Our Newcastle
Our Future

Net Zero Newcastle - 2030 Action Plan

September 2020

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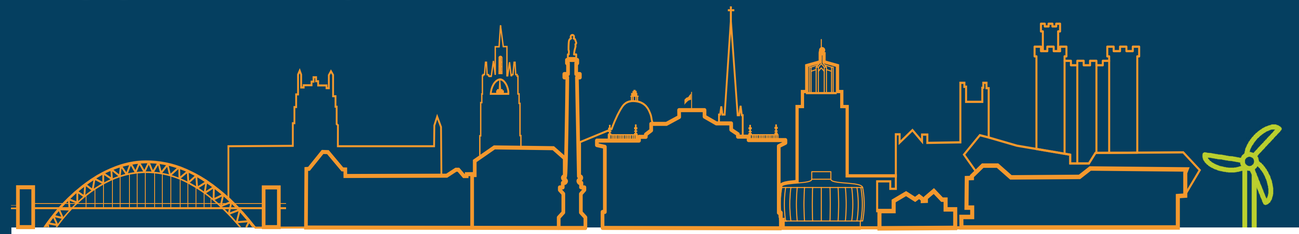


Part One:
INTRODUCTION

FOREWORD FROM THE LEADER

COUNCILLOR NICK FORBES
Leader of Newcastle City Council and Co-Chair of Newcastle's city-wide Net Zero Taskforce

"This Action Plan sets out the scale of the Net Zero challenge for the city and the areas where we must take action to mitigate and adapt to climate change."

As well as a devastating public health crisis, the Covid-19 pandemic has simultaneously been a deep and complex economic and social shock to Newcastle. In this time of crisis, it has also shown us a brief glimpse of a more environmentally friendly future with less traffic, more active travel, less air pollution and fewer greenhouse gas emissions.

However, our emissions have rapidly rebounded as lockdown has been eased and the long-term emissions savings from the pandemic are expected to be minimal. The Climate Emergency is as real as it was before the pandemic and climate change remains the challenge of our generation. It is clear from the scientific evidence that the impacts of climate change are stark and accelerating in severity. Only last month (August 2020), we saw the highest temperature ever recorded on the planet. Time is very much of the essence in order to stay within the 1.5°C global temperature rise as a safety limit set out by the Intergovernmental Panel on Climate Change (IPCC) and the Government's legally binding Net Zero 2050 commitment (link **here**), and we must take immediate steps to initiate short term actions to deliver effective change in the short, medium and long term.

Despite the devastating impacts of Covid-19, the city's determination and cross-party commitment to achieving Net Zero status by 2030 remains undiminished. I believe that the crisis that we are facing now must, and will be, a pivotal moment in our transition to a low carbon future. We have a once-in-a lifetime moment to deliver low carbon transformation for the best interest of our residents, businesses, the environment and future generations, whilst simultaneously achieving a resilient, fair and inclusive economic recovery. The wholesale decarbonisation of a city has never been done before and the challenge is quite simply, enormous. We know where we want to go and we know we have some (but not all) of the tools at our disposal to get there. On our journey to Net Zero, we will face many challenges: disruptor events, new technologies and applications, political change, economic shocks, funding issues, to name just a few. We are facing this at a time of great uncertainty.

But we have a proud heritage of innovation, industry and collaboration. We have delivered world-class engineering solutions to address challenges of their time and successfully achieved economic growth and prosperity for the city. We must now draw on our city-wide world leading expertise and resources to be the example of a post-industrial city that has mitigated its own emissions, adapted to climate change, prepared for a rapidly changing economy and delivered our **Net Zero vision** for the city. Solutions will not happen overnight. Instead they require long-term investment in the city's infrastructure, economy and housing, as well as behaviour change from communities and businesses.

We want to see a Green New Deal to rebuild a just and sustainable economy, that delivers low carbon transformation for the best interest of our residents, the environment and future generations, whilst simultaneously achieving a resilient, fair and inclusive economic recovery. We must grow our business base and 'green-collar' jobs in the 'new' low carbon economy through product and service innovation, reskilling and addressing poverty to ensure an inclusive society that challenges social inequality. We must ensure that these new 'green-collar' jobs are not an extension of the gig economy, but instead are high quality, well paid and permanent positions in thriving industries. This will mean using short term economic stimulus money as a springboard for delivering sustained and ambitious low carbon economic growth, and leveraging much greater private sector investment.

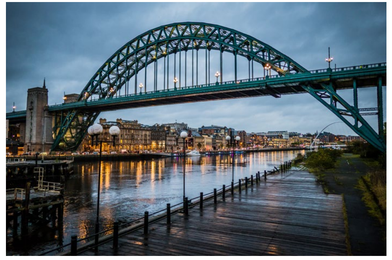
The Net Zero transition is not something that can be achieved by one organisation, agency or community acting along, but by the city coming together, building on our strong history of partnership and cooperation. Together we are stronger, and to achieve an ambition of the scale of Net Zero, collective, practical action is what truly matters. This Action Plan sets out the scale of the Net Zero challenge for the city and the areas where we must take action to mitigate and adapt to climate change. The actions presented are wide ranging in their scope and approach. We have set out a bold vision and set of actions across three key themes ('Energy', 'Transport' and 'Adaptation and Sustainability') to address emissions from all sectors of the city and to deliver our ambitious aim to be a Net Zero Newcastle.

We invite you (our city residents and businesses) to express your support via the **Net Zero Pledge** and to engage with us and other city-wide organisations to help deliver our Net Zero future for the benefit of everyone.

WHAT IS THIS DOCUMENT?

This Action Plan presents Newcastle's view of how the city can achieve its ambition to be Net Zero carbon by 2030. In its creation, we have engaged with a diverse range of individuals and organisations from across the city to feed in different values, perspectives and backgrounds.

This Action Plan is a continuation and enhancement of the Climate Emergency Advisory Report (link **here**) which was presented and approved at Newcastle City Council's Cabinet in March 2020 and the previous reports setting out detailed proposals for multiple low carbon interventions, that has been presented to Climate Change Committee (further information **here**).



Councillor Clare Penny-Evans

Cabinet Member for Climate Change and Communities

Our commitment to have Net Znero emissions, twenty years ahead of the Government's targets, requires far reaching change in every aspect of the city's life. It is not something that can be achieved by one institution, but by the city coming together and acting collaboratively to change the nature of how we generate greenhouse gas emissions and how we mitigate and adapt to the impacts of climate change.

The 'Net Zero Newcastle - 2030 Action Plan' is…

… a map of the key actions Newcastle will likely need to take in order to reach Net Zero status by 2030.

Based on what we know today, this Action Plan sets out the numerous actions that we think we must take to deliver the transition towards a Net Zero future by 2030. There will be many other actions that will emerge over time that will need to be identified and progressed.

By setting out the actions in a clear and transparent way, we aim to focus the city residents, businesses and public sector organisations on a sequence of key actions that will allow us to achieve Net Zero 2030 and to be reflected in city and organisational plans.

… a document that sets out ways in which each of us can play our part in achieving the Net Zero commitment.

We know that no individual or organisation can deliver the city's Net Zero commitment alone, and we must work together to enable everyone across the city to engage in a meaningful way and to understand the individual, collective and organisational changes that we must deliver together.

We have an ambitious programme of Net Zero interventions of what we as a council can influence through our policies, programmes, projects and services, but this fundamentally requires a whole city approach, with businesses, universities, the private sector, residents and communities going on this journey with us. A communications plan and programme will enable key messages set out in this document to be delivered to target audiences.

… in constant review.

The actions detailed in this plan will be reviewed, renewed and re-published online at the beginning of each calendar year through the Net Zero Newcastle webpage (link **here**). An annual progress report will be published at the beginning of each calendar year setting out the actions that have been delivered and progress on other priority actions over the preceding year, and will confirm whether the actions that are proposed over the coming months and years remain relevant, appropriate and targeted in scale and structure for achieving Net Zero by 2030.

The 'Net Zero Newcastle - 2030 Action Plan' is not…

… the only carbon reduction plan within Newcastle.

We recognise organisations will continue to have their own plans and strategies and this plan should complement and support those.

In addition, a Economic Renewal Plan and a plan for people and communities will be published shortly and will draw on many of the Net Zero themes, in particular the economic opportunities arising from **Green Growth** as we transition to a Net Zero future.

… perfect.

This is our first iteration of the plan, prepared through extensive engagement across the city. We expect that it will be reviewed and refined based on continuous feedback and further engagement, especially in light of the emerging social, economic and public health environment that we are all experiencing as a result of the Covid-19 pandemic.

… a list of firm commitments or instructions.

This plan sets out actions that we believe can deliver the city's carbon reduction commitment. It relies on a collaborative effort from organisations and individuals to decide how they will change their own activities to help achieve the city's shared ambition. We must work together, sharing knowledge and learning lessons that will allow us to collectively succeed.

… a barrier.

The plan isn't intended to impose rules that stifle innovation and other work occurring in the city. Far from that being the case, we want this plan to encourage others to come forward with their own initiatives and demonstrate leadership in the Net Zero transition.

… complete.

There will be no such thing as a 'final version' as it will be in constant review as real world events happen and new technologies and delivery methods become available. An annual progress report will be published at the beginning of each calendar year.

WHAT YOU CAN DO TO HELP

Newcastle Net Zero Pledge

We invite you (our residents, young people and businesses) to support the city as we transition to Net Zero by pledging to take three simple and 'no cost' actions. In fact, you will most likely save money!

Whilst these actions might seem inconsequential, if we all do them, they will make an enormous impact on our city-wide emission levels. **If every individual and business in the city implemented these three simple actions, we would rapidly see a drop in our city-wide emissions of approximately 475 tonnes of CO_2(e) per year, almost one third of our emissions.**

2030 Net Zero Newcastle Pledge

SIGN THE NET ZERO PLEDGE HERE

NET ZERO PLEDGE FOR INDIVIDUALS

I pledge to undertake these 3 Net Zero actions:

- ☐ **ACTION 1**
  I will improve the energy efficiency of my home using the checklist here and sign up for the Green Home Grant here.
- ☐ **ACTION 2**
  I will walk, cycle or take public transport instead of a car on at least 50% of my journeys.
- ☐ **ACTION 3**
  I will build four of the Personal Sustainable Actions into my daily life using the checklist here.

NET ZERO PLEDGE FOR YOUNG PEOPLE

I pledge to undertake these 3 Net Zero actions:

- ☐ **ACTION 1**
  I will attend the upcoming Climate Change Youth Summit.
- ☐ **ACTION 2**
  I will encourage friends and family to adopt sustainable habits and to sign the Net Zero Pledge.
- ☐ **ACTION 3**
  I will walk, cycle or take public transport to get to school / college.

NET ZERO PLEDGE FOR BUSINESSES

I pledge to undertake these 3 Net Zero actions:

- ☐ **ACTION 1**
  I will ensure a Sustainable Travel Plan for all company employees will be prepared and communicated to staff.
- ☐ **ACTION 2**
  I will contact Business Energy Savings Team (BEST) to request an energy efficiency review to identify carbon and cost savings - link here.
- ☐ **ACTION 3**
  I will drive down packaging and use natural, recyclable and recyled materials wherever possible.

NEWCASTLE'S CLIMATE EMERGENCY

NEWCASTLE'S COMMITMENT TO CLIMATE ACTION

On 3 April 2019, Newcastle City Council declared a Climate Emergency. The Climate Emergency declaration made the commitment to create a new Climate Change Strategy with the aim of achieving Net Zero status by 2030 and to establish a Climate Change Convention (further information **here**).

The Climate Emergency declaration:

- Declare a 'Climate Emergency'
- Update the 2010 Newcastle Declaration on Climate Change by pledging to make Newcastle upon Tyne carbon neutral by 2030, taking into account both production and consumption emissions
- Call on the Government to provide powers and resources to make the 2030 target possible
- Work with other Government bodies and Non Governmental Organisatoins (NGOs) to determine and implement best prac tice methods to limit Global Warming to less than 1.5°C
- Work with partners across the city and region to deliver this new goal through all relevant strategies and plans recognising that the council cannot deliver on this ambition alone
- Ensure that representatives on the Tyne and Wear Pensions Fund continue to lobby for further disinvestment in fossil fuels
- Report to Council as soon as possible on the actions the Cabi net will take to address this emergency

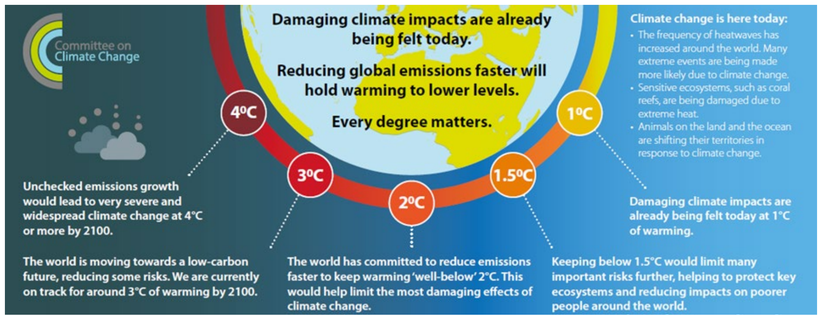
WHY WAS A CLIMATE EMERGENCY DECLARED?

Human activity has already caused irreversible climate change; the impacts of which are being felt around the world and here in Newcastle.

Since pre-industrial times, human activities have caused approximately 1°C of global warming. At current rate, we will reach 1.5°C between 2030 and 2052. Past emissions alone do not commit the world to 1.5°C.

Under the Paris Climate Agreement, the UK is committed to restricting the increase in global average temperatures to well below 2°C and preferably below 1.5°C. For this to be achieved, cutting carbon emissions over the next decade will be crucial.

Currently, the world is on track to overshoot the Paris Agreement's 1.5°C limit before 2050. The Climate Change Act 2008 commits the UK to reduce net carbon emissions to zero by 2050, and to five-yearly carbon budgets between now and then.

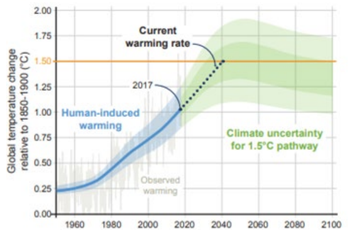


Source: Committee on Climate Change

THE PARIS AGREEMENT

The overall objective of the United Nations Framework Convention on Climate Change (UNFCCC) is 'stabilising greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous human-induced interference in the climate system. The 2015 Paris Agreement was the first comprehensive global agreement to tackle climate change.

The Paris Agreement contains a long-term temperature goal (the level of warming that the world is aiming for) in which Parties (countries) commit to 'holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change'.



Source: Intergovernmental Panel on Climate Change

THE NATIONAL PICTURE

Since the 2015 Paris Agreement, which committed signatories to hold global warming to below 2.0°C above pre-industrial levels and pursue efforts to limit warming to 1.5°C, a special report by the Intergovernmental Panel on Climate Change (IPCC) published in 2018 outlined a pressing need to hold global warming at 1.5°C against pre-industrial levels to mitigate risks associated with climate change.

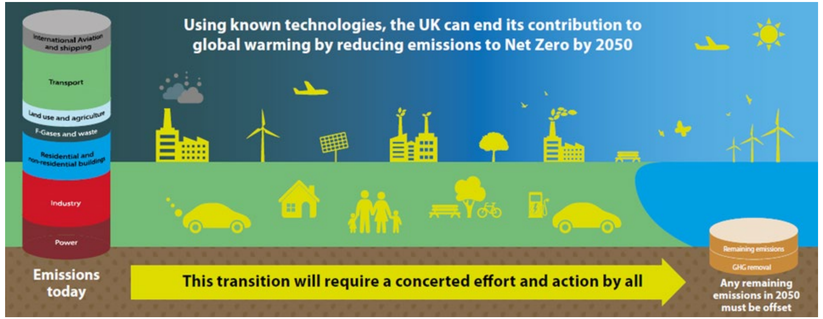
Following the IPCC report, the Government commissioned the UK's Committee on Climate Change (CCC) to assess what this means for current UK targets, policy and obligations.

Published in May 2019, the CCC report concluded that the UK can reduce emissions to Net Zero by 2050, and that this could cost less than 2% of the UK's Gross Domestic Product (GDP).

In response to the CCC report, the Government introduced a statutory instrument into parliament on 12 June 2019, to amend the 2008 Climate Change Act and enshrine into law a 2050 Net Zero target for the UK. This was signed into law on 27 June 2019.

The UK became the first major economy in the world to make a legally binding commitment to Net Zero greenhouse gas emissions by 2050.

Keeping below 1.5°C requires massive and rapid change with deep emissions reductions in all sectors.



Source: Committee on Climate Change

NEWCASTLE'S NET ZERO VISION

The Benefits of Net Zero

There are many benefits for Newcastle city residents and businesses by delivering Net Zero from phasing out harmful greenhouse gas emissions and adapting to the most damaging effects of climate change.

Many of these benefits and cross-cutting priorities are reflected in our key policies and plans across the city. The image to the right shows our vision for a Net Zero city and the benefits that this would deliver for:

- The local economy
- Individuals
- The local environment

Our Net Zero Vision

Our Net Zero vision is to see Newcastle not be a net contributor to climate change by 2030.

Our Climate Emergency declaration has set us on a path to Net Zero by 2030. Our primary focus is on Carbon Dioxide (CO_2) but our city-wide approach also tackles emissions from other important greenhouse gases.

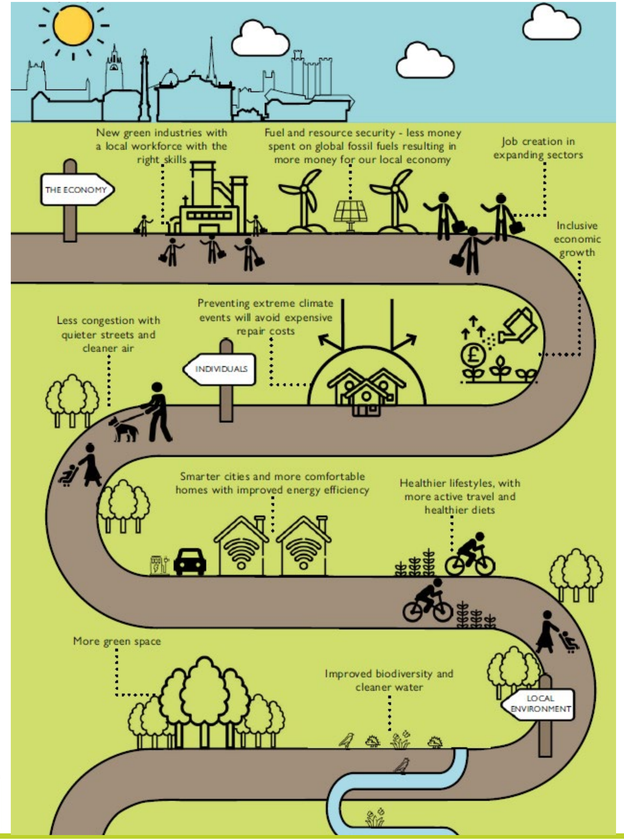
CO_2 is the main greenhouse gas emitted by humans, largely due to the use of fossil fuels to power our economy, heat our properties and for transport. Once CO_2 is emitted, the land surface and the ocean take some of the carbon out of the atmosphere, but a significant proportion remains for centuries to millenia. This creates warming that persists in the atmosphere for a very long time.

Each additional tonne of CO_2 emitted adds more long-lasting CO_2 to the atmosphere and creates more warming, meaning that global temperature increases in proportion to the cumulative total emissions of CO_2. Emissions of CO_2 must therefore be brought to Net Zero to stop temperatures increasing.

Councillor Joyce McCarty

Deputy Lead of the Council and Cabinet Member for Resources

Our ambition is for a green city of the future, which values all residents, provides quality sustainable housing, a low carbon economy which addresses poverty and looks to ensure all people feel invested and included by challenging social inequality.



WHAT DOES NET ZERO MEAN?

Net Zero (also referred to as 'carbon neutrality') refers to balancing city-wide carbon emissions with carbon reduction and removal activities.

What do we mean by 'balance'?

Net Zero means achieving an equilibrium (a balance) between the greenhouse gases that are caused by human activity put into the atmosphere and those taken out.

What greenhouse gases are included in the Net Zero target?

Sometimes Net Zero refers to carbon dioxide (CO_2) only and sometimes it refers to all greenhouse gas (GHG) emissions. Greenhouse gases are gases in the Earth's atmosphere that trap heat. There are seven main GHGs that contribute to climate change, as covered by the UNFCC's Kyoto Protocol - they are:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulphur hexafluoride (SF_6)
- Nitrogen trifluoride (NF_3)

Each GHG has differing warming impacts depending on how long they remain in the atmosphere and how effective they are at retaining energy – the global warming potential (GWP). With the exception of water vapour, CO_2 is one of the largest global GHG (accounting for up to 81% of global emissions) and remains in the climate system for a very long time, causing increases in concentrations that will last for thousands of years. CO_2 is commonly used as a reference greenhouse gas for determining Net Zero targets and in accordance with international norms, Newcastle will adopt the same approach.

In order to capture the impact of other GHGs, in many places throughout this Action Plan, carbon dioxide equivalent or $CO_2(e)$ is used which is a universal unit of measurement to indicate the GWP of GHGs, expressed in terms of the GWP of one unit of carbon dioxide. In all cases, we will use the UK Government's GHG conversion factors which are published every year to determine the applicable $CO_2(e)$ figure.

Example of carbon reduction and removal:
Installing energy efficiency and low carbon heating options to reduce and replace emissions from our buildings

Carbon reduction and removal

Carbon emissions

Example of carbon emissions:
Emissions resulting from gas boilers for heating our homes and buildings.

Part Three sets out our intended approach and measures to reduce and remove carbon emissions, and **Part Four** details the estimated delivery timeline.

Newcastle's Emissions Inventory provides details of our city-wide emissions inventory.

CARBON MANAGEMENT HIERARCHY

In achieving Newcastle's Net Zero status, the carbon management hierarchy of emission management will be implemented, as set out below.

The Carbon Management Hierarchy directs our city to prioritise those actions which have the greatest impact by:

- First, avoiding activities that are carbon-intensive and hence generate high emissions; then
- Second, reducing carbon-intensive activities wherever possible; then
- Third, substituting those energy sources with a high carbon footprint for low carbon options; and finally
- Fourth, compensating for those remaining emissions which cannot be avoided or reduced.

Carbon Management Hierarchy

Top priority

Avoiding carbon-intensive activities.

1) Avoid

Efficient use of resources and implementing measures to reduce demand.

2) Reduce

Replacing high carbon intensity energy sources with renewable and low carbon technologies.

3) Substitute

Considering negative emissions options for capturing carbon emissions using natural and human engineered methods.

4) Compensate

Option of last resort

LONG-LIVED AND SHORT-LIVED GREENHOUSE GASES

Global Net Zero emissions of long-lived greenhouse gases and stable or falling emissions of short-lived greenhouse gases are needed to stop global temperatures increasing.

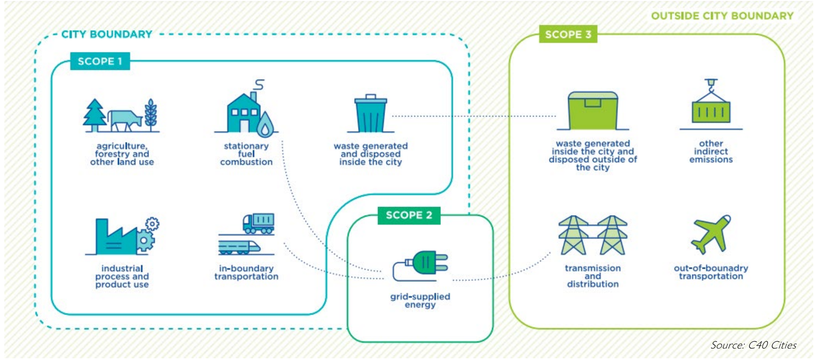
Long-lived greenhouse gases accumulate in the atmosphere, so continued emissions of these gases leads to continually increasing warming. Warming created by long-lived gases is not naturally reversible on the timescale of decades to centuries.

Short-lived greenhouse gases such as methane affect the climate in different ways to CO_2, with constant rates of emission leading to an approximately constant level of raised global average temperature but not continually increasing warming

SCOPE OF EMISSIONS

The Global Protocol for Community-Scale GHG Emission Inventories (GPC) divides emissions into three categories or 'scopes' at a city level:

- ***Scope 1 - Direct emissions***
  Emissions from sources located within the Newcastle local authority boundary – for example petrol, diesel, natural gas, etc.
- ***Scope 2 - Energy indirect emissions***
  Emissions occurring as a consequence of the use of grid-supplied electricity, heat, steam and / or cooling within Newcastle's local authority boundary.
- ***Scope 3 – Other indirect emissions***
  All other emissions that occur outside Newcastle's local authority boundary as a result of activities taking place within the city boundary – for example consumer activities and travel outside city boundaries and outside the control of the city.



Source: C40 Cities

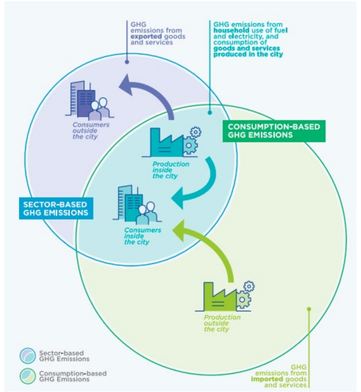
PRODUCTION AND CONSUMPTION EMISSIONS

Cities also give rise to the production of significant quantities of GHG emissions outside their boundaries (scope 3). There are two different approaches for accounting for carbon emissions:

- ***Approach #1 – Production based emissions***
  This takes into account carbon emissions from burning of fossil fuels required to produce goods and deliver services within Newcastle. Generally this is determined using sector-based approach, for example emissions from transport, domestic properties, or commercial and industrial facilities.
- ***Approach #2 – Consumption based emissions***
  This relates to imports and exports of goods and services to Newcastle that, either directly or indirectly, involve carbon emissions. This includes things like food, clothing, electronic equipment (etc) by Newcastle city residents.

A city consumption-based GHG inventory can be defined as the emissions arising within a city's boundary, minus those emissions associated with the production of goods and services exported to meet demand outside the city, plus emissions arising in supply chains for goods and services produced outside the city but imported for consumption by its residents:

CONSUMPTION = PRODUCTION - EXPORT + IMPORT



Source: C40 Cities

NET ZERO COMMITMENT

Our Net Zero target relates to Scope 1 and Scope 2 emissions, in accordance with the GPC emissions inventories and frameworks developed on the basis of the Paris Agreement.

Newcastle City Council also recognises the critical importance of adopting a consumption-based approach in order to address Scope 3 emissions on an equitable basis, and to address GHGs other than CO_2.

We do however recognise that it is important that we focus our immediate efforts on addressing the Scope 1 and Scope 2 emissions because we can have a much more direct impact on reducing these emissions. We intend to explore further the emerging options for delivering a consumption based approach as it does not help the climate if we simply move production to another country. In the meantime, we will evaluate options to eliminate Scope 3 emissions and non-CO_2 based GHGs directly, through partnership working, and by lobbying for change at national and international forums.

In order to address the three scope emission categories, we will follow our Carbon Management Hierarchy (**here**).

Further information on the framework that we are using for our emissions inventory at city level is included in **Newcastle's Emissions Inventory**.

CARBON OFFSETTING

By 2030, Newcastle will have to contribute Net Zero carbon to the atmosphere. Any emissions emanating from any sector of Newcastle's economy which fail to have been mitigated through low or zero-carbon practices must be offset by an equal amount.

What is Carbon Offsetting?

Offsetting is defined as:

The process of trying to reduce the damage caused by releasing carbon dioxide into the environment by doing other things that remove carbon dioxide, for example, by planting trees.

Source: Cambridge Dictionary

Common examples of offsets include natural solutions (such as planting trees) and technological solutions (such as carbon capture, utilisation and storage, and direct air capture).

Most national and international scenarios include some form of negative emissions programmes or offsetting flexibility, and there is broad recognition that offsetting has its place in allowing cities and countries to achieve their climate change targets.

Shortcomings of Carbon Offsetting

Offsetting is often criticised because if a city (or company or country) can afford to offset, then under the system it doesn't need to make deep and meaningful cuts to its emissions.

In some cases, this can dis-incentivise meaningful climate change mitigation action by weakening the drivers for change and reducing innovation towards a lower carbon future.

Addressing the Shortcomings

In order to address the shortcomings of the carbon offsetting approach, we must learn from the mistakes of historical schemes. It is therefore of the utmost importance that the quality of the offsetting mechanism is ensured.

Reputable offset sources must be used that have clear and effective principles and rules which govern their use. Key considerations in selecting appropriate offsetting measures are listed in the box to the right.

Councillor John-Paul Stephenson

Cabinet Member for Environmental and Regulatory Services

We recognise the inherent shortcomings of carbon offsetting and want to strive as a city to make bold strides towards Net Zero over the coming years. Therefore, offsetting is the option of last resort in the hierarchy of mitigation of the city emissions, and wherever possible we will adopt an insetting approach.

KEY CONSIDERATIONS FOR CARBON OFFSETTING

- ***Equivalence*** - any carbon unit should have a clear long-term climate benefit, at least as large as the effect of a unit of CO_2 removal in Newcastle.
- ***Additionality*** - the activities generating carbon units should drive genuinely additional emissions reductions (i.e. that would not have happened in the absence of such activity).
- ***Permanence*** - the activities generating carbon units should lead to permanent reduction or removal of GHGs from the atmosphere.
- ***Sustainability*** - the activities generating carbon units need to support wider sustainability objectives by:
  - Doing no net harm
  - Preserving and enhancing environmental integrity
  - Ensuring compatibility with sustainable development goals
  - Not disadvantaging local communities
  - Delivering environmental and social co-benefits to support local economic development
  - Ensuring land and biomass are used sustainably

CARBON INSETTING

The options available to a local authority are different to those of a company or country. Policy levers through the planning framework provide options for the development of local offsetting schemes. Our preference would be towards this 'insetting' approach.

Insetting can be considered the same as offsetting, except the mitigation activity is confined to a specific undertaking – this could be the operations of an organisation (public or commercial) where the cost to offset is simulated internally so the business case for internal carbon mitigation projects becomes more financially viable and incentivises that carbon saving project.

Insetting can happen across organisations within a geographically defined administrative area.

A city-wide insetting scheme could involve the movement of finance towards renewable energy generation or carbon reduction or sequestration schemes; this could include energy efficiency or tree planting/habitat restoration.

The finance may be one-off payments towards schemes in exchange for carbon credits (generated through projects within the city under the additionality principles) or the utilisation of green bonds for example through crowd sourcing and other means - something like a Net Zero Geordie Bond.

5 year Green Bond schemes already exist in the market; the key difference would be that investments must make projects happen within the city. These could offer a higher return to personal finance than traditional options, which may be essentially devaluing in ISAs – this latent capacity could be used to accelerate the city's drive towards Net Zero, but also help build community capital through residents being able to contribute towards the wider programme.

Importantly, a carbon insetting scheme will also retain investment in our local economy.

However, the complexity in designing a scheme of this nature must be carefully considered against the overall benefit it could deliver. We intend to explore whether a city-scale insetting programme would be suitable for Newcastle and gauge the level of interest from our residents and business in being part of such a scheme.

CLIMATE CHANGE CONVENTION

Timeline for Newcastle's Net Zero Programme to date

Newcastle's Climate Change Convention

We have been working across the city to establish a partnership-based approach drawing in other public sector organisations, businesses, residents and stakeholders to set out a collective understanding of our emission profiles, the scale of the decarbonisation challenge and an action-based path to a Net Zero future.

We have established a Climate Change Convention as a framework to deliver our Net Zero 2030 commitment. The convention comprises:

- ***The Climate Change Committee***
  This committee has been established to engage both members and the public with climate change and Net Zero issues. The committee takes evidence from expert witnesses, environmental groups, residents and stakeholders from across the city on their views and provides advice to Cabinet and the City Council. The committee complements the more technical work of the Net Zero Taskforce and allows members to hold officers and partners to account.
- ***The Net Zero Taskforce***
  The taskforce creates partnership working between key players in the city, including our universities and college, hospital trust, airport, housing, transport, business, voluntary sector and utilities representatives. The taskforce is responsible for commissioning work to establish a city-wide path to Net Zero 2030 and assessing the implications and expectations of all partners.
- ***The Citizen's Assembly***
  This is a forum at North of Tyne Combined Authority level for representation by city residents (including young people) in identifying and guiding climate change priorities. A Net Zero Champions approach will be considered through the Citizen's Assembly.

Climate Change Convention		
The Climate Change Committee	***The Net Zero Taskforce***	***The Citizen's Assembly***
• Advise Cabinet and Council on actions and resources required to deliver climate change ambitions • Consider evidence and advice from communities, interest groups, academics, officers and partners • Establish task and finish groups to investigate issues • Review options to meet Net Zero target • Consider roles of partners • Make recommendations to Cabinet • Advisory report to Cabinet by March 2020	• Develop evidence base to underpin Net Zero ambition. • Make recommendations to NCC and city partners, including Asks of Government • Facilitate collaboration • Pool expertise • Develop a Net Zero / decarbonisation pathway for the city • Produce report on city's route to Net Zero by May 2020	• Externally managed and facilitated Citizens' Assembly bringing together representative residents' groups, including young people • Being led by North of Tyne Combined Authority

AN EVIDENCE-BASED APPROACH

Evidence-Based Decisions

In order to deliver on our Net Zero commitment, we must ensure we tackle emissions where they arise and we must deploy our limited resources to achieve the greatest carbon reduction impact.

We are not seeking to reduce all emissions from all sectors but instead to achieve Net Zero, so trade-offs between sectors must be considered where it makes technical and economic sense.

In order to take appropriate actions, we must understand the nature and sources of the climate emissions at city level by using reliable baseline information in order to determine an appropriate scale and type of intervention.

Perfect Data

Whilst data is very important to our climate change planning for mitigation and adaptation, we must not allow the absence of perfect data to prevent us taking action.

With the best intentions and in a quest to design a fully optimised approach for our climate action planning , we may find ourselves continually wanting to pursue better data before making fully informed decisions, without recognising that with constant change and disruptor events in the real world, we may never achieve such a situation.

Instead, we need to determine what data precision is good enough to make informed decisions, while also clearly differentiating between different types of data, and what data has operational value.

Key Performance Indicators

It is entirely possible to achieve emissions impact without any emissions data at all. For example:

- If a person wants to reduce her carbon footprint, so she intends to reduce her commercial air travel by 50%. Does she need to know the exact emissions incurred by flying to do this? No – it is sufficient to cut her airline miles travelled in half.
- If she wants to reach zero emissions from flying, she could simply stop flying, requiring even less data analysis.

The same logic applies to cities using emissions from personal transport as an example, we can either measure the emissions from existing cars, or measure the rate of change by which we replace these cars with more sustainable options.

It is easier to count the number of electric vehicles in the city (relative to the total number of cars) than to measure city-wide emissions from existing fossil-fuelled cars. The growing share of electric cars is a relative change - illustrating that emissions data should not be the primary focus when monitoring the rate of change. We can develop specific and measurable Key Performance Indicators to tell us how we are performing in meeting our Net Zero commitment within the city.

Local Metrics of Performance

To allow pre- and post-intervention monitoring and determine the effectiveness of specific actions that we take, we intend to use a range of local metrics of performance including:

- Urban Observatory real time monitored air quality, environmental and urban data
- National datasets that can be calibrated at city-wide level (within the local authority boundary)
- Transport data including cordon counts, patronage data from public transport operators, etc
- Census data - due to be carried out in 2021
- Energy efficiency and low carbon / renewable heating installation databases and Microgeneration Certification Scheme (MCS) data derived at city-wide level
- Maintained records of project / programme uptake
- Waste collection, processing, recycling and landfill volume data
- Among other local data sources

We recognise that this is an area which will require further development over the coming years to create Key Performance Indicators and a monitoring framework. In some cases, the local structures and datasets are in place (such as the Urban Observatory), but in some cases we will need to work with city partners to seek access to existing but currently inaccessible datasets and establish new monitoring programmes.

urban observatory

National and Local Interaction

We must also take into account changes at a regional and national level and the impact that they will have on our local actions. For example, the carbon intensity of the national grid is constantly evolving with a strong focus on decarbonisation (further information **here**) and the impact that this will have on our approach to heating homes and deploying low carbon transport infrastructure is fundamental to how we achieve our Net Zero commitment.

EMISSIONS REPORTING AND MONITORING

City-wide Emissions Inventory

The first part of our evidence-based approach involves preparing and emissions inventory. From 2020 onwards, Newcastle's city emissions inventory will be reported through CDP. Our first CDP emissions disclosure has been submitted in August 2020 and is currently under review.

Emissions inventory

An emissions inventory is a database that lists the sources and volumes of greenhouse gas emissions discharged to the atmosphere over a calendar year.

A city-wide emissions inventory is prepared by collecting many sources of evidence and data and analysing this data to determine a common unit and reporting framework for emissions from many sectors. The common unit that is used is carbon dioxide equivalent or $CO_2(e)$ – please see **What Does Net Zero Mean?** for further detail.

In preparing an emissions inventory, we have to draw on data from a range of databases. Some of these databases are:

1. Continuous monitoring of emissions from a source; and / or
2. Short-term emission measurements that are extrapolated to a longer time period; and / or
3. Use of emissions factors.

Emissions factors

An emissions factor is a representative value that attempts to relate the quantity of a pollutant emitted with an activity level associated with the emission of that pollutant. In preparing the Newcastle city-wide emissions inventory, the Government's official conversion factors have been used (link **here**). The emission factor gives a conversion factor to a standardised unit – kg $CO_2(e)$ per unit of activity.

Why is an Emissions Inventory Important?

In order to deliver targeted climate change mitigation actions at the scale and speed required, we must understand the nature and sources of emissions. By maintaining an emissions inventory over time which adopts an internationally standardised approach and is periodically enhanced, this allows us to determine how we are performing in our journey to Net Zero and whether the actions we have taken and that are planned are delivering the level of positive change that we require.

The emissions inventory gives a city-wide view of the aggregate emissions levels. Many of the datasets that are used to compile the emissions inventory are derived from national datasets that do not take account of local changes.

Therefore, in order to determine the impact of our actions, we must rely on other means of assessing impact and setting local metrics of performance. Whenever possible, the development of local, source-specific emission factors is desirable (for more information, see **Local Metrics of Performance**).

CDP Emissions Inventory

CDP is a not-for-profit charity that runs the global disclosure system for investors, companies, cities, states and regions to manage their environmental impacts.

In some cases, companies and organisations within the city will report through other international and national emission disclosure platforms.

In some cases, these approaches differ in the scope of the emissions that are assessed (see Scope 1, 2 and 3 definitions in **Scope of Emissions**) and the methodology that is used.

The CDP process requires collection and submission of information from across the city on:

- ***City details and governance***: integrating sustainability into city planning
- ***Climate hazards and vulnerability***: risk and vulnerability assessment underway and details on current impacts of climate hazards
- ***Adaptation***: details on actions, adaptation plan and goals
- ***City-wide emissions***: details on city-wide inventory of emissions
- ***Emissions reduction***: details on targets, actions and action planning
- ***Opportunities***: potential for collaborating with business on sustainability initiatives
- ***Energy***: reports total source of electricity mix breakdown and scale of data
- ***Transport***: provides information on total number of vehicles per mode of transport and other transport metrics
- ***Food***: food consumption information and sustainable food policies
- ***Waste***: solid waste generation statistics
- ***Water security***: reports on anticipated timescale of risks to water supply and describes the actions taken to reduce these risks.

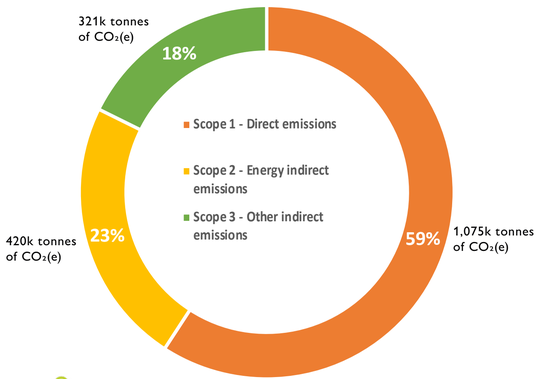
NEWCASTLE'S EMISSIONS INVENTORY

The latest published emissions figures from national databases (BEIS 2018 data) estimate that Newcastle emits 1,816k tonnes of $CO_2(e)$ per year from all three scopes of emissions (see **Scope of Emissions**). **The combined Scope 1 and 2 emissions equate to 1,495k tonnes of $CO_2(e)$ per year.**

The figures presented are extrapolations from national datasets and do not take account of local factors and actions completed to date. As set out in **Local Metrics of Performance**, over the coming months and years we will start to set out local monitoring and reporting systems and produce local metrics of performance which will allow the emission inventory accuracy to be improved.

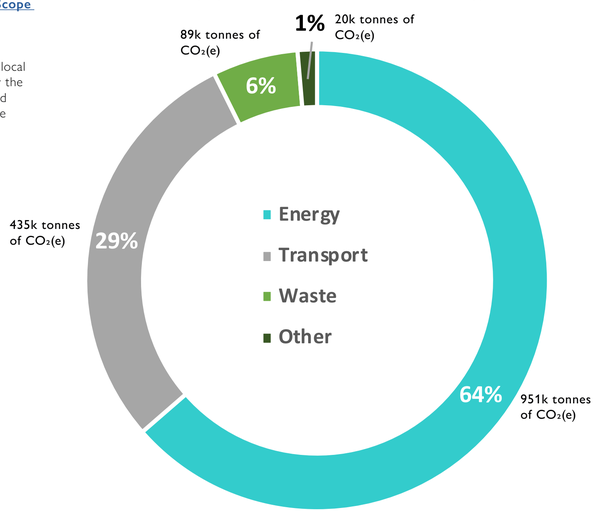
The split by scope of emissions and emission sector is shown on this page.

Emissions inventory by scope of emissions*



Scope 3 emissions are often under-represented in national datasets and may be significantly higher than shown.

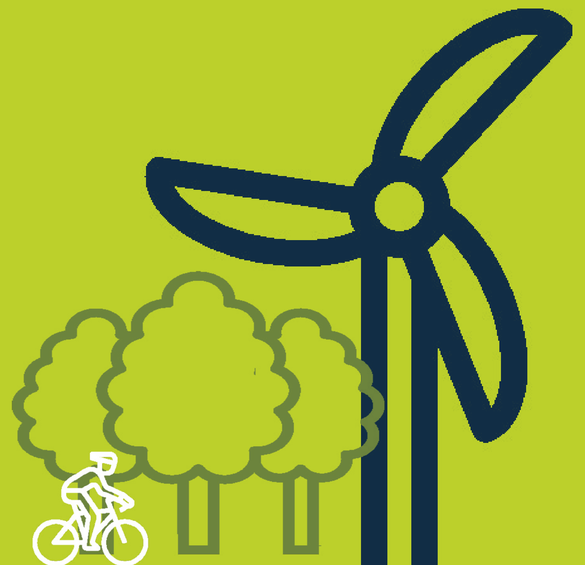
Emissions inventory by sector (Scope 1 and 2 emissions only)*



The 'Other' category includes emissions from industrial process, livestock, land use and generation of grid supplied energy.

*Excludes fugitive emissions

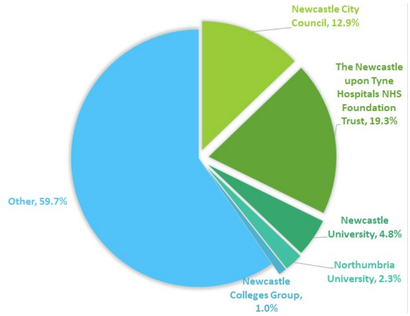
OUR COMMITMENT



We are Proud, Fair and Ambitious. We are Newcastle.

Anchor Institutions

The anchor institutions are the main organisations in the city with a particularly high emission profile. The five largest organisations make up over 40% of the city's total commercial gas consumption, equating to almost 100,000 tonnes of CO_2 emissions per year- that's almost 7% of the city's Scope 1 and 2 combined emissions.



As the largest emitting organisations, we all agree that we have a particular duty to act.

Our Collective Commitment

Our collective commitment to the city is:

- To embed climate change considerations into everything we do as organisations – they will be embedded into our organisational DNA.
- To challenge ourselves to deliver as ambitious a Net Zero delivery plan as possible and to deliver the required changes at the earliest opportunity.
- To take the necessary steps to ensure a just and fair transition to a low carbon future economy.
- To work with city businesses and entrepreneurs, we will collectively work to yield the greatest benefits from green growth for our local economy and strive towards self-sustaining commercial low carbon models.
- To draw upon our city strengths and work with partners within and outside the city to deliver on our Net Zero commitment.

Newcastle City Council

Pat Richie, Chief Executive

Addressing the Climate Emergency is one of the greatest challenges of our time and every part of the city has a contribution to make.
Working collectively with our partners, communities and individuals we will lead by example, placing climate considerations and sustainability at the heart of everything we do on our journey towards a Net Zero future.

NHS
The Newcastle upon Tyne Hospitals
NHS Foundation Trust

Dame Jackie Daniel,
Chief Executive

Climate breakdown is the greatest threat to health that we face. I'm proud that Newcastle Hospitals was the first health organisation in the world to commit to tackling the Climate Emergency. As we continue our journey, I hope our actions provide inspiration to others across the system to act with urgency.

We stand with our students and young people across the world in recognising the climate emergency as the most important challenge of our lifetime. We are committed to achieving Net Zero carbon within our activities and, through our education and research, to working with our partners on solutions for a Net Zero future.

Professor Chris Day,
Vice-Chancellor and President

Northumbria University
NEWCASTLE

Professor George Marston,
Pro Vice-Chancellor
(Research and Innovation)

Addressing the challenge of Climate Change is at the heart of Northumbria University's activities, evidenced through our world-leading research and operational efficiency. In the five years since 2015, we have halved our own emissions, and fully support the goal of achieving a Net Zero Carbon Future in Newcastle.

Newcastle University

NCG

We know how crucial positive environmental initiatives are to our stakeholders and communities and we must demonstrate our commitment to positive change by fully supporting Net Zero Newcastle.

We want NCG to be recognised regionally and nationally for our positive contribution to environmental sustainability and our ambition is to become the most sustainable College Group in the UK.

Liz Bromley, Chief Executive Officer

The climate and ecological crisis poses the greatest threat to human physical and mental health this Century. Here at CNTW we are committed to reducing our carbon emissions to Net Zero and ensuring that social and environmental impact is considered in all decisions that we make. We look forward to working in partnership with NCC to improve mental wellbeing by emphasising the connection between green spaces, physical activity, and having better environments to live in.

James Duncan,
Deputy Chief Executive
(Board Lead for Sustainability)

NHS
Cumbria, Northumberland, Tyne and Wear
NHS Foundation Trust

Nexus as both the operator of Metro and the Passenger Transport Executive for Tyne and Wear is committed to supporting Net Zero. We see public transport as very much part of the solution and some of our major investments in the coming years, such as a new fleet for Metro, a new Depot, Metro Flow and investment in technology for ticketing and information will help not only make public transport even greener, but ensure it is a viable and attractive alternative to the car.

Helen Mathews
Head of Corporate Planning

NEXUS

YHN are fully committed to the Net Zero target. We recognise that as a housing provider we can contribute to this target through our work with Newcastle City Council on delivering new build programmes and housing investment programmes. We are in a strong position to support behaviour change through the conversations we have with our customers.

Tina Drury,
Managing Director

Your Homes Newcastle

Newcastle International
Your Airport

Newcastle International will be vital to the future economic success of the City and the region. We are confident this role can be fulfilled in a way that also supports Newcastle's Net Zero Action Plan. Our sector leading Net Zero 2035 strategy for the Airport will be key to this, but we will also help the city to achieve the wider vision.

Nick Jones,
Chief Executive

e·on

Support for the UK target to reach Net Zero is fundamental to E.ON's strategy; we believe the future of energy is decarbonised, decentralised and local, with customers in control and helping to combat the climate crisis. E.ON support Newcastle's collective commitment and ambitious Net Zero plans.

Andrew Angus,
Housing Solutions Manager

home group

For Home Group, the Climate Emergency is a global issue with local solutions and we are fully committed to the Net Zero goal. We want to be a leader in our sector but recognise that this is a team effort. Working with our communities and partners is vital in order to achieve our collective goals and we will continue to build on our early successes such as the Gateshead Innovation Village.

Nusheen Hussain,
Executive Director of
Business Development

sustrans

Sustrans fully supports Newcastle's Net Zero Action Plan. Changes are needed to make walking, cycling and public transport more attractive to people than driving, with more people using active travel in daily activities. The climate crisis shows that we cannot return to pre-2020 levels of private car use.

Jonah Morris,
Partnerships Manager -
North East & Cumbria

NE1

Put simply, Net Zero is a must. Newcastle needs to pursue the goal to be both economically and environmentally sustainable. We need to attract investment and encourage people to come to Newcastle to study, work, establish and grow businesses and for people to simply enjoy spending time here. Net Zero, therefore, needs to be central to what makes Newcastle an attractive, interesting and sustainable city.

Adrian Waddell,
Chief Executive

A Net Zero Future for Newcastle will play a vital role in our economic recovery and will help us to transform our great city. It will support the creation of new jobs, catalyse the creation of new technologies, attract investors from across the globe and further enhance our proposition as a place to live well. This commitment will put our city on the map as a destination of choice for businesses who also want to tackle the climate crisis and will help us to create a more liveable city – where more people will want to visit, live, work and study.

Jennifer Hartley,
Director

NewcastleGateshead Initiative

invest newcastle uk

TUC

There is overwhelming scientific evidence of the need to decarbonise our economy. Energy-intensive industries, including the energy, transport, manufacturing and construction sectors, will be key to achieving this transition, but this is a project that will require change right across our economy. Trade union members have the expertise to deliver it. The voices of workers who are at the forefront of dealing with the challenge of climate change must be at the centre of achieving a successful transition to the economy we will need.

Beth Farhat,
Regional Secretary (Northern TUC)

Businesses across the region are committed to reaching our Net Zero targets. Getting this right will be key to our local and national recovery, and will ensure the North East remains a global leader in Net Zero goods, services and skills.

Sarah Glendinning,
Regional Director, North East

CBI

North East England Chamber of Commerce

Tackling climate change can easily fall down the list of priorities, particularly for the voluntary and community sector who are at the forefront of fighting the daily impacts of social inequality. But if we are to ensure that our communities have a better chance of thriving in the future, we must be proactive now. We are fully committed to supporting Newcastle's Net Zero Action Plan. It is a vital tool to achieve a just transition to a greener economy for all.

Lisa Goodwin,
Chief Executive

Connected Voice
Connecting People Supporting Action

Climate change is a global emergency. Working with our members we will ensure that sustainability is at the heart of our recovery plans for the North East, helping to create new jobs and opportunities for the region. We commit to working collectively to deliver on our Net Zero commitment.

James Rambotham, Chief Executive

Part Two:
DEVELOPING THE PLAN

ACTION PLAN PRODUCED WITH THE CITY

In preparing this Action Plan, we have sought to work in a positive and collaborative manner with city residents, businesses and organisations. This document sets out the culmination of those discussions to date.

In order to be successful in moving towards Net Zero, we must engage in discussion, debate and collaborative development of the actions that will deliver our Net Zero future.

Call for Evidence

From 17 December 2019 to 31 January 2020, we carried out a Newcastle Climate Change Call for Evidence, and the findings of the consultation were presented at a Climate Change Summit on 12 February 2020.

We opened our call for evidence to engage and hear from individuals and organisations living, working and delivering services in Newcastle upon Tyne in a discussion on what the city as a whole can do to make Newcastle Net Zero by 2030.

The consultation had a good uptake, with 1,229 responses from individuals and organisations, including over 360 young people.

The call for evidence had three parts:

1. ***Call for Scientific and Technical Evidence***
   We asked individuals and organisations to submit scientific, academic or technical evidence.
2. ***Hearing from Everyone***
   We asked individuals and organisations to send us their ideas for everyday, simple things everyone can do now to make a positive difference, for larger scale projects, new ways of delivering services, new initiatives and investments, and what they thought in general about what people and organisations in Newcastle are doing to tackle climate change.
3. ***Hearing from Young People***
   We wanted to hear from young people about their views on climate change, providing them with a specific version of the 'Hearing from Everyone' call for evidence.

Business Surveys

Over the course of 2020, a number of business surveys have been undertaken in order to obtain the views of businesses current growth prospects. Throughout the month of June, Newcastle Gateshead Initiative (NGI) and Invest Newcastle undertook a series of design sprints to obtain the views of a range of business representatives on the future of the city and the city's economic recovery planning. The North East Local Enterprise Partnership (NELEP) Growth Hub also recently asked businesses their views on adopting greener practices and processes.

Through these business engagement events, the following key messages have been identified as important to local businesses:

- Make the city a true "living lab" for progressive green innovation.
- Create a holistic, innovative economic ecosystem with the green agenda used as the arrow-head for change.
- Expand innovation assets (for example, the Innovation Hubs in Singapore) and labs in the city centre (Helix plus) linked by sustainable transport.
- Use design challenges to solve the city's problems and to attract attention of national and international investors.

Climate Change Summit

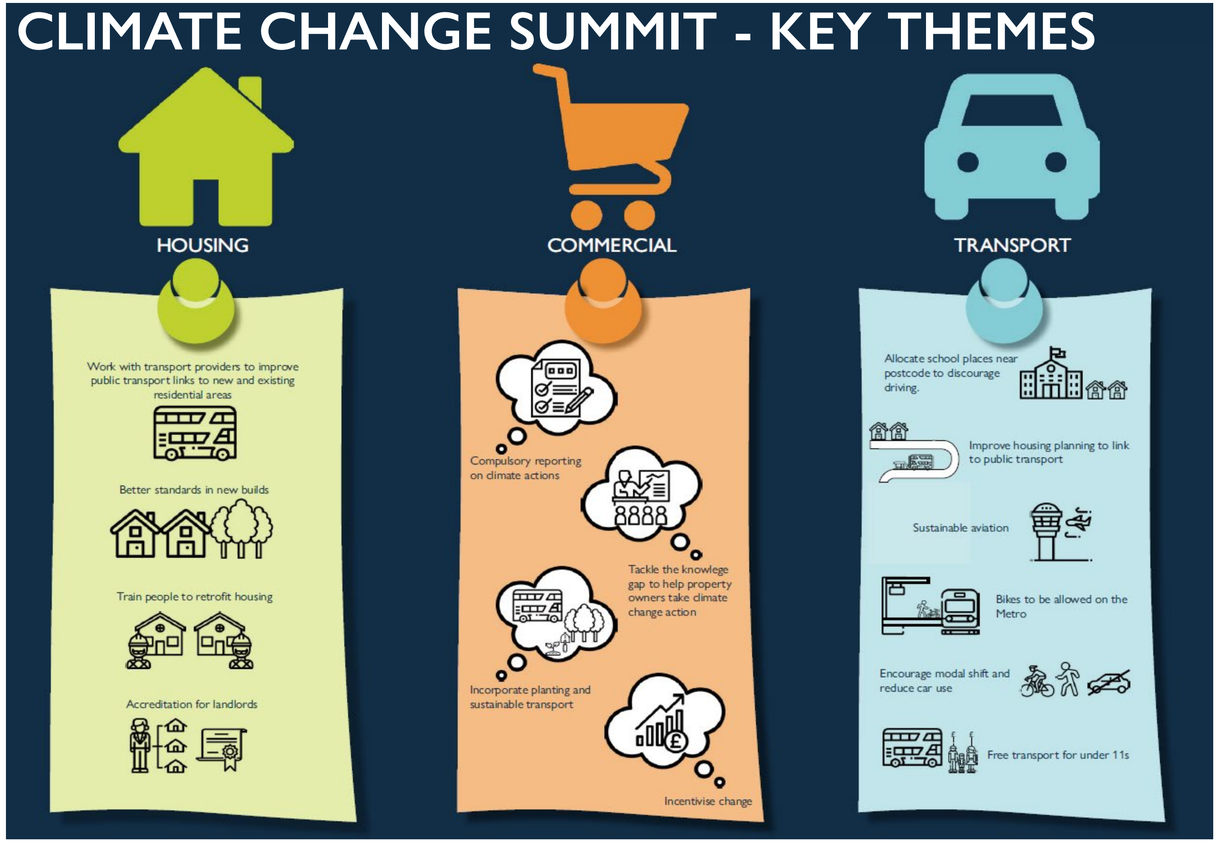
A Climate Change Summit was held on 12 February 2020 to discuss the city's key climate change priorities and the series of actions that the city could take to deliver Net Zero by 2030. The key themes and priorities that emerged from the Climate Change Summit are shown in the graphic on the next page (link **here**).

Following the launch of this Action Plan and as we implement the actions set out in the plan, we will continue to hold Climate Change Summits, with the next ones expected to be a Business Summit, a Student Summit, a Civic Society and Voluntary Sector Summit, and a Youth Summit.

A Climate Change Youth Summit

Working with the Youth Democracy Group (formerly the Youth Council), a Climate Change Youth Summit will be arranged to engage with young people on the topic, collect views and ideas, understand young people's priorities and how they can contribute to the Net Zero programme.

> **What you said!**
>
> Throughout this Action Plan, look out for the 'What you said!' boxes which provide key information and statements from the Call for Evidence.



LOCAL, REGIONAL, NATIONAL AND INTERNATIONAL ENGAGEMENT

ENGAGEMENT

Newcastle can only realise its Net Zero commitment by working alongside local, regional, national and international partners to create solutions that work for the city. To be successful, we cannot work in isolation from the developments that are happening in the low carbon sector outside the city.

Local action will go some way towards helping us achieve our Net Zero goal. However, climate change is a global problem and its solutions need to be coordinated from an international level right down to the local level. We will work with a range of stakeholders to exchange learning, access funding and expertise, and deliver resource to key actions.

LOCAL ENGAGEMENT

There are established strong partnerships across key organisations in the city – universities, colleges, schools, health partners, business community and the voluntary and community sectors and we will be building on this to drive our transition to Net Zero.

We are committed to a programme of citizen and community engagement, focussing on all sections of society to shape our response to the climate crisis. Plans for further Climate Summits and a Citizen's Assembly were put on hold due to Covid-19 and new mechanisms to ensure we can involve everyone safely are being developed.

REGIONAL ENGAGEMENT

The North of Tyne Combined Authority (NTCA) is already responding positively to the needs of residents and organisations, to facilitate the transition to Net Zero. The NTCA uses its influence to access resources, direct its investment programme to stimulate innovation in clean growth and uses skills and education programmes to equip citizens with the tools they need to play their part.

The NTCA has also pledged that every school in the North of Tyne area will have a UN accredited climate change teacher. The pledge is a world first and meets a key UN target for sustainable development and Article 12 of the Paris Agreement on Climate Change. NTCA also plays a crucial convening role – enabling conversations between citizens, communities and sectors about the type of economy and society they want in the future through for example the Citizen's Assembly, and what we can collectively do to make it happen.

The North East Local Enterprise Partnership (NELEP) is instrumental in a range of important elements of our Net Zero future including promoting the need for greater devolved powers, economic response, strategic sector and skill studies, overseeing funding dispersion, economic response, policy and research, raising the profile of Net Zero actions (including improving carbon literacy), among other important functions. Working with neighbouring local authorities, combined authorities and other regional bodies will be important to ensure we have a joined up approach to project development and delivery, and to avoid inadvertently duplicating effort or working at cross-purposes.

NATIONAL ENGAGEMENT

We understand the climate related issues in Newcastle, however we require increased funding, support and intervention from Government to ensure we can contribute consistently to reducing emissions.

The actions set out in this plan require significant investment. Whilst we are committed to working with stakeholders to implement our ambitious plans to decarbonise the city, without action from Government to increase powers, funding and resources progress at the city level, we will be severely constrained.

To ensure we have the greatest impact, we will continue to make clear and evidence-based demands of Government to support our transition to Net Zero. These will include (but are not limited to):

- Requesting and receiving national funding
- Securing new powers
- Communicating local climate change challenges
- Presenting locally designed 'greatest impact' projects to mitigate and adapt to climate change
- Making recommendations on the development of national policy on climate change
- Promoting locally based delivery of Net Zero programmes.

There are also a wide range of expert forums, think tanks and advocacy groups, and co-ordination forums covering various topics at a national level that we will engage with where appropriate.

Asks of Government

Throughout this Action Plan, there are 'Asks of Government' boxes which set out the key requests that we will make to Government in order to deliver on our Net Zero commitment. These are by no means the only requests that we will have to Government, but represent requests that we consider to be the highest priority at this moment in time.

INTERNATIONAL ENGAGEMENT

UN Climate Change Conference of the Parties (COP26) is due to be held in Glasgow in November 2021. By that date, our aim is to have enacted our Action Plan and be making bold strides towards cutting our city-wide emissions from all sectors. COP26 is an opportunity for Newcastle to present an ambitious roadmap for climate action and to showcase our climate leadership to the world.

Where we can learn lessons from other countries and international organisations that can be applied successfully in Newcastle, we intend to do so.

GREEN GROWTH

Green Growth

In response to the economic impact of Covid-19, the Government is promoting a clean, green and more sustainable economic recovery to deliver thousands of new jobs and has to date announced in excess of £3.5bn for this purpose.

Green Growth means fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies. (Source: OECD)

National policy initiatives aimed at creating green jobs in the housing, construction transport and conservation sectors will provide funding for new research and development (R&D) into new cleaner technologies in air and automotive sectors, to make all homes more energy efficient and to decarbonise the public sector through energy efficiency measures and investment in nature and conservation.

Growth of the UK's low carbon economy is estimated to be 11% per year between 2015 and 2030 – four times faster than the rest of the economy (source: OECD).

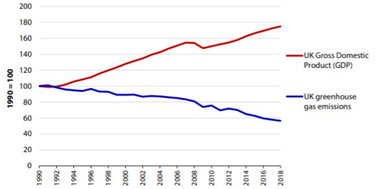
Green Growth can deliver:
- New jobs and local economic growth
- Low carbon transition
- Innovation and research funding
- Expanded economic sectors and future export markets

Climate Change and the Economy

Since the Climate Change Act was passed in 2008, the UK has continued to demonstrate that it is possible to decouple emissions growth from economic growth.

Greenhouse gas emissions have fallen by 30% in the UK while the economy has grown by 13% over the period 2008 to 2018 (UK Committee on Climate Change).

The following graph shows falling emissions in a growing UK economy:



The Economic Impact of Covid-19

Newcastle, like other international cities, faces extremely challenging economic conditions as a result of the Covid-19 health pandemic. At the peak of the lockdown in April 2020, the UK's economy shrank by 20.4% - the largest monthly contraction on record, reflecting record widespread falls in services, production and construction output (source: ONS).

The crisis has had a direct impact on all residents and individual businesses in the city and is likely to change consumer and business behaviours on a temporary or permanent basis. The crisis has also had major impacts on remote working, transport / commuting changes, use of green spaces and commercial disricts in the city and there has been a need for reskilling and retraining.

Different sectors within the city have been more affected than others, with many industries (notably retail, accommodation, food and beverage, cultural activities and creative, arts and entertainment, sports activities, amusement and recreation) having had to either close or pause trading.

A Green and Inclusive Economic Recovery in Newcastle

Our Net Zero ambitions will underpin our economic recovery efforts working in close collaboration with our partners, to position Newcastle as an industry leader in the technologies and services that will deliver our Net Zero future as well as growth and new green jobs. Economic growth must go hand-in-hand with our aim to promote social equity and inclusive employment.

Newcastle is well positioned to lead a green economic recovery and to take advantage of our area's unique energy innovation assets, capabilities and research strengths and talent that will provide the foundations to drive future growth, investment and new green jobs to the city. Some of these unique strengths are listed overleaf.

We are working with our partners through the North of Tyne Combined Authority (NTCA) to deploy funds to deliver carbon reduction and create green jobs. Our North of Tyne Green New Deal will help firms and workers transition to a green economy by investing to boost offshore green energy projects, the creation of green jobs where carbon reduction is needed most, and training for workers moving from traditional to green industries.

Engaging with Business

Working together with city and regional business forums and partners, we will engage with businesses operating in the city and further afield who have a unique and crucial role to play in achieving the city's Net Zero ambitions.

We will engage and listen to all businesses to ensure we understand and respond to the challenges they face and help support them to take advantage of the commercial and growth opportunities of Net Zero.

Many businesses are already leading the way making strong commitments towards our Net Zero future, and we are keen to hear from all businesses who are keen to expand in low carbon sectors.

North East England Chamber of Commerce

invest newcastle uk

North East Local Enterprise Partnership

NEWCASTLE NE1

NewcastleGateshead Initiative

OUR UNIQUE STRENGTHS

Councillor Ged Bell

Cabinet Member for Employment and Culture

We are open for business and by promoting our area's unique green economic assets and capabilities to the world we want to become a leading city on testing and embedding green technologies and innovations, thus attracting investment, talent and new innovative businesses to the city.

NEPTUNE YARD AND THE OFFSHORE WIND INDUSTRY

The North East is home to a globally important offshore energy and subsea technology supply chain cluster, with organisations servicing various aspects of these global markets. The region boasts world-class expertise in subsea engineering, robotics, planning and development, as well as design and fabrication of components such as pipelines, umbilicals and wind turbine foundations.

Newcastle is home to one of the region's key Enterprise Zones along the River Tyne, which support offshore energy and subsea businesses. Part of the North Bank of the Tyne, Neptune Yard is one of the UK's six CORE (Centre for Offshore Renewable Engineering) sites, providing services to businesses looking to invest in manufacturing for the renewable energy industry.

Focusing on businesses which operate in offshore and marine sectors, the site boasts close proximity to the Port of Tyne and river front, heavy lifting and storage facilities, extensive warehousing, a deep water quay, a deep water berth and a dry dock facility.

It is also home to Tyne Subsea, a national Research and Development centre for subsea engineering. Newcastle and the wider region provides access to three deep sea ports and close proximity to North Sea developments such as Dogger Bank, which are set to bring at least £140m of investment to the region.

NATIONAL CENTRE FOR ENERGY SYSTEMS INTEGRATION (CESI)

CESI is a £20 million multi-institutional, multi-discipline industrial research consortium investigating the future energy challenges for the UK. Led by Newcastle University and partnering with other UK Universities such as Durham University.

The research undertaken encompasses the whole energy system, including heating, cooling, electricity and transport, taking into account generation, distribution and demand as well as policy, economics and regulation.

Researchers utilise innovative demonstrator facilities to test, validate and improve our understanding of the value of taking a flexible whole systems approach to energy.

SMART GRID LAB NEWCASTLE HELIX

Newcastle helix

The UK's largest smart grid project, the Smart Grid Lab integrates a £2 million energy storage test bed with a full scale smart grid on the Newcastle Helix site.

This allows simulation of distribution networks under future scenarios in a real-time network simulator, to understand how smart grids will help meet future energy challenges.

The facilities are the result of a partnership between Newcastle University and industrial partners Northern Powergrid and Siemens, demonstrating the region's pedigree in engaging industry with state of the art laboratory facilities.

Tom Warburton

Director of City Futures

We will create a new generation of jobs in the industries and infrastructure we need to tackle the climate crisis, and a workforce that will be able to contribute to and benefit from a new green economy. We want to create more and better jobs for our residents, support businesses to succeed and attract investment by supporting and encouraging businesses to realise the benefits and growth that transitioning to low carbon can deliver.

SUPPORTING NEWCASTLE'S GREEN GROWTH

SKILLS

We will support all our residents to be skilled for future new sectors and we will work with our colleges and universities to develop a new workforce for the green industrial revolution that will take place in our city. We will work with trade unions and employers to ensure that workers and businesses are supported to transition to a green economy, and that no one is left behind in the transition.

Specific skills interventions could include:

- Supporting tradespeople to develop the skills and accreditation needed to install and maintain low and zero carbon heating systems, such as domestic heat pumps
- Ensuring a supply of adequately skilled and qualified installers of domestic and commercial energy efficiency measures such as those supported through the Green Homes Grant scheme.
- Supporting training of engineers and maintenance operatives in low carbon growth sectors, such as offshore wind.
- Closer collaboration with regional businesses in the low carbon sector to maximise skills and employment opportunities for Newcastle residents in a wider regional context.
- Specific support to encourage young people and those from disadvantaged communities to learn about employment opportunities within the low carbon sector and to take up relevant skills provision such as work experience, apprenticeships and specialist training. Where suitable funding is avaialble regionally or nationally to enable this skills agenda, it will be identified and progressed where beneficial and appropriate to do so

INNOVATION

Meeting the city's Net Zero target will require significant innovation and collaboration across the city; including innovation in new technologies, new research, new business models and new consumer offerings.

We want Newcastle to be recognised as a "living lab" for rapid innovation, demonstration and commercialisation of products and services which will support a more sustainable and inclusive society.

Our universities, which already have globally renowned talent and researchers that are at the cutting edge of new thinking in low carbon technologies, material science and applications are central to this agenda. The Helix site will be a prime location through which to drive further innovation and roll-out of proven technologies and business models in the city centre. We must make the most of our research city to deliver our Net Zero goal.

Throughout 2020 and 2021, SMEs in the North East are invited to put forward solutions and ideas to a range of global energy challenges as part of the North East Local Enterprise Partnership (NELEP) New Energy Innovation Challenge. We will work with NELEP to support our businesses to ensure that the most promising ideas turn into a reality. Piloting new ideas and testing new approaches will be critical to meeting our Net Zero aims including seeking flexible funding for test beds for innovative ideas.

BUSINESS SUPPORT

The Business & Intellectual Property Centre (BIPC), located at City Library, provides a front-door for businesses and residents seeking advice and support to set-up and grow small and medium sized businesses.

The BIPC provides intellectual property advice and business information services and works closely with business support organisations and private sector partners to deliver workshops, events and workshops on a range of business topics.

BIPC is developing a Green Growth delivery strand, which will work with SMEs to:

- Create a network of Green Growth partners and experts including business support organisations, banks and professional bodies, to provide a coordinated BIPC Green Offer to SMEs and start-ups.
- Recruit a Green Growth Expert in Residence who will provide advice and support to business clients.
- Deliver a programme of Green Growth events and workshops.
- Work with North East Purchasing Organisation (NEPO) to ensure that businesses understand the need for a Green Growth strategy and can demonstrate green and sustainable business practices as a social-value measure, in order to be competitive and secure new contract and sub-contract opportunities.

WORKING WITH THE NEXT GENERATION

The impacts of climate change will be felt now and into the future.

How we act now will have a direct impact on the next generation. Engaging young people and students in climate change discussions is fundamentally important to ensuring that they understand how the world is changing, what our human impact has been on the climate, as well as setting out a plan for how society can adapt and take the necessary steps to ensure a sustainable future.

Our aim is to involve children, young people and students in initiatives which will help them to contribute to delivering a Net Zero Newcastle. We will do this by:

1. Ensuring that children, young people and students are invited to participate in, and are represented in a meaningful way in, Climate Change Summits and the Citizen's Assembly. For example, the Centre for Life held a Youth Summit in January 2020 on climate change
2. Establishing a mechanism through which students can undertake research projects on climate change with organisations in the region and to add value to real world Net Zero projects, as part of their academic studies.
3. Developing a network of Student Climate Change Champions to deliver sessions in schools and with voluntary and community groups across the region on how young people can understand the impacts of climate change and important actions that they can take individually and collectively to solve climate change issues.

Children and Young People in Newcastle

There are approximately 61,000 children and young people living in Newcastle (0-18 years). Each year more than 6,000 young people aged 11-18 in Newcastle take part in the national, annual **Make your Mark** campaign. In 2019 young people voted for 'Protect our environment' as the most important issue in Newcastle.

As a group, the Youth Democracy Group, led by Youth Parliament will work on this issue locally and regionally over the coming months. Protect our Environment is also a national campaign for the Youth Parliament.

"What you said!

Top 5 Young People Responses about Awareness Raising on Climate Change:

- **Put advertising and posters up that show how climate change is affecting the world.**
- **We can protest through the streets of Newcastle.**
- **We could make more campaigns and signs.**
- **Show people the reality of the situation - make adverts brutally appealing so it makes people understand what happens in the world.**
- **Use social media to raise awareness."**

Students in Newcastle

Universities are hugely important to the economic, social, cultural and environmental wellbeing of the places in which they are located. There are more than 50,000 people studying in Newcastle's three higher education providers.

The Students in Newcastle Forum (SINF) is a strategic group that brings together Newcastle City Council, students and senior management from Newcastle University, Northumbria University and Newcastle Colleges Group as well as a range of strategic partners such as the CCG (Clinical Commissioning Groups) and Police to discuss issues relating to the student community in Newcastle.

Student Union representatives also sit on the SINF, providing a direct link with students in the city. SINF is used to raise, update on and discuss key issues for students across the city.

Climate change is a topical issue for the forum. Students have shown not only a commitment to contributing to city-wide action and events but also play a huge role in encouraging their unions and settings to make changes and sign up to the climate change agenda.

Councillor Paula Holland

Cabinet Member for Education and Skills

Climate change is one of the greatest challenges that our children will face, and we must prepare them for the challenges that lie ahead.

PUBLIC HEALTH AND CLIMATE CHANGE

PUBLIC HEALTH - COVID-19 AND CLIMATE CHANGE

Introduction from Eugene Milne - Director of Public Health, Newcastle City Council

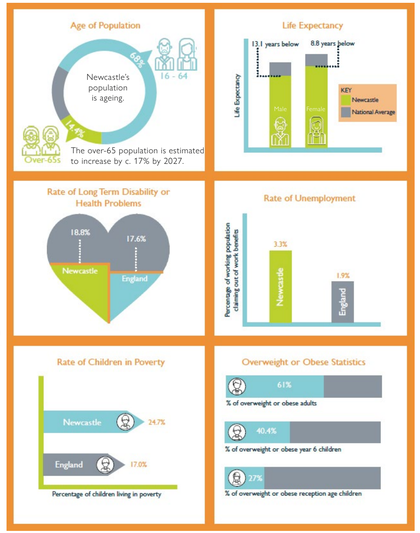
Covid-19 has delivered the greatest shock to our way of life that many of us have ever experienced. The threat went from theory to real world events and immediate risk at such extraordinary speed that in the World Health Organisation (WHO) 2019 list of 10 greatest threats to health and wellbeing, it was not even named. It was described instead only in general terms as *"disease X, which represents the need to prepare for an unknown pathogen that could cause a serious epidemic".*

Climate change seems more familiar and insidious but its tangible impacts will come with increasing frequency and aggression. We can see it coming, which is why the WHO placed climate change and air pollution at the very top of its list of threats.

We need to make substantial and permanent changes to the way that we live and interact with our shared environment.

Without those, the ultimate toll will dwarf even the worst scenarios of the current pandemic. Worldwide deaths from Covid-19 have totalled around 700,000 to date. Annual premature deaths worldwide attributable to pollution total around 7 million per year.

The impacts and disruptions that could follow, given our current trajectory, are unimaginably large. We can alter this, but we need to act beyond our usual zones of comfort and convenience.



PUBLIC HEALTH CHALLENGES

Key public health challenges for Newcastle include:
- Mental health
- Obesity
- Respiratory health

All three of these health challenges are closely associated with environmental characteristics. Our environment, where we live, grow, work and how we move through it has a profound impact on our quality of life, life expectancy and everyday wellbeing, from the air we breathe to the scenery we experience.

Climate change action, such as increased green space or improved active travel infrastructure will directly benefit all three of these areas and yield mutual benefit to improve quality of life and address inequalities.

The health impact of climate change has a disproportionately negative impact on those who are vulnerable, such as older people, children, people in urban settings and people living in deprivation.

Councillor Irim Ali

Cabinet Member for Neighbourhoods and Public Health

Covid-19 has shown that planning for systemic risks is unavoidable, particularly in relation to public health challenges. We must prepare for the very serious impacts of climate change on our populations and our public health systems.

INTRODUCTION TO CLIMATEVIEW

WHAT IS CLIMATEVIEW?

ClimateView is an industry leading software that models a path to city-wide Net Zero status for the city.

Many of the city partners are also setting out bold Net Zero and sustainability commitments and are mapping their routes to achieve this widespread decarbonisation agenda.

By setting out the actions in a clear and transparent way in this Action Plan, we aim to focus the city residents, businesses and public sector organisations on a sequence of key actions that will allow us to achieve Net Zero 2030 and enable these actions to be reflected in city and organisational plans.

The model has three sections:

Section 1: Emissions profile of the city showing which sectors we generate emissions from.

Section 2: Transition targets that show the key 'emission reduction' activities that we would need to achieve in order to take our city-wide emissions to Net Zero.

Section 3: Key actions that the city (residents, businesses and organisations) propose to take to achieve the transition targets and ultimately Net Zero status.

ClimateView

TRANSITION TARGETS

A Transition Target model formally defines the transition from the starting state (today's high-carbon status quo) to the desired, lower-carbon, state over a defined time period.

Transition Targets should have the following qualities:
- Be measurable and time bound.
- Have a direct impact on emissions arising from the city.
- Be inspirational to activate and engage all actors, and help us stretch what we think is possible.
- Be clear and easy to communicate so that actors can act independently on them.

ClimateView have identified 79 human activities that generate emissions across all sectors and have developed mathematical models to allow a carbon abatement profile for each Transition Target to be defined over time. Some of the Transition Targets are not relevant to Newcastle but many are, and they are shown in Section 2 of the model.

The Transition Targets for each of the key emission categories are summarised **here**.

OUR CITY-WIDE ACTIONS

The actions vary in nature and size of impact. Different types of actions are shown in the image below.

Some of the Net Zero actions have already happened, others are in progress, and others are planned. When you click on the action, you can see the status and when it was (or is) targeted for implementation.

By no means are the actions set out in the model the end of the process. This platform will develop and get added to over time, and it's very important that this evolution does happen so that we are adapting and enhancing our 'Net Zero Newcastle - 2030 Action Plan' for real world events.

Our key Net Zero actions are set out in Parts Two, Three and Four of this Action Plan.

Link to Newcastle's 'Net Zero Newcastle - 2030 Action Plan' model in ClimateView

ClimateView can be opened in Chrome, Safari, Firefox or Edge

FUNDING OUR NET ZERO PROGRAMME

Councillor Joyce McCarty

Deputy Leader of the Council and Cabinet Member for Resources

In delivering our Net Zero programme, we will continue to engage with other cities and programmes to ensure we learn lessons and follow best practice and to use benchmarking to maximise key metrics such as carbon reduction potential per pound spent.

The Net Zero Funding Challenge

Our 'Net Zero Newcastle - 2030 Action Plan' is aspirational and wide-ranging, but the actions we can take will be determined by the funding that we have available, Government support and how innovative and creative we are in responding to the challenge.

Our cost estimates of the scale of investment required to deliver Net Zero by 2030 is £375m. For further information on the cost estimates, please refer to **Part Four**.

Whilst this cost may seem prohibitively high, there are other important considerations to take into account, such as:

- Many of the Net Zero projects require upfront capital expenditure to deliver longer-term operational cost savings. The investment does not take account of these long-run cost savings.
- Often large scale capital programmes can leverage much larger amounts of private money which is invested into the city. This will be a key priority for our funding of Net Zero projects.
- A capital spend of this volume delivers other benefits for the city by acting as a local economic stimulus. This in turn:
  - Encourages new businesses to set up in the city by improving the city's business attractiveness
  - Drives inward investment into the city
  - Retains existing jobs and creates new jobs for local residents
  - Facilitates increases to local revenue streams for the city through business rates
  - Enhances innovation and delivering funding for further infrastructure projects

The public sector in Newcastle faces extremely hard financial times with:

- A growing population
- Increasing demand for services (including social care, transport and education)
- Previous and ongoing budget cuts from the Government
- The immediate and ongoing economic challenges of the Covid-19 pandemic

Looking Beyond Grant Funding

We recognise that we cannot rely fully on grant funding and must look at alternative commercial funding streams to deliver our Net Zero commitment.

This may include incorporating energy costs into commercial and social rents, adopting Invest to Save models and establishing Public-Private Partnerships. We have been and will continue to be open to using a mix of alternative commercial models and financial approaches for funding low carbon infrastructure and technology, some of which will be innovative and some which are well-proven.

We must also ensure that we put the available funding that we do have to best use. To do so, we will judge all future investment proposals on the following key criteria:

1. Do the projects deliver the greatest level of carbon reduction potential that they can achieve?
2. Can the money be better invested in other forthcoming and viable schemes to deliver greater carbon reduction potential for each pound spent?
3. Is the available funding leveraging additional private sector investment?
4. Will the project deliver local economic stimulus and job creation?
5. Does the scheme deliver fair and inclusive economic growth for the city?
6. Do the schemes maximise opportunities for cost savings, operational improvements and asset value enhancement whilst delivering significant carbon reduction potential?

If the answer to any of the above criteria is 'no', then we will challenge our delivery teams to re-evaluate the options and return with an investment case which addresses the shortcomings.

Tom Warburton

Director of City Futures

Most of the technical solutions to deliver Net Zero now exist. Dealing with man made climate change is therefore now largely a matter of finance and behaviour – how we finance the interventions required and how we all change our behaviour to reduce emissions.

Ready to Act

We recognise that we are in a period of uncertain funding, with European structural funds coming to an end and little detail has been provided on future Government funding streams. We need to develop a fully costed investment and delivery programme, with a portfolio of low carbon projects which are ready to react to opportunities to access funding streams as they arise.

We encourage city partners and businesses to work independently and together with Newcastle City Council to develop robust feasibility studies and conceptual designs for schemes which are technically and economically viable and that will deliver the required carbon savings for our Net Zero future.

We will then identify suitable funding streams and / or develop innovative financing mechanisms, and promote these projects to key regional, national and international organisations in the interests of bringing forward the necessary funding programmes on an expedited basis.

> **What you said!**
>
> The Council needs to be 'bold' and take decisions (as part of a clear strategy) that will make a difference.

Funding Streams

A number of existing and upcoming potential funding streams for the city's Net Zero plans are shown in the word cloud below.

The text colour relates to the primary sector that the funding can have an impact on:

- *Yellow* - Domestic properties
- *Turquoise* - Non-domestic properties and Green Growth
- *Blue* - Transport
- *Purple* - Public sector
- *Green* - Nature, green infrastructure and carbon capture

Tony Kirkham

Director of Resources, Newcastle City Council

Grant funding for low carbon schemes is an extremely important springboard for initiating important Net Zero demonstration projects. However, we must continually seek ways to make schemes increasingly commercially viable and look for new models of deploying funding to wider Net Zero programmes in the future with the right level of commercial support and risk under-writing from Government.

PRIORITY ACTIONS

This page sets out the priority actions detailed in Part 1 (shown by green boxes) and Part 2 (shown by blue boxes) of this Action Plan.

A1
Develop list of carbon offset opportunities taking into account the key considerations set out in Key Considerations for Carbon Offsetting.

A2
Ensure that representatives on the Tyne and Wear Pensions Fund continue to lobby for further disinvestment in fossil fuels.

A3
Explore whether a city-scale carbon insetting programme would be suitable for Newcastle, and gauge interest from local organisations, businesses and residents.

A4
Further develop Key Performance Indicators and Local Metrics of Performance.

A5
Continue to engage with all members of the city through the Climate Change Convention. Hold additional Climate Change Summits, including a Youth Summit.

A6
Improve over time local emission monitoring (either directly or via indicators) to improve the accuracy of Newcastle's emissions inventory.

A7
Promote and encourage uptake of the Net Zero Pledge and associated local low carbon action by city residents and businesses.

A8
Prepare for and seek to implement as many Net Zero projects as possible by COP-26 in November 2021 to demonstrate Newcastle's climate leadership.

A9
Continue to engage at local, regional, national and international forums to learn lessons, access funding and deliver resources to key Net Zero actions.

A10
Engage with local and regional businesses and business forums on Green Growth and how best to maximise the benefits to the city.

A11
Engage in and promote new forums and routes for research, development, innovation and pilot programmes in the low carbon sector across the city.

A12
Work with city higher education providers and education partners to prepare for, and support, a low carbon skills transition.

A13
Provide business support to SMEs in the city through a Green Growth delivery strand of the Business and IP Centre (BIPC) Newcastle.

A14
Actively promote climate change action, learning, research, idea generation and leadership through the Students in Newcastle Forum (SiNF).

A15
Each January, prepare an annual update for the previous year, and a concise forward plan for the next year of actions taken through the Net Zero Newcastle programme.

A16
Monitor, prepare for and submit grant and other funding applications to deliver on the city's Net Zero commitment, with an immediate priority to stimulate economic growth and job retention and creation.

A17
Support city partners in making successful applications for grant, research and other funding.

A18
Look beyond grant funding by working with public and private sector partners to develop pathways to commercial deployment and mass roll-out of low carbon measures.

A19
Working with the Youth Democracy Group (formerly the Youth Council), a Climate Change Youth Summit will be arranged.

A20
Explore opportunities to engage with school age children on Climate Change issues and solutions through the curriculum, by providing hands on Net Zero project ideas and supporting in their delivery.

A21
A Net Zero Champions approach to communicating key messages will be considered by the Citizen's Assembly.

A22
Work with trade unions, city-wide businesses and employers and business forums to support the transition to a low carbon / green economy in the city.

A23
Use the tools at our disposal to promote our key 'Asks of Government' (see orange box to the right) either directly to decision makers, through consultations, or via collective advocacy groups.

Michelle Percy

Director of Place, Newcastle City Council

Our city is one that has been built on innovation and hard work. We will need both to tackle the challenge presented by climate change. The directorate I lead is responsible for housing, planning, property and transport, as well as managing major projects, areas that encompass a huge proportion of our city's carbon emissions. Through this plan, our purpose is to ensure our generation delivers on these commitments so that our city's future is secured, and as defined by innovation and hard work as our past was.

Asks of Government

1. Provide funding and investment programmes for low carbon infrastructure and technology. This must also include future grant programmes after we leave the EU and maintain low carbon objectives.
2. Redraft and improve the existing Green Book guidance for investment in projects to consider the need for rapid, socially-just decarbonisation, requiring a broader assessment of social and environmental impacts (factoring in job creation and growth in green economic sectors), and considering the cost of inaction. This must also include supporting local authorities by providing access to the information, data and business cases required to drive investment in carbon reductions.
3. Provide support to local authorities in leveraging private sector investment, for example by underwriting the risk profile on innovative low carbon pilot programmes, which may be marginally financially viable, to allow local authorities to prove a concept before rolling out wider programmes.
4. Deliver a robust and transparent governance framework addressing accounting and measurement issues, as well as monitoring, verification and purchasing of offsets.
5. Develop a list of eligible projects for offsetting and a list of 'excluded projects' at national and international level.
6. Government to provide support to local low-carbon investment bond initiatives through long-term investment incentive structures.
7. Set clear and detailed rules for selecting carbon units to help ensure higher standards.

Part Three:
NET ZERO THEMES

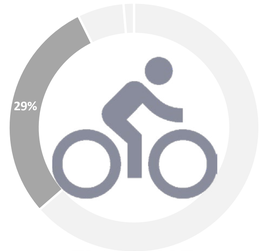
NET ZERO THEMES & TRANSITION TARGETS

ENERGY

Approximately 64% of the city's emissions are from energy usage in domestic and non-domestic properties. In order to address these emissions, a potential path to Net Zero for the energy sector includes the following Transition Targets:

- Reducing energy consumption by 31.7% in homes and by 34% in non-domestic properties through building fabric improvements, insulation, passive cooling, etc
- Increasing rooftop solar PV on all properties in the city to 40% equating to approximately 30% of homes and 60% of non-domestic properties
- Installing heat pumps in 57% of homes and 22% of non-domestic properties
- Low carbon District Energy Networks to supply 20% of homes and 74% of non-domestic properties
- Hydrogen blended in the gas mix up to 20% for all properties
- A range of smaller impact interventions including renewable biofuels to 4% of properties and biogas to 4% of properties

Further detail on the background, pathways for decarbonising the energy sector including national grid level decarbonisation, local context and priority actions is included in the **Energy** section. Further information is also included in ClimateView (see **Introduction to ClimateView**).

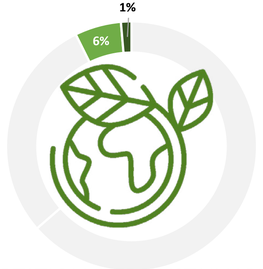


TRANSPORT

Approximately 29% of the city's emissions are from the transport sector. In order to address these emissions, a potential path to Net Zero for the transport sector in 2030 includes the following Transition Targets:

- Transitioning to Electric Vehicles for c. 41% of the personal vehicles and 7% of freight vehicles, and to hydrogen trucks for 28% and biofuel trucks for 4% of freight vehicles.
- Enhancing Sustainable Transport modal shift by:
  - 40% of all commuters who currently use cars will transfer to electric (or other ultra low emission) buses
  - 12% of commuters who currently use cars will walk or cycle
  - 1.3% of all car travel will be transferred to railway
- Increasing the efficiency of transport methods by:
  - Ensuring the vast majority (in excess of 95%) of vehicles have improved vehicle technology to deliver 6.9% emission reduction from personal vehicles and 11.1% engine efficiency improvement for freight vehicles
  - Increasing ecodriving by 10%
  - Improving the load factor for freight transport by 17.6%
- Reducing the need to travel by working at home increasing by 21.6% and face-to-face business meetings reducing by 50%
- Increasing the efficiency of the use of vehicles by 10% by increasing car pools, rental cars and other means

Further detail on the background, existing modal patterns and patronage levels on public transport, local and regional transport context and priority actions is included in the **Transport** section. Further information is also included in ClimateView (see **Introduction to ClimateView**).



ADAPTATION AND SUSTAINABILITY

Approximately 7% of the city's emissions are from the waste sector and a range of other small emission sectors. In order to address these emissions, a potential path to Net Zero for the waste sector in 2030 includes the following Transition Targets:

- Reducing waste production by 20%
- Increasing the recycling rate by 20%
- Increasing other means for landfill diversion by 20%

A wide range of other personal and organisational sustainable activities will be required across all sectors to effectively reduce our city-wide emission profile. These are set out in the **Adaptation and Sustainability** section. Further information is also included in ClimateView (see **Introduction to ClimateView**).

EMISSION SHORTFALL

Even with all of these actions and achieving the listed transition targets, we expect to **achieve approximately 79% of our Net Zero target.**

The remaining emissions will need to be offset or inset (see **Carbon Offsetting** and **Carbon Insetting**), such as through nature-based carbon capture projects (further information **here**).

Over the coming months and years, we will look at options for raising ambition in existing proposed transition targets and new technologies or applications that become available that will allow us to reach the Net Zero target quicker.

OVERVIEW

Energy is essential for our city. It provides heat for our homes and places of work, powers our transport and keeps our healthcare system running. It also accounts for the lion's share of our city-wide emissions at 64% of all Scope 1 and 2 emissions coming from our use of energy in various domestic and non-domestic properties.

Rising energy prices, energy inefficient housing and low incomes have resulted in high levels of fuel poverty across the UK - see **Fuel Poverty** section for more detail.

The Energy Pyramid

When considering the best approach for mitigating emissions from the Energy sector for Newcastle, the **Carbon Management Hierarchy** approach is critical. The Energy Pyramid is shown to the right.

Energy Efficiency

By improving the energy efficiency of buildings and processes, we begin to reduce the size of the energy decarbonisation challenge. Without sufficient energy efficiency improvements, the UK will struggle to sufficiently decarbonise our energy supply, as higher carbon options will continue to be needed to meet peak demand. It will also be a more costly transition for consumers - higher energy demand requires increased resources, including more back up generation, larger power lines and network reinforcements.

These system costs are collective and rarely monetised with a single energy efficiency investment, but at a city or country scale, they can have major impacts.

Grid Electricity is Decarbonising Rapidly

Huge progress has been made over recent years to decarbonise the UK's national grid electricity by phasing out the remaining coal-fired power stations and recently removing restrictions on new onshore wind energy development.

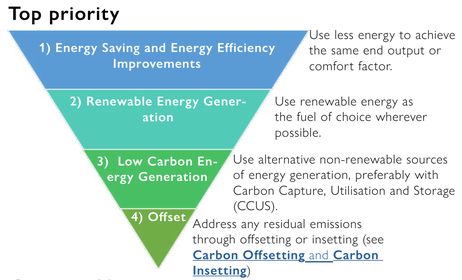
We now get more of our electricity from renewable sources than ever before, however as the generation from renewable energy sources is often variable, electricity storage and demand management to use power when it is available is increasingly important.

Grid Gas is Reliant on New Fuel Vectors

The vast majority of our homes, our public and commercial buildings are heated using gas from the national gas grid. Gas is also a key component of our national electricity system, being burned in gas power stations to generate electricity.

Unlike the electricity grid, the gas grid is very much at the start of the decarbonisation process, and is primarily looking towards hydrogen to act as the future fuel vector for supply of energy through the existing gas grid.

Energy Pyramid



A FUTURE NET ZERO ENERGY SYSTEM

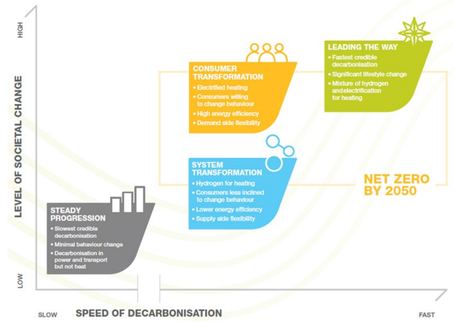
The National Grid have produced a Future Energy Scenarios (FES) document (link **here**) which provides detail on how the grid can evolve safely and reliably to deliver low carbon energy to end customers to meet national Net Zero targets.

In the FES study, four scenarios are assessed - each scenario is summarised in the image to the right.

National Electricity Grid

Carbon emissions from the power sector continue to fall in all scenarios, with the 'Leading the Way' scenario becoming net negative by 2030; other Net Zero scenarios achieve this by the mid-2030s.

The 'Steady Progression' scenario does not reach net negative emissions due to the continued presence of fossil fuels in the generation mix and the absence of Carbon Capture, Utilisation and Storage (CCUS).



Source: National Grid - Future Energy Scenarios

National Grid

Future Energy Scenarios

Reaching Net Zero carbon emissions by 2050 is achievable. However, it requires immediate action across all key technologies and policy areas and full engagement across society and end consumers..

Northern Powergrid - Preparing for Net Zero

Northern Powergrid, the distribution network operator for Newcastle, are preparing for large scale changes in the demand and supply of power to our homes and businesses in the city from the Net Zero transition.

These changes include new generating plants, providing homes with power for heat pumps and preparing for future modes of low carbon transport (such as Electric Vehicles) . The electricity grid is very dynamic and Northern Powergrid are preparing for a range of future energy scenarios to ensure reliable supply to properties in the city.

National Gas Network

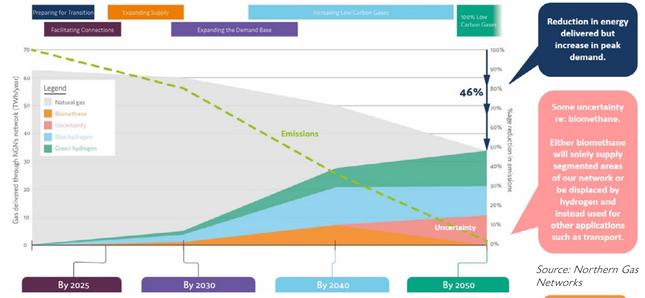
Most of the UK's gas demand is met by natural gas that flows from North Sea production centres and import pipelines through a nationwide transmission and distribution system directly into our buildings.

To fully decarbonise heat, our use of fossil fuels to provide heat must be all but eliminated. Natural gas can no longer be used in our homes. New systems to provide virtually zero-carbon heat must be planned and implemented across our homes, public, commercial and industrial buildings.

There are different potential solutions to this challenge, but none will be easy. The scale of infrastructure required, the urgent timescales, the complexity of co-ordination and the disruption to homes, institutions and businesses all make decarbonising heat one of the most difficult aspects of the UK's Net Zero target.

Northern Gas Networks - Pathway to Net Zero

Together with other distribution grid operators, Northern Gas Networks are preparing for a transition to a predominantly (but not solely) hydrogen-based gas supply system by 2050. Northern Gas Network have set out an ambitious and detailed pathway to Net Zero, as shown in the graph below:



Source: Northern Gas Networks

FUEL POVERTY

PUBLIC HEALTH AND ENERGY

Poor quality housing or unsuitable housing is a risk to health - living in housing which is in poor condition, cold, overcrowded or unsuitable will adversely affect the health and wellbeing of individuals and families, young and old. It can cause or exacerbate a range of underlying health conditions, from risk of respiratory illness to poor mental health.

In the most vulnerable population groups, cold homes can cause serious illnesses that lead to hospital admission and deaths, most commonly from pneumonia and influenza. A key component of the public health strategy is to ensure that people have energy efficient homes and are able to adequately heat them during the winter months.

Evidence-based measures to reduce the risks to health associated with fuel poverty involve increasing energy efficiency in the home through installing insulation and efficient heating systems. There have already been extensive programmes in Newcastle of cavity wall and loft insulation and heating improvement schemes, so any solution must be a deeper retrofit / greater improvement than the quick wins.

Councillor Irim Ali

Cabinet Member for Neighbourhoods and Public Health

Tackling fuel poverty and cold home-related health problems is important for improving health outcomes and reducing inequalities in health.

FUEL POVERTY

Living in fuel poverty is defined as being on a lower income and living in a home which cannot be kept warm at a reasonable cost. The number of households suffering from fuel poverty is rising and as average fuel prices increase and numbers of people claiming benefit increase. At its most severe, fuel poverty means households are faced with a decision of whether to 'heat or eat'.

Newcastle has a higher than UK average level of fuel poverty. National figures show that almost 13,000 homes in Newcastle suffer from fuel poverty and it's estimated that a further 10,000 are just above the current definition and only a small change in income levels could result in them being classed as fuel poor (source: ONS 2020).

Evidence strongly suggests that fuel poverty leads to more people living in colder temperatures and are more likely to experience poorer physical and mental health because of this. Unemployment and impacts on household income arising from Covid-19 are expected to exacerbate these issues.

Those living in fuel poverty and poor housing normally make adjustments to how they live to cope with high energy costs. These adjustments can include:

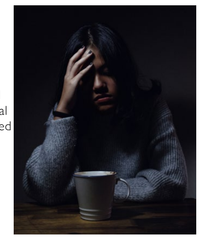
- Going to bed early to help keep warm
- Only heating one room
- Not having friends or family around due to stigma
- Using ovens as a source of heating
- Using candles instead of mains lighting
- Cutting back on household spending such as using food banks
- Formal and informal borrowing
- Spending time in public locations such as libraries to keep warm

MENTAL HEALTH AND FUEL POVERTY

People with mental health conditions have increased risk to health and social inequalities which includes poor housing and the associated health risks this exacerbates. Cold homes are associated with decreased socialization and increased disruption to daily routines that put individuals at risk and may negatively contribute to their wellbeing.

There is a strong body of evidence that people with mental health conditions are not only at increased risk of fuel poverty, but fuel poverty itself reduces mental health and wellbeing in adults and increases rates of absence from work.

Conditions which impair cognitive function, such as dementia, can lead to a further increased risk as there are often barriers to: understand and implement energy efficiency within homes; understand routes and criteria to access the support available; and recognise illnesses associated with cold homes.



Actions to address fuel poverty have been found to significantly and immediately improve peoples' mental health. Reduced morbidity associated with cold homes will also reduce pressures on acute services, and support successful and appropriate hospital discharges.

FIGHTING CLIMATE CHANGE AND FUEL POVERTY TOGETHER

INCREASING HOUSEHOLD INCOME

There are a number of statutory and voluntary services available to support people achieve this but these require people at risk to have both the awareness and skills to utilise the available resources.

A core part of Newcastle's aim to address fuel poverty is promoting financial inclusion to tackle inequality. Advice is available to mximise your household income through:

- Benefits advice
- Debt advice
- Energy saving and fuel debt advice
- Support to find work

Newcastle City Council Welfare Rights, Money Matters and a range of voluntary advice services help over 35,000 Newcastle clients a year, securing additional benefits and helping to write off debts. Over the last three years these services have secured on average over £52m worth of additional incomes and debt write off each year.

Eugene Milne

Director of Public Health, Newcastle City Council

Living in a cold home has significant negative impacts on the health of the occupants and increases demand on the NHS. Fuel poverty can lead to social isolation of vulnerable groups and may reduce children's educational attainment.

REDUCING ENERGY COSTS

Newcastle City Council's Energy Services (link **here**) offers a case work service for Council tenants to address all energy issues experienced by residents - such as fuel debt, disconnection, problems with bills and difficulties dealing with energy suppliers.

Your Homes Newcastle (YHN) also run an Energy for the Future programme which provides home visits for tailored energy efficiency advice to tenants.

In the last two years Energy Services has accessed around £325k in energy bill reductions and energy measures support funding for residents.

Energy bill reductions were achieved by correcting billing errors, applications for the Warm Home Discount, goodwill payments, energy trust awards and savings made from switching to cheaper suppliers or tariffs. Energy measures support includes accessing funding for heating improvements and insulation measures.

Additional support has included getting self-disconnected clients back onto supply, removal of prepayment meters, setting up energy payment arrangements and delivery of energy saving advice.

Another effective way of tackling fuel poverty is by improving energy efficiency of the property you live in. Newcastle has a long history supporting energy efficiency improvements by establishing a dedicated team in the 1970s to improve both homes and the Council's own buildings.

IMPROVING ENERGY EFFICIENCY

The Government has recently announced the Green Homes Grant which enables uptake of energy efficiency and low carbon measures via a voucher scheme ranging in value between £5,000 - £10,000 depending on household income. ***We encourage all city residents to access the Green Homes Grant - find out more here.***

A number of previous and exsting schemes are listed below:

- Energy Company Obligation (ECO) which delivers contributions to new more efficient boilers, insulation and other measures.
- Newcastle Warm Zone that ran between June 2004 to December 2012 and successfully delivered 82,950 fuel poverty assessments, over 54,000 insulation measures in over 42,000 homes. New benefits income of £9.7m was delivered.
- Care and Repair Newcastle which provides funding for gas safety
- Your Homes Newcastle initiatives including the Housing Investment Programme which delivers energy efficiency measures through reroofing, new energy efficient windows and doors, energy efficient gas boilers (where essential), and cavity wall and loft insulation.
- Installing over 1,000 solar PV panel systems on Newcastle's homes to reduce electriciyt bills and carbon emissions.
- Warm Homes Fund which delivered new gas central heating systems to low income households where they had an old inefficient non gas heating system. The scheme delivered 92 new heating systems. The project also helped a further 344 households where they were not eligible for new heating systems with energy advice and debts support.

Lifting Future Standards

In order to avoid lock-in of buildings with high carbon footprints, we must ensure that new city developments are built to the highest standard possible. This will avoid creating a problem for future years and requiring expensive retrofit of low carbon technologies in the future to buildings that we are constructing today. To do so, our planning policy framework must play a critical role and we will continue to lobby Government to introduce a mandatory national higher standard; without this we cannot secure higher standards for development.

Newcastle's Planning Policy

Part 1 of The Planning and Energy Act 2008 allows local planning authorities in their development plan documents to impose "reasonable requirements for;

1. A proportion of energy used in development to be from renewable sources in the locality of the development;
2. A proportion of energy used in development in their area to be low carbon energy from sources in the locality of the development; and
3. Compliance with energy efficiency standards that exceed the energy requirements of building regulations.

Within Newcastle's Core Strategy:

- Policy CS1 (Spatial Strategy for Sustainable Growth) requires all development to be designed to reduce carbon emissions and adapted to the effects of climate change.
- Policy CS16 (Climate Change) requires development to be sustainable, able to function effectively in a changing climate and address the impacts of climate change emissions.

These policies should be read alongside the other Local Plan policies that set out in more detail how development address issues such as flood management, natural environment, landscape and design.

Policy CS16 (Climate Change)

There are six criteria that all new residential, non-residential and mixed-use developments must meet to conform with Policy CS16 (Climate Change) of the Core Strategy and Urban Core Plan (CSUCP):

1. A good standard of building fabric, passive design and landscape measures to minimise energy demand.
2. Flexible design to allow for adaptation to alternative uses.
3. A good level of sustainability through the applicant demonstrating best practice project and site management, site water use, site transport, waste reuse and recycling, the sustainable use of materials and construction techniques.
4. Minimise a developments contribution to, and provide resilience from, the on-going and predicted impacts of climate change.
5. A reduction in whole-life CO_2 equivalent emissions impact.
6. Optimise the use of local renewable or low carbon energy in accordance with a hierarchy, prioritising decentralised energy schemes, followed by other renewable energy solutions and finally other lower carbon energy solutions. Where no decentralised energy scheme exists, strategic and other large-scale developments must evaluate the feasibility of providing a decentralised energy system and, where feasible implement such schemes.

These requirements therefore ask developers to incorporate measures above the standard form of building fabric, as set out through Building Regulations 2013, to achieve a good level or standard. For this reason, the guidance seeks to reduce developments carbon dioxide emissions by a further 15% above that required by Building Regulations 2013 for residential developments and 25% for non-residential developments.

National Regulations and Standards

We recognise the importance of national standards for building requirements to be lifted in line with our local planning policy. We will promote enhancements to the Bulding Regulations and other national standards to further advance the decarbonisation of properties in the city. These include:

- Building Regulations
  The Building Regulations (Part L) detail the national requirements for conservation of fuel and power in buildings. They set the national standard for energy performance of all new and existing buildings. The Future Homes Standard will require new build homes to be future-proofed with low carbon heating and world-leading levels of energy efficiency; it will be introduced by 2025. The standard has recently undergone consultation.
- Minimum Energy Efficiency Standards (MEES)
  In 2016, the new MEES in the residential and commercial private rented sector was established. It is now deemed unlawful to let properties with an Energy Performance Certificate (EPC) rating below an 'E' rating. Further information is available **here**.

Councillor Linda Hobson

Cabinet Member for Housing

The Government's recent consultation set out in the Planning White Paper proposes radical changes to the planning system. We must ensure that the changes to the planning system include comprehensive policies which set out the Government's commitment to Net Zero and addressing climate change, promoting sustainable development patterns, not embedding high carbon intensity solutions into building design and construction, and avoiding a future liability.

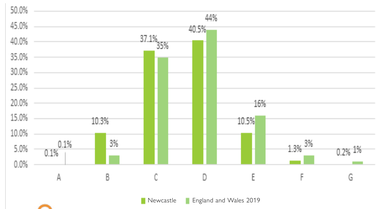
Reduced Domestic Energy Consumption

Newcastle has 137,000 homes in the city. 53,700 of these homes are over 80 years old and were not designed to be highly energy efficient.

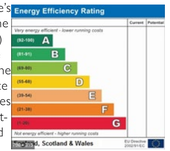
The quality of the homes in Newcastle and future new build homes need to be upgraded to safeguard residents health and wellbeing.

Adapting homes to be more energy efficient and resilient to climate change will improve living conditions, reduce energy demand, reduce fuels costs, improve health and wellbeing of residents and minimise incidents of fuel poverty in the city.

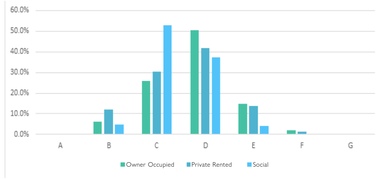
Energy use from homes accounts for approximately a third of Newcastle's carbon emissions and to reduce these emissions the homes will require significant improvements to the fabric to improve the properties insulation levels and conversion of the current heating and power systems away from high carbon fuels to renewables and other alterative low carbon sources.



The energy performance of Newcastle's housing stock can be assessed using the Standard Assessment Procedure (SAP) which is the methodology used by the Government to access and compare the energy and environmental performance of homes. A higher SAP score indicates lower running costs and homes are rated between A to G with A being good and G being very poor.



Previous energy efficiency schemes (see **Improving Energy Efficiency**) and projects undertaken in Newcastle have helped improve the performance of our homes with an estimated 77.6% of homes falling in band C and D and 10.4% in band A and B. Newcastle housing stock now performs better than the English SAP averages.



Despite the progress to date, there is a lot more improvement needed. To achieve our Net Zero targets we need to bring all our homes up to band A and B wherever possible and transition to low carbon power and heating sources for the majority of homes.

Newcastle's housing market is split into three key sectors:

- Owner occupiers - 38% of Newcastle's homes
- Private rented - 37% of Newcastle's homes
- Social housing - 25% of Newcastle's homes

Each sector is covered by different housing standards and regulations and has it's own unique set of challenges and opportunities for reducing domestic energy consumption - for example:

- Owner occupiers are often able to make energy efficiency changes most easily and see the direct benefits of the investment. However, there is limited regulation and no clear Government targets on energy efficiency levels to be achieved in this sector, along with a lack of advice on improvements needed to their properties. Newcastle City Council can be proactive by developing schemes that deliver national funding regimes locally.
- Improvements in the private rented market have been constrained by 'split incentives', where landlords meet the costs of energy efficiency upgrades and tenants are perceived to reap the benefit. The recent implementation of the Minimum Energy Efficiency Standards (April 2019) now restricts properties with the lowest EPC band ratings of F or G from being let. But there are a range of benefits to making energy efficiency upgrades for landlords as well such as raised property values, properties that are easier to let, reduced risk of rent arrears, lower tenancy turnover and less occurrences of condensation and dampness.
- Social landlords have control over whole estates, access to capital funding and investment in terms of coordinated stock upgrades. The last major improvement programme set by the Government, the Decent Homes Investment Programme, helped to modernise social housing stock and has helped this sector reach the current levels.

Retrofitting Existing Homes

Improving the performance of existing homes requires upgrading of the fabric of the building and the heating systems. The key elements of the property that can be improved are based on a fabric first principle. This involves reducing the energy demand of the property by improving its thermal performance - this can be done by ensuring that the roof, walls and floors are fully insulated, and that windows and doors have a high thermal performance.

Properties should also be well sealed against draughts from windows and doors, services penetrating the fabric of the building, and poor design and workmanship. A property which is well insulated and has low air change rates will require less energy to heat and maintain the home at a suitable temperature. This will provide an environment suitable to fit efficient and reliable low carbon heating and power systems and can be coupled with smart ventilation systems.

Further information on personal sustainable actions you can take in your home are included in **Personal Sustainable Actions at Home**.

Heat Loss in the Home

External Walls

Up to 35% of the heat loss from a property goes through the walls. Walls can be insulated by filling the cavity with insulation material which is the least disruptive and most cost effective method. Where the cavity is not suitable, or the walls are of solid construction then external insulation cladding or internal insulation is the only alternative. External and internal insulation solutions are more complex and costly compared to cavity wall insulation and will change the appreance of the property.

Roof

Up to 25% of the heat that is lost from a property is through the roof and the installation of loft insulation to pitch roof properties is one of the simplest and most economical solutions to improve performance of the property. Insulation of flat roofs and properties with rooms in the roof are more complicated and costly unless undertaken as part of a wider roof replacement programme.

Source: Energy Saving Trust

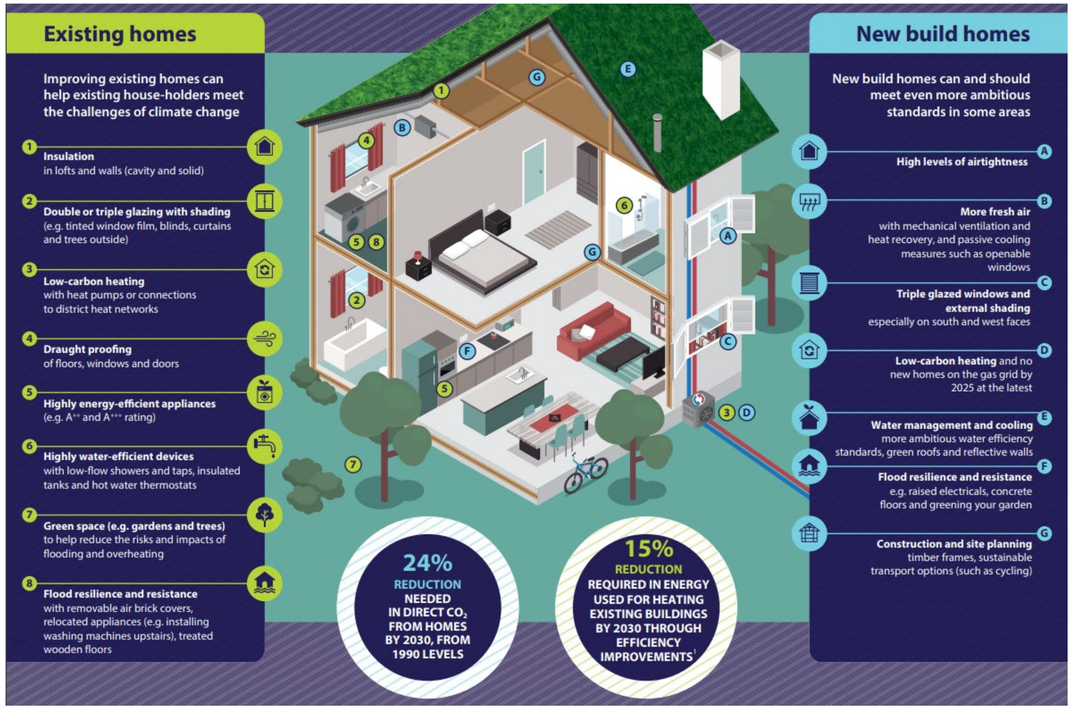
Opening and draughts

Up to 10% of heat loss is through the windows and doors and a further 15% from draughts from ill-fitting windows & doors. Draught stripping can be applied to these openings at relatively low cost and can be fitted on a DIY basis. Identification of services that penetrate the fabric that have not be fitted correctly and gaps in the fabric such as gaps between floorboards on the ground floor, spot lights in the ceiling below the roof can reduce in heat loss and can also be sealed relatively easily.

Floors

Up to 15% of heat lost goes through the ground floor of a property, the majority of properties built before the 1960s will have no insulation as part of the construction. As with solid roofs, floors can normally only be insulated by removing the existing flooring which is very disruptive and costly. Your Homes Newcastle (YHN) have partnered with QBot, a new innovative way of insulating suspended timber floors using robot vehicles to spray insulation on the underside of the floor. Reducing the need to lift carpets and remove flooring decreasing the disturbance to the tenant. Solid floor properties require renewal of the whole floor or adding insulation on top which requires significant adjustments to doors, services and skirting to accommodate the change in height of the floor.

Homes Fit for the Future

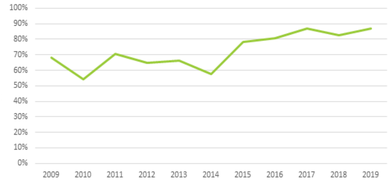


Source: Committee on Climate Change

New Build Homes

Newcastle has seen a steady increase in the number of new build properties in the city and the number of these that are built to band A-B standard, with 38% with A-B rating in 2009 rising to 87% in 2019.

New build homes registered EPC rating A and B



Building Regulations

This is a significant improvement and has been driven by a change in Building Regulations but we are still not seeing properties being built beyond building regulations standards, as a result in the last 10 years only 0.5% new builds have been built to a band A rating in Newcastle.

New build energy performance is driven by house builders complying with Building Regulations with part L (conservation of fuel and power) and F (ventilation) are the key sections of the regulation that impact the performance of the new buildings. The regulation was last updated in 2012 and new higher standards are due to come into force in 2020 as part of the Government proposal to introduce a new Future Homes Standard.

Future Homes Standard

It is expected that an average home built to the Future Homes Standard will have 75-80% less carbon emissions than one built to current energy efficiency requirements (Approved Document L 2013). This will be achieved through very high fabric standards and a low carbon heating system. This means a new home built to the Future Homes Standard might have a heat pump, triple glazing and standards for walls, floors and roofs that significantly limit any heat loss.


Source: Stephenson Quarter concept designs

This will be achieved through staged approach starting with the revised building standards in 2020 and then further requirements in a new Future Homes Standard by 2025.

Home Quality Mark and Passivhaus

There are a range of design standards such as Home Quality Mark and Passivhaus that set energy performance standards above the current building regulation requirements and are well recognised both nationally and internationally. There are cost implications of building to the higher standards but these are often offset by the reduced maintenance, running costs and sustainability of the property.

Organisations commissioning new housing such as social housing providers, universities and supported housing providers should consider specifying as high a standard as possible and increasing the number of properties built.

Reduced Non-Domestic Energy Consumption

Non-domestic property accounts for approximately 24% of the city-wide emissions.

Non-domestic users of energy within the city vary in type:
- From schools to colleges;
- From leisure centres to libraries;
- From hospitals to universities;
- From police stations to fire stations;
- From retail spaces to offices to industrial warehouses; and
- Many other types.

No two non-domestic properties are the same. Every property has a different:
- Daily, seasonal and peak demand profiles;
- Mix of fuel types providing their power and heating;
- Control systems and maintenance arrangements;
- Commercial leasing and ownership structures;
- Among many other variables.

We intend to advise, enforce (and support where possible) property owners, businesses and organisations to:
1. Undertake an Energy Performance Certificate (EPC) and check that the property conforms to the Minimum Energy Efficiency Standard (MEES); and
2. Produce an energy audit of their property which identifies and benchmarks energy consumption levels, assesses and recommends options for improving the energy efficiency and energy supply arrangements for the property to drive operational cost savings and decarbonisation.

Minimum Energy Efficiency Standard (MEES)

From 1st April 2018, it is now unlawful to grant a new lease for properties in England and Wales which do not meet the Minimum Energy Efficiency Standards (MEES). The regulation also applies to lease renewals.

From 1 April 2018, landlords of privately rented property in England or Wales must ensure that their properties reach at least an Energy Performance Certificate (EPC) rating of E before granting a new tenancy to new or existing tenants. These requirements will apply to all private rented properties in England and Wales, even where there has been no change in tenancy arrangements from 1 April 2023 for non-domestic properties.

Where a landlord wishes to continue letting property which is currently sub-standard, they will first need to ensure that energy efficiency improvements are made which raise the rating to a minimum of E. In certain, limited, circumstances landlords may be able to claim an exemption from this prohibition on letting sub-standard property, this includes situations where all improvements which can be made have been made, and the property remains below an E. Where a valid exemption applies, landlords must register the exemption on the database set up for this purpose – the PRS Exemptions Register. Further information is available **here**.

Landlords and their agents should act by commissioning an up-to-date Energy Performance Certificate (EPC) which will identify the current rating (which may have changed over time), and recommend opportunities for improvement.

Accessing Energy Audits through the Business Energy Saving Team

Over the past 20 months, we have delivered an innovative Business Energy Efficiency Scheme called BEST (link **here**) which provides specific support to assist business to reduce energy, identify cost savings and improve efficiency and improve sustainability.

In Newcastle, BEST has carried out 34 energy audits with 745 tonnes of annual CO_2 savings recommended, with a combined cost saving of £278,916 . However, more needs to be done. Small businesses particularly face specific barriers in adopting environmentally friendly practices often including a lack of capacity and access to tools needed to 'green' their businesses, poor access to finance for greener technologies, and inadequate awareness of the benefits of increasing efficiency and improving resilience.

We intend to expand and improve the exiting BEST programme to increase the number of businesses adopting Net Zero actions and to reach a greater number of businesses and to tailor the support around the needs and investment capabilities of small, medium and large energy consumers to maximise the impact potential, delivered at the right level for the business. Most SMEs don't own their premises, so the landlord may have to deliver improvements to the property whilst the SME focuses on their own operations and assets.

Non-Domestic Energy Consumption Actions

Non-Domestic Energy Consumption Actions To Date

Through its operational property portfolio, the Council and partner organisations have taken considerable steps towards this goal (a full update on recent actions is available **here**). Key progress to date includes the following:
- £8m LED street light replacement programme underway with 34,000 street lamps across the City fitted with LEDs reducing energy consumption by 50-70%, delivering annual savings of £1.7m - further information is available **here**.
- Reducing energy usage in public sector, university and college buildings through a range of system optimisation, building fabric improvements, installation of energy efficiency measures, efficient lighting, improved heating systems, and direct connection to District Energy Networks such as the Helix project.
- Works are also ongoing on techno-economic feasibility studies for a range of energy efficiency and low carbon heat interventions to domestic and non-domestic properties types using various low carbon heat sources from around the city. These include low carbon District Energy Networks accessing wastewater, water, and geothermal heat (further information on low carbon heat sources **here**) and hydrogen supply options.
- Establishing bespoke sustainable construction frameworks and lifting the bar on minimum design and operational performance standards for new build and retrofit projects.
- Reducing building operational hours to reduce energy consumption - the exception is Newcastle upon Tyne NHS Hospitals Foundation Trust which is increasing operational hours.

Public Sector Decarbonisation Fund

The Government has recently announced that a Public Sector Decarbonisation Fund will be launched to support the Clean Growth Strategy and post Covid-19 economic recovery.

The fund will invest £1 billion through a grant programme to public sector bodies, including schools and hospitals, to fund both energy efficiency and low carbon heat upgrades. Further information on the fund is expected to be forthcoming in 2020.

Newcastle's public sector organisations intend to work collaboratively to make best use of these available funds to deliver an accelerated and enhanced low carbon building retrofit programme across the city. Works are ongoing to profile suitable buildings, conduct energy audits, determine appropriate technical solutions and design procurement and implementation programmes.

Alternative Financing and Delivery Mechanisms

Newcastle's anchor institutions are working together to trial alternative financing and delivery mechanisms to accelerate the decarbonisation of non-domestic property portfolios.

One option that is being explored is an Energy Performance Contracting approach whereby specific outcomes (emission savings, cost savings, etc) are guaranteed by the contractor. This approach can enable greater certainty over project outcomes and ensure that commercial risks are adequately mitigated before making an investment decision.

Supporting City-wide Deployment of Low Carbon Measures on Non-Domestic Properties

In order to deliver Net Zero by 2030, it is very important that all non-domestic property owners (including commercial, retail, industrial, offices, etc) develop their own plans to address their property emissions and energy consumption.

We invite all non-domestic property owners to engage with the Climate Change team at Newcastle City Council (climatechange@newcastle.gov.uk) to discuss options for collaboration and / or support in assessing and delivering the necessary measures and / or support in finding suitable funding options for low carbon measures and / or provide appropriate support in reuqred policy or legislative changes.

Renewable Electricity Generation

Large and Small Scale Renewable Energy Generation

In addition to our 100% Clean Energy commitment for Newcastle City Council and other anchor institutions' clean energy transitions, we must ensure a renewable energy transformation across the city.

Grid-scale renewable energy installations have been growing over recent years at astonishing speeds, delivering a rapid decarbonisation of the national electricity grid (further information **here**). As the renewable energy market has developed, the cost of renewable energy equipment (primarily solar PV) has reduced dramatically and it is now a financially attractive option for domestic and non-domestic properties, delivering significant savings on electricity bills.

As well as delivering zero carbon electricity to local homes and businesses, small scale renewable energy installations can also create opportunities for local investment by local people, and allow opportunities for addressing inequality within the city.

Self-consumption

As a result of rapidly decreasing renewable energy installation costs, businesses and households can increasingly produce and consume, some or all of their own electricity, behind the connection point with the grid (i.e. the meter). Through the process of 'self-consumption', passive consumers are therefore becoming active 'prosumers' (i.e. producers and consumers of renewable energy).

The best way to make your renewable energy installation financially attractive is to use as much of the power at home / on site as possible, thereby avoiding the cost of the retail price of electricity which is typically higher than 14 pence per kWh. Any power that you do not use can be sold to the grid using the Smart Export Guarantee (link **here**), however this is at a much lower price, typically around 4 - 5.5 pence per kWh.

One way to increase self-consumption is to install timers or a controller to use the energy at the times that it is being generated. However, for homes with rooftop solar PV, self-consumption levels typically only achieve approximately 40%. To increase the self-consumption rate further and make schemes increasingly financially attractive, an energy storage solution is often required, comprising:

- Renewable energy installation - to generate power (e.g. solar PV modules and inverter)
- Controller - to manage the power generation and battery condition to prevent overcharging and discharging, and to preserve the battery life
- Accumulator - a battery powered energy storage system in order to allow the power to be stored and used when it is needed.

To deliver Net Zero Newcastle by 2030, a dramatic increase in the number of properties in the city using renewable energy is required. As a city, we will support this transition through various means including:

- Implement the Newcastle GREEN project (see further information **here**) to facilitate uptake of lowest-cost and high quality renewable energy installations.
- Encouraging SMEs to consider renewable energy installations for their on-site usage to have increasing control over energy bills.
- Increase the self-consumption rate by using heat pumps to heat homes at a lower temperature and deliver highly efficient heat energy from the renewable energy that is generated on site
- We intend to apply for funding for a pilot project for a Neighbourhood Virtual Power Plant comprising:
  - Domestic scale renewable energy installations on multiple properties.
  - Installation of an increasing number of Electric Vehicle (EV) charging points on the street.
  - Controller managing excess power from the renewable energy installations being sent to the EV charging points, to a suitably sized battery bank or direct to the grid.
- Newcastle will continue to develop world-leading programmes of research and investment into enhanced renewable energy generation and storage; including solar, wind, geothermal, energy storage technologies and improving efficiency of generation through our universities.
- Encourage uptake of renewable energy installations by preparing a Planning Process Note which provides a helpful guide that sets out when installations are likely to benefit from Permitted Development and when properties will need to secure the necessary planning approvals.

Supporting Renewable Electricity Generation

100% Clean Energy Commitment

In March 2016 (link **here**), Newcastle City Council committed to a 100% Clean Energy City. Among other things, the commitment was that the Council will work towards a clean energy system by 2050 and will prioritise local deployment of renewable and low carbon electricity and heat systems, as well as mechanisms to reduce demand, including smarter distribution and energy efficiency of domestic, commercial and industrial premises.

Smart Cities

Increasingly smart energy systems which adopt 'time of use' and 'flexible demand' approaches to energy consumption have the potential to enable future cities to become dynamic energy users and further support low carbon energy systems locally and nationally.

Renewable Energy Purchasing

Northumbria University, Newcastle College Group and Newcastle City Council purchases 100% of its electricity requirement from renewable energy sources (such as wind, solar, hydroelectric and biomass) through its power procurement process. Newcastle University has entered into a collaborative Power Purchase Agreement in 2019 to buy renewable energy from a portfolio of wind farms (further information **here**). The Newcastle upon Tyne Hospitals NHS Foundation Trust has secured 100% REGO (the Ofgem guarantee of origin certification) certified renewable electricity for all non-CHP supplies in the future.

Rooftop Solar PV

In an effort to generate renewable energy, city organisations and businesses have been deploying rooftop solar PV installations on buildings across the city. Recent rooftop solar PV projects that have been completed include:

- The Civic Centre - 100kWp (Newcastle City Council)
- Manors Car Park - 160kWp (Newcastle City Council)
- King's Gate building - 86kWp (Newcastle University)
- Various buildings on campus - totalling 360kWp across 8 buildings (Northumbria University)
- Installation of solar PV panels on domestic properties - approx 1,000 solar PV systems totalling 1,900kWp (Newcastle City Council and Your Homes Newcastle)
- Palatine building - 218kWp (Your Homes Newcastle)
- School Solar Programme - 121kWp across 11 schools (Newcastle City Council)

There are plans for many more rooftop solar PV projects across the city and these are supported in principle as part of the Net Zero agenda, provided they are sensitively sited. We encourage city property owners to consider an installation on their roof(s).

Ground Mounted Solar PV

A number of studies are underway to consider options for deploying ground mounted solar PV on suitable landholdings. Further schemes are planned in the future to maximise available and suitable landholdings for renewable energy generation within the city.

Newcastle GREEN

To support wider deployment of rooftop solar PV and low carbon retrofit measures, we are seeking to assist residents and businesses in:

- Understanding the potential of their property to accommodate rooftop solar PV and the cost and carbon savings.
- Providing a framework of support and guidance to remove barriers to uptake of low carbon measures by property owners by simplying the pre-installation and installaiton process.

The Newcastle GREEN initiative has been launched to develop a GIS web-based platform using high resolution Lidar (digital terrain) data across the whole city to produce a tailored set of rooftop solar PV and other low carbon options for every property in the city. The tool is intended to cover both domestic and non-domestic properties.

Newcastle GREEN is expected to be launched in 2020.

Source: Northumbria University

Low Carbon Heat Transition

The Problem with Today's Heating

Heating and hot water for buildings make up around 40% of the UK's total energy demand, and 20% of its total GHG emissions (CCC, 2016). Most of this demand is met by natural gas that flows from North Sea production centres and import pipelines through a nationwide transmission and distribution system directly into our buildings. The rest is met through electricity, bioenergy and oil. Increasing fuel security is a key policy for the UK to address reducing North Sea production and strong reliance on gas from Russia.

By ensuring that the city's homes and buildings are more energy efficient and better insulated, demand for heat can be significantly reduced, cutting energy bills and carbon emissions. But there will always be demand for heat in buildings, and in the future that will need to be met as far as possible without burning any fossil fuels.

The Net Zero Heat Challenge

To fully decarbonise heat, our current heating approach must completely change. Our use of fossil fuels to provide heat must be all but eliminated. Natural gas can no longer be used in our homes. New systems to provide virtually zero-carbon heat must be planned and implemented across our homes, commercial and industrial buildings.

This is one of the greatest challenges of our city-wide (and national) Net Zero programme, due to the infrastructure changes required, the challenging timeframes for delivery and the wide range of building types that zero-carbon heat options must deliver to.

National Pathways to Low Carbon Heat

In order to deliver a low carbon heat transition nationally, a recent report by the Net-Zero Infrastructure Industry Coalition and Mott Macdonald (The Path to Zero Carbon Heat 2020) identifies three primary pathways that are currently available, as shown to the right.

Pathway no 1 - Electrification Pathway

This pathway involves widespread deployment of heat pumps in buildings across the UK, which when combined with the roll-out of electric vehicles leads to more than a doubling of total UK electricity demand by 2050.

Key below right

Key challenges to this pathway:

- The sheer scale of additional low carbon electricity generating capacity that must be achieved to meet the additional electrical demand
- Enhancements to the grid
- Scaling up supply chains to deliver millions of heat pump systems and energy efficiency measures across the country

Pathway no 2 - Hydrogen Pathway

This pathway is based on the majority of buildings in the UK being directly supplied with hydrogen by 2050, which is combusted in hydrogen heating systems

Key right

Key challenges to this pathway:

- Producing the huge quantities of hydrogen required to meet demand;
- Building a largely new national hydrogen transmission system;
- Co-ordination throughout the hydrogen infrastructure value chain; and
- Building public confidence in using hydrogen in buildings, the capability of installers and the safety of equipment.

Pathway no 3 - Hybrid Pathway

The hybrid pathway explores the widespread deployment of hybrid heat pump systems. The heat pump components of these systems meet most of a building's heat demand with the gas boiler components used at peak times, initially using natural gas but by 2050 mostly biomethane.

Key below

Key challenges to this pathway:

- Major infrastructure challenges for generation of low carbon electricity and grid enhancements, similar in nature to the Electrification Pathway;
- Because methane and biomethane are not emission free, then hydrogen infrastructure will also be required;
- The pathway creates greater uncertainty about the UK's long-term heat decarbonisation strategy, making infrastructure planning decisions more difficult and delaying the mobilisation of supply chains.

Key

Elec	**Electric heating (primarily heat pumps)**
HHP	**Hybrid heat pumps (electricity and gas)**
H_2	**Hydrogen heating**
Distr	**District heating**

A Low Carbon Heat Pathway for Newcastle

A Net Zero Heat Pathway for Newcastle

The low carbon heat transition across the UK will vary from city to city, depending on the low carbon heat resources available and the infrastructure available to support the low carbon heat transition in each location.

The national Net Zero Heat Pathways are useful for understanding the national context that we must take into consideration (together with our local infrastructure and low carbon resources) when setting out a Net Zero heat pathway for Newcastle. Using the same colour schematic, a Net Zero Heat Pathway envisaged for Newcastle is set out below and the 3 key constituent components are described to the right.

Key on previous page

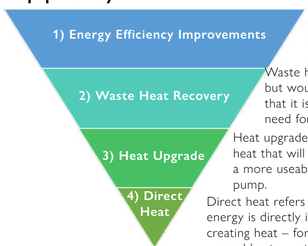
Newcastle has an excellent set of low carbon natural resources available to us to support this low carbon transition (as set out overleaf).

Low Carbon Heat Pyramid

When considering the Net Zero Heat Pathway for Newcastle, the **Carbon Management Hierarchy** approach is critical. With this in mind, the Low Carbon Heat Pyramid is described below (Association of Decentralised Energy - ADE):

Low Carbon Heat Pyramid

Top priority



Option of last resort

Further information on energy efficiency in domestic properties (**here**) and non-domestic properties (**here**).

Waste heat is heat that exists anyway, but would otherwise be wasted, meaning that it is very low carbon. and avoids the need for other energy consumption.

Heat upgrade refers to lower temperature heat that will be upgraded or concentrated to a more useable temperature by using a heat pump.

Direct heat refers to circumstances where energy is directly input for the purpose of creating heat – for example electricity into a panel heater, natural gas or hydrogen, or biomass or bioLPG into a boiler.

Electrification of Heat

Further information on heat pumps and green gas is included **here**.

A heat pump is a type of renewable heating system that can be used to heat or cool homes and other buildings. They use electricity to absorb heat from outside air or from underground, operating much like a fridge in reverse, to provide useful heat for space heating and water heating.

As the electricity network decarbonises further (further information **here**), the carbon savings associated with heat pumps and the Electrification of Heat approach will progressively improve, and it is expected that this will form a large proportion of the low carbon heat for the city by 2030.

Fully electric heat pumps will not be suitable for every property in Newcastle. It is expected that there will be a need for hybrid heat pumps also. In order to deliver low carbon gas to hybrid heat pumps, hydrogen and green gas supply to the local gas grid will be required. It is notable that gas boilers will not be installed in new residential properties from 2025 and this is expected to accelerate the roll out of heat pumps.

Hydrogen

Further information on Green Hydrogen and Blue Hydrogen is included **here**.

Hydrogen supply to the national gas grid is a key priority for the country, with a great deal of attention and targeted investment to achieve this. In order to deliver Net Zero status nationally, hydrogen will almost certainly have to play a key role in our energy supply mix for domestic, commercial, industrial and / or transport related uses.

At the moment, the economics of hydrogen production and distribution are such that it will likely play a greater role in the near term in transport and industry, than it will in domestic applications. However, towards the late 2020s, we hope that significant investment in mass expansion of the low carbon hydrogen sector will have occurred, driven by technological and infrastructure improvements.

For Net Zero 2030, we expect hydrogen will play a moderate role in heating our homes, businesses and other buildings, either through supply from the local gas grid or through District Energy Networks.

District Energy Networks

Further information on District Energy Networks is included **here**.

A District Energy network is a system that produces heat, power and sometimes cooling from a central location via one or more large scale energy centres, often using different energy sources. Underground pipes are used to deliver heat to customers in the form of hot water and cooling in the form of chilled water.

District Energy Networks are widely recognised as a sustainable, cost-effective solution to the provision of heating, cooling and power. District Energy Networks are a good solution for densely populated urban environments, and we expect them to play a significant role in our Net Zero future. Our focus will be on ensuring a transition away from gas as the fuel source for heat generation to low carbon and zero carbon heat sources.

Electrification of Heat

Heat Pumps

Heat pump technology is not new. In fact, most homes in the UK already have a heat pump in them – within the fridge. A heat pump works like a fridge in reverse, by absorbing heat from an outside source (air, ground or water) into a fluid within the heat pump called a refrigerant. A pump compresses this refrigerant which increases the temperature and the useful heat from the fluid is transferred to hot water via a heat exchanges to provide heat for the building and hot water.

A heat pump extracts heat from the air, ground or water and uses it to heat the home. Even if it is cold outside (as low as -10°C), a heat pump can normally efficiently extract heat. Heat pumps require electricity to operate. However around 75 percent of the energy required is generated from the outside air or ground collector with only the remaining 25 percent coming from electricity. This means that three quarters of the energy you use will be from a renewable source, which will significantly reduce emissions and your carbon impact.

In other words, a heat pump produces approximately 3 units of heat (figure varies by heat pump technology) for every 1 unit of electricity they use. By comparison, other traditional heating systems deliver less than 1 unit of heat for every unit of fuel or electricity they use. For example, a gas boiler may have an efficiency of 90% but heat pumps can be 300%-400% efficient (or greater) depending on the heat source and product.

Electrification of Heat Plan for Newcastle

We intend to develop a delivery plan for wide-scale deployment of heat pumps to homes addressing key barriers such as supply chain issues, training of heat pump engineers, cost reductions, understanding of the technology, etc. We recognise the role that heat pumps can play in creating jobs and growing our local economy, and we will seek to maximise value for the city and the region.

Air Source Heat Pump

Source: Public Utilities Access Forum

By clicking on the image to the right, it will take you to the 'Stay Warm & Go Green' webpage.

Electrification of Heat Demonstration Project - Newcastle

Newcastle has been awarded £3.9m by the Department for Business, Energy & Industrial Strategy (BEIS) to deliver one of the three pilot projects for the Electrification of Heat Demonstration Project. The aim is to show the feasibility of a large-scale roll-out of new heat pump technology in Great Britain, and is a partnership between energy supplier E.ON and Newcastle City Council, with support from social housing provider Your Homes Newcastle and charity National Energy Action.

We are providing full funding to support 250 households in Newcastle to install a free heat pump and other requisite property upgrade - which don't need to be an E.ON customer, nor become one to take part - to take positive steps towards a greener, lower carbon future, while enjoying the efficient heating, hot water and comfort that every home needs. 80% of the heat pumps will be delivered to private tenure owner occupiers, with 20% to suitable social housing residents.

Hydrogen

Hydrogen via the Gas Grid

The use of hydrogen for heating properties in Newcastle would be directly fed from the gas grid to hydrogen boilers that would directly replace today's natural gas boilers, with associated upgrading of meters and possibly internal gas pipework. The resulting heat can be distributed using existing central heating systems, reducing disruption for end-users.

A key issue for the hydrogen sector is how quickly the transition from Blue Hydrogen to Green Hydrogen can occur. Blue Hydogren is generated using methane generated through a process called Steam Methane Reformation which generates significant emissions that have to be captured and stored. Green Hydrogen is generated by electrolysis using renewable energy, and is a much cleaner solution.

Carbon Capture, Utilisation and Storage (CCUS)

The capturing and storage of emissions from the production of Blue Hydrogen is a process called Carbon Capture, Utilisation and Storage, or CCUS. There are currently no operating CCUS schemes in the UK and very few worldwide. The process is very expensive and various technologies are still under development and in demonstration stage.

CCUS has the potential to decarbonise the economy and maximise economic opportunities for the UK. However, it is currently expensive and cost reductions are necessary to be able to deploy CCUS cost effectively in the UK. The Government has established a CCUS Cost Challenge Taskforce to address the challenge of delivering CCUS solutions at a viable cost; one of the CCUS pilot programmes is in Teeside.

Role of Hydrogen for Newcastle's Space Heating

At present, the cost of producing and transporting hydrogen (both Blue Hydrogen and Green Hydrogen) is prohibitively high for space heating. Over the period to 2030, it is expected that some blending of hydrogen into the gas grid will occur, however we intend to watch this market as it develops closely and work with Northern Gas Networks to support roll-out of hydrogen where it is suitable and safe to do so, particularly where it can be used in District Energy Networks or large commercial facilities.

It is expected that hydrogen will play an important role in heavy vehicle transportation, as discussed **here**, where it competes with much more expensive fuel types such as diesel.

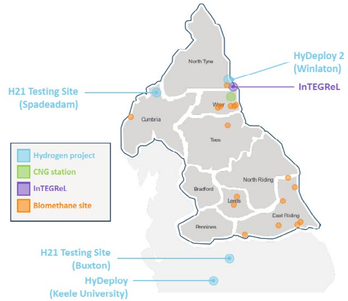
Hydrogen for Direct Fuel Supply to Properties

Modern day boilers can expected to be able to withstand a natural gas / hydrogen blend of up to 20%.

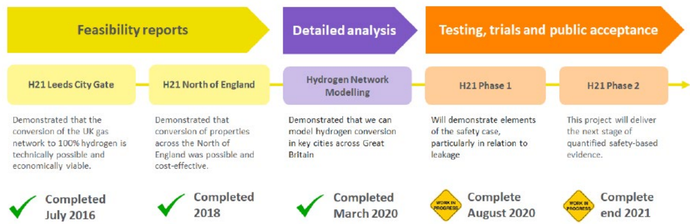
Northern Gas Networks, working together with Cadent, will be starting the HyDeploy 2 trials of 670 existing gas network customers in Winlaton, Gateshead who will be receiving this 20% blend. The trial of blending is expected to start in September 2020. New boilers designed to take up to 100% hydrogen have been developed by leading boiler manufacturers.

A wider programme called H21 is seeking to demonstrate the suitability of the existing gas networks to transport 100% hydrogen.

Further information on HyDeploy and H21 are shown in the image below. Of key importance in all hydrogen supply programmes is ensuring safety throughout the supply chain and in end use in properties.



Source: Northern Gas Networks



Source: Northern Gas Networks

Low Carbon Heat Sources

Waste Heat Recovery

Often heat is created as a by-product from industrial processes and city infrastructure. This excess heat can be a useful by-product and become an important 'free' source of energy by capturing and redistributing it where it is needed.

Waste heat is typically based on low grade heat which is at a temperature lower than that useful to industrial processes (typically below 90°C). Waste heat may be recovered using current technologies including direct re-use of heat, heat transfer via heat exchanger, heat pumps (open and closed cycle) and power cycles.

There are a limited number of industrial facilities in Newcastle to supply waste heat to lower temperature heat sinks, however further evaluation of waste heat opportunities is to be conducted. in London, for example, waste heat from the Tube has been used to both cool the stations and proivde heat to adjacent buildings - there may be options for similar arrangements in Newcastle using Metro infrastructure.

One promising source of waste heat recovery in Newcastle is from waste water, or sewage. In a sewage heat recovery system, a heat pump is used to capture the warmth of wastewater and transfer it to the clean water stream that is entering homes and businesses. The whole system operates as a closed-loop system, which means the dirty water never touches the clean water, only the warmth is transferred through a heat exchanger.

Combined Heat and Power

In a Combined Heat and Power plant (CHP) the heat which is produced as a by-product of the generation of electricity is captured to be used locally, or distributed via a highly insulated 'heat main' for use throughout a heating network.

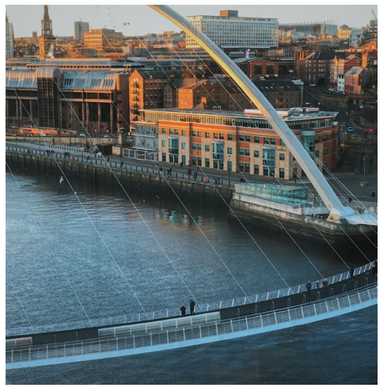
CHP schemes are generally sited close to demand to meet local energy needs including heat, power and cooling. The local siting of CHP plants avoids energy losses through the transmission and distribution of electricity via the National Grid and local distribution networks. The level of sophistication of CHP technologies means plants can exceed 80% efficiency at point of use. Gas-fired CHP is by far the most common heat generating technology used in UK district heating systems, and whilst it is not a zero-carbon technology it is widely recognised as a lower carbon alternative to traditional centralised energy production and supply as a result of its ability to achieve the same ends via a more efficient process.

Newcastle already has a number of existing CHP schemes (such as Byker Wall, Riverside Dene, The Rise (Scotswood), the Civic Centre, Eldon Square, Royal Victoria Infirmary, Freeman Hospital, Eldon Square, etc) which could be considered as base load providers for future District Energy Networks that use heat from low carbon sources.

Water Source Heat

Water source technologies have good potential where there is a sufficient body of flowing water available which can be directed through a chamber of heat exchangers suitably sized as to extract sufficient heat.

In Newcastle, the River Tyne is the greatest asset for water source derived heat. Work has begun on assessing opportunities for accessing water derived heat from the River Tyne and we will be looking to develop technically and economically feasible schemes in the coming years.



Low Carbon Heat Sources *(continued)*

Geothermal Heat

Geothermal energy is the thermal energy generated and stored in the Earth.

Shallow geothermal heat / ground source heat

There are various means of extracting heat from the ground at relatively shallow levels – some methods rely on closed loop systems which run thermal exchange fluid through piping installed either horizontally or vertically in the ground. Others are open loop systems which abstract water from a surface or groundwater source to a heat exchanger where heat is transferred from the water. The thermally spent water is then discharged back to the source.

The opportunity for accessing ground source heat within Newcastle is very significant and an ambitious programme of ground source heat District Energy Networks is planned using both building scale and larger district heat network installations and putting our green space to good use in generating valuable heat.

Mine water heat

When mines are in use, there is a constant process of pumping water out so that miners can safely access the coal. However, when mines are closed and this pumping stops, the mines gradually fill up with water. Geothermal energy naturally heats this water to around 12-20°C. By passing the water through a heat exchanger, the heat can be boosted to around 40°C.

Mine water heat is an emerging and promising area of development for low carbon heat supply and heat storage for our cities, and Newcastle has a vast array of mine workings and mine access points scattered across the city. We will develop projects that can cost-effectively access this mine water reserve.

Deep geothermal heat

A 1.6km deep borehole was drilled between 2011 and 2014 at Science Central / Helix site which showed that the temperature of the rock is approximately 70°C. Whilst the borehole was an exploratory exercise, it was not successful at the time in retrieving enough hot water to supply the energy centre.

As part of the Net Zero Geothermal Research for District Infrastructure Engineering (NetZero GeoRDIE) project, a £1.6m academia and industry consortium will develop Newcastle Helix's borehole into a state-of-the-art research facility for exploring a range of technologies to optimise the extraction and exploitation of this renewable heat source as part of the local energy system.

In addition, a North East Geothermal Assessment (funded by the NE LEP) is underway to determine the geothermal resource potential using geological and geophysical data from subsurface industries. We intend to use this study and other evidence sources to identify future opportunities for deep geothermal heat.

Other Low Carbon Heat Sources

There are a range of other low carbon heat sources that can supply properties with heat through property integrated systems or through District Energy Networks. We expect these systems will have a limited application and impact on Newcastle's Net Zero future:

- Solar thermal
- Anaerobic digestion
- Biomass
- Biofuel

District Energy Networks

District Energy Networks

District Energy Networks have the potential to make a significant contribution to delivering our Net Zero commitment, preserving natural resources and improving the quality of life in urban environments.

The strategic benefits include:
- Reducing carbon emissions;
- Reducing the costs of energy supply and improving the security of supply; and
- Stimulating economic regeneration and job creation.

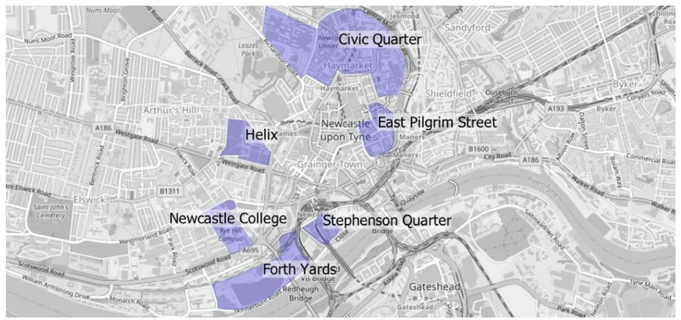
Analysis by the Committee on Climate Change and the Energy Systems Catapult (2018) notes that large-scale district heat networks are one of the most effective way of delivering heat in dense urban areas, regardless of the mix of technologies that energises these networks.

District Energy Networks are a particularly effective solution for densely populated urban environments. Its best use case is in:
- City centres
- Multi-storey towers, low rise residential blocks and care homes
- Communities with mixed use buildings such as leisure centres, schools, offices and residential

Newcastle already has a number of District Energy Networks dating back to the 1970s. These networks reliably deliver 67GWh of heat per year to over 3,800 customers. These District Energy Networks supply the hospitals, Helix / Science Central site, Byker Estate, among other commercial scale and communal schemes.

We have bold plans to deliver wider and more integrated District Energy Networks over the coming years, through the Regenerate Newcastle Partnership. In order to deliver Net Zero Newcastle by 2030, we will need to focus on using low or zero carbon heat sources to supply these District Energy Networks.

Possible Future District Energy Networks



Scheme locations and boundaries will likely vary from those shown.

Regenerate Newcastle Partnership

The Regenerate Newcastle Partnership is a strategic 40 year partnership agreement between Newcastle City Council and Engie to deliver low carbon District Energy Networks across the city and create a lasting low carbon legacy for the city.

The Regenerate Newcastle Partnership will enable the development of District Energy Networks that will introduce more housing to heat networks, other key development sites, and develop a low carbon heat and power future for the city. Over time, we expect the District Energy Networks across the city to coalesce and interconnect to form a larger, integrated network.

The partnership will alleviate fuel poverty, catalyse decarbonisation of the city's building stock, align with the city regeneration programme and help create jobs and economic growth over the short, medium and long term.

John Haynes
Managing Director, Places & Communities (North), Engie UK

The purpose of the Regenerate Newcastle Partnership is to utilise the existing, planned and future development sites in Newcastle to build on the current heat infrastructure within the city to create a network that can link the east and west of the city through into the city-centre. The heat network will provide renewable & low carbon heating and cooling to public sector buildings, commercial and residential properties as set out in the Energy Masterplan.

Personal Sustainable Actions in the Home

There are many ways to reduce energy use in the home that do not require the resident to carry out physical improvement to the property. Changing the way we use and live in our homes, with simple no or low cost actions can reduce the homes energy demand. ***We encourage all city residents to access the Green Homes Grant - find out more here.***

Turn appliances off at the plug to save an average of **£30 a year**.

Use plug sockets that can be turned on and off via your phone, to make sure you switch unused appliances off.

You could use cheaper timer plugs to schedule turning appliances off.

Almost half the money spent on energy bills is absorbed by heating and hot water costs.

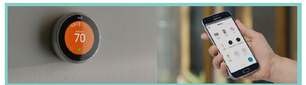
Turning your heating down by just one degree could save up to **£80 a year**.

Keeping a watchful eye on your consumption levels can help you decide if and when you have to change the way you use energy.

Installing a Smart Meter lets you track your consumption with accurate and real time information. Learn more about how they work with our guide to Smart Meters.

Next time your boiler comes up for repair, install a renewable energy heating system, such as a heat pump.

A heat pump is a type of renewable heating system that can be used to heat or cool homes. They use electricity to absorb heat from outside air or from underground. The heat extracted is used to heat your home and provide you with hot water.



Smart thermostats can make your heating more efficient by only warming the rooms you are using.

They learn how long it takes to heat your home, so they can have it at the right temperature at exactly the right time. They can also be controlled by your phone.

If you installed room thermostats, programmers and thermostatic radiator valves, you could save around **£75 a year**.

A cold draught can make it more tempting to turn the heating up. Draught-proofing kits are a good way to prevent this.

Seal cracks in floors and skirting boards, line your letterbox and block an unused chimney to reduce your heating bills by up to **£35 a year**.

If you don't have double glazing, plastic lining for your windows can save energy and keep more heat in.

Throwing out a perfectly good appliance won't save you much money, but when it is time to swap, going for one with a high energy-efficiency rating can be worth the investment.

Opting to buy an A+++ washing machine, a modern, efficient dishwasher and an A+++ fridge freeze wcould save you around **£34 a year**.

Conversion from filament bulbs to new LED bulbs, which have a longer life and use less energy can save an average household **£35 a year**.

LED bulbs now have a greater range of bulb types, colour rendering and don't have the disadvantage of slow start up times that compact fluorescent bulbs have.

For further information or support, please contact our Energy Services team on 0191 278 3427 or at the website (link here)

Other great tips to conserve energy are available **here.**

PRIORITY ACTIONS

The priority actions set out on these pages reflect our collective city-wide approach to addressing Energy related emissions and contributing towards delivering a Net Zero Newcastle by 2030.

E1
Work with Northern Powergrid and Northern Gas Networks to assess and identify the best route to deliver Net Zero in the energy sector.

E2
Monitor developments in the national and international energy sector to identify new and / or promising emerging technologies and applications to deliver Net Zero.

E3
Continue to work to eliminate fuel poverty through installation of energy efficiency measures and provide ongoing advice and support to fuel poor residents.

E4
Work with private sector partners and housing organisations to deploy available Green Homes Grant and other funding streams to as many properties as possible within the city.

E5
Engage with the private rented sector to ensure adherence with the Minimum Energy Efficiency Standard (MEES) and support where possible implementation of low carbon measures to deliver EPC improvements.

E6
Develop Newcastle GREEN (GIS-based Renewable Energy and Energy efficiency Network) website and promote uptake of low carbon measures to all property owners (domestic and non-domestic).

E7
Through the planning process, require and encourage developers to design and build properties that are fit for the future and conform fully with Policy CS16 (Climate Change).

E8
Continue to support local SMEs with access to energy audits and energy grants through the Business Energy Savings Team (BEST) project.

E9
Seek to expand the existing provision to local SMEs to have access to energy audits and energy grants through expansion of the BEST project.

E10
Promote through all suitable means, small scale renewable energy generation and self consumption in domestic and non-domestic properties.

E11
Apply for funding for a pilot project for a Neighbourhood Virtual Power Plant.

E12
Continue to develop world-leading programmes of research and investment into enhanced renewable energy generation and storage and improving efficiency of generation through our universities.

E13
Encourage uptake of renewable energy by preparing a Planning Process Note which sets out when installations are likely to benefit from Permitted Development and when they will need to secure the necessary planning approvals.

E14
Working with our delivery partner E.ON, deliver the BEIS funded Electrification of Heat Demonstration Project and learn lessons that can be applied in future heat pump roll out projects.

E15
Develop a delivery plan for wide-scale deployment of heat pumps to homes addressing key barriers such as supply chain issues, training of heat pump engineers, cost reductions, understanding of the technology, etc.

E16
Monitor closely developments in the hydrogen sector and the potential for hydrogen to play an increasing role in our Net Zero heat / gas supply future.

E17
Work with Engie through the Regenerate Newcastle Partnership to deliver District Energy Network and associated projects within the city, creating an expanded and increasingly integrated low carbon heat system.

E18
Prepare for and deliver an ambitious programme of Public Sector Decarbonisation of anchor institutions property portfolios via the forthcoming funding mechanism.

E19
Ensure that all new buildings and major capital programmes embed low carbon and renewable heat and electricity measures into their design and construction.

E20
Explore options for increasingly smart energy systems which adopt 'time of use' and 'flexible demand' approaches to energy consumption.

E21
In preparing the updated Local Plan, key low carbon and national or international standards will be considered and assessed for suitability to be incorporated into city-wide planning policies.

E22
Use the tools at our disposal to promote our key 'Asks of Government' (see orange box to the right) either directly to decision makers, through consultations, or via collective advocacy groups.

NORTHERN POWERGRID

Jim Cardwell

Head of Policy Development

Northern Powergrid is supporting Newcastle with its decarbonisation plans. The critical role we undertake to support homes and businesses to deliver and receive their power requires us to build new relationships and new projects to ensure we can collectively meet societal Net Zero goals, while minimising energy bills and maximising system reliability. Our innovative services and tools are already being trialled in Newcastle and we are excited about the potential of developing these further, with the aim of ensuring Newcastle flourishes in a world where decarbonised power flows across our network.

Northern Gas Networks

Mark Horsley

Chief Executive Officer

Northern Gas Networks has been developing plans to facilitate the distribution of Net Zero carbon fuels, including hydrogen, to support UK decarbonisation efforts and meet our Net Zero emissions targets by 2050.

Through our gas mains replacement programme, we have already made significant progress in future-proofing our gas distribution network in Newcastle to ensure it is capable of transporting low carbon gases. We look forward to further collaboration with organisations and individuals in Newcastle to support the transition towards Net Zero.

Asks of Government

1. Ensure that the proposed changes which Government brings forward to the planning system include specific measures to support the delivery of Net Zero and that the revised National Planning Policy Framework provides a comprehensive framework with clarity to support Net Zero, addressing climate change and promoting sustainable patterns of development and travel.
2. Ensure continuation of the Minimum Energy Efficiency Standards and acceleration of the Future Homes Standard, and ongoing commitment to raising standards and avoiding lock in of inefficient technologies and building structures.
3. Commitment from Government to a long-term sustained Green Homes Grant funding to allow businesses to have the confidence to invest in upskilling, expanding services, improving delivery efficiency and driving down the cost per unit installed over time.
4. Government to deliver sustained long-term funding mechanisms for retrofitting energy efficiency improvements into non-domestic properties.
5. Government to provide support and funding to SMEs to decarbonise their operations and reduce operational costs.

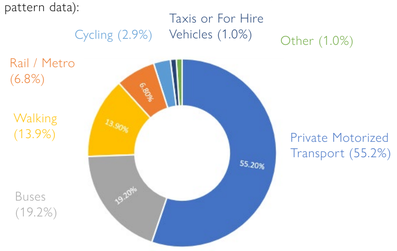
OVERVIEW

Transport enables the movement of people and goods, supports economic growth and provides employment for city residents. Despite many recent technological and efficiency improvements, transport in the city is still responsible for approximately 29% of Newcastle's emissions.

Transport is the UK's largest contributor to greenhouse gas (GHG) emissions. 28% of UK emissions originate from transport, and this does not include international aviation and shipping. Most domestic transport emissions, approximately 90%, are from road transport and, while emissions from other sectors of the economy have fallen, an increase in vehicle kilometres driven has offset increased vehicle efficiencies, resulting in only modest reductions of emissions since 1990 (Department for Transport).

Newcastle's Transport Sector at a Glance

The modal mix for transport in Newcastle is shown below (based on Census 2011 data commuting pattern data):



There are 95,600 cars registered in Newcastle. Cars account for approximately 20% of Newcastle's total CO_2(e) emissions.

Public transport data for 2018/19 shows patronage levels across Tyne and Wear of:
- 120.9m on buses (0.5% increase from the year before but overall 10 year trend of -1.08% per year)
- 36.4m on Metro (0.14% increase from the year before but overall 10 year trend of -1.10% per year)
- 8.9m entries and exits to / from Newcastle Central Station

Regional Transport Model

There is a large component of cross-local authority boundary movement on a daily basis. Newcastle is a net importer of cars every day, as people come to the city for work, leisure, retail and other purposes. So the transport sector must be considered at a regional scale

The seven councils in the North East of England (Durham, Gateshead, Newcastle, Northumberland, North Tyneside, South Tyneside and Sunderland) are part of a Joint Transport Committee.

Our single region-wide transport approach provides good transport links for the North East that enables economic growth and sustains jobs and communities. Transport needs to work for everyone by being accessible, affordable, reliable, easy to use, safe, sustainable, integrated.

Further improvements are needed, as set out in this section, to deliver an improved and low carbon sustainable transport system for Newcastle and the wider region.

Sustainable Transport

Significant change is required to drive forward the decarbonisation of the transport sector in Newcastle. A sustainable transport model is one that:
1. Reduces travel demand, particularly motorised modes, by reducing the need to travel, number of trips and trip lengths
2. Delivers greater use of sustainable modes such as public transport, walking and cycling for moving people and high capacity freight
3. Achieves efficient and effective use of existing transport systems and provision of infrastructure and services
4. Increases energy efficiency and reduces vehicle emissions

We are pleased to note that the Government is developing a Transport Decarbonisation Plan, to be published in 2020, and we look forward to seeing further detail as it emerges.

Councillor Arlene Ainsley

Cabinet Member for Transport and Air Quality

We will not be able to decarbonise transport without reducing demand for private car usage and increasing demand for public transport, particularly as low carbon public transport like electric buses and hydrogen-powered trains become more cost-effective. Unlike many other low carbon transport programmes, public transport benefits lower income households as much as those with higher incomes, and serves to reduce inequality across the city by enhancing access to services and opportunities.

The Benefits of Sustainable Transport

Achieving the movement of our transport system away from personal car ownership, towards a more efficient, low carbon, shared, active and public transport-based system will:
1. Allow individuals to choose the most suitable transport option for each journey
2. Dramatically reduce the number of vehicles needed, reducing the cost of travel
3. Reduce carbon emissions and improve air quality, and the health and wellbeing of residents
4. Allow more efficient use of land, with less space needed for parking

Delivering a Sustainable Low Carbon Transport Model for Newcastle

A growing population and an increase in the number of people living, visiting and working in the city means that managing movement into and around the city will only become a bigger challenge over time. If we continue with the current modes of transport (high emission private car dominance in the city), air quality will continue to deteriorate and our residents' health will be further detrimentally impacted.

There are two keys ways that we can improve residents' health through a low carbon transport model:
1. Encouraging greater use of active travel (making journeys by physical means - for example, walking and cycling) use of means, thereby improving the health and wellbeing of residents
2. Reducing emissions within the city, particularlary in sensitive zones, such as around schools, hospitals, and areas of greatest concentration of people

There is a clear opportunity in Newcastle to improve the health and wellbeing of residents by:
- Increasing the modal share of active travel through developing an attractive, safe and continuous walking and cycling network infrastructure.
- Facilitating a large increase in public transport patronage and reducing the dominance of cars in the city.
- Enabling a transition of public transport and other vehicular traffic in the city (such as taxis) to ultra low emission vehicles (ULEVs) and infrastructure.

This section sets out the actions we as a city are taking at the moment to address emissions from the transport sector and a path towards a Net Zero future.

"What you said!

Top 5 Young People Responses about Simple Everyday Things Everyone Can Do:
- Encourage people to walk more.
- Take the bus instead of a car.
- Try and not use cars because they release fossil fuels.
- We could cycle instead of taking the car.
- Use an electric car."

Councillor Arlene Ainsley

Cabinet Member for Transport and Air Quality

Addressing air quality issues in Newcastle is critically important. We must all recognise the damage that air pollution has on our residents (particularly the young people of Newcastle) and take urgent collective and individual action to address this public health issue.

AIR QUALITY

Dr Julie Hall

Consultant Neuroradiologist and chair of Newcastle Hospitals' Active & Sustainable Travel Group

Making neighbourhoods and our city's transport network more focused on active ways of getting around will improve air quality, reduce carbon emissions and improve staff and patients' health and wellbeing. Public health is multi-faceted but a transport network that prioritises active and sustainable ways of getting around, and makes them safe and easy, is a great place to start..

AIR POLLUTION

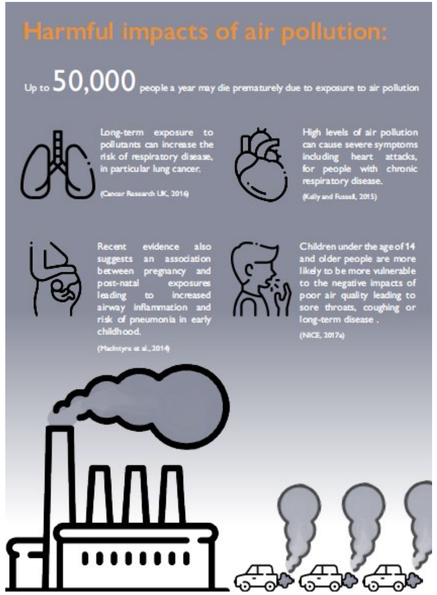
Road transport is responsible for significant contributions to emissions of carbon dioxide, nitrogen oxides and particulate matter emitted from vehicle exhausts, generally in areas where people live and work. Pollutants in the air such as particulate matter, nitrogen dioxide and ozone cause irritation of the respiratory system.

Newcastle achieved progress between 2005 to 2015, with a reduction of road transport CO_2(e) emissions from 485 kilotonnes (kT)CO_2(e) to 405kT CO_2(e). This has been delivered through a shift to newer vehicles which produce lower CO_2 emission levels and increases in active travel.

Emissions of the main air pollutants from transport have declined over the past two decades but levels of nitrogen dioxide, the harmful component of nitrogen oxides, are still widely exceeding legal limits in Newcastle.

Children are particularly vulnerable to poor quality air as they have less developed immune systems to protect them against pollutants. The 2018 UNICEF report 'The Toxic School Run' estimates that one in three children are growing up in towns and cities in the UK with unsafe levels of particulate pollution. This not only violates a child's 'right to health', but also their future; potentially impacting on their 'right to education', their 'right to play' and ultimately, their 'right to life'.

There are many reasons that we must address air pollutants across the city. The harmful impacts of air pollution on our city residents are shown in the image to the right.



WELLBEING FOR LIFE

Newcastle's Wellbeing for Life Strategy (2013) seeks a future in which Newcastle becomes both a Sustainable City, a place that does not compromise the wellbeing and health of future generations in order to meet the needs of today; a City of Healthy Lifestyles which promotes an environment where the healthy choice is the easy choice. Transport has a key role to play in achieving Healthy City status for Newcastle.

Guided by a Healthy City vision, our city-wide transport strategy aims to reassert the supremacy of the city over its traffic. This is a future we have committed to providing for future generations through the ambitious targets to decarbonise our transport sector.

To achieve this future, we must create a city that is a sustainable place to live and work by shifting to more sustainable modes of travel, promoting alternative low carbon travel choices, reducing carbon emissions from transport and reducing the dominance of the private car in our city.

What you said!

Be honest about what will happen if we choose to ignore this Climate Emergency - show simple data on deaths from pollution etc. - and have a simple publicity campaign.

A CITY-WIDE VISION

The 15 Minute City

The 15 Minute City concept allows a resident to fulfil their basic needs such as gaining access to local goods, services and leisure within a 15-minute walk or cycle ride of their home. Essentially, it creates self sufficient communities with grocery stores, parks, cafes, leisure and sport facilities, health centres, schools and even workplaces that are readily accessible using Sustainable Transport means.

These city models prioritise multimodal transportation and human beings rather than car-centric design. 15 Minute Neighbourhood modifications aims to:

- Give up road space from cars to pedestrians, bikes and green space
- Subsidise businesses in city centres with tax incentives
- Shift usage from single-use commercial buildings to multi-function architecture
- Implement connected vehicle technology that guides drivers to parking spaces on designated driving streets, reducing fuel consumption and CO_2 emissions
- Automate door-to-door delivery fleet for efficiency and reduction of units on roads
- Expand public transport to encourage residents to decrease the use of private cars.

We are looking to utilise this conceptual thinking in designing our Low Traffic Neighbourhood schemes and overall City-wide Low Carbon Transport Vision.

Low Traffic Neighbourhoods

Low Traffic Neighbourhoods implement the principle of ensuring vehicular traffic does not take precedence in residential areas. While people should be able to drive to residential neighbourhoods (if needed), they should not have the right to drive through. In line with the **Carbon Management Hierarchy** approach, through traffic should use the established road hierarchy, as set out below:

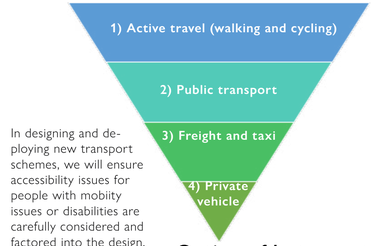
The principle is that key routes are preserved to allow free flow of traffic, with neighbourhood streets defined and restricted according to the road hierarchy. This is illustrated in the graphic above right.

City-wide Low Carbon Transport Vision

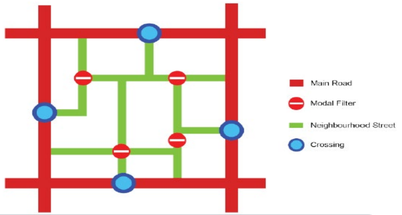
Using the approach set out above, a city-wide vision for Low Traffic Neighbourhoods across Newcastle is shown in the image to the right. This would create at low cost a city-wide walking and cycling network, improve air pollution and noise impacts at the most sensitive receptors, improve safety for our city residents and deliver widespread progress towards Net Zero Newcastle

The Council has developed a Local Cycling and Walking Infrastructure Plan (LCWIP) - link **here**. Subject to funding, we will seek to utilise Low Traffic Neighbourhood and other types of infrastructure to help ensure neighbourhoods are linked to schools, parks, retail, healthcare and other city-wide services, and infrastructure. We will develop detailed plans over the coming months for a city-wide Vision and will engage with local councillors and residents.

Sustainable Transport Pyramid



In designing and deploying new transport schemes, we will ensure accessibility issues for people with mobility issues or disabilities are carefully considered and factored into the design.



Planning Policy

Our Planning Policy framework supports improvements in our transport network so that people have more choice in how they travel in and around Newcastle as set out in the following policies:

- CS13 Transport supports sustainable travel by protecting and enhancing pedestrian routes, cycle networks and Rights of Way and ensuring development provides direct, safe, secure and continuous pedestrian and cycle links and the policy also seeks to reduce unnecessary traffic through, within and around the Urban Core. The policy seeks to minimise car trips and promote and enhance public transport.
- UC5 defines Primary and Secondary Pedestrian Routes within the Urban Core, that will be the focus for improvement over the Local Plan period.
- UC6 states that priority will be given to cycling in the Urban Core where appropriate and cycle infrastructure will be developed by promoting cycle improvements and links to the surrounding area.
- UC7 designates a bus loop in the Urban Core that will refocus routes so that they provide good service around the edge of the retail area with less reliance on the routes that cut across.
- UC9 seeks to minimise traffic in the Urban Core by focusing traffic on the designated Urban Core Distributor Road.
- UC10 states that within the Urban Core, the location and supply of safe, secure car parking will be managed by minimising car parking for development, promoting short stay over long stay car parking, and restricting the development of temporary car parks.
- DM10 which states development must provide connections through developments both to the existing and future wider pedestrian and cycle network.
- DM11 requires major development to promote and facilitate the use of public transport and demonstrate accessibility by public transport to the Urban Core and other key local facililites
- DM12 requires development to provide safe, secure and useable vehicle and cycle parking that satisfies its operational requirement.

Improving Residents' Health through Low Carbon Transport

Our primary priority for Net Zero Newcastle, is to focus on the immediate improvement to air quality that can be achieved by addressing harmful emissions by:

1. Reducing the dominance of the private car on our city; and
2. Facilitating a dramatic growth in active travel.

Newcastle has 95,600 registered vehicles in the city. Newcastle imports more people every day than it exports.

Our population is predicted to grow but the number of vehicles doesn't necessarily need to grow with it. To be successful in addressing emissions from the transport sector, we must ensure car ownership does not grow (and preferably falls) during the period to 2030 and beyond.

To achieve this, the city must:

- Encourage the majority of residents to make active travel and public transport their preferred modal choice
- Address key drivers for this modal shift, such as accessibility to low carbon travel methods, reliability and affordability of public transport services, health improvements, etc.
- Adopt technological improvements that will enable lower number of vehicles on the road by reducing requirement for car ownership, such as autonomous vehicles and Mobility as a Service (Maas) solutions (further information on MaaS) **here**).

Further information on our proposed actions to achieve these aims are provided in this section.

Clean Air Zone

In 2017 the UK Government issued a legal direction which required councils in Newcastle, Gateshead and North Tyneside to take action to reduce illegal levels of traffic-related pollution in certain areas as quickly as possible.

A category C Clean Air Zone (CAZ C) will be introduced from January 2021 to reduce the number of high polluting vehicles entering our city in order to improve air quality. Under a CAZ C, charges ranging from £12.50 - £50 per day apply to buses, coaches, taxis (Hackney Carriages and private hire vehicles), heavy goods vehicles and vans that do not meet the required emissions standards.

The additional measures implemented – lane restrictions on the Tyne Bridge and approaching routes, and investment in public transport, walking and cycling – will also help to reduce car journeys and address air quality issues in the city.

We will systematically develop and implement plans to remove private motorized vehicles from the city centre, commercial districts and sensitive part of the city.

What you said!
The city centre should as far as possible be a car-free zone.

Parking Policies

The availability of parking has a direct impact on the mode of travel people choose for their journey. Parking provided as part of developments must be of an appropriate quality and level to cater for the development and visitors whilst, helping to promote Sustainable Transport choices. We will develop and implement an emissions based parking tariff in the city centre and key commercial districts.

Ride Sharing

Ride sharing is an important way of reducing the number of vehicles on our roads, by addressing the issue of single occupancy vehicles. We view informal ridesharing through services such as Lyft and Uber as vital for increasing accessibility for non-drivers and lower-income residents and reducing personal journeys which add to peak hour congestion.

Car Clubs

Co-wheels is a 'pay by the hour' car club operating in Newcastle which enables people to make car journeys without owning a personal vehicle. The scheme helps to reduce the number of car journeys, in turn reducing congestion and pollution.

We intend to assess the potential for wider (to achieve a critical mass) deployment of car clubs within the city, based on Ultra Low Emission Vehicles to boost the effectiveness of the car club approach. We want to ensure that access to travel options is enhanced in communities with low car ownership through community clubs as opposed to household ownership.

Active Travel in Newcastle

Enhancing Modal Shift Towards Active Travel

Active travel tackles inactivity and over reliance on the car by providing sustainable, healthier and safer travel choices for Newcastle's residents and visitors. Increased use of active travel helps to reduce greenhouse gas emissions while also improving the health and wellbeing of city users.

Figures from Sustrans suggest that people in the North East feel positively about cycling as a mode of transport and are ready to build on the 9 million journeys made by bike in Newcastle in 2016/17 (which took the equivalent of nearly 7,000 cars off the city's roads).

There are a number of ways that modal shift towards active travel can be supported in Newcastle, some of which are described here.

Active Travel in the School Run

The school run not only contributes to congestion, it also substantially impacts air quality. Children are disproportionately exposed to higher doses of pollution during the trips to and from school and whilst they are at school, particularly when in playgrounds sited near a road. Schools can play a critical role in educating the whole school community about air pollution, raising their awareness of the problem and supporting real action to reduce emissions.

Taking measures to improve the air quality and environment around schools is also encouraged, such as:

- Introducing car free zones around schools.
- Regular car free weekends.
- Greater use of streets to create safe spaces for children to play, walk, run and cycle.

School Streets

The School Streets initiative involves installing temporary restrictions on a road outside school to stop both school traffic and through traffic for two time-limited periods at the start and end of the school day. The aim is to make the area cleaner and safer and encourage families to use more sustainable forms of transport for the school journey.

We intend to develop and implement additional School Streets initiatives across Newcastle. In September 2020, Defra have announced £2m of funding available for air quality improvement schemes, which is currently being considered.

Healthy Pupil Capital Fund (HPCF)

Newcastle City Council is utilising the Healthy Pupil Capital Fund grant (HPCF) (2018-19) to develop and implement a programme, designed to build on existing air quality measurement initiatives, increase community awareness of air pollution and participate in actions to help address sustainable active school travel. It is a collaboration between Public Health, Road Safety and Transport, working in partnership with Newcastle University's Urban Observatory.

The programme comprises provision of:

- Air quality monitors outside schools.
- Equipment for selected schools to support active travel i.e. cycle and scooter storage.
- Cycle helmets for onsite storage, to support the 'Bikeability' programme and other cycle-based activities.
- Free curriculum resources and campaign materials on air quality.
- Free support for schools to work towards the Modeshift Stars active travel programme.
- A dedicated schools portal by the Urban Observatory, to enable them to view and analyse the data collected from their air quality monitor, for use within the curriculum, local campaigns and wider communications with the school community.
- Teacher training session and written resource on air quality and how to use and interpret the school's air quality monitor results.
- Support for National Clean Air Day campaign, including publicity.

Active Travel in Newcastle

Reallocation of Road Space to Active Travel

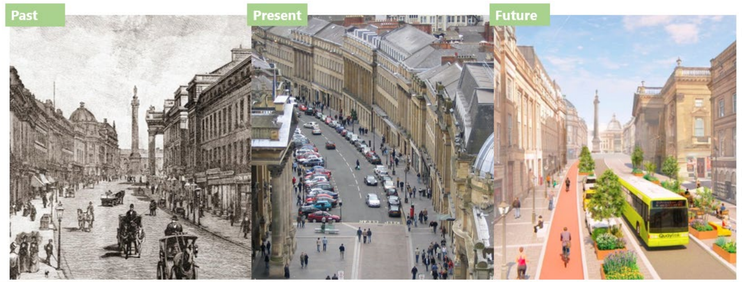
As coronavirus restrictions ease, we're working with a range of partners, including NE1, Northumbria Police, the universities and the Newcastle upon Tyne Hospitals NHS Foundation Trust to ensure that the city is a safe and welcoming place for people.

Key transport priorities include changing city-wide transport networks to enable people to travel to and around the city, while maintaining social distance, and to meet the increasing demand for space to walk and cycle. We are looking at how these short-term changes can help us deliver longer-term ambitions for a cleaner and greener transport network that encourages more active travel and a reduction in car journeys.

Local Cycling and Walking Infrastructure Plan (LCWIP)

Our Local Cycling and Walking Infrastructure Plan (LCWIP) sets out proposed improvements to walking and cycling infrastructure and developing a corresponding network of provision, enabling more people to choose to travel on foot or bike. City-wide planning policy (through the Development Allocations Plan) makes specific reference to the LCWIP whereby its walking and cycling network plans will have an important role when having discussions with developers, and will help to secure funding for future walking and cycling schemes.

We will implement a safe walking and cycling network to connect every school, to every park, to every district shopping centre, by implementing the key components of the LCWIP.



e-Scooters Trial

We are currently working with Gateshead Council to introduce a joint e-scooter trial for 12 months to assist reduced public transport capacity restrictions and provide an alternative to vehicular travel.

In the initial stages of the trial, priority is given to providing capacity to support journeys on key transport routes into central areas of Newcastle and Gateshead.

In the medium to longer term though, we envisage e-scooters being used in different ways and areas – potentially for visitor, tourist and leisure type journeys in the Central area, potentially expanding out and linking with the Tyne and Wear Metro system to help support first and last mile journeys.

National Low Carbon Transport Scheme

The Government launched a £2bn cycling and walking revolution on 28 July 2020.

This was prompted by the uptake of active travel during the coronavirus lockdown and includes thousands of miles of new bike lanes, cycle training, prescription bikes and the Fix your Bike voucher scheme.

As part of the revolution, the Government announced that they were looking for at least one small or medium-sized city which wants to create a zero-emission transport system, with extensive bike lanes, an all-electric (or zero-emission) bus fleet, and a ban on nearly all petrol and diesel vehicles in the city centre, with deliveries made to consolidation hubs and the last mile being done by cargo bike or electric van. As a city, we intend to apply for this Zero Carbon City Centre scheme.

Current Transport Integration Challenges

Public transport provides one of the most viable alternatives to the private car and can play a significant role in minimising the number of car trips on the highway network as well as providing for other benefits such as improving health and wellbeing and reducing carbon emissions.

What is Integrated Transport?

A key step in delivering a Sustainable Transport system for Newcastle is integrating the transport system, by encouraging public transport usage by everyone. The number of riders greatly impacts transport emissions savings as the more passengers that are riding a bus or train, the lower the emissions per passenger mile.

In its most simplistic form, Integrated Transport is about the ease of moving around. Nearly every trip you make has more than one mode of travel, for example walking at the beginning and end, and then some combination of cycling, or travelling by bus, train, ferry or car or any other mode. For a trip to be integrated, the journey must be seamless with different segments readily connecting in close proximity (in space and time), to ensure a reasonable travel time from your origin to your destination.

We want to see a fully integrated transport system for Newcastle, which delivers:

- Co-ordinated timetabling and travel information for ease of use
- Integrated fares, ticketing and promotions
- Cost-effective and sustainable transport at a reliable quality

Increased Patronage of Public Transport

There has been a long term decline in public transport use across Newcastle, although for the first time in many years, bus patronage levels increased in 2018/19.

Due to maintenance programmes and unreliability issues, fewer people are using the Metro. A major decline in Metro use can clearly be mapped back to the 1985/86 deregulation of bus services which ended Tyne and Wear's integrated transport network and meant bus services stopped feeding into Metro interchanges.

The impact of Covid-19 on public transport has been dramatic. In the short term, social distancing will reduce the capacity of public transport by around 75% rendering the existing commercial model undeliverable for the foreseeable future.

Local and Government support will be required and we must find ways to ensure that public transport usage rebounds quickly to pre-Covid 19 levels and patronage levels continue growing thereafter. To achieve this, a multitude of bold measures will need to be implemented across the city and safety concerns of members of the public must be addressed as a priority.

> **What you said!**
> Promote active and public transport with sustainable reintegrated transport/car "free" city centre and green commuter corridors (but recognize the needs of long-distance commuters with off-centre transport hubs and prioritise parking for people with accessibility issues).

Improving Information

Providing connecting information is critical to a successful Integrated Transport model.

Public transport users expect reliable and timely service information in today's connected society. We want to have accurate and timely information before we choose a connected trip. We also want real time updates during the trip, so we know where to go next and whether there is another quicker or move convenient option that has presented itself.

We will work with Nexus, who run the public transport information to develop longer term proposals for improving information access.

Efficient Interchanges

Public transport users want a convenient, reliable and quick journey, with seamless connections from start to end. The key is for services to connect, with little lag time, at key interchange points.

Buses, bikes and private vehicles are often competing for the same space in Newcastle and pinch-points on the network cause safety concerns for people on bikes. This, together with journey time reliability issues means more buses are needed to run to timetable, which increases operating costs, meaning fares go up and less people then use the bus.

Improving Transport Integration

Park & Ride

Park & Rides serve as an excellent way to enhance transport integration and take cars out of the city centre. The current Park & Ride provision is shown in the image to the right, which is largely tied to the locations of Metro stations.

There are a number of factors that must be addressed to make our Park & Rides most effective, including:

- Optimal location for new Park & Rides and expansion of existing Park & Rides.
- Integrated ticketing for public transport.
- Free parking at Park & Rides to avoid people coming into the city having to pay for parking and then pay for public transport.
- Other incentives such as shop discounts / vouchers for Park & Ride users should also be considered.
- Amount and pricing of existing car park provision within the city.

We will support colleagues around the region, such as Nexus who are the main operator of Park & Rides and neighbouring authorities to:

- Improve access to and effectiveness of our existing and future Park & Ride facilities, including consideration of schemes at Follingsby, Callerton expansion, Eighton Banks (Gateshead) and other appropriate sites.
- Further enhance integration of public transport services including linking to Northumberland Park and the Northumberland Line (further information here), and enhancing reliability of services.

In identifiying sites for expansion, careful consideration of the Metro rolling stock replacement (further information here) will be important, where greater connectivity may be achieved by use of vehicles with battery technology and access to the mainline rail networks.

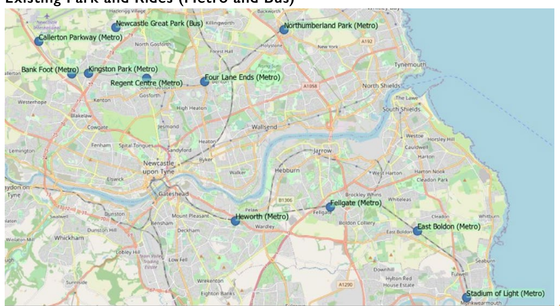
Sustainable Park & Rides

As our transport system transitions to Electric Vehicles, we must prepare our Park & Rides to be fit for the future by developing schemes which incorporate car-port mounted solar PV, Electric Vehicle charging points, electric or hydrogen buses into the city centre.

We will learn lessons from other cities, such as Leeds, who are deploying innovative new ways of delivering sustainable Park & Rides.

Source: Leeds City Council

Existing Park and Rides (Metro and Bus)



What you said!

Have more Park and Rides outside of the city centre and make it free to park and travel.

Intelligent and Enhanced Transportation

Intelligent Transportation / Smart Ticketing

In Newcastle it is possible to integrate our public transport services through a smart ticketing system which enables passengers to move seamlessly between different modes of travel at the cheapest possible price in most scenarios.

This would be rolled out using Mobility as a Service (MaaS), a digital transport service platform that allows users to access, pay for, and get real-time information on, a range of public and private transport options.

In Newcastle, this would expand our existing 'Pop' branded smartcard for all local transport, as well as integrated uses like Park and Ride, cycle storage and Tyne Tunnel tolls.

We envisage that MaaS users would buy transport services as packages based on their needs instead of buying the means of transport.

We intend to assess the potential to offer passengers an incentive such as carbon credits to increase MaaS usage and discourage vehicular travel.

What you said!

It's much cheaper for us to drive and park in town than it is to get the bus, it's so frustrating as I'd much prefer to get the bus.

Bus Priority on Key Corridors

We have undertaken an analysis that examines existing locations of delay for bus journeys and identified proposed measures to give more priority to buses on key corridors.

Focusing on the ones that do not require significant civil engineering and require reallocation of road space, three main areas have been identified:

- Corner House on Sandyford Road
- Stamfordham Road
- Great North Road

We are working with bus operators in the city and working on the highways programme to improve bus lanes across Newcastle. We are aiming for a visible improvement in our public transport networks and journey time reliability, through improved traffic signals and bus priority measures on key routes.

Bus Franchising

Under a bus franchising approach, the deregulated bus market is suspended and bus operators are only able to provide services under contract to the local transport authority.

This approach offers a range of advantages such as:

- Integrated ticketing
- Network planning
- Cross subsidy across bus services and other modes
- Unified marketing

Bus franchising is an opportunity we are interested in as it brings together the strengths of private operators in efficient service delivery but within a co-ordinated and planned public transport network.

Whilst it may not be suitable for all areas, it is a mechanism that allows the sensible co-ordination of bus services within a competitive market that drives operators to deliver better value for the public purse. We will assess options and the pros and cons of a bus franchising approach for Newcastle.

Electrification of Transport and Ultra Low Emission Vehicles (ULEV)

The Road to Zero Strategy, 2018 sets out the Government's aims to put the UK at the forefront of the design and manufacturing of zero emission vehicles, and for all new cars and vans to be effectively zero emission by 2040.

There are three rapidly emerging technologies that are driving the decarbonisation of transport in the UK and worldwide. These are:

1. Electrification - the electrification of public transport systems is a technology that has been successfully deployed for over 100 years. Overhead catenary lines are beginning to be displaced in city centre locations by battery powered light rail systems with charging at stops.
2. Batteries - Battery Electric Vehicles (BEVs) are the front-runners for low carbon transition of light vehicles, primarily cars and vans. Batteries are a well understood technology and the technology is developing quickly as mass market deployment continues. A significant consideration for BEVs, as the increasing deployment of rapid chargers is putting increasing demand on the electricity network for re-charging vehicle batteries within acceptable timescales.
3. Hydrogen fuel cells - a fuel cell is an electrochemical device that combines hydrogen and oxygen to produce electricity, with water and heat as by-products. Hydrogen fuel cells are expected to play an increasingly important role in heavy vehicles where due to the high energy density of hydrogen and reduced time for refilling a truck with hydrogen as compared to charging a large battery..

To power all these zero emission vehicle technologies, electricity is needed. This could be conventionally supplied from the electricity grid or from on-site renewables, or in the case of hydrogen, made off-site and delivered in tube trailers to the filling station.

Other potential options for decarbonising transport include biofuels and synthetic fuels.

To be considered fully carbon neutral, electricity from a green source must be used for the battery charging and/or the production of hydrogen from electrolysis.

We are promoting ultra-low emission buses, taxis and freight vehicles, while supporting the development of alternative fuels and power sources. We will work in collaboration with bus operators to further encourage the adoption of low carbon buses and the move towards their fuel-efficient operation.

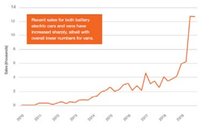
Encouraging Electric Vehicle (EV) Uptake

In order to encourage the uptake of EVs in Newcastle, Government policies would be required to support the transition towards EVs and increase consumer confidence in charging infrastructure provision.

In 2019, battery electric vehicles (BEVs) and plug in hybrid electric vehicles (PHEVs) made up just over 3% of all new vehicle sales in the UK. While overall numbers of EVs are low in Newcastle, the recent increase in sales has been steep and gives us a strong indication that they will continue to grow, reinforced by changes in company car tax in April 2020 that further incentivise EVs as company cars (which make up 9% of cars in the UK).

Cars

Vans



Source: National Grid - Future Energy Scenarios

It is important to note that the market will play a very important role in the update of EVs with technological improvement, vehicle range extension, price point reduction and other factors playing an important role in consumer decisions at the point of purchase.

Evidence from other countries where favourable EV policies and tax incentives, robust EV infrastructure deployment and other support mechanisms have shown an exponential increase in EV sales over several years, in many cases over 2-3 years.

Transport Planning Guidance is to be updated and will include requirements for provision of EV charging points for major developments.

Electrification of Vehicles

Residential Charging Schemes

As most EV users prefer to carry out the largest proportion of charging at home, we believe residential charging schemes are of great importance in increasing EV uptake amongst Newcastle residents.

We have made a bid to the Office of Low Emission Vehicles for grant funding to be able to implement a pilot scheme to provide 23 chargers in a number of areas of the city in a first instance that will help us to understand how we may be able to manage wider implementation. Further information is available **here**.

Existing Electric Vehicle Infrastructure

We have provided destination-based charging facilities primarily in the city centre, accessed through the Charge Your Car network map (link **here**). However, there are reliability issues with this network.

The network was installed as a regional initiative and we are currently seeking to improve the network via a procurement process that is being led by the North East Combined Authority (NECA). Through this process, we will replace / upgrade as necessary all of the existing charge points in the city and that it will also provide for maintenance and then expansion of this network in due course.

Over the coming year, we will develop an ambitious city-wide plan for the rollout of Electric Vehicle charging infrastructure, wherever possible using existing infrastructure and ensuring greatest value for money. In parallel, we will identify and pursue funding to deploy this ambitious plan.

ULEVs for taxi fleet and buses

We are working with NECA to provide Rapid Chargers for electric taxis at three locations in the city – Helix, St Nicholas Car Park in Gosforth and at the Kingston Park Park and Ride Car Park.

This will encourage the use of electric taxis as there will be sufficient on-street rapid charging infrastructure.

"What you said!

Start with public transport, electric-powered buses first."

Sustainable Freight

We promote an efficient, safe and sustainable freight sector as a major employer and driver for growth. We support all partners, including the North East Freight Partnership, to move freight away from road transport and encourage them to switch to zero emissions vehicles or cargo bikes. A good local example is ZMOVE bikes which operate a fleet of electric cargo bikes serving Newcastle and Gateshead.

Freight Consolidation

As our city population grows, so too does the volume of goods needed to service businesses and residents operating in the city. More freight, means more goods vehicles making deliveries in the city centre and commercial districts, causing additional congestion along with safety concerns about HGVs sharing a limited road space with a growing number of cyclists. Successful consolidation centre models are now proving how large volumes of goods can be dropped off outside a city's perimeter, consolidated and then delivered for the last-mile leg on fewer, greener vehicles.

We will develop a plan for the city to implement Freight Consolidation Hubs and low carbon last mile freight deliveries, and assess practical implementation options, as well as seeking funding. The plan will draw on Planning Policy UC8 which requires freight delivery service plans to be provided in the Freight Management Area in the Urban Core to promote sustainable freight movement.

Improving Public Transport

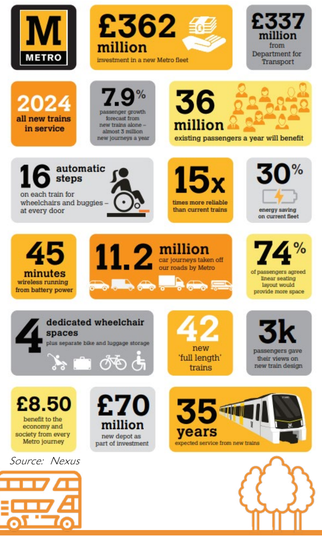
METRO

The average Metro patronage levels have generally decreased in the last ten years but a fleet renovation of 42 two-carriage metro trains are being supplied by Stadler Rail as part of a £362 million investment and are scheduled for 2022-2025.

The new trains will cut Metro's high voltage power consumption by 30% while providing 15 times better reliability than the current fleet. Metro's 36 million passengers will benefit from modern features including wifi, charging points, air conditioning and a step-change in accessibility.

Stadler will also build and run a £70m new maintenance facility at Metro's current depot site in South Gosforth, Newcastle, as part of the deal, creating scores more jobs in construction and employing around 100 people directly. The train depot will feature sedum roofing, rain water recycling, daylight capture and other environmental features.

Source: Nexus and Stadler Rail



Source: Nexus

Source: Nexus and Stadler Rail

Improving Public Transport

Retrofitting

Retrofitting vehicles with pollution-reducing technology can offer a relatively low cost alternative to purchasing new low emission vehicles. It also reduces the incentive to relocate dirtier vehicles away from areas with the worst air quality problems and thus reduces overall emissions of NOx.

At present retrofitting is particularly relevant for heavy vehicles, taxis and vans operating in areas with poor air quality. The Low Carbon Vehicle Partnership's Clean Vehicle Retrofit Accreditation Scheme for buses, coaches, HGVs, vans and black cabs provides independent evidence that a vehicle retrofit technology will deliver the expected emissions reductions and air quality benefits.

The Clean Bus Technology Fund (CBTF) is a Government pilot programme which awarded £40 million to 20 English local authorities to retrofit more than 2,700 buses. Newcastle engaged in this programme for 23 buses.

Ultra Low Emission Buses

To provide further support for the transition to zero emission buses, the Government has launched a new ultra low emission buses scheme. £48 million will be provided to accelerate the uptake of ultra low emission buses and related infrastructure.

We intend 100% of our bus fleet to be ultra low emission by 2030, and will work with the bus fleet operators to access the necessary funding and implement the infrastructure throughout the city.

Hydrogen

A hydrogen vehicle uses hydrogen fuel for motive power. The power for such vehicles comes from converting the chemical energy of hydrogen to mechanical energy either by burning hydrogen in an internal combustion engine, or, more commonly, by reacting hydrogen with oxygen in a fuel cell to run electric motors.

There are no GHG emissions from using hydrogen in fuel cells, but its production either requires electricity (for electrolysis) which will then need to come from a renewable and sustainable source, or is via steam methane reformation, which creates CO_2 and will therefore require Carbon Capture, Utilisation and Storage (CCUS) technology to be feasible (Department for Transport). Further information on hydrogen production is included **here**.

Widespread use of hydrogen for fuelling transportation is a key element of a proposed hydrogen economy and is something we support in Newcastle. We are closely watching developments at Tees Valley Combined Authority where plans are currently being developed to bring a fleet of hydrogen road vehicles and new refuelling infrastructure to the region to allow cars, buses, bin lorries, trains and other vehicles to be powered by hydrogen fuel.

The value that a hydrogen transport system can bring to the city to deliver the Net Zero transition and economic growth is very considerable, and we are investigating options for hydrogen to play a future role here.

Improved Vehicle Technology and Low Carbon Fuels

Since 2011, the European Union has been driving forward vehicle emission regulations. These mandatory emission reduction targets for new cars have progressively improved vehicle technology and driven down tailpipe emissions.

As we leave the European Union, the Government has committed to an approach for improved vehicle technology that is at least as ambitious as the current vehicle emission regulations.

As a city, we intend to lobby Government to ensure the bar is continually lifted for new vehicle technology and this drives significant GHG emission reductions in new vehicles. We will also lobby for scrappage schemes to encourage the replacement of our dirtiest vehicles with new lower emission vehicles and Ultra Low Emission Vehicles (ULEVs).

Low carbon fuels will continue to be vital to drive down emissions from conventional vehicles, and in sectors which are harder to decarbonise such as heavy goods vehicles. Increasing the supply and sustainability of low carbon fuels is important to minimise emissions whilst our city-wide fleet of vehicles transitions to ULEVs.

Ecodriving

Taking steps to accelerate the adoption of fuel-efficient motoring (ecodriving) by company car drivers, businesses operating fleets, and private motorists is very important part of reducing transport emission. Further information on ecodriving is included **here**.

OUT OF BOUNDARY TRANSPORT EMISSIONS

There are two key elements of our out of city boundary emissions in which we must work to address transition to low carbon / zero carbon emissions over time. These Scope 3 emissions (see **Scope of Emissions**) are from three primary areas:

1. AVIATION

One of the hardest hit sectors of the economy by Covid-19 has been the aviation sector – the impacts have been sudden and severe. The aviation sector is a very important part of the UK economy; it connects people and businesses around the world, supports modern supply chains for high value / short shelf life products, enables the transport of vital medical supplies and direct delivery of aid where it is most needed.

The aviation industry represents approximately 2% of global human-induced carbon emissions and it is important that we continue to focus on decoupling aviation growth from emissions – since 2005, airlines have been able to grow passenger numbers in the UK by 25% while reducing carbon emissions by 3%. Deeper and faster improvements are needed to ensure we transition to a Net Zero economy, and the aviation industry is committed to transformational low carbon change.

Newcastle International Airport and Net Zero

Newcastle International Airport is located within Newcastle's local authority boundary. It is the second largest airport in the North of England and of strategic importance to the UK as a whole as well as being the region's international gateway. As a city, we want to see Newcastle International Airport and our local aviation industry recover in the short term from Covid-19 and grow in destinations and volume of flights, whilst simultaneously delivering a rapid transition to Net Zero.

The airport has set out a plan to be Net Zero by 2035 (link **here**), which sets out how it will address its Scope 1, 2 and 3 emissions through a series of targeted actions, shown in the image above right. In addition, the airport's Net Zero plan commits to:

- Work with airlines to encourage the use of the latest, most efficient aircraft
- Support Sustainable Aviation.

Source: Newcastle International Airport

Sustainable Aviation

Sustainable Aviation is a long term strategy which sets out the collective approach of UK aviation to tackling the challenge of ensuring a cleaner, quieter, smarter future for the industry.

The road map shows how a 70% growth in passenger numbers by 2050 can be accommodated whilst reducing net carbon emissions levels from just over 30 million tonnes of CO_2 per year down to zero through smarter flight operations, new aircraft and engine technology, modernising our airspace, the use of sustainable aviation fuels and significant investment in carbon reductions through smart market-based policy measures.

2. HEAVY RAIL

Rail is generally considered on a regional basis, and there is a North East Rail Management Unit that is hosted by Nexus and includes the Tees Valley Authorities. It acts as a link with rail operating companies and promotes service improvements (such as the recent Horden Station) and links with the Transport for the North.

Transport for the North

Transport for the North is England's first sub-national Transport Body responsible for providing the infrastructure needed to drive economic growth in the region.

Transport for the North brings together the North's local transport authorities and business leaders together with Network Rail, Highways England, and HS2 Ltd, and work with central Government. it is responsible for shaping the strategic and economic development of the network for rail users and works with the industry to ensure collaboration on future rail infrastructure planning and investment.

Transport for the North is delivering a number of important transport improvement programmes including Northern Powerhouse Rail (see below), rail franchising investment, Integrated and smart travel, major road investment, improvements to freight and logistics through ports and airports across the North, improving international connectivity, and strategic planning for future development corridors.

A number of regional and national schemes that will have an impact on heavy rail transport in Newcastle are shown on this page.

High Speed Rail

The North requires investment for action on rail and a plan for longer-term transformation to reduce journey times, increase capacity and improve reliability. This means kickstarting HS3 (High Speed North) which is a proposed east-west railway network from Liverpool to Newcastle, integrating it with HS2 and planning for the redevelopment of the North's gateway stations.

This project is a transformational scheme that will further strengthen Newcastle's economy by benefiting from compatible through-services connecting to HS2 via the 'classic' network and significantly reducing journey times. The total journey time between Newcastle and London would be reduced from 169 to 137 minutes. These changes will boost rail patronage across the network and reduce vehicular traffic and aviation emissions.

Northern Powerhouse Rail (NPR)

Northern Powerhouse Rail (NPR) (link **here**) is a major rail programme designed to unlock the economic potential of the North. It will transform rail services making it easier to move between the region's towns and cities. Featuring new and significantly upgraded railway lines, NPR will reduce journey times, improve reliability of commuting between cities, and importantly reduce private car use across the region.

Through the NPR programme, there is an aspiration for Newcastle to Leeds journey time of 58 minutes.

Source: Transport for the North

East Coast Main Line (ECML)

The All-Party Parliamentary Group on the East Coast Main Line, is chaired by Newcastle North MP Catherine McKinnell.

Whilst we welcome HS2 and the potential High Speed North programme (HS3), it is important to recognise the key value of the East Coast Main Line (ECML) and that improvements on this line are essential as well as investing in branch lines to deliver a properly joined-up regional rail network, and for the ECML to be ready for, and integrated into, High Speed Rail future expansion plans.

The Northumberland Line

Reopening of the Northumberland freight-only rail line to passenger trains is proposed for 2023 to improve the connectivity of towns in South East Northumberland from Ashington, Bedlington and Blyth with Newcastle. The Northumberland Line is intended to connect into Newcastle Central Station and will tie into the Metro at Northumberland Park in North Tyneside.

The scheme will contribute towards population and economic growth, provide an incentive for employers to relocate to the area, improve access to labour supply for employers in the wider Tyne and Wear area and reduce journeys made to Newcastle by car.

Other branch line improvements are proposed across the region including the Bensham Curve or the Leamside Line which may play a future role in freight and passenger rail services.

3. MARITIME

Maritime transport is often described as the backbone of international trade and the global economy. Around 80 per cent of global trade by volume and over 70 per cent of global trade by value are carried by sea and are handled by ports worldwide.

Clean Maritime Plan

The Government has developed a Clean Maritime Plan to deliver on a vision of zero emission ships being commonplace globally by 2050. The plan sets out how Government sees the UK's transition to a future of zero emission shipping

Newcastle's Maritime Sector

A number of small fishing, tourist and leisure boats are based at Ouseburn and St Peter's Marina, as well as along the Quayside. The maritime sector in Newcastle is small with a minimal emission footprint. Wherever possible, we will seek to support a low carbon transition for the maritime sector in Newcastle.

Personal Sustainable Actions for Transport

Sustainable Transport
Travel is a necessity. The best approach to taking personal sustainable actions for your own transport is to use the Sustainable Transport Pyramid when deciding how to take a journey.

What you said!

We need positive messages about the difference that changes can make to people's lives and the city.

Personal Sustainable Transport Pyramid

Most Important

1) Active travel (walking and cycling)

Use active travel in daily activities
Walk to the local shops rather than take the car
If possible, live car free.

2) Public transport

Check what your nearest public transport service is and what bus and Metro routes run from your area.
Download the app for your local public transport operator: **Metro app**, **Stagecoach bus app**, **Go North East app**, **Arriva bus app**.
Get a Pop card from Nexus and save money if you travel regularly (link **here**).
Take the train rather than driving for long distance journeys.

3) Freight and taxi

Try car sharing or using pool cars.
Use taxis for select journeys.

Last Resort

4) Private vehicle

Consider buying or leasing an Ultra Low Emission Vehicle (ULEV), such as an Electric Vehicle for your next car.
If you're not able to buy or lease a ULEV, consider buying or leasing a more efficient car for your next car.
Use ecodriving techniques - further information **here**.

Personal Sustainable Actions - Ecodriving

In the car
From large studies, it has been proven that ecodriving has produced average savings of 15% on fuel and CO_2. Organisations that have incorporated a wider package of behavioural and procedural measures in managing their fleets (see the case study below) have delivered typical emission savings of between 10-30%. These driving behaviours also improve road safety.

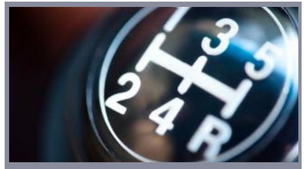
Subsidised ecodriving training is available- for further details and eligibility, please visit the Energy Savings Trust website **here**.

Drive smoothly

Assess the road ahead as much as possible to avoid unnecessary braking and acceleration, which increases the amount of fuel you use.

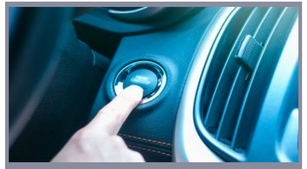
Keep your distance

Maintain a greater distance from the vehicle in front so that you can adapt your speed when necessary without using the brakes.



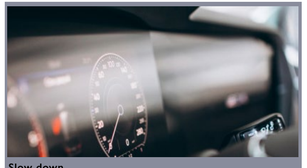
Shift up early to a higher gear

Driving at lower revs reduces fuel consumption so change up a gear at around 2,000 RPM.



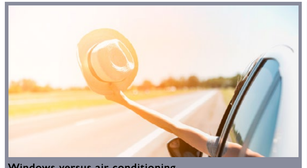
Switch off your engine

Many newer cars automatically turn off when stationary in neutral. If yours doesn't, turn off your engine when you've stopped for a minute or so to save fuel.



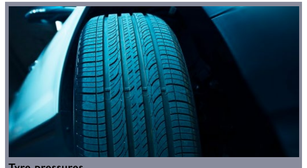
Slow down

Your fuel costs will increase the faster you drive so keep speeds reasonable.



Windows versus air conditioning

It is more fuel efficient to open the windows a little than to use air-conditioning when driving. Air conditioning can increase your fuel consumption by as much as 5%. However, we appreciate that open windows are not always pleasant on extremely hot days or at higher speeds, so to save fuel, if you do use air-con, try to use it sparingly.



Tyre pressures

Under-inflated tyres increase your fuel consumption and can be dangerous on the road so check them once a month and before long journeys.

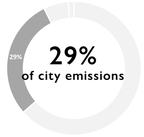
Lighten your load and reduce drag

Remove excess items from your car before travelling to reduce weight.

Having roof racks and boxes attached to your car when they're not being used will increase drag and increase your fuel costs.

PRIORITY ACTIONS

The priority actions set out on these pages reflect our collective city-wide approach to addressing Transport related emissions and contributing towards delivering a Net Zero Newcastle by 2030.



T1
Develop detailed plans for a city-wide Low Carbon Transport Vision including 15 Minute City concept, Low Traffic Neighbourhoods and incorporating the Local Cycling and Walking Infrastructure Plan and School Streets initiative.

T2
Assess options and develop a plan for limiting growth in the number of private motorised vehicles in the city, to counter the impacts of population growth.

T3
Systematically develop and implement plans to remove private motorized vehicles from the city centre, commercial districts and sensitive part of the city.

T4
Implement the Clean Air Zone (category C) using secured funds.

T5
Develop and implement an emissions based parking tariff in the city centre and key commercial districts.

T6
Assess the potential for wider deployment of car clubs within the city, based on Ultra Low Emission Vehicles. Ensure that access to travel options is enhanced in communities with low car ownership through community clubs as opposed to household ownership.

T7
Develop and implement additional School Streets initiatives.

T8
Implement, and where possible enhance, the Healthy Pupil Capital Fund programme.

T9
Develop and implement schemes to reduce the dominance of cars in the city by reallocating road space to active travel and low carbon transport modes, whilst meeting vibrant high street and Covid-19 requirements.

T10
Implement a safe walking and cycling network to connect every school, to every park, to every district shopping centre, by implementing the key components of our Local Cycling and Walking Infrastructure Plan.

T11
Work with Gateshead Council to implement a 12 month e-Scooter trial. If successful, explore ways to extend and expand the scheme.

T12
Prepare a bold, detailed and high quality submission to the Government for the recently announced Zero Carbon City Centre scheme.

T13
Work with Nexus and other city public transport operators to develop a city-wide plan for further improving transport integration and to develop and implement a Smart Ticketing system using the 'Pop' branded smartcard.

T14
Consider options for expansion of, and new sites for, Park & Ride schemes across the city. Develop and seek funding for Sustainable Park & Ride schemes.

T15
Enhance the information and payment systems available for passenger transport to enable a 'Mobility as a Service' approach to transport integration.

T16
Work with bus operators to improve bus lanes and bus priority through better co-ordinated traffic signals on key transport corridors to improve overall public transport networks.

T17
Assess options and the pros and cons of a bus franchising approach.

T18
Promote and support the transition towards ultra-low emission buses, taxis and freight vehicles operating within the city, including options such as cargo bikes.

T19
If successful in grant funding bid to Office for Low Emissions Vehicles, implement a pilot scheme to provide 23 Electric Vehicle chargers in a number of areas of the city.

T20
Work with the North East Combined Authority (NECA) to renew, replace and expand the Electric Vehicle charging infrastructure across the city.

T21
Develop an ambitious city-wide plan for the rollout of Electric Vehicle infrastructure across the city. Work with North East Combined Authority to deploy Rapid Chargers, particularly to encourage use by electric taxis.

T22
Work with the North East Freight Partnership and other relevant organisations to move freight away from road transport and to encourage the switch to zero emission vehicles.

T23
Develop a plan for the city to implement Freight Consolidation Hubs and low carbon last mile freight deliveries, and assess practical implementation options, as well as seeking funding.

T24
Support other city low carbon transport projects such as the Metro rolling stock replacement programme, and work with city and regional partners to increase ambition in their transition to Net Zero.

T25
Ultra Low Emission Buses scheme. Work with bus fleet operators to assess the necessary funding and to implement the infrastructure throughout the city to take 100% of buses to ultra low emission status.

T26
Investigate options for hydrogen to play a future role in public transport in Newcastle.

T27
Wherever suitable and appropriate, support the decarbonisation of Out of Boundary Transport Emissions by working with local, regional and national transport organisations.

T28
Use the tools at our disposal to promote our key 'Asks of Government' (see orange box to the right) either directly to decision makers, through consultations, or via collective advocacy groups.

Asks of Government

1. Government to provide adequate and sustained funding and a legislative framework to drive forward a Net Zero ambition across the whole transport system.
2. Government to bring foward funding for ultra low emission buses to be deployed across the city. Any residual buses that are not converted to ultra low emission should be funded for retrofit to improve fuel efficiency.
3. Government to ensure the bar is continually lifted for new vehicle technology and vehicle efficiency improvements to drive significant emission reductions in new vehicles.
4. Government to bring forward scrappage schemes to encourage the replacement of our dirtiest vehicles with new lower emission vehicles and Ultra Low Emission Vehicles (ULEVs).

OVERVIEW

Future Climate Risk

Nine of the ten warmest years for the UK have occurred since 2002 and all the top ten warmest years have occurred since 1990. By 2050, the chance of experiencing a hot summer like 2018 is expected to be around 50% regardless of emissions trajectory (i.e. it will take place on average every other year) (UK Climate Change Committee).

The impacts of climate change are accelerating and extreme weather events are increasing in intensity and frequency.

If we carry on in a 'Business as Usual' approach with high emission levels, a global warming of 4°C by 2100 is expected to drive significant and systemic impacts, including:

- *Extreme heat*
  Warming across the entirety of the UK is expected, with summers warming more than winters. Temperatures experienced during the 2018 summer would be expected more often than every other year by the 2090s.
- *Water availability*
  Wetter winters and drier summers are expected, with around 40% less precipitation in an average summer across the UK (compared to the 1981-2000 average), leading to water deficits in around 25% of water resource zones.
- *Sea-level rise and flooding*
  The projected range of sea level rise for the UK's capital cities is between 30 cm to 1.15 metres by 2100. This is creating a growing threat of damaging coastal flooding. The population at significant risk of surface, river or coastal flooding would be expected to rise to 3.3 million across the UK by 2050.
- *Systemic risks*
  Climate-related disruptions to global food systems and livelihoods is likely to create significant risks of food price shocks and possibly increase migratory pressures

(Source: Committee on Climate Change - Climate Change Risk Assessment 2017 Evidence Report)

Climate Change Adaptation

Climate change adaptation seeks to lower the risks posed by the consequences of climatic changes.

Adaptation measures may be planned in advance or put in place spontaneously in response to a local pressure. They include large-scale infrastructure changes – such as building defences to protect against sea-level rise or enhancing drainage systems to avoid surface water flooding, as well behavioural shifts such as individuals using less water and adopting sustainable practices, and more households and businesses buying flood insurance.

What you said!

Make it applicable to the individual. Climate change is an abstract concept …people need to understand why it is they should care.

Why Adaptation to Climate Change is Important

By transitioning to a Net Zero status, together with national and international efforts to achieve a 1.5 - 2°C by 2100 trajectory (see **The Paris Agreement** section for further information), we can successfully mitigate the worst impacts of climate change.

However, we are already seeing the substantial impacts of a global temperature rise of just 1°C. Because CO_2 emissions accumulate in the atmosphere (see **Long-lived and Short-lived Greenhouse Gases** for further information) for very long periods of time, continued emissions of these gases leads to continually increasing warming. Warming created by long-lived GHGs is not naturally reversible on the timescale of decades to centuries. We will therefore experience the impacts of climate change from past and current emissions for a long time to come.

The Paris Agreement targets a threshold of well below 2°C, ideally 1.5°C, but current global plans give only a 50% chance of meeting 3°C (UK Committee on Climate Change). It is prudent to plan adaptation strategies for a scenario of 4°C.

Adaptation planning takes time, especially for infrastructure, buildings and the natural environment, which means actions need to be implemented now to avoid 'lock-in' to high levels of risk in 2050 and beyond.

Source: Greenpeace

What is Sustainability?

Sustainability focuses on meeting the needs of the present without compromising the ability of future generations to meet their needs. The concept of sustainability is composed of three pillars:

1. Economic;
2. Environmental; and
3. Social

In other words, ensuring actions we take today are good for profits, the planet, and people.

Sustainable Actions

Presented in these boxes are a number of important steps that we as a city can take to incorporate sustainable methods into our ways of living and working. Further sustainable actions, including Efficient Resource Management and Personal Sustainable Actions are presented in relation to Energy (**here**), Transport (**here**) and Sustainability (**here**).

Delivering Sustainability through the Planning Process

Our Planning Policy framework must guide, enable, support and require sustainable development to deliver our Net Zero aims.

Guidance for Low Carbon Retrofitting

By December 2020, we will produce a Planning Process Note for property owners that sets out a summary of the key planning policies that enable sustainable development and a simple guide to streamlining an application for various low carbon and sustainable initiatives for both new builds and retrofitting existing properties. This guidance will address Permitted Development rights, presumptions in favour of sustainable developments, and how further advice can be sought.

Draft Sustainability Guidance for New Developments

Newcastle City Council has prepared a Draft Sustainability Guidance (link **here**) which provides guidance on the approach to sustainable design and construction for residential, non-residential and mixed-use developments in accordance with the requirements set out in Policy CS16 (Climate Change) of the Core Strategy and Urban Core Plan (CSUCP) - link **here**.

Over the coming months and years, we intend to strengthen our local planning policy and ensure full adherence by developers to the detailed Climate Change requirements set out in Policy CS16. In determining applications for new developments, we will ensure that:

- Council requirements are linked to national guidance and the requirements cannot be negotiated down in discussion with developers; and
- The Council will proactively support where possible developers to deliver innovative low carbon or sustainable solutions, where necessary.

Sustainable Procurement

Newcastle City Council has embedded Social Value at the heart of its Commissioning and Procurement Plan. One of the four core components of Social Value in the plan is 'Green and Sustainable' procurement.

Through their procurement and supply chains, we want to encourage city businesses to think about:

- Resources they use and how these can be reduced or improved
- Local and sustainable sourcing of materials
- Training and awareness raising within the organisation and in the wider community
- Investment in green spaces and the local built environment

By December 2020, we will produce a Green and Sustainable Procurement guidance document for our city's businesses.

Sustainable Travel Plans

Sustainable Travel Plans are a low cost and effective way of making dramatic reductions in our city-wide emissions.

By December 2020, we will produce a template and guidance document for preparing a Sustainable Travel Plan. These will be tailored to specific audiences / users as follows:

- Businesses and organisations
- Personal
- Schools

Sustainable Construction

The construction industry is a big user of natural resources in construction raw materials (such as concrete, steel and glass), equipment usage (such as cranes, excavators, etc), fabrication, as well as the future building fuel type and operation. The goals of sustainable construction are to reduce the industry's impact on the environment. Sustainable construction methods include:

- Using renewable and recyclable resources
- Reducing energy consumption and waste
- Creating a healthy, environmentally-friendly environment
- Protecting the natural environment

Reducing emissions throughout the construction lifecycle should be encouraged and supported through the design and specification of buildings, materials selection, construction methods, etc. We will work with designers, architects, engineers and contractors to encourage increasing use of low carbon approaches and materials in design, construction and operations of new buildings.

Further information on sustainable construction methods is available **here**.

Climate Change Vulnerability

The National Climate Change Risk Assessment

The UK Government is required, under the 2008 Climate Change Act, to publish a Climate Change Risk Assessment (CCRA) every five years. The assessment sets out the risks and opportunities facing the UK from climate change. The first risk assessment was published in 2012, and the second in 2017. The third is due in 2022.

The six key national priority risk areas are:

1. Flooding and coastal change risks to communities, businesses and infrastructure
2. Risks to health, well-being and productivity from high temperatures
3. Risks of shortages in the public water supply, and for agriculture, energy generation and industry, with impacts on freshwater ecology
4. Risks to natural capital, including terrestrial, coastal, marine and freshwater ecosystems, soils and biodiversity
5. Risks to domestic and international food production and trade
6. New and emerging pests and diseases, and invasive non-natives-pecies, affecting people, plants and animals

Councillor Karen Kilgour

Cabinet Member for Health and Social Care

Social care is a frontline essential service and we are committed to playing a crucial role in helping the city to change. Climate change affects everyone and we must work together to strive for a healthy, safe and sustainable world.

Climate Change Risks and Public Health

The increased risk of extreme weather and other events that are exacerbated by climate change, such as rainfall, heatwaves, food supply and the spread of some infectious diseases, will have an adverse effect on health of our city residents.

Extreme weather events have and will continue to pose significant risks to health and social care services as people who are affected seek support but also as the services themselves are impacted, for example, by flooding of essential buildings or overheating of care homes.

The weather plays an important role in the health and wellbeing for people with existing medical conditions and those at increased risk of infection. This includes people over 75 and those with chronic respiratory disease, due to increased levels of ozone causing breathing problems, trapping of pollution in still, hot weather, and impacts on fuel poverty and living conditions.

Professor Hayley Fowler

Professor of Climate Change Impacts (Newcastle University) and Co-Chair of Newcastle's city-wide Net Zero Taskforce

The world has warmed 1.1°C since pre-industrial times causing increases in extreme weather events such as heavy rainstorms, flooding, heatwaves, droughts, forest fires, and air pollution incidents. Further warming is predicted to make these extreme events worse.

Natural Hazards for Newcastle

As part of the Civil Contingencies Act, Newcastle City Council is required to identify the risk factors for the city and to build resilience within the city for addressing both natural hazards and malicious threats. The National Risk Register forms the framework for our Local Risk Assessment which is issued every 2 years and looks ahead by 5 years.

The most prevalent natural hazards for the city are expected to be:

1. Severe weather such as:
   - Storms and gales
   - Low temperatures and heavy snow
   - Heat waves
   - Drought
2. Flooding arising from:
   - Banks bursting from the River Tyne
   - Surface water and drainage flooding
   - Coastal and tidal flooding

There are a number of natural hazards that will be exacerbated by climate change which will impact on Newcastle residents, businesses and the city's infrastructure. For example, the latest UK Climate Projections (2019) are for sea level rises of up to 0.9m in the North Sea by 2100. The River Tyne is tidal and Newcastle's Quayside is already vulnerable to rising sea levels.

By understanding the key natural hazards that may impact on the city and how they will develop over the coming years and decades, we can develop tailored and effective response plans and design suitable mitigation and adaptation options.

Recent Extreme Weather Events

Toon Monsoon and Thunder Thursday, June 2012

A flash flood event that overwhelmed the drainage networks and created extreme volumes of surface water flooding.

Around 500 domestic (residential) properties were flooded internally and over 50 non-domestic properties affected.

In addition to causing major economic disruption, the event also caused direct damages estimated at £70-80m within Newcastle.

There were also a number of other extreme weather events in 2012.

North Sea Tidal Surge, December 2013

A tidal surge from the North Sea affected the Quayside and flooded over 25 properties.

Climate change is affecting sea levels and these may impact the Quayside in the future.

Costs for repairing damage to roads and pavements at the end of 2013 required £4m.

Beast from the East, February 2018

A Siberian storm that hit the east coast of the UK with several days of sub-zero temperatures and heavy snow affecting city-wide operations.

Hundreds of schools were forced to close and commuters faced travel mayhem due to the treacherous conditions.

Planning and Responding to Extreme Events

Prevention, mitigation and adaptation are key parts of the risk mitigation process. We must determine what we can do within the city to mitigate the existing impacts that we are experiencing from natural hazards, and identify how we can best adapt for increasing severity and frequency of impacts from natural hazards due to climate change.

Weather Preparedness

Being prepared for extreme weather events and building our city-wide resilience to natural hazards is crucial. There are a number of national tools we use to this end including:

1. Hazard Manager - a service provided by the Met Office which provides real-time meteorological information to monitor weather patterns. For example, we can track and forecast for incoming storms, identify risks of lightning strikes and heavy snow. This allows us to prepare our emergency response to weather events.
2. Heat Health Reports - we have access to reports from the Met Office giving advice on whether we will hit particular regional thresholds in the NHS Heatwave Plan for England. This allows us to prepare for the public health impacts of heatwaves.
3. Cold Weather Reports - we have access to cold weather health watch reports which send out alerts when temperatures and other winter weather threats such as ice and snow may affect people's health and safety.

Alison McDowell

Director of Adult Social Care and Integrated Services, Newcastle City Council

It is well documented that climate change is one of the biggest public health threats of this century; our Health and Social Care organisations are already considering how to respond and prepare for the changes we will all need to make.

Severe Weather Response

Natural hazards will inevitably occur and we must prepare to manage these events when they happen to protect our city residents and infrastructure.

Major Incidents Plan

We have a city-wide Major Incidents Plan which sets out our response to various severe weather events. The plan details the responsibility structure and escalation routes that the response co-ordination team must take through a series of prioritised communication routes, decision points and actions.

Flood Plan

The Council's Flood Plan document sets out roles and responsibilities for service areas during a flood incident as well as operational requirements for flood assets and locations around the city that are liable to fluvial flooding.

Local Resilience Forum

Under the Civil Contingences Act, the Council is required to work in partnership with Northumbria's Local Resilience Forum (LRF). While the LRF covers a wider geography then just Newcastle, in the event of a major incident occurring the city, the partners would come together to support a multi-agency response.

Future Climate Change Adapation Research

In order to prepare and design suitable adapation measures for future climate change risks and natural hazards, we will need to continue to review and incorporate research into our designs, specifications and planning. The good news is that we have world-leading research institutions in the city which will enable us to assess with greater accuracy future climate change risks in advance, and to undertake real-time monitoring of the environment. Research forums and projects include the following:

- ***PYRAMID Project***
  Newcastle University have secured funding to deliver a project to use real-time urban environmental monitoring networks to capture, manage and be prepared for flood events.
- ***Blue Green Cities Project***
  Newcastle was selected as a demonstration city for this wide ranging academic project, focussing on the opportunities to retrofit Sustainable Urban Drainage (SuDS) into an established urban environment to provide long term resilience to the effects of climate change. The project draws together academics, risk management authorities and other key stakeholders and develops real world applications for the research findings. This multi-organisational and interdisciplinary group recognises that it is only through partnership and collaboration that the major changes to the urban landscape required to meet the climate change challenge can be achieved.
- ***National Hazards Partnership***
  The National Hazards Partnership is a joint collaboration between many leading public and research organisations which report on different types of hazards, allow for sharing of knowledge, ideas and expertise, and provide advice to Government and emergency responders for disaster response. We will continue to actively engage and learn from this partnership.

Climate Change Adaptation

Building Climate Change Resilience

To adapt to the worst impacts of climate change, we must work to build resilience into our city infrastructure and future developments. The approach to building climate change resilience is set out through various plans and assessments, including the following:

Cold Weather Plan

We are currently finalising a Newcastle Cold Weather Plan, to identify and define the procedures and workstreams required to implement the National Cold Weather Plan for England most effectively in the city.

Heatwave Plan for England

We use the Heatwave Plan for England to prepare for, alert people to, and prevent, the major avoidable effects on health during periods of severe heat in England. Northumbrian Water also have an up-to-date Drought Plan (link **here**).

Local Flood Risk Management Plan (link **here**)

Newcastle City Council, Northumbrian Water and the Environment Agency work together to manage flooding in the city. Newcastle and our partners are accounting, planning and making significant investments in Newcastle to reduce flooding risks that will only increase as a consequence of climate change.

The Local Flood Risk Management Plan explains our objectives for managing flood risk in the city and the activities that need to take place to allow that to happen in a sustainable way.

The Environment Agency has prepared maps showing the areas at risk of flooding from several causes. The areas are identified using predicted water levels and take the location, type and condition of any flood defences and ground levels into account, whether or not they are currently shown on the flood map for the city.

The maps are only a guide to the extent of flooding. Flooding is influenced by many variables including where a rainstorm occurs, the characteristics of the drainage catchment, variations in rain over a wide area, how wet the ground is already and if the rivers are full from a previous storm.

Newcastle Strategic Flood Risk Assessment (link **here**)

Local Planning Authorities (LPAs) are required to take a lead role in local flood risk and development planning in order to demonstrate that sufficient consideration has been given to flood risk at all stages of the planning process, and to avoid inappropriate development in higher flood risk areas.

The Strategic Flood Risk Assessment presents a summary of flood risk from all sources to groups of strategic development sites within the city. An outline flood risk mitigation strategy for Newcastle has also been prepared.

Climate change is expected to cause increased impacts in Newcastle due to:

- Increases in tidal levels due to global sea level rise
- Increasing flood flows and surface water run-off as rainfall intensifies
- Changes in the frequency, duration and severity of storm events.

Newcastle Surface Water Management Plan (link **here**)

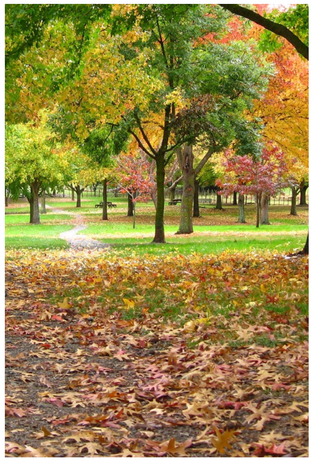
The Council, Northumbrian Water and the Environment Agency produced an integrated plan that models flood risk in the city centre from all sources, allowing for climate change projections, and identifies mitigation opportunities. The plan includes a high level cost benefit exercise and estimates funding available and potential contributors.

The plan is currently being used as a baseline for developing a more detailed investment strategy for climate change adaptation related to flooding for the city.

Quayside Barrier Project

Over the past few years, in response to severe flood events, a city-wide partnership is currently developing options for enhancing flood defences along the Quayside to replace the temporary barriers that have been used as a defence mechanism to date. Works are at an early stage of concept development at present and further details are expected to come forward in the coming months.

Green Spaces



Green infrastructure comprises a range of multifunctional green spaces and inter-connecting links between areas. Green infrastructure features include: wildlife sites; parks and gardens; areas of countryside; woodland and street trees; allotments and agricultural land; open spaces including outdoor sport and recreation provision; footpaths, cycle paths and bridleways; and ponds, river corridors and lakes that enable the migration and movement of species and people.

Why Green Space is important

Green spaces help make our city resilient to climate change and achieve our Net Zero commitment. The preservation and enhancement of green space and the planting of trees acts as both a contributor to **Carbon Offsetting** and **Carbon Insetting** through negative emissions from natural carbon sequestration, and also by avoiding the green spaces being turned over to alternative uses (e.g. roads, buildings, etc) and their associated emissions.

Additionally, they bring a host of wider benefits to people's lives: improving air quality, providing habitat for urban ecology, mitigating both flooding and the urban heat island effect, and making cycling and walking even more attractive.

National and local planning policies set out the importance of protecting and enhancing green infrastructure, as well as addressing the issue of biodiversity loss.

Protecting and Enhancing Green Spaces

The city's green space is protected and enhanced through a range of policies and measures, including:

- The Council's Local Plan – the Core Strategy and Urban Core Plan (CSUCP) includes policies on green infrastructure and the natural environment.
- The Development and Allocations Plan (DAP) includes policies on protecting and enhancing green infrastructure, trees and landscaping, biodiversity and habitats and protecting and providing for all types of open spaces.
- The current joint Newcastle and North Tyneside Biodiversity Action Plan (link **here**) is a 10 year vision for the protection and enhancement of biodiversity in Newcastle and North Tyneside. It was adopted in 2012 and will be reviewed over the coming year to assess the status of the area's priority habitats and species and create a new vision to safeguard and enhance the biodiversity of Newcastle and North Tyneside.
- Supporting documents and plans include the Green Infrastructure Strategy (2011), Green Infrastructure Delivery Framework (2018/19) and the Newcastle Open Space Assessment (2018).

To ensure that Newcastle has sufficient provision of open spaces and green infrastructure going forward, an Open Spaces and Green Infrastructure Strategy will be prepared.

Newcastle's Tree Inventory

Before we can consider the future of our tree stock we need to know what we have now. A city- wide iTree Eco Study of canopy cover, inventory of trees on Council land and an Eco Study for the whole city has been conducted. The study findings are shown below:

- 150.7 hectares of canopy cover - 18.1% (national average 17%; target 20% by 2050.
- 213,778 trees in the Council's inventory, with 187 species recorded
- 5,684 tonnes of CO_2(e) per year are sequestered by Council managed trees.
- The total benefits, including social value, of the Council's tree stock is estimated at over £14m per year.

Nature-based Carbon Sequestration Solutions

Nature-based Solutions for Carbon Sequestration

Nature-based solutions harness the power of nature to reduce greenhouse gas emissions and also help us adapt to the impacts of climate change. They are win-win solutions that involve protecting, restoring and sustainably managing ecosystems to address society's challenges and promote human well-being.

Forests, woodlands and trees are probably the most well-known nature-based solutions for climate change, but there are many more, including: peatlands; mangroves; wetlands; savannahs; coral reefs; and other landscapes.

Tree Strategy (April 2019) - link here

Newcastle City Council's Tree Strategy demonstrates its commitment to caring for the trees under its management and to increasing the number across the city. The strategy sets out a methodology to take stock of the existing tree population and how those trees will be maintained.

It includes a commitment to increase the canopy cover across the city from the existing 18.1% to 20% by 2050, equating to a total increase in numbers of over 19,000 trees. Where possible, and if successful with upcoming proposals, we will seek to exceed the 20% by 2050 canopy level cover both in cover and in delivery timeframes.

The overall objective is for Newcastle to have a sustainable and increasing tree population which is diverse in variety and species that will bring benefits of all who live, work and visit the city, whilst simultaneously sequestering CO_2 from the atmosphere.

> **What you said!**
>
> Planting trees is a simple, low-cost way to store carbon dioxide whilst making the city a more desirable place to be.

North East Community Forest / Trees for Climate Programme

Newcastle City Council is leading and coordinating a bid to the Trees for Climate Programme with six other local authorities in the North East of England to deliver a proposed North East Community Forest (NECF). The bid will be submitted in August 2020, and if successful, woodland and tree creation could be available as soon as this year.

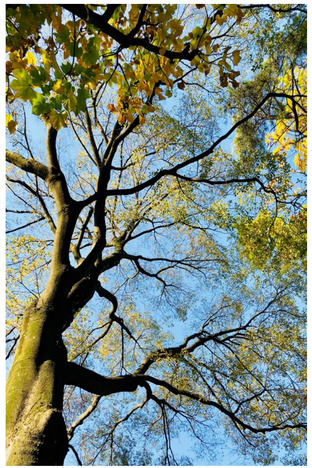
We have teamed up with the likes of the Woodland Trust, Northumberland Wildlife Trust, Durham Wildlife Trust, Forestry Commission and Urban Green Newcastle. Additional partners and stakeholders are already on board, with more being pursued.

If successful with the bid, the NECF should deliver 750 hectares of tree planting over 5 years, wihch would equate to 250,000 tonnes CO_2 captured over the 5 year period.

Urban Tree Challenge Fund

The Council was successful in receiving a grant from the Urban Tree Challenge Fund in the first round of 2019/20. We have applied for a further grant in round two, the results of which will be announced later this year.

560 trees were planted and up to 360 more are planned in the first round. 10,000 trees are planned to be planted through the second round.



Efficient Resource Management

The Benefits of Efficient Resource Management

The benefits of efficient resource management are greater than simply reducing emissions arising from the manufacturing, transportation, use, disposal and processing of waste.

By thinking differently about how we manage resources and what we throw away we can generate many benefits to the city such as: reducing the number of heavy-load vehicles on our roads; alleviating congestion and improving air quality; avoiding plastic entering our watercourses and oceans; ecological and biodiversity damage; and creating partnerships between organisations to derive value from our waste in a local, circular economy.

The Circular Economy

Part of the our city-wide strategy is to support the development of a 'circular economy'. This is where resources, such as plastic, are kept in use for as long as possible. We extract maximum value from them whilst they are in use, then recover and regenerate products and materials instead of throwing them away.

A practical local example is how plants and vegetation grow, produce green waste that is converted into compost and then are used to grow more plants and vegetation, all within the city.

This is an alternative to a traditional 'linear economy'. In a linear economy, resources are used to make things, which are then used, and disposed of at the end of their life (the 'make, use, dispose' model). Single-use plastic bottles are a good example of this.

As well as creating new opportunities for growth, a more circular economy will:

- Reduce waste
- Drive greater resource productivity.
- Deliver a more competitive economy.
- Better address emerging resource security / scarcity issues in the future.
- Help reduce the environmental impacts of production and consumption both here and abroad.

Emissions from Waste

Greenhouse gas emissions from the waste sector mainly comprise methane released from landfill sites (90%), with the remainder (10%) from waste water treatment and incineration of waste. Methane is emitted when biodegradable wastes – most importantly food and paper/card – decompose anaerobically (i.e. in the absence of oxygen).

Landfill emissions can be reduced in three ways: creating less waste, sending less waste to landfill and capturing more of the methane released at landfill sites. Increased reuse and recycling and other waste prevention measures are generally low cost and can also contribute to reductions in upstream emissions (e.g. avoiding food waste not only avoids emissions in disposal of that waste, it also avoids emissions in production and processing of the food in the first place).

The Newcastle Waste Strategy - link here

The Newcastle Waste Strategy has a vision for "our Newcastle to be a clean, green and sustainable city that wastes less and recycles more". It includes a Plan of practical actions that have already and will continue to reduce our impact on climate change as well as helping to reduce the city's carbon footprint.

We want to inspire individuals and organisations to take responsibility for changing their behaviour around the waste of any resource and to be proud of their communities and the environment we live in.

Efficient Resource Management *(continued)*

Carbon Reduction through Existing Waste Management Actions

The ambitious Waste Strategy Action Plan supports the Council's approach on climate change as well as helping to reduce the city's carbon footprint. Actions already taken to reduce the carbon footprint and environmental impact of Newcastle's waste include:

- '***Your city, your home***', a city-wide multimedia campaign, with regular videos achieving hundreds of thousands of hits on social media delivering real behaviour change.
- The '***Spring clean***' dedicated operational team cleaned up lots of local hot spots.
- We now have 'Smart' litter bins, with sensors, allowing real time reporting of how full they are, reducing overflowing and making collections smarter too.
- Our new vehicles meet the latest emissions requirements and include electric bin-lifts, reducing our carbon footprint.
- Residents and trade customers can now recycle more plastics including pots, tubs and trays, and we reduced vehicle travel by 30,000 miles a year meaning less emissions.
- We recycle more in our own buildings.
- We've listened to residents and changed collections including 'opt in' pilots for recycling to make putting the right waste in the right place easier.
- Working with our current disposal contractors resulted in an additional 10,000 tonnes of waste being diverted away from landfill last year, saving 5,600 tonnes of $CO_2(e)$.

Christine Herriot

Director of Operations and Regulatory Services

I am committed to ensuring that our services are undertaken in the most environmentally effective and sustainable way. Our overarching aim is to minimise any negative impact that our activities may have on the environment, as well as reducing pollution, ensuring compliance with relevant legislation and continually improving our environmental performance to underpin our Net Zero Carbon ambitions and objectives. .

Further Improvements to Efficient Resource Management

The following sub-sections set out actions that we are taking as a city to improve the efficiency of resource management and move towards an increasingly circular economy.

Waste

Going forwards, we're working with businesses and NE1 on experimental schemes to improve waste collection and recycling in the city centre, minimising its environmental impact.

We have also joined forces in a project involving seven North East local authorities on a plan for a new Energy Recovery Facility to treat 'residual waste' that should ensure over 90% of waste is diverted from landfill, delivering improved sustainability and reduced carbon emissions. Through the procurement process, we will be assessing the reduction and / or offsetting of the project's carbon footprint and protection of natural resources such as materials used in the design, construction and operation of the plant, as well as other social value considerations.

"What you said!

Reduce single-use plastic in items such as plastic bags and drinking straws (have plant-based alternatives)."

Efficient Resource Management *(continued)*

Food

British households throw away 7.2 million tonnes of food and drink (the majority of which could have been eaten) worth £12 billion every year (source: WRAP).

Food waste includes surplus food (when too much was purchased, stocked or produced) and food that is not fit for animal or human consumption but which could be used for compost or energy recovery (anaerobic digestion).

Food Newcastle was established in 2013 to coordinate food activities across the city and provide an environment for creating a healthier food culture. Together with Newcastle City Council and wider stakeholders they became members of the Sustainable Food City Network and also produced the Newcastle Food Charter.

A number of specific actions in relation to improving the sustainability of our food supply and food waste is set out in Theme 6 (Environmental Sustainability - Reducing Waste and the Ecological Foopprint of the Food System) of the Newcastle Food Plan - link **here**.

The group are aspiring for zero food waste and encouraging residents, business and the public sector to highly value food. The aim is to address the social and economic issues of food waste in Newcastle, as well as the environmental impacts.

A number of other actions were proposed and taken forward including:

- Minimising domestic food waste by: raising awareness and understanding of food labels (e.g. use by, best before, display until dates); planning what to buy; correct food storage; portioning and use of left overs.
- Reducing food waste in public sector catering.
- Supporting community composting initiatives.
- Minimising edible food going to landfill through city-wide programmes.

These programmes shall be supported and wherever there's potential, enhanced. We also encourage residents to consider the sustainability of their food and consider reducing meat consumption and to source food locally wherever possible.

"What you said!

Change to diet is essential. The CO_2 cost of traditional meat and dairy production is a huge contributor to overall CO_2 output. New evidence has revealed that the CO_2 cost of production of food is far great than the CO_2 cost of transportation, so even locally produced meat may not be better than vegetables from further away."

Water

Every 5 years, Northumbrian Water develop a Water Resource Management Plan (WRMP) setting out providing reliable and sustainable water supplies to our customers. The latest version of the WRMP covers the planning period 2020 - 2025 (link **here**).

The plan forecasts how much water Northumbrian Water will have available to supply their customers, taking account of future droughts, climate change and the need to protect the environment.

The forecasts show that there will be reliable and sufficient supplies of water to meet customer demand over the planning period, however, we must still ensure we use water efficiently. A key component of the improving resource efficiency relates to reducing leakage from the water pipes and providing advice to customers on how they can reduce the amount of water that they use.

Northumbrian Water are currently working with three organisations (Cenergist, AgilityEco and National Energy Action) on separate programmes that aim to deliver water saving advice and product installation in conjunction with energy saving initiatives already underway.

Further information on Northumbrian Water's Net Zero carbon emissions target for 2030 and Public Interest Commitment are included on the website (link **here**).

Personal Sustainable Actions in Your Daily Life

Sustainability in daily life
Changing a few daily activities to adopt more sustainable options can be beneficial for your local environment, save you money, make you healthier and support the transition to Net Zero Newcastle.

Listed below are a few ideas for sustainable actions in your dialy life.

Make a Personal Sustainable Travel Plan

Make a Personal Sustainable Travel Plan using the template here.

Reduce, Reuse, Recycle

Following the waste hierarchy of Reduce, Reuse and Recycle will help reduce the amount of waste you generate and thereby avoiding the emissions created during production, transportation and processing the waste.

Reduce your plastic footprint

Simple changes can make a huge difference to how much single use plastic you generate. WWF have a good set of recommended actions (link here). Why not try buying from zero waste shops such as NE Living in Grainger Market and Everything Good in Jesmond (other shops are available).

Take a reusable shopping bag (Bag for Life) to the shops

We use 5 trillion plastics bags a year globally. That's 700 a year per person - less than 1% are recycled (source: The World Counts). Carrying a small reusable shopping bag whenever you leave the house means you won't need to accept a plastic bag for an impromptu purchase.

Reduce your meat consumption

You don't have to go vegetarian or vegan to make a difference - you can cut down on meat gradually.

By reducing your consumption of animal protein by half, you can cut your diet's carbon footprint by more than 40% (source: World Resources Institute - link here).

Conserve water and energy

Fitting a water meter at your property could save you money by making sure you only pay for what you use. It will not save energy on its own, but it might help you and your household to waste less water and reduce energy costs through having to heat less water for showers etc. Other energy conservation ideas are detailed here.

Shop locally

Everything we buy has a carbon footprint, either in the way it is produced or in how it is transported.

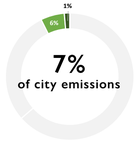
By shopping locally, you are helping to cut down on the emissions associated with travel miles of that product, and you're supporting a local 'circular' economy.

Ecotourism and offsetting

Try ecotourism for your next holiday or getaway. Look out for Ecolabelled accommodation. Another resource in your toolbox to compensate that unavoidable flight or car trip is to consider offsetting your emissions with a trusted green project – look out for a Newcastle based insetting project in the near future (link here).

PRIORITY ACTIONS

The priority actions set out on these pages reflect our collective city-wide approach to delivering Sustainability and Adaptation measures and contributing towards delivering a Net Zero Newcastle by 2030.



A&S1
Produce a guidance document for property owners that sets out a summary of the key planning policies that enable sustainable development and a simple guide to streamlining an application for low carbon initiatives.

A&S2
Produce a Green and Sustainable Procurement guidance document for our city's businesses.

A&S3
Produce a template and guidance document for preparing a Sustainable Travel Plan, tailored to specific audiences / users.

A&S4
Develop a Climate Change Adaptation Working Group including city organisations to identify key climate change risks and develop targeted and effective preparation, development and adaptation activities.

A&S5
Prepare a Cold Weather Plan for Newcastle to address the city's response to protect residents and infrastructure from increasing severity and frequency of extreme weather events due to climate change.

A&S6
Work with city-wide partners and stakeholders to develop a plan for enhancing flood defences along the Quayside to replace the temporary barriers that have been used as a defence mechanism to date.

A&S7
Ensure that Newcastle has sufficient provision of open spaces and green infrastructure going forward. An Open Spaces and Green Infrastructure Strategy will be prepared.

A&S8
Submit a high quality bid to the Trees for Climate Programme to deliver a proposed North East Community Forest (NECF). If successful, start woodland and tree creation at the earliest opportunity.

A&S9
If successful in the Urban Tree Challenge Fund, start woodland and tree creation at the earliest opportunity.

A&S10
Implement low carbon measures and efficient resource management actions set out in the Waste Strategy Action Plan.

A&S11
Working with businesses and NE1 on experimental schemes to improve waste collection and recycling in the city centre, minimising its environmental impact.

A&S12
Continue working to deliver the Energy Recovery Facility to treat 'residual waste' that should ensure over 90% of waste is diverted from landfill, delivering improved sustainability and reduced carbon emissions.

A&S13
Develop plans to improve efficiency of resource management through waste (including food waste), water, materials and other resources, particularly where a circular economy can be achieved.

A&S14
Communicate personal sustainable actions to city residents to encourage significant uptake.

A&S15
Work with project partners to develop an investment strategy which better protects Newcastle city centre from surface water flooding, taking into account climate change projections.

A&S16
Meet Newcastle's target to better protect 578 households, including 358 currently at significant risk and 250 in the 20% most deprived areas, from surface water flooding by March 2026.

A&S17
When the Council divests of land and property, encourage sustainable development options on the sites, such as sustainable construction methods and materials, low carbon heat and electricity sources, etc.

A&S18
Continue developing new plans to adapt to climate change effects including hot weather plans and surface water flooding plans. Ensure best climate change practice is captured, including green-blue linkages.

A&S19
Prepare comprehensive response to the Planning White Paper with city-wide position on incorporating green infrastructure and active travel infrastructure into new developments.

A&S20
Use the tools at our disposal to promote our key 'Asks of Government' (see orange box to the right) either directly to decision makers, through consultations, or via collective advocacy groups.

Professor Hayley Fowler

Professor of Climate Change Impacts (Newcastle University) and Co-Chair of Newcastle's city-wide Net Zero Taskforce

We need to make our communities resilient to climate change and increasing extreme weather events, but with low-carbon technological solutions that embrace green growth and sustainability.

Asks of Government

1. Embed a commitment that developers must ensure open space, tree planting and the money to maintain those trees into the future in national planning policy.
2. Provide more support for other nature-based solutions than trees for mitigating and adapting to climate change
3. Raise the profile of green infrastructure and set out a spending programme to address inequalities and deficiencies.
4. Government to provide additional targeted funding for climate change adaptation programmes to improve community climate resilience, particularly to extreme events.

Part Four:
TIMELINE

TIMELINE

Set out in this part of the Action Plan are more detailed timelines and key details that are proposed to be taken in order to deliver the identified Priority Actions set out in Parts 1, 2 and 3.

For each Priority Action, the following key information is presented:

- ***Delivery Timeframe*** - there are four timeframe categories:
  - By COP26 - actions to be completed by the Glasgow UN Climate Change Conference of the Parties (COP26) in Glasgow in November 2021
  - Short Term - from November 2021 until end of 2023
  - Medium Term - from beginning of 2024 to end of 2027
  - Long Term - from beginning of 2028 to end of 2030
- ***Estimated Cost*** - there are four cost categories:
  - No Cost
  - Low Cost - less than £50,000
  - Medium Cost - greater than £50,000 but less than £5,000,000
  - High Cost - greater than £5,000,000
- ***Performance Indicator*** - the performance indicator provides a short summary of the key deliverable or deliverables that would consitute completion (or substantial completion) of the Priority Action.
- ***Responsible Party / Parties*** - a short list of a select number of key organisations, groups or key stakeholders who are expected to lead the Priority Action and / or are considered important to the Priority Action achieving a successful outcome.

Some of the Priority Actions will be continuous and may extend beyond the Delivery Timeframe shown. The Delivery Timeframe shown refelects when the key steps towards the action implementation have been completed.

Some of the funds in the Estimated Costs category have already been secured however the vast majority (in excess of 90%) have not yet been secured. In some cases, bids for funding have been submitted and the result is pending.

The Estimated Costs include costs both for undertaking the specific planning works or preparatory activities set out in the Priority Action as well as the funding to deliver the capital programme required to see the Priority Action through to its full implementation. For the largest regional capital programmes, namely the Metro rolling stock replacement which is part of a £362 million investment programme and the £2.2 billion Energy Recovery Facility in Teeside, the full costs are not captured in the Estimated Costs.

Section of 'Net Zero Newcastle - 2030 Action Plan'	Priority Action		Delivery Timeframe				Estimated Cost						
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Part 1 (Introduction) and Part 2 (Developing the Plan)	A1	Develop list of carbon offset opportunities taking into account the key considerations set out in Key Considerations for Carbon Offsetting.					£				Initial list produced and published	Newcastle City Council
	A2	Ensure that representatives on the Tyne and Wear Pensions Fund continue to lobby for further disinvestment in fossil fuels.					£				Commitment and agreed actions from Tyne and Wear Pension Fund	Newcastle City Council and Tyne and Wear Pensions Fund
	A3	Explore whether a city-scale carbon insetting programme would be suitable for Newcastle, and gauge interest from local organisations, businesses and residents.						£			Feasibility study conducted and published	Newcastle City Council
	A4	Further develop Key Performance Indicators and Local Metrics of Performance.					£				Initial list produced and published	Newcastle City Council, Newcastle University and Northumbria University
	A5	Continue to engage with all members of the city through the Climate Change Convention. Hold additional Climate Change Summits, including a Youth Summit.					£				Climate Change Summits held	Newcastle City Council
	A6	Improve over time local emission monitoring (either directly or via indicators) to improve the accuracy of Newcastle's emissions inventory.						£			Improvements to be logged via the CDP emission disclosure platform	Newcastle City Council, Newcastle University and Northumbria University
	A7	Promote and encourage uptake of the Net Zero Pledge and associated local low carbon action by city residents and businesses.						£			Number of Net Zero Pledges by category (individual, young people and businesses)	Newcastle City Council and all city residents, young people and businesses
	A8	Prepare for and seek to implement as many Net Zero projects as possible by COP-26 in November 2021 to demonstrate Newcastle's climate leadership.					£				Number of priority actions completed by COP26 in November 2021	All responsible parties
	A9	Continue to engage at local, regional, national and international forums to learn lessons, access funding and deliver resources to key Net Zero actions.					£				Continuous action - no defined performance indicator	All responsible parties
	A10	Engage with local and regional businesses and business forums on Green Growth and how best to maximise the benefits to the city.						£			Local business engagement analysis and potentially output from NELEP (or alternative) low carbon sector studies	Newcastle City Council, North of Tyne Combined Authority, North East Local Enterprise Partnership, Newcastle Gateshead Initiative / Invest Newcastle, NETI, among others
	A11	Engage in and promote new forums and routes for research, development, innovation and pilot programmes in the low carbon sector across the city.							£		Secured low carbon research funding	Newcastle City Council, Newcastle University, Northumbria University, local businesses, among others
	A12	Work with city higher education providers and education partners to prepare for, and support, a low carbon skills transition.							£		Number of training programmes, training providers and courses run in low carbon skills and potentially output from skills analysis conducted as part of NELEP (or alternative) low carbon sector studies	Newcastle College Group, Newcastle University, Northumbria University, North of Tyne Combined Authority, Newcastle City Council and local training and skills providers
	A13	Provide business support to SMEs in the city through a Green Growth delivery strand of the Business and IP Centre (BIPC) Newcastle.							£		Establishment of Green Growth delivery strand and establishment of provision of service	Newcastle City Council, North of Tyne Combined Authority, North East Local Enterprise Partnership, Newcastle Gateshead Initiative / Invest Newcastle, NETI, among others
	A14	Actively promote climate change action, learning, research, idea generation and leadership through the Students in Newcastle Forum (SNF).					£				Initial engagement and feedback from SNF, and established ongoing programme of engagement	Newcastle University, Northumbria University and Newcastle City Council
	A15	Each January, prepare an annual update for the previous year, and a concise forward plan for the next year of actions taken through the Net Zero Newcastle programme.					£				Annual update prepared and published	Newcastle City Council (with input from city partners)
	A16	Monitor, prepare for and submit grant and other funding applications to deliver on the city's Net Zero commitment, with an immediate priority to stimulate economic growth and job retention and creation.								£	Secured grant and other funding	Newcastle City Council, Newcastle University, Northumbria University, Newcastle upon Tyne Hospitals NHS Foundation Trust, local businesses, among others
	A17	Support city partners in making successful applications for grant, research and other funding.								£	Secured low carbon research funding	Newcastle City Council, Newcastle University, Northumbria University, local businesses, among others
	A18	Look beyond grant funding by working with public and private sector partners to develop pathways to commercial deployment and mass roll-out of low carbon measures.							£		establish business cases 'for investment-grade low carbon interventions and identficaiton of routes to non-grant funded commercial deployment	All responsible parties
	A19	Working with the Youth Democracy Group (formerly the Youth Council), a Climate Change Youth Summit will be arranged.						£			Climate Change Youth Summit held	Newcastle City Council
	A20	Explore opportunities to engage with school age children on Climate Change issues and solutions through the curriculum, by providing hands on Net Zero project ideas and supporting in their delivery.						£			Initial delivery programme prepared and published	Newcastle City Council and local schools
	A21	A Net Zero Champions approach to communicating key messages will be considered by the Citizen's Assembly.					£				Feedback from Citizen's Assembly	Citizen's Assembly / North of Tyne Combined Authority
	A22	Work with trade unions, city-wide businesses and employers and business forums to support the transition to a low carbon / green economy in the city.					£				Local business engagement analysis and potentially output from NELEP (or alternative) low carbon sector studies	Newcastle City Council, trade unions, city-wide businesses and employers and business forums
	A23	Use the tools at our disposal to promote our key 'Asks of Government' (see orange box to the right) either directly to decision makers, through consultations, or via collective advocacy groups.					£				Asks of Government' update in annual report	Newcastle City Council, North of Tyne Combined Authority, North East Local Enterprise Partnership, business forums, among others

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Part 3 (Net Zero Themes) - Theme 1 - Energy	E1	Work with Northern Powergrid and Northern Gas Networks to assess and identify the best route to deliver Net Zero in the energy sector.						£			Periodic updates on progress and market / sector changes to the Climate Change Committee	Newcastle City Council, Northern Powergrid and Northern Gas Network
	E2	Monitor developments in the national and international energy sector to identify new and / or promising emerging technologies and applications to deliver Net Zero.					£				Periodic updates on progress and market / sector changes to the Climate Change Committee	Newcastle City Council and other relevant interested stakeholders
	E3	Continue to work to eliminate fuel poverty through installation of energy efficiency measures and provide ongoing advice and support to fuel poor residents.								£	Maintain record of number of installations completed	Newcastle City Council, Your Homes Newcastle and other housing associations
	E4	Work with private sector partners and housing organisations to deploy available Green Homes Grant and other funding streams to as many properties as possible within the city.								£	Access to Government record of number of applicants to Green Homes Grant	Government / Office of National Statistics
	E5	Engage with the private rented sector to ensure adherence with the Minimum Energy Efficiency Standard (MEES) and support where possible implementation of low carbon measures to deliver EPC improvements.							£		Maintain record of number of installations completed	Newcastle City Council
	E6	Develop Newcastle GREEN (GIS-based Renewable Energy and Energy efficiency Network) website and promote uptake of low carbon measures to all property owners (domestic and non-domestic).						£			Launch of Newcastle GREEN	Newcastle City Council and city partners
	E7	Through the planning process, require and encourage developers to design and build properties that are fit for the future and conform fully with Policy CS16 (Climate Change).					£				Adherence to policy requirements to be checked	Newcastle City Council
	E8	Continue to support local SMEs with access to energy audits and energy grants through the Business Energy Savings Team (BEST) project.							£		BEST project outcome reports	Newcastle City Council and partner authorities in Gateshead, North Tyneside, Northumberland and Sunderland.
	E9	Seek to expand the existing provision to local SMEs to have access to energy audits and energy grants through expansion of the BEST project.							£		Securing additional funding for BEST project	Newcastle City Council and partner authorities in Gateshead, North Tyneside, Northumberland and Sunderland.
	E10	Promote through all suitable means, small scale renewable energy generation and self consumption in domestic and non-domestic properties.							£		Increasing levels of Microgeneration Certified Schemes (MCS) accredited installations	Government / Office of National Statistics and Ofgem
	E11	Apply for funding for a pilot project for a Neighbourhood Virtual Power Plant.						£			Secured grant and / or other funding	Newcastle City Council and partner organisations for pilot project
	E12	Continue to develop world-leading programmes of research and investment into enhanced renewable energy generation and storage and improving efficiency of generation through our universities.							£		Additional research programmes	Newcastle University, Northumbria University and other research bodies
	E13	Encourage uptake of renewable energy by preparing a Planning Process Note which sets out when installations are likely to benefit from Permitted Development and when they will need to secure the necessary planning approvals.						£			Planning Process Note produced and published	Newcastle City Council
	E14	Working with our delivery partner E.ON, deliver the BEIS funded Electrification of Heat Demonstration Project and learn lessons that can be applied in future heat pump roll out projects.							£		Feedback report to BEIS with lessons learned	E.ON and Newcastle City Council
	E15	Develop a delivery plan for wide-scale deployment of heat pumps to homes addressing key barriers such as supply chain issues, training of heat pump engineers, cost reductions, understanding of the technology, etc.						£			Initial delivery plan produced and presented to Climate Change Committee	Newcastle City Council and Northern Powergrid
	E16	Monitor closely developments in the hydrogen sector and the potential for hydrogen to play an increasing role in our Net Zero heat / gas supply future.							£		Periodic updates on progress and market / sector changes to the Climate Change Committee	Newcastle City Council and Northern Gas Network
	E17	Work with Engie through the Regenerate Newcastle Partnership to deliver District Energy Network and associated projects within the city, creating an expanded and increasingly integrated low carbon heat system.								£	Development and delivery of investment-grade District Energy Network projects	Regenerate Newcastle Partnership
	E18	Prepare for and deliver an ambitious programme of Public Sector Decarbonisation of anchor institutions property portfolios via the forthcoming funding mechanism.								£	Development and delivery of investment-grade Public Sector Decarbonisaton projects	Newcastle City Council, Northumbria University, Newcastle University, Newcastle upon Tyne Hospitals NHS Foundation Trust, Newcastle College Group, and other public sector bodies
	E19	Ensure that all new buildings and major capital programmes embed low carbon and renewable heat and electricity measures into their design and construction.							£		Establish and implement minimum requirements and standards for new buildings and capital programmes	Newcastle City Council, Northumbria University, Newcastle University, Newcastle upon Tyne Hospitals NHS Foundation Trust, Newcastle College Group, and other public sector bodies
	E20	Explore options for increasingly smart energy systems which adopt 'time of use' and 'flexible demand' approaches to energy consumption.						£			Initial concept for smart energy systems and applications within city presented to Climate Change Committee	Newcastle University and Newcastle City Council
	E21	In preparing the updated Local Plan, key low carbon and national or international standards will be considered and assessed for suitability to be incorporated into city-wide planning policies.					£				Local Plan published and prepared incorporating low carbon standards	Newcastle City Council
	E22	Use the tools at our disposal to promote our key 'Asks of Government' (see orange box to the right) either directly to decision makers, through consultations, or via collective advocacy groups.					£				Asks of Government' update in annual report	Newcastle City Council, North of Tyne Combined Authority, North East Local Enterprise Partnership, Northern Powergrid and Northern Gas Networks

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Part 3 (Net Zero Themes) - Theme 2 - Transport	T1	Develop detailed plans for a city-wide Low Carbon Transport Vision including 15 Minute City concept, Low Traffic Neighbourhoods and incorporating the Local Cycling and Walking Infrastructure Plan and School Streets initiative.					£				City-wide Low Carbon Transport Vision produced and communicated to Climate Change Committee	Newcastle City Council, Nexus, transport operators, among others
	T2	Assess options and develop a plan for limiting growth in the number of private motorised vehicles in the city, to counter the impacts of population growth.							£		Summary report of options for limiting growth in motorised vehicles presented to Climate Change Committee	Newcastle City Council
	T3	Systematically develop and implement plans to remove private motorised vehicles from the city centre, commercial districts and sensitive part of the city.							£		Air Quality improvement plan produced and communicated to Climate Change Committee	Newcastle City Council
	T4	Implement the Clean Air Zone (category C) using secured funds.								£	Clean Air Zone (Category C) implemented and monitoring report conducted	Newcastle City Council
	T5	Develop and implement an emissions based parking tariff in the city centre and key commercial districts.							£		Parking tariff structure developed and implemented	Newcastle City Council
	T6	Assess the potential for wider deployment of car clubs within the city, based on Ultra Low Emission Vehicles. Ensure that access to travel options is enhanced in communities with low car ownership through community clubs as opposed to household ownership.							£		Plan for wider deployment of ULEV car clubs is prepared and published	Newcastle City Council
	T7	Develop and implement additional School Streets initiatives.							£		Additional School Streets initiatives developed and implemented	Newcastle City Council
	T8	Implement, and where possible enhance, the Healthy Pupil Capital Fund programme.							£		Healthy Pupil Capital Fund programme enhanced and implemented	Newcastle City Council
	T9	Develop and implement schemes to reduce the dominance of cars in the city by reallocating road space to active travel and low carbon transport modes, whilst meeting vibrant high street and Covid-19 requirements.							£		City-wide Low Carbon Transport Vision produced and communicated to Climate Change Committee	Newcastle City Council, Nexus, transport operators, among others
	T10	Implement a safe walking and cycling network to connect every school, to every park, to every district shopping centre, by implementing the key components of our Local Cycling and Walking Infrastructure Plan.								£	City-wide Low Carbon Transport Vision produced and communicated to Climate Change Committee	Newcastle City Council, Nexus, transport operators, among others
	T11	Work with Gateshead Council to implement a 12 month e-Scooter trial. If successful, explore ways to extend and expand the scheme.					£				e-Scooter trial developed and implemented	Newcastle City Council and Gateshead Council
	T12	Prepare a bold, detailed and high quality submission to the Government for the recently announced Zero Carbon City Centre scheme.					£				Submission of Zero Carbon City Centre bid	Newcastle City Council, Nexus, transport operators, city centre businesses and other organisations, among others
	T13	Work with Nexus and other city public transport operators to develop a city-wide plan for further improving transport integration and to develop and implement a Smart Ticketing system using the 'Pop' branded smartcard.							£		City-wide Low Carbon Transport Vision produced and communicated to Climate Change Committee	Newcastle City Council, Nexus, transport operators, among others
	T14	Consider options for expansion of, and new sites for, Park & Ride schemes across the city. Develop and seek funding for Sustainable Park & Ride schemes.								£	City-wide Low Carbon Transport Vision produced and communicated to Climate Change Committee	Newcastle City Council, Nexus, transport operators, among others
	T15	Enhance the information and payment systems available for passenger transport to enable a 'Mobility as a Service' approach to transport integration.							£		Information and payment system improvements for passenger transport implemented	Newcastle City Council, Nexus, transport operators, among others
	T16	Work with bus operators to improve bus lanes and bus priority through better co-ordinated traffic signals on key transport corridors to improve overall public transport networks.							£		City-wide Low Carbon Transport Vision produced and communicated to Climate Change Committee	Newcastle City Council, Nexus, transport operators, among others
	T17	Assess options and the pros and cons of a bus franchising approach.					£				City-wide Low Carbon Transport Vision produced and communicated to Climate Change Committee	Newcastle City Council, Nexus, transport operators, among others
	T18	Promote and support the transition towards ultra-low emission buses, taxis and freight vehicles operating within the city, including options such as cargo bikes.						£			Plan for ultra-low emission buses, taxis and freight vehicles to be prepared and published. Key milestone implementation stages to be presented to Climate Change Committee.	Newcastle City Council, Nexus, transport operators, among others
	T19	If successful in grant funding bid to Office for Low Emissions Vehicles, implement a pilot scheme to provide 23 Electric Vehicle chargers in a number of areas of the city.							£		If successful, implementation of pilot scheme	Newcastle City Council
	T20	Work with the North East Combined Authority (NECA) to renew, replace and expand the Electric Vehicle charging infrastructure across the city.							£		Complete procurement stages of NECA Electric Vehicle charging programme. Key milestone implementation stages to be presented to Climate Change Committee	Newcastle City Council and North East Combined Authority
	T21	Develop an ambitious city-wide plan for the rollout of Electric Vehicle infrastructure across the city. Work with North East Combined Authority to deploy Rapid Chargers, particularly to encourage use by electric taxis.							£		City-wide Low Carbon Transport Vision produced and communicated to Climate Change Committee	Newcastle City Council, Nexus, transport operators, among others
	T22	Work with the North East Freight Partnership and other relevant organisations to move freight away from road transport and to encourage the switch to zero emission vehicles.							£		Road transport and freight action plan to be presented to Climate Change Committee	Newcastle City Council, local businesses, business forums, freight companies, among others
	T23	Develop a plan for the city to implement Freight Consolidation Hubs and low carbon last mile freight deliveries, and assess practical implementation options, as well as seeking funding.							£		Secure funding for Freight Consolidation Hubs. Key milestone implementation stages to be presented to Climate Change Committee	Newcastle City Council
	T24	Support other city low carbon transport projects such as the Metro rolling stock replacement programme, and work with city and regional partners to increase ambition in their transition to Net Zero.					£				Low carbon transport programmes from city and regional partners progressed from feasibility to implementation	City and regional transport organisations
	T25	Ultra Low Emission Buses scheme. Work with bus fleet operators to assess the necessary funding and to implement the infrastructure throughout the city to take 100% of buses to ultra low emission status.							£		Application for necessary funding for buses transition to 100% ultra low emission fleet. Key milestone implementation stages to be presented to Climate Change Committee	Bus operators and Newcastle City Council
	T26	Investigate options for hydrogen to play a future role in public transport in Newcastle.							£		Periodic updates on progress and market / sector changes to the Climate Change Committee	Newcastle City Council and transport operators
	T27	Wherever suitable and appropriate, support the decarbonisation of Out of Boundary Transport Emissions by working with local, regional and national transport organisations.							£		Continuous action - no defined performance indicator	Newcastle International Airport, Transport for the North, National Rail, local maritime sector, among others
	T28	Use the tools at our disposal to promote our key 'Asks of Government' (see orange box to the right) either directly to decision makers, through consultations, or via collective advocacy groups.					£				Asks of Government' update in annual report	Newcastle City Council, North of Tyne Combined Authority, North East Local Enterprise Partnership, Nexus and transport operators

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Part 3 (Net Zero Themes) - Theme 3 - Adaptation and Sustainability	A&S1	Produce a guidance document for property owners that sets out a summary of the key planning policies that enable sustainable development and a simple guide to streamlining an application for low carbon initiatives.					£				Planning Process Note produced and published	Newcastle City Council
	A&S2	Produce a Green and Sustainable Procurement guidance document for our city's businesses.					£				Sustainable Procurement Note produced and published	Newcastle City Council
	A&S3	Produce a template and guidance document for preparing a Sustainable Travel Plan, tailored to specific audiences / users.						£			Sustainable Travel Plan template and guidance document produced and published	Newcastle City Council
	A&S4	Develop a Climate Change Adaptation Working Group including city organisations to identify key climate change risks and develop targeted and effective preparation, development and adaptation activities.					£				Establish Climate Change Adaptation Working Group	Newcastle City Council, Newcastle University, Northumbria University, Environment Agency, Northumbrian Water, Newcastle upon Tyne Hospitals NHS Foundation Trust, Urban Green, business forums, among others
	A&S5	Prepare a Cold Weather Plan for Newcastle to address the city's response to protect residents and infrastructure from increasing severity and frequency of extreme weather events due to climate change.						£			Cold Weather Plan produced and published	Climate Change Adaptation Working Group
	A&S6	Work with city-wide partners and stakeholders to develop a plan for enhancing flood defences along the Quayside to replace the temporary barriers that have been used as a defence mechanism to date.								£	Development of plans and progression of funding application	Environment Agency, Newcastle City Council, Northumbrian Water, NE1 and Groundwork
	A&S7	Ensure that Newcastle has sufficient provision of open spaces and green infrastructure going forward. An Open Spaces and Green Infrastructure Strategy will be prepared.							£		Open Spaces and Green Infrastructure Strategy produced and published	Newcastle City Council and Urban Green
	A&S8	Submit a high quality bid to the Trees for Climate Programme to deliver a proposed North East Community Forest (NECF). If successful, start woodland and tree creation at the earliest opportunity.								£	Submission of North East Community Forest bid	Newcastle City Council, North of Tyne Combined Authority, together with neighbouring local authorities
	A&S9	If successful in the Urban Tree Challenge Fund, start woodland and tree creation at the earliest opportunity.							£		Planting and establishment of trees under the Urban Tree Challenge Fund	Newcastle City Council
	A&S10	Implement low carbon measures and efficient resource management actions set out in the Waste Strategy Action Plan.								£	Waste Strategy Action Plan updates	Newcastle City Council
	A&S11	Working with businesses and NE1 on experimental schemes to improve waste collection and recycling in the city centre, minimising its environmental impact.							£		Waste Strategy Action Plan updates	Newcastle City Council
	A&S12	Continue working to deliver The Energy Recovery Facility to treat 'residual waste' that should ensure over 90% of waste is diverted from landfill, delivering improved sustainability and reduced carbon emissions.								£	Milestone delivery stages of the Energy Recovery Facility procurement and delivery	Newcastle City Council and other involved local authorities
	A&S13	Develop plans to improve efficiency of resource management through waste (including food waste), water, materials and other resources, particularly where a circular economy can be achieved.							£		Increasing number of businesses operating and securing value from the local circular economy	Newcastle City Council, local businesses, business forums, among others
	A&S14	Communicate personal sustainable actions to city residents to encourage significant uptake.					£				Number of Net Zero Pledges by category (individual, young people and businesses)	Newcastle City Council and all city residents, young people and businesses
	A&S15	Work with project partners to develop an investment strategy which better protects Newcastle city centre from surface water flooding, taking into account climate change projections.								£	Surface Water Flooding Investment Strategy produced and published	Climate Change Adaptation Working Group
	A&S16	Meet Newcastle's target to better protect 578 households, including 358 currently at significant risk and 250 in the 20% most deprived areas, from surface water flooding by March 2026.								£	Surface Water Flooding Investment Strategy implementation key milestones	Climate Change Adaptation Working Group
	A&S17	When the Council divests of land and property, encourage sustainable development options on the sites, such as sustainable construction methods and materials, low carbon heat and electricity sources, etc.							£		Inclusion of sustainable development options on divested land and property	Newcastle City Council
	A&S18	Continue developing new plans to adapt to climate change effects including hot weather plans and surface water flooding plans. Ensure best climate change practice is captured, including green-blue linkages.						£			Hot Weather Plan produced and published	Climate Change Adaptation Working Group
	A&S19	Prepare comprehensive response to the Planning White Paper with city-wide position on incorporating green infrastructure and active travel infrastructure into new developments.					£				Submission of consultation response to Planning White Paper	Newcastle City Council
	A&S20	Use the tools at our disposal to promote our key 'Asks of Government' (see orange box to the right) either directly to decision makers, through consultations, or via collective advocacy groups.					£				Asks of Government' update in annual report	Newcastle City Council, North of Tyne Combined Authority, North East Local Enterprise Partnership, Nexus and transport operators

ACKNOWLEDGEMENTS

A wide range of city stakeholders and interested parties have been actively involved in the preparation of this 'Net Zero Newcastle - 2030 Action Plan'. We would like to share our sincere thanks and appreciation with all of the teams and individuals at the following organisations who have shared their insights and expertise.

Newcastle City Council
The Newcastle upon Tyne Hospitals NHS Foundation Trust
Northumbria University NEWCASTLE
Newcastle University
NCG
NEXUS
NHS Cumbria, Northumberland, Tyne and Wear NHS Foundation Trust
NE1
TUC
Your Homes Newcastle
home group
CBI
North East England Chamber of Commerce
NewcastleGateshead Initiative
invest newcastle uk
NORTH OF TYNE COMBINED AUTHORITY
North East Local Enterprise Partnership
Newcastle International Your Airport
sustrans
Connected Voice Connecting People Supporting Action
Northern Gas Networks
NORTHERN POWERGRID
ENGIE
e·on
ClimateView