation.org/app/uploads/2020/05/Class-of-2020.pdf>

²² Energy Efficiency Infrastructure Group, 2020

²³ Powering Britain's public sector, Centrica Business Solutions

https://www.centrica.com/media/3662/powering_britains_public_sector_web_final.pdf

- As government looks to develop a new skills offer it should prioritise reducing short-term unemployment while laying the foundations for more radical retraining and reskilling within high demand areas, including the low-carbon economy. A Future Skills Programme is needed to support job search, training and reskilling over the immediate period with the goal of keeping people engaged in the labour market post Job Retention Scheme. This fixed programme should cover promoting the upskilling and retraining within specific areas of the economy in future demand including jobs required to achieve net-zero emissions.

2. Deliver on existing fiscal commitments from the Budget to leverage investment and cut emissions

The Government has already committed an unprecedented amount of fiscal support to businesses and society throughout the COVID-19 pandemic so that the UK's economy can be protected. We therefore anticipate that government finances will be under considerable pressure in the coming years, meaning that previously committed spend might be reviewed.

The private sector remains committed to investing for the future and will deliver the majority of the long-term investment required to meet the net-zero target. However, there is still an important role for previously announced fiscal measures to help build a clean and resilient economy, and crucially help unlock business investment in technologies where the UK can be world leaders.

Renewable and nuclear power, electric vehicle manufacturing and infrastructure, CCUS and hydrogen are all technologies where government spending can stimulate private sector innovation and investment. As the economic recovery is planned, accelerating investment under long-term regulatory frameworks can help deliver cost-effective anticipatory investment ahead of future consumer demand (such as grid investment to support electric vehicle and heat pump uptake). In this context, the Government should accelerate the development of low and zero-carbon industrial clusters in targeted regions around the UK. The recent government announcement of intent to deliver high-powered charging points at all motorway service areas by 2023, backed by the £500m of funding announced at the Spring Budget this year, is a welcome development that will support business and consumer confidence. Meanwhile, long-term and predictable market mechanisms should be maintained in order to enhance UK leadership in these sectors that are major employers with significant growth opportunities that are also crucial for achieving net-zero emissions.

Priority actions:

- Build on the success of the Contract for Difference auctioning programme in delivering low-cost renewable power generation such as offshore and onshore wind and solar. The success of these auctions in driving down the costs of renewables means that they will not add to constrained resources. The next auction round taking place in 2021 must go ahead with regular auctions every two years thereafter. Delivering this ambitious programme will be central to a successful clean and resilient recovery, including the Government's ambition to increase offshore wind capacity to 40GW by 2030, which will help provide supplies of affordable low-carbon electricity. The opportunity for job creation is also significant, with offshore wind alone capable of supporting 28,000 jobs according to government estimates
- To support new vehicle sales, all pre-existing incentives for low-emissions car purchases must remain in place to build consumer confidence and support new vehicle sales. Maintaining the Plug-in Car and Van Grants would motivate customers and businesses alike to purchase low-carbon vehicles. This would contribute to net-zero progress, help improve air quality and trigger additional investment associated with charging infrastructure. This type of incentive from the Government, as part of a wider low-carbon mobility strategy signals the UK's intent to develop markets for zero emissions vehicles, which gives certainty to the private sector investing in this technology. Government should also look at scaling up support for investment in on-street charging infrastructure in those localities where the market will not deliver so as to support a widespread and accessible charging network across the country. Such investment would help to support an economic recovery and support many new jobs in this growing low-carbon sector,

addressing pressures on employment whilst supporting 'no regrets' investment needed for net-zero.

- Carbon capture, utilisation and storage (CCUS) technology has a critical role to play in the UK's decarbonisation journey, especially within carbon-intensive sectors such as manufacturing and oil and gas. Delivering on the £800m CCS Infrastructure Fund announced at the Budget would boost significant short-term regional growth in areas of the country where these sectors are based, developing low-carbon and zero-carbon industrial clusters, bringing employment opportunities (including high-skilled jobs) and importantly, ensuring long-term certainty to sectors, which as a result of COVID-19 are facing severe economic challenges. The UK's oil & gas sector will be integral to the net-zero transition, and the current impact of the pandemic, including the steep fall in oil prices puts this at risk. With the cost of CCUS infrastructure substantially high per asset, delivering the CCS Infrastructure Fund will ensure these projects can still progress and attract global investors. Confirming and implementing financial support mechanisms to facilitate carbon capture in power generation, industry and 'blue' hydrogen production, together with the transport and storage of CO₂, is critical to facilitating the development of this industry.
- Heat decarbonisation remains a key topic where rapid progress and leadership is required. Previously announced support mechanisms must now be accelerated, in order to create investor confidence in the delivery programme that is required. In addition to the £100m Clean Heat Grant Scheme, which we recommend is accelerated, other prior announcements that must now be delivered include the Green Gas Support Scheme, the £270m Green Heat Network Fund and the previously committed £315m Industrial Energy Transformation Fund, which will act as a key driver for industrial productivity and competitiveness. The CBI has established a Heat Policy Commission to provide ongoing support and challenge to government in this vital area, which will report during the summer.
- Carbon pricing remains a crucial catalyst to continue incentivising cost-effective abatement of greenhouse gas emissions. As the UK transitions out of the European Union, it will remain critical that the UK's new Emissions Trading Scheme (UK ETS) is up and running by January 2021 ensuring a smooth exit, and following the 6th Carbon Budget advice from the Committee on Climate Change due in December 2020, any changes to the scheme whether related to the emission cap or sectors included within scope should be implemented by at least January 2023. When developing the UK ETS, government must ensure those sectors negatively impacted by pricing carbon are protected, such as energy intensive industries which will still require compensation and a level of free allowances, to protect competition and mitigate the risk of carbon leakage. Every effort should still be made to link the UK ETS with the EU ETS.

3. Look beyond the fiscal remit to drive investment and stimulate a green recovery through smarter regulation and clear policy

In the months to come, policy makers will be tasked with keeping the UK's finances in check having undertaken unprecedented measures to mitigate against the shock to the economy. Therefore, it will be critical for any green recovery to balance the need for spending with an approach that alleviates pressures on public finances. As before the health crisis, this must be a collective effort between government, business, and civil society to deliver low-carbon solutions right across the country.

In addition to confirming and building on the commitments made in the Budget, the Government has an opportunity to signal its long-term intent through reviewing barriers to delivery and implementing developments to policy frameworks, regulation, and planning policies. Not only do these changes cost comparatively less to administer but act as key enablers for the development of the technologies required for the net-zero transition, such as the roll-out of electric vehicles and low carbon heating options. For instance, it's positive to see the range of temporary measures introduced by the Government to relieve pressures from the planning system but this could go one step further by accelerating the planning process for projects that are ready to go and waiting in the wings for

approval.²⁴ Early progress on ‘shovel ready’ projects will be key to the recovery not only in providing jobs but in supporting the interconnected supply chains across infrastructure delivery.

Building on government’s progress to date must not stop there, it should include making headway on those policy consultations already in the pipeline as well as streamlining existing regulations to support the net-zero transition. One such example is the way that policy costs are currently charged between electricity and gas, which acts as a barrier to heat pump deployment as advocated for in the Government’s recent Future Homes Standard consultation. This is also an opportunity to make further progress on developing a flexible energy system, including local flexibility markets. This will require positive decisions on energy generation and grid capacity post-2024. The drop in energy consumption resulting from the pandemic has highlighted the need to accelerate the development of system flexibility to support increased renewables, and variable demand. In addition, there is a clear link between water and energy use; government should therefore go further in implementing a common standard for homes of 110 litres per person per day and introduce mandatory water labelling for all water using products and appliances.

Getting the policy and regulation environment right will also be vital for unlocking private capital, both domestically and internationally. With capital searching for a return many investors are actively looking for financing opportunities in the low-carbon economy and progressive policy will be key for this finding a home in the UK. However, any recovery must not rely on private capital alone, underpinning the success of any investment must be strong public-private partnerships, including local and regional authorities, that together embed low-carbon practices at the core of rebuilding the economy.

It would be amiss for any policy and regulatory change to ignore the unprecedented shifts seen in the way we live and do business as a result of the crisis. These include amongst others, digital transformation, the adoption of flexible working patterns and changes to travel. Whilst it is important to note that these trends were already on the horizon, if harnessed in the right way this acceleration of change stands to transform the UK’s productivity as well as its response to climate change. However, to do so effectively requires strong partnerships between government and business to develop policy that is not only fit for purpose but promotes the innovation we have seen to date.

Priority actions:

- To help decarbonise UK road transport, government must respond to the phase out of the internal combustion engine consultation by the end of 2020 providing a revised plan for how it will support the transition to any new phase out date. Delivering the right mix of driver incentives, charging and fuelling infrastructure, and support for UK manufacturing will be need for achieving a successful transition. Government should also include a commitment to conduct a review into the taxation of road fuels to support the transition to low-carbon transport.
- Government must set out the timeline that shows how the Future Homes Standard is delivered by 2025. This should be ambitious, clear and leave no part of the housing sector and construction industry behind. Clarity around the programme to introduce changes to the regulatory framework and any associated transitional arrangements would provide more certainty, allowing key investment decisions to be made and helping businesses plan effectively and be clear on the expectations on them to deliver over the next five years. A focus on the training requirements for low-carbon skills should also take into account the needs of homebuilders delivering to these new standards.
- The Energy White Paper and National Infrastructure Strategy should be published as soon as possible and used to give industry confidence to invest by setting out a vision the development of low-carbon infrastructure. These publications should take into account the impact of the pandemic and the priorities for delivering a clean and resilient recovery. Testing programmes and creation of market frameworks to support innovation and develop new technologies, such as hydrogen, should also be accelerated, and these publications can provide pathways for such innovation and development.

²⁴ CBI case studies

- This paper has provided some ideas on stimulating the market for low-carbon heat. To accelerate this further, the planned roadmap for decarbonising heat in buildings (the Heat and Buildings Strategy), should be published by the autumn. This should support the roll-out of heat pump solutions (including hybrid systems), heat network investment, and hydrogen-based solutions, which will all support investment and job creation. This will give clarity to the industry and ensure that we make progress with the major infrastructure challenge of heat decarbonisation, which is critical for achieving net-zero emissions, and will create major employment and industrial opportunities.

4. Build the foundations of a green economic recovery into plans to support companies recovering from the pandemic

The transition to a low-carbon economy has been predicated on significant investment taking place across the private sector. This remains the case, but the pandemic will leave companies with high levels of unanticipated debt that could risk much needed investment across the economy as companies are forced to focus on debt-repayments. To respond, we need bold ambition from government and the financial sector to enable indebted businesses to become more sustainable, resilient, and able to invest in our net-zero emissions future.

The UK has already developed a world-leading sustainable finance industry, with products, metrics and best practice that could contribute to this effort. Principles of conditionality could be used to ensure that capital allocated from any new government-backed equity products support best practice in corporate behaviour, including investment plans that are consistent with the net-zero target, and operating in more sustainable ways that promote a circular economy.

The economic rebuild from the pandemic creates a unique opportunity to embed the principles of stewardship, including environmental, sustainability and governance (ESG) goals into business practices that if established now, could help deliver a successful recovery that leads to a global economic system that favours investment and business models that contribute to our climate goals, supports communities and is more resilient to external threats. As highlighted by the Committee on Climate Change's recent letter on building a resilient recovery,²⁵ private sector capital can help drive the recovery as part of a longer-term response to climate change. Investors are increasingly looking for opportunities to provide capital that will help achieve the Paris agreement goals, satisfy increasing ESG demand and take advantage of the returns on offer from green investment. Progress on green finance also needs to be made, such as the Financial Stability Board's Task Force on Climate-Related Disclosures (TCFD) recommendations, which the CBI believes should form the basis of voluntary disclosure requirements for all firms across the UK.

Priority actions:

- As government and financial institutions plan a response to this challenge of avoiding economic stagnation resulting from high debt levels, net-zero principles could be built into any elements of conditionality, such as may be found in options for transferring debt to equity. This could involve conditions that support companies' sustainability and climate goals that support the UK's progress to net-zero.
- Government should ensure that the public procurement process is used to prioritise and enable spending on products and services that support domestic resilience and help reduce emissions, whilst also supporting an ambitious skills agenda. With total government procurement expenditure of roughly £300bn per year, there is significant opportunity to strengthen UK manufacturing and supply chains, including opportunities for apprenticeships in new growth sectors, whilst embedding resilience and reducing carbon emissions. The vital role of local authorities in enabling sustainable and economically active places should be recognised and government must prioritise and support local authority prioritisation for a green economic recovery.

²⁵ <https://www.theccc.org.uk/publication/letter-building-a-resilient-recovery-from-the-covid-19-crisis-to-prime-minister-boris-johnson/>

- As short-term decisions are made to support specific sectors and businesses that are hard-hit by the pandemic, government should consider how any financial aid could be used to help tackle the long-term transitions needing to take place. This encompasses the need for new skills and retraining as part of new active labour market policies, the avoidance of creating stranded assets, and helping businesses that are carbon-intensive develop pathways that will enable them to become low-carbon in the future. As an example, the importance of developing the Sustainable Aviation Fuels industry is a priority area for helping to tackle this sector's emissions and creating UK industrial capabilities and competitiveness in new technologies. The sector's recently published roadmap highlighted that £500m of matched public/private funding over five years (totalling £1bn) could support a flagship first-of-a-kind commercial plant across the UK.

5. Coordinate a global response to the climate crisis

The COVID-19 pandemic has demonstrated just how interconnected our economies are, whether through supply chains or demand for goods and services and has made clear the importance of acting together as an international community in the face of global threats. Coordinated international action will be critical to building the resilience needed to respond to such shocks in the future. The relationship between pandemics and climate change has been well documented since the beginning of the crisis, and the lessons to be learned are numerous.

As the UK hosts COP26 in 2021 in partnership with Italy, and has the presidencies of the G7 (UK) and G20 (Italy), we have an opportunity to lead the international response to the ongoing climate crisis and focus multilateral efforts to address that threat while at the same time recovering from the pandemic. This can be achieved through international policy frameworks, which the UK will be seeking to shape as it develops a post-Brexit strategy for international trade and diplomacy. Our future relationship with the European Union will also help shape our combined long-term efforts to reach net-zero emissions and restore the natural environment.

Crucially, we first need to act at home to get the UK on track to reaching our net-zero target. This starts with government policy providing the signals to local and global investors alike that the UK is a world leader in tackling climate change. We need an action plan for how we intend to reach net-zero by 2050 and we need sector roadmaps to aid the low-carbon journey across every industry.

Priority actions:

- Now that dates for COP26 have been confirmed, government should prioritise working with businesses to build their involvement into plans for the summit. Early engagement will give businesses a clear understanding of how to help plan their positive action ahead of COP, such as setting science-based net-zero targets and joining climate initiatives.
- To support global progress towards developing low-carbon economies, the Government can use its presidency of COP26 to commence and engage in clean investment dialogues involving key stakeholders, such as private sector developers, investors' funders, finance ministries and development banks. This will help countries involve local and international stakeholders with investment experience as part of their policy development processes at an early stage to attract private capital at scale and on reasonable terms.
- The Government should increase efforts to develop international policy frameworks that support emissions reduction across connected regions and sectors. For example, coordinated action on aviation emissions through the carbon offsetting and reduction scheme for international aviation, continued development of carbon pricing and international trade regimes that promote emissions reduction and circular economies. We must also work to ensure that the EU Green Deal is introduced and deployed fairly and consistently as it will have wider reaching impacts beyond the EU and its states, including the UK.