Pre-Issuance Impact Report on the UK Government Green Financing Programme

Delivered for HM Treasury and the UK Debt Management Office

June 2021

Who we are

Established in 2001, the Carbon Trust works with businesses, governments and institutions around the world, helping them contribute to, and benefit from, a more sustainable future through carbon reduction, resource efficiency strategies, and commercialising low carbon businesses, systems and technologies.

The Carbon Trust:

- works with corporates and governments, helping them to align their strategies with climate science and meet the goals of the Paris Agreement;
- provides expert advice and assurance, giving investors and financial institutions the confidence that green finance will have genuinely green outcomes; and
- supports the development of low carbon technologies and solutions, building the foundations for the energy system of the future.

Headquartered in London, the Carbon Trust has a global team of over 250 staff, representing over 30 nationalities, based across five continents.

The Carbon Trust's mission is to accelerate the move to a sustainable, low carbon economy. It is a world leading expert on carbon reduction and clean technology. As a not-for-dividend group, it advises governments and leading companies around the world, reinvesting profits into its low carbon mission.

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Glossary

Biodiversity: Considers the variety of living species (within species, between species and of ecosystems) on Earth, including plants, animals, bacteria, and fungi.

Clean transportation: Low and zero emission mobility, including vehicles, incentives, infrastructure, and alternative fuels.

Climate change adaptation: Actions that respond to the likely physical impacts of climate change over time. For example: flood protection, resilience and other risk mitigation programmes; data driven climate monitoring solutions; engineering activities and technical consultancy dedicated to adaptation to climate change.

Climate change mitigation: Actions to reduce and/or prevent the emission of greenhouse gases (GHGs) that contribute to climate change. This might involve using and developing more energy efficient technologies, deploying renewable technology, and reducing energy demand.

CO_2: Carbon dioxide - a greenhouse gas.

CO_2e: "Carbon dioxide equivalent" is a term for describing different greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO_2e signifies the amount of CO_2 which would have the equivalent global warming impact.

Energy efficiency: Schemes for energy efficiency programmes for the commercial, public and industrial sectors. Support schemes for residential energy efficiency programmes (including heating, retrofit, and insulation). Research and development for new energy efficiency technologies.

Greenhouse gas (GHG): Any gas in the atmosphere which absorbs and re-emits heat, and thereby keeps the planet's atmosphere warmer than it otherwise would be. The main GHGs in the Earth's atmosphere are water vapour, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and ozone (O_3).

Green bond: A green bond is a fixed-income financial instrument designed specifically to finance or refinance certain climate-related or environmental projects.

Green gilt/sovereign green bond: A sovereign green bond is a green bond issued by a national government. The term 'gilt' is explicitly used for the bonds issued by the UK government; a green gilt is a green bond issued by the United Kingdom.

ICMA: International Capital Market Association; a not-for-profit membership association which serves its member firms active in the international debt capital markets. In that function, ICMA publishes the Green Bond Principles as curated by the executive committee, which is one of the recognised standards for the issuance of green bonds.

Impact metrics: The measure of environmental or social benefit achieved by an activity, for example renewable energy produced in kWh, CO_2e, or new jobs created.

Living and natural resources: Protection and enhancement of terrestrial and marine biodiversity, ecosystems and natural capital. Sustainable land use and protection, including environmentally sustainable agriculture. Environmentally sustainable clean water, water storage and wastewater management initiatives.

Net zero target: A national net zero target requires deep reductions in emissions, with any remaining sources being removed from the atmosphere with greenhouse gas removals.

Pollution prevention and control: Reduction of air emissions and greenhouse gas control. Waste prevention, waste reduction, waste recycling, and energy/emission-efficient waste to energy.

Renewable energy: Assets or schemes that support development of renewable energy generation capacity, such as wind, solar and hydrogen. Schemes for renewable heat use and energy storage, including heat networks, heat pumps and hydrogen heating. Research and development for the commercial viability of renewable energy technologies.

UK government green financing programme: Also referred to as 'the programme', is a series of green bond issuances, alongside a green retail savings bond via NS&I. The purpose of which is to finance or refinance UK government led sustainable assets and schemes.

Executive summary

The UK government green financing programme ('the programme') is a green gilt (bond) issuance programme, alongside a world-first green retail savings bond via NS&I – the UK government's retail savings arm. In addition to the core purpose of financing sustainable projects, the programme will finance or refinance projects and schemes that will deploy much needed infrastructure, create jobs, support biodiversity and mainstream green financial products.

The programme, as a sovereign green bond, innovates in a number of ways. The inclusion of the retail component is novel but the programme also seeks to innovate in its approach to reporting the impact of the programme. Firstly in the wide choice of metrics which encompass environmental, social and biodiversity measures, and secondly in considering the alignment of the programme with stated UK government policy goals.

In support of the programme, the Carbon Trust has considered the proposed financed activities and reviewed the proposed metrics. These have been assessed against established reporting metrics and the feasibility of data collection. A shortlist comprising environmental (including nature-based), and social metrics was produced and is summarised in Figure 1 below.

The Carbon Trust has also examined a range of UK government sustainability policies in the context of the programme. The overarching goal of net zero was identified as the most relevant and comprehensive, with the Climate Change Committee's (CCC) Sixth Carbon Budget the best representation and description of activities and associated allocation of GHGs to achieve net zero, and is therefore the most suitable point of reference for the programme. The CCC's Sixth Carbon Budget recommendation sets out the total spending required across the whole economy to achieve the UK's net zero target. Government spending areas related to sustainability have changed over time as the priority areas for action have been addressed. This will continue to be the case over the course of the programme and as we move towards net zero, so although we would not expect government spending to compare directly with the total economic requirements as set out in the Sixth Carbon Budget, the categories of spend are broadly aligned.

The programme's categories are comparable, and the allocations align sensibly, with the CCC's Sixth Carbon Budget. We are confident that the programme will contribute to achieving net zero by 2050. There is an opportunity to build on this by continuing to assess the programme's expenditure against the net zero ambition, particularly with the government's upcoming net zero strategy led by the Department for Business, Energy and Industrial Strategy (BEIS), and similarly to consider the programme's expenditure and metrics in the context of the government's response to the biodiversity review.

Climate change and adaptation

- Number of flood defences
- Number of properties better protected
- Estimated number of beneficiaries from adaptation projects
- Number of jobs created/supported

Living and natural resources

- Absolute or % reduction in air/water pollutants
- Annual GHG emissions reduced/avoided in tonnes of CO_2e equivalent
- Hectares of protected areas restored/ maintained
- Increase of area under certified land management (ha)
- Number of native species which have benefitted from the project
- Number of jobs created/supported

Pollution prevention and control

- Annual GHG emissions reduced/avoided in tonnes of CO_2 equivalent
- Reduction of air pollutants: particulate matter (PM), sulphur oxides (SO_x), nitrogen oxides (NO_x), carbon monoxide (CO), and non-methane volatile organic compounds (NMVOCs)
- Waste that is prevented, minimised, reused or recycled before and after the project in % of total waste and/or in absolute amount in tonnes p.a.
- Amount of waste reused or recycled (tonnes or in % of total waste)
- Number of SMEs that receive support
- Number of jobs created/supported

Clean transport

- Annual GHG emissions reduced/avoided in tonnes of CO_2e equivalent
- Project lifetime greenhouse gas impacts ($MtCO_2$)
- Project lifetime reduced carbon emissions
- Reduction of air pollutants: particulate matter (PM), sulphur oxides (SO_x), nitrogen oxides (NO_x), carbon monoxide (CO), and non-methane volatile organic compounds (NMVOCs)
- Number of jobs created/supported
- Number of loans to SMEs and/or microenterprises
- Number of SMEs that receive support for equipment and facilities and technological modernisation
- Number of people with access to sustainable transport systems

Renewable energy

- Annual GHG emissions reduced/avoided in tonnes of CO_2 equivalent
- Capacity of renewable energy plant(s) constructed or rehabilitated in MW
- Number of households and businesses supported to transition to low carbon heating
- Number of households benefitted

Energy efficiency

- Annual energy savings in MWh/GWh (electricity) and GJ/TJ (other energy savings)
- Annual GHG emissions reduced/avoided in tonnes of CO_2 equivalent
- Level of certification by property
- Number of households benefitted
- Number of jobs created/supported

● **Environmental impacts** ◆ **Social impacts**

Figure 1. Infographic showing the likely available metrics and the approximate distribution of spending by category for the UK government green financing programme

Introduction

Sovereign green bond issuances

Sovereign bonds represent nearly half of the total outstanding bonds in the market. As such, they have the potential to represent the single biggest opportunity to orientate spending towards sustainable activities and support countries' commitments to net zero targets and the Paris Agreement.

Sovereign green bonds differ to standard corporate green bonds in some key ways:

- They differ not just in the predominance of large-scale infrastructure projects, but also through facilitating activities that encourage more sustainable behaviour by citizens, for example in the way they travel or consume.
- They facilitate the transition of the private sector through catalysing finance that supports the private sector to improve efficiency and transition to more sustainable business models.
- They have an important role in promoting sustainable finance in the market and moving forward best practice in green bond issuance.

We feel that the ambitious UK government green financing programme is representative of these efforts.

The UK's rationale for establishing a green financing programme

The UK is a leader in climate policy and sustainable finance. The Climate Change Act 2008 represented the first legally binding climate change mitigation target set by a country. This was followed in 2019 by the first net zero commitment by a major economy. The UK has also led the way in sustainable finance with initiatives such as the Green Investment Bank and the Green Finance Initiative. The UK government green financing programme continues the UK's direction of travel and focuses on linking to wider climate-related government policy and commitments.

In 2021 HM Treasury plans to issue the UK's first sovereign green gilt through the UK Debt Management Office (DMO). Furthermore, there is the intention of a series of further issuances over the coming months and years. These will have a number of beneficial outcomes, for example it is hoped that they will:

- help build a green yield curve and mainstream green financial products;
- attract dedicated funding for the UK's net zero target and other environmental objectives;
- finance sustainable projects;
- provide funding to deploy much needed infrastructure; and
- raise finance to create greener jobs across the country.

Additionally, the launch of a world-first green retail savings bond via NS&I will enable individuals to support green projects, engaging citizens in the transition of the UK towards its net zero target.

Purpose of the pre-issuance impact assessment report

The UK government, as outlined in the UK Government Green Financing Framework, is pursuing green gilt (bond) issuances alongside a world-first green retail savings bond via NS&I. Collectively, these are referred to as the UK government green financing programme and this report has looked at the total pool of eligible projects and programmes that may be financed or refinanced by both product types.

The purpose of the pre-issuance impact assessment report is to outline:

- the likely approach to be taken for reporting the sustainability impacts of the UK government green financing programme;
- a shortlisting of likely available metrics that the government will aim to report against; and
- an upfront (ex-ante) assessment of the allocation and alignment of the likely financed activities with the government's sustainability related policies, highlighting how the UK government green financing programme supports the climate goals and commitments of the UK government.

Our approach to this work has been to review the current list of UK government potentially eligible projects and programmes, alongside the likely available metrics. It is important to say, that because of the long-term nature of the programme, the blend of projects may change over time.

As an upfront assessment, the available data are by nature limited and underlying projects can be subject to change. An early stage analysis of the expected expenditure categories and their positive impact nevertheless offers a novel evaluation of the alignment with the UK's environmental objectives and policies.

Through engaging in an early stage impact assessment, the UK government can mobilise the resources and processes to enable robust impact reporting throughout the programme and consider impact more holistically across the green financing programme. It further contributes to the desired level of transparency and the aim of the government to push forward the green finance agenda and expectations.

Impact analysis and statement

Distribution of spending

The Carbon Trust has undertaken a line-by-line analysis of the proposed spend areas in the programme. This analysis follows the categories laid out in the UK Government Green Financing Framework, and also looks at spend thematically, including climate change mitigation, adaptation and biodiversity. This analysis forms the basis of the comparisons that have been drawn with UK climate-related policy.

As shown in Figure 2, approximately 55% of the eligible spend might be focused on clean transportation, followed by living and natural resource and renewable energy as the next largest categories. This is unsurprising given that the government has a more direct role in financing the transport sector, e.g. rail, roads and buses. Whereas in the energy sector, the private sector plays a more significant role in financing projects. Therefore in other areas, such as energy efficiency and renewable energy, the appropriate government involvement will be more focused on encouraging and enabling citizens and the private sector to be more sustainable and to develop sustainable projects. These proportions are subject to change.

Framework categories

The current list of eligible spend for the UK government green financing programme is split between 6 categories, as outlined in the UK Government Green Financing Framework:

- Clean transportation
- Climate change and adaptation
- Energy efficiency
- Living and natural resources
- Pollution prevention and control
- Renewable energy

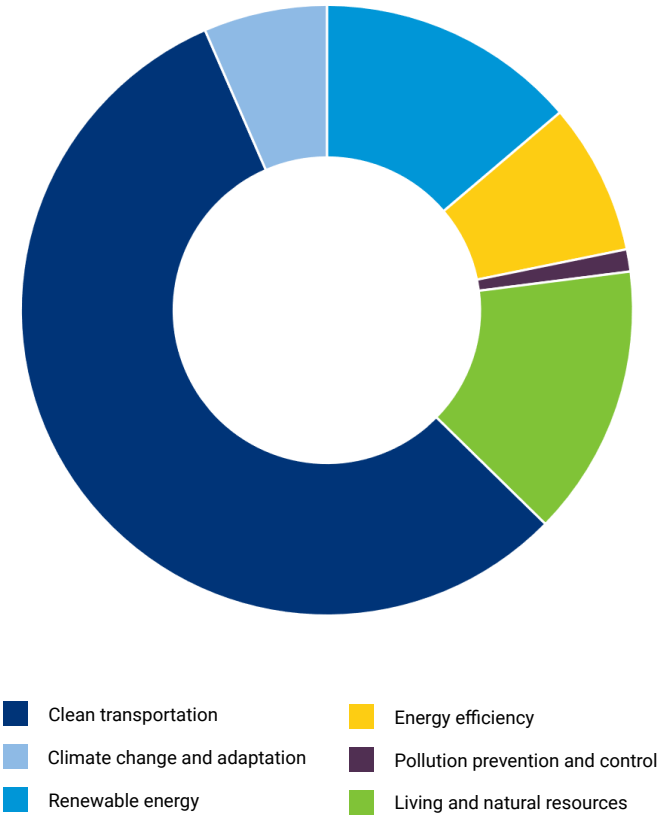


Figure 2. Estimated proportion of spending by Framework category. Carbon Trust analysis of HM Treasury data - subject to change

Climate mitigation, climate adaptation and biodiversity

The projects and programmes funded and financed by the UK government have many cross-cutting themes.

We have therefore further analysed the current eligible expenditures to apportion them between climate change mitigation, adaptation and biodiversity. It should be noted that many programmes have multiple desired outcomes across all three themes, however, we have categorised them by the most dominant theme and likely outcome.

As shown in Figure 3, the eligible projects are predominantly focused on climate mitigation projects. This is expected given the current focus on achieving net zero which requires significant climate mitigation efforts. It is encouraging however to see the number of projects focused on biodiversity and adaptation, and this is expected to grow over time.

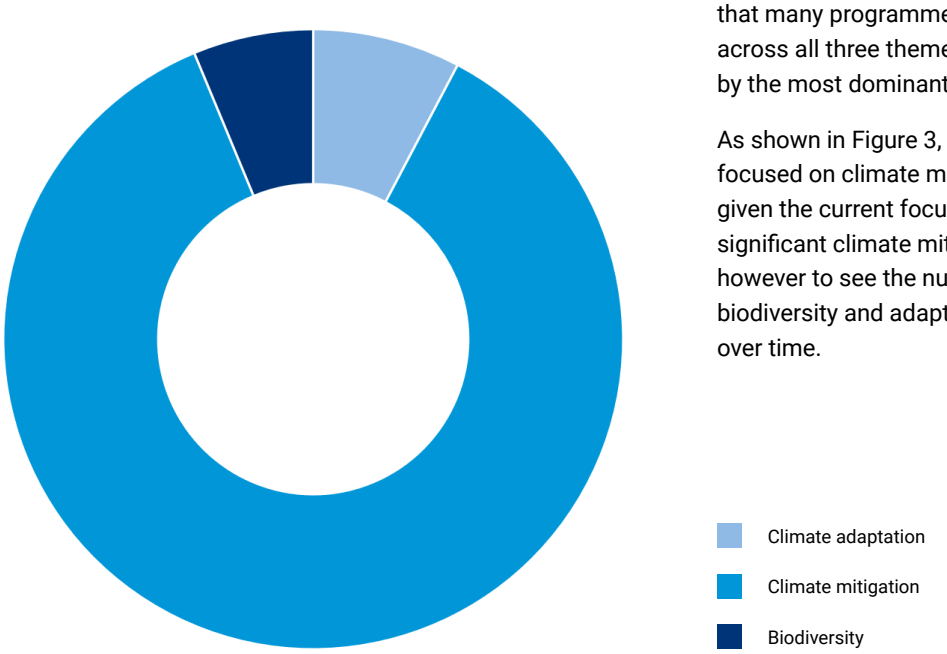


Figure 3. Estimated proportion of spending by theme. Carbon Trust analysis of HM Treasury data - subject to change

Direct versus enabling spend

Governments have a unique role in achieving impact. They can have a direct impact by investing in specific projects, and/or can have an enabling or catalytic impact, where their support leverages private sector investment and development, or broader societal action.

We have therefore categorised the spending as enabling or direct across the themes of adaptation, mitigation and biodiversity. Approximately 75% of spending can be classified as direct investment versus 25% enabling. This is influenced by the mitigation spend, as demonstrated in Figure 4.

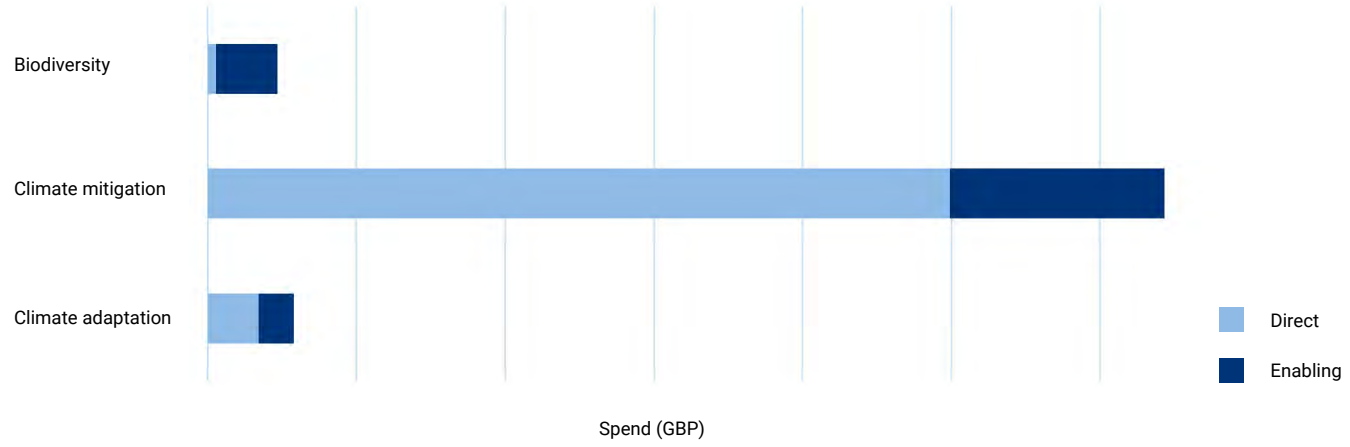


Figure 4. Estimated proportion of direct versus enabling spending by theme. Carbon Trust analysis of HM Treasury data - subject to change

Alignment of spending to UK policy – a guiding KPI

Net zero

Given the UK's leading ambition and target to achieve net zero, we have explored assessing the UK's green financing programme against the recommendations outlined by the CCC's Sixth Carbon Budget.

The CCC is an independent, statutory body established under the Climate Change Act 2008. Its purpose is to advise the UK and devolved governments on emissions targets and to report to parliament on progress made in reducing greenhouse gas emissions and preparing for and adapting to the impacts of climate change.[1]

The Sixth Carbon Budget focusses on the UK's pathway to net zero, and recommends a 78% reduction in UK territorial emissions between 1990 and 2035. This brings forward the UK's previous 80% target by nearly 15 years, with the Carbon Budget Order 2021 legislation now in place.[2]

The Sixth Carbon Budget can be met through action in four key areas:

1. **Take up of low carbon solutions**
2. **Expansion of low carbon energy supplies**
3. **Reducing demand for carbon-intensive activities**
4. **Land and greenhouse gas removals**

It is explored through 11 sector lenses (see below).

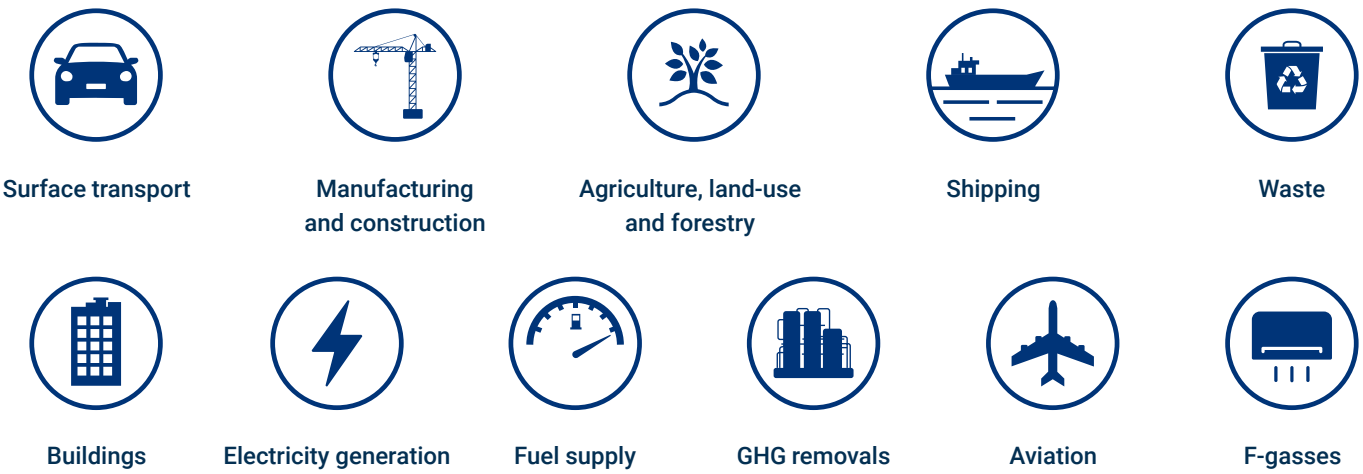
The Sixth Carbon Budget explores the additional capital expenditure (CAPEX) required above the baseline and across both the public and private sector to meet the UK's net zero goals. It is therefore challenging to compare this directly with the spend of the UK government green financing programme, which is only public sector spend. However, a comparison of the proportional spend by sector provides an interesting analysis.

We have therefore mapped the sectors of the CCC's Sixth Carbon Budget to that of the UK Government Green Financing Framework. It is not an exact alignment, but suitable for the purpose of broader categorisation. The period mapped is for 2020-2024 which reflects the current spend forecast of HM Treasury.

As demonstrated in Figure 5, the CCC forecasts an even, dominant additional CAPEX spend in renewable energy, energy efficiency and clean transportation. As previously discussed, the UK government green financing programme is more heavily weighted towards transport (Figure 1), as the government has more direct funding responsibility for transport. However, the overlap of the categories is encouraging.

The CCC assesses the natural environment as a form of carbon abatement, not directly addressing the cost of climate adaptation or biodiversity. The UK government green financing programme does make financial provision for living and natural resources, including biodiversity.

The 11 sector lenses of the CCC Sixth Carbon Budget



1 https://www.theccc.org.uk/
2 https://www.legislation.gov.uk/uksi/2021/750/contents/made

It is necessary here to introduce the ever-evolving nature of the climate and environmental challenges faced. Climate target setting and pathways are incredibly powerful tools; however, over time they change as sectors advance more quickly or slowly than planned. It would therefore be appropriate for the annual impact reporting to consider and assess the alignment of spend with the UK's net zero target as a guiding KPI. Future developments in the UK's net zero pathway will need to be taken into account.

We are encouraged by the broad alignment of the recommended CCC investment areas with those of the UK government green financing programme. We would not expect these spend proportions to align directly, as different sectors require varying levels of direct government financing versus enabling spending. We recommend ongoing tracking of this alignment of the UK government green financing programme with the requirements for meeting net zero, especially once the BEIS net zero strategy is released. Tracking policy alignment will encourage the cross-governmental collaboration required to mobilise funding to the right programmes to meet the net zero targets.

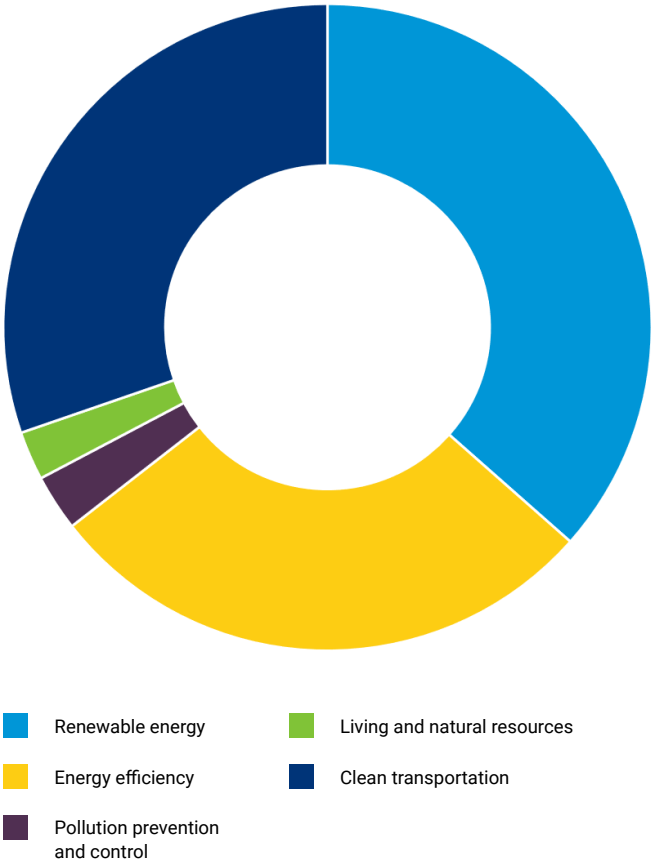


Figure 5. Mapping of the additional CAPEX required between 2020-2024 to the Framework categories. Carbon Trust analysis of CCC data

Suggested impact metrics for ongoing reporting

In order to understand and communicate the impact of the UK government green financing programme, an exercise has been undertaken, in collaboration with HM Treasury, the DMO and other UK government departments, to appraise the current level of impact reporting data that are likely to be available. By undertaking this exercise at pre-issuance, the UK government has been able to engage relevant cross-departmental stakeholders and establish a baseline of likely impact reporting data, with a view to expanding and improving this over the course of the programme.

The Carbon Trust has assessed that the metrics have been considered in the context of a range of environmental and social impact metrics that could be applied, drawing on guidance from publications such as ICMA's Harmonised Framework for Impact Reporting and the metrics used by the relevant government departments for project assessment.

The number of existing likely available metrics, and the novel inclusion of social impact metrics across the eligible government programmes to be financed or re-financed, is encouraging. We encourage the UK government to continue their discussions with relevant departments, notably the Department for Environment, Food and Rural Affairs (Defra), on the availability of biodiversity metrics, as this is becoming a key focus for the broader UK environmental strategy. We recommend the UK government embarks on a process to ensure that there is a consistent methodology and approach across the departments for reporting on impact metrics in time for the annual reporting commitments.

We are presenting here the indicative list of metrics that the UK government seeks to report against, with the caveat that they may be subject to change or expansion depending on future developments.

Table 1. Indicative list of metrics that the government seeks to report against

Framework category	Suggested metrics
Clean transportation	**Environmental** ● Annual GHG emissions reduced/avoided in tonnes of CO_2e equivalent ● Project lifetime greenhouse gas impacts ($MtCO_2$) ● Project lifetime reduced carbon emissions ● Reduction of air pollutants: particulate matter (PM), sulphur oxides (SO_x), nitrogen oxides (NO_x), carbon monoxide (CO), and non-methane volatile organic compounds (NMVOCs) **Social** ◆ Number of jobs created/supported ◆ Number of loans to SMEs and/or microenterprises ◆ Number of SMEs that receive support for equipment and facilities and technological modernisation ◆ Number of people with access to sustainable transport systems
Renewable energy	**Environmental** ● Annual GHG emissions reduced/avoided in tonnes of CO_2 equivalent ● Capacity of renewable energy plant(s) constructed or rehabilitated in MW **Social** ◆ Number of households and businesses supported to transition to low carbon heating ◆ Number of households benefitted
Energy efficiency	**Environmental** ● Annual energy savings in MWh/GWh (electricity) and GJ/TJ (other energy savings) ● Annual GHG emissions reduced/avoided in tonnes of CO_2 equivalent ● Level of certification by property **Social** ◆ Number of households benefitted ◆ Number of jobs created/supported
Pollution prevention and control	**Environmental** ● Annual GHG emissions reduced/avoided in tonnes of CO_2e equivalent ● Reduction of air pollutants: particulate matter (PM), sulphur oxides (SO_x), nitrogen oxides (NO_x), carbon monoxide (CO), and non-methane volatile organic compounds (NMVOCs) ● Waste that is prevented, minimised, reused or recycled before and after the project in % of total waste and/or in absolute amount in tonnes per annum ● Amount of waste reused or recycled (tonnes or in % of total waste) **Social** ◆ Number of SMEs that receive support ◆ Number of jobs created/supported
Living and natural resources	**Environmental** ● Absolute or % reduction in air/water pollutants ● Annual GHG emissions reduced/avoided in tonnes of CO_2e equivalent ● Hectares of protected areas restored/maintained ● Increase of area under certified land management (hectares) ● Number of native species which have benefitted from the project **Social** ◆ Number of jobs created/supported
Climate change and adaptation	**Environmental** ● Number of flood defences constructed **Social** ◆ Number of properties better protected ◆ Estimated number of beneficiaries from adaptation projects ◆ Number of jobs created/supported

Pre-issuance impact assessment case studies

To illustrate the potential impact of the UK government green finance programme, below are a few example projects that are included in the pool of eligible assets for financing and/or refinancing. The case study information and data has been provided by the UK government.

Case study:

Social Housing Decarbonisation Fund

Funding period: 2019 to 2029

Funding amount: £160m in 2021/2022

Purpose:

- The Social Housing Decarbonisation Fund seeks to improve the energy performance of social rented homes, on the pathway to net zero by 2050.
- Social housing in this context relates to accommodation which is provided at affordable rates, to people on low incomes or with particular needs.
- The aim is to upgrade a significant amount of the social housing stock, currently below Energy Performance Certification (EPC) rating C, up to that standard. This is in line with the government's Clean Growth Strategy to have as many homes as possible improved to EPC C by 2035.
- Energy efficiency improvements could include improved insulation, replacement of inefficient appliances such as lighting, heating etc.
- The intention is to deliver warm, energy efficient homes, reducing carbon emissions and fuel bills, tackling fuel poverty, and supporting green jobs.

Energy Performance Certificates (EPCs) are needed whenever a property is built, sold or rented. An EPC gives a property an energy efficiency rating from A (most efficient) to G (least efficient) and is valid for 10 years.

Metrics currently available	Metric type	Impact as estimated by UK government
Estimated annual GHG emissions avoided/reduced	● Environmental	Annually 0.6MtCO_2e (2023-2027) and 1.4MtCO_2e (2028-32)
Estimated number of jobs created/ supported	◆ Social	Annual average of around 11,000 jobs until 2030
Number of households benefited	◆ Social	Estimated to improve around 900,000 social homes to EPC C by 2030

Case study:

Zero emission buses

Funding period: 2021/22

Funding amount: £120m

Purpose:

- The National Bus Strategy laid out a plan to support at least 4,000 new zero emission buses.
- To support this, the Zero Emission Bus Regional Areas (ZEBRA) scheme aims to support local authorities to introduce zero emission buses and the infrastructure needed to their areas.
- The funding could support the introduction of up to 500 zero emission buses and associated infrastructure.
- Decarbonising England's bus fleet by rolling out zero emission buses will deliver cleaner and more reliable journeys.
- Key social co-benefits of introducing zero emission buses are public health benefits through improved air quality; bus operating cost savings in the longer term, which could lower fares and lead to other improvements for passengers; and improvements to the economy and employment rates through industry and innovation.

- 80% of buses operated in the UK are made in the manufacturing sites across the UK (Alexander Dennis based in Falkirk, Scotland, c.2,200 employees; Wrightbus, based in Ballymena, Northern Ireland, c.575 employees; Optare, based in North Yorkshire, England c.450 employees).
- The Covid-19 pandemic created a threat to the future of the UK bus manufacturing industry and its extensive supply chain. Therefore, delivery of the 4,000 zero emission buses will provide a considerable boost to an industry at risk and help position the British bus manufacturing sector as a centre of high-tech manufacturing, with benefits for jobs and trade.

Metric currently available	Metric type	Impact as estimated by UK government of 4,000 electric buses
Estimated annual GHG emissions avoided/reduced	● Environmental	171,949-188,190 tonnes CO_2e per annum

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Published in the UK: 2021