

# Net Zero Strategy and Action Plan



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# Leader's Foreword



## 1 Leader's Foreword – 2023 Climate Change Response and Net Zero

There is a point we reach at which we must reconcile the things we see as notional and those we know to be based in fact and firm reasoning.

The issue of climate change gets bounced around with some saying that we are part of the natural ebb and flow of a constantly altering, natural ecological cycle that will just 'happen to us anyway'. Some will say that this may be absolutely true, and that many wider factors impact the flow of climate change, but that this process is being ever quickened by the continuous industrial impact of fossil fuels, wider carbon generating sectors including agriculture but also the direct impacts of the way we live as individuals day by day making choices over the way we consume energy, the efficiency of our homes and places of work generally and even the way we choose to travel.

Regardless of the many factors that go in to making and baking the cake that is climate change, there is a response that we can all agree on – we can do our part to be efficient.

Efficient in our consumption, efficient in our day to day travel and adventure – even efficient in the way we consume our food! The most important part in my opinion, in being efficient, is choosing to learn about the many ways we can be efficient in all areas of our lives to the continued betterment of the planet.

Many talk about sustainability. To me, sustainability is a bit of a cop out. We can easily be sustainable by shaving off a bit here and a bit there. However, these acts of sustainability will be varied, different dependent on the time of day, the place we find ourselves or indeed the way we feel. Efficiency requires a more measured, methodical, deliberate and purpose driven set of aims – even values – to change our habits, our beliefs and our respect for our planet and therefore each other.

So, my huge wish is for you to read this response to Climate Change and Net Zero in a grounded, deliberate and purpose driven way – a way that looks at the solutions you might come up with within your own life and the life of your loved ones and friends. I want this document to be one that allows you to reflect and consider how your everyday habits impact on our world – a bit grand I know – but I mean it because without that focus and determination, the whole meaning and direction of this document loses any authority in the collective responsibility we have to take care of our place.

Hartlepool is extremely important to me. The people who read this are incredibly important to those who have spent many days, weeks and months putting this strategy together. And it is together that we will look to work on the solutions, changes and positive opportunities in order

that we might all take seriously our part in our place for the environment that we so desperately need to take better care of.

My vision of 2023 – 2033 is quite large. Some say too large. But I see a Hartlepool that grows in efficient ways using innovative materials and energy saving software and energy storing devices in order to deliver on a social housing strategy that sees individuals and families benefit from lower bills as their inbuilt PV linked storage allows them to come off grid at certain points in a week, and that the home that they are living in has been built with Modern Methods of Construction (MMC) so as to allow them to be heat efficient all year round – remembering to inform people that airflow is an important part of an MMC home. I see us taking our place in ensuring businesses and wider homes can benefit from the Home Energy Management Systems and Business Energy Management Systems as we each look to move our homes and places of work into a new energy and cost efficient future that protects us from the kind of cost of living crisis we have seen since the end of 2021 and continue to suffer from in 2023.

In closing, I wish to give thanks to the contributors, wider council officer team and you who are reading this document. Collectively we care about our place. Collectively we can respond to this strategy. But only as individuals can we take the much needed responsibility to make the kind of positive impact that can change our climate for the better.



**Councillor Mike Young**

Leader of Hartlepool Borough Council

## 2 Executive Summary

The need for taking immediate and radical action on climate change and its impacts is being increasingly recognised by businesses, governments, and the public. In recognising the amount of action and the speed at which this must be done, the UK has since ratified the Paris Agreement to keeping global warming to well below 2°C, and pursuing efforts to limit the temperature increase to 1.5°C. On this notion, the UK officially declared a climate emergency in 2019. Hartlepool Borough Council has acknowledged our role in the need to act and to play our part to support the nation in achieving our national commitments. In response, Hartlepool Borough Council declared our own climate pledge in 2021 and have passed a motion to develop a strategy to achieve net zero carbon emissions.

The Climate Change Response and Net Zero Strategy for Hartlepool Borough Council sets out the framework for the council to become a net zero emissions local authority by 2050. While this is indeed an ambitious target, by proactively tackling our carbon emissions and adapting to climate change, we can anticipate numerous positive outcomes for our environment, economy, and the overall health and wellness of our communities. We do not have all the solutions yet, but this represents a significant initial stride in the long journey toward establishing a prosperous, green, and low-carbon Hartlepool.

This strategy serves as a roadmap to achieving net zero emissions from our operations, outlining the specific measures and initiatives required to attain the ambitious target of net-zero emissions by 2050. The strategy encompasses a wide range of actions under five key aims:

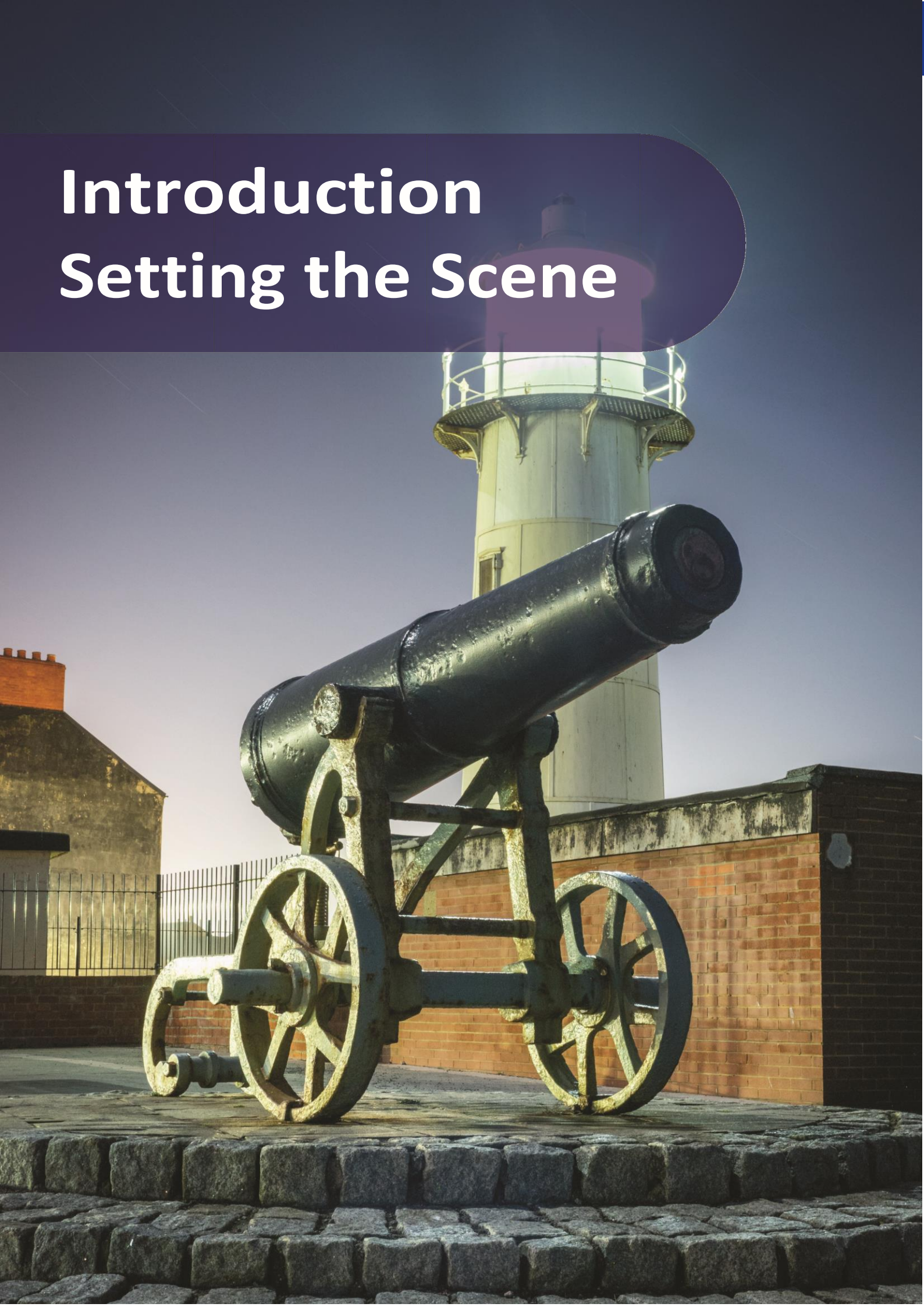
- Aim 1: Reduction of local authority CO<sub>2</sub> emissions
- Aim 2: Resource maximisation and waste reduction
- Aim 3: Domestic energy and sustainable warmth
- Aim 4: The natural environment
- Aim 5: Climate resilience and adaptation

The themes and the proposed actions within them were guided based on the evidence gathered on the sources of carbon emissions and from our engagement with Hartlepool Borough Council staff.

This marks only the beginning of a remarkable transformation, and the proposed actions will continually evolve. In essence, this strategy is designed to remain dynamic, serving as a living document where actions are regularly monitored and reviewed as we learn from early implementation, improve our evidence database, and broaden our engagement with other stakeholders as we seek to extend the net zero target for the wider borough.

# Introduction

## Setting the Scene



## 3 Introduction - Setting the Scene

### The Context of Climate Change

#### The Difference Between ‘Weather’ and ‘Climate’

It can sometimes get quite confusing when trying to understand the unique differences between weather, seasons and climates. Weather refers to the short-term changes in conditions of a particular place, such as the temperature, precipitation, cloudiness, brightness, wind conditions, and atmospheric pressure. The season is a concept closer related to climate but is usually referred to as a period of the year distinguished by certain climatic conditions. Climate, however, is the average state of the atmosphere of a specific location and describes the changes in weather patterns over a prolonged period of time and space, typically spanning decades or longer. Throughout its entire 4.5 billion years of existence, the Earth has experienced many cycles of colder and warmer periods, each cycle taking place over many thousands or even millions of years. It is correct in saying that changes to the Earth’s climate is a natural phenomenon and occurs due to a variety of reasons which may include fluctuations in solar radiation from the sun, widespread volcanic activity, and even small changes to the orbit of the Earth around the sun. Climate change, therefore, refers to ‘*a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended period*’.<sup>1</sup>



# 1.04°C

Average rise in global land and sea temperatures since the late 19<sup>th</sup> Century

What is most worrying though, is the current rate of climate change – in particular since the beginning of the Industrial Revolution. Records show that change is happening at an unprecedented rate, never before seen, and much too fast to be attributed to natural causes alone. The scientific evidence is clear. Greenhouse gas (GHG) levels, mainly carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and ozone (O<sub>3</sub>), in the atmosphere have been increasing rapidly, and there is unequivocal evidence that human activity has been the main driving force behind today’s climate change. This type of climate change is referred to as *anthropogenic* climate change. Recognising that the rate of today’s climate change is human-induced is key.

<sup>1</sup> IPCC, 2018: [Annex I](#): Glossary [Matthews, J.B.R. (ed.)]. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 541-562. <https://doi.org/10.1017/9781009157940.008>.



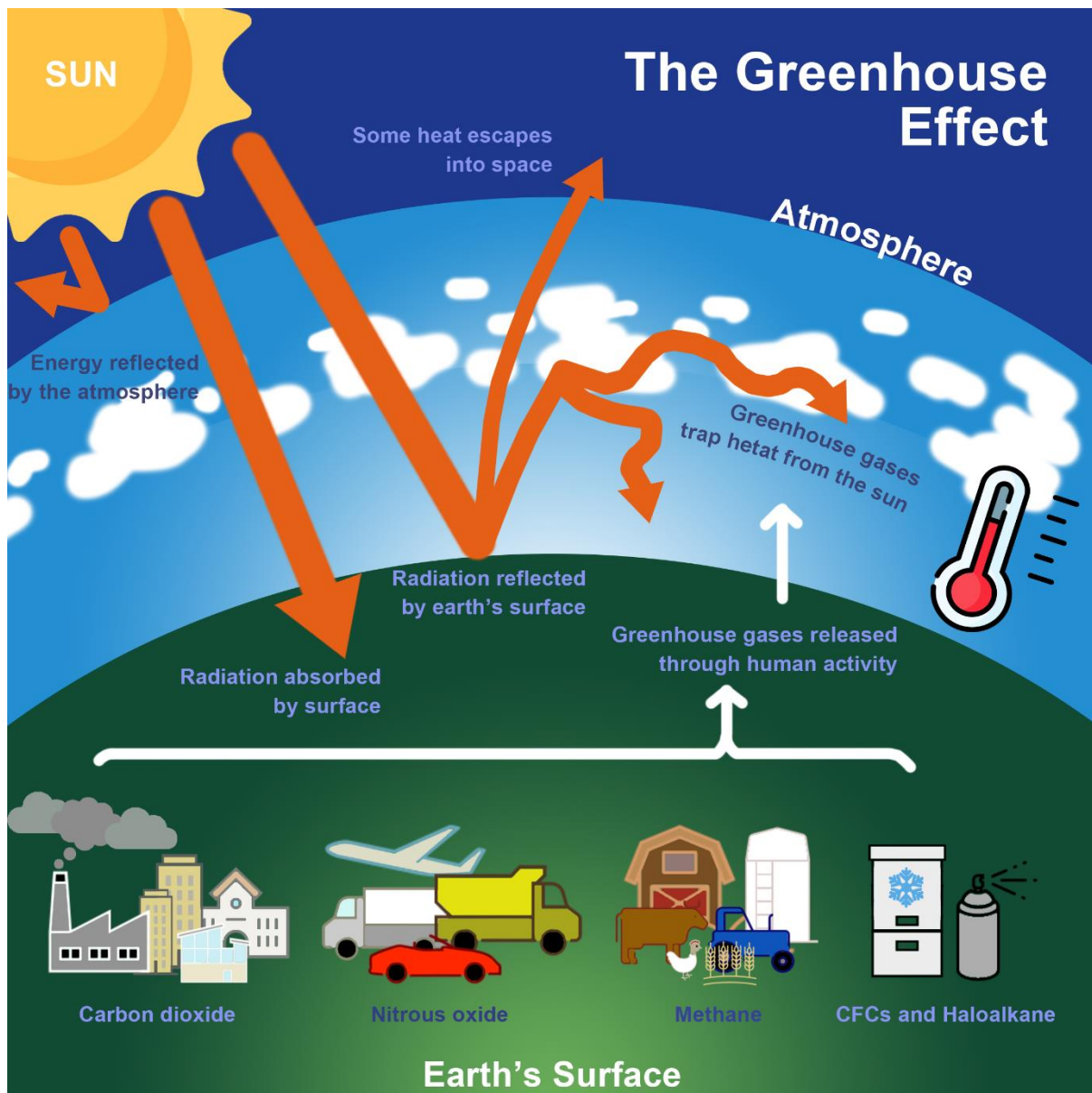


Figure 1 Diagram of Greenhouse Effect

There is a very delicate relationship linking the climate, ecosystems, biodiversity and human society where changes to one affects all other aspects. Climate change is an all-encompassing issue that affects not just the environment but also socio-economic factors. The current rate of anthropogenic climate change and the compound stresses and events related to it pose a real challenge for people, habitats, and species across the world to adapt to these sudden changes. It has affected every aspect of our lives and the effects are all interrelated. Climate change does not only mean rising global average temperatures. It also poses a wide range of global threats that have far-reaching implications for both natural ecosystems and human societies. A summary of the observed changes of mean climate across climate system components and their attribution to human influence can be found in Figure 2. A more detailed explanation of the greenhouse gas effect and the risks posed by climate change can be found in Appendix B – The Causes and Impacts of Climate Change.

Figure 2 The assessment of observed changes of mean climate across climate system components, and their attribution to human influence<sup>2</sup>

Change in indicator	Observed change assessment	Human contribution assessment
<b>Atmosphere and water cycle</b>	Warming of global mean surface air temperature since 1850-1900	<i>likely</i> range of human contribution ((0.6-1.3°C) encompasses the very likely range of observed warming ((0.9-1.2°C))
	Warming of the troposphere since 1979	Main driver
	Cooling of the lower stratosphere since the mid-20th century	Main driver 1979 - mid-1990s
	Large-scale precipitation and upper troposphere humidity changes since 1979	
	Expansion of the zonal mean Hadley Circulation since the 1980s	Southern Hemisphere
<b>Ocean</b>	Ocean heat content increase since the 1970s	Main driver
	Salinity changes since the mid-20th century	
	Global mean sea level rise since 1970	Main driver
<b>Cryosphere</b>	Arctic sea ice loss since 1979	Main driver
	Reduction in Northern Hemisphere springtime snow cover since 1950	
	Greenland ice sheet mass loss since 1990s	
	Antarctic ice sheet mass loss since 1990s	<i>Limited evidence &amp; medium agreement</i>
	Retreat of glaciers	Main driver
<b>Carbon cycle</b>	Increased amplitude of the seasonal cycle of atmospheric CO <sub>2</sub> since the early 1960s	Main driver
	Acidification of the global surface ocean	Main driver
<b>Land climate</b>	Mean surface air temperature over land (about 40% larger than global mean warming)	Main driver
<b>Synthesis</b>	Warming of the global climate system since preindustrial times	

Key

medium confidence	likely / high confidence	very likely	extremely likely	virtually certain	fact
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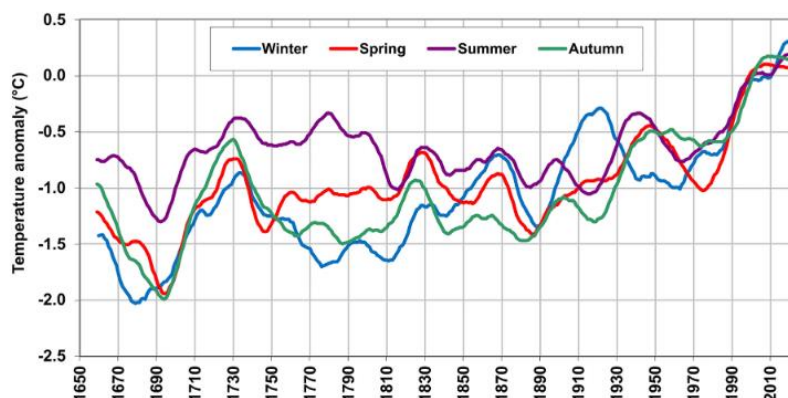
## In the UK

The UK faces just as much of a change as anywhere else in the world. We will see increasingly warmer temperatures with the greatest increase during the summer season in addition to greater frequency and intensity of extreme weather events. According to the UK Met Office all of the top ten warmest years occurred this century, and on average the UK was 1°C warmer between 2012 and 2021 when compared to the average for 1961-1990.<sup>3</sup> Heatwaves like the one experienced in 2018 are now thirty times more likely to happen.

<sup>2</sup> IPCC, 2023: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, 184 pp.

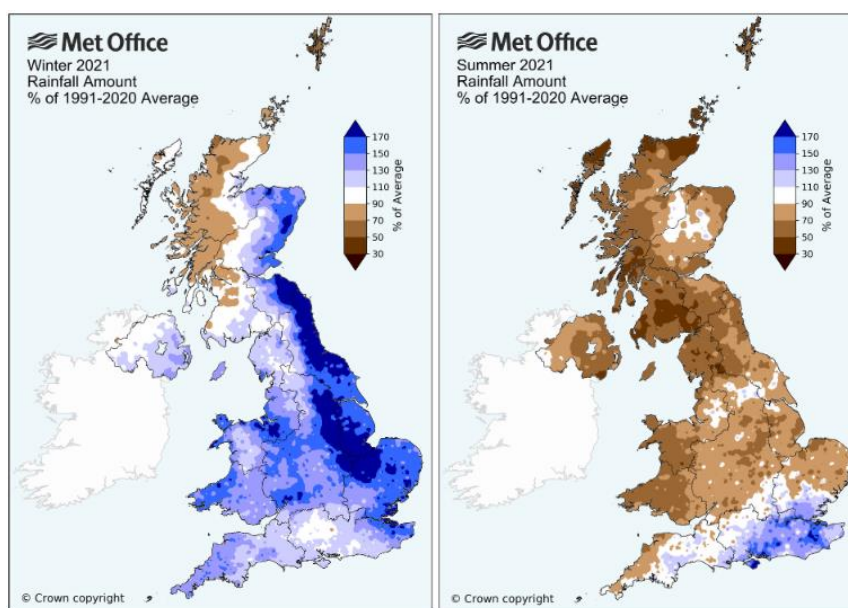
<sup>3</sup> Climate Change Explained, UK GOV, 2023. Available at: [Climate Change Explained](#)

Figure 3 Rising temperatures by season between 1659–2021, expressed as anomalies relative to 1991–2020 average<sup>4</sup>



The most up-to-date UK Climate Change Projections (UKCP18) were launched in November 2018, by the Department for Environment, Food and Rural Affairs, illustrating a range of future climate scenarios over the 21<sup>st</sup> century.<sup>5</sup> Both the projections and scientific data available from the Met Office indicate that over the next century, the North East will experience greater uneven temporal distribution of precipitation with wetter winters and drier summers as depicted in Figure 4. Despite the overall trend of drier summers, it is highly likely that heavy summer rainfall events will see an increase in intensity.

Figure 4 Rainfall anomalies (%) for seasons of 2021. Winter refers to the period December 2020–February 2021<sup>6</sup>



Climate change impacts on the UK will be more place-specific, meaning that impacts are unique to a particular geographical location or area. Flooding, storms and extreme heat will put added pressure and disruption to critical infrastructure including buildings, transport networks energy, healthcare systems and emergency response services. More frequent, intense rainfall events and rising mean sea levels will mean an increased threat of flooding,

<sup>4</sup> Kendon, M., McCarthy, M., Jevrejeva, S., Matthews, A., Sparks, T., Garforth, J., & Kennedy, J. (2022). State of the UK Climate 2021. *International Journal of Climatology*, 42(Suppl. 1)( S1), 1– 80. <https://doi.org/10.1002/joc.7787>

<sup>5</sup> UK Climate Projections (UKCP), Met Office. Available at: [UK Climate Projections \(UKCP\)](https://www.metoffice.gov.uk/climate/ukcp)

<sup>6</sup> Kendon, M., McCarthy, M., Jevrejeva, S., Matthews, A., Sparks, T., Garforth, J., & Kennedy, J. (2022). State of the UK Climate 2021. *International Journal of Climatology*, 42(Suppl. 1)( S1), 1– 80. <https://doi.org/10.1002/joc.7787>

particularly in coastal cities and low-lying regions.<sup>7</sup> A recent study found that between 994 and 1,180 miles (~ 30%) of England’s shoreline will see increasing pressure to realign, impacting 120,000 – 160,000 residential and non-residential properties by the 2050s if global mean surface temperatures rose by between 2 and 4°C by 2100.<sup>8</sup>

Our farming practices may change due to climate change. On the plus side, warmer weather and higher levels of CO<sub>2</sub> will be conducive for crop growth and may allow us to explore the production of other vegetable crops which would previously be limited to warmer climates. On the other hand, crops that we grow today may be unsuited to higher temperatures. Furthermore, concerns arise regarding access to water resources in the face of drier summers and a surge in drought occurrences, rendering farming seasons more erratic and food security an ever-mounting concern. Additionally, the rising temperatures could create a more hospitable environment for pests, pathogens, and invasive non-native species compounding the challenges faced by our agricultural systems.

***In addressing the changing climate, there are two major elements that warrant concerted action***

- *Climate adaptation: hand-in-hand with sustainable development, proactive adaptation is essential for communities and environments to strengthen climate resilience and to reduce the near, mid and long term climate risks*
- *Climate mitigation: reducing further emissions of greenhouse gases, and enhancing “sinks” of these gases*

All these changes will have significant impacts on the environment, critical infrastructure, human health and wellbeing, and key economic sectors and local businesses, making it essential to set in place robust measures to reduce emission levels and adapt to the changing climate. Climate change is one of the greatest long-term challenges humanity has had to face, and the need for urgent action has never been clearer.



**426.5 million**

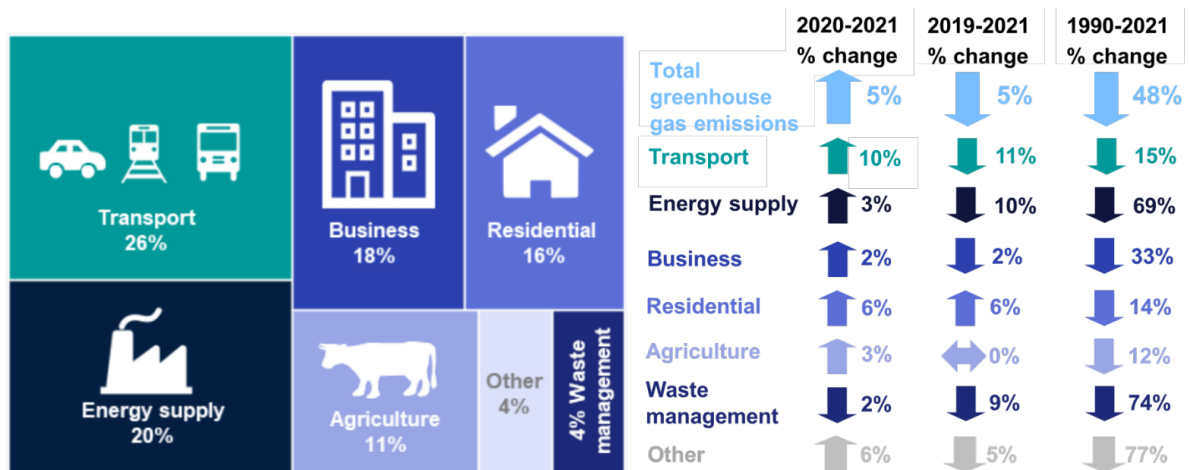
Tonnes of CO<sub>2</sub> equivalent greenhouse gas emissions in UK in 2021

One of the easiest and most widely adopted methods to understand our contributions to climate change is by examining our carbon emissions. In 2021, the UK greenhouse gas emissions data published by the Department for Business, Energy and Industrial Strategy (BEIS) was estimated to be 426.5 million tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e), a significant reduction of 46.7% since 1990. Despite the coronavirus (COVID-19) pandemic, this was still an increase of 5% from the 2020 figure of 406.3 million tCO<sub>2</sub>e. In fact, GHG emissions from the transport sector rose by 10.3% in 2021, accounting for over half of the overall increase from 2020 (*Figure 5*).

<sup>7</sup> Flood and Coastal Erosion Risk Management Research Programme: Exploratory sea level projections for the UK to 2300, 2019. Available at: [Exploratory sea level projections for the UK to 2300](#)

<sup>8</sup> Responding to climate change around England’s coast - The scale of the transformational challenge, Sayers et al., 2022. Available at: [Responding to climate change around England’s coast - The scale of the transformational challenge](#)

Figure 5 Transport was the largest emitting sector of UK GHG emissions in 2021, while waste management was the only sector that had a reduction in emissions from 2020 to 2021.<sup>9,10</sup>



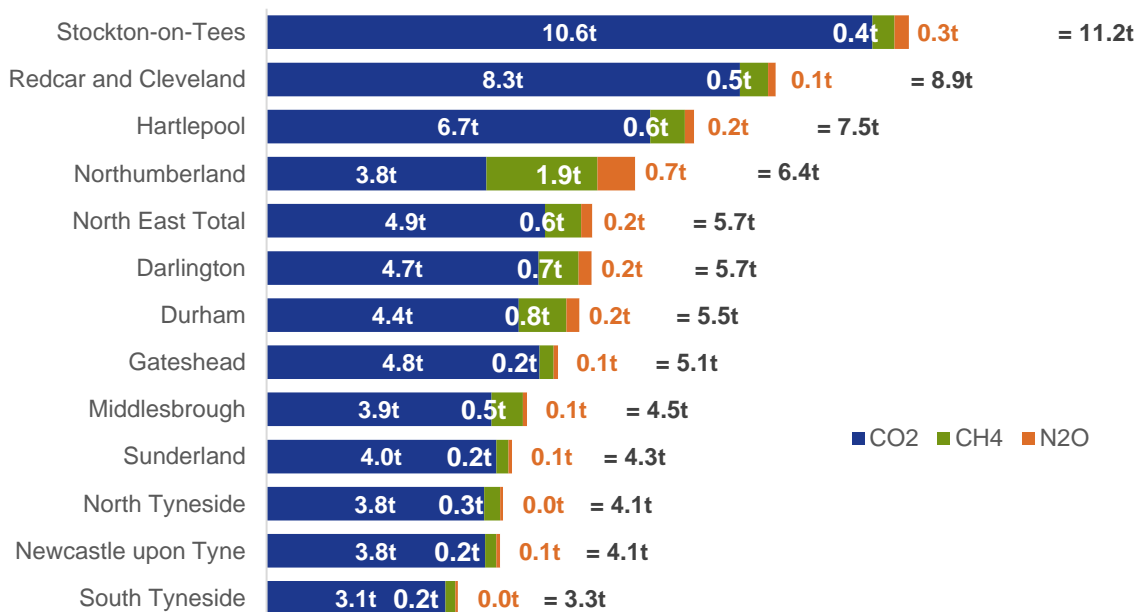
### Borough-wide Emissions

In 2023, the Department for Energy Security and Net Zero, formally a part of the Department for Business, Energy and Industrial Strategy (BEIS), released the latest available dataset for UK local authority and regional greenhouse gas emissions covering the years 2005 through to 2021.

Taking a closer look at the North East of England, Figure 6 shows how Hartlepool performs when compared to other local authorities in the North East, expressed as GHG emissions per capita. Hartlepool ranked third in the region at 7.5 tCO<sub>2</sub>e per capita, with CO<sub>2</sub> making up for 92% of the all emissions.<sup>11</sup>

Figure 6 GHG emissions per capita in the North East

2021 GHG emissions per capita in North East Local Authorities (tCO<sub>2</sub>e)



<sup>9</sup> BEIS, 2023. [2021 UK Greenhouse Gas Emissions](#).

<sup>10</sup> BEIS, 2023. [2021 UK Greenhouse Gas Emissions](#).

<sup>11</sup> UK local authority and regional greenhouse gas emissions national statistics, 2005 to 2021, Department for Energy Security and Net Zero, 2023. Available at: [UK local authority and regional greenhouse gas emissions national statistics, 2005 to 2021, Department for Energy Security and Net Zero](#)

The latest carbon emissions data estimates published by the Department for Energy Security and Net Zero showed that in 2021, a grand total of 691.2 ktCO<sub>2</sub>e (kilotonnes of carbon dioxide equivalent) were emitted in Hartlepool, with greatest contributions from industrial, domestic and transport related sources. The public sector emissions, which includes education, health and local government bodies, contributed 5% of Hartlepool’s borough-wide emissions.



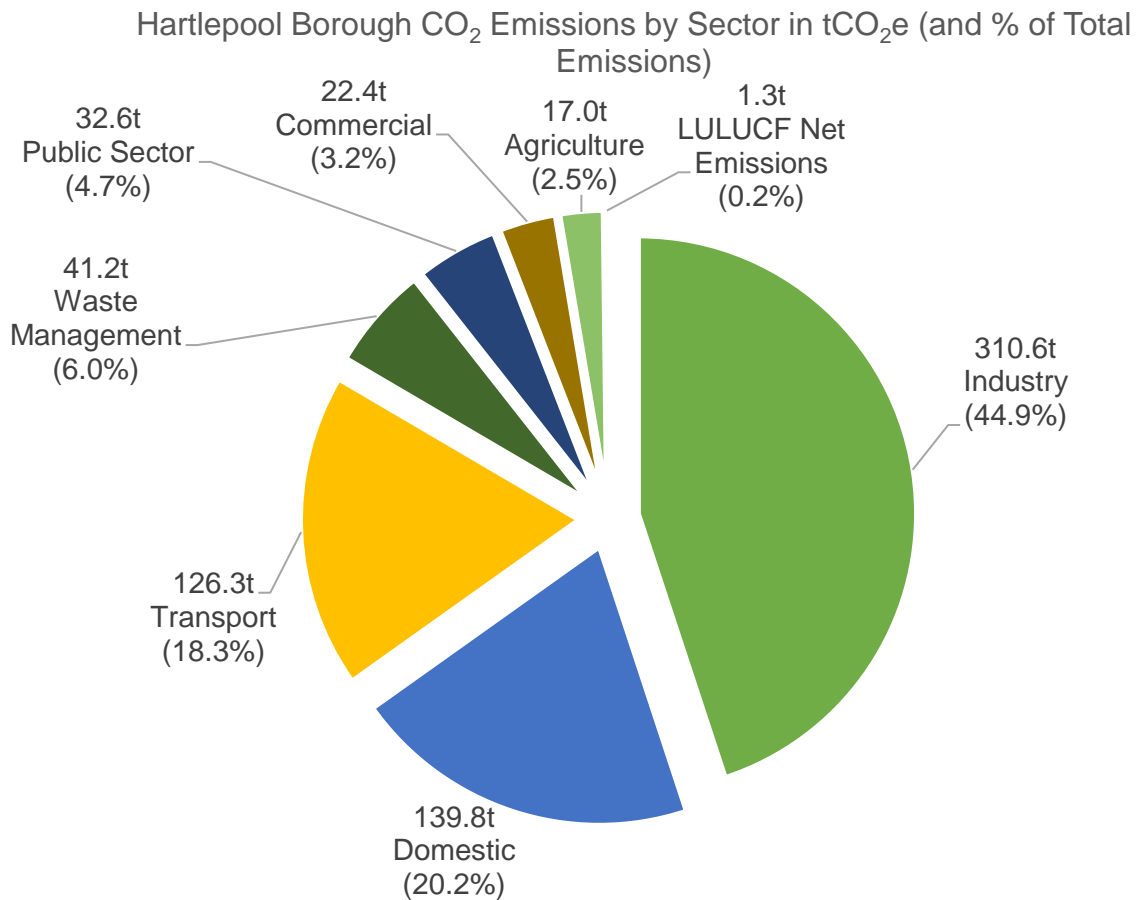
## 3<sup>rd</sup> Highest

Hartlepool’s rank out of 12 North East Local Authorities for GHG emissions per capita

<b>Hartlepool Borough Total Emissions</b>	<b>691.2 ktCO<sub>2</sub>e</b>
<b>Per Capita Emissions</b>	<b>7.5 tCO<sub>2</sub>e</b>

Figure 7 shows a full breakdown of Hartlepool’s emissions by sector. The largest amount of CO<sub>2</sub>e generated by sector within Hartlepool were produced from industrial processes (45%) with a further 20% produced from the domestic sector and 18% by the transport sector.

Figure 7 Breakdown of Hartlepool’s emissions by sector



# Key Drivers for Action



## 4 Key Drivers for Action

There was a global response to the threats of climate change, whereby nearly 200 Parties adopted the Paris Agreement in 2015, a legally binding international treaty on climate change, to keep global temperature rise this century to below 2°C compared to pre-industrial levels and to further pursue a goal of limiting temperature rise to 1.5°C only. With the emissions expected to be released over the next few decades on top of the emissions already in our atmosphere, the global average surface temperature is anticipated to exceed the 1.5°C limit within the first half of the 2030s, posing climate related risks to human health, the environment and economic prosperity



# 1.5°C

Limit to global warming goal / target  
of the Paris Climate Agreement

Following on these commitments, the UK became the first major economy to set in law a climate goal by adopting the Climate Change Act 2008 that set out the legal framework for the UK to reduce greenhouse gas emissions by 100% of 1990 levels by 2050. More recently, the UK was the place where nations doubled down on their commitment to climate action and keeping the 1.5°C target by signing the Glasgow Climate Pact during the 2021 United Nations Climate Change Conference (COP26).

### International

#### Intergovernmental Panel on Climate Change

- The Intergovernmental Panel on Climate Change (IPCC) was established in 1988, providing detailed scientific research and reporting on climate change, its impacts and setting targets for mitigation

#### Rio Earth Summit

- The Rio Earth Summit took place in 1992, whereby the first United Nations Framework Convention on Climate Change (UNFCCC) was agreed by member states to stabilise atmospheric GHG concentrations, becoming the foundational treaty to key climate-related agreements today

#### Kyoto Protocol

- 1995 saw the establishment of the annual United Nations Conference of the Parties (COP) leading to the adoption of the Kyoto Protocol in 1997

#### Paris Agreement

- 2015 Paris Agreement – building on the Kyoto Protocol, 196 countries committed to adopt legally binding carbon reduction targets to keep the increase in global average temperatures to below 2°C above pre-industrialised levels, with an aspirational target of 1.5°C

#### IPCC AR6

- The IPCC AR6 Synthesis Report: Climate Change 2023 found that temperature will increase by 1.5°C in the first half of the 2030s and will become very difficult to control temperature increase to 2.0°C towards the end of 21st century. COP26 which took place in Glasgow in 2021 aimed to accelerate action towards the goals of the Paris Agreement

#### UN SDGs

- The United Nations Sustainable Development Goals (SDGs) include several relevant actions: Affordable and Clean Energy, Sustainable Cities and Communities, Responsible Consumption and Production, and Climate Action



As a member of the G7 (Group of Seven) and the G20 (Group of Twenty), the UK participates in discussions and agreements related to climate change and sustainable development

### National

#### Climate Change Act 2008

- The Climate Change Act was passed in 2008, initially making it a legal duty for the UK to reduce greenhouse gas emissions by 80% by 2050 compared to 1990 levels. The UK Committee on Climate Change (CCC) was formed in the same year
- The UK revised its target of 80% reduction to a 'net zero' target for GHG emissions by 2050 through the Climate Change Act 2008 (2050 Target Amendment) Order 2019

#### Environment Act 2021

- The Environment Act allowed the UK to enshrine some environmental protection into law, offering new powers to set new binding targets for air quality, water, biodiversity net gain, and waste reduction

#### Build Back Greener

- The Government's main climate change policy document is the Net Zero Strategy (Build Back Greener), first published on 19 October 2021 and updated in April 2022. It set out policies and proposals for decarbonising all sectors of the UK economy to meet the Government's net zero target by 2050

#### Powering Up Britain

- Powering Up Britain and the Net Zero Growth Plan which sets out how the Government will enhance the country's energy security and deliver on our net zero commitments

### Local

- Hartlepool Borough Council committed to a climate pledge in 2021, to take a leading role and work with all stakeholders across the borough to take action against climate change
- The council's Net Zero Plan supports the delivery of outcomes under our climate pledge

In support of the Government's Net Zero 2050 target, many Local Authorities across the country have declared climate pledges and set out their own ambitious roadmaps to deliver on net zero locally. In 2021, Hartlepool Borough Council (HBC) committed to taking a leading role and working with everyone across the borough to act on the causes and impacts of climate change by making our own climate pledge. Hartlepool Borough Council is fully committed to reducing the council's GHG emissions in delivering its services, and limit its contribution to the climate crisis. We set a target of reaching net zero across all council operations by 2050, in keeping with the national target.



## 2050

Target year for Net Zero HBC emissions and legally binding target for reduction to zero of UK GHG emission

### **Net zero – what does it mean?**

*The UK is committed to reaching net zero GHG emissions by 2050. The term 'net zero' refers to the absolute balance between the inputs and outputs of something. When applied to the context of GHG emissions, this refers to the balance of emissions produced and the emissions sequestered. Therefore, achieving net zero GHG emissions allows for unavoidable emissions to be emitted into the atmosphere, but this must be negated by the absorption of the equivalent amount of emissions from the atmosphere by means of afforestation, other nature-based solutions or new sequestration technologies.*

It needs to be recognised that with less funding and smaller cash flows, tighter resources, lower purchasing power, and older building assets and infrastructure, smaller and rural councils such as HBC have a slight disadvantage on their journey to net zero when compared to larger councils. Despite these challenges, HBC is determined to achieve its targets. The steps and interventions that we will take in order to reach net zero by 2050 are set out in this document.



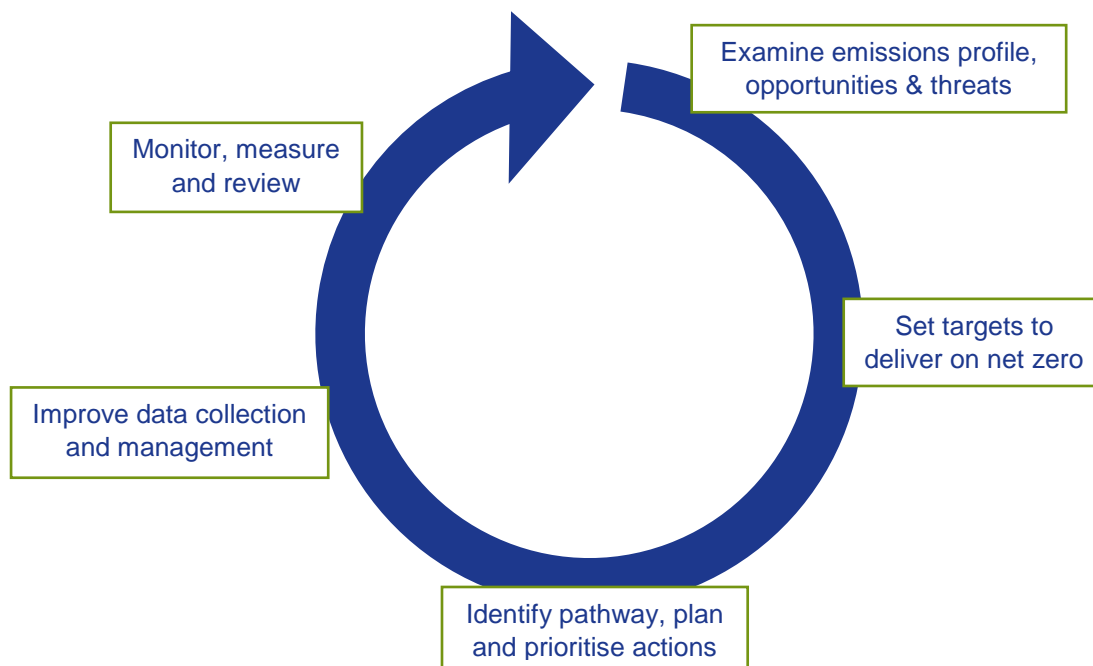
# Approach to the Framework



## 5 Approach to the Framework

This report draws together the current findings from three key strands of data: a carbon accounting exercise, consultation with Lead Officers, and a wider internal staff survey. We gathered data on our emissions, climate risks and developed an understanding of the current situation, the barriers and opportunities for change. Our approach initially looked at our emissions profile to establish a baseline detailing an inventory of emission sources, providing a reference point to track our changing emissions over time. This was supported by an internal staff survey and the examination of existing policies, projects and programmes. It enabled us to understand what climate change meant to HBC colleagues and provided valuable information that helped us to identify strategic focus areas for action. While the consultation with our Lead Officers allowed us to plan and prioritise the actions to target the areas with the most significant sources of emissions. Ongoing review and monitoring will track our progress on delivering on these actions – a great opportunity for us to understand our successes and identify the areas where more action is needed to deliver on our targets. The 2023 approved plan will be reviewed and updated after five years. Each subsequent updated plan will undergo the same process of revision and publication. Greater detail of the monitoring and reporting procedures will be discussed in the Governance Framework section.

Figure 8 – Framework overview



# Our Current Carbon Footprint



## 6 Our Current Carbon Footprint

An essential step to evaluate our contribution to climate change and develop an action plan is to understand the sources of our emissions and how much is emitted. This is known as a carbon footprint; the total amount of GHGs produced as a result of our activities.

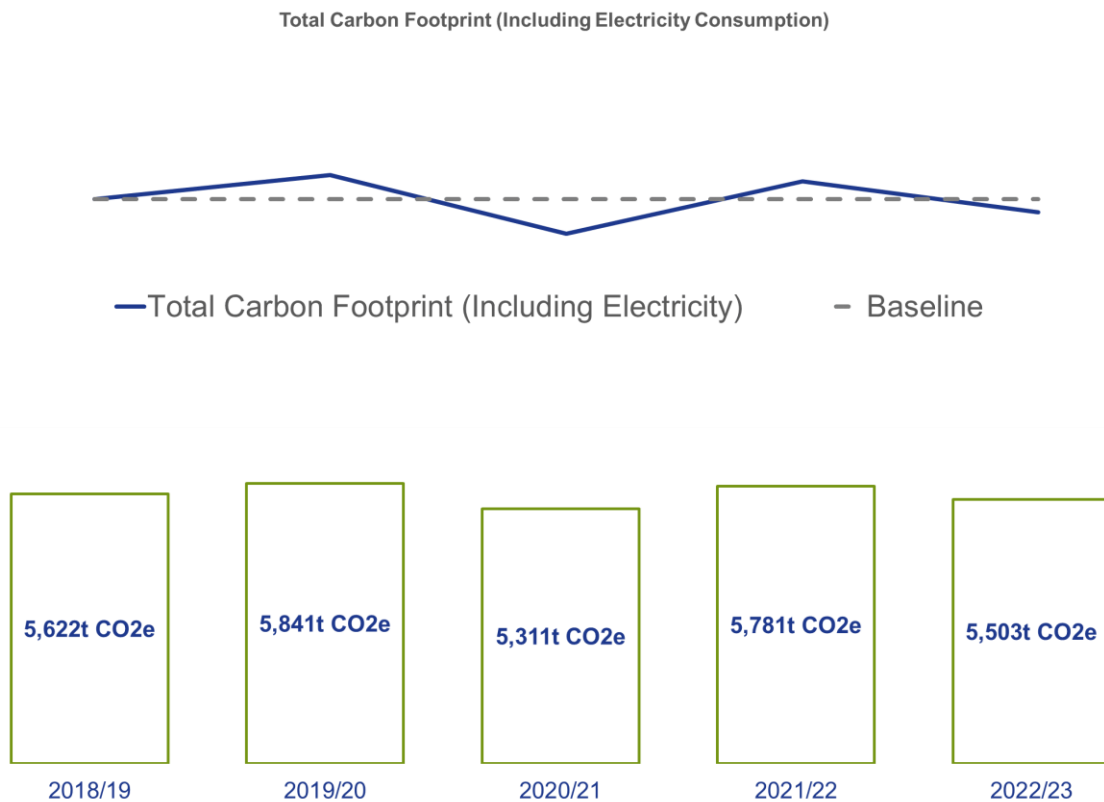


**5,503 tCO<sub>2</sub>e**

Hartlepool Borough Council  
emissions in 2022/23

As this is our first climate emergency response and net zero strategy, we conducted carbon audits for the financial years from 2018/19 through to 2022/23, setting the 2018/19 period as our baseline year. The financial year 2018/19 was chosen as the baseline year as it was the earliest date with complete and comparable data. This measure will allow us to track, monitor and compare progress on our corporate CO<sub>2</sub>e emissions over time. Figure 9 shows a column chart and a line chart compared to baseline emissions providing a visual description of our changing emissions throughout the years.

Figure 9 Total carbon emissions equivalent for each year, including electricity

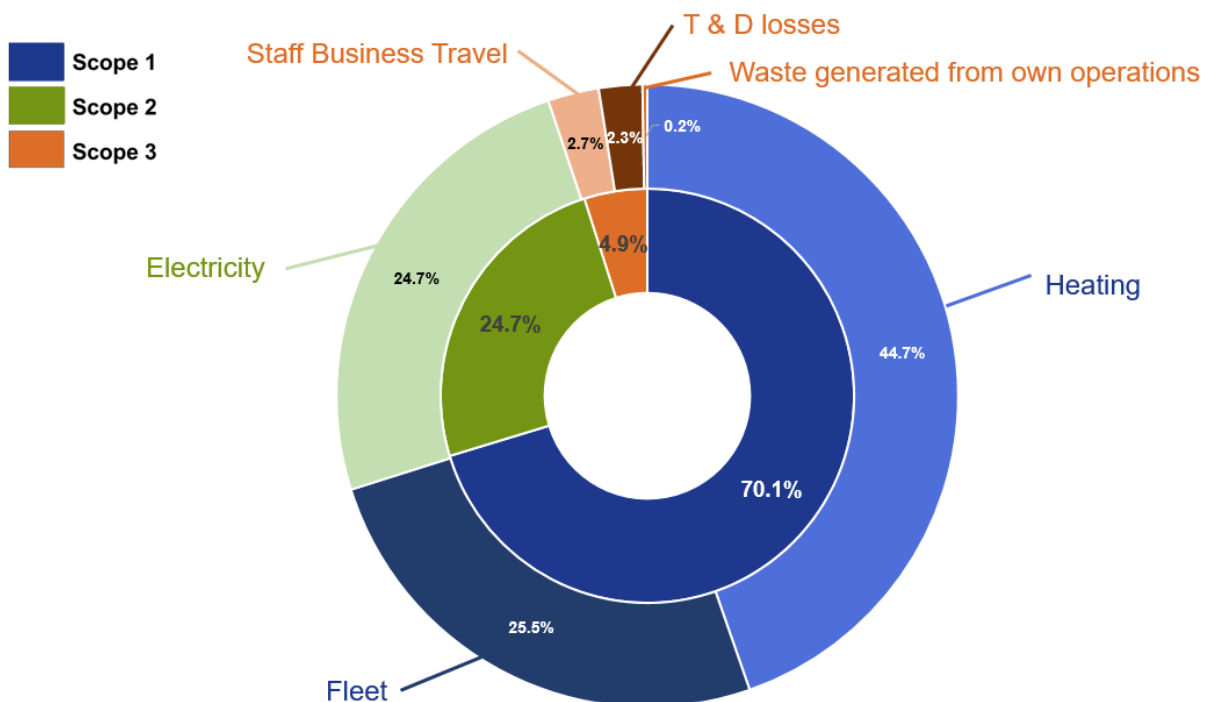


Carbon audits allow organisations to understand their carbon footprint, identify key opportunities to reduce emissions, set robust targets, and to develop the best strategic approach to achieve them. Greenhouse gases can be categorised into three scopes when conducting a carbon audit. These are:

<p><b>Scope 1</b> Direct emissions – a result of direct fuel combustion by the organisation through activities such as heating and the use of fuel in fleet vehicles</p>	<p><b>Scope 2</b> Indirect emissions - purchased energy such as electricity and steam</p>	<p><b>Scope 3</b> Emissions that are not produced by the organisation but are those that it is indirectly responsible for – examples include business travel, waste disposal, and purchased goods and services</p>
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Taking a look at Figure 9, not much of a trend can be established as emissions fluctuate from year to year. In order to provide a better picture of how we are doing, we decided to include emissions data for 2022/23 within this report, though readers should keep in mind that this data is a provisional figure at the moment. The most recent emissions total of 5,503 tCO<sub>2</sub>e for 2022/23 is 4.8% lower than the previous year and 2.1% lower than the baseline year of 2018/19. A breakdown of emissions by activity for 2022/23 is set out in Figure 10. Overall, CO<sub>2</sub>e emissions from the council’s land and building assets in 2022/23 were 3,817tCO<sub>2</sub>e, with approximately 64.4% of emissions resulting from the heating of buildings, the largest contributor of emissions (Figure 10). The council’s next biggest source of emissions is its fleet, contributing to 25.5% of total emissions.

Figure 10 - HBC 2022/23 Emissions Profile



Currently, Scope 3 emissions only account for staff business travel, electricity transmission and distribution losses, and the amount of waste generated from HBC operations. It is important to note that a large portion of our Scope 3 emissions is not included in HBC’s overall footprint, which when calculated would significantly alter the emissions profile. The calculation of these emissions are omitted due to the complexity in accounting for these emissions. Moving forward, HBC will seek to expand on its accounting of these upstream and downstream emission sources for a more holistic understanding of HBC’s carbon footprint.



**2,457 tCO<sub>2</sub>e**

Emissions from gas heating council buildings in 2022/23 (44.7% of total emissions)



**1,402 tCO<sub>2</sub>e**

Emissions from the council’s fleet of vehicles in 2022/23 (25.5% of total emissions)

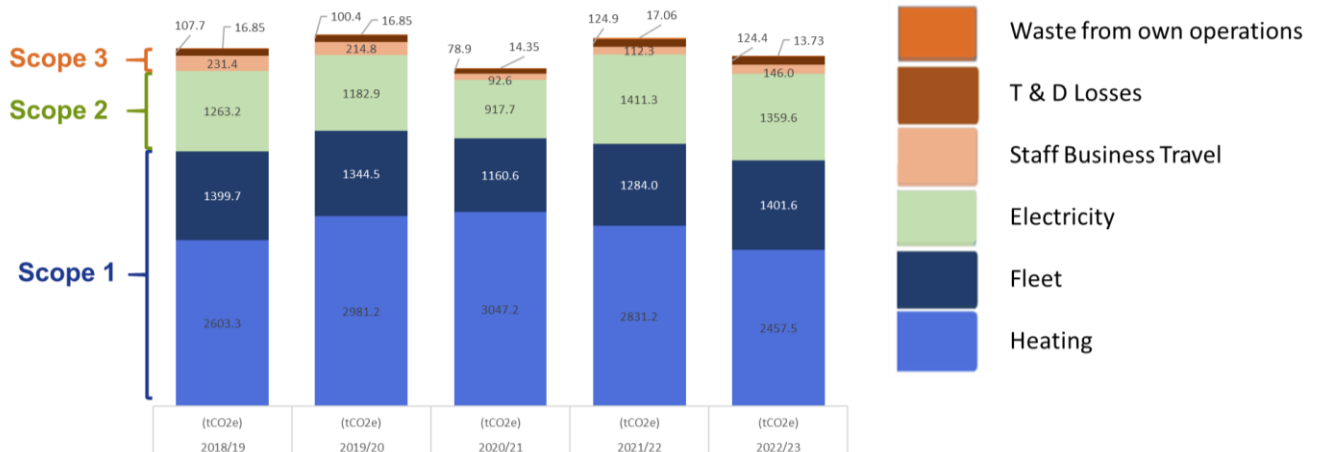


**1,360 tCO<sub>2</sub>e**

Emissions from electricity in council buildings and street lighting in 2022/23 (24.7% of total emissions)

Compared to the baseline year, emissions from gas heating dropped by 5.6% and electricity consumption increased by 7.6%, while staff business travel emissions reduced by 36.9%. Figure 11 below shows the changes to the proportion of emissions sources between 2018/19 and 2022/23.

Figure 11 A comparison of HBC emissions profile by financial year

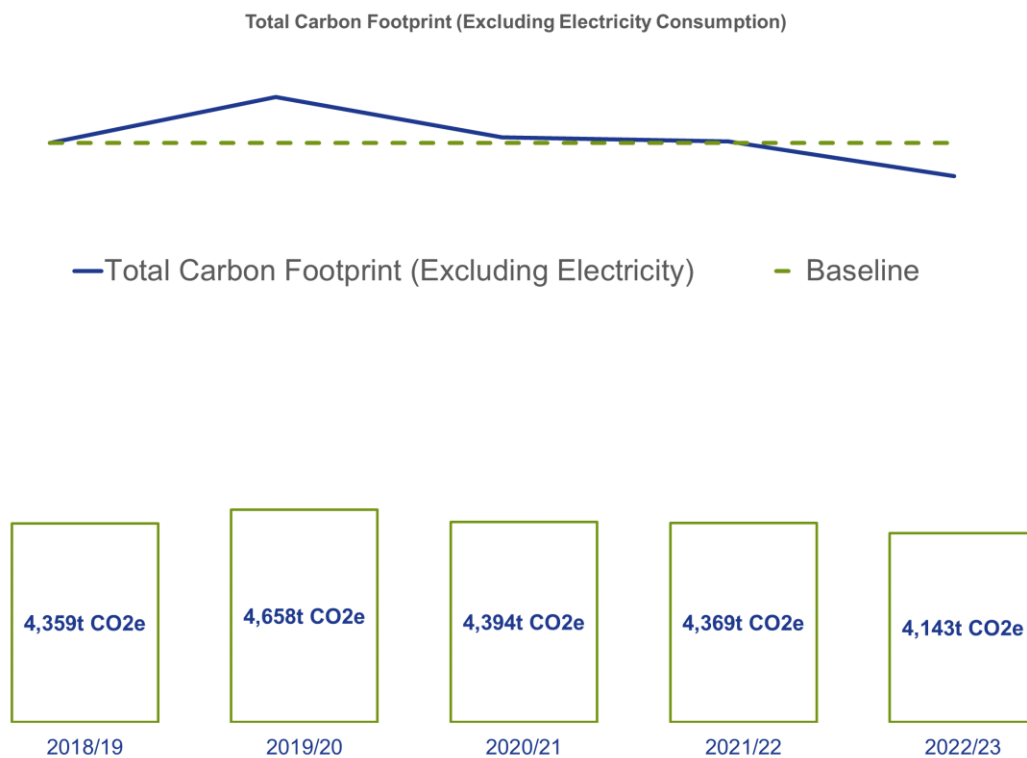




## Exclusion of Scope 2 Emissions

The council began purchasing low carbon electricity since April 2019 for all of its buildings and on-site electric vehicle charging, supplied wholly by renewable sources as verified by The Carbon Trust and backed by Renewable Energy Guarantees Origin (REGO) certificates.<sup>12</sup> This opens the opportunity to consider the offsetting of emissions produced through HBC’s electricity use. The carbon footprint of purchased electricity still uses the emission conversion factors for transmission and distribution as provided by the Department of Energy Security and Net Zero for reporting purposes as the electricity still travels through the national grid. To see how this affects HBC’s carbon footprint, a revised trend line and column chart is provided below in Figure 12, with Scope 2 emissions excluded. Transmission and distribution emissions remain.

Figure 12 Total carbon emissions equivalent for each year, excluding scope 2 emissions



When Scope 2 emissions are excluded, the total emissions from council activity rose in the 2019/20 financial year and have since fallen year on year. The 2020/21 emissions were similar to but slightly higher than the 2018/19 baseline though this year was likely to be heavily impacted by the Covid-19 pandemic. 2021/22 saw a small reduction and levels remained similar to the 2018/19 baseline. The latest figures show a 5.2% annual reduction in emissions which is equivalent to 223 tCO<sub>2</sub>e.

<sup>12</sup> NEPO extends award-winning Electricity framework for a further two years, NEPO, 2022. Available at: [NEPO extends award-winning Electricity framework for a further two years](#)

**5.2%**

Reduction in 2022/23 HBC carbon footprint compared to previous year (4.8% if electricity included)

It is important to remember that even though the council's purchased electricity is low carbon, it does not mean that it can be used indiscriminately. During times of peak demand for electricity the amount of low or zero-carbon electricity supplied may not meet the increased demand, meaning excess electricity demand will have to be met by other means, namely, fossil fuels. It is therefore essential that HBC continues to work on improving energy efficiency and increasing renewable generation.



# Our Achievements



## 7 Our Achievements

Hartlepool Borough Council has already been delivering important actions to decarbonise our operations and tackle the climate crisis.

<b>Hartlepool Local Plan</b> <ul style="list-style-type: none"> <li>• Adopted the Local Plan in 2018</li> <li>• The Local Plan covers topics on climate mitigation and adaptation, sustainable transport networks, the natural environment, green infrastructure and ecological networks</li> </ul>
<b>Climate Pledge</b> <ul style="list-style-type: none"> <li>• Adopted our first Climate Pledge in December 2021, committing to deliver on 7 key priorities including setting out a clear timetable in our Net Zero Plan and to become a net zero emissions local authority</li> </ul>
<b>Sustainable Warmth Scheme</b> <ul style="list-style-type: none"> <li>• Council of the Year - North East Regional Energy Efficiency Awards 2021 and 2022</li> <li>• Secured a combined total of £2,476,000 in funding to deliver on home energy efficiency improvements</li> <li>• Processed over 600 applications</li> <li>• Delivered on over 140 homes with over 244 improvement measures</li> </ul>
<b>Public Sector Decarbonisation Scheme</b> <ul style="list-style-type: none"> <li>• £272,500 funding secured for energy efficiency improvements to four buildings: Civic Centre, Town Hall Theatre, Brierton site, and Masefield Centre</li> <li>• LED lighting improvements across the project buildings</li> <li>• Installation of an air source heat pump (ASHP) at the Masefield Centre</li> <li>• Experienced CO<sub>2</sub> reductions of 28.9 tCO<sub>2</sub> and over 410,000kWh in energy savings. Carbon savings are expected to increase to 48.6tCO<sub>2</sub> as we await data results to come in</li> </ul>
<b>Biodiversity</b> <ul style="list-style-type: none"> <li>• Enhancing biodiversity, in particular invertebrates, within our parks</li> <li>• Creation of green corridors, wildflower meadows and herbicide-free zones</li> <li>• Previous works together with the Environment Agency on the re-naturalisation of Burn Valley Beck in 2010</li> </ul>
<b>Air Quality</b> <ul style="list-style-type: none"> <li>• No exceedance of any air quality objectives in Hartlepool</li> <li>• New actions to improve air quality set out in the 2022 Air Quality Annual Status Report</li> <li>• Added 5 additional non-automatic nitrogen dioxide (NO<sub>2</sub>) monitoring sites in 2022</li> </ul>
<b>In the wider Tees Valley</b> <ul style="list-style-type: none"> <li>• Trees on Tees Woodland Creation Partnership</li> <li>• Together with Darlington, Middlesbrough, Redcar and Cleveland, and Stockton-on-Tees, formed an umbrella body known as the Tees Valley Combined Authority, targeting for Net Zero by 2050</li> <li>• One of only two locations chosen to build on local innovation strengths - pilot hydrogen production and carbon capture, utilisation and storage (CCUS)</li> <li>• Tees Valley hosting the National Hydrogen Transport Hub</li> </ul>



# £2,476,000

Secured in funding to deliver home energy efficiency improvements

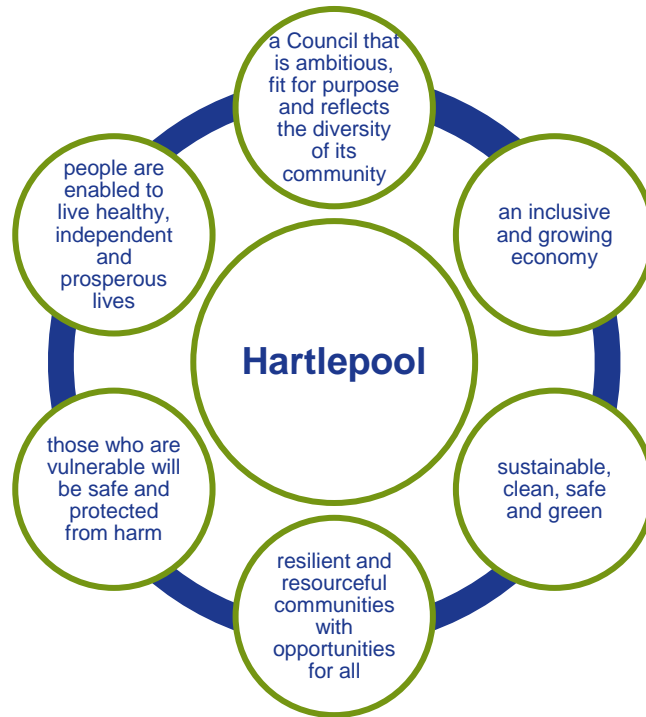
# Our Vision for a Low Carbon Future



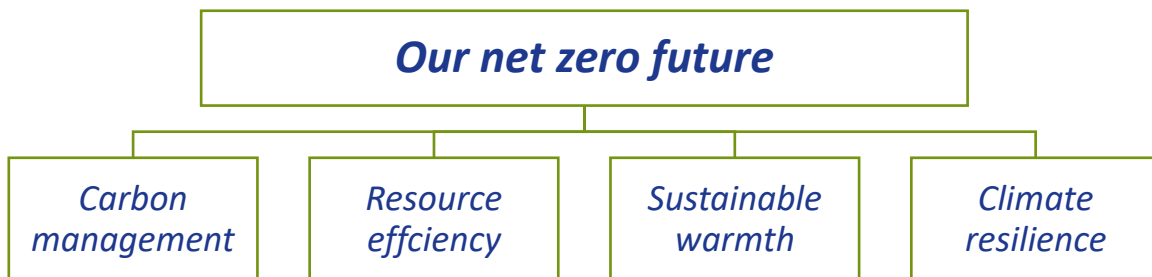
## 8 Our Vision for a Low Carbon Future

The authority formally adopted a new Council Plan covering the period up to 2023/24 setting out our vision for Hartlepool.

Figure 13 Hartlepool Borough Council - Council Plan 2021-24



Our ambition is for Hartlepool to be a thriving, green and low-carbon neighbourhood and economy. We will endeavour to support the Central Government on the UK’s journey towards Net Zero by 2050. We will lead by example by tackling our own emissions and decarbonise our operations. The council’s net zero strategy is guided by the following overarching vision for effective carbon management, resource efficiency, sustainable warmth and climate resilience.



As we work towards achieving our emission goals, the council will ensure that efforts to reduce emissions will not undermine the delivery of the essential services that we provide to the residents of the borough. Armed with a climate strategy, we aim to make Hartlepool a greener and healthier place to live. The strategy is designed to keep in line with our overall vision outlined in the Local Plan, and to ensure the efficient allocation of resources directed to the right areas within the authority to create the biggest impact. It will also touch on areas further afield where the council may have the ability to influence change.

## Our Goal

Our goal is for Hartlepool Borough Council to stop all contributions to climate change by 2050 and demonstrate leadership to other places in the UK and globally. Our climate pledge has paved the way to net zero by 2050 and we are now taking the steps to deliver on this. There is no quick fix for climate change and it is a process that will take time; however, we are aware that immediate action is needed. Our primary focus is to address CO<sub>2</sub> emissions as this GHG can persist in the atmosphere for hundreds of years after being released. Alongside reducing emissions, we will also make the borough more resilient to the impacts of climate change we are already experiencing. The next step in this journey will be to expand this boundary to include the wider jurisdiction's emissions by working together with all stakeholders across the borough.

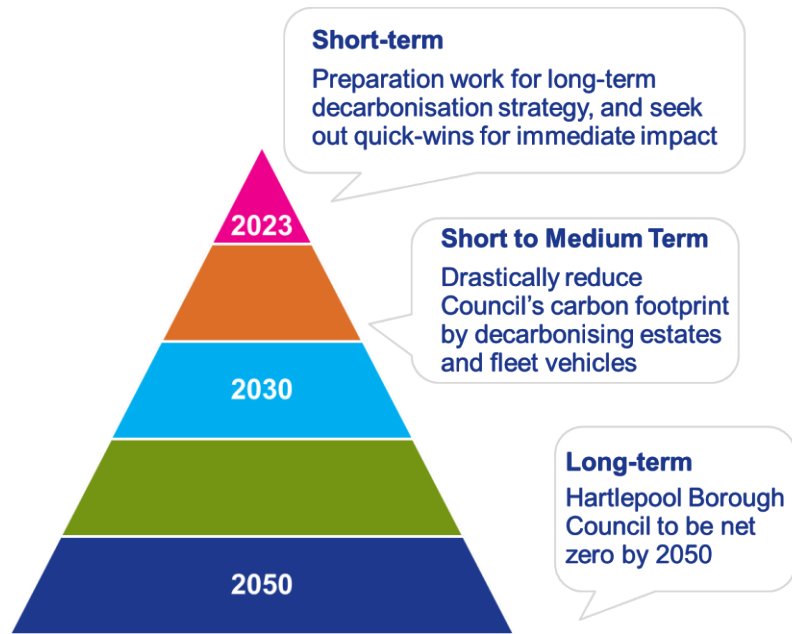


Figure 14 - Our goals for the short, medium and long term

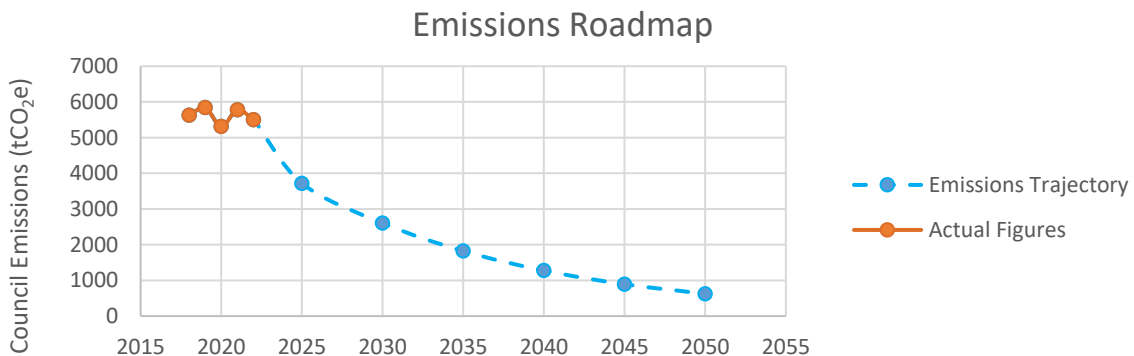


**30%**

Targeted reduction in GHG emissions every 5 years

We are targeting a trajectory of 30% emission reductions for every 5 years. That would mean a 54% reduction by 2030 compared to our baseline year of 2018. This would leave us with a small amount of remaining emissions to be offset in 2050.

Figure 15 Current and future potential emissions trajectory for Hartlepool Borough Council



The strategy is based on five aims for carbon reduction and sustainability encompassing a series of objectives that identify the actions we need to take in order to realise them. Although broken down into separate categories, these aims and objectives are by no means independent of each other, meaning that there will be instances where an aim or objective may be cross-cutting across between areas and can have a synergistic effect.

### **Reduction of local authority CO<sub>2</sub> emissions**

- Reduce energy demand and improve energy efficiency
- Increase sustainable energy capacity
- Reduce fleet emissions
- Work with people to inspire change

### **Resource maximisation & waste reduction**

- Improve waste management to maximise use of existing resources
- Sustainable purchasing and procurement of goods and services

### **Domestic energy and sustainable warmth**

- Improve domestic energy efficiency to reduce energy demand
- Support shift towards sustainable energy in the domestic sector

### **The natural environment**

- Maintain good local air quality
- Protect existing natural habitats
- Expand and connect natural habitats and increase tree cover

### **Climate resilience and adaptation**

- Adapt the built and natural environment to current and future climate change impacts
- Review our progress on net zero
- Work towards sustainable development



## Strategy Aims and Objectives

The council has identified five key areas of action to tackle climate change. In this section, we set out the context for the strategy to deliver the council's own Net Zero 2050 target and touch on how we may be able to guide, influence and support wider emission reductions within Hartlepool. A full list of potential actions are set out in the Climate Emergency Response and Net Zero Action Plan in Appendix A.

### Reduction of Local Authority CO2 Emissions

- Reduce energy demand and improve energy efficiency
- Increase sustainable energy capacity
- Reduce fleet emissions
- Work with people to inspire change

The council recognises that reducing our own carbon footprint is a crucial step for local authorities in their efforts to play their part to combat climate change. As part of the council's strategy to decarbonise the delivery of its services, we will seek to tackle this challenge head on, taking multiple approaches from practical steps to reviewing new policies in order to ensure that both climate change and our carbon footprint are always considered at all levels of the decision-making process. We aim to build on all the hard work our colleagues have already put into this front.

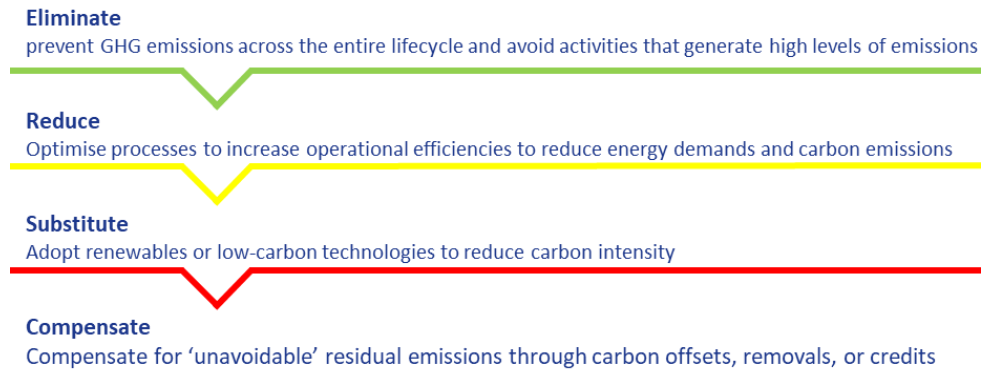
#### ***What is a 'carbon budget'?***

*A carbon budget is the permitted and cumulative total amount of carbon dioxide that can be released over a specific period of time. It stands as a cap on the total greenhouse gas emissions, which should not be exceeded, to meet emissions reduction commitments. Carbon budgets have become a core component for analysing the potential implications of our actions in a carbon-constrained future and can help with developing a decarbonisation plan.*

*Carbon budgets can be applied to at various scales from individual corporations to a national level.*

We have chosen to adopt the carbon management hierarchy as our framework for streamlining the way we handle our greenhouse gas emissions.<sup>13</sup> This hierarchy will serve as our compass, directing us in the best course of action to manage these emissions effectively. It comprises four key steps, each with its distinct purpose, aimed at reducing our environmental footprint; firstly, avoiding any activities that generate high levels of emissions where possible, secondly reducing carbon-intensive activities, thirdly substituting energy sources for sustainable ones and finally, compensating any unavoidable emissions.

Figure 16 The carbon management hierarchy



Firstly, we will make every effort to avoid engaging in activities that result in high levels of emissions whenever possible. This means we will be proactive in identifying and curtailing practices that contribute significantly to GHG emissions. Secondly, we are committed to minimizing carbon-intensive activities within our operations. This involves a systematic review of our processes and practices to identify areas where we can reduce our carbon footprint, thus lessening our impact on the environment. Thirdly, we will substitute our existing energy sources with sustainable alternatives where possible to further diminish our reliance on carbon-intensive power generation. Lastly, as part of our comprehensive approach, we recognise that there may be unavoidable emissions that we cannot eliminate entirely. In these cases, we will take responsibility for our carbon footprint by implementing measures to compensate for these emissions. This could involve investing in carbon offset projects or other similar initiatives.



<sup>13</sup> GHG Management Hierarchy updated for net-zero, IEMA, 2020. Available at: [GHG Management Hierarchy updated for net-zero](#).

## Building Assets

### Our Purchased Electricity

In 2019, Hartlepool Borough Council made the switch to low carbon electricity. Through the NEPO framework, all of the council's buildings and on-site electric vehicle charging points are supplied by EDF's 100% zero carbon and renewable energy as verified by The Carbon Trust and backed by REGO (Renewable Energy Guarantees Origin) certificates.<sup>14</sup> The zero carbon electricity purchased is still however, supplied via the National Grid network. This means that customers, such as ourselves, receive electricity via the National Grid and not directly from zero carbon electricity generators and therefore the transmission and distribution of electricity still incurs a carbon cost. It must also be noted that during periods of peak demand the amount of low or zero carbon electricity supplied may not meet the increased demand. This means that excess electricity demand will have to be met by other means, primarily, fossil fuels. We are, however, moving in the right direction by supporting low and zero carbon electricity generation with the grid currently in a transitional state as we slowly shift towards sustainable energy altogether. With the policies and proposals set out in the government's Build Back Greener strategy, the UK's power system will hopefully be fully decarbonised by 2035.<sup>15</sup>



# 100%

Of HBC's electricity purchased is from renewable sources

### Our Gas Consumption

As illustrated in Figure 10 heating of our buildings make up for the majority of our emissions, but this also offers the biggest opportunity for carbon savings. We will continue to reduce our reliance on fossil fuels as the main energy source for our buildings and increase our own decentralised electricity generation capacity. Some of the works that we have already carried out on our properties include upgraded LED lighting to a number of our buildings including the Civic Centre, a replaced gas boiler with a low carbon air source heat pump at an office-cum-community centre, and a combined 88kWp of solar panels installed across a number of our buildings.



# 26.3%

Of council gas heating emissions are from Mill House Leisure Centre

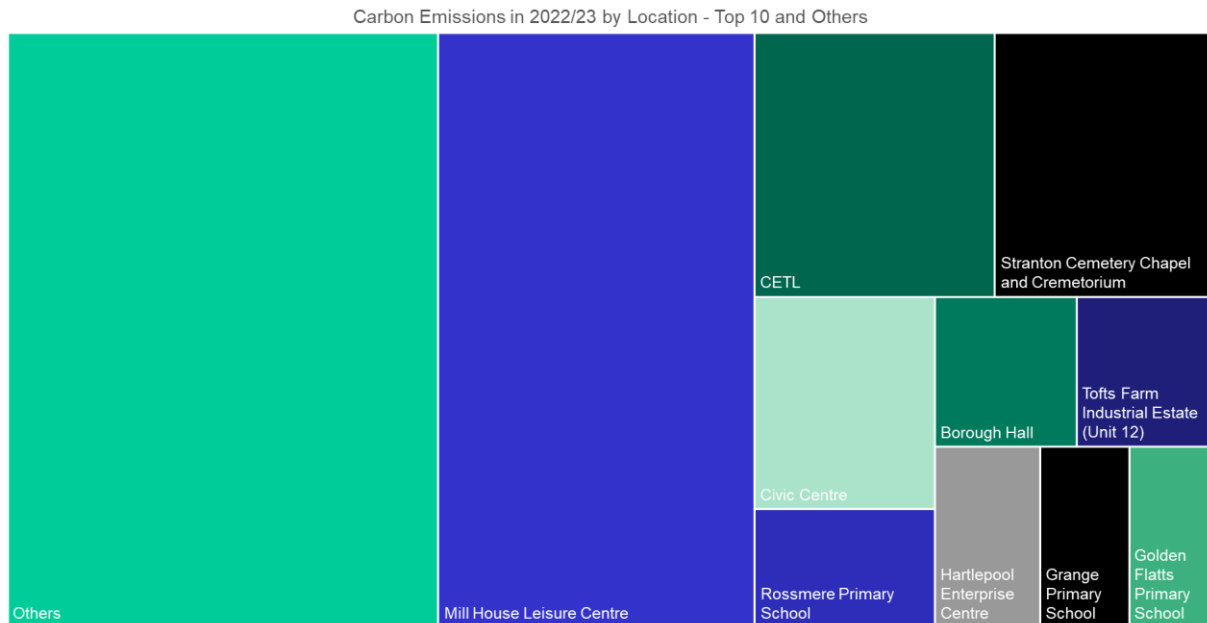
In 2022/23, 64% of our asset emissions derived from the burning of gas used for heating, equivalent to 2,458tCO<sub>2</sub>e. Mill House Leisure Centre was the location with the highest emissions followed by the Centre for Excellence in Teaching and Learning (CETL) and

<sup>14</sup> NEPO extends award-winning Electricity framework for a further two years, NEPO, 2022. Available at: [NEPO extends award-winning Electricity framework for a further two years](#)

<sup>15</sup> Net Zero Strategy: Build Back Greener, UK GOV, 2022. Available at: [Net Zero Strategy: Build Back Greener](#)

Stranton Cemetery and Crematorium. These 3 assets alone contributed to over two-fifths (43.1%) of total emissions from gas. Civic Centre, Rossmere Primary School, Borough Hall, Tofts Farm Industrial Estate, Grange Primary School, Hartlepool Enterprise Centre and Golden Flatts Primary School complete the top 10 list of single highest emitters by gas use. Together, these top 10 assets make up for almost 65% of the emissions from gas consumption. This information is illustrated in Figure 17 below. This data highlights the assets that need attention to decrease gas consumption and achieve the most substantial contributions to carbon reduction.

Figure 17 Carbon emissions from gas heating in 2022/23 by location

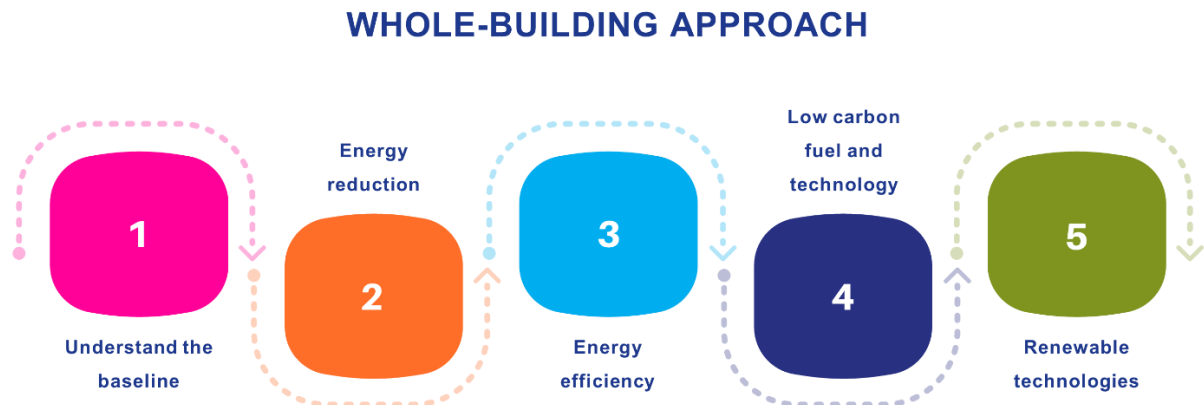


### Taking the whole-building approach

We will continue to invest in retrofitting and decarbonising our buildings by taking the whole-building approach. The whole-building approach is a pragmatic approach towards a net zero future. It applies the logic of reducing energy demand by as much as possible before considerations are made for cleaner sources of fuel, and finally renewables, to offset consumption.

- (1) Gather energy information about each building, including energy consumption, financial costs and carbon emissions. This will become a reference point (baseline) for the comparison of the impacts of interventions
- (2) Investigate low-cost measures that are quick and easy to implement to reduce consumption and the amount of energy demand. This could include simple measures such as setting the thermostat 1°C lower
- (3) Upgrade inefficient technology with newer, more energy efficient replacements to reduce energy consumption and ensure that energy is used as efficiently as possible. This stage might look at improvements to building equipment such as low carbon heating and cooling, or fabric insulation upgrades
- (4) Utilise low carbon fuel and technologies to make a shift away from the use of fossil fuels which are often used for heating and hot water
- (5) Finally, consider renewable energy technologies such as solar panels to generate electricity locally to reduce the dependency on grid electricity. This also builds resilience to any potential energy shortages and price hikes

Figure 18 Taking the whole-building approach to reduce overall emissions



By implementing the whole-building approach, we will also be applying the GHG management hierarchy<sup>16</sup> of emissions management which prioritises those actions which have the greatest impact by:

- Eliminating unnecessary emissions by avoiding activities that generate high levels of emissions
- Reduce emissions where possible by increasing efficiency and optimising approaches
- Substitute carbon intensive activities with low carbon alternatives
- Compensate for any remaining unavoidable emissions through emission removals, offsets and carbon credits

In today's economic climate, many organisations are continually challenged to optimise resources, streamline operations, and maximise efficiency. Public sector organisations are under increasing pressure to identify significant savings yet deliver more with fewer resources. One of the key aspects that can significantly influence an organisation's performance is in its estate management. This is a strategic approach to maximising the space efficiency of an organisation's property portfolio, ensuring that all assets, including land and property, are utilised optimally.

With the increased prevalence of hybrid and remote working models, estate rationalisation has become even more critical for us in adapting to the evolving needs of the organisation. One potential course of action that we can consider to address this challenge involves adopting a phased approach to rationalise our assets. This approach entails a comprehensive review of the usage and reduction of our property assets, with a particular emphasis on optimising the utilisation of our headquarter buildings. In doing so, this can lead to multiple benefits including reduced associated maintenance costs, energy use and carbon emissions and therefore contribute to delivering revenue savings across all properties in 2023/24 and beyond.

When it comes to new construction projects and acquisitions, we intend to adopt a somewhat different approach. Our goal is for long-term capital initiatives to not only deliver on short-term advantages but also to strategically minimise carbon footprints while enhancing the

<sup>16</sup> GHG Management Hierarchy updated for net-zero, IEMA, 2020. Available at: [GHG Management Hierarchy updated for net-zero](#).

performance in the long run. To achieve this, we will take the following steps into consideration:

1. We will assess the presence of locked-in or embedded carbon by exploring innovative technologies, materials, and construction methods. This proactive approach will help us prevent potential issues in the future that may necessitate costly retrofitting and decarbonisation efforts
2. We will advocate for Central Government to establish higher, mandatory national standards for the development sector. Furthermore, we will support these standards through the implementation of our planning policy framework
3. Our future builds will prioritise designs aimed at reducing carbon emissions and ensuring adaptability to the changing climate and its associated impacts
4. We will optimise the utilisation of decentralised renewable energy systems and low-carbon technologies, especially in large-scale developments



## Streetlights

All of Hartlepool Borough Council's streetlights have already been converted to energy-efficient LEDs which, at the time, cut electricity consumption by almost half. As previously mentioned, despite being powered by renewable sources it is still important that we reduce our use of electricity by as much as possible, thus we will continue to strive to reduce the overall amount of electricity we use for street lighting. Streetlights in public carparks, promenades, and gardens are switched off between the hours of 12am and 5am, and streetlights are armed with in-built photocells/photosensors which act as light sensors and make the lamps light up only when it is dark. At the moment, HBC are trialling ten solar-powered streetlights across the town. Streetlights that harness solar power have the capability to transform solar energy into electrical energy, which is subsequently stored within an integrated battery. This stored energy is then utilised to operate the streetlight's illumination from dusk to dawn.



# 100%

Of HBC street lighting uses energy efficient LED bulbs

Illuminated road signs, bollards, and traffic signals draw power from the same electrical source that provides energy to our streetlights. In areas where it has been deemed safe and appropriate, we have undertaken de-illumination efforts to lower our electricity consumption. To achieve even greater reductions in our electricity usage, we will persist in extending the de-illumination of road signs and bollard lighting units. Furthermore, we remain committed to exploring the feasibility of innovative solutions that can further reduce our energy consumption for street lighting purposes.

## Fleet

All emissions from HBC's own fleet vehicles fall under Scope 1. These fleet emissions constitute a substantial 25.5% of our total emissions, highlighting the urgent need for action to align with our net-zero target. Our fleet vehicles serve essential functions across multiple teams within the council, including Environmental Services, Highways and Engineering, Cleansing, and Horticulture teams. Currently, the majority of HBC's fleet relies on diesel fuel.

Point 4 of the UK Government's Ten Point Plan for a Green Industrial Revolution, titled "Accelerating the Shift to Zero Emission Vehicles," underscores the government's commitment to transitioning to electric vehicles (EVs) as a means to create job opportunities, reduce emissions, and bolster the British industry while ensuring continued mobility. Additionally, the UK Government's Transport Decarbonisation Plan (TDP) outlines a comprehensive vision for achieving net-zero transportation by 2050, emphasizing increased active travel, adoption of zero-emission vehicles, and decarbonisation across rail, maritime, and aviation sectors.<sup>17</sup>



# 34.7%

Of Fleet Emissions are from waste-management vehicles

Electrifying an entire fleet all at once can be prohibitively expensive and impractical, particularly for heavy-duty vehicles like refuse trucks. In the near term, we are exploring alternative fuels, such as hydrotreated vegetable oil (HVO). HVO is a biofuel derived from various sources, including plants, algae, or animal remains. Unlike traditional liquid fuels like

<sup>17</sup> Decarbonising transport: a better, greener Britain, Department for Transport, 2021. Available at: [Decarbonising Transport – A Better, Greener Britain \(publishing.service.gov.uk\)](https://www.gov.uk/government/publications/decarbonising-transport-a-better-greener-britain)

petrol and diesel, biofuels like HVO are considered green and renewable energy sources due to their replenishable nature. One key advantage of HVO is its compatibility with diesel-powered vehicles, requiring no adjustments or modifications to diesel engines, ensuring a seamless transition. As a sustainable fuel, HVO offers a significant opportunity to dramatically reduce emissions in the short term, serving as an excellent transitional fuel. By replacing and consuming the same quantity of HVO as diesel in 2022/23, we could have avoided a staggering 98.6% of fleet carbon emissions. Furthermore, HVO may yield benefits in fuel efficiency and reduced maintenance and repair costs. It's essential to note that while HVO presents numerous advantages, it typically comes at a higher cost than traditional diesel, may necessitate changes to existing storage and refuelling infrastructure, and, despite supply chain improvements, may occasionally experience volatility. Nevertheless, HBC is committed to exploring this opportunity and plans to trial HVO fuel with our fleet vehicles as a transitional solution, following the lead of other local authorities like Redcar and Cleveland<sup>18</sup>. Building on our robust collaborations with other local authorities, we will work closely to share knowledge and advice regarding this technology.

Looking ahead, our long-term objective is to operate a fleet powered by alternative fuels by the mid-2030s, significantly reducing HBC's carbon footprint over this period. Two viable options for achieving this goal are electric vehicles and hydrogen-powered vehicles. Hartlepool's Local Transport Plan (LTP3) for 2011-2026 underscores our commitment to expanding electric car provision within the council and establishing an extensive charging infrastructure accessible to residents, visitors, and businesses alike<sup>19</sup>. Furthermore, we are actively collaborating with fellow local authorities under the Tees Valley Combined Authority (TVCA) to spearhead the Electric Vehicle Charging Infrastructure Project for our region, ensuring its successful development and implementation.

While hydrogen power is another promising avenue, its large-scale rollout is still in its nascent stages compared to electric vehicles. The UK Hydrogen Strategy, published in 2021 and updated in December 2022, outlines the approach to developing the UK's low-carbon hydrogen sector, with a goal of achieving 10GW of low-carbon hydrogen production capacity by 2030. TVCA's net-zero strategy also highlights the creation of a National Hydrogen Transport Hub<sup>20</sup> as a top priority. Moreover, plans are underway to generate over 4GW of energy from hydrogen in Tees Valley by 2030. Given our advantageous location within the Tees Valley, we have the option to consider both electric and hydrogen-powered vehicles.



## 4 Gigawatts

Of energy from hydrogen planned to be produced in the Tees Valley by 2030

As public sector authorities, we have a duty to promote the adoption of clean and energy-efficient vehicles. When procuring or leasing vehicles, we will explore modifications to technical specifications related to energy consumption and environmental performance ratings throughout their entire lifespan to fulfil this obligation.

<sup>18</sup> Two North East local authorities trial HVO in diesel engines, NEPO, 2023. Available at: [Two North East local authorities trial HVO in diesel engines](#)

<sup>19</sup> Hartlepool Local Transport Plan (LTP3) 2011-2026, Hartlepool Borough Council, 2011. Available at: [Hartlepool's Local Transport Plan \(LTP3\) – Hartlepool Borough Council](#).

<sup>20</sup> The UK Hydrogen Strategy (2021) Available at: [UK hydrogen strategy - GOV.UK \(www.gov.uk\)](#)



## Paying for Net Zero – Invest to Save, Invest to Generate

Although every study shows that the cost of inaction on climate would be far greater than the cost of action, we still need to develop a funding scheme to deliver on net zero not to the detriment of delivering on our core services to the community.<sup>21,22,23</sup> At the moment, it is not clear what the full cost of achieving net zero will be. We have a rough idea of the financial cost for each specific action but further information on the detailed costs associated with each action will need to be developed as each action is addressed over the lifetime of the plan. To reach net zero domestically will require a wide range of investments in new assets such as electric cars, windfarms and heat pumps. We will explore investing in large scale off-site renewable energy projects such as solar and wind farms as well as retrofit works to incorporate decentralised electricity generation on suitable assets such as Tofts Farm, our fleet vehicle depot. In the long run these changes should lead to savings, meaning some of our low-carbon investments could ultimately pay for themselves, or even become a revenue stream.

### **Funding sources for net zero**

- *Hartlepool Borough Council Budget on a case-by-case basis*
- *Government funding schemes, such as the Public Sector Decarbonisation Scheme (PSDS), Public Sector Low Carbon Skills Fund, workplace charging scheme,*
- *Review of new and innovative private and public funding sources, such as green bonds, crowd funding*

## A Concerted Effort

Awareness, training and behavioural change are critical aspects to reaching net zero emissions as they influence how individuals, organisations and communities interact with energy, resources and the environment. We will ensure that all relevant senior management receive carbon literacy training to raise climate awareness and help them better understand how their services impact on our carbon emissions. Changing individual and collective behaviour and mind-sets also play an important role in reducing energy use by consumers, typically in everyday life, which tackle excessive or wasteful energy consumption. Actions as simple as communication campaigns can increase awareness and influence behavioural change. Through the application of the carbon management hierarchy, we aim to promote practices that help our staff reduce emissions when carrying out their work. This includes embracing advanced digital technologies for meetings rather than in-person gatherings. In-person meetings however, give participants the ability to engage more fluidly with one another, encouraging greater collaboration, participation and teamwork. Thus, when in-person meetings are necessary, group together in-person meetings that occur within a single geographic area to avoiding excessive trips and maximise travel efficiency. We will also thoroughly explore every opportunity available to us to reduce the number of business miles travelled in a private car, and encourage employees to opt for low-carbon transport options, such as walking or cycling, and using public transportation when feasible. In fact, HBC provides a fleet of bicycles that employees can borrow for both short and long-term use, complemented by induction courses on basic cycle training. We intend to enhance communication of these resources to encourage employee uptake for commuting to and from on-site meetings within the Borough and nearby locations.

<sup>21</sup> Adapt Now: a global call for leadership on climate resilience, Global Commission on Adaptation, 2019. Available at: [Adapt Now: a global call for leadership on climate resilience](#)

<sup>22</sup> The human cost of disasters: an overview of the last 20 years (2000-2019), United Nations Office for Disaster Risk Reduction, 2020. Available at: [The human cost of disasters: an overview of the last 20 years \(2000-2019\)](#)

<sup>23</sup> The economic consequences of climate change, OECD, 2015. Available at: [The economic consequences of climate change](#)

## Council's Resource Maximisation & Waste Reduction

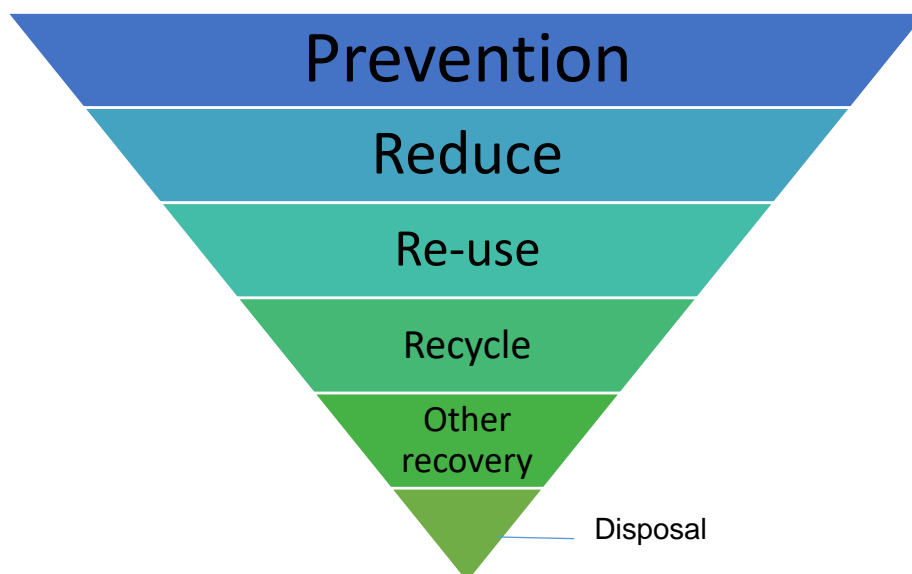
- Improve waste management to maximise use of existing resources
- Sustainable purchasing and procurement of goods and services

### Resource efficiency and waste minimisation

The concept of a linear economy is evidently unsustainable. It is imperative that we alter our perspective on waste, viewing it not as a problem but as a valuable resource. Recognising waste as a resource highlights the importance of transitioning to a 'circular' economy, where we strive to keep resources in use for as long as possible, extracting their maximum value.

By embracing the principles of the circular economy and adhering to the waste management hierarchy (Figure 19), our aim is to recover and regenerate products and materials whenever feasible, thereby prolonging their useful life. This shift in behaviour becomes crucial once again, prompting us to launch a recycling communications campaign across all council services. This campaign will disseminate key messages that encourage resourcefulness, waste reduction, and steps we can take to decrease our carbon footprint.

Figure 19 Waste management hierarchy



We will additionally explore the potential for launching a pay-as-you-throw pilot scheme based for council departments. This initiative is aimed at discouraging waste generation within our facilities and fostering enduring changes in behaviour. We anticipate that implementing such a program can lead to a reduction in waste production while incentivising departments to prioritise waste reduction, reuse, and recycling.

*'If you can't measure it, you can't manage it'*

Currently, our calculations regarding the quantity of waste generated by our own operations are based on estimates. However, we will soon be in a position to collect actual waste data, and we will commence this data recording as soon as we are fully prepared to do so.

Further afield, we are actively supporting the TVCA's comprehensive Waste Management Strategy, which is being designed to optimise the utilisation of waste resources. Our collaborative efforts with partners throughout the Tees Valley will focus on harnessing the full potential of the region's waste resources. These resources will serve as a valuable biogenic feedstock for the production of both low-carbon fuels and industrial energy, aligning with the objectives outlined in the TVCA Net Zero Strategy.



### Green and Sustainable Procurement

Hartlepool Borough Council is dedicated to integrating sustainable principles across all facets of our operations, including our procurement endeavours. Our commitment to social value is deeply ingrained in the core of Hartlepool Borough Council's procurement strategy. An essential aspect of this commitment is enhancing environmental well-being through our procurement processes. As part of our ongoing efforts, a reform to our public procurement law at the time of writing is progressing. The government is aiming for a more transparent and simple process following the move from EU to UK law post-Brexit. A main objective of the Procurement Bill is an opportunity to make it easier for SME's to do business with the public sector and ensure contract requirements are proportionate. The new regulations should enable suppliers to provide information in an efficient manner through the new supplier registration system. This will in theory allow suppliers to tell us, the client, only once, what information suppliers need to be kept up to date. This data will likely include net zero and carbon reduction type data that will be required to support the delivery of contracts.

Hartlepool Borough Council will also be able to look outwards to key suppliers in its supply chain to learn and support their net zero ambitions. This learning approach can also be replicated through Hartlepool working with other local government colleagues, regional organisations (such as NEPO) and the wider public sector to help shape, develop and create good practice.

## Domestic Energy and Sustainable Warmth

- Improve domestic energy efficiency to reduce energy demand
- Support shift towards sustainable energy in the domestic sector

The compounding consequences of rising energy, food and fuel prices, high inflation, COVID-19 pandemic, the energy crisis and climate change are putting additional strain on families and economies. Consequently, this worsens the socioeconomic factors that are essential for human health and overall well-being.

Last year marked the 30<sup>th</sup> anniversary of the UNFCCC, an international treaty signed by 198 parties with the objective to stabilise the greenhouse gas concentrations in the atmosphere. Unfortunately, there has been little significant progress made towards achieving these goals. Since the establishment of the UNFCCC, the carbon intensity of the worldwide energy system has experienced only a slight decrease of less than 1%. Fossil fuels still hold a dominant position in global electricity production, while renewable energy sources only account for a mere 8.2% of the total global energy production.<sup>24</sup>



# 21%

Of total territorial GHG emissions in Hartlepool are from the domestic sector

Energy use in buildings is a significant contributor to carbon emissions. In terms of consumption, the UK's domestic sector (32%) is the second largest consumer of energy following the transport sector (34%).<sup>25</sup> As an end-user the domestic sector contributed 16% of the UK's total GHG emissions, ranking 4<sup>th</sup> largest source out of nine different sectors.<sup>26</sup> It is a slightly different story for the borough of Hartlepool with the domestic sector being the second largest source, contributing to 20.2% of total territorial GHG emissions, behind the industrial sector at 44.9%.<sup>27</sup>

Embracing the holistic whole-building approach entails a strategic focus on minimising energy demand before delving into discussions around cleaner fuel sources and renewable energy. This approach underscores the imperative for a multifaceted approach that encompasses:

- **Enhanced Energy Efficiency:** The paramount importance of enhancing energy efficiency across the board. This involves adopting measures to reduce energy consumption and wastage in all aspects of building operation and design.

<sup>24</sup> Romanello M et al., 2022. The 2022 report of the Lancet Countdown on health and climate change: health at the mercy of fossil fuels. Lancet. Countdown Vol. 400(10363):1619-1654.

<sup>25</sup> Energy consumption in the UK 2021, BEIS, 2022. Available at: [Energy consumption in the UK 2021](#)

<sup>26</sup> 2021 UK Greenhouse Gas Emissions, BEIS, 2021. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1134663/emissions-statistics-summary-2021.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1134663/emissions-statistics-summary-2021.pdf)

<sup>27</sup> UK local authority and regional greenhouse gas emissions national statistics, 2005 to 2021, Department for Energy Security and Net Zero, 2023. Available at: [UK local authority and regional greenhouse gas emissions national statistics, 2005 to 2021, Department for Energy Security and Net Zero](#)

- **Enhanced Insulation:** The imperative to bolster insulation standards, ensuring that homes are tightly sealed and well-insulated. This not only conserves energy but also contributes to the creation of more comfortable living environments.
- **Affordable Warmth Initiatives:** Implementing measures to ensure that households have access to affordable warmth, especially during the winter months. This includes programmes to assist vulnerable populations in heating their homes efficiently and comfortably.
- **Protection from Extreme Heat:** Recognising the increasing challenges posed by extreme heat during the summer season and the necessity to protect communities from its adverse effects. Strategies for cooling and climate resilience are pivotal aspects of this approach.

By addressing these key components, the whole-building approach lays the groundwork for sustainable, energy-efficient, and resilient structures that contribute to a more environmentally conscious and comfortable living environment.



**0.73%**

325 of the 44,650 residential properties  
in Hartlepool are owned by HBC

Of the 44,650 dwellings in the Borough, only 0.73% of the properties are directly controlled by the council. In order to make a meaningful impact, it is necessary to work together with homeowners and landlords to make insulation upgrades and transition to sustainable heating systems such as ground and air source heat pumps. One approach we can take to accomplish this goal is to lead the way and showcase the advantages of these upgrades with our own housing inventory. We remain committed to advancing our efforts in collaboration with registered housing providers to incrementally enhance the energy efficiency of the council's housing portfolio. This ongoing partnership underscores our dedication to making our housing stock more environmentally sustainable and cost-effective for residents.

In addition to our work with housing providers, we will actively engage with registered landlords and homeowners and the private rental sector. Through these engagements, we aim to influence and elevate standards in private rental properties, with a strong emphasis on minimising the environmental footprint of these buildings. This approach not only benefits tenants and homeowners but also contributes to our broader environmental objectives. Hartlepool Borough Council has already made strides towards this shift. We have reached out to almost 2,000 homes in the community to spread the word and through the Sustainable Warmth Scheme, we have delivered upgrades to over 140 homes with more than 244 improvement measures. Looking forward, we will continue to push on with the Sustainable Warmth Scheme and support homeowners to meet PAS2035 standards for building retrofits, while with new builds we will lobby for central government to raise national housing standards.

We will encourage and promote the integration of cutting-edge renewable technologies in future housing development projects through the planning process. By encouraging developers to incorporate these sustainable solutions into their designs, we will foster the creation of homes that not only meet modern living needs but also align with our commitment to a greener and more sustainable future.

Additionally, the authority has established targets pertaining to domestic energy:

- Addressing fuel poverty through local leadership
- Consistent with national policy, our aspiration is that by 2035, the sale or installation of new gas boilers will be discontinued
- Advocating for improved sealing and insulation of homes as a cost-effective approach to reducing heating expenses and promoting a healthier indoor environment for residents.

## The Natural Environment

- Maintain good local air quality
- Protect existing natural habitats
- Expand and connect natural habitats and increase tree cover

## Air Quality

Data from the Lancet Countdown estimated that exposure to air pollution, in particular to particulate matter 2.5 (PM2.5) which contributed to 4.7 million deaths globally in 2020, of which 3.7 were attributable to anthropogenic emissions, and 1.3 million were directly related to fossil fuel combustion.<sup>28</sup> Recent studies have suggested that PM2.5 pollution can have harmful effects on human health. The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 require that in England by the end of 2040, an annual average of 10 µg/m<sup>3</sup> for PM2.5 is not exceeded at any monitoring station.<sup>29</sup> Air quality recommendations published by the WHO in 2021 go a step further by making the recommendation to keeping annual average concentrations of PM2.5 to a maximum of 5µm/m<sup>3</sup>.<sup>30</sup> Maintaining good air quality is remains vital, as it has a direct influence on human health and overall well-being. Ultimately, prioritising good air quality enhances the quality of life and contributes to the long-term sustainability of our planet.



# 4.5%

Fraction of mortality attributable to particulate air pollution in Hartlepool in 2021  
(North East = 4.8%, England = 5.5%)

We are fully committed to implementing national policies on air quality to safeguard the health of the public and the environment. These policies aim to reduce the levels of harmful air pollutants such as particulate matter (PM10 and PM2.5), nitrogen dioxide (NO<sub>2</sub>) and sulphur dioxide (SO<sub>2</sub>), which can have detrimental effects on respiratory health and cardiovascular function, with children, the elderly and those with underlying health conditions being the most vulnerable.<sup>31</sup> Hartlepool enjoys relatively good air quality in areas where the public are regularly exposed to air pollution, with levels sitting well within acceptable limits set by the Government.<sup>32</sup> Additionally, in the year 2021, the mortality rate in Hartlepool attributed to fine particulate PM2.5 air pollution was notably lower at 4.5% compared to the regional average of 4.8% in the North East and the broader national average of 5.5% for England. This suggests that the town's air quality measures have contributed to a lower health risk associated with air pollution compared to other areas in the region and the country as a whole.

<sup>28</sup> Policy brief for the UK, British Medical Association, 2022. Available at: [Policy brief for the UK](#).

<sup>29</sup> The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023, GOV UK, 2023. Available at: [The Environmental Targets \(Fine Particulate Matter\) \(England\) Regulations 2023](#)

<sup>30</sup> WHO Air Quality Guidelines, World Health Organisation, 2021. Available at: [WHO Air Quality Guidelines](#).

<sup>31</sup> Clean Air Strategy 2019, Department for Environment, Food & Rural Affairs. Available at: [Clean Air Strategy 2019](#).

<sup>32</sup> Air Quality Annual Status Report 2022, Hartlepool Borough Council, 2022. Available at: [Air Quality Annual Status Report 2022](#)

Presently, our Borough is equipped with two air quality monitoring stations. Over the past year, we made the decision to enhance our existing automatic air quality monitoring stations. Additionally, we expanded our monitoring efforts by establishing five new non-automatic monitoring sites specifically focused on tracking NO<sub>2</sub> levels. This expansion aims to provide more comprehensive data on pollutant levels and enhance our understanding of areas where action is needed to mitigate NO<sub>2</sub> levels effectively.

We will aim to launch a new initiative this year to monitor Particulate Matter (PM2.5) as a crucial component of our commitment to the environment, human health and wellbeing. Alongside this, we are embarking on a comprehensive overhaul of our Air Quality Strategy and Action Plan to ensure it aligns with the most current and effective approaches for safeguarding our air quality. Moreover, in our mission to combat air pollution we will foster close collaboration with local industries and businesses. By working together, we aim to reduce pollution levels and enhance the overall air quality within our community. We will expand on our collaborative efforts by strengthening partnerships with external organisations. This broader engagement will allow us to extend our reach and make a positive impact on air quality in areas beyond our immediate jurisdiction

In addition to our proactive measures, we are dedicated to raising local awareness about the critical issue of air pollution. It is essential that our community understands the significance of this challenge and recognises the pivotal role that the council plays in both maintaining and enhancing air quality. Through education and outreach, we aim to inspire collective action and a shared commitment to cleaner, healthier air for all.

### Natural and Semi-natural Green Spaces

Natural and semi-natural green spaces such as parks and forests play a vital role in urban environments by providing a safe haven for biodiversity and promoting physical and mental wellbeing for the people living in the town. These green areas serve as essential components of sustainable urban planning, enhancing biodiversity conservation, ecological resilience, and the quality of life of Hartlepool residents. We will adopt a blended approach for safeguarding and restoring natural spaces for our local biodiversity and species numbers, tailoring our actions on a case by case basis. This approach is designed not only to protect our native species and habitats but also to increase their resilience with a more diverse species population that is well-suited to the ongoing shifts in climate. In our efforts to improve the green infrastructure of the borough, we will employ suitable management techniques to maintain and enhance the quality and significance of our current green spaces. Additionally, as we evaluate our forthcoming Local Plan, we will place increased emphasis on incorporating public green spaces into future development projects. We aim to elevate the quality of our parks dotted across the town, including Ward Jackson Park and Burn Valley Gardens, by implementing the strategies detailed in our newly established parks and open spaces management documents. Furthermore, we will adopt a tailored fit-for-purpose maintenance approach suited to the specific needs of our open spaces and roadside verges. This approach will not only be advantageous for our local biodiversity and wildlife but will also create more opportunities for people to connect and engage with nature.



Where feasible, we will investigate the potential of nature-based solutions, which in a broad sense, yield various advantages depending on the specific solution adopted. These advantages may encompass climate change mitigation, the preservation of biodiversity, the management of floods and stormwater, enhanced air and water quality, economic benefits, and the enhancement of social value. These solutions leverage the inherent potential of nature to address environmental challenges, all the while fostering wellbeing and ecological conservation.



# 5.7%

Tree canopy cover in Hartlepool  
(Bottom 20 local authority areas)

With only 5.7% tree canopy cover, Hartlepool falls within the bottom 20 local authority areas for tree cover.<sup>33</sup> The regulations laid out in the Environmental Targets (Woodland and Trees Outside Woodland) (England) Regulations 2022 create a legally binding target across all of England to increase the combined canopy cover of woodlands and trees outside woodlands to 16.5% by 31 December 2050.<sup>34</sup> This leaves a significant opportunity for Hartlepool to make its contribution and enhance its efforts. At present, we have the Hartlepool Tree Strategy 2020-2030 which sets out the long-term vision for the treescape we want to see in the Borough.<sup>35</sup>



We are employing various methods to boost our tree canopy coverage. Presently, a tree survey is in progress, furnishing us with valuable insights into the composition of our canopy mix, the health of our trees, and recommendations for effective tree management. Once this is complete, we will work on our new tree strategy to lay out the long-term strategy for climate resilience and adaptation. We will look to introduce a tree replacement standard to increase tree canopy cover in the borough, countering development-induced tree loss and in accordance with The Environmental Targets (Woodland and Trees Outside Woodland) (England) Regulations 2023. Additionally, through the funding and collaboration with neighbouring local authorities on the Trees on Tees project, we are aiming to plant 1 million trees, or 500ha, by 2035 on both public and private land across the Tees Valley.<sup>36</sup>

<sup>33</sup> Mapping English tree cover: results, ranking and methodology, Friends of the Earth, 2023. Available at: [Mapping English tree cover](#)

<sup>34</sup> The Environmental Targets (Woodland and Trees Outside Woodland) (England) Regulations 2022, 2022.GOV.UK. Available at: [The Environmental Targets \(woodland and Trees Outside Woodland\) \(England\) Regulations 2022](#).

<sup>35</sup> Hartlepool Tree Strategy 2020-30, Hartlepool Borough Council. Available at: [Hartlepool Tree Strategy 2020-30](#)

<sup>36</sup> Trees on Tees, Tees Valley Combined Authority. Available at: [Trees on Tees](#)

## Climate Change Resilience and Adaptation

- Adapt the built and natural environment to current and future climate change impacts
- Review our progress on net zero
- Work towards sustainable development

Climate change is a present reality, and its repercussions are already evident on a global scale with significant impacts on humans, economies and the environment worldwide. Climate change resilience and adaptation are two crucial concepts in addition to climate change mitigation. Beyond doing everything to cut down on GHG emissions, we must take action to prepare and adjust to both the current and projected consequences of climate change.

Rapidly rising temperatures and extreme heat exacerbate the knock-on health impacts including cardiovascular disease, respiratory disease, heat-stroke, and worsening of mental health. Vulnerable populations (those over 65 years of age and children under one year of age) now face greater exposure to extreme heat. Globally, heat-related deaths increased by 68% between 2000-2004 and 2017-2021 with the confluence of the COVID-19 pandemic significantly contributing to this death toll.<sup>37</sup> The changing climate affects the spread of climate-sensitive infectious diseases such as Lyme disease and dengue fever, as conditions become more suitable for their emergence and transmission, putting populations at much higher risk of emerging diseases. The impacts of climate change are also rapidly aggravating and worsening the effects of other coexisting crises such as air pollution, food insecurity, the energy crisis and the rising cost-of-living.



# 68%

Increase globally in heat-related deaths  
between 2000-2004 and 2017-2021

### Climate resilience and adaptation, what do they mean?

Climate resilience refers to our capacity or ability to anticipate, cope with shocks and bounce back in a timely and efficient manner from the challenges posed by a changing climate. It involves implementing strategies and policies to minimise vulnerability and ensure that communities, ecosystems, and economies can better withstand climate-related shocks. Adaptation, on the other hand, can be defined as the process taken to '*adjust to the actual or expected climate and its effects*' and thrive in a changing climate.<sup>38</sup> Both require planning and implementing actions to reduce the risks and seizing the opportunities presented to us by a warming climate. Both resilience and adaptation are vital components of our response to climate change, helping us to protect lives, livelihoods, and the environment.

<sup>37</sup> The 2022 report of the Lancet Countdown on health and climate change: health at the mercy of fossil fuels, The Lancet, 2022. Available at: [The 2022 report of the Lancet Countdown on health and climate change: health at the mercy of fossil fuels](#)

<sup>38</sup> SYRAR5 Glossary, Intergovernmental Panel on Climate Change, 2019. Available at: [SYRAR5](#).

A multifaceted approach is required, encompassing several key components for effective climate action. To begin with, we will undertake a revision of our Local Plan, ensuring that our planning policies remain consistently aligned with both mitigation and adaptation measures as stipulated by the Climate Change Act. This will mean that climate-related considerations will be more effectively incorporated into all aspects of future planning and policy developments. Moreover, we will place greater attention on detailed methodologies on specific items within the planning policy such as embodied carbon, resource efficiency, and the allocation of land for improved resilience measures. We will seek to enable local and multi-agency collaboration and delivery of adaptation and mitigation strategies at appropriate scales and across all decision-making levels. Lastly, a critical aspect of building climate resilience is to increase the wealth of knowledge, awareness, and capacity amongst stakeholders within the planning system.<sup>39</sup> This is something that we will strive for to foster a collective commitment to effectively address the challenges posed by climate change.

In our upcoming initiatives, we have outlined the following actions that will guide our efforts towards climate resilience. First and foremost, we are committed to thoroughly investigating flood mitigation and flood management strategies. Our aim is to develop comprehensive plans that address the challenges posed by flooding and ensure the safety and resilience of our communities.

As part of our approach, we will be implementing hard landscape schemes that take into account various elements. These schemes will incorporate solutions such as permeable pavements, carefully chosen materials, sustainable drainage systems (SuDS), and the utilisation of nature-based solutions. These measures are integral to alleviating the potential impacts of future flood and drought events, helping to safeguard our environment and key infrastructure.

Furthermore, we are dedicated to adopting a fabric-first approach for future urban planning schemes. This approach involves a holistic perspective, emphasising the importance of the entire building in urban development schemes. By considering the fabric of the buildings themselves as a fundamental aspect of our planning, we can create urban environments that are more sustainable, resilient, and better equipped to address the challenges of the future.

## Inclusivity

It is particularly important to ensure a just transition towards sustainable development and we are committed to ending our contribution to climate change in a way that is fair and creates a better future for everyone. Planning ahead and taking action against climate change presents rare opportunity to better the collective wellbeing of the people of Hartlepool. By directing our efforts towards reducing emissions and addressing current inequalities, we can create an economy and society that prioritises these values.

In July 2023, HBC partnered with the Institute for Community Studies to imagine what a just transition to net zero might look like in Hartlepool. Through a participatory policy development process together with members of the public, voluntary, community and social enterprise

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<sup>39</sup> CSE & TCPA, 2023. Spatial Planning for Climate Resilience & Net Zero – Barriers & opportunities for delivering net zero and climate resilience through the local planning system.

organisations and officers from HBC, we worked together to identify challenges and develop policy asks that respond to the unique assets, strengths and challenges in Hartlepool.

#### Principles identified for a just transition in Hartlepool

- Protect the vulnerable
- Improve quality of life
- Offer new opportunities
- Inclusive and accessible
- Hope
- Share responsibilities
- Set a positive example



There were a number of key challenges identified through this exercise but there were two specific topics which drew particular attention from the participants: deprivation, and political disengagement. This brought around two emerging policy asks:

1. Empowering residents with food autonomy through the support of local community organisations in order to reduce financial costs and carbon emissions, and to reap the health benefits of a healthy diet
2. To understand the priorities and challenges of different communities within the town through better engagement with the community, to facilitate greater political engagement of residents and provide easy ways for them to contribute their opinion, and to ensure that any information on the transition to net zero is easily accessible



We are committed to delivering a just transition by working with local communities and businesses to deliver on our net zero future. We have launched the Your Say, Our Future platform, an engagement platform offering residents the opportunity to get involved and shape the future of Hartlepool. It is a chance for the community to have their say on the issues that matter to them.



# YOUR SAY OUR FUTURE



Skills are a fundamental enabler of net zero and a fair transition to net zero will rely on every element of the skills system. The transition to net zero represents a huge opportunity to secure livelihoods and grow new industries in the town, enhance social equality, and improve overall health and wellbeing. These opportunities are not guaranteed and if we are to reach net zero and secure this brighter future, a rapid and well-managed shift in the skills of the UK workforce is required. Through the net zero transition, an estimated 135,000 to 725,000 new jobs could be created in the UK in low carbon sectors, such as building retrofits, renewable energy generation, low-carbon hydrogen production, CCUS, the manufacturing of electric vehicles and in the area of circular-based waste management.<sup>40 41</sup>



## £2.25 million

Value of Civil Engineering Academy project supporting net zero jobs and featuring roof top solar panels and EV charging points

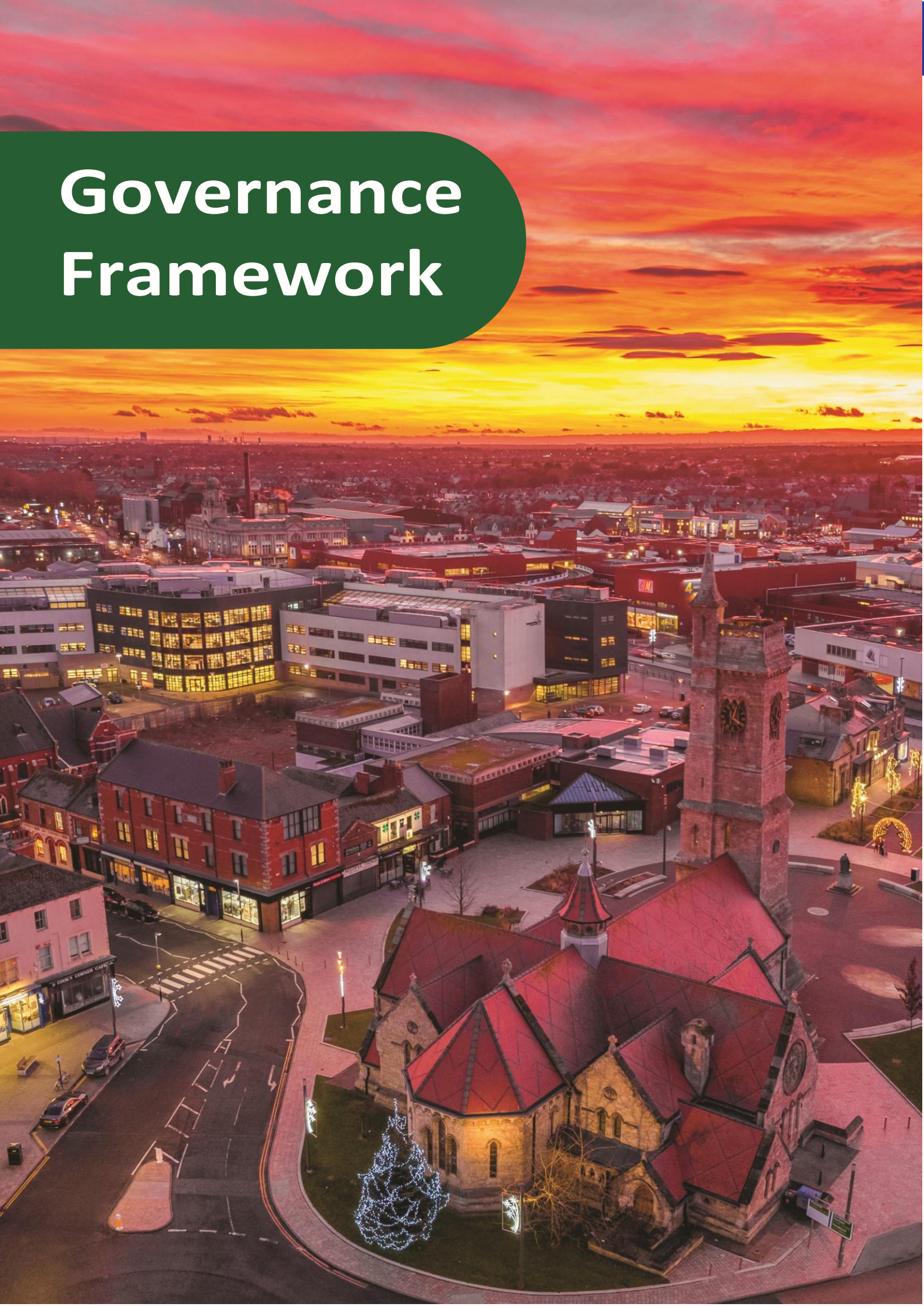
Through the Town Deal Fund, HBC together with Seymours and the Hartlepool College of Further Education will be bringing a £2.25m Civil Engineering Skills Academy to the town with an expected completion date in 2024. The Civil Engineering Academy building will boast roof-top solar panels and electric vehicle charging points. The training centre will provide a wide range of accredited and bespoke construction and civil engineering training to meet the future skills and workforce needs of key economic sectors such as construction, energy and transport. It will expand the access to skills and qualifications, offering the local community a chance to upskill, reskill and retrain in order make the most of the future demand for net zero jobs.



<sup>40</sup> A Net Zero Workforce, Climate Change Committee, 2023. Available at: [A Net Zero Workforce](#)

<sup>41</sup> Skills and Net Zero, Professor Dave Reay, 2023. Available at: [Skills and Net Zero](#)

# Governance Framework



## 9 Governance Framework

### Governance

There are standard governance arrangements in place within the council, both at an officer and member level, to oversee both key decisions as well as any significant actions. These mechanisms already present an opportunity to monitor and review our actions and arrangements within this strategy.

Hartlepool Borough Council recognises that good governance leads to good management and the attainment of good performance. Establishing a strong and robust governance framework is therefore a critical factor for success to realise our goals. The transformation required to achieve net zero will be both substantial in scale and complex in execution, and would require the overall responsibility to sit at the level of the Senior Leadership Team or above, with the delivery of the actions being driven by relevant Lead Officers across the various services of the council to reduce their own department's carbon footprint.

Additionally, through public engagement and empowerment this should ultimately lead to beneficial outcomes for citizens and service users. Good governance enables local authorities to pursue their visions in an effective and responsive manner, as well as underpinning their visions through appropriate mechanisms for control and effective management of risk. For this reason, all future reports around climate change and net zero will be submitted to the Finance and Policy Committee, which is open to the public, for review and feedback. We will also continue to explore new and innovative ways of participation and channels for communication to provide residents the opportunity to consult and influence any changes and new measures adopted in our Climate Change Response and Net Zero Strategy.

### Monitoring, Measuring and Reporting

The plan is intended to be a live document, and will change and develop as we continue to build on our understanding of the emission sources, and the most effective solutions to bring them down. We will continually monitor and evaluate the progress of this strategy and action plan against its intended outcomes, and review and refine as we go based on the lessons learnt.

To date, we have adopted a mixture of data sources, tools, and manual processes to calculate our emissions and carbon footprint, enabling us to combine disparate information flows. We intend to implement improved data management processes to accurately record, track and monitor our future emissions to empower us to make well-informed decisions with data-driven knowledge. We expect that data management processes will be constantly improved however, we aim to have that new system in place come the next carbon audit.

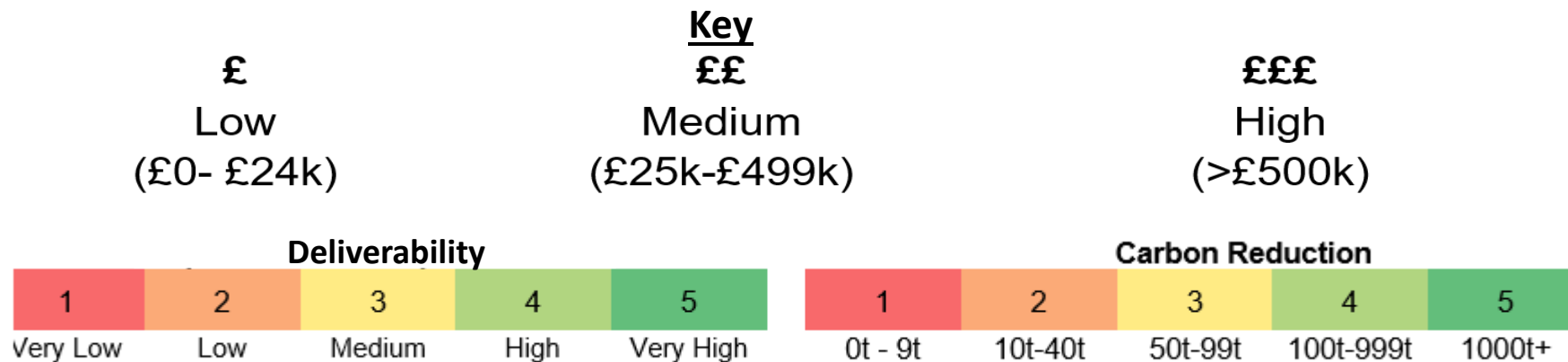
Performance monitoring updates on the action plan and our carbon emissions will take place yearly to track our progress against the outlined actions and performance, while a full review will be conducted after every 5 years.

To ensure transparency, reports on our organisational emissions profile will be made publicly available each year on our website, and reported using the Local Government Association and Local Partnerships' Greenhouse Gas Accounting Toolkit reporting methodology.

## 10 Appendices

### Appendix A – Climate Change Response and Net Zero Action Plan

As part of the Strategy development, an initial Action Plan has been developed to identify the various types of actions that will need to be taken to deliver on our goals. As the document focuses primarily on council emissions, most of the items relate to actions that we can take to address our own carbon footprint and environmental impact. Some actions, however, include varying levels of influence on external stakeholders; whether we action, enable, influence or lobby others for change. The Climate Emergency Strategy Action Plan outlines the actions for climate change adaptation and mitigation progress. The actions are grouped into 5 key aims (1) reducing local authority CO<sub>2</sub> emissions, (2) resource maximisation and waste reduction, (3) domestic energy and sustainable warmth, (4) the natural environment and (5) climate change resilience and adaptation. Some of the actions detailed here are projects that have already secured funding while others may require feasibility studies to develop projects and business cases over time. The proposed actions in this document are not final – it will be subject to change over time and is not a definitive and exhaustive list; neither should it be considered that all of the proposed actions detailed here will be delivered. The key below explains the scoring method. 'Deliverability' considers all factors on the ease of implementation of the action and how it addresses the aim it sits under. 'Carbon reduction' estimates the potential carbon savings/reductions in the long term. 'Cost' looks at the estimated expected financial cost the action is likely to incur. Work will be carried out to continue to assess the expected impact of actions and each project will, in time, be costed and prioritised. The actions will be reviewed annually to assess our progress.





## Aim: Reduction of Local Authority CO2 Emissions

### Objective 1 - Reduce energy demand and improve energy efficiency

Ref	Action	Target Date	Deliverability	Carbon Reduction	Cost	Action Owner
1.01	Climate Impact Assessment tool to be required on all future capital project developments	2024	3	4	£	Strategic Development
1.02	Decarbonisation and emissions reductions targets to be embedded in the Strategic Asset Management Strategy to rationalise assets and reduce carbon emissions	2025	5	4	££	Estates and Asset Management
1.03	For Council Assets anticipated to serve 10 years or longer - undertake feasibility studies on assets and develop investment plans for energy efficiency improvements including retrofit works and low-carbon technologies with a target of 20% carbon emissions savings of current emissions	2028	4	5	££	Estates and Asset Management
1.04	Review existing Heat Decarbonisation Plan and identify priority assets that require immediate retrofit works to achieve 10% savings on current carbon emissions	In progress	5	4	££	Estates and Asset Management
1.05	Evaluate potential financial investments for invest-to-save projects on a case-by-case basis	In progress	4	5	££	Finance
1.06	Expand the de-illumination of road signs and bollard lighting units	2030	1	1	£££	Highways and Engineering
1.07	Continue to investigate the feasibility of other solutions to further reduce street light energy consumption	In progress	1	2	£	Highways and Engineering

'Deliverability' considers all factors on the ease of implementation of the action and how it addresses the aim it sits under. 'Carbon reduction' estimates the potential carbon savings/reductions in the long term. 'Cost' looks at the estimated expected financial cost the action is likely to incur.

## Aim: Reduction of Local Authority CO2 Emissions

### Objective 2 - Increase sustainable energy capacity

Ref	Action	Target Date	Deliverability	Carbon Reduction	Cost	Action Owner
1.08	All future new developments mandated in the Capital Programme to investigate, and where feasible, install appropriate renewable energy systems providing at least 50% of the building's anticipated energy demand	In progress	5	4	£££	Estates and Asset Management/ Strategic Development
1.09	For existing Council Assets, investigate feasibility of introducing renewable energy systems to provide at least 15% of building electricity demand	2025	4	5	££	Estates and Asset Management
1.10	Undertake technical feasibility for off-site renewable energy projects, such as solar or wind farms, and maintain a live database of development opportunities for investment	2025	4	2	£££	Estates and Asset Management
1.11	Construct a 147.9kWp solar PV and battery storage system at the Tofts Farm Fleet Vehicle Depot and MOT facility to reduce electricity demand from grid and prepare for future expansion of battery electric vehicle (BEV) fleet	2026	5	3	£££	Estates and Asset Management

'Deliverability' considers all factors on the ease of implementation of the action and how it addresses the aim it sits under. 'Carbon reduction' estimates the potential carbon savings/reductions in the long term. 'Cost' looks at the estimated expected financial cost the action is likely to incur.

## Aim: Reduction of Local Authority CO2 Emissions

### Objective 3 - Reduce fleet emissions

Ref	Action	Target Date	Deliverability	Carbon Reduction	Cost	Action Owner
1.12	Identify and install EV charging infrastructure at suitable Council owned and operated sites and support the Tees Valley Combined Authority (TVCA) to roll out EV charging infrastructure improvements	In progress	2	2	£££	Highways and Engineering
1.13	Trial the use of hydrogenated/hydrotreated vegetable oil (HVO) as a low-carbon transition fuel for fleet vehicles, and monitor and report progress annually	2025	5	5	£	Environmental Services
1.14	Develop and deliver long-term fleet strategy to replace fleet vehicles with BEVs, or other low emission vehicles such as hydrogen-powered vehicles	2030	4	5	££	Environmental Services/Strategic Development

### Objective 4 – Work with people to inspire change

Ref	Action	Target Date	Deliverability	Carbon Reduction	Cost	Action Owner
1.15	Investigate available options to reduce staff business travel miles by car by 10% per annum, and to encourage sustainable forms of travel (active travel, public transport, carpool, hybrid vehicles, BEVs)	2024	2	2	££	Human Resources
1.16	Ensure that all senior management (CEs, DCEs, Directors, HoS) and Councillors receive Carbon Literacy Training to increase climate awareness and dissemination of information	2024	5	1	£	Strategic Development
1.17	Climate Communications Campaign to roll out in 2024 to encourage positive behaviour change	2024	5	2	£	Strategic Development
1.18	Establish a network of Climate Champions across all departments	2024	3	1	£	Strategic Development

'Deliverability' considers all factors on the ease of implementation of the action and how it addresses the aim it sits under. 'Carbon reduction' estimates the potential carbon savings/reductions in the long term. 'Cost' looks at the estimated expected financial cost the action is likely to incur.

## Aim: Resource Maximisation and Waste Reduction

### Objective 5 - Improve waste management to maximise use of existing resources

Ref	Action	Target Date	Deliverability	Carbon Reduction	Cost	Action Owner
2.01	Support TVCA's wider Waste Management Strategy for the Tees Valley which aims to better utilise waste resources	2050	4	2	£££	Environmental Services
2.02	Record actual data for the Council's waste collection and report annually	2024	2	1	£	Environmental Services
2.03	Develop a recycling guide for all Council services and promote key messages through Communications Strategy	2024	3	1	£	Environmental Services
2.04	Investigate the feasibility of a pay-by-weight scheme for Council departments' waste removal	2025	2	1	££	Environmental Services

### Objective 6 – Sustainable purchasing and procurement of goods and services

Ref	Action	Target Date	Deliverability	Carbon Reduction	Cost	Action Owner
2.05	Put in place a new procurement strategy and framework which will seek to assist our supply chain in reducing and monitoring emissions	2024	5	5	££	Procurement

'Deliverability' considers all factors on the ease of implementation of the action and how it addresses the aim it sits under. 'Carbon reduction' estimates the potential carbon savings/reductions in the long term. 'Cost' looks at the estimated expected financial cost the action is likely to incur.

## Aim: Domestic Energy and Sustainable Warmth

### Objective 7 - Improve domestic energy efficiency to reduce energy demand

Ref	Action	Target Date	Deliverability	Carbon Reduction	Cost	Action Owner
3.01	Deliver Affordable Warmth Strategy, promote and support residents to improve energy efficiency and reduce energy consumption of their homes through communication campaigns, energy advice partnership projects, voluntary sector partners, guidance schemes and funding schemes such as HUG/LAD3	In progress	4	2	£££	Public Protection
3.02	Continue to work with registered housing providers to progressively increase the energy efficiency of the Council's housing stock	In progress	2	2	£	Housing Services
3.03	Engage with registered Landlords in the private rental sector to improve EPC ratings and adhere to the Minimum Energy Efficiency Standards (MEES)	TBC	3	2	££	Public Protection

### Objective 8 – Support shift towards sustainable energy in the domestic sector

Ref	Action	Target Date	Deliverability	Carbon Reduction	Cost	Action Owner
3.04	Under current policy CC1, continue to encourage developments to incorporate renewable energy systems in their designs and where feasible, require 10% of their energy supply from decentralised and renewable or low carbon sources	In progress	3	2	£	Planning Services

'Deliverability' considers all factors on the ease of implementation of the action and how it addresses the aim it sits under. 'Carbon reduction' estimates the potential carbon savings/reductions in the long term. 'Cost' looks at the estimated expected financial cost the action is likely to incur.

## Aim: The Natural Environment

### Objective 9 - Maintain good local air quality

Ref	Action	Target Date	Deliverability	Carbon Reduction	Cost	Action Owner
4.01	Publish the new Air Quality Strategy and continue to update annual Air Quality Status Reports on the Council website	In progress	3	1	£	Environmental Protection
4.02	Implement the actions outlined in the updated Air Quality Strategy, paying particular attention to working closely with local industry and businesses to reduce pollution and to improve air quality	In progress	4	1	£	Environmental Protection

### Objective 10 – Protect existing natural habitats

Ref	Action	Target Date	Deliverability	Carbon Reduction	Cost	Action Owner
4.03	Implement the Place-based Management Plans, monitor and track progress annually	In progress	3	1	£	Heritage, Parks and Open Spaces
4.04	Take a fit-for-purpose approach to maintenance regimes of open spaces and roadside verges to benefit local wildlife	In progress	3	1	£	Environmental Services

'Deliverability' considers all factors on the ease of implementation of the action and how it addresses the aim it sits under. 'Carbon reduction' estimates the potential carbon savings/reductions in the long term. 'Cost' looks at the estimated expected financial cost the action is likely to incur.

## Aim: The Natural Environment

### Objective 11 - Expand and connect natural habitats and increase tree cover

Ref	Action	Target Date	Deliverability	Carbon Reduction	Cost	Action Owner
4.05	Enhance the quality and value of existing green spaces	In progress	4	1	££	Heritage, Parks and Open Spaces
4.06	Complete a tree survey to better understand the condition of the trees across the Borough	2024	3	1	£	Planning Services
4.07	Revise the Tree Strategy to enhance and protect our native tree species with the supplementary introduction of warmer-climate tree species for a more diverse canopy that is better adapted to a warming climate	2026	4	1	£	Planning Services
4.08	Introduce a tree replacement standard to increase tree canopy cover in the borough, countering development-induced tree loss and in accordance with The Environmental Targets (Woodland and Trees Outside Woodland) (England) Regulations 2023	2026	4	1	£	Planning Services
4.09	Ensure that soft landscaping covers 13.8% of the total site area of the new Highlight Leisure Centre, consisting of grassed areas and tree cover	2025	1	1	££	Architects & Landscape
4.10	Together with Tees Valley and other local authorities, deliver on Trees on Tees programme to create woodland and deliver on planting projects	2035	5	5	££	Heritage, Parks and Open Spaces

'Deliverability' considers all factors on the ease of implementation of the action and how it addresses the aim it sits under. 'Carbon reduction' estimates the potential carbon savings/reductions in the long term. 'Cost' looks at the estimated expected financial cost the action is likely to incur.

## Aim: Climate Change Resilience and Adaptation

### Objective 12 - Review progress on net zero

Ref	Action	Target Date	Deliverability	Carbon Reduction	Cost	Action Owner
5.01	Annual reporting and review of GHG emissions and climate strategy	In progress	5	1	£	Strategic Development

### Objective 13 - Adapt the built and natural environment to current and future climate change impacts

Ref	Action	Target Date	Deliverability	Carbon Reduction	Cost	Action Owner
5.02	Evaluate and establish a climate risk register for the Borough	TBC	5	1	£	Emergency Planning & Net Zero Officer
5.03	Review Borough's flood risk management strategy	In progress	5	1	£	Emergency Planning/Flood and Coastal Risk
5.04	Investigate the feasibility of improving drainage systems and look to incorporate sustainable drainage systems (SuDS) in future urban planning schemes, conforming to policy CC1 and CC2 of Local Plan 2018	2025	4	1	£	Architects & Landscape
5.05	Take a fabric-first approach with material considerations in future urban planning schemes	2024	4	5	£	Architects & Landscape

### Objective 14 – Work towards sustainable development

Ref	Action	Target Date	Deliverability	Carbon Reduction	Cost	Action Owner
5.06	Review the active travel infrastructure within the Borough and identify future requirements for a well-connected active travel network	2027	2	1	£££	Highways and Engineering
5.07	Monitor, prepare for and submit grant and other funding applications to deliver on the aims set out in this Net Zero Plan with a specific focus on GHG emissions, waste and resources, the natural habitat and climate adaptation	In progress	5	3	£	All responsible parties

'Deliverability' considers all factors on the ease of implementation of the action and how it addresses the aim it sits under. 'Carbon reduction' estimates the potential carbon savings/reductions in the long term. 'Cost' looks at the estimated expected financial cost the action is likely to incur.



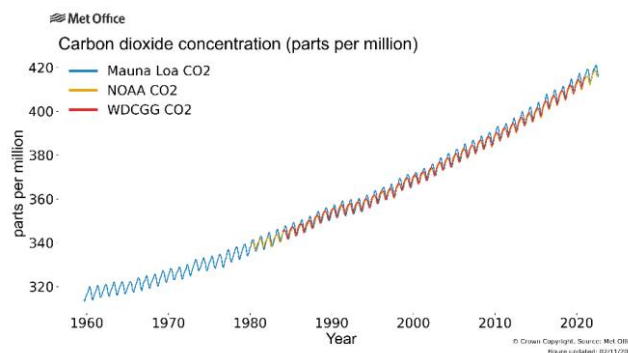
## Appendix B – The Causes and Impacts of Climate Change

### Causes of Climate Change

The term ‘greenhouse effect’ is used to describe how heat is trapped close to the Earth’s surface by the atmospheric layer of greenhouse gases (GHGs). These gases in the atmosphere allow the sun’s light to reach the Earth’s surface but absorbs infrared radiation from the Sun in the form of heat, which is circulated in the atmosphere and eventually lost to space. Greenhouse gases include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), ozone (O<sub>3</sub>) and fluorinated gases. There are other GHGs such as water vapour, but the ones listed above are the main gases of concern. Essentially, these gases act as a “blanket” wrapped around the Earth to keep the planet warm. Without this layer of heat-trapping gases, the earth would be frozen and life on the planet as we know today would not exist. On the other hand when too much GHGs are expelled into the atmosphere the “blanket” becomes too thick and traps too much heat, raising the Earth’s average temperature.

There are many natural sources of GHGs such as volcanic activity, forest fires, melting permafrost, the release of methane from wetlands and swamps, and even the respiration of animals and plants. Worryingly, the amount of GHGs in the atmosphere today, in particular CO<sub>2</sub>, far exceed the naturally occurring range of the past million years or so. We now know that the raised levels of GHGs in the atmosphere are a result of human activity, which over the years has continued unabated and is undoubtedly the root cause for today’s warming trend.

Figure 20 Atmospheric CO<sub>2</sub> concentrations dating back to 1958, from the NOAA (National Oceanic and Atmospheric Administration) and WDCGG (World Data Centre for Greenhouse Gases).<sup>42</sup>

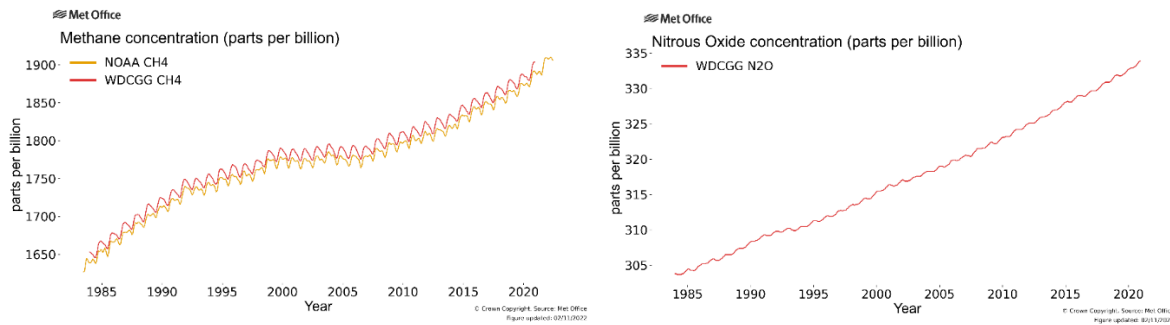


Carbon dioxide is the most dominant GHG and the majority of anthropogenic CO<sub>2</sub> released into the atmosphere is from the extraction and burning fossil fuels. We currently rely heavily on fossil fuels to heat our homes, run our vehicles, generate electricity, and to power industry and manufacturing. Meanwhile, carbon sinks such as the ocean, soil and forests are being continually exploited, meaning that we emit more CO<sub>2</sub> into the atmosphere than natural sinks are able to remove – leading to a rise in atmospheric CO<sub>2</sub>. The exploitation of carbon sinks, such as deforestation can also lead to large amounts of CO<sub>2</sub> being released into the

<sup>42</sup> Carbon dioxide and other greenhouse gases, Met Office. Available at: [Greenhouse gases | Climate Dashboard \(metoffice.cloud\)](https://www.metoffice.cloud/greenhouse-gases)

atmosphere. Sources for other GHG gases such as CH<sub>4</sub> and N<sub>2</sub>O include livestock and agricultural farming, while sources of fluorinated gases include the production of refrigeration products and aerosols. Unsurprisingly, these gases are also on the rise.

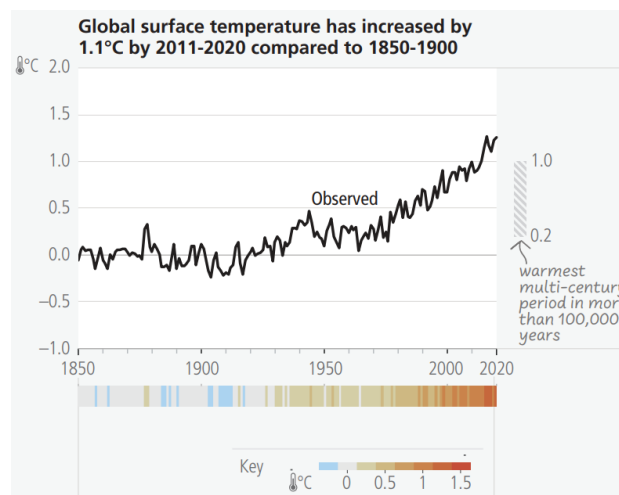
Figure 21 Atmospheric methane and nitrous oxide concentrations over time<sup>43</sup>



We can analyse each of these gases by their specific ‘global warming potential’ (GWP), which is determined by how effective the gas is at trapping heat and how long it remains in the atmosphere before breaking down. To standardise the effects of various greenhouse gases, the United Nations Intergovernmental Panel on Climate Change (IPCC) created a measure known as ‘carbon dioxide equivalent’ (CO<sub>2</sub>e). Carbon dioxide equivalent essentially describes the GWP of a gas. This becomes a much more accurate method to describe and measure our carbon footprint.

Human activity continues to pump GHGs into the atmosphere, upsetting the natural balance. As the level of these gases rise and the “blanket” thickens, so too does the temperature of the Earth and our challenge to find the solutions.

Figure 22 Average global surface temperature change over time.<sup>44</sup>



<sup>43</sup> Carbon dioxide and other greenhouse gases, Met Office. Available at: [Greenhouse gases | Climate Dashboard \(metoffice.cloud\)](https://www.metoffice.com/uk/about-us/our-work/our-reports-and-publications/greenhouse-gases)

<sup>44</sup> IPCC, 2023: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, 184 pp.

## Risks, Threats and Impacts of Climate Change

Human-induced climate change has affected every aspect of the world and the effects are all interrelated. Climate change does not only mean rising global average temperatures. It also poses a wide range of global threats that have far-reaching implications for both natural ecosystems and human societies. Some of the major global threats caused by climate change include:

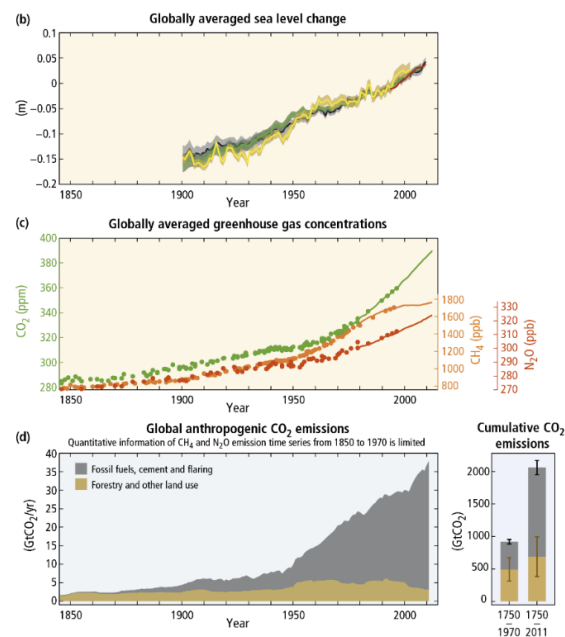
- Changes to weather patterns and extreme weather events

Weather patterns are changing and becoming more unpredictable. Climate change has also contributed to the intensification of extreme weather events such as wildfires, storms, floods and droughts. Countries around the world have already seen a flurry of extreme weather events in recent years from Europe experiencing its warmest summer leading to wildfires contrasted by record rainfall throughout the month of July 2023 in UK.

- Sea level rise

There is a significant threat to coastal communities from sea level rise due to the melting ice caps and glaciers along with the thermal expansion of seawater.

Figure 23 Demonstration of a strong positive correlation between the increase of anthropogenic CO<sub>2</sub> emissions, atmospheric greenhouse gas concentrations and global average sea level change<sup>45</sup>



- Ocean acidification

Increased levels of CO<sub>2</sub> in the atmosphere has meant that more CO<sub>2</sub> is being absorbed by the oceans, leading to ocean acidification. This poses a threat to marine species and could alter marine food chains and food supply to humans. Acidification can also reduce the level of protection we get from reefs against

<sup>45</sup> IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

storms, lost tourism opportunities and many other benefits that the marine ecosystem offers.

- Biodiversity loss

Climate change can disrupt natural ecosystems leading to species loss, spread of diseases, increased competition and shifts to the natural distribution of species. Many plants and animals struggle to adapt quickly enough to the current rate of change resulting in a decline in biodiversity.

- Food and water insecurity

Changes in weather patterns from temperature to precipitation affect crop yields and water availability putting great pressure on our agricultural systems, impacting food production, supply chains and even livelihoods. The affected productivity of farming systems is wide-ranging including horticulture, livestock, agro-forestry and fisheries, leading to food shortages.

- Economic disruptions

The combined impacts of extreme weather events, sea-level rise, disruptions to food supply chains and industries can bring about significant economic consequences, affecting global trade and development.

- Health risks

Climate change can alter the distribution range of diseases and exacerbate the threat of infectious diseases amongst the human population. These may come in the form of food-borne, water-borne and vector-borne diseases. Environments which were not previously sustainable for certain disease vectors become ideal conditions for them to flourish. The IPCC AR6 Working Group II and the 2022 Lancet Countdown reports have revealed that climate change and weather extremes also have a negative impact on the physical and mental health and wellbeing of people all around the world.<sup>46,47</sup>

- Migration and displacement of people

Environmental degradation, changes or reductions to the availability of resources and the loss of livelihoods can lead to an increase in the number of climate refugees. Socio-economic inequalities also exacerbate the vulnerability of those in poverty-stricken countries and communities who tend to face the brunt of climate change. Often times, those least responsible for climate change are also those who are at greatest risk.

A summary of the observed changes of mean climate across climate system components and their attribution to human influence can be found in Figure 2.

<sup>46</sup> Climate Change 2022: Impacts, Adaptation and Vulnerability, IPCC, 2022. [Available at: Climate Change 2022: Impacts, Adaptation and Vulnerability](#)

<sup>47</sup> The 2022 report of the Lancet Countdown on health and climate change: health at the mercy of fossil fuels, Romanello et al., 2022. Available at: [The 2022 report of the Lancet Countdown on health and climate change: health at the mercy of fossil fuels](#)

Figure 24 The assessment of observed changes of mean climate across climate system components, and their attribution to human influence<sup>48</sup>

Change in indicator	Observed change assessment	Human contribution assessment
<b>Atmosphere and water cycle</b>	Warming of global mean surface air temperature since 1850-1900	<i>likely</i> range of human contribution (0.8-1.3°C) encompasses the <i>very likely</i> range of observed warming (0.9-1.2°C)
	Warming of the troposphere since 1979	Main driver
	Cooling of the lower stratosphere since the mid-20th century	Main driver 1979 - mid-1990s
	Large-scale precipitation and upper troposphere humidity changes since 1979	
	Expansion of the zonal mean Hadley Circulation since the 1980s	Southern Hemisphere
<b>Ocean</b>	Ocean heat content increase since the 1970s	Main driver
	Salinity changes since the mid-20th century	
	Global mean sea level rise since 1970	Main driver
<b>Cryosphere</b>	Arctic sea ice loss since 1979	Main driver
	Reduction in Northern Hemisphere springtime snow cover since 1950	
	Greenland ice sheet mass loss since 1990s	
	Antarctic ice sheet mass loss since 1990s	Limited evidence & medium agreement
	Retreat of glaciers	Main driver
<b>Carbon cycle</b>	Increased amplitude of the seasonal cycle of atmospheric CO <sub>2</sub> since the early 1960s	Main driver
	Acidification of the global surface ocean	Main driver
<b>Land climate</b>	Mean surface air temperature over land (about 40% larger than global mean warming)	Main driver
<b>Synthesis</b>	Warming of the global climate system since preindustrial times	

Key

medium confidence	likely / high confidence	very likely	extremely likely	virtually certain	fact
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<sup>48</sup> IPCC, 2023: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, 184 pp.