UNIVERSITY OF LEEDS

Priestley Centre for Climate Futures

Realising co-benefits of climate action

Climate Evidence Unit

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Summary

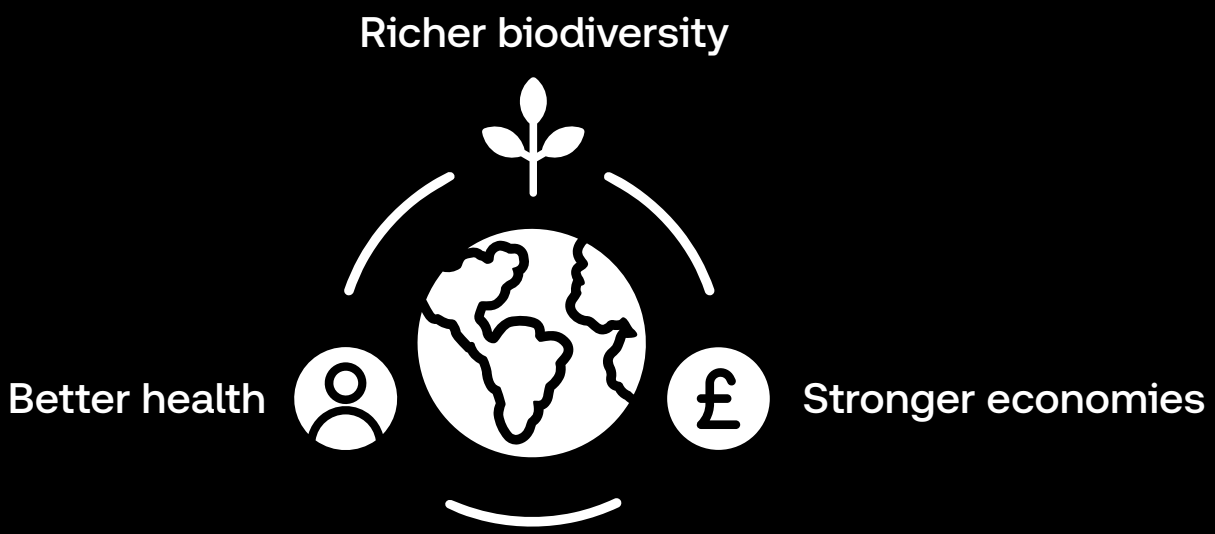
Climate action aims to reduce the impacts of climate change, either by reducing hazards through emission reductions (otherwise known as mitigation) or reducing vulnerability and exposure through adaptation.

Co-benefits of climate action are additional positive consequences that result from mitigation or adaptation measures. Co-benefits from climate action might be to boost prosperity or growth, to enhance wellbeing or to deliver benefits for the natural environment, including protecting and improving biodiversity. There can also be negative side-effects of climate action. The negative side effects from these trade-offs should be minimised where possible.

Whilst there are a growing number of instances of co-benefits being included in decision making on climate action, this is often not the case. Furthermore, co-benefits do not feature sufficiently prominently in the public discourse concerning taking action to combat the consequences of human-driven climate change.

We recommend that:

- Co-benefits and trade-offs should be considered in all decisions on climate action. This applies on all scales, from local through national to international decision making.
- Public communication on climate action is broadened to routinely include co-benefit information that is tailored to resonate with the audience. This can include better messaging on how co-benefits can boost personal and family wellbeing and improve individuals' financial security.
- Efforts should be made to encourage the private sector to include a greater focus on co-benefits and trade-offs when considering climate mitigation and adaptation. One route to encouraging this could be through updated regulation and reporting on climate action.
- The research community should step up to fill knowledge gaps around the magnitude of co-benefits, and how to maximise the benefits for all mitigation and adaptation measures.
- Policies that are not primarily aimed at climate mitigation or adaptation can also have an indirect effect on climate change and actions to deal with associated challenges. It would be useful to consider the impact of all new policies on climate goals.



What are co-benefits and why are they important?

We are now feeling the effects of climate change in the UK and internationally, with an estimate of long-term warming crossing 1.3°C above pre-industrial levels (based on a 20-year average (Betts et al., 2023; Met Office, 2025), and the first individual calendar year exceeding 1.5°C of warming (World Meteorological Organization, 2025)).

We are experiencing impacts that include record breaking extreme maximum temperatures, more intense rainfall, and hazards such as drought and wildfires (IPCC, 2023). The increased likelihood of many of these damaging extremes has been formally attributed to human-induced climate change (Philip et al., 2020; World Weather Attribution, n.d.), and even where there is no formal attribution, the picture of change is consistent with our physical understanding of what we expect in a warming world.

Climate action is mostly focused on reducing the amount of future climate change, by reducing greenhouse gas emissions, and increasingly on adaptation to reduce our vulnerability and exposure to the climate change that has already occurred or is now locked in. However, our achievements lag behind what is needed to reduce the impacts to acceptable levels.

For instance, when we focus on global emission reduction efforts, fully implementing current policies puts us on course to experience a median global warming of between around 2.5°C and 3°C by the end of the century (UNEP, 2024). Even the most ambitious emission reduction pledges imply warming that exceeds the Paris Accord “guard rail” of 1.5°C (UNEP, 2024). For adaptation, in the UK we are not acting fast enough or going far enough to produce a resilient society (Climate Change Committee, 2025). A similar picture is seen around the world (UNEP, 2024a). Given the potential catastrophic damage, this raises the question of why are we not acting quickly enough, or going far enough, in our response?

The answer is complex and context specific (O’Neill et al., 2023), but reasons include a perception that taking climate action is too costly, or something somebody else should be doing. It also results from a lack of governance being in place for mitigation or adaptation, and our inability to scale-up small-scale demonstration projects.

In this report we suggest that a missing ingredient to climate decision making is often that the co-benefits that can accompany mitigation and adaptation actions (see Box) are not accounted for. These benefits, which are in addition to the direct benefits from avoided climate impacts, have the potential to lead to better outcomes for prosperity, health, biodiversity, etc, and should be included in climate decision making as a matter of good practice. We explore several examples of where co-benefits have been considered in climate decision making, and the benefits that come from their inclusion.

Understanding co-benefits and trade-offs of climate policies and actions

Co-benefits are the additional, often indirect advantages that arise from climate policies or actions, benefiting public health, the economy, biodiversity, and social equity (van Bavel et al., 2025). These benefits often overlap with broader sustainability and development goals.

Examples of climate action co-benefits include: improved air quality and public health; economic growth and job creation; energy security and reduced dependence on fossil fuels; biodiversity conservation and ecosystem restoration; and improved social equity and community resilience.

An important framing for co-benefits is the idea of the triple dividend (Surminski & Tanner, 2016). This considers action on climate change to produce direct benefits from avoided impacts (the first dividend), the indirect economic benefits (the second dividend) and further social and environmental benefits (the third dividend). There is evidence that the triple dividend approach is being increasingly applied within government.

The flip side of co-benefits of climate action are trade-offs, which can cause undesirable consequences and costs. For example, phasing out coal, oil, and gas may lead to job losses in these sectors. Some climate policies (e.g., carbon taxes, green energy subsidies) may increase energy and transportation costs, disproportionately affecting low-income households. Co-benefits and trade-offs can arise from both emission reduction (mitigation) actions and adaptation actions.

Some of the types of climate action that lead to co-benefits are:

- Reducing fossil fuel use decreases air pollution, leading to lower rates of respiratory diseases like asthma and cardiovascular conditions.
- Investments in renewable energy and green industries generate new employment opportunities. This includes jobs in manufacturing, installation, and maintenance.
- Countries investing in solar and wind energy reduce vulnerability to global oil and gas price fluctuations.
- Nature-based solutions (e.g., afforestation, wetland restoration) enhance biodiversity while also capturing carbon.
- Subsidies for energy-efficient housing help low-income families save on electricity bills while reducing emissions.

What do we know from academic literature on co-benefits?

The academic literature on co-benefits of climate change mitigation and adaptation highlights that whilst there can be numerous advantages to society from climate actions beyond avoiding the damaging impacts of climate change, these benefits depend on the specific chosen solutions and actions, and the policy designs which shape those choices. This makes co-benefits sometimes difficult to realise. A broader literature review and full citation information is available as an annex to this report.

Health & air pollution

Climate policy measures across different sectors can significantly improve people's health, increase life expectancy, reduce health inequalities, and lower healthcare costs. For instance, improved insulation and ventilation in buildings can enhance respiratory and mental health. Shifts towards plant-based diets and lower calorific intake can make diets healthier and reduce food-related emissions. Active travel, such as walking and cycling, can promote healthier lifestyles and reduce transport-related health burdens, especially in lower-income areas. Additionally, transitioning to net-zero emissions by phasing out internal combustion engine vehicles can drastically reduce localised air pollution, potentially preventing premature deaths.

Nature and wider environmental benefits

Mitigating climate change to limit temperature rises benefits ecological factors like biodiversity, ocean acidification, and water availability. Changes in land use, such as those resulting from reducing meat consumption and production and reducing food waste, can decrease soil erosion and methane emissions. Allocating more land to forestry can increase carbon sinks and act as flood defences. Urban strategies like pedestrianization, reducing car transportation, and increasing green spaces can improve biodiversity and liveability.

Prosperity, economy and equity

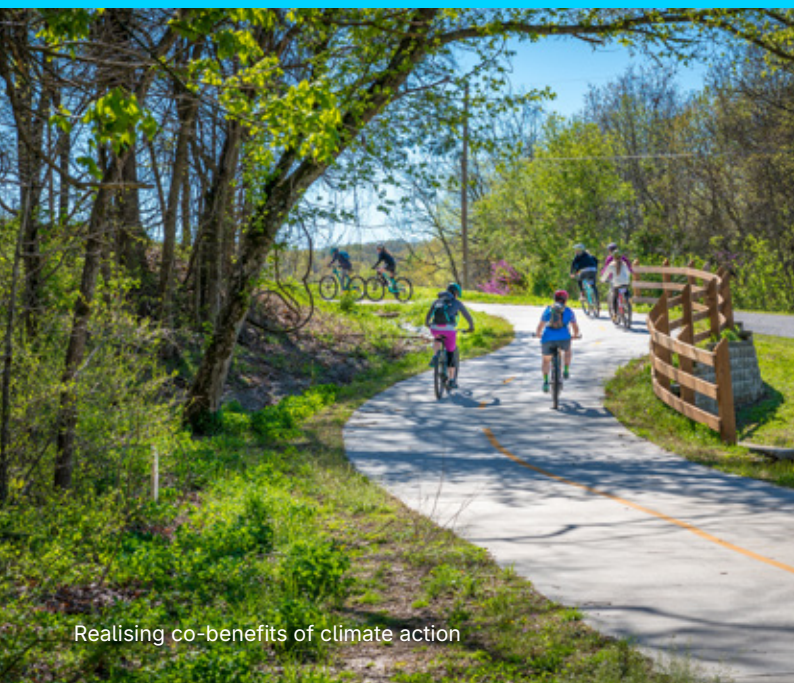
Integrating climate impacts into policy appraisal processes, as seen in the UK's HM Treasury's 'Green Book' guidance, is a positive step. However, the temporal mismatch of costs and benefits in climate action, where costs are immediate, but benefits are often delayed, or the spatial mismatch where costs and benefits occur in different locations pose challenges. Challenges also occur from the difficulty in credibly monetising some benefits. Climate policies designed to reduce inequality, such as frequent flier levies, can be designed to bring benefit to poorer households.

Societal and wellbeing impacts

While physical co-benefits of climate policy are well-documented, there is less evidence on social co-benefits. Gendered aspects of energy poverty, the role that city design plays in social cohesion, and teleworking's impact on leisure and social isolation are important considerations. Assessing these socio-cultural co-benefits is challenging as they do not fit neatly into monetized cost-benefit analyses.

Aligning policy areas by pursuing 'reverse' co-benefits

It is also important to recognise climate benefits can result from policies that have a primary intention of achieving other policy objectives. Policy objectives such as energy security, optimising urban design or economic development can have positive co-benefits for climate policy or cause tensions and trade-offs between policy areas.



Learning by doing – case studies of the use of co-benefits

We have assembled case studies to explore different aspects of co-benefits of climate action.

The case studies have been chosen to examine several aspects of co-benefits and trade-offs. Firstly, by covering different spatial and governance scales – international national, regional and local. Secondly, the case studies cover both mitigation and adaptation co-benefits.

The first case study focuses on the national scale and how some co-benefits have been included in UK carbon budget decisions. Two other examples focus on more regional and local scales, with examples from Cornwall and the Yorkshire and Humber region. From these examples, we see that different approaches are possible, tailored to the local context. In both regional cases the use of co-benefits is helping to drive engagement with local stakeholders and improving decision making. The fourth case study focuses on examples of co-benefits research at the University of Leeds. This highlights how the research community is adding to the evidence base around co-benefits, as well as delivering applied research tools to help policy makers. One of the tools is examined in more detail and extends to international evidence and has a balanced consideration of co-benefits and trade-offs.

Case study 1

The Sixth and Seventh UK Carbon Budgets

Authors: Sam Betts-Davies & Elliott Johnson

Setting UK carbon budgets involves an independent recommendation by the Climate Change Committee (CCC) followed by the setting out of how the carbon budget will be achieved by UK government.

At the time of writing this case study the Sixth Carbon Budget has been specified by the Department of Energy and Net Zero and the recommendation for the Seventh Carbon Budget has recently been specified by the CCC, with government now working on its response.

The consideration of co-benefits in the assessment

An assessment of the co-benefits of climate ambition was included within the impact assessment undertaken to confirm the Sixth Carbon Budget by government (Department for Business Energy and Industrial Strategy, 2021), the 2033-2037 carbon budget for the UK. The impact assessment developed by the Department for Business, Energy and Industrial Strategy (BEIS) in the process of deciding the Sixth Carbon Budget evaluated four policy options: a 'do nothing' scenario and three carbon budgets of varying ambition.

A narrow range of monetised benefits were included in the BEIS impact assessment. Costs included technological deployment and supporting infrastructure, finance, fuels and air quality pollutants. Monetised benefits assessed included carbon savings (using government carbon values), natural capital benefits, reduced damage costs associated with fewer air quality pollutants and fuel savings from efficiency measures or cost savings. These costs and benefits are aggregated to form a net present value (NPV) of each policy option. The distribution of costs and benefits across societal groups is not considered. Furthermore, the 'do nothing' option was considered to have zero costs or benefits, suggesting that the impact assessment did not include the cost of loss and adaptation associated with inaction. However, calculating the costs of climate impacts for the UK is difficult to ascertain without knowing the future levels of global climate change mitigation.

Beyond these monetised co-benefits, the 2008 Climate Change Act legislates for ten wider considerations to be assessed by government when setting carbon budgets. Whilst some of these pertain to the technological and economic feasibility and implications of achieving the budgets, others address areas where co-benefits could be realized. These include social considerations such as the impact on fuel poverty, the spatial implications on devolved administrations, and the consistency of the budgets with developments in climate science. These analyses are qualitative, sitting outside of the quantitative framework, and thus have no direct bearing on the evaluation of each option. Other factors not included within the Climate Change Act are also qualitatively evaluated, including impacts on land use, recreation and amenities, water, biodiversity and raw material supply and use. These assessments are limited, and not specific to the different carbon budget options considered by the monetised evaluation. Given this, it is difficult to understand the extent to which these qualitative assessments impact upon the final carbon budget decision.

The result of this economic approach to the appraisal of co-benefits is that:

1. Monetised co-benefits play a disproportionate role in decision-making relative to benefits assessed qualitatively.
2. The extent to which non-monetised co-benefits influence decision making is unclear.
3. Several important non-monetised co-benefits are completely omitted from considerations (such as health, impacts on social cohesion, or the distributions of benefits across different socio-economic groups).

Applying the lessons in the Seventh Carbon Budget advice

Recently, the Seventh Carbon Budget advice to government has been released by the CCC (Climate Change Committee, 2025). Whilst the CCC's Seventh Carbon Budget report is not legally binding, its advice has been followed in the setting of previous budgets. Like BEIS' Sixth Carbon Budget impact assessment, this includes some treatment of co-benefits, but not all benefits are covered due to a lack of mechanisms available to monetise these co-benefits. The CCC's assessment of co-benefits does go further than previous government analyses, providing a greater focus on the co-benefits for households, explored in terms of metrics of prosperity.

Quantified co-benefits are estimated to provide £2.4–£8.2 billion per year in net benefit by 2050 (Change Committee, 2025). The largest quantifiable co-benefit found through climate action is in health, related to improvements in outdoor air quality due to the switch to low-carbon heating, electric cars, and modal shift including active travel. Other quantified co-benefits include better insulated and less damp homes and health improvements from a reduction in average meat and dairy consumption. A quantified trade-off is the increased travel time on public transport.

Unlike the Sixth Carbon Budget, the co-benefits calculated by the CCC for the Seventh Carbon Budget result from analyses of the mitigation options outlined in their indicative scenario for achieving the Seventh Carbon Budget. In the Department for Energy Security and Net Zero's (DESNZ, previously BEIS) forthcoming assessment of this advice, a greater detail on the specific mitigation strategies used to meet climate targets would enable a more robust evaluation of climate action co-benefits and trade-offs—both those that can be monetised and those assessed qualitatively, such as broader societal and environmental gains.

Case study 2

How Cornwall Council “Decision Wheels” enable assessment of multiple policy goals

Authors: Josh Lait & Tim Foxon, Energy Demand Research Centre

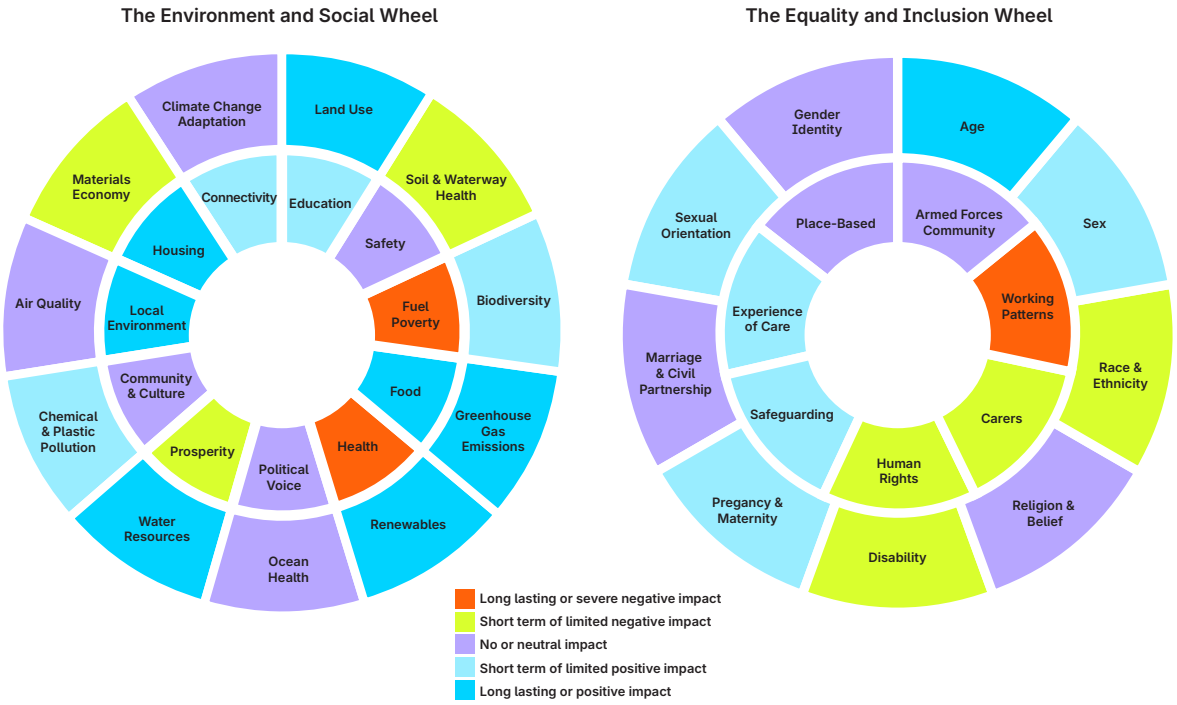
Local authorities in the UK are working to address the climate crisis while also managing the social and economic challenges their residents encounter (Brown et al., 2023).

A longstanding method for assessing the multiple economic, social and environmental impacts of policy is cost-benefit analysis, which relies on monetary valuation of co-benefits to assess trade-offs between these impacts. However, many local authorities are beginning to develop and use alternative tools that enable comparison of a wider range of impacts, measured in physical or social value terms, within a coherent framework (Braunholtz-Speight, 2024; Gilbertson, 2021; Jones et al., 2022). These emerging tools aim to help decision-makers recognise and apply a more informed judgment to the choices that are likely to exist when simultaneously trying to achieve multiple policy goals (HM Treasury, 2024b).

Development of a tool to consider co-benefits and trade-offs

Following the declaration of a climate emergency by Cornwall Council in 2019, the Council developed the Cornwall Development and Decision Wheel in 2021 to assess the multiple impacts of local policies (Cornwall Council, 2024). For example, proposed climate change mitigation measures were informed by theories of environmental and social sustainability, including the nine planetary boundaries framework (Rockström et al., 2009) and the UN’s Sustainable Development Goals (UN DESA, 2024). The tool was also informed by insights from doughnut economics, which proposes that societies need to exist in the ‘safe operating space’ between two concentric rings, where the outer ring represents the planet’s ecological ceiling, and the inner ring refers to meeting basic human needs (Raworth, 2017). This led to the creation of two decision wheels [see Figure 1 on page 10]. These wheels help outline the potential environmental, social, and economic effects of the proposed project or decision, highlighting the co-benefits and trade-offs of particular actions.

Figure 1: Cornish Council's Decision Wheels



Each section of the wheel represents a specific area of potential impact, with the impact of a policy measure evaluated on a five-point scale. Council policy officers designing and implementing policy must use the tool early in a project or decision-making process to help guide and improve the outcome. A senior officer authorises the final decision wheels, which are published in reports to Cornwall Council's cabinet, committees, and boards. This ensures all policy documents contain a visual representation of impact along with a series of impact statements for elected officials to review and discuss.

As a specific example, the transport report to Cornwall Council's cabinet, *Tamar Bridge and Torpoint Ferry: Future Financing*, includes two completed decision wheels (Torpoint Ferry - Future Financing, 2022). These highlight how increasing the toll cost of using these crossings by car could impact the Council's other policy goals. The Environment and Social Decision Wheel shows positive co-benefits, including improving air quality and emissions reductions, as residents are encouraged to shift to active travel modes, such as walking or cycling.

However, it also draws attention to the possible adverse impacts of increasing the costs of crossing by car. These include limiting social journeys, business activity and Cornish residents' access to health services or employment opportunities in Plymouth. Therefore, the proposal may undermine the Council's other goals, such as enhancing levels of connectivity, prosperity and health in the county.

Using the Equality and Inclusion Decision Wheel highlights how a decision could also lead to short-term and localised negative impacts based on location or resident age, such as additional costs for people of working age who regularly use these crossings to go to work and for communities in Southeast Cornwall, such as Saltash, Torpoint and the Rame peninsula, which rely on these crossings to access key services in Plymouth.

Reflecting on co-benefits for decision making

A local authority policy officer reports several clear advantages of using the Cornwall Development and Decision Wheel to enhance decision-making:

- It ensures projects are evaluated in relation to a range of policy areas.
- Stakeholders from different service areas are encouraged to work together to mitigate adverse impacts.
- The rationale and evidence behind the decisions are made transparent.

Case study 3

How the Yorkshire & Humber Climate Commission prioritises co-benefits in climate action

Author: Jon Kedwards, Yorkshire & Humber Climate Commission

The Yorkshire & Humber Climate Commission (YHCC) is an independent advisory body that brings together people from the public, private and third sectors to support and enable the delivery of ambitious climate action across Yorkshire and the Humber.

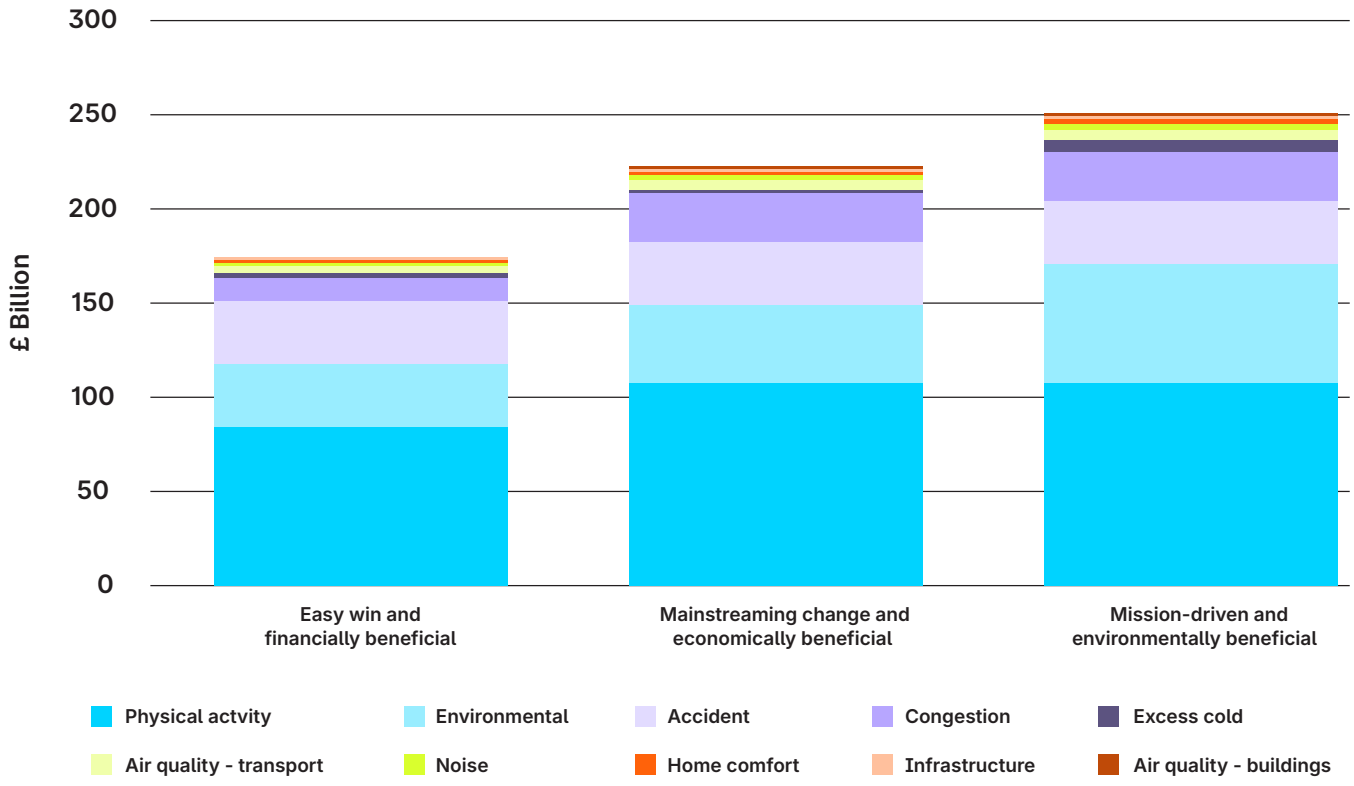
The Commission has found that it is increasingly clear that the scale of climate action in the region is hugely dependent on demonstrating co-benefits – particularly of improved health, reduced inequalities, engaged, thriving and resilient communities, and healthy ecological systems. These co-benefits must be realised in the places that need them most.

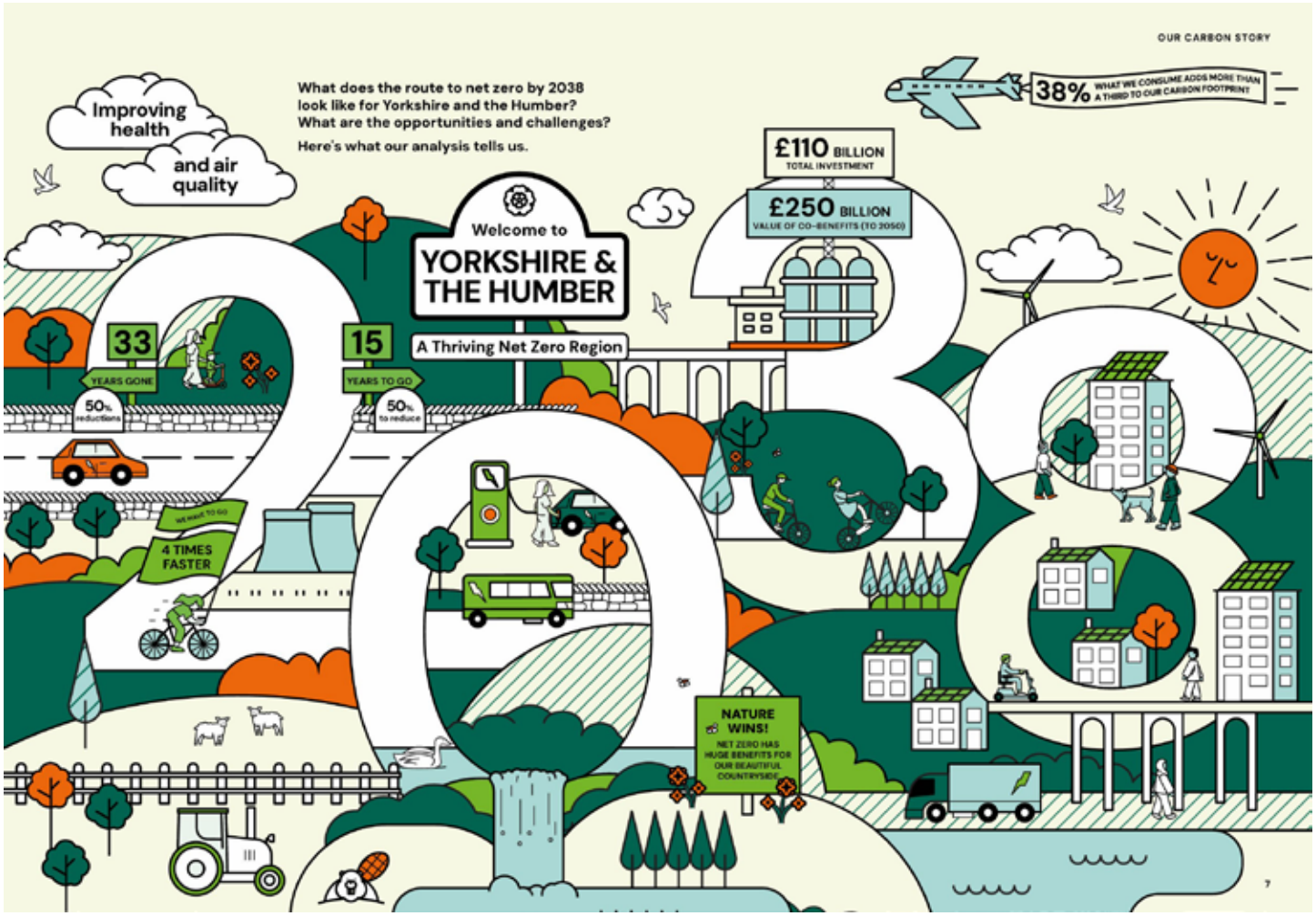
Putting a value on co-benefits

Our Carbon Story (Yorkshire & Humber Climate Commission, 2024) examines the changes required to reach the region's net zero target by 2038. Achieving net zero could generate over £250 billion in co-benefits by 2050 (Figure 2 on page 12). This is a conservative estimate, as the modelling does not include aspects such as improved biodiversity. At a regional economy scale, the benefits include reducing pressure on the NHS through improved public health, greater energy security, growth in the low-carbon jobs market, and reductions in poverty and inequality.

The transport sector stands out for generating significant co-benefits, particularly through health improvements from increased walking and cycling, alongside reductions in accidents and congestion. While major investment is still required, framing this investment through avoided costs and clear benefits strengthens the case for action.

Figure 2: Quantifying the co-benefits





Integrating co-benefits into action planning

In the Commission's latest Climate Action Plan an important aim is to avoid siloed thinking and to consider co-benefits, particularly co-benefits experienced by those most at risk of climate impacts or of losing out in the carbon reduction transition. A new prioritisation process for possible actions gives equal weight to carbon reduction, climate adaptation and nature recovery, and a 'just transition' lens is used to ensure consideration is given to the social impact of, and opportunities from, climate action. The result is a set of seven 'whole system, whole place' themes with a set of integrated actions, and associated outcomes that go well beyond a narrow focus on carbon emissions reduction to describe the kind of co-benefits expected from concerted climate action.

Embedding into policy advocacy

It is increasingly clear that public health, and the social and economic resilience of places when faced with climate-related risks, are powerful policy drivers where the potential benefits of joining up decision-making are well known and backed up by extensive research. For example, the policy approach to housing retrofit does not focus solely on carbon emissions, because that would lead to solutions that miss crucial social and economic opportunities. Some decarbonising actions at the individual level, including heat pump installation and buying electric vehicles, are costly options that are not available to everyone; whereas carefully focused initiatives can be designed to benefit broader groups. For instance, improving home energy efficiency, and public and active travel will reduce people's energy bills, reduce car dependency and support better health.

One of YHCC's policy asks of government has been to:

"Join up climate, skills and economy strategies and ensure they address the big challenges together, including ageing populations, poverty, skills shortages and climate risks."

Building partnerships for action

Championing co-benefits is proving a critical factor in developing several of the Commission's core projects. An example of this is the development of partnership working with the health sector, in the form of the Yorkshire and Humber Public Health Network (YHPHN). This partnership has developed the Climate & Health narratives (YHPHN, 2024), a resource that frames these challenges and benefits in clear and accessible terms for ease of use by health professionals. Many of the actions that reduce carbon will positively impact population health, and this will result in financial savings to the health system, including to the NHS in the long term. For example, a strategic retrofit programme targeting the leakiest homes could save the NHS £540m per year (Garrett et al., 2023).

Ongoing work is focussed on building relationships with senior leaders, deepening understanding, and identifying and driving action across all sectors, including the regional NHS. The Commission, with the Health Innovation Network (Yorkshire & Humber) recently hosted a roundtable event, chaired by Baroness Brown, that brought together leaders from the region's Integrated Care Boards to build a common level of understanding and identify the key actions needed to unlock progress. A major challenge, across all sectors and particularly within the healthcare system, is to enable decision-makers to prioritise climate action when there are a significant number of immediate pressures that cannot be ignored. A co-benefits approach is critical to successfully enabling this prioritisation.

Case study 4

Co-benefits research at the University of Leeds is providing decision support tools and new learning

Author: Jason Lowe

The University of Leeds, working with the Met Office, produced a tool for both policy makers and researchers that helps to understand the types of co-benefit and trade-offs available in different regions and different sectors, and the confidence we have in information about those impacts.

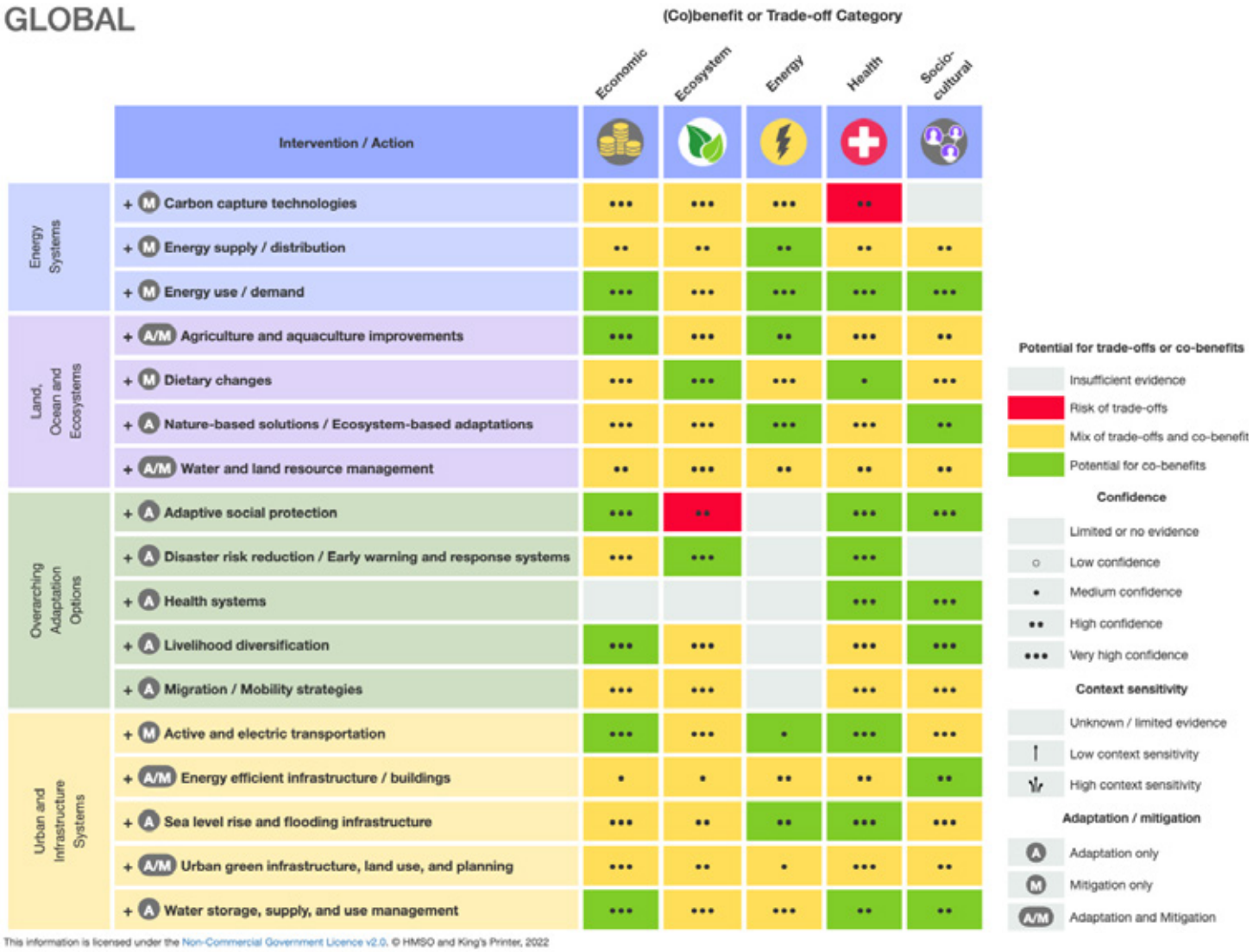
This was showcased at COP27 in Egypt and can be accessed here: **https://priestleycentre.shinyapps.io/climatecobenefitsportal**

Within the tool the user can select their interests and easily see how a range of different actions impact co-benefits, and trade-offs, across different categories. Populated with peer-reviewed scientific evidence, the tool aims to provide policymakers, academics and industry with a simple and trustworthy method of assessing the impact and potential wider value through co-benefits of a particular course of action.

On the launch of the tool, the then Government Chief Scientific Advisor, Sir Patrick Vallance, commented:

"We know that immediate and sustained action is needed to prevent the most dangerous impacts of climate change. By adopting a systems approach, we can prioritise solutions that result in the greatest net benefit, both for human health and the environment."

Figure 3: An overview of climate adaptation and mitigation interventions with evidence of opportunity for win-win (co)benefits, taken from the (Co)Benefits Portal global dataset. Examples of specific action areas for 'energy supply' and 'agriculture and aquaculture improvements' are expanded.



There is an active research portfolio of co-benefits relevant research at the University, including:

Transforming infrastructure to reach net zero

Dr Katy Roelich is developing a new long-term planning approach for changing infrastructure to meet the growing social and environmental challenges facing cities, whilst reducing emissions.

Capturing carbon through UK woodlands

Professor Dominick Spracklen and Dr Cat Scott are exploring the carbon storage capacity of UK woodlands, to help quantify and maximise the role forests can play in achieving net zero emissions, whilst preserving biodiversity and delivering a range of other ecosystem services.

Taking the carbon out of transport

Professor Greg Marsden and Professor Jillian Anable are helping local authorities identify what action they could take to progress towards net zero transport emissions, which comes with multiple co-benefits including improved air quality and promoting wellbeing.

Discussion

The academic literature and practice in the United Kingdom both demonstrate that there are many co-benefits that can add to the direct benefits of avoided impacts from climate mitigation and from adaptation actions.

However, there are also trade-offs that can offset some of the benefits of climate action in other policy areas. Careful consideration is needed of the wider implications for different stakeholders, seeking to maximise benefits and minimise trade-offs. Doing this well typically requires co-development, drawing on the specialist knowledge of the stakeholders to understand the context into which climate solutions are to be implemented and the potential range of co-benefits and trade-offs in particular situations. Furthermore, it is necessary to consider over what timescales different benefits and trade-offs might occur, and whether additional activities need to be put in place to realise the co-benefits.

Citizens play an important role in climate action, and it is often vital to the success of a specific type of climate action that there is a broad understanding of reasons for climate action and the benefits that it produces (see case study 3).

Co-benefits may sometimes be seen as a greater motivation for climate action by many stakeholders than the avoided climate-related impacts, partly because of the psychological distance between stakeholders and climate impacts that may not be realised until some way into the future.

We recommend that public communication is broadened to routinely include co-benefit information that is tailored to resonate with the audience. This can include focusing on better messaging around how co-benefits can boost personal and family wellbeing, and individuals' financial security such as lower energy costs (see case study 1).

Other co-benefits that can be effective motivators are positive impacts on house prices. When designing communication materials on a climate policy, it is useful to consider if any of the co-benefits might be a better 'entry point' for the communication than the climate goals. A clear example of this, highlighted through citizen panels (Bailey et al., 2025), relates to the benefits of a lower meat diet. Health benefits may resonate with some public groups more than the climate benefits from lower emissions.

Alongside citizen stakeholders, there is a role for co-benefit thinking in public and private sector organisations. For instance, insulation of workplaces can reduce greenhouse emissions, while also saving on building operating costs. A culture of making more use of online meetings can also reduce the carbon footprint of buildings, whilst saving money on travel expenditure. Efforts should be made to encourage the private sector to include a greater focus on co-benefits and trade-offs when considering climate mitigation and adaptation. One route to encouraging this could be through updated regulation and reporting on climate action.

A growing number of frameworks and tools now exist to help understand and realise co-benefits. A notable example is the Cornwall Development and Decision Wheel (case study 2).

There are also tools available for use on national and international scales, including that from the University of Leeds (shown in case study 4) and work from the government funded CSN0W programme, which provided climate services for the UK (DESNZ, 2025).

Whilst there are instances of co-benefits being included in decision making on climate action, this is still often not the case. Furthermore, the UK government primarily appraises climate policy using monetary-focused methods like cost-benefit analysis. These methodologies are detailed in the HM Treasury's Green Book (HM Treasury, 2024a). The economic framing poses some complications for the inclusion of assessments of co-benefits, given difficulties with attaining data accurately reflecting the cause-and-effect relationships between climate policies and future social benefits.

In cases that involve air quality, health or nature, there are established methodologies to monetise the social benefit of the effects of climate policy (Finn & Brockway, 2023; Karlsson et al., 2020). These 'monetised benefits' are therefore increasingly included within the aggregated economic benefit assigned to a policy option and are directly considered by decision makers.

However, there are a much broader range of social and ecological benefits that do not easily fit into monetised cost-benefit analysis frameworks. Their omission in these analyses means that decision makers receive an incomplete assessment of the positive and negative effects of policies, leading to the potential for missing opportunities to realise the full benefits of the transition to a resilient low-carbon future. **We recommend that co-benefits are considered in all policies and decisions on climate action.** This applies on all scales from local to national to international decision making.

Whilst knowledge and understanding of co-benefits and trade-offs is increasing, there are still many gaps. We recommend that the **research community steps up to fill knowledge gaps around the magnitude of co-benefits, and how to maximise the benefits for all mitigation and adaptation measures**. There are also **knowledge gaps around the potential detrimental side effects of climate actions**.

It is also becoming apparent that policies that are not primarily aimed at climate mitigation or adaptation can have an indirect effect (co-benefits and trade-offs) on climate goals. **It is desirable to consider the impact on climate and climate goals of all new policies**.

In conclusion, there is growing academic and real-world evidence that the consideration of co-benefits and trade-offs leads to better outcomes as we try to navigate the challenges of a changing climate. Decisionmakers should take steps to ensure that this evidence is harnessed for improved policy and action for the climate, society, and the economy.

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