

Appendix 3: Shetland Net Zero Route Map Overview

In 2022 Shetland Islands Council launched a project to develop a Net Zero Route Map for Shetland. This involved hearing from the sectors of energy, transport, buildings, waste, business and industry and nature-based solutions, to determine an appropriate set of measures for Shetland to reach Net Zero emissions.

The project involved a way of measuring greenhouse gas (GHG) emissions and establishing a baseline for emissions, steps included around decarbonising vehicles, vessels, buildings, operations and land.

The Shetland NZRM helped to identify the main sources of emissions in Shetland. While energy usage and, the Sullom Voe Oil Terminal and Shetland Gas Plant, were high, the highest total emissions were from land use which was shown to be our highest emitting sector. This is attributed mainly to the extent of degraded peatland in Shetland. Peat is an incredibly carbon-dense soil, formed by compression of decomposed sphagnum mosses and other organisms over thousands of years. Peatlands in Shetland have become degraded due to drainage, historic overgrazing, development, peat extraction and the harsh local climate.

The development of the Shetland Climate Change Strategy is based upon engagement, data and information gained during the Net Zero Route Map project, local and national policy and guidance, and best practice.

Appendix 3: Shetland Net Zero Route Map Overview

Establishing the boundary and scope of emissions for the Shetland Net Zero Route Map was challenging. Compared with other Local Authorities, Shetland is unique in terms of its geography and economy, so the common approaches to GHG reporting exclude some activities and sources of emissions that are highly relevant to Shetland; the major examples being aviation and the entire marine industry.

It was essential that a credible baseline was developed for Shetland and so the principles of ISO 14064 were used, where the emissions baseline should seek to be as complete and as relevant as possible. Therefore, sources of emissions that are not typically included in area-wide inventories were scoped in, such as aviation, ferries, the marine industry and all emissions from land.

Emissions for the Shetland baseline have been calculated by scope, as defined below:



Type	Definition	Examples
Scope 1	Direct emissions from fuel combustion and fugitive emissions within the Local Authority's geographic boundary	- Fuel combustion in buildings and road vehicles - Emissions from agriculture, waste and wastewater treatment, or landfill activities taking place within the Shetland region
Scope 2	Indirect emissions from purchased electricity, heat, steam or cooling that is generated elsewhere	Typically, electricity would be generated outside the area boundary and therefore classed as Scope 2 – whereas in Shetland, at present the fuel combustion to produce electricity would be classed as Scope 1, but that will change (post-2024) when there is an interconnector to the UK grid
Scope 3	Other indirect emissions	- Journeys to/from the region that are outside the Local Authority boundary – by ferry or domestic aviation - Harbour tugs - Sullom Voe Port and vessels - Fishing, aquaculture and other marine sector emissions Other indirect emissions, such as supply chains for food, products and materials, are not included in this study. Emissions from the offshore oil and gas industry are also not included as these would be allocated to the end users of the oil and gas.

Large point sources of emissions in Shetland have also been shown against the baseline to provide context, these are however not considered part of Shetland's baseline as the end user of products from these facilities are wider than Shetland for example Sullom Voe Terminal and Shetland Gas Plant. An end-user methodology has been used in calculating the Shetland baseline.

In 2019/20, Shetland was responsible for emissions totalling 764,200 tCO₂e from Scope 1 and 2 emissions and 174,500 tCO₂e from Scope 3 emissions, totalling 938,700 tCO₂e.

Shetland Islands GHG Emissions Baseline for 2019/2020 (ktCO₂e)



Participation



People

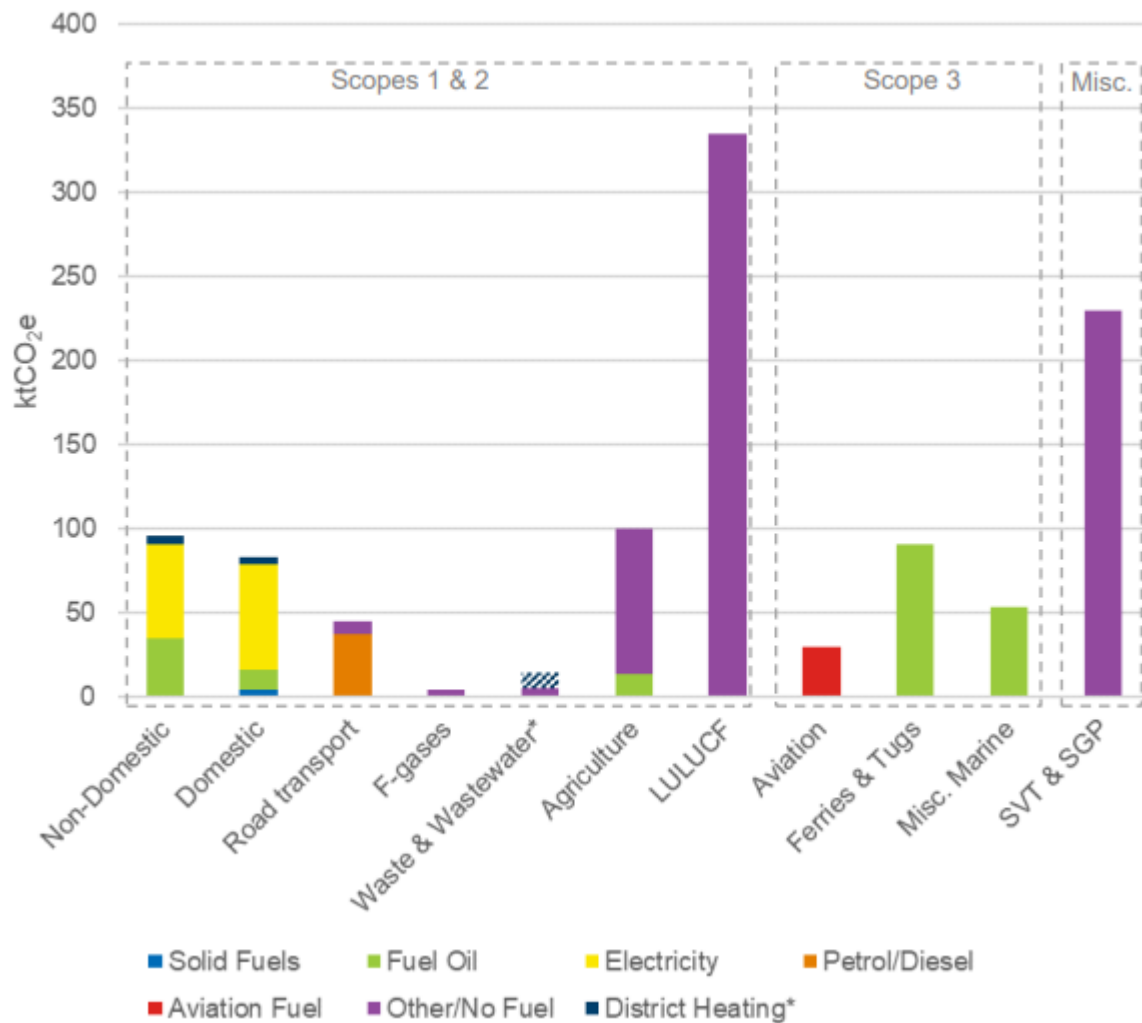


Place



Money

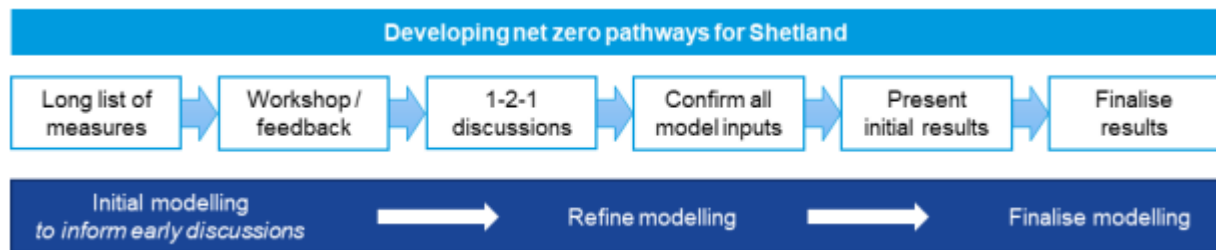
Appendix 3: Shetland Net Zero Route Map Overview



* Emissions from the ERP, which incinerates waste, could arguably be included in the 'Waste & Wastewater' category or in the domestic and non-domestic buildings category as it is used as a heat source. It is shown in both categories to provide scale.

The GHG emissions profile for Shetland is highly unusual. In contrast to most Local Authorities, where emissions are dominated by energy use in buildings and road transport, some of Shetland's largest sources of emissions are from land use, energy industries and agriculture.

Following establishment of Shetlands emissions baseline, the following methodology was used to develop the net zero pathways:



Several stakeholder events were held during the development of the Net Zero Route Maps, engaging over 100 stakeholders across Shetland. Stakeholder involvement and partnership working is particularly strong in Shetland, which is absolutely essential in having a co-ordinated and collaborative approach to addressing climate change and accelerating progress.

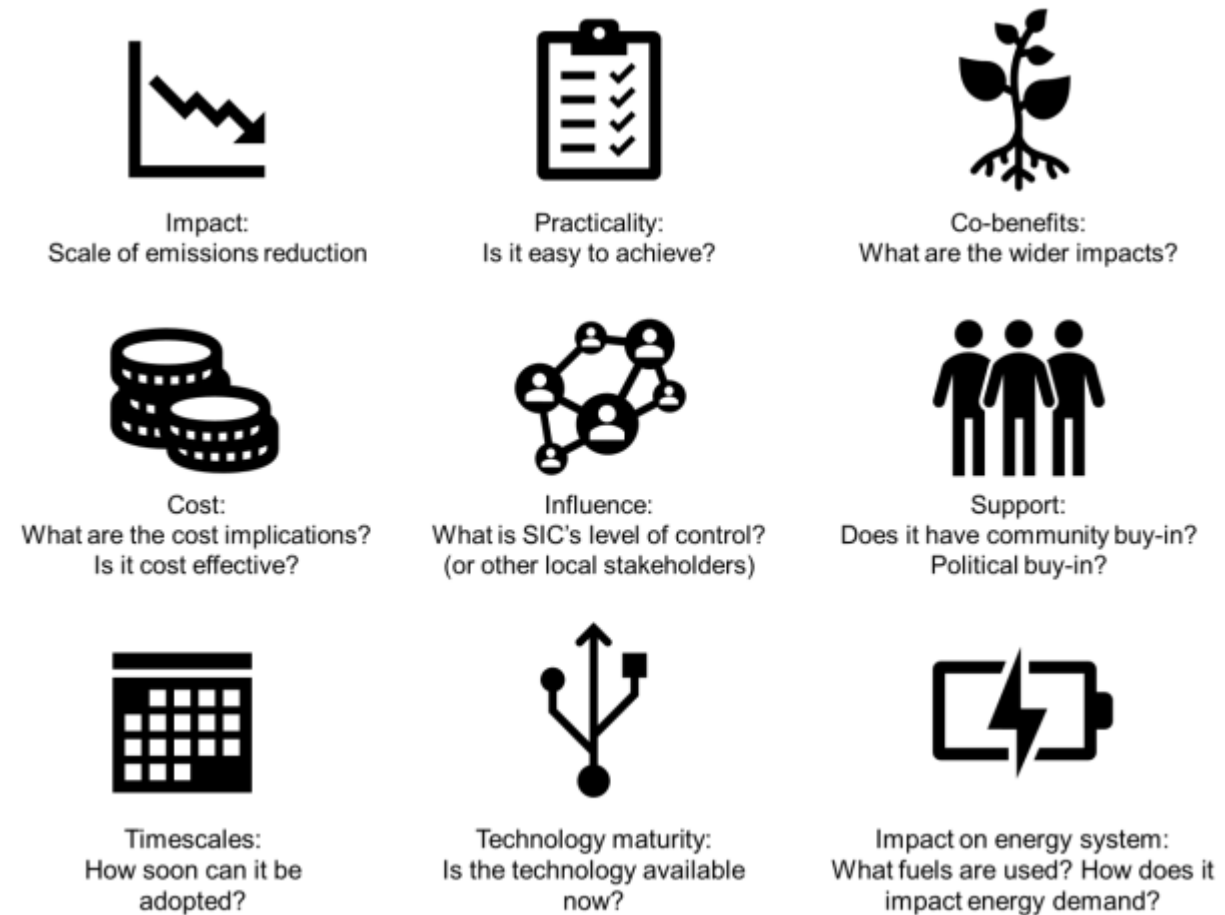
This process identified a variety of GHG mitigation measures that can deliver important economic, social and environmental co-benefits. Some of the major opportunities identified included:

- Peatland restoration – this is the single most impactful mitigation measure for Shetland.
- Improving standards of living, lowering fuel bills by retrofitting buildings and ensuring that everyone has access to affordable, low carbon heating and energy.
- Leading the way on sustainable agricultural practices and paludiculture
- Contributing towards the decarbonisation of the wider UK energy system via large-scale renewable energy technologies and storage systems.
- Becoming a hub of innovation for technologies such as green hydrogen, CCS and tidal power, which could include a micro-CCS pilot project at the Lerwick ERP.

The other measures evaluated for each sector covered a range of options relating to energy efficiency, behaviour change, and low or zero carbon technologies.

When prioritising measures, consideration was given to:

Appendix 3: Shetland Net Zero Route Map Overview



Once ambitious but appropriate measures and timescales were developed through stakeholder engagement, pathway projections were modelled for Shetland's journey to net zero, as can be seen in the graphs below:

Projected all GHG emissions reductions following implementing pathway measures:



Participation



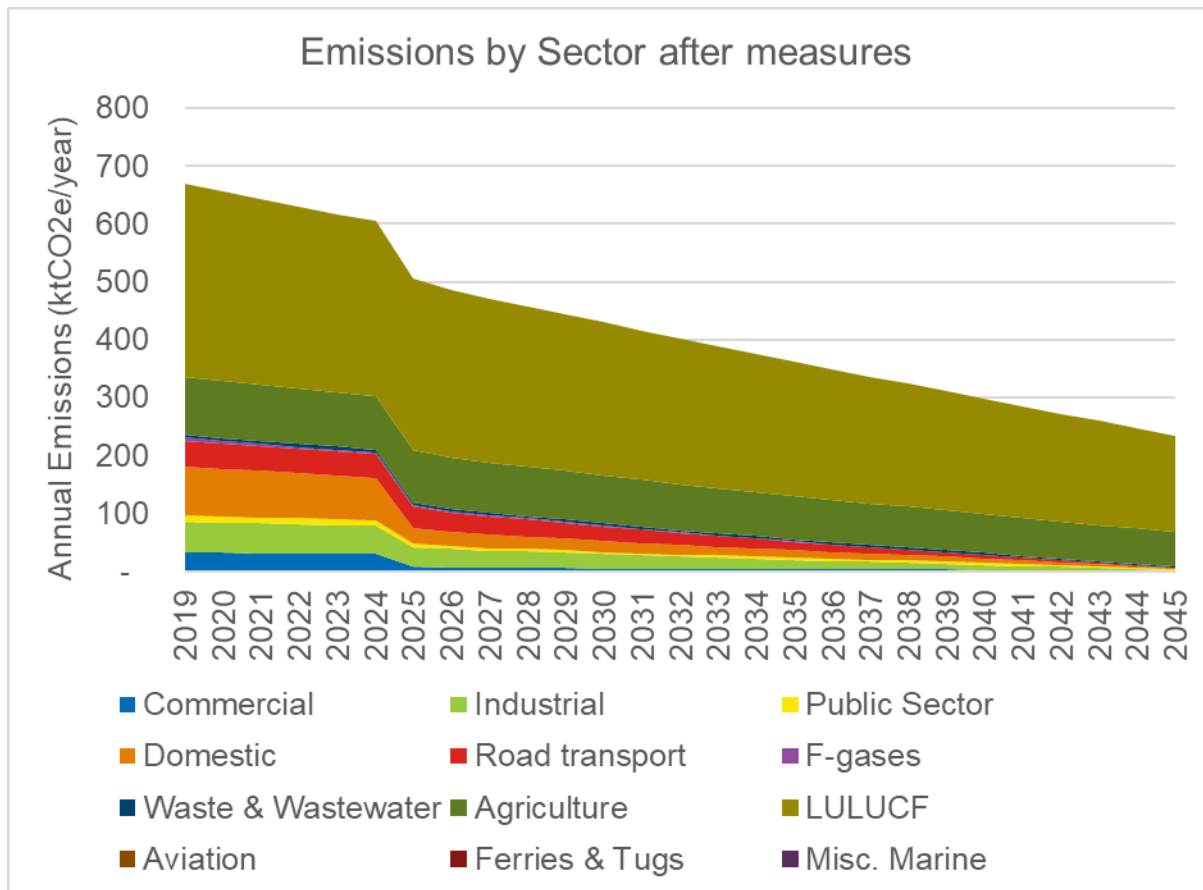
People



Place

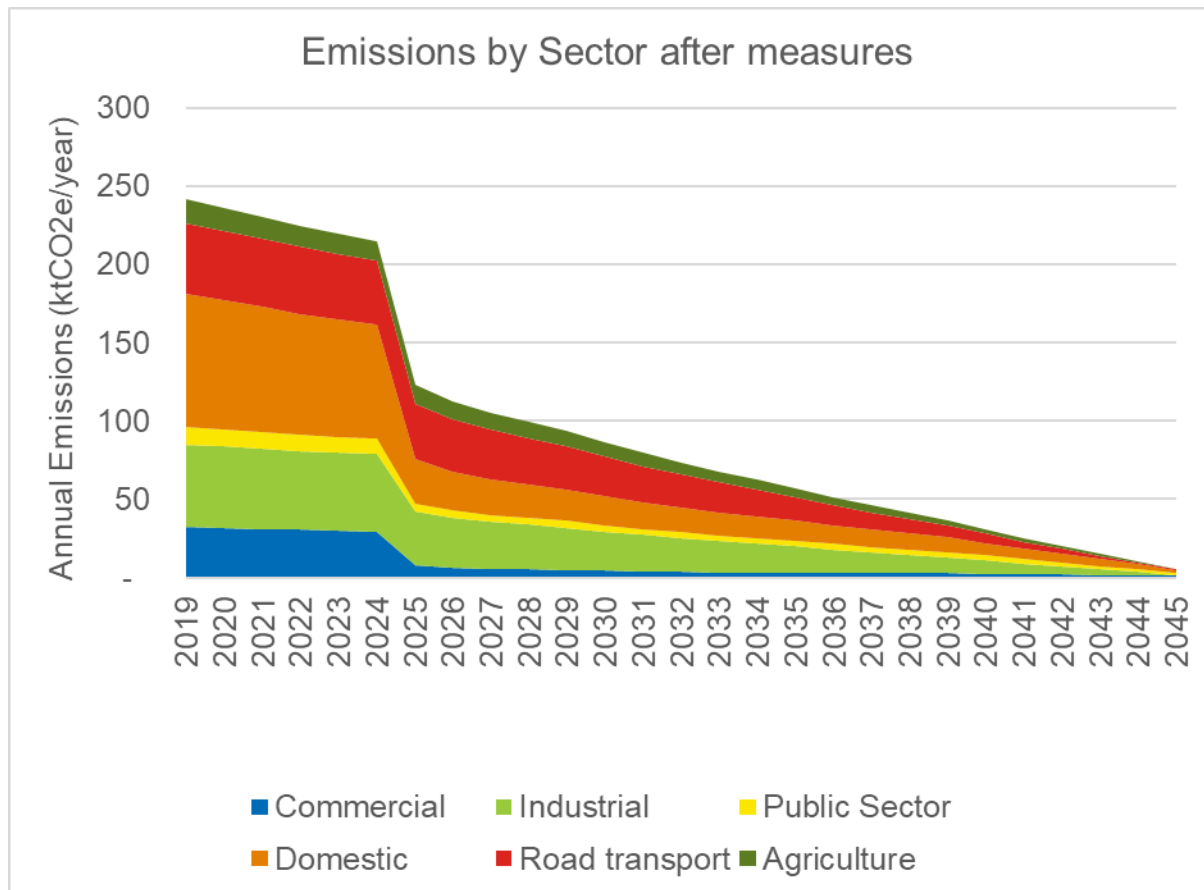


Money



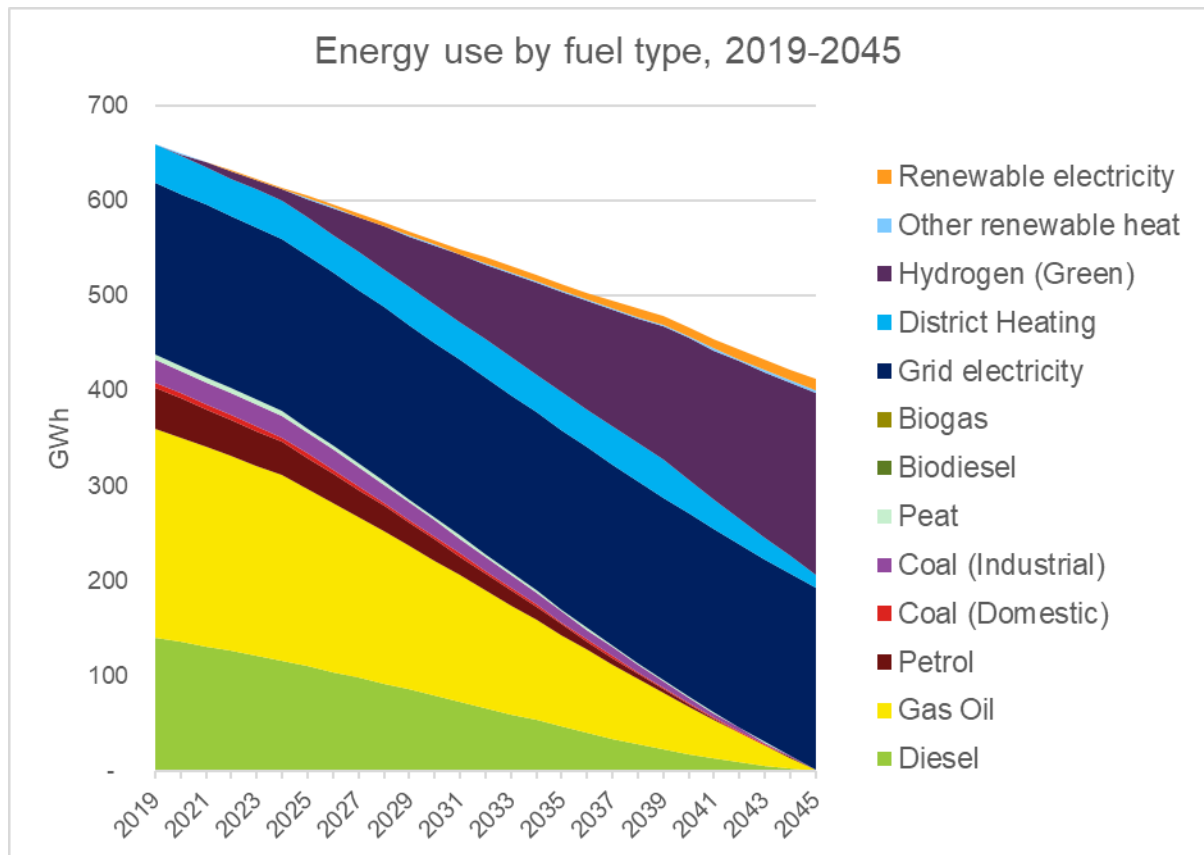
Approximately 65% reduction

Projected fuel only GHG emissions reductions following implementing pathway measures:



Approximately 95-100% reduction

Changes in fuel consumption following implementation of measures:



The GHG baseline assessment, pathways analysis and stakeholder engagement process undertaken during the Net Zero Route Map project highlighted important mitigation measures that must be adopted in Shetland to reduce emissions. In very broad terms, the key components to achieving this are:

- Phasing out the use of fossil fuel.
- Working towards changing the way that land is used and managed in order to tackle non-energy-related emissions.

Both require close engagement with the local community to ensure that the transition is fair and avoid any unintended negative social, economic or environmental consequences.

Key messages from the pathways modelling are as follows:

- Electrification of buildings and transport, and connection to the mainland electricity grid, will have a very important role to play in reducing emissions from energy use in Shetland. These could feasibly be reduced to net zero by 2045 if all fossil fuels are replaced with zero-emission alternatives, such as decarbonised grid electricity or green hydrogen.



Participation



People



Place



Money

Appendix 3: Shetland Net Zero Route Map Overview

- A significant portion of emissions are associated with sectors that are difficult to electrify (e.g. aviation, marine vessels, etc.) or are not associated with energy use at all (e.g. land use and agriculture). At present it is not clear whether there will be technologies available by 2045 that can mitigate these sources of emissions.
- It is likely to be difficult or impossible for area-wide emissions in Shetland to get to net zero by 2045 based on currently available technologies or mitigation methods, barring a systemic overhaul of the economy, land uses, consumer habits and social engagement.

The emissions profile in Shetland makes it unlikely that net zero can be achieved across all sectors without CCS. With that in mind, it will be important to:

- Maintain high levels of ambition while focusing on measures that can definitely be adopted by 2045.
- At the same time, plan ahead to take advantage of new technologies or solutions that may become available in future years.
- Work with the local community and businesses to ensure that the economy and society are prepared for the wider-scale changes that will take place as the UK and the world transition to a net zero future.

Whilst there are a huge number of actions that will need to be taken to transition to net zero, they can be simplified into four main areas:

- Start mainstreaming carbon neutrality considerations into all activity.
- Accelerate activities to reduce emissions immediately.
- Plan for larger emissions reductions longer-term.
- Increase visibility of action on carbon neutrality to enhance and support buy-in.

These measures offer the potential to transform the way that people live in Shetland for the better, improving standards of living and further strengthening Shetlands unique, highly resilient community.

The full Shetland Islands Council and Shetland Net Zero Route Map reports can be found on the Shetland Islands Council website.

