

Nature

Protecting and enhancing the natural environment



Strategic areas of focus



Sustainable development goals



Principal threats/opportunities

PT1 PT2 PT3 PT4 PT5 PT6 PO1 PO3 PO4

Page 72 Read more about principal threats and opportunities.

Strategic performance indicators

Nature	Unit of measurement	Target 2020/21	Actual 2020/21	Pass/Fail	Target 2021/22
Reduction in pollution incidents - sewage (high and medium)*	Number	23	7	Pass	12
Wastewater compliance (% population equivalent served)**	%	99.16	99.5	Pass	99.18
Reduction in number of properties at risk of out of sewer flooding (cumulative over 2015-21 period)	Number	62	52	Fail	0
Reduction in carbon footprint. Relates to reduction in net operational carbon emissions measured in tonnes of carbon dioxide equivalent (tCO ₂ e)	%	***	0.64	***	***

*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 2021/22.

Strategic areas of focus

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. We aim to continually remove properties from this register. Unforeseen complexities for one of our sewer rehabilitation schemes in Belfast resulted in the removal of a lower number of properties at risk of out of sewer flooding than targeted over PC15. There are 108 properties on the register and we propose to remove 57 properties from the register through defined projects over PC21.

Reducing the amount of surface water reaching the sewers can help reduce the risk of sewer flooding due to overcapacity. We removed an impermeable surface area equivalent to around 42 football pitches from the sewer network over PC15. The Ravenhill Avenue flood alleviation project commenced in 2021/22 and will remove an impermeable area, equivalent to around 12 football pitches, which discharges rainwater into the Belfast sewerage network. We plan to significantly increase the level of area removed, to the equivalent of around 52 football pitches in 2021/22 alone, and a similar area in each of the five remaining years of PC21.

Trenchless sewer technology

In 2020/21, we commenced a £0.5m programme of essential sewer improvement work in the Dunmurry and wider West and South Belfast areas. This work will mainly be undertaken using underground trenchless techniques to reline the sewers, which significantly reduces the duration and disruption of the works to the public. It is a more environmentally friendly approach as it helps us avoid waste material from digging up the roads. This is part of an overall programme of work to improve the existing sewers in these areas, which will enhance the local sewerage infrastructure and reduce the risk of out of sewer flooding.



Sewer relining technology being used in wider West and South Belfast



<https://www.youtube.com/watch?v=gObOphvWWNo>

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.

The water regulation reform programme involves a review of discharge standards. To assist this, we are undertaking an unannounced sampling programme to get a better

understanding of wastewater treatment works' performance. The unannounced sampling programme was paused in the period April to July 2020 due to COVID-19 restrictions, and recommenced from August 2020. We are also installing event and duration monitors on our sewer network to better understand spills from combined sewer overflows and enable regulatory reporting on spills.

There are a number of key projects proposed for PC21 which will improve wastewater compliance and support the water 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.

Building back better in Belfast

A £10m programme of work commenced during 2020/21 at Belfast wastewater treatment works. The extensive project involves the construction of two new treatment tanks at - equivalent in volume of six Olympic-size swimming pools - to cope with current and short-term future wastewater requirements. The two new

treatment tanks will provide much-needed additional secondary treatment capacity and will facilitate essential improvements within the associated sewerage networks, ensuring wastewater treatment for Belfast remains compliant, in advance of the Living With Water Programme commencing.



Construction of new treatment tanks at Belfast wastewater treatment works

Strategic areas of focus

Restoring water quality in Carlingford Lough and Lough Foyle

A major cross-border project, aimed at improving water quality in Carlingford Lough and Lough Foyle through enhanced wastewater treatment, has seen the completion of four of its eight wastewater upgrades over 2020/21 as the project reaches the halfway stage. The Shared Waters Enhancement and Loughs Legacy (SWELL) project - which is being led by NI Water working in partnership with Irish Water, the Agri-Food & Biosciences Institute (AFBI), Loughs Agency and East Border Region - was awarded €35m in 2018/19, as part of the EU's INTERREG VA Programme. The four-year project involves the construction of new wastewater treatment works as well as upgrades to sewerage networks at strategic locations on both sides of the border to address wastewater pollution in Carlingford Lough and Lough Foyle.

The four wastewater upgrades included new wastewater infrastructure at Warrenpoint wastewater treatment works and Newpoint wastewater pumping station (Newry) located in the Carlingford Lough drainage basin and at Strabane wastewater treatment works and Donemana wastewater treatment

works located in the Lough Foyle drainage basin. SWELL partner, Irish Water will deliver a further four projects in 2021/22 at Lifford, Killea and Carrigans in County Donegal and in Omeath, County Louth.

With match-funding for the SWELL project provided by the Department of Housing, Local Government and Heritage in Ireland and the Department of Agriculture, Environment and Rural Affairs in Northern Ireland, the SWELL project will culminate in the development of an innovative ecosystem legacy model. The model will link various aspects of environmental modelling such as urban drainage models, catchment models, coastal models and ecological models, undertaken within the catchments and the respective loughs over the lifecycle of the project. This will enable tracking the pathways of nutrients and contaminants of wastewater, industrial or agricultural sources to determine their impact on the receiving waters. Importantly, this legacy model will assist the water utilities and regulatory bodies on both sides of the border by identifying best approaches to achieving further improvement of overall water quality in the future.



Completed SWELL wastewater treatment works at Donemana, County Tyrone

Sustainable solutions

Every day we recycle wastewater from 727,000 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.

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.

In 2020/21, we upgraded the existing wastewater treatment works in Ballykelly, County Derry/Londonderry by developing a sustainable integrated constructed wetland to enhance the traditional treatment works and reduce energy and carbon. We are also examining the potential of solar power to provide half of the energy needs for the works, lowering our electricity costs and carbon emissions.



Ballykelly integrated constructed wetland, County Derry/Londonderry

We are continuing to invest in replacing our existing treatment assets with lower energy solutions as part of our £47m rural wastewater investment programme. The recently completed Lisnagunogue rural wastewater treatment works in County Antrim involved replacing an existing aeration process with a lower energy process, and with the addition of solar panels, is delivering a 75% reduction in energy consumption at the site. Further work is ongoing to identify opportunities for lower carbon treatment solutions, with a target of seven wastewater treatment sites within our PC21 Business Plan.

Strategic areas of focus

Busy bees

We are now formal partners in the All-Ireland Pollinator Plan, an island-wide initiative to reverse the decline of precious pollinating insects. We already have some beautiful pollinator areas across our land bank such as Ballynacor wildflower



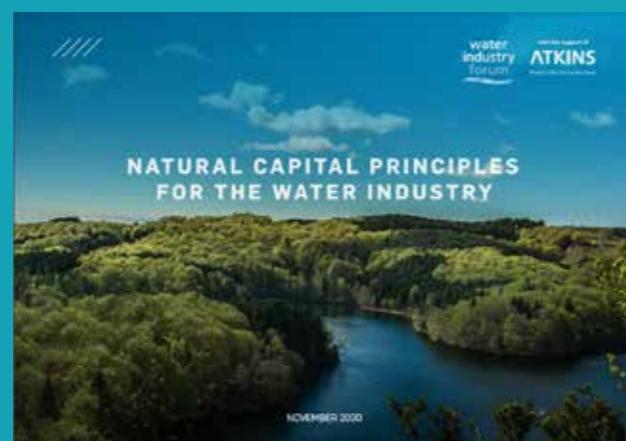
meadow, Co Armagh constructed on former sludge lagoons. Hedgerows and grass verges beside our buildings are also important havens for biodiversity, all of which we will be mapping on the Biodiversity Ireland webpage.



Read more at <https://pollinators.ie/wp-content/uploads/2021/03/FINAL-All-Ireland-Pollinator-Plan-2021-2025-WEB.pdf>

Putting nature at the heart of decision making

The Water Industry Forum, working with Water UK's Environment Policy Advisory Group members including NI Water, has produced a set of principles 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. We are piloting the use of multi-capitals decision making on the Living With Water Programme and plan to roll out the new approach across our investment programme to inform our next business plan in PC27 (2027-33).



The full list of principles can be found at http://www.waterindustryforum.com/documents/uploads/WIF_Natural_Capital_Principles_for_the_Water_Industry.pdf

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.

Our 2020/21 campaign employed a COVID-19 related strand due to the increased use of wet wipes. Further customer campaigns focussed on rubble blocking a sewer, historic seabed wet

wipes, sewer related debris in Lough Erne, County Fermanagh and fatbergs in Portrush, County Antrim. We continued the seasonal campaigns around bag it and bin it and FOG over Christmas and Easter. This was accompanied with bag it and bin it messages in specific geo-located areas through social media and working with a variety of stakeholders to highlight the issue. 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. Over 2021/22, our campaigns will continue to highlight the reasons behind out of sewer flooding and pollution incidents.



Join the refillution

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 200 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.



Strategic areas of focus

Towards zero carbon

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 vast majority of our carbon emissions. We are determined to harness the huge and largely unseen potential for NI Water to address climate change. Not only are we committed to becoming carbon neutral by 2050, 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.

There have been a number of significant developments over 2020/21 including the

move towards mandatory climate change reporting against the Taskforce for Climate-related Financial Disclosures (TCFD) for large sections of the UK economy by 2025, proposals on a Climate Change Bill for Northern Ireland and the publication of Water UK's net zero carbon route map.

We have undertaken a gap analysis with TCFD and identified a number of actions to take in advance of mandatory TCFD reporting for large companies in 2023/24. Over 2021/22, we plan to develop a climate change strategy in liaison with key stakeholders such as the DfI and the Utility Regulator covering mitigation and adaptation measures. The strategy will outline the governance arrangements, include a net zero carbon route map to 2050 and address climate resilience.

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

 **100%**
electricity consumption from renewables by 2027

Carbon neutral by 2050

Building more renewables on our land

In 2020/21, we increased our electricity consumption from renewable sources such as solar and hydro power to 43%, rising to 100% by 2027. NI Water can help reduce Northern Ireland's requirement for fossil fuel generated electricity and cut society's carbon footprint. This can be done by working with planners and the local community to place renewable generation at a select number of suitable sites.

With third party expertise and funding, this could deliver as much as 200 megawatts of output – equivalent to one third of a typical power station's capacity. The income from leasing the associated land will also generate around £2m of income per annum, helping to keep the cost of water services down and easing the funding-pressure for government.

Doubling Northern Ireland's renewable generating capacity

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. To do so effectively will require the intermittency of supply that accompanies renewables to be addressed. This can be done by deploying large scale batteries across the province. The sites selected will need to have major electricity grid connections. These are hard to obtain and expensive to create but the good news is that NI Water already owns over 3,000 widely distributed grid connected sites. The major sites could also be used to deploy batteries.



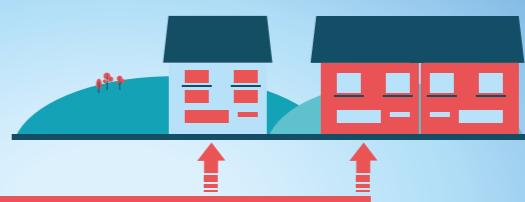
3,000 widely distributed grid connected sites

Providing sources of warmth for homes and businesses

The heat that comes from the organic matter at a wastewater works combined with hot water from showers, baths, dishwashers, and washing machines, could provide a valuable source of warmth. For example, our Belfast wastewater sites are close to housing, government buildings, the harbour estate and other potential customers with an interest in decarbonising their source of heating. In Great Britain heat obtained in this way is also being used

in the agri-food sector to reduce carbon emissions, create jobs and increase resilience by bringing overseas food production to the UK. The electrolysis process required to produce hydrogen also creates heat that can be captured and used to feed a district heating scheme. For example, producing hydrogen at scale for buses and heavy goods vehicles, could supply heating to many of cities' key buildings.

Heat recovery from sewers to heat homes and businesses



Strategic areas of focus

Hydrogen'ius'!!

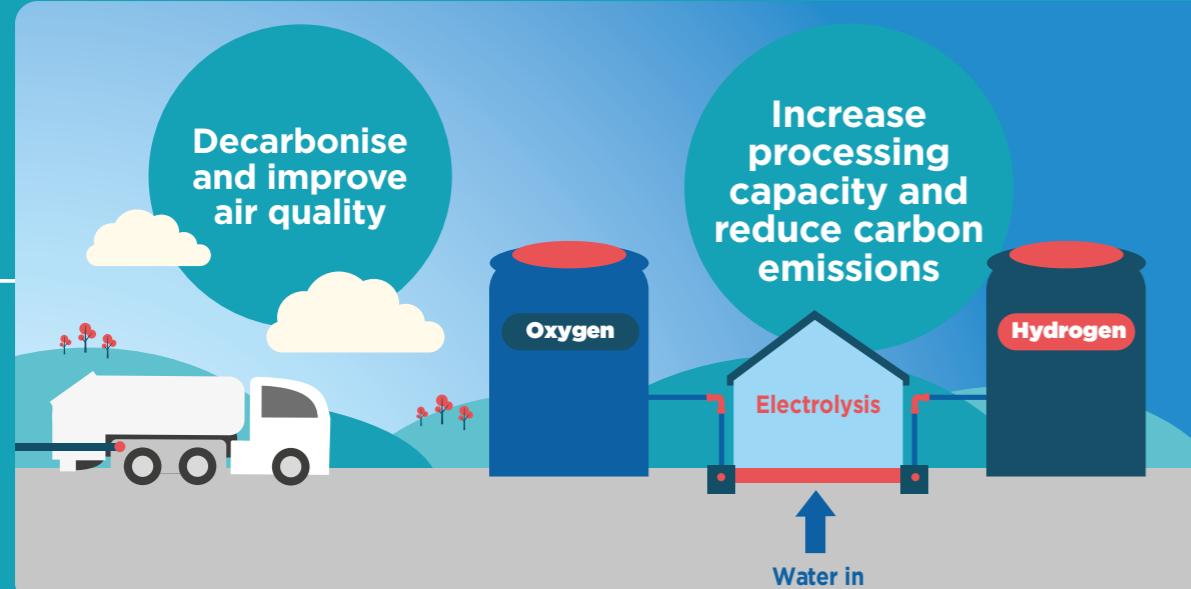
Producing and storing hydrogen could be central to our decarbonisation journey in Northern Ireland. The key to producing hydrogen is accessing on-site generated renewable electricity during the day and low cost wind farm energy at night when overall electricity demand is limited. The early production of hydrogen at a wastewater treatment works could help improve processing capacity, reduce carbon emissions and improve flexibility in the electricity grid. Electrolysis splits hydrogen from oxygen and it may be possible to use that oxygen as a replacement or to compliment the aeration process (pumping of air) to provide oxygen for bacteria growth, with a reduction in aeration being required.

Producing hydrogen is also a good fit for our society's ambition to see renewable generation in Northern Ireland double by 2030. 85% of our green electricity comes from wind today and this is likely to remain so as renewable capacity expands. The challenge is what to do at night time when the requirement for electricity is low. Already 15% of wind generating capacity at night is curtailed. This means that expensive wind turbines are turned off. Electrolysis capacity at night time could use this surplus electricity to produce hydrogen more affordably. Rather than paying for the curtailment of wind turbines, electrolyzers could be key in building wind

farm investor confidence as hydrogen becomes more important.

The supply of green hydrogen from NI Water sites could help the gas network to signal how it might migrate and remain relevant in a decarbonising world. We are assessing how many of our sites are adjacent to the gas network. Natural gas, which is mainly methane, is not green and will need to be phased-out or replaced with a green alternative. Historically, town gas had significant quantities of hydrogen, around 60%, so we know that hydrogen can meet our household needs if the distribution system is configured appropriately. Work is now underway by Keele University to confirm that up to 20% of the gas for our homes could become hydrogen without changing our current gas fittings.

Over 2020/21, NI Water unveiled a ground breaking concept to help kick start the hydrogen economy in Northern Ireland. We were awarded £5m of funding from the Department for the Economy (DfE) to undertake an innovative oxygen and hydrogen demonstrator project that will deploy a state-of-the-art, 1 Megawatt electrolyser at a major wastewater treatment works. This will be the first in the UK and Ireland to demonstrate how electrolysis can help to increase processing capacity, reduce carbon emissions and improve flexibility in the electricity grid.



https://www.youtube.com/watch?v=lEKebw_qjrl



Electrolyser at Kinnegar wastewater treatment works, Holywood, County Down

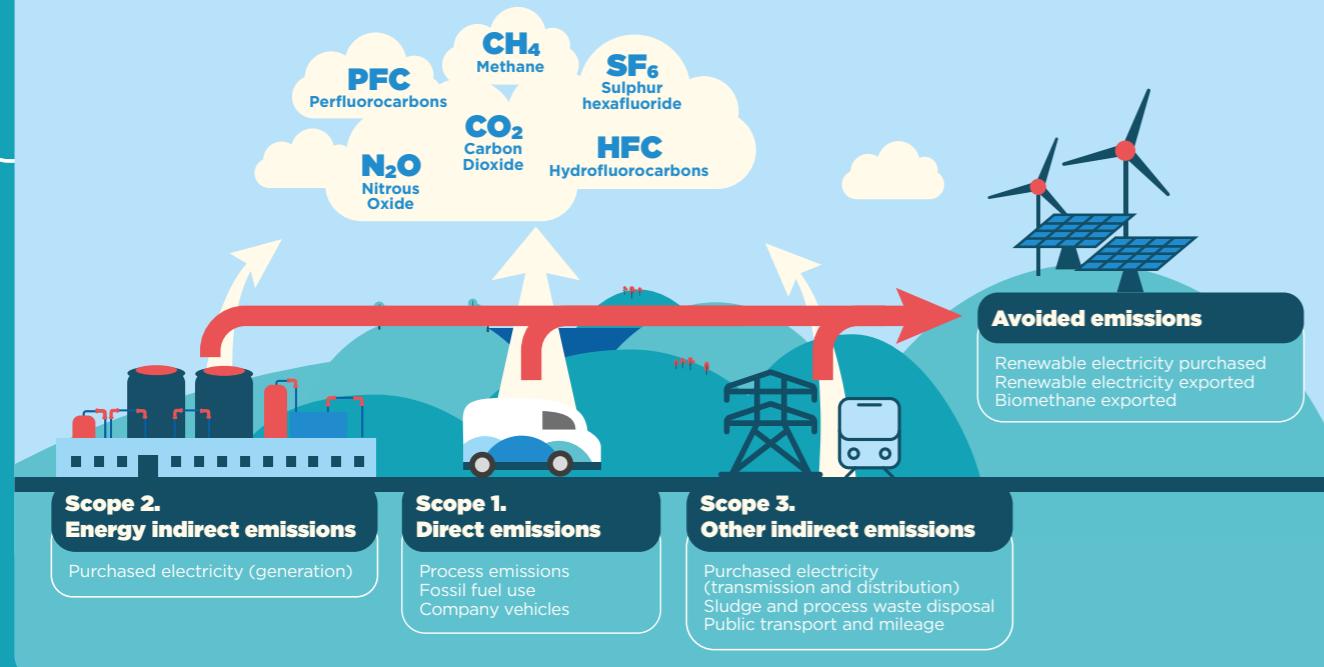
Strategic areas of focus

Greenhouse gas emissions

Our greenhouse gas emissions are accounted for and calculated using the UK Water Utilities industry Carbon Accounting Workbook. 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 working towards TCFD compliance. We are liaising with peer

water companies to determine how we can capture additional areas in our carbon footprint reporting and embed carbon in our business case decision making. Our carbon footprint doesn't currently capture some emissions from treatment processes, embedded carbon in materials such as carbon dense concrete used to construct our infrastructure or in the carbon stored in our land.

Greenhouse gas emissions by scope



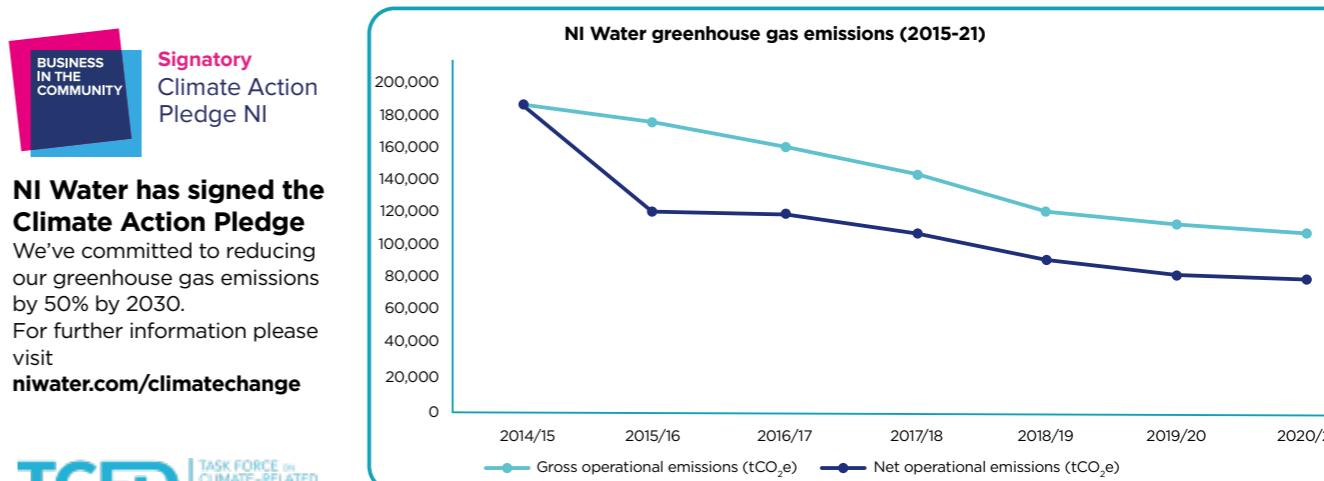
Greenhouse gas emissions (continued)

NI Water greenhouse gas emissions	2020/21 tCO ₂ e	2020/21 kWh	2019/20 tCO ₂ e	2019/20 kWh
Scope 1 direct emissions				
Direct emissions from burning of fossil fuels	4,520	19,387,492	7,151	27,978,365
Process emissions from our treatment plants	13,100	*	8,701	*
Transport: Company owned or leased vehicles	2,569	11,019,559	2,733	10,692,997
Total scope 1 direct emissions	20,189	30,407,052	18,585	38,671,362
Scope 2 energy indirect emissions				
Grid electricity purchased	69,300	297,246,290	75,111	293,862,324
Total scope 2 energy indirect emissions	69,300	297,246,290	75,111	293,862,324
Scope 3 other indirect emissions				
Business travel on public transport and private vehicles used for Company business	68	292,614	216	845,188
Emissions from sludge and process waste disposal	12,400	-	11,841	-
Grid electricity purchased - transmission and distribution	5,960	25,564,039	6,377	24,948,396
Total scope 3 other indirect emissions	18,428	25,856,653	18,433	25,793,584
GROSS OPERATIONAL CARBON EMISSIONS	107,917	353,509,995	112,130	358,327,269
Avoided emissions from renewable electricity exported	(605)	(2,595,007)	(927)	(3,627,778)
Avoided emissions from biomethane exported	-	-	-	-
Avoided emissions from renewable electricity purchased	(28,490)	(122,201,252)	(31,875)	(124,706,182)
Total avoided emissions	(29,095)	(124,796,260)	(32,802)	(128,333,960)
NET OPERATIONAL CARBON EMISSIONS	78,822	228,713,735	79,328	299,993,310
NI Water greenhouse gas emissions intensity			2020/21	2019/20
Operational emissions per megalitre of treated water (tCO ₂ e/ML)			0.175	0.118
Operational emissions per megalitre of sewage water (tCO ₂ e/ML)			0.501	0.386

*Figures have been updated in line with the most recent SECR guidelines.

The net operational carbon emissions reduced from 79,328 tCO₂e in 2019/20 to 78,822 tCO₂e in 2020/21, a reduction of 0.64%. There was an increase in greenhouse gas emissions intensity as a result of an increase in energy consumption in 2020/21.

We are developing a net zero carbon route map in 2020/21 which will set out the pathway and targets to reach net zero carbon by 2050. Progress in reducing our greenhouse gas emissions is shown below:



TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES



<https://www.youtube.com/watch?v=L9XMgsGZJtQ&feature=youtu.be>