NEW ECONOMICS FOUNDATION

RECESSION READY

A GREEN PLAN TO BEAT TOMORROW'S DOWNTURN

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CONTENTS

EXECUTIVE SUMMARY

Failure to respond to the last recession by scaling up investment in a socially just way to tackle climate breakdown was a missed opportunity. Austerity saw vital public services and investment cut back after 2010, prolonging economic pain, increasing inequality and suppressing average living standards by up to £3,600 per year. But worse still, failure by governments to fund a cleaner, zero-carbon economy after the recession, has left a permanent scar on our planet. Not enough investment was brought forward in the crucial months after the recession.

Green public investment was cut back after 2010, while money was found for tax cuts that benefited the richest households more than anyone else. New analysis for this report shows that had £10.5bn – only a third of the funds used to pay for the coalition government's cuts to income tax and corporation tax between 2010 and 2013 – been used instead to fund a mass home insulation programme, residential emissions would have been reduced by 30% by 2018. This is about a third of current emissions from the UK's power sector.

Ten years on, the government is now faced with two considerable policy challenges. The first is the alarming lack of progress in reducing UK carbon emissions to meet the UK's climate goals. As a global community, we now have just over a decade to limit global temperature rises to a maximum of 1.5°C above 1990 levels, beyond which we risk crossing 'tipping points' that could lead to catastrophic and potentially irreversible damages. The economy is thought to be behind on 17 of its 24 key indicators of progress towards emissions targets; short-term carbon budgets have largely been met due to temporary events outside of domestic policy control.

The second policy challenge is the current vulnerability of the UK economy to the next recession and the potential powerlessness of monetary policymakers to aid a recovery. The likelihood of another recession is now higher than at any time since 2007 – the most recent forecasts claim there is a 30%–40% chance of a recession within the next few months. Perhaps more worrying still is that policymakers are desperately ill-equipped to repel the effects of recession. The depth of the 2008 financial crisis, and the damage caused by austerity since then, has meant that monetary policy has been unable to lift interest rates above their effective lower bound – a point beyond which further reductions have little or no positive effect on spending in the economy. Meanwhile, although the so-called automatic stabilisers – social security payments and progressive tax – would still provide a substantial cushion during the next recession, a decade of welfare cuts and freezes has left the UK safety net significantly less effective than the one in 2008. If left unreformed, the poorest will be more vulnerable to the effects of recession than ever before.

These two separate challenges are becoming increasingly well recognised, not only among the more heterodox economists who first identified them, but among mainstream economists and policymakers as well. More than 10 years on from the last UK recession, this report seeks to echo the argument made by the New Economics Foundation (NEF) and the Green New Deal Group more than a decade ago: that both challenges demand a single, common solution. The policy response to the next recession should contain within it the **largest green stimulus in zero-carbon infrastructure that is feasibly possible.**

Based on an analysis of past recessions and projects for future downturns, this report identifies the key criteria – such as with regard to the length of required lead-in time, the ability to enable future green investment, and the size of impact on economy-wide spending, among others – that should be used to build projects for an effective green stimulus package. We then use these criteria to assess the future pipeline of green infrastructure projects in the UK, which are required to meet climate targets on time. Based on this analysis we recommend priority areas that policymakers should target for an expansion of green infrastructure during recession.

To illustrate the macroeconomic shape and effects of the type of green stimulus we propose,

TABLE 0.1: ILLUSTRATIVE, 3–4-YEAR GREEN STIMULUS FOR DIFFERENT TYPES OF RECESSIONS DURING THE EARLY 2020s

Figures % of level GDP following a recession unless otherwise stated and cumulative over 3–4 years

Indicative Size of Shock (% pre-recession GDP)	Time Period	Home Insulation	EVs and Charging Network	Flood and Drought Defences	Renewable Energy	Energy Network	Walking, Cycling, Bus Infrastructure	Skills and R&D	Tree Planting	Heat Pumps	Total Size of Stimulus
8	Next 1–24 months	0.5	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.1	2
16		0.6	0.4	0.4	0.4	0.5	0.3	0.2	0.1	0.1	3
8	Next 2–5 years	0.4	0.3	0.3	0.4	0.3	0.1	0.1	0.2	0.4	2.5
16		0.7	0.4	0.4	0.5	0.6	0.3	0.2	0.2	0.7	4

we also conduct a high-level feasibility analysis across each of our priority investment areas to set out the indicative fiscal stimuli that could be used in response to either a moderate or a large recession during the first half of the 2020s. Table 0.1 summarises the possible size and composition of these green stimulus packages.

We also model the effect that an overall green stimulus might have on UK public borrowing, debt, and financing costs. In addition to the green infrastructure spending, these stimuli would also need to contain a suite of other discretionary measures, such as increases in unemployment benefits and cuts to consumption taxes. Our analysis shows that debt would be even *higher* as a proportion of GDP without a green stimulus package, partly because of lower GDP and partly because of higher borrowing due to higher welfare costs and lower tax receipts. Despite a green stimulus resulting in rising debt, the peak in overall debt financing costs would likely be lower than that seen during recessions in the late 1980s and early 1990s. While annual public sector borrowing would also rise, it is likely to remain well within the bounds of recent historical precedent for recessions. By any sensible assessment, therefore, there is clearly enough scope to responsibly finance a green stimulus during recession through temporary public borrowing. If required, longer-term debt and borrowing could also be stabilised after four to five years, in part through progressive tax rises.

Finally, we discuss the institutional reforms that will be necessary to make effective fiscal and monetary coordination possible for the long term, and particularly to support long-term public and private green finance – whether in or out of a recession. We set out the shape of fundamental reforms to the UK's macroeconomic policy frameworks, including a transformative new agenda for the UK's fiscal rules, monetary policy, and macro-prudential policy – as well as the associated institutional assignments between the Treasury and the Bank of England. In doing so, we signpost the priorities for macroeconomic policy research concerned with supporting the path to a future sustainable economy.

Outside of a recession, our principal recommendation for government is to increase green investment, across both the public and private sector, as fast as is technologically possible. Second to this, we propose the government prioritises removing present day barriers to future expansions in green investment. A critical, intermediate objective in the next few years is to create as many 'shovel-ready', green infrastructure projects as possible, since the number of fast-paced investment opportunities is a common limiting factor to effective infrastructure stimulus. These include intensifying the necessary research and development for future efficiencies and closing the UK's low-carbon skills gap, for example by increasing the skills capacity to retrofit heat pumps across residential properties at scale.

The UK needs a Green New Deal that goes far beyond the country's strategy to manage economic downturn. But the nature of our response to a recession could ultimately prove the difference between whether progress towards crucial climate targets is either derailed or realised. Recovery from a recession can no longer be thought about in terms of returning to a status quo. The policy response must be used to reprogram the nature, direction, and purpose of future supply and demand, as well as its level and growth rate. The responses to a recession need to become springboards to a different, sustainable economic future.

1. THE UK'S CLIMATE IMPERATIVE

The recent report by the United Nations Intergovernmental Panel on Climate Change (IPCC) added to the overwhelming weight of evidence on the risks posed by climate change. We now have just over a decade to limit global temperature rises to a maximum of 1.5°C, beyond which we risk crossing tipping points that could lead to catastrophic and potentially irreversible damage.[1] Warming of just half a degree beyond this threshold will most certainly increase the number and severity of droughts, floods, tropical cyclones, and heatwaves, potentially increasing the costs of global damage by $54 trillion.[2] The devastating effects of global heating could send millions into poverty by threatening health systems, food security, water supplies, and economic livelihoods.

All countries must play their part both to reduce emissions and adapt to the unavoidable impacts of climate change. The Paris Agreement requires all signatories to urgently act to transform their economies to a sustainable 1.5°C pathway.

1.1 THE CURRENT UK POLICY RESPONSE

Earlier this year, the government adopted a target of net-zero emissions by 2050 as recommended by its statutory climate advisors, the Committee on Climate Change (CCC).[3] However, this target is unlikely to be ambitious enough. Recent research suggests that 'to meet its Paris obligations, the UK must achieve zero-carbon energy by around 2035' – a 'real zero' based on actual emissions reduction rather than 'net zero' that relies on unproven 'negative emissions technologies' to remove some of the produced emissions from the environment.[4] Other studies have suggested that the UK should net by 2030 or earlier, with a maximum of 5% emission addressed through negative emissions.[5]

Despite climate commitments, when it comes to concrete action the government's track record on fiscal policy and climate change is found wanting.[6] Out of 25 policy actions recommended by the CCC, only one has been delivered in full, with 10 actions not showing even partial progress, putting the policies off track for the fourth (2023–2027) and fifth (2028–2032) carbon budgets. Out of 24 underlying indicators (such as improvements to building insulation) only seven were on track in 2018, including only two outside the energy and power sectors.[7]

In fact, the previous 2013–2017 carbon budget (a framework for monitoring emission targets over specified time-period) was met largely for reasons outside of policy control. First, accounting revisions of the UK's share of the EU Emissions Trading System (ETS) cap; second, anaemic economic growth. Had the 2008 financial crisis not occurred, on the otherwise projected path of economic growth the UK would have significantly missed the budget.[8]

Outside of these issues, the progress made over this period was mostly due to reducing emissions in the energy sector, primarily from coal (See Figure 1.1). But this 'unanticipated over-achievement' has covered up failures in cutting emissions in other sectors; notably emissions for surface transport and residential property have increased.

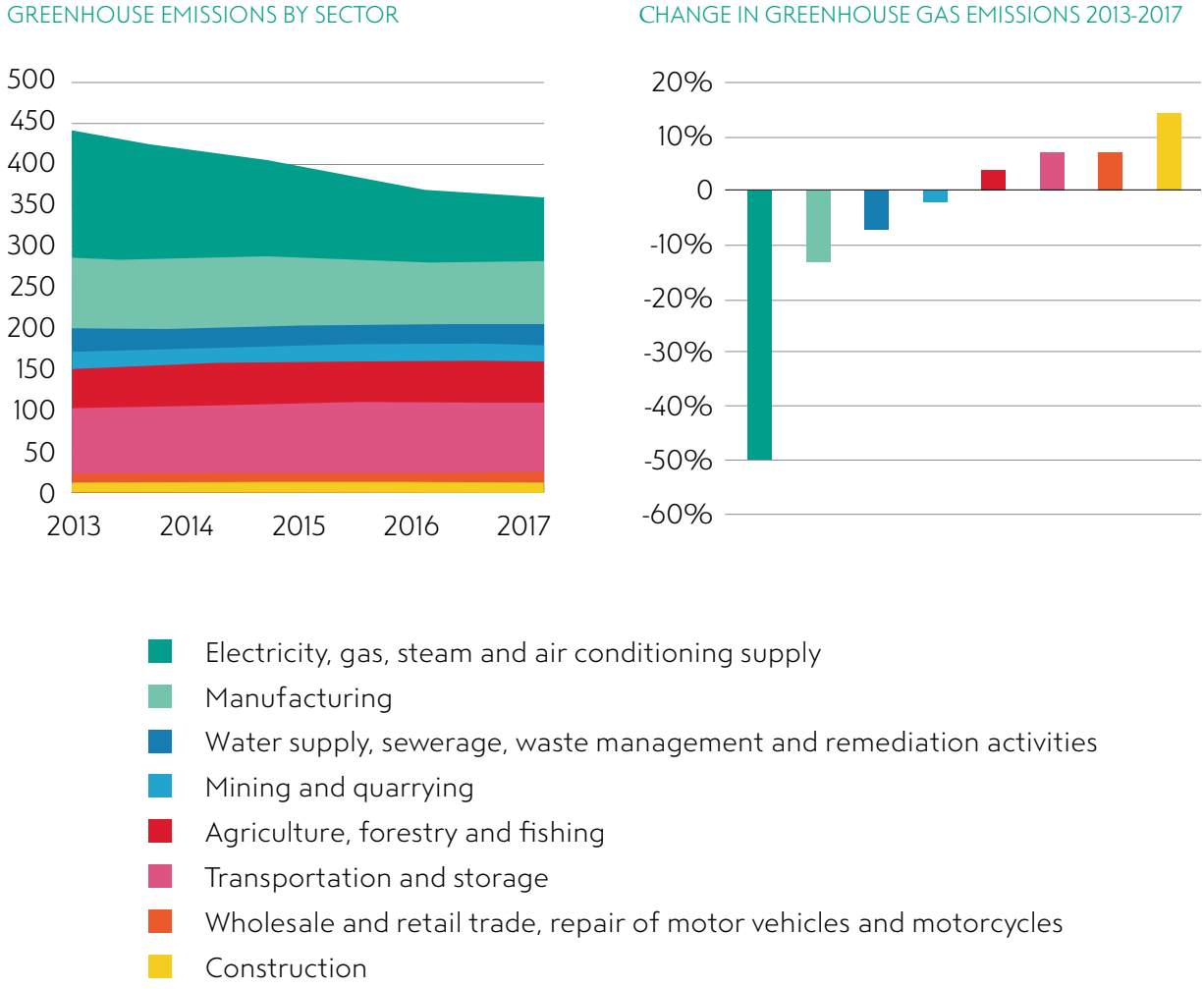
1.2 THE CASE FOR FURTHER PUBLIC SECTOR INTERVENTION

To reach current climate goals, which are significantly less ambitious than the demands of many climate campaigners and may need to be brought forward, the UK will need a radical overhaul of the economy. We will need to achieve transformation in every resource- and energy-intensive sector of the economy, from power generation to heat, construction, the manufacturing industry, and agriculture. Significant changes need to be made to our institutional set-up and a substantial increase in investment is required for a net-zero transition, as current levels of investment expenditure are 'much too low'.[9]

This investment will have to be considerable and will require the largest peacetime mobilisation of resources in the country's history.[10,11] NEF has put forward a variety of financial reforms aimed at the private sector to steer financial flows towards sustainable activities and away from carbon-

FIGURE 1.1: FALL IN UK GREENHOUSE GAS (GHG) EMISSIONS DOMINATED BY THE ENERGY SECTOR AND THE PHASING OUT OF COAL WHILE EMISSIONS FROM TRANSPORT AND RESIDENTIAL INCREASE

GHG IN MILLIONS OF TONS, 2013–2017; CHANGE IN GHG EMISSIONS ACROSS SECTORS IN PERCENTAGE, 2013–2017



Source: Eurostat 2019

intensive ones.[12] As important as these measures are, however, direct government investment is vital and cannot be intermediated through the private sector alone.

Nothing on the scale and speed of required investment has ever been achieved before without direct financial support from the state. As research at the Breakthrough Institute has shown, the five most successful deliberate reductions in carbon – although modest by comparison to what needs to be achieved – all came off the back of public sector-led governance and investment.[13] In the UK, the CCC has also acknowledged explicitly that public subsidies for private markets and price signalling alone will not be enough,[14] while the Treasury has reportedly acknowledged that the CCC's new targets would not be credible without plans for 'increased government spending'.[15]

Another important reason for government investment is fairness. Social licence and public support are critical for a transition at pace and depth. Alongside urgency, social and economic fairness must be a guiding principle of climate transition.[16] A purely private finance or partially

subsidised approach to the energy system transition would still mean that the ownership and income from new energy assets would most likely fall to the richest in society (i.e., shareholders of big energy companies). This would most likely exacerbate inequality and have important distributional consequences.

Investment will be needed not just in places where private markets (however guided) can make use of the profit motive of firms alone. Funds will also need to flow into projects and investments that yield the highest social returns for people and communities, sometimes in the absence of direct commercial interests. Without government investment and policy support we will not have a just transition. The workers, communities, and local places whose livelihoods are in some way dependent on carbon-intensive activities or the fossil fuel industry could be left stranded by a poorly managed transition.[17] This means supporting jobs, economic security, and social wellbeing in places and industries that could be neglected by the UK's transition to a low-carbon economy.[18]

Moreover, a low-carbon transition will require new technologies. The government also has a key role in creating new markets and proactively shaping existing ones. The public sector can take on the early risks, shift market expectations, and boost the private sector's willingness to invest. Breakthrough technological advancements are often reached through public subsidies and, more importantly, through direct government investment[19] – the Internet being just one example.[20] Direct public investment can help unlock a virtuous feedback loop with more funding and innovation, lowering the costs through network and economy of scale effects. The expanding opportunities for profitable investment and increased expectation of future market size in turn attract still more efforts and funding, fuelling clean growth.[21]

Finally, public investment in a low-carbon transition, besides addressing market failures, has a strong case on purely economic grounds. Investment will not only unlock vital energy and infrastructure assets, it will also create millions of new green jobs and help raise living standards across the board. It will spur new low-carbon business models, spearhead economies of scale, and prompt a variety of environmentally friendly feedback loops and spill-over effects which are all vital to a green transition.[22] Above all, the long-term benefits of green public investment will outweigh the upfront financial costs, while a lack of action now will only store up much greater problems for the government later.[23] Taking action on climate change sooner will be cheaper than the dramatic array of different measures that will become necessary later if climate change is left unabated.[24, 25]

2. UNDERSTANDING RECESSIONS AND THE CASE FOR A FISCAL POLICY RESPONSE

A key concern for mainstream macroeconomic policy is managing the so-called business cycle: fluctuations in the overall output of an economy between expansion and contraction. The way societies choose to avert, mitigate and adapt to these cycles – and especially the effects of recessions – is of vital importance for living standards and inequality over both the short and medium term. Mismanagement of the business cycle leads to deeper pain and weaker recoveries, with the poorest regions and households invariably among the worst affected.[26] For the UK, however, there is a dual cause for concern. Not only are recessionary threats for the UK mounting, but policymakers have rarely been more poorly equipped to deal with the consequences of the next downturn.

Improving the UK's readiness for a recession should be an immediate strategic priority for policymakers over the coming months. In addition, we argue that so-called discretionary fiscal policy – deliberate changes to government expenditure or tax receipts – will need to play a far larger role in steadying the economy in the future than in it has in the recent past.

2.1 THE UK'S RECESSIONARY RISKS ARE INCREASING

Whether at home or abroad, there is currently no shortage of recessionary dangers on the horizon. Technically, a recession is commonly defined as two consecutive quarters in a year of contraction in gross income. But more broadly, a recession describes a period of declining economic activity. Usually due to some sort of shock, firms and households lose the confidence or the capacity to maintain their spending and investment. Firms respond by cutting back on their costs – namely jobs and investment, while households may cut back on consumption – often preferring to save or pay down debts. The decline in spending and investment in turn leads to a fall in wages, employment, and spending power in the economy, leading to even further reduced spending and further cutbacks by firms and households.

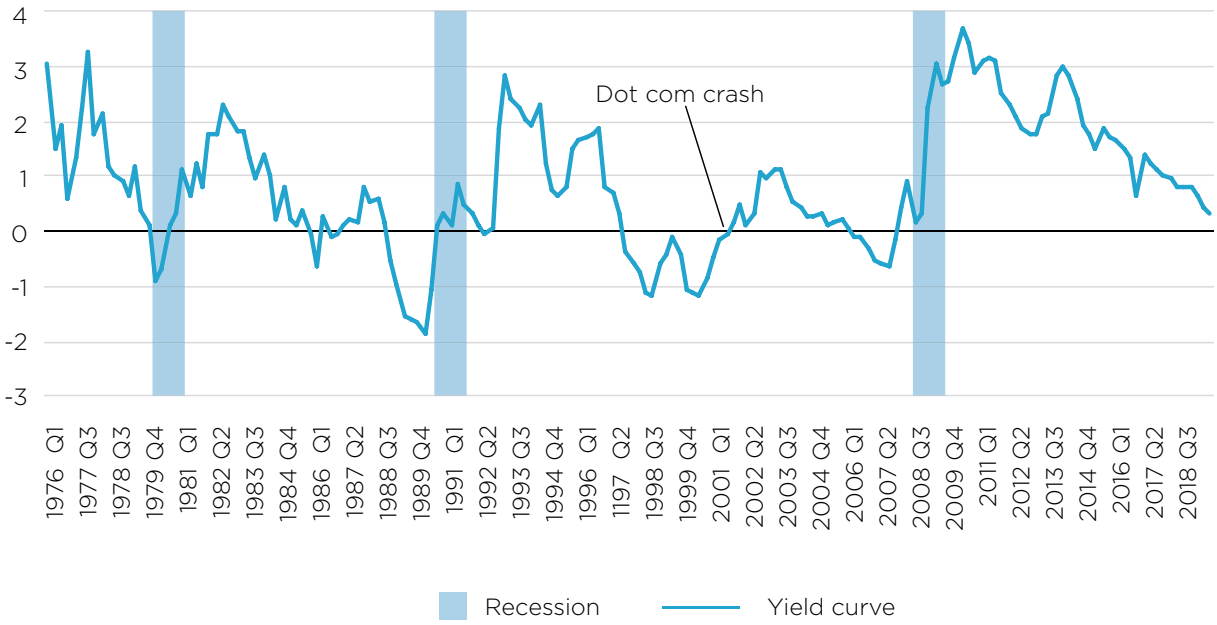
Recessions can impact different parts of an economy in different ways; no two recessions are ever the same. But invariably, the poorest in society are hit hardest, and for longest – often leading to temporary, or sometimes permanent, increases in inequality.[27] At home, Brexit presents a huge and immediate potential shock to the UK's trading relationship with the European Union (EU), with the threat of disrupted supply chains and a crashing value in the pound particularly likely in the event that the UK leaves the EU without a deal. Besides Brexit, the global outlook has also deteriorated significantly in recent months, predominantly due to the risk of protracted trade wars between the USA and China,[28] as well as the serious escalation in tensions between oil exporters in the Middle East.

Less immediately, but no less important, is the general passage of time since the last recession. The year-on-year cumulative effects of economic growth make financial bubbles either at home or abroad – such as those leading to a stock crash in Silicon Valley or in China, or a collapse in domestic house prices in the UK – more likely. Indeed, the gradual accumulation of such risks is partly why the UK tends to experience a recession on average once every 10 years.[29]

The current indicators of a recession risk are not limited to qualitative assessments only. One quantifiable indicator that is widely recognised to presage a recession is the so-called slope of a country's yield curve – the gap between the interest rates charged on long-term government debt compared to short-term debt. A large, positive gap is perceived to imply that investors expect monetary policy to remain tight – meaning higher interest rates and more expensive credit over the longer term. Such conditions are normally associated with an economy that is operating near its full potential.

FIGURE 2.1: DOWNWARD SLOPING YIELD CURVES HAVE PRESAGED EACH OF THE PAST THREE MAJOR RECESSIONS

PERCENTAGE POINT DIFFERENCE BETWEEN THE INTEREST RATE (YIELD) ON FIVE-YEAR TREASURY BONDS AND TWO-YEAR BONDS, Q1 1976 TO Q2 2019



Source: NEF analysis based on Bank of England 2019 and ONS 2019

A smaller gap between short- and long-term interest rates, however, may reflect expectations of lower interest rates in the future. And a key reason for this would be looser monetary policy in response to a declining economic environment. A falling or negative yield curve – where the difference between long-term and short-term interest rates on government debt gets smaller, or even turns negative over time – is perceived to imply that lenders think the medium-term economic outlook is deteriorating.

Since the 1970s, a negative yield curve – higher interest rates on short-term debt compared with long-term – has presaged a recession in the UK on three occasions (Figure 2.1).[30] Today, a decade-long downward sloping yield curve has brought the difference between long- and short-term debt close to zero, and during August 2019 some measures of the yield curve had the difference even turning negative – a phenomenon that was shared across a number of advanced economies.[31]

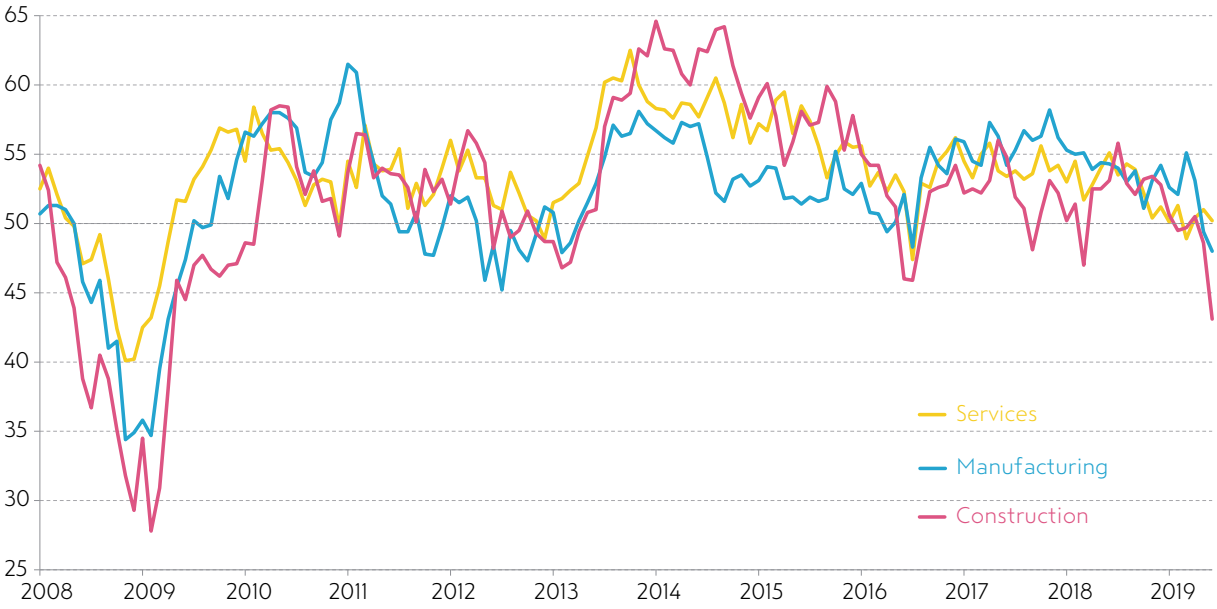
Furthermore, survey data on firm-level output (quantity of goods or services produced by individual firms in a specific time period) has seen a gradual decline across all major sectors of the economy. In early summer 2019, it fell to levels more usually associated with periods of economic stagnation or recessions (Figure 2.2). Alongside this collapse in firm-level output, quarter-on-quarter GDP also contracted during the three months to June for the first time since 2012. Several predictive models – such as those of the Bank of England, the National Institute for Economic and Social Research (NIESR), and the Resolution Foundation – suggest that the chances of the UK entering into a technical recession during the next few months range from about 30% to 40%.[32]

2.2 THE UK IS ILL-EQUIPPED TO RESPOND TO THE NEXT RECESSION

When it comes to managing the response to recessions, economists tend to consider a country's policy toolkit in terms of three broad categories:

1. **Monetary policy.** Orthodox economics traditionally regarded this as the dominant intervention. Central banks lower the cost of

FIGURE 2.2: FIRM LEVEL OUTPUT HAS BEEN GRADUALLY DECLINING SINCE 2014
PURCHASING MANAGERS' INDEXES (PMIS) FOR THE SERVICE SECTOR, MANUFACTURING AND CONSTRUCTION, 2008 TO 2019



Source: NEF adaptation from Smith, J. (2019). Failing to plan = planning to fail. The risk of recessions and the importance of macroeconomic policy in limiting the damage they cause. London: Resolution Foundation. Retrieved from https://www.resolutionfoundation.org/app/uploads/2019/07/Failing-to-plan.pdf

NB: PMIs are a survey measure of firms' output. The responses are aggregated into an index where the value of 50 equates to no change in output. Values above 50 denote increasing rates of expansion in firm level activity, while values below 50 represent corresponding contraction.

their base rate – ultra short-term interest rates charged on commercial bank deposits – in the hope that some portion of the reduced interest rate gets passed on to households and firms in the form of mortgages, overdrafts, credit cards, and bank loans.

2. **Automatic stabilisers.** The so-called automatic stabilisers refer to the way a country's welfare safety net can soften the impact of a recession without any need for further intervention from policymakers. As unemployment rises or wages fall, entitlement to work-related social security payments increases automatically. High overall levels of social security payments by government are usually funded by higher public borrowing in the short term and help to maintain a minimum standard of living and spending in the economy.

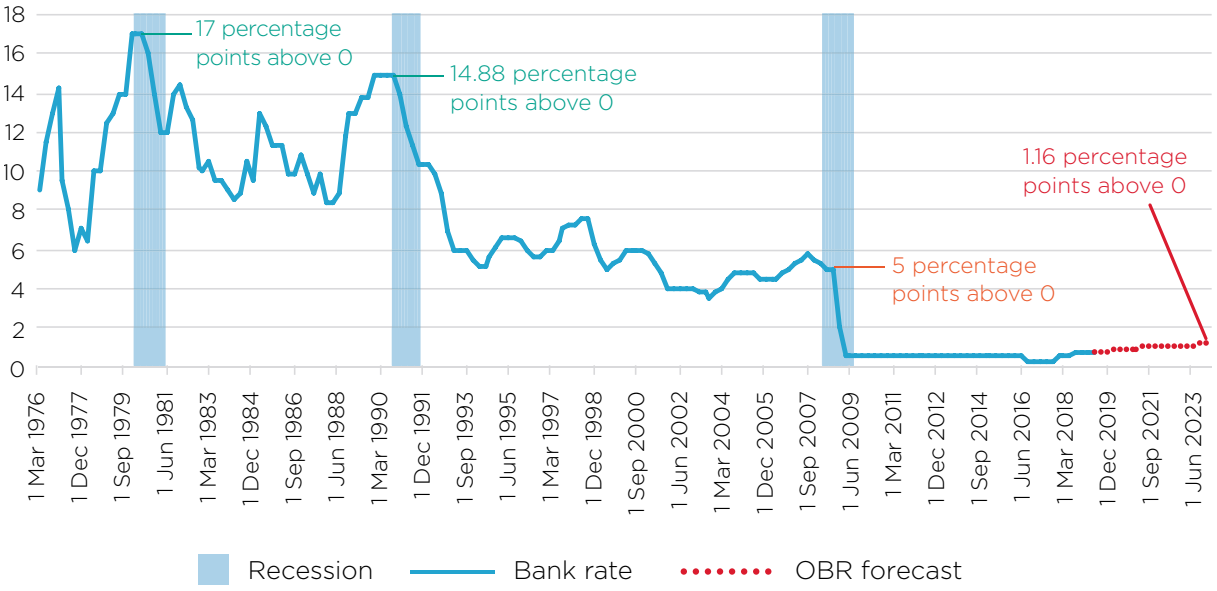
3. **Discretionary fiscal policy.** Discretionary fiscal policy refers to any area of government tax or spending that requires an active change from government. Governments can respond to recessions in this way either by increasing public spending or by cutting taxes. In each case, overall spending in the economy is likely to rise, usually funded by higher government borrowing in the short term. Such policies are not usually used to stabilise the economic cycle outside of extreme cases; at the macro level, they are instead set according to targets for national debt and borrowing.

2.3 THE LIMITS TO MONETARY POLICY

With respect to the standard recession-fighting toolkit, macroeconomic policymakers have rarely been as powerless as they are today. The Bank of England's base rate of interest has been stuck at – or close to – record lows for nearly a decade unable to fall further without going negative and unable to increase quickly because of highly levels of private debt and the impact on standards of living. As a result, spending and core inflation have risen too slowly over the past 10 years.

FIGURE 2.3: CONVENTIONAL MONETARY POLICY HAS RUN OUT OF AMMUNITION TO RESPOND TO A RECESSION

BANK OF ENGLAND BASE RATE (OUTTURN AND FORECAST) PRESENTED ALONGSIDE PERIODS OF TECHNICAL RECESSIONS, Q1 1976 TO Q1 2024



Source: NEF analysis using data from the Bank of England (ID: IUQLBEDR) and Office for Budget Responsibility Economic and Fiscal Outlook March 2019 'supplementary economy tables' and ONS 2019

This leaves the Bank of England with limited options were the UK to re-enter a recession in the coming months and years. Further interest-rate cuts in response to a recession would quickly come up against what economists call their effective lower bound – a point beyond which further reductions have little or no positive effect on spending in the economy.[33] Some economists describe this as increasingly trying to "push on a string", where the closer to zero interest rates become, the less able they are to incentivise investment and spending in the economy, especially when few firms and households are willing to borrow.[34]

Past recessions required the Bank of England to respond with an average cut in interest rates of more than five percentage points in order to aid recovery.[35] But today, the base rate sits at just 0.75% above zero, and even after another five years is only expected to return to a little over 1% (Figure 2.3). Interest rate cuts, even if feasible, would be extremely weak at stimulating aggregate demand and would more likely be counterproductive.[36] Standard monetary policy is dangerously out of ammunition.

So-called quantitative easing (QE) represents the most established attempt to circumvent the problem of the effective lower bound. It involves the Bank of England buying up debt on financial markets in order to simulate some of the effects of a rate cut on longer-term interest rates.[37] However, as even the Bank's chief economist Andy Haldane has conceded, the effects of QE are inherently uncertain and unreliable,[38] and come with a number of potentially harmful side effects,[39,40] such as rising wealth inequality.[41,42] Furthermore, QE itself also has a zero lower bound just like the Bank of England's base rate and with yields on 10-year government bonds already sitting at less than 0.5%, long-term rates may have almost reached their effective floor as well.[43]

More radical innovations in monetary policy – for example negative interest rates, central bank funding schemes, and purchasing private sector assets – have been under intense scrutiny in recent years. In some cases, there have been experiments across several different advanced economies, including the UK. None, however, represents a clear solution to the inability of contemporary monetary policy to stimulate the economy.[44]

Depending on the behavioural response from banks and savers, negative rates could actually reduce spending in the economy, or else increase the number of risky loans.[45,46] Bank funding schemes may be effective when a key determinant of recessionary conditions is bank lending, but will be heavily constrained by risk appetite and demand for new loans in the private sector, and also are thought to be less effective in response to other types of recessions.[47] Purchasing private sector assets in a similar manner to QE offers some further options on long-term rates. But this risks the central bank making explicit distributional decisions that threaten its neutrality and ultimately is constrained by the limited number of private sector bonds in circulation.

The Resolution Foundation recently conducted a thorough assessment of monetary policy options in a UK context and found that it was ultimately insufficient as the main – let alone the only – tool for stabilising the economy following future recessions. The report estimated that the maximum future rate cut of a single percentage point is likely to be worth little more than a 0.3% boost to GDP, while the scope for further QE was thought to be worth a boost to GDP of less than 0.7%.[48] Even if further innovation made it possible to squeeze a little more out of monetary policy, the total horsepower available is likely to fall well short of that required to stabilise the economy during a major recession, where, in the absence of a policy response, GDP can be expected to contract from anything between 6% and 18%.[49]

Indeed, this is a conclusion increasingly shared by the world's leading mainstream economists and central bankers. In a paper presented at what is considered one of the most prestigious events among the macroeconomic community, the Jackson Hole Economic Policy Symposium, Harvard economists Lawrence Summers and Anna Stansbury suggested that what was once previously treated as unquestionable is now patently false: central banks cannot always stimulate aggregate demand and raise inflation through monetary policy.[50] They conclude: 'What is needed are admissions of impotence, in order to spur efforts by governments to promote demand through fiscal policies and other means.'

2.4 THE AUTOMATIC STABILISERS HAVE BEEN WEAKENED

Personal taxation and social security transfers are seen as perhaps the second major tool used by policymakers to respond to a recession. Since 2010, however, their effectiveness has been eroded, primarily by a series of cuts to both the level and breadth of entitlements to work-related benefit payments. Increasing the personal allowance for income tax and several tax giveaways for savers have boosted livings standards for higher earners who are most likely to save rather than spend their disposable incomes. The effects of the so-called bedroom tax (reductions in housing benefit for households deemed to have a spare bedroom), the benefit cap and the move from disability living allowance (DLA) to personal independence payments (PIPs) have all disproportionately impacted the UK's lowest income families.

In addition, two further reforms have significantly reduced living standards. First, since 2016/2017, most working-age benefits – outside of disability-related payments and carer's allowance – have been subjected to a four-year freeze. This means that payments are no longer uprated with inflation and have therefore seen their value fall in real terms since 2016. Second, payments for children living in families receiving housing benefit, tax credits, and universal credit have been largely limited to the first two children only, leaving families with three or more children significantly worse off. The combined effects of these two reforms alone are expected to reduce disposable incomes for the poorest third of families by well over £300 per year on average by 2020/2021, and in some cases by more than £1000.[51]

The automatic stabilisers would still provide a substantial cushion during a recession, although their effectiveness is likely to be weaker than during previous recessions. For example, recent analysis from the Resolution Foundation found that the current social security system would have been 20% less effective during the 2008 recession and recovery compared with the one in place at the time.[52] Earlier this year, NEF proposed a major overhaul of the tax and benefit system that involved abolishing the personal allowance of income tax and using the funds to create a non-conditional weekly payment to almost all adults.[53]

2.5 USING EXPANSIONARY FISCAL POLICY TO TACKLE FUTURE RECESSIONS

The limited scope of monetary policy and the weakened state of the UK's fiscal stabilisers mean that discretionary fiscal policy will need to have a far larger role in combatting future recessions compared with the recent past. If not, recessions will be deeper, recoveries will be slower, and living standards will suffer significantly – with the poorest households hit hardest.

Fiscal policy – changes in the level of government spending and taxation – can increase demand in the economy, either by directly raising government spending and investment, or indirectly increasing spending by households and firms. The extent to which such interventions increase demand depends in large part on what economists call the spending multiplier – the ratio of a change in national income to any change in spending by government, firms, or households. Recession borrowing – through the issuance of treasury bonds – is by far the most effective way to fund a fiscal stimulus.[54]

Discretionary fiscal stimulus during a recession can in theory take an almost infinite number of different forms and can therefore (within feasibility constraints) be tailored to respond to the specific challenges of a given recession. A review of recent recessions in the UK throws up three key parameters across which recessions might be analysed and assessed when considering a fiscal policy response:

- The size of effect on aggregate economic activity.
- The way that the supply-side of the economy automatically starts to adjust.
- The underlying causes of recessions.

The key role for discretionary fiscal policy in a future recession will be in offsetting the effects of lost spending in the economy. The most recent four recessions in the UK saw GDP contract by between 2% and 6.3%.[55] However, these figures are net of the offsetting effects of monetary and fiscal response from policymakers. Absent of discretionary policy, the impact of a shock to the economy (albeit after the effects of the automatic stabilisers) is far larger. For example, the Resolution Foundation estimates that without the combined effects from government expenditure increases and tax cuts, interest rate cuts and QE, GDP could have contracted by more than 15% by 2010, compared with the end of 2007.[56]

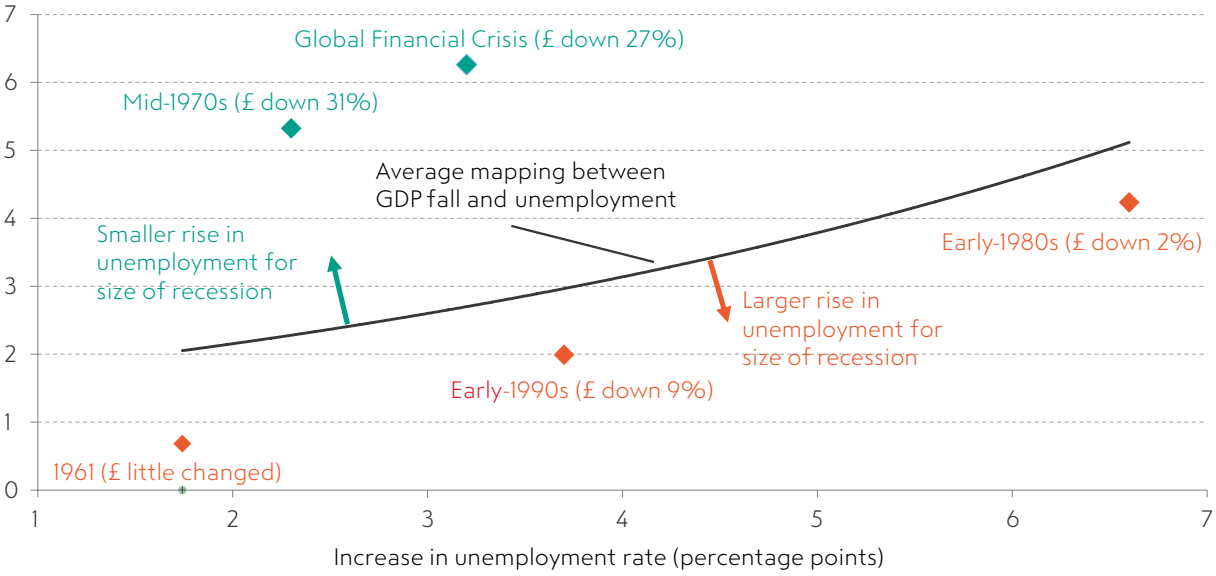
If (based on a headline analysis of the past four recessions), we take an indicative rule of thumb that policy is usually successful in offsetting around two-thirds of contraction during a recession, then based on the recent past, policy is usually required to boost spending in the economy by about 4% to 12% of GDP, depending on the severity of a shock.[57] With monetary policy currently expected to boost GDP by little more than one percentage point, it is highly likely that fiscal policy will be required to boost GDP by up to 10%, depending on the severity of the recession.

In addition to the size of the recession – and therefore the magnitude of any response – the *way* in which the economy contracts is also important. This can be thought of as the supply-side response to a recession. In the UK it tends to come in the form of either higher unemployment, a fall in real wages, or both.[58] In the UK's recent past, the factor that has determined the balance between these two channels has been the value of the pound (Figure 2.4). When the pound crashes, inflation rises, causing the cost of labour for firms to fall relative to the price of the products and services they produce. This forced collapse in real wage costs tends to mean that firms have to make fewer workers redundant to save costs.

Overall, living standards fall during a recession – and fall fastest for the poorest families – irrespective of the nature of the supply-side adjustment. But whether the adjustment is wage or employment led can be important for designing the most effective discretionary response. A wage-led adjustment is more likely to see the effects widely spread across different sectors of the economy and is therefore more likely to require an equally diffuse, or broad-based, response from fiscal policy. However, an unemployment-led recession is more likely to see the pattern of effect following the supply chains of industries most affected by the underlying causes of recessions. This could lead to concentrated pockets of job losses in particular industries and geographic locations. In response to such a recession, the fiscal response to boost demand may also need to be more targeted at the industries and regions that are worst affected.

FIGURE 2.4: DURING A RECESSION, THE SUPPLY SIDE OF THE ECONOMY TENDS TO ADJUST MORE THROUGH A LOWER REAL WAGES OR HIGHER UNEMPLOYMENT

PEAK-TO-TROUGH FALLS IN GDP (%) AND MAXIMUM RISE IN THE UNEMPLOYMENT RATE (PERCENTAGE POINTS) DURING POST-1955 RECESSIONS, UK



Source: NEF adaptation from Smith, J. (2019). Failing to plan = planning to fail. The risk of recessions and the importance of macroeconomic policy in limiting the damage they cause. London: Resolution Foundation. Retrieved from https://www.resolutionfoundation.org/app/uploads/2019/07/Failing-to-plan.pdf

More generally, the response to a downturn needs to also address deeper failings of the UK economy. In 2016, Chief Economist of the Bank of England Andy Haldane noted that the response to the UK's latest downturn translated into 'a recovery which for most has been slow and low, for many partial and patchy and for some invisible and incomplete'. Accordingly, Haldane conceded that for many regions and local communities throughout the UK, 'the language of "recovery" simply did not fit their facts.'[59] These conclusions are hardly surprising given real earnings remain no higher today than they were a decade ago: the longest period without an overall increase in earnings for nearly two centuries. Indeed, in the 10 years after the global financial crisis, the UK suffered the biggest drop in average real wages of any OECD (Organization for Economic Cooperation and Development) country outside of Greece and Mexico.[60]

While boosting overall investment and spending during a recession at speed is the first priority – targeting the response in a way that looks to support the longer-term creation of secure, well-paid work in regions of the UK where they are currently lacking should also be an area of important consideration for policymakers. It is not sufficient to seek a recovery in aggregate income with no regard for the distribution and composition of the recovery. What is meant by recovery, and for whom, should also fundamentally shape the nature of intervention.

3. A GREEN STIMULUS TO ACCELERATE THE LOW-CARBON TRANSITION

The previous chapters advanced two discreet arguments. First, in view of the UK's climate obligations, the country has so far done too little too late. As a country, we now face the prospect of mobilising a significant amount of resources in order to meet our global climate obligations as early in the twenty-first century as possible. It is hard to overstate how significant this shift will need to be: Every form of economic policy will need to be refocused on green transformation. Second, the scope for policymakers to respond to future recessions with monetary policy is severely compromised while the automatic fiscal stabilisers have been weakened. Tackling the next recession in the UK will have to depend on discretionary fiscal expansion supported by monetary policy in a way that has not been the case during any UK recession in living memory.

In this chapter, we bring these two arguments together. As outlined in Section 1, public investment in transforming the UK's industry and consumption is urgently required. It should be taking place now and will likely need to continue to grow until the economy is embedded within safe environmental limits. But this journey will not be linear. Before climate goals are met, the UK is highly likely to face at least one recession, and possibly several more. We argue in this chapter that recessions can potentially side-track progress and plans for realising a successful green transition. The need for a large, discretionary stimulus package that will come with every future recession must be geared towards accelerating a low-carbon transformation and ensuring all momentum is maintained.

Any public investment during a recession will always need to be additive to a baseline level of existing green investment that is as ambitious as possible. Recessions, however, always change the parameters of efficiency and possibility within advanced capitalist economies. During a recession, private activity slumps and demand from markets for safe assets like government debt tends to grow. So *additional* public investment during a recession, even if only temporary, will help to either ensure progress is not lost or to even accelerate the speed of transition beyond what might otherwise be the case. In this chapter, we set out the principles and areas of investment around which a green public stimulus package could be built. We finish by setting out illustrative packages of investment and scenarios for how policymakers might use these now to respond to a future UK recession.

3.1 THE MISSED OPPORTUNITY OF 2008

According to leading mainstream economists Olivier Blanchard and Lawrence Summers, a particular problem with the response to the last recession was that politicians and policymakers did not have the necessary plans in place for a sizeable fiscal stimulus (supported by monetary policy).[61] Lacking a well-thought-out public investment plan meant that when the crisis struck, proposals for a fiscal stimulus had to be generated without sufficient prior planning. As a result, the long-term view was largely missed.

In the UK, the pipeline of public infrastructure investment was neglected. Demand growth was sucked out of the economy too early; social security payments and tax cuts were raided to breaking point as a short-term means of reducing the public deficit. This austerity agenda, alongside largely ideological reasons,[62] led policymakers to quickly shelve their promises to be the 'greenest government ever',[63] putting any plans to meet climate targets on the backburner.

There were credible calls on the Treasury to respond to the crash with a green stimulus,[64] but the approach taken was to cut taxes, loosen monetary policy, 'getting the banks lending', and a general reduction in government investment (regardless of its implications for plans to mitigate climate change). Unsurprisingly, more than 10 years on from the global finance crisis, policymakers are now well behind in meeting their climate targets.

Previous NEF analysis has shown that the policy of discretionary spending cuts, or austerity, over the past decade had a combined effect on the level of GDP of around 4.7% – or £100 billion – in 2018/2019 alone.[65] Some of this impact will have decayed and eroded over time, but these offsetting effects are likely to have been limited by the fact that monetary policy was restricted by the effective lower bound to interest rates (Section 2.2). To break this number down another way, deliberate policy from government over the past nine years has had the standalone effect of suppressing gross incomes by just under £1,500 per person, more than £3,600 per household, in 2018/2019 alone.

However, the harm and extent of missed opportunity cannot only be measured in terms of short-term living standards, important though they are. The particular policy decision to implement tax cuts – specifically for corporations and changes to national allowance – over any form of a green stimulus as a response to the last recession was a missed opportunity to accelerate momentum towards reaching climate and environmental goals. New NEF analysis finds that had £10.5bn, only a third of the total funds used to pay for the Coalition government's cuts to income tax and corporation tax between 2010 and 2013, been used instead to fund a mass home insulation programme, residential emissions would have been reduced by 30% by 2018.[66] From 2010 to 2018, a total of 129 million $MtC0_2$ would have been saved – that is two years worth of current emissions from the power sector. Furthermore, within three years, the energy savings to household bills would be equal to the cost of the initial investment from government. Over-time, government taxes on higher economy wide spending elsewhere (due to lower energy bills) would also exceed the initial outlay. Indeed, by 2018 the programme would have saved the household sector £32 billion in energy bills.

3.2 THE CASE FOR GREEN INFRASTRUCTURE WITHIN A STIMULUS

Despite various threats of another potential economic downturn, policymakers and politicians are yet to generate the readily available blueprints that can help them navigate the next economic downturn. In an article for the *Financial Times*,[67] senior economics editors Chris Giles and Sam Fleming, sum up the current predicament:

'IF THE WORLD ECONOMY SLID IN THE YEARS AHEAD, THE MAIN LEVER OF POLICY WOULD REMAIN WHAT IT HAS BEEN FOR THE LAST DECADE: IMPROVISATION.'

Indeed, it is hardly surprising that leading mainstream economists Blanchard and Summers (Section 3.1) have called on governments to prepare themselves with readily available blueprints. Within this perilous position comes the opportunity to do things differently. While the UK needs a readily available stimulus plan for when the next crisis or recession strikes, it is imperative that this plan is largely green in focus.

A green stimulus package would involve allocating a considerable amount of government funds towards much-needed economic infrastructure projects and activities that will help the UK transition to a net-zero economy. It would primarily involve investing in a variety of mitigation measures that would help reduce the amount of carbon emissions the economy currently produces (e.g. investment in clean energy, transport, utilities, and homes) – beyond the given baseline level of public investment happening anyway to reach climate targets on time. However, it would also include mobilising resources for adaptation measures that help prevent or minimise the damage climate change will entail (e.g. flood defence systems).

Economic shocks happen. When they do, they can hugely disrupt investment, for example in carbon reduction, a disruption that we cannot afford. However, they are rarely factored into future projections of investment. The planned path of investment to decarbonise UK industry and the indicative investment scenarios that could achieve climate targets (such as those put forward by the government or even the CCC) do not consider the business cycle at all – the peaks and troughs between economic expansion and contraction. While the short-term effects of an economic downturn result in a reduction in emissions (due to reduced consumption), it can rapidly derail long-term public and private sector investment – especially those needed for a net-zero transition.

On the one hand, climate change investments could be given a lower priority as policymakers prefer measures whose benefits are visible in the

short term.[68] At the same time, with low appetite for risk from the private sector and with access to capital for private firms especially expensive and scarce in a downturn, low-carbon investments could be discouraged because they require more upfront capital compared to carbon intensive alternatives (although the latter are more expensive to maintain over the lifetime of the asset).[69] These two factors, among others, may aggravate the carbon lock-in and disrupt much-needed investment for a net-zero transition. Ensuring that some significant portion of a future stimulus is green, however, would help to make sure that the business cycle does not displace the much-needed investments to reduce carbon emissions.

In the event of an economic downturn, a green stimulus package – with significant investment in infrastructure – would provide a considerable boost to short-term aggregate demand while deploying underutilised production resources (unemployed labour and uninvested savings).[70] In times of a recession, considerable numbers of unemployed workers are available and many businesses run below their potential capacity. As new contracts are tendered to the private sector, a green stimulus would stimulate spending and investment, boosting employment, hours, and pay (especially through construction activities).

In the initial planning and construction phase, green energy projects are more labour intensive than their carbon-intensive alternatives. For large-scale projects, spending during the planning phase can reach up to 25% of capital investment of certain projects.[71] Meanwhile, market anticipation of such a green infrastructure stimulus can also stimulate aggregate demand by raising private sector expectations and crowding in additional private sector investment.[72]

A well-designed green stimulus package, with government investment in green infrastructure, is also likely to carry a higher multiplier (have a greater positive effect) on further spending in the economy than an across-the-board tax cut (or indeed most other forms of public spending). This is because across-the-board tax cuts do not lead to direct increases in spending. Wealthy beneficiaries are less likely to consume, and other beneficiaries may prefer saving or paying down debt obligations from any extra income gained from the tax cut.

Conversely, government investment leads to a direct injection of spending and investment in the economy in the short term, whilst boosting the productive capacity of the economy in the long term. When the UK economy was on the brink of another recession in 2013, the International Monetary Fund (IMF) advised the UK Treasury to carry out a meticulously targeted infrastructure-based stimulus.[73] The combination of high multipliers and a frontloaded effect in terms of the economic boost created, makes green infrastructure investment particularly well suited for economic stimulus.[74]

A well-established objection to such a green stimulus is that infrastructure projects tend to have long lead-in times;[75,76] therefore as a tool for macroeconomic stabilisation, it could be a slow way to stimulate aggregate demand in the short term. If the spending of government funds is lengthy and drawn out over a number of years, then the conditions that initially warranted the stimulus may have changed and the stimulus may no longer be necessary. Conversely, a strong argument can be made that tax cuts or a monetary policy stimulus may prove a more efficient counter-cyclical (acting to counterbalance the effects of the economic cycle) lever of stabilising demand.[77] Accordingly, we envision a stimulus package that would potentially entail a certain level of tax cuts and monetary policy measures alongside it. But, more importantly, the green stimulus would need to be specifically targeted to meet three criteria:

1. Small- and medium-sized projects that are relatively easy to kick-off on the ground quickly.

2. Shovel-ready projects where 'design, planning and engineering is advanced enough that with sufficient funding, construction can begin quickly'.[78]

3. Non-infrastructure-based green investment needed to catalyse and enable the low-carbon transition – such as reskilling programmes and research and development.

Naturally, investment in the critical infrastructure needed to put the economy on a low-carbon pathway requires planning – shovel-ready projects are not prepared overnight. The National Infrastructure and Construction Pipeline (NICP) is currently tasked with identifying major planned

infrastructure investments, the timing of delivery, and the financing provisions. At present, the pipeline sets out over £400 billion in proposed infrastructure projects – with £190 billion planned to take place by 2020/2021, covering 278 individual projects and 398 programmes.[79]

Many of these projects and activities will contribute to the net-zero transition. For example, there are over 90 projects worth at least £145 billion in the pipeline aimed at the energy sector (not including oil and gas planned investments and Hinkley Point C Nuclear power station). There is another £110 billion of pipeline investment aimed at the transport sector (not including airports and roads) and £40 billion within the utilities sector (electricity distribution and transmission, smart meters, water, and sewerage).[80] Projects deemed to be essential to a green transition could be among those accelerated or brought forward during a recession as part of a wider stimulus package.[81]

Nevertheless, the right prior planning is critical. While there are currently a variety of shovel-ready projects and activities that can be pursued in the short term, a green stimulus is likely to be more successful if all branches of the government – especially the administrative departments and local authorities – are better prepared to launch such a stimulus, should a downturn strike. Accordingly, an important recommendation of this report is that all branches of the government start formulating long-term plans for making a green transition.

Along the lines of the recommendation made by leading mainstream economists Blanchard and Summers, within such plans there should be contingency strategies and measures to be implemented in the event of a downturn. With long-term preparations and contingency plans in place, certain green infrastructure projects and measures should be possible to bring forward in a relatively short space of time. Climate change is too big a threat for the lack of shovel-readiness and insufficient government planning to be used as excuses for delayed progress and disruptions to any potential momentum.

3.3 FRAMEWORK AND ANALYSIS OF GREEN INFRASTRUCTURE PROJECTS

A well-prepared green stimulus programme must satisfy a number of criteria. Many of these criteria will be easier to fulfil if the government boosts investment and starts taking the necessary policy measures to address climate change today. In the following, we set out the key factors that must be considered in selecting projects for the part of a stimulus committed to green infrastructure investment.[82] We then conduct an analysis of the most promising projects recommended by the CCC against these criteria.

- **Timeliness:** A variety of abatement measures can be delivered more quickly than others. Even within projects that are otherwise considered shovel-ready there can be meaningful variation in the precise lead-in time. For example, work on insulating a home could start quicker than a windfarm. In many instances, this will only be a matter of weeks, but in the early phases of a recession, these time differences can be critical to protecting future living standards. This criterion is also among the most critical and has a particularly high weighting.

- **Barriers:** Certain projects will still face some level of barriers before they can be implemented. For example, retrofitting homes with heat pumps could be launched in a timely fashion, but will require a significant re-skilling of workers before a significant programme is rolled out. These barriers were qualitatively retrieved from the CCC technical net zero report.[83]

- **Sequencing:** Certain projects will hold particular value because they support or facilitate other projects further down the line, or because they are a necessary or sufficient condition for future projects. For example, transmission and distribution infrastructure of electricity enables the flow of renewable energy to charging points, which further enables investment in the production of electronic vehicles.

- **Employment multiplier:** The rate at which aggregate employment is expected to increase for a given unit of investment.

- **Gross value added (GVA) multiplier:** The rate at which aggregate output is expected to increase for a given unit of investment.

- **Total abatement:** This effectively measures the expected reduction in the amount of carbon emissions for a given unit of investment in a given project.

- **Total resource cost:** This is largely based on the CCC cost estimates of annual resource costs of all measures to reduce emissions. The total resource cost depends on the unit resource cost (marginal abatement cost) of a measure and the scale of deployment (abatement produced by the measure).[84]

- **Vertical or horizontal application:** This criterion assesses whether the stimulus effects of a project can be spread widely and across the country (such as a programme of home insulation or subsidising solar panel installation) or if they are better suited to a focused intervention in a given region or industry (like the manufacturing of parts for wind turbines).

Table 3.1 sets out our analysis of an initial long list of abatement measures drawn primarily from work done by the CCC.[85] This long list is made up of activities that the CCC already believes are at, or close to, a level regarded to be shovel-ready. It should be noted that these are urgent measures that the government should be spearheading today, regardless of the stage the economic cycle is at. Not only are they needed to catalyse a low-carbon transition, but investment in these measures will help create jobs and much-needed economic activity in regions and communities faced with long-term industrial decline. However, even if the government was to ramp up investment today, the scale of investment needed in these measures is such that they would be capable of absorbing additional investment in the event of a downturn in the short to medium term.

In practice, these abatement measures will not be individual projects, but rather multiple projects (e.g. offshore wind will probably involve multiple offshore wind farm projects, while transmission and distribution upgrades will similarly be geographically spread and consist of multiple different projects). These measures are also regarded by the CCC to be 'low-cost-low-regret' because each is consistent with a number of different strategies and pathways to a decarbonised economy.[86] The remainder of this section briefly discusses each of the most promising projects in turn.

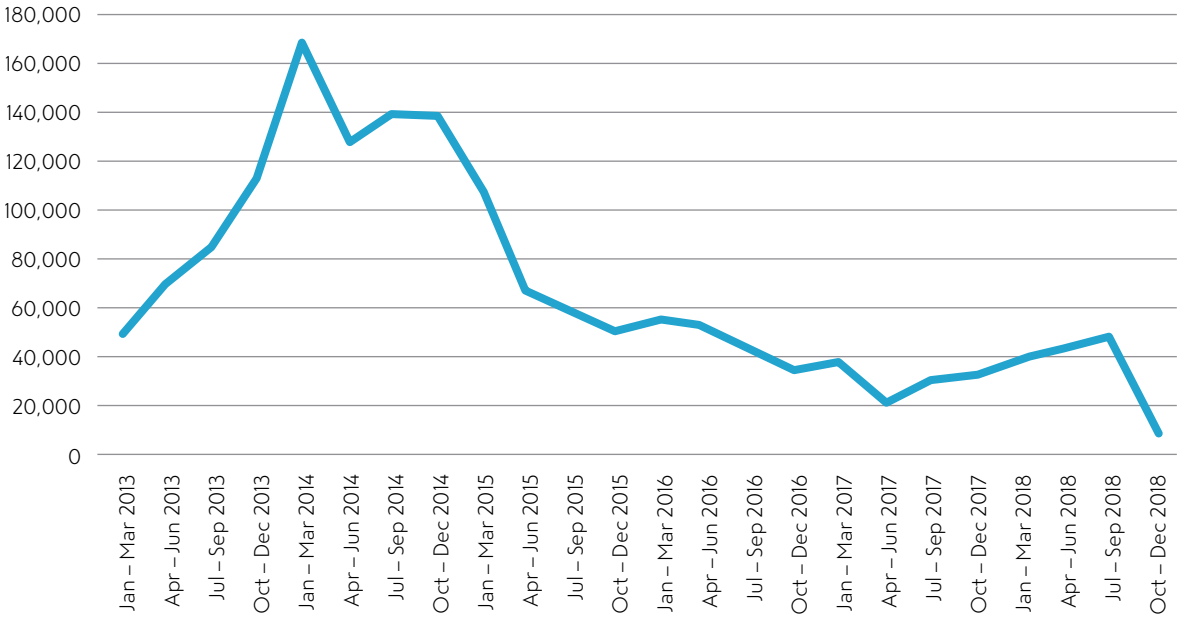
Home Insulation: Retrofitting homes with new insulation is an extremely strong candidate for a green stimulus package. It is labour intensive, shovel-ready, has a short lead-in time, and can be rolled out either right across urban and rural areas or else targeted where it is most needed. Moreover, it is a much-needed abatement measure on which the UK is already very far behind and it needs to happen as a matter of course.[87] The CCC estimates that between now and 2030, insulation is needed for solid walls in six million homes, cavity walls in six million homes, and topping up loft insulation in over 20 million homes. This would not only result in a reduction of 25% in household energy demand, but would contribute to £8.6 billion in energy bill savings per year during the 2020s and help to bring 4.5 million homes out of fuel poverty.[88] However, insulation measures have fallen from a peak of more than 170,000 for the months of January to March 2014, to just under 10,000 from October to December 2018 (Figure 3.1). There is an immediate need to ramp up home insulation and this is likely to remain the case across the short to medium term. The scale and urgency of home insulation needed is considerable and may require complimentary spending on reskilling and training as highlighted in the following sections.

Electric vehicles and charging networks: As shown in Chapter 1, transport is the UK's highest emitting sector, with emissions increasing rather than declining in recent years. Presently, the CCC suggests that electric vehicles (EVs) are a leading option to achieve a zero-carbon transport system. Extensive take up of EVs necessitates complimentary infrastructure, which involves the implementation of a countrywide network of rapid charging points on major roads. Over 16,000 new rapid chargers are required at more than 2,000 sites by 2030.[89] Indeed, a more publicly visible charging network boosts consumer confidence and can act as a strong incentive for individuals to switch to EVs.[90] Naturally, there is an upper bound as to how many charge points are actually useful, but to reach 100% EV sales by 2030 (at least) we would need the visible charging network to be in place by then. Public financial support for EVs and a charging

TABLE 3.1 : FRAMEWORK AND ANALYSIS OF GREEN INFRASTRUCTURE PROJECTS

Project	Timeliness	Barriers	Sequencing	Employment Multiplier	GVA Multiplier	Total abatement ($MtCO_2e$)	Total resource cost	Vertical applicability
Home insulation	Low	Low	Low Enabler	Strong	Strong	High	Low	High
Evs and EV charging networks	Low	Moderate	Moderate Enabler	Strong	Strong	High	Low	High
Transmission & distribution infrastructure	Moderate	Moderate	High Enabler	Strong	Strong	High	Moderate	High
Onshore Wind	Low	Moderate	Moderate Enabler	Strong	Strong	High	Low	Moderate
Solar projects	Low	Moderate	Moderate Enabler	Strong	Strong	High	Low	Moderate
Heat Pumps	Low	Moderate	Low Enabler	Strong	Strong	High	Higher	High
Flood and Drought Resilience	Low	Low	Low Enabler	Strong	Strong	Low	Low	Moderate
Cycling and Walking Infrastructure	Low	Low	Low Enabler	Strong	Strong	Low	Moderate	High
Tree Planting	Low	Moderate	Moderate Enabler	Strong	Strong	Moderate	Low	High
Hydrogen refuelling	Moderate	High	Low Enabler	Strong	Strong	High	Low	Low
Waste and manure management	Low	Low	Low Enabler	Strong	Medium	Low	Low	Moderate
Recycling initiatives	Low	Low	Low Enabler	Strong	Medium	Low	Moderate	High
Offshore Wind	High	Moderate	Moderate Enabler	Strong	Strong	High	Low	Low
Habitat conservation	Low	Moderate	Low Enabler	Strong	Strong	Low	Low	Moderate
Peatland Reforrestation	Low	Moderate	Low Enabler	Strong	Medium	Low	Low	Low
Scale-up production/manufacturing Wind Turbine Facilities	High	High	High Enabler	Strong	Strong	High	Low	Low
Scale-up production/manufacturing Solar Facilities	High	High	High Enabler	Strong	Strong	High	Low	Low
Enteric Fermentation	Moderate	Low	Low Enabler	Strong	Medium	Low	Low	Low
District heating networks	High	High	High Enabler	Strong	Strong	High	Higher	High
Bus infrastructure	Low	Moderate	Low Enabler	Medium	Strong	Low	Moderate	High
Railway electrification	Moderate	Moderate	Low Enabler	Medium	Strong	Low	Moderate	High
Electric Buses	Moderate	Low	Low Enabler	Medium	Strong	Low	Moderate	High
Hydrogen-fulled boiler	Moderate	Moderate	Low Enabler	Strong	Strong	High	Higher	Low
Smart Metres	Low	Low	Low Enabler	Strong	Strong	Low	Higher	High
Soil & Water Conservation	Moderate	Moderate	Moderate Enabler	Strong	Medium	Low	Low	Low

FIGURE 3.1: HOME INSULATION MEASURES IN SIGNIFICANT DECLINE
NUMBER OF HOME INSULATION MEASURES INSTALLED (INCLUDING CAVITY, LOFT, SOLID WALL, AND OTHER INSULATION), 2013–2018, QUARTERLY



Source: Authors own calculations from Household Energy Efficiency Statistics, BEIS (2019).

network infrastructure could be rolled out quickly across the UK, has a potentially high employment multiplier, and can be scaled up evenly or targeted at particular places that potentially face significant economic hardship. It is therefore also among the strongest candidates for a green stimulus package.

Flood defence and drought resilience systems: Over £30 billion in investment will be needed between now and 2050 to tackle flooding and coastal changes, while £21 billion of investment is needed to make sure households and businesses are resilient to droughts and water shortages. Indeed, over five million homes are currently at risk of flooding with one in four homes at risk of experiencing a drought in the next 30 years. This could worsen with population growth and lack of investment.[91] The National Audit Office estimates that for every £1 spent on protecting communities from flooding, around £9 in property damages and wider impacts is avoided.[92] New defence systems or maintenance/upgrades to existing infrastructure are largely shovel-ready and relatively easy to deploy. According to the NICP, there are at least 28 shovel-ready schemes worth £2.4 billion that could be brought forward to mitigate flooding.[93] While the NICP only makes reference to water and sewerage projects (with no specific reference to drought resilience), there is an additional £10.8 billion of shovel-ready investment needed for maintenance and new infrastructure. Flood defence systems and improvements in our water infrastructure do not directly contribute to a reduction in carbon emissions, but they are a critical adaptation measure needed in the fight against climate change. These measures are needed throughout the country, especially in regions that are facing degrading infrastructure.

Renewable energy projects: Renewables (mainly solar and wind energy sources) are less expensive than carbon intensive forms of power generation in the UK and are a critical pillar to reaching net zero by 2050. According to the CCC they could be rolled out at scale in order to decrease current emissions, and their scenarios indicate that the role of renewables could be four times larger than they are today. Indeed, the CCC also suggest these are cheap abatement measures that will need to be implemented now but also continuously over a long period. It is possible to ramp-up investment

FIGURE 3.2: DIRECT UK EMPLOYMENT IN RENEWABLE ENERGY IN DECLINE
DIRECT EMPLOYMENT – NUMBER OF JOBS – IN RENEWABLE ENERGY (INCLUDING SOLAR, ONSHORE WIND, OFFSHORE WIND, AND OTHERS) FROM 2014–2017

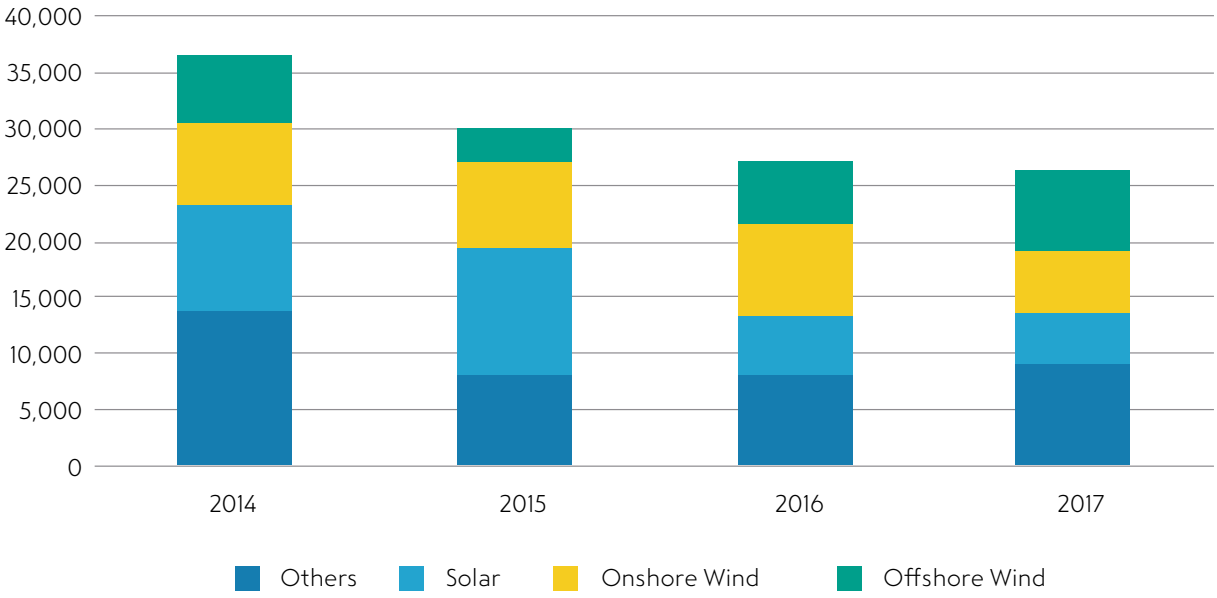
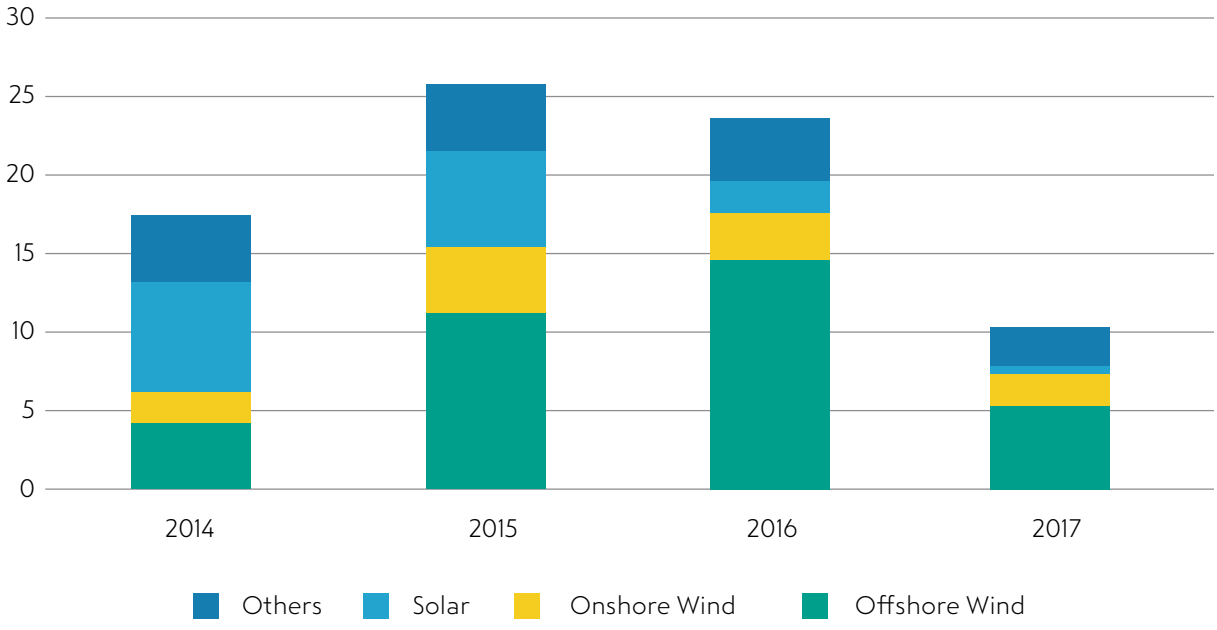


FIGURE 3.3: INVESTMENT IN UK RENEWABLES IN DECLINE
INVESTMENT – IN $US BILLIONS – IN RENEWABLE ENERGY (INCLUDING SOLAR, ONSHORE WIND, OFFSHORE WIND, AND OTHERS) FROM 2014–2017



Source: ONS (2019) Survey of the Low-Carbon and Renewable Energy Economy and Bloomberg New Energy Finance

quickly and do more than is "needed" earlier, as part of a stimulus package. However, the most recent statistics suggest a variety of policy changes and withdrawals of subsidies since 2015[94] have led to a significant fall in renewable job creation and investment, with the latter falling by 56% from 2016 to 2017 – and the former falling by 30% since 2014 (Figures 3.2 and 3.3).

Renewable energy investment in a green stimulus could help boost employment in the construction and engineering sectors, although these projects also tend not to have comparatively short lead-in times (e.g. when compared to insulating a home). Nevertheless, even the planning phases for these projects require substantial spending and investment. For a given two-year installation time-frame for a wind turbine project, planning and consultations take up most of the project time and budget.[95] As of 2018, there was also just under £15 billion of planned investment in wind farm projects alone in the NICP – some of which potentially could be brought forward.[96] Furthermore, significant investment in decentralised microgeneration energy schemes could also be explored, including small-scale onshore wind turbines and solar panels for use by households, small communities, farmers, and small businesses. Technical studies estimated that solar PVs could provide up to 23% of London's electricity need,[97] but only 3% is currently being registered – the lowest of any region in the UK.[98] With over 147 million square metres of rooftops, the capital could become one of world's largest solar farms.[99] But in a similar vein, the installation of solar PVs could be rolled out across low-income regions to help boost construction unemployment while reducing energy cost for households.

Transmission and distribution network infrastructure: Our distribution and transmission networks are in urgent need of upgrade, if we are to meet the goals of a net-zero transition. Electricity transmission networks are high-voltage cables that run across the UK to bring power from generators to the electricity distribution network – which dispenses electricity to industrial, commercial, and domestic users. Investment in the transmission and distribution network infrastructure is a high priority, primarily because it enables greater electrification of homes and transport, but also because without it, sufficient renewable energy projects cannot be brought onto the system. Indeed, our present network infrastructure was not designed for the growth in electricity demand required for a net-zero transition and will not be able to cope without significant investment. The current network also has efficiency issues. For example, power losses in transmission and distribution totalled over £1.28 billion in 2017 enough to power almost seven million homes.[100]

However, improving the network does not have especially fast lead-in times. This notwithstanding, in the short-run upgrading (or simply maintaining) local distribution networks (household, street, and town level)[101] may be a feasible quick turnaround for investment. Overall, as of 2018, the NICP suggests there is currently £12 billion and £6 billion of transmission and distribution (respectively) shovel-ready schemes planned for the next three years that could be brought forward.[102] According to the CCC, a large expansion of the distribution network capacity is a low-regret option because even if over expanded it will enable greater electrification in the future, and could avoid up to £34 billion of network expenditure. At the same time, upgrades are particularly labour intensive – with equipment only taking up to 8%–10% of upgrade costs.[103] This is another excellent measure that could also be specifically targeted at regions and places that have faced long-term industrial decline and eroding infrastructure.

The CCC estimates that yearly investment in the network will need to be doubled to reach the UK's net zero target before 2050. To meet a much earlier target will require substantially higher investment. For these reasons, projects aimed at upgrading the distribution network should be made a priority for a green stimulus.

Reskilling and training: The UK is currently suffering from a low-carbon skills gap, with the CCC outlining that virtually every sector of the economy is going to require a degree of reskilling and training. The 2008 Green New Deal proposal from NEF and the Green New Deal group argued: 'There will be a need for a training, education, research and development programme for the "carbon army" of workers needed to bring about a low-carbon future.'[104] This need is more acute than ever. As the trade union Unison has argued: 'One critical element often ignored is that achieving net

zero requires not just policy changes, but the people to deliver them … [without which] the UK will fall short because the workers won't be available to organise, assess, persuade and make the necessary adaptations to UK homes.'[105]

A net-zero transition will necessitate a range of skills to be developed ranging from agroforestry and EVs (manufacturing, design, servicing, and recycling), to large-scale engineering projects and hi-tech renewable alternatives, energy efficiency construction skills, and the capabilities to retrofit heat pumps at the household level. Aside from being a critical enabler for the net-zero carbon transition, a nationwide reskilling programme alongside investment in research and development will also have a large economic boost, an employment multiplier, and should be particularly concentrated in areas either suffering from a short-term recession or long-term industrial decline.

Tree planting: New scientific evidence suggests planting trees and restoring habitats is perhaps one of the most effective means of tackling climate change because of the capacity to remove carbon from the atmosphere.[106] To reach net zero by 2050 at least 1.5 billion new trees will have to be planted, at a planting rate of 30,000 hectares per year.[107] However, only 1,420 hectares of new woodland were planted in England last year and less than 10,000 hectares were planted on average over the last five years.[108] Scaling up of 30,000 to 50,000 hectares per year is possible and was achieved when supported by policy in 1980s.[109] However, for a widespread tree-planting programme to be feasible for a green stimulus, important barriers and obstacles would need to be addressed in the coming years. While the Forestry Commission has already identified five million hectares of low-risk areas for afforestation, planning and the approvals process need to be simplified.[110] Alongside this, the CCC has suggested the entire forestry supply chain needs scaling up (i.e., increasing seed production and nursery capacity to grow saplings) and reskilling of the workforce to plant and manage trees would be required.[111]

Heat pumps: Retrofitting homes and buildings with heat pumps to replace gas boilers is one of the most important means of reducing household and business sector emissions. However, the CCC has specifically noted that decarbonising heat in existing homes is one of the areas that the UK is struggling with most and delivery must progress with far greater urgency. While gas boiler sales continue at over one million per year, heat pump sales in 2017 were fewer than 20,000. Alongside home insulation, the total system cost of heat de-carbonisation could be £6.2 billion higher per year to 2050 without these energy efficiency measures.[112] The CCC does not assume technology cost reductions – but scaling up of the heat pump industry should result in future cost savings through efficiencies of scale. However, supply chain and market development need to be encouraged now for this to be a feasible option in the future. In addition, there is currently a significant gap in the availability of qualified heat pump installers. At the same time, homes need to be better insulated before the benefits of heat pumps can be properly reaped. If these issues are addressed in the short term, then a nationwide programme aimed at retrofitting buildings with new heat pumps would be an extremely strong candidate for a future green stimulus package. Like home insulation, it would then have a short lead-in time and could be rolled out either right across urban and rural areas, or else targeted where economic activity is most needed.

Supplementary measures: Important supplementary investment could be made in walking, cycling, and bus infrastructure. The carbon abatement value of these measures on an individual basis may be relatively smaller but collectively, they have an important impact and are necessary for a low-carbon transition. The CCC estimates that adequate investment in cycling, walking, and public transport could reduce car miles by 10%. In addition, these measures could be particularly effective in stimulating economic activity quickly given their smaller size and minor lead-in times. In addition, they have high employment and GVA multipliers and can be carried out at the local level – and thus can be specifically targeted at particular areas and regions.

3.4 ILLUSTRATIVE STIMULUS PACKAGES

Based on this analysis, we set out four illustrative green stimulus packages to meet differing recessionary shocks over the coming decade. The packages are designed to maximise recovery during a recession when monetary policy is likely to be far less effective than in the UK's recent past

TABLE 3.2: ILLUSTRATIVE OPTIONS FOR DISCRETIONARY STIMULUS FOLLOWING DIFFERENT TYPOLOGY RECESSIONS DURING THE EARLY 2020S

ALL FIGURES ARE PRESENTED AS A PERCENTAGE OF NOMINAL GDP IN THE YEAR OF A RECESSION (UNLESS OTHERWISE STATED) AND REPRESENT CUMULATIVE VALUES OVER A 3–4-YEAR PERIOD

		Scenario 1	Scenario 2	Scenario 3	Scenario 4
Indicative size of shock (maximum contraction following recession, % pre-recession level GDP in constant prices)		8	16	8	16
Date range of recession (indicative)		Q1 2020 to Q4 2021		Q1 2022 to Q4 2025	
Size of monetary offset (equivalent % GDP)		1	1	2	2
Size of 'non-green' fiscal offset (% GDP)		4	8	2.5	6
Of which: Itemised public investment within different priority areas for green infrastructure (% GDP)	Home insulation	0.5	0.6	0.4	0.7
	EVs and charging networks	0.2	0.4	0.3	0.4
	Flood and drought defences	0.2	0.4	0.3	0.4
	Renewable Energy	0.3	0.4	0.4	0.5
	Energy network	0.2	0.5	0.3	0.6
	Walking, cycling & bus infrastructure	0.2	0.3	0.1	0.3
	Skills and R&D	0.2	0.2	0.1	0.2
	Tree planting	0.1	0.1	0.2	0.2
	Heat pumps	0.1	0.1	0.4	0.7
Total green stimulus (% GDP)		2	3	2.5	4
Total discretionary stimulus (fiscal and monetary, equivalent % GDP)		7	12	7	12

Note: This table illustrates the possible quantum and composition of discretionary monetary and fiscal stimulus for different scenarios of recessions during the first half of the 2020s. The precise figures are based on qualitative judgments and quantitative analysis by the authors, and with respect to (a) the expected headroom for monetary policy as set out in Chapter 2; (b) the principles for effective green infrastructure stimulus set out in Table 3.1; (c) a high-level feasibility assessment of the total maximum investment possible in the UK within a given area of infrastructure, both within a year and in total; and (d) the total amount of abatement required from different areas of infrastructure to meet carbon abatement targets significantly earlier than the CCC's recommendation of 2050.

(Chapter 2). Given the principles and framework outlined in this chapter, our packages would have a significant bang for buck and could be flexibly tailored to entail a component that specifically targets spending and investment at low-income households and regions in need of new economic activity. Indeed, this type of targeting would prove more effective at stimulating aggregate demand – given the higher marginal propensity of lower income households to spend – but would also help to significantly rebalance the economy and raise the living standards of the places, communities, and people that need it the most.

Of course, investment in many of these projects and the below recommendations should be carried out irrespective of the phase in the economic cycle in the form a Green New Deal. Our recommendations would fit within a broader Green New Deal as part of a policy package to stimulate aggregate demand in the short- to medium-run. On the other hand, our green stimulus package could also be adopted in the absence of a wider Green New Deal. In any case, it is important to note that for the stimulus to

have its desired effect on aggregate demand, projects would have to be in addition to existing planned public investment – in the form of new projects, projects that have been brought forward, or projects that shift from the private sector to the public sector which would otherwise have been dropped during an economic downturn. Recent analysis from Tom Bailey *et al* (2019) has shown that decarbonising UK energy by 2030 will require investment of 1.9% of GDP each year (from a blend of private and public sector finance). Where such investments may come under threat due to an economic downturn, there is clearly scope for a large portion of green stimulus to come from state guarantee or direct financing of pipeline project that would have otherwise come from the private sector.[113]

To illustrate the size and shape of possible green stimulus, we consider both a small- to medium-sized contraction and a larger shock respectively. In response to each, we set out possible green stimulus packages as part of wider discretionary fiscal package, which might also include increases in social security payments and cuts in consumption taxes. We set out illustrative versions of these stimuluses for a recession within the next 1–24 months and for a recession later in the 2020s respectively, giving us four scenarios overall (Table 3.2).

For a small- to medium-sized contraction within the next two years we call for government to deliver a green stimulus of at least 2.0% of GDP, spread over a minimum of a three year period following economic shock. This would sit alongside a small monetary stimulus up to the current maximum headroom of around 1% of GDP, and other discretionary fiscal measures such as an increase in means-tested benefits and cuts in consumption taxes, in addition to any other focused tax or expenditure measures designed to tackle some of the specific symptoms of a recession. Assuming a medium-sized recession were to take place next year in 2020/2021, the size of green stimulus implied by Table 3.2 would be around £30 billion spread out across the following three years – but the precise package could be smaller or larger depending on the composition of the recession and other supply-side adjustments in the economy. As with all recessions, time would be of a premium. As a rule of thumb we recommend that between a third and a half of the overall package is spent within the first 12 months, with as much of that as possible spent in the first six months.

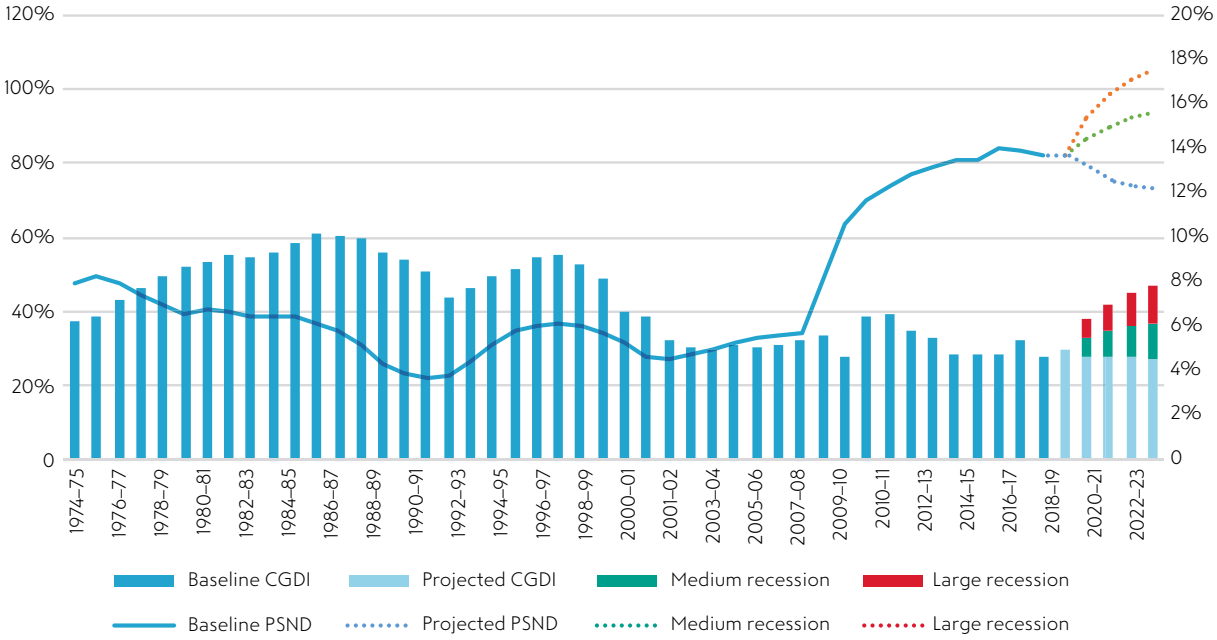
For a larger-sized shock within the next two years (more similar in approximate size to the 2008 financial crisis) we envision a green stimulus of around 3.0% of GDP (around £50 billion in 2020/2021 terms) spent over a minimum of three years. Here the profile of spending may need to be frontloaded slightly less aggressively as a proportion of the overall investment, since it will be near the maximum of what can be deployed and absorbed on productive public investments at short notice and within a single year. Nonetheless, we recommend that as close to a third of the overall stimulus as possible is delivered within the first 12 months following economic shock.

New analysis produced for this report also gives an indication of the quantum of impact such stimulus packages might have on the public finances. Our illustrative results – based on counter factual, typology recessions constructed on the basis of the UK's recent experience and projections for a no-deal Brexit[114] – are set out in Figures 3.4 and 3.5. Figure 3.4 shows that despite debt rising to the highest level since the 1970s, the peak in overall debt-financing costs would likely be lower than that seen during recessions in the late 1980s and early 1990s. Annual public sector borrowing would rise as well, but would also remain within the bounds of recent historical precedent. The stimulus required for a medium-sized recession would see annual borrowing rise to similar levels as seen following the previous global financial crisis. Furthermore, indicative stress tests on our model show that debt would be even *higher* as a proportion of GDP without a discretionary stimulus, partly because of lower GDP overall and partly because of higher borrowing on the automatic stabilisers due to higher welfare costs and lower tax receipts. By any sensible assessment, therefore, there is clearly sufficient scope to responsibly finance a significant green stimulus during a recession through temporary public borrowing. If required, longer-term debt and borrowing could also be stabilised after four to five years, in part through progressive tax rises.

In the short term, the immediate priority for government would be to start on the necessary planning and development in advance to make

FIGURE 3.4: DURING A RECESSION, PUBLIC DEBT WOULD NEED TO RISE, BUT THE OVERALL COST OF DEBT FINANCING WOULD LIKELY REMAIN WITHIN HISTORICAL NORMS

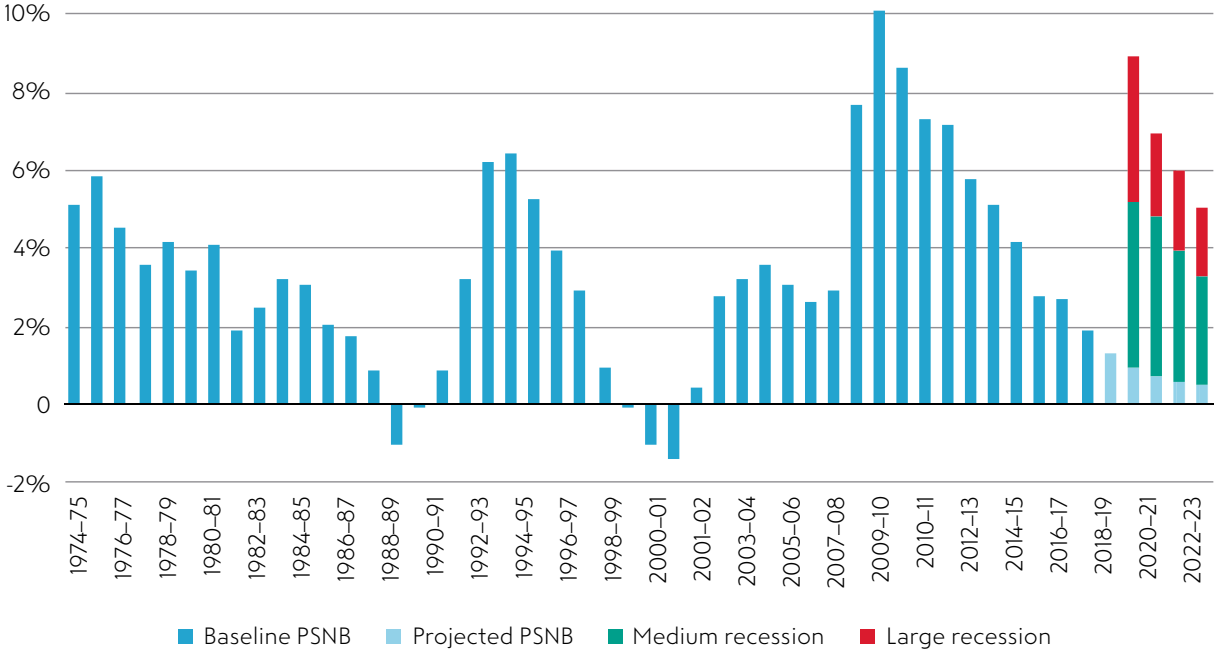
PUBLIC SECTOR NET DEBT (PSND, LEFT-HAND SIDE) AS A PROPORTION OF GDP AND CENTRAL GOVERNMENT DEBT INTEREST (CGDI, RIGHT-HAND SIDE) AS A PROPORTION OF TOTAL GOVERNMENT RECEIPTS, OUTTURN, PROJECTIONS, AND NEF COUNTERFACTUAL SCENARIOS, 1974/1975 TO 2023



Source: NEF analysis based on OBR 2019, various: Public Data Bank, Economic and Fiscal Outlook 'supplementary tables' and Fiscal Risks Report 'ready reckoners'

FIGURE 3.5: DURING A RECESSION, PUBLIC BORROWING WOULD NEED TO RISE BUT WOULD REMAIN WITHIN HISTORICAL NORMS

PUBLIC SECTOR NET BORROWING (PSNB) AS A PROPORTION OF GDP, OUTTURN, PROJECTIONS, AND NEF COUNTERFACTUAL SCENARIOS, 1974/1975 TO 2023



Source: NEF analysis based on OBR 2019, various: Public Data Bank, Economic and Fiscal Outlook 'supplementary tables' and Fiscal Risks Report 'ready reckoners'

such a large infrastructure investment possible at short notice and over short time frames. In the longer-term, the share of green infrastructure investment within a wider stimulus – and in addition to baseline green investment – could be slightly larger (Table 3.2). This is partly because the baseline investment in, and maintenance of, green infrastructure should also be significantly larger given we will be further down the path towards decarbonisation, and public spending can more easily step in to fund private sector projects that might be put under risk by an economic downturn. But this judgement is also contingent on the government acting between now and then to prepare an emergency pipeline of projects specifically for the purpose of increasing green infrastructure spending during a recession. In particular, we assume the government prioritises the removal of barriers to further high-value projects, such as access to land for tree planting or skilled workers for heat pump installation, over the next two years.

Home insulation and heat pumps (in the 2–5-year scenario) would take up the biggest proportion of stimulus spending. To action this, the government could launch a programme that retrofits insulation and heat pumps in social housing across the UK. This could be complemented by a more targeted programme that offers to install insulation and heat pumps to households on the lowest incomes, alongside a potentially subsidised scheme (either loans or grants) for landlords and other owner occupiers. Accordingly, the government should establish a national agency that commits to help retrofit all homes across the UK. This is something that would likely need to be established in advance of any recession, however, and should be made an urgent priority. In addition to implementing these suggestions, this new agency could look to cover all costs of a particular activity – such as loft insulation (needed for over 20 million homes and costs about £350 for an average semi-detached house), whilst subsidising or offering grants for the more expensive solid-wall insulations.

The EV and recharging network element of the stimulus package could involve the government establishing a national infrastructure programme for building rapid chargers and connecting them to the grid, alongside subsidising the purchase of new EVs for households. Considerable subsidies for EVs could be offered to households on the lowest incomes, whilst rapid chargers could be targeted at the regions and places in most need of investment. Whilst such chargers may not be used much initially, the investment and ensuing construction activity will boost employment and spending, helping spur a virtuous cycle of feedback loops and spill-over effects that would lead to more investment, spending, and economic activity.

Scaling up investment in renewables and the energy network could similarly be implemented through a new national agency. Not only would this introduce some much-needed competition into the energy sector but it would also increase the amount of assets held by the public sector – something which was actually started by the Green Investment Bank (GIB) in 2012 but which was never scaled up as the GIB was sold to the private sector in 2017.[115] With a public stake in these energy infrastructure assets, any financial dividends could be redistributed to local authorities for more investment and spending.

Investment in flood defences, drought resilience, and tree planting are measures that are relatively easy to deploy and critical to a comprehensive climate change response. These measures will be stronger and more effective if executed by local governments. This would be contingent, however, on robust 5-year forward-looking project plans being created at the local level, encompassing contingency blueprints, so that projects could be brought forward if necessary.

Finally, a Just Transition reskilling programme could be launched across the UK, supported by a new Just Transition Fund,[116] via a combination of new and existing agencies at national and local level. This is an essential prerequisite for the net-zero investment response, that could be launched alongside vital new investment in research and development.

4. FISCAL AND MONETARY COORDINATION – TOWARDS A NEW SETTLEMENT

The core arguments set out in this report – macroeconomic policy needs to do more to support zero-carbon transition and this includes the explicit policy response to a recession – are growing in recognition across the UK policy landscape. However, the underlying institutional cultures of macroeconomic policymaking in the UK as yet remain largely at odds with this agenda.

Overall, the dangers are twofold, but both pertain to the coordination and alignment of monetary and fiscal policy around a new agenda. First, even if the overwhelming arguments in favour of a large fiscal response to the next recession are heeded, and green infrastructure forms a predominant part of the package, the nature of institutional delegation and objectives makes it likely that this stimulus will be too short-lived. Second, left unreformed, any monetary policy response is unlikely to be sufficient to complement green investment – and may even bias markets against it.

In this chapter, we set out a brief overview of the problems alongside some of the options for longer-term, institutional reform. More detailed policy work in this space should be an urgent priority both inside and outside government, to ensure that the coordinated policy response to future recessions is used to accelerate progress towards a zero-carbon transition, rather than hinder it.

4.1 MONETARY AND FISCAL POLICY LACK COORDINATION

As with most advanced economies, the UK's most influential macroeconomic institutions – the Bank of England and the Treasury – operate under a formal division of labour. For some time now they have been pulling in opposite directions, as if at some sort of tug of war.

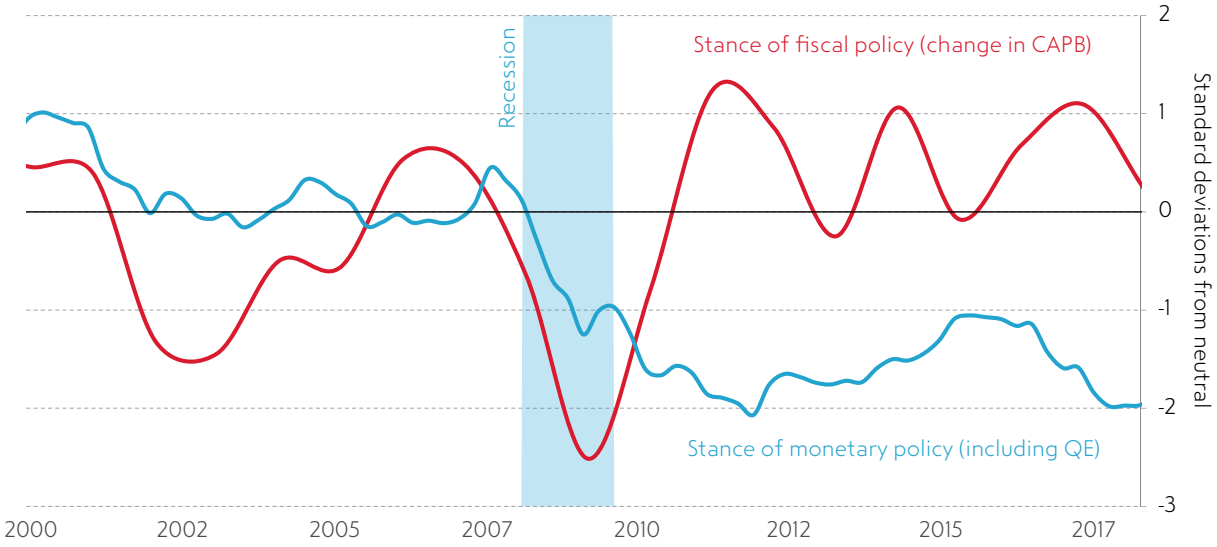
The Bank of England is tasked with managing aggregate demand (spending and investment) and the ebb and flow of the economic cycle, and operationalised by the objective to meet a 2% inflation target. Fiscal surpluses and deficits invariably have a significant impact on aggregate demand. But discretionary fiscal policy is normally set with reference to debt and borrowing targets rather than targets of aggregate demand, such as inflation or employment in the economy.

Despite facing the largest recession in post-war history, and widespread acknowledgement that monetary policy had become constrained, expansionary fiscal policy was withdrawn prematurely due to political commitments to reduce public debt and borrowing: austerity. So while the Bank was trying to do its job of boosting aggregate demand (spending and investment in the private sector), the Treasury was running fiscal austerity, which had the opposite effect. Figure 4.1 shows that although monetary policy has been forced to remain loose for much of the decade so far, the stance of fiscal policy has pivoted sharply towards taking demand out of the economy.

We also know that this tug of war between monetary and fiscal policy caused significant harm to the recovery of living standards. As discussed in Section 2.2, the isolated effect of withdrawing fiscal stimulus year-on-year was to suppress gross income by tens of billions every year up to 2018/2019. Figure 4.2 also provides a strong indication that monetary policy has failed to offset this damage.

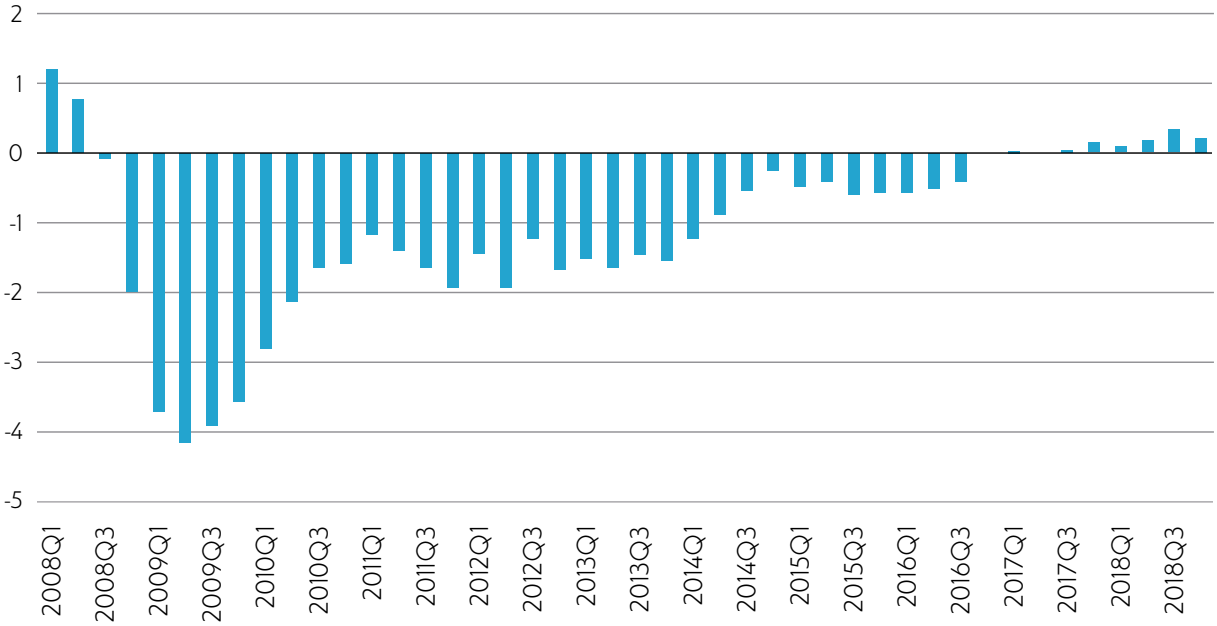
An economy's output gap – the difference between what the economy is producing, and its supposed potential given available technology and people's willingness to work – measures whether resources and living standards are being wasted. There are fundamental limitations to how an output gap could ever possibly be measured accurately, indeed otherwise well-respected macroeconomic models regularly produce widely contradictory estimates of the output gap, which also differ significantly from the OBR's latest estimates set out

FIGURE 4.1: FISCAL POLICY STARTED WORKING AGAINST MONETARY POLICY AFTER 2010
MEASURES OF THE 'STANCE' OF MONETARY AND FISCAL POLICY (STANDARD DEVIATIONS FROM NEUTRAL), 2000 TO 2018



Source: Resolution Foundation (2019)[140]

FIGURE 4.2: PROGRESS TOWARDS CLOSING THE OUTPUT GAP STALLED AFTER FISCAL STIMULUS WAS WITHDRAWN
OBR CORE ESTIMATE FOR THE UK OUTPUT GAP (% GDP), Q1 2008 TO Q3 2018



Source: OBR (2019) March 2019 Economic and fiscal outlook – charts and tables: economy
https://obr.uk/efo/economic-fiscaloutlook-march-2019/

in Figure 4.2.[118] The OBR's latest estimates suggest the gap closed reasonably quickly following the recession, coinciding with the joint stimulus from both monetary and fiscal policy. But following the tightening of fiscal policy in 2011, the output gap stopped closing and remained between 1% and 2% of GDP for almost four years. [119] Thus, even by conservative mainstream standards, fiscal austerity led the economy to perform far below its potential.

The experiences of the 2008 recession support wider arguments that the current institutional arrangement is poorly equipped to conduct a sustained, effective, and coordinated monetary and fiscal response to a recession. Reforming the framework will require sustained research and development from a number of organisations over the coming months and years. It will be a particular area of policy interest for NEF going forward. For the purposes of this report, however, we set out two directions of reform that could be considered with regard to the coordinated management and deployment of fiscal space – i.e., the government's scope to increase its borrowing and debt – by both the Treasury and the Bank of England.

4.2 REFORMING THE FISCAL RULES

Essentially, the current fiscal rules assume that the best time to use so-called fiscal space (the extent to which national governments can take on more public borrowing without harming their economy) is via the temporary automatic stabilisers during the immediate aftermath of a recession (Section 2.2). This leads to two related problems. First, the drive to reduce debt and borrowing after a recession leaves open the danger that fiscal stimulus will be unwound too quickly. Ultimately the decision will be at the discretion of politicians, but the expression of macro fiscal targets solely in terms debt and borrowing increases the likelihood of this mistake. Second, such rules tend to bias against preventative investment outside of recessions more generally. With respect to climate change, this makes little logical sense. Preventative investment to reduce current and future emissions today is much more efficient than waiting to intervene until after the planet has already warmed up. Holding back fiscal space will be an entirely inappropriate contingency when faced with increased flooding and land shortages caused by rises in global temperature and sea levels.

Nonetheless, the first step to solving this problem can be achieved through evolution rather than revolution, in the current rationale underpinning the fiscal rules. Even within mainstream economic literature, the validity of using the existing stock of debt as a proxy for responsible future borrowing has been discredited.[120] In the UK, the Treasury should begin work immediately on how to define new fiscal targets borne from a more sophisticated analysis of how and when to use fiscal space. Doing this effectively will require the development of two new analytic tools:

- First, development of a framework for assessing, measuring, and forecasting 'fiscal space'. Fiscal space should be defined in terms of the threshold beyond which there is a significant risk of adverse economic effects (e.g. the risk of causing a crisis in private investment, treasury bond issuance, or a collapse in the value of sterling). New research at the IMF has set out the beginnings of a framework to measure a given country's fiscal space through an assessment of exposure to shock, access to finance, and present economic and institutional structures.[121] Building on the work at the IMF and insights from increasingly popular Modern Monetary Theory,[122] a systematic approach to measuring fiscal space – based on the resource capacity of the economy – should be modified, trialled, and formalised for a UK context. Such a framework would allow the Treasury to more accurately assess the level of fiscal space available to the UK at a given point in time.

- Second, a framework for conducting cost-benefit analyses of how to use fiscal space (through higher or lower levels of debt and public borrowing) is needed. The Treasury should look to adapt and develop existing cost-benefit methodologies to assess the comparative effects of different uses of fiscal space with respect to either averting or responding to future economic shocks. Assessing scenarios in response to climate-related risks should predominate, but risks related to demography and the financial system should also be included. Such a tool would allow policymakers to accurately assess the implications of holding back fiscal space compared with the implications of borrowing for investment, and therefore allow politicians to come to an informed view on the best combination of fiscal intervention or fiscal prudence at a given point in time.

Development of these tools would allow fiscal policy to operate with a greater level of sophistication than present day monetary policy. Just as it is considered equally harmful to overshoot or undershoot the inflation target, so too should it be considered just as irresponsible to underuse fiscal space as it is to overuse it. This principle is true at all times, but the stakes are especially high today in view of the climate consequences of failing to re-embed the economy within safe limits on time.

4.3 CO-CREATING FISCAL SPACE

In view of a more sophisticated framework for macro fiscal policy, it would also make sense for fiscal space to become a greater focal point for tighter coordination between monetary and fiscal policy. Indeed, both throughout history and even among advanced economies today, central banks and treasuries have successfully used such coordination to tackle some of the biggest socio-economic challenges of their time, from post-war recovery to supporting ambitious industrial or socioeconomic transformation.[123]

Besides the stated objectives of current policies like QE – reducing long-term interest rates by buying up debt in the marketplace – buying up public debt also has powerful spill-over effects for fiscal space. In the UK, the Bank of England continues to hold £435 billion of government debt.[124] In doing so, the Bank ensures demand for this debt remains strong, pushing down the interest rate that government is expected to pay. In the UK's case, this has contributed to a decade of record-low borrowing costs for the Treasury.

The direct effect of this is to significantly increase the government's fiscal space beyond what it would otherwise have been. The Bank's QE programme therefore significantly increased the scope for productive public spending, but this opportunity was largely wasted by economically harmful austerity politics and the accompanying tightening of the fiscal rules under Coalition and Conservative governments. Failure to make the most of this fiscal space also made it harder for the Bank of England to deliver on its own objectives as well, since after 2009 the Bank of England could not cut interest rates any further directly to stimulate economic recovery.[125]

Accordingly, in the event of another economic downturn, the Treasury and Bank of England could coordinate by launching a green fiscal stimulus expansion alongside an expansion of a QE programme. The QE programme would primarily be launched to offset any potential increase in interest rates resulting from a fiscal expansion. Indeed, this would not be unprecedented – the Bank of Japan has been successfully targeting 0% interest on 10-year government loans for some time now. Historically, central banks and treasuries have coordinated their activities, in different ways, to help tackle some of the biggest socio-economic challenges of their time. By reviewing IMF data for 13 advanced economies from the 1930s to the 1970s, Josh Ryan-Collins and Frank van Lerven demonstrate that treasuries have successfully cooperated with central banks to help finance government expenditure.[126] These ideas have been endorsed by a number of leading economists[127] – and most recently by a trio of distinguished ex-central bankers.[128]

Besides a new framework for managing fiscal space at the Treasury, a green stimulus may also require a revised institutional arrangement to support the operations of the Bank of England and monetary policy more broadly. This could include introducing new supplementary targets in the Bank's mandate. A third institution should be introduced – such as a national investment bank (NIB) or network of regional public banks – to increase commercial lending to green industries, housing, and technological innovation.[129] Instead of using the Bank of England balance sheet to purchase corporate bonds from the private sector, the Bank should use its QE power more strategically to finance the NIB. Such a NIB would need a democratic mandate or mission from the government (e.g. from Her Majesty's Treasury) to support a low-carbon transition.

Indeed, there are a number of historical precedents for this more strategic form of QE. The most notable examples include the US Treasury in the 1930s, which used the Federal Reserve Bank to help finance the publicly owned Reconstruction Finance Corporation — at the time the world's largest bank — to support Roosevelt's New Deal Policies to help the USA out of the Great Depression.[130]

The advantage of this approach is that it would also help to provide a backstop against short-term political negligence by the government in the form of underusing fiscal space for ideological reasons: a surplus bias.[131] In exceptional circumstances – such as the government demonstrably failing to provide sufficient stimulus during a large economic shock – the Bank of England could be given the power to delegate additional direct investment in green infrastructure to the NIB.

4.4 MONETARY POLICY IS NOT GREEN ENOUGH

The Bank of England's previous monetary policy stimuli have been somewhat biased towards carbon-intensive activities.[132,133] Underpinning the Bank's monetary policy operations is a carbon bias, most pertinently in its collateral framework, which determines the assets that can be used as collateral by commercial banks in exchange for funding from the Bank of England. For example, the £125 billion Term Funding Scheme allows commercial banks and building societies to borrow (or refinance) from the Bank of England at a low rate. To borrow from the Bank under this scheme, commercial banks and building societies need to put down collateral. Problematically, the risk measures the Bank uses to determine what collateral is safe enough to hold on its balance sheet are based on private sector credit rating agencies. These agencies do not account for climate change risks in their internal credit assessments of models. By not accounting for climate change risks, carbon- and fossil-fuel-intensive assets are offered lower discount rates – and green and more sustainable assets at higher discount rates – than would otherwise be the case.

In a similar vein, the Bank of England's £10 billion corporate bond purchase programme uses a 'market neutral approach' that is supposed to mirror the composition of current financial market capitalisation.[134] By mirroring the set-up in financial markets, it also ends up reflecting the same biases, market failures, and negative effects embedded within regular market operations. As financial markets are considerably skewed towards carbon-intensive activities, the Bank's corporate bond purchases end up reinforcing this carbon-intensive bias. Empirical evidence, for example, suggests that nearly 50% of purchases were from manufacturing and electricity sectors, generating 52% of emissions but providing just 11.8% of GVA.[135]

Importantly, the Bank's collateral framework and asset purchases have a profound impact on the economy influencing the price and allocation of capital in financial markets. When the Bank of England purchases assets or accepts them as collateral, the yields of these assets are lowered relative to other comparable ineligible ones. Because the current structure of corporate asset purchases and the collateral framework are skewed towards fossil fuels and carbon-intensive assets, the Bank ends up creating better financing conditions – an implicit subsidy – for these sorts of activities. Accordingly, in these respects, the Bank's previous monetary stimuli have been at odds with a net-zero transition and helped reinforce a carbon lock-in.[136]

It is important, therefore, that in the event of another potential downturn, the Bank's operations do not exacerbate climate-related financial risks and that it re-aligns its asset purchase programmes and collateral frameworks with the goals of a net-zero transition.

4.5 GREENING MONETARY POLICY AND GUIDING CREDIT FLOWS

Integrating climate-related risks into the Bank's collateral framework would be a step in the right direction, but may not be an immediately available option in the short term, as it can take time to adequately asses the risk profile of certain assets, etc. Accordingly, the Bank of England could temporarily adopt a precautionary approach and steer credit and investment into sustainable and green activities. This would include offering certain green or more sustainable assets favourable funding conditions when commercial banks and building societies look to refinance at the Bank of England. The most carbon- and fossil-fuel-intensive assets could also be excluded from Bank's collateral framework (however, this sudden change may not necessarily be advisable in the immediate aftermath of a downturn).

Alternatively, the Bank could deploy other refinancing operations to foster green forms of bank lending. For example, the Bank's Term Funding Scheme could be recalibrated to offer better financing conditions to banks able to demonstrate

that they are lending for green activities. Most pertinently, an expressly lower refinancing rate could be targeted at bank lending for non-financial business investment in sustainable activities. Recent empirical evidence suggests that these sorts of programmes are being carried out in emerging and developing countries,[137] and were used to great effect in the past by advanced economies.[138]

In addition, the Bank of England could implement a green form of QE – for example, where exclusively environmentally friendly bonds issued by corporates are purchased by the Bank. Evidence suggests that such a programme could help reduce global warming.[139] Indeed, if this programme ended up being permanent in nature – with a long-term horizon – and formed a part of the government's industrial policy, it would be far more effective and help stabilise the financial system in the long-run.

Another possible approach is for the Bank's QE programme to purchase bonds issued by a public intermediary – such as a green public investment bank. The green public investment bank could then finance lending for green infrastructure investments or green small and medium enterprise (SME) loans. The Bank of England might be more comfortable with this approach since the bonds would ultimately be underwritten by the state. Alternatively, in certain cases, the green public investment bank could fund grants to support green public investment projects (in which case no private debt would be accumulated). In any case, a lower interest rate and more credit would be channelled into the real economy for green and sustainable activities.

5. KEY MESSAGES AND RECOMMENDATIONS

KEY MESSAGES

- The UK is currently facing two momentous policy challenges: first, an urgent need to address environmental breakdown; second, the current vulnerability of the UK economy to the next recession and the potential powerlessness of monetary policymakers to aid a sustainable and prosperous recovery.

- The failure to respond to the last recession by scaling up investment to meet climate targets was a missed opportunity. If just a third of the funds used for tax cuts were instead deployed as part of home insulation programme – residential emissions would be 30% lower and after just three years, the energy savings to household bills would amount to the underlying cost of the programme.

- UK policy makers urgently need a readily available blueprint that can help them navigate the next economic downturn. This plan should contain the **largest green stimulus that is feasibly possible –** one that aims to boost zero-carbon infrastructure and entails a significant reskilling and training programme.

- There are numerous green shovel-ready projects and small/medium sized measures that can be deployed quickly and at scale. Given the lack of a meaningful recovery to the last recession, too much emphasis is afforded to short-term measures that might immediately stimulate aggregate demand and ultimately the longer view is often missed.

- There are a number of key criteria worth considering when selecting projects and measures for a green stimulus – such as with regard to the length of required lead in time, the ability to enable future green investment, and the size of impact on economy wide spending, among others. We apply these criteria to build illustrative green stimulus package (see Table 5.1 below), designed to respond to recessions of different size over the next five years.

- Our analysis of the public finances in response to recession shows that debt would be even *higher* as a proportion of GDP without such a green stimulus package, due to lower GDP, higher welfare costs and lower tax receipts. Despite a green stimulus resulting in rising debt, the peak in overall debt financing costs would likely be lower than that seen during recessions in the late 1980s and early 1990s.

TABLE 5.1: ILLUSTRATIVE, 3–4-YEAR GREEN STIMULUS FOR DIFFERENT TYPES OF RECESSIONS DURING THE EARLY 2020S

FIGURES % OF LEVEL GDP FOLLOWING A RECESSION UNLESS OTHERWISE STATED AND CUMULATIVE OVER 3–4 YEARS

Indicative Size of Shock (% pre-recession GDP)	Time Period	Home Insulation	EVs and Charging Network	Flood and Drought Defences	Renewable Energy	Energy Network	Walking, Cycling, Bus Infrastructure	Skills and R&D	Tree Planting	Heat Pumps	Total Size of Stimulus
8	Next 1–24 months	0.5	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.1	2
16		0.6	0.4	0.4	0.4	0.5	0.3	0.2	0.1	0.1	3
8	Next 2–5 years	0.4	0.3	0.3	0.4	0.3	0.1	0.1	0.2	0.4	2.5
16		0.7	0.4	0.4	0.5	0.6	0.3	0.2	0.2	0.7	4

KEY POLICY RECOMMENDATIONS

- Better to plan for failure, than fail to plan: all branches of the government need to start formulating long-term plans for making a green transition. Within such plans there should be contingency strategies and measures to be implemented in the event of an economic downturn. Climate change is too big a threat for the lack of 'shovel-readiness' and insufficient government planning to be the limiting factor that ultimately delays or derails a green transition for the economy.

- The government should establish new national agencies that are specifically responsible for:

  1. Retrofitting all homes across the UK.

  2. Scaling up investment in renewables and the energy network.

  3. Significantly increasing the planting of trees across the UK.

  4. A national infrastructure programme for building rapid EV chargers and connecting them to the grid, alongside subsidising the purchase of new EVs for households.

- Fiscal and monetary authorities need to better coordinate their activities to co-create fiscal space and align their operations towards environmental objectives, especially in the event of a downturn. Fiscal rules need to be reformed, so that a framework for assessing fiscal space and analysing the costs and benefits of using this fiscal space is available. Monetary policy operations should be greened, and the Bank of England should actively steer credit flows towards green sectors and activities.

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