Nature Protecting and enhancing the natural environment

Nature based solution for treating wastewater using a wetland at Castle Archdale, County Fermanagh.

Strategic areas of focus

- More resilient network
- Sustainable solutions
- Keep it clear
- Towards zero carbon

Sustainable development goals

Principal threats/opportunities

Page 84 Read more about principal threats and opportunities.

Strategic performance indicators

Nature	Unit of measurement	Target 2021/22	Actual 2021/22	Pass/ Fail	Target 2022/23
Reduction in pollution incidents - sewage (high and medium)*	Number	12	12	Pass	11
Wastewater compliance (% population equivalent served)**	%	99.18	99.23	Pass	94.65
Reduction in number of properties at risk of out of sewer flooding (cumulative over 2021-27 period)	Number	0	3	Pass	6
Reduction in carbon footprint. Relates to reduction in net operational carbon emissions measured in tonnes of carbon dioxide equivalent (tCO_2e)	%	***	13	***	***

*Calendar year target.

**Calendar year target. Based on pre-announced rather than un-announced regulatory sampling at the treatment works and the reported wastewater compliance doesn't incorporate flow compliance for the wastewater treatment works or the sewer network.

***Target to be set following development of net zero carbon route map in 2022/23.

More resilient network

Reducing sewer flooding

Flooding and the risk of flooding can constrain economic development, increase the cost of insurance and pollute our natural environment. Most of the urban areas of Northern Ireland, including road surfaces, are served by combined sewers that carry both wastewater and surface water - such a system would never be built today.

Climate change has contributed to an increase in the intensity and frequency of rainfall. Heavy rainfall can cause the sewers to become full of water and the sewage to back up in the system. Many of our traditional systems include 'combined sewer overflows', which were designed to prevent out of sewer flooding/damage to properties by discharging this excess water directly into the rivers or streams bypassing the treatment works.

We understand that internal sewer flooding is one of the worst things that can happen to our customers' properties. We maintain a register which defines properties verified to be at risk of internal flooding as a result of the capacity of the sewerage system being exceeded. There were 108 properties on the register at the start of PC21. We removed three properties from the register in 2021/22 and plan to remove a further six properties in 2022/23.

We have a smarter approach to drainage area planning. Our new modelling studies are transforming our analysis and providing a world class evidence base on which informed decisions can be made. Our growing toolbox of digital surveys, powerful analytical tools and integrated environmental models are giving us better insight than ever into how our wastewater networks performing and how this performance affects our customers, nature and the economy. Industry leading modelling software (Infoworks ICM) is now being used to perform complex hydraulic analysis. It enables us to identify our worst performing overflows. Interactive Power BI dashboards then convey risks and recommendations; and bespoke software enables creation 3D visualisations.

Reducing the amount of surface water reaching the sewers can help reduce the risk of sewer flooding due to overcapacity. The Ravenhill Avenue flood alleviation project commenced in 2021/22 and will remove an impermeable area equivalent to around 12 football pitches, which currently discharges into the Belfast sewerage network. Ongoing investigation work on storm water removal will result in re-profiling the total impermeable area removed during PC21.

Storm water modelling.

"Timmy the Tunneller" arrives at £7m Ravenhill flood alleviation project

A major Tunnelling Machine has arrived in Belfast, for use on a major £7m Flood Alleviation Project, which is well underway in the Ravenhill area of South Belfast. Once complete, in early 2023, this major project will reduce the risk of out of sewer flooding in the area.

The machine, which is over 2 metres in diameter and 2.5 metres long will tunnel below the busy Ravenhill Road and help reduce disruption during construction. The tunnel will extend 75 metres from the edge of Ormeau Park up Ravenhill Avenue. Once the tunnelling works are completed, the more traditional open cut method will be used to construct the remaining sewers and manholes.

This essential infrastructure project involves the upgrade of existing and installation of new sewers along a section of Ravenhill Avenue and surrounding streets. It will increase the capacity of the sewerage system in this area of South Belfast and update the existing infrastructure, some of which dates back to the early 1900's.

Work is taking place in phases, progressing along Ravenhill Avenue, Sunwich Street, Federation Street and Millar Street. The project team have worked well with the local community to minimise disruption, including employing the use of underground trenchless construction methods where appropriate.

Tunnelling machine used for the Ravenhill flood alleviation project.

Tunnel boring machine arrives at £8m South Belfast project

A "friendly giant" Tunnel Boring Machine (TBM) over 10 feet in length has arrived in Belfast, for use on a major £8m Flood Alleviation Project. The work is to upgrade the sewerage infrastructure and substantially reduce the risk of out-of-sewer flooding in the Marguerite Park area of South Belfast, and pave the way for future works in the Sicily Park area.

Work on Phase one of this major infrastructure project is underway within the grounds of Musgrave Park & Musgrave Park Hospital, and the overall project will take up to two years to complete.

The machine will help reduce disruption within Musgrave Park/ Musgrave Park Hospital and Malone College by tunnelling around 800m of the new sewer underground – right below our feet! We will also tunnel under the main Belfast to Dublin Railway line, avoiding the need for any closures. The tunnelled sections of sewer will be up to 8m below ground level, the equivalent height of two double decker buses!

NI Water is delighted to welcome the arrival of the TBM on this major Flood Alleviation Project and look forward to putting the machine into operation!

The machine will remove approximately 4,000 tonnes of soil, equivalent to 250 full lorry loads of earth from below the ground, while users of the park and hospital will be unaware of what is happening below their feet! Tunnelling will also significantly reduce excavation works, and avoid the use of 21,000 tonnes of new stone fill, saving around 24,000 litres of fuel in transportation.

NI Water would like to thank the public for their ongoing patience as construction progresses on this major project. Once complete, the local community will benefit from reduced risk of out-of-sewer flooding in the Marguerite Park area for many years to come.

The overall project involves constructing over 1.3km of new large diameter sewer from the 'Grovelands' area of Musgrave Park, through the park grounds, Musgrave Park Hospital and Malone College, crossing under the railway line and through an area of private land into Diamond Gardens/Marguerite Park and Donegal Park.

NI Water Project Managers at the arrival of the tunnel boring machine.

Find out more: *https://www.niwater.com/major-infrastructure-detail/10029/sicilymarguerite-park-flood-alleviation-project-phase-1/*

Delivering a 21st century drainage and wastewater system for Belfast

Infrastructure Minister Nichola Mallon published Living With Water in Belfast: An Integrated Plan for Drainage and Wastewater Management in Greater Belfast. This follows Executive approval and a public consultation on the Plan. At £1.4bn over 12 years it is not a quick, or inexpensive fix. The Plan aims to deliver a long-term approach to drainage and wastewater management that will protect from flooding, provide a cleaner and greener environment and ensure that Belfast is open for business and investment. The publication of the Plan is a major milestone as it represents the culmination of five years of studies by the programme partners to assess the challenges faced and determine drainage and wastewater related investment needed for Greater Belfast. It also marks the start of the delivery phase. Over 50 engineers are working full time to deliver the construction works which will include upgrading six wastewater treatment works and their sea outfalls, replacing pumping stations, building new tunnels and upgrading pipelines and sewers across the area. NI Water is working closely with partners to deliver sustainable solutions that provide adaptation to climate change and will also, where possible, provide a range of benefits to communities such as improved green spaces.

The Infrastructure Minister, the Belfast Lord Mayor and NI Water's Head of the Living With Water Programme visit the demonstration project at Cave Hill Country Park in Belfast.

Find out more at Living With Water Programme | Department for Infrastructure (*https://www.infrastructure-ni.gov.uk/topics/living-water-programme*)

Completing the picture on wastewater compliance

We recognise the need to improve how we measure wastewater compliance. The current regulatory monitoring programme is based on pre-announced rather than unannounced regulatory sampling at the treatment works and the reported wastewater compliance doesn't incorporate flow compliance for the wastewater treatment works or the sewer network. This provides an incomplete picture of environmental compliance and protection. We are working with the NIEA and other stakeholders to reform the wastewater compliance model to improve compliance across the whole wastewater system. This is known as the water regulation reform programme. We have agreed a revised governance structure for wastewater regulation, refreshed the terms of reference and developed a route map for the programme of work over PC21.

Reforming our wastewater compliance assessment is a key part of a wider programme of Water Regulation Reform being taken forward by our environmental regulator, the NIEA. To help inform this, we are undertaking an unannounced sampling programme to get a better understanding of wastewater treatment works' performance.

We are also installing flow meters at wastewater treatment works and event and duration monitors (EDMs) on our sewer network to better understand spills from combined sewer overflows and enable future regulatory reporting on spills. Combined sewer overflows act as emergency discharge valves in our sewerage system, discharging untreated sewage and wastewater when the system is overloaded. They are a necessary part of the existing sewerage system, preventing sewage from flooding homes and businesses. We delivered 52 monitors at combined sewer overflows against a target of 50 for 2021/22. We didn't deliver any EDMs at wastewater treatment works against target of 16 for 2021/22. We continue to work with NIEA to establish the method for measurement of flow requirements at wastewater treatment works, which may be a combination of flow meters and EDMs at most wastewater treatment works. We removed five unsatisfactory intermittent discharges against a target of seven for 2021/22. We plan to recover this slippage over PC21.

There are a number of key projects proposed for PC21 which will improve wastewater compliance performance and support the wastewater regulation reform programme. These include delivery of capital investment schemes to upgrade wastewater treatment works and parts of the network, doubling the number of event duration monitors to around 650, installing flow meters and improving our environmental models.

The intelligent control of wastewater flow involves the deployment of a digital tool called Aquasuite. It uses AI to control all the feed from each individual pumping station to ensure the flow to the treatment works is at a constant rate, so avoiding peaks and troughs. We expect this solution to create more headroom at works which means capital investment for upgrading can be deferred or avoided. It will improve treatment efficiency and deliver better compliance at the works – and improve our carbon footprint through running our pumps more efficiently.

Building capacity for Ballygowan

We continued to make good progress on the construction of the new £6.4m Ballygowan wastewater treatment works despite ongoing delays with some building services and materials. Overall, the work on site is at an advanced stage with the testing and commissioning phases planned for the end of 2021/22. NI Water is planning to install a new 65kW renewable solar energy system within the footprint of the old wastewater treatment works site. The electricity created from the new solar panels will be used to provide additional power to run the treatment works, reducing energy usage and lowering the carbon footprint of the site.

Construction of the wastewater treatment works at Ballygowan, County Down.

Find out more: *https://www.niwater.com/major-infrastructure-detail/10035/ballygowan-wastewater-treatment-works/*

Sustainable solutions

Every day we recycle wastewater from 736,000 homes and businesses before safely returning it to the rivers and sea. Traditional treatment works are carbon intensive, requiring a lot of energy, concrete and chemicals to ensure treated wastewater can be safely released back to the environment. We are committed to a more sustainable approach to wastewater treatment and have deployed a number of innovative approaches such as lower energy technologies and nature based solutions.

Lower energy treatment solutions

Set in the heart of an agri food hub, Dungannon wastewater treatment works receives over 60% of its influent from agri food traders. To treat difficult, high strength influent effectively and to serve these vital business customers in a way that protects the natural environment required the installing of a state-of-the art treatment process known as Nereda®. This technology places the plant at the forefront of world-class industry innovation, offering a low-energy solution for the treatment of both domestic and industrial wastewater. The investment – which forms the first phase in a wider programme of improvements planned for Dungannon wastewater treatment works – extended the existing works to meet the current demand and maintain regulatory compliance.

Its application is well suited to Dungannon as it allows delivery of a high quality effluent but only required a quarter of the space of traditional wastewater treatment solutions, meaning that it was installed without NI Water needing to purchase additional land. The addition of this process at Dungannon means that the works can cope with increasing current demand and maintain regulatory compliance.

The diagram above shows the layout of the Dungannon wastewater treatment works, County Tyrone (NI Water land ownership outlined in blue) with the new Nereda® process being installed to the north of the site (marked in colour).

Working with wetlands

In keeping with our ambition to put back more than we take out, we identified a green solution, which uses constructed natural wetlands to treat wastewater instead of traditional wastewater treatment processes. Wetlands do more than you think – they filter our fresh water, absorb and retain carbon, and support biodiversity.

NI Water has many examples of using reed beds at the end of a conventional (mechanical) wastewater treatment system to 'polish' or 'purify' the water. Clabby is the first site in Northern Ireland where we are leading the way with reed bed technology for the full treatment of wastewater. Known as Phragmifiltre®, this innovative system is the first reed bed technology in the UK that provides complete treatment of wastewater in one wetland system, with no pre-settlement and using little to no power. Because of the unique way the Phragmifiltre® process stores and composts sludge on site, there is no need for tankers to visit the site to desludge - a major difference to the previous treatment works. This natural system also provides wildlife habitats - another important element that a conventional treatment works doesn't have.

We are partnering with the Agri-Food and Bioscience Institute on an EU EU-funded project, CatchmentCARE, that aims to improve freshwater quality within the North Western and Neagh Bann international river basins. The project is focussed across three cross-border catchments, the Arney, Blackwater and Finn. As part of the project, final effluent from Cavanagrow wastewater treatment works is instead of being discharged into the local water course when ground conditions are suitable and used to irrigate a crop of willows. This improves the water course quality and provides irrigation for the crop.

Clabby wastewater treatment works, County Fermanagh - Courtesy of BSG Civil Engineering Ltd.

Boosting biodiversity

Strong biodiverse ecosystems are the basis for our water supply chains. We are partners in the All-Ireland Pollinator Plan, an island-wide initiative to reverse the decline of precious pollinating insects. We have been conducting fieldwork to identify areas best suited to be left aside for pollinators and mapped these areas on the All Ireland Pollinator Plan web-mapping tool. Working with the NI Water Bee Keeping Group is helping us identify areas to survey in the pollinator season. We are also undertaking counts of pollinators alongside site surveys, to assist the UK Centre for Ecology and Hydrology citizen science project.

Find out more at *https://pollinators.ie/wp-content/uploads/2021/03/FINAL-All-Ireland-Pollinator-Plan-2021-2025-WEB.pdf*

Nature based decision making

We are committed to putting nature at the heart of our decision making. The Water Industry Forum, working with Water UK's Environment Policy Advisory Group members including NI Water, produced a set of principles in 2020/21 on using natural capital type approaches in investment decision making. The principles are seen as a best practice guide for water companies and regulators to help design and apply natural capital type tools, ultimately with the aim of making more sustainable investment decisions and delivering better outcomes for customers and the environment. Over 20221/22, the Forum has been developing further guidance on driving best value decision making using a multi-capitals approach. We continue to pilot the use of multi-capitals decision making on the Living With Water Programme and have a number of activities within our Climate Strategy to support multi-capitals decision making. We plan to roll out the new approach across our investment programme to inform our next business plan in PC27 (2027-33).

Keep it clear

We deal with around 15,000 blockages of our sewers each year, over 11,000 of which could have been prevented. The most common causes of these blockages is the flushing of items which do not dissolve down the toilet such as wet wipes and the disposal of fats, oils and grease (FOG) down the sink. These combine to form a solid mass in the pipes underground, meaning less waste can pass through the pipe. If enough waste cannot pass through, it leads to flooding in homes, business or our natural environment.

'Wipe' Out at Christie Park

NI Water is appealing to customers in the Coleraine area to bag and bin their bathroom rubbish such as wipes and sanitary items after hundreds of wet wipes recently washed up at Christie Park. The sewer will require an upgrade, however the main problem here is the flushing of inappropriate items such as wipes and sanitary products. It is not the first time this has happened but NI Water and local Councillor William McCandless are appealing for it to be the last. If we all make changes to our flushing habits, then incidents like this, and those where we see an overflowing manhole, can be avoided in the future.

Our customer campaigns continued the seasonal messages around bag it and bin it and FOG over Christmas and Easter. This included messages carried in daily papers. Belfast Live featured Belfast wastewater treatment works skips and the volume of sewer related debris. This was in turn supported by the work of our education team who engage school children and the community to support and spread the message.

NI Water staff and Councillor William McCandless at the manhole at Christie Park, Coleraine, County Derry/Londonderry.

Find out more at: *https://www.niwater.com/fats-oil-and-grease-fog/*

Got the Bottle?

Northern Ireland uses 145 million single use plastic bottles every year. Across the UK, 7.7 billion plastic water bottles are used each year, with the average person now using 150 plastic water bottles every year – that's more than three a week. Many are discarded, and end up polluting our rivers and seas. Staggeringly if just one in ten refilled just once a week, we would save around 340 million plastic bottles a year.

NI Water is committed to tackling the problems caused by plastic bottles and bottle tops, which block up our drains and rivers, and pollute our seas and shorelines. By refilling a reusable bottle, not only do you reduce plastic waste, you are also helping to drive down your carbon footprint. Our Councils have signed up hundreds of local businesses across their local area who welcome any member of the public on to their premises to refill their reusable bottle with tap water. Over 300 primary and secondary schools have also signed up to become Refill schools, pledging to reduce the number of single use plastic water bottles in school and encouraging all pupils to refill a reusable bottle with world class tap water.

NI Water is a member of the Responsible Plastic Management Programme, which aims to introduce reducing plastic use initiatives across the company. The Programme helps to positively manage plastic enquiries that are becoming more prevalent in business, society and from interest groups and regulators. We will work collaboratively with the Programme to develop a responsible action management plan, with a view to engaging internally and externally our commitment to reducing plastic pollution.

Towards zero carbon

Climate change is of strategic importance to the water sector given its carbon intensity and exposure to extreme weather events. Operational emissions from the water industry account for nearly 1% of the UK's total carbon emissions. This is because water and wastewater treatment is energy and chemical intensive and transporting water requires a great deal of pumping. Grid electricity accounts for the majority of our operational carbon emissions.

At NI Water, we're committed to delivering a net zero, climate resilient future for all our customers. We are determined to harness the huge and largely unseen potential for NI Water to address climate change. We are committed to net zero by 2050 in line with the net zero target for Northern Ireland. We can also play a strategically important role in helping society to decarbonise by planting one million trees; building more renewables on our land; kick-starting our hydrogen economy; and providing sources of warmth for district heating schemes.

We know that we can't do this alone. We will need support from all of our partners and stakeholders; a positive policy and regulatory environment from government and regulators, innovation from our supply chain, reduced water use from our customers, collaborative planning from councils and other partners, and more.

We are encouraged to see progress by the NI Executive on climate change legislation for Northern Ireland with a net zero 2050 target and key climate related strategies on Energy, Green Growth, Environment, Infrastructure and Skills. We have engaged through the relevant consultations.

NI Water is Northern Ireland's single, largest electricity consumer

One of Northern Ireland's largest land owners

Carbon neutral by 2050

Battery Energy Storage Project

Following a competitive tender, NI Water has awarded Continu Ltd funding under Phase 2 of the SBRI (Small Business Research Initiative) to undertake a collaborative research project into the benefits of the use of large-scale battery storage technology to store and use renewable energy.

Head of Energy at NI Water said:-

"To provide the green power for the increasing adoption of electric vehicles and to start to decarbonise the heating for homes and places of work, Northern Ireland needs to double its renewable generating capacity in the next ten years.

"NI Water has over 3,000 widely distributed grid connected sites, which have the potential to play a vital part in the deployment of large-scale batteries across the province. The key outcome for this exciting research project is to reduce usage and costs while maintaining reliability of supply at all times.

MD of Continu, commented,

"Having successfully completed six months of feasibility research (Phase 1), we are excited to build on this further to develop our findings. This will identify opportunities to use battery energy storage technologies within NI Water in order to reduce energy consumption, reduce cost, improve resilience and generate income. Given NI Water's position in the Northern Ireland electricity market, the project has the potential to demonstrate major benefits and will provide valuable information to other large energy users in both public and private sectors."

NI Water staff and supplier representatives involved in the battery project.

Approach to climate disclosures

There have been a number of significant developments over 2021/22 including the Sustainability Accounting Standards Board and the International Integrated Reporting Council merger to form the Value Reporting Foundation, the publication of draft IFRS sustainability disclosure standards and the draft Task Force on Nature-related Financial Disclosures (TNFD) framework. This builds on the move towards mandatory climate change reporting against the Taskforce on Climate-related Financial Disclosures (TCFD) for large sections of the UK economy by 2025.

We have undertaken a gap analysis with TCFD and identified a number of actions to take as part of our transition towards mandatory TCFD reporting for large companies in 2023/24. NI Water has registered with Carbon Disclosure Project (CDP) and used the CDP questionnaire to prepare the TCFD climate disclosures. The CDP aligns with the Climate Disclosures Standards Board (CDSB) framework which helps corporates identify material information and data. The CDP and CDSB are part of a climate disclosure framework, which ultimately supports corporate disclosures under the TCFD framework.

Organisations with climate-related risks, opportunities and impacts

CDP DISCLOSURE INSIGHT ACTION

Generate clear and well-structured information and data

CDSB Climate Disclosure Standards Board

Disclose relevant material information and data in the mainstream report

TCFD TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

Resulting in: Efficient and investor-useful, TCFD-aligned mainstream disclosures

Climate governance

Board

The NI Water Board is responsible for overseeing the management of risks associated with climate change. Climate change is one of NI Water's Principal risks and the Board receives regular updates on the management of climate change risks throughout the year. Find out more about our Principal Risks on page 84.

The Board also provides leadership on climate change. The Chair of the Board launched the Power of Water Report in November 2021 at the International Convention Centre in Belfast. The Report highlighted the unique opportunity we have in Northern Ireland to collaborate with urgency to deliver a green economy. The hybrid event as attended by over 300 stakeholder representatives and received widespread media coverage. Find out more about the Power of Water Report at page 53.

The Audit Committee and Risk Committee received updates on the development of the Climate Risk Model to support the TCFD disclosures. Refer to the reports by the Committee Chairs at page 118 and page 120.

The Board has also been updated on the development of the Climate Change Strategy.

The Climate Change Strategy will be a call to action. We will engage widely to understand how we can work together to reach the targets set out in the strategy. However, this does not mean that our Climate Change Strategy will be the only one to focus on. We all need to plan, engage and come together to ensure we are moving in the right direction.

Executive Committee

Responsibility for the management of climate risks rests with the Executive Committee. The Director of Asset Delivery is the designated Senior Responsible Owner for climate change and is supported by designated senior managers and their teams across relevant areas of the business. The Executive Committee received regular updates on the management of climate risks over 2021/22. This included a half day workshop in January 2022 to review progress on the development of NI Water's Climate Change Strategy, the Climate Risk Model and building momentum on the Power of Water Report.

Climate Strategy

Focusing on climate is not new for NI Water. Since our formation in 2007, we have made significant improvements in water resilience for customers; delivering high levels of leakage detection, sustained investment in water mains and water efficiency initiatives. We have been developing a Water Resilience and Supply Plan from 2012 and have been partners in the Living With Water Programme to improve strategic drainage infrastructure from 2014. Since 2015, we have reduced our operational carbon emissions by well over 50%, through alternative fuel projects to reduce fossil fuels used in our treatment processes, delivering solar farms, restoring peatland and planting new woodlands.

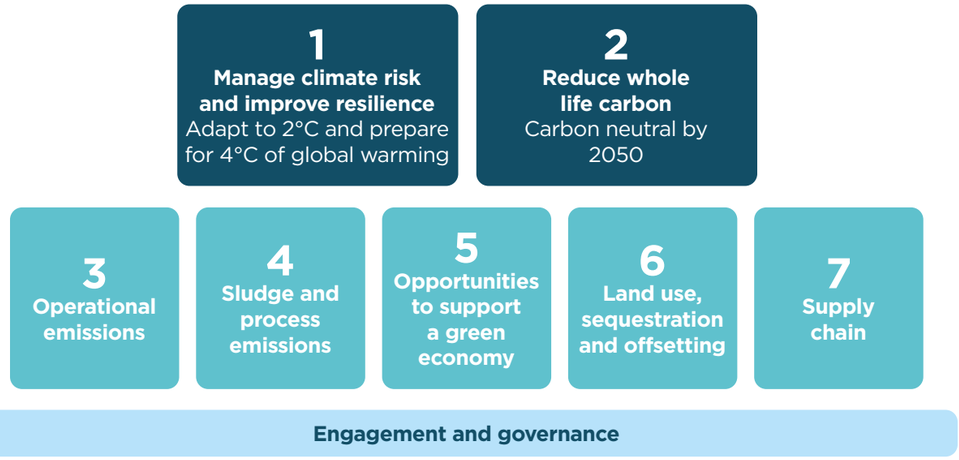
Corporate Strategy

Our Strategy 2021–2046 was launched in 2019 and through our strategic priority on nature, set out our goal to fully exploit innovative approaches to energy and new technology to reduce our carbon footprint and ultimately become carbon neutral. The long term corporate strategy also recognised the need for a sustained step change in levels of investment to improve asset resilience, particularly for our wastewater infrastructure. We recognised the need to develop a Climate Change Strategy to provide the targets that support this ambition, and begin to identify how and what we will need to change in order to deliver on these targets.

Developing a Climate Change Strategy

In 2021/22, Deloitte completed an advisory project regarding a Climate Change Strategy. A key recommendation was to identify prioritised actions required to take forward development of NI Water's Net Zero carbon route map and climate resilience strategy, including actions required to align with TCFD.

Over 2021/22, NI Water engaged ARUP climate change subject matter specialists to assist in developing a Climate Change Strategy and implementation road map. A series of workshops were facilitated by ARUP and were held over several months. They involved the active participation of NI Water senior managers and technical staff as well as workshop participation and discussions with Directors. The outcome of this work is a draft NI Water Climate Change Strategy that is framed around twin targets for climate resilience and Net Zero and starts by outlining NI Water's current carbon emissions and understanding of climate risk. To achieve our overarching targets, the draft strategy and associated action plan covers seven core pillars:



Seven core pillars in NI Water's draft Climate Change Strategy.

Together these areas will contribute to the management of climate risk and the reduction of whole life carbon. The strategy also sets out how NI Water will work with others, through internal governance to monitor and review progress, and engagement with wider stakeholders.

NI Water actions and action owners have been identified to ensure traction and delivery of the proposed NI Water Climate Change Strategy for informing NI Water's first net zero, climate change resilient business plan - PC27 (2027-33).

Climate risks

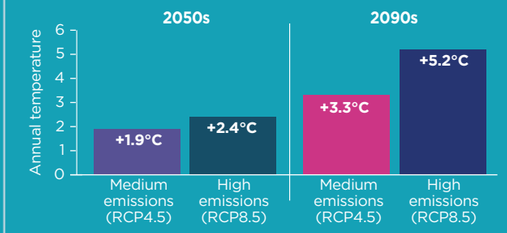
Climate risks include physical (extreme weather related) risks, transitional (net zero) risks and opportunities (such as outlined in the Power of Water Report).

Physical risks

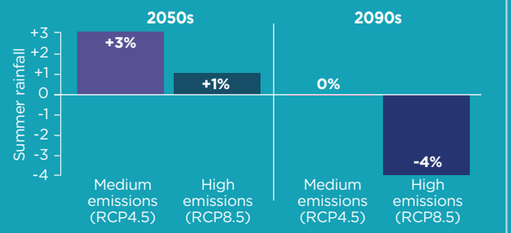
We have already seen the impact of global warming across our region through increased flooding, storms, prolonged periods with no rainfall and more frequent periods of intense rainfall. All of these factors create challenges across our business.

By 2050 Northern Ireland is expected to experience a temperature increase of between a 1.9°C, in a middle emission scenario, and 2.4°C, in a high emission scenario. By the 2090s the temperature is projected to be significantly higher of between 3.3°C and 5.2°C. As the future is uncertain for future planning we are planning for a temperature increase of 2°C in 2050 and for a 4°C increase in the 2090s.

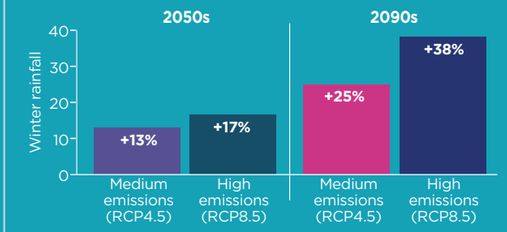
Annual temperatures are set to increase on average by between 1.9°C - 2.4°C by 2050**



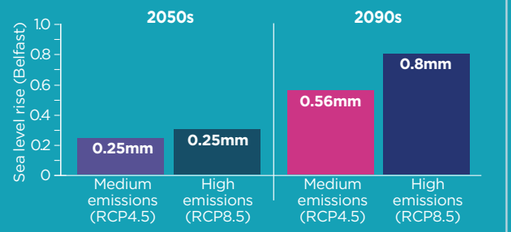
We can expect hotter drier summers, and while overall summer rainfall is projected to decrease, downpours will be more extreme*



Winter rainfall is projected to increase creating warmer wetter winters*



Projected sea level rise has the potential to impact our coastal towns and cities including Belfast



Climate change and sea level rise projections based on the 90th and 95th percentile respectively (compared to the 1981-2000 average)

Future climate projections for Northern Ireland.

*The key risks identified across the UK water sector include***:*

- risks to water networks from cascading failures;
- risk to infrastructure from river, surface water, groundwater and coastal flodding and erosion;
- risks to subterranean and surface infrastructure from subsidence;
- risks to water supplies from reduced water availability;
- risks to health from poor water quality and household supply interruptions; and
- risks to aquifers and agriculture and from sea level rise and saltwater intrusion.

*CCRA3 2021, Summary for Northern Ireland available at https://www.ukclimaterisk.org/wp-content/uploads/2021/06/CCRA-Evidence-Report-Northern-Ireland-Summary-Final.pdf.
**UKCP18 key results, available at https://www.metoffice.gov.uk/pub/data/weather/uk/ukcp18/science-reports/UKCP18-Key-results.xlsx.
***CCRA3, 2021, Water briefing, available at https://www.ukclimaterisk.org/wp-content/uploads/2021/06/CCRA3-Briefing-Water.pdf.

Transitional risks

Limiting warming to 1.5°C means that corporates face transition risks from the required policy and regulation, such as the introduction of carbon taxes, climate litigation, reputational exposure and shifting consumer preferences, as well as from the 'green premium' on new technology.

Opportunities

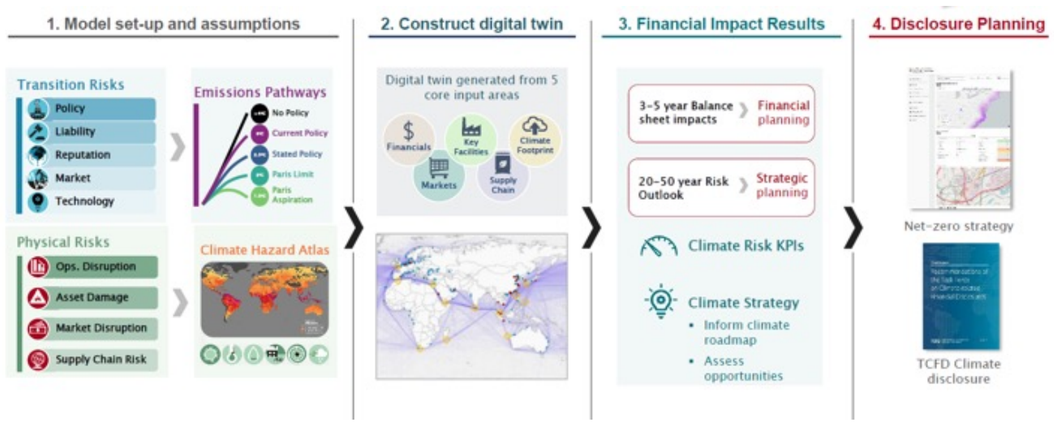
We have an exciting opportunity to address the challenge of climate change whilst also creating opportunities for development, improving infrastructure in a sustainable way, reducing inequalities, embracing the environment, providing places future generations can be proud of, cleaner air, jobs and opportunities for all. The Power of Water gave an insight to the possibilities that are already within our grasp. We truly believe that Northern Ireland has the skills and ambition to come together in agreeing and implementing a common approach. An approach that will outline a roadmap to success. Find out more about the Power of Water Report at page 53.

Risk scenario modelling

NI Water has worked with its insurance broker, Marsh, and the Centre for Risk Studies at the University of Cambridge (drawing on the Risilience platform*) to develop a Climate Risk Model to assess the financial impacts of physical and transitional risks over PC21. Marsh and the Centre for Risk Studies supported a number of workshops over 2021/22 involving relevant colleagues from across the business. The modelling is centred on scenario analysis disclosures for a range of climate warming pathways but also supports a number of other TCFD disclosure reporting areas. The model was developed in an iterative process starting from an existing generic model template, developed by the Centre for Risk Studies, which was tailored for NI Water.

The modelling involved the following steps:

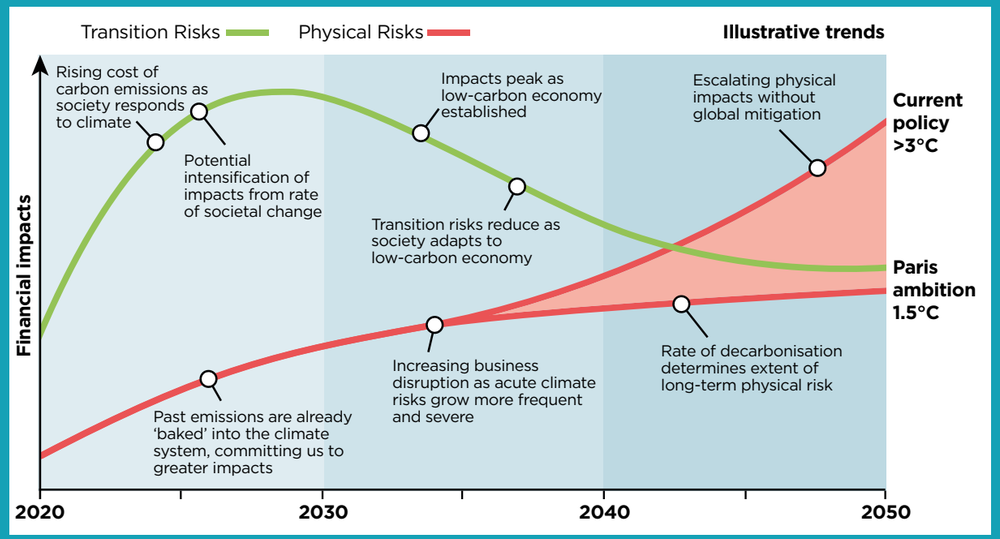
1. Model set up and assumptions – the model identified relevant transitional and physical risk categories. The physical risks categories were informed by a climate hazard atlas. A number of emission pathways were also identified to reflect the range of policy options;
2. Construct digital twin – a digital twin of NI Water was constructed using the PC21 financial actuals and forecasts;
3. Assess financial impact – the financial impacts were assessed over the medium term (2022-27). Indicative financial impacts were outlined over the longer term to 2050; and
4. Disclosure planning – outputs were aligned with the TCFD disclosure requirements.



Overview of NI Water's Climate Risk Model developed in partnership with Marsh and the Centre for Risk Studies at the University of Cambridge.

*Risilience is a platform used by global companies to facilitate strategic and financial decision making from climate change. Risilience uses a rigorous scenario-based framework that integrates a wide range of threat classes with the latest international standards in climate science to provide a competitive view of a corporation's balance sheet. Risilience works closely with its academic partner, the Centre for Risk Studies at the University of Cambridge Judge Business School, to tackle complex issues of management science and business risk.

The model points to illustrative trends for physical and transitional risks over the next three decades. These show transitional risks peaking over the next decade before being overtaken by physical risks. These trends reflect that companies and their owners face significant risks from both action and inaction.



Illustrative trends for physical and transitional risks over the next three decades.

The magnitude of the short term financial impacts over the PC21 period excludes the costs to transition NI Water to net zero. This aligns with the approach taken for the PC21 Business Plan and will likely result in a material increase in the financial impacts once factored in for PC27 (2027-33) and future Price Controls.

Key areas for development of scenario modelling

The modelling exercise has identified a number of areas for development, which have been incorporated into the draft Climate Change Strategy action plan:

Transitional risk:

- policy risk – assessment of scope 3 supply chain emissions as part of setting of science based targets;
- technology risk – quantifying the cost to decarbonise the business by 2050 and funding via the Price Controls; and

Physical risk:

- assessment of granular asset level impacts to inform long term asset resilience as part of our 25 year resilience plans for clean water (in place and to be updated for latest climate change projections by 2023/24) and wastewater (to be developed by 2023/24).

Embedding climate risks

Our principal risk on climate change is being aligned with the analysis on physical and transitional risks and the action plan for the draft Climate Change Strategy. This will further support the embedding of climate risks through our corporate, directorate and programme/project risk and resilience management systems.

The long term viability assessment has been updated for the latest analysis on climate risks. Find out more at page 127.

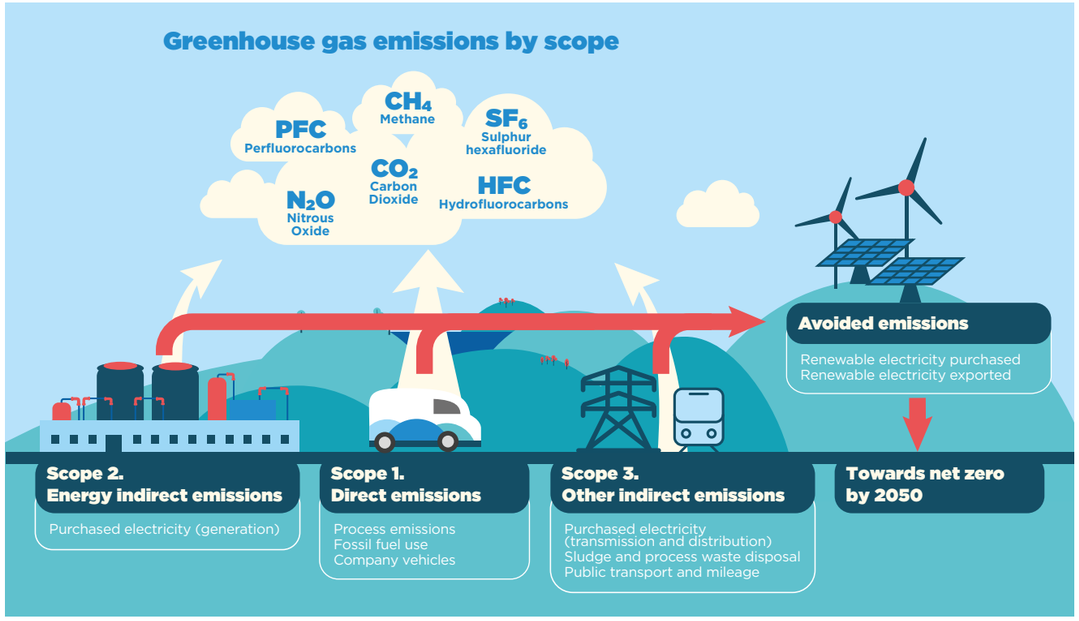
The Directors have considered in the Section 172 statement how their decisions support the long-term climate resilience of the business and the consideration of the climate impact of its operations. Find out more at page 133.

We have also considered the impact of climate change on the financial statements across areas such as provisions, impairment, contingent liabilities and accounting judgements and estimates. Find out more at page 155.

Climate metrics and targets

Our greenhouse gas emissions are accounted for and calculated using the UK Water Utilities industry Carbon Accounting Workbook, which aligns with the Greenhouse Gas Protocol. The workbook is updated each year with the most recent carbon emission factors released by government. We follow the 2019 UK Government Environmental Reporting Guidelines including the streamlined energy and carbon reporting guidance and are transitioning towards TCFD compliance.

We are liaising with our climate change subject matter specialists and the water industry to determine how we can capture additional areas in our carbon footprint reporting and embed carbon in our business case decision making for our PC27 Business Plan. Our carbon footprint doesn't currently capture some emissions from wastewater treatment processes, embedded carbon in materials such as carbon dense concrete used to construct our infrastructure or all the carbon stored in our land. This will include setting 'science based' climate targets for scope 1, 2 and 3 emissions. Targets are considered 'science-based' if they are in line with what the latest climate science deems necessary to meet the goals of the Paris Agreement – limiting global warming to well-below 2°C above pre-industrial levels and pursuing efforts to limit warming to 1.5°C. We will also consider validation of our targets by the Science Based Target initiative (SBTi), which defines and promotes global best practice in science-based target setting.



NI Water greenhouse gas emissions	2021/22 tCO_2e	2021/22 kWh	2020/21 tCO_2e	2020/21 kWh
Scope 1 direct emissions				
Direct emissions from burning of fossil fuels	4,319	20,040,113	4,520	19,387,492
Process emissions from our treatment plants	13,000*	n/a	13,100*	n/a
Transport: Company owned or leased vehicles	2,466	10,592,784	2,569	11,019,559
Total scope 1 direct emissions	**19,785**	**30,632,897**	**20,189**	**30,407,052**
Scope 2 energy indirect emissions				
Grid electricity purchased	62,797	295,727,438	69,300	297,246,290
Total scope 2 energy indirect emissions	**62,797**	**295,727,438**	**69,300**	**297,246,290**
Scope 3 other indirect emissions				
Business travel on public transport and private vehicles used for Company business	344	1,477,878	68	292,614
Emissions from sludge and process waste disposal	12,400*	n/a	12,400*	n/a
Grid electricity purchased - transmission and distribution	5,556	24,156,522	5,960	25,564,039
Total scope 3 other indirect emissions	**18,300**	**25,634,400**	**18,428**	**25,856,653**
GROSS OPERATIONAL CARBON EMISSIONS	**100,882**	**351,994,734**	**107,917**	**353,509,994**
Avoided emissions from renewable electricity exported	(469)	(2,036,957)	(605)	(2,595,007)
Avoided emissions from biomethane exported	-	-	-	-
Avoided emissions from renewable electricity purchased	(31,838)	(136,561,723)	(28,490)	(122,201,252)
Total avoided emissions	**(32,307)**	**(138,598,679)**	**(29,095)**	**(124,796,260)**
NET OPERATIONAL CARBON EMISSIONS	**68,575**	**213,396,055**	**78,822**	**228,713,734**
NI Water greenhouse gas emissions intensity			**2021/22**	**2020/21**
Operational emissions per megalitre of treated water (tCO_2e/Ml)			0.113	0.132
Operational emissions per megalitre of sewage water (tCO_2e/Ml)			0.184	0.214

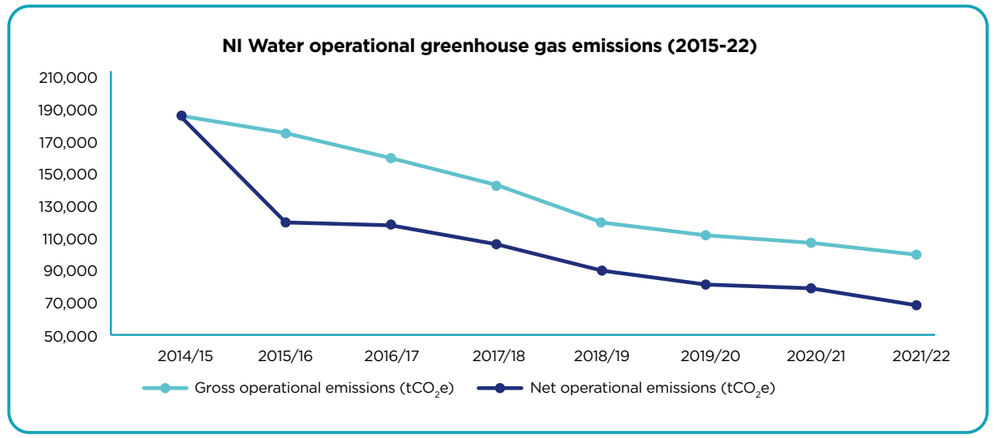
*The Scope 1 process emissions from our treatment plants and the Scope 3 emissions from sludge and process waste disposal are being reviewed to determine the tCO_2e. This work will take place over 2022/23. Provisional tCO_2e have been used for 2021/22 reporting based on the 2020/21 tCO_2e.

The net operational carbon emissions reduced from 78,822 tCO_2e in 2020/21 to 68,575 tCO_2e in 2021/22, a reduction of 13%. The reduction in net operational carbon emissions was primarily due to the use of a lower carbon supply of grid electricity and the increase in renewable electricity purchased. There was a resulting decrease in greenhouse gas emissions intensity.

NI Water's electricity consumption and renewable energy generation is shown below:

Electricity consumption and renewable energy generation	2021/22 MWh	2020/21 MWh
Grid electricity purchased (excluding renewable energy)	144,222	174,988
Grid electricity purchased - renewable energy	151,506	122,279
Renewable electricity generated and used	9,612	10,426
Total electricity consumption	**305,340**	**307,694**
Renewable electricity generated and used	9,612	10,426
Renewable electricity generated and exported to the grid	2,386	2,798
Total renewable energy generated	**11,998**	**13,225**

Progress in reducing our operational greenhouse gas emissions is shown below:



We're playing a pivotal role in doubling Northern Ireland's renewable generating capacity.