



The Best of Both Worlds:

How tackling cost-of-living
and decarbonisation
creates win–wins for the
UK economy

June 2022

**ACHIEVING
ZERO**

CLG UK Members



CLG UK Affiliate members



CLG UK Associate members



The University of Cambridge Institute for Sustainability Leadership

The University of Cambridge Institute for Sustainability Leadership partners with business and governments to develop leadership and solutions for a sustainable economy. We aim to achieve net zero, protect and restore nature, and build inclusive and resilient societies. For over three decades we have built the leadership capacity and capabilities of individuals and organisations, and created industry-leading collaborations, to catalyse change and accelerate the path to a sustainable economy. Our interdisciplinary research engagement builds the evidence base for practical action.

Authors and acknowledgments

This report was prepared by Beverley Cornaby and Sanna Markkanen, with support from Eliot Whittington, Serena Liuni and Isabelle Cross.

We would like to acknowledge UK Corporate Leaders Group members, CISL colleagues, Cambridge Econometrics and external reviewers for their input, constructive comments and feedback on this report.

Citing this report

University of Cambridge Institute for Sustainability Leadership (CISL). (2022). *The Best of Both Worlds: How tackling cost of living and decarbonisation creates win-wins for the UK economy*. Cambridge, UK: CLG UK.

Copyright

© 2022 University of Cambridge Institute for Sustainability Leadership (CISL). Some rights reserved. The material featured in this publication is licensed under the Creative Commons Attribution-NonCommercial-ShareAlike License.

The opinions expressed here are those of the authors and do not represent an official position of the Corporate Leaders Groups, CISL, the wider University of Cambridge, or clients.

Contents

Executive summary.....	3
Introduction	4
The impact of the dual crises on the UK	5
Support for rising cost of living in the UK	5
UK climate action – a step closer to net zero emissions.....	6
How tackling the cost of living could support decarbonisation	6
Approaches to mitigate the cost-of-living crisis	7
The three policy packages.....	7
Key findings	8
In summary	10
The role of policy	11
The role of business	15
Business can lead the way towards a net zero economy.....	15
The energy crisis is impacting UK businesses.....	15
Actions businesses could take to address the cost-of-living crisis in a net zero compatible manner	16
Policy measures that could support effective business action	17
Conclusions and recommendations	18
The role of business	18
Annex 1: The E3ME model	19
Limitations to the modelling	19
Annex 2: Policy scenarios.....	21
Annex 3: Findings.....	23
Economic impacts	23
Social impacts	23
Environmental impacts.....	26
Conclusions.....	28
References.....	29

Executive summary

The UK is in the midst of dual crises, with a cost-of-living crisis adding to the climate crisis. Both of these crises disproportionately affect the poorest and most vulnerable in society, who also have fewest resources to cope with changing circumstances. It is vital we tackle both crises with the urgency they require. Policy measures to address the cost-of-living crisis can be just as, if not more, effective when designed to align with the UK's net zero target. An aligned approach to addressing the cost-of-living crisis and decarbonisation challenge could create win-wins for the UK economy.

Globally, countries are witnessing the worst cost-of-living crisis in decades, with the price of food, energy and fertilisers increasing rapidly. Even in developed countries, as many as one in four households are now struggling financially, with disposable incomes expected to fall further in 2022. In the UK, one estimate calculates that UK families are facing an increase in costs of £400 per month since last year, and inflation is currently at just over nine per cent – the highest level in over 40 years.

A key driver of higher UK inflation has been rising energy bills. In April 2022, the energy price cap rose significantly for the second time in one year, doubling the number of fuel-poor households overnight. Further price increases are expected, meaning by the end of 2022, household energy bills will have approximately doubled compared with the start of the year. As a result, government has provided support, targeting vulnerable households in particular. However, while these measures have been welcomed, they have also been criticised for not supporting businesses or providing a package of support to help improve household energy efficiency and lower energy bills in the long term.

Energy prices in the UK are expected to remain high, meaning that further cost-of-living support may be required. **In providing shorter-term support, it is vital all measures keep the UK on track to meet its longer-term climate targets and build an economy resilient to shocks.**

To examine what a cost-of-living crisis policy package that supports decarbonisation could look like, the UK Corporate Leaders Group (CLG UK) commissioned Cambridge Econometrics to undertake a modelling exercise. **Our evidence indicates that policies that align with the net zero target generate more favourable economic outcomes than other types of cost-of-living support policy packages, in addition to being more progressive through primarily benefitting the lowest income households most.**

Building on the modelling results, we propose a set of policy priorities as follows:

- 1) Align the cost-of-living support measures and strategy on energy security with the UK's net zero target by focusing on reducing demand and future vulnerability, through a range of measures designed to address the needs of different household income categories.** To maximise the benefits of public sector spending to mitigate the impacts of the cost-of-living crisis on UK households and economy, we would invite the government to consider the following actions:
 - Direct future cash payments to low-income households while also making it easier and more attractive for able-to-pay households to undertake energy efficiency improvements.
 - Ensure that all new domestic and commercial buildings are energy and water efficient.
 - Extend elements of the cost-of-living support package to businesses.
- 2) Align long-term incentives to encourage households and businesses to switch from fossil fuel systems to electric alternatives.**
- 3) Facilitate investment in affordable zero carbon energy and ensure a secure and stable electricity supply.**

Introduction

Globally, we are in the midst of dual crises. We were already dealing with a climate crisis, which governments around the world have committed to address. Now we are experiencing a cost-of-living crisis that is disproportionately impacting the most vulnerable and requires urgent political intervention.

A report¹ by the Intergovernmental Panel on Climate Change (IPCC) made headlines last year when it drove the UN Secretary-General to describe climate change as a “code red for humanity”.² The report itself highlighted how global warming has accelerated and we are getting dangerously close to a temperature rise of 1.5°C, which could have major implications for our exposure to climate risks. These climate risks disproportionately affect the poorest and most vulnerable, who also have fewest resources to cope with changing circumstances or a sudden disaster such as a drought or flooding. To protect the people and the planet, we must move to inclusive, green economies. The most urgent action is to address energy systems and the move away from fossil fuels.

Last year’s Conference of the Parties (COP), COP26,³ led to several significant outcomes in ramping up climate ambition globally. The UK government in leading the COP26 negotiations and the adoption of the Glasgow Climate Pact,⁴ led a global commitment to strengthen climate mitigation measures aimed to turning the 2020s into a decade of global climate action. The UK Presidency also supported the formation of the Glasgow Financial Alliance for Net Zero (GFANZ). GFANZ is a global coalition of leading financial institutions committed to accelerating the decarbonisation of the economy by directing their resources away from fossil fuels and mobilising capital towards activities and investments that support the transition to climate neutral economies.^{5,6} Another noteworthy development was the formation of a coalition of 20 countries, including the US and the UK, that agreed to stop the financing of new overseas oil and gas projects by the end of 2022. This agreement is expected to mark the turning of the tide in global energy investment towards a cleaner, greener future, shifting around US\$8 billion each year from fossil fuels to clean energy.⁷

However, progress towards carbon neutrality, and the prioritisation of decarbonisation as a major policy objective for this decade, risks being deprioritised in the face of the current cost-of-living crisis.

Globally, countries are witnessing the worst cost-of-living crisis in decades, with the price of food, energy and fertilisers increasing rapidly.⁸ The most recent cost increases fuelled by Russia’s invasion of Ukraine add to the crisis caused by the COVID-19 pandemic, which led to disruptions in global supply chains, eroded the income of around 60 per cent of the world’s workforce⁸ and caused global gas prices to surge as sudden increase in demand outstripped supply.^{9,10,11} Even in developed countries, as many as one in four households are now struggling financially.¹² Disposable incomes are expected to fall further in 2022,¹³ which will further affect households’ ability to pay for food, heating, electricity, socialising and bigger purchases. At the same time, income inequality is expected to increase, with the lowest income households being worst affected by the rising cost of everyday essentials and wage stagnation.¹⁴

Most countries are now taking steps to support their citizens with the cost-of-living crisis.¹⁵ In response to the crisis, the head of the International Monetary Fund has called on all countries to support the poorest members of society by subsidising food and energy costs.¹⁶

The impact of the dual crises on the UK

At a time when the UK government should be focusing on how it can ratchet up its own ambitions and climate action, the headlines are instead dominated by a cost-of-living crisis that is expected to result in the worst fall in living standards since the 1950s.¹⁷ This crisis, caused by high inflation driven in part by increasing energy prices, is outstripping wage and benefit increases.¹⁸ Support has been urgently sought from government for households, especially those on the lowest incomes, who are struggling with increasing costs of essential goods and services.¹⁹

It is vital that we tackle both the cost-of-living crisis and the climate crisis with the urgency they require. The most efficient solution would be a set of policies that address both crises simultaneously and put us firmly on track to a climate neutral, nature positive and socially inclusive economy.

Support for rising cost of living in the UK

The cost of living in the UK has risen significantly, with one estimate calculating that UK families are now facing an increase in costs of £400 per month since last year.²⁰ Measures of price increases suggest that inflation in the UK is currently at 9.1 per cent – the highest level in over 40 years.²¹ These impacts are disproportionately felt by those on the lowest incomes because increasingly higher bills means they have a much lower percentage of disposable income.¹⁸ There is also a risk of high inflation driving up interest rates, which could adversely affect mortgage owners and first-time buyers, reducing their spending power and increasing the risk of a housing market crash.¹⁰

A key driver of higher UK inflation has been rising energy bills. The government sets a price cap, which limits how much energy retailers can charge consumers for their default tariffs, to protect consumers and increase competition in the retail market.²² However, this price cap reflects the true cost of energy and thus increases as wholesale prices rise. In April 2022, the price cap rose significantly for the second time in one year, doubling the number of fuel-poor households overnight.²³ Further price increases to reflect the growing gas price in global markets are expected in October 2022.²⁴ In real terms, this means UK dual-fuel household energy bills rose by an average of £693 to £1,971 per year in April 2022,²⁵ and are predicted to rise by over £800 to around £2,800 or more, in October.^{26,27} This means that, by the end of 2022, household energy bills will have approximately doubled compared with the start of the year.

Because of these price rises, there has been increasing pressure on the UK government to provide support to struggling households. As a result, two support packages have been announced to date, the latest in May 2022.²⁸ These packages, targeting low-income households in particular, included a £400 payment towards energy bills for all households, a £650 Cost of Living Payment for those on means-tested benefits, a one-off £300 Pensioner Cost of Living Payment, a £150 Disability Cost of Living Payment and £500 million to increase and extend the Household Support Fund. These payments follow the £150 council tax rebate for households in bands A to D that was announced in March 2022.²⁹ However, while these measures have been welcomed, they have also been criticised for not supporting businesses or providing a package of support to help improve household energy efficiency and lower energy bills in the long term.³⁰

UK climate action – a step closer to net zero emissions

In late 2021, the UK government released its Net Zero Strategy,³¹ setting out the policies and proposals for how the UK would meet its 2030 and 2050 climate targets.^{32,33,34} The strategy was a bold response to the climate crisis, indicating the UK government's commitment to both driving down emissions and transforming our economy. It set a high standard for other countries to emulate, covering a breadth of issues that demonstrated an understanding of the systemic nature of the threats we face, whereby every part of daily life, the economy and our infrastructure has its part to play in protecting us from the worst changes in climate. The strategy also demonstrated the massive opportunities for innovation, job creation and skills development to build back greener and put the UK on track to meet its ambitious climate targets.

The Net Zero Strategy was a positive step by the UK. The Climate Change Committee (CCC) called it an “achievable and affordable vision that will bring net benefits to the UK” and “ambitious and comprehensive”, a “significant step forward” strategy that will set a “globally leading benchmark”.³⁵ However, it remains to be determined how far these policies will take the UK towards reaching its targets in terms of actual emissions reductions and, therefore, what further policies and regulations may yet be required. Key areas where additional detail and explicit plans are needed include energy efficiency, buildings, land use and agriculture. It is also worth noting that the strategy relies heavily on incentives to shift consumer behaviour and choices, despite it remaining unclear whether, and how, these incentives will result in change at a scale that is needed to provide market certainty for investors. Finally, the strategy highlights that further targeted engagement of small and medium-sized enterprises (SMEs) is still required; something that needs to be set out by sector to show what they can do to contribute.

In addition to the shortcomings of the Net Zero Strategy outlined above, further clarity is also required in how the UK adapts and builds resilience to the impacts of climate change. The UK is facing various climate risks, as outlined in the recent UK Climate Change Risk Assessment,³⁶ that it must be better equipped to deal with.³⁷ As highlighted in the CLG UK policy briefing *Preparing for the storm*,³⁸ the UK has recently made some progress on adapting to a changing climate. A broad policy framework exists, much of the underlying scientific information that businesses and others need is available, and many businesses are demonstrating leadership on adaptation and working within communities to enhance resilience. However, these measures alone are not sufficient. The increased risks from climate change mean we need a step change in the application of policy and also in planning for, and adequately funding, measures to manage, climate impacts across the UK.

How tackling the cost of living could support decarbonisation

Energy prices in the UK are expected to remain high throughout 2023 and 2024,³⁹ meaning that further cost-of-living support may be required, especially for the most vulnerable households.⁴⁰ In providing shorter-term support, it is vital that all measures keep the UK on track to meet its longer-term climate targets and build an economy resilient to shocks. This will include needing to think carefully about the design of any policy package, including looking at the impact on inflation and other key conditions. To assess what a future policy package could offer, CLG UK has undertaken modelling work with the aim of looking at how policies that support the cost of living can also support decarbonisation to create win-wins for the UK economy. This report outlines the results of the modelling, makes recommendations for a future policy package and highlights the role of business in supporting them.

Approaches to mitigate the cost-of-living crisis

In addressing the cost-of-living crisis, policymakers have an opportunity to develop a package of support that also puts the UK firmly on a pathway to net zero. This may mean going beyond short-term policies to consider measures that would offer medium- and long-term benefits across the economy. To examine what this policy package could look like, CLG UK commissioned Cambridge Econometrics to undertake a modelling exercise to explore the macroeconomic and distributional outcomes of different policy approaches to address the cost-of-living crisis.

The three policy packages

The E3ME macroeconomic model (see Annex 1) was used to assess the economic and emissions impacts of three policy packages consisting of both short-term and medium- to long-term measures to address the cost-of-living crisis and support households in the UK. The modelling also looked at the distributional impacts that each policy package would have across different household income categories.

The total costs to the Exchequer of the measures included in each policy package were equal to ensure that the outcomes of the scenarios could be directly compared and value for money assessed. The difference between the policy packages lies in the types of measures, the degree to which support is targeted at low-income or vulnerable households, and how well they address climate change and aid the transition to net zero.

The three policy packages (see Annex 2) are:

- **Climate positive scenario:** Measures in this scenario include targeted support for low-income, vulnerable households in the short term, and in the medium- to long-term a focus on increased uptake of energy efficiency and low carbon heating measures plus investment in public transport. The medium- to long-term measures have been chosen to reduce household energy demand and, subsequently, exposure to volatile fossil fuel prices.
- **Neutral policy scenario:** Measures in this scenario include the short-term measures already announced to address the cost-of-living crisis in March 2022 (this includes the Energy Bills Rebate package plus elements of the 2022 Spring Statement, but not the additional measures announced on 26 May 2022). The medium- to long-term measures include government investments with no preference for the climate outcomes.
- **Climate negative scenario:** Short-term and medium- to long-term measures in this scenario lead to environmental outcomes that could be seen to contradict the net zero target.

All three scenarios were compared against the standard E3ME baseline scenario, which is based on official projections and accounts for the impacts of the COVID-19 pandemic and recent shocks to energy prices.

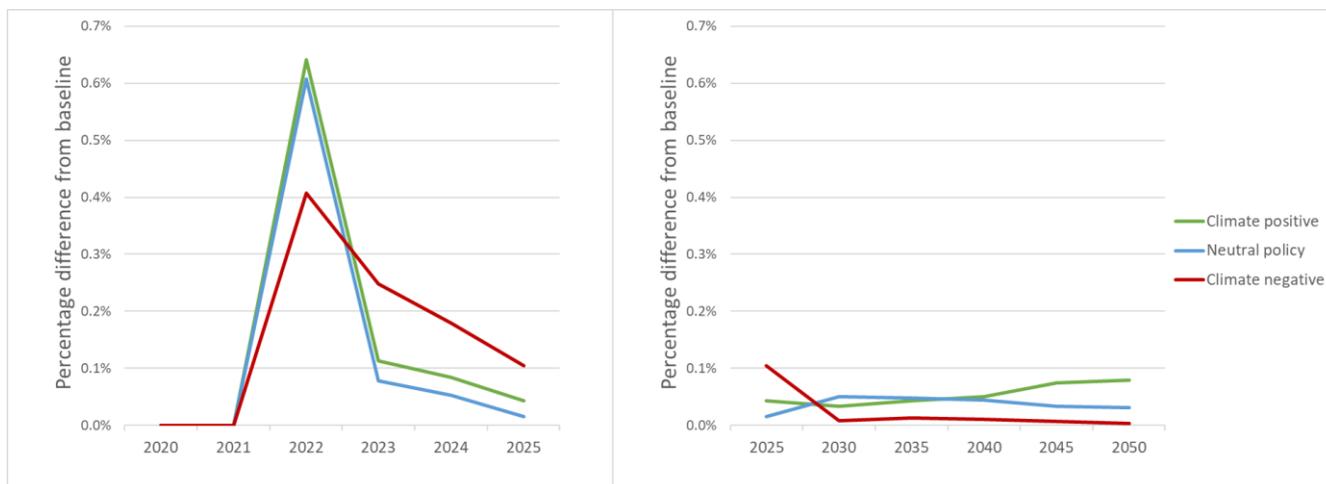
Key findings

While all the policy packages generate relatively small impacts for the economy and household finances, the ‘climate positive’ scenario generates the most favourable economic, social and environmental outcomes, as follows (see Annex 3 for the full findings):

Economic impacts

In the short term, overall macroeconomic impacts are similar across the three scenarios, reflecting the similar level of overall spending on policy measures. However, in the long term, the largest benefit is in the climate positive scenario, in which both the economic stimulus from the policy spending and the long-term energy savings from energy efficiency and the uptake of heat pumps (which lead to increased household consumption of other goods and services) contribute to increased GDP (see Figure 1).

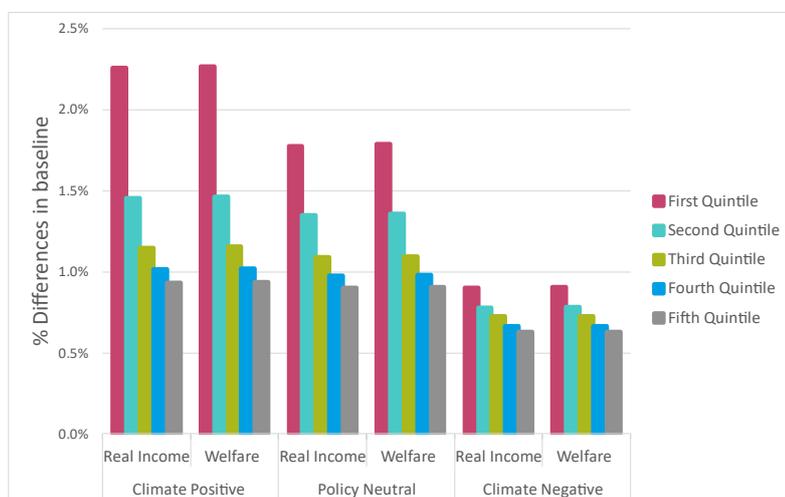
Figure 1: Gross domestic product (GDP) – yearly from 2020 to 2025 and five yearly from 2025 to 2050



Social impacts

Employment follows the same pattern as GDP for all three scenarios, with investments in energy efficiency measures in the climate positive scenario also having a positive effect on employment in the long term. The climate positive scenario is the most progressive (see Figure 2), with measures directly targeted to support low-income households. After 2022, the impact on real income reduces as large one-off payments are removed for all scenarios.

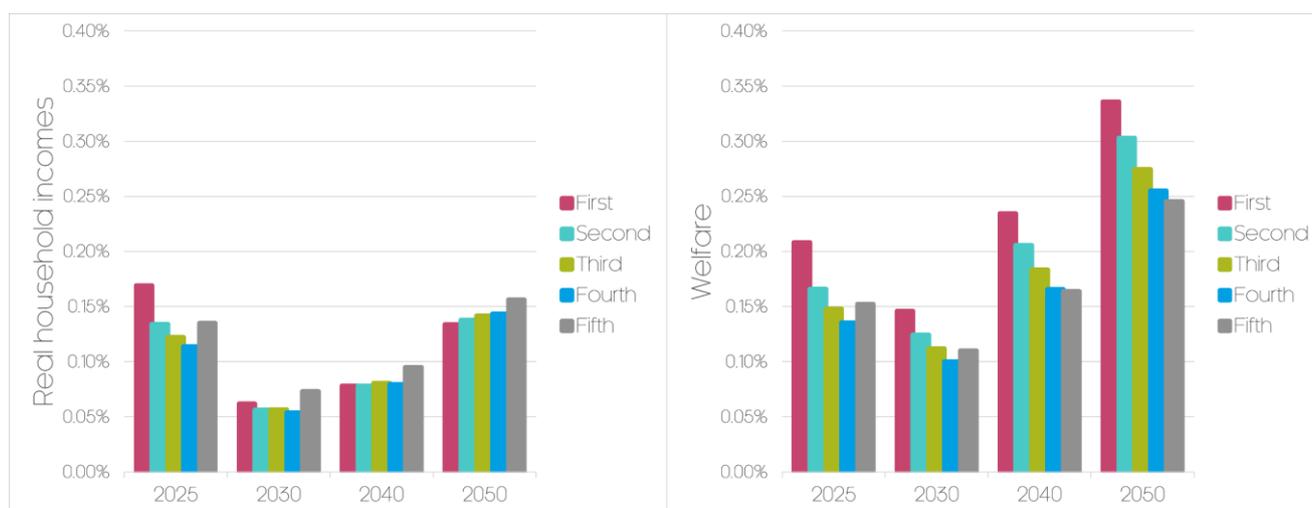
Figure 2: A comparison of income and welfare in 2022 for each scenario



Greater energy efficiency leads to lower energy bills, allowing households to spend more money on other goods and services and therefore increasing the welfare of households. In the climate positive scenario, the energy savings in the long run are approximately equal to the real income impacts. Impacts are highly progressive since lower income households benefit proportionally more from energy savings, as can be seen by comparing the panels in Figure 3.

Real household incomes increase the most for the upper quintiles compared with the baseline; however, when energy savings are accounted for, the lowest income households see the highest percentage change. This is because low-income households spend a higher proportion of their income on energy, and therefore energy efficiency measures benefit them the most.

Figure 3: A comparison of real household incomes and welfare, displayed as percentage changes, for the climate positive scenario (relative to the E3ME baseline)

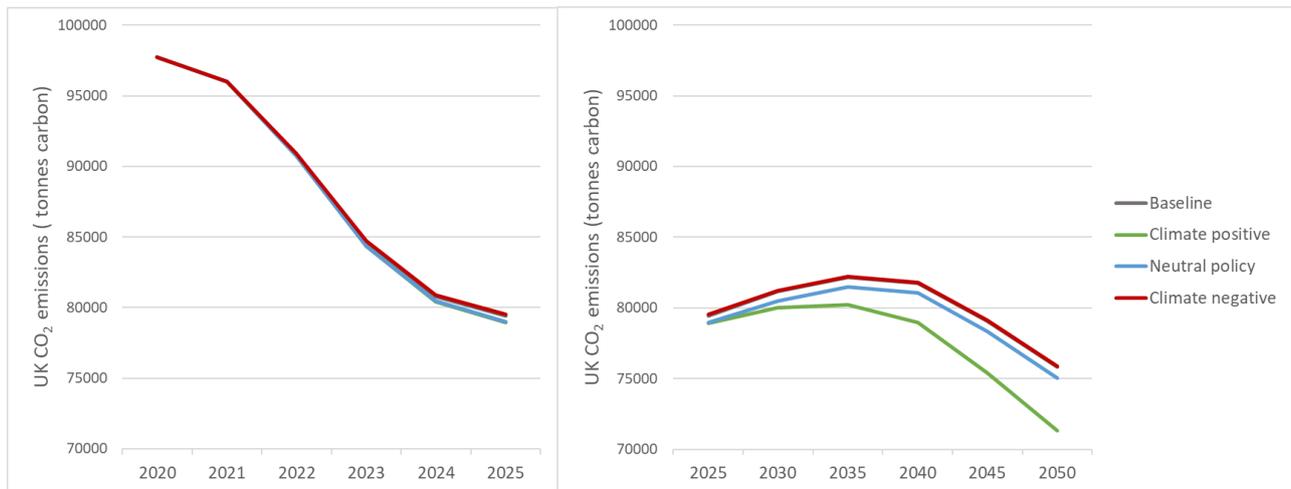


Environmental impacts

The climate positive scenario shows a reduction in household carbon dioxide (CO₂) emissions of 26 per cent by 2050 from energy efficiency measures and the uptake of heat pumps, compared with the baseline. The ‘neutral policy’ scenario has some energy efficiency measures in the short term, which leads to almost 5 per cent reduction in emissions by 2050 compared with the baseline. However, the ‘climate negative’ scenario shows a negligible change in CO₂ emissions, reflecting the absence of energy efficiency measures. This is because long-term investment in fossil fuels in the UK does not necessarily lead to increased domestic emissions, domestic demand or reduced domestic prices, as any additional fossil fuels produced may be exported.

Total, economy-wide, CO₂ emission reductions are more modest, reflecting the fact that the policies implemented were targeted only at households. However, the overall reduction of CO₂ emissions is still notably larger for the climate positive scenario. Absolute CO₂ emissions for all scenarios follow a downward trend due to policies already built into the baseline, as seen in Figure 4.

Figure 4: Absolute CO₂ emissions yearly from 2020 to 2025 and five yearly from 2025 to 2050, UK (please note that the baseline results, the 'grey' line, follow the same trajectory as the climate negative scenario, making it difficult to see)



In summary

The climate positive scenario generates the most favourable outcomes, demonstrating how policy measures designed to address both the cost-of-living crisis and meet the net zero targets can create the biggest wins for the economy in the long term. Furthermore, tackling the cost-of-living crisis with measures that do not target support towards vulnerable households and/or contribute to decarbonisation would be a missed opportunity to use such funds to simultaneously tackle other important long-term government priorities. Specifically, the energy efficiency measures in the climate positive scenario offer an opportunity to both reduce household CO₂ emissions and improve consumer welfare in the long term. Given all three packages cost the same to the Exchequer, the climate positive package also presents the best value for money and the greatest return on investment.

The role of policy

The modelling results discussed in the previous section suggest that policy measures to address the cost-of-living crisis can be more effective when designed to align with meeting the UK's net zero target. Policies that align with the net zero target could also generate more favourable economic outcomes than other types of cost-of-living support policy packages, in addition to being more progressive through primarily benefitting the lowest income households. The benefits to the economy and climate persist into the long term.

Building on the modelling results, we propose a set of policy priorities as follows:

- 1) Align the cost-of-living support measures and strategy on energy security with the UK's net zero target by focusing on reducing demand and future vulnerability, through a range of measures designed to address the needs of different household income categories.**

The government's cost-of-living support announced in May 2022 promised increased financial support to all households, with some of the measures exclusively targeting those on the lowest incomes.²⁸ However, the measures consisted primarily of one-off payments, which will not reduce consumers' vulnerability to future price shocks or enable them to reduce their energy consumption without compromising comfort (such as not heating their home when the indoor temperature falls below 18°C) and possibly their health. The cash payments were also not targeted exclusively at those households that are having trouble paying their bills, meaning that some public sector funding will go to households that do not require it.

To boost the economy and household finances in the medium- to long-term, the government would need to target cash payments exclusively at the most disadvantaged households and direct more support towards demand reduction measures that improve energy efficiency (such as insulation, draught-proofing, heat pumps, triple glazing and quick wins, such as conversion to energy-efficient LED lighting). These measures could deliver welfare and health benefits, reduce vulnerability to future price increases and contribute to meeting the UK's emissions reduction targets. Instead of one-off cash payments, a combination of subsidies, incentives and low-cost finance could be used to incentivise private sector landlords and able-to-pay owner occupiers to improve the energy efficiency of their properties and to switch from gas to electric options, such as heat pumps. In the case of private sector landlords, it is important to ensure that the take-up of government subsidies will benefit the tenants, for example by making subsidies conditional on improved security of tenure for sitting tenants or limits on rent increases.

Supporting households to improve energy efficiency is an effective way to reduce their energy bills in the near term and the long term. One analysis suggests that improving the energy rating of a house from band 'D' to band 'C' could save a household approximately £500 per year.⁴¹ There are helpful existing schemes to support low income households, including the Energy Company Obligation Scheme (ECO),⁴² the Home Upgrade Grant,⁴³ the Green Homes Scheme Local Authority Delivery Grant,⁴⁴ and the Social Housing Decarbonisation Fund.⁴⁵ However, as many have suggested,^{46,47} there is scope to build on these by considering a new option for a government funded scheme focussed on making available subsidised energy efficiency measures to a wider group of households over say the next 3 years ahead to help with saving money on bills in the near term as well as delivering long-term decarbonisation benefits.

The £5,000 grant for heat pumps and the removal of VAT on the materials and labour for energy efficiency improvements and heat pump and solar panel installation for households⁴⁸ are a step in the right

direction. However, the VAT reductions are effective only if the savings are passed on to the customers and not used by service providers to increase their prices. Moreover, these two measures alone do not make these solutions affordable to low-income households, nor do they provide any specific support to improve energy efficiency in the private rented sector. They also fail to offer sufficient incentives for able-to-pay households to make the capital investments needed for deep energy efficiency retrofits and heat pumps, both of which remain costly compared with the savings they can generate. Neither the cost-of-living support measures nor the UK Energy Security Strategy published in April 2022 adequately address the key challenge of reducing households' dependence on gas as the main heating fuel. Some elements of the Energy Security Strategy, such as the plan to allow new onshore and offshore gas and oil exploration, are also based on a misguided assumption that an increase in domestic oil and gas supply would reduce costs to UK consumers instead of being sold in the global markets to the highest bidder.⁴⁹ Moreover, new investment in oil and gas would be incompatible with the government's Net Zero Strategy and 2030 emissions reduction target, because it would add to the UK's carbon footprint rather than reduce it.

To maximise the benefits of public sector spending to mitigate the impacts of the cost-of-living crisis on UK households and economy, we would invite the government to consider the following actions:

- **Direct future cash payments to low-income households while also making it easier and more attractive for able-to-pay households to undertake energy efficiency improvements.** This would enable the government to provide short-term support to vulnerable households and those who are not able to make changes to their accommodation while incentivising able-to-pay households to invest in energy efficiency and electrification. Expanding schemes to offer support with energy efficiency measures to a greater number of households could help with saving money on bills in the short term as well as delivering longer term decarbonisation benefits. While interventions such as 'one-stop shops', awareness-raising campaigns, databases of registered service providers, and free or government-subsidised energy efficiency audits would make it easier and less risky for able-to-pay households to invest in energy efficiency and electrification.
- **Ensure that all new domestic and commercial buildings are energy and water efficient** to make them more resilient to future price increases and potential impacts of climate change, such as heat-waves. For example, if new-built properties are constructed with a heat pump installed (which can also be used to cool down the indoor temperature), this would reduce the need for retrofitting and increase climate resilience. The government is shortly due to consult on new building standards that could help deliver these changes.
- **Extend elements of the cost-of-living support package to businesses** (see following section for further details). This could help the markets for heat pumps and energy efficiency retrofits to scale up, eventually making them more affordable to more households.

Extensions to support for households and business should be funded through general taxation rather than by other energy customers via levies to ensure they do not further increase energy bills.

2) **Align long-term incentives to encourage households and businesses to switch from fossil fuel systems to electric alternatives.**

The residential sector is responsible for around 16 per cent of the UK's greenhouse gas (GHG) emissions. The use of natural gas for heating and cooking is the main source of these emissions.⁵⁰ The vast majority

(around 78 per cent) of residential buildings use gas as their main heating fuel, with only around 10 per cent using electricity.⁵¹ For the UK to decarbonise its buildings sector, households and businesses must switch away from fossil gas to electric technologies that run on rapidly decarbonising power. However, these technologies are currently not competitively priced compared with fossil-fuel-using technologies.

It is difficult to get households to switch from relatively low-cost gas boilers to more expensive electric options, and the lack of current cost savings makes it harder. It has been suggested that previous attempts by the government to accelerate the uptake of heat pumps failed because of concerns about high installation and operating costs.⁵² While high energy prices already act as a partial driver of change the current situation still presents a barrier to large-scale decarbonisation of residential building stock, and has resulted in calls for energy market reform⁵³ to drive innovation, investment and more consumer-focused services to better support decarbonisation, improve reliability and lower cost.⁵⁴

The current pricing system that links the price of electricity to the price of gas through the ‘marginal pricing mechanism’ has been said to be unfit for purpose as a growing share of power comes from nuclear, wind and solar.⁵⁵ Following the recent increases in gas prices, it is estimated that generating power from renewable energy is at least four times cheaper than gas, while the cost of new nuclear generation is approximately half that of gas.⁵⁶

The government has pledged a comprehensive review of the power system within the Energy Security Strategy.⁵⁷ This should deliver an energy market able to incentivise households and businesses to make the switch to the electric alternatives that will deliver lower emissions.

3) Facilitate investment in affordable zero carbon energy and ensure a secure and stable electricity supply.

The role of the electricity sector will expand as it becomes the energy source for much of our transport and heating. This, in turn, will require renewable and other low-carbon and zero-carbon power generation capacity to be more than trebled to meet the growing demand and to compensate for the phasing out of fossil fuel sources in the power sector. New ways of storing electricity will also be needed, along with power grid upgrades and mechanisms to enable consumers to flex their demand, to ensure reliable supply as the share of power from intermittent renewable sources increases.⁵³

The fastest and cheapest ways to develop generation capacity and to improve energy security are onshore wind and solar photovoltaics (PV).⁵⁸ However, these two technologies were not allocated any specific public sector financing in the government’s recent Energy Security Strategy (beyond the VAT rate cut for households that was announced separately),⁵⁷ even though solar PV deployment is expected to increase five-fold by 2035. While the strategy does state that the government will seek to “radically simplify planning processes” and consider the best way to make use of public sector rooftops for solar PV, onshore wind is added in almost as an afterthought as something that can be increased in areas where there is “strong local support” for a new project or the expansion of an existing project. Public sector funding seems to be reserved for nuclear and hydrogen, neither of which will help to address the cost-of-living crisis in the short term.

The Energy Security Strategy contains an ambitious objective to bring up to 50GW of offshore wind online by 2030, including up to 5GW of innovative floating wind. This is supported by a plan to offer “clear investable signals through annual auctions” (which is intended to keep costs down through competition) and a consultation on changes to the 2024 Contracts for Difference auction (which incentivise renewables

to locate and operate in a way that minimises overall system costs). While these changes, alongside the simplification of planning permissions for large-scale solar PV plants, are welcome and will accelerate the deployment of new capacity, it is important to ensure that essential environmental impact assessments are still carried out adequately.

A key shortcoming of the strategy is the failure to allocate support to demand-side reduction measures, such as energy efficiency and electrification. This is a major omission that requires urgent attention. A further shortcoming is its stated intention to allow more domestic oil and gas exploration, which would not support progress towards the UK's emissions reduction targets and is likely to have minimal impact on UK energy prices.

In the drafting of the UK Energy Security Bill,⁵⁹ CLG UK would like to invite the government to ensure that all measures included in it are designed to maximise the long-term benefits, to support the UK's net zero target and to provide short-term support for struggling households.

The role of business

Business is stepping up to the challenge of meeting the UK's net zero targets. However, smaller businesses are finding it increasingly difficult to prioritise sustainability while faced with rising energy bills and other costs. The current circumstances are also challenging for energy retailers, as wholesale gas prices have risen ahead of price cap changes, resulting in many of them going out of business.

So far, government support has been targeted at households, with little support being offered to businesses. There is now an opportunity for government to support business, and for business to step up and take a leading role in actions that address both the cost-of-living crisis and the net zero challenge.

Business can lead the way towards a net zero economy

To meet the UK's climate targets, action is required across the whole of the economy. Business is stepping up, as evidenced by the six-fold increase since January 2021 in the number of businesses signing up to the Science Based Targets initiative (SBTi) and committing to set emissions reduction targets.⁶⁰ A total of 538 UK headquartered businesses had signed up by May 2022, with 230 of these already having approved targets. Alongside this, 2,986 UK headquartered SMEs have signed the SME Climate Commitment, publicly committing to achieve net zero emissions by 2050.⁶¹

Making a commitment is just the first step these businesses take and it must be followed up by action and actual emission reductions. Businesses can do this by creating transition plans to set out how they will adapt to climate risks and meet net zero targets. At COP26 in November 2021, as part of its announcement on creating the UK as the first 'Net Zero-aligned Financial Centre', the government set out plans to make the publication of transition plans mandatory.⁶² They have now launched a Transition Plan Taskforce to examine how this can be implemented to ensure the highest standards possible.⁶³

In the lead-up to COP26, the UK government took a lead in calling for SMEs to commit to net zero through its Together for our Planet campaign.⁶⁴ They supported the setup of the UK Business Climate Hub⁶⁵ hosted on the SME Climate Hub,⁶⁶ through which SMEs can access practical tools, resources and advice to help them reduce their emissions. UK business organisations like the Confederation of British Industry (CBI),^{67,68,69} the Federation of Small Businesses (FSB)⁷⁰ and the British Chambers of Commerce (BCC)⁷¹ all now provide resources and run events to support SMEs, while CISL has produced online training and financial support resources.⁷² However, even with this support available, SMEs are reportedly finding it harder to prioritise sustainability following the pandemic and now the energy crisis.⁷³

The energy crisis is impacting UK businesses

While consumers are protected to some extent from substantial energy bill price rises by the energy cap and the Energy Bills Support Scheme,⁷⁴ businesses do not receive this same protection.⁷⁵ As such, energy prices for businesses have been rising even faster and higher over the last year,⁷⁶ as gas prices have rocketed over 300 per cent in a 14-month period.⁷⁷ Smaller businesses have been impacted the most by the recent price increases.^{78,79}

The only support available for businesses at the moment is for Energy Intensive Industries (EIIs). This includes an extension of the pre-existing Energy Intensive Industries (EII) compensation scheme,⁸⁰ which supports energy-intensive businesses to remain competitive by providing "relief for the costs of the UK Emissions Trading Scheme (ETS) and Carbon Price Support mechanism" to compensate for higher electricity costs in the UK than in other countries. Business organisations, such as the BCC^{81,82} and the

FSB,⁸³ have called for more support from government for businesses with energy bills, while others have focused their efforts on producing advice on how to mitigate the rising energy costs.⁸⁴ These organisations also continue to call for government to address demand through support for household energy efficiency measures, with the most recent from the Director-General of the CBI⁸⁵ and the Director of Policy and Public Affairs at the BCC.⁸²

Actions businesses could take to address the cost-of-living crisis in a net zero compatible manner

Businesses could take several steps to support decarbonisation and the cost-of-living crisis:

- **Commit to buying or producing zero carbon power.** By purchasing zero carbon power, businesses could support further investment and acceleration towards zero carbon power networks at scale. Businesses could do this, for example, by switching suppliers to tariffs that offer zero carbon electricity or entering longer term zero carbon energy corporate Power Purchase Agreements or by deploying on-site renewable electricity generation technologies. Businesses could also play a key role in creating lead markets for electric alternatives to fossil-fuel-based heating and cooling systems, such as heat pumps.
- **Support customers to be more energy efficient.** Energy retailers could support customers through engagement campaigns, while mortgage providers could incentivise them through products and services. These initiatives should be pitched appropriately to ensure that those who are unable to pay receive tailored support to enable them to access grants and subsidies.
- **Invest in green skills development programmes,** prioritising schemes that directly support those who are out of work, employees in sectors where jobs are at risk, young people and parents of young children. These schemes could enable growing companies to increase and diversify their workforce, by offering different employment routes through paid internships, in-job training, flexible working arrangements, subsidised on-site childcare facilities and subsidies to cover the cost of travelling to work.
- **Provide support to employees and customers with the cost of living.** There are different ways a business could offer this support. Offering a real living wage, which allows the employee and their immediate family to have a decent standard of living, is shown to improve business performance and tackle poverty and inequality.⁸⁶ Alongside this, offering a budget or 'value' range of products and services could make items more affordable and support vulnerable households if they are directly targeted.
- **Make net zero commitments.** If they have not already done so, businesses should make ambitious climate commitments; they must then draw up comprehensive strategies and transition plans detailing how they will reach their targets, which they should be held accountable for. Such commitments and actions could demonstrate to government how the wider economy is supporting the UK to take steps to meet its climate targets and could also signal where change is required to support business further.

Policy measures that could support effective business action

The UK government could take several steps to support UK businesses:

- **Provide a targeted package of support to UK businesses struggling with rising energy bills.** A package of measures, even if short-term actions, could ease immediate cost pressures on businesses and help reduce the likelihood of them deprioritising sustainability. This package could be targeted towards supporting smaller SMEs in particular, and it could be linked to support for improving energy efficiency, helping to reduce costs for the long term. This support should be taxpayer funded rather than by other energy customers to ensure it does not further increase energy bills.
- **Incentivise the uptake of energy efficiency measures by business.** Supporting businesses to invest in energy efficiency measures could reduce their bills in the long term, lessening the impact of rising energy prices and supporting decarbonisation. This support should also engage and incentivise business property landlords to enable them to support their business tenants.
- **Develop a long-term policy framework that provides certainty for future business investment.** Businesses will only invest if they know that demand will remain high. Implementing medium- and long-term stable policy frameworks that create exponentially increasing demand could provide the business certainty to invest.
- **Develop a long-term strategy for engaging UK businesses to undertake net zero actions,** which includes targeted engagement of SMEs by sector. This strategy should seek to build on the Together for our Planet campaign, which was launched last year in the lead-up to COP26 to demonstrate ongoing government support for net zero actions to maintain the momentum built during 2021.

Conclusions and recommendations

An aligned approach to addressing the cost-of-living crisis and decarbonisation challenge could create win-wins for the UK economy.

Policy measures to address the cost-of-living crisis can be just as, if not more, effective when designed to align with the UK's net zero target. Our evidence indicates that policies that align with the net zero target generate more favourable economic outcomes than other types of cost-of-living support policy packages, in addition to being more progressive through primarily benefitting the lowest income households. The benefits to the economy and climate persist into the long term.

Building on the modelling results, we propose a set of policy priorities as follows:

- 1) Align the cost-of-living support measures and strategy on energy security with the UK's net zero target by focusing on reducing demand and future vulnerability, through a range of measures designed to address the needs of different household income categories.
- 2) Align long-term incentives to encourage households and businesses to switch from fossil fuel systems to electric alternatives.
- 3) Facilitate investment in affordable zero carbon energy and ensure a secure and stable electricity supply.

The role of business

Businesses are stepping up to the challenge of meeting the UK's net zero targets. They are also being impacted by the cost-of-living crisis, although to date limited support has been provided by government to UK businesses. There is now an opportunity for government to support business, and for business to step up and take a leading role in actions that address both the cost-of-living crisis and the net zero challenge.

Steps businesses could take to support decarbonisation and the cost-of-living crisis:

- Commit to buying or producing zero carbon power.
- Support customers to be more energy efficient.
- Invest in green skills development programmes.
- Provide support to employees and customers with the cost of living.
- Make net zero commitments.

Steps the UK government could take to support UK businesses:

- Provide a targeted package of support to UK businesses struggling with rising energy bills.
- Incentivise the uptake of energy efficiency measures by business.
- Develop a long-term policy framework that provides certainty for future business investment.
- Develop a long-term strategy for engaging UK businesses to undertake net zero actions.

Annex 1: The E3ME model

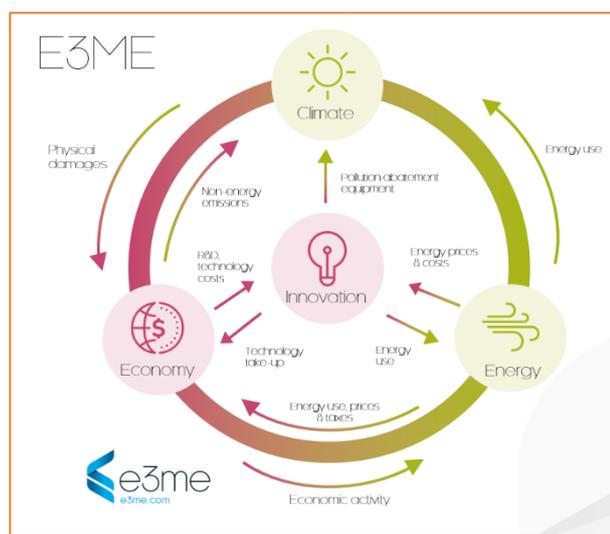
E3ME is a computer-based simulation model of the global economy, energy system and environment, which covers 70 global regions. It consists of macroeconomic equations and is integrated with a suite of Future Technology Transformation (FTT) models that simulate the power generation sector, the household heating sector and the transportation sector.

E3ME is designed for scenario analysis and allows the impact of policies relative to a baseline scenario to

be assessed with annual projections out to 2060. It is open with regard to economic policy, with no assumptions of full employment or budget balance.

E3ME is often used to assess the impacts of environmental and climate mitigation policy on the economy and the labour market. The basic model structure links the economy to the energy system to ensure consistency across each area.

E3ME can provide a comprehensive analysis of policies and is capable of producing a broad range of economic and social indicators. In addition, the model provides a range of energy-related and environmental indicators.



Limitations to the modelling

Modelling carried out using E3ME is limited by the availability and quality of data, and the fact that it only provides results on an annual basis. Because the model is designed primarily to assess structural change, it only delivers high-level distributional impacts that are limited to income quintiles.

Limitations specific to this analysis:

- Which households receive the Social Housing Decarbonisation Fund cannot be specifically targeted in the model; however, as various income groups could live in social rented housing, a reasonable approximation is made by distributing this fund evenly across income groups. It is assumed that the money is spent on energy efficiency measures and that there is a resultant reduction in heat and electricity demand.
- The power sector is not assumed to decarbonise more rapidly in any of the scenarios than in the baseline, as this was not part of the policy package. If the measures in the climate positive scenario are coupled with power sector decarbonisation, and the government achieves its 2030 renewable energy targets, this could lead to an even larger reduction in emissions than the current results indicate (however, there is great uncertainty about the future design and make-up of energy markets and bills, and therefore how much the costs to consumers will actually decline).

Assumptions:

- Both electricity demand and heat demand from the increased uptake of insulation, heat pumps and other energy-efficient products are assumed to decrease at a rate of 0.5 per cent a year.

Insulation can reduce energy demand by over 20 per cent for households that take it up. Overall energy demand from households will be reduced even further if improved energy efficiency is combined with other energy-saving purchases, such as heat pump installation^{87,88}. However, only a subset of the population will make use of the subsidy and VAT cuts, so the overall reduction is still relatively small and potentially unequally distributed. This is because whether or not a household takes up a low carbon technology depends on factors such as the relative cost of technologies, the potential long-term savings and also whether their existing heating technology has reached the end of life.

- The heat pump subsidy has a cap of 30,000 households a year, so spending is controlled by slowly phasing out the subsidy. Spending peaks a few years after the subsidy is made available, and the subsidy is completely phased out by 2042, in line with expectations that it will no longer be provided if there is sufficient demand for heat pumps. The uptake of heat pumps should be faster if the planned phase-out of gas boilers by 2035 is realised; however, it is not present in this analysis.

Annex 2: Policy scenarios

Policy scenario	Description of measures to include			
	Short-term measures	Specific assumptions	Medium- to long-term measures	Specific assumptions
Baseline scenario	Standard E3ME baseline scenario, based on official projections, accounting for the impacts of the COVID-19 pandemic and recent shocks to energy prices. All scenarios are compared against this baseline.			
Climate positive scenario	<p>Targeted support to low-income households, including:</p> <ul style="list-style-type: none"> Expand the Warm Home Discount (providing more support to those currently eligible). Extend the Winter Fuel Payment to more low-income households. VAT exemption for energy-efficient materials (e.g. heat pumps, solar panels and insulation) for five years. 	<p>Match the cost of the Energy Bills Rebate package of measures (£9.1bn) plus other measures announced in the Spring Statement aimed at cost-of-living. Specifically target measures at low-income deciles.</p> <p>Lump sum payments in 2022 for the Energy Bills Rebate package.</p> <p>VAT exemption is continued to 2050.</p>	<p>Large-scale retrofit programme:</p> <ul style="list-style-type: none"> Subsidies/ grants for energy efficiency and low-carbon heating for low-income households (e.g. Social Decarbonisation Fund). Incentives for ‘able-to-pay’ households to encourage energy efficiency measures and heat pump installation (e.g. remove VAT in the long term) <p>Public transport subsidies or public transport investment.</p>	<p>Lump sum for heat pumps; £5,000 per household available for up to 30,000 heat pumps a year. Practically, implemented in 2022 and then slowly phased out as demand increases. Subsidy reaches zero by 2042.</p> <p>£1.75bn for Social Housing Decarbonisation Fund as a lump sum to households, spread over three years, 2022–2025 (see limitations in Annex 1 for details).</p> <p>VAT exemption for energy efficiency measures for all households, as in the short term, continued to 2050.</p> <p>Follow-up bus strategy. £3bn initial subsidy to 2030 for other transport; another £3–6bn for 2030–2050 assumed. This is implemented as a lump sum price cut of £0.375bn a year out to 2050.</p>

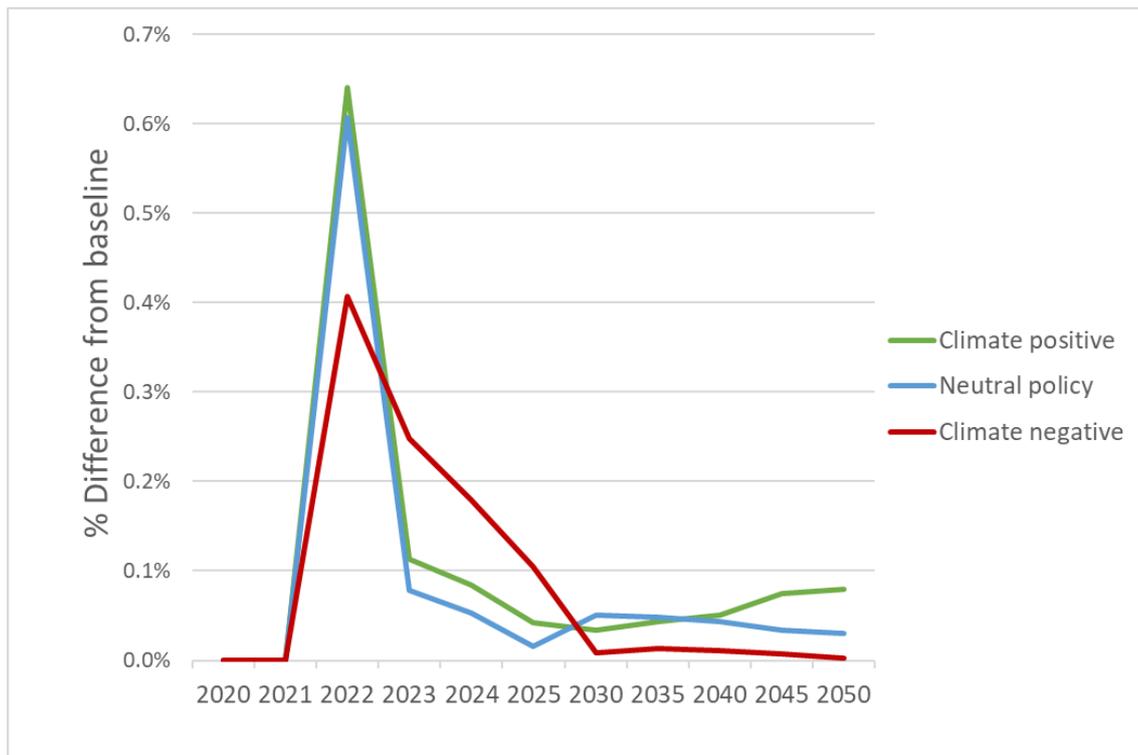
<p>Neutral policy scenario</p>	<p>Short-term measures to match the Energy Bills Rebate package (£150 per band A–D household council tax rebate, £200 loan per household energy bills rebate, fund for local authorities to support low-income households not eligible for the council tax rebate)</p> <p>Fuel duty reduction (5p per litre).</p> <p>VAT exemption for energy-efficient materials (e.g. heat pumps, solar panels and insulation) for five years.</p>	<p>80 per cent of households to receive £150 council tax rebate (22.2m households).</p> <p>All households receive energy bills rebate of £200 (27.8m households).</p> <p>£144m provided to support vulnerable people and individuals on low incomes that do not pay council tax, or that pay council tax for properties in Bands E–H.</p> <p>In total, lump sum payments match the £9.1bn rebate package for 2022.</p>	<p>Government spending that has no preference for climate outcomes – replicates the assumed public investment levels in the ‘net zero compatible’ scenario, but targets investment instead towards policy objectives with no specific environmental/ climate aspect.</p>	<p>Take total yearly package cost for low carbon and put this in as a lump sum of additional government spending.</p>
<p>Climate negative scenario</p>	<p>Removal of environmental policy costs from energy bills.</p> <p>Removal of VAT from energy bills.</p> <p>Removal of climate change levy for businesses</p>	<p>Match (as close as possible) the cost of the Energy Bills Rebate package of measures (£9.1bn) plus other measures announced in the Spring Statement aimed at cost-of-living.</p> <p>VAT is currently 5 per cent – the cost of tax relief would be approximately £1.7bn.⁸⁹ This is removed from 2022–2027. Approximate cost of £8.5bn.</p> <p>Removal of environmental levies: ~13 per cent of energy bills, 2022 only. (£1.75bn revenue if Carbon Price Floor is included).⁹⁰</p> <p>Look at what climate change levy is applied to, then remove it from these fuels.</p>	<p>Increased investment in domestic fossil fuel extraction.</p>	<p>Put in, as additional investment for oil and gas sector, the same yearly amount as the low carbon package cost.</p>

Annex 3: Findings

Economic impacts

- In the short term, overall macroeconomic impacts are similar across the three scenarios, reflecting the similar level of overall spending on policy measures:
 - Spending is spread out over a longer period in the climate negative scenario, which is reflected in the GDP results (Figure 1).
- In the long term, we see:
 - Much smaller positive impacts across all scenarios from the additional government spending.
 - The largest benefit is in the climate positive scenario, in which both the economic stimulus from the policy spending and the long-term energy savings from energy efficiency and the uptake of heat pumps (which lead to increased household consumption of other goods and services) contribute to increased GDP.
 - Changes in GDP are driven by different policies phasing in and out, as well as the cumulative effect of energy efficiency savings coming into play in the long run in the climate positive scenario. In the neutral policy scenario, the VAT cut is phased out in 2027, and funds allocated to long-term government spending will replace this.

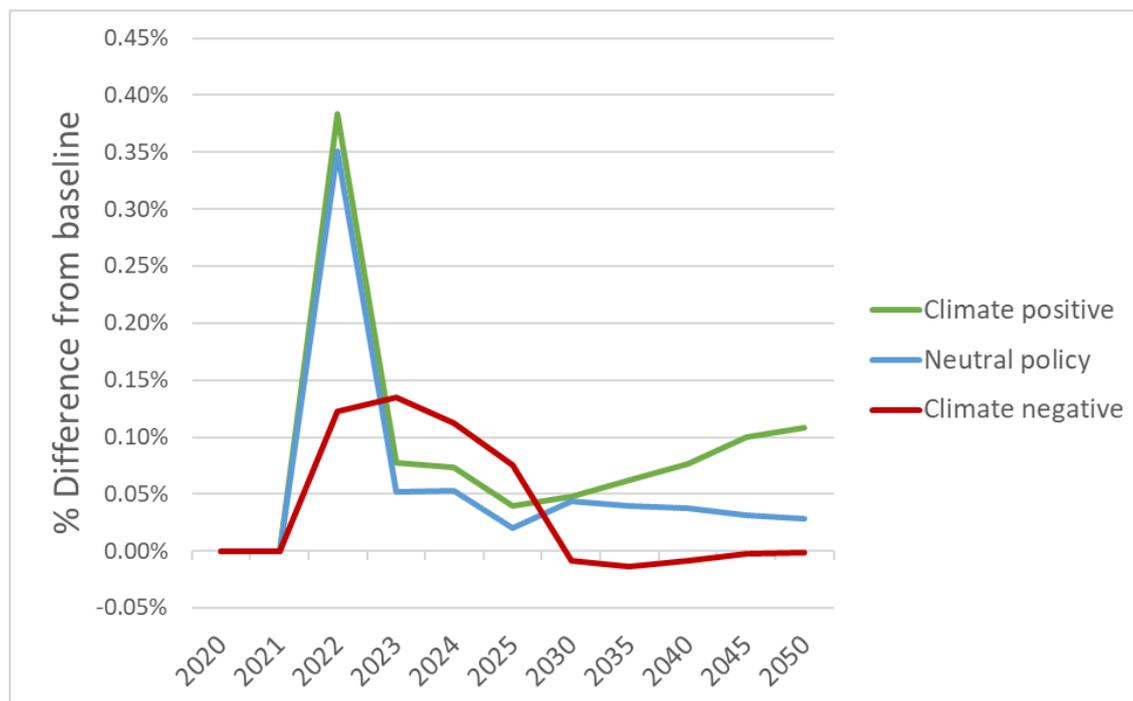
Figure 2: GDP



Social impacts

- Employment follows the same pattern as GDP for all three scenarios, with investments in energy efficiency measures in the climate positive scenario also having a positive effect on employment in the long term (Figure 2).

Figure 3: Employment



- In 2022, there is a modest improvement in real incomes across all income quintiles, with the lowest income quintile benefitting the most, in all three scenarios (Figure 3–5).
 - The climate positive scenario is the most progressive, with measures directly targeted to support low-income households.
 - The neutral policy scenario is less progressive than the climate positive scenario but more progressive than the climate negative scenario.
 - Impacts between 2023 and 2030 remain higher in the climate negative scenario because policy spending on lowering energy bills is spread out over a longer period in the short term, compared with the other two scenarios.
 - After 2022, the impact on real income reduces as large one-off payments are removed for all scenarios.
 - No impact on real incomes is seen in the long term in the climate negative scenario, in which investment is focused on increased oil and gas extraction.
 - Long-term increases in real incomes for the climate positive and neutral policy scenarios are linked to increases in employment compared with the baseline.

Figure 4: Income distribution (by quintile) for the climate positive scenario

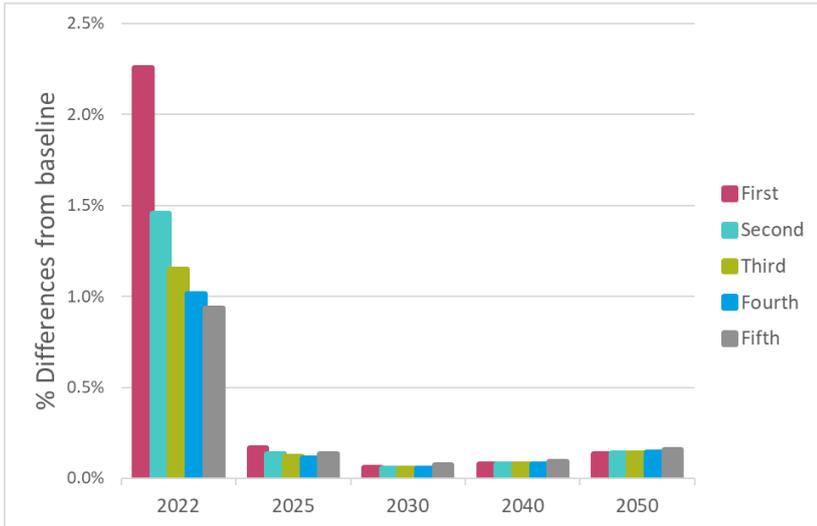


Figure 5: Income distribution (by quintile) for the neutral policy scenario

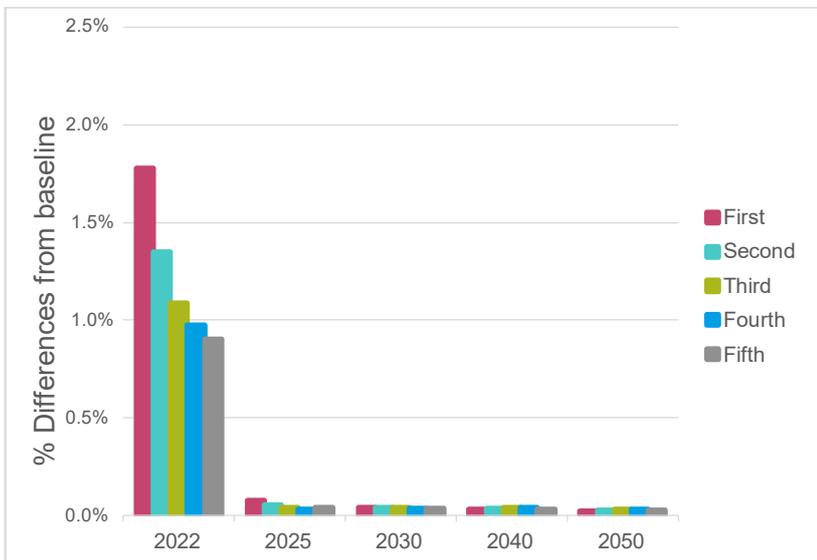
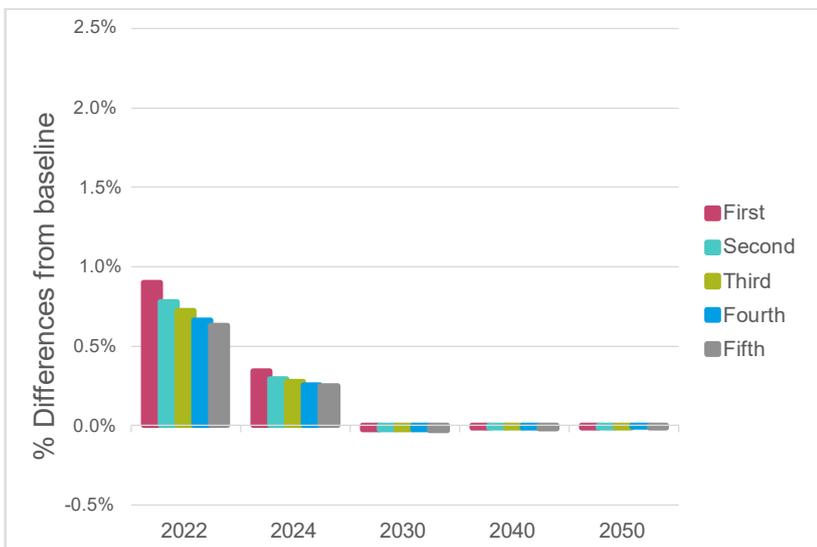
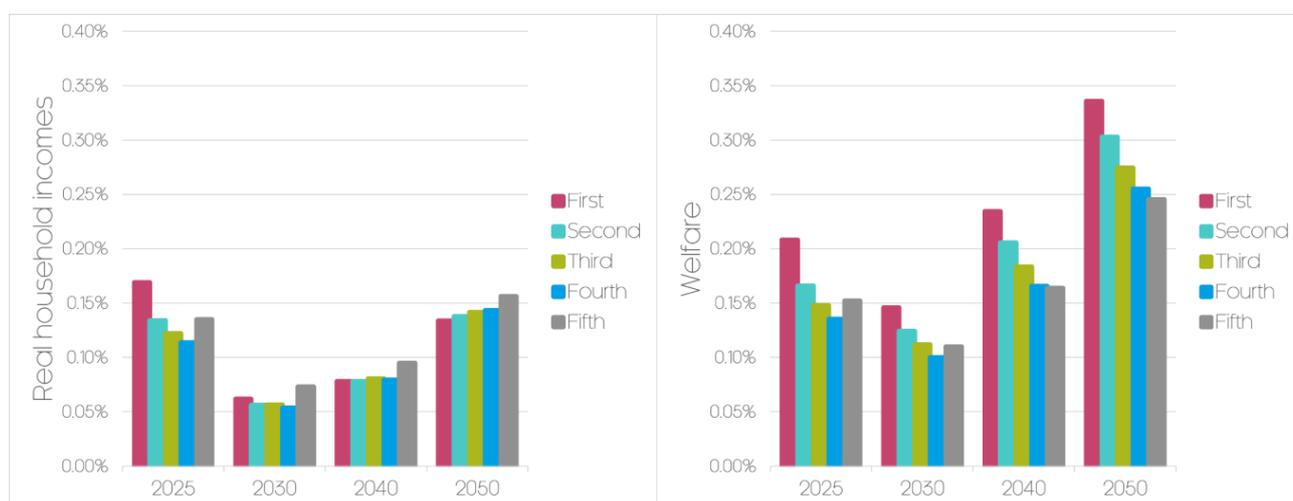


Figure 6: Income distribution (by quintile) for the climate negative scenario



- Greater energy efficiency leads to lower energy bills, allowing households to spend more money on other goods and services and therefore increasing the welfare of households. In this analysis, consumer welfare is taken to be disposable income plus energy efficiency savings for households.
 - In the climate positive scenario, the energy savings in the long run are approximately equal to the real income impacts. Impacts are highly progressive because lower income households benefit proportionally more from energy savings in particular. This can be seen by comparing the panels in Figure 6.
 - Real household incomes increase the most for the upper quintiles compared with the baseline; however, when energy savings are accounted for, the lowest income households see the highest percentage change. This is because low-income households spend a higher proportion of their income on energy, and therefore energy efficiency measures benefit them the most.

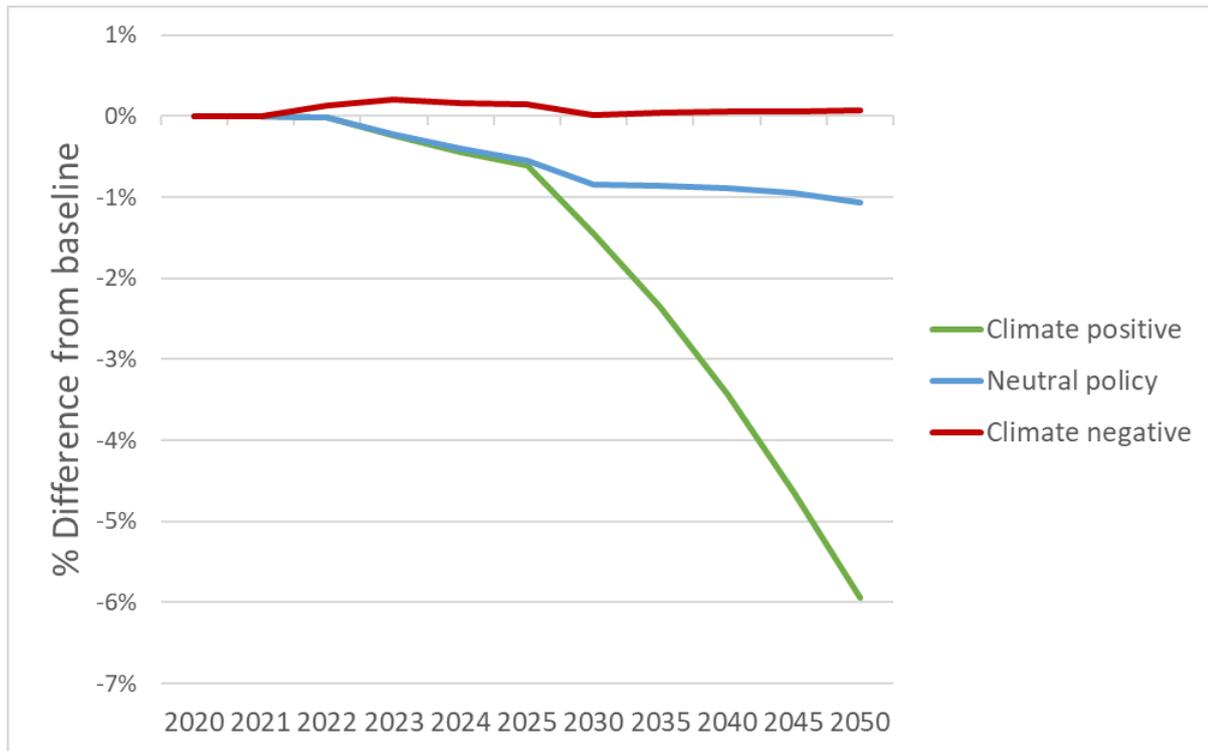
Figure 7: A comparison of real household incomes and welfare, displayed as percentage changes relative to the E3ME baseline starting from 2025



Environmental impacts

- The climate positive scenario shows a reduction in household CO₂ emissions of 26 per cent by 2050 from energy efficiency measures and the uptake of heat pumps, compared with the baseline (Figure 7).
- The neutral policy scenario has some energy efficiency measures in the short term, which lead to almost a 5 per cent reduction in emissions by 2050 compared with the baseline.
- The climate negative scenario shows a negligible change in CO₂ emissions relative to the baseline scenario, reflecting the absence of energy efficiency measures. This is because long-term investment in fossil fuels in the UK does not necessarily lead to increased domestic emissions, domestic demand or reduced domestic prices, as any additional fossil fuels produced may be exported.

Figure 7: Household CO₂ emissions



- Total, economy-wide, CO₂ emission reductions are more modest, reflecting that the fact that policies implemented were targeted only at households (Figure 8).
- The overall reduction of CO₂ emissions is still notably larger for the climate positive scenario.
- Absolute CO₂ emissions follow a downward trend due to policies already built into the baseline, as seen in Figure 9.

Figure 8: Total CO₂ emissions, UK

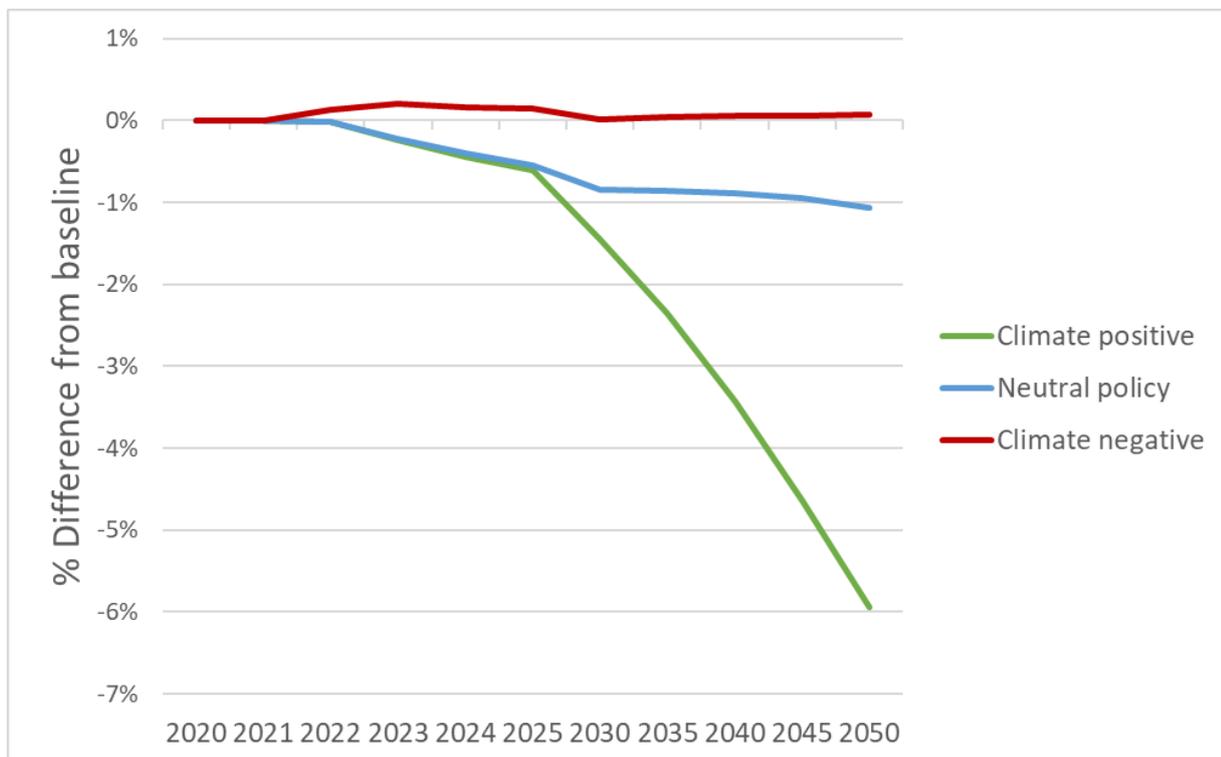
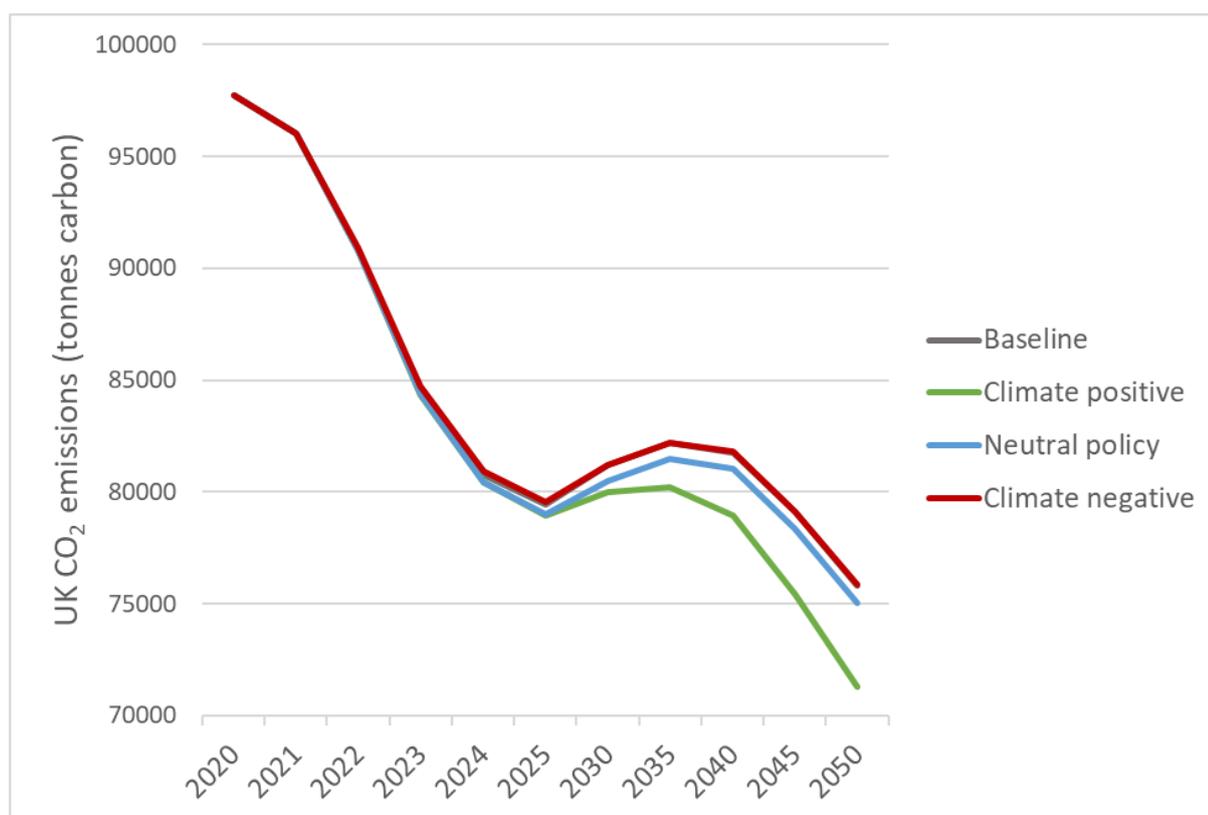


Figure 9: Absolute CO₂ emissions, UK (please note that the baseline results, the 'grey' line, follow the same trajectory as the climate negative scenario, making it difficult to see)



Conclusions

- While the policy packages generate relatively small impacts for the economy and household finances, the climate positive scenario generates the most favourable economic, social and environmental outcomes.
- Energy savings from the long-term energy efficiency measures implemented in the climate positive scenario have a positive impact on consumer welfare in the long term.
- Long-term energy efficiency measures implemented in the climate positive scenario lead to a significant reduction in household CO₂ emissions by 2050.
- The modelling analysis suggests that tackling the cost-of-living crisis using the climate positive package would generate a win-win situation, in which not only the cost-of-living crisis is partly addressed, and economic benefits are achieved, but also progress is made towards longer-term levelling up and decarbonisation goals.
- The analysis shows that policy measures to address the cost-of-living crisis can be designed to be harmonious with decarbonisation and still provide a similar level of support to households, in addition to generating benefits to the wider economy and environment. These benefits persist into the long term.
- Tackling the cost-of-living crisis with measures that do not target support towards vulnerable households and/or contribute to decarbonisation would be a 'missed opportunity' to direct the funds to address the cost-of-living crisis in a way that maximises their ability to also tackle other important long-term government priorities.

References

- ¹ IPCC. (2022). *IPCC Sixth Assessment Report. Working Group 1: The Physical Science Basis*. Retrieved from: <https://www.ipcc.ch/report/ar6/wg1/>
- ² United Nations. (2021). *Secretary-General calls latest IPCC climate report 'code red for humanity', stressing 'irrefutable' evidence of human influence*. [Statement]. Retrieved from: <https://www.un.org/press/en/2021/sgsm20847.doc.htm>
- ³ UN Climate Change Conference UK 2021. (2022). Retrieved from: <https://ukcop26.org/>
- ⁴ UN Climate Change Conference UK 2021. (2021). *COP26: The Glasgow Climate Pact*. Retrieved from: <https://ukcop26.org/wp-content/uploads/2021/11/COP26-Presidency-Outcomes-The-Climate-Pact.pdf>
- ⁵ Glasgow Financial Alliance for Net Zero. (2022). *About us*. Retrieved from: <https://www.gfanzero.com/about/>
- ⁶ United Nations Climate Change. (2021) *New Financial Alliance for Net Zero Emissions Launches*. [External Press Release]. Retrieved from: <https://unfccc.int/news/new-financial-alliance-for-net-zero-emissions-launches>
- ⁷ Ferris, N. (2021). *UK and US lead move to end overseas funding for oil and gas at Cop26*. The New Statesman. Retrieved from: <https://www.newstatesman.com/environment/2021/11/uk-and-us-lead-move-to-end-overseas-funding-for-oil-and-gas-at-cop26>
- ⁸ Sustainable Development Goals. (2022). *War in Ukraine threatens to unleash "unprecedented wave" of global hunger and destitution, warns UN Chief*. Retrieved from: <https://www.un.org/sustainabledevelopment/blog/2022/06/war-in-ukraine-threatens-to-unleash-unprecedented-wave-of-global-hunger-and-destitution-warns-un-chief/>
- ⁹ Sleigh, S. (2022). *Explained: What Is The Cost of Living Crisis?* The Huffington Post. Retrieved from: https://www.huffingtonpost.co.uk/entry/explained-what-is-the-cost-of-living-crisis_uk_61dbf949e4b0bcd219614c85
- ¹⁰ Howard, L. (2022). *Navigating The Cost Of Living Crisis*. Forbes. Retrieved from: <https://www.forbes.com/uk/advisor/energy/cost-of-living-crisis/>
- ¹¹ Institute for Government. (2022). *Cost of living crisis*. Retrieved from: <https://www.instituteforgovernment.org.uk/explainers/cost-living-crisis>
- ¹² Whiting, K. (2022). *Cost of living crisis: 1 in 4 people in the developed world are struggling, poll shows*. World Economic Forum. Retrieved from: <https://www.weforum.org/agenda/2022/05/cost-of-living-crisis-poll/>
- ¹³ OECD. (2022). *The Price of War. OECD Economic Outlook, June 2022*. Retrieved from: <https://www.oecd.org/economic-outlook/>
- ¹⁴ Hodgson, A. (2021). *Top Five Global Trends in Income and Expenditure*. Euromonitor International. Retrieved from: <https://www.euromonitor.com/article/top-five-global-trends-in-income-and-expenditure>
- ¹⁵ Taylor, H. (2022) *What are other countries doing to mitigate against the cost of living crisis?* Work Foundation. Retrieved from: <https://www.lancaster.ac.uk/work-foundation/news/blog/what-are-other-countries-doing-to-mitigate-against-the-cost-of-living-crisis>
- ¹⁶ Josephs, J. (2022). *Governments should subsidise food and energy, says IMF boss*. BBC News. Retrieved from: <https://www.bbc.co.uk/news/business-61523624>
- ¹⁷ Office for Budget Responsibility. (2022). *Developments in the outlook for household living standards*. Retrieved from: <https://obr.uk/box/developments-in-the-outlook-for-household-living-standards/>
- ¹⁸ Hourston, P. (2022). *Cost of living crisis*. Institute for Government. Retrieved from: <https://www.instituteforgovernment.org.uk/explainers/cost-living-crisis>
- ¹⁹ Elliott, L. (2022). *Cost of living crisis: immediate support from Sunak a 'moral imperative' – CBI*. The Guardian. Retrieved from: <https://www.theguardian.com/business/2022/may/16/cost-of-living-crisis-immediate-support-from-sunak-a-moral-imperative-cbi>
- ²⁰ Loughborough University. (2022). *Research by Loughborough finds families are facing increases in costs of £400 per month*. Retrieved from: <https://www.lboro.ac.uk/news-events/news/2022/may/families-facing-increases-in-costs/>
- ²¹ BBC News. (2022). *What is the UK's inflation rate and why is the cost of living going up?* Retrieved from: <https://www.bbc.co.uk/news/business-12196322>
- ²² Department for Business, Energy & Industrial Strategy, The Rt Hon Greg Clark MP, The Rt Hon Theresa May MP, & The Rt Hon Claire Perry. (2018). *Government introduces new legislation to cap poor value energy tariffs in time for next winter*. [Press Release]. GOV.UK. Retrieved from: <https://www.gov.uk/government/news/government-introduces-new-legislation-to-cap-poor-value-energy-tariffs-in-time-for-next-winter>
- ²³ The Guardian Live. (2022). *Britain's biggest increase in energy charges will take effect driving 2.5m more stress on fuel – live business*. Retrieved from: <https://newsfounded.com/uk/britains-biggest-increase-in-energy-charges-will-take-effect-driving-2-5m-more-stress-on-fuel-live-business-2/>

- ²⁴ Ofgem. (2022). *Check if the energy price cap affects you*. Retrieved from: <https://www.ofgem.gov.uk/information-consumers/energy-advice-households/check-if-energy-price-cap-affects-you>
- ²⁵ Ofgem. (2022). *Price cap to increase by £693 from April*. [Press Release]. Retrieved from: <https://www.ofgem.gov.uk/publications/price-cap-increase-ps693-april>
- ²⁶ Ofgem. (2022). *Letter from Jonathan Brearley to the Chancellor and SoS for BEIS*. Retrieved from: <https://www.ofgem.gov.uk/sites/default/files/2022-05/20220524%20-%20Letter%20from%20Jonathan%20Brearley%20to%20Chancellor%20and%20BEIS%20SoS.pdf>
- ²⁷ Binns, K. (2022). *October 2022 energy price cap now expected to rise by 51%*. The Money Edit. Retrieved from: <https://www.themoneyedit.com/household-bills/energy/october-energy-price-cap>
- ²⁸ HM Treasury. (2022). *Policy paper: Cost of Living Support*. GOV.UK. Retrieved from: <https://www.gov.uk/government/publications/cost-of-living-support>
- ²⁹ HM Treasury. (2022). *Policy paper: Overall government support for the cost of living: factsheet*. GOV.UK. Retrieved from: <https://www.gov.uk/government/publications/government-support-for-the-cost-of-living-factsheet/government-support-for-the-cost-of-living-factsheet>
- ³⁰ Lempriere, M. (2022). *Energy sector welcomes further support for consumers amid cost of living crisis*. Current News. Retrieved from: <https://www.current-news.co.uk/news/energy-sector-welcomes-further-support-for-consumers-amid-cost-of-living-crisis>
- ³¹ Department for Business, Energy & Industrial Strategy. (2021). *Policy paper: Net Zero Strategy: Build Back Greener*. GOV.UK. Retrieved from: <https://www.gov.uk/government/publications/net-zero-strategy>
- ³² Department for Business, Energy & Industrial Strategy, & The Rt Hon Chris Skidmore MP. (2019). *UK becomes first major economy to pass net zero emissions law*. GOV.UK. Retrieved from: <https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law>
- ³³ Department for Business, Energy & Industrial Strategy. (2020). *Policy paper: The UK's Nationally Determined Contribution under the Paris Agreement*. GOV.UK. Retrieved from: <https://www.gov.uk/government/publications/the-uks-nationally-determined-contribution-communication-to-the-unfccc>
- ³⁴ Department for Business, Energy & Industrial Strategy, Prime Minister's Office, 10 Downing Street, The Rt Hon Kwasi Kwarteng MP, The Rt Hon Alok Sharma MP, & The Rt Hon Boris Johnson MP. (2021). *UK enshrines new target in law to slash emissions by 78% by 2035*. [Press Release]. GOV.UK. Retrieved from: <https://www.gov.uk/government/news/uk-enshrines-new-target-in-law-to-slash-emissions-by-78-by-2035>
- ³⁵ Climate Change Committee. (2021). *Government's Net Zero Strategy is a major step forward, CCC says*. Retrieved from: <https://www.theccc.org.uk/2021/10/26/governments-net-zero-strategy-is-a-major-step-forward-ccc-says/>
- ³⁶ Department for Environment, Food & Rural Affairs. (2022). *Policy paper: UK Climate Change Risk Assessment 2022*. GOV.UK. Retrieved from: <https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2022>
- ³⁷ Harrabin, R. (2021). *UK warned it is unprepared for climate chaos*. BBC News. Retrieved from: <https://www.bbc.co.uk/news/science-environment-57487943>
- ³⁸ University of Cambridge Institute for Sustainability Leadership (CISL). (2021). *Preparing for the storm: The role of UK business and government in improving UK resilience to climate change in the UK*. Cambridge, UK: CLG UK. Retrieved from: <https://www.corporateleadersgroup.com/preparing-for-the-storm-role-uk-business-and-government-improving-uk-resilience>
- ³⁹ Emery, R. (2022). *Will energy prices go down in 2023? Latest predictions for October 2022 and beyond*. The Money Edit. Retrieved from: <https://www.themoneyedit.com/household-bills/will-energy-prices-fall-2023>
- ⁴⁰ Race, M. (2022). *Energy bills: More help may be expected next year, says think tank*. BBC News. Retrieved from: <https://www.bbc.co.uk/news/business-61600185>
- ⁴¹ Britchfield, C., & Guertler, P. (2022). *Responding to the UK gas crisis: the critical role of energy efficiency and a green homes retrofit driver*. Retrieved from: <https://9tj4025ol53byww26jdkao0x-wpengine.netdna-ssl.com/wp-content/uploads/Responding-to-the-UK-gas-crisis-E3G-Briefing.pdf>
- ⁴² Ofgem. (2022). *Energy Company Obligation*. Retrieved from: [https://www.ofgem.gov.uk/environmental-and-social-schemes/energy-company-obligation-eco#:~:text=The%20Energy%20Company%20Obligation%20\(ECO,closed%20on%2031%20March%202022](https://www.ofgem.gov.uk/environmental-and-social-schemes/energy-company-obligation-eco#:~:text=The%20Energy%20Company%20Obligation%20(ECO,closed%20on%2031%20March%202022)
- ⁴³ Department for Business, Energy & Industrial Strategy, & Lord Callanan. (2022). *Households save £200 on bills with energy efficiency investment*. [Press Release]. GOV.UK. Retrieved from: <https://www.gov.uk/government/news/households-save-200-on-bills-with-energy-efficiency-investment>
- ⁴⁴ Department for Business, Energy & Industrial Strategy. (2021). *Green Homes Grant Local Authority Delivery scheme, Phase 2: funding allocated to Local Net Zero Hubs*. GOV.UK. Retrieved from: <https://www.gov.uk/government/publications/green-homes-grant-local-authority-delivery-scheme-phase-2-funding-allocated-to-local-net-zero-hubs>

- ⁴⁵ Department for Business, Energy & Industrial Strategy. (2021). *Social Housing Decarbonisation Fund: Wave 1 (closed to applications)*. GOV.UK. Retrieved from: <https://www.gov.uk/government/publications/social-housing-decarbonisation-fund>
- ⁴⁶ Phillips, J., Britchfield, C., & Guertler, P. (2022). *Home energy security strategy: the permanent solution for lower bills*. E3G. Retrieved from: <https://www.e3g.org/publications/the-home-energy-security-strategy-permanently-lower-uk-bills/>
- ⁴⁷ CBI. (2022). *Give people more control over their energy bills*. Retrieved from: <https://www.cbi.org.uk/media-centre/articles/give-people-more-control-over-their-energy-bills/>
- ⁴⁸ Waite, R. (2022). *Spring statement: VAT abolished on energy-saving materials and solar panels*. Architects Journal. Retrieved from: <https://www.architectsjournal.co.uk/news/spring-statement-vat-abolished-on-energy-saving-materials-and-solar-panels>
- ⁴⁹ Climate Change Committee. (2022). *Letter to Kwasi Kwarteng from the Climate Change Committee*. Retrieved from: <https://www.theccc.org.uk/wp-content/uploads/2022/02/Letter-to-Kwasi-Kwarteng-Climate-Compatibility-of-New-Oil-and-Gas-Fields.pdf>
- ⁵⁰ Department for Business, Energy & Industrial Strategy. (2022). *2020 UK Greenhouse Gas Emissions, Final Figures. National Statistics*. Retrieved from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1051408/2020-final-greenhouse-gas-emissions-statistical-release.pdf
- ⁵¹ Statista. (2022). *What is the main way you heat your property during the winter?* Retrieved from: <https://www.statista.com/statistics/426988/united-kingdom-uk-heating-methods/>
- ⁵² Ambrose, J. (2021). *What are heat pumps and why is the UK government pushing them?* The Guardian. Retrieved from: <https://www.theguardian.com/environment/2021/oct/19/what-are-heat-pumps-and-why-is-the-uk-government-pushing-them>
- ⁵³ Lord, T., & McNally, P. (2021). *Powering Ahead: The Need to Reform UK Energy Markets*. Tony Blair Institute for Global Change. Retrieved from: <https://institute.global/policy/powering-ahead-need-reform-uk-energy-markets>
- ⁵⁴ Key-Bright, S. & Day, G. (2021). *Rethinking Electricity Markets. EMR2.0: a new phase of innovation-friendly and consumer-focused electricity market design reform*. Catapult Energy Systems. Retrieved from: <https://esc-production-2021.s3.eu-west-2.amazonaws.com/2021/07/ESC-Rethinking-Electricity-Markets-Report-Final-060421.pdf>
- ⁵⁵ Grubb, M. (2022). *Opinion: Renewables are cheaper than ever – so why are household energy bills only going up?* Retrieved from: <https://www.ucl.ac.uk/news/2022/jan/opinion-renewables-are-cheaper-ever-so-why-are-household-energy-bills-only-going>
- ⁵⁶ Wright, O. (2022). *Energy market reform will cut fuel bills*. The Times. Retrieved from: <https://www.thetimes.co.uk/article/energy-market-reform-will-cut-fuel-bills-dpvr79hcl>
- ⁵⁷ Department for Business, Energy & Industrial Strategy, & Prime Minister's Office, 10 Downing Street. (2022). *Policy paper: British energy security strategy*. GOV.UK. Retrieved from: <https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy>
- ⁵⁸ Chrobak, U. (2021). *Solar power got cheap. So why aren't we using it more?* PopSci. Retrieved from: <https://www.popsoci.com/story/environment/cheap-renewable-energy-vs-fossil-fuels/>
- ⁵⁹ Department for Business, Energy & Industrial Strategy, & The Rt Hon Kwasi Kwarteng MP. (2022). *BEIS in the 2022 Queen's Speech*. GOV.UK. Retrieved from: <https://www.gov.uk/government/news/beis-in-the-2022-queens-speech#:~:text=The%20Energy%20Security%20Bill%20will,energy%20price%20cap%20beyond%202023>
- ⁶⁰ Science Based Targets. (2022). *Companies taking action*. Retrieved from: <https://sciencebasedtargets.org/companies-taking-action#table>
- ⁶¹ SME Climate Hub. (2022). *Committed businesses: Working together in the race to Zero*. Retrieved from: <https://businessclimatehub.org/smes/?pag=107&search§or&country=United+Kingdom+%28of+Great+Britain+and+Northern+Ireland%29&netzero#filter>
- ⁶² HM Treasury. (2021). *Fact Sheet: Net Zero-aligned Financial Centre*. GOV.UK. Retrieved from: <https://www.gov.uk/government/publications/fact-sheet-net-zero-aligned-financial-centre/fact-sheet-net-zero-aligned-financial-centre>
- ⁶³ E3G. (2022). *HM Treasury launches UK Transition Plan Taskforce*. [Press Release]. Retrieved from: <https://www.e3g.org/news/hm-treasury-launches-uk-transition-plan-taskforce/>
- ⁶⁴ Department for Business, Energy & Industrial Strategy, Prime Minister's Office, 10 Downing Street, The Rt Hon Kwasi Kwarteng MP, The Rt Hon Alok Sharma MP, & The Rt Hon Boris Johnson MP. (2021). *Calling all small businesses to lead the charge to net zero*. [Press Release]. GOV.UK. Retrieved from: <https://www.gov.uk/government/news/calling-all-small-businesses-to-lead-the-charge-to-net-zero>
- ⁶⁵ UK Business Climate Hub. (2022). Retrieved from: <https://businessclimatehub.org/uk/>
- ⁶⁶ SME Climate Hub. (2022). Retrieved from: <https://smeclimatehub.org/>
- ⁶⁷ CBI. (2022). *Race to Zero: Driving the UK's sustainable future*. Retrieved from: <https://www.cbi.org.uk/our-campaigns/race-to-zero-delivering-the-uk-s-sustainable-future/>

- ⁶⁸ CBI. (2021). *Financing green: a guide for SMEs*. Retrieved from: https://www.cbi.org.uk/media/7391/12701-how-smes-can-finance-thier-climate-action_tr.pdf
- ⁶⁹ Thackray, T. (2021). *The CBI and decarbonisation: supporting SMEs on their journey to net zero*. CBI. Retrieved from: <https://www.cbi.org.uk/articles/the-cbi-and-decarbonisation-supporting-smes-on-their-journey-to-net-zero/>
- ⁷⁰ Federation of Small Businesses. (2022). *Small business sustainability hub*. Retrieved from: <https://www.fsb.org.uk/campaign/small-business-sustainability-hub.html>
- ⁷¹ British Chambers of Commerce. (2022). *Zero Carbon Business*. Retrieved from: <https://www.britishchambers.org.uk/page/zero-carbon-business>
- ⁷² University of Cambridge Institute for Sustainability Leadership. (2022). *CISL and the SME Climate Hub*. Retrieved from: <https://www.cisl.cam.ac.uk/centres/centre-for-sustainable-finance/cisl-and-sme-climate-hub>
- ⁷³ George, S. (2022). *SMEs struggling to keep sustainability top of the agenda, survey finds*. Edie. Retrieved from: <https://www.edie.net/smes-struggling-to-keep-sustainability-top-of-the-agenda-survey-finds/>
- ⁷⁴ Department for Business, Energy & Industrial Strategy. (2022). *Energy Bills Support Scheme explainer*. GOV.UK. Retrieved from: <https://www.gov.uk/government/news/energy-bills-support-scheme-explainer>
- ⁷⁵ Energy UK. (2022). *Energy UK hosts roundtable on business energy costs*. Retrieved from: <https://www.energy-uk.org.uk/media-and-campaigns/press-releases/526-2022/8115-energy-uk-hosts-roundtable-on-business-energy-costs.html>
- ⁷⁶ Federation of Small Businesses. (2022). *New analysis shows £10,000 increase in small business utility bills ahead of Spring Statement*. [Press Release]. Retrieved from: <https://www.fsb.org.uk/resources-page/new-analysis-shows-10-000-increase-in-small-business-utility-bills-ahead-of-spring-statement.html>
- ⁷⁷ Cyrus, C. (2022). *Failed UK Energy Suppliers Update*. Forbes. Retrieved from: <https://www.forbes.com/uk/advisor/energy/failed-uk-energy-suppliers-update/>
- ⁷⁸ Ambrose, J. (2021). *Energy costs and Covid pose 'existential threat' to UK's small businesses*. The Guardian. Retrieved from: <https://www.theguardian.com/business/2021/dec/30/energy-costs-and-covid-pose-existential-threat-to-uks-small-businesses>
- ⁷⁹ Federation of Small Businesses. (2022). *Small firms left out in the cold from energy support measures, as 0.5% base rate hits*. [Press Release]. Retrieved from: <https://www.fsb.org.uk/resources-page/small-firms-left-out-in-the-cold-from-energy-support-measures-as-0-5-base-rate-hits.html>
- ⁸⁰ Department for Business, Energy & Industrial Strategy, Lee Rowley MP, & Lord Grimstone of Boscobel Kt. (2022). *High energy usage businesses to benefit from further government support*. [Press Release]. GOV.UK. Retrieved from: <https://www.gov.uk/government/news/high-energy-usage-businesses-to-benefit-from-further-government-support>
- ⁸¹ British Chambers of Commerce. (2022). *BCC calls for immediate emergency budget*. [Press Release]. Retrieved from: <https://www.britishchambers.org.uk/news/2022/05/bcc-calls-for-immediate-emergency-budget>
- ⁸² Veitch, A. (2022). *Energy strategy a step in right direction but business needs support now – BCC*. British Chambers of Commerce. Retrieved from: <https://www.britishchambers.org.uk/news/2022/04/energy-strategy-a-step-in-right-direction-but-business-needs-support-now-bcc>
- ⁸³ Federation of Small Businesses. (2022). *Small firms call for action on cost of doing business crisis as GDP falls*. [Press Release]. Retrieved from: <https://www.fsb.org.uk/resources-page/small-firms-call-for-action-on-cost-of-doing-business-crisis-as-gdp-falls.html>
- ⁸⁴ del Maestro, A., & O'Regan, R. (2022). *Six measures to mitigate energy costs in volatile times*. CBI. Retrieved from: <https://www.cbi.org.uk/articles/six-measures-to-mitigate-energy-costs-in-volatile-times>
- ⁸⁵ CBI. (2022). *Director-General Tony Danker: CBI Achieving Net Zero speech in full*. Retrieved from: <https://www.cbi.org.uk/media-centre/articles/director-general-tony-danker-cbi-achieving-net-zero-speech-in-full>
- ⁸⁶ Barford, A., Gilbert, R., Beales, A., Zorila, M., & Nelson, J. (2022). *The case for living wages: How paying living wages improves business performance and tackles poverty*. Business Fights Poverty, University of Cambridge Institute for Sustainability Leadership & Shift. DOI: 10.17863/CAM.80370. Retrieved from: https://www.cisl.cam.ac.uk/files/the_case_for_living_wages_report_2022.pdf
- ⁸⁷ Energy Saving Trust. (2022). *Cavity wall insulation*. Retrieved from: <https://energysavingtrust.org.uk/advice/cavity-wall-insulation/>
- ⁸⁸ British Gas. (2022). *What's the average gas and electricity bill in Great Britain*. Retrieved from: <https://www.britishgas.co.uk/energy/guides/average-bill.html>
- ⁸⁹ HM Revenue & Customs. (2013). *Official Statistics: Non-structural tax reliefs*. GOV.UK. Retrieved from: <https://www.gov.uk/government/statistics/main-tax-expenditures-and-structural-reliefs>
- ⁹⁰ HM Revenue & Customs. (2021). *National Statistics: Environmental Taxes Bulletin commentary (June 2021)*. GOV.UK. Retrieved from: <https://www.gov.uk/government/statistics/environmental-taxes-bulletin/environmental-taxes-bulletin-commentary-june-2021#climate-change-levy-and-carbon-price-floor-receipts-and-declarations>