

Chapter 1. Towards green growth

This chapter provides a brief overview of key environmental trends in the United Kingdom and progress towards climate change and biodiversity targets. It assesses the environmental effectiveness and economic efficiency of the environmental policy mix, including regulatory and voluntary instruments, fiscal and economic instruments and public and private investment in environment-related infrastructure. It examines the interaction between the environment and other policy areas with a view to highlighting the opportunities and barriers to environmentally friendly and socially inclusive growth.

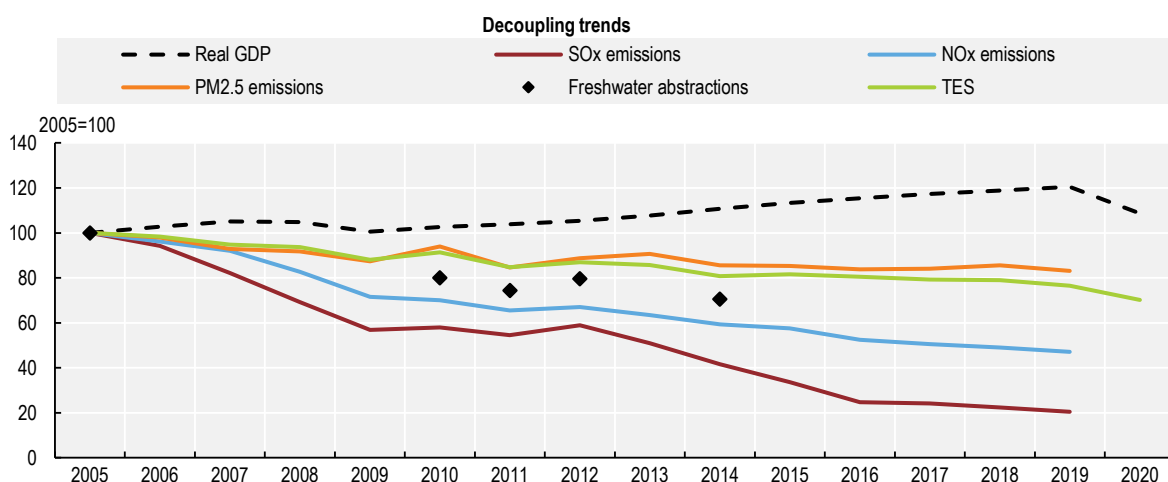
1.1. Addressing environmental challenges at the time of EU exit and COVID-19¹

Over the past decade, progress has been made across the United Kingdom in decoupling several environmental pressures from economic growth (e.g. greenhouse gas [GHG] and air pollutant emissions; municipal waste generation; energy and material consumption; water abstractions) (Figure 1.1); in improving wastewater treatment; and in expanding the network of protected areas. However, air pollution, including from domestic heating and road traffic, remains a health concern. Agricultural management, climate change and infrastructure development continue to put pressure on the natural environment, causing habitat loss, fragmentation and degradation (Hayhow et al., 2019). Further efforts are needed to achieve net zero GHG emissions by 2050, address the growing risks of climate change, reverse the loss of biodiversity and ensure a more resource-efficient circular economy.

The UK government has devoted a great deal of time and effort to ensuring EU environmental law was adequately retained in the national legislation after exit from the European Union (EU exit) on 31 January 2020. The Environment Act 2021 lays out a domestic framework for environmental governance post-EU exit (most provisions apply to England only). It puts environmental principles² into law; introduces legally binding long-term targets on air quality, water, biodiversity, resource efficiency and waste reduction; and establishes a new Office for Environmental Protection (OEP). The implementation of the Act, the setting of targets and the operation of the OEP will tell whether the UK government's ambition is commensurate with the challenge of protecting and enhancing the environment for future generations.


The United Kingdom has been hard hit by the coronavirus pandemic, with the largest gross domestic product (GDP) contraction (-9.7%) in the G7 in 2020 (OECD, 2021a). A fast initial roll-out of COVID-19 vaccines has weakened the link between new COVID-19 cases, hospitalisations and deaths, allowing a broad reopening of the economy. Activity rebounded quickly driven by consumption growth, and GDP is expected to reach its pre-pandemic level at the beginning of 2022. It is estimated that the long-run GDP will be reduced by 4% by the EU exit and a further 2% by the pandemic (OBR, 2021a).

Figure 1.1. The United Kingdom has made progress in decoupling several environmental pressures from economic growth



Note: GDP at 2015 prices. TES: Total energy supply.

Source: OECD (2021), Environment Statistics (database).

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1.1.1. Progress towards climate targets

Objectives

The United Kingdom is at the forefront of global climate action. Ahead of its presidency of the 2021 UN Climate Change Conference of the Parties (COP26) in Glasgow, it has led the way by raising its national ambition. In 2019, it was the first G7 country to legislate for net zero GHG emissions by 2050³ to deliver on the Paris Agreement, a step up from its previous 80% reduction target. In 2020, it submitted a new Nationally Determined Contribution committing to reduce GHG emissions⁴ by at least 68% by 2030 from 1990 levels. This is a clear progress from the previous commitment of 57%⁵ and the highest reduction target set by a major economy (Cuming, 2021). The 2008 Climate Change Act has been the key driver of the UK's climate policy (Box 1.1).

Box 1.1. The 2008 Climate Change Act: A gold standard for climate action

The 2008 Climate Change Act was adopted on the basis of cross-party consensus. It provided for the establishment of a long-term emissions goal and interim targets expressed in five-year carbon budgets (CB), which the government is legally obliged to achieve. The Act directed that these targets should be established on the basis of advice from an independent expert body – the Climate Change Committee (CCC), which reports on progress to Parliament rather than to the government. The CCC's mandate extends beyond parliamentary elections, which has helped ensure the UK's direction on climate change remains focused on the long-term target.

Originally, the Act committed the United Kingdom to reduce its GHG emissions by 80% by 2050, compared to 1990 levels. The first five CBs were set to achieve this goal. CB1, 2, 3 (2008-12, 2013-17 and 2018-22) were set in 2009. CB4 (2023-27) and CB5 (2028-32) were set in 2011 and 2016.

In 2019, to reflect the government's net zero ambition, the headline target of the Act was amended. In 2021, following the CCC's recommendations, the government set CB6 (2033-37), which would cut emissions (including international aviation and shipping emissions) by approximately 78% by 2035. This is the first CB setting the path to the UK's net zero target.

The Act also requires the government to publish a UK-wide climate change risk assessment (CCRA) every five years and to develop a National Adaptation Programme to respond to climate risks across England. CCRA also informs the corresponding programmes of the devolved governments.

The Act has served as a model for the development of climate laws in a number of countries (e.g. Denmark, France, Germany, Mexico, New Zealand, Sweden).

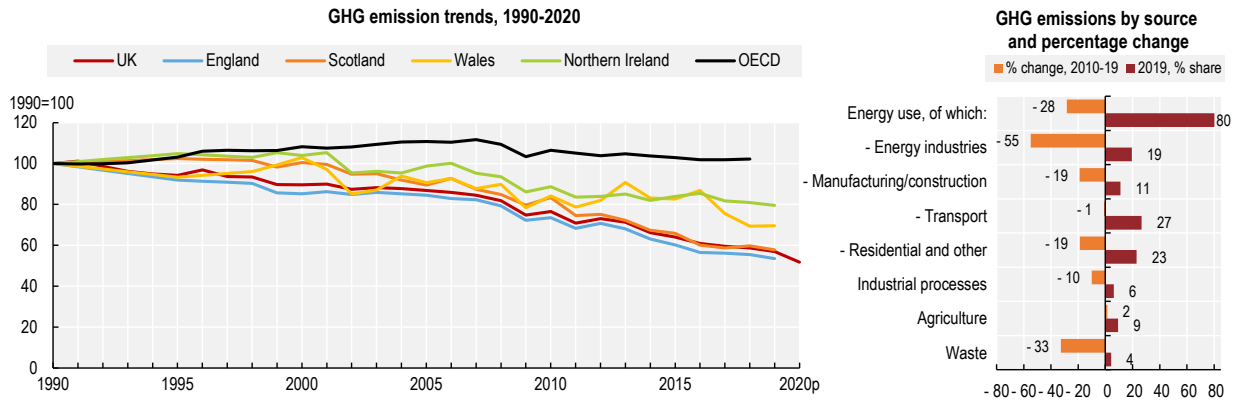
Source: CCC (2020), CCC Insights Briefing 1: The UK Climate Change Act.

Mitigation

The UK's GHG emission intensities per capita and per GDP (excluding emissions from land use, land-use change and forestry) are low compared to other OECD countries. However intensity per capita is above the OECD Europe average when emissions embedded in imported goods and services are included (OECD, 2021b). The country has one of the strongest records of emission reductions in the OECD over 1990-2019 (-44%) (Figure 1.2). Energy industries have been the largest source of emission reductions, with the shift in electricity generation from coal to gas and, in the past decade, to renewable energy. With the COVID-19 crisis, GHG emissions are estimated to have decreased by 9% in 2020, primarily due to the decline of road transport during the lockdowns and the reduction in business activity. Compared to the

OECD average, the UK's emissions structure has a higher share of transport (2019: 27% vs 24%), residential and commercial sectors (21% vs. 11%) and a lower share of energy industries (19% vs. 29%) (OECD, 2021b).

Figure 1.2. GHG emissions have fallen significantly, especially in the power sector



Note: Excluding emissions from land use, land-use change and forestry. 2020 data are preliminary. Right panel: "other" includes emissions from fuel combustion in the commercial/institutional and agricultural sectors and fugitive emissions from fuels.

Source: BEIS (2021), 2020 UK greenhouse gas emissions, provisional figures; BEIS (2021), National Inventory Report 2021; NAEI (2021), Greenhouse Gas Inventories for England, Scotland, Wales & Northern Ireland: 1990-2019; OECD (2021), Environment at a Glance Indicators, Climate change.

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The United Kingdom met its emissions reductions target for the first commitment period of the Kyoto Protocol (2008-12) (Figure 1.3). Under the terms of the Withdrawal Agreement, it remains committed to its shared target with the European Union under the Kyoto Protocol as part of the Joint Fulfilment Agreement (BEIS, 2021a). The United Kingdom had to reduce emissions not covered by the EU Emissions Trading System (ETS) by 16% over 2005-20. It surpassed this target. It met its first and second CB and is on track to meet its third budget (2018-22). The 2007-08 financial crisis and the COVID-19 crisis have played a significant role in meeting these budgets (CCC, 2020a).

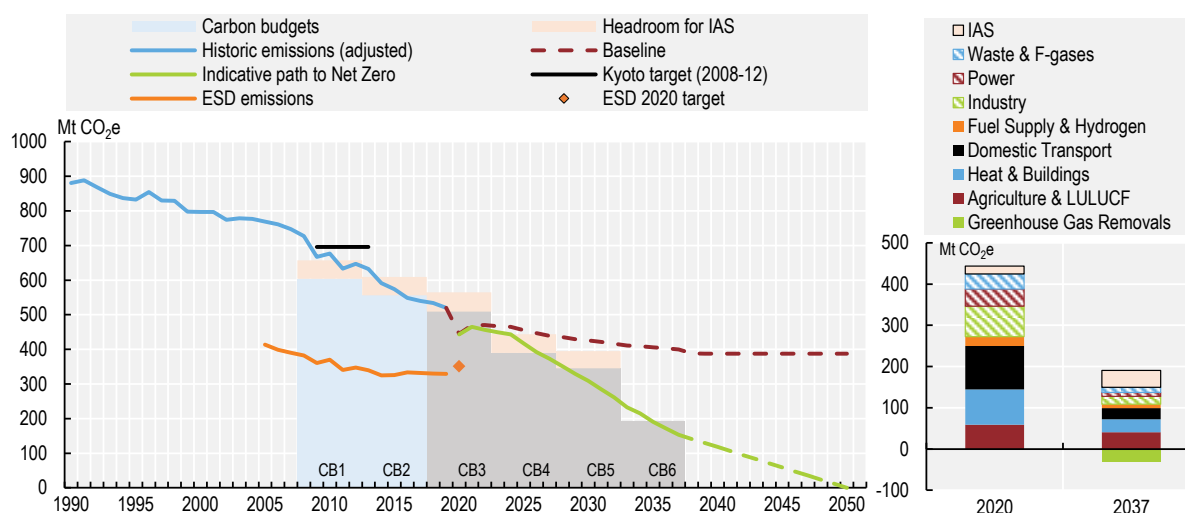
As provided by the 2008 Climate Change Act, the government outlined its plan for reducing emissions in the 2021 Net Zero Strategy (NZS) (HM Government, 2021). It builds on the 2020 Ten Point Plan for a Green Industrial Revolution and sectoral plans including the 2020 Energy White Paper, the 2021 Industrial Decarbonisation Strategy, Transport Decarbonisation Plan and Hydrogen Strategy, as well as the Heat and Buildings Strategy. The NZS outlines indicative emission reductions by sector, to meet the sixth carbon budget (2033-37) and ultimately net zero by 2050 (Figure 1.3). It calls for fully decarbonising electricity by 2035, subject to security of supply, and rapidly electrifying transport, heating and industry. These actions would be supplemented by low-carbon hydrogen, carbon capture and land-use change (CCC, 2021a). The vision is backed by key milestones sending strong signals to investors and consumers, including 40 gigawatts (GW) of offshore wind capacity by 2030; 5 GW of hydrogen production capacity by 2030; 600 000 heat pump installations a year by 2028; ending the sale of new petrol and diesel cars and vans by 2030 and hybrid vehicles by 2035; ending the sale of new gas boilers by 2035; planting 30 000 hectares (ha) of trees per year by 2024; and deploying carbon capture, utilisation and storage in four industrial clusters by 2030.

Baseline projections show the United Kingdom would not have reached the fourth and fifth budgets (2023-27; 2028-32) set to achieve the 80% reduction target with the policies in place until mid-2019 (Figure 1.3). As of mid-2021, before the NZS was adopted, only 20% of the emission savings for the sixth

budget (2033-37), which sets the path to net zero, had policies “potentially on track” for full delivery (CCC, 2021b). The NZS put forward credible policy proposals to put the United Kingdom on track to net zero (CCC, 2021a). However, it is not yet clear how it will deliver on this ambition. The impact of individual measures is not quantified and some, notably in the agriculture and building sectors, remain to be developed. The government will report on its progress annually.

Figure 1.3. Policies must be implemented quickly to put the United Kingdom on a net zero path

Past performance against climate objectives and indicative path to net zero



Note: The sixth carbon budget (CB6) includes international aviation and shipping (IAS) emissions, but the previous ones do not. Historic emissions are adjusted for accounting changes, including wetlands brought in under the 2019 inventory and IAS emissions; and converting the projections into Global Warming Potential values with climate-carbon feedbacks of the IPCC Fifth Assessment Report. The Kyoto target should be compared to lower emissions. Baseline: based on policies implemented, adopted or planned as of August 2019. ESD: GHG emissions in Effort Sharing Decision sectors (not covered by the ETS). LULUCF: land use, land-use change and forestry.

Source: BEIS (2021), Net Zero Strategy-charts and tables; Eurostat (2021), Greenhouse gas emissions in ESD sectors.

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Adaptation

The United Kingdom is experiencing widespread changes in the climate (CCC, 2021c). Average temperature is around 1.2°C warmer than the pre-industrial period, UK sea levels have risen by 16 cm and episodes of extreme heat are becoming more frequent. By 2050 (relative to a 1981-2000 baseline), average winter temperatures are projected to increase by around 1°C and rainfall by 5% (central estimates) with increasing risk of flash floods. Average summer temperatures are projected to increase by 1.5°C and rainfall to decrease by 10% with increasing risks of flooding and excess deaths from heat. Continuing sea level rise of around 10-30 cm with possible rises extending up to 30-40 cm across the United Kingdom will increase the risks of flooding and affect the functioning of coastal infrastructure.

The United Kingdom has undertaken three comprehensive assessments of its climate risks, and the government published adaptation plans in 2013 and 2018 (CCC, 2021c). There have been some actions in response, notably in tackling flooding and water scarcity, but overall progress in planning and delivering adaptation is not keeping up with increasing risk. The CCC identified eight priority risk groups in the following areas: i) viability and diversity of terrestrial and freshwater habitats and species from multiple hazards; ii) soil health from increased flooding and drought; iii) natural carbon stores and sequestration from multiple hazards, leading to increased emissions; iv) crops, livestock and commercial trees from

multiple climate hazards; v) supply of food, goods and vital services due to climate-related collapse of supply chains and distribution networks; vi) people and the economy from climate-related failure of the power system; vii) human health, wellbeing and productivity from increased exposure to heat in homes and other buildings; viii) the United Kingdom itself from climate change impacts overseas. The third National Adaptation programme due in 2023 is an opportunity to set an ambitious vision with measurable targets to assess progress. Policies are being developed without sufficient recognition of the need to adapt to the changing climate. This undermines their goals, locks in climate risks, and stores up costs for the future.

Climate finance

In 2019, United Kingdom committed GBP 11.6 billion in dedicated climate finance over the 2021/22–2025/26 period split equally between mitigation and adaptation (CCC, 2021b). This figure is double the level of support over the previous five-year period. The commitment is protected at this level against the announced temporary cuts in UK official development assistance (ODA) from 0.7% to 0.5% of gross national income. The GBP 11.6 billion funding is additional to the contribution to large multilateral development banks, some of which will be used to support climate-related projects. The United Kingdom has also committed to align the full extent of its ODA spending with the Paris Agreement and to end export finance for overseas fossil fuel investments.

1.1.2. Atmospheric emissions and air quality

Emissions of most major air pollutants have declined significantly over recent decades with the shift from coal for domestic heating and power generation and stricter emission standards (Figure 1.1); (Defra, 2021a). In 2019, sulphur oxide (SO_x), nitrogen oxides (NO_x) and fine particulate matter (PM_{2.5}) emission intensities per capita and per GDP were among the lowest in OECD countries. However, the rate of reduction has slowed down for some pollutants in recent years. Industrial and domestic combustion (heating) are major sources of SO_x, CO and PM_{2.5}, while road transport is the main emitter of NO_x, and non-methane volatile organic compound (NMVOC) emissions mainly come from solvent use. Emissions of ammonia (NH₃) are largely driven by agricultural activity, primarily linked to herd sizes and farming practices. They decreased between 2005 and 2013, then rose until 2017 and have stabilised since 2018. The United Kingdom had legally binding targets to reduce air pollutant emissions through the National Emission Ceilings Regulations 2018 and 2012 amended Gothenburg Protocol to the Convention on Long-range Transboundary Air Pollution. In 2019, it published a Clean Air Strategy and a National Air Pollution Control Programme to limit emissions in accordance with national emission reduction commitments. This plan will be revised in 2022. In 2019, the United Kingdom had already met its 2020 reduction targets for SO_x, NO_x and NMVOC. However, further efforts were needed to meet 2020 targets for NH₃ (from agriculture) and PM_{2.5}, as well as to meet 2030 targets for all pollutants except NMVOCs (Defra, 2021a).

Population exposure to PM_{2.5} has steadily decreased since 2005 but remained in 2019 above the new World Health Organization guideline value⁶ of 5 microgrammes per cubic metre (µg/m³) (OECD, 2021b). People in Scotland are least exposed to air pollution (6.7 µg/m³), while people living in Greater London are exposed to levels twice as high. In 2020, concentrations of NO₂ decreased with the reduction in road traffic due to COVID-19 lockdown restrictions. Five zones (out of 43) exceeded the annual mean limit value for NO₂, down from 33 in 2019 (Defra, 2021b). Urban background ozone pollution has an overall long-term increasing trend. Air pollution continues to be the largest environmental risk to the public's health in the United Kingdom. Each year, between 28 000 and 36 000 deaths are attributed to human-made air pollution (PHE, 2019).

1.1.3. Progress towards biodiversity targets

The metropolitan United Kingdom (England, Scotland, Wales and Northern Ireland) has a diverse mix of habitats and species for its small size (approximately 240 000 km²) with a marine area approximately 3.5 times the size of the land area. The diversity of geology, landforms and sea floors, the long history of land management, the warming effect of the Gulf Stream, and a large tidal range result in a wide biodiversity range.

The key drivers of change across terrestrial biodiversity, as identified in the 2011 National Ecosystem Assessment, are habitat change (land use/condition) and pollution. Other threats are over-exploitation, invasive species and climate change. The main threats to the marine environment are fishing pressure, climate change, acidification, hazardous substances and eutrophication (JNCC, 2019).

The development and implementation of biodiversity policy in the United Kingdom is largely devolved and delivered through country plans and strategies. Over 2010-20, action was co-ordinated through the UK post-2010 Biodiversity Framework. This framework set out how the countries worked together to contribute to the Strategic Plan for Biodiversity 2011-20 and meet the Aichi targets of the United Nations Convention on Biological Diversity. The countries have also jointly developed the UK Marine Strategy to achieve good environmental status in their marine waters by 2020.

Biodiversity indicators show progress in several assessed measures, including agri-environment schemes, reducing air and marine pollution, extending marine protected areas and improving knowledge, but many present mixed or negative trends (Table 1.1). In particular, the abundance of UK priority species, and common farmland and woodland birds is in long-term decline while pressure from invasive species is increasing. Most UK habitats and species of European importance are in unfavourable condition.

Table 1.1. Biodiversity loss continues

UK Biodiversity Indicators 2021

Indicator / measure(s)		Long-term change	Short-term change
A1. Awareness, understanding and support for conservation	
A2. Taking action for nature: volunteer time spent in conservation		☺ 2000-19	☺ 2014-19
A3. Value of biodiversity integrated into decision making		Under development	Under development
A4. Global biodiversity impacts of UK economic activity/sustainable consumption		Experimental – under review	Experimental – under review
A5. Integration of biodiversity considerations into business activity	
B1. Agricultural and forest area under environmental management schemes	B1a. Area of land in agri-environment schemes	☺ 1992-2020	☺ 2015-20
	B1b. Area of forestry land certified as sustainably managed	☺ 2001-21	≈ 2016-21
B2. Sustainable fisheries	B2a. Percentage of marine fish stocks harvested sustainably	☺ 1990-2019	☺ 2014-19
	B2b. Biomass of marine fish stocks at full reproductive capacity	☺ 1990-2019	☹ 2014-19
B3. Climate change adaptation		Under development	Under development
B4. Pressure from climate change (Spring Index)		Not assessed	Not assessed
B5. Pressure from pollution			
B5a. Air pollution	B5a (i). Area affected by acidity	☺ 1996-2018	☺ 2013-18
	B5a (ii). Area affected by nitrogen	☺ 1996-2018	☺ 2013-18
B5b. Marine pollution		☺ 1990-2019	☺ 2014-19
B6. Pressure from invasive species	B6a. Freshwater invasive species	☹ 1960-2020	Not assessed
	B6b. Marine (coastal) invasive species	☹ 1960-2020	Not assessed
	B6c. Terrestrial invasive species	☹ 1960-2020	Not assessed

B7. Surface water status		≈ 2009-20	≈ 2015-20
C1. Protected areas	C1a. Total extent of protected areas: on land	☺ 1950-2021	≈ 2016-21
	C1b. Total extent of protected areas: at sea	☺ 1950-2021	☺ 2016-21
	C1c. Condition of Areas/Sites of Special Scientific Interest	☺ 2005-21	☹ 2016-21
C2. Habitat connectivity		Experimental – under review	Experimental – under review
C3. Status of European habitats and species	C3a. Status of UK habitats of European importance	☹ 2007-19	☹ 2013-19
	C3b. Status of UK species of European importance	☹ 2007-19	☹ 2013-19
C4. Status of UK priority species	C4a. Relative abundance	☹ 1970-2019	≈ 2014-19
	C4b. Distribution	≈ 1970-18	≈ 2013-18
C5. Birds of the wider countryside and at sea	C5a. Farmland birds	☹ 1970-18	☹ 2013-18
	C5b. Woodland birds	☹ 1970-18	☹ 2013-18
	C5c. Wetland birds	☹ 1975-2018	≈ 2013-18
	C5d. Seabirds	Not assessed	Not assessed
	C5e. Wintering waterbirds	☺ 1975/76-2017/18	≈ 2012/13-2017/18
C6. Insects of the wider countryside (butterflies)	C6a. Habitat specialists	☹ 1976-2020	≈ 2015-20
	C6b. Species of the wider countryside	≈ 1976-2020	≈ 2015-20
C7. Plants of the wider countryside		Experimental – under review	Experimental – under review
C8. Mammals of the wider countryside (bats)		☺ 1999-2019	☺ 2014-19
C9. Genetic resources for food and agriculture			
C9a. Animal genetic resources – effective population size of Native Breeds at Risk	C9a(i). Goat breeds	☺ 2004-20	≈ 2015-20
	C9a(ii). Pig breeds	☹ 2000-20	☹ 2015-20
	C9a(iii). Horse breeds	☹ 2000-20	☹ 2015-20
	C9a(iv). Sheep breeds	☺ 2000-20	☺ 2015-20
	C9a(v). Cattle breeds	☺ 2000-20	☺ 2015-20
C9b. Plant genetic resources – Enrichment Index		☺ 1960-2018	☺ 2013-18
D1. Biodiversity and ecosystem services	D1a. Fish size classes in the North Sea	☹ 1983-2019	☹ 2014-19
	D1b. Removal of GHGs by UK forests	☺ 1990-2019	☺ 2014-19
	D1c. Status of pollinating insects	☹ 1980-2017	≈ 2012-17
E1. Biodiversity data for decision making	E1a. Cumulative number of records	☺ 2004-21	☺ 2016-21
	E1b. Number of publicly accessible records at 1 km ² resolution or better	☺ 2008-21	☺ 2016-21
E2. Expenditure on UK and international biodiversity	E2a. Public sector expenditure on UK biodiversity	☺ 2000/01-2019/20	☹ 2014/15-2019/20
	E2b. Non-governmental organisation expenditure on UK biodiversity	..	☺ 2014/15-2019/20
	E2c. UK public sector expenditure on international biodiversity	☺ 2001/02-2019/20	≈ 2014/15-2019/20

Note: ☺: improving, ☹: deteriorating, ≈ little or no overall change, “..”: insufficient or no comparable data. Long-term – an assessment of change since the earliest date for which data are available, although if the data run is for less than ten years a long-term assessment is not made; Short-term – an assessment of change over the latest five years, six years for C3a and C3b.

Source: Defra (2021), UK Biodiversity Indicators 2021 Revised.

In 2019 the United Kingdom reported it was on track to meet 5 of the 20 Aichi Biodiversity Targets:⁷ mainstreaming, protected areas, implementation of the Nagoya Protocol, National Biodiversity Strategy, and mobilisation of information and research (JNCC, 2019). However, according to the Royal Society for the Protection of Birds (RSPB), most assessments point towards ongoing loss of UK biodiversity or no recovery from depletion (HoCs, 2021a). The United Kingdom is one of the most nature-depleted countries in the world (NHM, 2020). According to the Natural Capital Committee, an independent advisory committee which ran from 2012 to 2020, most natural assets are deteriorating (NCC, 2020a).

Habitat and species

The UK Species Inventory contains 59 210 species of animals, plants and fungi known to occur in the United Kingdom (including native, naturalised and non-native species). Knowledge gaps remain in the number and trends of threatened species, but progress has been made in assessing the threat of extinction and with monitoring indicator species. Overall, only 14% of UK species have had their conservation status assessed; 21% of these are threatened (JNCC, 2019).

Only 8 041 species have been assessed against International Union for Conservation of Nature (IUCN) Red List criteria. The taxa with the highest proportion of species assessed nationally above Least Concern include birds (49%) and terrestrial mammals (55%). Insects, and in particular beetles and moths, have experienced the highest proportion of national extinctions in Great Britain across taxa, with 5% of insect species assessed being classified as extinct. In all, 207 species have been assessed as nationally extinct in Great Britain in recent history. However, no species is known to have gone nationally extinct since 2010. A significant proportion of the UK's fish (27%), reptiles (46%), birds (22%) and marine mammals (19%) that have been assessed globally are threatened (JNCC, 2019) (OECD, 2021b).

There has been progress in improving the status of some nationally and internationally threatened species. These include successful re-introductions of the white-tailed eagle, short-haired bumblebee and beaver in Scotland, and the chequered skipper in England, as well as recovery programmes for red kite and natterjack toad. However, overall progress is insufficient to halt widespread and significant ongoing declines across many species (e.g. for priority species as a group and for groups such as farmland birds, specialist butterflies and other pollinating insects) (JNCC, 2019). In 2019, only 39% of UK species of European importance were in favourable conservation status (Defra, 2021c).

Protected areas

Within the United Kingdom, the law protects sites that are nationally important for plants, animals or geological or physiographical features as Sites of Special Scientific Interest – or in Northern Ireland as Areas of Special Scientific Interest. In the marine environment, a number of regional marine protected areas are designated, including Marine Conservation Zones in England, Wales and Northern Ireland, and Nature Conservation Marine Protected Areas in Scotland. The United Kingdom also contributes to international networks of protected sites created under the Ramsar, World Heritage and OSPAR Conventions. Special Protection Areas (SPAs) and Special Areas of Conservation protect habitats and species of European importance.

The total extent of protected areas has increased significantly since 2015 to cover 29% of land area and 42% of the economic exclusive zone (EEZ) in 2020 (OECD, 2021b). This is well above the Aichi 2020 targets of protecting at least 17% of land and 10% of marine and coastal areas. It is also close to the G7 targets of protecting at least 30% of land and sea by 2030. However, only 0.5% of land area has strict management objectives (IUCN management categories⁸ I and II), compared to 7.4% on average in OECD countries. About 9% of land area and 1% of the UK's EEZ are designated under IUCN categories III and IV, compared to 1.5% and 4% respectively on average in OECD countries. The RSPB estimates that only around 5% of the UK's land is both protected and managed effectively for nature (HoCs, 2021a).

The recent increase is almost entirely down to the designation of inshore and offshore marine sites under the EU Habitats Directive; the designation of Marine Conservation Zones in English, Welsh and Northern Irish waters; and designation of Nature Conservation Marine Protected Areas in Scottish waters. The extent of protected areas on land has increased by 14 462 ha since 2015. Protected area designation has continued, notably for marine birds. This has resulted in the designation of new marine SPAs in 2020, with more expected shortly in Northern Ireland and Scotland. These efforts have not yet translated into results. In 2019, only 5% of UK habitats of European importance were in favourable conservation status (Defra,

2021c). Bogs, mires and fens, and grasslands show the worst conservation status, while rocky habitats and dune habitats are in most favourable status (EEA, 2019).

Water management

The United Kingdom abstracts less than 5% of its internal and renewable resources. It is therefore under low water stress (OECD, 2021b), although risks of water shortages are projected due to climate change (CCC, 2021c). In 2019-20, England had a low intensity of freshwater abstraction for public water supply per capita compared to other OECD countries (CCC, 2021c). In 2019, only 16% of surface waters in England met the “good ecological status” standard under the EU Water Framework Directive. However, a higher percentage met this standard in the devolved nations, especially in Scotland where 63% of surface waters achieved a “good ecological status” in 2020 (Defra, 2021c). The most common pressures impacting water bodies are physical modification (affecting 41% of water bodies in England), diffuse pollution from rural areas (affecting 40%), waste water (affecting 36%), and related to cities and transport (affecting 18%). The number of designated bathing waters in England meeting at least the minimum standard increased considerably from 46% in 1995 to 98% in 2019. The number of bathing waters achieving “excellent” status has also increased in the past decades, with 71% meeting this standard in 2019. That same year, 85% of surface bodies supported required flow standards and 73% of groundwater bodies were sustainable compared to objectives of achieving sustainable levels for 90% of surface water bodies and 77% for groundwater bodies by 2021. In 2016, the United Kingdom complied with the collection and secondary treatment targets (Articles 3 and 4) of the EU Urban Waste Water Treatment Directive, and was close to achieving the more stringent target (Article 5) (EC, 2020a). However, pollution from sewer overflows is of particular concern (Environment Agency, 2021a).

1.2. Improving environmental governance and management

1.2.1. Institutional framework for environmental governance

The responsibility for environmental policy and regulation is devolved in Scotland, Wales and Northern Ireland to the Scottish government, the Welsh government and the Northern Ireland Executive. There is no devolved government for England; the UK government makes decisions and proposes legislation that concerns England. Indeed, many UK government policies, such as its 25 Year Environment Plan (25 YEP), published in 2018, are intended to apply to England only. Scotland, Wales and Northern Ireland enjoy varying degrees of autonomy, but each has responsibilities for the environment, agriculture, fisheries and energy. The legal frameworks are similar in all the administrations, but the powers are different in each jurisdiction’s acts, regulations and orders.

Devolved administration and horizontal co-ordination

In England and Northern Ireland, dedicated government departments define overall environmental policy and establish the legal framework: the Department of Environment, Food and Rural Affairs (Defra) in England and the Department of Agriculture, Environment and Rural Affairs in Northern Ireland. Defra has lead responsibility for all environmental policy areas apart from climate change mitigation, for which the Department for Business, Energy and Industrial Strategy has the policy lead. In addition, the Department for Transport promotes sustainable mobility.

The Environment Agency in England and the Northern Ireland Environment Agency (NIEA) are executive bodies with regulatory and advisory functions.⁹ The Scottish Environment Protection Agency (SEPA) and Natural Resources Wales¹⁰ are regulatory authorities that report directly to the Scottish and Welsh governments, respectively. In England, Scotland and Wales, flood prevention and management are part of the agencies’ remit along with environmental regulation.

Natural England is responsible for land management and wildlife and habitat conservation, while Forestry England oversees forest management. In Scotland, all these functions fall under the remit of NatureScot. Natural Resources Wales takes care of these issues along with the rest of environmental management in the country. In Northern Ireland, the NIEA is in charge of nature protection, but the Forest Service manages forests.

The devolution agreements were created when the United Kingdom was an EU member state. The intersection of the devolution settlements with EU membership has allowed for “upward divergence” in environmental policy across the four UK nations. In particular, the Scottish and Welsh governments have aspired to pursue environmental policies that would go beyond the European Union’s minimum requirements. However, Northern Ireland has historically been lagging in terms of environmental governance (Burns et al., 2018).

Environmental agencies across the United Kingdom have mechanisms for institutional co-operation with the other UK nations, but stakeholders perceive that they do not function well (Burns et al., 2018). The Joint Nature Conservation Committee brings together representatives from conservation bodies of the UK’s four nations. This body establishes common standards across the United Kingdom for monitoring and researching nature conservation and analyses the resulting information. Its recommendations are then left to be implemented by the competent legislative authorities in each country. The UK-wide CCC operates on a similar basis. It is the statutory advisory body on climate change to both the Scottish and Welsh governments.

These policy co-ordination mechanisms were until recently operating within the EU framework. In the absence of this unifying platform, reinforced co-operation mechanisms are necessary to prevent the divergence between the environmental policy approaches of the four nations from compromising the level playing field for UK businesses.

The new arrangements for policy cohesion and managing divergence are covered by a programme of common policy frameworks that is led jointly by the UK and devolved governments. For example, a new UK Biodiversity Framework is being elaborated. The Inter-Ministerial Group for Environment, Food and Rural Affairs is a forum for environment ministers from across the UK nations to regularly discuss current issues in these areas. A review of intergovernmental relations in 2021 has made changes to the structures and ways of working that will strengthen engagement across the four UK nations. However, the focus so far has been primarily on matters crucial to facilitating trade (Chloe, 2021).

Government effectiveness and regulatory quality in the United Kingdom decreased slightly (from a very high level) over 2014-19 (World Bank, 2020). This decline could be attributed to a long period of uncertainty over EU exit. EU exit has affected the capacity of the country’s environmental institutions in particular. The National Audit Office ranked Defra second among UK government departments most affected by EU exit. Defra recruited over 1 300 new staff members to work on EU exit issues (Burns et al., 2018).

EU exit followed a long period of austerity and significant staffing cuts for the environment in all four nations. For example, government funding for the Environment Agency’s functions other than flood defence was nearly halved between fiscal years 2009/10 and 2018/19 (NAO, 2020). The budget cuts were partly offset by the increased subsistence charges for permitted installations (Section 1.2.3) and improved efficiency of administrative procedures. Still, the persistent lack of resources has weakened policy implementation, including environmental quality and compliance monitoring and reporting. Compliance assurance activities with regard to installations not covered by a permitting regime (and hence not paying subsistence fees) have been particularly affected.

SEPA’s capacity has also been undermined by a significant cyber-attack on 24 December 2020, carried out by organised crime to extort money. Most of SEPA’s information technology systems, including backups, were encrypted or content was deleted. As a result, staff had no access to e-mail, data or

systems. Since then, SEPA has focused on renewing and upgrading its systems and infrastructure. Full recovery is expected to take around 18-24 months.

Local government and vertical co-ordination

Local authorities (which usually have an Environmental Health Department) are responsible for spatial planning and waste management. In addition, in England and Wales local authorities perform a number of environmental regulatory functions, including permitting, inspecting and enforcing against some medium- and low-risk installations, in most cases with respect to air emissions only. They also manage local air quality, including emissions from mobile sources. They have administrative enforcement and prosecutorial powers with respect to “statutory nuisance” – noise, odour, dust and smoke. Local authorities also have permitting responsibilities in Northern Ireland.

Vertical co-ordination usually consists of guidance from the national environmental regulator to local governments. For example, Defra produces guidance notes for each of the 80 sectors regulated by local authorities. Developed in collaboration with business organisations by technical working groups, these guidance notes contain the descriptions of relevant best available techniques and emission limit values. They are generally quite prescriptive so as to maintain a level playing field between local authorities across England.

1.2.2. Regulatory and policy evaluation

The United Kingdom continues to emphasise evidence-based policy making. Regulatory and policy evaluation, *ex ante* and *ex post*, plays an important role in environmental governance. The country has long been a frontrunner in performance measurement with regard to both policy implementation and corporate results of environmental authorities.

Regulatory impact assessment

Regulatory impact assessment (RIA) is carried out for all regulations except for deregulatory and low-cost measures, which are eligible for a fast-track procedure. The Regulatory Policy Committee, a non-departmental advisory body, provides the government with external, independent scrutiny of evidence and analysis supporting new regulatory proposals in RIAs. It also scrutinises the quality of *ex post* evaluations of legislation. The Better Regulation Executive within the Department for Business, Energy and Industrial Strategy is responsible for better regulation policy. It is also the lead unit in the UK government for promoting and delivering changes to the regulatory policy framework (OECD, 2018).

RIAs have been required for significant policy changes and new policies for at least the last two decades, although requirements have changed progressively. The latest standard format for RIAs in England is significantly slimmed down, allowing under 50 lines to summarise the problem under consideration and the need for intervention; the policy objectives and intended effects; alternative options considered; and a description of the monetised and non-monetised costs and benefits identified, by main target groups. Further information can be provided in a separate “Evidence base” document. However, the current RIA template focuses primarily on the regulatory burden on businesses. It does not appear to allow sufficient space to identify potential environmental risks or tackle environmental impacts if these are not a primary concern of the draft regulation. Guidance on environmental aspects of RIA is also cursory in the other three nations (Nesbit, 2019).

Strategic environmental assessment

Strategic environmental assessment (SEA) is widely used, particularly in land-use planning. For example, SEA is integrated into the broader sustainability assessment, which is a legal prerequisite for adoption of local spatial plans in England and Wales. Beyond the land-use planning sphere, SEA has been used for

local air quality action plans, local transport plans, municipal waste management strategies, water resources (river basin) management plans, waste management plans, etc. The UK government Green Book provides guidance on how to appraise and evaluate policies, projects and programmes. However, SEA is rarely used for non-environmental plans and programmes such as regional economic strategies.

SEA legislation in Scotland (Environmental Assessment [Scotland] Act 2005 and its implementing regulations) is more robust than that in the other jurisdictions of the United Kingdom. Scottish SEA covers some of the highest-level strategies, plans, programmes and policies, including legislation. These include, for example, the Climate Change Act, energy policy, national transport infrastructure strategies and the national planning framework. A database provides a record of all public plans, programmes and strategies that have been subjected to SEA.

Ex post policy evaluation

The Environment Act 2021 lays out a domestic framework for post-EU exit environmental governance (primarily for England) and introduces regulatory changes in the areas of air, water, waste, biodiversity and chemicals. It sets legally binding long-term targets on air quality, water, biodiversity and resource efficiency and waste reduction, as well as statutory Environmental Improvement Plans (EIPs). EIPs set interim targets for each five-year period and lay out steps to improve the natural environment. Both medium- and long-term targets are supported by a new statutory cycle of monitoring, planning and reporting.

The law establishes the OEP to hold the government accountable on progress towards achieving targets. The OEP can make annual recommendations to which the government must respond. However, the OEP will only operate in England and likely in Northern Ireland. In addition, it will be required to consider guidance from the government, raising concerns about its independence.

Environmental Standards Scotland (ESS) is a similar independent watchdog body set up in Scotland in 2021. It aims to ensure the effectiveness of environmental law and prevent enforcement gaps arising from the United Kingdom leaving the European Union. The ESS can examine the implementation and effectiveness of environmental laws, including international obligations. It can prepare improvement reports to which the ministers must respond with an improvement plan, subject to parliamentary approval. It can also serve compliance notices on public authorities, which can be enforced through the courts. Wales has only appointed an interim Environmental Protection Assessor until it completes a review of its environmental governance framework.

Policy evaluation is also done through performance indicators. The 25 YEP outcome indicator framework in England is made up of 66 indicators. These indicators are arranged into ten broad themes related to the goals of the 25 YEP and commitments to protect and improve the global environment. The themes are environmental topics that people will generally recognise (e.g. air, freshwater, seas and estuaries, wildlife). Indicator frameworks are also used in other jurisdictions to evaluate corporate performance of environmental authorities. For example, SEPA uses 17 corporate performance measures. In addition, the National Audit Office reports on the effectiveness of the regulatory policy framework as a whole through value-for-money studies. Welsh ministers publish a State of Natural Resources Report every five years to evaluate the performance of government policy.

1.2.3. Environmental regulation and compliance assurance

During the 47 years of the United Kingdom's membership in the European Union, the gradual penetration of environment-related EU directives into national policy and legal systems was profound. Consequently, a rapid and sudden disentanglement risks legal uncertainty and policy gaps. The UK government has devoted a great deal of time and effort to ensuring adequate retention of EU environmental law. However, this process is taking longer than expected: specific changes are still being made through a multitude of statutory instruments, particularly on air quality, chemicals and nature protection. In January 2022, the UK

government announced its intention to bring forward a Brexit Freedoms Bill to end the special status of EU law and ensure it can be more easily amended or removed to reduce regulatory burden on businesses.

The COVID-19 pandemic has created additional challenges for environmental regulation. SEPA, for example, issued Principles for Regulatory Approach to EU exit and COVID-19 in 2020 to provide clarity on temporary regulatory positions (e.g. on waste management) in relation to these unusual circumstances. Temporary positions enabled regulated businesses to continue operating within the COVID-19 restrictions, while also protecting the environment.

Environmental impact assessment and permitting

Environmental impact assessment (EIA) conclusions must be considered in issuing a development consent (in England, by a local authority) or a planning permission (in Scotland, by a local planning authority or the Scottish government). The environmental regulator is a statutory stakeholder in the development/planning consent process. It must consider any relevant information or conclusions from the EIA when making the subsequent permitting decision.

Operators applying for a bespoke environmental permit in England must conduct a site-specific risk assessment if their activity exceeds certain thresholds of environmental impact. This risk assessment is different from an EIA and includes identification of risk sources, pathways and receptors, as well as actions to control these risks. For example, operators of industrial installations and waste management facilities must assess risks related to their air emissions (including those of GHGs) and discharges into surface water and groundwater.

UK environmental regulators diversify permitting regimes based on the regulated activity's level of environmental impact. This approach makes the procedural burden proportionate to the risk. The Environmental Authorisations (Scotland) Regulations 2018 establish four types of authorisations:

- permits for higher risk and/or non-standard activities that require rigorous assessment (permits may contain a mixture of standard and bespoke conditions)
- general binding rules (GBRs) – a set of mandatory rules that cover specific low-risk activities
- registrations for activities where a simple assessment or screening can determine whether to allow the proposed activity
- notifications of low-risk activities (which may be associated with GBRs) to let the regulator know the activity is carried out.

In England, the Environment Agency issues “standard rules permits” for installations in 21 sectors where activities are sufficiently uniform to make this approach suitable. General legal requirements cover all businesses that do not require a permit. For example, they are required to fulfil their “duty of care” with respect to waste management, to prevent water pollution and to use best practicable means to prevent statutory nuisances.

Cost recovery is a key principle of environmental regulation in the United Kingdom, one of the few OECD member countries to impose service-based environmental fees. The Environment Agency must recover all costs (but without additional revenue) associated with its permitting, compliance assessment and enforcement activities – from staff employment to support services. The Environment Agency's charging scheme was integrated across different regulatory regimes in 2019. It covers a permit application charge and an annual subsistence charge to cover the costs of compliance monitoring. Local authorities also charge fees, albeit at much lower rates, for their permitting and compliance and enforcement activities. Under similar arrangements in Scotland, SEPA recovered 98% of its costs through charging schemes in 2019-20 (SEPA, 2021).

Sectoral approach and promotion of green practices

SEPA's 2016 One Planet Prosperity Regulatory Strategy declared a new approach to regulation: working with businesses to go beyond compliance is the best way to deliver the ambitious goals. It recognises multiple influences on environmental performance of a business: consumer demand for environmental credentials; investor and supply-chain requirements for environmental performance; assessment by external ratings bodies; trade association membership standards; expectations of employees about environmental performance; and social scrutiny by residents, non-governmental organisations (NGOs) and via social media. Businesses more often view environmental and social issues as a market driver of business success than as a compliance issue involving concerns about cost and business disruption. The strategy built on the agency's prior efforts to target promotion of compliance and green business practices at key economic sectors.

SEPA develops a plan for its interactions with each sector it regulates. The sector plans are developed via engagement with the sectors, internal experts, relevant regulators and other key stakeholders. Sector plans focus on practical ways of delivering environmental, social and economic outcomes. They specify levels of compliance, the market context and key social issues. The latter include recognising the importance of creating local jobs in rural communities and any issues that non-compliance is creating in the communities the sector is operating in. This approach seeks to ensure systemic tackling of remaining compliance issues for the sector, mapping out most promising "beyond compliance" opportunities, and identifying and harnessing the key levers that influence that particular sector. As of June 2021, SEPA had published 15 sector plans.

The Environment Agency uses a similar sectoral approach. It systematically produces five-year strategies and annual intervention plans for a range of regulated sectors in England. The 2016-20 strategies covered 14 sectors, including food and drink, cement, chemicals, paper, pulp and textiles, oil and gas, metals, landfills and hazardous waste.

UK environmental regulators use a variety of tools to help businesses to reach and go beyond compliance. The Environment Agency provides "retailer" compliance assistance through direct contacts with businesses; inspectors advise operators as part of their regular activities. In addition, the agency gives limited free assistance as part of the permit application process. This advice allowance is included in the basic application charge. Additional pre-application advice is chargeable at a moderate fee of GBP 100 per hour.

NetRegs – one of the first web-based environmental compliance promotion tools in Europe – was created in partnership between the UK environmental regulators in 2002. In 2011, the Environment Agency (then also covering Wales) withdrew from NetRegs to integrate environmental guidance to businesses into one multi-theme hyper-portal. NetRegs was then revived as a partnership between SEPA and the NIEA. It provides free environmental guidance on a wide variety of environmental topics for businesses in dozens of sectors throughout Scotland and Northern Ireland. The tools include online guidance, an e-mail newsletter, e-learning courses, an environmental self-assessment tool and a mobile app that delivers checklists specific to each sector.

Farmers are a key segment of the regulated community in need of compliance assistance. They are given high-quality, easy to use information on best practices in fertiliser use to comply with requirements in nitrate-vulnerable zones (EC, 2019). In 2018, for example, the NIEA signed a Memorandum of Understanding with the Ulster Farmers Union to build a stronger and more effective working relationship between the NIEA and the farming community, support sustainable farming and deliver improved legislative compliance.

Much of the assistance focuses on good practices that offer win-win environmental and business solutions. Zero Waste Scotland – a not-for-profit environmental organisation fully funded by the Scottish government – uses a variety of tools to help small businesses to achieve cost savings, new sales, reduced risk and

competitive advantage through improvements in resource efficiency. SEPA's nine Sustainable Growth Agreements with individual companies or groups of businesses also target win-win solutions. Examples of sectors covered are construction (a 2017-18 agreement with Superglass) and wastewater management (with Scotland Water, 2018-20). These agreements seek to achieve specific environmental outcomes, and results are monitored annually.

Environmental regulators encourage companies to use effective environmental management systems (EMSs), e.g. through a 5-10% reduction in administrative fees. The British national environmental management standard, BS8555, that governs EMS for small and medium-sized enterprises (SMEs), allows them to implement the system in individual modules rather than as a whole. This makes an EMS more attractive to small businesses by reducing its implementation costs.

UK governments also use public relations incentives to promote environmentally friendly business behaviour. Scotland's VIBES initiative (Vision in Business for the Environment of Scotland) has been recognising businesses of all sizes and sectors employing environmental best practices in their daily activities since 2010. The award programme is a partnership between SEPA, several other government institutions and business groups. There are many award categories, including energy, climate change adaptation and circular economy. A case study is produced for each winning business and published on the VIBES website.

Environmental inspections

The United Kingdom has historically championed risk-based management of environmental compliance monitoring, the approach taken up by many OECD member countries. For many years, the Environment Agency used the Operational Risk Appraisal (Opra) system as a key tool for risk assessment of sites, inspection planning and charge setting. However, Opra was withdrawn in favour of a simpler performance-based approach as part of the Environment Agency's strategic review of charges in 2019. Compliance assessment plans still prioritise permitted installations based on several criteria such as their sector, compliance scores, enforcement activity, incidents, complexity and location. Under a performance-based system, lower-risk, well-managed activities are charged less than higher-risk or poorly managed activities.

In Scotland, the Dynamic Regulatory Effort Assessment Model (DREAM) used by SEPA for the last decade distinguishes three ranges of low-risk installations. It draws on 35 risk factors, with corresponding frequencies of walk-through inspections of every two, three or five years. SEPA is revising the DREAM model as it does not contain the levels of data needed to enable the shift to sector-based regulation. A new mechanism will set priorities within and across sectors while still maintaining a focus on high hazard activities, sites of community concern and those with a history of non-compliance.

In addition to regular site inspections, the Environment Agency carries out audits (in-depth evaluations) to identify root causes of non-compliance. Audits usually review the effectiveness of an operator's management system. In addition, an audit could be used to assess whether the permit still provides an appropriate level of environmental protection, i.e. by benchmarking it against up-to-date best practices. Audits are always planned, and the operator is notified to provide information or attendance of certain personnel. Regular site inspections can be unannounced so that normal operations can be observed. Inspection and audit reports are available to the public upon request.

The Environment Agency has adopted a standard approach to classify permit breaches and score environmental permit compliance known as the Compliance Classification Scheme (CCS). CCS is organised around performance bands, providing a reactive way of tracking operators' conduct. The compliance rating is based on CCS events over the previous calendar year. It allocates points for each permit breach recorded in the CCS under one of the four categories based on potential environmental impact (from Category 1 corresponding to most serious offences). The points from each event are added to produce an annual total non-compliance score,¹¹ which is then converted into a compliance rating.

In an excellent practice, UK environmental regulators make compliance indicators a key part of their performance management. For example, the Environment Agency sets targets for the number and percentage of sites to be compliant across a range of activities and industry sectors. These are aggregated for corporate reporting as well as reported and analysed separately by industry sector. The number of serious and significant pollution incidents (Categories 1 and 2 according to the agency's classification) is used in England as a surrogate measure of environmental impact. An interesting supplementary measure is the number of serious pollution incidents per 100 permits in a sector, which shows the proportion of incidents in each sector and highlights sectors that cause a disproportionate number of incidents.

The risk-based approach, together with the emphasis on compliance promotion, has helped UK environmental regulators to improve permit compliance levels over the years. As of 2019, 90.5% of Scottish regulated businesses were in compliance. Over 2015-20, SEPA was reducing the number of operators found in non-compliance for two years or more by about 40% annually (SEPA, 2021). However, the percentage of permits in the worst-performing bands in England has remained largely unchanged (around 3%) since 2010, as has the number of serious pollution incidents (Environment Agency, 2021b).

Enforcement

Over the last decade, the United Kingdom has put increasing emphasis on administrative rather than criminal response to non-compliance. Figure 1.4 illustrates this trend for England, where administrative sanctions range from cautions (warnings) to compliance/enforcement notices to fixed or variable monetary penalties (VMPs). The Environment Agency decides on the basis of investigation and according to criteria laid out in its guidance on offence response options whether to use an administrative penalty or resort to criminal prosecution. The decriminalisation of less severe violations has made enforcement more proportionate to non-compliance, more expedient and more efficient. Distancing administrative penalties from criminal justice also increases the impact of the system of sanctions overall.

Fixed monetary penalties (in England, GBP 300 for businesses) may be applied to minor offences. The Regulatory Enforcement and Sanctions Act (2008) introduced VMPs in England and Wales. They became operational in 2010.¹² The amount of a VMP may not exceed the maximum amount of the fine that can be imposed by a criminal court or in any event GBP 250 000 per offence. According to the Environment Agency's latest (2019) Enforcement and Sanctions Policy and the 2018 calculation methodology, the penalty can cover any obvious financial benefit unlawfully gained by the offender as long as the total VMP does not exceed the statutory maximum. This represents progress in the possibility to recover economic benefits of non-compliance – the deterrence approach practised by the United States Environmental Protection Agency since the 1980s. However, the Environment Agency imposed VMPs only three times in 2020-21, with an average penalty of less than GBP 4 200 per case. VMPs are not yet available under the Environmental Permitting Regulations that cover most permit breaches.

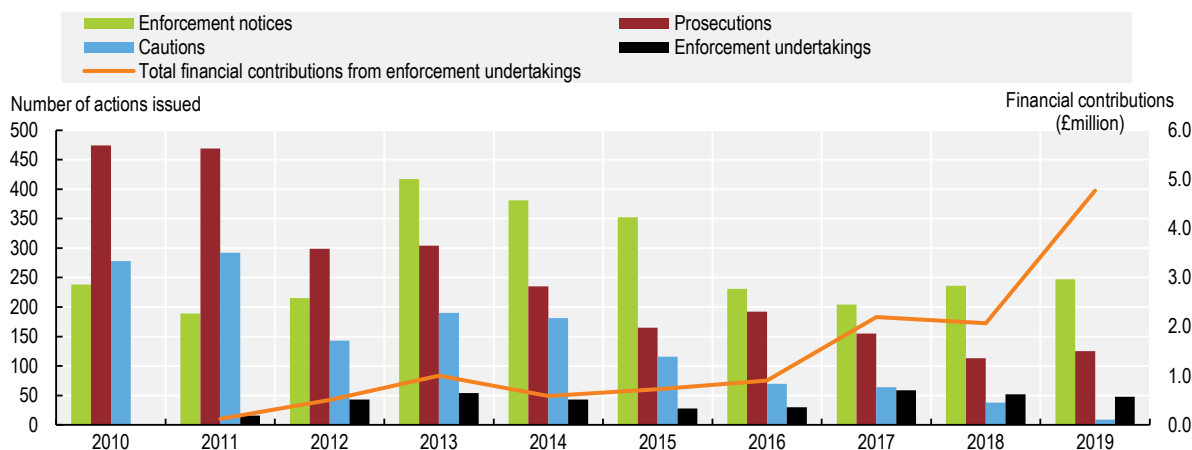
In Scotland, fixed fines of GBP 600 (in most cases) are imposed for first-time offences without significant environmental harm. SEPA plans to introduce VMPs in 2021, based on a 2015 regulation, after an implementation delay caused in part by the 2020 cyberattack on the agency. VMPs will not be available for all offences, but removal of financial gain from the offence is envisaged. The maximum penalty is set out in the legislation defining that offence, whereas the minimum VMP in Scotland will be GBP 1 000. According to SEPA's Guidance on the use of enforcement action (2016), once an administrative fine has been imposed, the offence can no longer be prosecuted.

Another possible non-compliance response is an enforcement undertaking. In this case, the offender makes a voluntary offer, accepted by the regulator, to restore and remediate the local environment and prevent repeated non-compliance. The agency then decides whether financial resources towards remediation or upgrading of equipment would be more appropriate than monetary penalties. Enforcement undertakings, first introduced in England and Wales, were more recently introduced in Scotland. Since put

into practice in England in 2011, their total monetary value has increased sharply (Figure 1.4). Indeed, the Environment Agency views enforcement undertakings as the main enforcement alternative to prosecution.

Figure 1.4. Enforcement in England shifts from prosecution to administrative sanctions

Enforcement actions used for environmental offences by businesses in England, 2010-19



Note: Environmental offences for the purpose of this analysis are waste, water quality and emissions offences.

Source: Environment Agency (2020).

StatLink  <https://stat.link/prbnhl>

For more serious offences, as defined in the regulatory agency's enforcement and prosecution policy, agencies consider prosecution. In England and Wales, the Environment Agency, Natural Resources Wales or a local authority can prosecute directly. In Scotland, SEPA must make recommendations to the public prosecutor – the Procurator Fiscal – who decides and then conducts any prosecution proceedings. In Northern Ireland, the NIEA refers prosecution cases to the Public Prosecution Service. In setting penalties for environmental crimes, courts consider guidance developed by the UK Sentencing Council.

In an interesting practice, the Environment Agency often uses a formal administrative “caution” as an alternative to prosecution. This caution is a written acceptance by the violator that it has committed the offence. The agency only uses a formal caution where it considers it could bring a prosecution and the offender consents to be cautioned. The Environment Agency keeps a record of the formal caution. It is produced in court only if the offender is later prosecuted for a different offence. If the offender does not accept the formal caution, the agency then prosecutes for the original offence.

Fighting environmental crime beyond significant permit breaches requires broad interagency efforts across the United Kingdom. For example, the National Wildlife Crime Unit supports police forces across the country in dealing with wildlife crime. The UK Partnership for Action against Wildlife Crime brings together a number of statutory and voluntary bodies to improve co-operation. These bodies include the police, UK Border Agency, Defra, Home Office, Natural Resources Wales, Scottish Natural Heritage, the Joint Nature Conservation Committee, Royal Botanic Gardens Kew, the NIEA, and environmental and animal welfare NGOs.

Public transparency of enforcement is another good practice demonstrated by UK environmental regulators. The Environment Agency maintains a public register of enforcement actions, searchable by offender's name, action or offence type, and date. SEPA publishes a list of penalties imposed and

undertakings accepted. Making enforcement actions public increases pressure on violators to improve their performance.

1.3. Promoting investment and economic instruments for green growth

In March 2020, the United Kingdom swiftly introduced a massive package of measures to respond to the COVID-19 emergency and support businesses, households and public services (OECD, 2020a). From the summer onwards, in addition to extending support measures, the government introduced new ones to support demand and jobs. Successive packages totalled GBP 315 billion by October 2021 or 15% of 2020 GDP, one of the largest fiscal responses to the COVID-19 crisis globally (OBR, 2021) (IMF, 2021). The March 2021 budget added virus-related support in 2021-22, designed measures to stimulate economic recovery over 2021-23, and planned fiscal consolidation from 2023. Alongside the budget, the government wants to level up investment across the United Kingdom, to create an outward-looking, net zero, high-tech economy through the 2021 plan to Build Back Better (Plan for Growth) (HM Treasury, 2021a). It introduced a temporary 130% capital allowances super deduction for investment in 2021-23 and launched the UK Infrastructure Bank to increase investment, notably in green infrastructure. As fiscal policy moves from rescue to recovery, the general government deficit is projected to decline from 12.9% of GDP in 2020 to 5.4% in 2022 and 4.0% in 2023. (OECD, 2021a).

1.3.1. Green elements in the UK's 2020 recovery package

In the summer of 2020, as part of its COVID-response package, the UK government announced investment in cycling and public transport and energy efficiency in buildings to support jobs and reduce GHG emissions (HM Treasury, 2020a). In November 2020, the Prime Minister outlined the Ten Point Plan for a Green Industrial Revolution to build back better (Table 1.2). The plan seeks to mobilise GBP 12 billion of government investment to create and support up to 250 000 green jobs by 2030 and reduce UK emissions by 180 Mt CO₂e between 2023 and 2032 (40% of 2019 emissions) (HM Government, 2020). It was followed by the 2020 Spending Review and National Infrastructure Strategy setting out how the UK government intends to fund the Ten Point Plan. The plan was generally welcomed by stakeholders but was criticised for bringing forward previously announced spending commitments and for being insufficient for the net zero target (IISD, 2020); (CCC, 2021b).

Table 1.2. The 2020 Ten Point Plan for a Green Industrial Revolution

Targets	Expected impacts
Offshore wind Quadruple offshore wind capacity to 40 GW by 2030	Support for up to 60 000 jobs in 2030 Savings of 21 Mt CO ₂ e between 2023 and 2032 (5% 2018 UK emissions)
Hydrogen 5 GW of low-carbon hydrogen production capacity by 2030	Support for up to 8 000 jobs by 2030 Savings of 41 Mt CO ₂ e between 2023 and 2032 (9% 2018 UK emissions)
Nuclear Pursuing large-scale nuclear and developing small and advanced reactors	A large-scale nuclear power plant will support a peak of around 10 000 jobs during construction
Electric vehicles End the sale of new petrol and diesel cars and vans by 2030 and hybrid cars and vans by 2035	Support for around 40 000 new jobs in 2030 GBP 2.8 bn package (incl. GBP 0.5 bn for purchasing grants and GBP 1.3 bn for charging infrastructure) Savings of around 5 Mt CO ₂ e to 2032
Public transport, cycling and walking Accelerate the transition to more active and sustainable transport with at least 4 000 more British-built zero-emission buses	Up to 3 000 jobs by 2025 Government investment of GBP 5 bn in buses, cycling and walking over this parliament Savings of around 2 Mt CO ₂ e from green buses, cycling and walking between 2023 and 2032
Jet zero and green ships	Up to 5 200 jobs supported by a domestic sustainable aviation fuels industry

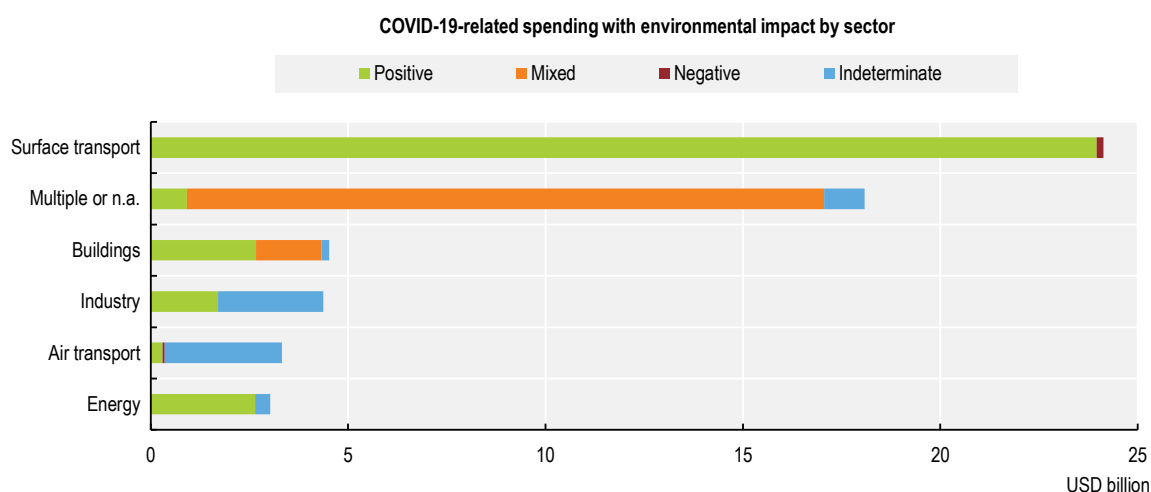
Make the United Kingdom the home of green ships and planes	Savings of up to 1 Mt CO ₂ e by 2032 from clean maritime
Greener buildings 600 000 heat pump installations per year by 2028 and moving away from fossil fuel boilers	Up to 82 500 jobs GBP 1.5 bn for the Green Homes Grant Voucher Scheme Savings of 71 Mt CO ₂ e between 2023 and 2032 (16% 2018 UK emissions)
Carbon capture, utilisation and storage (CCUS) Capture 10 Mt of carbon dioxide a year by 2030 and establish CCUS in four clusters	Support for around 50 000 jobs by 2030 Up to GBP 1 bn of public investment by 2025 Savings of around 40 Mt CO ₂ e between 2023 and 2032 (9% 2018 UK emissions)
Protecting our natural environment Planting 30 000 ha of trees every year by 2024	Up to 20 000 jobs from improving flood defences by 2027 Up to GBP 5.2 bn of investment for flood defences
Green finance and innovation Raise total R&D investment to 2.4% of GDP by 2027	Unlock the potential for 300 000 jobs in exports and domestic industry by 2030 GBP 1 bn of government funding in net zero innovation

Note: Greener buildings: the Green Homes Grant Voucher Scheme was ended in March 2021 with GBP 314 million spent and 47 500 homes upgraded. CCUS: the 2021 NZS aims to store 20-30 Mt CO₂ per year by 2030.

Source: HM Government (2020), The Ten Point Plan for a Green Industrial Revolution; NAO (2021), Green Homes Grant Voucher Scheme.

It is difficult to determine whether a measure is exclusively related to COVID-19 and to distinguish between rescue and recovery measures. However, the United Kingdom is reported to have allocated USD 57 billion (2.1% of 2020 GDP) to measures with environmental implications as part of its recovery efforts (Figure 1.5). More than half of this total (1.2% of GDP) was allocated to measures with a likely positive environmental impact. These were mostly grants or loans tagged for their climate mitigation effect, supporting in particular public transport services (rail, transport services in London, bus and light rail services across the rest of England) whose use declined during the pandemic. Environment-related measures represent a small share of the COVID-19 response package due to the importance of rescue measures. The 2020 Ten Point Plan for a Green Industrial Revolution, the 2021 plan to Build Back Better, the NZS and the Fairer, Greener Scotland Programme for Government 2021-22 aim to mobilise green private investment and to promote green finance through the new UK Infrastructure Bank and the Scottish National Investment Bank.

Figure 1.5. Most green spending related to COVID-19 is on public transport



Note: Airline and car manufacturer bailouts with no green conditions are reported as indeterminate in the figure.

Source: OECD (2021), *OECD Green Recovery Database* (database).

StatLink  <https://stat.link/7z9d0w>

Among the 50 largest economies covered by the Global Recovery Observatory, the United Kingdom invested the most on green transport (O’Callaghan and Murdock, 2021). This reflects efforts to align the climate and the wider well-being agendas through street redesign and management (Box 1.2) (OECD, 2021c). Budgets were also announced for promoting electric vehicles (EVs) (Section 1.3.3), renewables (Section 1.3.2), woodland creation and peat restoration (Section 1.3.3). However, the hasty implementation of the Green Homes Grant Voucher Scheme has been detrimental to results. It was ended after reaching fewer than 10% of the homes it was set out to upgrade, and had limited impact on job creation (NAO, 2021a). Other measures ran counter to the climate objectives. For example, the Bank of England has granted COVID Corporate Financing Facility loans to UK-based car manufacturers and airlines with no environmental conditions. There are also concerns the super deduction announced in the March 2021 budget could encourage high-carbon investment.

The United Kingdom has made progress in integrating environmental objectives into departmental plans. The 2021 Autumn Budget and Spending Review outlines the public spending contribution to net zero (GBP 26 billion) and other green objectives¹³ (GBP 4 billion) over 2021-25 (HM Treasury, 2021b). However, it has not published the potential negative contribution of programmes. Despite progress in updating the Green Book (Box 1.3), government departments do not always consider it on a consistent basis when appraising programmes (HoCs, 2021a). Some countries, such as France, have classified budget lines according to their impact (positive or negative) on environmental objectives. The United Kingdom could follow the same approach to ensure public spending is consistent with environmental objectives. The Environment Act exempts HM Treasury from being bound by environmental principles¹⁴ by exempting taxation, central spending and resource decisions from their application. This is intended to ensure the Treasury Minister’s ability to alter the UK’s fiscal position but goes against the recommendation of the House of Commons Environmental Audit Committee (HoCs, 2021a).

Box 1.2. Recovery measures to accelerate active travel

In 2019, journeys below 2 miles (3.2 km) represented 43% of all urban and town journeys; 58% of car trips were shorter than 5 miles and 25% were shorter than 2 miles. Switching short car journeys to cycling and walking can contribute to achieve net zero, improve air quality, health and well-being, and address inequalities, congestion and noise pollution. The UK government aims for half of journeys in towns and cities to be cycled or walked by 2030.

In 2020, the Department for Transport has fast-tracked a pre-existing national agenda to overhaul bus, cycle and walking links, as well as to promote electrification. The GBP 2 billion package is focused on stimulating the shift to active modes through providing additional incentives to individuals (e.g. GBP 50 bike-repair voucher estimated at EUR 28 million) and support for local authorities to make temporary pop-up infrastructure permanent (e.g. 240 km of protected bicycle tracks estimated at EUR 300 million). Well-being aspects are mainstreamed as general practitioners are enabled to prescribe cycling as a health-improving measure, a new national rental e-cycle scheme will enable access to e-cycle for those with pre-existing conditions, and employers are encouraged to take on the cycle-to-work scheme (Section 1.3.3).

The Fairer, Greener Scotland Programme for Government 2021-22 commits that 10% of all transport spending will be devoted to active travel by 2024-25.

Source: Buckle et al. (2020), Addressing the COVID-19 and climate crises: Potential economic recovery pathways and their implications for climate change mitigation, NDCs and broader socio-economic goals; Dft (2021), Decarbonising Transport: A Better, Greener Britain.

1.3.2. Investing in environmental and low-carbon infrastructure

Low investment and innovation rates have been key factors behind the weak productivity performance of the United Kingdom in recent years (OECD, 2020a). The government aims to increase public investment from 1.9% of GDP in 2019-20 to 2.7% by 2025-26. The 2020 National Infrastructure Strategy seeks to boost growth and productivity across the whole of the United Kingdom, levelling up and strengthening the Union; put the United Kingdom on the path to net zero; and support private investment (HM Treasury, 2020b). It provides for GBP 27 billion investment (equivalent to 1.2% of GDP) in economic infrastructure (transport, energy and digital communications) in 2021/22. The 2020 and 2021 Spending Reviews also include multi-year capital funding commitments for infrastructure projects such as high speed rail, strategic roads, flood defences and broadband. However, there are questions about whether infrastructure programmes sufficiently consider regional disparities and environmental objectives (Box 1.3).

Box 1.3. Assessing environmental impacts of public investment

The United Kingdom has a robust framework for monitoring and evaluating public spending programmes, including a Green Book to appraise the costs and benefits of policies, projects and programmes. However, an HM Treasury review (2020) concluded that appraisal practice was likely to undermine the government's objectives in areas such as "levelling up" the regions and reaching net zero. Selection of projects is heavily reliant on benefit-cost ratio. Too much weight is placed on benefits that can easily be assigned a monetary value and insufficient weight on addressing strategic policy priorities.

The Green Book was revised to include stronger guidance on establishing clear objectives from the start and clearer advice on what constitutes value for money, as well as new guidance on appraising transformational impacts and place-based analysis. The updated version requires all projects to consider their impacts on carbon emissions, whether or not they directly target the net zero objective. It provides further guidance on assessment of emissions. The government has also developed guidance on accounting for the effects of climate change, valuing projects' impacts on the natural environment, accounting for natural capital stocks, and valuing costs and benefits that cannot be measured in monetary terms.

The 2020 National Infrastructure Commission's (NIC) design principles seek to deliver a net biodiversity gain and contribute to large-scale restoration of wildlife. The government has committed to embedding the environmental net gain principle for development, including housing and infrastructure, in its 25-year environment plan. It has legislated for biodiversity net gain through the Environment Act. Existing planning regimes also require some consideration of the impact of development on natural capital, and the infrastructure industry has begun to adopt approaches that support natural capital. However, despite the increasing availability of tools and resources, the National Infrastructure Assessment has largely considered the environment as a constraint. Challenges remain relating to planning policy and practice and to measurement and valuation of natural capital. At the end of 2021, the government added the objective to support climate resilience and the transition to net zero to the NIC's remit.

Source: HM Treasury (2020), Green Book Review 2020: Findings and response; NCC (2020), State of Natural Capital Annual Report 2020; NIC (2021), Valuing natural capital in infrastructure.

Environmental protection

Public expenditure on environmental protection (mostly on waste management, Chapter 2) steadily decreased over 2010-19 from 1% of GDP to 0.6%, below the EU average of 0.8%. Spending on biodiversity

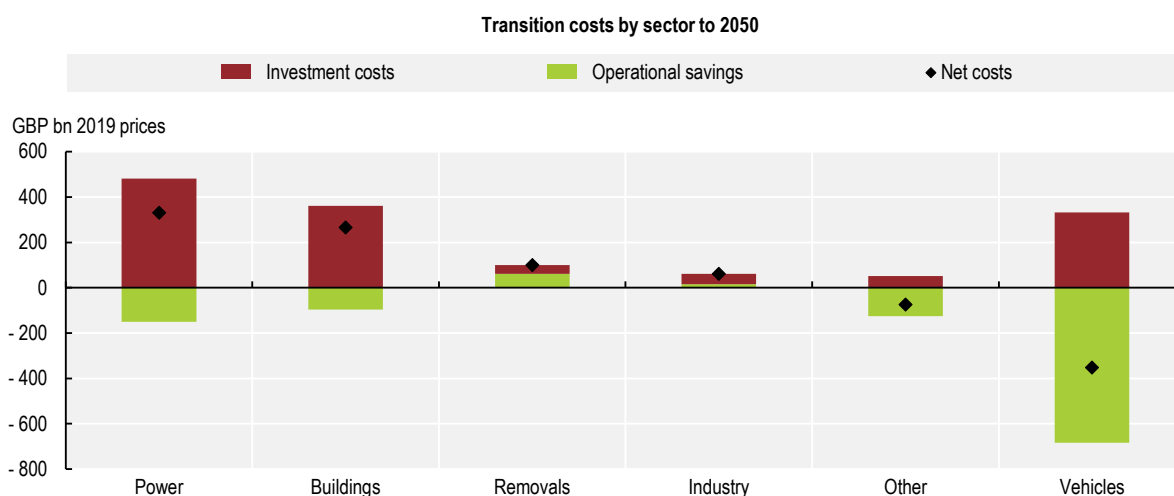
fell by more than a quarter to reach only 0.02% of GDP in 2019. The situation is changing with increased recognition of the potential of nature-based solutions (NbS) (OECD, 2021d); the government has allocated GBP 750 million to England's Nature for Climate Fund to support the creation, restoration and management of woodland and peatland habitats from 2020 to 2025 (Section 1.3.3).

Low-carbon transport and energy infrastructure

The NZS estimates that additional annual investment must grow to GBP 50-60 billion by 2030 (HM Government, 2021). With operational savings generated through reduced reliance on fossil fuels, the net cost of the transition is estimated at 1-2% of GDP by 2050, depending on the sources (CCC, 2020b) (HM Government, 2021). The power and buildings sectors are expected to contribute most to investment costs due to the increase in electricity generation and high costs of decarbonising buildings, while vehicles are anticipated to dominate net operating savings (Figure 1.6). The NZS and 2021 Spending Review commit GBP 26 billion in total public investment for net zero to 2025. This appears generous in some areas (e.g. innovation, EV charging infrastructure) but low in others (e.g. heat pumps and heat networks) (CCC, 2021a).


Figure 1.6. Net costs of the net zero transition are projected to be small over 2020-50

Capital investment and operating costs savings in the CCC balanced pathway to net zero



Note: The CCC has used scenarios to identify a Balanced Pathway to Net Zero, which forms the basis of the sixth carbon budget. The Balanced Pathway makes moderate assumptions on behavioural change and innovation. It takes actions in the coming decade to develop multiple options for later roll-out (e.g. use of hydrogen and/or electrification for heavy goods vehicles and buildings).

Source: CCC (2020), The Sixth Carbon Budget - The UK's path to Net Zero; OBR (2021), Fiscal risks report, July.

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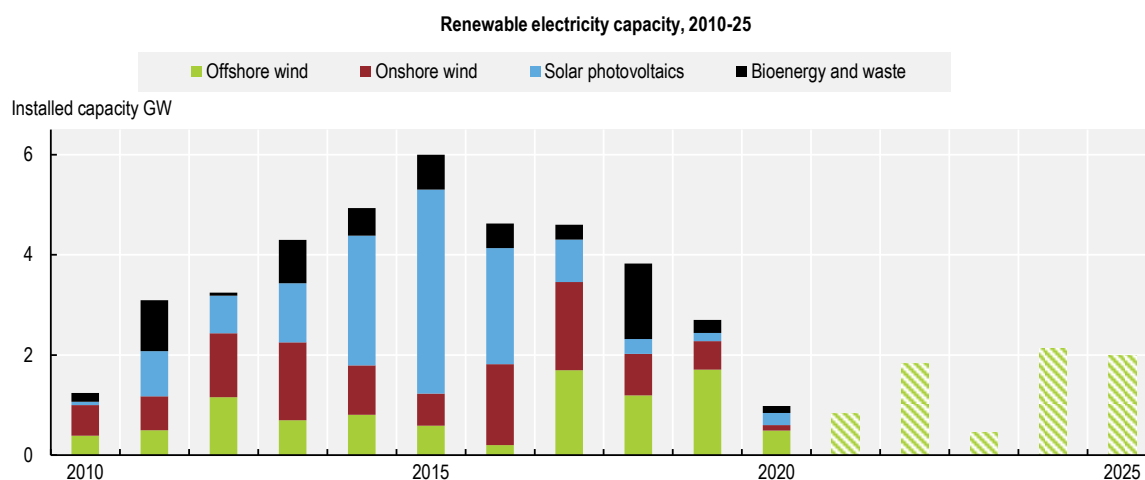
Renewable energy

Over the past decade, the United Kingdom has achieved remarkable growth in renewable electricity thanks to renewable obligations, feed-in tariffs and contracts for difference (CfD) (Figure 1.7) (IEA, 2019). CfD is now the main mechanism for supporting large-scale renewable electricity generation. Through competitive auctions, it provides 15-year contracts to new renewable generation at a guaranteed strike price. CfDs have led to strong cost reductions and significant investments since they were introduced in 2014 –

particularly in offshore wind where the United Kingdom is a world leader. The government aims to accelerate deployment of low-cost renewable generation through CfDs by reviewing the frequency of CfD auctions. The fourth CfD round (held at the end of 2021) aims to double the capacity achieved in the 2019 round to 12 GW with a record budget of GBP 285 million. It was opened to established technologies such as onshore wind and solar photovoltaics, as well as offshore wind and less established technologies such as floating offshore wind and tidal stream. In 2020, renewables accounted for 14% of total energy supply and 43% of electricity generation, above the respective OECD averages of 12% and 30% (IEA, 2021). The country missed the overall binding target of 15% share of renewables in gross final energy consumption, set for the United Kingdom by the EU Renewable Energy Directive for 2020. However, it met the 2020 sub-targets on electricity and transport of the National Renewable Energy Action Plan, although it was below the objective for heating.


Despite the doubling of public budget on energy research, development and deployment (RD&D) since 2014, the United Kingdom remained behind leading countries in 2020. Spending on nuclear energy expanded significantly, while increasing less for cross-cutting technologies and energy efficiency. As a share of total public budget on energy RD&D, the United Kingdom spends more on nuclear power than the IEA average (33% vs. 21%) and less on energy efficiency and renewables (23% and 13% vs. 26% and 15%, respectively).

Figure 1.7. The United Kingdom has achieved remarkable growth in renewable electricity



Note: Offshore wind 2021-25: contracted capacity under the Contracts for Difference scheme as of 1 November 2021.

Source: BEIS (2021), Renewable energy statistics; LCCC (2021), CfD Contract Portfolio status.

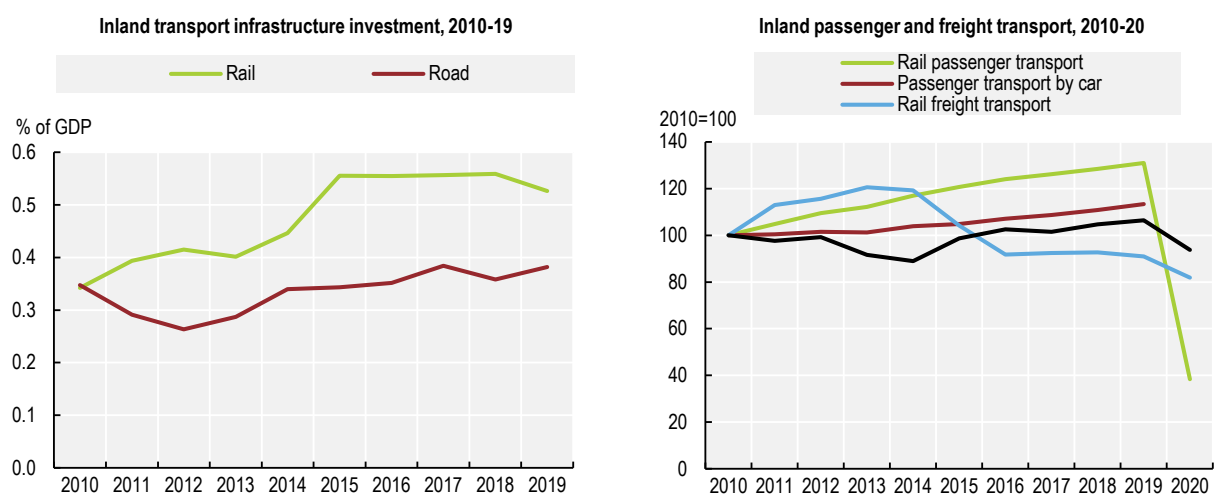
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Transport

Transport is the largest GHG emitter and a major source of local air pollution; related infrastructure development is among the main causes of habitat loss (Hayhow et al., 2019). In 2019, road transport accounted for 90% of passenger and freight transport. Over the past decade, public investment in transport infrastructure has increased, especially in rail (Figure 1.8). In 2019, the United Kingdom had one of the highest rail investment rates per unit of GDP in the OECD (OECD, 2021e). Planned investment suggests continued high rates to 2025 with the construction of the high speed rail (IPA, 2021). However, the rail system suffers from long standing issues such as poor passenger service performance; fragmentation and lack of accountability; concerns around increasing costs and financial sustainability (HoCs, 2021b). The


2021 Williams-Shapps Plan for Rail was designed to address these issues. Some question whether regional links are sufficiently prioritised to maximise the economic and social benefits of rail investment (HoCs, 2021c). Meanwhile, major programmes have fallen behind schedule and are over budget. The 2021 Transport Decarbonisation Plan aims at building extra capacity on the rail network to support significant shifts from road to rail. It commits to invest GBP 12 billion in local transport systems to 2024. However, there are concerns around the size of the road-building budget compared to these funding pots (CCC, 2021b). It was estimated that the Road Investment Strategy (GBP 24 billion investment over 2020-25) will add 20 Mt CO₂ from construction, increased vehicle speed and extra traffic (Transport for Quality of Life, 2020).

Figure 1.8. Transport investment has increased, especially in rail, but road remains the dominant transport mode



Note: Investment: England, Scotland and Wales. Passenger and freight transport: Great Britain only. Rail infrastructure expenses include investment in all urban and suburban railways, Underground, Metrolink and Tramlink. Until 2014, rail infrastructure expenses include only the government grant to Network Rail. Since 2015, they have included investment of Network Rail.

Source: ITF/OECD (2021), Transport Infrastructure and Transport Measurement (databases).

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Buildings

Buildings account for 23%¹⁵ of total GHG emissions. Over 2010-19, public support contributed GBP 9.3 billion to finance residential energy efficiency investments in the United Kingdom (Dobrinevski and Jachnik, 2021). The bulk of this support was provided through mandating energy companies to help households adopt energy efficiency measures (Energy Company Obligation replacing previous schemes in 2013). Incentives were also provided through payments to households and small businesses that generate heat through low-carbon sources (Renewable Heat Incentive), building standards and tax reliefs.

Despite progress in improving energy efficiency of buildings in the past decade, the United Kingdom is not on track to meet targets set prior to its net zero commitment. The 2017 Clean Growth Strategy objective was to reach at least Energy Performance Certificate band C¹⁶ in as many houses as possible by 2035 and in as many fuel poor homes as possible by 2030. In 2019, existing houses in England and Wales were mostly rated in band D and rating bands have not changed in recent years (ONS, 2020). Owner-occupied homes, which account for 64% of England's homes, are the worst performing. Only 47 500 heat pump were installed in 2021, compared with 600 000 planned by 2028 in the Ten Point Plan (NAO, 2021a). The 2021 Heat and Buildings Strategy provides for standards and regulations to improve buildings performance

and phase out the installation of high-carbon fossil fuel boilers off the gas grid. It also provides public funding to support energy efficiency and low-carbon heat for social housing, those in fuel poverty, local authorities and public sector buildings, plus a small number of heat pumps and some heat networks. However, there are concerns about insufficient funding to backup the strategy and the lack of mechanisms to improve energy efficiency of owner-occupied homes, while several proposals are still being discussed (CCC, 2021a).

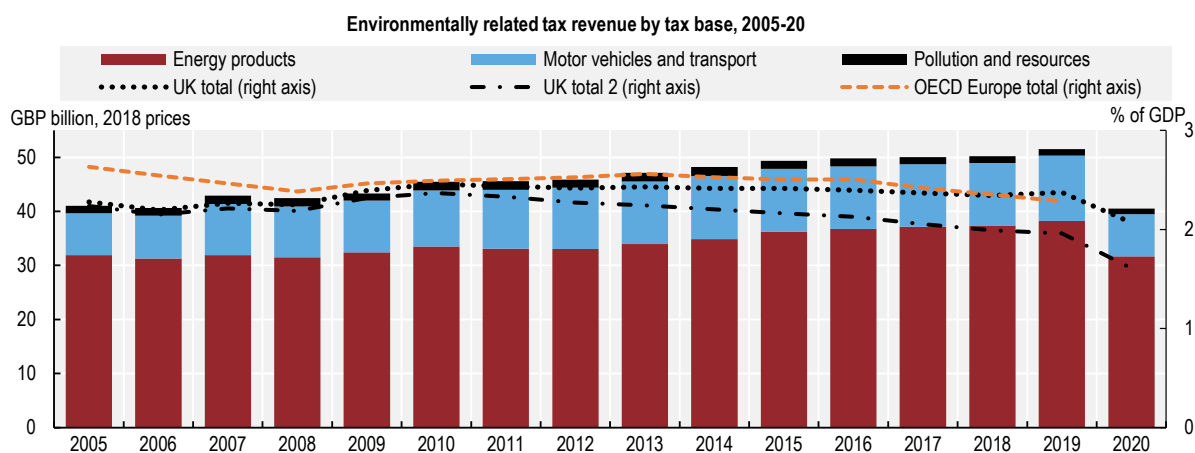
1.3.3. Greening the system of taxes and charges

Overview

Although the UK government has recognised taxes as an important instrument for environmental policy, the exchequer departments¹⁷ have limited understanding of their environmental impact (NAO, 2021b). The NZS plans to strengthen and expand the UK ETS, but the role of taxes in achieving the UK's targets remains to be clarified. Recent decisions on taxation run counter to climate objectives. These include, for example, a renewed freeze of fuel duty and vehicle excise duty for heavy goods vehicles (HGVs), suspension of the HGV road user levy and a reduced rate for air passenger duty for domestic flights.

Revenue from environmentally related taxes, which had risen to 2.5% of GDP in 2010, decreased slowly to 2.3% in 2018 before dropping sharply to 2.1% in 2020 (Figure 1.9) (ONS, 2021). The COVID-19 crisis largely explains this drop, as travel restrictions reduced revenue from fuel duty and air passenger duty. Between 2010 and 2019, fuel duty revenue – the largest source of energy tax revenue – did not keep pace with GDP growth. This was due to a reduction in the tax base (fuel consumption remained broadly stable) and effective tax rates (freeze of duty rates since 2011). Expressed as a share of GDP, revenue from environmentally related taxes has fallen faster than the OECD Europe average over the past decade. As in many countries, most receipts come from taxes on energy products and, to a lower extent, on motor vehicles' purchase and use and transport. Taxes on pollution and resource management such as landfill taxes and aggregate levy do not raise much revenue. However, high landfill tax rates have played a key role in diverting waste from landfills and a plastic packaging tax will take effect from 2022 (Chapter 2).

Figure 1.9. Revenue from environmentally related taxes did not keep pace with GDP



Note: the ONS includes Renewables Obligation, Contracts for Difference, Carbon Reduction Commitment (phased out in 2019) and Emissions Trading System (green and white certificates and carbon permit auctions) in energy taxes, the equivalents of which are often not included in other European countries' data. In UK total 2, energy taxes only include fuel duty, climate change levy and carbon price support.

Source: OECD (2021), OECD Environment Statistics (database); ONS (2021) Environmental Taxes (dataset).

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Taxes on energy use and carbon pricing

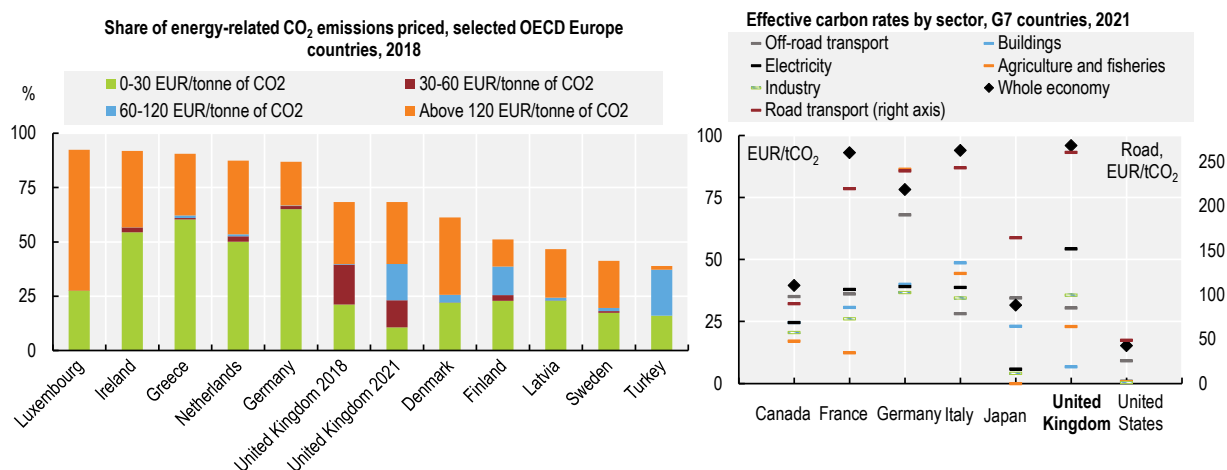
Until 2020, energy taxes were levied in the framework of the EU Energy Tax Directives. In 2020, the rates applied in the United Kingdom were well above the minimum rates of the directive (EC, 2020b), and they remained unchanged in 2021. There are three main taxes on energy use. First, a fuel duty applies to liquid fuels (including bioethanol and biodiesel), as well as to liquefied petroleum gas (LPG) and natural gas (including biogases) when used as motor fuels. In addition, a climate change levy (CCL) applies to solid fossil fuels, LPG, natural gas and electricity when supplied to business and public sector users. The CCL is not based on fuels' carbon content; energy-intensive businesses with a climate change agreement with the Environmental Protection Agency are entitled to discount CCL rates. Finally, in 2013, the United Kingdom introduced a carbon price floor that taxes fossil fuels used in electricity generation via carbon price support (CPS) rates on top of the ETS allowances price.¹⁸ CPS rates were increased from GBP 4.9 /t.CO₂ in 2013 to GBP 9.6 /t.CO₂ in 2014 and GBP 18.0 /t.CO₂ in 2016. Combined with the UK's commitment to end coal use by 2024 and EU air quality regulations, increased CPS rates helped reduce the share of coal in electricity generation from 40% in 2012 (the year before the CPS was introduced) to 2% in 2019.

In 2021, the four governments of the United Kingdom launched the UK ETS to replace the EU ETS in which the United Kingdom had participated since 2005 (ICAP, 2021). The design features of the UK ETS largely mirror those of the EU ETS Phase 4. It covers energy-intensive industries, the power sector and aviation. The UK ETS has a tighter emissions cap (5% lower than what would have been the UK's expected notional share of the EU ETS cap), which will be reduced annually by 4.2 Mt. Mechanisms to adjust supply and contain costs, as well as a transitional allowance reserve price of GBP 22 (EUR 25), aim to ensure market stability. To minimise the risk of carbon leakage, a share of allowances is freely allocated to emissions-intensive sectors exposed to trade as in Phase 4 of the EU ETS. The UK ETS authority (made up of the four governments) has committed to implement a net zero consistent trajectory for the annual ETS cap. It will also explore expanding the ETS to sectors not subject to an explicit carbon price as is planned by the European Union. The authority is open to linking the UK ETS internationally to other systems but has not decided on preferred linking partners (HM Treasury, 2021c).

The complex system of explicit (ETS, CPS) and implicit carbon prices¹⁹ (CCL, fuel duty and preferential tax treatments [Section 1.3.4]) sends inconsistent signals across sectors and fuels (Figure 1.10). They do not reflect the environmental damages from energy use and are not aligned with the net zero target.²⁰ Compared with other OECD European countries, effective carbon rates²¹ are high in the road and electricity sectors but low in others, especially in the residential and commercial sector. In 2021, 45% of carbon emissions from energy use were priced above EUR 60 per tonne of CO₂, the midpoint benchmark for carbon costs in 2020. Emissions priced at this level were primarily emitted by road transport and electricity.

As in other countries, high effective carbon rates in road transport are justified by non-climate external costs (e.g. air pollution, congestion) associated with petrol and diesel use. The United Kingdom is one of the few OECD members to tax diesel and petrol at the same nominal rate. This is positive as diesel has higher carbon content than petrol and diesel engines generally generate higher local air pollution cost. However, continued freezes of fuel duty rates undermine carbon prices and do not encourage the shift to public and active transport, and to EVs. The freeze until 2026/27 announced in autumn 2021 will cost GBP 7.9 billion in revenue loss.

Figure 1.10. Carbon prices vary by sector and fuel



Note: Includes emissions from the combustion of biomass. Left panel: top 5 and bottom 5 OECD Europe countries. Price levels have increased in EU countries in 2021 due to the significant increase in EU-ETS prices. This increase is not reflected in the left panel.

Source: OECD (2021), Carbon Pricing in Times of COVID-19: What Has Changed in G20 Economies?; OECD (2021), "Effective carbon rates", OECD Environment Statistics (database).

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While electricity consumption is subject to a carbon price under the ETS and the carbon price floor, gas consumption faces no or low carbon prices (CCC, 2020c). CCL imposed on business and public sector users is higher for electricity than for gas, although the government plans to align rates in 2025. In addition, the costs of support to renewables (such as the renewables obligation and CfD) is passed through to consumers and weight on electricity bills, encouraging use of gas over electricity for household and business customers and slowing the transition to cleaner energy. Expanding carbon pricing to gas and reducing policy costs in electricity bills would improve price incentives. The UK government committed to delivering cheaper electricity by rebalancing policy costs from electricity bills to gas bills this decade in the 2021 Heat and Buildings Strategy and NZS.

Transport-related taxes and charges

The share of taxes on motor vehicles and transport (excluding fuel duty) in revenue from environmentally related taxes dropped from 24% to 19% over 2019-20, mostly due to reduced revenue from air passenger duty (APD).²² The United Kingdom applies taxes on purchase and use of motor vehicles. The vehicle excise duty (VED) is the largest source of revenue from taxes on motor vehicles. Other tax incentives and subsidies encourage the purchase of EVs.

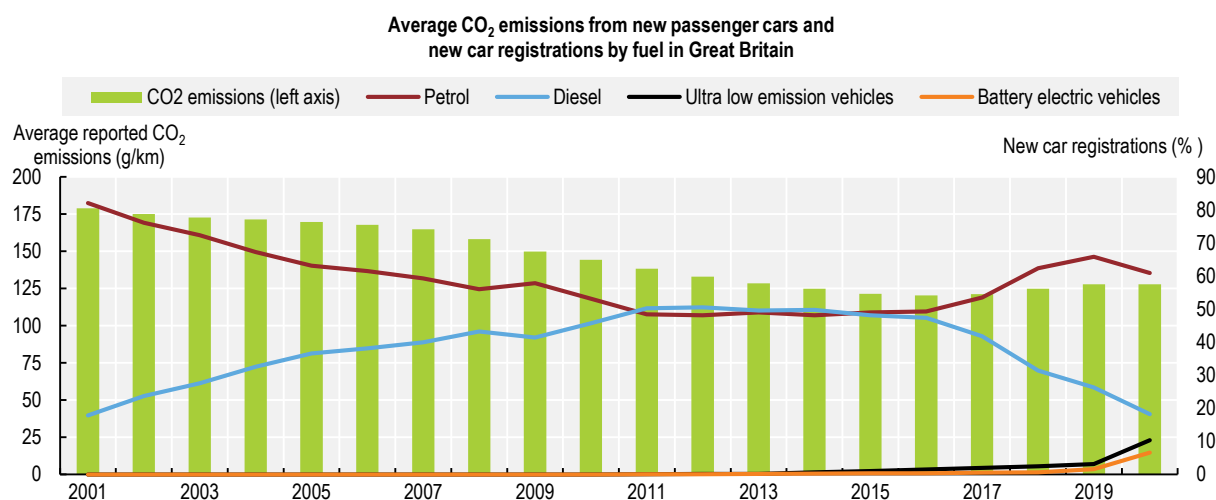
Vehicle taxes

Since 2001, VED has been based on a car's CO₂ emission band. Since 2017, VED due in the first year has been based on CO₂ emission band and fuel type. Higher rates are charged for diesel cars not meeting real driving NO_x emission standard; lower rates are charged for alternative fuel vehicles (hybrids, bioethanol and LPG); and EVs are exempt. After a new car has spent a year on the road, VED is charged at a flat rate with a premium for cars with a list price over GBP 40 000, a slightly reduced rate for alternative fuel vehicles and exemption for EVs (including those over GBP 40 000, since 2020).

The 2001 VED reform has been a key factor in nearly tripling the number of diesel cars over the past two decades; the 2017 reform was welcome to revert this trend. (Figure 1.11). However, despite tighter CO₂

emission performance standards, average CO₂ emissions per kilometre of new cars have risen over 2016-19, due to the rising share of larger vehicles (SUVs).²³ In addition, the 2017 reforms weakened the link between VED liabilities and CO₂ emissions after a vehicle is first registered (HM Treasury, 2020c). This affects second-hand car sales, reducing the incentive to choose lower emitting cars. The UK government ran a Call for Evidence on i) increasing first licence VED for more polluting vehicles or introducing a more granular system whereby rates vary with every gramme of CO₂²⁴ and ii) greening VED after first registration.

Figure 1.11. Electric vehicles account for a rising but modest share of new car registrations



Note: New car registrations fell by 29% in 2020 due to the COVID-19. Ultra low emission vehicles: reported to emit less than 75g of CO₂ from the tailpipe for every kilometre travelled. Includes battery electric, plug-in hybrid electric and fuel cell electric vehicles.

Source: DfT (2021), Vehicle licensing data tables.

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APD is levied on a per-passenger basis on all flights departing UK airports. Rates vary by destination and by class of travel with higher rates on long-haul flights and on business and first-class tickets. However, rates have been too low to discourage the growing demand for air travel (until the COVID pandemic) and are only loosely linked to flights' emissions: emissions are taxed most heavily for short-haul, economy-class flights (Adam et al., 2021). In the 2021 Autumn Budget, the UK government increased APD for the longest long-haul flights. At the same time, it also decreased the rate for domestic flights with an overall net expected increase of 387 000 passengers annually (OBR, 2021a). A study has shown that a frequent flyer levy would be more effective in limiting demand and would have less impact on low-income earners (Chapman et al., 2021).

Tax treatment of company cars

The United Kingdom encourages use of passenger cars through favourable company car tax taxation. The private use of a company car by employees (72% of which are males) is taxed as an in-kind benefit with a further tax if free or subsidised fuel is provided (ACEA, 2021). The taxable value is based on discounts from the standard 37% rate of the car's list price, CO₂ emissions and fuel type. The imputation rate does not vary with private mileage. Overall, employees are taxed on an estimated in-kind benefit that is less than the real value of using a company car (22% less in 2015, which was in line with the EU average) (Princen, 2017). The company car tax has encouraged people to drive more: the private mileage of

company cars increased over 2002-19 and was nearly triple that of private cars in 2019 (DfT, 2021c). Combined with fuel car benefit, it has also led to choosing larger, diesel cars.

Zero-emission cars attract a reduced percentage of 0% in 2020-21, 1% in 2021-22, before returning to the planned 2% rate in 2022-23.²⁵ Changes in rates have sent contradictory signals: electric cars, which had been exempted from 2010, were taxed from 2015 with increasing rates to 2019-20 before being exempted again in 2020-21. These changes have reduced incentives and delayed decisions to purchase EVs (HoCs, 2018). While the 2020 reform promotes cleaner cars, favourable company car taxation will continue to contribute to car use, congestion and non-exhaust air emissions (e.g. from tyres and brakes).

Incentive for cycling

The cycle to work scheme allows employers to buy or lease bicycles and related equipment for their employees. Employees pay back this amount through a salary sacrifice for an agreed period. The scheme provides income tax and social contributions savings for employees. This in-kind benefit is not taxable. Employees can save up to 40% of the cost of a new bicycle. Over the past ten years, more than 1.6 million people participated in the scheme, including nearly 200 000 during the COVID-19 pandemic between March and September 2020 (Cycle to Work Alliance, 2021). Building on this success, the cycle to work scheme could be further promoted for low income, self-employed workers and employees of SMEs.

Support to EVs

Since 2011, the UK government has provided a range of subsidies to incentivise uptake of low emission cars. By March 2020, it had spent GBP 1.1 billion, including GBP 1 billion on the plug-in car grant paid to the car manufacturer to reduce the up-front purchase costs of qualifying cars (NAO, 2021c). The initial grant was GBP 5 000 per car until 2016. The eligibility rules have been tightened over time and in December 2021, the grant was GBP 1 500 and only available for zero-emission cars priced under GBP 32 000. Although its importance to consumers is regularly analysed, the additional impact of the plug-in car grant has not been demonstrated (NAO, 2021c). The number of electric car registrations increased in recent years (Figure 1.11), but their share in newly registered cars and in the total fleet remains well below that of OECD leaders (EAFO, 2021). Support was also provided to install charging points and to raise consumer awareness. The UK government has committed to spend up to GBP 3.5 billion for cars and vans to 2025. This includes GBP 1.3 billion for charging points, GBP 0.6 billion for the plug-in vehicle grants and an additional GBP 0.6 billion for charging infrastructure and plug-in vehicle grants announced in the 2021 Spending Review; and up to GBP 1 billion for the development and mass-scale production of EV batteries and EV supply chain (DfT, 2021a; HM Treasury, 2021b).

Road pricing

Fuel taxes are well-suited to reflect external costs from CO₂ emissions. However, differentiated kilometre charge by time and place is the best option to address congestion, the main external cost of transport (GBP 59.4 billion a year) (van Dender, 2019) (Lord and Palmou, 2021). There are several individual toll roads, bridges and tunnels (e.g. Mersey Crossings, M6 toll road). In addition, a fee is charged to enter certain areas with certain vehicles (in many cases based on emissions) (Butcher and Davies, 2020). These include the London low emission and ultra-low emission zones and congestion charge, which have reduced congestion and air pollution. Bath, Birmingham and Portsmouth have introduced Clean Air Zones that charge entry to the most polluting vehicles. However, private cars are not always charged.

Since 2014, there has been a road user levy for HGVs using UK roads. However, in practice only non-UK hauliers pay the charge as UK hauliers receive an equivalent reduction in their VED. The levy is based on weight, number of axles and Euro emissions standards since 2019. It was suspended from August 2020 to help the haulage industry recover from the effects of the global pandemic. There has been some discussion over the years about introducing a network-wide road pricing system, which would make differential charges based on time and distance travelled. However, it has never been implemented. As

EVs develop, road pricing will be needed to address transport externalities and loss of fuel and vehicle duty revenue. It will be key to achieving Scotland's target of reducing car miles by 20% by 2030 (elementenergy, 2021).

Economic instruments for biodiversity

Financing biodiversity through carbon sequestration services

Woodland creation for GHG removal will be required to achieve net zero by 2050. Scotland, and to a lesser degree Northern Ireland and Wales, rely on public financial support (Section 1.3.4) to finance forest carbon sequestration. The England Trees Action Plan 2021-24 aims to meet the UK's target of planting 30 000 ha of trees per year by 2024 for their many benefits (carbon sequestration, biodiversity habitats, landscapes, recreation, rural development, timber). Over GBP 500 million of the GBP 750 million Nature for Climate Fund will be mobilised to achieve this target (UK Government, 2021). Devolved administrations have also published plans for woodland creation and peatland restoration. The Scottish government has raised its tree planting ambition to 18 000 ha per year by 2024/5, with ambition in Wales of at least 5 000 ha per year (CCC, 2021a).

England has also taken steps to mobilise private finance to support forest creation. Since its launch in 2018, the GBP 50 million Woodland Carbon Guarantee (WCaG) scheme has supported the potential planting of 2 314 ha. WCaG gives forest landowners the opportunity to sell captured carbon as verified carbon credits, called Woodland Carbon Units (WCU). They can be sold to the government at a guaranteed price every five or ten years up to 2055/56 or on the open market. By offering a guaranteed price for carbon credits indexed for the duration of the contract, WCaGs reduce the financial risk associated with long-term investment. This is important given the low open market price for carbon credits from national forests (GBP 5-15/tCO₂), which does not encourage the creation of woodlands, especially in areas of high land value. In addition, profits from commercial logging of WCaG forests are exempt from income tax and corporate tax, and the value attributable to the trees is exempt from capital gains tax. The sale of voluntary carbon credits is not subject to value added tax (VAT). Some countries such as New Zealand have gone further by allowing forest carbon credits in compliance markets. The UK government is exploring GHG removal methods, including NbS and the incentives needed for their short- and long-term deployment.

Land offset markets for biodiversity

The Environment Act 2021 calls on local authorities to develop local nature recovery strategies in their spatial planning; encourages landowners to sign up, on a voluntary basis, to long-term conservation covenants; and provides that all developments must demonstrate a Biodiversity Net Gain (BNG) of at least 10% as part of the planning permission. The BNG requirement also applies to Nationally Significant Infrastructure Projects. Habitat must be secured for at least 30 years via obligations/conservation covenants. When seeking a planning permission, a developer will have to calculate the number of "biodiversity units" attributable to the site in its pre-developed state, based on a Defra metric. It must then demonstrate how it will raise the total units and maintain that improvement for 30 years. To achieve BNG, development proposals must follow the "mitigation hierarchy" that requires to avoid harm first, then mitigate or finally compensate for losses on-site, off-site or via statutory biodiversity credits (on the biodiversity offset market). In England, mandatory BNG will apply by amending the Town and Country Planning Act and is expected to become law by 2023. Wales aims to publish its BNG strategy by 2023 as part of its nature recovery action plan.

Once enacted, offset markets under net gain policy could attract significant private funding (property developers) for land biodiversity services, including forests. However, they can lead to high transaction costs and miss the scientific logic of nature conservation. In particular, there is no guarantee that developers will compensate locally, based on local opportunity mapping. Providing public financial support,

combined with the price instrument, to developers wishing to compensate with land of higher marginal benefit to nature could help address this problem.

Another option would be to levy a nature tax on building permits. Building permit taxes set at a rate lower than the initial market price for land offsets would not change the overall level of offsets set by 10% BNG cap but reduce the demand for offsets. The market price will gradually align with the tax rate (if all developers are obliged under both instruments). Despite such apparent incompatibility, the combination of instruments could improve cost-efficiency when taxes are used to secure a minimum market price (“floor price”), again if all developers are obliged under both instruments. While a floor price may reduce static efficiency in situations where the land offset market would otherwise produce offset prices below the floor value, such an effect, as well as the relative price certainty it engenders, usually increases dynamic cost-efficiency compared to a “pure” tradable offset system. Since 2012, the French development tax applies to constructions, reconstructions, extensions of buildings and developments of any kind requiring a planning permit. The proceeds are partially allocated to financing the protection of sensitive natural areas (ENS), as defined by the departments. The development tax has doubled the funding of ENS since 2012. However, revenues compensated in ENS for less than 10% of artificialised land over the last 30 years.

1.3.4. Removing potentially perverse incentives

Support to fossil fuels

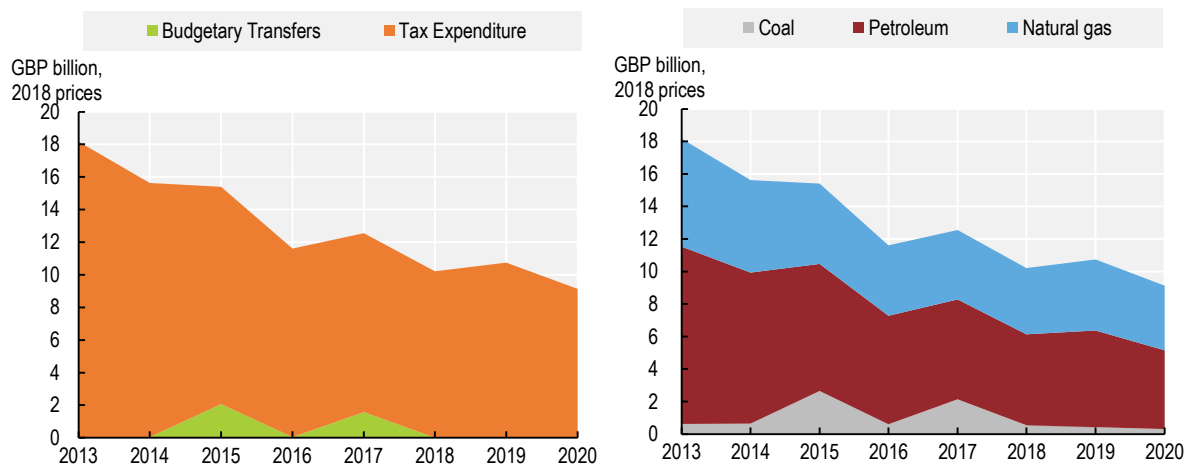
The United Kingdom has committed to rationalise inefficient fossil fuel subsidies as part of Sustainable Development Goal 12.²⁶ Under Aichi Biodiversity Target 3, it should aim to eliminate, phase out or reform all subsidies harmful to biodiversity. In 2020, the United Kingdom announced an end to support for fossil fuel projects overseas, including export finance, aid funding and trade promotion for new crude oil, natural gas, or thermal coal projects.

The United Kingdom defines a fossil fuel subsidy according to the IEA price gap approach,²⁷ and as such has no fossil fuel subsidies. The OECD Inventory of Support Measures includes both direct budgetary transfers and tax concessions that provide a benefit or preference for fossil fuel production or consumption. This definition of support²⁸ is deliberately broader, encompassing policies that can induce changes in the relative prices of fossil fuels.

As in other OECD countries, the United Kingdom delivers most support to fossil fuels through tax expenditures and oil and gas attract the bulk of government support (Figure 1.12). In terms of foregone revenue, larger tax reliefs supporting consumption includes reduced rate of VAT on supply of domestic fuel and power; VAT exemption of domestic passenger transport, including UK portion of scheduled flights; fuel duty not charged on kerosene used as heating fuel; and reduced rate on diesel used in off-road vehicles (“red diesel”) (NAO, 2021b). These tax preferences undermine the carbon price signal and discourage an efficient use of energy resources. Budget 2020 announced that entitlement to red diesel would be removed from 2022 (excepting use for agriculture, rail and home heating), but the March 2021 budget confirmed further exceptions.

Figure 1.12. Support to fossil fuel has decreased

Composition of support by type and fuel, 2013-20



Note: Measures appearing in the Inventory are classified as support without reference to the purpose for which they were first put in place or their economic or environmental effects. No judgement is therefore made as to whether or not such measures are inefficient or ought to be reformed. Data need to be interpreted with caution because fossil fuel subsidy data may be partial and because data record tax expenditure as an estimate of revenue that is foregone due to a particular feature of the tax system that reduces or postpones tax relative to a jurisdiction's benchmark tax system, to the benefit of fossil fuels. Hence, i) tax expenditure estimates could increase due either to greater concessions, relative to the benchmark treatment, or to a raise in the benchmark itself; ii) international comparisons of tax expenditure could be misleading, due to country-specific benchmark tax treatments. It is important to note that definitions of tax expenditure, and the benchmarks used to estimate the size of the expenditure, are nationally determined and may hamper international comparisons.

Source: OECD (2021), *OECD Inventory of Support Measures for Fossil Fuels* (database).

StatLink  <https://stat.link/epxn8a>

The largest measure supporting production is the “Ring-fence” corporate income tax related to oil and gas activities in the North Sea (enabling a 100% first-year capital allowance for capital expenditures to be deducted from corporate profits). In addition, capital expenditures associated with the decommissioning of fields can be deducted in full from corporate profits in the year in which they are incurred. The combination of tax provisions approximates a “cash-flow” tax system, equivalent to imputed-income tax systems where the objective is to levy a neutral business tax (Boadway and Bruce, 1984). Therefore, provisions such as the expensing of exploration and development costs may not be a preferential tax provision. However, these provisions encourage oil and gas investment in the United Kingdom (NAO, 2021b).

The United Kingdom is not tracking support measures with potential environmentally harmful impact (NAO, 2021b).²⁹ The OECD generally recommends a sequential, five-step approach to reform fossil fuel subsidies. First, the country identifies the fossil fuel subsidy measures and their policy objectives. Second, it evaluates the economic, social and environmental effects of the identified measures. Third, on the basis of this evaluation, it prioritises support measures that need reform. Fourth, it assesses the distributional implications of the reform and identifies the winners and losers of the policy change. Finally, it designs alternative policies to achieve the same objectives more cost effectively and with better environmental or social outcomes. Such an approach would help minimise adverse impacts of fossil fuel subsidy reform and, in turn, reduce the risk of political backlash and backtracking (Elgouacem, 2020). The same approach is recommended for assessing subsidies harmful to biodiversity (OECD, 2020b) (Box 1.4).

Box 1.4. Tracking support with potential environmentally harmful impact

Since 2013, G20 countries have developed and implemented a methodology for voluntary, country-led peer reviews of fossil-fuel support as a “valuable means of enhanced transparency and accountability” and an important avenue for knowledge exchange. The People’s Republic of China, the United States, Germany, Mexico, Indonesia and Italy have completed peer reviews. The OECD Companion to the Inventory of Support Measures for Fossil Fuels offers a sequential framework to help governments assess and address the effects of fossil-fuel support measures and their reform.

The OECD is also developing guidance on identifying and assessing subsidies harmful to biodiversity at a national level. Several countries, including France, Germany, Italy, Lithuania and Switzerland, have identified and assessed national-level subsidies harmful to biodiversity or to the environment.

Source: OECD (2021), *Update on recent progress in reform of inefficient fossil-fuel subsidies that encourage wasteful consumption 2021*; OECD (2021), *OECD Companion to the Inventory of Support Measures for Fossil Fuels 2021*; OECD (2021), *OECD work in support of biodiversity*.

Support to farming

The Common Agricultural Policy (CAP) defined support for UK agriculture until EU exit. In 2018-20, policy support for UK farmers was close to the EU-27 average, as measured by the Producer Support Estimate. It represented about 20% of gross farm receipts (OECD, 2021f). However, in 2020, UK agricultural support included GBP 2.7 billion in payments that may incentivise outputs and increase environmental pressure through on-farm investments and input use, including tax rebates for agricultural fuel. This is four times the agricultural support for environmental protection under the Rural Development Programme (RDP) inherited from the European Union.

The Agriculture Act 2020, which entered into force post-EU exit and much of which is specific to England,³⁰ introduces the “principle of public money for public goods”. Most payments inherited from the CAP will gradually be replaced by payments for public goods through environmental land management (ELM) schemes, including the Sustainable Farming Initiative (SFI), the Local Nature Recovery Scheme and the Landscape Recovery Scheme. The shift from supporting income and market prices to paying farmers for the provision of public goods is a welcome step towards market orientation of agricultural production and protection of biodiversity.

UK agriculture has gained valuable experience in testing results-based payments. Under a pilot project in 2016-18, payments to farmers were directly linked to the level of environmental outcomes achieved, not to management inputs/actions as is the case with action-based agri-environment schemes. The project focused on four key priority biodiversity objectives in arable and grassland systems: species-rich hay meadows, habitat for breeding waders, provision of winter bird food, and provision of pollen resources for pollinators. All the results-based measures had better performance to improve biodiversity than their equivalent control sites under management based agreements (Natural England, 2019).

Pending a shift to results-based approaches, support for agricultural practices meant to protect ecosystems has been weighed against support for other environmental, economic and social objectives. The United Kingdom has devoted a large share (70%) of the CAP RDP 2014-20³¹ to ecosystem protection, particularly England (81%). Scotland is spending 18% of its RDP on forest carbon sequestration (3% for Northern Ireland and Wales, 0% for England). Little is spent on practices meant to mitigate GHG and NH₃ emissions.

Recommendations on green growth

Addressing environmental challenges

- Use the legislation, including the Environment Act, to set ambitious quantitative interim and long-term targets on air quality, biodiversity, water (including marine), waste reduction and resource efficiency and develop plans for achieving them to operationalise the goal of leaving the environment in a better state within a generation.
- Swiftly implement the Net Zero and related sectoral strategies, and ensure that resources allocated are in line with the needs identified; detail the expected mitigation impact of measures adopted and planned.
- Further mainstream biodiversity in land use: accelerate the transition from practice-based payments to farmers to results-based payments; strengthen market-based incentives for carbon sequestration as a means of leveraging private finance for forests and their biodiversity; combine public financial support and the land offset market to direct the net gain in biodiversity towards land with high biodiversity value; consider combining the taxation of building permits with the land offset market to ensure a floor price on the market.

Improving environmental governance and management

- Strengthen co-ordination and peer learning between environmental authorities of the four UK nations in setting and implementing environmental policies and laws.
- Secure human and financial resources necessary to maintain and further develop the good regulatory practices in permitting and compliance assurance.
- Reinforce the environmental aspects of regulatory impact assessment; expand the application of strategic environmental assessment to non-environmental policies, plans and programmes.
- Accelerate implementation of variable administrative monetary penalties; in determining such penalties, put more emphasis on recovering economic benefits of non-compliance.

Promoting investment and economic instruments for green growth

- Systematically screen actual or proposed subsidies, including tax provisions to identify those that are not justified on economic, social and environmental grounds and, on the basis of this assessment, develop a plan to phase out fossil fuel and other environmentally harmful subsidies. Clarify the role of taxes in achieving environmental targets.
- Pursue efforts to consider environmental impacts (including on the natural environment) in cost-benefit analysis of public investment and ensure it is systematically considered in decision making. Foster the use of natural capital valuation tools.
- Carry on with plans to set a net zero consistent trajectory for the annual cap of the UK ETS and to explore expanding the system to sectors not subject to explicit carbon prices, as part of a broader fiscal reform that addresses potential adverse impacts on households and competitiveness.
- Consider how to gradually replace declining fuel duty revenues in the context of the transition to electric vehicles, including looking at policy options such as distance-based charges that may vary with vehicle emissions on national roads, and charge differentiation by place and time in the most congested urban areas. Consider increasing first licence vehicle excise duty for more polluting vehicles and green vehicle excise duty after first registration and abolishing the favourable tax treatment of company cars. Ensure the cycle to work scheme meets its objectives, with consideration of low income, self-employed workers and SME employees.

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Notes

¹ Internationally-comparable indicators presented in the OECD Environment at a Glance online platform and related UK profile support the analysis (OECD, 2021b). They should be read in conjunction with this report.

² Integration principle, prevention principle, precautionary principle, rectification at source principle and polluter pays principle.

³ The Climate Change Act requires consideration of the “differences in circumstances between England, Wales, Scotland, and Northern Ireland”. Each of the devolved administrations are committed to the UK net zero commitment in the Climate Change Act, but the level of ambition through the carbon budgets and individual targets set by the nations can vary. Scotland has its own climate change plan and aims to achieve net zero by 2045, with interim emission reduction targets of 75% by 2030 and 90% by 2040 compared to 1990 levels. Wales also has statutory climate targets of 63% in 2030, 89% in 2040 and net zero in 2050. Collectively, Scotland, Wales and Northern Ireland accounted for 22% of UK emissions in 2019.

⁴ Excluding international aviation and shipping emissions, in line with the United Nations Framework Convention on Climate Change.

⁵ As set in the fifth carbon budget.

⁶ In 2021, the guideline value was reduced from 10 µg/m³ to 5 µg/m³.

⁷ The JNCC did not assess progress towards Target 18, relating to Indigenous peoples and local communities, as it was deemed not relevant to the United Kingdom.

⁸ The IUCN protected area management categories, classify protected areas according to their management objectives but do not provide any indication of whether protected areas are effectively managed or enforced. IUCN categories are not truly hierarchical; however sites designated as the “stricter” categories (I-II in particular) are likely to be more restrictive in the sorts of permitted activities. Different approaches are likely explained by varying national priorities but also by factors such as local geography, ecology and pre-existing patterns of human settlement.

⁹ The NIEA is part of the Department of Agriculture, Environment and Rural Affairs, while in England the Environment Agency is independent, but “sponsored” by Defra.

¹⁰ Natural Resources Wales was formed in 2013. Before that, the Environment Agency covered both England and Wales.

¹¹ For certain offences, the non-compliance score may be suspended for up to six months if the operator is actively addressing the non-compliance in line with a voluntary improvement plan. Suspended scores do not count towards calculating subsistence charges.

¹² VMPs were authorised by the Environmental Civil Sanctions (England) Order 2010 and the Environmental Civil Sanctions (Miscellaneous Amendments) (England) Regulations 2010. Note that VMPs are referred to as “civil sanctions” in the UK terminology, whereas they are classified as administrative in this report. This is because they are imposed by an administrative body (in this case the Environment Agency) and not as a result of a civil judicial decision.

¹³ Of which GBP 3.7 billion for flood defences and GBP 0.5 billion for biodiversity.

¹⁴ As set out in the Environment Act, ministers have to take due regard of five environmental principles when making policy.

¹⁵ Including indirect emissions from electricity consumption.

¹⁶ An EPC is required when a building is constructed, sold or let, and is valid for ten years. Domestic EPCs are banded from “A” to “G”, where “A” is the most energy efficient in terms of likely fuel costs and CO₂ emissions.

¹⁷ HM Treasury and HM Revenue & Customs.

¹⁸ With higher prices in the United Kingdom, reduced emissions in the country may have been counteracted by an increase in emissions in other EU ETS participating countries. However, limited transmission capacity between the United Kingdom and the European Mainland’s electricity grids limits this shift. The additional emission cuts in the United Kingdom may thus have rather increased the intake of emission permits into the market stability reserve of the EU ETS rather than increased emissions outside the United Kingdom (OECD, 2021g).

¹⁹ While the UK ETS is jointly managed by all four nations, CPS, CCL, fuel duty and tax treatments are reserved to the UK government.

²⁰ BEIS suggests a shadow price consistent with net zero of GBP 245/tCO₂ in 2021 (BEIS, 2021b).

²¹ Effective carbon rates summarise how countries price carbon through fuel excise taxes, carbon taxes and ETS.

²² Although registrations declined by 30%, the introduction of the Worldwide Harmonised Light Vehicle Test (WLTP) Procedure has led to an increase in tax liability, thereby maintaining revenue from the vehicle excise duty.

²³ From 2020, this has also been due to more accurate data on car emissions.

²⁴ The VED band system creates a “cliff-edge” effect that does not reward manufacturers for improving their vehicles’ efficiency within bands and the differentials between band rates are uneven.

²⁵ With the WLTP reform, the government reduced most company car tax rates by 2% in 2020-21 for cars first registered from April 2020. Rates will return to planned levels over the following two years, increasing by 1% in 2021-22 and in 2022-23. Rates will then be frozen until 2024-25.

²⁶ SDG 12 calls for ensuring sustainable consumption and production patterns.

²⁷ The IEA estimates subsidies to fossil fuels that are consumed directly by end-users or consumed as inputs to electricity generation. It follows the price-gap approach that compares average end-user prices paid by consumers with reference prices that correspond to the full cost of supply. The price gap is the

amount by which an end-use price falls short of the reference price and its existence indicates the presence of a subsidy.

²⁸ The OECD definition follows the subsidy definition in the Agreement on Subsidies and Countervailing Measures under the World Trade Organization. OECD's broad definition of support was adopted in 2019 to track and measure the Sustainable Development Goal Indicator 12.c.1 on fossil fuel subsidies.

²⁹ As noted above, the United Kingdom defines a fossil fuel subsidy according to the IEA price gap approach.

³⁰ The devolved governments are also developing new agricultural policies.

³¹ Related funding continues until projects are finished.



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