



Yell

Community Climate Action Plan

May 2023



Carbon
Neutral
Islands



About the plan

The Carbon Neutral Island (CNI) project is a Programme for Government commitment by the Scottish Government that aims to demonstrate the climate-resilience and low carbon potential of islands. This Community Climate Action Plan (CCAP) is a community record of existing knowledge and data and prioritises key actions towards achieving a carbon neutral and sustainable future. This action plan is intended to be a 'living document' owned by the Yell community, which can be reviewed and amended to reflect the progress made on Yell's decarbonisation journey.

North Yell Development Council (NYDC), the local community anchor organisation for the Carbon Neutral Islands Project on Yell, employs a community development officer who has led on the development of this plan. NYDC is one of Shetland's oldest and most successful

development groups with a history stretching back to the 1940s. NYDC was established to strengthen the community, enhance the local tradition of pulling together to get things done with a focus on making the community a better place to live, work and visit. From the outset the group identified the importance of Enterprise, Initiative and Self-Help, three concepts which still feature on the NYDC's letterhead today.

Scottish Government commissioned Community Energy Scotland to act as the key delivery partner for the initial phase of the project. A key aim from government is to ensure the community is at the heart of the project. Community Energy Scotland was chosen given their previous experience of engaging with communities and delivering community-led projects.

Acknowledgements

This plan would not have been possible without the support of our key project partners:

Community Energy Scotland (CES) is Scotland's only national charity dedicated to supporting communities across Scotland to develop their own decarbonisation & renewable energy projects. They have supported us by carrying out our energy and transport carbon audit, providing community outreach expertise, networking opportunities, shared learning and facilitation of training opportunities, as well as support in the production of this action plan.

Scottish Communities Climate Action Network (SCCAN) provided a range of training to CNI Community Development Officers (CDOs) and representatives from steering groups and anchor organisations to equip the project members with the skills and confidence to deliver effective engagement events in the island communities.

Sniffer have led on the components of the work on climate resilience and adaptation, including support to prepare climate and coastal change assessments and working with live scribes to create visualisations of island specific issues.

The CNI Community Development Officer for Yell, would also like to thank the following organisations for their contribution to the development of this Community Climate Action Plan:

- **The Yell Community**
- **The Yell CNI steering group**
- **Shetland Islands Council**
- **Shetland Amenity Trust**
- **Other Carbon Neutral Island communities and CDOs from Barra, Cumbrae, Hoy, Islay and Raasay**

Contents

Executive Summary	1
1. Yell and the Climate Emergency	3
1.1. Climate Change	3
1.1.1. Benefits of decarbonisation	3
1.2. Island environment	4
1.2.1. Background to Yell	4
1.2.2. Yell Adaptation Map	4
1.3. Demographics of the island	5
1.3.1. Population	5
2. The Carbon Neutral Islands Project	6
2.1. Introduction to the project	6
2.1.1. What is Carbon Neutral?	6
2.1.2. Drivers underpinning the Carbon Neutral Islands Project	6
2.1.3. Aims for the CNI Islands	7
2.1.4. An Island Led Approach	7
3. Carbon Audit Overview	8
3.1. Methodology Overview	8
3.2. Key Findings	8
4. Areas for Action	9
4.1. Energy	10
4.1.1. Carbon Audit	11
4.1.2. Community climate actions	11
4.2. Housing	12
4.2.1. Carbon Audit	13
4.2.2. Community Climate Actions	13
4.3. Transport	14
4.3.1. Carbon Audit	15
4.3.2. Community climate actions	16
4.4. Land use, Agriculture and food	17
4.4.1. Carbon Audit	17
4.4.2. Community climate actions	19
4.5. Blue carbon	20
4.5.1. What is blue carbon?	20
4.5.2. Blue Carbon Potential	20
4.6. Waste and wastewater	21
4.6.1. Carbon Audit	21
4.6.2. Community climate actions	22
4.7. Business, Economy, and Community Resilience	23
5. Community engagement	24
6. Next Steps	26
6.1. Review of the Climate Action Plan	26

Executive Summary

The Carbon Neutral Island (CNI) project is a Programme for Government commitment by the Scottish Government, focusing on the islands of Yell, Barra, Cumbrae, Hoy, Islay and Raasay to support them to become carbon neutral by 2040. In this first phase of activities, wide ranging baseline carbon audits were carried out for each island which identified key carbon sources and sinks with the aim of stimulating discussion and engagement with the local community. These discussions have helped to identify and shape the key community priorities presented in this island-led action plan in an effort to lower emissions and improve resilience on Yell.

Top priority actions

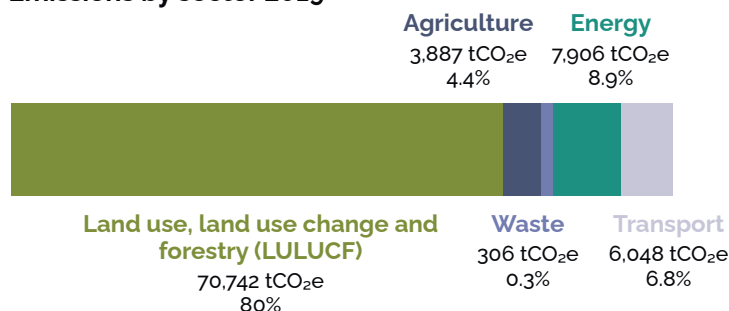
The actions from the community consultation and engagement events have been split into various sections within this report, however, below are the top 6 actionable projects which the community felt strongly about being delivered as part of the plan:

- 1** Investigate fixed links/tunnels as an alternative to ferries to encourage business sustainability, population retention and growth while reducing emissions.
- 2** Establish community hubs for food, warmth and information during power cuts, communication failures and weather events.
- 3** The improvement of housing stock to increase energy efficiency, with an emphasis on measures which also increase available housing stock.
- 4** Increased access to local food and spaces to grow more food locally.
- 5** Benefits arising from renewables projects built on Yell should be directed to the benefit of the local community.
- 6** Develop community skip and scrapstore to reduce waste to landfill and encourage a circular economy.

Carbon Audit Overview:

As part of the development of this action plan, baseline carbon audits were carried out to identify the key sources of greenhouse gas emissions in Yell, with the aim of supporting the identification of priority areas for decarbonisation.

Emissions by sector 2019



The graph above gives an overview of emissions from each of the audited sectors: land use, land use change, and forestry (LULUCF); agriculture; waste; energy; and transport. The largest source of emissions comes from the LULUCF category. These emissions occur primarily from peatlands, much of which has been considered to be in a degraded state and as such is acting as a net source of emissions. The data for this section is based on satellite imaging and the emissions totals are heavily dependent on the emissions factor applied. These emissions factors are related to the quality of peatland, for which, further analysis is required to increase the accuracy of the assessment. The data regarding land use emissions is currently considered to be of low certainty.

Blue carbon is not currently covered by the GHG Protocol and is therefore considered separately.



Figure 1 - Waves Crash onto Westsandwick beach as the sun sets at the Ramna stacks, photo credit: Ryan Nisbet

Next Steps

This plan is the first phase of Yell's detailed exploration into lowering the GHG emissions of the island while improving quality of life for residents and the resilience of our community. It is important that the community continue to review the plan and its actions, as well as adapt it to take into account any changes within the community over time.

Immediate actions which are noted as important for the community following this plan include:

- Allocating lead roles and responsibility for each action in order to start pursuing them.
- Develop an investment strategy aimed at costing the community climate change action plan and at identifying finance that can be channelled towards the implementation of the Plan.
- Ground truthing and further data gathering in the land use and blue carbon sectors.
- Ensuring that the implementation of the Plan is driven by the island community and its success does not rely on volunteer action.

This Action Plan is a tool for the whole community to use to support the long-term sustainability of the island, its people, and its environment into the future.



1. Yell and the Climate Emergency

1.1. Climate Change

Climate change and nature loss are amongst the greatest threats facing our planet. Small, low-lying islands are under threat from climate change and predicted rising sea-levels. Climate change is expected to increase instances of flooding and coastal erosion, whilst simultaneously negatively affecting water supply, food production, health, tourism, and accelerating habitat depletion.

Scotland has declared a climate emergency and stepped up its climate action and commitments through Scotland's 2019 Climate Change Act – calling for net zero greenhouse gas emissions by 2045. Scotland's climate change legislation also ensures we prepare and adapt to the impacts which are already locked in, including rising sea levels and more extreme weather.

1.1.1. Benefits of Decarbonisation

While the overall aim of decarbonisation is to address global climate change, at a local level there are direct benefits from community climate actions. Benefits can include reducing costs for households and businesses, healthier people and places, and new opportunities for employment and skills development within a new, decarbonised, economy.

This plan aims to address the need for both **adaptation** actions that manage and reduce the negative impacts of climate change, and **mitigation** actions that reduce emissions that contribute to climate change. Figure 2 illustrates that adaptation and mitigation often overlap, and both are needed to help reduce risks from changes in climate and weather and increase community resilience.

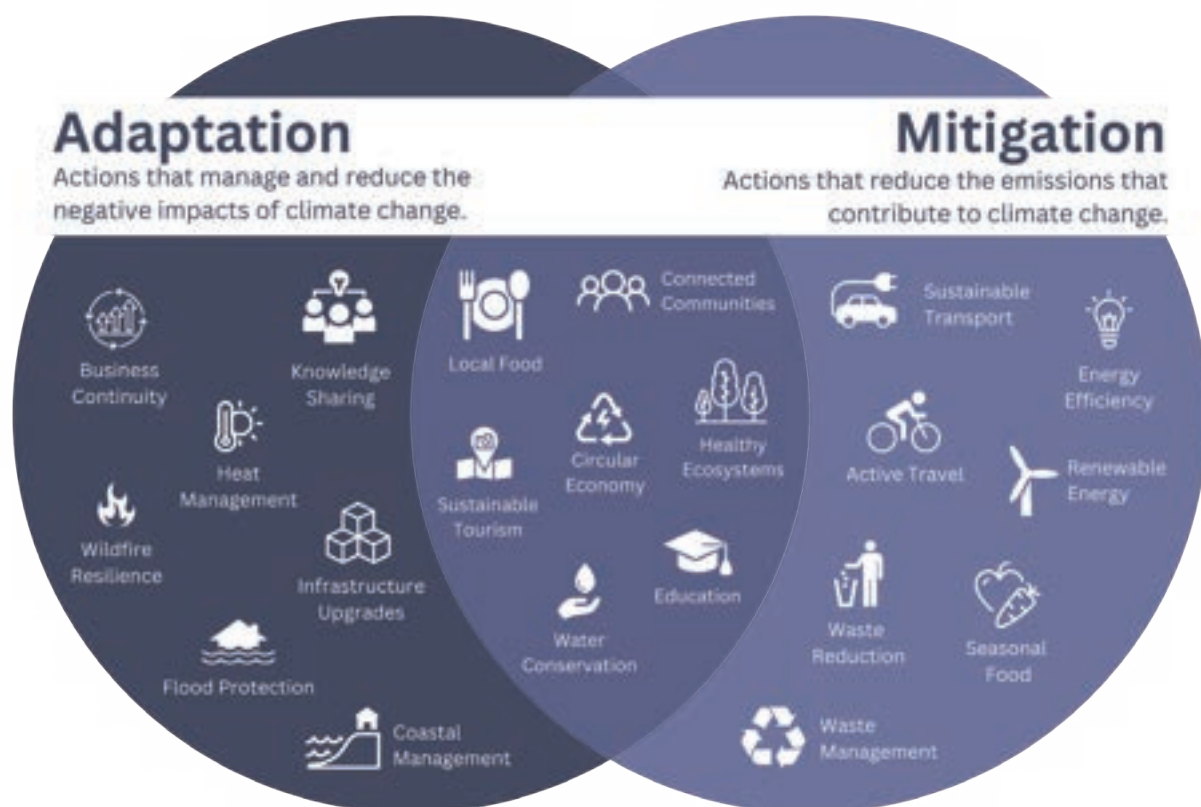


Figure 2. Diagram illustrating the overlaps between climate change adaptation and mitigation actions. Adapted from Highland Adapts, available at: <https://highlandadapts.scot/>.

Figure 4 - Adaptation map for Yell

1.3. Demographics of the island

1.3.1. Population

The 2011 Census recorded Yell's population at 966 people.

A key issue for Yell is the aging population. Historically, young people move away for opportunities to work and study, while older residents often move to Yell to retire. This is shown in the 2011 census data highlighted in Figure 5, which indicates that compared to the national average, Yell's population has a lower population aged 16 to 29 years old and a higher population aged 60 to 74.

A lack of housing has been identified as a significant issue for Yell as it is a limiting factor in retaining and increasing the population,

particularly young people. This cross-cutting issue prevents socio-economic growth due to a reduced workforce and limitations on community growth.

Low house prices and high construction costs have historically prevented many local people accessing mortgages due to the issue of negative equity whereby the cost of building a house in Yell is greater than the value of the completed house. Most houses constructed in recent years have been self builds, and people must be committed to staying on-island long-term due to the issue of negative equity and must raise other funds as banks will not cover negative equity. There has been limited construction of social housing in Yell over recent decades and there is limited availability.

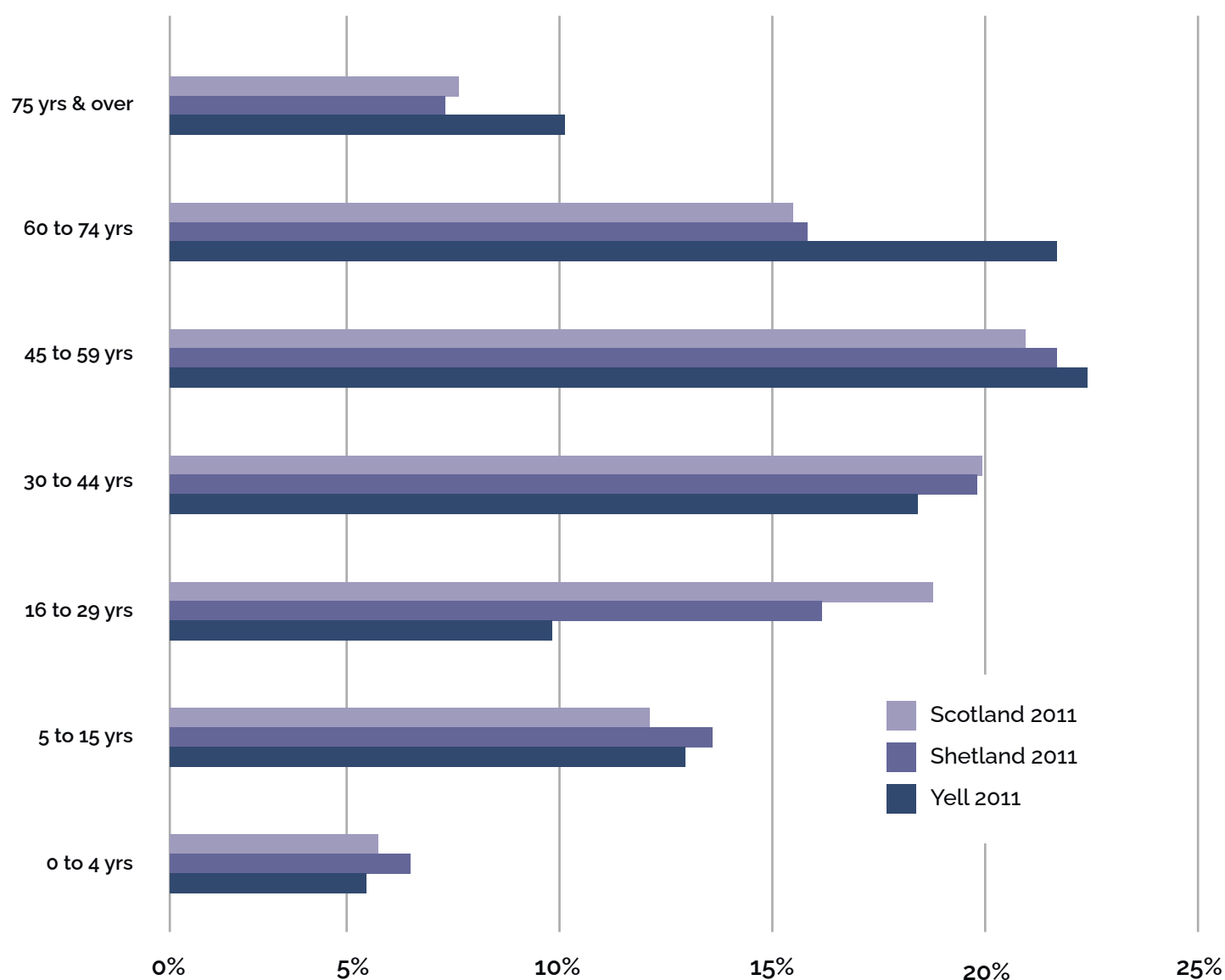


Figure 5 - Demographic age profile of Yell, Shetland, & Scotland 2011

2. The Carbon Neutral Islands Project

2.1. Introduction to the project

In May 2022 the Cabinet Secretary for Rural Affairs and Islands announced the six Scottish islands to be supported by the Carbon Neutral Islands project: Yell, Barra, Cumbrae, Hoy, Islay and Raasay. The CNI project includes one island from each of the local authority areas with responsibility for islands in Scotland.

More widely, the CNI project will help to deliver key commitments in the National Islands Plan² and the National Performance Framework³, create island-based jobs, and support islands to adapt to the negative effects of climate change.

The project aims to align with wider net-zero and decarbonisation efforts and will contribute to the Scottish Government's statutory target to reach net zero by 2045.

2.1.1. What is Carbon Neutral?

The Project considers carbon neutrality akin to net zero. Accordingly, a carbon neutral island is an 'island where the greenhouse gas (GHG) emissions (captured as CO₂ equivalent) are in balance with the sinks'. Sinks can be natural resources capable of absorbing CO₂ (trees) or technological solutions that do the same thing (carbon capture and storage). This project aims to achieve carbon neutrality on each of the 6 islands by 2040, five years prior to Scotland as a whole.

The Project will look at carbon neutrality as broadly as possible in line with the Scottish Government's updated Climate Change Plan list of sectors:

- Electricity
- Buildings
- Transport
- Industry
- Waste and the Circular Economy
- Land Use, Land Use Change and Forestry (LULUCF)
- Agriculture
- Negative Emissions Technologies

In addition, the project will also include a blue carbon component which will support Scotland to refine its nationwide methodologies in this field.

2.1.2. Drivers underpinning the Carbon Neutral Islands Project

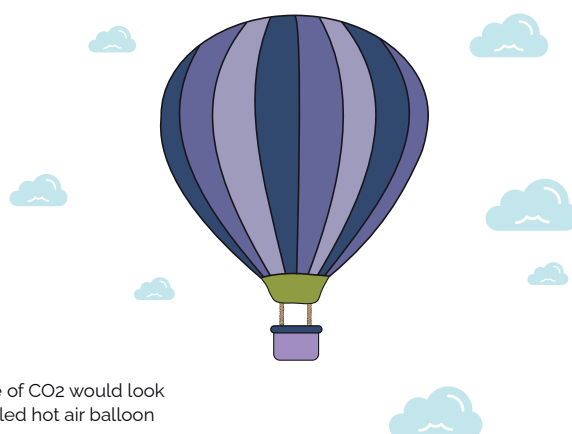
The CNI project is underpinned by the following key drivers: alignment, justice and inclusion, and replicability.

Alignment: The project aims to align with existing island-based climate change efforts and to avoid duplication. The first step towards this was a study which mapped existing island-based climate accounting exercises, projects and funding sources.

Justice and inclusion: The project will support islands to become carbon neutral in a just and fair way. To ensure this, the project will consider the recommendations of the Just Transition Commission. Fairness will be promoted through an effective bottom-up participatory process driven by the six island communities.

Replicability: The work is being completed to standardised and agreed methodologies wherever possible in order to allow replication and direct comparison. All Scottish islands will benefit from the project through knowledge sharing of good practice from the implementation of the project. The six islands will act as 'Lighthouse Communities' for other Scottish islands and as catalysts for net zero action across Scotland.

² <https://www.gov.scot/publications/national-plan-scotlands-islands/documents/>
³ <https://nationalperformance.gov.scot/>



A tonne of CO₂ would look like a filled hot air balloon

2.1.3. Aims for the CNI Islands

By 2040 the goals for each of the six islands are:

- The island community has achieved carbon neutrality.
- The net zero journey has been driven by the island community itself.
- Learnings from the six CNI islands are used to influence the Scottish Government Islands Team, Local Authorities, Climate Regional Hubs and the Islands Centre for Net Zero and help to develop resources to support other Scottish islands on their decarbonisation journeys.

Whilst the overarching theme of the project is climate resilience the project aims to improve quality of life, create employment and improve the sustainability of the community.

2.1.4. An Island Led Approach

On Yell the CNI project is led by an island steering group of community representatives who identified North Yell Development Council (NYDC) as the anchor organisation. NYDC is funded by the project to employ a local CNI Community

Development Officer (CDO). The CDO is the link between the Steering Group, the Community, and the external agencies involved in the project, supported by Community Energy Scotland (CES).

The CDO has worked closely with the technical team at CES to ensure local data informs the initial carbon audit, detailed in Section 8, which includes work by the external consultants. The carbon audits, along with climate and coastal change assessments by Adaptation Scotland and JBA Consulting, are tools to help identify and highlight potential key areas for decarbonisation, mitigation and adaptation actions. However, the actions within the Community Climate Action Plan look beyond the data to reflect the island community's priorities for a flourishing carbon neutral future.

The Community Climate Action Plan (CCAP) helps the community record existing knowledge and data, prioritise key projects and schedule actions towards a carbon neutral and sustainable future. The CCAP is a 'living document' owned by the Yell community, which can be reviewed and amended to reflect the progress made on the island's decarbonisation journey.



3. Carbon Audit Overview

To help support the identification of priority areas for decarbonisation, and to track progress towards achieving carbon neutrality, carbon audits have been carried out to establish a representative baseline of greenhouse gas emissions on Yell. It is thanks to the cooperation of local residents and businesses that this exercise has been possible. The audits quantify greenhouse gas (GHG) emission sources and sinks for key sectors – Energy; Transport; Waste; Agriculture; and Land-Use, Land-Use Change and Forestry (LULUCF).

3.1. Methodology Overview

The audits for energy, transport, waste, agriculture and LULUCF follow the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (2021)⁴ which is itself aligned with IPCC guidelines (2019)⁵. This is an internationally recognised standard which enables communities to identify, measure, and report where their emissions come from in a robust and consistent way. The audits are intended as a tool to help understand the different sources of emissions on and around the island, and to plan effective emissions reduction strategies. They provide a baseline to help to track progress over time. An initial study of 'Blue Carbon' potential was also conducted, however significant evidence gaps currently prevent its inclusion in the inventory. Further details are provided on this in the Blue Carbon section.

3.2. Key Findings

The graph below gives an overview of emissions from each of the different sectors, including LULUCF; Energy; Transport; Agriculture; and Waste. This is intended to provide an overall picture of the current level of emissions on Yell. While the analysis contains estimates and uncertainties, it helps to give an indication of the scale and pattern of emissions across each sector. Blue carbon is not included in the graph below as it is not currently covered by the Greenhouse Gas Protocol, and it is a new and emerging field.

Clearly, LULUCF is shown as the biggest emissions source, accounting for around 80% of Yell's total emissions. This is primarily due to the large areas of peatland on Yell, much of which has been assessed to be in a degraded condition and is therefore considered a source of greenhouse gas emissions. Although healthy peatland can capture and store CO₂ from the atmosphere, peatland that has been drained or otherwise degraded becomes a source of greenhouse gases. It is important to note that the level of uncertainty in the assessment of the LULUCF sector is much higher than for other sectors and it will be important to carry out more work to fully ground truth these results. It is also important that emissions from other sectors are not overlooked, as these are still significant and important to address.

The next largest sectors are energy and transport respectively. Within energy, the largest source of emissions is residential energy. Within the transport sector, the largest source of emissions is waterborne transport.

The findings from the carbon audits are discussed in more detail in each of the relevant sections. A full in-depth analysis of each of the sectors can be found in the respective carbon audit reports.

⁴ Global Protocol for Community-Scale Emissions Greenhouse Gas Inventories 11 (GPC 11). [online] Available at: <https://ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities> (Accessed: 17/03/2023)
⁵ 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories [online] Available at: <https://www.ipcc.ch/report/2019-refinement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/> (Accessed 17/03/2023)

Emissions by sector 2019



4. Areas for Action

The following sections reflect the themes of the carbon auditing process, and areas the community have identified as priorities for action. Ideas for actions were collected from the community in two main ways, these were: a household survey provided to every household as well as online, and a series of community engagement events. These ideas were then collected to include all the suggested ideas while avoiding duplication.

Ideas were separated out into categories which were then presented at a CNI event held in the Cullivoe hall, where people were invited to select their 3 favourite ideas from each of the action areas. This ranking was also available online for those who were not able to attend in-person.

The number of votes given to each idea was totalled, and this is presented beside each action idea. Ideas have been sorted into a ranking from highest to lowest in each category. The highest-ranking options in each category have been highlighted.

All ideas have been categorised to consider the likely timescale for each idea, this categorisation is shown in Table 1.

One tonne of CO₂ is roughly equal to:



3400 miles in a petrol car

1/5 of an average household's annual heating oil use

14 sacks of household coal



Categorisation

Timeframe

Short Term, S	0-1 Years
Medium Term, M	1-5 Years
Long Term, L	5+ Years

Table 1 - Timeframe categorisation



4.1. Energy

Emissions associated with electricity use contribute around 64% of total emissions from the energy sector on Yell, with heating oil accounting for around 18% of energy-related emissions and other fuels such as gas oil, coal, and peat making up most of the remainder.

Electricity on Yell is currently supplied by the Shetland-wide grid. This electricity has a significantly higher carbon intensity than the national grid, and this is one of the reasons why Yell's energy emissions are relatively high compared to the other CNI islands. This situation will change once Shetland is connected to the mainland grid via the new subsea cable, and emissions from electricity use will fall considerably. It will also allow for the export of renewable energy from Shetland to the UK grid.

The North Yell Development Council (NYDC) operates the 4.5MW Garth Wind Farm, consisting of five 900kW turbines. Nova Innovation have

installed the world's first offshore tidal array in Bluemull Sound. There are around 20 small-scale wind turbines on Yell (5–6kW capacity) and 1 domestic solar photovoltaic array (4kW).

Yell has two large wind farms proposed to be built. These are Statkraft's Energy Isles wind farm, a proposed 18 turbine project between 126MW and 200MW⁶ and the Beaw field project, a proposed 17-turbine, 72MW project⁷ which was recently purchased by Statkraft from Peel.

From the household survey, the most popular energy project action related to renewable projects directly connected to homes and businesses, as shown in Figure 6. Connecting homes and businesses directly to renewable projects would provide resilience against fluctuations in energy prices and could allow energy users to regulate their demand in accordance with times of peak production, reducing dependence on the grid.

The Yell Community Climate Action Plan will consider the potential to take forward projects in the islands as a whole. Which whole-island energy projects would you like included in your Community Climate Action Plan?

Rank in order of importance

1st choice 2nd choice 3rd choice 4th choice 5th choice

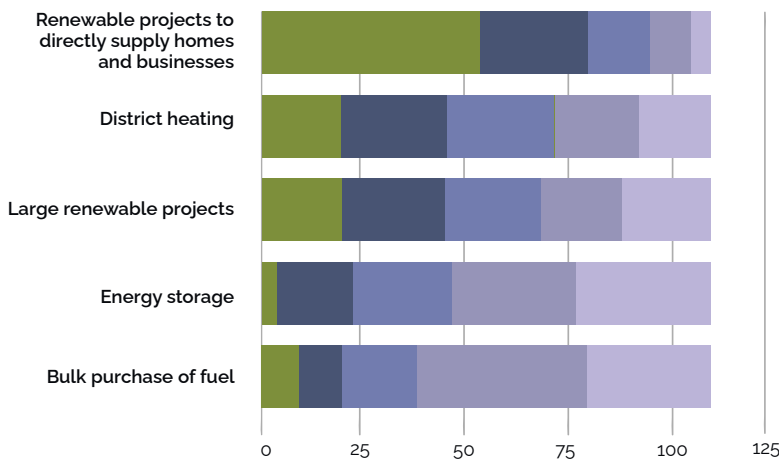


Figure 6 - Household survey - energy projects response

There is interest in Yell for energy developments to produce benefits for Yell. The most popular suggested benefit is the potential of energy

projects to lower fuel poverty, followed by increased local employment opportunities. These opportunities could support Yell to become more resilient, with a sustainable economy.

⁶ Report (statkraft.co.uk)

⁷ <https://peellandp.co.uk/news-and-views/news/government-support-for-two-shetland-wind-farms/>

What benefits would you most like to see from whole-island energy projects in Yell?

Rank in order of importance

1st choice 2nd choice 3rd choice 4th choice

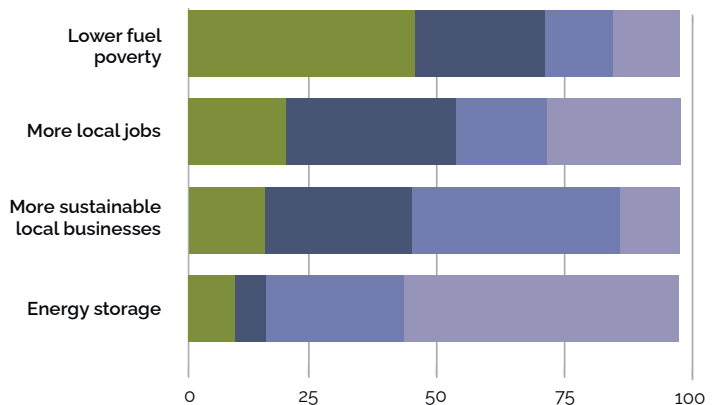
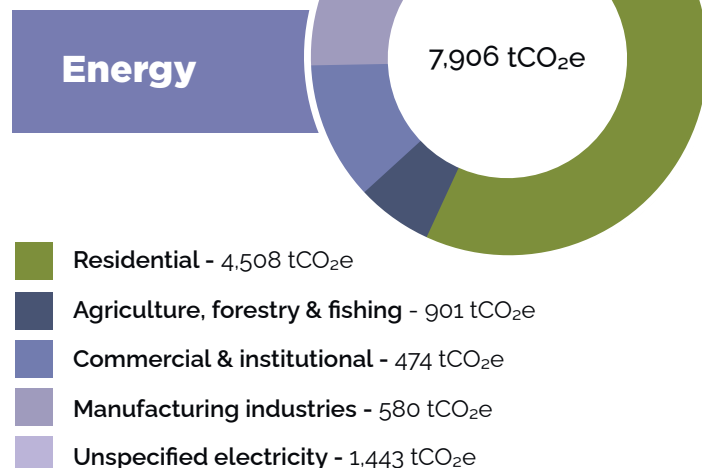


Figure 7 - Prioritisation of energy project benefits

4.1.1. Carbon Audit

Figure 8 - Energy related greenhouse gas emissions in Yell in tonnes of CO₂e



The graph above gives a breakdown of emissions from the energy sector. Residential energy use accounts for the greatest proportion, around 57% of overall energy related emissions. A more detailed breakdown of residential energy emissions is given in the Housing section below.

The commercial and institutional sector includes all public buildings on the island. Again, most of the emissions come from the electricity use, which is partly due to the high carbon intensity of electricity on Shetland. Biomass, in the form of wood pellets, is also an important energy source in the school and leisure centre. Biomass is generally considered a 'low carbon' fuel, provided it is sustainably harvested and is sourced as locally as possible. More work is needed to establish energy use from the full range of businesses on the island, though it is expected that much of the commercial sector is captured under 'unspecified electricity'.

4.1.2. Community climate actions

There is interest in a possible connection point to energy generated in Yell, such that in an event that there is a power cut, Yell will retain continuity of supply. The Yell community has also voiced an interest in small scale domestic renewables. The following three highest ranking actions relate to ambitions relating to large scale renewables and the ways in which they should benefit the local community, including through benefit funds, the cost of energy and local employment.

Number of votes	Action	Timescale
40	Yell should have a connection point to local renewables, such that during a power cut Yell can maintain continuity of supply.	L
32	Small scale domestic renewable energy projects (e.g., solar PV, micro wind, solar, solar hot water).	M
30	Community benefit funds from wind turbines on Yell should be spent locally.	M
25	Large scale renewables should reduce the cost of energy for local people.	L
23	Large scale renewable projects should support local employment in the project wherever possible including ongoing maintenance.	M
21	Support and advice for domestic renewable energy and energy saving including how to access funding.	S
15	Community owned energy projects.	M/L
13	Artificial micro grid where all houses have a share in a renewable project, making use of constrained energy to provide battery charging/storage heating at low cost.	M
12	Increased tidal power production.	L
9	Households and communities should have provision for heating and cooking in event of a power cut.	S
7	Large scale renewables should ensure significant measures to support biodiversity, wildlife and habitat.	S
6	Yell residents should have the opportunity to input into proposed projects.	M
6	Consider burying of transmission lines to increase resilience.	L
2	Investigate geothermal projects (large ground source heat).	L

4.2. Housing

Residential energy use accounts for the greatest proportion of overall energy use on Yell. According to figures available from the National Records of Scotland, which is based on Council Tax data, there are approximately 504 dwellings on Yell. Of these, it is estimated that 86% are occupied by full-time residents. A detailed survey of household energy use was carried out as part of this project, with questionnaires distributed to all occupied households on the island. A return rate of 26.5% was achieved. This survey showed that 35% of households do not feel they are able to adequately heat their homes. Furthermore, 68% of households are spending more than 10% of their income on energy use, suggesting that they are in fuel poverty, 27% of households spend more than 20% of their income on energy, suggesting that they are in extreme fuel poverty. The survey results are shown in Figure 9.

Spending on energy: What percentage of your total household income do you estimate is spent on energy? (electricity, heating oil, gas, coal, wood, peat etc)

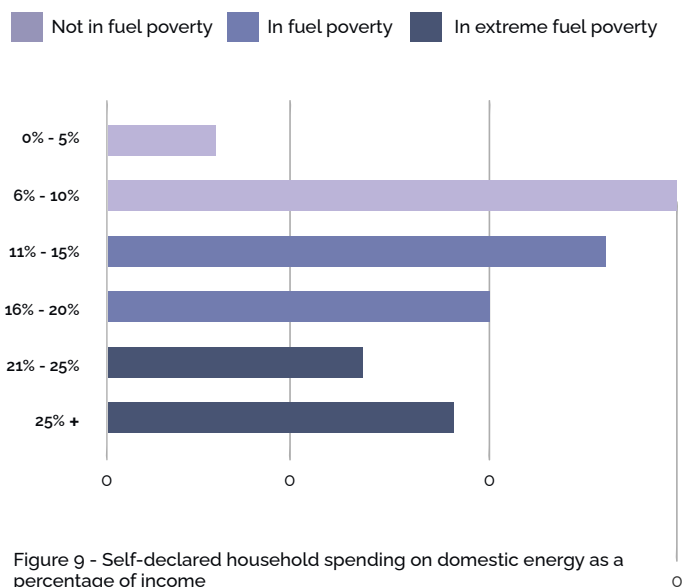


Figure 9 - Self-declared household spending on domestic energy as a percentage of income

Of those properties with an Energy Performance Certificate (EPC), around 84% have a rating of D or lower. All of this demonstrates that the housing stock on Yell is generally not energy efficient and is costly to heat, with many households in fuel poverty. There are clearly synergies and co-benefits to addressing the issues of home energy efficiency and reducing carbon emissions from the residential sector, and this is a high priority for the CNI project on Yell.

The household survey identified that among home energy projects, people are most keen to see domestic renewable energy systems and improvements to the energy efficiency of buildings, this is shown in Figure 10.

At a household level, a Community Climate Action Plan for Yell could include home energy projects. Of the examples given below, which would you be most interested in?

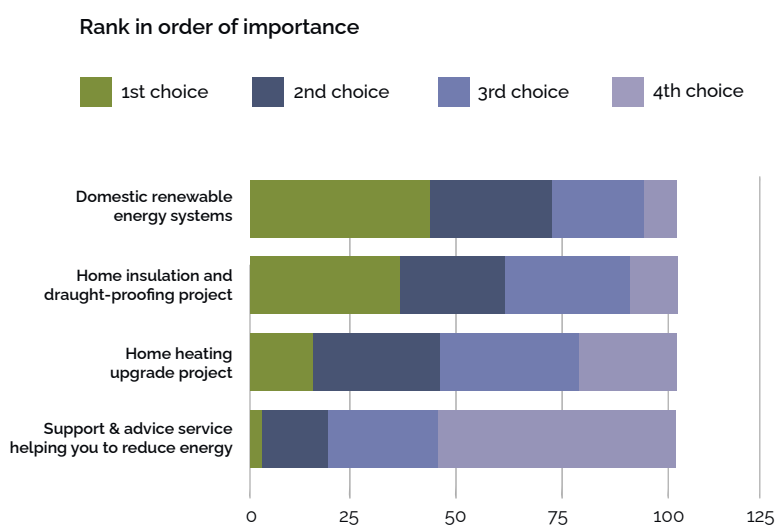


Figure 10 - Household Survey response to home energy project prioritisation

The impact of increased energy bills was identified as a factor currently impacting household in Yell. It is seen in Figure 11 that reducing energy bills is the single greatest reason people have to reduce their energy usage.

What would be your main motivation to review energy use in your home?

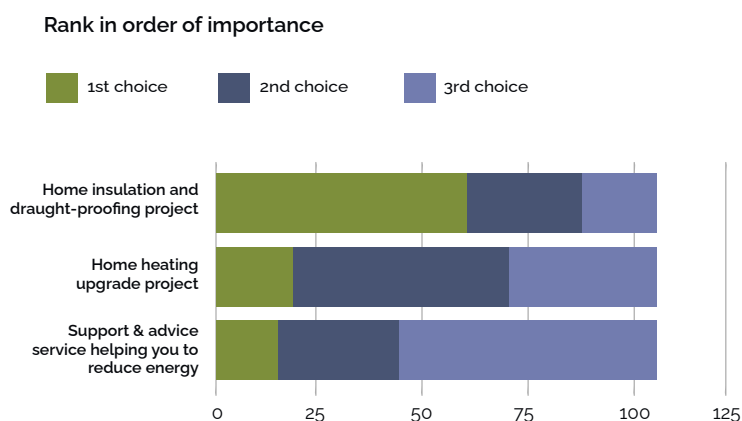


Figure 11 - Motivation to review energy use in households.

4.2.1. Carbon Audit

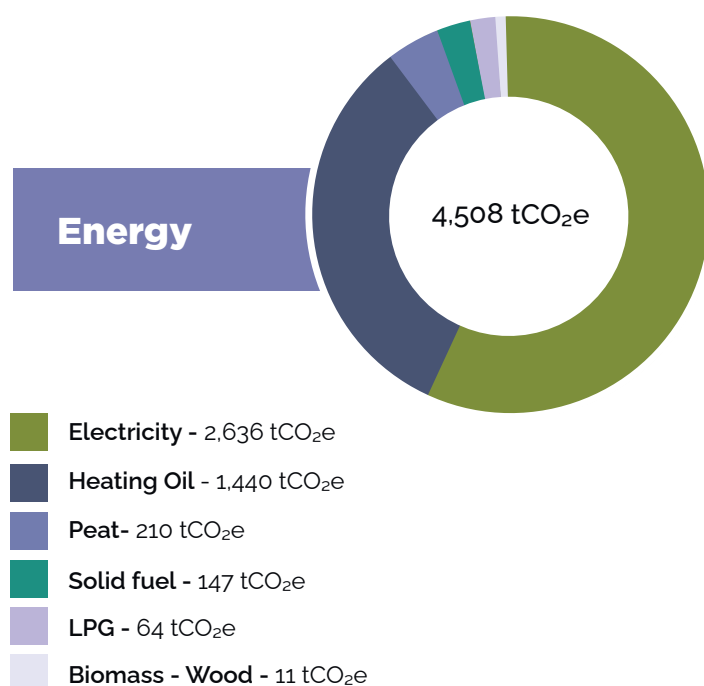


Figure 12 - Residential energy emissions by fuel type in tonnes of CO₂e

The average household on Yell uses around 8,700 kWh of electricity per year, though this varies considerably depending on the size of the house and how it is heated. In total approximately 3.9 GWh of electricity is consumed in domestic properties on Yell each year, which accounts for around 58% of total residential energy emissions. Based on the household survey, it is estimated that a total of 464,000 litres of heating oil is used for domestic

heating each year, accounting for 32% of residential energy emissions. The household survey also indicates that around 47 tonnes of coal and 200 tonnes of peat are burned for domestic heating annually and this accounts for most of the remaining emissions.

As explained above, Yell's electricity is supplied from the Shetland-wide grid which has a high carbon intensity compared to the national grid due to the high reliance on fossil fuels, particularly diesel used in the Lerwick power station. This situation will change once Shetland is connected to the national grid via subsea cable and Yell's emissions from electricity use will fall significantly as a result.

4.2.2. Community Climate Actions

The Yell community actions relating to housing can be summarized as the need to improve and increase the current housing stock. The most popular option was the replacement of inefficient doors and windows in homes. These measures are likely less intrusive than other measures such as insulation. Concerns were raised at consultations relating to the impact of adding insulation to older buildings, including the loss of space and the potential for damp.

Actions relating to increasing housing supply were ranked highly. The lack of suitable housing is often considered to be an issue for those looking to move to or remain on Yell.

Number of votes	Action	Timescale
51	Support to improve or replace old/inefficient doors and windows in homes.	M
45	Increase climate friendly housing supply to ensure people can find suitable homes both to buy and rent.	L
41	Improving insulation in all suitable properties, with specific consideration for older homes such as crofts.	M/L
21	New homes built to high energy efficiency standards and making use of renewable technology.	L
17	Investigate suitability of heat recovery systems and heat pumps.	M

4.3. Transport

There are two ferries operating on the Toft to Ulsta route connecting Yell to mainland Shetland, these are the Daggri and the Dagalien. The Bigga and the Geira vessels operate on the Yell-Unst-Fetlar triangle.

Yell acts as the connecting island to the north Isles, therefore the Yell sound service provides capacity for all of Yell, Unst and Fetlar.

Through the survey, there was a strong response in support of fixed links; 74% of 115 respondents put fixed links as a first choice and a further 11% put it as a second choice (85% of people put it in their top 2). There is a clear ambition within the community for fixed links, as has been shown through the recent formation of local tunnel action groups, which have been created to drive forward the case for fixed links. As part of the next phase of the CNI project, it is hoped that there will be capacity to further investigate the case for tunnels in the context of environmental, social, and economic sustainability and the



long-term benefits to the island. This will complement work already being brought forward by the Shetland Islands Council and Tunnel Action Groups, and fit well with longer term transport carbon reduction ambitions of both the Scottish and UK governments.

Low emission ferries were the option which was most selected as a second and third choice, highlighting the community awareness and interest in the need to decarbonise marine transport.

The Yell Community Climate Action could include travel projects. Are there any travel projects you would like to see included?

Rank in order of importance

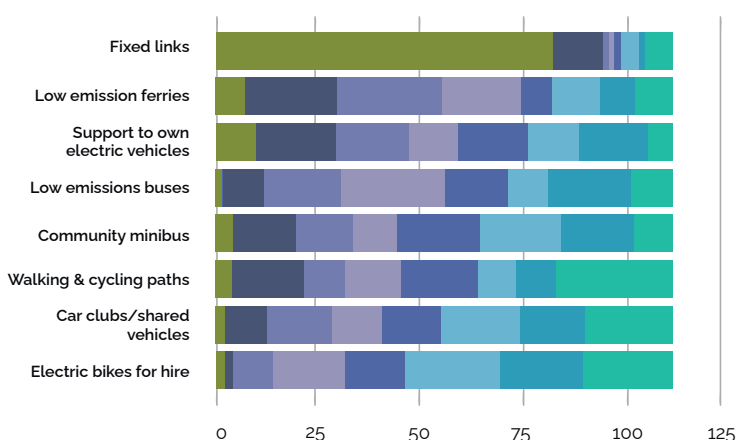


Figure 14 - Transport option ranking from household survey

Support to own low electric vehicles was the third most popular option in the survey. Car ownership on Yell tends to be high due to limited public transport options. The uptake of electric vehicles on Yell is still low at present, but gradually increasing. The high

upfront cost of EVs tends to be the biggest barrier to uptake. Electric vehicles have historically been free to charge at council operated charging stations, however, they have recently announced that this will now incur a charge⁸. This change will increase the cost of operating electric cars in Shetland; however, it may also promote greater provision of privately operated car charge points, increasing coverage. The high cost of travel for Yell residents was highlighted as a key reason to reduce travel related energy use, as shown in Figure 15.

⁸ Electric Vehicle charging tariffs from 11th April 2023 – Shetland Islands Council

What would be your main motivation to reduce your energy use with regards to travel?

Rank in order of importance

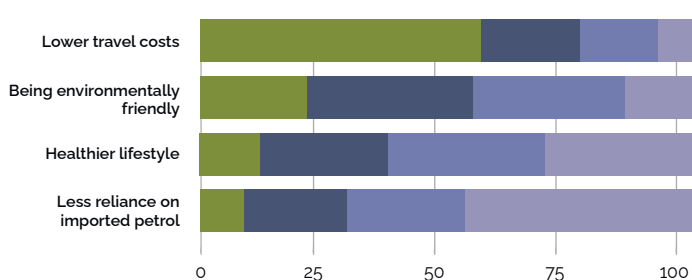


Figure 15 - Motivation for transport related energy reduction

4.3.1. Carbon Audit

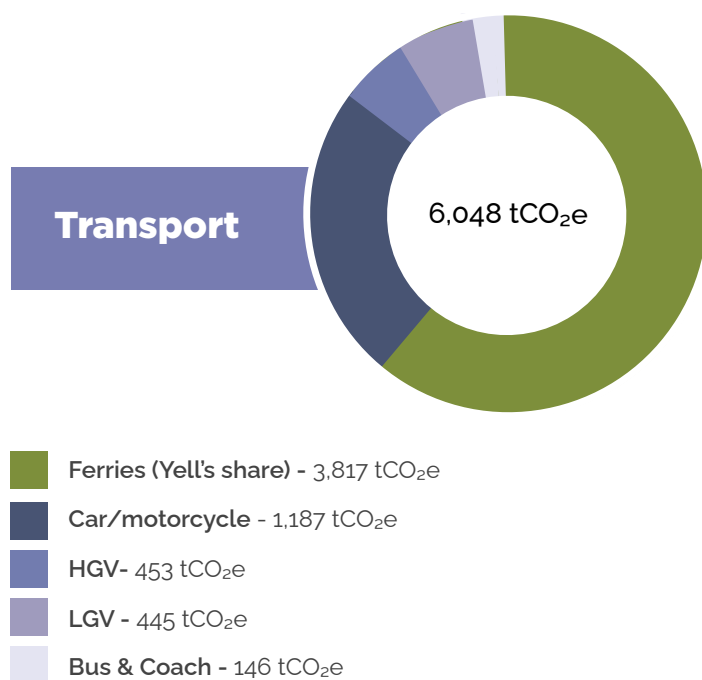


Figure 16 - Transport related greenhouse gas emissions in Yell, tonnes of CO₂e.

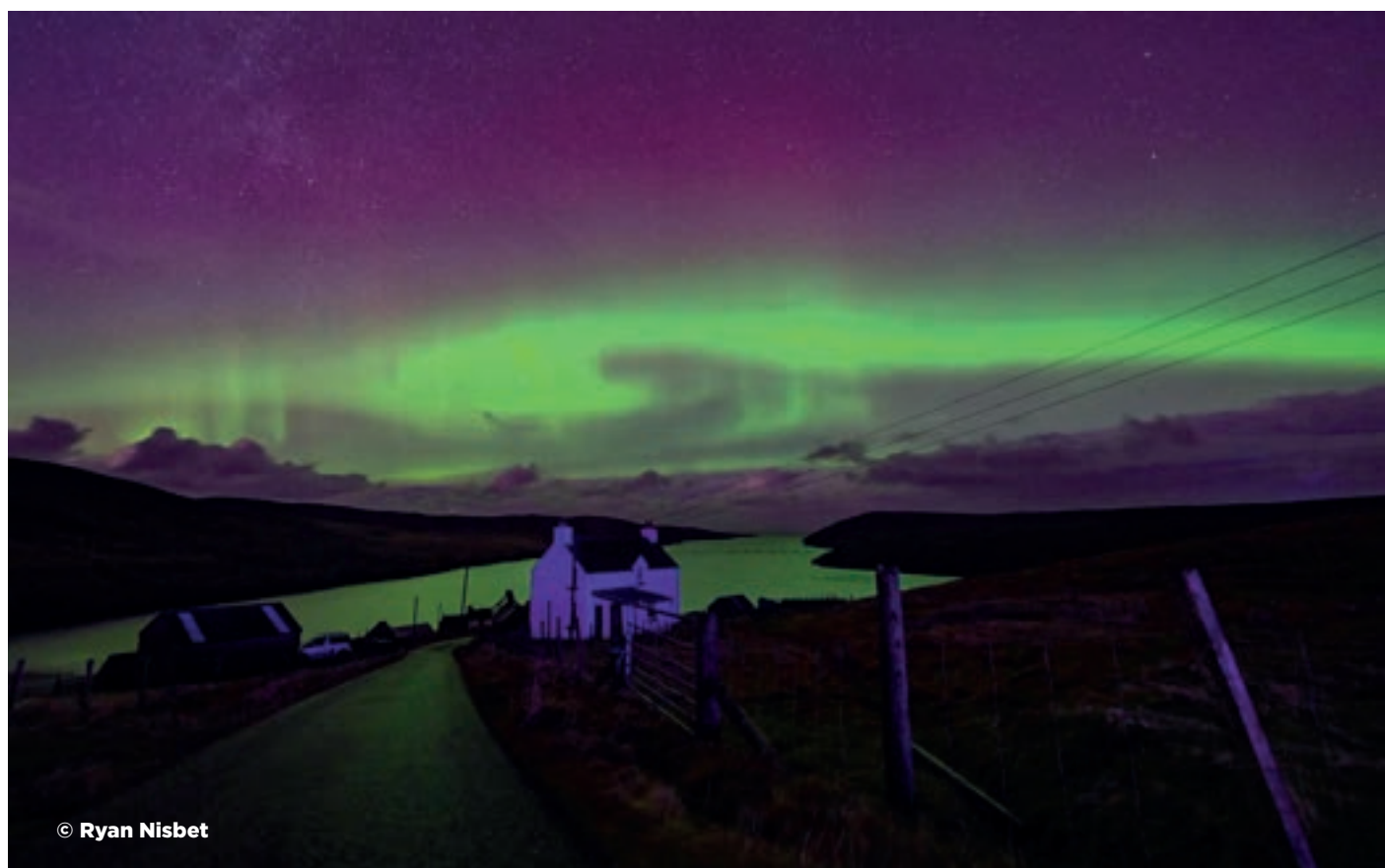
The graph above gives a breakdown of emissions from the transport sector. Yell's share of emissions from ferries accounts for around 63% of overall transportation emissions. This includes

emissions only from ferry journeys which depart Yell on both the Yell sound and Bluemull sound routes⁹.

Emissions from on-road transportation includes all cars, LGVs, HGVs, buses, and motorcycles registered on Yell. Cars account for 52% of on-road emissions, while HGVs account for 20% and LGVs (including pickups) account for a further 20%. Public buses and coaches make up most of the remainder.

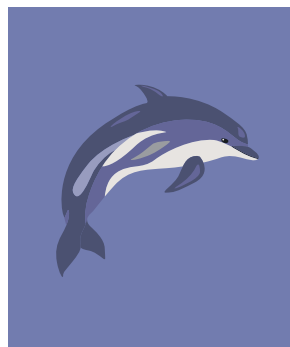
There are around 488 cars on Yell, with a roughly even split between petrol and diesel. There are currently 5 fully electric cars on the island and 17 hybrid electric vehicles. Based on the household survey carried out as part of this project the average annual mileage for a car on Yell is approximately 7,000 miles. This includes both travel on-island and off-island as it is not currently known what proportion of residents' on-road travel is done off-island. The figures do not include visitor traffic, or 'pass-through' traffic by residents travelling to and from Unst and Fetlar.

⁹ For transboundary journeys, such as ferries and flights, the convention within the GPC methodology is to allocate emissions to the territory from which the journey departed. The remaining proportion is attributed to the landmass to which the journey links.



4.3.2. Community climate actions

The most popular transport-related action is the investigation of fixed links as an alternative to ferries. There is the potential for fixed links connecting both Yell to the mainland and Yell and Unst. The need for well-connected public transport for Yell is also a popular option. There is a need for public transport services such as buses to be aligned with ferries, such that it is possible to access a bus both within Yell and through mainland Shetland. The Yell community has also highlighted the need for improved provision of car charge points in both public and domestic settings to encourage the adoption of electric cars.



Number of votes	Action	Timescale
105	Investigate environmental impact of fixed links/tunnels as an alternative to ferries to encourage business and population retention and growth.	M
41	Full regular island bus service which aligns with ferries and improved off-island buses to increase public transport use, reducing commuter miles and improving access to transport for those without cars.	S
28	Electric car charge points, with fast or rapid chargers available at all public buildings and facilities as well as at shops, businesses, accommodation, halls etc. with further provision for slow chargers at households for overnight charging.	M
25	Investigate the production of hydrogen for local use including by buses, ferries, and other vessels.	L
9	Bookable electric 'mainland car' so people can get throughout Shetland for day trips/appointments etc.	M
4	Renewables powered electric car club with community hubs on Yell.	L
3	Improved car parking provision to enable car sharing.	M
3	Bike storage at ferries and other locations with built in charging suitable for electric bikes.	L

4.4. Land Use, Agriculture and food

4.4.1. Carbon Audit

4.4.1.1. Land Use, Land Use Change and Forestry

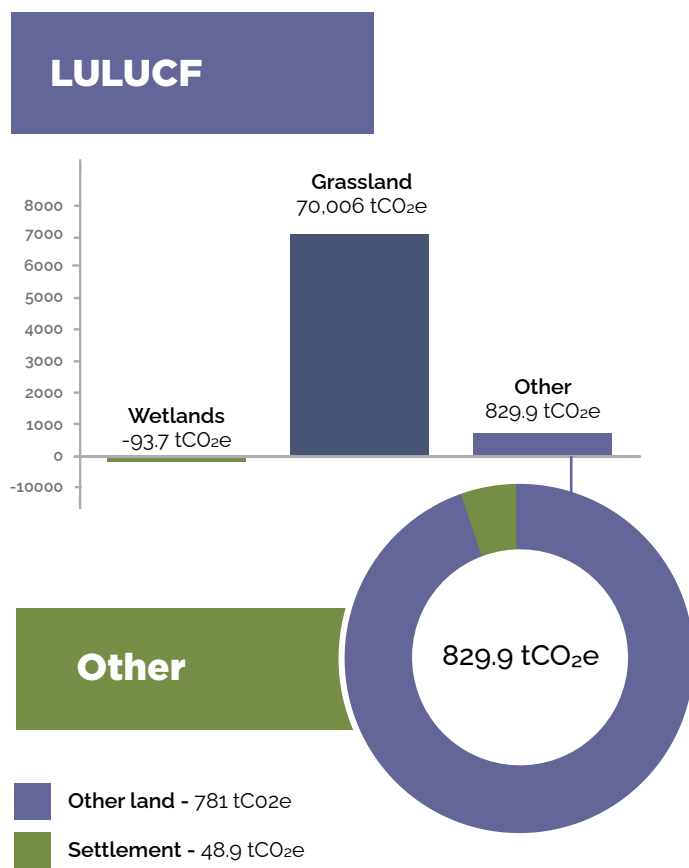


Figure 18 - Overview of Land Use related emissions in Yell, given in tonnes of CO₂e.

An initial desk-based assessment of LULUCF has been carried out which considers both current land use as well as land use change over time. Managed land is defined by the IPCC¹⁰ as land where communities intervene in land-use for ecological, economic, and social purposes. As such, all land on the six CNI islands is viewed as managed in line with national and international guidelines. The land use emission estimates are predominately based on UK Land Cover maps from the Centre for Ecology and Hydrology, supplemented with additional data on peatlands. Local knowledge was also sought to sense-check assumptions around land use change. It is important to note that uncertainties in the land use sector are significantly higher than for other sectors, which is the case at both national- and local levels. The analysis relies on a high degree of modelling and while these figures are based on the best data that is currently available more work is needed to fully ground-truth the results.

For the land use sector, most emissions are attributed to "Grassland" (70,006 tCO₂e in 2019). The terminology here may be a little confusing, as 'Grassland' in Yell mainly refers to areas of peatland. Peatlands store vast amounts of carbon and in their natural condition peatlands can sequester carbon.

Healthy peatlands capture CO₂ from the atmosphere through photosynthesis. Because the plants that grow on peatlands do not fully decompose under wet conditions, they do not release carbon which would otherwise be returned to the atmosphere as CO₂. In this way, healthy peatlands can act as a carbon sink. However, large areas of peatland, across the UK and on Yell, have been drained or otherwise modified and are in a degraded condition. Peatlands on Yell have been drained mainly to improve grazing for livestock or as a side effect of peat cutting or erosion caused by sheep. Draining the soil so that it is not waterlogged leads to the decay of plant material and soil shrinkage. This releases carbon and methane into the atmosphere and the peatland becomes a source of greenhouse gas emissions. Overall, this is considered to be the most significant source of emissions on Yell¹¹.

¹⁰ IPCC. (2006). 'Consistent Representation of Lands', in 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Eggleston H.S. et al. (eds), IPCC, Volume 4, Chapter 3, pp.3.6. Available at: https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_03_Ch3_Representation.pdf

¹¹ More information on peatlands and climate change is available from the UK Centre for Ecology and Hydrology, <https://www.ceh.ac.uk/sites/default/files/Peatland%20fact-sheet.pdf>

Islands peat soils 2016

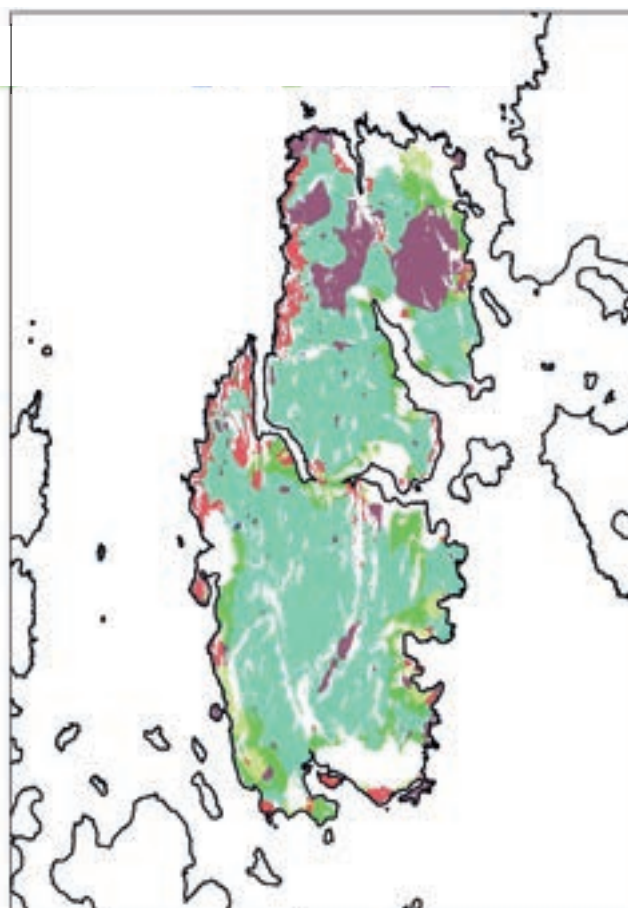
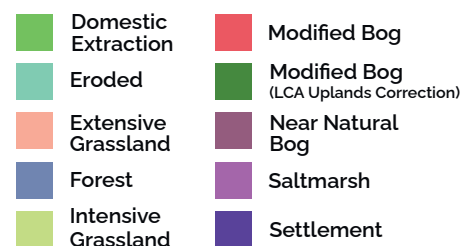
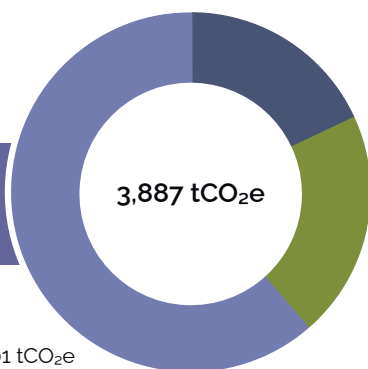


Figure 19 - Peatland Condition Map

4.4.1.2. Agriculture



Crofting is an important part of the local culture and heritage, with around 100 crofts on Yell. There is approximately 2,660 hectares of agricultural land on Yell, categorized as improved grassland¹². There are around 20,240 sheep on the island and around 118 beef cattle, as well as small numbers of pigs, poultry, and horses. These local livestock numbers were used to inform the carbon audit calculations, together with national level data for average animal features, the use of fertilisers, and the way in which manure is managed.

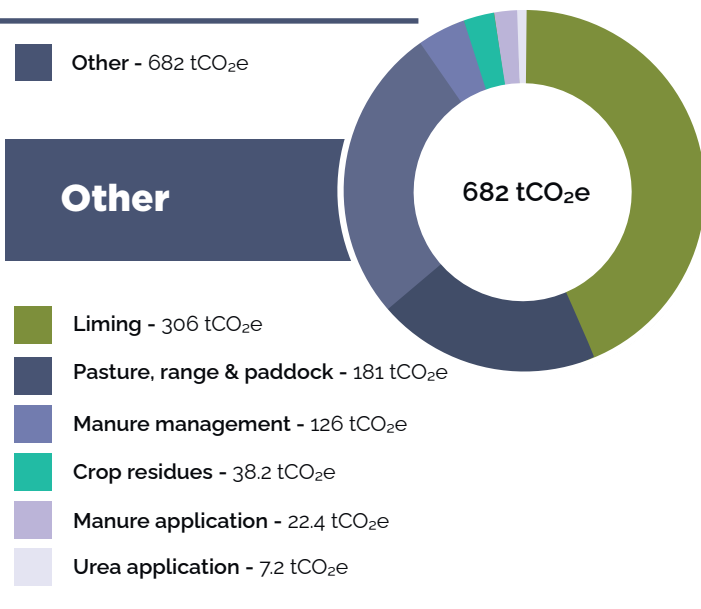
The main source of emissions within the agricultural sector on Yell are from enteric fermentation, which takes place in the digestive system of ruminant livestock. Microbes in the digestive tract of animals decompose and ferment food, producing methane as a by-product. Emissions from enteric fermentation account for 62% of Yell's emissions from agriculture.

Other land management practices such as applying inorganic fertiliser, liming, and the decomposition of manure under anaerobic conditions also have an impact. More information on greenhouse gas emissions from Hill, Upland and Crofting (HUC) farming is available from the Department for Agriculture and Rural Economy¹³.

¹² <https://www.gov.scot/publications/agriculture-maps/>

¹³ <https://www.gov.scot/publications/resas-climate-change-evidence-huc-farmer-led-group/pages/4/>

Figure 20 - Agriculture related emissions on Yell, in tonnes of CO₂e, with a detailed breakdown of the "Other" emission sources.



4.4.2. Community climate actions

The Yell community have expressed an interest in increased access to local food. Most food currently produced on Yell is exported. This is the case for meat, which is exported live; and for wild caught and farmed fish landed in Cullivoe. These products are generally exported out of Shetland, often to international markets. Making these products available to buy locally would likely require a significant level of scale to make local processing and sale a viable option, the local market in this case would therefore likely be Shetland wide and involve promoting the use of Shetland produced meat and fish.

Other potential options for the production of local food could be smaller scale, such as through the provision of community owned growing spaces, these projects could be combined with actions to avoid waste to ensure that excess food produced is used by those in the wider community.

Yell residents are also interested in developing the current knowledge base on Yell's peatlands and possible changes to these, as well as their role in reducing emissions.

Number of votes	Action	Timescale
45	Local fish and lamb should be available to buy locally to reduce food miles.	M
36	Community owned polycrubs with social spaces-built in.	S
34	Investigate impact of wind farms on local peatlands.	M
32	Encouraging more use of / growing of / availability of /diversity of local food.	S
18	Local market/community fridge to reduce food waste and decrease food miles.	M
14	Support the restoration of peatland.	L
12	Investigate suitable areas for community woodlands.	S/M
10	Community allotments.	S
8	Develop plant based commercial food production e.g., seaweed, vegetables.	S/M
7	Investigate projects which could improve biodiversity.	S/M/L
3	No-dig horticulture and agriculture.	S

4.5. Blue carbon

Adler & Allan produced a 'Habitat Suitability Study' to derive models of potential blue carbon sites as part of the Carbon Neutral Islands Project.

The report provides distribution maps of potential locations of existing blue carbon habitats on and around Yell. The results are only an indication of potential habitats and need to be validated before an assessment of carbon stocks and the potential for sequestration in waters surrounding Yell can be estimated. Further work will be necessary in this area.

4.5.1. What is blue carbon?

Several definitions of blue carbon exist. The Scottish Blue Carbon Forum defines blue carbon as the carbon captured and stored in marine and coastal ecosystems that accumulates over long timescales through natural processes (e.g. photosynthesis). Carbon is present in both inorganic and organic forms.

Blue carbon habitats are increasingly recognised for their potential as a marine nature-based solution, offering multiple co-benefits for climate mitigation, adaptation, and biodiversity. As a nature-based solution, blue carbon habitats are important in tackling climate change and, in conjunction with some terrestrial habitats, can help to reduce atmospheric carbon dioxide via natural sequestration/carbon capture.

In Scotland, blue carbon habitats include saltmarshes, seagrasses, kelp beds, biogenic reefs, and geological sedimentary stores, such as seafloor and sea loch sediments, and many of these are present in the coasts and seas around Yell.

Blue carbon habitats are vulnerable to the impacts of climate change and human pressures and in a degraded state could in fact contribute to emissions. Therefore, actions in this area should focus on protection, restoration and enhancement of existing blue carbon habitats and should consider the potential to restore or create new habitats where appropriate.

4.5.2 Blue Carbon Potential

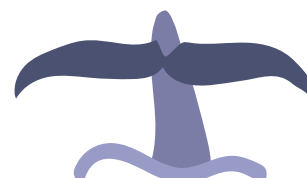
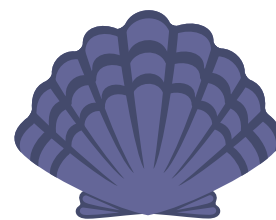
To understand the potential of blue carbon habitats for climate change mitigation on Yell, we need to calculate the contribution from Yell's existing blue carbon habitats.

The focus of future work should be on the organic carbon stored in these habitats. This is because the formation of organic carbon leads to sequestration of carbon dioxide (the principal greenhouse gas) and where the carbon stored remains vulnerable to

human pressures. It is hugely challenging to calculate the impact of disturbance on organic carbon stores because the ocean carbon cycle is complex and many evidence gaps remain.

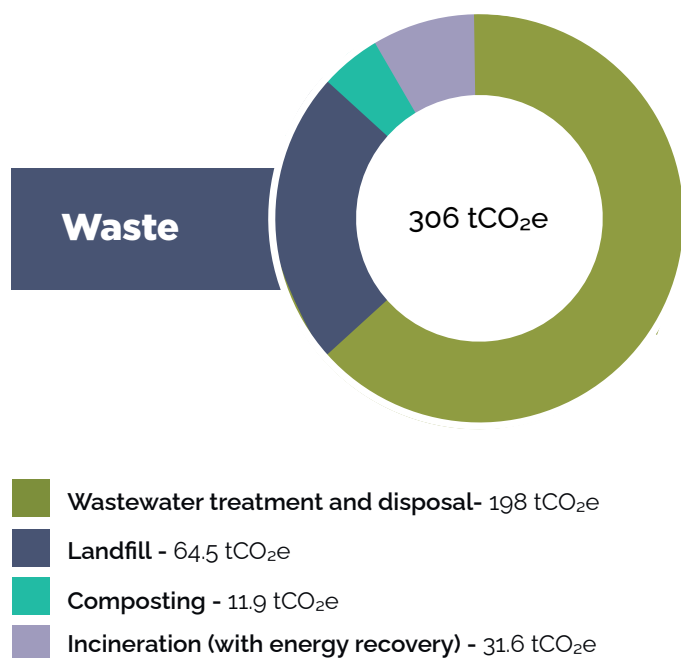
In contrast, the formation of inorganic carbon (calcium carbonate) in the marine environment does not reduce the amount of atmospheric carbon dioxide and physical disturbance of some inorganic carbon, for instance shell material, is not known to cause emissions. However, calcifying reef structures, such as maerl beds, are essential for biodiversity and can help to trap and protect organic carbon that may come from other sources. The role calcifying habitats play in climate mitigation is not currently well understood.

Due to current data gaps, including on the extent and condition of blue carbon habitats around Yell's shores, the Adler & Allan baseline study is heavily based on 'predicted' blue carbon stores from habitat suitability modelling, a process that maps areas with the correct conditions for a habitat or species to exist. Ground-truthing of these habitat models will help to validate the predictions and improve the evidence base of habitat distribution and extent. This information can then inform a more accurate scoping of the potential contribution of blue carbon habitats to carbon sequestration and storage for the island.



4.6. Waste and wastewater

4.6.1. Carbon Audit



Landfill falls under scope 3 as waste is exported whilst wastewater is treated on island.

Figure 22 - Waste related greenhouse gas emissions for Yell, in tonnes of CO₂e

Around 65% of emissions from the waste sector are due to the treatment and disposal of wastewater. This



is followed by emissions from landfill which account for 21% of total emissions from waste. Emissions included here are from waste treatment only and do not include the transportation of waste or the energy used in recycling, as these would be accounted for elsewhere.

It is assumed that all domestic wastewater is treated through septic tanks, and an estimated uplift has been applied to account for industrial wastewater production and treatment. Based on local authority data, the average person on Shetland generates around 420kg of waste each year. It is assumed that Yell waste is managed and treated in a similar way to the rest of Shetland. Around 20% of household waste is sent to landfill and around 62% goes to the Lerwick Energy Waste plant from where it is incinerated to produce energy. Most of the remaining waste is organic matter which is composted¹⁴.

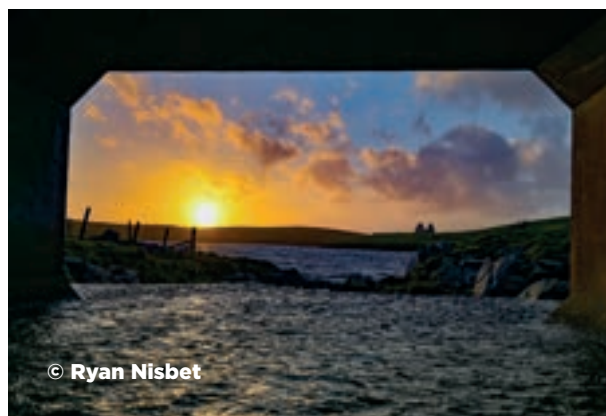
¹⁴ SEPA provides a useful visual tool to help understand the generation and management of household waste by local authority area <https://informatics.sepa.org.uk/HouseholdWaste/>



4.6.2. Community climate actions

The Yell community are interested to see better provision for waste, particularly bulky waste. This could be combined with opportunities to reuse and repair broken items, turning waste into a useful resource.

The Yell community is interested in recycling, and its benefits, with the aim of ensuring waste is disposed of in the most sustainable means possible. Recycling and other waste requires frequent collection to ensure this is made practical for residents.



Number of votes	Action	Timescale
40	Yell should have a connection point to local renewables, such that during a power cut Yell can maintain continuity of supply.	L
32	Small scale domestic renewable energy projects (e.g. solar PV, micro wind, solar, solar hot water).	M
30	Community benefit funds from wind turbines on Yell should be spent locally.	M
25	Large scale renewables should reduce the cost of energy for local people.	L
23	Large scale renewable projects should support local employment in the project wherever possible including ongoing maintenance.	M
21	Support and advice for domestic renewable energy and energy saving including how to access funding.	S
15	Community owned energy projects.	M/L
13	Artificial micro grid where all houses have a share in a renewable project, making use of constrained energy to provide battery charging/storage heating at low cost.	M
12	Increased tidal power production.	L
9	Households and communities should have provision for heating and cooking in event of a power cut.	S
7	Large scale renewables should ensure significant measures to support biodiversity, wildlife and habitat.	S
6	Yell residents should have the opportunity to input into proposed projects.	M
6	Consider burying of transmission lines to increase resilience.	L
2	Investigate geothermal projects (large ground source heat).	L

4.7. Business, Economy and Community Resilience

Creating sustainable communities which are resilient to climate change involves taking a holistic approach combining decarbonisation with adaptation and actions to increase community resilience. This includes creating a sustainable economy in Yell and ensuring communities have the capacity to thrive while taking forward the changes required to respond to the climate crisis while continuing to flourish as a community.

The table below summarises ideas from the community for actions to take forward relating to business, local economy and community resilience. Many of these are aimed towards increasing community resilience and making Yell a viable and attractive place to live and work in.

Although not all these actions have a direct carbon saving benefit, they are vitally important in terms of economic and social sustainability whilst having the potential to indirectly save emissions. Community climate action relies on local communities with the capacity, resources and drive to take forward any proposed projects.

Due to the impact of extreme weather causing a loss of communications and power in Yell as well as other areas of Shetland during winter 22/23, the Yell community has identified the need to establish community hubs for food, warmth and information during power cut, communication failures and extreme weather events.

Number of votes	Action	Timescale
67	Community skip and scrapstore to encourage reuse, recycling, and repurposing of waste and to prevent individual journeys to transport waste to Lerwick.	S
29	Investigate what happens to recycling and waste and the attached environmental impacts including emissions associated with shipping and recycling and look to replace current system if required.	S
25	Ensure community recycling bins are emptied at suitable frequency.	S
22	Encourage local composting and food waste disposal.	S
16	Recycle plastics locally to create useful items.	M
10	Support with creating suitable spaces for recycling bins for collection.	M
9	Increase public awareness of importance and benefits to recycling where appropriate.	S
9	Ensure opportunities to recycle are accessible to all.	M
9	Investigate alternatives to plastic bin bags.	S
8	Investigate feasibility of anaerobic digester.	L

5. Community engagement



Keep Yell Warm days

The public were invited to come and discuss the project at the Keep Yell Warm days held every Tuesday in Cullivoe throughout the winter. This generated conversation and ideas and provided an opportunity for people to ask questions about the project individually or in small groups.



Household Survey

A mail drop survey was provided to each household in Yell. Respondents were asked about their energy and fuel use to support the creation of the energy and transport carbon audit. Respondents also provided their views through the ranking of suggested ideas for the Yell Community Climate action plan, as well as on their motivation for making change. Many respondents also provided suggestions for the action plan, which were subsequently fed into the final ranking of ideas.



Blue Planet II screenings

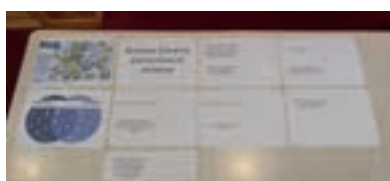
Screenings of Blue planet II were put on in the Westsandwick Hall, these were followed by short presentations on Yell's carbon emissions and conversations on the importance for change within the community.

Consultation Event in Mid Yell

A consultation event was held in the Mid Yell Hall, this event allowed for more in-depth discussion on each of the topics, and generated many of the ideas which form the action plan. People were given an overview of the project by CES, before being split into groups to discuss different topics at tables spread around the hall, participants circulated between tables to cover all the topics.

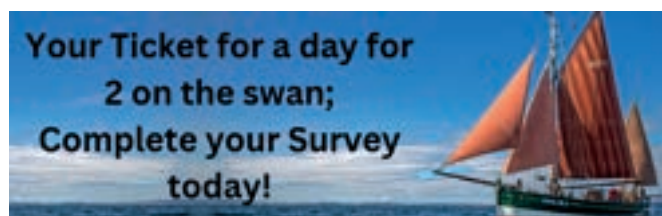


Community Engagement



Community Carvery

A Community Carvery was held in the Cullivoe Hall. This provided an opportunity for people to view the full carbon audits and information generated to date. All ideas input to the project to date were spread among the tables with one category on each table. the public were invited to tick the 3 ideas they liked best within each category. Locally sourced food was served.



Online engagement

Both surveys were available to complete online and were advertised through the Carbon Neutral Yell Facebook page. The online campaign was significant in increasing engagement with the wider public and in increasing survey responses.

Future Engagement

The need to engage with the youth population of Yell has been identified as a key engagement requirement moving forward. Unfortunately, there was no schools project as part of the initial stage of the project. Some young people did attend some of the events, however an approach focused on this group will be valuable moving forward.

6. Next Steps

The next stage of the CNI project will involve refining the ideas coming out of the community engagement process to create more detailed proposals. These actions will be evaluated in terms of estimated costs, their feasibility, the likely carbon impact, and the wider benefits to the community.

The CNI project will proceed to cost the implementation of the climate change action plan and it will develop a community investment strategy to help fund the actions where necessary.

What - While some of the actions are already clearly defined others may need further discussion to understand what is needed to achieve the desired outcome.

Who - While the CCAP is intended to benefit the whole community, specific actions will require a range of different actors. These include:

- Individuals within the community
- Community organisations
- Private businesses
- Local Authorities
- Statutory Bodies
- Scottish (and wider) Government
- Other networks of interested parties and communities.

Most actions will require the different actors to collaborate and building partnerships will be an important part of the process, along with a potential need to inform and influence others.

How - It is important that actions are led by and for the community. This will likely involve leading on immediate actions, taking advantage of any potential "quick wins" available, working on longer plans and investment strategies and exploring opportunities for collaborations which will allow the Yell community to lead, and work with others, to begin making tangible progress towards our own local vision of a decarbonised future. The CDOs are an integral part of this project and its progress.

The resources required to deliver on this vision are likely to be substantial, and the full Community Decarbonisation Investment Strategies will consider and describe in detail how best to utilise funding from different sources including:

- Local and external sources
- Existing public funding

- Public-private partnership
- Private investment

When - Having identified the timescale for each action it will be important to map out a timeline for implementation. Some actions may be achieved quickly while others may take longer and require different stages of activity.

6.1. Review of the Climate Action Plan

The Community Climate Action Plan is intended to be a living document reviewed and updated locally by the Yell Community Development Officer as the project progresses.

It is suggested that a review of the plan is conducted by the CNI steering group on Yell regularly to reflect on progress and update or amend identified actions in line with any changes to the island's circumstances. Engagement with the wider Yell community on changes may be necessary as deemed appropriate by the CDO and steering group.





Carbon Neutral Islands 2023

Yell