Net Zero Routemap

Scottish Canals

Detailing our course to becoming net zero in greenhouse gas emissions by 2030

Contents

Foreword

The 250-year history of Scotland's canals has been a story of overcoming challenge. Thomas Telford and the other great engineers of the 19th century were truly tested constructing our network through the often unforgiving Scottish landscape.

The rapid rise of rail and roads also created struggles that could never have been anticipated only a few decades earlier. More recently a whole new generation of dedicated canal workers overcame multiple challenges to reverse a long period of decline with the Millennium Link Project, restoring abandoned waterways, in doing so reinventing the canal network, creating new purpose and meaning.

The threat of global climate change was far from unknown at the turn of the millennium but has evolved into the key challenge facing people and communities. For our network today, it is of a very different nature and on a scale greater than any in the canals' history. The declaration of a Climate Emergency by the Scottish Government in 2019 reflects the urgency with which the rise in global temperature threatens to impact our canals directly and the communities in which we operate, the sectors we support and our partners and stakeholders. This Emergency creates an imperative to act now, waiting will only exacerbate matters. The consequences and impacts of climate change are still only partially understood, but we accept that action is required now even whilst we continue to gather data and formulate our mitigation and adaptation plans.

In 2021, like so many organisations who attended COP26 in Glasgow, Scottish Canals made a bold commitment to meet this challenge head on and reach net zero for our direct emissions by 2030 – 15 years ahead of Scotland's already ambitious target to meet this milestone. Making a promise is just the first step, however, and our Net Zero Routemap provides a clear route to achieving our ambition, both in terms of potential solutions and timescales.

Our direct emissions footprint is far from insignificant but is relatively small. We very much recognise the absolute need to make our own contribution but also to support Scotland's wider climate ambitions at every opportunity. We are committed to working with others to deliver essential community resilience and wider emissions reduction, be that through provision of active travel routes along our towpaths, mitigating against flood events through the innovation of the Glasgow Smart Canal, to future plans to support the transition to renewable energy sources on both a local and national scale.

We hope the message is clear; our net zero ambition may not be easy, but like the challenges of the past, it is achievable.

John Paterson
Chief Executive Officer

Executive Summary

This plan is presented in its context as a key pillar of our wider sustainability strategy and vision, drawing from the wider themes of our Corporate Plan and in turn feeding into our annual planning and investment cycle to deliver action on our canals.

We aim to provide an understanding of the challenge we've set ourselves, defining clearly our baseline for measuring future progress and setting our scopes and boundaries in line with those accepted globally. In contrast we also highlight the unique nature of our heritage network and the considerations we'll need to make to deliver net zero at local level but in accordance with international best practice. Several appendices support what we believe is a robust interpretation of the net zero goal.

The main body of the Routemap explains clearly how we plan to enact our ambition. This is presented in two ways, reflecting the need both to deliver at local level but also address common themes and synergies across our estate.

We group the emissions sources within our portfolio, providing clear goals, actions and partnership opportunities for each. This is accompanied by a clear Routemap for each our canals, with a timeline showing where individual projects will take place. We believe this dual approach provides us with the greatest flexibility as we embark on our net zero journey and will allow us to assess and include new opportunities as they arise.

Whilst our commitment at COP26 was to reduce direct emissions this Routemap is broader; addressing our Scope 3 and wider emissions, together with seeking out opportunities for others to realise their own and contribute to Scotland's climate change goals.

Our vision

To go beyond net zero and be climate positive by 2030 – removing more carbon from our environment than we emit

Climate positive canals

The challenge presented by the Climate Emergency requires bold ambition and solutions. This plan is our statement of intent and forms one of the key pillars of our 2030 Sustainability Strategy.

Whilst we recognise the need to take direct action to reduce our own emissions, and this plan sets out how we intend to achieve this primary goal, we will not view this in isolation but as an integrated part of our broader strategy, leveraging the available synergies with the other pillars.

Leaders in water and biodiversity stewardship

Scotland's canals are key blue-green corridors supporting a wealth of biodiversity. We will aim to manage them to further enhance this through opportunities to increase carbon sequestration. Whilst our canals are largely gravity fed, we will identify and enact any water stewardship opportunities that reduce fuel use and carbon emissions.

Connecting people and communities

The Climate Emergency is a shared challenge and a just energy transition is essential – we will accept responsibility for, but not limit, our efforts to our direct emissions. We will seek opportunities at all levels to support and partner with the communities in which we operate, local business and other stakeholders.

Protected heritage

Our net zero goals will require radical change but whilst we will embrace a new future, we will continue to respect our past and our role as custodians of our canals' scheduled monument status.

Best practice governance

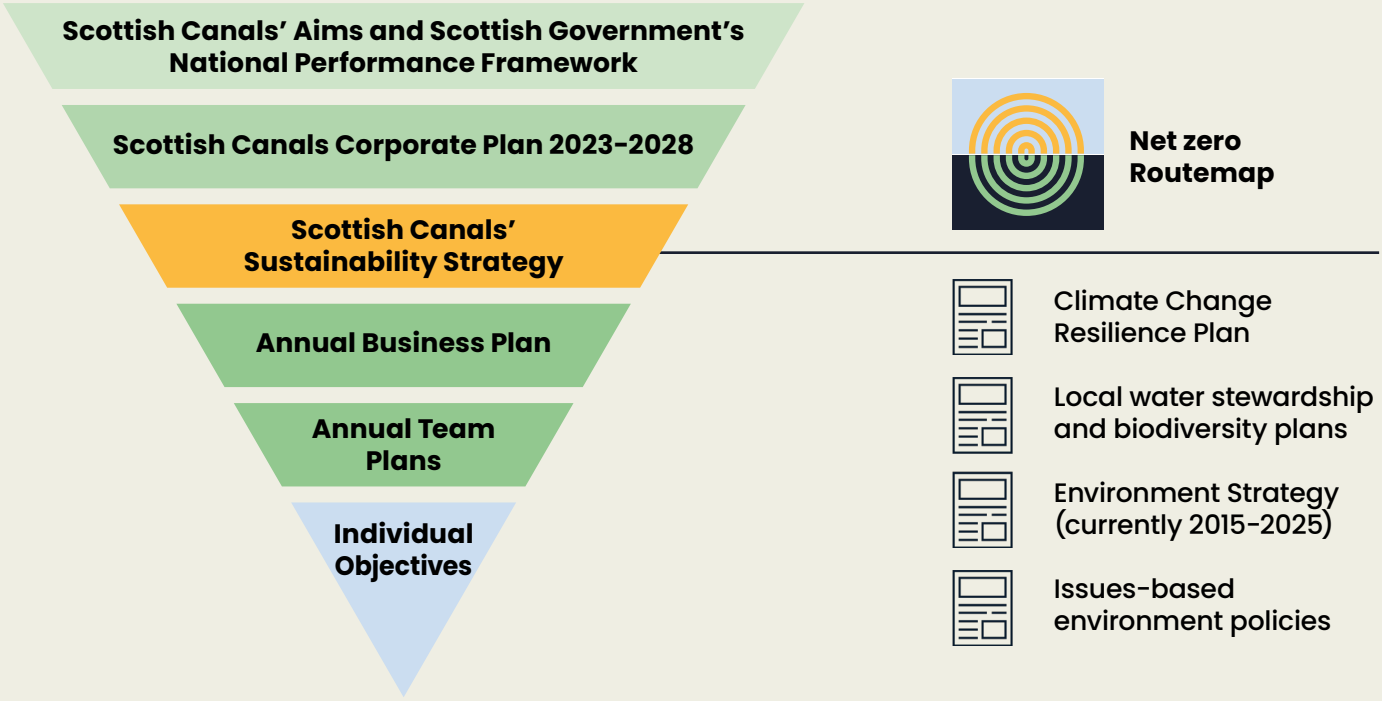
We are committed to achieving our goals within current regulatory frameworks but will seek to partner with regulators to pioneer new ways of working to achieve our net zero and other beyond compliance goals.

Scottish Canals

SUSTAINABLE DEVELOPMENT GOALS

Scottish Canals supports the Sustainable Development Goals

Our approach



The Scottish Government recognised the urgency of the climate challenge by declaring a global climate emergency in 2019. In response the Climate Change Act commits Scotland to net zero emissions of all greenhouse gases by 2045, five years earlier than for the rest of the United Kingdom. Our approach expands this ambition as we seek both to reduce our own emissions even earlier, but also use our unique position and infrastructure to contribute to Scotland's wider commitment to a net zero or even climate positive future.

Our Sustainability Strategy will be firmly embedded into our Five Year Corporate Plan for Scottish Canals, the document driving our corporate priorities and objectives. This builds on the standard set by our **Environment Strategy** (2015-25) which has guided our approach to our direct environmental impacts for the last eight years and remains relevant, albeit in a changed context. Our approach will be action driven reflecting the urgency of both the climate and biodiversity crises and thus this action plan is the first of a portfolio to include place-based water stewardship plans for each of our canals. We fully recognise that our Net Zero Routemap, whilst integrated with and complementary to our place-based approach to water stewardship, biodiversity management, community engagement and good governance, also needs to have a standalone quality – our response to a truly global challenge that impacts us all regardless of political or geographic boundaries.

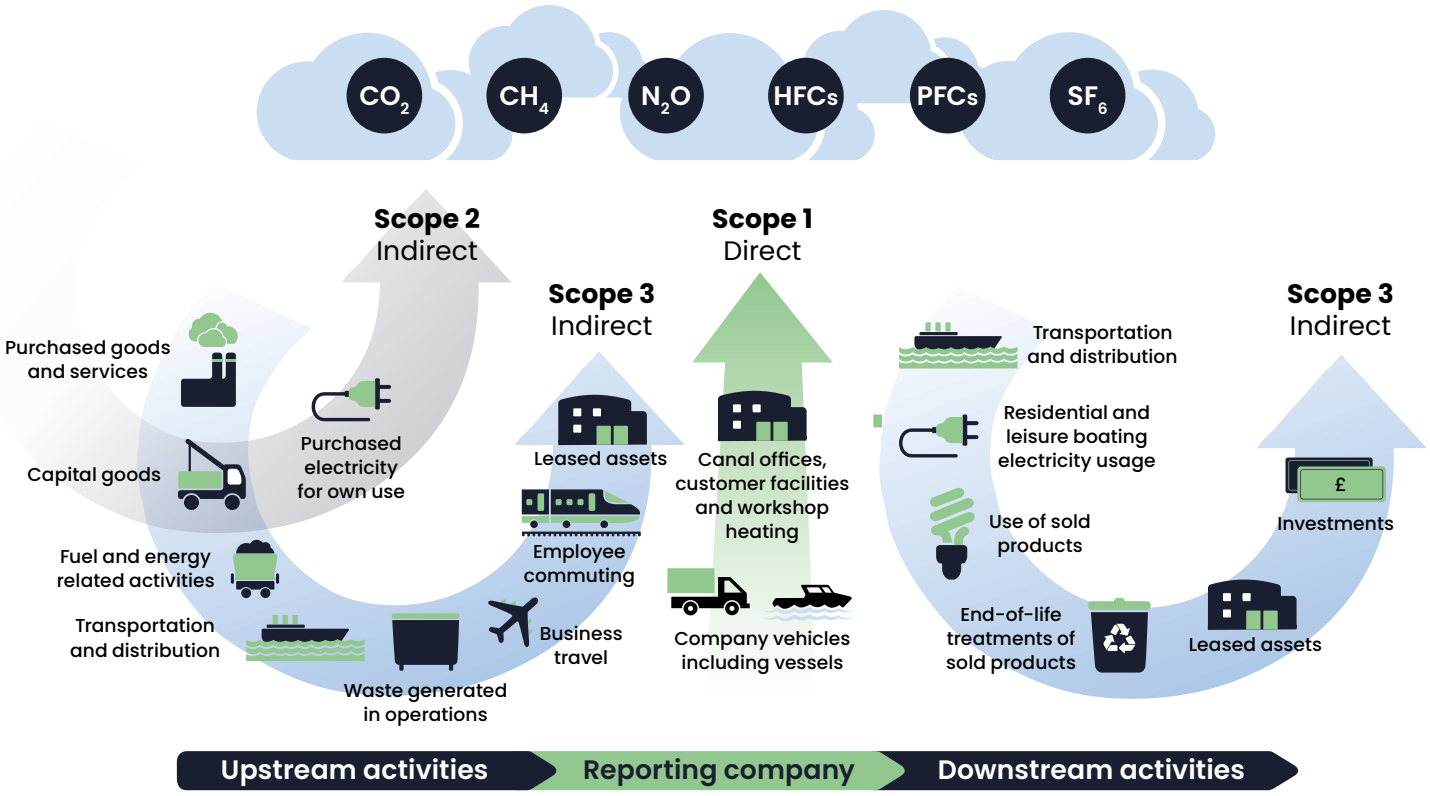
We are well aware that strategy and planning will not lead to the required action if we fail to engage and empower our people and our stakeholders. This Routemap will therefore inform our Annual Operation Plan for the canals, filtering down to annual team plans and individual staff objectives.

'Climate Change Act' Climate Change Act (Scotland) 2009 amended by the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019.

Environment Strategy – https://www.scottishcanals.co.uk/business-governance/strategy-planning/environment-strategy-2015-25

Our carbon footprint

Overview of Greenhouse Gas Protocol scopes and emissions across the value chain.



Scope 1

Scope 2

Emissions covered by this Routemap and associated actions. The Routemap outlines how we intend to reduce these emissions by at least 90% directly, with the remaining maximum 10% covered by offsets meeting the criteria outlined in appendix 5.

Scope 3

We recognise that our Scope 3 emissions likely exceed those in Scopes 1 and 2 and represent a significant part of our overall carbon footprint. Between now and 2030 we will seek to reduce these emissions using an opportunities-based approach targeting key areas of our supply chain. This approach and subsequent reporting is further detailed in later sections of the document.

Wider Scopes

We fully recognise that the climate emergency is a shared challenge and the role Scottish Canals can play in working with others to reduce emissions out of our own scopes. Where cost-effective opportunities exist we'll continue to partner with others in projects that reduce such emissions as well as promote wellbeing and broader community benefit.

All values in this report are in Carbon dioxide equivalent measure (CO_2e). This is used to compare the emissions from various greenhouse gases based upon their global warming potential. Electricity transmission and distribution losses are Scope 3 but will be covered by measures for Scope 2 in this routemap.

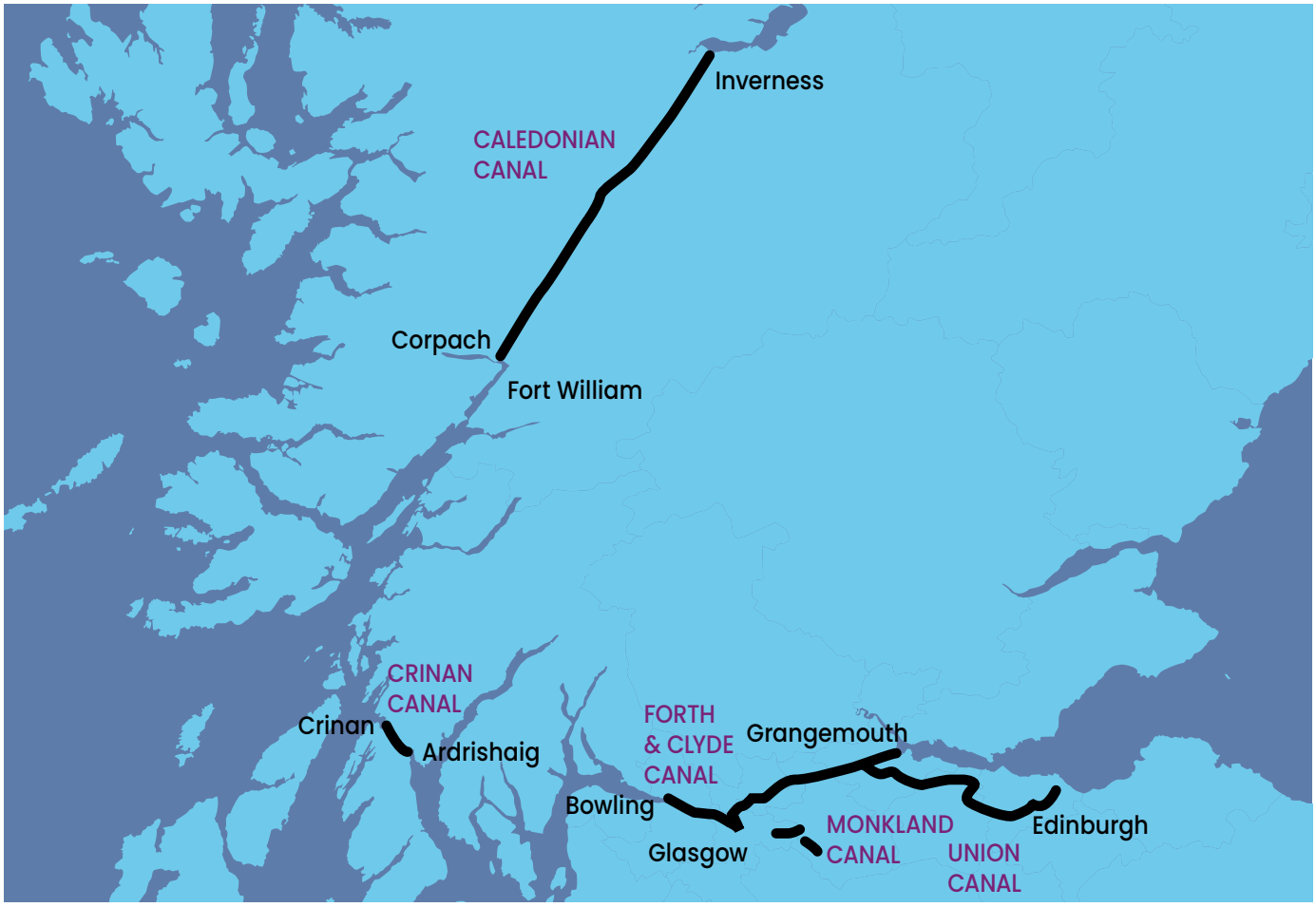
A unique challenge

At Scottish Canals we are incredibly proud of our unique heritage and nature of the assets under our stewardship. We recognise the huge diversity of stakeholders who interact with our waterways, towpaths, properties and destinations.

By definition our estate is almost entirely a linear one with assets and energy use spread along the length of our four working canals.

This distinctive character does however present some challenges when plotting our course to net zero. In line with the principles presented by the ISO NET Zero Guidelines where gaps or challenges exist we will aim to address these but they won't be a reason to delay action to reduce emissions now.

ISO Guidelines – International Organisation for Standardisation NET Zero Guidelines (IWA 42:2022)

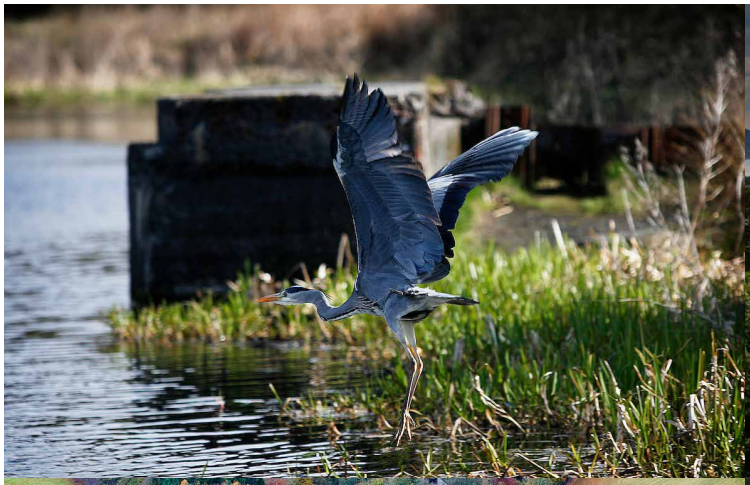


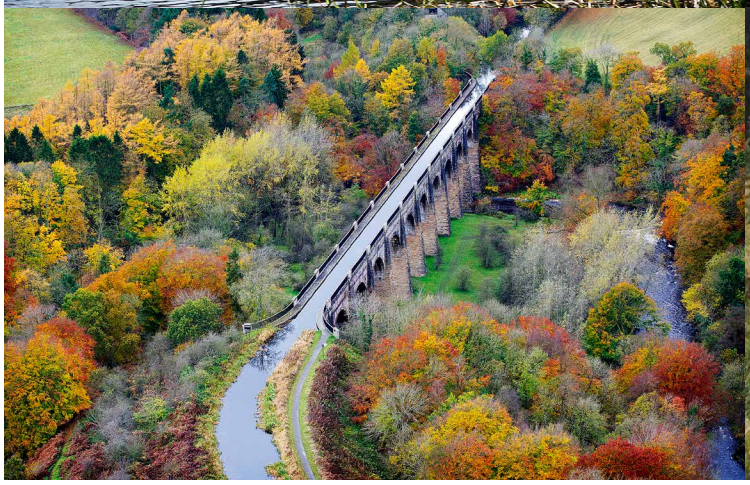
These are some of our key considerations;

- The canals are Scheduled Monuments and therefore any works that might impinge physical canal structures, or indeed the setting of the canal, need to be carefully controlled. This therefore presents some limits on the changes we can plan to make when deciding on energy efficiency or renewable energy options.

- The Caledonian and Union Canals celebrated their bicentenaries in 2022, the last of our canals to reach this landmark. Not all of our buildings and assets are this old of course but our asset base is weighted towards buildings over 50 years old and therefore of constructions that are inherently energy inefficient with high levels of heat loss. In such properties it's the high levels of heat loss and air exchange that help remove moisture, avoiding excessive condensation and mould. We need to maintain awareness of this when looking to apply energy efficiency measures that may compromise air exchange. Heat pump technologies in particular may be unsuitable as they provide a less intense heat that relies on lower levels of air exchange to be effective.

- Our portfolio is diverse in reflection of our canal users and includes not just offices but boaters facility blocks, visitor centres, catering outlets and engineering workshops. There is not a 'one size fits all' approach with economies of scale we can adopt. There are of course some commonalities we can leverage but we also have to think about the unique attributes of each asset and propose the right net zero intervention that fits.





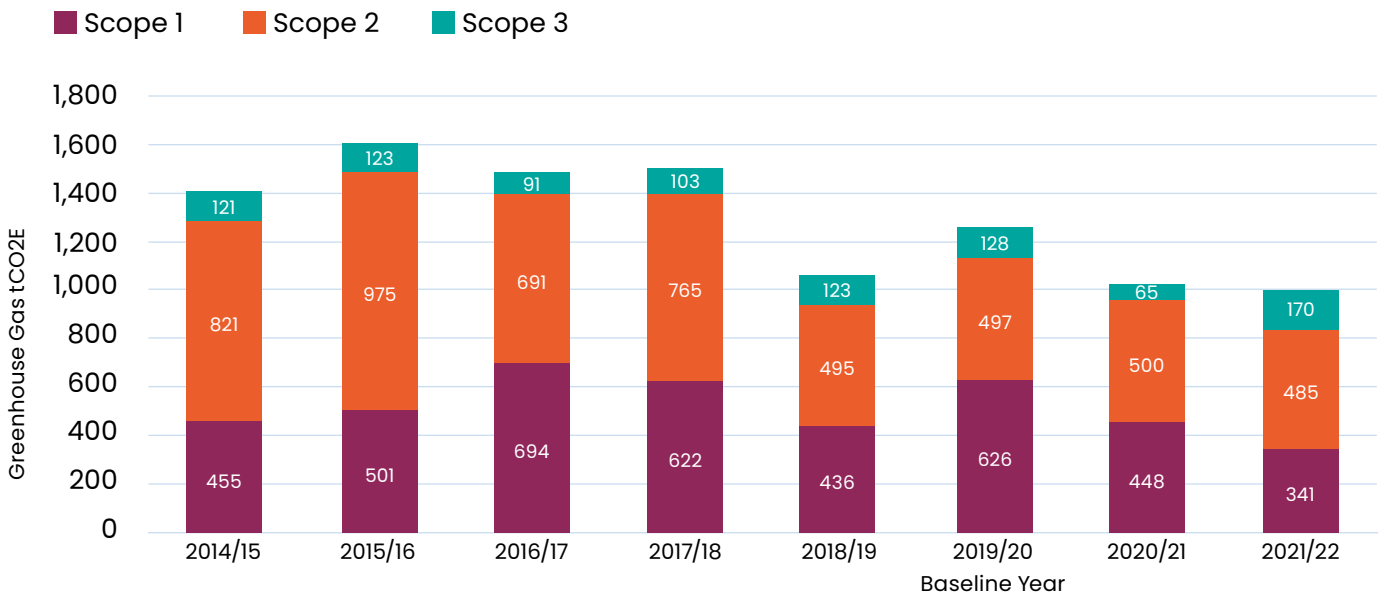

Scottish Canals

The journey so far

As a standalone public body since 2012 Scottish Canals has reported Scope 1 and 2 emissions, (together with grey fleet and public transport Scope 3 emissions) under the Public Bodies Duty since 2014 when our emissions under Scopes 1 and 2 were 1276t CO_2e.

The figure shows the changes to our emissions since then culminating in a drop to 826t CO_2e in 2022. The main driver of this downward trend has been the decarbonisation of the national grid. In response to this we have taken steps to utilise a greater proportion of electricity in our energy mix to take advantage of the greater use of renewable sources at a national level.

'Public Bodies Climate Change Duties' Climate Change (Duties of Public Bodies: Reporting Requirements) (Scotland) Order 2015 as amended.



The Journey So Far

Some examples of this progress are outlined on this page. We have also taken initial steps to install our own renewables with solar photovoltaic (PV) arrays at The Falkirk Wheel, Auchinstarry customer facility and Seaport Marina with further installations planned at the Crinan Canal. This is in addition to energy efficiency measures such as the installation of light-emitting diode (LED) lighting.

Whilst being proud of the work done so far we recognise that a more strategic, embedded approach is required to make the rapid progress required to reach our net zero goal.

Progress

In 2019 **The Eggshed Partnership** project created a community space and interpretation centre from a disused building at Ardrishaig Harbour. The award winning design of this building incorporated a high level of energy efficiency enabling the use of heat pump technology rather than a direct-fired heating system.

The Falkirk Wheel office and meeting room space is now heated via a heat pump system powered by roof mounted solar PV arrays installed in 2022. This has displaced a gas boiler previously used and is the first step in the decarbonisation of our landmark location.

We have enacted the initial stages of our **fleet decarbonisation** and invested in electric vehicles, principally panel vans on the Lowland Canals. Electric vehicles now account for over 25% of our fleet and we have supported this with investment in charging infrastructure at seven of our locations.

Goal breakdown

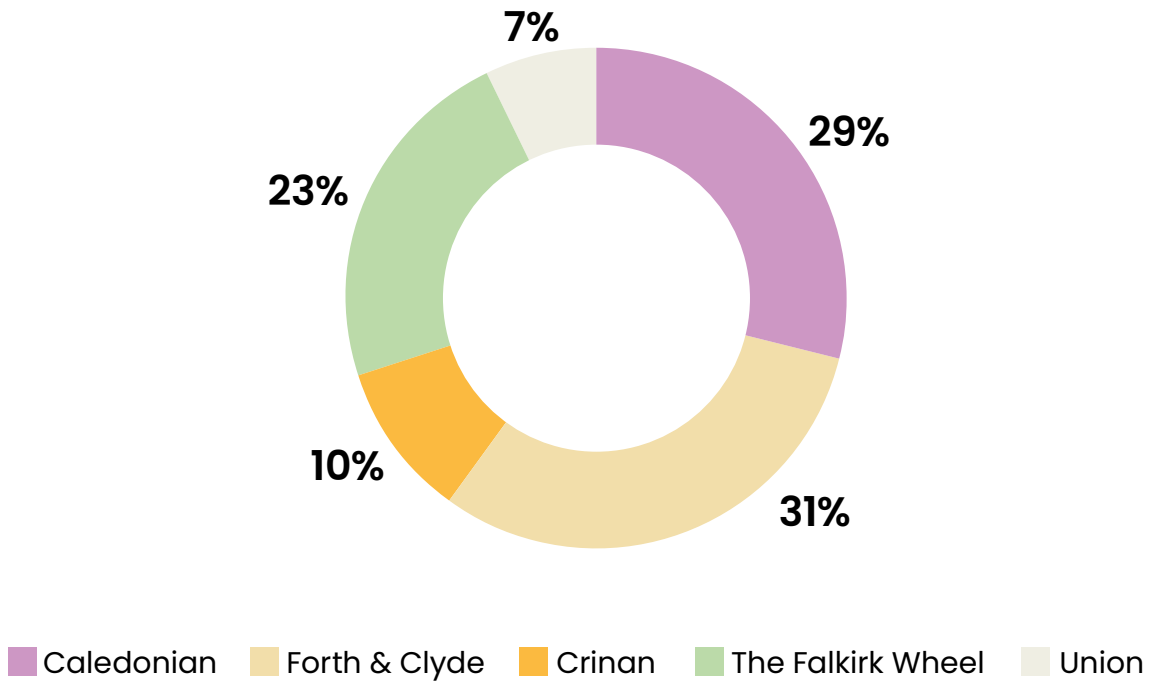


Figure 2 – Distribution of emissions by canal network baseline year 2019/20

	BASE TARGET
Overall	A robust, transparent, disclosed claim to net zero emissions from direct operations (Scopes 1 & 2).
Targets	Transparent numerical targets disclosed.
Scope 1 Heating	Greater than 30% reduction in emissions by 2026, reaching at least 90% by 2030.
Company Vehicles (Scope 1)	Greater than 40% reduction in emissions by 2026, reaching at least 90% by 2030.
Scope 2 (purchased electricity)	Greater than 25% reduction in emissions by 2026, reaching at least 90% by 2030 (market-based methodology).
Scope 3	Emissions defined and quantified by 2024; action plans in place with key suppliers 2024-26; reduced emissions trajectory established and disclosed 2025-2030.
Supporting a wider net zero transition	Throughout the lifespan of this plan seek opportunities to leverage our estate, infrastructure and other resources to support net zero activity and goals within the communities in which we operate.
Disclosure	Progress against targets subject to public disclosure on an annual basis. We will also fully disclose and justify any amendments to the targets set out in this plan.

Scope 1

Vehicles & plant

Target

Greater than 40% reduction in emissions by 2026, reaching 90% by 2030.

Actions

Transition The Falkirk Wheel tour boats from diesel to electric or other low carbon/ net zero fuel source.

Establish a rolling programme of vehicle replacement ensuring all vehicles are transitioned to a low carbon fuel unless health & safety reasons prevent this.

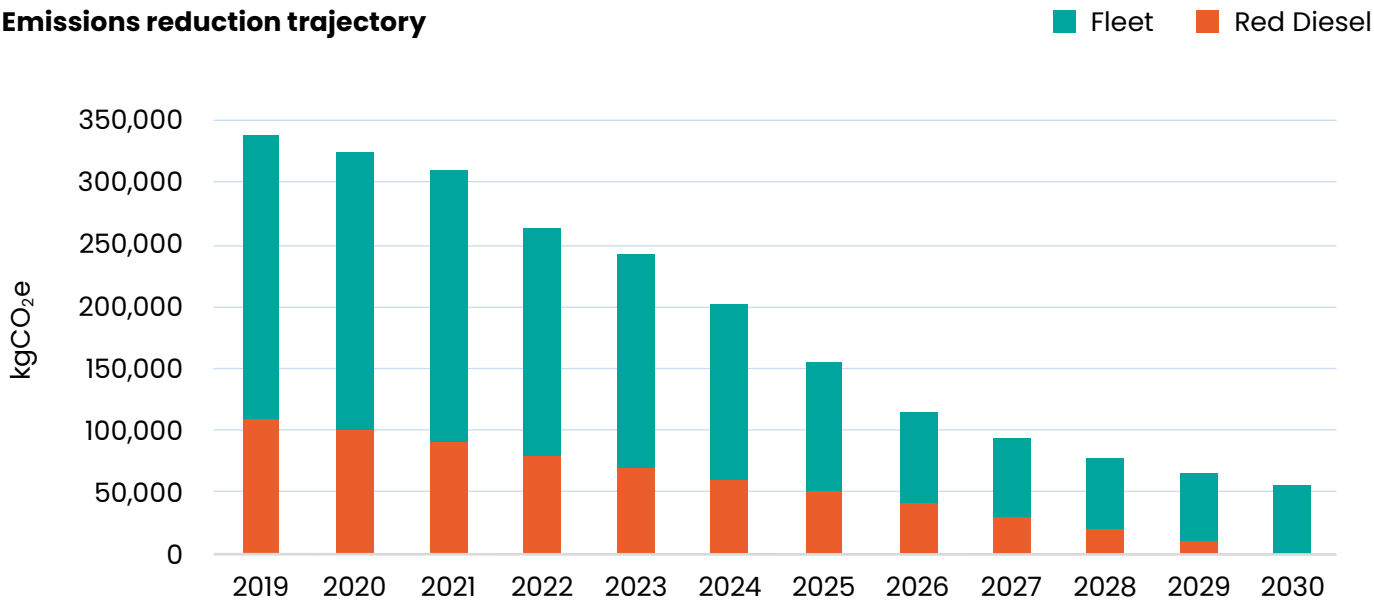
Expand our electric vehicle (EV) charging network to ensure all employees have access to charging capability, especially in more remote locations.

Fully explore the use of hydrotreated vegetable oil (HVO) as a transition fuel to make rapid emissions reductions in the shorter term.

Promote the use of smaller electric vehicles and non-powered vehicles for shorter journeys, especially along our towpaths and canal access routes.

Ensure reducing unnecessary journeys does not impact communication and collaboration across our teams.

Emissions reduction trajectory



Partnerships

Explore opportunities to expand our EV charging networks to include provision for partner organisations and canal users.

Encourage the use of electric and other low carbon vessels on our canals e.g. through the provision of rapid charge points, sharing of HVO fuel supplies with hire boat providers.

Scope 1

Heating

Target

Greater than 30% reduction in emissions by 2026, reaching at least 90% by 2030.

Actions

Incorporate net zero options into the masterplanning for The Falkirk Wheel site, replacing current natural gas usage with a low carbon alternative.

Review our presence and needs at Canal House, our current headquarters. Reduce our physical footprint to create a more energy efficient work environment, maximising lower carbon heating systems present on site and phasing out natural gas usage.

Ensure our new workshop at Lock 16 meets Scottish Government guidelines for net zero best practice. This will result in a significant emissions reduction as our current leased premises is heated using natural gas.

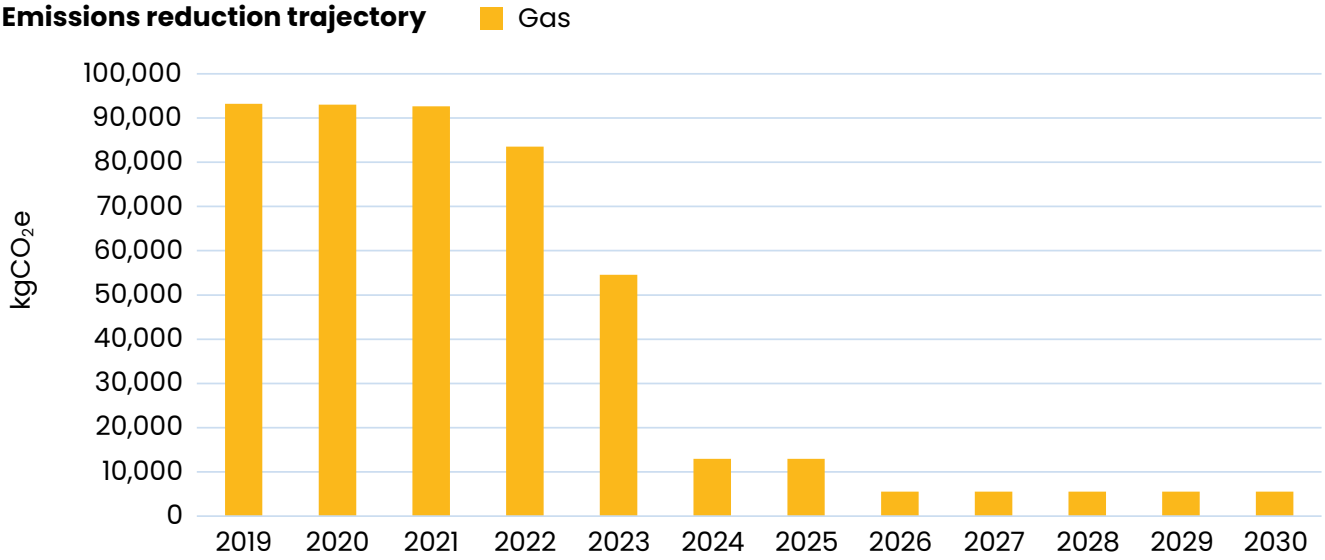
Fully explore smaller scale heating interventions using an opportunities-based approach e.g. where a source of waste wood exists consider small-scale biomass heating for older heritage buildings.

Partnerships

Explore any opportunities to partner in district heating projects either as a producer of heat, infrastructure provider or recipient. Build these as appropriate into our destination masterplanning.

Retain an open minded approach to new technologies, particularly the opportunities that hydrogen might represent as production of green hydrogen and associated transport networks develop.

Emissions reduction trajectory



Scope 2

Electricity

Target

Greater than 25% reduction in emissions by 2026, reaching 95% by 2030.

Actions

Incorporate onsite renewable options into our masterplanning for the future of The Falkirk Wheel site and Canal House and associated landholdings in Glasgow. Supplement this capacity where possible when upgrading smaller buildings (e.g. facilities blocks) at all locations where potential exists.

Accelerate our electricity submetering programme to better understand our electricity usage in order to take further steps to increase usage efficiency. To include increased deployment of 'smart bollards' to better understand and positively influence third party usage of our supplies.

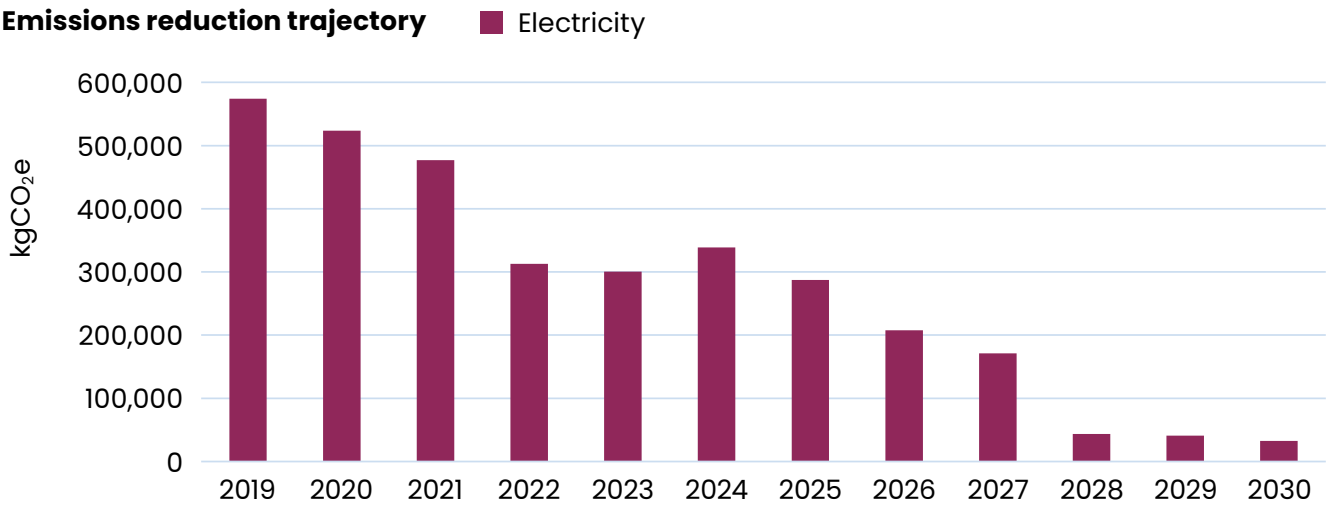
Where local renewable options cannot be deployed (because of cost, technical feasibility or other reasons that will be clearly reported) enact the hierarchy of approach set out in appendix 4. Aim to enact options which demonstrate the principles of additionality and ensure the relevant energy attributes are obtained.

Partnerships

Actively explore any opportunities to partner with other organisations to pool demand and resource when considering any potential Power Purchase Agreement options. These could incorporate renewable energy generation on land owned by Scottish Canals, land owned by partner organisations or third party estate.

Explore the potential to use the canal network to distribute renewable electricity between generation and consumption sites, ensuring that use of the canal is demonstrably a less resource intensive and more sustainable means of distribution.

Emissions reduction trajectory



The Falkirk Wheel

The Falkirk Wheel is the world's only rotating boat lift and links the Forth & Clyde Canal and Union Canal.

The Falkirk Wheel attracts around

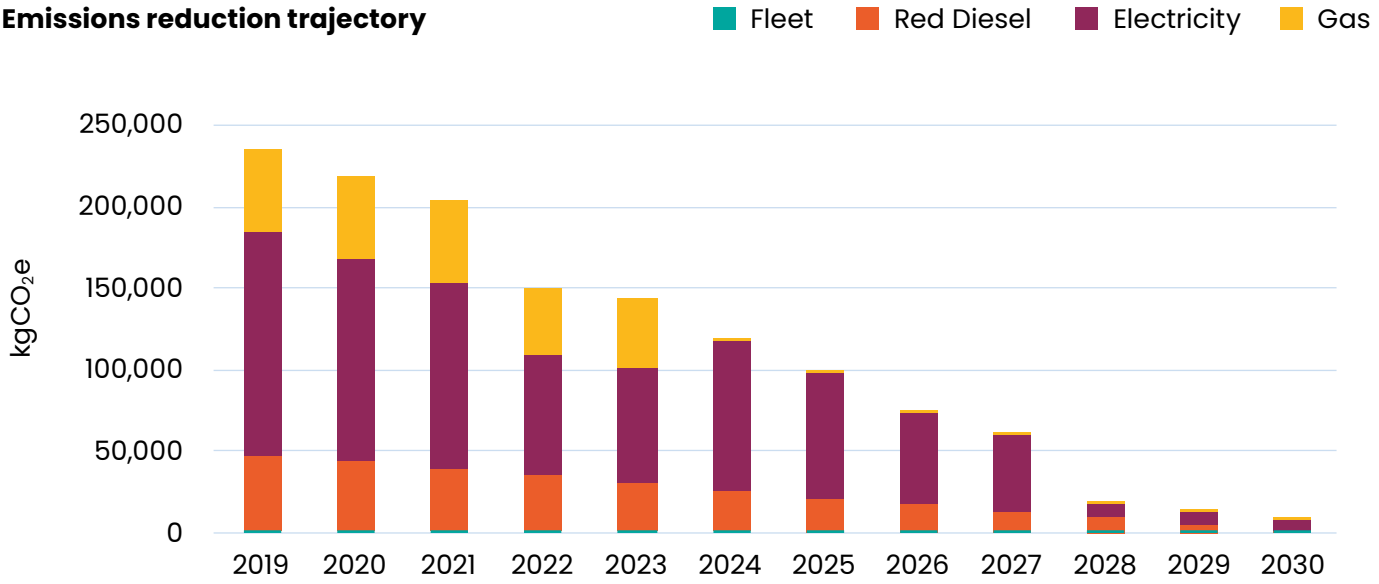
400,000

visits annually

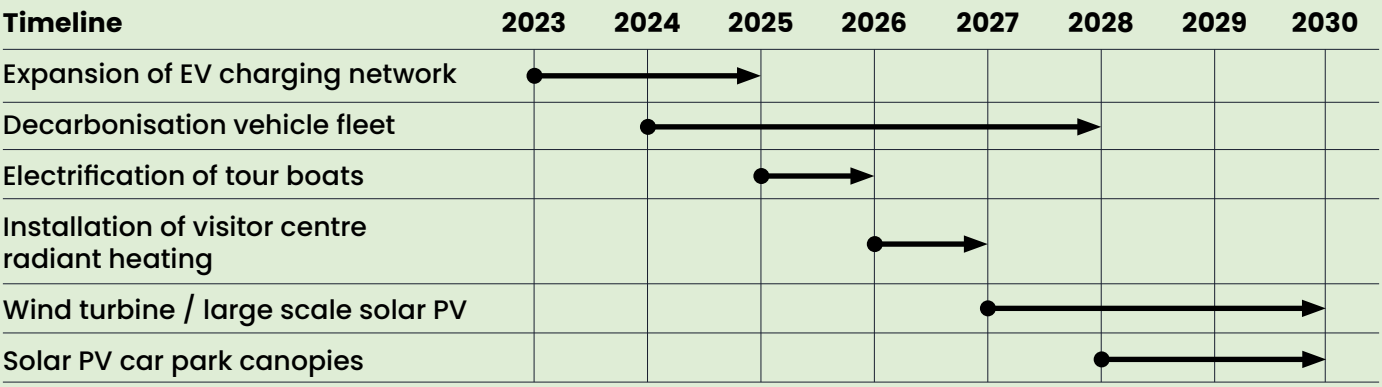
The Falkirk Wheel

- For the Purposes of our Net Zero Routemap, The Falkirk Wheel, our highest energy consuming site, is considered separately from the Union and Forth & Clyde Canals. This is a reflection of its unique status as one of Scotland's most visited attractions. One of our key aspirations is to make The Falkirk Wheel a net zero visitor attraction and the centrepiece of our Routemap.
- The site comprises not only the boat lift itself but a visitor centre incorporating catering and retail, office and events space and holiday boat hire. This results in a significant space heat demand met by a combination of gas fired boilers, standard electric heaters and air source heat pumps. The visitor centre building in particular is a large space with a high heat loss profile and will require an innovative decarbonisation solution.
- As with our other locations an element of vehicle fleet is associated with the site therefore subject to our aspirations under 'Vehicles and Plant'. The site also has two, currently diesel powered, tour boats and a further key challenge of our Routemap is to be decarbonise these.

Emissions reduction trajectory



Key interventions and projects



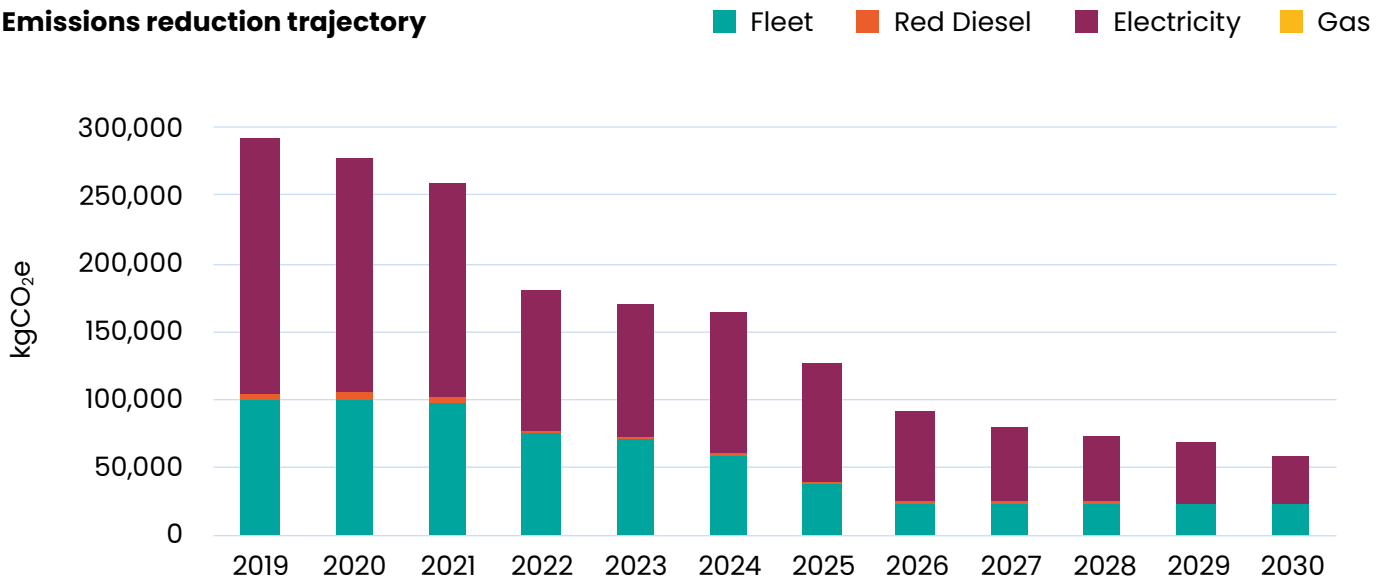
Caledonian Canal

Running 60 miles along the Great Glen from Fort William to Inverness and joining a number of freshwater lochs along its length including the navigation of Loch Ness.

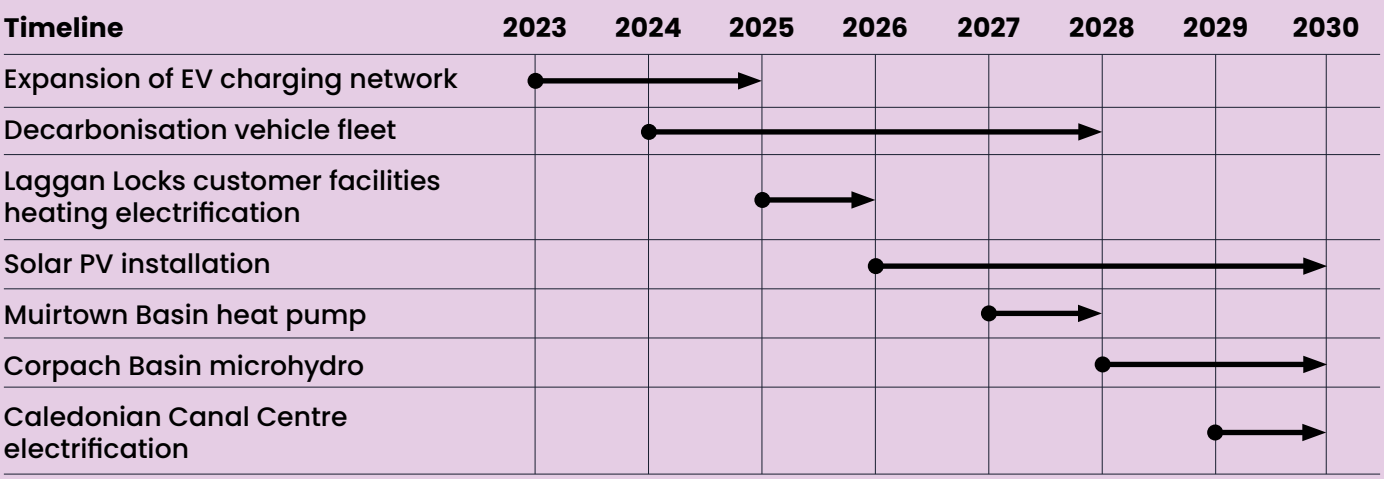
Caledonian Canal

- A major visitor destination with a number of related facilities including the Caledonian Canal Centre in Fort Augustus, Laggan accommodation bothies and several large facility blocks. All of these have their own energy consumption and greenhouse gas emissions profile.
- Principal office for the Canal is at Seaport Marina, Inverness with smaller offices at Muirtown, Fort Augustus and Corpach. All are supplied with electric heating via storage and panel heaters and have older building fabric requiring significant upgrade to meet modern standards of energy efficiency.
- Significant rural stretches of canal with minimal infrastructure requiring vehicles capable of handling Highland winter conditions for inspection and maintenance.

Emissions reduction trajectory



Key interventions and projects



Crinan Canal

‘Britain’s most beautiful shortcut’ was opened in 1801 and runs for nine miles between Ardrishaig on Loch Gilp and Crinan on the Sound of Jura.

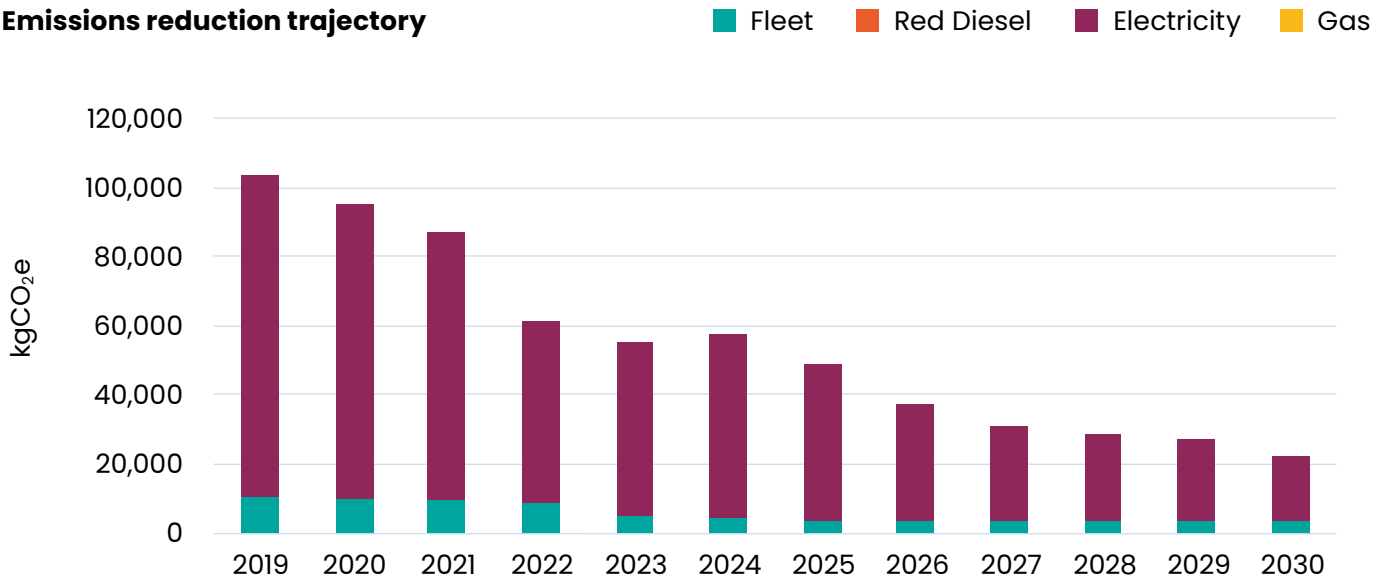
1,600

Yachts and other leisure craft pass through the navigation each year

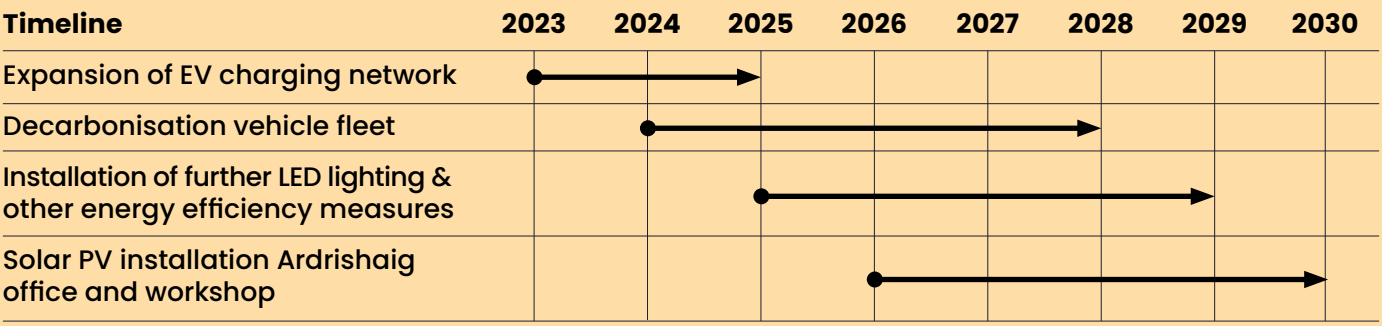
Crinan Canal

- The Canal links Loch Fyne at Ardrishaig with the Sound of Jura, creating a pathway for boats through the Kintyre Peninsula on their way to the Western Isles.
- To cater for our visitors a number of facility blocks are located along the canal. These are small buildings with generally limited energy efficiency opportunities.
- The main Scottish Canals presence is at Ardrishaig. The historic canal offices and workshops present significant challenges in terms of energy efficiency, in contrast to our modern Eggshed community hub.
- The canal is readily accessible due to its short length and the presence of a parallel road for much of this. This presents significant opportunity to use smaller electric vehicles or bicycles. All terrain capability needs to be retained for reservoir access.

Emissions reduction trajectory



Key interventions and projects



Forth & Clyde Canal

Opened in 1790, this 38 mile canal provides navigation between the east and west coasts of Scotland.

More than

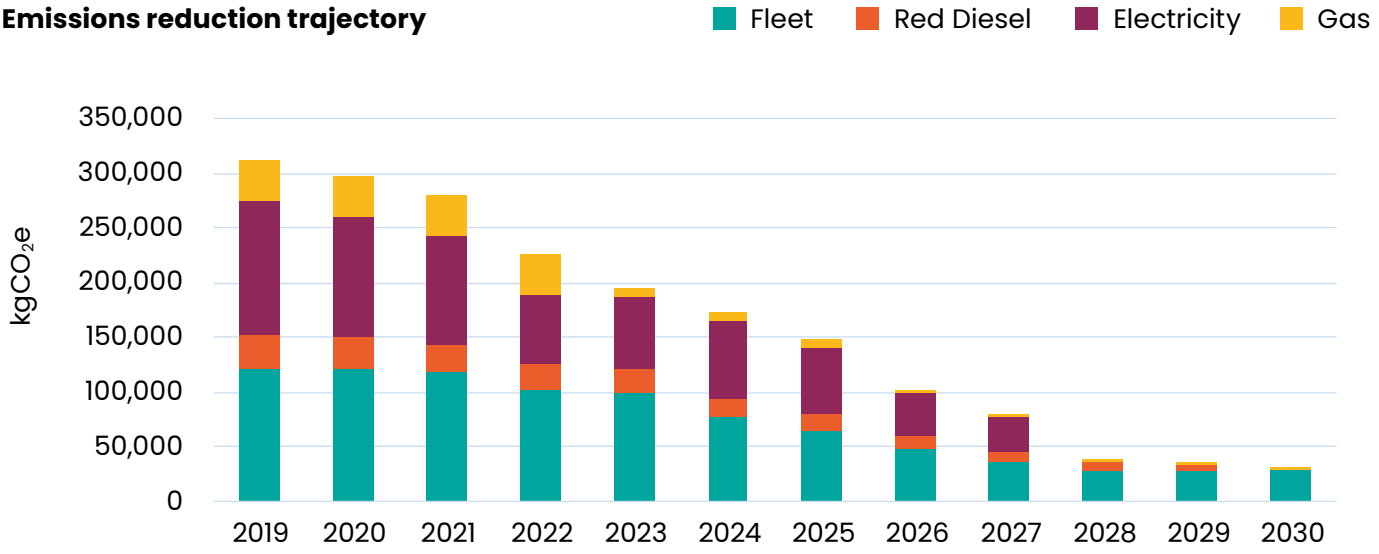
130,000

people in North Glasgow live within 1.4km of the canal

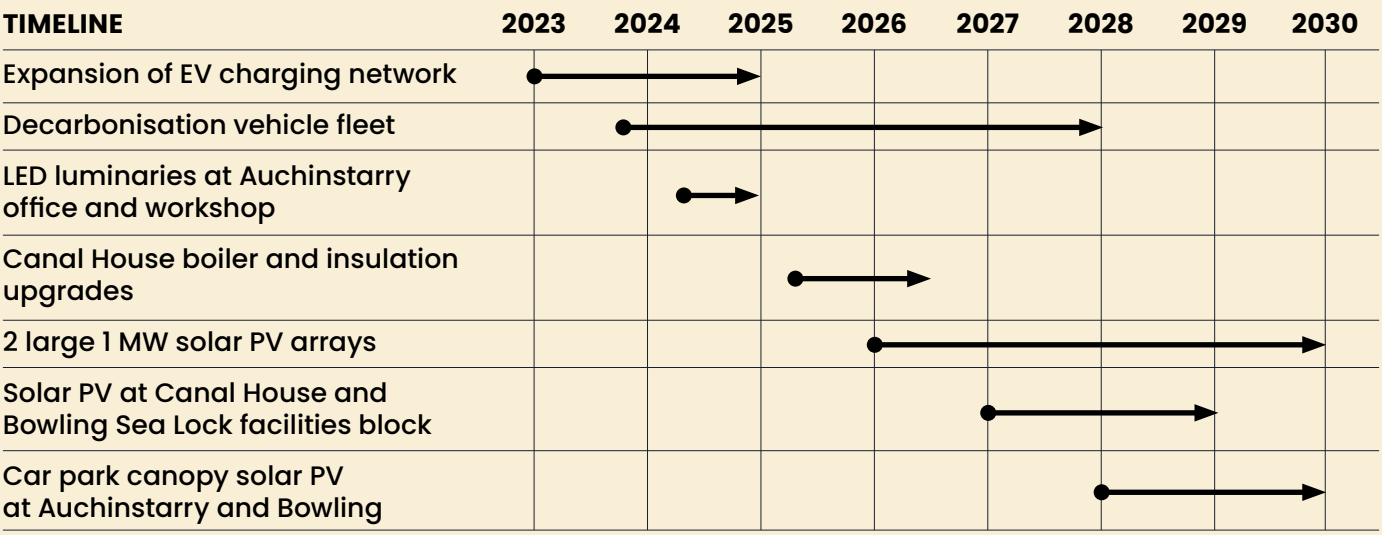
Lowland Canals | Forth & Clyde Canal

- After a period of decline the waterway was restored as part of the Millennium Link project in 2001. Suitable for the seagoing vessels of its day the canal now caters primarily to residential boaters.
- The canal has since been reborn as key blue-green infrastructure providing multiple wellbeing, leisure and active travel benefits to the communities through which it passes.
- The Glasgow branch has undergone a transformative programme including landmark projects such as the Pinkston Watersports Centre, Speirs Lock, the Claypits nature reserve, Stockingfield Bridge and the Glasgow Smart Canal, Europe's first smart flood management system.
- Other major projects on the canal include the Bowline at Bowling at the west end of the canal, a fully accessible linear park, and The Kelpies at the east terminus, the world's largest equine sculptures and modern icons of Scotland's landscape.

Emissions reduction trajectory



Key interventions and projects for Forth & Clyde Canal and Union Canal (see page 27)



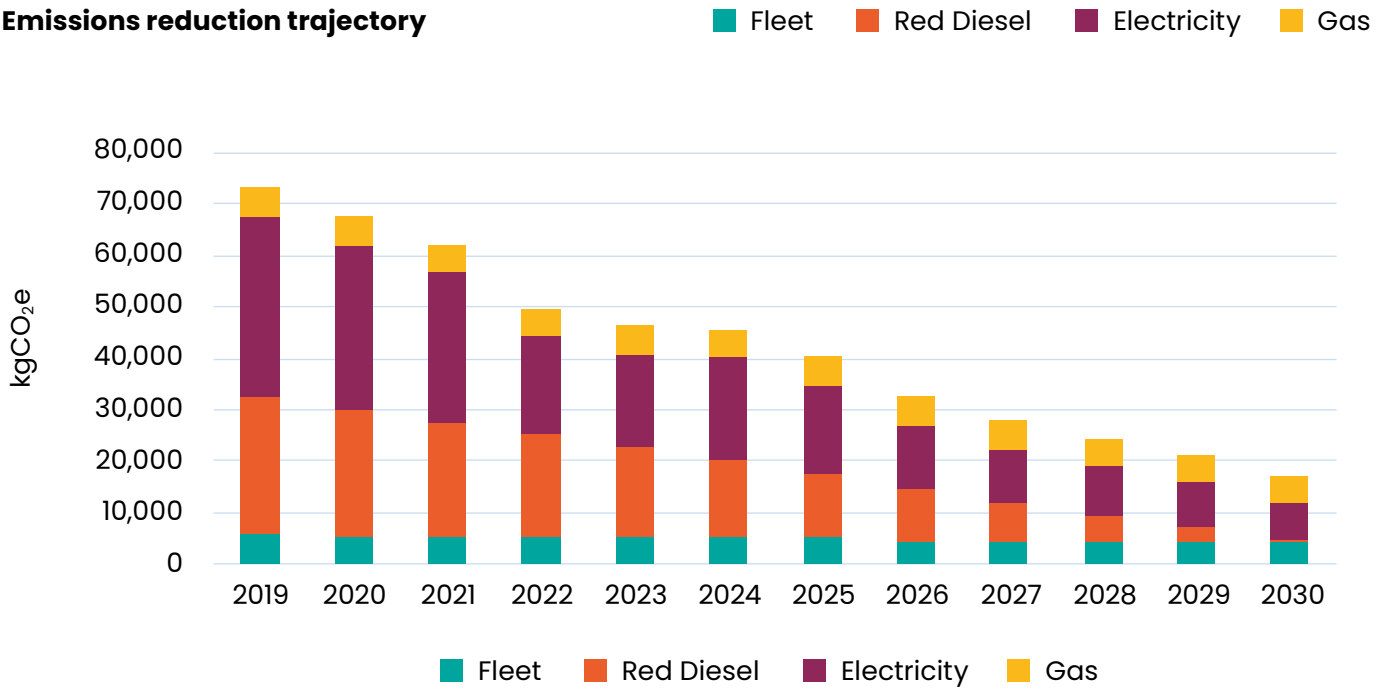
Union Canal

Built to service Edinburgh with minerals and other raw materials from further West.

Lowland Canals | Union Canal

- The Union Canal was opened in 1822 but fell into slow decline following the construction of the Edinburgh-Glasgow railway.
- Like the Forth & Clyde, the Union Canal was restored as part of the Millennium Link project with The Falkirk Wheel enabling passage between Scotland's two largest cities.
- Another key component of Scotland's active travel network the canal is now used by walkers, paddlers and cyclists.
- Developments on the Union have not been as prolific as on the Forth & Clyde but include Lochrin Basin, a stunning and award winning mixed-use development at the modern terminus of the canal and also new third party funded marinas at Ratho and Winchburgh.
- Unique amongst our canals as being a contour canal, with no lock gates but requiring several navigable aqueducts including the Avon Aqueduct the second longest in the UK.

Emissions reduction trajectory



Scope 3

Target

Full quantification of our Scope 3 emissions by 2025, further clarifying priority action areas.

Detailed action plan in place identifying emissions reductions to 2030 and 2040.

Actions

These are actions we can begin to implement now. They will be better informed by the longer term targets set above but not dependent on full quantification of our Scope 3 emissions.

- Adopt Scottish Government and other best practice guidelines in assessing both the immediate and whole life cycle carbon emissions of any new build or major engineering projects we undertake. These assessments will inform our procurement and design choices.
- Undertake an assessment of the carbon emissions associated with the collection, recycling and disposal of our waste. We will explore options to reduce aspects of our footprint both via internal behavioural change and procurement choice.
- Assess the emissions associated with the catering and retail offering at The Falkirk Wheel and set a target to reduce these whilst improving the quality of products offered.
- Adopt a programme to positively engage our staff to identify and provide access to opportunities that will reduce emissions from staff travel.
- Produce clear requirements within our procurement process for all goods and services to minimise carbon emissions, adopting measurable KPIs to measure success. This will form part of a broader commitment to leading standards of sustainable procurement policy.

Partnerships

Produce a carbon assessment tool in collaboration with our main engineering contractor.

Continue to promote our canals as a fundamental component of Scotland's active travel network, seeking opportunities to appropriately expand our active travel offering.

Work with our suppliers, particularly our food and beverage suppliers, to source locally and reduce transport emissions.

Initial actions

Our hope is that this Routemap provides clarity on Scottish Canals' ambitions to be a net zero organisation, the principles by which we hope to achieve this and a clear sense of the technologies and solutions we aim to enact across our network.

Internally the Routemap will be supported by numerous projects and workstreams with appropriately tracked actions which we will report against. Below are some of the initial actions we'll be enacting to support the Routemap.

No	ACTION	TIMESCALE
1.	Clearly establish sponsorship within Scottish Canals Executive Management Team for this Routemap and its outputs.	2023
2.	Undertake a review of Scottish Canals energy data recording and reporting systems to facilitate more frequent, accurate and well evidenced carbon reporting.	2023-25
3.	Create and rollout net zero training based on this Routemap tailored for all Scottish Canals employees.	2023-24
4.	Evolve the Scottish Canals Asset Management Plan to incorporate a more structured approach to facilitating a low emissions estate, including where appropriate repurposing or disposal of inefficient assets.	2023-25
5.	Undertake a gap analysis of existing energy use and emissions data to highlight further information required to set SMART targets and progress indicators.	2023-24
6.	Produce a framework for annual progress reporting against this Routemap, aligned to the ISO (International Organization for Standardization) Net Zero Guidelines.	2023
7.	Produce a comprehensive low emissions vehicle strategy to incorporate strategic mapping of charging infrastructure, deployment of intermediate fuels such as HVO and identification of better working practices that will encourage safe usage of low emissions vehicles.	2023-24
8.	Scope and commission a feasibility study of opportunities for micro-hydro power on the canal network and associated feeders. (The potential hydro power opportunity is currently not well enough understood to be incorporated into this Routemap.)	2023-25
9.	Undertake further scoping work to understand the funding routes, delivery process and emissions reduction/energy provision potential of larger scale renewables, in particular larger scale solar PV.	2023-24
10.	Further develop designs, costings and funding routes for electrification of The Falkirk Wheel tour boats.	2023-25
11.	Identify partners to collaborate with to further understand the carbon and wider natural capital value of revised management practices and land use changes on Scottish Canals estate.	2023-25
12.	Assign dedicated resource to identifying appropriate funding streams, both Governmental and within the private sector, in support of our net zero ambition and specific projects.	2023 onwards
13.	Embed as standard practice further identification of energy monitoring and efficiency opportunities that can be enacted as part of Scottish Canals' routine estate maintenance. Incorporate basic financial and carbon paybacks into this approach.	2023 onwards
14.	Embed as appropriate the principles of the **Net Zero Public Buildings Standard** into all new building projects to ensure these meet our net zero ambition from the outset.	2023 onwards

Net Zero Public Buildings Standard
https://www.scottishfuturestrust.org.uk/publications/documents/net-zero-public-sector-buildings-standard-full-document-suite

Beyond 2030

This Routemap thus far has looked only to 2030. This is a very deliberate choice reflecting the urgency of the Climate Emergency and the need for Scottish Canals, along with all other organisations, to take action to reduce emissions now rather than pushing targets out within longer timeframes. We do however fully recognise that even if we achieve our ambition to reach net zero our work will not stop there. These are some of our considerations looking to 2040 and even beyond.

- Low carbon and renewable energy technologies are developing at a rapid pace. What we plan and install during the lifespan of this Routemap may well prove to be intermediate technology and we'll embed a process of review, update and disclosure of any change to ensure we remain at the forefront of the carbon reduction challenge.

- In common with many other organisations we recognise the need to further evolve our approach to Scope 3 emissions, working in closer partnership with our suppliers and customers to agree and meet mutually defined goals. This work will parallel rather than delay the progress necessary in Scopes 1 and 2 and we'll update this plan to reflect new thinking and targets in this area.

- As part of our tiered approach to tackling carbon emissions we'll build Scope 4 into our organisational thinking at the earliest opportunity. This will include an assessment of the emissions associated with home working. Addressing wider definitions of Scope 4 we'll also produce an appropriate metric to define organisational growth and disclose Scope 4 emissions against this benchmark.

- Linking directly to one of our other sustainability pillars 'connecting people and communities' we'll establish clear lines of sight to any opportunities for Scottish Canals to support progress towards net zero within our communities and partner businesses. Our approach will always be stakeholder led rather than imposed so no defined target is proposed for this aspect of the plan but we will disclose progress.

- Achieving net zero is a significant challenge but not a limit and our ambition is to progress into a climate positive position. In this capacity we'll work to understand the carbon sequestration baseline of our estate and waterways and identify opportunities to increase carbon removal from the atmosphere.

Appendices

Appendix 1

Our Net Zero Principles

- **Accessible**; at all stages of our net zero journey we will endeavour to ensure our aims, methods and progress are relatable to all stakeholders, incorporating the relevant technical terms as best possible in a plain English approach.
- **Relevant**; our targets will be aligned with best national and international practice and standards and we will aim to adapt as these change.
- **Evidence Based**; our targets and reporting will clearly reflect actual emissions and conform to accepted scopes.
- **Complete**; any exclusions we make (e.g. for third party energy usage) will be justified, consistent and aligned with accepted practice.
- **Consistent**; our principal aim will be to maintain the same methods, boundaries and factors throughout our net zero journey.
- **Flexible**; Where we do need to make changes (e.g. to reflect new understanding, change in recognised practice) we will be clear in what we are doing, open to challenge and consistent in our approach.
- **Realistic**; whilst open to all new technologies we will prioritise what is known and achievable, managing stakeholder expectations accordingly.
- **Cost Effective**; as a publicly funded organisation we will always remain aware certain reductions may not represent value for our limited resource. We will be transparent about these difficult decisions and the alternatives available.
- **Just**; whilst focussing on our most direct (Scope 1 & 2) emissions we will aim to maximise collaboration and the social and economic opportunities for all stakeholders as a core part of our journey.
- **Transparent**; we will aim always to disclose the methodologies, data sources, assumptions and progress of all aspects of our net zero planning and journey.

Appendix 2

What is Net Zero Carbon?

Scottish Canals defines net zero carbon as the reduction as far as possible of all in-scope carbon emissions, and the removal of an amount of carbon from the atmosphere equivalent to any remaining in-scope emissions.

- In-scope carbon for this Routemap comprises our Scope 1 and Scope 2 emissions as defined in our baseline carbon footprint.
- It is generally recognised that it may prove unrealistic to eliminate all emissions. This may be due to technological or logistical limitations or to ensure key functions such as emergency backup are maintained. Our intention is to minimise these 'residual' emissions as far as possible and in any case to less than 10% of baseline.
- We will adopt best practice principles, as outlined in the Routemap, to demonstrate removal of residual emissions by 2030. This will be achieved either through offsetting via accredited methods or from excess renewable energy generation providing additionality for use in the UK grid or directly by third party users.
- We intend for this definition to provide a robust basis to challenge ourselves and our stakeholders in working together to produce a meaningful claim to being a net zero organisation. We believe this definition upholds the principles of the Paris Agreement limiting global temperature to a 1.5°C increase.

Appendix 3

Preparing our Carbon Baseline

- A comprehensive record of annual electricity and gas consumption, based on billing records, was accessed to help inform this project. This identified 171 mains electricity meter points and nine properties with connections to the gas mains.
- Third party usage billed to Scottish Canals, such as that supplying residential boat moorings, was subtracted from the baseline. Depending on the nature of such consumption this is considered within our plans to reduce Scope 3 emissions or support others with emissions reduction out with our own scope.
- A significant number of remaining assets have a low level of utility consumption, including some properties which are unoccupied or otherwise have no energy consumption at all. To prioritise activity, a screening process was undertaken to identify those assets responsible for 75% of the annual baseline energy consumption.
- Having identified this representative sample of our energy profile, site visits were completed with our energy consultants to help identify opportunities for either energy efficiency improvements or the installation of onsite renewable energy.
- Analysis of vehicles, boats and plant was undertaken separately, based on liquid fuel purchased and balance of stocks where applicable. Again, third party usage (such as sales to boaters) was identified from fuel logs and discounted for the purpose of this exercise.
- Analysis was prepared for the respective canal networks, as well as The Falkirk Wheel. This recognises that each of our networks, and The Falkirk Wheel as a landmark destination, has unique features in terms of buildings, infrastructure, fleet and resultant energy consumption profiles. This allowed us to create appropriate emission profiles and tailor opportunities for projects and investment.

Appendix 4

Approach to Scope 2 Emissions

This appendix sets out how we intend to apply Scottish Canals' Net Zero Principles to our Scope 2 emissions and procurement of electricity, in particular to ensure that our net zero journey represents cost-effective use of our funds and doesn't detract from other aspects of the valuable work we do.

Location-based vs Market-based Reporting

Our timeline to achieve net zero means we cannot simply wait for the UK electricity grid to decarbonise, we need to take further steps to reduce the carbon footprint of the electricity we procure. The organisational challenges we face plotting our net zero route have been articulated earlier in this report. In particular our geographically dispersed estate, comprising numerous smaller energy demands, doesn't necessarily lend itself to efficient deployment of onsite renewables at every demand location, whether this be directly procured or via a private wire arrangement with a third party. In response to this we recognise the need to adopt a **market-based approach to Scope 2 reporting**, although we will parallel this with location-based reporting to ensure transparency and meet the reporting requirements of the Public Bodies Climate Change Duties.

To ensure this approach meets our principles and overall vision to make meaningful change in the face of the Climate Emergency we will ensure compliance with three key technical requirements that define the quality of renewable electricity procurement;

Energy Attributes; We will ensure exclusive claim to the energy attributes of the renewable electricity generated. This can be achieved through onsite self-generation and consumption or via Renewable Energy Guarantees of Origin certificates (REGOs).

Renewable Sourced; Only electricity generated through wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogas will be considered to meet our requirements. We will therefore not accept 'unbundled' energy attributes as part of our evidence of progress towards net zero.

Additionality; Electricity procured must lead to a direct increase in renewable energy generation, with a real and verifiable emission reduction or avoidance, to count towards our net zero ambition. In practical terms this means we will only consider electricity purchasing contracts that contribute to the construction of new renewable energy facilities. Self-generation and consumption projects are considered to demonstrate additionality.

To ensure we meet the requirements for renewable sourcing with additionality all electricity purchased will therefore need to be transparent in its provenance.

The table below examines how electricity procurement routes are assessed against the requirements and the hierarchy under which they will be considered under our net zero definition.

Best Practice			Energy Attribute	Renewable Sourced	Additionality
↓	Onsite	Owned renewables e.g. rooftop PV			
	Onsite	PPA with new, unsubsidised renewable generation			
	Offsite	PPA with new, unsubsidised renewable generation			
	Offsite	'High quality' green tariffs – 100% renewable, investment in new projects			
	Offsite	PPA with existing or subsidised renewable generation			
	Offsite	'Low quality' green tariffs from utility suppliers			
	Offsite	Standard energy tariffs			

Appendix 5

Offsetting Principles

By design offsetting is the least developed part of our Net Zero Routemap. We believe our focus should be first and foremost on achieving real, verifiable cuts to our Scope 1 and 2 emissions through energy efficiency improvements and adoption of renewable energy technologies. As set out in our net zero definition however there is a need to recognise a small proportion (<10% of baseline) of emissions that are likely to be unavoidable due to technological, cost or operational (e.g. health and safety) constraints.

Our principal aim will be to reduce the amount of offsets required to the lowest possible level. Where they are required we want them to represent genuine value to global efforts to combat the Climate Emergency, able to withstand scrutiny and not undermine or damage any claim to becoming a net zero organisation. To ensure this we'll therefore adopt the following specific principles in choosing how to offset any unavoidable emissions;

Permanence – any reduction will be long term with removal offsets clearly prioritised over reduction projects.

Additionality – we will only consider offsetting against removals or reductions that wouldn't otherwise have happened had it not been for our intervention, either directly in indirectly via third parties.

Measurable – any offsets must be robustly quantifiable. If any estimation techniques are employed we'll ensure these are both conservative and justified.

Accountability – any offsets will be unique to Scottish Canals, and not overlap with any claims made by other organisations.

Relevant – we hope to prioritise projects that have direct relevance to our canal stakeholders, such as supporting the communities in which we work or the businesses operating canalside or on the waterways to reduce their own emissions. We recognise this may conflict with the final principal below.

Verifiable – we acknowledge that offsets forming part of recognised, verified schemes have legitimacy with the widest audience. Such offsets will always be sought except where we determine a better outcome (based on our overriding sustainability principles) can be achieved supporting a local, relevant opportunity.

Glossary

Active Travel

Modes of travel that involve a level of activity. Most commonly refers to walking and cycling but can also include trips made by wheelchair, mobility scooters, adapted cycles, e-cycles, scooters, as well as cycle sharing schemes.

Biodiversity Crisis

The rapid loss of species and the rapid degradation of ecosystems.

Blue-Green Infrastructure

Use of 'blue' elements, like rivers, canals, ponds, wetlands, floodplains, water treatment facilities, and 'green' elements, such as trees, forests, fields and parks, in urban and land-use planning.

Carbon Footprint

A measure of the amount of emissions (in tCO_2e) released into the atmosphere as a result of the activities of a particular individual, organisation, or community.

Climate Change

Long-term shifts in temperatures and weather patterns. Such shifts can be natural, but since the 1800s human activities have been the main driver of climate change, primarily due to the burning of fossil fuels.

Climate Emergency

Situation where urgent action is required to reduce or halt climate change and mitigate the resultant environmental damage.

Direct Operations

In the context of this Routemap activities that result in Scope 1 emissions.

District Heating

System for distributing heat generated in a centralised location through a system of insulated pipes for residential and commercial heating requirements such as space heating and water heating.

Emission Factor

The average emissions of a given GHG for particular activity. Emission factors are also expressed as the average combination of GHGs for a particular activity, in units of $kgCO_2e$.

Emissions (CO_2e)

Carbon dioxide equivalent measure used to compare the emissions from various greenhouse gases based upon their global warming potential. For example, the global warming potential for methane over 100 years is 25. Therefore 1 tonne of methane released is equivalent to 25 tonnes of CO_2 (measured on a 100-year time horizon).

Greenhouse Gas (GHG)

Emissions of the seven GHGs as defined by the Kyoto Protocol; carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride and nitrogen trifluoride.

Green Hydrogen

Hydrogen generated by renewable energy or from low-carbon power. Green hydrogen has significantly lower carbon emissions than grey hydrogen, which is primarily produced by steam reforming of natural gas.

Heat Pump

Device that uses work to transfer heat from a cool space to a warm space using a refrigeration cycle, cooling the cool space and warming the warm space.

Market-Based Methodology

Method for calculating GHG emissions from electricity based on the electricity purchased and is intended to support the use and reporting of green energy tariffs via Renewable Energy Certificates (REC) and Guarantees of Origin (REGO). The alternative location-based or place-based method calculates the emissions from electricity use based on the average emission intensity of the power grid local to use.

Micro-Hydro

Type of hydroelectric power that typically produces from 5 kW to 100 kW of electricity using the natural flow of water.

Net Zero

Net zero emissions are reached when anthropogenic (i.e. human-caused) emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period.

Offsetting

A method of indirectly reducing residual emissions.

Paris Agreement

Legally binding international treaty on climate change. It was adopted by 196 Parties at the UN Climate Change Conference (COP21) in Paris, France, on 12 December 2015. It entered into force on 4 November 2016. Its overarching goal is to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels" and pursue efforts "to limit the temperature increase to 1.5°C above pre-industrial levels."

Power Purchase Agreement (PPA)

Long-term contract between an electricity generator and a customer. PPAs may last anywhere between 5 and 20 years, during which time the power purchaser buys energy at a pre-negotiated price. Such agreements play a key role in the financing of independently owned (i.e. not owned by a utility) electricity generators, especially producers of renewable energy.

Renewable Energy Guarantees of Origin certificates (REGOs)

Allow electricity suppliers to demonstrate to customers that supplied electricity was produced from renewable sources.

Residual GHG Emissions

Emissions after all reasonable efforts have been made by an organisation to reduce its carbon footprint.

Scope

A way of categorising emission sources in relation to the reporting organisation, used as a way of providing transparency in emissions accounting, making it clear the type of emission source and the level of control of the reporting organisation over the source. Three levels of scope have been defined and used on a global basis.

Scope 1

Direct emissions from owned or controlled sources, including company facilities and company vehicles. These are predominantly from the combustion / use of fossil fuel derived energy sources.

Scope 2

Indirect emissions from the generation of purchased electricity, steam, heating and cooling consumed by the reporting organisation.

Scope 3

Includes all other indirect emissions that occur in an organisation's upstream and downstream value chain, typically from sources that they do not control or own.

Unbundled

In the context of this Routemap the separation of the renewable energy attribute of electricity from the physical electricity supplied to the user.

Water Stewardship

Use of water that is socially and culturally equitable, environmentally sustainable and economically beneficial, achieved through a stakeholder-inclusive process that includes both site and watershed-based actions.

Acronyms

EV – Electric Vehicle. **HVO** – Hydrotreated vegetable oil. **LED** – Light-emitting diode.
PV – Photvoltaic. **SMART** – Specific, Measurable, Achievable, Relevant and Time-bound

Net Zero Routemap

Scottish Canals

Detailing our course to becoming net zero in greenhouse gas emissions by 2030