

Net Zero Aberdeen Routemap

Towards becoming a net zero emissions city by 2045



**net
zero**
Aberdeen



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Executive Summary



Sectors from across the city have co-created a pathway leading the way towards a net zero Aberdeen by 2045. This **Net Zero Aberdeen Routemap** and the accompanying **6 themed strategies** sets out the approach for the journey to a net zero city, aiming to build on the existing foundations of Aberdeen's Net Zero Vision.

A city at the heart of the global energy sector, a just energy transition is a vital priority and can build on knowledge and experience as a world-leader in energy. However Net Zero Aberdeen goes beyond this, spanning the net zero priorities for the city, addressing mobility and buildings, developing a circular economy, protecting and enhancing our natural environment and boosting empowerment. The approach will be iterative and ready to flex to changing drivers and opportunities, expanding new technology, increasing innovation and building skills and capacity.

In developing actions across these themes we can unlock wider benefits for our city, people and economy and in doing so aim to create a greener, cleaner and healthier environment.

Our net zero themes:



Buildings and heat:

reducing energy demand, energy efficiency and transitioning to low and zero carbon heat.



Circular economy:

making better use of valuable resources.



Energy Supply:

increasing decentralised energy, developing green hydrogen, offshore wind; alongside expanding skills and supply chains.



Mobility:

Reducing the demand for travel, moving to low and zero emission vehicles and boosting active travel.



Natural Environment:

Protecting and enhancing nature across the city to avoid emissions from land and to increase carbon stores.



Empowerment:

Setting the means and mechanisms for input, participation and collaboration vital to all the other themes.

Collaboration is key

Strong collaboration has been at the core of these net zero ambitions. Drawing on a range of expertise the routemap and strategies were co-created and drive the direction for collaborative city-wide working to enable a just transition and net zero future. To meet a Net Zero Aberdeen it will be essential to grow this collective input.

Net Zero Aberdeen will sit alongside Aberdeen Adapts: Climate Adaptation Framework. In driving forward to meet city net zero ambitions, we need to build in resilience, taking action to prepare for inevitable changes in climate.

Introduction

1.1. Setting the context

Building on the Net Zero Vision, Net Zero Aberdeen presents the Routemap which sets the pathway for a net zero city by 2045, a journey supported by 6 themed strategies. Reducing global emissions is essential to limit the impact of climate change and addressing the scale and urgency of change, net zero is a key commitment for many.

In Aberdeen these drivers have brought a wide range of organisations together to work collaboratively and co-create Net Zero Aberdeen, with a focus on the city, it’s challenges, expertise, innovations and ambitions.

Recognising the need for a collaborative approach across sectors, the Net Zero Aberdeen Routemap was driven forward and directed by a Net Zero Leadership Board. The supporting strategies, covering Mobility, Buildings and Heat, Circular Economy, Energy Supply, Natural Environment and Empowerment were each developed by a different theme leader within the Net Zero Delivery Unit.

Table 1 - Key drivers behind this Routemap

International
<ul style="list-style-type: none">• Paris Agreement at the UN Climate Conference 2015 (COP21) set a global commitment to limit global warming to well below 2°C, preferably to 1.5°C.• An Intergovernmental Panel on Climate Change (IPCC) special report 2018, highlighted the need for rapid and far-reaching change to reach this target.• IPCC special report 2021, unequivocally confirms climate change is human induced, widespread, rapid and intensifying; ‘Code Red for humanity’.• Countries adopted the “Glasgow Climate Pact”, at the UN Climate Change Conference (COP26) in November 2021. This reaffirmed commitment to the Paris Agreement and requested countries to revisit and strengthen their climate pledges.• Climate Action is one of the 17 UN Global Goals, encouraging urgent action to combat climate change and its impacts. It also significantly impacts on several other Goals.• Phase 1 of the UN Biodiversity Conference (COP15) was in October 2021, with phase 2 in May 2022, ensuring by 2050 a shared vision of living in harmony with nature is fulfilled.



National

- UK's seminal 'Stern Review on the Economics of Climate Change' published in 2006 set out the very clear economic case to act on climate change now.
- Climate Change Act 2008 sets a framework for a UK reduction in greenhouse gas emissions and provision for adaptation to climate change.
- Climate Change (Scotland) Act 2009 set duties for public bodies which include:
 - contributing to the delivery of national emission targets; (Routemap to Net Zero)
 - adapting to help deliver the national adaptation programme; (Aberdeen Adapts).
- Climate Change (Duties of Public Bodies: Reporting Requirements) (Scotland) Order 2015 placing duty on public bodies to report on meeting their climate duties.
- Climate Change Committee 2019 report, Net Zero: the UK's contribution..., reassessed long-term UK targets, stating net-zero is needed to meet Paris Agreement. The UK has adopted ambitious territorial emissions targets aligned to the Paris Agreement.
- Climate Ready Scotland, the national adaptation programme, was updated in 2019, addressing the risks in the UK Climate Risk Assessment and Projections (UKCP18).
- Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 amended emissions targets of the 2009 Act, to reduce Scotland's emissions to net-zero by 2045 at the latest with a series of interim reduction targets also.
- Climate Change (Duties of Public Bodies: Reporting Requirements) (Scotland) Amendment Order 2020, requires bodies to include the following in their annual Climate Change Reports: target date for zero direct emissions; targets for reducing indirect emissions; alignment of spending and resources to delivering reduction targets.
- Scotland's Climate Change Plan Update (CCPu) was published in 2020. This sets out the Government approach to Net Zero, stating public sector bodies have a strong leadership role in delivering the transition, while recognising critical the roles of others.
- GHG Emissions Trading Scheme Order 2020 establishes the UK Emissions Trading Scheme (ETS), replacing participation in the EU ETS, on 1 January 2021.
- UK's Sixth Carbon Budget reports were published in December 2020, outlining the paths and policies to a Net Zero UK.
- UK government published the seminal 'Economics of Biodiversity: The Dasgupta Review' in early 2021 stating the economic imperative to reverse nature's decline.

1.2 Scotland's Targets

The Scottish Parliament has set into law several targets the ultimate goal of which is to have net-zero greenhouse gas (GHG) emissions by the year 2045. These targets are what the Scottish Government have set for themselves to achieve for Scotland as a whole.

The interim targets in the legislation are as follows:

- 2020 is at least 56% lower than the 1990 baseline,
- 2030 is at least 75% lower than the 1990 baseline, and
- 2040 is at least 90% lower than the 1990 baseline.

Ultimately the Scottish Parliament sets these targets based on domestic advice and internationally agreed practices. The Scottish Ministers have the power to adjust these targets. The current list of gases, and the baseline year of 1990 appear to be inspired by the international practices of the Kyoto Protocol which is an international agreement on the tackling of CO₂ emissions and other greenhouse gases. The legislation's targets are set from advice containing ambitious targets from the Committee on Climate Change in their publication *Advice on the new Scottish Climate Change Bill* – March 2017. These targets do represent national targets but seek to meet international targets.

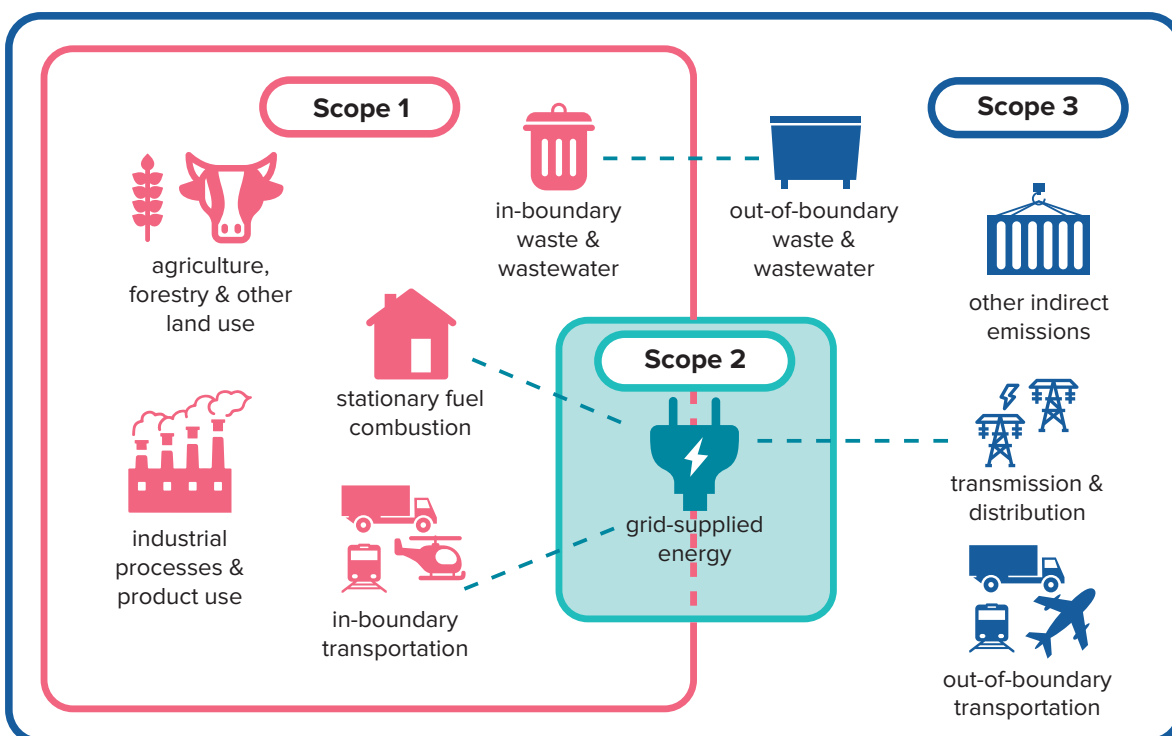
Additional mostly non-statutory sector-based targets and commitments are also being presented by the Governments. These are outlined in Section 2 of this Routemap.

Explanatory note – emissions terminology

Human induced climate change is brought about by the emission of a range of 'greenhouse gases' (GHGs) into the atmosphere, from societal processes such as the burning of fossil fuels for energy production. GHGs such as carbon dioxide (CO₂) and methane (CH₄) trap the sun's heat in our atmosphere causing 'global warming' which in turn affects the global climate in many varying, complex and often dangerous ways. Some GHGs have a much higher warming potential than others. For example, by equal volume methane has a 21 times greater impact on the climate than carbon dioxide. For the sake of simplicity, the aggregate impact of these gases is collectively referred to as *carbon dioxide equivalent emissions* (CO₂e), carbon emissions or simply carbon. Whereby one thousand tonnes of methane emitted would equate to 21 thousand tonnes of CO₂e (ktCO₂e). The carbon dioxide GHG is used as the baseline as it is the most emitted and therefore most abundant of the GHGs.

1.3 Emissions – Scope of Reporting

International standard for measuring GHG's – categorises emissions into 3 categories:



— Inventory boundary (Including scopes 1, 2 and 3) — Geographic city boundary (including scope 1)
 — Grid-supplied energy from a regional grid (scope 2)

Figure 1: Graphical representation of three scopes of emissions taken from the Greenhouse Gas Protocol for cities

- Scope 1 – direct local emissions from sources of local energy consumption
- Scope 2 – emissions linked to consumption of grid-based energy
- Scope 3 – emissions throughout the value chain linked to material use, infrastructure, transport, in production and product sales.

This Routemap will need to try and influence activities included Scope 1, 2 and 3

1 Greenhouse Gas Protocol for cities: <https://ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities#supporting-documents>





1.4 Emissions - Scotland

Greenhouse gases (GHG) emissions

Scotland's sector greenhouse gases (GHG) emissions from 2005 to 2019 are outlined in *Figure 2*, below. In 2019, Scottish emissions of GHG were estimated to be 47.8 million tonnes of carbon dioxide equivalent (MtCO₂e). With carbon dioxide (CO₂) making up 70.2% of this figure.

Emissions from business, energy supply, public sector, transport, industrial processes, waste management, international shipping and aviation, residential, agriculture and land use, land change and forestry are included in this figure. Data is measured against a 2005 baseline.

GHG Inventory (Scotland) by source ktCO₂e

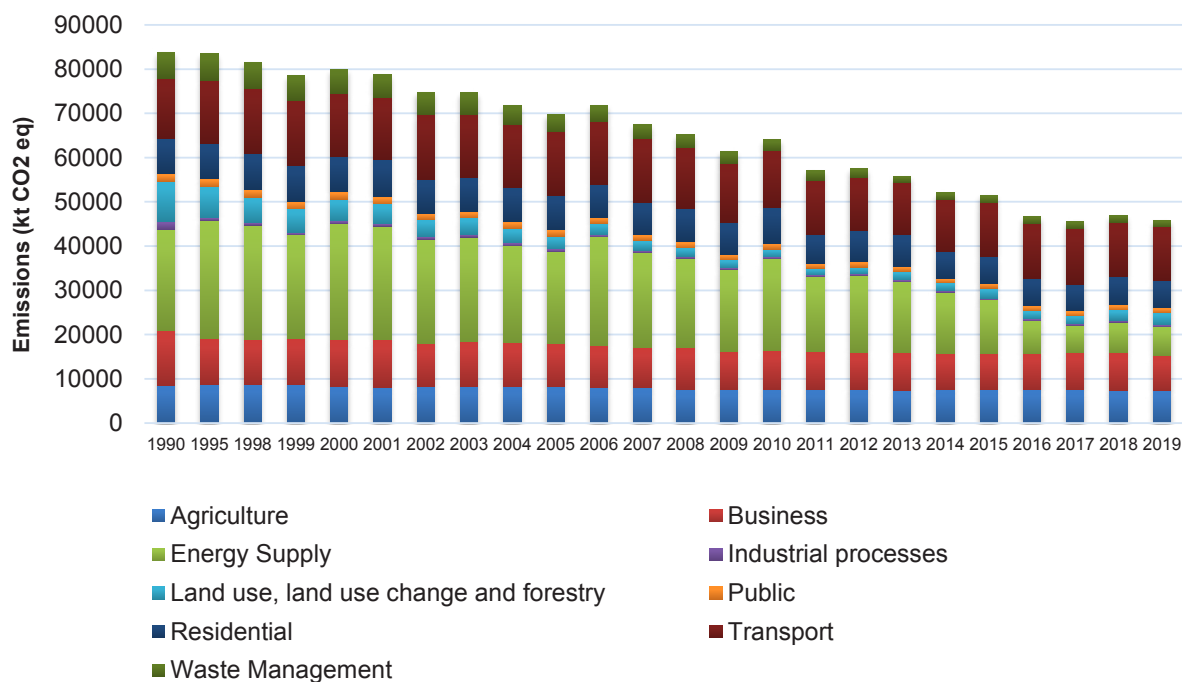


Figure 2: Graph showing Scotland's sector-based annual emissions in ktCO₂e from 2005 to 2019. A downward trend over time is evident, as is the long journey yet to net zero emissions.

2 <https://www.gov.scot/binaries/content/documents/govscot/publications/statistics/2021/06/scottish-greenhouse-gas-statistics-1990-2019/documents/scottish-greenhouse-gas-emissions-2019/scottish-greenhouse-gas-emissions-2019/govscot%3Adocument/scottish-greenhouse-gas-emissions-2019.pdf>

3 National Atmospheric Emissions Inventory: https://naei.beis.gov.uk/reports/reports?section_id=4



Homes in Scotland are estimated to produce an average of 7.0 tonnes of CO₂ per year (2019). Though in addition to emissions data, an estimated 24.6% of households in Scotland were in fuel poverty; with 12.4% in extreme poverty.

Explanatory note – net zero and offsetting

While society aims to ultimately reach absolutely no emissions of GHGs into the atmosphere from human activities, also known as ‘absolute zero’ emissions, this will likely take a very long time and may even turn out to be impossible in some limited activities, e.g. agriculture. Therefore, the foreseeable aim is to reach ‘net zero’ emissions. This term refers to the overall balancing of emissions to ‘net zero’ across all societal activities, whereby the limited and perhaps unavoidable (at least in the short to medium term) emissions from one activity are ‘offset’ by the removal of GHGs from the atmosphere by others. Activities which can remove or sequester GHGs from the atmosphere are natural processes such as forestry land use or technological solutions such as carbon capture and storage (CCS) (which is yet to be developed at meaningful scale). While this balancing or ‘offsetting’ approach may ultimately be needed, today’s solutions should be focused on immediate emissions reduction across all activities and sectors aiming for absolute zero emissions.

4 Scottish Housing Condition Survey 2019 key findings:

<https://www.gov.scot/binaries/content/documents/govscot/publications/statistics/2020/12/scottish-house-condition-survey-2019-key-findings/documents/scottish-house-condition-survey-2019-key-findings/scottish-house-condition-survey-2019-key-findings/govscot%3Adocument/scottish-house-condition-survey-2019-key-findings.pdf>

1.5 Emissions – The City of Aberdeen

GHG emissions are generally broken down into two data groupings.

At geopolitical scales, such as:

- Countrywide or national emissions, e.g. Scotland
- Area based emissions, e.g. Aberdeen City or Cairngorms National Park

Across sectors with often related stakeholders and actions, such as:

- Transport emissions, e.g. road and rail
- Building emissions, e.g. housing

The collation, analysis and modelling of data will form a key component of the Routemap, a vital part of this work will include GHG calculations, targets, and monitoring. This also forms the general rationale for the six theme based

strategies which will ultimately form the most significant parts of this Routemap.

To demonstrate the required reduction in our GHG emissions, we need a baseline to measure current and future emissions against. Global and national GHG emissions and associated calculations and targets generally work from a 1990 emissions baseline.

However, area-based emissions in Scotland, such as those for the City of Aberdeen, are calculated from 2005 at the earliest. The UK Government provides a number of data sets including a breakdown of carbon dioxide (CO₂) by local authority area and a sub data set of 'emissions within the scope of influence of local authorities'. CO₂ emissions data for Aberdeen is set out in *Figure 3*, with the change in CO₂ emissions from 2005 to 2019 indicated by sector in *Table 2*.

ktCO₂ emissions - Aberdeen (sub data set)

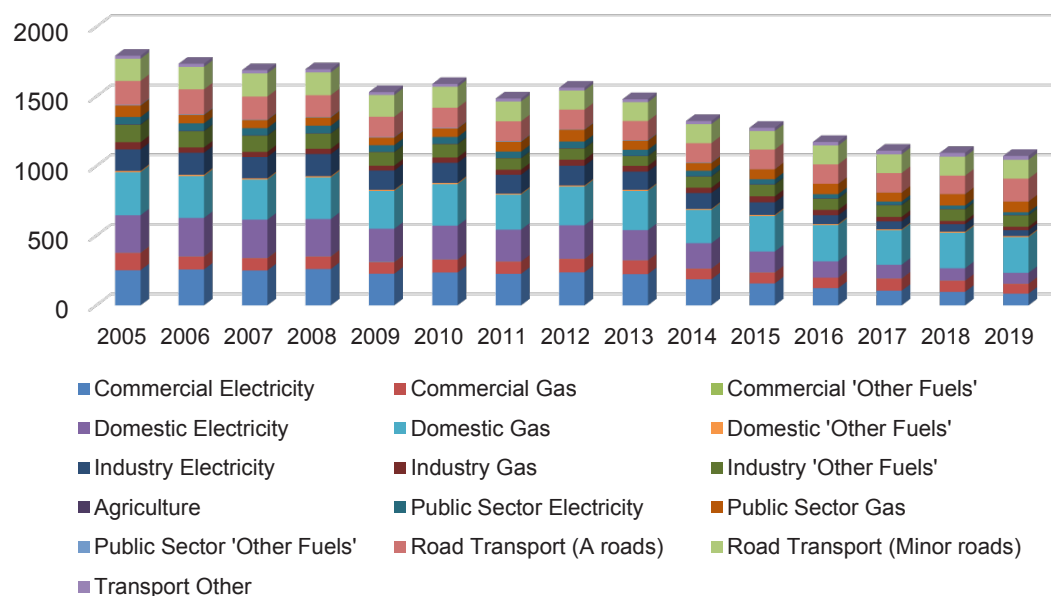


Figure 3: UK Government, Local Authority CO₂ emissions 2005-2019 national statistics: Aberdeen

Table 2: CO2 emission estimates for the City of Aberdeen, all measures in ktCO2.

Sector	Breakdown	2005 baseline	2019 measure	% change
Industrial	Electricity	154.15	42.84	-72%
	Gas	52.19	24.14	-54%
	Other fuels	125.2	81.76	-35%
	Agriculture	3.32	3.23	-3%
	Total	334.87	151.96	-54.6
Commercial	Electricity	252.59	84.34	-67%
	Gas	124.13	70.58	-43%
	Other fuels	0.81	0.62	-23%
	Total	377.54	155.54	-58.8%
Public	Electricity	52.35	19.36	-63%
	Gas	82.55	76.91	-7%
	Other fuels	5.02	0.78	-84%
	Total	139.93	97.05	-30.6%
Domestic	Electricity	269.43	78.05	-71%
	Gas	309.13	256.24	-17%
	Other fuel	9.47	7.66	-19%
	Total	588.03	341.95	-41.8%
Transport	Roads (A class)	171.89	163.51	-5%
	Roads (minor)	158.89	135.36	-15%
	Other	22.03	27.83	26%
	Total	352.81	326.71	-7%
Grand Total		1793.18	1073.21	-40.1%

In addition, greenhouse gas emissions for 2012 and 2019 from household waste in Aberdeen are set out Table 3.

Table 3: Aberdeen Household waste data (SEPA) - ktCO2e.

Sector	Breakdown	2005 baseline	2019 measure	% change
Waste (Household)	Disposal (incl. incineration)	17.67	8.87	-49.8%
	Recycling	0.54	0.61	12.9%

5 <https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2019>

6 <https://data.gov.uk/dataset/723c243d-2f1a-4d27-8b61-cdb93e5b10ff/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2019>

7 SEPA Household Waste data:
<https://informatics.sepa.org.uk/HouseholdWaste/>

1.6 Carbon scenarios

Emissions data tends to be well understood and generally available at both national and organisational levels. There remains a need to mature the approach to citywide data to help: understand where to focus attention based on historical emissions; to develop and define paths to reducing GHG emissions; to estimate the impacts of local proposals; measure their outcomes and learn and adapt our approach. It is inefficient for every place to spend time and money developing their own approach to this challenge.

Activity on citywide emissions data is ongoing, with Aberdeen participating in work through the Scottish Cities Alliance to support city emission monitoring and scenario planning. Further work is required in this area with the aim of evolving subsequent iterations of the Routemap, Strategies and any associated plans through more sophisticated emissions data and methods. In doing so, helping to track targets and being led by the latest climate science.

1.7 Aligning with Aberdeen Adapts

Aberdeen Adapts is a Climate Adaptation Framework for the City, targeting 5 key priorities and 15 long term goals for building city resilience to climate change. Reducing global emissions is essential to limit the impact of climate change. However, there will still be change. As our Net Zero Aberdeen actions accelerate, it will be essential to understand the synergies and interdependencies with the adaptation agenda to avoid locking in climate risks and any need for costly retrofit at a future point; and to unlock the benefits for both emission reduction and adaptation from nature-based solutions.

Synergies with Aberdeen Adapts

- **Mobility:** Enhancing travel options and integration of transport networks can support resilience during and following severe weather. Building in adaptation, such as blue and green infrastructure into travel routes can increase use and benefit health.
- **Buildings and Heat:** Retrofit actions can benefit emission reduction and adaptation agendas. Net Zero outcomes for building design and energy efficiency can help to regulate building temperature and protect buildings from the elements.
- **Circular Economy:** this Net Zero theme approach in maximising use of resources
- **Energy Supply:** This Net Zero theme has a strong relationship with Aberdeen Adapts, with a need to build resilience into emerging energy infrastructure, understand potential changes to energy demand and consider energy security.
- **Natural Environment:** aligns closely with Aberdeen Adapts through opportunities to protect and enhance carbon stores and increase nature-based solutions.
- **Empowerment:** is relevant to the Aberdeen Adapts objectives covering engagement, participation and capacity building of organisations and citizens on climate change.

2.0 Net Zero Aberdeen Routemap

2.1 Indicative Targets for Aberdeen to achieve Net Zero by 2045

From the analysis of Scotland and Aberdeen’s current emissions, one can see areas that remain to be tackled. To achieve net zero, we require to focus attention on the remaining areas, which have been captured in six predominantly sector-based themes.

More details on the themes are set out in their respective strategies, in terms of the challenges and strategic approach we face within each area. We need to consider the range of technical and behavioural solutions required to reduce emissions associated with each theme, while also ensuring we deliver multiple co-benefits, including improving the natural environment and reducing inequalities.

Set out in Table 4 below are the initial bottom-line reductions which will be required for Aberdeen’s emissions, many of which are under our control and influence. These are initially based on a mix of national targets, e.g. 75% reduction by 2030 and linear reductions at 5-year intervals between them. With a requirement for science-based targets, the sector challenges, solutions, and their impacts in terms of emissions will need to be calculated, modelled and these targets checked as part of this Routemap’s ongoing development. Specific sector and sub sector-based targets will also be considered for inclusion, where feasible and desirable.

Table 4: Indicative Targets

Aberdeen emissions	2005 Baseline	*2019 40% reduction	2025 57.5% reduction	2030 75% reduction	2040 90% reduction	2045 100% reduction
ktCO ₂	1793	1076	762	448	179	Net Zero

*2020 data expected to be available in late June 2022



2.2 Routemap for the City of Aberdeen

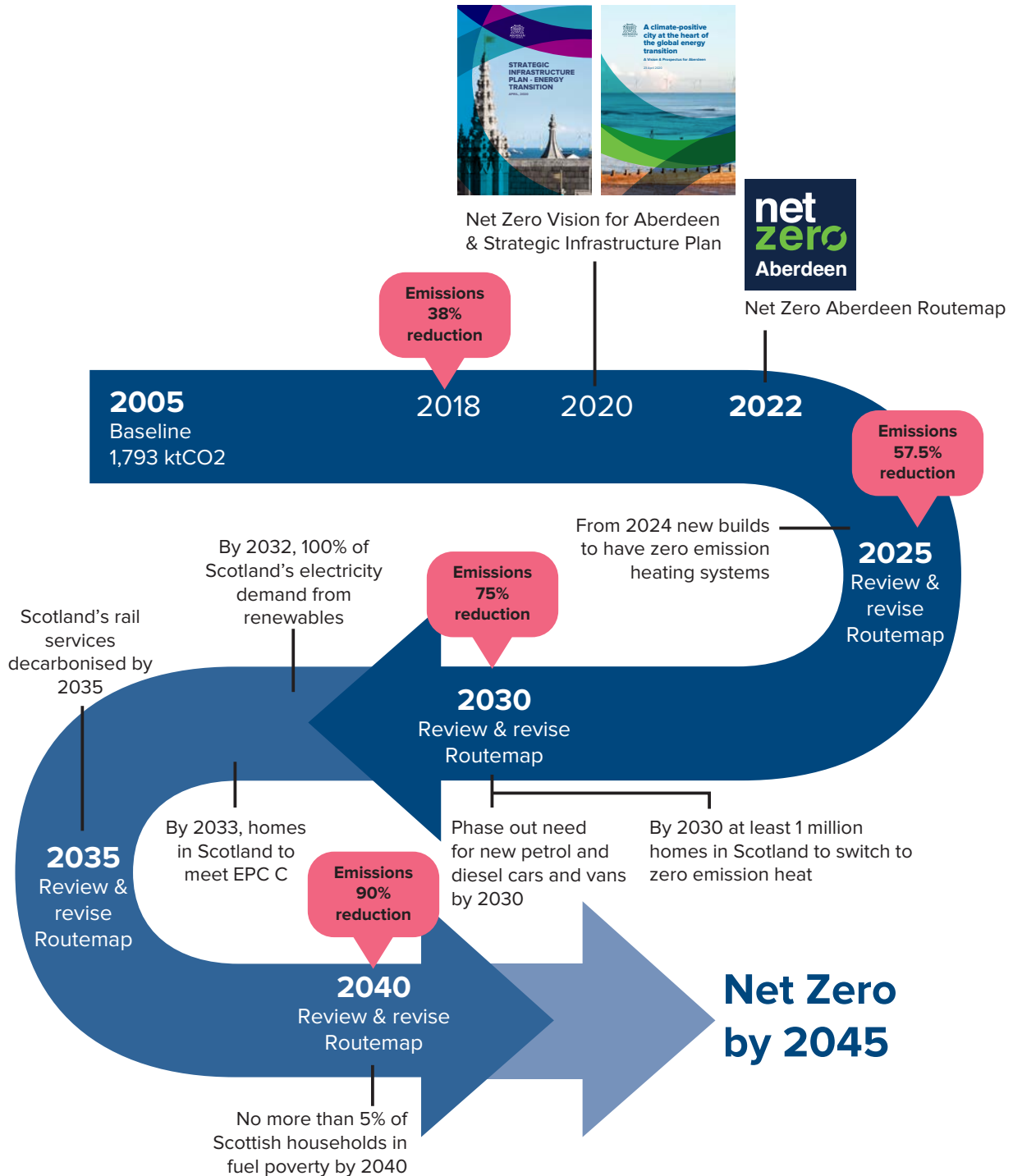


Figure 4: Key milestones to 2045

Table 5 below, outlines most of the key net zero related milestones across all levels of the UK which will impact Aberdeen. These manifest as a mix of existing and emerging legislation, consultations, ambitions, targets, and outcomes. Some of these are already being progressed at a local level through the initiatives of various organisations and partnerships and some will require concerted effort over many years to be achieved.

1. Mobility	2. Buildings & Heat	3. Circular Economy	4. Energy Supply	5. Natural Environment	6. Empowerment	Themes					
						1	2	3	4	5	6
2015 to 2020 : Key Milestones in run up to start of Routemap process											
UK	Signed the Paris Agreement by all nations at UN Climate Conference 2015 (COP21) – limit warming to well below 2C and make plans how to achieve that by COP26 in Glasgow in 2021					x	x	x	x	x	x
	Published the seminal ‘Economics of Biodiversity: The Dasgupta Review’ in early 2021						x	x	x	x	x
	Sixth Carbon Budget reports published in 2020, outlining the paths and policies to Net Zero					x	x	x	x	x	x
	GHG Emissions Trading Scheme Order 2020 establishes the UK Emissions Trading Scheme (ETS), replacing participation in the EU ETS, on 1 January 2021								x		
Scotland	Climate Change (Duties of Public Bodies: Reporting Requirements) (Scotland) Order 2015 places duty to report on climate action					x	x	x	x	x	x
	Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 – National Net Zero target of 2045 and increased reporting duties for public bodies					x	x	x	x	x	x
	Scotland’s Climate Change Plan Update (CCPu) to reach Net Zero was published in 2020					x	x	x	x	x	x
Region	Regional Economic Strategy published					x	x	x	x	x	x
	City Region Deal agreed					x	x	x	x	x	x
	Regional Hydrogen Strategy published					x	x		x		x
Aberdeen	End of Aberdeen led EU MUSIC Project on City Transition Management for energy and climate					x	x	x			x
	Powering Aberdeen: Aberdeen’s sustainable energy action plan 2015 published (superseded)					x	x	x	x	x	x
	Aberdeen Adapts: A climate adaptation framework for Aberdeen published in 2019					x	x	x	x	x	
	City Council ‘Green Budget’ agreed					x	x	x	x	x	x
	Net Zero Vision & Strategic Infrastructure Plan published in 2020					x	x	x		x	x
	Council Energy & Climate Routemap published in 2020					x	x	x		x	x

1. Mobility	2. Buildings & Heat	3. Circular Economy	4. Energy Supply	5. Natural Environment	6. Empowerment	Themes					
						1	2	3	4	5	6
<Start of Net Zero Aberdeen Routemap process>											
2021 to 2025 : Key Milestones											
UK	UK ETS Authority “How to Comply” guidance was published in 2021								x		
	UK Shared Prosperity Fund and £4bn levelling up fund launched	x	x	x	x	x	x	x			
	UN Climate Conference 2021 (COP26), reaffirmed commitment to the Paris Agreement and adopted the Glasgow Climate Pact, requesting countries to strengthen climate pledges	x	x	x	x	x	x	x			
	UN Biodiversity Conference 2021 & 2022 (COP15) - to ensure that, by 2050, the shared vision of living in harmony with nature is fulfilled.								x	x	x
	Consulting on whether it's appropriate to end gas grid connections to new homes build from 2025 in favour of clean energy alternatives		x						x		x
	Commitment to have “self-driving” vehicles on the roads by 2021	x									
	UK Hydrogen Strategy published in 2021, with consultation on a Low Carbon Hydrogen Standard.	x	x						x		
	By 2023 – work with industry to complete testing necessary to allow up to 20% blending of hydrogen into the gas distribution grid for all homes on the gas grid		x						x		x
	By 2023 – hydrogen heating trials in a local neighbourhood		x						x		x
	By 2025 – will support industry to begin a large village hydrogen trial and set out plans for a possible pilot hydrogen town before the end of the decade		x							x	x
	By 2025 – hope to see 1GW of hydrogen production capacity									x	
	Already committed to ending coal in the electricity mix no later than 2025									x	

1. Mobility	2. Buildings & Heat	3. Circular Economy	4. Energy Supply	5. Natural Environment	6. Empowerment	Themes					
						1	2	3	4	5	6
Scotland	The Climate Change (Duties of Public Bodies: Reporting Requirements) (Scotland) Amendment Order 2020 – Statutory Guidance expected in 2022/23					x	x	x	x	x	x
	Establishing a zero emissions heavy duty vehicle programme					x					
	Local Energy Policy Statement 2021 on the principles and outcomes for local energy schemes								x		x
	Increase new woodland creation from current target level of 12,000 hectares annually in 20/21 to 18,000 in 24/25 to achieve 2032 target of 21% of land be covered by forest									x	
	Scottish Government planning to consult on creating a mandatory national food waste reduction target and in line with EU circular economy package will also consult on requirement to separately collect garden waste by 2023 and textiles and hazardous elements of household waste by 2025.							x			
	Environmental Protection (Single-use Plastic Products) (Scotland) Regs 2021 - in force June 22							x			
	Net Zero Public Sector Buildings Standard for New Builds was introduced in 2021						x		x		
	August 2023 – implementation of the Deposit Return Scheme for single use drinks containers							x			
	2023 - Bio waste (e.g. garden waste) is either separated and recycled at source or it is collected separately and not mixed with other waste							x			
	Heat Networks (Scotland) Act 2021, sets requirements for a heat networks regulatory framework to become operational by 2024						x		x		x
	Local Heat and Energy Efficiency Strategies (LHEES) launched by local authorities by 2024						x		x		x
	New Build Zero emissions from Heat Standard will be introduced from 2024 (by which point all new builds will have to have zero emission heating systems)						x		x		x
	Regulations introduced for all buildings to achieve good level of energy efficiency						x				x
	Majority of new buses purchased from 2024 are net zero emissions (brought forward from 2032)						x		x		
	Decarbonise public sector fleet by 2025						x		x		
	2025 – delivery of first active freeways – segregated active travel routes on main travel corridors										
	Increase woodland carbon market by at least 50% by 2025								x		x
	To reduce current emissions from waste from 1.9 megatonnes yearly to 1.2 by 2025							x			
	2025 – separate collection of textiles in line with EU Requirements (subject to consultation) 2025 - have reduced % of waste going to landfill to 5% and 70% of waste will be recycled To deliver a reduction in food waste by one third (33%) by 2025 against a 2013 baseline Ban landfilling biodegradable municipal waste by 2025 (will extend to non-municipal waste later)										
	Energy Efficiency Standard for Social Housing - no social housing lets below EPC D by 2025						x		x		x
Region	By 2023 Regional Land Use Partnership pilots have developed Regional Land Use Frameworks									x	
Aberdeen	Council Climate Change Plan 2021-25 approved in 2021					x	x	x	x	x	x
	Hydrogen Hub								x		

1. Mobility	2. Buildings & Heat	3. Circular Economy	4. Energy Supply	5. Natural Environment	6. Empowerment	Themes					
						1	2	3	4	5	6
2026 to 2030 : Key Milestones											
UK	Aiming to develop 5GW of low carbon hydrogen production capacity by 2030								x		
	Trial hydrogen heating at town scale before the end of this decade						x		x		x
	Growing the installation of electric heat pumps from 30,000 PA to 600,000 PA in 2028						x		x		x
Scotland	Housing to 2040 strategy includes "Action 13: Aim for all new homes delivered by Registered Social Landlords and local authorities to be zero emissions by 2026"						x		x		x
	At least 50% of Scotland's building stock is heated using zero emission systems						x		x		x
	2030 interim fuel poverty targets: ● No more than 15% of households in Scotland are in fuel poverty, ● No more than 5% of households in Scotland are in extreme fuel poverty						x		x		x
	Reduce car kilometres by 20% by 2030, with a routemap on how to meet this target					x					
	Phase out need for new petrol and diesel cars and vans by 2030					x					
	Scottish Government will be consulting on zero/ultra low emission city centre's by 2030					x	x				x
	Between 2020 and 2030 expect to see development of 11 and 16 GW of renewable capacity offshore wind policy statement – potential for 8 and 11 GW of offshore wind capacity by 2030								x		
	To reduce emissions in waste sector to 0.8 megatonnes PA by 2030							x			
2031 to 2035 : Key Milestones											
UK	Targeting 40GW of offshore wind by 2030 including 1GW floating offshore wind								x		
	With no new commitments, all existing nuclear plants due to cease generating by end of 2030								x		
Scotland	Peatland restoration needs to increase beyond current 20,000 hectares to achieve 2032 target of 250,000 hectares of peatland having been restored									x	
	Achieve 2032 target of 21% of land will be covered by forest									x	
	By 2032, we will generate at least the equivalent of 50% of our energy (across heat, transport, and electricity demand) from renewable sources					x	x		x		
	By 2032, 100% of Scotland's electricity demand from renewable sources					x	x		x		x
	Energy Efficiency Standard for Social Housing 2 (ESSH2) milestone is for social housing to meet an EPC Band B by December 2032, within limits of cost, technology, consent.						x		x		x
	Heat in Buildings Strategy, all homes meeting at least EPC band C by 2033						x				
	Scotland's rail services will be fully decarbonised by 2035					x			x		
2035 interim fuel poverty targets: ● no more than 10% of households in Scotland are in fuel poverty, ● no more than 3% of households in Scotland are in extreme fuel poverty						x		x		x	
2036 to 2040 : Key Milestones											
Scotland	Decarbonise scheduled flights within Scotland by 2040					x					
	2040 targets of no more than 5% of households in fuel poverty, no more than 1% in extreme fuel poverty; and the median fuel poverty gap is no more than £250 in 2015 prices before inflation						x				x
2041 to 2045 : Key Milestones											
Scotland	By 2045, need to have transitioned 2 million homes and 100,000 non-domestic buildings to low/zero emissions from heating systems						x	x			x
<Goal Accomplished – A Net Zero Aberdeen>											

2.3 Our Routemap Themes

The route-map has 6 themes:

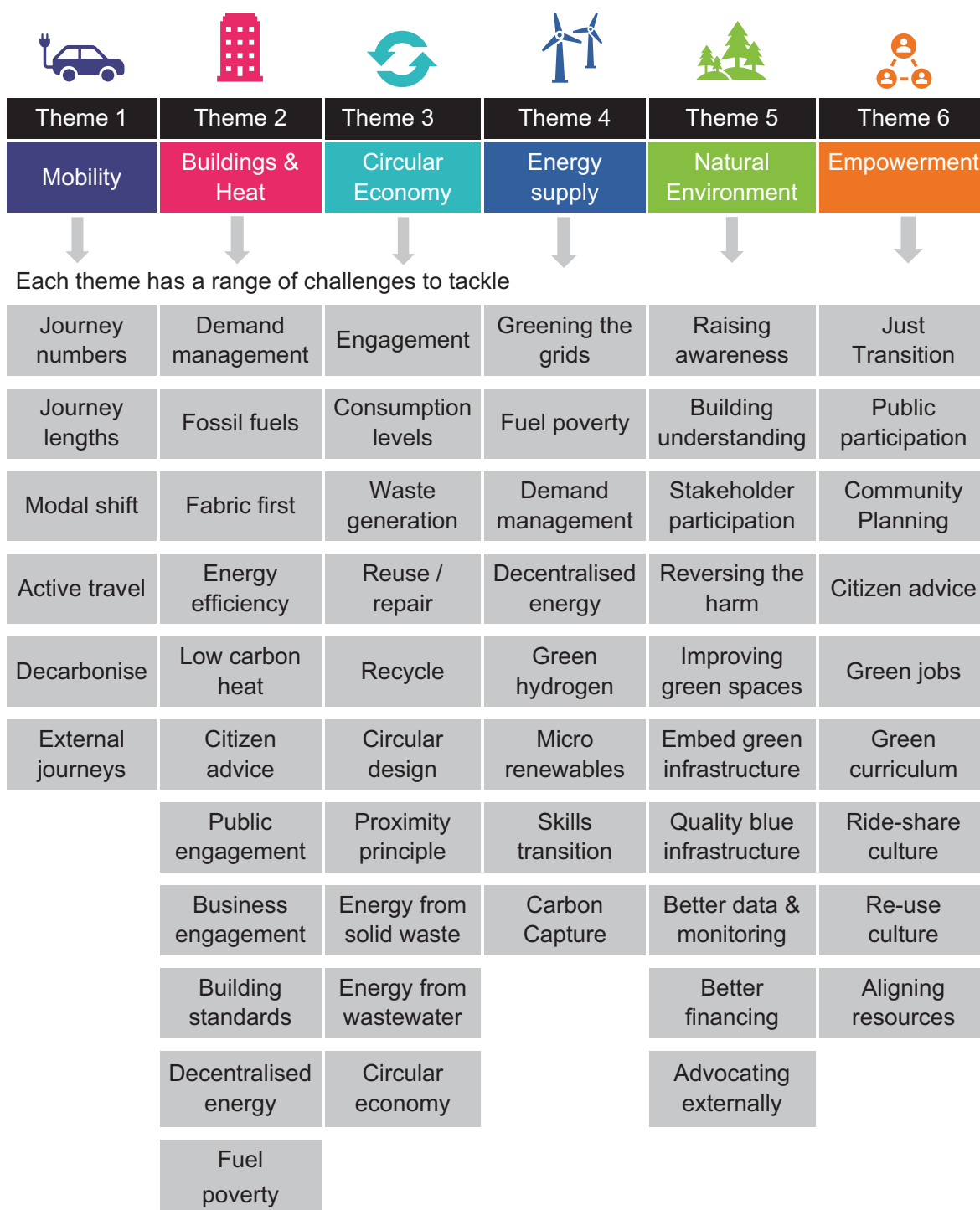








Figure 5: Graphical representation of the six themes of the Net Zero Aberdeen Routemap with abbreviations of each of the challenges so far identified under each theme.

2.4 Net Zero Theme Strategies – summary

Our six net zero strategies set out their respective strategic aims, outcomes, objectives and measures. A summary of the aim and outcomes of each is presented below.

	Strategic aim	Key outcomes
	<p>Mobility We will reduce travel demand, play a key role in enabling a transition to low/zero emission vehicles and facilitate more walking, wheeling and use of public transport to reduce emissions while increasing the safety of road users.</p>	<ul style="list-style-type: none"> Reduction in traffic across the city Reduction in proportion of journeys by car drivers to less than 50% by 2030 Improved travel planning Reduce the need for car travel, facilitating local services & 20-minute neighbourhoods Increased number of people taking public transport Increased number of people walking and wheeling Reduced emissions from transport
	<p>Buildings & Heat Reduced greenhouse gas emissions to net zero by 2045, through rapid decarbonisation across all sectors with many changes to the ways in which both power and heat is generated and used.</p>	<ul style="list-style-type: none"> Improved energy performance data Improved plans, policies and standards Improved energy efficiency of buildings Improve energy management controls Expand low and zero emissions heating Increased connections to decentralised energy systems Reduced fuel poverty
	<p>Circular economy We will identify, promote and develop circular economy models that can maximise the value of products and materials, to reduce carbon emissions and support economic resilience.</p>	<ul style="list-style-type: none"> Job creation and enhanced business resilience Materials are recovered and regenerated A reduction in emissions from the whole lifecycle of products
	<p>Energy supply We will develop affordable low-carbon energy choices for our citizens and use our strengths as a global energy capital to put ourselves at the front of the energy transition; focusing on developing globally recognised centres of excellence for green hydrogen and offshore wind.</p>	<ul style="list-style-type: none"> No exacerbation of fuel poverty Increase decentralised energy Commercialise green hydrogen Expand micro renewables Enable a skills transition Carbon capture, and utilisation and storage Capitalise on offshore wind Secure investment Diversify the energy supply chain
	<p>Our Natural Environment We will further protect and expand nature across Aberdeen, enhancing its integrity, managing it to contribute to an overall reduction in greenhouse gas emissions, and reversing the nature decline for the multiple benefits these provide in ensuring our most basic societal and economic goods.</p>	<ul style="list-style-type: none"> Reduction in greenhouse gas emissions Increase in biodiversity Improved health & wellbeing
	<p>Empowerment We will empower stakeholders to understand their needs and remove barriers to their goals, working with them on our net zero journey, ensuring a strong partnership approach. We will communicate with stakeholders, allowing us all to learn and adapt, while maintaining a view across the Net Zero themes, community projects and other initiatives.</p>	<ul style="list-style-type: none"> Increase communication and understanding Improve collaboration and participation Ensure intervention and action

2.6 Theme co-benefits

Table 6: Table outlining the co-benefits of the six Net Zero Aberdeen Strategies

	Mobility	Buildings & Heat	Energy Supply	Circular Economy	Natural Environment	Empowerment
Improved health & wellbeing	●	●	●		●	●
Improved air quality	●		●		●	
Protect/ enhance biodiversity				●	●	●
Reduces flood risk					●	
Fair/ just transition	●	●	●	●	●	●
Skills development		●	●	●		●
Green jobs/ job creation			●	●		●
Economic growth	●	●	●	●		●
Increase in carbon store					●	
Helps conserve natural resources		●		●	●	
Helps reduce fuel poverty		●	●			
Placemaking	●	●			●	

2.7 The next 12 months

Net Zero Aberdeen is a long-term approach on our journey to a net zero city and nation by 2045, with a critical interim decade of action to 2030. This Routemap attempts to build on the existing foundations of Aberdeen's Net Zero Vision. However, there remains capacity and knowledge gaps to fill and more sophisticated and detailed work to undertake as we evolve and mature on our collective journey. Over the next 12 months, Net Zero Aberdeen intends to:

- Develop a plan and actions for engagement, including climate change branding and design, developing non-technical summaries of information, building a digital presence for information and collaboration, developing a pledge scheme for Aberdeen and promoting it alongside this Routemap, working with young people and other stakeholders to shape and deliver iterations of this Routemap, the Strategies and subsequent plans;
- Review and evolve our citywide approach to climate change and energy transition governance, working with the Net Zero Leadership Board, Delivery Unit and other partners across the city;
- Explore and mature our approach to estimating, measuring, monitoring and analysing and reporting energy and emissions data and associated metrics;
- Work with all stakeholders to identify existing and develop new collaborative plans and actions to deliver the outcomes of our Routemap and Strategies and plans;
- Develop and / or implement industry standard methods to assess our plans and actions for carbon, costs and other impacts to inform our priorities and direct our investment decisions;
- Work with all stakeholders through the above processes and other methods to review and refine future iterations of this Routemap and Strategies;
- Provide accessible and transparent reporting to the public, governments, Net Zero Aberdeen & Council in a years time on progress.



3.0 Monitoring & Reporting

It is essential for efficient and robust management of effort and matters of public, partner and investor trust that Net Zero Aberdeen provide regular, transparent and honest reporting on the challenges, opportunities, actions and outcomes from this collective journey. There exist a range of reporting requirements for levels of governments and for various organisations across sectors, including.

- Scottish Government - A duty to report annually on climate change progress to the Scottish Parliament. They are supported by the Climate Change Committee.
- Public Bodies, including Aberdeen City Council
 - Required to report annually on targets, actions, and outcomes on emissions under their control and understand and address climate risks to assets and operations
 - Recommended to report annually on emissions reduction and adaptation activities under their wider influence; this Routemap and Aberdeen Adapts;
 - Required to report annually on procurement activities, including on compliance with / furtherance of Sustainable Procurement Duty and community benefit plans.
 - Report triennially on compliance with the Biodiversity Duty.

- Pension Funds are subject to Occupational Pension Schemes (Climate Change Governance and Reporting) Regulations 2021.
- Mandatory reporting of climate related financial information across the economy is expected by 2025, with a significant portion in place by 2023.
- Signatories to the Cities Pledge to Zero, Glasgow and Edinburgh Declarations have reporting expectations in line with existing global and European reporting standards.

The intention for Net Zero Aberdeen is not to add further complex reporting requirements on an already crowded market. Instead, to provide regular updates on ambitions, efforts and outcomes (as set out in the Routemap and accompanying Strategies) through existing and new governance and engagement channels and to provide at least one more comprehensive annual report on progress which builds on the information already being collated and submitted across organisations and sectors.

4.0 Governance

4.1 Net Zero governance

Aberdeen’s Net Zero Vision proposed a governance model, as set out in Figure 6 below, to drive forward the direction and develop the details of the Net Zero Aberdeen journey, as currently articulated through this Routemap and Strategies. This model consists of:

- **Leadership Board** - driving direction through a range of city representation.
- **Delivery Unit** – implementing activity through theme collaboration.
- **Themes** – Six themes driven by a theme lead from a range of city organisations.

This approach has been effective during this phase. However, there has been learning throughout, including an awareness of the plethora of climate change, net zero, resilience and energy transition bodies across Aberdeen. Therefore, a review of the approach to climate governance across Aberdeen will take place with the aim to ensure the city model is most efficient and effective to drive collaboration, investment and outcomes.

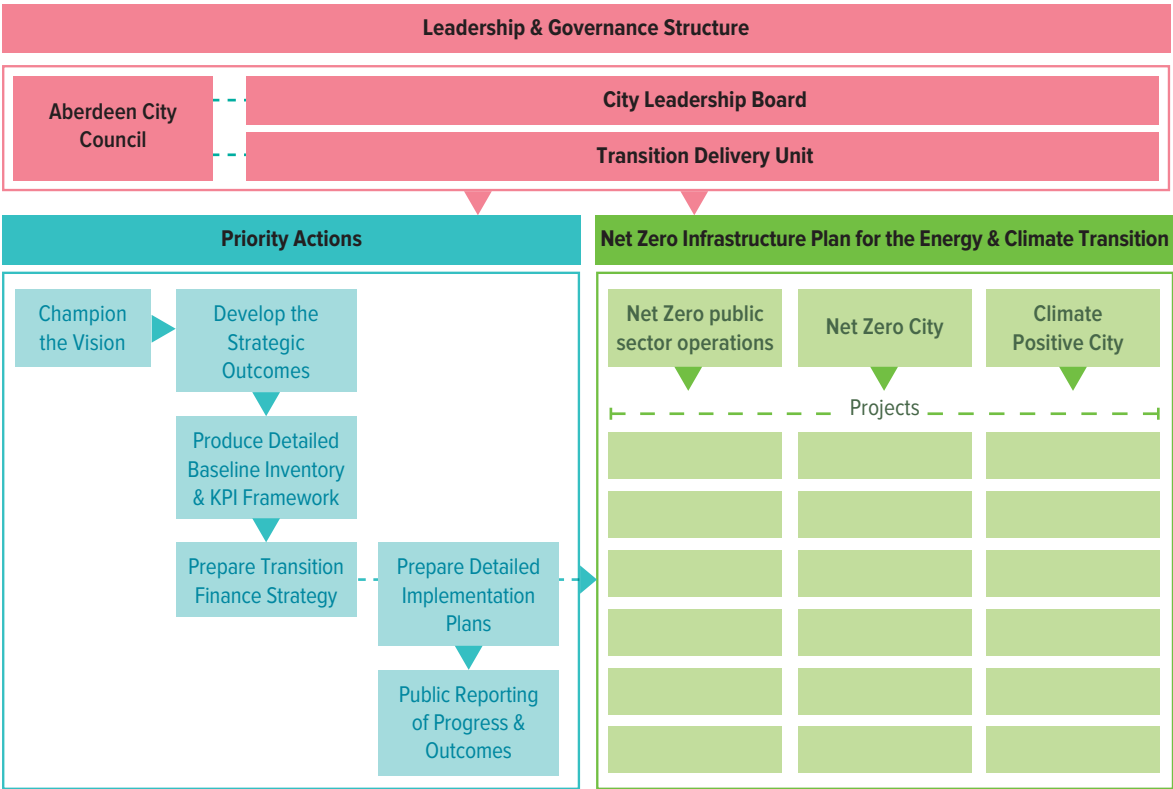


Figure 6 – Aberdeen Net Zero Vision Governance proposals

Table 7: Representatives on the Net Zero Aberdeen Leadership Board and Delivery Unit

Leadership Board	Delivery Unit
Scottish Gas Networks	Robert Gordon University
Scottish Renewables	Skills Development Scotland
BP	Scottish Futures Trust
Scottish Fuel Cell Association	NESTRANS
ORE Catapult	Aberdeen City Council
Core Cities UK	Net Zero Technology Centre
Opportunity North East	Aberdeen Renewable Energy Group
Aberdeen City Council	Aberdeen Heat and Power
University of Glasgow	Zero Waste Scotland
Crown Estate Scotland	NESBiP
Just Energy Transition Commission	NatureScot
Net Zero Technology Centre	University of Aberdeen



4.2 Finance and Investment

It is evident that the pace, depth and scale of system change demanded across all sectors to reach net zero by 2045 comes with significant cost. As identified in the seminal Stern Review on the Economics of Climate Change, it is expensive to act now yet it is far more costly to defer action. Likewise, local action comes with significant economic and other opportunities, especially for Aberdeen in terms of our just energy transition agenda.

As investment focus shifts towards a Wellbeing Economy, climate change and energy transition funding models and investment opportunities are becoming increasingly innovative, frequent, evident and scaled. For example, Glasgow Agreement on mobilising private capital, UK

Sovereign Green Bond, Levelling Up, City Region Deals, Scotland's Programme for Government, North East Just Transition Fund and so on.

Therefore, there is a need to set out local focus areas and priorities for collaborative action to access and direct investment towards, while ensuring no-one is left behind. Following on from the City Region Deal and Strategic Infrastructure Plan, this is something which the Net Zero Aberdeen Vision and Routemap continue to do for Aberdeen. Further effort is required to evolve more detailed plans and undertake financial assessments and business cases, considering; the costs and benefits of those actions and conversely, the costs and other implications of not acting.



5.0 Global Goals

5.1 Net Zero Aberdeen and the UN Sustainable Development Goals

<p>1 NO POVERTY</p> 	<p>Generating clean energy and improving energy efficiency will help to alleviate fuel poverty. Principles of 'community wealth building' and a 'just transition' underpin Empowerment, Energy Supply and the Buildings & Heat Strategies.</p>
<p>2 ZERO HUNGER</p> 	<p>Supporting local food growing, including orchards and market gardens is included in the Natural Environment Strategy. Reducing food waste is also part of the Circular Economy Strategy.</p>
<p>3 GOOD HEALTH AND WELL-BEING</p> 	<p>Increased tree cover and clean energy generation can contribute to improved air quality and help to improve health. Expanded use of blue green infrastructure and active travel can contribute to health and well-being. The Mobility and Natural Environment Strategy are relevant to delivering this SDG.</p>
<p>4 QUALITY EDUCATION</p> 	<p>Actions to support wider engagement with schools will support global citizenship education and education for sustainable development. The Empowerment Strategy aligns to SDG4.</p>
<p>5 GENDER EQUALITY</p> 	<p>A 'just transition' should consider gender equality and the aims of delivering a 'just transition' feature throughout the Routemap and supporting strategies.</p>
<p>6 CLEAN WATER AND SANITATION</p> 	<p>Improving water use efficiency through the effective use of resources and the expanded use of blue green infrastructure will contribute to protecting and restoring water related ecosystems, rivers and aquifers. Increased tree cover will also support the water environment. The Circular Economy Strategy and Natural Environment Strategy are most relevant to this SDG.</p>
<p>7 AFFORDABLE AND CLEAN ENERGY</p> 	<p>Generating clean energy, extend the heat network, increase the share of renewable energy in the energy mix and improve the energy efficiency of buildings will contribute to universal access to affordable, reliable and modern energy services. The Building and Heat Strategy and Energy Supply Strategy are most relevant here.</p>
<p>8 DECENT WORK AND ECONOMIC GROWTH</p> 	<p>Encouraging effective use of resources will support local business to decouple economic growth from environmental degradation and create jobs in the process. The Empowerment Strategy and Circular Economy Strategy are most relevant to the delivery of this SDG.</p>
<p>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE</p> 	<p>Encouraging the effective use of resources and low-carbon enhancements to infrastructure will support and encourage local stakeholders and researchers to further innovate. The Buildings and Heat Strategy and Circular Economy Strategy are most relevant to the delivery of this SDG.</p>



Increasing energy efficiency and effective use of resources will help to alleviate fuel poverty and deliver a 'just transition' protecting and sustaining income growth of those facing most socio-economic challenges. The aims of delivering a 'just transition' feature throughout the roadmap and its supporting strategies.



Improving building quality, protecting and enhancing open spaces, resilient design of infrastructure, reducing losses from weather impacts all contribute to a sustainable city. All six strategies are relevant but especially the Empowerment Strategy and the Mobility Strategy.



Minimising waste, encouraging the effective use of resources, improving data capture, encouraging sustainable procurement and the wider engagement with citizens will all increase greater awareness of the links with climate action. The Circular Economy Strategy aligns to SDG12.



Reducing emissions, increasing the resilience and build standards of city assets, climate risk management and embedding climate considerations into city-wide activities and decision-making are all contributing to climate action. All six strategies are delivering this SDG.



Improving water use efficiency through effective use of resources and the expanded use of blue green infrastructure will contribute to protecting and restoring water related ecosystems, rivers and aquifers. Increased tree cover will also support the water environment. The Natural Environment Strategy is most relevant to delivering this SDG.



Increasing nature-based solutions and reversing the harm will contribute to overall biodiversity gain and potentially support and protect habitats for wildlife. The Natural Environment Strategy is most relevant to delivering this.



Developing effective, accountable and transparent governance of the city's climate actions, benchmarking and public reporting of progress will contribute to strong institutions and a process in which people feel able to participate. The Empowerment Strategy is most relevant here.



Aiming to embed climate considerations into other programmes, plans and strategies will lead to improved policy coherence and present opportunities to engage further with multi-stakeholder partnerships both within Aberdeen and further afield. The Empowerment Strategy is most relevant here.



