



# Maximising the benefits of a net zero transition for the infrastructure sector



# Content

03

Executive  
Summary



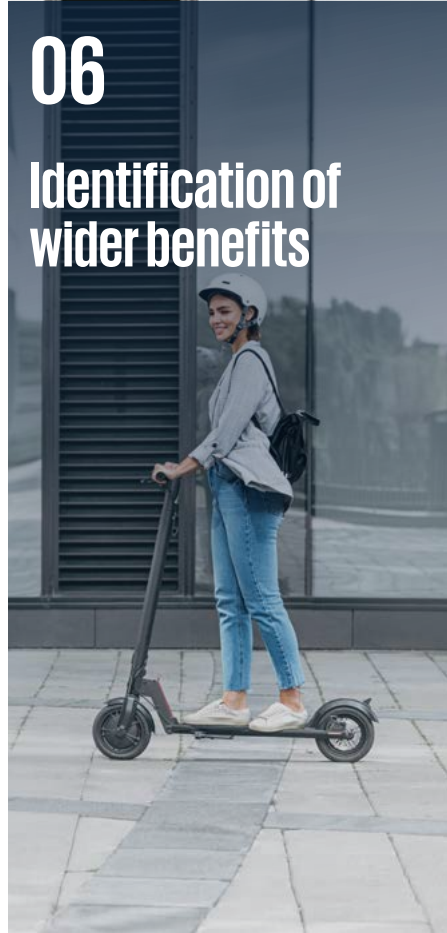
04

Context



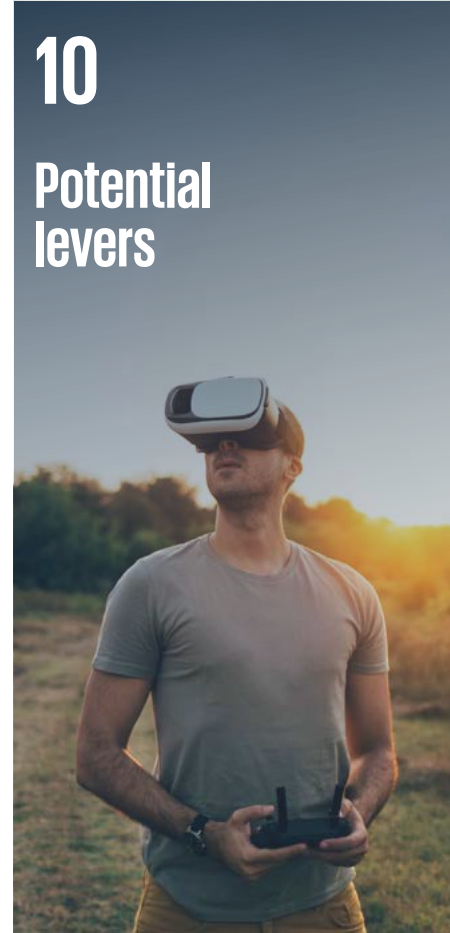
06

Identification of  
wider benefits



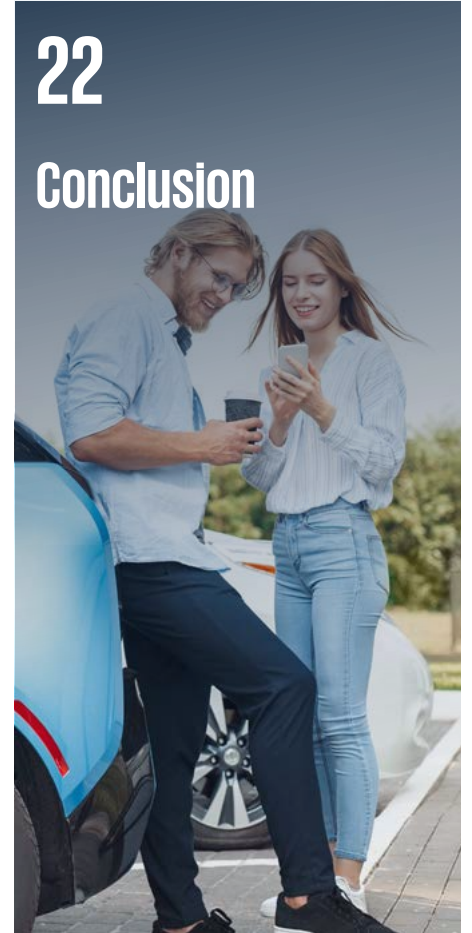
10

Potential  
levers



22

Conclusion





# Executive summary

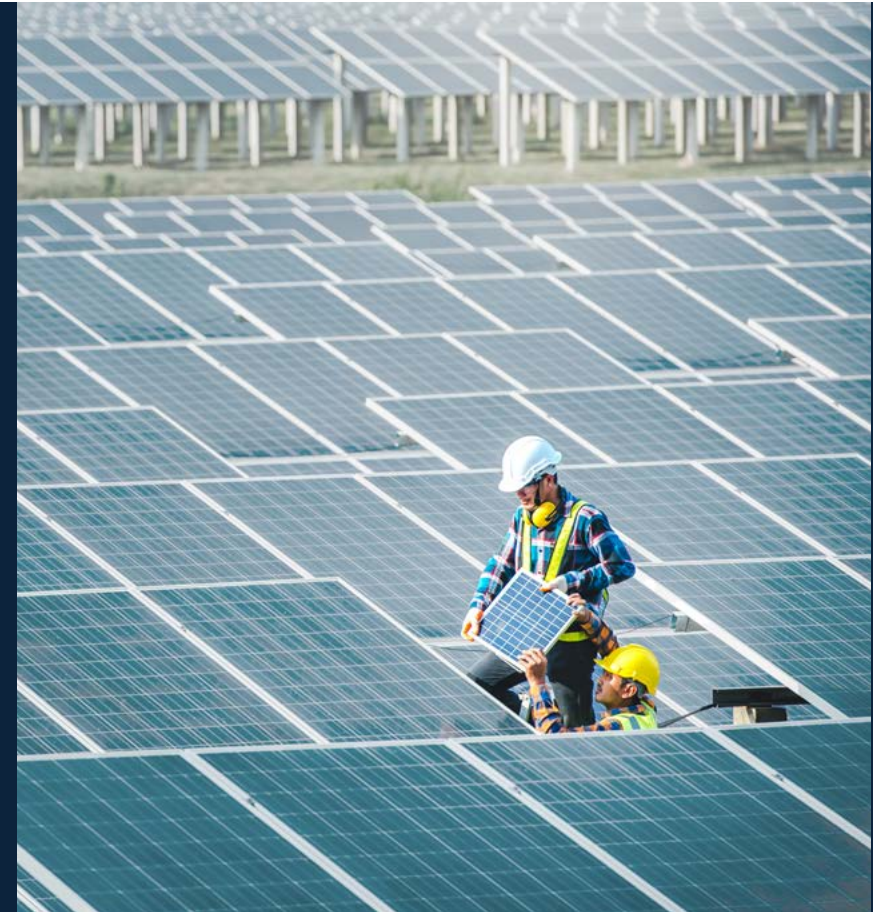
Infrastructure and the built environment have historically been one of the contributing factors in rising levels of greenhouse gases through the materials that are used, the loss of natural habitat, the operational impacts and then final demolition or disposal, accounting for 25% of the total UK emissions.<sup>1</sup> However, over the past couple of decades forward thinking organisations within this sector have been making significant efforts to reduce this impact.

More recently people have realised that the assets that this sector is responsible for are essential for the transition to a net zero economy, such as large-scale renewable energy installation, sewer systems and net zero buildings all of which need to work with nature, not against it.

The industry and workforce behind these assets are also integral to the success of the transition and must be supported and upskilled.

A radical rethinking is needed to meet this transition. Through that radical rethinking, a much greater value to society can be delivered.

This paper seeks to identify how this sector can maximise the benefits of a net zero transition through its delivery and planning of schemes, procurement of the value chain and using sustainable finance to unlock essential capital that is linked to sustainability performance.





# Context

Torrential rains, typhoons, floods and wildfires have become the weather that is synonymous with the summer of 2023. Whilst wildfires raged across at least nine countries in the Mediterranean, Super Typhoons have been recorded in the Pacific. Extreme weather events are increasing. In 2022, drought was officially declared in the UK in eight regions on the 12th August, with the ninth being added shortly after, and four of the ten highest ever UK temperatures were recorded in the last three years. Floods and heat waves are only a foretaste of what awaits us in the next few decades. In July the United Nations Secretary General Antonio Guterres said “the era of global warming has ended and the era of global boiling has arrived.”

## The impacts of industrial revolution

Our planet is experiencing significant and accelerated climate change that began over a century ago, triggered by the impacts of our industrial revolution. It is affecting every country and nation on every continent, disrupting national economies, and affecting our lives, the way we live, the buildings we inhabit and the places we work.

By rapidly cutting emissions of greenhouse gases, we can lessen the risks and dangers of climate change. However, achieving this will require a comprehensive socio-economic transformation and massive investments in sustainable technologies in all sectors like industry, transport, energy etc.

## The Paris Agreement

In response to the various commitments under the Paris Agreement or subsequent COP meetings, most nations have now set net zero targets and carbon budgets for various sectors are being established.

Climate finance is one mechanism that will be necessary for mitigation and adaptation measures. The Agreement acknowledges that developing countries do not have the financial means or capacity to manage the challenges brought by climate change and therefore reinforces that developed countries should provide financial assistance to more vulnerable countries where possible. For the first time, it also encourages voluntary financial contributions by other parties.

The Agreement emphasises the need for realising technology development to improve resilience to climate change and reduce GHG emissions. Although there is still a long way to go, the years since the establishment of the Agreement have already sparked low-carbon solutions, innovations, and new markets. A technology framework has also been established to provide overarching guidance to the well-functioning Technology Mechanism, which accelerates technology development and transfer through its policy and implementation arms.

This paper focuses on identifying the wider benefits of reaching net zero emissions and discusses delivery approaches to ensure that the benefits are maximised.

## The broader benefits

Broader benefits are to be found across the sustainability spectrum. Increased social value due to cleaner air, water and food could free up billions and improve healthcare, resource availability and life spans, as well as life quality for non-pollution related illnesses.





## The social value

Social value can also be gained from expanding the job market and providing new and rewarding careers in green firms and organisations. Scarcity of workers, especially in the construction sector, may lead to wage increases and meeting the scarcity head on is done via further job creation to serve the “green revolution”.

Natural Capital will be preserved thus protecting habitats and ecosystems more broadly. Seeing natural resources as assets to be carefully managed, not merely blindly consumed, will change thought patterns and behaviour of most firms for the better.

In order to unlock these positive wider benefits, we have identified 5 levers:



**Delivering/  
Planning**



**Green Finance**



**Procurement**



**Technological**



**Economic**

This paper will analyse the first three levers and provide brief comments on the last two levers.





# Identification of wider benefits

## Do nothing

The pathway to net-zero emissions by 2050 is challenging and is likely to incur large cost but at the same time, it bring new opportunities and potential to access wider benefits.

Net zero refers to achieving a balance between the amount of greenhouse gases put into the atmosphere and the amount of greenhouse gases taken out of the atmosphere. This will require us to both reduce the amount of polluting gases we emit and neutralise all remaining emissions via nature-based or technological removals. CO<sub>2</sub> is perennially scarce for industrial purposes, providing a market for capturing this key greenhouse gas, and storage can occur in old oil and gas fields. Sequestering in limestone and other porous rock is growingly popular as costs decrease, and urgency grows.

Doing nothing also leads to investors divesting from companies which do nothing, leading to stranded assets, loss in market capitalisation and value due to branding damage and loss of stakeholder support: employees, partners, and customers will all flee firms and organisations which do nothing. To tackle growing concerns and future growth there is no alternative: this is why 'do nothing' is a death sentence for the planet and organisations.

This section explores the potential economic and social benefits, as well as the benefits of natural capital, in creating a zero-carbon society.





## Least cost deployment (economic benefits)

Economic benefits vary incredibly across sectors and organisations. Reducing acid rain and airborne pollution may free up and regenerate habitats for wild animals, meaning, among other value producing species, salmon and bees and certain trees can prosper. Net zero also leads to healthier and longer human lives, aiding the economy due to longer and more productive work for all adults. Sustainability can lead to positive outcomes in the reduction of bankruptcies and debt repayment defaults, though estimating the cost or the benefits of reaching net zero with any accuracy is difficult, especially considering the level of uncertainty around new and emerging technologies, and changes in the economy and people's behaviour.<sup>2</sup>

The CCC's latest budget also made clear that reaching net zero will be costly. In 2019, only £10 billion of £390 billion of total investment across the UK went to low carbon projects. CCC estimates this needs to rise significantly to about £50 billion per year by 2030 and remain at that level for the

next three decades - less than 1% of projected GDP over that period. The cost of financing this investment could range from £3 billion to £17 billion per year.<sup>3</sup>

His Majesty's Treasury and the Department for Business and Trade (DBT), the Department for Energy Security and Net Zero (DESNZ) and the Department for Science, Innovation and Technology (DSIT) refer to an investment figure of £70 billion per year, or over £1 trillion by 2050. However, the economic analysis of net zero will apparently change given the COVID-19 pandemic.

The European Commission estimated in their report 'Investing in a climate-neutral future for the benefit of our people'<sup>4</sup>, that reaching the 2030 climate target will require additional annual energy system investments of €336 billion on average per year. Whereas globally, energy investments that currently stand at around US\$2 trillion per year or 2.5% of global GDP according to the International Energy Agency need to increase to an annual average investment to between US\$3.1 trillion

and US\$5.8 trillion per year until 2050 according to Bloomberg New Energy Finance<sup>5</sup>.

Models that try to calculate costs have a degree of uncertainty because the underlying economics are constantly changing. One example is when electricity from newly constructed renewables becomes cheaper than from new fossil-fired generation. Another is when it becomes cheaper to build new renewables than to keep running the existing fossil-fuelled power generations.

In 2019, the cost of offshore wind decreased by over 30% in the UK according to the Institute of Government<sup>6</sup>. This suggests that the UK could accelerate moves to electrify other parts of the economy that have previously relied on energy from fossil fuels, such as surface transport and heating for homes and offices, according to Simon Evans in his analysis for Carbon Brief: Record-low price for UK offshore wind cheaper than existing gas plants by 2023<sup>7</sup>.



## Three pillars of wider benefits

### Increased social value

It is evident that assessments have been made to calculate the social cost of climate change, whether it covers crop failure, mass migration, damage to property or damage to human health. These methodologies vary significantly depending on the author and its intended audience. However, for the purpose of this paper we shall be focussing on the social value through the creation of jobs and innovation of embracing the opportunities posed by the transition to a net zero economy.

### Expanding the job market

The transition to a net zero, greener economy will bring new employment opportunities in sustainable production processes and outputs, leading to social co-benefits of green investment.

New offshore wind, hydrogen and Carbon Capture Utilisation and Storage (CCUS) industries may help support new jobs while also pushing forward the UK government's levelling up agenda to invest in regional economies. Based on estimations, the government's Ten Point Plan for a Green Industrial Revolution (2020) identifies that these projects could support up to 60,000 jobs for offshore wind, up to 50,000 jobs for CCUS and up to 8,000 jobs for hydrogen projects by 2030 (potentially unlocking 100,000 jobs by 2050 in a high hydrogen net zero scenario)<sup>9</sup>. The programme to retrofit buildings could also result in an

increased trained workforce of up to 230,000 by the end of this decade. The UK Government recognises that whilst new jobs are likely to be created, there may be a number of jobs lost in transitioning sectors, such as oil and gas extraction and combustion engine engineering for vehicles, and therefore it has committed to support workers and businesses in the transition to a new low-carbon workforce.<sup>9</sup>

The Ten Point Plan for a Green Industrial Revolution<sup>10</sup> builds on the opportunities to recover from COVID-19 and invest in making the UK a global leader in green technologies, and whilst government has set the vision, the Institute of Public Policy Research (IPPR) concluded that achieving net zero emissions by 2050 is a shared responsibility. Decarbonising our built environment is central to the plan, from creating a low-carbon construction industry to improving energy efficiency in major infrastructure projects to support our towns and cities to achieve net zero.

However, the whole construction industry is facing large and permanent skill gaps and skill shortages, that may hamper its ability to carry out the government's ambitions. IPPR's analysis shows that up to 750,000 construction workers could retire or be close to retiring over the next 15 years. Not enough is being done to replace these workers, with only 20.3% of construction workers aged under 30. The changing face of construction towards Modern Methods of Construction also needs to be considered as this will attract people with different skills into the industry.

### Natural Capital will be preserved

Natural Capital, and its benefits, can be defined as the world's stocks of natural assets which includes geology, soil, air, water and all living things. It is from this Natural Capital that humans derive a wide range of services, often called Ecosystem services, which make human life possible.<sup>11</sup>

As the world's population booms towards 9 billion by 2050, with the eighth billion person being born on the 15th November 2022, the demand for agricultural products (food, fibre, and fodder) will rise dramatically. Combined with the effects of climate change, these demands will put even more strain on land, water, energy, and other resources that are already stretched.

Nature supports human health, livelihoods, and economies in countless ways. Ecosystems store carbon to slow climate change, purify and regulate water supplies, provide habitat for fauna, and offer opportunities for spiritual and cultural experiences.

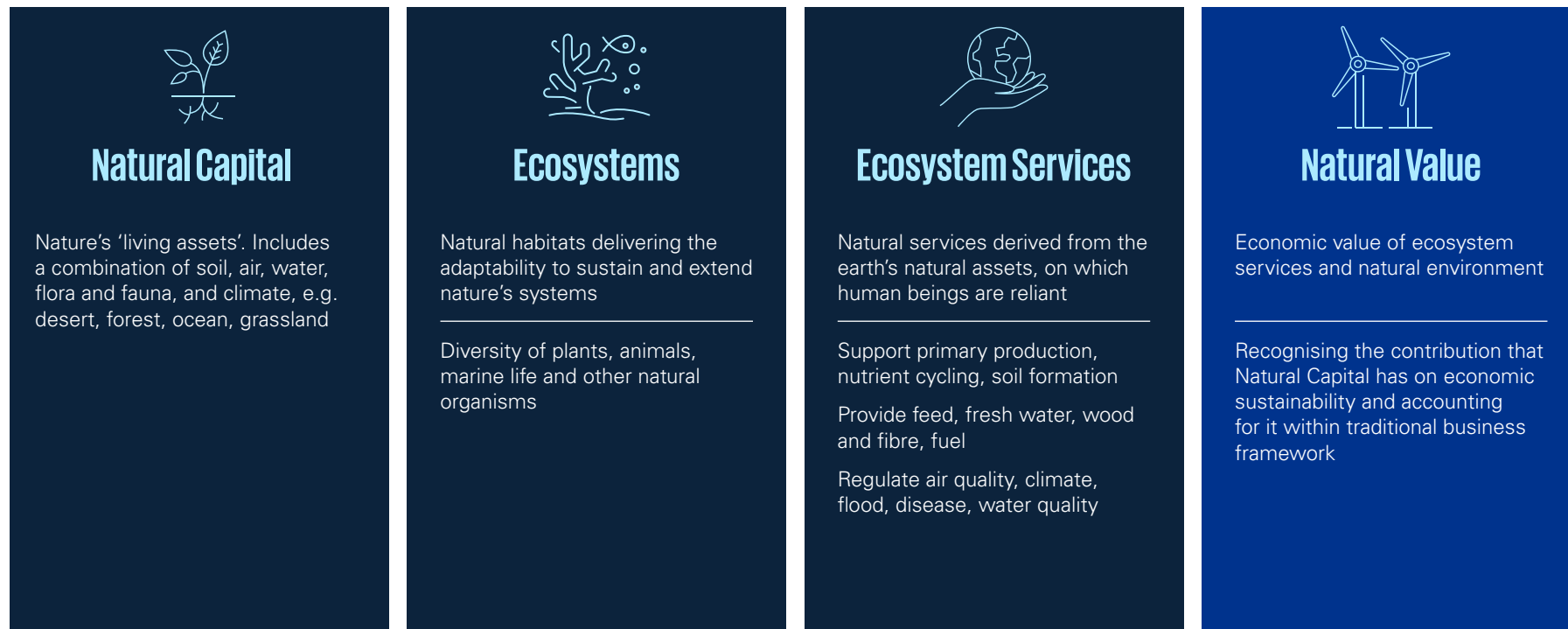
Translating our natural world into tangible daily benefits is easily observed by agricultural workers but is often overlooked by others. Seeing the food and beverages which sustain us only neatly presented in the supermarket is quite detached from the supply chain and point of origin for the products. In other words: nature and healthy ecosystems are taken for granted and largely ignored.







The world's population depends on resilient Natural Capital, but despite its importance, Ecosystem Services have largely been treated as externalities. They are recognised as important but not always factored into business and investment decision-making, often because practical, credible information about them is lacking or inaccessible. Consequently, in economic terms, these Ecosystem Services are typically 'free' and are consequently at risk of being increasingly overexploited. A lack of agreed valuation on Natural Capital has limited the ability in recent times to invest in it through payment for the Ecosystem Services it provides.



Source: adapted from World Forum on Natural Capital, The Economics of Ecosystems and Biodiversity, Food and Agriculture Organisation of United Nations.



# Potential levers

Five levers have been identified that are key to deliver net-zero within the infrastructure sector.

They are:

- Delivering/Planning
- Procurement
- Green Finance
- Technological
- Economic

By analysing examples of current best practice and learning lessons from throughout the sector, this paper addresses the first three and details measures that need to be addressed to maximise the benefits of each.

## Delivery/planning

### Infrastructure Carbon Review (ICR)

In 2020 a review of the 2013 ICR was carried out. This highlighted that there have been significant developments with regards to carbon maturity within the following areas:<sup>12</sup>

#### Increasing ambition and culture change

Science and evidence-backed net zero targets have seen a significant increase within organisations, e.g. the water sector has committed to become net zero by 2030. These ambitions are supported by the principles of PAS 2080 promoting a culture of challenge, an increase in collaborative working across the wider value chain to deliver low-carbon, low cost innovations and the adoptions of carbon training.

#### Quantification and assessment

In-use, capital and operational carbon will become the key factor in decision-making for organisations/ governments in selecting low carbon solutions, e.g. for the transport sector. New carbon quantifications and assessment tools are being developed and increasingly used for option appraisals.

#### Innovation and capitalising on benefits

The industry is beginning to transition to the creation and adoption of low-carbon, low-cost innovations, with some sectors ahead of others. One example is the industry wide effort to accelerate the

deployment of low-carbon construction materials and technologies, the turning point for many being the construction of the London 2012 Olympic and Paralympic Games infrastructure which showed that high standards of sustainability can be achieved whilst not comprising on quality or programme. Despite relatively low levels of maturity in commercial and procurement solutions, leading organisations are capitalising on the benefits of embedding carbon management in the programmes of work and gaining wider commercial benefits such as raising a green bond. The sustainable bond market, according to the Climate Bonds Initiative, is growing rapidly, rising to almost US\$ 1.1 trillion being issued in 2021, marking an increase of 57% on 2020 volumes.<sup>13</sup>

#### Spreading good practice

According to the Green Construction Board in their seven year review of the ICR<sup>14</sup>, the UK is taking a leading position through its carbon management practices and is influencing asset owners internationally, such as the UAE and New Zealand through initiatives such as I3P.



The changes within society, relating to those which pertain to the Infrastructure Carbon Review, have been amplified due to the COVID-19 pandemic, and now the UK Government has the opportunity to build back better and deliver an investment-led recovery that accelerates climate action and reduces inequalities that the pandemic has deepened. Benefits from becoming benchmark cases for spreading knowledge and approaches, will lead to numerous benefits – such as gaining new partners or investors.

The UK Chancellor presented, in his 2021 Budget, support for sustainable investment, technology, infrastructure and skills and is committed to establish a UK Infrastructure Bank. The bank will mobilise investments for supporting private sector and local authority infrastructure projects to deliver net zero. Several banks and investors have made their commitment to support the net zero transition across the country, through the UK-based coalition of bank, investors and other institutions – ‘Financing a Just Transition Alliance’<sup>15</sup>. But for the public and private sector a consistent approach is needed to link economic, social and environmental impacts with investment decision-making.

According to the CCC, as previously mentioned, the UK will need to increase extra capital investment to achieve net zero. Investment can deliver significant environmental and social benefits, but also real economic gains, not least in terms of reduced energy and resource consumption. Taken together, this extra capital expenditure (CAPEX) could amount to well over £1 trillion between now and 2050.

In addition, the UK’s green CAPEX to 2050 could be a significant instrument for bringing environmental security and improving social outcomes for Britain’s workplaces, households and regions, however there are challenges of making these synergies come to life.<sup>16</sup>

#### Decision-making frameworks and social value

One framework that has been developed to calculate social value is a model that was developed by the Cabinet Office and the Department for Digital, Culture, Media & Sport, which offers a mechanism to maximise the benefits of net zero potential levers and drive nationwide outcomes. The 5 critical themes of social value, as defined by the framework, comprise: promoting local skills and employment, supporting growth of responsible regional businesses, creating healthier, safer and more resilient communities, decarbonising our environment and promoting social innovation.

Through the Public Services (Social Value) Act 2012 and subsequent Procurement Policy Notes 06/20 and 05/21 the UK Government requires public bodies to take into account the social value, defined as identifying the wider benefits of public decisions on people, the economy and the environment, in the services they commission and procure. All central government contracts need to explicitly evaluate social value with a 10% minimum weighting.

The Social Value Portal, a collaborative initiative, provides a decision-making framework for government and businesses to utilise in their procurement processes, based on the 5 critical

Themes mentioned above, 20 core Outcomes and 48 key Measures (Themes, Outcomes and Measures - TOMs). More recently, the application of the TOMs has begun to expand beyond procurement and its user base has broadened to include a number of institutional investors - notably those involved in real estate and infrastructure.

The framework has continued to expand since its establishment to include place-based features (the Portal has launched its first pilot with Durham City Council to develop place-based TOMs), enhancing the links between climate action and the need for wider social value and supporting skills development for the low-carbon transition.

Other technological solutions, such as the Ariba Network, a digital marketplace connecting companies with social enterprise suppliers that reinvest or donate profits toward positive social or environmental causes, can also help to reduce the time and cost burden of taking social impact into account in decision-making. Around £2 trillion in business-to-business transactions are made annually through this platform and in the UK alone, this translates into over £65 billion worth of commerce – roughly 3% of the UK’s GDP. There is inevitably a case for linking environmental values with social values, as recognised by local and central government. The Social Value framework could provide a mechanism for bringing together the visions for a green and just recovery from COVID-19 and deriving social outcomes from the provision of public incentives and support for the energy, industry, housing and transport sector during their

net zero transitions. Social value could be a major tool for government procurement, allowing the creation of positive spill overs for people and places.

Businesses, banks, and investors could also commit to introduce social value as a way of overcoming the silos that often exist between the environmental, social and governance (ESG) pillars of sustainable finance.





## Case study – South West Infrastructure Partnership (SWIP)

Across industry there are examples of businesses and non-government organisations joining together to tackle the challenges and provide partnership solutions. Founded by the Institution of Civil Engineers (ICE) South West in 2017, SWIP is a voluntary, self-organised group of cross-sector infrastructure leaders and professionals with an interest in the development of the South West's future infrastructure, working together with partners to consider climate adaptation and achieving net zero.

SWIP organised online workshops where more than 500 infrastructure stakeholders were involved. The main purpose of these workshops was to identify the factors stopping the delivery of net zero, what the barriers are across all infrastructure sectors – local authorities, business groups – and what their understanding is of net zero. The stakeholders had a varied level of maturity regarding their understanding about net zero and the following three main pillars could be highlighted from the discussion:

### Building a new mindset around net zero

**Decarbonisation can happen if people know how to make it happen. Stakeholders need to be looking for wider benefits and seeing net zero as a necessary component of how we develop infrastructure in the future.**

### Leadership

**To develop this mindset, it is crucial to have leadership at all levels. There will be a need for validated carbon literacy schemes to enable people to be able to deliver net zero. This will require significant effort to educate people within industry in addition to infrastructure stakeholders and end users.**

### Recognition

**Collaboration and learning from each other is necessary to deliver decarbonisation at scale. This benchmarking and partnering can drive stakeholder dialogue in a transparent approach to sharing lessons and experiences for the wider benefit of all parties.**

The value chain needs to be considered holistically to avoid missing opportunities for decarbonisation. At all stages – from purpose, governance, regulation and standards through innovation and collaboration, to financing and delivery – we need to consider carbon reduction.

Through the SWIP, the South-West can be seen as a living laboratory where demand and project requirements can be challenged and where stakeholders can work and learn together to establish a value network and experiment with innovative approaches. SWIP is now collaborating to develop its South West vision 2050 to further accelerate infrastructure decarbonisation at a regional level.



### Valuation of GHG emissions for policy appraisal and evaluation

In 2009 the Government reviewed its approach taken to developing carbon values, through its Carbon valuation in UK policy appraisal: a revised approach<sup>17</sup>. The conclusion of it was to move to a “target-consistent” or “abatement cost” approach to carbon valuation rather than a “social cost of carbon” approach.

In 2021 a new policy paper, Valuation of greenhouse gas emissions: for policy appraisal and evaluation<sup>18</sup>, was published by BEIS which sets out a revised approach to valuing greenhouse gas (GHG) emissions in policy appraisal.

Greenhouse gas emissions values differ from market carbon prices. They are used for valuing impacts on GHG emissions resulting from policy interventions. The government uses these values to estimate a monetary value of the greenhouse gas impact of policy proposals during policy design and after delivery.

The purpose of assigning a value is to allow for a consistent and evidence-based approach to determining whether such policies should be implemented.

The following criteria were taken into consideration by BEIS while updating the current values:<sup>19</sup>

## Pragmatic

Series should be stable, and allow effective decision-making in its application, and represent a reasonable balance of the factors above

## Consistent

New values must be consistent with the UK’s national and international climate commitments

## Evidence-based

Values should be supported by the latest evidence available

## Simple and transparent

Series should be intuitive, resistant to modelling artefacts, easily understandable and replicable



## Case study – National Grid

National Grid<sup>20</sup> set a target was set to reduce the carbon intensity of their construction projects by 50% by 2020 (from 2015).

The organisation worked directly with its designers to ask, 'How do you apply carbon reduction?'. i.e., build nothing, build less, build smart in alignment with the PAS 2080 Carbon In Infrastructure standard. They applied an internal carbon price on whole-life carbon emissions to inform major investment decisions.

Carbon was also included within the tender process with a weighting of 5%. Using their project data, National Grid identified that with every 10% reduction in capital carbon, costs are expected to be reduced by 5%, indicating a strong correlation between carbon and costs. One of the major construction projects at the time, the Wimbledon substation, was awarded to a bidder who promised a 23% reduction in carbon dioxide compared to the original design. This resulted a saving of £3 million and demonstrated that applying a carbon lens to design and procurement can reduce costs. In 2017 National Grid consequently won a Business in the Community (BITC) award for this approach.

National Grid has now moved into a new regulatory period and have pledge to deliver carbon neutral construction by 2026. They have increased their 'carbon weighting tender

to 10%. They are also examining how to decarbonise high carbon intensive material and activities (e.g. steel, aluminium, and concrete) and how to source them in the most sustainable way. Working groups have been set up to develop a roadmap to achieve net zero construction.

National Grid Electricity Transmission is taking action on own operational emissions as well as its work on capital projects. The business has a 1.5 degree aligned Science Based Target, and a target to achieve Net Zero by 2050.

From an operational perspective, one of National Grid's dominant sources of GHG is the use of the insulating gas Sulphur Hexafluoride (SF6) within their switchgear. National Grid have committed to be net zero by 2050. To achieve this, they must reduce and remove this gas from the network. Working in partnership with Hitachi Energy they have now developed a new solution to replace the SF6 with a more sustainable option, EconiQ. Trialled at Richborough substation in Kent, as part of the London Power Tunnels project, they will be building a new substation which will be free of sulphur hexafluoride (SF6). These projects forms part of their ambition to reduce SF6 emission by 50% by 2030 and eliminating it totally from their electricity assets by 2050.





## Procurement

Procurement provides an opportunity to ensure that net zero is fully integrated into an organisation's business processes and does not remain at the periphery. One approach is to use a balanced scorecard during the procurement process as follows:

### Balanced Scorecard – Gardiner and Theobald<sup>21</sup>

A Balanced Scorecard is a well-used visual tool that helps articulate outcomes and benefits of a project to an organisation or programme. It creates a direct link between project requirements, outputs, outcomes and benefits to the organisation's vision or mission.

The Balanced Scorecard facilitates understanding across all stakeholders and the supply chain and links activities to client benefits, across projects, programmes and portfolios. It allows clear links to be seen from key deliverables to social, economic and environmental objectives, procurement evaluation criteria and key performance indicators.

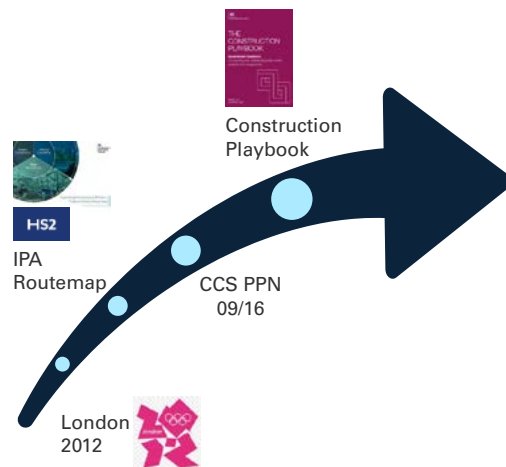
Market priorities can also be described by a Balanced Scorecard, which will in turn prepare and align itself to deliver the economic, social, and environmental goals ambitions and objective of a programme, such as reducing GHGs. Furthermore, Balanced Scorecards can also set the culture for organisations by setting priorities for action.

The Scorecard can be used with the Construction Innovation Hub Value Toolkit<sup>22</sup> ('4 Capitals Model') and the Crown Commercial Function Social Value Model<sup>23</sup> to align with best practices and government policy.

### Evolution of a Balanced Scorecard

Balance Scorecards were initially developed for use on the London 2012 Olympics, but now they have strong provenance in public and private sector construction projects. The learning from there was that a Balanced Scorecard setting out: Vision, Mission, Priority Themes, Critical Success Factors, Key Performance Indicators and Evaluation Criteria was a preferred method for the articulation of value to stakeholders and suppliers alike.

In addition, a Learning Legacy paper was established as a best practice guide.



Since then, Balanced Scorecards have been adopted widely in the UK and the approach is a part of the '6 Pillars of Procurement' from the Infrastructure and Projects Authority Project Initiation Routemap – Procurement module<sup>24</sup> (as Pillar 1: Understanding the outcomes). Pillar 1 requires the client to communicate clearly and accurately a detailed range of expected results, breaking these down into the output requirements for each contract, agreement and undertaking.

Under the UK Government Cabinet Office (Crown Commercial Services) Procurement Policy Note PPN 09/16 'Balanced Scorecard for Growth'<sup>25</sup>, it is obligatory to apply a Balanced Scorecard approach for public sector clients in the UK for construction works, infrastructure and capital investment projects with a total value exceeding £10 million.

In the establishment of the Construction Playbook<sup>26</sup> in December 2020, Balanced Scorecards are seen as critical in underpinning the policy "Outcome-based Approach", ensuring that results are set out at the beginning and linked to Government priorities through a programme lifecycle.

### Balanced Scorecards in practice

UK Government guidance gives examples of what a Balanced Scorecard approach might produce which include the following:<sup>27</sup>

- Timely, transparent and inclusive pre-procurement market engagement with suppliers to allow them to gear up to compete, and to ensure the procurement specification is optimised to take account of market capabilities and the potential value suppliers can deliver;
- Taking account of economic, social or environmental considerations in procurement design, technical specifications, award criteria and contract performance conditions linked to the subject matter of the contract;
- Driving good supply chain practice by influencing the behaviour of prime contractors, for example by requiring evidence of supply chain management approaches, requiring suppliers to openly advertise sub-contracting opportunities;
- Through publication in head contracts, and the flow down of Balanced Scorecard components to subcontracts, the majority of the supply chain can be linked to the delivery of client benefits and understand what is important to the ultimate client and key stakeholders.



## Industry innovation

Collectively, the industry is rising to the challenge and bringing forward great innovation and Research and Development. Through working groups such as the Institute of Civil Engineers' Carbon Project<sup>28</sup>, the Construction Products Association and the Mineral Products Association, various initiatives are underway to reduce the embodied carbon of key materials.



## Case study – concrete and cement industry

The concrete and cement industry is an example of how one sector alone cannot deliver net zero. A whole systems approach is required, and significant changes need to be made across the construction, energy and transportation sectors.

The Minerals Products Association (MPA), at the launch of UK Concrete in 2020, highlighted a few ways in which this sector could achieve net zero through carbon-free electricity and transport networks, fuel switching, larger use of low-carbon cement and concrete, and CCUS technology for cement production. An example of one of these measures is detailed below.

**Fuel-switching:** The concrete and cement industries are already making significant combined investments in fuel switching, changes in production composition and energy efficiency, leading to 53% lower direct and indirect emissions than in 1990. The MPA are building on this progress through their hydrogen and plasma technology demonstrations reflecting the potential to reduce emissions

Other examples from all aspects of the construction industry can be found through the Construction Products Association Decarbonisation Directory.<sup>29</sup>

through fuel switching in cement and lime production. One example of fuel-switching was seen at Hanson Cement's Ribblesdale plant in Lancashire where the proportion of fuels in the cement kiln's main burner was gradually increased to a wholly net zero mix. The trial fuel mix combined waste biomass in the form of meat and bone meal and glycerine with 'grey hydrogen' as sufficient quantities of green hydrogen were not available at the time of the trial. This made the fuel mix net zero at point of use. In future the grey hydrogen can be substituted for green hydrogen, enabling a net zero pathway for fuel use in cement production.





## Challenges

One of the key challenges with regards to carbon management is the reliability of data. Following the Infrastructure Carbon Review in 2013, companies assessed and reported their carbon management maturity on an annual basis to, at the time, the Department of Energy and Climate Change. However, during the report produced recently by Skanska ('Is our Carbon Wallet Empty?'), only 9% of carbon figures could be obtained from industry<sup>30</sup>. It raises the issue that there may be gap between perception and reality. Organisations that have directly linked their carbon calculations to their existing automated processes, such as bill of quantities, are more likely to have accurate data, although these remain the minority.

One workstream that the Institution of Civil Engineers (ICE) Carbon Project<sup>31</sup> is looking at is the quality of data and how it is assessed throughout the lifecycle of a project in a consistent and meaningful way. It is also encouraging everyone within the infrastructure chain to consider projects in a whole life way, instead of the traditional 'cradle to gate' or 'cradle to site'. By adopting this wider approach, carbon impact of the user behaviour, OPEX carbon and disposal/repurpose at the end of life will be taken into consideration. This approach is supported by PAS 2080 which provides guidance on whole-life carbon management.

Another barrier that has been identified in several major programmes is the rigidity of their planning approvals, such as Hybrid Bills or Development Consent Orders (DCO). A Hybrid Bill or DCO may be predicated on a certain design based on the current best available technology and end use of the asset and potentially its over-site development. There is a process for change, but people can be reluctant to engage with it due to the extensive timescales, costs and risks involved in seeking to amend an original Hybrid Bill or DCO.

One major project that overcame this challenge was Crossrail through its over-station developments. Due to the location of several of the new stations within the heart of London, a decision was made during the planning stage to link the planning consents to deliver around 3.5 million sq ft of commercial properties spread over 12 of their sites. These developments would generate approximately £500 million in revenue which was used to part finance the construction of the railway and facilitated the incorporation of technology such as ground source heating within the underground structure that could be used to heat the office space above. The Crossrail Tunnel Energy Segment design for the tunnels was developed as a renewable alternative to cool the tunnel and transfer the heat to adjacent buildings.<sup>32</sup>





## Finance

One method of financing a transition to a net zero economy is through the use of green and sustainable financing, or more recently, Transition bonds.

### Transition bonds are a mechanism of financing ‘brown to green’.

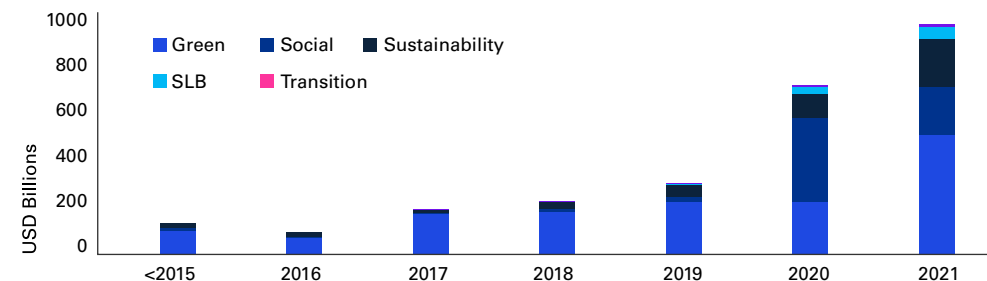
Transition bonds are a relatively new class of bonds that aim to assist carbon intensive industries, known as ‘brown industries’, to raise capital specifically for finance decarbonisation activities. The global transition bond market is still very small compared with more traditional green bonds. Further, several stakeholders consider it controversial since there is currently no standardised framework to issuing transition bonds and therefore less external assurance. The closest being a Climate Transition Finance Handbook<sup>33</sup> that was published by the International Capital Markets Association in 2020 which provides a set of general rules for transition themed bonds.

According to data compiled by BloombergNEF and reported in Modern Diplomacy<sup>34</sup>, only a handful of transition bonds have been issued to date, these include a US\$780 million transition bond in January that was issued by the Hong Kong branch of the Bank of China for projects aligned with China’s goal of carbon neutrality by 2060 and the European Bank of Reconstruction and Development which issued a US\$216.6 million transition bond to finance its portfolio of transition projects.

According to the article, recent announcements suggest that the market in transition bond market will increase. In February 2021 there was an announcement by the London Stock Exchange of a transition bond segment on its sustainable bond market. The Asian Development Bank announced in May that they would stop funding coal, oil and gas extraction and instead provide financial support for plants transitioning to cleaner solutions.

The article also noted the exponential rise of sustainable financing, stating that: ‘Analysis from the CBI released in April found that, despite the severe economic impact of COVID-19, a record US\$700 billion in green, social and sustainable finance was issued in 2020, almost double the US\$358 billion recorded in 2019.’ This increase was further seen during the post-COVID inflation year of 2021 were Climate Bonds Initiative identified the sustainable themed debt – Green, Social, Sustainability and Transition Bonds and Sustainability-Linked (GSS+) Bonds amounted to almost US\$1.1 trillion being issued in 2021, marking an increase of 57% on 2020 volumes.<sup>35</sup>

Whilst the GSS+ market dropped slightly in 2022, according to analysis by the World Bank the cumulative amount of GSS+ bonds issued to date by March 2023 had reached US\$4.1 trillion, with green bonds representing 64% of that total.<sup>36</sup>



Another approach that has been adopted by several European energy companies is to separate the green and brown aspects of their operations to allow separate funding. This approach results in a better return for their greener assets through better terms for their debt and a wider range of investors that are interested in sustainable options, such as renewable energy. This approach means that the organisation can still operate its brown activities until it reaches a point whereby the activity is no longer viable, whilst still developing its greener portfolio.

An excellent example of an energy company that has successfully transitioned from brown to green is Orsted, previously known as DONG energy. The ‘Powering Past Coal Alliance’ describes the transition in its article.

‘Orsted’s profitable transformation from oil, gas and coal to renewables’<sup>37</sup>.

Tom Harries and Meredith Annex at Bloomberg NEF describe how, in 2010, around 70% of the companies’ power plants burned coal, gas or oil. By the time of its name change, this has reversed with over 70% of its power coming from renewable sources in 2017. They are currently on track to be carbon neutral by 2025 and their share price continues to grow. According to their former CEO Henrik Poulsen *‘As a business, you have to make a profit, but you also need to make a broader contribution to society. We learned that these things aren’t in opposition to each other. In fact, they go hand in hand.’*



### Government commitment

A key factor to transitioning the whole economy to net zero is the importance of green finance that is more innovative and efficient. The UK Government is keen to become a global leader in green finance and has established a number of commitments to support this including:

- 1 The establishment of the Green Finance Institute in 2019 to deliver its Green Finance Strategy aiming to align private sector financial flows with sustainable and resilient growth. All finance will need to incorporate the financial risks, opportunities and challenges presented by climate change in order to achieve the goals of the Paris Agreement.
- 2 The introduction of mandatory reporting of climate-related financial information across the economy by 2025 (the first major economy to do so). The UK also cooperates with international partners to promote market-driven action on enhancing nature-related financial disclosures.<sup>38</sup>
- 3 The implementation of a green taxonomy that determines which economic activities are sustainable which will be overseen by the Green Technical Advisory Group (GTAG).<sup>39</sup>
- 4 The UK Government also announced in July 2021 that it will issue at least £15 billion green bonds to support projects that decarbonise key areas of the economy and also improve adaptation and resilience measures.<sup>40</sup>

These measures combined will provide a clear framework for investors to support the government in delivering the low carbon finance which is necessary to achieve the net zero economy by 2050.



## Case study – Anglian Water<sup>42</sup>

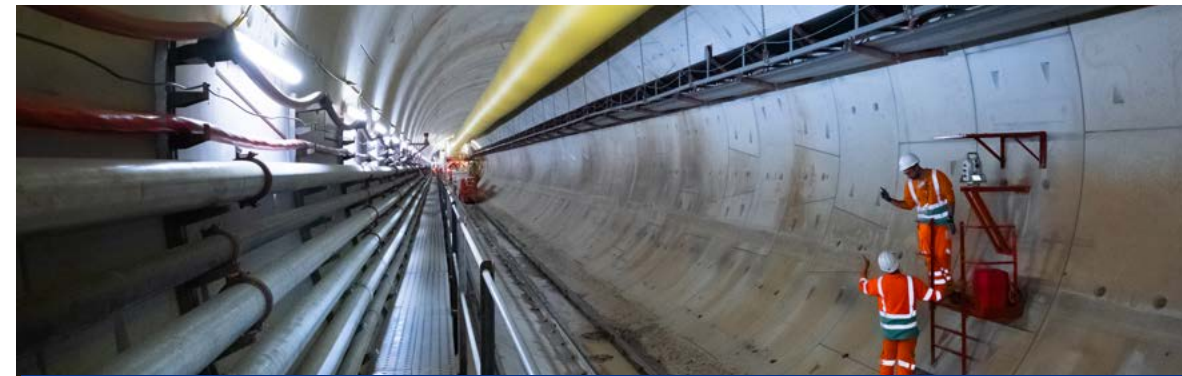
The Anglian Water Group has established commitments to cut its operational carbon by 30% from 2019/20 levels by 2025 and reduce capital carbon by 65%, from a 2010 baseline.

In the UK these targets are the most expanded so far from any water company with the industry being the first sector globally to work collaboratively on a road to net zero. Anglian will be the first British utility company to adopt these targets.

Peter Simpson, CEO for Anglian Water said:

*“This framework further amplifies our commitment to the environment and the reduction of our carbon footprint. Linking it directly to Anglian Water delivering these tough carbon targets demonstrates how determined we are as a responsible business to take the steps we need to invest in resilience for our region in the most sustainable way.*

*Funds raised will enable us to address the three-fold challenges of water scarcity, climate change and environmental protection in the face of a growing population, but it also represents the pinnacle in responsible financing.”*



## Case study - Tideway<sup>41</sup>

Tideway is the company responsible for delivering the Thames Tideway Tunnel. It is partly financed by 2.7 million UK pensioners that have an indirect investment in Tideway through UK pension funds managed by its investors. Most of the external debt has been raised using sustainable financing through £1.9 billion of Green Bonds and US Private Placements and a sustainability-linked Revolving Credit Facility (RCF).

According to Elina Beale, Head of Treasury *“Our sustainable financing strategy was the product of our efforts to align our financing with the company’s mission. The project is considered a pure play project and the most viable option was to issue Green Bonds.”*

A pure play is a company or project that focuses solely on one type of product or service. In Tideway’s case, their sole purpose is to clean up the tidal River Thames by stopping tens of millions of tonnes of sewage flowing into it each year.



## Real estate

Several reports have suggested that without effective net zero plans it's likely that there will be a decline in the value of real estate with it also becoming increasingly difficult to let or sell real estate as demand decreases due to a market shift towards increased customer desire for green credentials. According to research by Fidelity International, 97% of commercial real estate in Europe will not support the transition to net zero in their current form.<sup>43</sup>

International Property Securities Exchange (IPsx) and Carbon Intelligence, a consulting firm, have predicted the full impact of net-zero initiatives on valuations of UK commercial property and the mitigating actions investors should implement. The report takes into account UK's commitments to 78% reduction in GHGs by 2025 and the advent of stricter energy-efficiency standards. The report has outlined several advantages and disadvantages facing the owners of assets in the short, medium and long term.<sup>44</sup>

It concludes that without significant capital expenditure on net zero strategies it is likely that

the UK will miss out on short-term advantages bought about by minimal energy costs and ESG credentials.

IPsx seeks to improve transparency at the asset levels as investors grapple with net zero and energy-efficiency strategies. There is currently a lack of actionable data and benchmarking with regards to building energy efficiency performance to make informed investment decisions.

## Technological

Technological change on a large scale will be needed over the coming decades to achieve the international goal of reducing greenhouse gases that avoid dangerous impacts. This will require replacing current GHG-intensive technologies—especially energy technologies based on fossil fuels (oil, gas and coal)—with newer technologies that emit fewer or no greenhouse gases. In many cases this will require advanced technologies that have not yet been developed or adopted on a significant commercial scale, or which have not yet been invented.

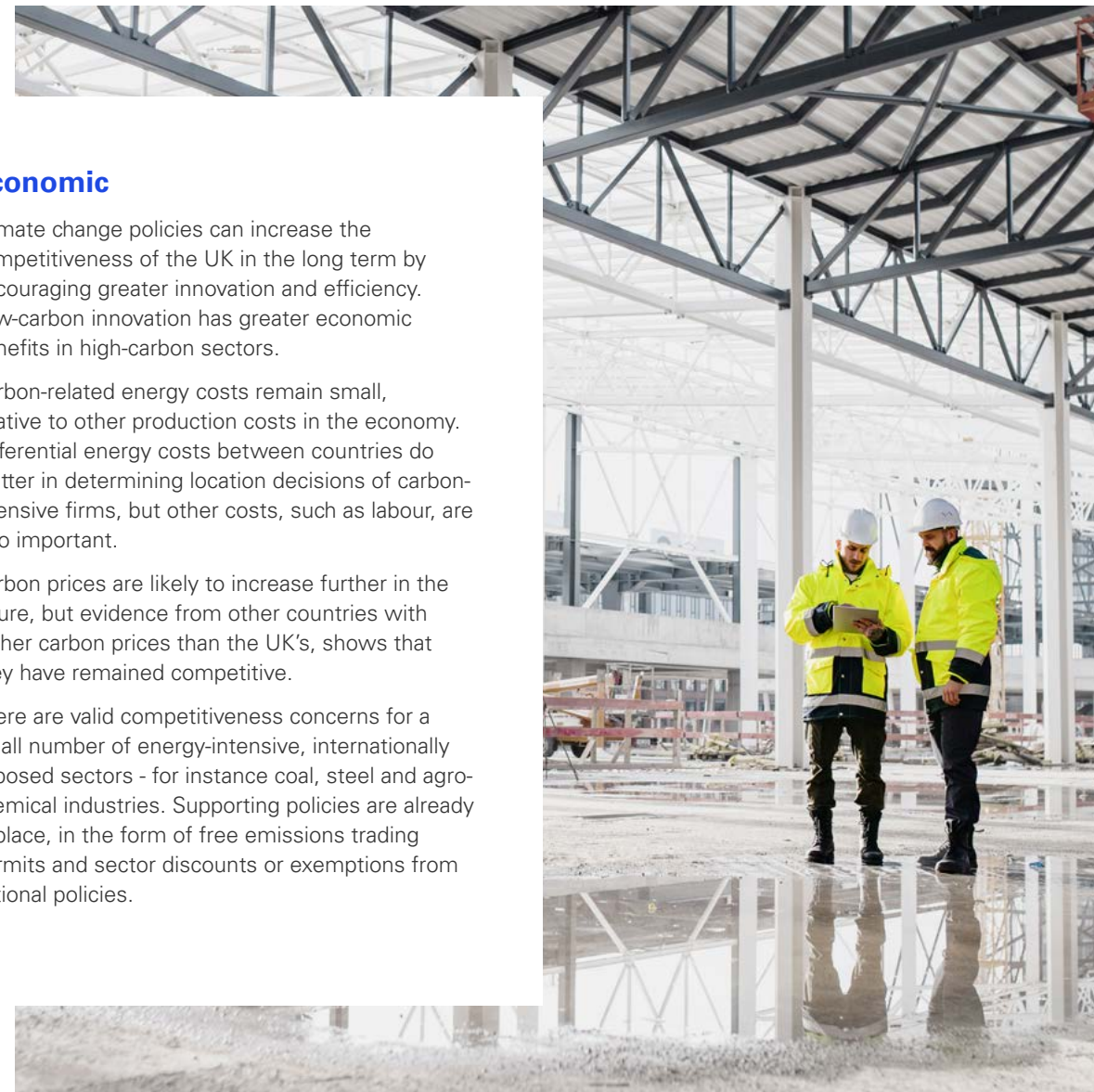
## Economic

Climate change policies can increase the competitiveness of the UK in the long term by encouraging greater innovation and efficiency. Low-carbon innovation has greater economic benefits in high-carbon sectors.

Carbon-related energy costs remain small, relative to other production costs in the economy. Differential energy costs between countries do matter in determining location decisions of carbon-intensive firms, but other costs, such as labour, are also important.

Carbon prices are likely to increase further in the future, but evidence from other countries with higher carbon prices than the UK's, shows that they have remained competitive.

There are valid competitiveness concerns for a small number of energy-intensive, internationally exposed sectors - for instance coal, steel and agro-chemical industries. Supporting policies are already in place, in the form of free emissions trading permits and sector discounts or exemptions from national policies.





# Conclusions/next steps

The pathway to net-zero emissions by 2050 is narrow and to reach it policy, technology and behaviour changes are necessary across the board. Every organisation and nation needs to increase their action and investment in the fight against climate change in order to achieve a sustainable, low-carbon future.

The journey to our net zero goals will incur large costs and significant change to business models, but at the same time, it brings new opportunities and access to potential benefits. The Government is also committed to ensuring the costs of decarbonising the energy system are fair and affordable for all energy users, considering both the benefits and the costs of different pathways holistically across the economy. ("Net Zero Strategy: Build Back Greener BEIS").

It is important to ensure that transition is beneficial to the economy, society and environment as much as possible. Therefore, transition plans that incorporate an efficient strategy of meeting our domestic net zero goal in terms of opportunities, challenges, and interdependencies will need to be more widely seen going forwards. In April 2022 the UK Transition Plan

Taskforce was launched to develop a gold standard framework for transition plans. Their first set of draft publications were launched in November and included:

- a transition plan disclosure framework
- an interpretative guidance which complements the framework
- a technical annex mapping the disclosure framework to the Task Force on Climate-Related Financial Disclosures (TCFD) and the International Sustainability Standards Board's (ISSB) Proposed IFRS S2 Exposure Draft and summarising the additional disclosure requirements.

These publications will inform how organisations approach transition planning – the preparation, disclosure and, ultimately, the implementation of its transition strategy.



**If we had started in 2000, we could have hit the 1.5 °C objective by halving emissions every thirty years. Now, we must halve emissions every ten years. If we wait another four years, the challenge will be to halve emissions every year. If we wait another eight years, our 1.5 °C carbon budget will be exhausted.<sup>45</sup>**

Mark Carney, former Governor to the Bank of England and current UN Special Envoy on Climate Action and Finance - 2021



## Next steps

Now is the time to make plans and take progressive action. Businesses and individuals can no longer wait for regulation or external pressure before they take action. Sustainability and the wider ESG is no longer a nice to have, it should be Business As Usual and must be integrated into every decision that is made. It is no longer a moral imperative that action is taken, there are clear business benefits and the future existence of an organisation and its supply chain now depend on the effectiveness of that action. The structure and size of the organisation will determine the extent to the changes that they can adopt. Below are a few examples that should be considered:



**Sustainable financing.** The dramatic increase in GSS+ (Green, Social, Sustainability Bonds plus Sustainability-linked Bonds and Transition Bonds) has shown the importance that the financial sector is now placing on ESG within its assets. Several leading infrastructure owners and operators are now looking at this debt market as a means to finance their sustainability initiatives or to raise capital to finance the transition from brown to green. Not only does this approach unlock capital, but by linking the sustainability performance of the asset to the repayments ensures that high standards of ESG performance are maintained. 'However, recent events has highlighted that ESG rating schemes need to cover all aspects the Environment, Social and Governance pillars and external verification of data is essential for the asset to demonstrate its credibility in these areas. This will help ensure that ESG ratings are not just a tick box exercise but demonstrate best practice in these areas and are aligned to the Principles of Responsible Investment.



**Explore new business models, approaches to financing, the regulatory environment and how consumers respond.** Taking a whole systems approach to innovation will be integral to maintaining and developing an international comparative advantage and a unique capability.



**Procurement** provides an opportunity to ensure that net zero is fully integrated into an organisation's business processes and does not remain at the periphery. One approach is to use a balanced scorecard during the procurement process and link sustainability conditions to contract clauses. During the delivery of the contract these conditions must be tracked as a programme deliverable and linked to payment. Previous experience has demonstrated that linking sustainability performance to incentivised contracts, where the incentive is ringfenced, drives exemplary performance and innovation.





**Seek professional support** who can help you to understand your company's exposure both to the physical effects of climate change and to the likely regulatory and economic impacts of the shift to a low-carbon economy. Specialists will be able to identify the areas of your business, as well as the countries where your operations or supply chain are located, which are – or will be – most affected by climate change or economic turmoil linked to climate change.<sup>46</sup>



**Harness the UK's international reputation** to attract inward investment and anchor existing and emerging supply chains in the UK. Brexit, COVID and the Ukraine conflict have all highlighted the fragility of complex international supply chains. International collaboration will also be critical to ensure that clean technologies become cheaper and more readily available, and finally...

# Demonstrate leadership







# Notes

1. <https://www.ukgbc.org/climate-change-2/>
2. Institute for Government <https://www.instituteforgovernment.org.uk/explainers/net-zero-target>
3. CCC The Sixth Carbon Budget (2020)
4. [https://eur-lex.europa.eu/resource.html?uri=cellar:749e04bb-f8c5-11ea-991b-01aa75ed71a1.0001.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:749e04bb-f8c5-11ea-991b-01aa75ed71a1.0001.02/DOC_1&format=PDF)
5. <https://about.bnef.com/new-energy-outlook/>
6. <https://www.instituteforgovernment.org.uk/explainers/net-zero-target#references>
7. Analysis: Record-low price for UK offshore wind cheaper than existing gas plants by 2023 (carbonbrief.org)
8. The Ten Point Plan for a Green Industrial Revolution (2020)
9. HM Treasury: UK Government Green Financing Framework (2021)
10. The Ten Point Plan for a Green Industrial Revolution (2020)
11. KPMG-NFF: A Return on Nature (2019)
12. The Green Construction Board: Good progress but not fast enough (2020)
13. <https://www.climatebonds.net/>
14. [https://www.constructionleadershipcouncil.co.uk/wp-content/uploads/2021/04/Infrastructure-Carbon-Review-seven-years-on\\_March-2021.pdf](https://www.constructionleadershipcouncil.co.uk/wp-content/uploads/2021/04/Infrastructure-Carbon-Review-seven-years-on_March-2021.pdf)
15. [https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2021/10/Just-Zero\\_2021-Report-of-the-UK-Financing-a-Just-Transition-Alliance.pdf](https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2021/10/Just-Zero_2021-Report-of-the-UK-Financing-a-Just-Transition-Alliance.pdf)
16. Net-zero: the £1 trillion-plus opportunity to create social value in the UK - Grantham Research Institute on climate change and the environment (lse.ac.uk)
17. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/245334/1\\_20090715105804\\_e\\_\\_\\_carbonvaluationinukpolicyappraisal.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/245334/1_20090715105804_e___carbonvaluationinukpolicyappraisal.pdf)
18. <https://www.gov.uk/government/publications/valuing-greenhouse-gas-emissions-in-policy-appraisal/valuation-of-greenhouse-gas-emissions-for-policy-appraisal-and-evaluation>
19. BEIS: Policy paper - Valuation of greenhouse gas emissions: for policy appraisal and evaluation (2021)
20. <https://www.nationalgrid.com/responsibility/environment/environmental-sustainability/performance-environmental-sustainability/our-climate-commitment>
21. <https://www.gardiner.com/services/supply-chain-management>
22. <https://constructioninnovationhub.org.uk/value-toolkit/>
23. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/940826/Social-Value-Model-Edn-1.1-3-Dec-20.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/940826/Social-Value-Model-Edn-1.1-3-Dec-20.pdf)
24. Procurement\_Module\_FINAL.pdf (publishing.service.gov.uk)
25. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/560246/Balanced\\_Scorecard\\_PPN\\_09\\_16.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/560246/Balanced_Scorecard_PPN_09_16.pdf)
26. The Construction Playbook – December 2020 (publishing.service.gov.uk)
27. Crown Commercial Service: Procuring Growth (2016)
28. <https://ice.org.uk/knowledge-and-resources/carbon-project>
29. Net Zero - The Challenge (constructionproducts.org.uk)
30. <https://www.skanska.co.uk/498048/siteassets/about-skanska/media/features/embedded-carbon-infrastructure/nziic-embedded-carbon-in-infrastructure.pdf>
31. <https://ice.org.uk/knowledge-and-resources/carbon-project>
32. <https://learninglegacy.crossrail.co.uk/documents/the-design-of-thermal-tunnel-energy-segments-for-crossrail/>
33. <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/climate-transition-finance-handbook/>
34. <https://moderndiplomacy.eu/2021/05/26/transition-bonds-a-new-tool-to-fund-the-shift-towards-climate-sustainability/>
35. <https://www.climatebonds.net/>
36. The World Bank Treasury Market Update April 2023. <https://www.climatebonds.net/2022/11/green-bond-market-hits-usd2tn-milestone-end-q3-2022#:~:text=The%20total%20green%2C%20social%2C%20sustainability%2C%20sustainability-linked%20%28SLB%29%20and,the%20total%20%2852%25%2C%20USD332.5bn%29%20came%20from%20green%20bonds.>
37. <https://www.poweringpastcoal.org/insights/orsteds-profitable-transformation-from-oil-gas-and-coal-to-renewables>
38. UK Government Green Financing Framework (2021)
39. <https://www.gov.uk/government/news/new-independent-group-to-help-tackle-greenwashing>
40. <https://www.edie.net/news/11/Chancellor-Rishi-Sunak-unveils--15bn-green-gilt-drive-to-assist-net-zero-ambition/>
41. <https://www.tideway.london/media/6243/tideway-sustainable-finance-framework-2023.pdf>
42. <https://www.anglianwater.co.uk/news/anglian-water-launches-new-financial-framework-to-issue-net-zero-based-green-bonds-aligned-to-new-carbon-targets/>
43. <https://www.fidelity.de/fidelity-articles/fachthe-men-im-fokus/how-big-a-threat-is-the-brown-discount/>
44. Value of UK real estate without net-zero plans to depreciate in five years – report | News | Real Assets (ipe.com)
45. Mark Carney – Value(s)
46. Towards net zero: How the world's largest companies report on climate risk and net zero transition (assets.kpmg)



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