Scottish Water
Trusted to serve Scotland

NET ZERO EMISSIONS ROUTEMAP

ANNUAL UPDATE 2021 – YEAR ONE

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YEAR ONE OVERVIEW

This year was the first on our 20-year journey to reaching Net Zero emissions by 2040.

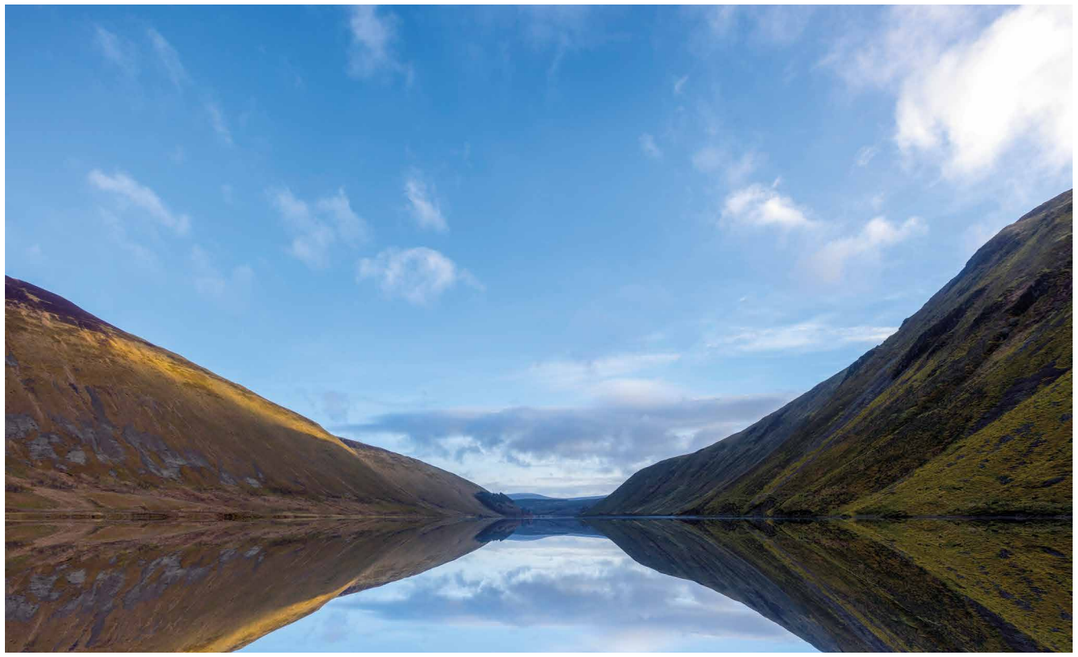
Since publishing our routemap last year, we have again experienced a number of extreme weather events.

Winter 2020 was the most challenging in a decade and January was the coldest since 1985. This summer, parts of Edinburgh received two thirds of July's expected rainfall in an hour. Weather events like this are happening with increasing frequency, in line with climate change projections. They reinforce the importance of us doing all we can, as quickly as possible, to support the elimination of the emissions that contribute to climate change.

Whilst we continue to target net zero emissions across all we do by 2040, since publishing our routemap we have developed an ambitious pathway to deliver net zero operational emissions by 2030.

In our first year, we delivered on our plans. To deliver on our ambitious targets, we have increased our focus on the four strategic actions in the routemap that can eliminate or reduce our emissions.

We are looking to increase our rate of delivery and will manage risks as they arise. Where we anticipate any shortfall, we will look to take corrective action to remain on track and where an outcome has not been met we will be open and transparent in our reporting of it.



PROGRESS IN YEAR

BECOMING MORE ENERGY EFFICIENT

Saved 1GWh of electricity through efficiency.

Set a 90GWh reduction in electricity usage target for 2030.

USING LOWER-CARBON ENERGY PRODUCTS

Installed 1GWh of solar renewable energy.

Developed a plan to change 800 diesel vans for electric vehicles and install charging infrastructure.

Assessed over 450 sites for their ability to host and use renewables.

Set a target to deliver 90GWh of renewable power by 2030.

Set a target to deliver 80GWh of energy from bioresource by 2030.

Set a target to deliver 110GWh reduction in gas energy by 2030, by stopping the thermal drying of sludge.

EMBRACING LOW CARBON CONSTRUCTION

Established our carbon academy and delivered vital training and guidance to hundreds of our people and suppliers.

Established a new Benefits Framework, making finding the lowest carbon solution a central part of investment decision making.

STORING AWAY EMISSIONS THAT CANNOT BE AVOIDED

Restored 45 ha of peatland.

Developed a plan to store more carbon than we produce, restoring all peatland on Scottish Water land and delivering 4,000-6,000 ha of tree planting.

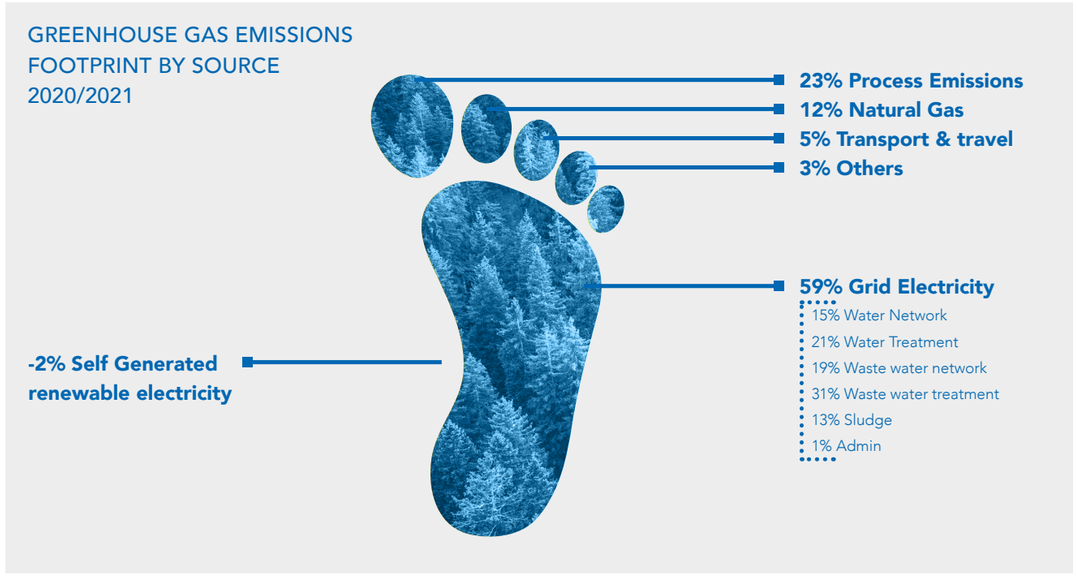
KEY OBJECTIVES FOR 2021/22

In year two, we will continue to progress the routemap and look for learnings from our expert panel and supply chain partners.

Our most ambitious targets for 2021/22 are:

- Increasing further the rate of energy efficiency delivery
- A further 7GWh of renewable energy capacity installed
- An additional 3GWh of energy produced from bioresources
- 400 hectares (ha) of peatland restoration and 100 ha of tree planting
- Progressing 12 exemplar zero emission investment projects.

2020/2021 OPERATIONAL EMISSIONS FOOTPRINT



Our operational greenhouse gas emissions fell to 249,000tCO_2e, a 2% reduction from 2019/20.

There were increases and decreases across the different carbon footprint categories this year.

The most significant increase was caused by a change in the way waste water process emissions are calculated in line with the Carbon Accounting Workbook used by the UK water sector.

This aligned it with updated global protocols and meant that the factors applied for the generation and impact of methane and nitrous oxide from waste water treatment were increased. This accounting change led to a 30% rise in process emissions reported during 2020/21.

We continue to work across the UK water sector to improve our understanding and management of these emissions.

Due to shifts in water usage patterns driven by Covid 19, we needed to pump more water and waste water, increasing the amount of electricity used.

However, due to the greening of the grid and other initiatives such as energy efficiency, we still reduced our emissions from electricity by 1,700 tCO_2.

Due to the pandemic, we also made significant savings in transport and travel emissions driving fewer miles and reducing our emissions.

These reductions were combined with a 1GWh increase in capacity in new renewable projects coming on- stream and being commissioned to displace grid electricity use.

These measures enabled Scottish Water to absorb the significant increase caused by process emission factor changes, and to show a modest decrease for the year.

PROGRESS UPDATE

Our routemap highlighted a number of key milestones on the way to net zero, covering all aspects of our emissions. These are supported by commitments to a range of actions and activities to build capacity and capability, and to deliver specific goals we would undertake over defined timescales to reach net zero.

Progress across each can be viewed on following pages.

ELECTRICITY

Electricity consumption is still our largest single source of emissions. We must reduce our consumption to reduce emissions and increase financial benefits, while enabling us to support other goals such as generating all the electricity we consume.

1. Reducing our consumption of electricity

GOAL: Reducing our consumption of electricity – 20% by 2040

- 1GWh of energy efficiency projects delivered with 1.8GWh targeted for 2021/22 and a further 4GWh under development as part of a wider programme.
- Our second 'Nereda Waste Water Treatment Works' designed, with construction due to start in September 2021. The Nereda process uses biological nutrient removal to meet environmental standards and is 30% more efficient than traditional waste water treatment works.
- Deployed data analytics to 1400 pumping stations, identifying equipment issues earlier which will lead to reduced energy usage.

2. Maximising the energy we recover from bio resource

3. Generating or hosting all the energy we use

GOAL: 100% of energy used is our own or hosted renewables by 2040

- Delivered 1GWh of additional renewable capacity through solar generation. An additional 7GWh of additional renewable capacity is in delivery in 2021/22.
- Studied 450 sites, identifying a potential for 90-110GWh of renewable generation.
- New 260GWh windfarm agreed with RWE on our land, to be commissioned in 2027.
- Additional 3GWh of energy generated from bioresources by PFI partners.

PROCESS EMISSIONS

Process emissions remain the most challenging area for the water sector to address, requiring a focus on the science, measurement and management of emissions, as well as on technologies to reduce or eliminate the production of emissions.

1. Reducing our production of process emissions

GOAL: 20% reduction

- Improved accounting of process emissions by working with wider UK water sector and aligning with Global Protocols.
- Undertaken studies to identify potential actions at waste water treatment works to minimise N_2O production.
- Pilot to test technology for recovering methane from sludge developed and planned for delivery in 2021.

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GAS AND FUEL OIL

Reducing our reliance on fossil fuels across all our sites is a key part of getting to net zero.

1. Maximising the energy we recover from bioresource

2. Eliminating consumption of gas and fuel oil

GOAL: 100% reduction in gas and fuel oil consumption

Key Achievements:

- Engaged in collaborative research with other water companies on sludge gasification technologies, a potential alternative for sludge processing that may not require fossil fuel.
- Installed and started evaluating an air source heat pump at one of our buildings with a view to rolling this out across our estate if successful.

TRANSPORT AND TRAVEL

Pre pandemic our fleet travelled around 19 million miles for business reasons. Our strategy aims to minimise the miles we travel and find zero emissions ways to travel.

1. Reducing fleet mileage and business travel

GOAL: 50% reduction in the distance we travel

- 5 million fewer business miles driven during 2020/21 saving 80% of emissions, mainly due to Covid 19 changing how we work. Currently reviewing how we might sustain these reductions longer term.
- 10% reduction in fleet emissions from reduced fleet mileage.

2. Transitioning our fleet to zero emissions vehicles

GOAL: 100% Zero Emissions Fleet – Transitioning our fleet to Zero Emissions Vehicles

- Agreed an investment strategy that will see 800 small and medium vans transition to electric powered over the next six years.
- We are developing charging infrastructure across our asset base to fuel our new EV fleet.
- All new lease and pool cars are now electric vehicles.

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INVESTMENT

We were the first UK water company to include investment emissions as part of our net zero goal. Investment emissions are projected to overtake operational emissions over the next two years.

1. We enable zero emission construction

GOAL: 75% reduction in carbon intensity of investment

- A construction expert panel has been established with senior members of our supply chain.
- Launched our "carbon academy" to share learning, explore innovative materials and develop "exemplar" projects around low carbon construction as well as promoting actions to deliver low carbon exemplar projects.
- All projects are now required to consider emissions in investment decision making.
- New delivery frameworks ensure all delivery partner contracts include requirements to manage carbon and incentives to reduce emissions.
- Developed new emissions data for 40 of the major different types of mechanical electrical equipment we buy to support better investment choices.
- In 2021/22, all new projects will be required to report their emissions, regardless of value bringing hundreds of further projects into the scope of carbon management.

2. Delivering zero emission investment with supply chain

GOAL: 75% reduction in carbon intensity

- Capital delivery alliance partners, CWA and ESD have established their top 10 most emissions intensive materials and are focused on identifying low emission alternatives.
- A set of 20 "golden rules" has been developed with partners to support decision making throughout a projects lifecycle to reduce emissions, from option development, to procurement to low carbon construction.
- Offsite manufacture has been tested on a significant maintenance project at Dalmarnock that reduced emissions by 80%. We are exploring how this could be deployed more widely.

SUPPORTING A FLOURISHING SCOTLAND

Across the 22,500 ha of our land, we can contribute to the natural, social and economic sustainability of Scotland's landscape by working to increase both carbon storage, and the biodiversity of our landholdings.

1. We will capture and store more carbon dioxide than we produce

OUTCOME: **Improve carbon dioxide storage on our land to support net zero emissions**

- Working with the James Hutton Institute to study how much carbon is currently stored across our landholdings, how much it captures annually, what opportunities exist to improve this, and to set out a credible and transparent mechanism to report carbon capture.
- Commenced surveys to understand the condition of all peatland on our land.
- Working with Forest and Land Scotland to support the development of a 10 year land management plan for over 5,000 ha of land in the Loch Katrine Estate, focusing on increasing woodland cover and improving biodiversity and amenity value.
- Joined the board of the Clyde Climate Forest, and are working with them to increase woodland cover and support biological connectivity from Galloway to the Trossachs.
- Adopting "nature based solutions" and progressing and working with the community to implement a blue green design to address flooding issues in Dundee.

ENABLERS

We know that we cannot achieve our ambitious goals alone. On our journey to net zero, there are some key enabling activity areas which we have progressed in the last year.

PEOPLE

- Carbon academy established to share best practice and be a focal point for learning activities.
- Two groups of modern apprentices taking part in the Fuel Change Challenge, the Scottish Apprentice Low Carbon Innovation Challenge.
- All of our leaders are being encouraged to complete the Scottish Government's Climate Solutions course.

CUSTOMERS AND COMMUNITIES

- Supporting the Let's Do Net Zero Scottish Government Campaign.
- Refreshed our partnership with Home Energy Scotland.
- Continued to run campaigns on Saving Water and Energy.

PROCUREMENT

- New delivery partner contracts include incentives for hitting emissions targets.
- All new framework contracts for materials include the need to provide emissions data and to work with us on exploring how to reduce emissions over time.

GOVERNANCE

- New benefits framework developed to support investment decision making.
- Benefits framework looks at a broad range of benefits using a six capitals approach and builds on SEPAs "One Planet Choices" approach.
- Wider benefits and whole life costs are considered alongside whole life carbon to support investment decisions which will assist in the delivery of net zero.

POLICY AND REGULATION

- Scottish Government and other public bodies engaged through various groups including:
  1. The minister led Environment and Economy Leaders Group (EELG)
  2. The Sustainable Scotland Network Steering Group
- Contributed case studies and evidence to Scottish Government's climate change plans.
- Shared our progress in developing approaches to carbon management and accounting for net zero.

INNOVATION

- Funded and established a new Scotland Hydro Nation Chair at Stirling University and are looking forward to working with Professor Andrew Tyler and his team.
- Prof Tyler will lead a £3.5 million initiative to position the country as a global leader in water research.
- Progressed innovation projects at our development centres and have commenced pilot trials of a new anaerobic waste water treatment reactor.

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We have progressed a number of activities across these areas.

LOW ENERGY WATER AND WASTE WATER TREATMENT, AMMONIA AND METHANE RECOVERY

DIGITAL AND ANALYTIC TOOLS

MATERIALS RESEARCH

WATER FOR HYDROGEN PRODUCTION

CASE STUDY: WASTE WATER ANAEROBIC TREATMENT TRIAL

We have developed a design for the anaerobic treatment of waste water and have installed a pilot reactor at our Denny Waste Water Treatment Works.

This will undergo a year long trial to test its effectiveness under a range of operating conditions. If successful, we will look to scale up the technology. This technology offers the potential for a waste water treatment works to not only be low energy but also to generate all the energy it consumes.

CASE STUDY: FLOW ENERGY

To help reduce energy consumption across our 2,500 sewage pumping stations, we have developed a tool called Flow Energy which uses energy consumption data and digital algorithms to identify potential issues.

This enables local teams to investigate sooner and put in place interventions to prevent service failure and reduce excess energy demand.

So far this has been deployed to over 1,400 sewage pumping stations, providing weekly reports to team leaders from across the country and could help save around 5% of energy demand in waste water pumping over the coming years.

CASE STUDY: CEMFREE / ROAD BINDER TRIALS

At Daldowie Waste Water Treatment Works we have trialled a low carbon concrete alternative called Cemfree.

This can be used in place of cement to from a concrete with up to 80% less embodied carbon. With our delivery partners, we are looking at how we might make greater use of this type of material.

At Biggar Water Treatment Works, we worked with McKenzie Construction to resurface an 800 metre section of access road by using a binder called ecoProactive to stabilise the existing surface. This process was cheaper than tarmacking the road and eliminated the need for quarrying and delivering new materials.

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CASE STUDY: HYDROGEN FROM FINAL EFFLUENT

Working with Cranfield University, we are studying the role of hydrogen in reducing carbon emissions in the industry.

This study looks at the technologies and processes available to produce hydrogen and what role these can play in reducing emissions.

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